



July 6, 2017

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

Regarding: Notice of Exempt Modification – Addition of 3 antennas, 1 squid, and swap of (3) Radios
Property Address: 239 Middle Turnpike Road, Manchester, CT (the “Property”)
Applicant: AT&T Mobility (“AT&T”, Site # CT5448)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 183 foot Monopole tower (“tower”) at the above-referenced address, latitude 41.78444444, longitude - 72.5116667. AT&T’s facility consists of six (6) wireless telecommunications antennas at 143 feet. The tower is controlled and owned by the Town of Mansfield. Assessor’s information is attached hereto.

AT&T desires to modify its existing telecommunications facility by adding (3) antennas, adding (1) squid, and swapping (3) radios for newer models. The centerline height of said antennas is and will remain at 143 feet.

Please accept this application as notification pursuant to R.C.S.A. § 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.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of the Town of Manchester, The Chief Building Inspector of the Town of Manchester and the Zoning Enforcement Officer of the Town of Manchester. A copy of this letter is also being sent to The Town Manager for the Town of Manchester, the owner of the structure that AT&T is located.

The planned modifications to AT&T’s facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T’s antennas and associated lines will be installed at 143 foot level of the 183 foot Monopole tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.



4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation is attached.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Centek Engineering dated June 14, 2017).

For the foregoing reasons AT&T respectfully requests that the proposed addition of antennas, squid, and swap of radios be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

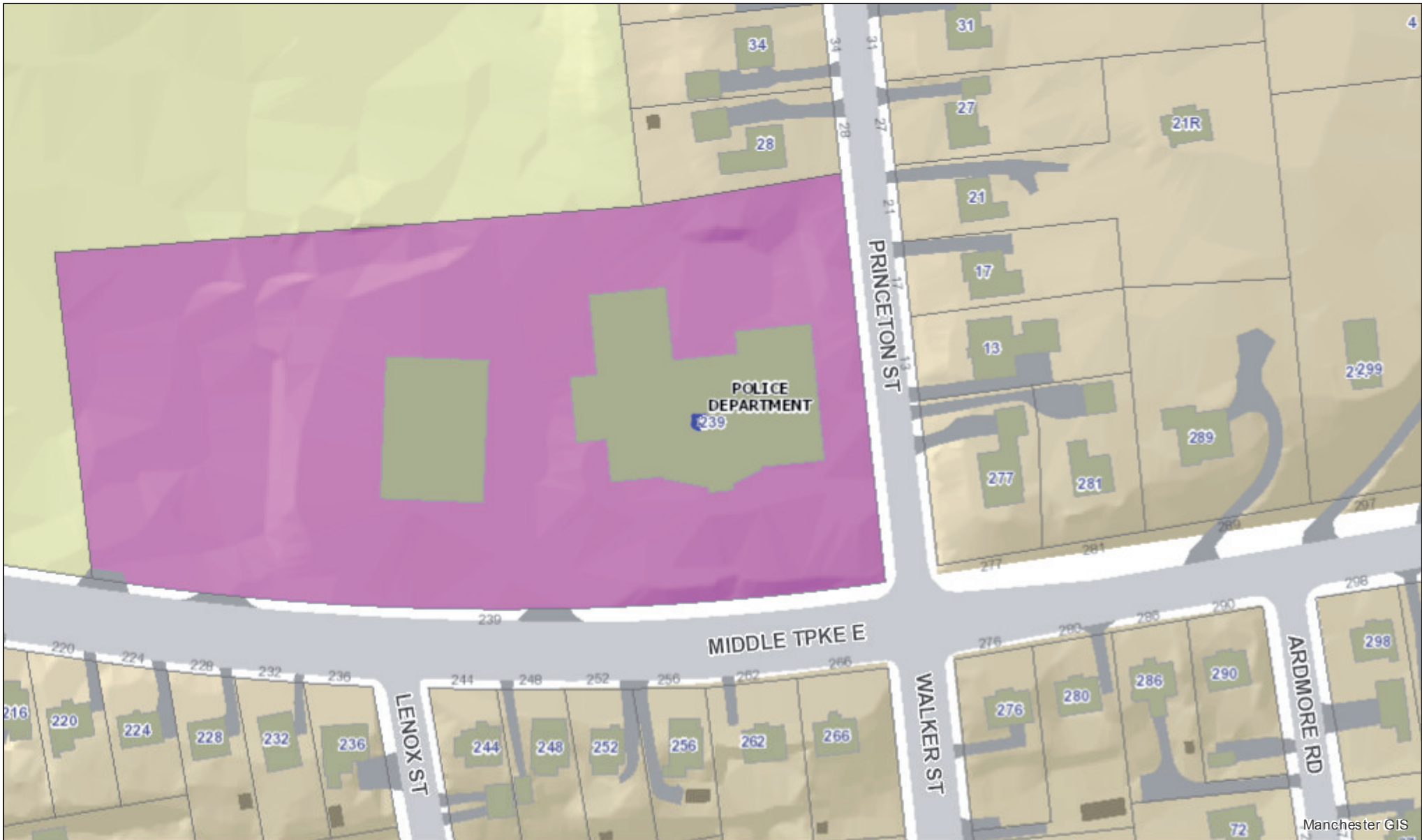
Sincerely,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom

CC: The Honorable Jay Moran, Mayor, Town of Manchester
Greg Smith, Chief Building Inspector, Town of Manchester
James Davis, Zoning Enforcement Officer, Town of Manchester
Town of Manchester, c/o Scott Shanley, General Manager

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

Town of Manchester, CT



Town of Manchester, CT

DISCLAIMER: This map is compiled from other maps, deeds, dimensions and other sources of information. Not to be construed as accurate surveys and subject to final changes as a more accurate survey may disclose.
NOTES: Original planimetric and topographic data were compiled by stereophotogrammetric methods from photography dated April 1999 in accordance with ASPR accuracy standards for 1 inch = 40ft large scale Class I mapping. The updating of the GIS data is performed by the GIS/Maps & Records Unit on a continual basis utilizing the best and most appropriated sources available.

1 inch = 100 feet

Author:



Date: 7/6/2017



WIRELESS COMMUNICATIONS FACILITY

CT5448 - LTE 3C WCS

MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST

MANCHESTER, CT 06040

GENERAL NOTES

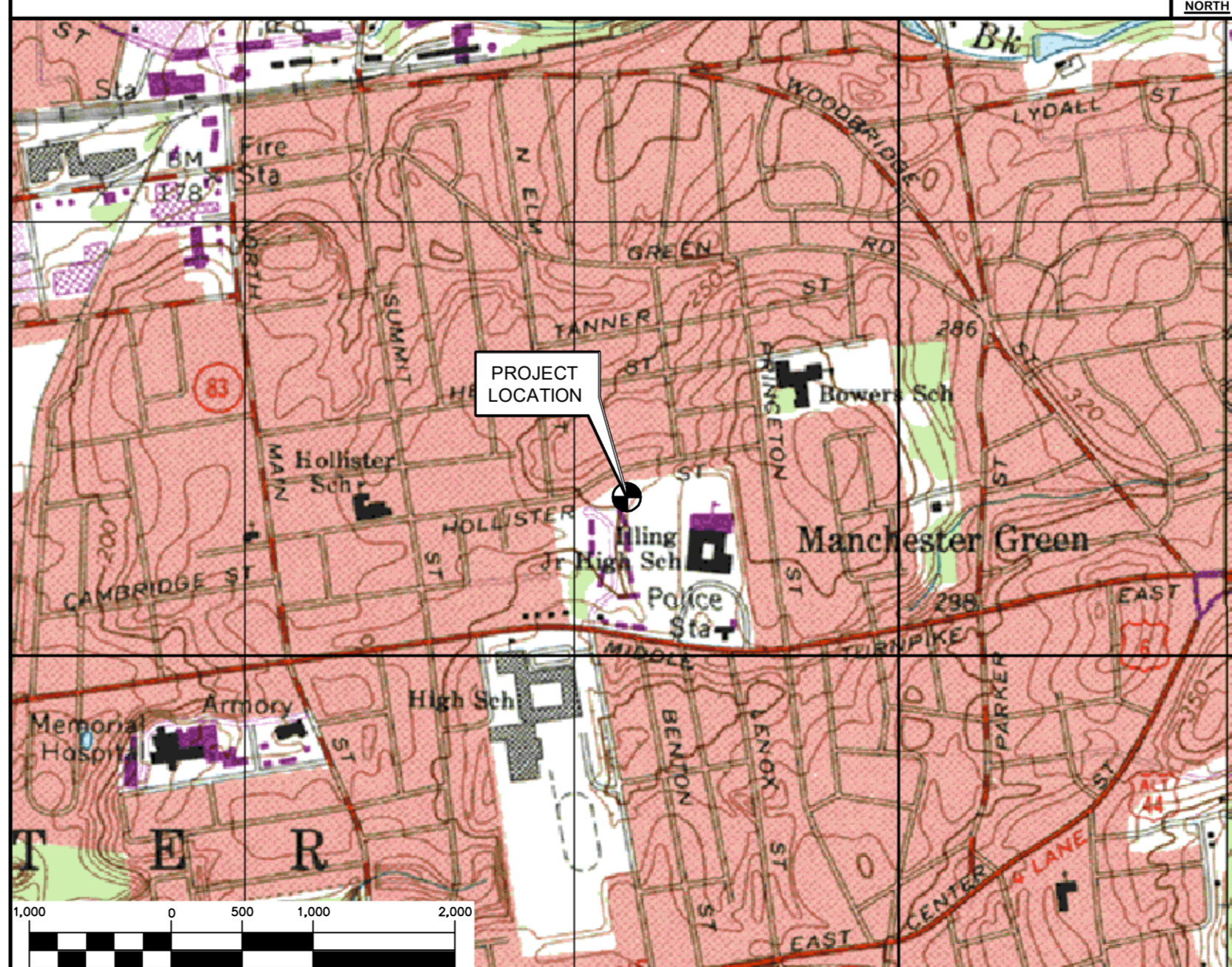
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL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

SITE DIRECTIONS

FROM:	500 ENTERPRISE DRIVE ROCKY HILL, CONNECTICUT	TO:	239 MIDDLE TURNPIKE EAST MANCHESTER, CONNECTICUT
<ol style="list-style-type: none"> 1. HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD 0.36 MI 2. TURN LEFT ONTO CAPITAL BLVD 0.27 MI 3. TURN LEFT ONTO WEST ST 0.16 MI 4. MERGE ONTO I-91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD 7.79 MI 5. MERGE ONTO CT-15 N/WILBUR CROSS HWY N VIA EXIT 29 TOWARD I-84 E/E HARTFORD/BOSTON 2.14 MI 6. CT-15 N/WILBUR CROSS HWY N BECOMES I-84 E/US-6 E/WILBUR CROSS HWY N 1.50 MI 7. KEEP LEFT TO TAKE I-84 E/US-6 E/WILBUR CROSS HWY N TOWARD BOSTON 1.35 MI 8. TAKE THE US-6/US-44/MIDDLE TPKE W EXIT, EXIT 60, TOWARD MANCHESTER 0.41 MI 9. TURN RIGHT ONTO MIDDLE TURNPIKE W/US-6 E/US-44 E. 0.46 MI 10. TURN RIGHT TO STAY ON MIDDLE TURNPIKE W 2.45 MI 11. TURN LEFT 0.08 MI 12. 239 MIDDLE TURNPIKE EAST 0.00 MI 			

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
- A. INSTALL (3) OCTA-PORT ANTENNAS AT POS.2
 - B. INSTALL (3) NEW RRU-32 BEHIND PROPOSED POS.2
 - C. INSTALL (1) SURGE ARRESTOR AT ANTENNAS
 - D. INSTALL DUS41+IDL2 UNITS WITHIN EXISTING LTE PURCELL.
 - E. REMOVE (2) EXISTING NOKIA GSM CABINETS ATOP OF CONC. SLAB-ON-GRADE
 - F. INSTALL 2" FLEXIBLE CONDUIT WITH (1) FIBER TRUNK & (2) DC CONDUCTOR CABLES

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5448
AT&T SITE NAME:	MANCHESTER CENTRAL
SITE ADDRESS:	239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-47'-03.84" N LONGITUDE: 72°-30'-42.30" W GROUND ELEVATION: ±288' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

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



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AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
MANCHESTER CENTRAL
CT5448 - LTE 3C
239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040

DATE: 06/13/17
SCALE: AS NOTED
JOB NO. 17004.27

TITLE SHEET

T-1
Sheet No. 1 of 8

REV.	DATE	BY	CHK'D	DESCRIPTION
0	06/28/17	KAWUR	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

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

GENERAL NOTES:

- 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 EVERSOURCE OWNED EQUIPMENT.
- REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

- ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
 - STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
 - STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
 - STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
 - PIPE---ASTM A53 (FY = 35 KSI)
 - CONNECTION BOLTS---ASTM A325-N
 - U-BOLTS---ASTM A36
 - ANCHOR RODS---ASTM F 1554
 - WELDING ELECTRODE---ASTM E 70XX
- 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.
- STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
- PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
- FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
- INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
- AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
- 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.
- ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
- 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.
- CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
- 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.
- LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
- SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
- MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
- FABRICATE BEAMS WITH MILL CAMBER UP.
- 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.
- COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
- INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
- 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:

- ANTENNA PANELS:**
 - SHERWIN WILLIAMS POLANE-B
 - COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
- COAXIAL CABLES:**
 - ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
 - TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
 - COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

- 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.
- 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.
- TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
- PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
- CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
- IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
- 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.
- 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.
- 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.
- 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).
- COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

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

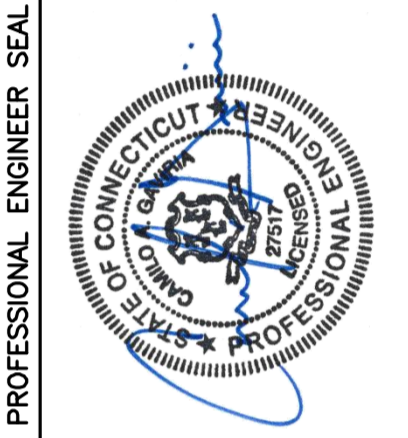
APPLICATION:

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

COMPLETED WORK:

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

REV.	DATE	DRAWN BY	CAG	ISSUED FOR CONSTRUCTION
0	06/26/17	KAWUR		

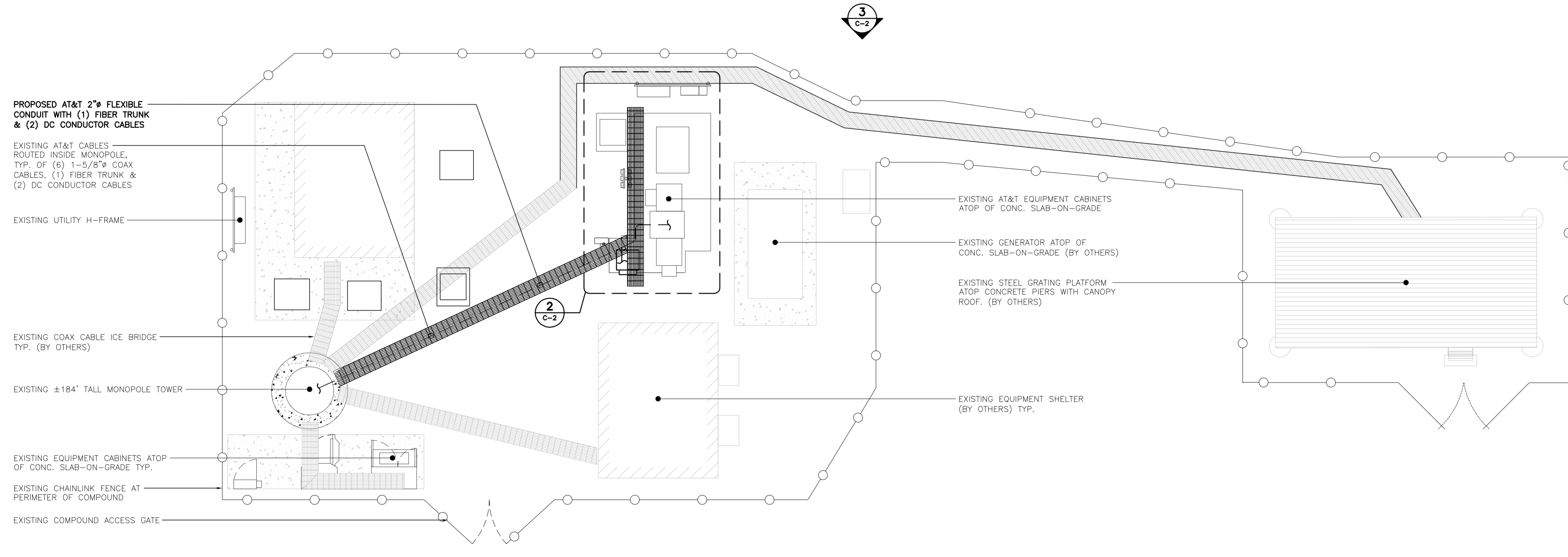


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AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
MANCHESTER CENTRAL
 CT5448 - LTE 3C
 239 MIDDLE TURNPIKE EAST
 MANCHESTER, CT 06040

DATE: 06/13/17
 SCALE: AS NOTED
 JOB NO. 17004.27

NOTES AND SPECIFICATIONS



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

3
C-2

2
C-2

PROPOSED AT&T 2" FLEXIBLE CONDUIT WITH (1) FIBER TRUNK & (2) DC CONDUCTOR CABLES

EXISTING AT&T CABLES ROUTED INSIDE MONOPOLE, TYP. OF (6) 1-5/8" COAX CABLES, (1) FIBER TRUNK & (2) DC CONDUCTOR CABLES

EXISTING UTILITY H-FRAME

EXISTING COAX CABLE ICE BRIDGE TYP. (BY OTHERS)

EXISTING ±184' TALL MONOPOLE TOWER

EXISTING EQUIPMENT CABINETS ATOP OF CONC. SLAB-ON-GRADE TYP.

EXISTING CHAINLINK FENCE AT PERIMETER OF COMPOUND

EXISTING COMPOUND ACCESS GATE

EXISTING AT&T EQUIPMENT CABINETS ATOP OF CONC. SLAB-ON-GRADE

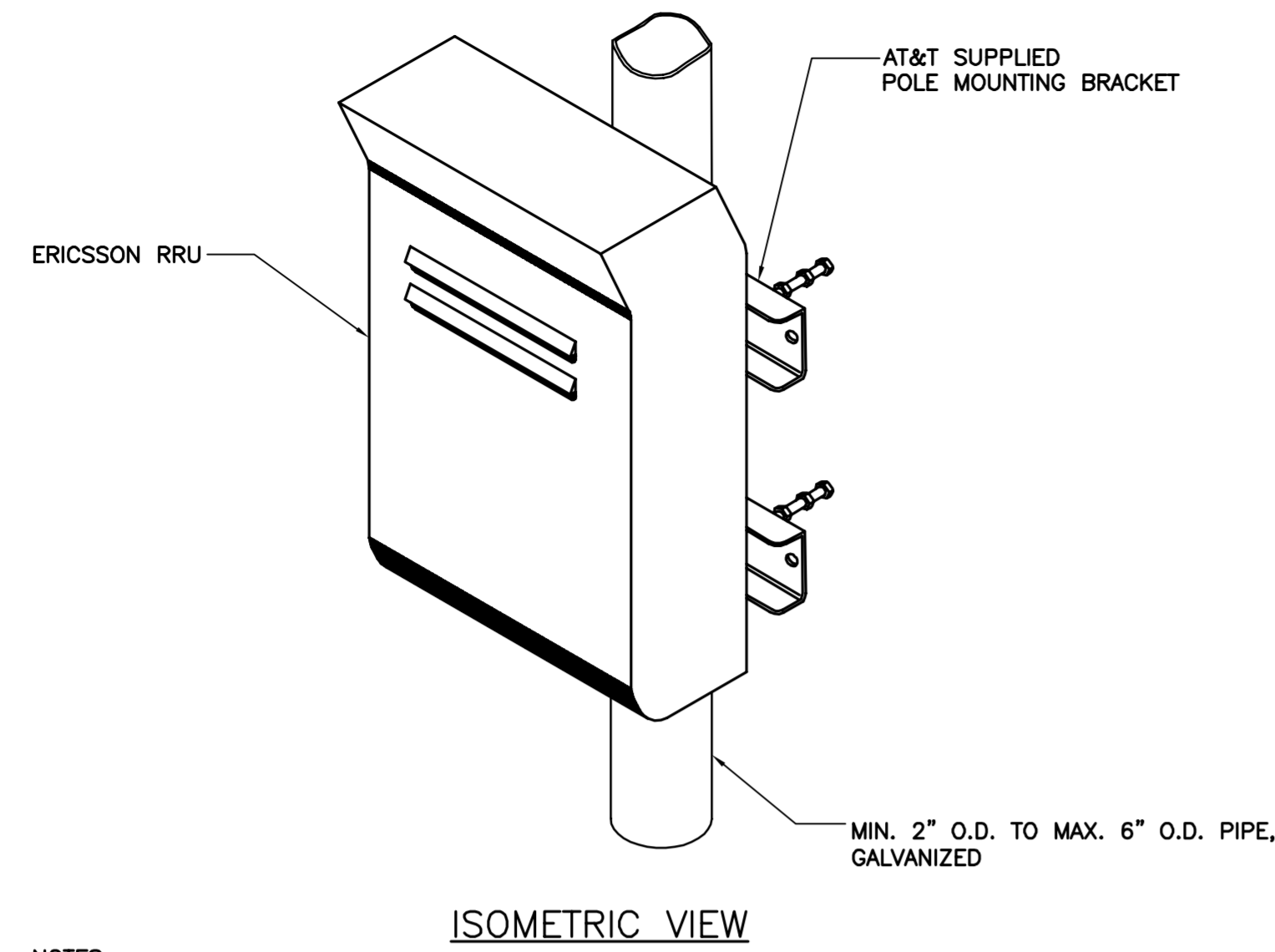
EXISTING GENERATOR ATOP OF CONC. SLAB-ON-GRADE (BY OTHERS)

EXISTING STEEL GRATING PLATFORM ATOP CONCRETE PIERS WITH CANOPY ROOF. (BY OTHERS)

EXISTING EQUIPMENT SHELTER (BY OTHERS) TYP.

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DATE:	06/13/17
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COMPOUND PLAN	
C-1	
Sheet No. 3	of 8

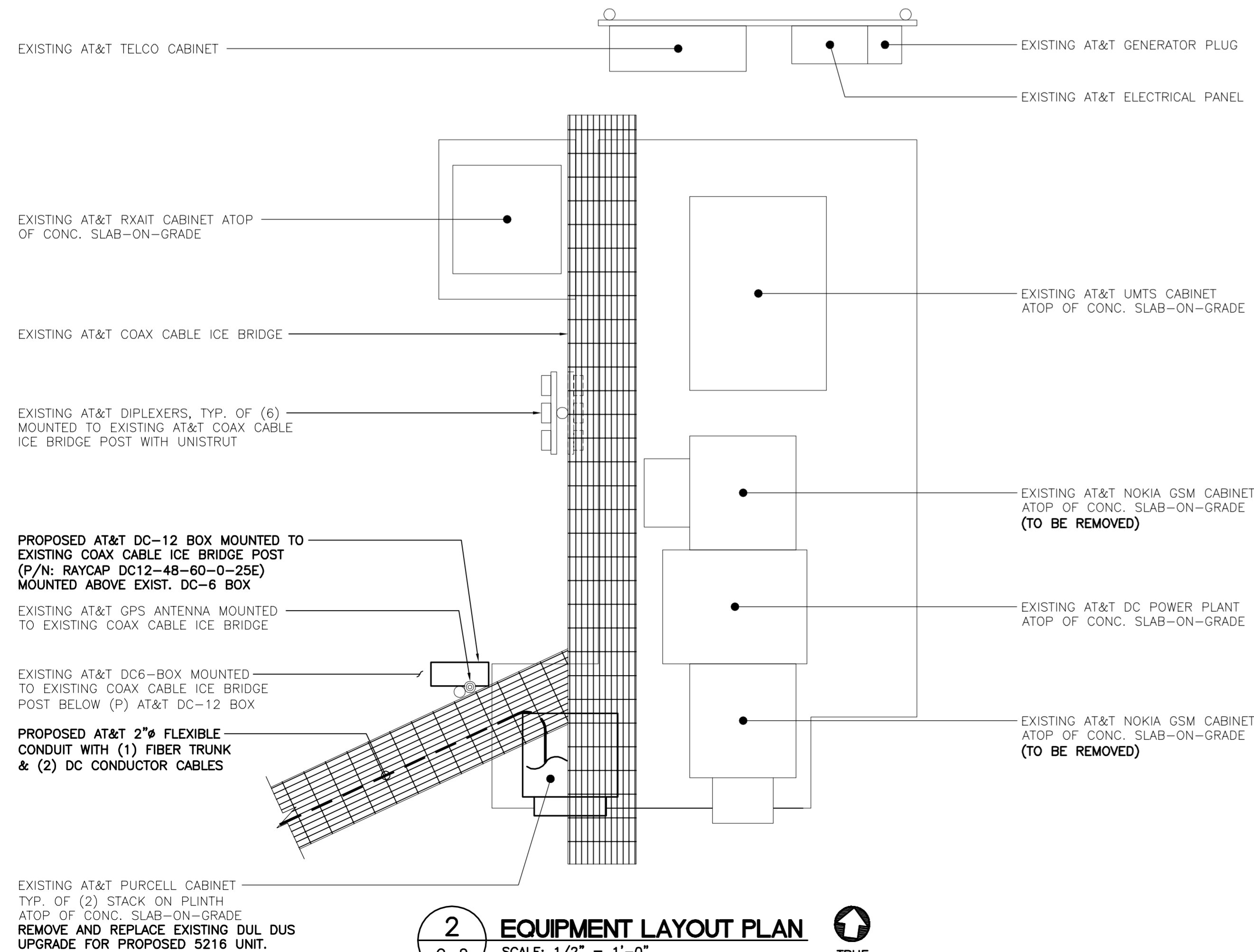
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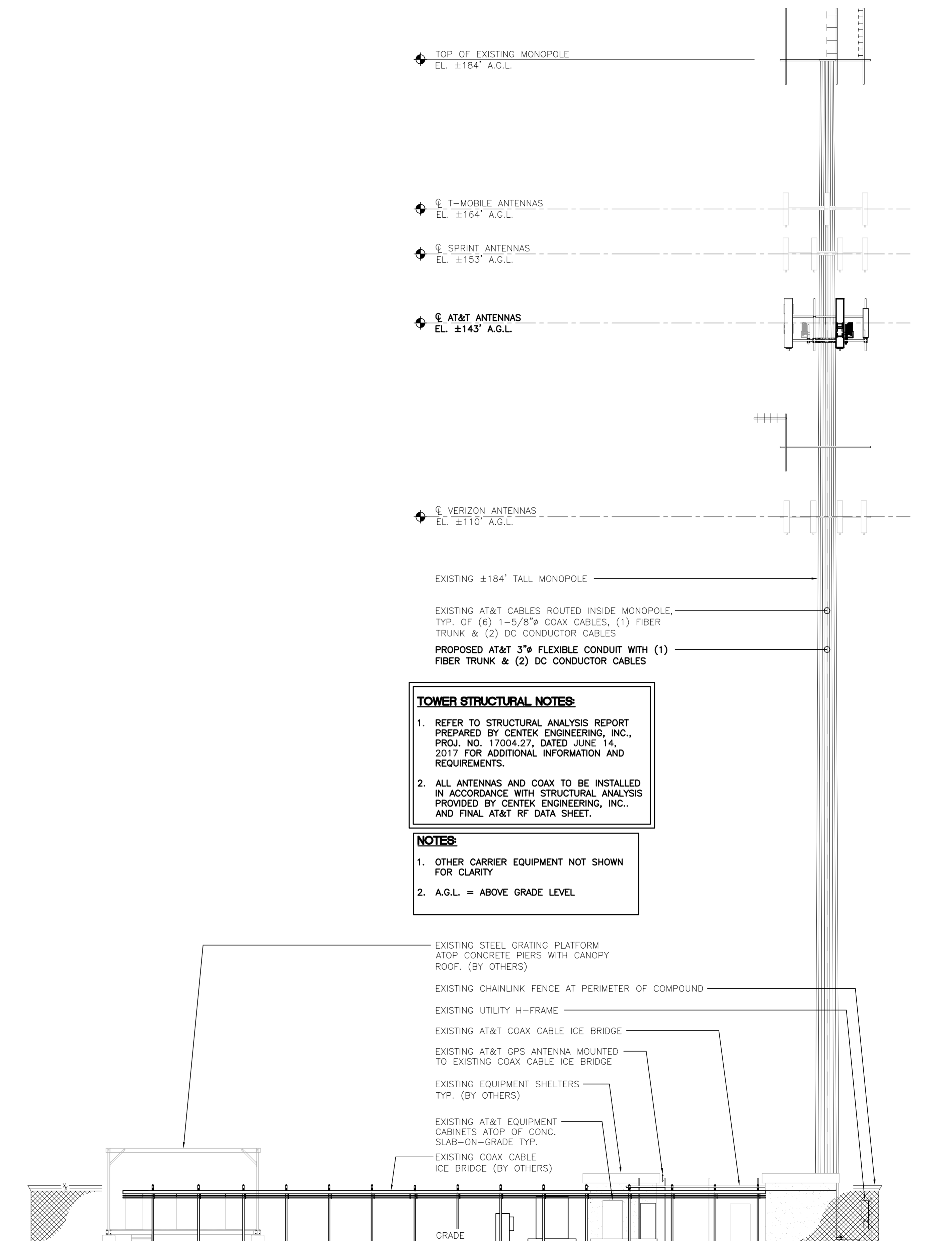
NOTES:

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

1 TYPICAL RRUS MOUNTING DETAILS
SCALE: NTS



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



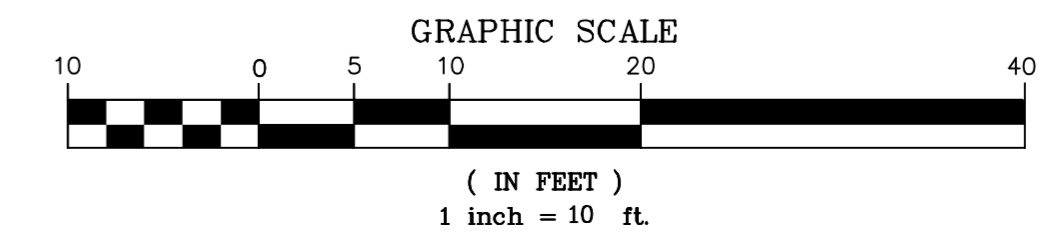
TOWER STRUCTURAL NOTES:

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 17004.27, DATED JUNE 14, 2017 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC.. AND FINAL AT&T RF DATA SHEET.

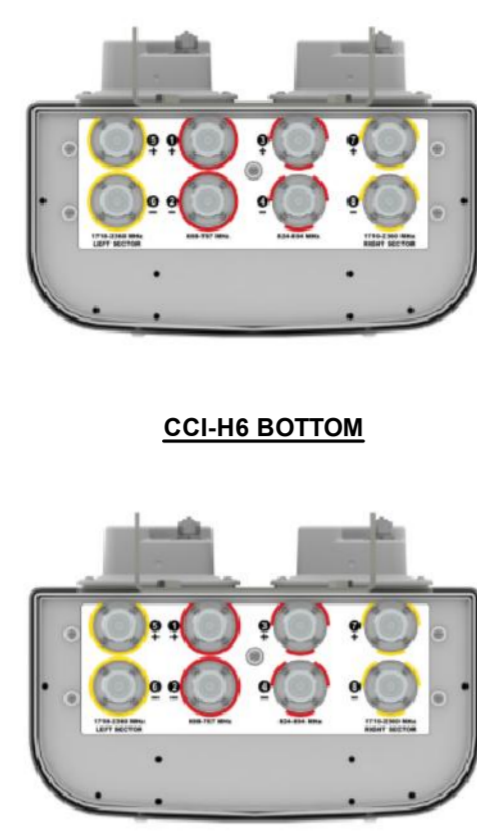
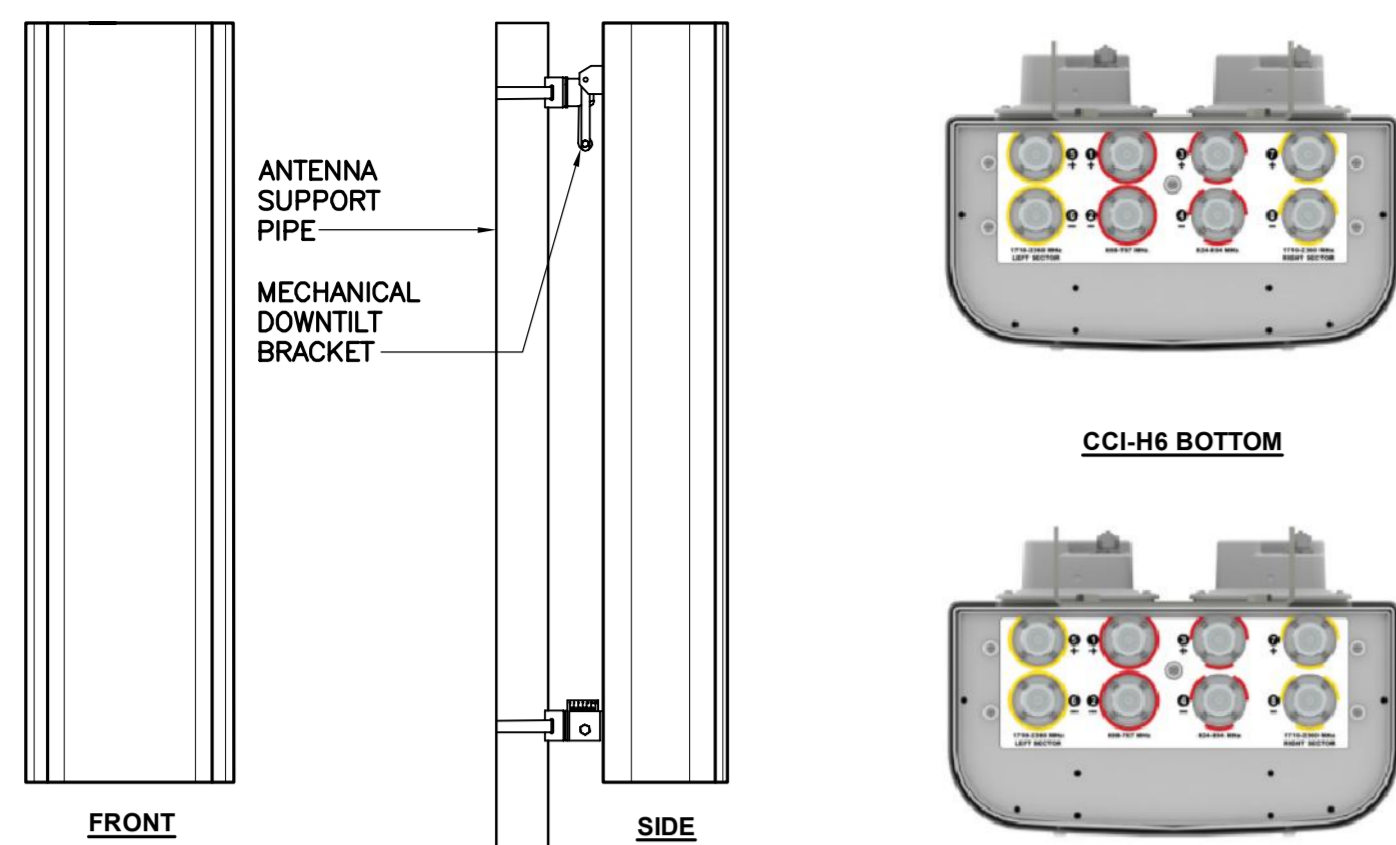
NOTES:

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

3 SOUTH TOWER ELEVATION
SCALE: 1" = 10'

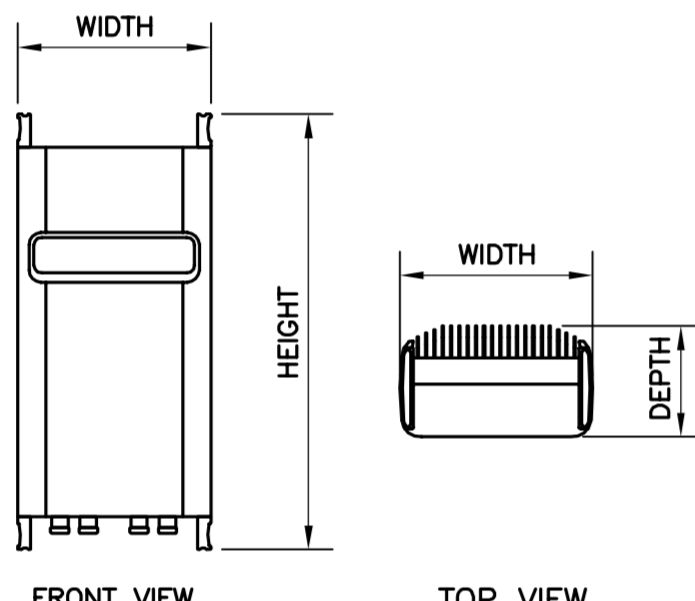


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AT&T MOBILITY WIRELESS COMMUNICATIONS FACILITY MANCHESTER CENTRAL CT5448 - LTE 3C 239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040	DATE: 06/13/17 SCALE: AS NOTED JOB NO. 17004.27
	PLANS, ELEVATION AND DETAILS
	C-2 Sheet No. 4 of 8



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: OPA-65R-LCUU-H6	72"L x 14.8"W x 7.4"D	73 LBS.
MAKE: CCI MODEL: OPA-65R-LCUU-H8	92.7"L x 14.4"W x 7"D	88 LBS.

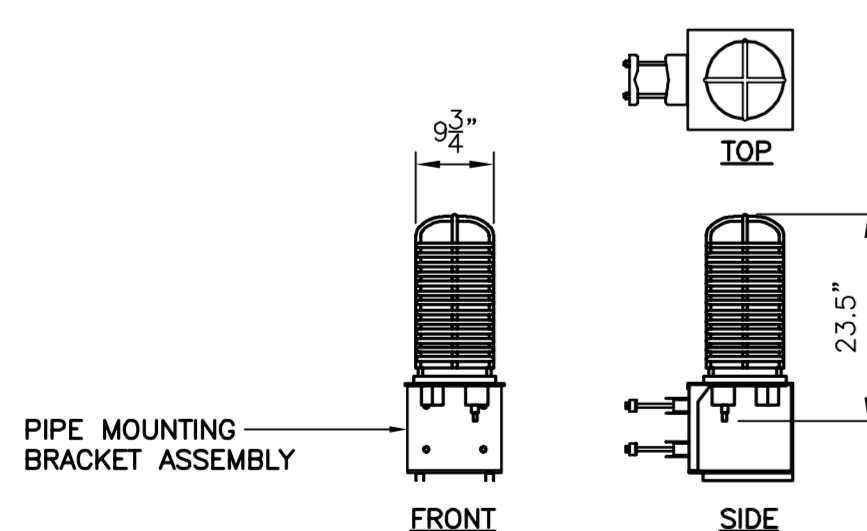
5 PROPOSED ANTENNA DETAIL
C-3 SCALE: 1/2" = 1'-0"



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

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

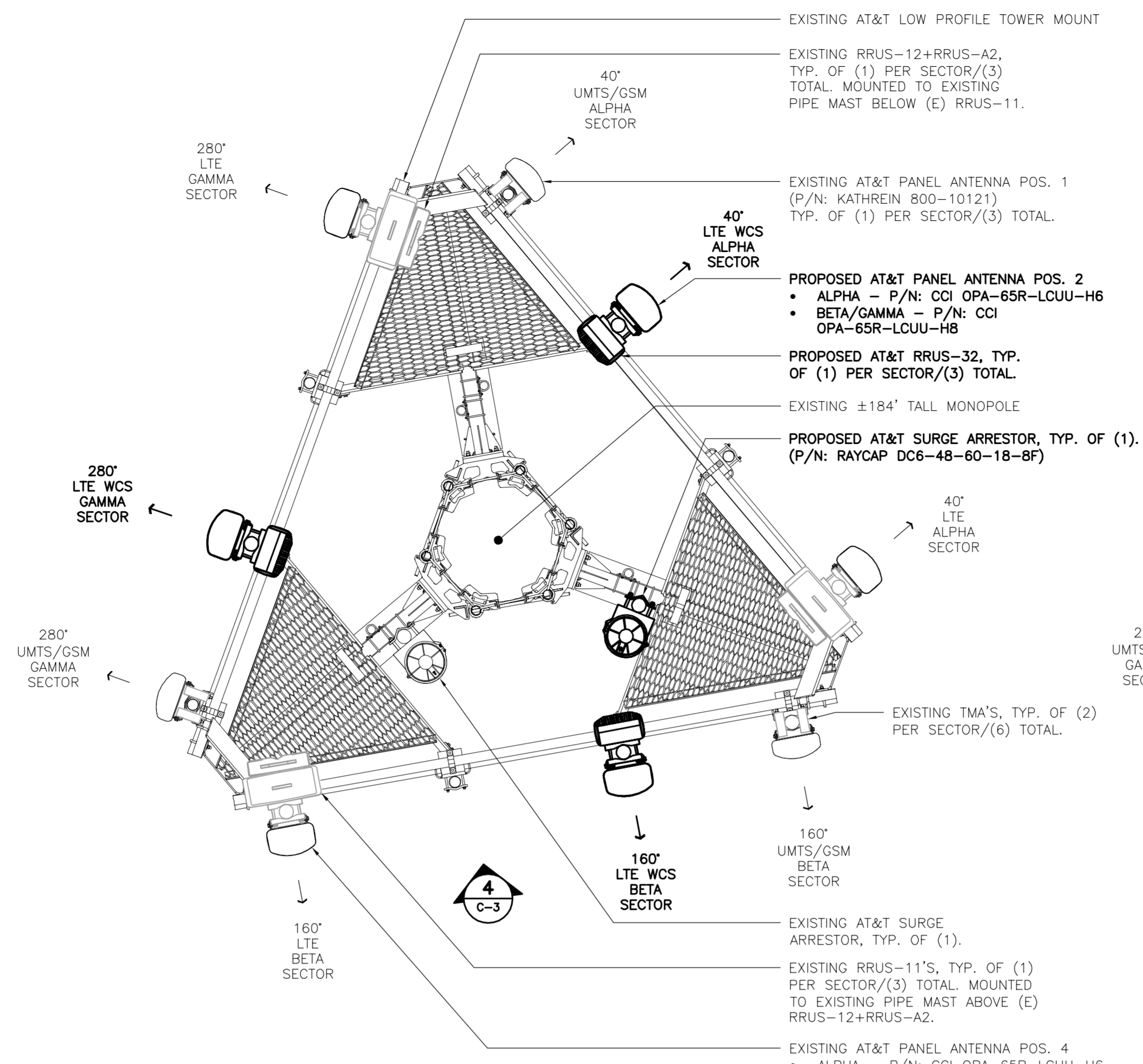
6 ERICSSON RRU 32 DETAIL
C-3 SCALE: 1" = 1'-0"



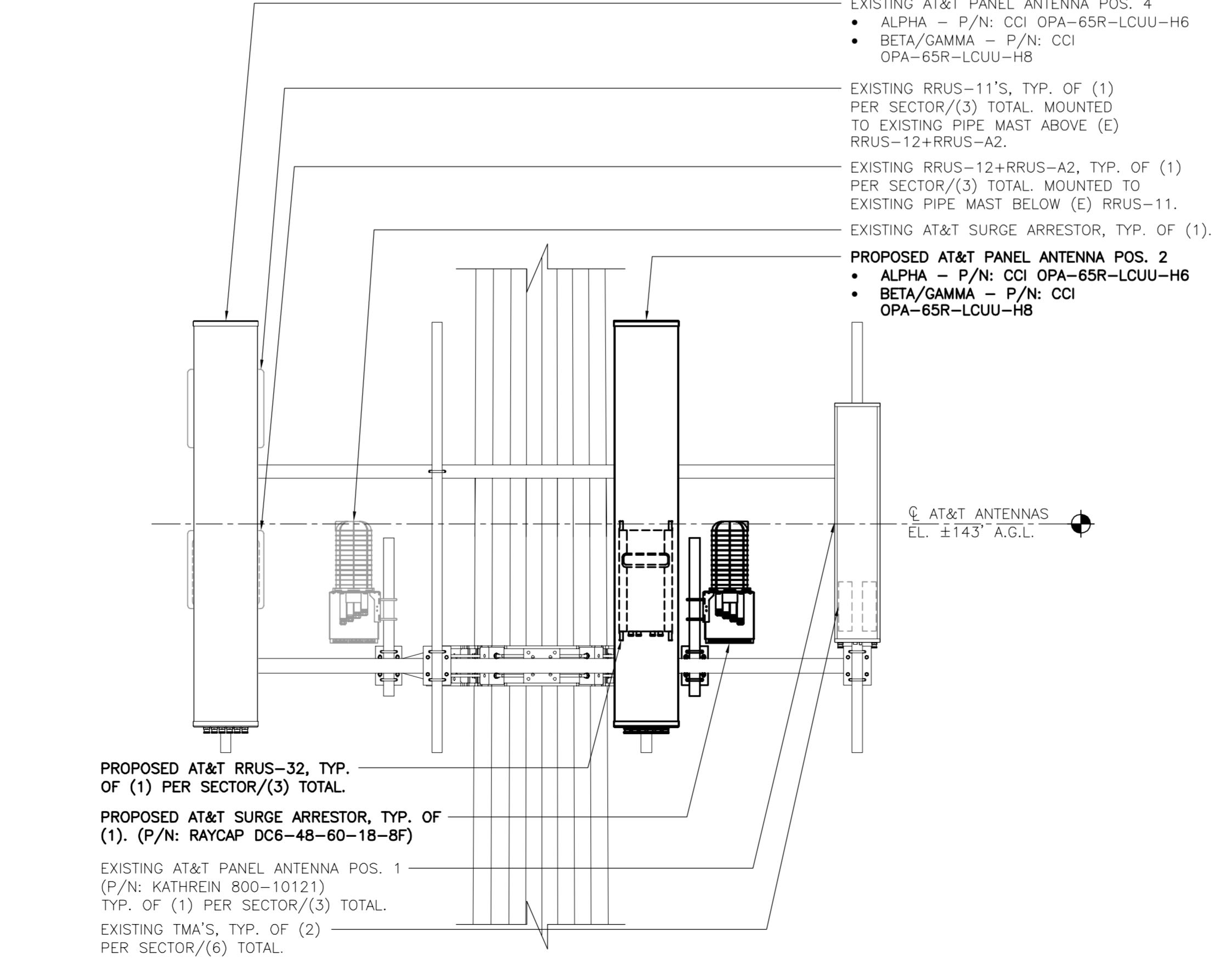
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

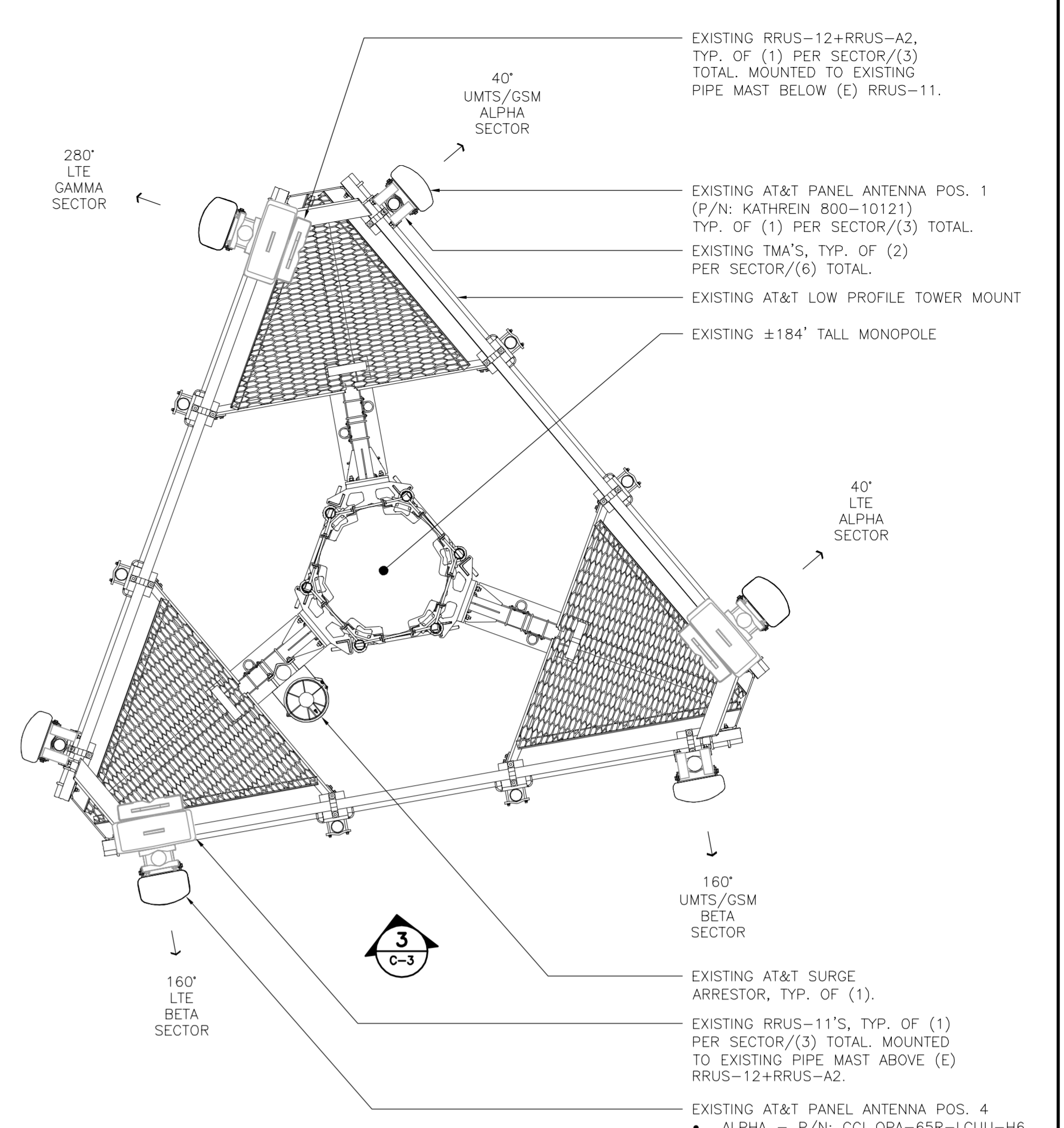
7 SURGE ARRESTOR DETAIL
C-3 SCALE: NTS



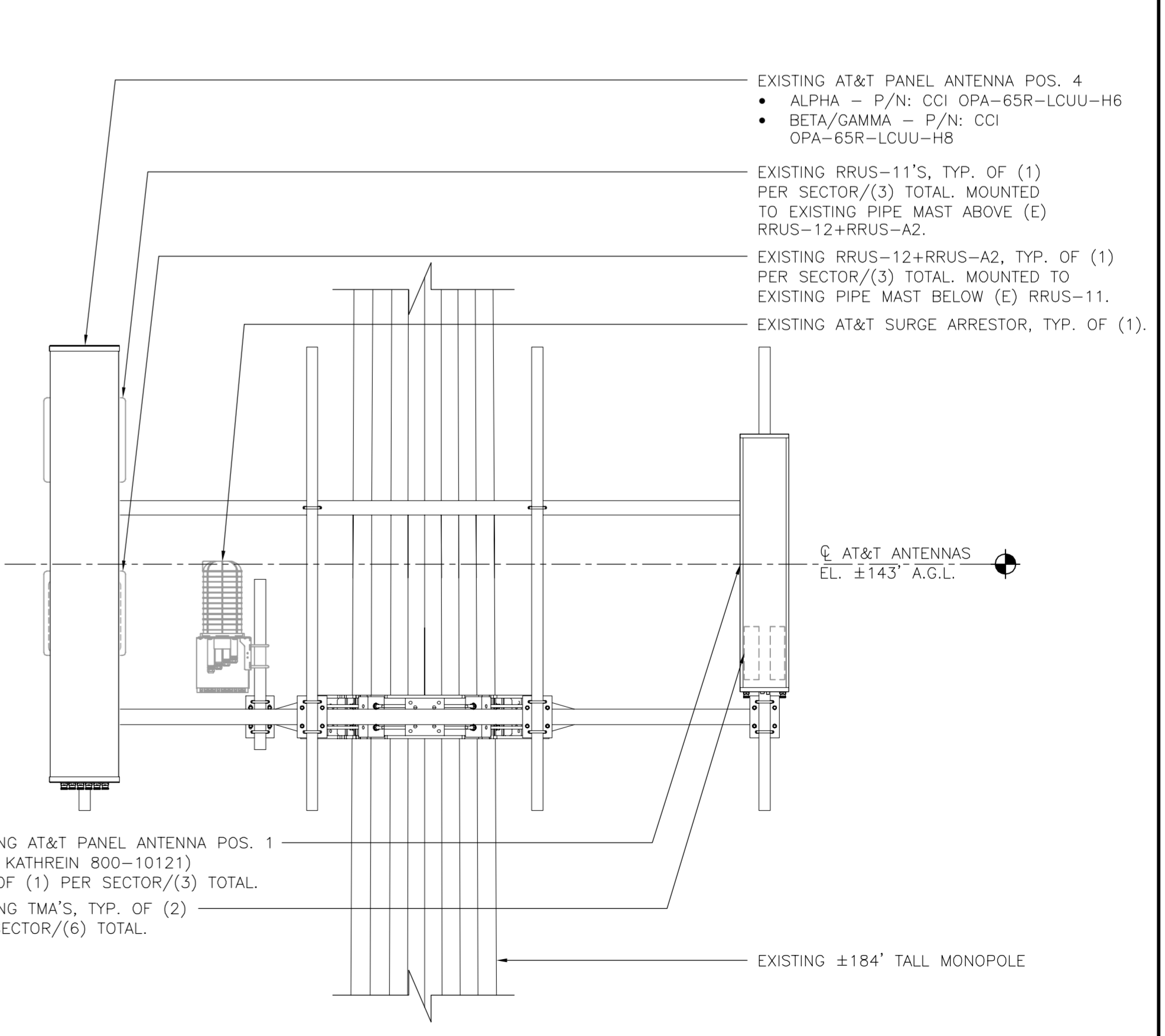
2 PROPOSED ANTENNA PLAN
C-3 SCALE: 1/2" = 1'-0"



4 PROPOSED ANTENNA ELEVATION
C-3 SCALE: 1/2" = 1'-0"

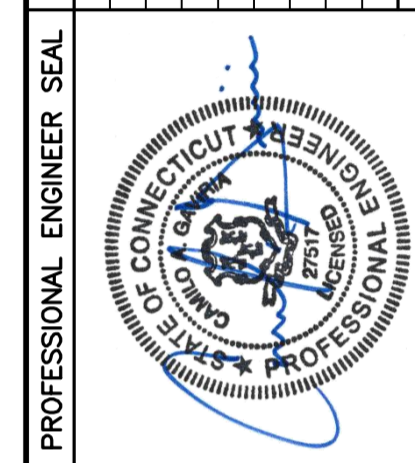


1 EXISTING ANTENNA PLAN
C-3 SCALE: 1/2" = 1'-0"



3 EXISTING ANTENNA ELEVATION
C-3 SCALE: 1/2" = 1'-0"

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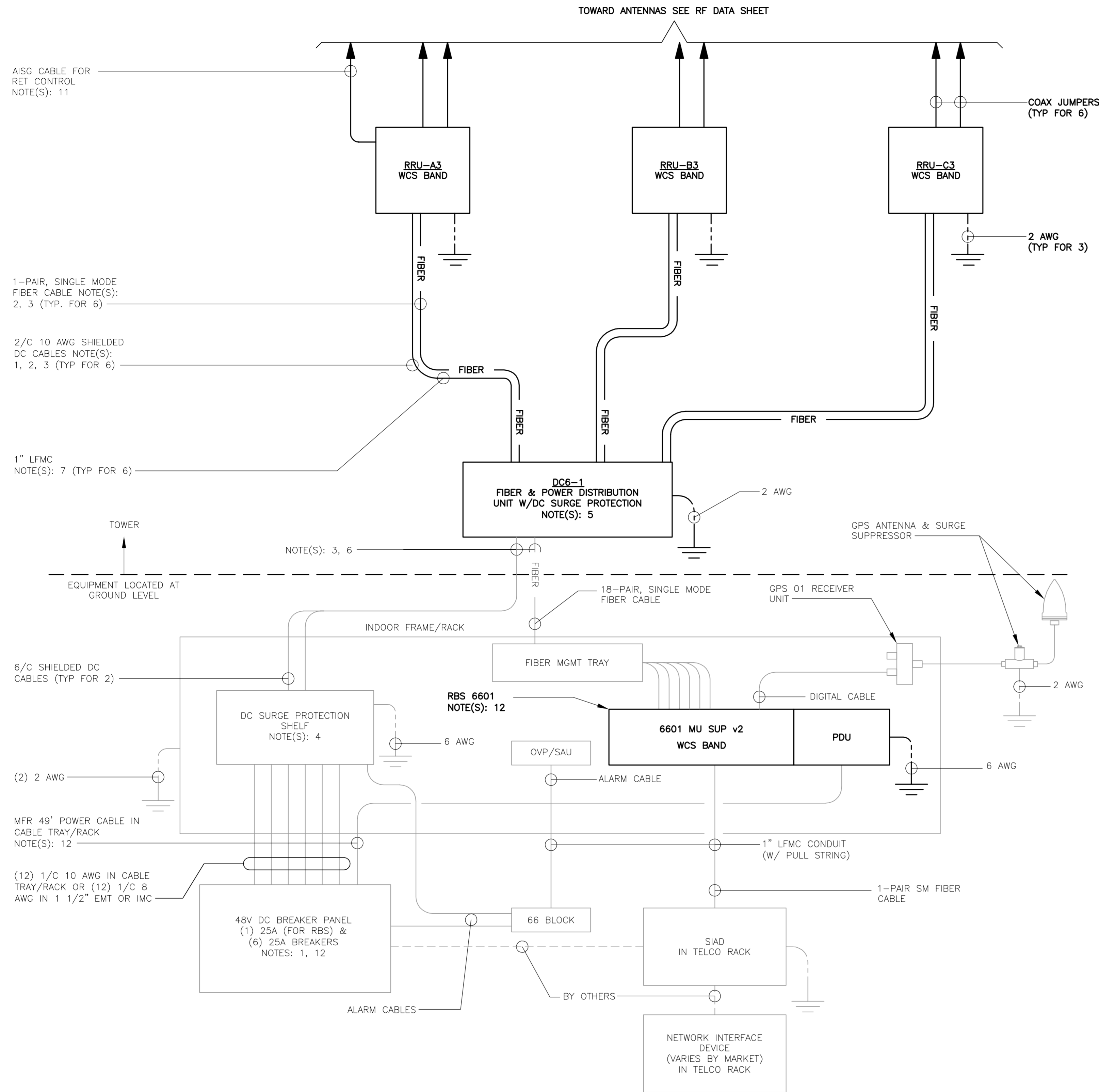


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LTE 3C WCS
EQUIPMENT
DETAILS



1 LTE SCHEMATIC DIAGRAM
E-1 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 DC6-48-60-18-8F.
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 I (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.

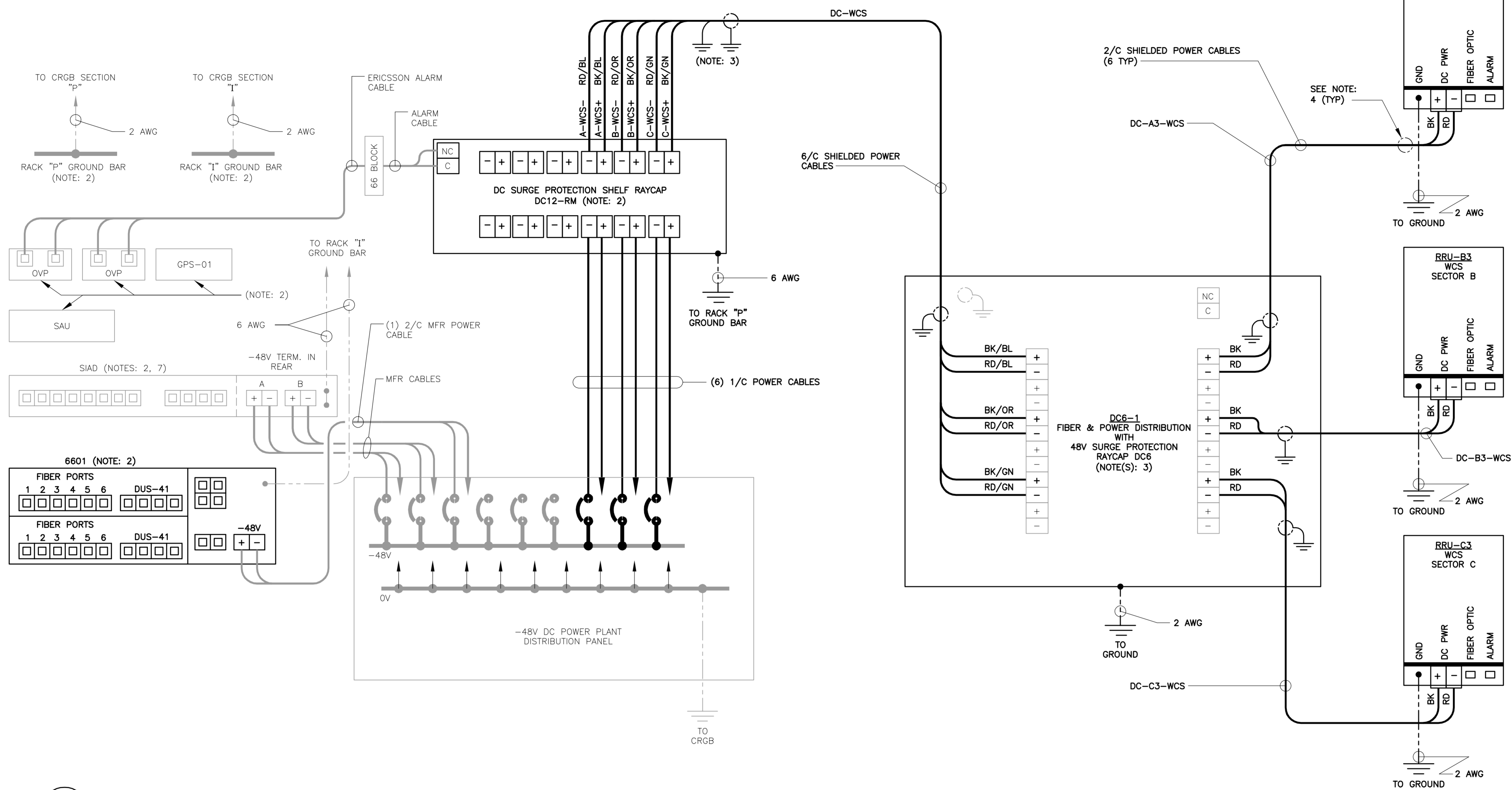
ELECTRICAL NOTES

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:
 - 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.

<p>PROFESSIONAL ENGINEER SEAL</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">REV.</td> <td style="width: 30%;">DATE</td> <td style="width: 30%;">CAG</td> <td style="width: 10%;">DESCRIPTION</td> </tr> <tr> <td>0</td> <td>06/26/17</td> <td>KAWUR</td> <td>ISSUED FOR CONSTRUCTION</td> </tr> </table>	REV.	DATE	CAG	DESCRIPTION	0	06/26/17	KAWUR	ISSUED FOR CONSTRUCTION
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<p>DATE: 06/13/17 SCALE: AS NOTED JOB NO. 17004.27</p>									
<p>LTE SCHEMATIC DIAGRAM AND NOTES</p>									
<p>E-1</p>									
<p>Sheet No. 6 of 8</p>									

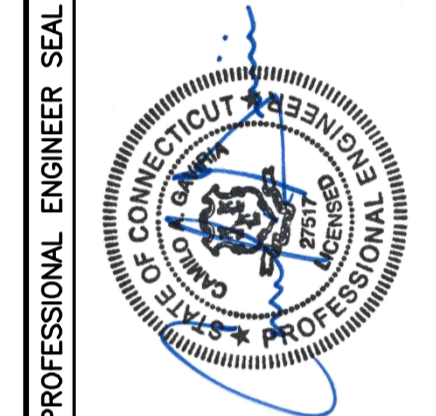


1 LTE WIRING DIAGRAM
E-2 NOT TO SCALE

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. THE BARE GROUND WIRE OF EACH MULTI-CONDUCTOR CABLE SHALL BE CONNECTED TO THE "P" GROUND BAR ON THE RACK. WHEN A SHIELDED CABLE IS USED, THE DRAIN WIRE ALSO SHALL BE CONNECTED TO THE "P" GROUND BAR.
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.

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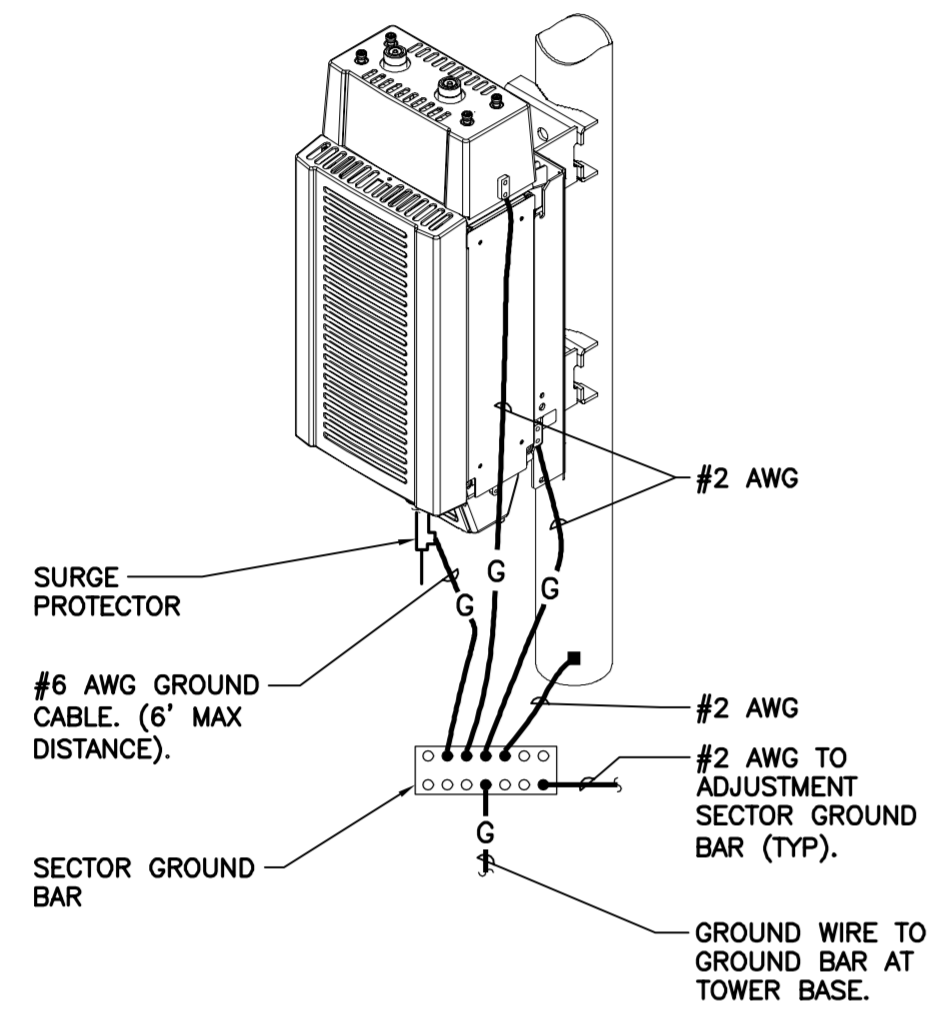
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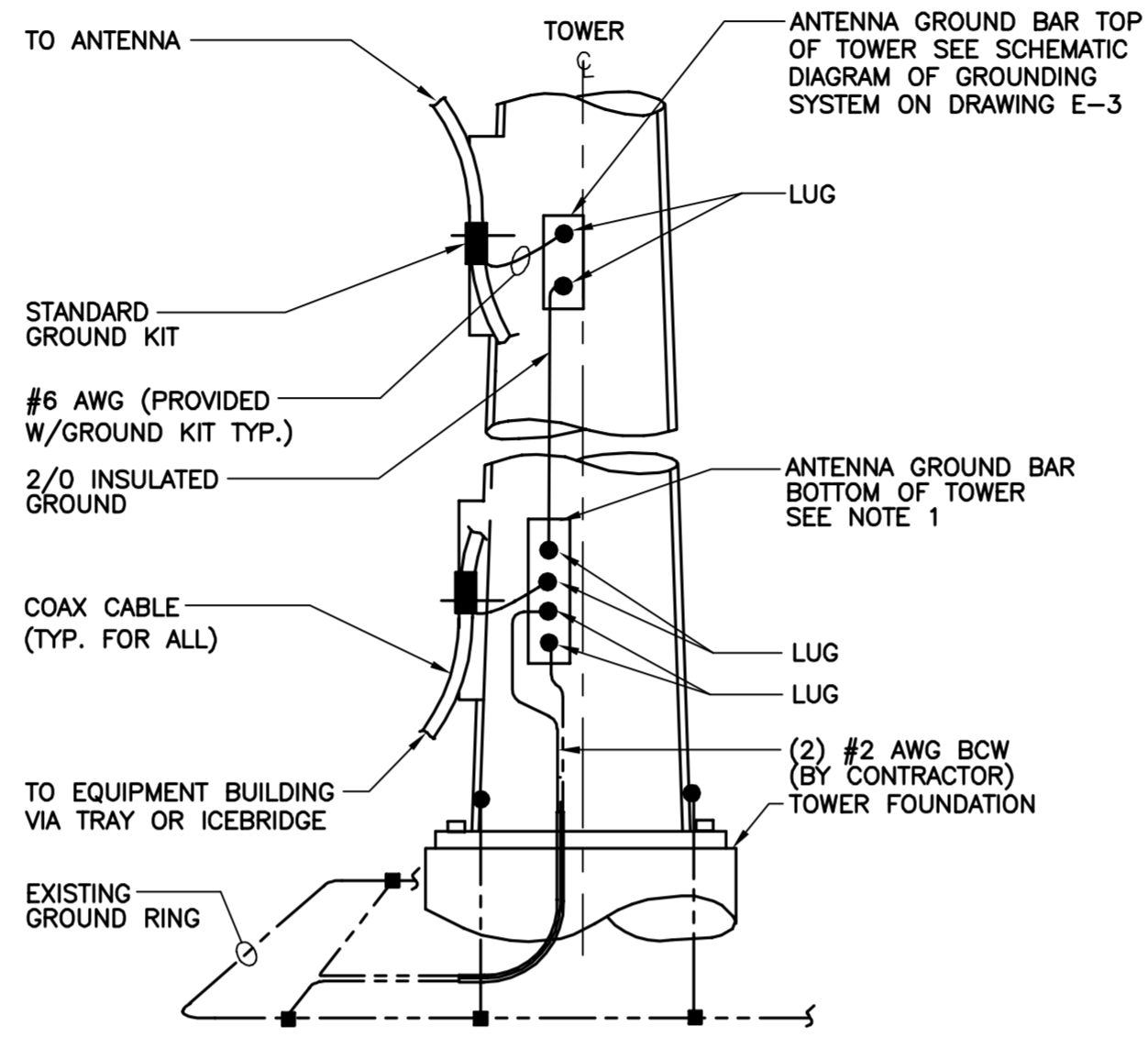
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LTE WIRING DIAGRAM

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
 1. AT TOP OF THE CABINET
 2. AT RIGHT SIDE OF THE CABINET.

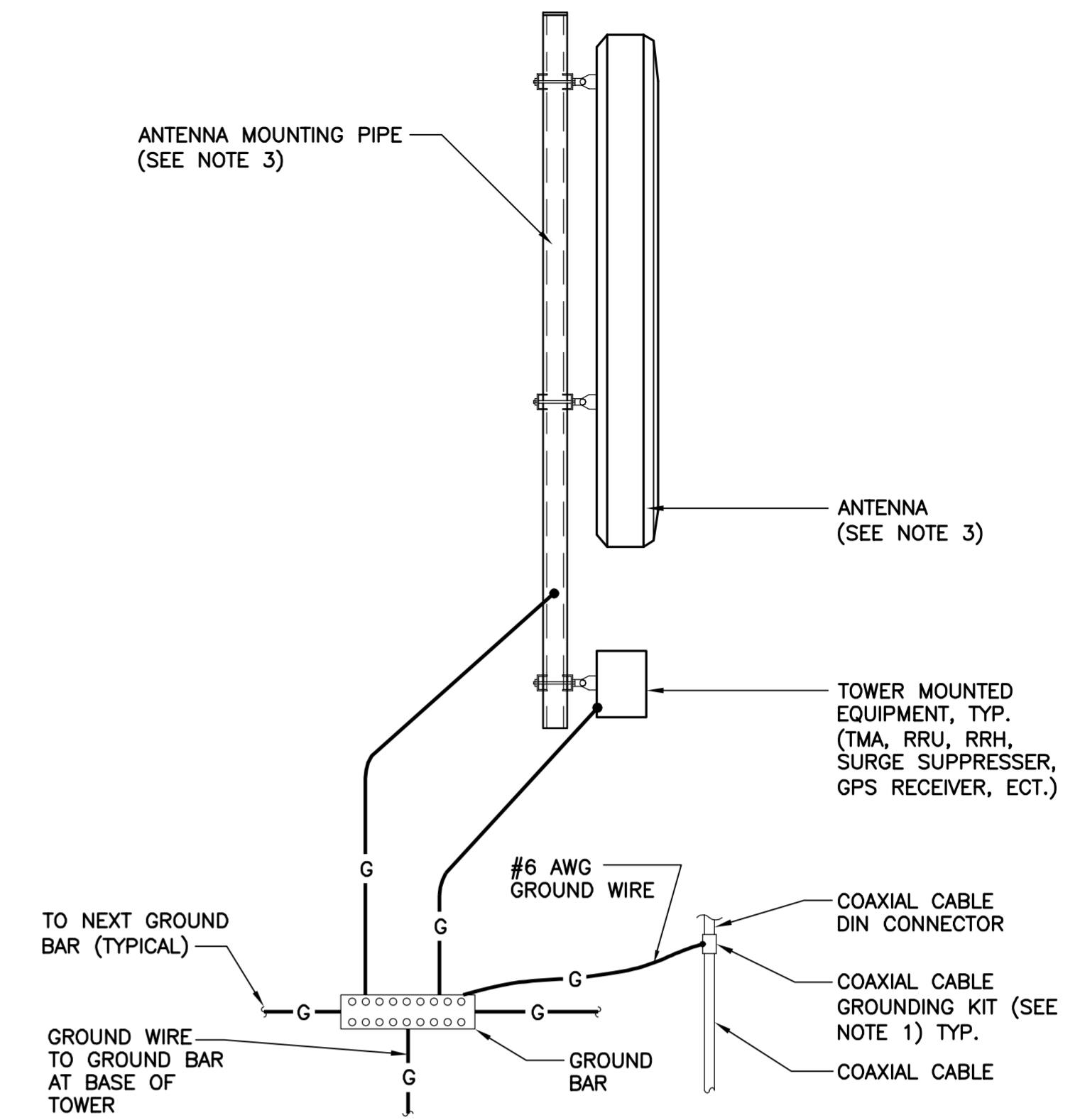


3 RRU POLE MOUNT GROUNDED
 E-3 NOT TO SCALE



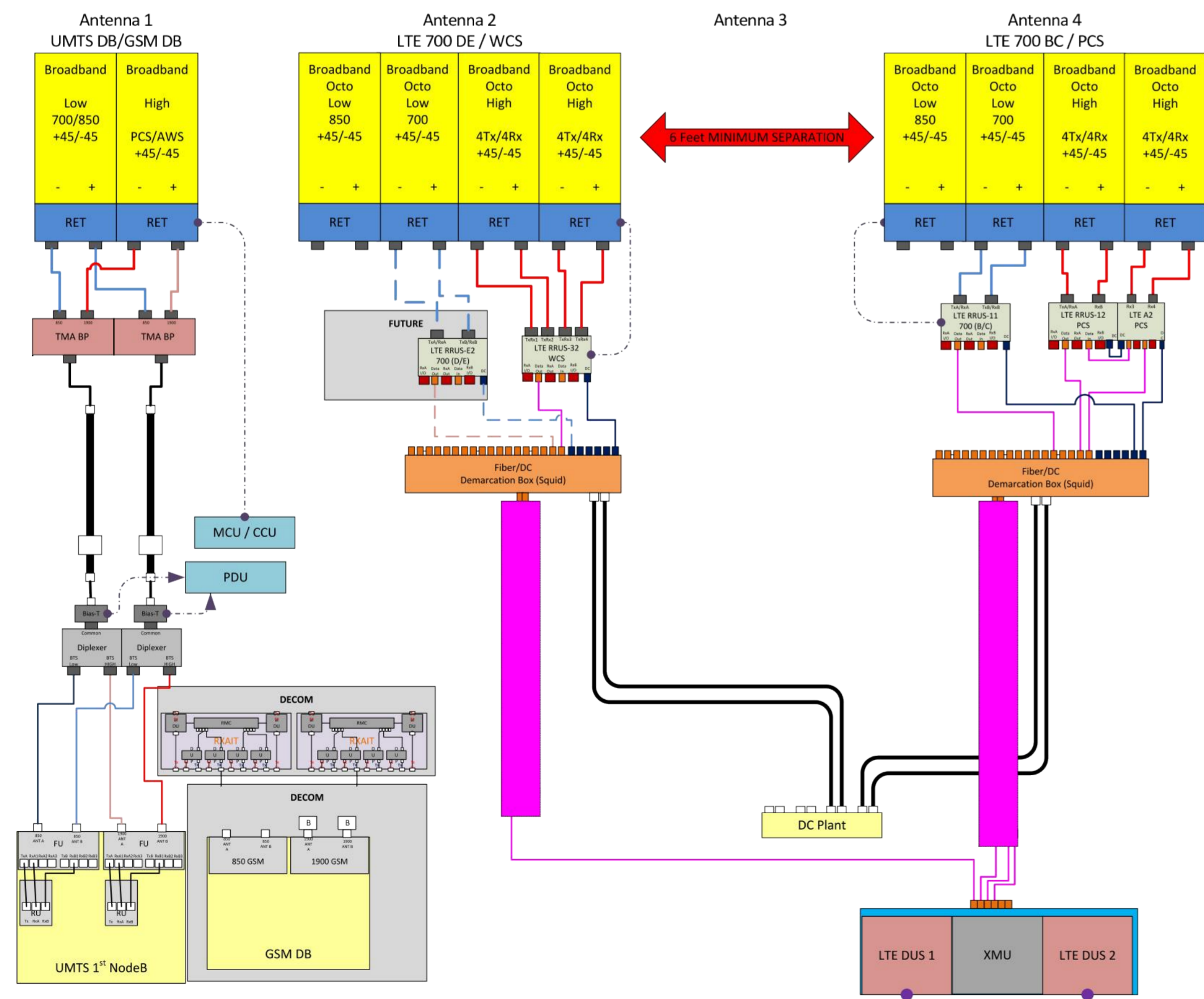
NOTES:
 1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

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

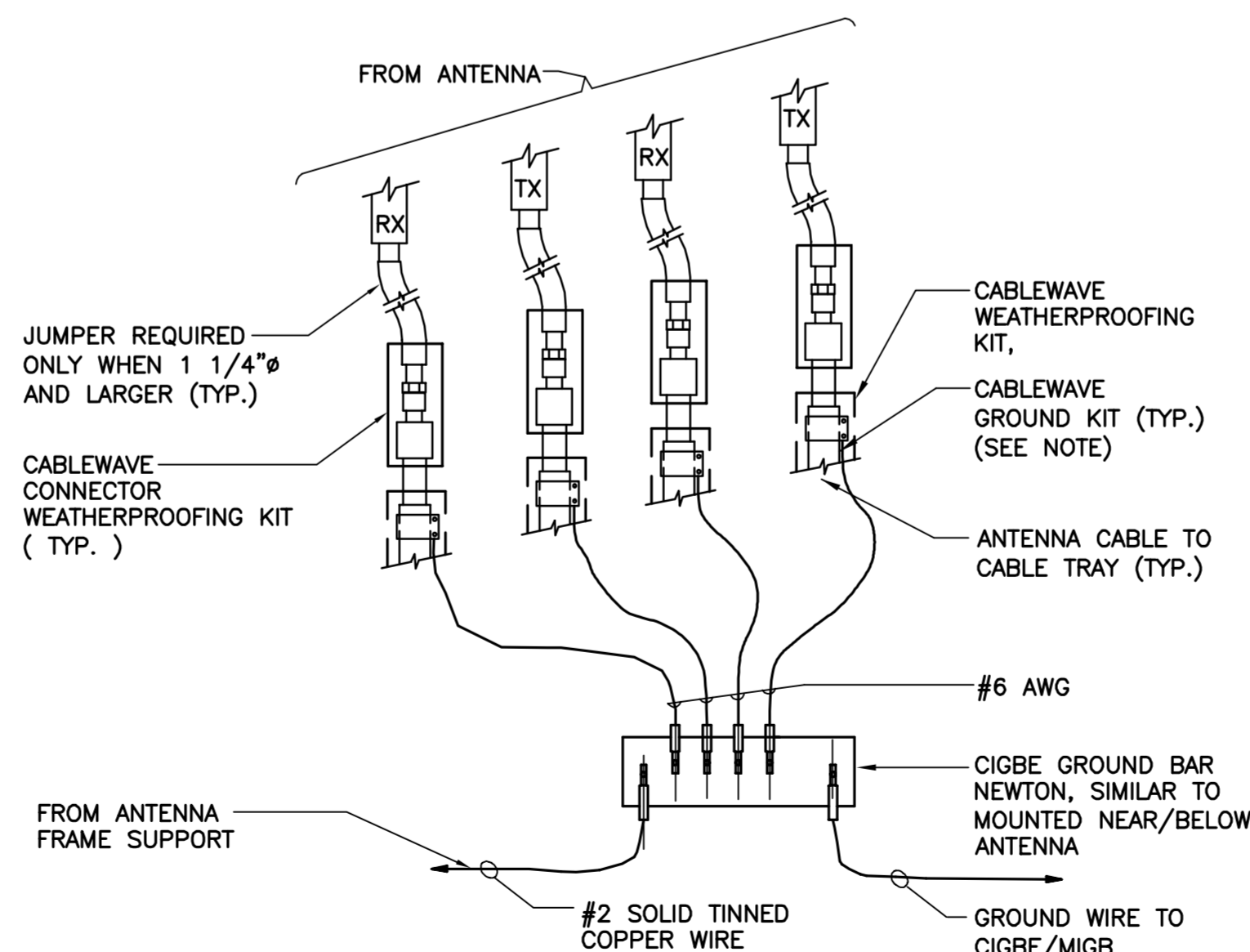


NOTES:
 1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
 2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
 3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 TYPICAL ANTENNA GROUNDED DETAIL
 E-3 NOT TO SCALE

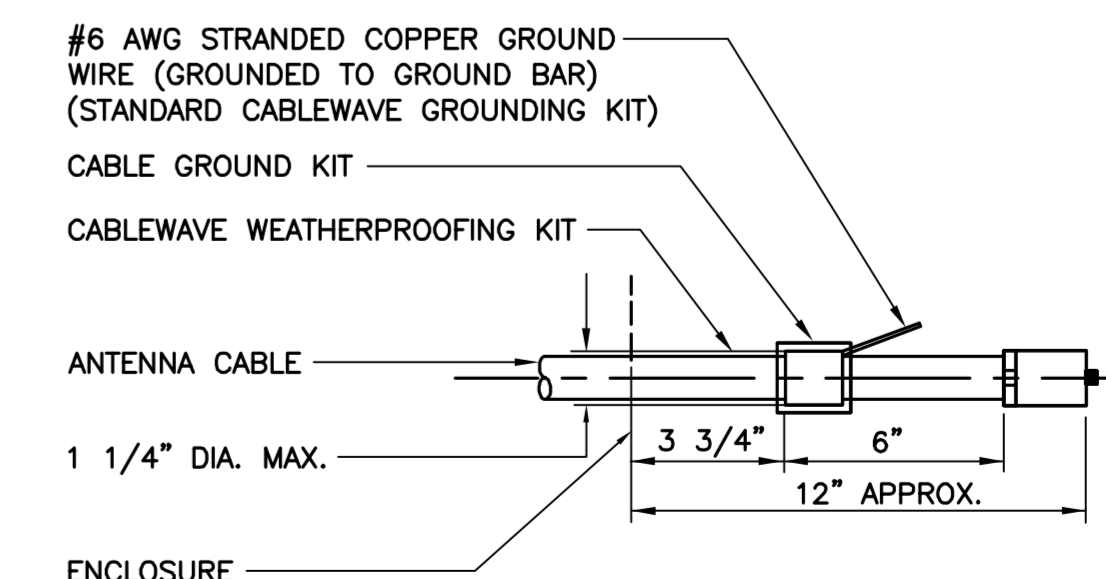


6 RF PLUMBING DIAGRAM
 E-3 NOT TO SCALE



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

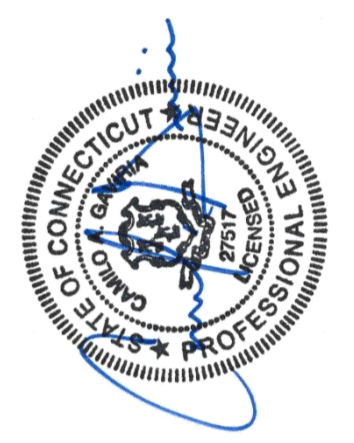
5 CONNECTION OF GROUND WIRES TO GROUND BAR
 E-3 NOT TO SCALE



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

4 ANTENNA CABLE GROUNDED DETAIL
 E-3 NOT TO SCALE

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 SCALE: AS NOTED
 JOB NO. 17004.27

TYPICAL ELECTRICAL DETAILS

E-3



Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5448

Manchester Central
239 Middle Turnpike
Manchester, CT 6040

June 16, 2017

Centerline Communications Project Number: 950006-059

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	11.13 %



June 16, 2017

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

Emissions Analysis for Site: **CT5448 – Manchester Central**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **239 Middle Turnpike, Manchester, 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 population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 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 performed for the proposed AT&T Wireless antenna facility located at **239 Middle Turnpike, Manchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

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

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

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

Table 1: Channel Data Table



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Kathrein 800-10121	143
A	2	CCI OPA-65R-LCUU-H6	143
A	3	CCI OPA-65R-LCUU-H6	143
B	1	Kathrein 800-10121	143
B	2	CCI OPA-65R-LCUU-H8	143
B	3	CCI OPA-65R-LCUU-H8	143
C	1	Kathrein 800-10121	143
C	2	CCI OPA-65R-LCUU-H8	143
C	3	CCI OPA-65R-LCUU-H8	143

Table 2: Antenna Data

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



RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	8	240	4,942.88	1.19
Antenna A2	CCI OPA-65R-LCUU-H6	2300 MHz (WCS)	15.45	2	120	4,209.02	0.81
Antenna A3	CCI OPA-65R-LCUU-H6	700 MHz / 1900 MHz (PCS)	11.65 / 14.85	4	240	5,420.52	1.42
Sector A Composite MPE%							3.42
Antenna B1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	8	240	4,942.88	1.19
Antenna B2	CCI OPA-65R-LCUU-H8	2300 MHz (WCS)	14.95	2	120	3,751.30	0.72
Antenna B3	CCI OPA-65R-LCUU-H8	700 MHz / 1900 MHz (PCS)	12.55 / 14.85	4	240	5,824.55	1.59
Sector B Composite MPE%							3.50
Antenna C1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	8	240	4,942.88	1.19
Antenna C2	CCI OPA-65R-LCUU-H8	2300 MHz (WCS)	14.95	2	120	3,751.30	0.72
Antenna C3	CCI OPA-65R-LCUU-H8	700 MHz / 1900 MHz (PCS)	12.55 / 14.85	4	240	5,824.55	1.59
Sector C Composite MPE%							3.50

Table 3: AT&T Emissions Levels



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

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	3.50 %
Town MFRE	0.11 %
Town MPD - ch 1	0.01 %
Town MPD - ch 2	0.02 %
Town MFD	0.03 %
Town services intercity	0.06 %
RAFS I/2	0.19 %
Town public works	0.08 %
Town Services EOC	0.08 %
Town FD	0.08 %
town SP hotline	0.11 %
Town Vol FD	0.07 %
Town Service - School	0.02 %
Htfd City FD	0.08 %
Tolland MUT	0.08 %
Sprint	0.47 %
Clearwire	0.09 %
T-Mobile	2.53 %
Verizon	3.51 %
Site Total MPE %:	11.13 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	3.42 %
AT&T Sector B Total:	3.50 %
AT&T Sector C Total:	3.50 %
Site Total:	
	11.13 %

Table 5: Site MPE Summary



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sectors with the largest calculated MPE% are Sectors B&C.

AT&T _ Frequency Band / Technology (Sectors B&C)	# 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	418.91	143	1.60	850 MHz	567	0.28%
AT&T 1900 MHz (PCS) UMTS	2	816.81	143	3.13	1900 MHz (PCS)	1000	0.31%
AT&T 850 MHz GSM	2	418.91	143	1.60	850 MHz	567	0.28%
AT&T 1900 MHz (PCS) GSM	2	816.81	143	3.13	1900 MHz (PCS)	1000	0.31%
AT&T 2300 MHz (WCS) LTE	2	1,875.65	143	7.19	2300 MHz (WCS)	1000	0.72%
AT&T 700 MHz LTE	2	1,079.32	143	4.13	700 MHz	467	0.89%
AT&T 1900 MHz (PCS) LTE	2	1,832.95	143	7.02	1900 MHz (PCS)	1000	0.70%
						Total:	3.50%

Table 6: AT&T Maximum Sector MPE Power Values



Summary

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

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	3.42 %
Sector B:	3.50 %
Sector C:	3.50 %
AT&T Maximum Total (per sector):	3.50 %
Site Total:	11.13 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **11.13 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

A handwritten signature in black ink, appearing to read 'Scott Heffernan', is written over a light blue horizontal line.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

Structural Analysis Report

183-ft Existing EEI Monopole

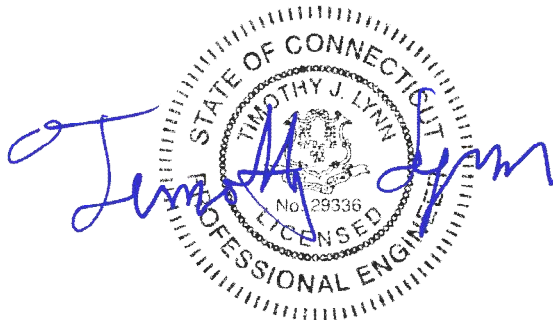
AT&T Mobility – LTE 3C

*AT&T Site Ref: CT5448
Manchester Central*

*239 Middle Turnpike East
Manchester, CT*

Centek Project No. 17004.27

Date: June 14, 2017



Prepared for:
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

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I n t r o d u c t i o n

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna upgrade proposed by AT&T Mobility on the existing monopole (tower) located in Manchester, Connecticut.

The host tower is a 183-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 9892 dated October 4, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents. Tower reinforcement information was obtained from a previous structural analysis report prepared by Hudson Design Group dated February 3 2016.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Tectonic dated July 21, 2016, visual verification from grade conducted by Centek personnel on June 14, 2017 and a AT&T RF data sheet.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 15.5-in at the top and 53.5-in at the base.

A n t e n n a a n d A p p u r t e n a n c e S u m m a r y

The existing, proposed and future loads considered in this analysis consist of the following:

- **UNKNOWN (EXISTING):**
Antennas: Two (2) 4-bay dipole antennas, two (2) 2-ft dishes and one (1) lighting rod mounted on a 12-ft low profile platform with an elevation of 184-ft above grade level.
Coax Cables: Four (4) 7/8" \varnothing coax cables running on the inside of the existing tower.
- **T-MOBILE (EXISTING):**
Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR21 panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) RFS ATMAP1412D-1A20 TMA's and three (3) Ericsson RRUS-11 remote radio heads mounted on a 12-ft platform w/ handrails with a RAD center elevation of 164-ft above grade level.
Coax Cables: Eighteen (18) 1-5/8" \varnothing coax cables and two (2) fiber cables running on the inside of the existing tower
- **SPRINT (EXISTING/RESERVED):**
Antennas: Three (3) RFS APXVSP18-C-A20 panel antennas, three (3) RFS APXVTM14 panel antennas, six (6) ALU 1900 MHz RRH's, three (3) ALU 800 MHz RRH's and three (3) ALU TD-RRH-8x20 remote radio heads mounted to a low profile platform with a RAD center elevation of 153-ft above grade level.
Coax Cables: Three (3) 1-5/8" \varnothing Hybriflex cables running on the inside of the existing tower.

- **CLEARWIRE (EXISTING):**
Antennas: Three (3) Kathrein 840-10054 panel antennas, three (3) Kathrein 860-10025 RCUs and three (3) 2-ft dishes mounted on the Sprint low profile platform with a RAD center elevation of 153-ft above the existing tower base plate.
Coax Cables: Two (2) 3" Ø conduits and three (3) 1/2" Ø coax cables running on the exterior of the existing tower.
- **UNKNOWN (EXISTING):**
Antennas: One (1) 20-ft 4-bay dipole antenna, two (2) 10-ft Omni-directional whip antennas and three (3) yagi antennas mounted on a 12-ft low profile platform with an elevation of 123-ft above grade level.
Coax Cables: Five (5) 1/2" Ø coax cables running on the inside of the existing tower.
- **VERIZON (EXISTING):**
Antennas: Six (6) Andrew LNX-6514DS panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) Alcatel-Lucent RRH2x40-07U remote radio heads, three (3) Alcatel-Lucent RRH2x60-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on a 12-ft low profile platform with a RAD center elevation of 113-ft above grade level.
Coax Cables: Two (2) 1-5/8" Ø fiber cables running on the inside of the existing tower.
- **UNKNOWN (EXISTING):**
Antennas: One (1) GPS antenna mounted on 2-ft standoff with an elevation of 54-ft above grade level.
Coax Cables: One (1) 1/2" Ø coax cable running on the inside of the existing tower.
- **AT&T (EXISTING TO REMAIN):**
Antennas: Three (3) Kathrein 800-10121 panel antennas, one (1) CCI OPA-65R-LCUU-H6 panel antenna, two (2) CCI OPA-65R-LCUU-H8 panel antennas, six (6) LGP21401 TMA's, three (3) Ericsson RRUS-11, three (3) Ericsson RRUS-12, three (3) Ericsson A2s and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on a 12-ft platform w/ handrails with a RAD center elevation of 143-ft above grade level.
Coax Cables: Six (6) 1-5/8" Ø coax cables, one (1) fiber cable and two (2) dc control cables running on the inside of the existing tower.
- **AT&T (PROPOSED):**
Antennas: One (1) CCI OPA-65R-LCUU-H6 panel antenna, two (2) CCI OPA-65R-LCUU-H8 panel antennas, three (3) Ericsson RRUS-32 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on a 12-ft platform w/ handrails with a RAD center elevation of 143-ft above grade level.
Coax Cables: One (1) fiber cable and two (2) dc control cables running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.

Analysis

The existing flagpole was analyzed using a comprehensive computer program entitled trnTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled “Structural Standard for Antenna Support Structures and Antennas”, the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC¹ and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75” radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford County; $v = 90-105$ mph	[Annex B of TIA-222-G-2005]
	Manchester; $v = 97$ mph	[Appendix N of the 2016 CT Building Code]
Load Cases:	<u>Load Case 1</u> ; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	[Appendix N of the 2016 CT Building Code]
	<u>Load Case 2</u> ; 50 mph wind speed w/ 1.00” radial ice plus gravity load – used in calculation of tower stresses.	[Annex B of TIA-222-G-2005]

¹ The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower “Section Capacity Table”, this tower was found to be at **97.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	133.08'-166.50'	97.3%	PASS

Foundation and Anchors

The existing foundation consists of a 7.0 Ø x 32.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 9892 dated October 4, 2002. The base of the tower is connected to the foundation by means of (18) 2.25"Ø, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	46 kips
	Compression	67 kips
	Moment	5770 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	89.3%	PASS
	Lateral Deflection	0.32 in.	PASS

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	85.0%	PASS
Base Plate	Bending	74.0%	PASS

CENTEK Engineering, Inc.
Structural Analysis – Monopole
AT&T Antenna Upgrade – CT5448
Manchester, CT
June 14, 2017

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

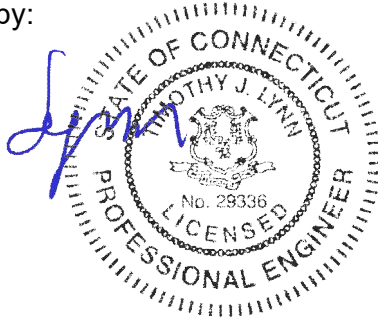
The analysis is based, in part, on the information provided to this office by AT&T. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer



*Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures*

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Andrew 2' w/Radome	185	A2 (ATI)	143
Andrew 2' w/Radome	185	A2 (ATI)	143
4 Bay DiPole (Town)	184	A2 (ATI)	143
EEI 12-ft Low Profile Platform (Town)	184	RRUS-11 (ATI)	143
15' Lighting Rod	184	RRUS-11 (ATI)	143
4 Bay DiPole (Town)	184	RRUS-11 (ATI)	143
AIR32 (T-Mobile)	164	RRUS-12 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-12 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-12 (ATI)	143
AIR21 (T-Mobile)	164	RRUS-32 (ATI - Proposed)	143
AIR21 (T-Mobile)	164	RRUS-32 (ATI - Proposed)	143
LNx-6515DS (T-Mobile)	164	RRUS-32 (ATI - Proposed)	143
LNx-6515DS (T-Mobile)	164	RRUS-32 (ATI - Proposed)	143
LNx-6515DS (T-Mobile)	164	DC6-48-60-18-8F Surge Arrestor (ATI)	143
ATMAP1412D-1A20 (T-Mobile)	164	DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	143
ATMAP1412D-1A20 (T-Mobile)	164	Commscope MTC3607R Platform (ATI)	143
ATMAP1412D-1A20 (T-Mobile)	164	Commscope MTC3607R Platform (ATI)	143
RRUS-11 (T-Mobile)	164	800-10121 (ATI)	143
RRUS-11 (T-Mobile)	164	OPA-65R-LCUU-H6 (ATI)	143
RRUS-11 (T-Mobile)	164	OPA-65R-LCUU-H6 (ATI - Proposed)	143
13' Platform w/rails (T-Mobile)	164	800-10121 (ATI)	143
AIR32 (T-Mobile)	164	800-10121 (ATI)	143
AIR32 (T-Mobile)	164	800-10121 (ATI)	143
APXVSP18-C-A20 (Sprint)	153	3' Yagi (Town)	123
APXVTM14 (Sprint)	153	EEI 12-ft Low Profile Platform (Town)	123
APXVTM14 (Sprint)	153	3' Yagi (Town)	123
APXVTM14 (Sprint)	153	20' 4-Bay Dipole (Town)	123
FD-RRH 2x50 800 (Sprint)	153	10' x 2" Dia Omni (Town)	123
FD-RRH 2x50 800 (Sprint)	153	3' Yagi (Town)	123
FD-RRH 2x50 800 (Sprint)	153	10' x 2" Dia Omni (Town)	123
(2) FD-RRH 4x40 1900 (Sprint)	153	HBXX-6517DS (Verizon)	113
(2) FD-RRH 4x40 1900 (Sprint)	153	LNx-6514DS-VTM (Verizon)	113
(2) FD-RRH 4x40 1900 (Sprint)	153	HBXX-6517DS (Verizon)	113
(2) FD-RRH 4x40 1900 (Sprint)	153	LNx-6514DS-VTM (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	HBXX-6517DS (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	LNx-6514DS-VTM (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	HBXX-6517DS (Verizon)	113
TD-RRH8x20-25 (Sprint)	153	LNx-6514DS-VTM (Verizon)	113
840-10054 (Cleanwire)	153	HBXX-6517DS (Verizon)	113
840-10054 (Cleanwire)	153	RRH2x60-AWS (Verizon)	113
840-10054 (Cleanwire)	153	RRH2x60-AWS (Verizon)	113
860 10025 RCU (Cleanwire)	153	RRH2x60-AWS (Verizon)	113
860 10025 RCU (Cleanwire)	153	RRH2x40-07-U (Verizon)	113
860 10025 RCU (Cleanwire)	153	RRH2x40-07-U (Verizon)	113
860 10025 RCU (Cleanwire)	153	RRH2x40-07-U (Verizon)	113
EEI 12-ft Low Profile Platform (Sprint/Cleanwire)	153	RRH2x60-PCS (Verizon)	113
APXVSP18-C-A20 (Sprint)	153	RRH2x60-PCS (Verizon)	113
APXVSP18-C-A20 (Sprint)	153	RRH2x60-PCS (Verizon)	113
VHLP2-23 (Cleanwire)	150	DB-T1-6Z-8AB-0Z (Verizon)	113
VHLP2-23 (Cleanwire)	150	DB-T1-6Z-8AB-0Z (Verizon)	113
VHLP2-23 (Cleanwire)	150	EEI 12-ft Low Profile Platform (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	LNx-6514DS-VTM (Verizon)	113
OPA-65R-LCUU-H8 (ATI - Proposed)	143	HBXX-6517DS (Verizon)	113
OPA-65R-LCUU-H8 (ATI)	143	LNx-6514DS-VTM (Verizon)	113
OPA-65R-LCUU-H8 (ATI - Proposed)	143	HBXX-6517DS (Verizon)	113
(2) LGP21401 TMA (ATI)	143	LNx-6514DS-VTM (Verizon)	113
(2) LGP21401 TMA (ATI)	143	2' Stand -Off	54
(2) LGP21401 TMA (ATI)	143	GPS	54

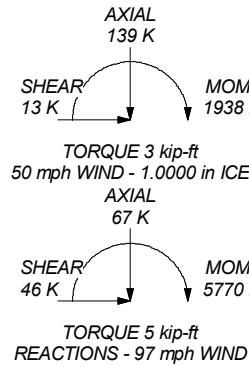
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 97.3%

ALL REACTIONS
ARE FACTORED



Section	Length (ft)	Number of Slices	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	17.50	18	0.1875	3.00	15.5000	19.4200	A572-65	0.6
2	36.42	18	0.2500	3.83	18.3730	26.4100	A572-65	2.2
3	23.92	18	0.3750	5.00	25.0648	30.2800	A572-65	2.6
4	25.00	18	0.4150	5.00	30.2800	35.8800	A572-65	3.7
5	49.08	18	0.4850	6.17	33.8300	44.8800	A572-65	10.0
6	49.08	18	0.5400	6.17	42.5334	53.5000	A572-65	13.6
							A572-65	32.7

Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job: 17004.27 - CT5448		
Project: 183' EEI Monopole - 239 Middle Turnpike Manchester, CT		
Client: AT&T Mobility	Drawn by: T.JL	App'd:
Code: TIA-222-G	Date: 06/14/17	Scale: NTS
Path:		Dwg No. E-1

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	Client AT&T Mobility	Designed by TJL

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- Basic wind speed of 97 mph.
- Structure Class III.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
- Welds are fabricated with ER-70S-6 electrodes..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <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	184.00-166.50	17.50	3.00	18	15.5000	19.4200	0.1875	0.7500	A572-65 (65 ksi)
L2	166.50-133.08	36.42	3.83	18	18.3730	26.4100	0.2500	1.0000	A572-65

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	133.08-112.99	23.92	0.00	18	25.0648	30.2800	0.3750	1.5000	(65 ksi) A572-65
L4	112.99-87.99	25.00	5.00	18	30.2800	35.8800	0.4150	1.6600	(65 ksi) A572-65
L5	87.99-43.91	49.08	6.17	18	33.9300	44.8800	0.4850	1.9400	(65 ksi) A572-65
L6	43.91-1.00	49.08		18	42.5334	53.5000	0.5400	2.1600	(65 ksi) A572-65

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	15.7391	9.1129	269.9504	5.4359	7.8740	34.2838	540.2560	4.5573	2.3980	12.789
L2	19.7196	11.4457	534.8757	6.8275	9.8654	54.2176	1070.4552	5.7240	3.0879	16.469
L3	26.2994	29.3870	2263.2318	8.7649	12.7329	177.7464	4529.4417	14.6963	3.7514	10.004
L4	30.7471	35.5944	4021.6758	10.6163	15.3822	261.4493	8048.6435	17.8006	4.6693	12.451
L5	35.5862	51.4849	7275.7826	11.8730	17.2364	422.1163	14561.1388	25.7473	5.1181	10.553
L6	44.5895	71.9751	16035.5005	14.9077	21.6070	742.1442	32092.1010	35.9944	6.5355	12.103
	54.3253	90.7713	32164.8894	18.8008	27.1780	1183.4899	64372.1021	45.3943	8.4656	15.677

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 184.00-166.50				1	1	1			
L2 166.50-133.08				1	1	1			
L3 133.08-112.99				1	1	1			
L4 112.99-87.99				1	1	1			
L5 87.99-43.91				1	1	1			
L6 43.91-1.00				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	√
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	84.0000 in

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Base Plate Data	
f_c	4 ksi
Grout space	4.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	62.0000 in
Outer diameter	68.0000 in
Inner diameter	43.0000 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.7500 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement <i>ft</i>	Total Number	Number Per Row	Start/End Position	Width or	Perimeter	Weight
							Diameter <i>in</i>	<i>in</i>	<i>plf</i>
3" dia Flex Conuit (Clearwire)	A	Surface Ar (CaAa)	153.00 - 7.00	2	2	0.000 0.000	3.0000		5.00
1/2 (Clearwire)	A	Surface Ar (CaAa)	153.00 - 7.00	3	3	0.000 0.000	0.5800		0.25

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement <i>ft</i>	Total Number	C_{AA}	Weight
							ft^2/ft
7/8 (Town)	C	No	Inside Pole	184.00 - 7.00	4	No Ice	0.54
						1/2" Ice	0.54
						1" Ice	0.54
1/2 (Town)	C	No	Inside Pole	123.00 - 7.00	5	No Ice	0.25
						1/2" Ice	0.25
						1" Ice	0.25
1/2 (Town)	C	No	Inside Pole	54.00 - 7.00	1	No Ice	0.25
						1/2" Ice	0.25
						1" Ice	0.25
1 5/8 (T-Mobile)	C	No	Inside Pole	164.00 - 7.00	18	No Ice	1.04
						1/2" Ice	1.04
						1" Ice	1.04
HYBRIFLEX 1-1/4" (T-Mobile)	C	No	Inside Pole	164.00 - 7.00	2	No Ice	1.30
						1/2" Ice	1.30
						1" Ice	1.30
HYBRIFLEX 1-5/8" (Sprint)	C	No	Inside Pole	153.00 - 7.00	3	No Ice	1.90
						1/2" Ice	1.90
						1" Ice	1.90
1 5/8 (AT&T)	C	No	Inside Pole	143.00 - 7.00	6	No Ice	1.04
						1/2" Ice	1.04
						1" Ice	1.04
Fiber Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	1	No Ice	1.00
						1/2" Ice	1.00
						1" Ice	1.00
DC Trunk (AT&T)	C	No	Inside Pole	143.00 - 7.00	2	No Ice	0.11
						1/2" Ice	0.11
						1" Ice	0.11
HYBRIFLEX 1-5/8" (Verizon)	C	No	Inside Pole	113.00 - 7.00	2	No Ice	1.90
						1/2" Ice	1.90
						1" Ice	1.90

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
Fiber Trunk (AT&T - Proposed)	C	No	Inside Pole	143.00 - 7.00	1	No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
DC Trunk (AT&T - Proposed)	C	No	Inside Pole	143.00 - 7.00	2	No Ice	0.00	0.11
						1/2" Ice	0.00	0.11
						1" Ice	0.00	0.11

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
L1	184.00-166.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L2	166.50-133.08	A	0.000	0.000	15.418	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.93
L3	133.08-112.99	A	0.000	0.000	15.550	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.77
L4	112.99-87.99	A	0.000	0.000	19.350	0.000	0.27
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.07
L5	87.99-43.91	A	0.000	0.000	34.118	0.000	0.47
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.89
L6	43.91-1.00	A	0.000	0.000	28.568	0.000	0.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.59

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	184.00-166.50	A	2.954	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.04
L2	166.50-133.08	A	2.907	0.000	0.000	48.692	0.000	1.10
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.93
L3	133.08-112.99	A	2.851	0.000	0.000	48.635	0.000	1.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.77
L4	112.99-87.99	A	2.793	0.000	0.000	59.106	0.000	1.30
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.07
L5	87.99-43.91	A	2.677	0.000	0.000	104.216	0.000	2.29
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.89
L6	43.91-1.00	A	2.407	0.000	0.000	85.117	0.000	1.82
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.59

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Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	184.00-166.50	0.0000	0.0000	0.0000	0.0000
L2	166.50-133.08	-0.5586	-0.3225	-0.8254	-0.4765
L3	133.08-112.99	-0.8123	-0.4690	-1.0998	-0.6350
L4	112.99-87.99	-0.8333	-0.4811	-1.2035	-0.6949
L5	87.99-43.91	-0.8553	-0.4938	-1.3352	-0.7709
L6	43.91-1.00	-0.7602	-0.4389	-1.3303	-0.7681

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	13	3" dia Flex Conduit	166.50 - 153.00	1.0000	1.0000
L1	14	1/2	166.50 - 153.00	1.0000	1.0000
L2	13	3" dia Flex Conduit	133.08 - 153.00	1.0000	1.0000
L2	14	1/2	133.08 - 153.00	1.0000	1.0000
L4	13	3" dia Flex Conduit	87.99 - 112.99	1.0000	1.0000
L4	14	1/2	87.99 - 112.99	1.0000	1.0000
L5	13	3" dia Flex Conduit	43.91 - 87.99	1.0000	1.0000
L5	14	1/2	43.91 - 87.99	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
15' Lighting Rod	B	From Face	3.00	0.0000	184.00	No Ice	4.50	4.50	0.05
			0.00			1/2" Ice	6.03	6.03	0.08
			7.00			1" Ice	7.58	7.58	0.12
4 Bay DiPole (Town)	A	From Face	3.00	0.0000	184.00	No Ice	3.15	3.15	0.03
			4.00			1/2" Ice	4.00	4.00	0.06
			7.00			1" Ice	4.85	4.85	0.09
4 Bay DiPole (Town)	A	From Face	3.00	0.0000	184.00	No Ice	3.15	3.15	0.03
			-2.00			1/2" Ice	4.00	4.00	0.06
			7.00			1" Ice	4.85	4.85	0.09
EEI 12-ft Low Profile	C	None		0.0000	184.00	No Ice	15.00	15.00	1.50

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	Client		AT&T Mobility				Designed by		TJL	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
Platform (Town)						1/2" Ice	18.40	18.40	1.75
AIR32 (T-Mobile)	A	From Leg	3.00		0.0000	1" Ice	21.80	21.80	2.00
			6.00			No Ice	6.51	4.71	0.13
			0.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32 (T-Mobile)	B	From Leg	3.00		0.0000	No Ice	6.51	4.71	0.13
			6.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32 (T-Mobile)	C	From Leg	3.00		0.0000	No Ice	6.51	4.71	0.13
			6.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR21 (T-Mobile)	A	From Leg	3.00		0.0000	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21 (T-Mobile)	B	From Leg	3.00		0.0000	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21 (T-Mobile)	C	From Leg	3.00		0.0000	No Ice	6.53	4.36	0.08
			-6.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
LNx-6515DS (T-Mobile)	A	From Leg	3.00		0.0000	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
LNx-6515DS (T-Mobile)	B	From Leg	3.00		0.0000	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
LNx-6515DS (T-Mobile)	C	From Leg	3.00		0.0000	No Ice	11.45	7.70	0.06
			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
ATMAP1412D-1A20 (T-Mobile)	A	From Leg	3.00		0.0000	No Ice	0.00	0.47	0.01
			0.00			1/2" Ice	0.00	0.57	0.02
			0.00			1" Ice	0.00	0.69	0.03
ATMAP1412D-1A20 (T-Mobile)	B	From Leg	3.00		0.0000	No Ice	0.00	0.47	0.01
			0.00			1/2" Ice	0.00	0.57	0.02
			0.00			1" Ice	0.00	0.69	0.03
ATMAP1412D-1A20 (T-Mobile)	C	From Leg	3.00		0.0000	No Ice	0.00	0.47	0.01
			0.00			1/2" Ice	0.00	0.57	0.02
			0.00			1" Ice	0.00	0.69	0.03
RRUS-11 (T-Mobile)	A	From Leg	3.00		0.0000	No Ice	2.57	1.07	0.05
			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11 (T-Mobile)	B	From Leg	3.00		0.0000	No Ice	2.57	1.07	0.05
			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11 (T-Mobile)	C	From Leg	3.00		0.0000	No Ice	2.57	1.07	0.05
			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
13' Platform w/rails (T-Mobile)	C	None			0.0000	No Ice	31.30	31.30	1.82
						1/2" Ice	40.20	40.20	2.45
						1" Ice	49.10	49.10	3.08
APXVSP18-C-A20 (Sprint)	A	From Leg	3.00		0.0000	No Ice	8.02	5.28	0.06
			-2.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSP18-C-A20 (Sprint)	B	From Leg	3.00		0.0000	No Ice	8.02	5.28	0.06
			-2.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSP18-C-A20	C	From Leg	3.00		0.0000	No Ice	8.02	5.28	0.06

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	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	17:11:00 06/14/17
	Client	AT&T Mobility	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
(Sprint)			-2.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVTM14	A	From Leg	3.00		0.0000	No Ice	6.34	3.61	0.06
(Sprint)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Leg	3.00		0.0000	No Ice	6.34	3.61	0.06
(Sprint)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Leg	3.00		0.0000	No Ice	6.34	3.61	0.06
(Sprint)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
FD-RRH 2x50 800	A	From Leg	3.00		0.0000	No Ice	2.06	1.93	0.06
(Sprint)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Leg	3.00		0.0000	No Ice	2.06	1.93	0.06
(Sprint)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	C	From Leg	3.00		0.0000	No Ice	2.06	1.93	0.06
(Sprint)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
(2) FD-RRH 4x40 1900	A	From Leg	3.00		0.0000	No Ice	2.24	2.32	0.06
(Sprint)			-2.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
(2) FD-RRH 4x40 1900	B	From Leg	3.00		0.0000	No Ice	2.24	2.32	0.06
(Sprint)			-2.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
(2) FD-RRH 4x40 1900	C	From Leg	3.00		0.0000	No Ice	2.24	2.32	0.06
(Sprint)			-2.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
TD-RRH8x20-25	A	From Leg	3.00		0.0000	No Ice	4.05	1.53	0.07
(Sprint)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	3.00		0.0000	No Ice	4.05	1.53	0.07
(Sprint)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	3.00		0.0000	No Ice	4.05	1.53	0.07
(Sprint)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
840-10054	A	From Leg	3.00		0.0000	No Ice	4.58	1.36	0.00
(Clearwire)			-5.00			1/2" Ice	4.87	1.62	0.02
			0.00			1" Ice	5.18	1.89	0.05
840-10054	B	From Leg	3.00		0.0000	No Ice	4.58	1.36	0.00
(Clearwire)			-5.00			1/2" Ice	4.87	1.62	0.02
			0.00			1" Ice	5.18	1.89	0.05
840-10054	C	From Leg	3.00		0.0000	No Ice	4.58	1.36	0.00
(Clearwire)			-5.00			1/2" Ice	4.87	1.62	0.02
			0.00			1" Ice	5.18	1.89	0.05
860 10025 RCU	A	From Leg	3.00		0.0000	No Ice	0.14	0.12	0.00
(Clearwire)			-5.00			1/2" Ice	0.19	0.17	0.00
			0.00			1" Ice	0.25	0.23	0.01
860 10025 RCU	B	From Leg	3.00		0.0000	No Ice	0.14	0.12	0.00
(Clearwire)			-5.00			1/2" Ice	0.19	0.17	0.00
			0.00			1" Ice	0.25	0.23	0.01
860 10025 RCU	C	From Leg	3.00		0.0000	No Ice	0.14	0.12	0.00
(Clearwire)			-5.00			1/2" Ice	0.19	0.17	0.00
			0.00			1" Ice	0.25	0.23	0.01
EEI 12-ft Low Profile	C	None			0.0000	No Ice	15.00	15.00	1.50

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	Project		183' EEI Monopole - 239 Middle Turnpike Manchester, CT				Date		17:11:00 06/14/17
	Client		AT&T Mobility				Designed by		TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
Platform						1/2" Ice	18.40	18.40	1.75
(Sprint/Clearwire)						1" Ice	21.80	21.80	2.00
800-10121 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			0.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
800-10121 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			0.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
800-10121 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	5.16	3.29	0.05
			0.00			1/2" Ice	5.51	3.64	0.08
			0.00			1" Ice	5.87	3.99	0.12
OPA-65R-LCUU-H6 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	9.66	5.52	0.07
			-3.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
OPA-65R-LCUU-H6 (AT&T - Proposed)	A	From Leg	3.00	0.0000	143.00	No Ice	9.66	5.52	0.07
			3.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
OPA-65R-LCUU-H8 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-3.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T - Proposed)	B	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			3.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			-3.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
OPA-65R-LCUU-H8 (AT&T - Proposed)	C	From Leg	3.00	0.0000	143.00	No Ice	12.98	7.52	0.09
			3.00			1/2" Ice	13.56	8.09	0.16
			0.00			1" Ice	14.15	8.67	0.24
(2) LGP21401 TMA (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	0.00	0.37	0.02
			2.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	0.00	0.60	0.03
(2) LGP21401 TMA (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	0.00	0.37	0.02
			2.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	0.00	0.60	0.03
(2) LGP21401 TMA (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	0.00	0.37	0.02
			2.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	0.00	0.60	0.03
A2 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	2.08	0.50	0.02
			-2.00			1/2" Ice	2.26	0.61	0.03
			0.00			1" Ice	2.44	0.73	0.05
A2 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	2.08	0.50	0.02
			-2.00			1/2" Ice	2.26	0.61	0.03
			0.00			1" Ice	2.44	0.73	0.05
A2 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	2.08	0.50	0.02
			-2.00			1/2" Ice	2.26	0.61	0.03
			0.00			1" Ice	2.44	0.73	0.05
RRUS-11 (AT&T)	A	From Leg	3.00	0.0000	143.00	No Ice	2.57	1.07	0.05
			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11 (AT&T)	B	From Leg	3.00	0.0000	143.00	No Ice	2.57	1.07	0.05
			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11 (AT&T)	C	From Leg	3.00	0.0000	143.00	No Ice	2.57	1.07	0.05
			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-12	A	From Leg	3.00	0.0000	143.00	No Ice	3.15	1.29	0.06

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	Project						Date	
183' EEI Monopole - 239 Middle Turnpike Manchester, CT						17:11:00 06/14/17		
Client						Designed by		
AT&T Mobility						TJL		

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
(AT&T)			2.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
RRUS-12	B	From Leg	3.00		0.0000	143.00	No Ice	3.15	1.29
(AT&T)			2.00				1/2" Ice	3.36	1.44
			0.00				1" Ice	3.59	1.60
RRUS-12	C	From Leg	3.00		0.0000	143.00	No Ice	3.15	1.29
(AT&T)			2.00				1/2" Ice	3.36	1.44
			0.00				1" Ice	3.59	1.60
RRUS-32	A	From Leg	3.00		0.0000	143.00	No Ice	3.31	2.42
(AT&T - Proposed)			6.00				1/2" Ice	3.56	2.64
			0.00				1" Ice	3.81	2.86
RRUS-32	B	From Leg	3.00		0.0000	143.00	No Ice	3.31	2.42
(AT&T - Proposed)			6.00				1/2" Ice	3.56	2.64
			0.00				1" Ice	3.81	2.86
RRUS-32	C	From Leg	3.00		0.0000	143.00	No Ice	3.31	2.42
(AT&T - Proposed)			6.00				1/2" Ice	3.56	2.64
			0.00				1" Ice	3.81	2.86
DC6-48-60-18-8F Surge	A	From Leg	1.00		0.0000	143.00	No Ice	1.91	1.91
Arrestor			0.00				1/2" Ice	2.10	2.10
(AT&T)			0.00				1" Ice	2.29	2.29
DC6-48-60-18-8F Surge	A	From Leg	1.00		0.0000	143.00	No Ice	1.91	1.91
Arrestor			0.00				1/2" Ice	2.10	2.10
(AT&T - Proposed)			0.00				1" Ice	2.29	2.29
Commscope MTC3607R	A	None			0.0000	143.00	No Ice	53.00	53.00
Platform							1/2" Ice	68.00	68.00
(AT&T)							1" Ice	83.00	83.00
3' Yagi	A	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08
(Town)			-6.00				1/2" Ice	3.79	3.79
			4.00				1" Ice	5.52	5.52
20' 4-Bay Dipole	A	From Face	3.00		0.0000	123.00	No Ice	4.00	4.00
(Town)			4.00				1/2" Ice	6.00	6.00
			6.00				1" Ice	8.00	8.00
10' x 2" Dia Omni	B	From Face	3.00		0.0000	123.00	No Ice	2.00	2.00
(Town)			-6.00				1/2" Ice	3.02	3.02
			9.00				1" Ice	4.07	4.07
3' Yagi	B	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08
(Town)			-3.00				1/2" Ice	3.79	3.79
			4.00				1" Ice	5.52	5.52
10' x 2" Dia Omni	B	From Face	3.00		0.0000	123.00	No Ice	2.00	2.00
(Town)			0.00				1/2" Ice	3.02	3.02
			9.00				1" Ice	4.07	4.07
3' Yagi	B	From Face	3.00		0.0000	123.00	No Ice	2.08	2.08
(Town)			0.00				1/2" Ice	3.79	3.79
			1.00				1" Ice	5.52	5.52
EEI 12-ft Low Profile	C	None			0.0000	123.00	No Ice	15.00	15.00
Platform							1/2" Ice	18.40	18.40
(Town)							1" Ice	21.80	21.80
LNX-6514DS-VTM	A	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41
(Verizon)			-6.00				1/2" Ice	8.63	5.86
			0.00				1" Ice	9.10	6.33
HBXX-6517DS	A	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24
(Verizon)			-4.00				1/2" Ice	9.00	5.71
			0.00				1" Ice	9.48	6.18
LNX-6514DS-VTM	A	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41
(Verizon)			0.00				1/2" Ice	8.63	5.86
			0.00				1" Ice	9.10	6.33
HBXX-6517DS	A	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24

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	Project		183' EEI Monopole - 239 Middle Turnpike Manchester, CT					Date		17:11:00 06/14/17
	Client		AT&T Mobility					Designed by		TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz Lateral	Vert						°
(Verizon)			4.00						0.10	
			0.00			1/2" Ice	9.00	5.71	0.10	
			0.00			1" Ice	9.48	6.18	0.16	
LNX-6514DS-VTM	B	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
(Verizon)			-6.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS	B	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
(Verizon)			-4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM	B	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
(Verizon)			0.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS	B	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
(Verizon)			4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM	C	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
(Verizon)			-6.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS	C	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
(Verizon)			-4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
LNX-6514DS-VTM	C	From Face	3.00		0.0000	113.00	No Ice	8.17	5.41	0.04
(Verizon)			0.00				1/2" Ice	8.63	5.86	0.09
			0.00				1" Ice	9.10	6.33	0.15
HBXX-6517DS	C	From Face	3.00		0.0000	113.00	No Ice	8.53	5.24	0.05
(Verizon)			4.00				1/2" Ice	9.00	5.71	0.10
			0.00				1" Ice	9.48	6.18	0.16
RRH2x60-AWS	A	From Face	3.00		0.0000	113.00	No Ice	3.36	2.03	0.06
(Verizon)			-4.00				1/2" Ice	3.61	2.26	0.08
			0.00				1" Ice	3.88	2.50	0.11
RRH2x60-AWS	B	From Face	3.00		0.0000	113.00	No Ice	3.36	2.03	0.06
(Verizon)			-4.00				1/2" Ice	3.61	2.26	0.08
			0.00				1" Ice	3.88	2.50	0.11
RRH2x60-AWS	C	From Face	3.00		0.0000	113.00	No Ice	3.36	2.03	0.06
(Verizon)			-4.00				1/2" Ice	3.61	2.26	0.08
			0.00				1" Ice	3.88	2.50	0.11
RRH2x40-07-U	A	From Face	3.00		0.0000	113.00	No Ice	0.00	1.23	0.05
(Verizon)			0.00				1/2" Ice	0.00	1.39	0.07
			0.00				1" Ice	0.00	1.55	0.09
RRH2x40-07-U	B	From Face	3.00		0.0000	113.00	No Ice	0.00	1.23	0.05
(Verizon)			0.00				1/2" Ice	0.00	1.39	0.07
			0.00				1" Ice	0.00	1.55	0.09
RRH2x40-07-U	C	From Face	3.00		0.0000	113.00	No Ice	0.00	1.23	0.05
(Verizon)			0.00				1/2" Ice	0.00	1.39	0.07
			0.00				1" Ice	0.00	1.55	0.09
RRH2x60-PCS	A	From Face	3.00		0.0000	113.00	No Ice	2.15	1.35	0.06
(Verizon)			4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Face	3.00		0.0000	113.00	No Ice	2.15	1.35	0.06
(Verizon)			4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	3.00		0.0000	113.00	No Ice	2.15	1.35	0.06
(Verizon)			4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
DB-T1-6Z-8AB-0Z	A	From Face	3.00		0.0000	113.00	No Ice	4.80	2.00	0.04
(Verizon)			0.00				1/2" Ice	5.07	2.19	0.08
			0.00				1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	B	From Face	3.00		0.0000	113.00	No Ice	4.80	2.00	0.04

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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	°	ft	ft ²	ft ²	K
(Verizon)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
EEI 12-ft Low Profile Platform	C	None			0.0000	No Ice	15.00	15.00	1.50
(Verizon)						1/2" Ice	18.40	18.40	1.75
GPS	C	From Leg	1.00		0.0000	1" Ice	21.80	21.80	2.00
			0.00			No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
2' Stand -Off	C	From Leg	1.00		0.0000	No Ice	0.80	0.13	0.02
			0.00			1/2" Ice	0.96	0.18	0.03
			0.00			1" Ice	1.13	0.24	0.04

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
			ft	ft	°	°	ft	ft	ft ²	K	
VHLP2-23 (Clearwire)	A	Paraboloid w/Shroud (HP)	From Leg	3.00	-5.00	Worst		150.00	2.17	No Ice	3.72
				0.00						1/2" Ice	4.01
				0.00						1" Ice	4.30
VHLP2-23 (Clearwire)	B	Paraboloid w/Shroud (HP)	From Leg	3.00	-5.00	Worst		150.00	2.17	No Ice	3.72
				0.00						1/2" Ice	4.01
				0.00						1" Ice	4.30
VHLP2-23 (Clearwire)	C	Paraboloid w/Shroud (HP)	From Leg	3.00	-5.00	Worst		150.00	2.17	No Ice	3.72
				0.00						1/2" Ice	4.01
				0.00						1" Ice	4.30
Andrew 2' w/Radome	A	Paraboloid w/Radome	From Leg	2.00	0.00	Worst		185.00	2.00	No Ice	3.14
				0.00						1/2" Ice	3.41
				0.00						1" Ice	3.68
Andrew 2' w/Radome	B	Paraboloid w/Radome	From Leg	2.00	0.00	Worst		185.00	2.00	No Ice	3.14
				0.00						1/2" Ice	3.41
				0.00						1" Ice	3.68

Tower Pressures - No Ice

$$G_H = 1.100$$

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	e	ft ²	ft ²	ft ²		ft ²	ft ²
L1 184.00-166.50	174.92	1.424	37	25.855	A	0.000	25.855	25.855	100.00	0.000	0.000
					B	0.000	25.855		100.00	0.000	0.000
					C	0.000	25.855		100.00	0.000	0.000
L2	148.98	1.376	36	64.258	A	0.000	64.258	64.258	100.00	15.418	0.000

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Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
166.50-133.08					B	0.000	64.258		100.00	0.000	0.000
					C	0.000	64.258		100.00	0.000	0.000
L3 133.08-112.99	122.77	1.321	35	47.753	A	0.000	47.753	47.753	100.00	15.550	0.000
					B	0.000	47.753		100.00	0.000	0.000
					C	0.000	47.753		100.00	0.000	0.000
L4 112.99-87.99	100.14	1.266	33	69.980	A	0.000	69.980	69.980	100.00	19.350	0.000
					B	0.000	69.980		100.00	0.000	0.000
					C	0.000	69.980		100.00	0.000	0.000
L5 87.99-43.91	65.44	1.158	30	149.061	A	0.000	149.061	149.061	100.00	34.118	0.000
					B	0.000	149.061		100.00	0.000	0.000
					C	0.000	149.061		100.00	0.000	0.000
L6 43.91-1.00	22.63	0.926	24	176.851	A	0.000	176.851	176.851	100.00	28.568	0.000
					B	0.000	176.851		100.00	0.000	0.000
					C	0.000	176.851		100.00	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.100$$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
L1 184.00-166.50	174.92	1.424	9	2.9537	34.470	A	0.000	34.470	34.470	100.00	0.000	0.000
						B	0.000	34.470		100.00	0.000	0.000
						C	0.000	34.470		100.00	0.000	0.000
L2 166.50-133.08	148.98	1.376	8	2.9067	80.711	A	0.000	80.711	80.711	100.00	48.692	0.000
						B	0.000	80.711		100.00	0.000	0.000
						C	0.000	80.711		100.00	0.000	0.000
L3 133.08-112.99	122.77	1.321	8	2.8510	57.485	A	0.000	57.485	57.485	100.00	48.635	0.000
						B	0.000	57.485		100.00	0.000	0.000
						C	0.000	57.485		100.00	0.000	0.000
L4 112.99-87.99	100.14	1.266	8	2.7935	81.619	A	0.000	81.619	81.619	100.00	59.106	0.000
						B	0.000	81.619		100.00	0.000	0.000
						C	0.000	81.619		100.00	0.000	0.000
L5 87.99-43.91	65.44	1.158	7	2.6771	169.584	A	0.000	169.584	169.584	100.00	104.216	0.000
						B	0.000	169.584		100.00	0.000	0.000
						C	0.000	169.584		100.00	0.000	0.000
L6 43.91-1.00	22.63	0.926	6	2.4075	195.997	A	0.000	195.997	195.997	100.00	85.117	0.000
						B	0.000	195.997		100.00	0.000	0.000
						C	0.000	195.997		100.00	0.000	0.000

Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e ft ²	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
L1 184.00-166.50	174.92	1.424	11	25.855	A	0.000	25.855	25.855	100.00	0.000	0.000
					B	0.000	25.855		100.00	0.000	0.000

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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 _{AA} In Face ft ²	C _{AA} Out Face ft ²
L2 166.50-133.08	148.98	1.376	11	64.258	C	0.000	25.855	64.258	100.00	0.000	0.000
					A	0.000	64.258			15.418	
					B	0.000	64.258			0.000	
L3 133.08-112.99	122.77	1.321	10	47.753	C	0.000	47.753	47.753	100.00	0.000	0.000
					A	0.000	47.753			15.550	
					B	0.000	47.753			0.000	
L4 112.99-87.99	100.14	1.266	10	69.980	C	0.000	69.980	69.980	100.00	0.000	0.000
					A	0.000	69.980			19.350	
					B	0.000	69.980			0.000	
L5 87.99-43.91	65.44	1.158	9	149.061	C	0.000	149.061	149.061	100.00	0.000	0.000
					A	0.000	149.061			34.118	
					B	0.000	149.061			0.000	
L6 43.91-1.00	22.63	0.926	7	176.851	C	0.000	176.851	176.851	100.00	0.000	0.000
					A	0.000	176.851			28.568	
					B	0.000	176.851			0.000	
					C	0.000	176.851		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	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C
			B	1	0.65	1	1	25.855				
			C	1	0.65	1	1	25.855				
L2 166.50-133.08	1.15	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
			B	1	0.65	1	1	64.258				
			C	1	0.65	1	1	64.258				
L3 133.08-112.99	0.99	2.64	A	1	0.65	35	1	1	47.753	1.19	59.10	C
			B	1	0.65	1	1	47.753				
			C	1	0.65	1	1	47.753				
L4 112.99-87.99	1.34	3.66	A	1	0.65	33	1	1	69.980	1.67	66.68	C
			B	1	0.65	1	1	69.980				
			C	1	0.65	1	1	69.980				
L5 87.99-43.91	2.37	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
			B	1	0.65	1	1	149.061				
			C	1	0.65	1	1	149.061				
L6 43.91-1.00	1.99	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
			B	1	0.65	1	1	176.851				
			C	1	0.65	1	1	176.851				
Sum Weight:	7.87	32.69						OTM	951.29 kip-ft	11.51		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C

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Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
184.00-166.50			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2	1.15	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
166.50-133.08			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3	0.99	2.64	A	1	0.65	35	1	1	47.753	1.19	59.10	C
133.08-112.99			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4	1.34	3.66	A	1	0.65	33	1	1	69.980	1.67	66.68	C
112.99-87.99			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5	2.37	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
87.99-43.91			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6	1.99	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
43.91-1.00			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	7.87	32.69						OTM	951.29 kip-ft	11.51		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1	0.04	0.61	A	1	0.65	37	1	1	25.855	0.69	39.58	C
184.00-166.50			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2	1.15	2.18	A	1	0.65	36	1	1	64.258	1.66	49.78	C
166.50-133.08			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3	0.99	2.64	A	1	0.7	35	1	1	47.753	1.28	63.62	A
133.08-112.99			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4	1.34	3.66	A	1	0.663	33	1	1	69.980	1.70	67.99	A
112.99-87.99			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5	2.37	10.01	A	1	0.65	30	1	1	149.061	3.23	73.38	C
87.99-43.91			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6	1.99	13.59	A	1	0.65	24	1	1	176.851	3.07	71.52	C
43.91-1.00			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	7.87	32.69						OTM	965.62 kip-ft	11.64		

Tower Forces - With Ice - Wind Normal To Face

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Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	2.03	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	1.86	4.83	A	1	1.2	8	1	1	57.485	0.61	30.35	C
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	2.37	6.75	A	1	1.2	8	1	1	81.619	0.83	33.17	C
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	4.18	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	3.42	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	13.90	55.07						OTM	489.38 kip-ft	5.74		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	2.03	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	1.86	4.83	A	1	1.2	8	1	1	57.485	0.61	30.35	C
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	2.37	6.75	A	1	1.2	8	1	1	81.619	0.83	33.17	C
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	4.18	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	3.42	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	13.90	55.07						OTM	489.38 kip-ft	5.74		

Tower Forces - With Ice - Wind 90 To Face

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
L1 184.00-166.50	0.04	1.91	A	1	1.2	9	1	1	34.470	0.39	22.51	C
			B	1	1.2		1	1	34.470			
			C	1	1.2		1	1	34.470			
L2 166.50-133.08	2.03	5.25	A	1	1.2	8	1	1	80.711	0.89	26.67	C
			B	1	1.2		1	1	80.711			
			C	1	1.2		1	1	80.711			
L3 133.08-112.99	1.86	4.83	A	1	1.2	8	1	1	57.485	0.82	40.72	A
			B	1	1.2		1	1	57.485			
			C	1	1.2		1	1	57.485			
L4 112.99-87.99	2.37	6.75	A	1	1.2	8	1	1	81.619	1.07	42.87	A
			B	1	1.2		1	1	81.619			
			C	1	1.2		1	1	81.619			
L5 87.99-43.91	4.18	16.22	A	1	1.2	7	1	1	169.584	1.57	35.61	C
			B	1	1.2		1	1	169.584			
			C	1	1.2		1	1	169.584			
L6 43.91-1.00	3.42	20.11	A	1	1.2	6	1	1	195.997	1.45	33.81	C
			B	1	1.2		1	1	195.997			
			C	1	1.2		1	1	195.997			
Sum Weight:	13.90	55.07						OTM	538.81 kip-ft	6.20		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K				psf			ft ²	K	plf	
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65		1	1	25.855			
			C	1	0.65		1	1	25.855			
L2 166.50-133.08	1.15	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65		1	1	64.258			
			C	1	0.65		1	1	64.258			
L3 133.08-112.99	0.99	2.64	A	1	0.65	10	1	1	47.753	0.35	17.59	C
			B	1	0.65		1	1	47.753			
			C	1	0.65		1	1	47.753			
L4 112.99-87.99	1.34	3.66	A	1	0.65	10	1	1	69.980	0.50	19.85	C
			B	1	0.65		1	1	69.980			
			C	1	0.65		1	1	69.980			
L5 87.99-43.91	2.37	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65		1	1	149.061			
			C	1	0.65		1	1	149.061			
L6 43.91-1.00	1.99	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65		1	1	176.851			
			C	1	0.65		1	1	176.851			
Sum Weight:	7.87	32.69						OTM	283.19 kip-ft	3.43		

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Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65							
			C	1	0.65							
L2 166.50-133.08	1.15	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65							
			C	1	0.65							
L3 133.08-112.99	0.99	2.64	A	1	0.65	10	1	1	47.753	0.35	17.59	C
			B	1	0.65							
			C	1	0.65							
L4 112.99-87.99	1.34	3.66	A	1	0.65	10	1	1	69.980	0.50	19.85	C
			B	1	0.65							
			C	1	0.65							
L5 87.99-43.91	2.37	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65							
			C	1	0.65							
L6 43.91-1.00	1.99	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65							
			C	1	0.65							
Sum Weight:	7.87	32.69						OTM	283.19 kip-ft	3.43		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 184.00-166.50	0.04	0.61	A	1	0.65	11	1	1	25.855	0.21	11.78	C
			B	1	0.65							
			C	1	0.65							
L2 166.50-133.08	1.15	2.18	A	1	0.65	11	1	1	64.258	0.50	14.82	C
			B	1	0.65							
			C	1	0.65							
L3 133.08-112.99	0.99	2.64	A	1	0.7	10	1	1	47.753	0.38	18.94	A
			B	1	0.65							
			C	1	0.65							
L4 112.99-87.99	1.34	3.66	A	1	0.663	10	1	1	69.980	0.51	20.24	A
			B	1	0.65							
			C	1	0.65							
L5 87.99-43.91	2.37	10.01	A	1	0.65	9	1	1	149.061	0.96	21.84	C
			B	1	0.65							
			C	1	0.65							
L6 43.91-1.00	1.99	13.59	A	1	0.65	7	1	1	176.851	0.91	21.29	C
			B	1	0.65							
			C	1	0.65							
Sum Weight:	7.87	32.69						OTM	287.45 kip-ft	3.46		

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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	32.69					
Bracing Weight	0.00					
Total Member Self-Weight	32.69			-2.31	2.21	
Total Weight	56.13			-2.31	2.21	
Wind 0 deg - No Ice		0.01	-28.32	-3363.51	1.72	0.07
Wind 30 deg - No Ice		14.32	-24.64	-2925.85	-1696.90	-1.45
Wind 60 deg - No Ice		24.69	-14.17	-1683.34	-2927.83	-2.58
Wind 90 deg - No Ice		28.50	-0.01	-2.80	-3380.82	-3.02
Wind 120 deg - No Ice		24.68	14.15	1677.86	-2927.34	-2.66
Wind 150 deg - No Ice		14.24	24.52	2908.33	-1688.88	-1.57
Wind 180 deg - No Ice		-0.01	28.32	3358.89	2.71	-0.07
Wind 210 deg - No Ice		-14.32	24.64	2921.23	1701.32	1.45
Wind 240 deg - No Ice		-24.69	14.17	1678.72	2932.26	2.58
Wind 270 deg - No Ice		-28.50	0.01	-1.82	3385.25	3.02
Wind 300 deg - No Ice		-24.68	-14.15	-1682.49	2931.76	2.66
Wind 330 deg - No Ice		-14.24	-24.52	-2912.95	1693.31	1.57
Member Ice	22.38					
Total Weight Ice	125.29			-15.20	8.24	
Wind 0 deg - Ice		0.00	-12.98	-1544.95	8.03	-0.08
Wind 30 deg - Ice		6.74	-11.63	-1382.92	-784.22	-1.27
Wind 60 deg - Ice		11.28	-6.49	-780.26	-1321.32	-2.12
Wind 90 deg - Ice		13.02	-0.00	-15.41	-1526.88	-2.40
Wind 120 deg - Ice		11.28	6.49	749.49	-1321.11	-2.04
Wind 150 deg - Ice		6.51	11.24	1309.50	-759.13	-1.13
Wind 180 deg - Ice		-0.00	12.98	1514.55	8.46	0.08
Wind 210 deg - Ice		-6.74	11.63	1352.52	800.70	1.27
Wind 240 deg - Ice		-11.28	6.49	749.86	1337.80	2.12
Wind 270 deg - Ice		-13.02	0.00	-14.99	1543.36	2.40
Wind 300 deg - Ice		-11.28	-6.49	-779.89	1337.59	2.04
Wind 330 deg - Ice		-6.51	-11.24	-1339.89	775.62	1.13
Total Weight	56.13			-2.31	2.21	
Wind 0 deg - Service		0.00	-8.43	-1001.59	-0.19	0.02
Wind 30 deg - Service		4.26	-7.34	-871.30	-505.84	-0.43
Wind 60 deg - Service		7.35	-4.22	-501.42	-872.27	-0.77
Wind 90 deg - Service		8.48	-0.00	-1.15	-1007.12	-0.90
Wind 120 deg - Service		7.35	4.21	499.16	-872.13	-0.79
Wind 150 deg - Service		4.24	7.30	865.45	-503.46	-0.47
Wind 180 deg - Service		-0.00	8.43	999.57	0.10	-0.02
Wind 210 deg - Service		-4.26	7.34	869.29	505.75	0.43
Wind 240 deg - Service		-7.35	4.22	499.41	872.18	0.77
Wind 270 deg - Service		-8.48	0.00	-0.86	1007.03	0.90
Wind 300 deg - Service		-7.35	-4.21	-501.17	872.04	0.79
Wind 330 deg - Service		-4.24	-7.30	-867.46	503.37	0.47

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice

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	<p>Project</p> <p style="text-align: center;">183' EEI Monopole - 239 Middle Turnpike Manchester, CT</p>	<p>Date</p> <p style="text-align: center;">17:11:00 06/14/17</p>
	<p>Client</p> <p style="text-align: center;">AT&T Mobility</p>	<p>Designed by</p> <p style="text-align: center;">TJL</p>

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	184 - 166.5	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-8.01	-2.79	3.52
			Max. Mx	8	-2.21	-44.35	0.11
			Max. My	2	-2.21	-0.13	44.58
			Max. Vy	20	-3.18	44.00	0.11
			Max. Vx	2	-3.18	-0.13	44.58

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	166.5 - 133.08	Pole	Max. Torque	20			-1.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.55	-1.83	5.02
			Max. Mx	20	-14.01	486.04	0.43
			Max. My	2	-14.05	0.09	485.45
			Max. Vy	20	-25.64	486.04	0.43
			Max. Vx	2	-25.50	0.09	485.45
L3	133.08 - 112.99	Pole	Max. Torque	20			-1.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.44	-0.35	13.51
			Max. Mx	20	-23.52	1151.80	1.32
			Max. My	2	-23.58	0.46	1148.50
			Max. Vy	20	-35.94	1151.80	1.32
			Max. Vx	2	-35.66	0.46	1148.50
L4	112.99 - 87.99	Pole	Max. Torque	20			-4.89
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.48	1.25	15.34
			Max. Mx	20	-29.01	1889.51	1.67
			Max. My	2	-29.05	0.82	1880.41
			Max. Vy	20	-37.84	1889.51	1.67
			Max. Vx	2	-37.55	0.82	1880.41
L5	87.99 - 43.91	Pole	Max. Torque	20			-4.89
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.06	5.49	18.59
			Max. Mx	20	-44.64	3607.00	2.23
			Max. My	2	-44.67	1.73	3585.19
			Max. Vy	20	-42.07	3607.00	2.23
			Max. Vx	2	-41.77	1.73	3585.19
L6	43.91 - 1	Pole	Max. Torque	20			-4.86
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-138.86	9.63	21.30
			Max. Mx	20	-67.31	5770.47	2.09
			Max. My	2	-67.31	2.02	5733.86
			Max. Vy	20	-45.67	5770.47	2.09
			Max. Vx	2	-45.38	2.02	5733.86
		Max. Torque	20			-4.75	

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	138.86	-0.00	12.98
	Max. H _x	21	50.52	45.60	-0.01
	Max. H _z	2	67.36	-0.01	45.32
	Max. M _x	2	5733.86	-0.01	45.32
	Max. M _z	8	5764.88	-45.60	0.01
	Max. Torsion	8	4.74	-45.60	0.01
	Min. Vert	25	50.52	22.79	39.24
	Min. H _x	9	50.52	-45.60	0.01
	Min. H _z	14	67.36	0.01	-45.32
	Min. M _x	14	-5727.86	0.01	-45.32
	Min. M _z	20	-5770.47	45.60	-0.01
	Min. Torsion	20	-4.74	45.60	-0.01

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Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shear _z	Overtuning Moment, M _x	Overtuning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	56.13	0.00	-0.00	-2.38	2.24	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	67.36	0.01	-45.32	-5733.86	2.02	0.14
0.9 Dead+1.6 Wind 0 deg - No Ice	50.52	0.01	-45.32	-5634.34	1.28	0.13
1.2 Dead+1.6 Wind 30 deg - No Ice	67.36	22.91	-39.42	-4987.26	-2893.90	-2.25
0.9 Dead+1.6 Wind 30 deg - No Ice	50.52	22.91	-39.42	-4900.66	-2844.79	-2.26
1.2 Dead+1.6 Wind 60 deg - No Ice	67.36	39.50	-22.67	-2868.98	-4992.66	-4.04
0.9 Dead+1.6 Wind 60 deg - No Ice	50.52	39.50	-22.67	-2818.83	-4907.37	-4.04
1.2 Dead+1.6 Wind 90 deg - No Ice	67.36	45.60	-0.01	-3.71	-5764.88	-4.74
0.9 Dead+1.6 Wind 90 deg - No Ice	50.52	45.60	-0.01	-2.93	-5666.31	-4.73
1.2 Dead+1.6 Wind 120 deg - No Ice	67.36	39.49	22.65	2861.73	-4991.77	-4.17
0.9 Dead+1.6 Wind 120 deg - No Ice	50.52	39.49	22.65	2813.15	-4906.51	-4.16
1.2 Dead+1.6 Wind 150 deg - No Ice	67.36	22.79	39.24	4959.66	-2880.38	-2.49
0.9 Dead+1.6 Wind 150 deg - No Ice	50.52	22.79	39.24	4874.96	-2831.48	-2.48
1.2 Dead+1.6 Wind 180 deg - No Ice	67.36	-0.01	45.32	5727.86	3.63	-0.14
0.9 Dead+1.6 Wind 180 deg - No Ice	50.52	-0.01	45.32	5629.95	2.89	-0.13
1.2 Dead+1.6 Wind 210 deg - No Ice	67.36	-22.91	39.42	4981.28	2899.45	2.25
0.9 Dead+1.6 Wind 210 deg - No Ice	50.52	-22.91	39.42	4896.28	2848.88	2.25
1.2 Dead+1.6 Wind 240 deg - No Ice	67.36	-39.50	22.67	2863.10	4998.18	4.03
0.9 Dead+1.6 Wind 240 deg - No Ice	50.52	-39.50	22.67	2814.53	4911.45	4.03
1.2 Dead+1.6 Wind 270 deg - No Ice	67.36	-45.60	0.01	-2.09	5770.47	4.74
0.9 Dead+1.6 Wind 270 deg - No Ice	50.52	-45.60	0.01	-1.32	5670.44	4.73
1.2 Dead+1.6 Wind 300 deg - No Ice	67.36	-39.49	-22.65	-2867.55	4997.46	4.18
0.9 Dead+1.6 Wind 300 deg - No Ice	50.52	-39.49	-22.65	-2817.42	4910.71	4.17
1.2 Dead+1.6 Wind 330 deg - No Ice	67.36	-22.79	-39.24	-4965.59	2886.10	2.49
0.9 Dead+1.6 Wind 330 deg - No Ice	50.52	-22.79	-39.24	-4879.30	2835.70	2.48
1.2 Dead+1.0 Ice+1.0 Temp	138.86	-0.00	-0.00	-21.30	9.63	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	138.86	0.00	-12.98	-1885.57	9.46	0.10
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	138.86	6.74	-11.63	-1686.07	-954.77	-1.19
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	138.86	11.28	-6.49	-953.69	-1610.46	-2.16

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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
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90 deg+1.0	138.86	13.02	-0.00	-21.60	-1860.89	-2.54
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	138.86	11.28	6.49	910.53	-1610.20	-2.25
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	138.86	6.51	11.24	1592.94	-925.41	-1.35
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	138.86	-0.00	12.98	1842.74	9.92	-0.09
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	138.86	-6.74	11.63	1643.27	974.11	1.20
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	138.86	-11.28	6.49	910.92	1629.80	2.16
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	138.86	-13.02	0.00	-21.14	1880.25	2.55
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	138.86	-11.28	-6.49	-953.28	1629.60	2.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	138.86	-6.51	-11.24	-1635.74	944.83	1.36
Dead+Wind 0 deg - Service	56.13	0.00	-8.43	-1060.39	2.18	0.03
Dead+Wind 30 deg - Service	56.13	4.26	-7.34	-922.63	-532.41	-0.43
Dead+Wind 60 deg - Service	56.13	7.35	-4.22	-531.59	-919.85	-0.77
Dead+Wind 90 deg - Service	56.13	8.48	-0.00	-2.65	-1062.42	-0.91
Dead+Wind 120 deg - Service	56.13	7.35	4.21	526.33	-919.70	-0.80
Dead+Wind 150 deg - Service	56.13	4.24	7.30	913.60	-529.92	-0.48
Dead+Wind 180 deg - Service	56.13	-0.00	8.43	1055.39	2.48	-0.03
Dead+Wind 210 deg - Service	56.13	-4.26	7.34	917.62	537.07	0.43
Dead+Wind 240 deg - Service	56.13	-7.35	4.22	526.58	924.51	0.77
Dead+Wind 270 deg - Service	56.13	-8.48	0.00	-2.35	1067.09	0.91
Dead+Wind 300 deg - Service	56.13	-7.35	-4.21	-531.33	924.36	0.80
Dead+Wind 330 deg - Service	56.13	-4.24	-7.30	-918.61	534.58	0.48

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	-56.13	0.00	0.00	56.13	0.00	0.000%
2	0.01	-67.36	-45.32	-0.01	67.36	45.32	0.000%
3	0.01	-50.52	-45.32	-0.01	50.52	45.32	0.000%
4	22.91	-67.36	-39.42	-22.91	67.36	39.42	0.000%
5	22.91	-50.52	-39.42	-22.91	50.52	39.42	0.000%
6	39.50	-67.36	-22.67	-39.50	67.36	22.67	0.000%
7	39.50	-50.52	-22.67	-39.50	50.52	22.67	0.000%
8	45.60	-67.36	-0.01	-45.60	67.36	0.01	0.000%
9	45.60	-50.52	-0.01	-45.60	50.52	0.01	0.000%
10	39.49	-67.36	22.65	-39.49	67.36	-22.65	0.000%
11	39.49	-50.52	22.65	-39.49	50.52	-22.65	0.000%
12	22.79	-67.36	39.24	-22.79	67.36	-39.24	0.000%
13	22.79	-50.52	39.24	-22.79	50.52	-39.24	0.000%
14	-0.01	-67.36	45.32	0.01	67.36	-45.32	0.000%
15	-0.01	-50.52	45.32	0.01	50.52	-45.32	0.000%
16	-22.91	-67.36	39.42	22.91	67.36	-39.42	0.000%
17	-22.91	-50.52	39.42	22.91	50.52	-39.42	0.000%
18	-39.50	-67.36	22.67	39.50	67.36	-22.67	0.000%
19	-39.50	-50.52	22.67	39.50	50.52	-22.67	0.000%
20	-45.60	-67.36	0.01	45.60	67.36	-0.01	0.000%
21	-45.60	-50.52	0.01	45.60	50.52	-0.01	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
22	-39.49	-67.36	-22.65	39.49	67.36	22.65	0.000%
23	-39.49	-50.52	-22.65	39.49	50.52	22.65	0.000%
24	-22.79	-67.36	-39.24	22.79	67.36	39.24	0.000%
25	-22.79	-50.52	-39.24	22.79	50.52	39.24	0.000%
26	0.00	-138.86	0.00	0.00	138.86	0.00	0.000%
27	0.00	-138.86	-12.98	-0.00	138.86	12.98	0.000%
28	6.74	-138.86	-11.63	-6.74	138.86	11.63	0.000%
29	11.28	-138.86	-6.49	-11.28	138.86	6.49	0.000%
30	13.02	-138.86	-0.00	-13.02	138.86	0.00	0.000%
31	11.28	-138.86	6.49	-11.28	138.86	-6.49	0.000%
32	6.51	-138.86	11.24	-6.51	138.86	-11.24	0.000%
33	-0.00	-138.86	12.98	0.00	138.86	-12.98	0.000%
34	-6.74	-138.86	11.63	6.74	138.86	-11.63	0.000%
35	-11.28	-138.86	6.49	11.28	138.86	-6.49	0.000%
36	-13.02	-138.86	0.00	13.02	138.86	-0.00	0.000%
37	-11.28	-138.86	-6.49	11.28	138.86	6.49	0.000%
38	-6.51	-138.86	-11.24	6.51	138.86	11.24	0.000%
39	0.00	-56.13	-8.43	-0.00	56.13	8.43	0.000%
40	4.26	-56.13	-7.34	-4.26	56.13	7.34	0.000%
41	7.35	-56.13	-4.22	-7.35	56.13	4.22	0.000%
42	8.48	-56.13	-0.00	-8.48	56.13	0.00	0.000%
43	7.35	-56.13	4.21	-7.35	56.13	-4.21	0.000%
44	4.24	-56.13	7.30	-4.24	56.13	-7.30	0.000%
45	-0.00	-56.13	8.43	0.00	56.13	-8.43	0.000%
46	-4.26	-56.13	7.34	4.26	56.13	-7.34	0.000%
47	-7.35	-56.13	4.22	7.35	56.13	-4.22	0.000%
48	-8.48	-56.13	0.00	8.48	56.13	-0.00	0.000%
49	-7.35	-56.13	-4.21	7.35	56.13	4.21	0.000%
50	-4.24	-56.13	-7.30	4.24	56.13	7.30	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00015029
3	Yes	5	0.00000001	0.00005762
4	Yes	7	0.00000001	0.00019292
5	Yes	6	0.00000001	0.00074539
6	Yes	7	0.00000001	0.00020338
7	Yes	6	0.00000001	0.00079003
8	Yes	6	0.00000001	0.00015844
9	Yes	5	0.00000001	0.00090434
10	Yes	7	0.00000001	0.00018854
11	Yes	6	0.00000001	0.00072792
12	Yes	7	0.00000001	0.00020055
13	Yes	6	0.00000001	0.00077870
14	Yes	5	0.00000001	0.00014541
15	Yes	5	0.00000001	0.00005482
16	Yes	7	0.00000001	0.00020032
17	Yes	6	0.00000001	0.00077683
18	Yes	7	0.00000001	0.00018911
19	Yes	6	0.00000001	0.00073005
20	Yes	6	0.00000001	0.00015753
21	Yes	5	0.00000001	0.00089936
22	Yes	7	0.00000001	0.00020401

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23	Yes	6	0.00000001	0.00079249
24	Yes	7	0.00000001	0.00019171
25	Yes	6	0.00000001	0.00074097
26	Yes	5	0.00000001	0.00019457
27	Yes	7	0.00004613	0.00062814
28	Yes	8	0.00000001	0.00047717
29	Yes	8	0.00000001	0.00048798
30	Yes	7	0.00004617	0.00069061
31	Yes	8	0.00000001	0.00041605
32	Yes	8	0.00000001	0.00044886
33	Yes	7	0.00004617	0.00060543
34	Yes	8	0.00000001	0.00047513
35	Yes	8	0.00000001	0.00041948
36	Yes	7	0.00004610	0.00069312
37	Yes	8	0.00000001	0.00049267
38	Yes	8	0.00000001	0.00045500
39	Yes	4	0.00000001	0.00042439
40	Yes	5	0.00000001	0.00035933
41	Yes	5	0.00000001	0.00041612
42	Yes	5	0.00000001	0.00009756
43	Yes	5	0.00000001	0.00033765
44	Yes	5	0.00000001	0.00039335
45	Yes	4	0.00000001	0.00042046
46	Yes	5	0.00000001	0.00039547
47	Yes	5	0.00000001	0.00034150
48	Yes	5	0.00000001	0.00009786
49	Yes	5	0.00000001	0.00042234
50	Yes	5	0.00000001	0.00035644

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	184 - 166.5	39.619	49	1.9471	0.0140
L2	169.5 - 133.08	33.779	49	1.8966	0.0086
L3	136.91 - 112.99	21.586	48	1.6077	0.0045
L4	112.99 - 87.99	14.225	48	1.3012	0.0032
L5	92.99 - 43.91	9.369	48	1.0139	0.0019
L6	50.08 - 1	2.551	48	0.4848	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	Andrew 2' w/Radome	49	39.619	1.9471	0.0140	36366
184.00	15' Lighting Rod	49	39.619	1.9471	0.0140	36366
164.00	AIR32	48	31.604	1.8648	0.0072	9738
153.00	APXVSP18-C-A20	48	27.373	1.7778	0.0055	6729
150.00	VHLP2-23	48	26.253	1.7493	0.0053	6205
143.00	800-10121	48	23.709	1.6766	0.0048	5250
123.00	3' Yagi	48	17.104	1.4364	0.0038	4104
113.00	LNX-6514DS-VTM	48	14.228	1.3014	0.0032	3854
54.00	GPS	48	2.963	0.5277	0.0007	4189

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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	184 - 166.5	213.888	20	10.5155	0.0740
L2	169.5 - 133.08	182.440	20	10.2639	0.0452
L3	136.91 - 112.99	116.691	20	8.7062	0.0236
L4	112.99 - 87.99	76.943	20	7.0484	0.0166
L5	92.99 - 43.91	50.693	20	5.4919	0.0101
L6	50.08 - 1	13.806	20	2.6247	0.0035

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	Andrew 2' w/Radome	20	213.888	10.5155	0.0740	7428
184.00	15' Lighting Rod	20	213.888	10.5155	0.0740	7428
164.00	AIR32	20	170.721	10.0967	0.0379	1953
153.00	APXVSP18-C-A20	20	147.906	9.6268	0.0290	1323
150.00	VHLP2-23	20	141.867	9.4726	0.0276	1216
143.00	800-10121	20	128.146	9.0790	0.0252	1021
123.00	3' Yagi	20	92.496	7.7794	0.0198	786
113.00	LNX-6514DS-VTM	20	76.958	7.0491	0.0166	733
54.00	GPS	20	16.036	2.8571	0.0038	777

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Concrete Stress ksi	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Critical Ratio
2.0000	18	2.2500	189.53	3.352	39.805	20.975	Bolt T	0.85
			223.65	4.080	54.000	54.000		
			0.85	0.82	0.74	0.39		

Compression Checks

Pole Design Data

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$					
L1	184 - 182.964	TP19.42x15.5x0.1875	17.50	183.00	397.9	9.2509	-6.36	13.20	0.482					
	182.964 - 181.929					9.2509	-6.36	13.20	0.482					
	181.929 - 180.893					9.3890	-6.48	13.80	0.469					
	180.893 - 179.857					9.5271	-6.59	14.41	0.457					
	179.857 - 178.821					9.6651	-6.71	15.05	0.446					
	178.821 - 177.786					9.8032	-6.83	15.70	0.435					
	177.786 - 176.75					9.9413	-6.95	16.38	0.424					
	176.75 - 175.714					10.0793	-7.07	17.07	0.414					
	175.714 - 174.679					10.2174	-7.19	17.78	0.405					
	174.679 - 173.643					10.3555	-7.32	18.51	0.395					
	173.643 - 172.607					10.4935	-7.44	19.26	0.386					
	172.607 - 171.571					10.6316	-7.56	20.03	0.377					
	171.571 - 170.536					10.7697	-7.68	20.82	0.369					
	170.536 - 169.5					10.9077	-7.81	21.63	0.361					
	169.5 - 166.5					11.4457	-3.80	24.99	0.152					
	L2					169.5 - 166.5	TP26.41x18.373x0.25	36.42	183.00	329.3	14.9059	-4.95	31.05	0.159
						166.5 - 164.856					14.9059	-8.93	31.05	0.288
164.856 - 163.212		15.4816	-20.83	34.79	0.599									
163.212 - 161.568		15.4816	-21.02	34.79	0.604									
161.568 - 159.924		15.7695	-21.38	36.77	0.582									
159.924 - 158.281		16.0573	-21.75	38.82	0.560									
158.281 - 156.637		16.3452	-22.12	40.95	0.540									
156.637 - 154.993		16.6330	-22.49	43.15	0.521									
154.993 - 153.349		16.9209	-22.87	45.43	0.503									
153.349 - 151.705		17.4966	-33.13	50.22	0.660									
151.705 - 150.061		17.4966	-33.33	50.22	0.664									
150.061 - 148.417		17.7952	-33.81	52.84	0.640									
148.417 - 146.773		18.0723	-34.30	55.35	0.620									
146.773 - 145.129		18.3602	-34.69	58.03	0.598									
145.129 - 143.486		18.6480	-35.08	60.80	0.577									
143.486 - 141.842		19.2237	-50.92	66.61	0.764									
141.842 -		19.2237	-51.13	66.61	0.768									

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	140.198								
	140.198 - 138.554					19.5116	-51.53	69.65	0.740
	138.554 - 136.91					19.7994	-51.93	72.78	0.714
	136.91 - 133.08					20.0873	-21.53	76.00	0.283
L3	136.91 - 133.08	TP30.28x25.0648x0.375	23.92	183.00	250.5	29.3871	-31.51	105.76	0.298
	133.08 - 132.023					30.3810	-54.13	116.86	0.463
	132.023 - 130.965					30.6553	-54.49	120.05	0.454
	130.965 - 129.908					31.2041	-15.61	126.62	0.123
	129.908 - 128.851					31.4785	-15.83	129.99	0.122
	128.851 - 127.793					31.7529	-16.05	133.42	0.120
	127.793 - 126.736					32.0273	-16.27	136.90	0.119
	126.736 - 125.678					32.3017	-16.49	140.45	0.117
	125.678 - 124.621					32.5761	-16.71	144.06	0.116
	124.621 - 123.564					32.8505	-16.94	147.73	0.115
	123.564 - 122.506					33.1249	-18.95	151.47	0.125
	122.506 - 121.449					33.3993	-19.18	155.26	0.124
	121.449 - 120.392					33.6737	-19.42	159.12	0.122
	120.392 - 119.334					33.9481	-19.65	163.04	0.121
	119.334 - 118.277					34.2225	-19.89	167.03	0.119
	118.277 - 117.219					34.4969	-20.13	171.08	0.118
	117.219 - 116.162					34.7712	-20.37	175.19	0.116
	116.162 - 115.105					35.0456	-20.61	179.37	0.115
	115.105 - 114.047					35.3200	-20.85	183.62	0.114
	114.047 - 112.99					35.5944	-23.52	187.93	0.125
L4	112.99 - 111.937	TP35.88x30.28x0.415	25.00	183.00	205.5	39.6491	-23.80	212.09	0.112
	111.937 - 110.885					39.9596	-24.07	217.11	0.111
	110.885 - 109.832					40.2702	-24.34	222.22	0.110
	109.832 - 108.779					40.5808	-24.62	227.40	0.108
	108.779 - 107.727					40.8914	-24.90	232.66	0.107
	107.727 - 106.674					41.2020	-25.18	238.00	0.106
	106.674 -					41.5126	-25.47	243.42	0.105

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	105.622								
	105.622 - 104.569					41.8232	-25.75	248.93	0.103
	104.569 - 103.516					42.1337	-26.04	254.51	0.102
	103.516 - 102.464					42.4443	-26.33	260.18	0.101
	102.464 - 101.411					42.7549	-26.62	265.94	0.100
	101.411 - 100.358					43.0655	-26.91	271.77	0.099
	100.358 - 99.3058					43.3761	-27.21	277.70	0.098
	99.3058 - 98.2532					43.6867	-27.50	283.71	0.097
	98.2532 - 97.2005					43.9972	-27.80	289.80	0.096
	97.2005 - 96.1479					44.3078	-28.10	295.98	0.095
	96.1479 - 95.0953					44.6184	-28.40	302.25	0.094
	95.0953 - 94.0426					44.9290	-28.70	308.60	0.093
	94.0426 - 92.99					45.2396	-29.01	315.05	0.092
	92.99 - 87.99					46.7149	-14.74	346.89	0.042
L5	92.99 - 87.99	TP44.88x33.93x0.485	49.08	183.00	179.0	53.2021	-16.62	375.16	0.044
	87.99 - 85.8839					53.9255	-32.05	390.68	0.082
	85.8839 - 83.7778					54.6488	-32.74	406.61	0.081
	83.7778 - 81.6717					55.3721	-33.43	422.97	0.079
	81.6717 - 79.5656					56.0955	-34.13	439.76	0.078
	79.5656 - 77.4594					56.8188	-34.83	456.99	0.076
	77.4594 - 75.3533					57.5421	-35.54	474.67	0.075
	75.3533 - 73.2472					58.2655	-36.26	492.80	0.074
	73.2472 - 71.1411					58.9888	-36.99	511.38	0.072
	71.1411 - 69.035					59.7121	-37.72	530.42	0.071
	69.035 - 66.9289					60.4355	-38.46	549.93	0.070
	66.9289 - 64.8228					61.1588	-39.21	569.92	0.069
	64.8228 - 62.7167					61.8821	-39.96	590.38	0.068
	62.7167 - 60.6106					62.6055	-40.72	611.32	0.067
	60.6106 - 58.5044					63.3288	-41.48	632.76	0.066
	58.5044 - 56.3983					64.0522	-42.26	654.69	0.065
	56.3983 - 54.2922					64.7755	-43.03	677.12	0.064
	54.2922 -					65.4988	-43.85	700.06	0.063

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.27 - CT5448	Page 29 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 17:11:00 06/14/17
	Client AT&T Mobility	Designed by TJJ

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
	52.1861								
	52.1861 - 50.08					66.2222	-44.64	723.51	0.062
L6	50.08 - 43.91	TP53.5x42.5334x0.54	49.08	183.00	142.6	68.3412	-23.41	795.21	0.029
	50.08 - 43.91					74.3380	-25.26	825.59	0.031
	43.91 - 41.6516					75.2029	-49.60	854.74	0.058
	41.6516 - 39.3932					75.2029	-50.11	854.74	0.059
	39.3932 - 37.1347					76.0678	-51.03	884.57	0.058
	37.1347 - 34.8763					76.9327	-51.96	915.09	0.057
	34.8763 - 32.6179					77.7977	-52.89	946.30	0.056
	32.6179 - 30.3595					78.6626	-53.84	978.22	0.055
	30.3595 - 28.1011					79.5275	-54.79	1010.84	0.054
	28.1011 - 25.8426					80.3924	-55.75	1044.18	0.053
	25.8426 - 23.5842					81.2573	-56.72	1078.25	0.053
	23.5842 - 21.3258					82.1222	-57.69	1113.04	0.052
	21.3258 - 19.0674					82.9871	-58.68	1148.58	0.051
	19.0674 - 16.8089					83.8520	-59.67	1184.87	0.050
	16.8089 - 14.5505					84.7169	-60.67	1221.92	0.050
	14.5505 - 12.2921					85.5819	-61.68	1259.72	0.049
	12.2921 - 10.0337					86.4468	-62.69	1298.31	0.048
	10.0337 - 7.77526					87.3117	-63.72	1337.67	0.048
	7.77526 - 5.51684					88.1766	-64.75	1377.81	0.047
	5.51684 - 3.25842					89.0415	-65.79	1418.76	0.046
	3.25842 - 1					89.9064	-66.83	1460.50	0.046

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	184 - 182.964	TP19.42x15.5x0.1875	7.42	218.78	0.034	0.00	218.78	0.000
	182.964 - 181.929		7.41	218.78	0.034	0.00	218.78	0.000
	181.929 - 180.893		8.54	225.40	0.038	0.00	225.40	0.000
	180.893 - 179.857		9.69	232.12	0.042	0.00	232.12	0.000
	179.857 - 179.857		10.88	238.93	0.046	0.00	238.93	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page	
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	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date
	Client	AT&T Mobility	17:11:00 06/14/17
		Designed by	TJL

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	178.821							
	178.821 - 177.786		12.09	245.85	0.049	0.00	245.85	0.000
	177.786 - 176.75		13.34	252.86	0.053	0.00	252.86	0.000
	176.75 - 175.714		14.62	259.97	0.056	0.00	259.97	0.000
	175.714 - 174.679		15.93	267.18	0.060	0.00	267.18	0.000
	174.679 - 173.643		17.27	274.49	0.063	0.00	274.49	0.000
	173.643 - 172.607		18.64	281.90	0.066	0.00	281.90	0.000
	172.607 - 171.571		20.04	289.41	0.069	0.00	289.41	0.000
	171.571 - 170.536		21.48	297.01	0.072	0.00	297.01	0.000
	170.536 - 169.5		22.94	304.71	0.075	0.00	304.71	0.000
L2	169.5 - 166.5	TP26.41x18.373x0.25	12.96	333.56	0.039	0.00	333.56	0.000
	166.5 - 164.856		16.07	425.48	0.038	0.00	425.48	0.000
	164.856 - 163.212		28.07	425.48	0.066	0.00	425.48	0.000
	163.212 - 161.568		36.09	459.21	0.079	0.00	459.21	0.000
	161.568 - 159.924		35.12	459.21	0.076	0.00	459.21	0.000
	159.924 - 158.281		41.36	476.55	0.087	0.00	476.55	0.000
	158.281 - 156.637		47.70	494.22	0.097	0.00	494.22	0.000
	156.637 - 154.993		54.13	512.21	0.106	0.00	512.21	0.000
	154.993 - 153.349		60.65	530.52	0.114	0.00	530.52	0.000
	153.349 - 151.705		67.26	549.15	0.122	0.00	549.15	0.000
	151.705 - 150.061		83.98	587.38	0.143	0.00	587.38	0.000
	150.061 - 148.417		82.88	587.38	0.141	0.00	587.38	0.000
	148.417 - 146.773		93.89	607.71	0.155	0.00	607.71	0.000
	146.773 - 145.129		102.39	626.89	0.163	0.00	626.89	0.000
	145.129 - 143.486		112.42	647.13	0.174	0.00	647.13	0.000
	143.486 - 141.842		122.51	667.69	0.183	0.00	667.69	0.000
	141.842 - 140.198		147.31	709.78	0.208	0.00	709.78	0.000
	140.198 - 138.554		145.96	709.78	0.206	0.00	709.78	0.000
	138.554 - 136.91		160.96	731.30	0.220	0.00	731.30	0.000
	136.91 - 133.08		175.99	753.15	0.234	0.00	753.15	0.000
L3	133.08 - 136.91	TP30.28x25.0648x0.375	79.88	772.99	0.103	0.00	772.99	0.000
	136.91 -		111.19	1100.47	0.101	0.00	1100.47	0.000

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	Job	Page	
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	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 17:11:00 06/14/17
	Client	Designed by	
	AT&T Mobility	TJL	

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	133.08							
	133.08 - 132.023		226.52	1176.75	0.192	0.00	1176.75	0.000
	132.023 - 130.965		236.43	1198.25	0.197	0.00	1198.25	0.000
	130.965 - 129.908		668.30	1241.85	0.538	0.00	1241.85	0.000
	129.908 - 128.851		696.26	1263.94	0.551	0.00	1263.94	0.000
	128.851 - 127.793		724.32	1286.23	0.563	0.00	1286.23	0.000
	127.793 - 126.736		752.50	1308.72	0.575	0.00	1308.72	0.000
	126.736 - 125.678		780.78	1331.39	0.586	0.00	1331.39	0.000
	125.678 - 124.621		809.17	1354.26	0.598	0.00	1354.26	0.000
	124.621 - 123.564		837.67	1377.33	0.608	0.00	1377.33	0.000
	123.564 - 122.506		872.03	1400.58	0.623	0.00	1400.58	0.000
	122.506 - 121.449		902.68	1424.04	0.634	0.00	1424.04	0.000
	121.449 - 120.392		933.44	1447.69	0.645	0.00	1447.69	0.000
	120.392 - 119.334		964.31	1471.53	0.655	0.00	1471.53	0.000
	119.334 - 118.277		995.27	1495.58	0.665	0.00	1495.58	0.000
	118.277 - 117.219		1026.36	1519.81	0.675	0.00	1519.81	0.000
	117.219 - 116.162		1057.54	1544.24	0.685	0.00	1544.24	0.000
	116.162 - 115.105		1088.83	1568.87	0.694	0.00	1568.87	0.000
	115.105 - 114.047		1120.23	1593.68	0.703	0.00	1593.68	0.000
	114.047 - 112.99		1151.80	1618.70	0.712	0.00	1618.70	0.000
L4	112.99 - 111.937	TP35.88x30.28x0.415	1189.68	1812.66	0.656	0.00	1812.66	0.000
	111.937 - 110.885		1227.68	1841.37	0.667	0.00	1841.37	0.000
	110.885 - 109.832		1265.78	1870.29	0.677	0.00	1870.29	0.000
	109.832 - 108.779		1303.97	1899.45	0.687	0.00	1899.45	0.000
	108.779 - 107.727		1342.28	1928.83	0.696	0.00	1928.83	0.000
	107.727 - 106.674		1380.68	1958.43	0.705	0.00	1958.43	0.000
	106.674 - 105.622		1419.20	1988.27	0.714	0.00	1988.27	0.000
	105.622 - 104.569		1457.82	2018.33	0.722	0.00	2018.33	0.000
	104.569 - 103.516		1496.53	2048.61	0.731	0.00	2048.61	0.000
	103.516 - 102.464		1535.37	2079.12	0.738	0.00	2079.12	0.000
	102.464 -		1574.29	2109.85	0.746	0.00	2109.85	0.000

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	<p style="text-align: center;">Job</p> <p style="text-align: center;">17004.27 - CT5448</p>	<p style="text-align: center;">Page</p> <p style="text-align: center;">32 of 42</p>
	<p style="text-align: center;">Project</p> <p style="text-align: center;">183' EEI Monopole - 239 Middle Turnpike Manchester, CT</p>	<p style="text-align: center;">Date</p> <p style="text-align: center;">17:11:00 06/14/17</p>
	<p style="text-align: center;">Client</p> <p style="text-align: center;">AT&T Mobility</p>	<p style="text-align: center;">Designed by</p> <p style="text-align: center;">TJL</p>

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	101.411							
	101.411 -		1613.33	2140.81	0.754	0.00	2140.81	0.000
	100.358							
	100.358 -		1652.47	2171.99	0.761	0.00	2171.99	0.000
	99.3058							
	99.3058 -		1691.72	2203.40	0.768	0.00	2203.40	0.000
	98.2532							
	98.2532 -		1731.07	2235.04	0.775	0.00	2235.04	0.000
	97.2005							
	97.2005 -		1770.52	2266.90	0.781	0.00	2266.90	0.000
	96.1479							
	96.1479 -		1810.08	2298.99	0.787	0.00	2298.99	0.000
	95.0953							
	95.0953 -		1849.74	2331.30	0.793	0.00	2331.30	0.000
	94.0426							
	94.0426 -		1889.52	2363.84	0.799	0.00	2363.84	0.000
	92.99							
	92.99 - 87.99		1000.12	2521.47	0.397	0.00	2521.47	0.000
L5	92.99 - 87.99	TP44.88x33.93x0.485	1080.28	2791.96	0.387	0.00	2791.96	0.000
	87.99 -		2161.72	2868.93	0.753	0.00	2868.93	0.000
	85.8839							
	85.8839 -		2243.48	2946.94	0.761	0.00	2946.94	0.000
	83.7778							
	83.7778 -		2325.65	3026.00	0.769	0.00	3026.00	0.000
	81.6717							
	81.6717 -		2408.22	3106.11	0.775	0.00	3106.11	0.000
	79.5656							
	79.5656 -		2491.22	3187.27	0.782	0.00	3187.27	0.000
	77.4594							
	77.4594 -		2574.62	3269.47	0.787	0.00	3269.47	0.000
	75.3533							
	75.3533 -		2658.42	3352.72	0.793	0.00	3352.72	0.000
	73.2472							
	73.2472 -		2742.63	3437.01	0.798	0.00	3437.01	0.000
	71.1411							
	71.1411 -		2827.24	3522.35	0.803	0.00	3522.35	0.000
	69.035							
	69.035 -		2912.26	3608.73	0.807	0.00	3608.73	0.000
	66.9289							
	66.9289 -		2997.67	3696.17	0.811	0.00	3696.17	0.000
	64.8228							
	64.8228 -		3083.47	3784.65	0.815	0.00	3784.65	0.000
	62.7167							
	62.7167 -		3169.68	3874.18	0.818	0.00	3874.18	0.000
	60.6106							
	60.6106 -		3256.28	3964.75	0.821	0.00	3964.75	0.000
	58.5044							
	58.5044 -		3343.28	4056.38	0.824	0.00	4056.38	0.000
	56.3983							
	56.3983 -		3430.65	4149.04	0.827	0.00	4149.04	0.000
	54.2922							
	54.2922 -		3518.67	4242.76	0.829	0.00	4242.76	0.000
	52.1861							
	52.1861 -		3607.00	4337.52	0.832	0.00	4337.52	0.000
	50.08							
	50.08 - 43.91		1899.45	4621.15	0.411	0.00	4621.15	0.000
L6	50.08 - 43.91	TP53.5x42.5334x0.54	1969.33	4903.43	0.402	0.00	4903.43	0.000
	43.91 -		3965.68	5018.90	0.790	0.00	5018.90	0.000
	41.6516							
	41.6516 -		3965.68	5018.90	0.790	0.00	5018.90	0.000

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.27 - CT5448	Page 33 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 17:11:00 06/14/17
	Client AT&T Mobility	Designed by T.J.L.

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	39.3932							
	39.3932 - 37.1347		4062.97	5135.72	0.791	0.00	5135.72	0.000
	37.1347 - 34.8763		4160.64	5253.88	0.792	0.00	5253.88	0.000
	34.8763 - 32.6179		4258.71	5373.39	0.793	0.00	5373.39	0.000
	32.6179 - 30.3595		4357.15	5494.24	0.793	0.00	5494.24	0.000
	30.3595 - 28.1011		4455.96	5616.43	0.793	0.00	5616.43	0.000
	28.1011 - 25.8426		4555.13	5739.97	0.794	0.00	5739.97	0.000
	25.8426 - 23.5842		4654.64	5864.86	0.794	0.00	5864.86	0.000
	23.5842 - 21.3258		4754.51	5991.08	0.794	0.00	5991.08	0.000
	21.3258 - 19.0674		4854.71	6118.66	0.793	0.00	6118.66	0.000
	19.0674 - 16.8089		4955.23	6247.57	0.793	0.00	6247.57	0.000
	16.8089 - 14.5505		5056.09	6377.83	0.793	0.00	6377.83	0.000
	14.5505 - 12.2921		5157.26	6509.43	0.792	0.00	6509.43	0.000
	12.2921 - 10.0337		5258.73	6642.38	0.792	0.00	6642.38	0.000
	10.0337 - 7.77526		5360.52	6776.67	0.791	0.00	6776.67	0.000
	7.77526 - 5.51684		5462.58	6912.31	0.790	0.00	6912.31	0.000
	5.51684 - 3.25842		5564.94	7049.29	0.789	0.00	7049.29	0.000
	3.25842 - 1		5667.57	7187.62	0.789	0.00	7187.62	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	184 - 182.964	TP19.42x15.5x0.1875	1.08	343.65	0.003	0.25	438.09	0.001
	182.964 - 181.929		1.11	348.78	0.003	0.25	438.09	0.001
	181.929 - 180.893		1.14	353.91	0.003	0.25	451.35	0.001
	180.893 - 179.857		1.17	359.04	0.003	0.25	464.80	0.001
	179.857 - 178.821		1.20	364.16	0.003	0.25	478.45	0.001
	178.821 - 177.786		1.23	369.29	0.003	0.25	492.29	0.001
	177.786 - 176.75		1.26	374.42	0.003	0.25	506.34	0.001
	176.75 - 175.714		1.29	379.55	0.003	0.25	520.58	0.000
	175.714 -		1.32	384.68	0.003	0.25	535.02	0.000

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587</p>	Job	17004.27 - CT5448	Page	34 of 42
	Project	183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date	17:11:00 06/14/17
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	174.679							
	174.679 - 173.643		1.35	389.81	0.003	0.25	549.65	0.000
	173.643 - 172.607		1.38	394.94	0.003	0.25	564.49	0.000
	172.607 - 171.571		1.41	400.07	0.004	0.25	579.52	0.000
	171.571 - 170.536		1.44	405.20	0.004	0.25	594.75	0.000
	170.536 - 169.5		1.47	410.32	0.004	0.25	610.17	0.000
	169.5 - 166.5		0.73	422.50	0.002	0.11	667.94	0.000
L2	169.5 - 166.5	TP26.41x18.373x0.25	0.86	553.72	0.002	0.14	852.01	0.000
	166.5 - 164.856		1.64	564.41	0.003	0.23	852.01	0.000
	164.856 - 163.212		3.80	575.10	0.007	0.25	919.54	0.000
	163.212 - 161.568		3.83	585.80	0.007	0.23	919.54	0.000
	161.568 - 159.924		3.88	596.49	0.007	0.23	954.27	0.000
	159.924 - 158.281		3.94	607.18	0.006	0.23	989.65	0.000
	158.281 - 156.637		3.99	617.88	0.006	0.23	1025.67	0.000
	156.637 - 154.993		4.04	628.57	0.006	0.23	1062.33	0.000
	154.993 - 153.349		4.10	639.26	0.006	0.23	1099.64	0.000
	153.349 - 151.705		5.83	649.96	0.009	0.25	1176.19	0.000
	151.705 - 150.061		5.84	660.65	0.009	0.23	1176.19	0.000
	150.061 - 148.417		6.11	671.34	0.009	0.25	1216.90	0.000
	148.417 - 146.773		6.12	682.03	0.009	0.23	1255.32	0.000
	146.773 - 145.129		6.16	692.73	0.009	0.23	1295.84	0.000
	145.129 - 143.486		6.21	703.42	0.009	0.23	1337.02	0.000
	143.486 - 141.842		9.17	714.11	0.013	0.25	1421.29	0.000
	141.842 - 140.198		9.15	724.81	0.013	0.23	1421.29	0.000
	140.198 - 138.554		9.17	735.50	0.012	0.23	1464.39	0.000
	138.554 - 136.91		9.19	743.95	0.012	0.23	1508.14	0.000
	136.91 - 133.08		3.94	743.95	0.005	0.10	1547.88	0.000
L3	136.91 - 133.08	TP30.28x25.0648x0.375	5.42	1128.58	0.005	0.14	2203.63	0.000
	133.08 - 132.023		9.38	1138.77	0.008	0.23	2356.37	0.000
	132.023 - 130.965		9.40	1148.96	0.008	0.23	2399.44	0.000
	130.965 - 129.908		26.39	1159.16	0.023	1.55	2486.74	0.001
	129.908 -		26.49	1169.35	0.023	1.55	2530.98	0.001

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Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	128.851							
	128.851 - 127.793		26.59	1179.54	0.023	1.54	2575.61	0.001
	127.793 - 126.736		26.69	1189.73	0.022	1.54	2620.63	0.001
	126.736 - 125.678		26.80	1199.93	0.022	1.54	2666.03	0.001
	125.678 - 124.621		26.90	1210.12	0.022	1.54	2711.83	0.001
	124.621 - 123.564		27.00	1220.31	0.022	1.54	2758.02	0.001
	123.564 - 122.506		28.94	1230.51	0.024	4.47	2804.60	0.002
	122.506 - 121.449		29.04	1240.70	0.023	4.47	2851.57	0.002
	121.449 - 120.392		29.14	1250.89	0.023	4.47	2898.93	0.002
	120.392 - 119.334		29.24	1261.09	0.023	4.47	2946.68	0.002
	119.334 - 118.277		29.34	1271.28	0.023	4.46	2994.81	0.001
	118.277 - 117.219		29.44	1281.47	0.023	4.46	3043.34	0.001
	117.219 - 116.162		29.54	1291.66	0.023	4.46	3092.26	0.001
	116.162 - 115.105		29.65	1301.86	0.023	4.46	3141.57	0.001
	115.105 - 114.047		29.75	1312.05	0.023	4.46	3191.27	0.001
	114.047 - 112.99		35.94	1322.24	0.027	4.89	3241.36	0.002
L4	112.99 - 111.937	TP35.88x30.28x0.415	36.04	1472.86	0.024	4.89	3629.75	0.001
	111.937 - 110.885		36.14	1484.40	0.024	4.89	3687.23	0.001
	110.885 - 109.832		36.24	1495.94	0.024	4.89	3745.16	0.001
	109.832 - 108.779		36.34	1507.48	0.024	4.88	3803.54	0.001
	108.779 - 107.727		36.44	1519.01	0.024	4.88	3862.38	0.001
	107.727 - 106.674		36.54	1530.55	0.024	4.88	3921.66	0.001
	106.674 - 105.622		36.64	1542.09	0.024	4.88	3981.40	0.001
	105.622 - 104.569		36.74	1553.63	0.024	4.88	4041.58	0.001
	104.569 - 103.516		36.84	1565.16	0.024	4.88	4102.23	0.001
	103.516 - 102.464		36.94	1576.70	0.023	4.88	4163.32	0.001
	102.464 - 101.411		37.04	1588.24	0.023	4.88	4224.86	0.001
	101.411 - 100.358		37.14	1599.78	0.023	4.87	4286.85	0.001
	100.358 - 99.3058		37.24	1611.31	0.023	4.87	4349.30	0.001
	99.3058 - 98.2532		37.34	1622.85	0.023	4.87	4412.20	0.001
	98.2532 -		37.44	1634.39	0.023	4.87	4475.55	0.001

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			TJL

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	97.2005							
	97.2005 - 96.1479		37.54	1645.92	0.023	4.87	4539.35	0.001
	96.1479 - 95.0953		37.64	1657.46	0.023	4.87	4603.60	0.001
	95.0953 - 94.0426		37.74	1669.00	0.023	4.87	4668.30	0.001
	94.0426 - 92.99		37.84	1680.54	0.023	4.87	4733.46	0.001
	92.99 - 87.99		18.68	1735.34	0.011	2.34	5049.12	0.000
L5	92.99 - 87.99	TP44.88x33.93x0.485	19.88	1976.33	0.010	2.53	5590.75	0.000
	87.99 - 85.8839		38.74	2003.20	0.019	4.86	5744.87	0.001
	85.8839 - 83.7778		38.94	2030.07	0.019	4.86	5901.09	0.001
	83.7778 - 81.6717		39.14	2056.94	0.019	4.86	6059.41	0.001
	81.6717 - 79.5656		39.33	2083.81	0.019	4.86	6219.82	0.001
	79.5656 - 77.4594		39.53	2110.68	0.019	4.85	6382.32	0.001
	77.4594 - 75.3533		39.72	2137.55	0.019	4.85	6546.92	0.001
	75.3533 - 73.2472		39.92	2164.42	0.018	4.85	6713.62	0.001
	73.2472 - 71.1411		40.11	2191.29	0.018	4.85	6882.42	0.001
	71.1411 - 69.035		40.30	2218.16	0.018	4.85	7053.31	0.001
	69.035 - 66.9289		40.49	2245.03	0.018	4.84	7226.30	0.001
	66.9289 - 64.8228		40.68	2271.90	0.018	4.84	7401.38	0.001
	64.8228 - 62.7167		40.87	2298.77	0.018	4.84	7578.56	0.001
	62.7167 - 60.6106		41.06	2325.64	0.018	4.84	7757.83	0.001
	60.6106 - 58.5044		41.24	2352.51	0.018	4.84	7939.20	0.001
	58.5044 - 56.3983		41.43	2379.38	0.017	4.84	8122.67	0.001
	56.3983 - 54.2922		41.62	2406.25	0.017	4.83	8308.23	0.001
	54.2922 - 52.1861		41.89	2433.12	0.017	4.83	8495.92	0.001
	52.1861 - 50.08		42.07	2459.99	0.017	4.75	8685.67	0.001
	50.08 - 43.91		21.24	2538.71	0.008	2.33	9253.58	0.000
L6	50.08 - 43.91	TP53.5x42.5334x0.54	21.64	2761.47	0.008	2.42	9818.83	0.000
	43.91 - 41.6516		43.03	2793.60	0.015	4.75	10050.08	0.000
	41.6516 - 39.3932		43.21	2825.73	0.015	4.75	10050.08	0.000
	39.3932 - 37.1347		43.38	2857.86	0.015	4.75	10284.00	0.000
	37.1347 - 34.8763		43.55	2889.99	0.015	4.75	10520.58	0.000
	34.8763 - 32.6179		43.71	2922.12	0.015	4.74	10759.92	0.000
	32.6179 -		43.87	2954.25	0.015	4.74	11001.92	0.000

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Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	30.3595							
	30.3595 - 28.1011		44.03	2986.38	0.015	4.74	11246.58	0.000
	28.1011 - 25.8426		44.19	3018.51	0.015	4.74	11494.00	0.000
	25.8426 - 23.5842		44.34	3050.63	0.015	4.74	11744.08	0.000
	23.5842 - 21.3258		44.49	3082.76	0.014	4.74	11996.83	0.000
	21.3258 - 19.0674		44.63	3114.89	0.014	4.74	12252.25	0.000
	19.0674 - 16.8089		44.77	3147.02	0.014	4.74	12510.42	0.000
	16.8089 - 14.5505		44.91	3179.15	0.014	4.74	12771.25	0.000
	14.5505 - 12.2921		45.05	3211.28	0.014	4.74	13034.75	0.000
	12.2921 - 10.0337		45.18	3243.41	0.014	4.74	13301.00	0.000
	10.0337 - 7.77526		45.31	3275.54	0.014	4.74	13569.92	0.000
	7.77526 - 5.51684		45.43	3307.67	0.014	4.74	13841.50	0.000
	5.51684 - 3.25842		45.55	3339.80	0.014	4.74	14115.83	0.000
	3.25842 - 1		45.67	3371.93	0.014	4.74	14392.83	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	184 - 182.964	0.482	0.034	0.000	0.003	0.001	0.516	1.000	4.8.2 ✓
	182.964 - 181.929	0.482	0.034	0.000	0.003	0.001	0.516	1.000	4.8.2 ✓
	181.929 - 180.893	0.469	0.038	0.000	0.003	0.001	0.507	1.000	4.8.2 ✓
	180.893 - 179.857	0.457	0.042	0.000	0.003	0.001	0.499	1.000	4.8.2 ✓
	179.857 - 178.821	0.446	0.046	0.000	0.003	0.001	0.492	1.000	4.8.2 ✓
	178.821 - 177.786	0.435	0.049	0.000	0.003	0.001	0.484	1.000	4.8.2 ✓
	177.786 - 176.75	0.424	0.053	0.000	0.003	0.001	0.477	1.000	4.8.2 ✓
	176.75 - 175.714	0.414	0.056	0.000	0.003	0.000	0.471	1.000	4.8.2 ✓
	175.714 - 174.679	0.405	0.060	0.000	0.003	0.000	0.464	1.000	4.8.2 ✓
	174.679 - 173.643	0.395	0.063	0.000	0.003	0.000	0.458	1.000	4.8.2 ✓

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Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	173.643 - 172.607	0.386	0.066	0.000	0.003	0.000	0.452	1.000	4.8.2 ✓
	172.607 - 171.571	0.377	0.069	0.000	0.004	0.000	0.447	1.000	4.8.2 ✓
	171.571 - 170.536	0.369	0.072	0.000	0.004	0.000	0.441	1.000	4.8.2 ✓
	170.536 - 169.5	0.361	0.075	0.000	0.004	0.000	0.436	1.000	4.8.2 ✓
	169.5 - 166.5	0.152	0.039	0.000	0.002	0.000	0.191	1.000	4.8.2 ✓
L2	169.5 - 166.5	0.159	0.038	0.000	0.002	0.000	0.197	1.000	4.8.2 ✓
	166.5 - 164.856	0.288	0.066	0.000	0.003	0.000	0.354	1.000	4.8.2 ✓
	164.856 - 163.212	0.599	0.079	0.000	0.007	0.000	0.677	1.000	4.8.2 ✓
	163.212 - 161.568	0.604	0.076	0.000	0.007	0.000	0.681	1.000	4.8.2 ✓
	161.568 - 159.924	0.582	0.087	0.000	0.007	0.000	0.668	1.000	4.8.2 ✓
	159.924 - 158.281	0.560	0.097	0.000	0.006	0.000	0.657	1.000	4.8.2 ✓
	158.281 - 156.637	0.540	0.106	0.000	0.006	0.000	0.646	1.000	4.8.2 ✓
	156.637 - 154.993	0.521	0.114	0.000	0.006	0.000	0.636	1.000	4.8.2 ✓
	154.993 - 153.349	0.503	0.122	0.000	0.006	0.000	0.626	1.000	4.8.2 ✓
	153.349 - 151.705	0.660	0.143	0.000	0.009	0.000	0.803	1.000	4.8.2 ✓
	151.705 - 150.061	0.664	0.141	0.000	0.009	0.000	0.805	1.000	4.8.2 ✓
	150.061 - 148.417	0.640	0.155	0.000	0.009	0.000	0.794	1.000	4.8.2 ✓
	148.417 - 146.773	0.620	0.163	0.000	0.009	0.000	0.783	1.000	4.8.2 ✓
	146.773 - 145.129	0.598	0.174	0.000	0.009	0.000	0.772	1.000	4.8.2 ✓
	145.129 - 143.486	0.577	0.183	0.000	0.009	0.000	0.760	1.000	4.8.2 ✓
	143.486 - 141.842	0.764	0.208	0.000	0.013	0.000	0.972	1.000	4.8.2 ✓
	141.842 - 140.198	0.768	0.206	0.000	0.013	0.000	0.973	1.000	4.8.2 ✓
	140.198 - 138.554	0.740	0.220	0.000	0.012	0.000	0.960	1.000	4.8.2 ✓
	138.554 - 136.91	0.714	0.234	0.000	0.012	0.000	0.947	1.000	4.8.2 ✓
	136.91 - 133.08	0.283	0.103	0.000	0.005	0.000	0.387	1.000	4.8.2 ✓
L3	136.91 - 133.08	0.298	0.101	0.000	0.005	0.000	0.399	1.000	4.8.2 ✓

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Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
	133.08 - 132.023	0.463	0.192	0.000	0.008	0.000	0.656	1.000	4.8.2 ✓
	132.023 - 130.965	0.454	0.197	0.000	0.008	0.000	0.651	1.000	4.8.2 ✓
	130.965 - 129.908	0.123	0.538	0.000	0.023	0.001	0.662	1.000	4.8.2 ✓
	129.908 - 128.851	0.122	0.551	0.000	0.023	0.001	0.673	1.000	4.8.2 ✓
	128.851 - 127.793	0.120	0.563	0.000	0.023	0.001	0.684	1.000	4.8.2 ✓
	127.793 - 126.736	0.119	0.575	0.000	0.022	0.001	0.694	1.000	4.8.2 ✓
	126.736 - 125.678	0.117	0.586	0.000	0.022	0.001	0.704	1.000	4.8.2 ✓
	125.678 - 124.621	0.116	0.598	0.000	0.022	0.001	0.714	1.000	4.8.2 ✓
	124.621 - 123.564	0.115	0.608	0.000	0.022	0.001	0.723	1.000	4.8.2 ✓
	123.564 - 122.506	0.125	0.623	0.000	0.024	0.002	0.748	1.000	4.8.2 ✓
	122.506 - 121.449	0.124	0.634	0.000	0.023	0.002	0.758	1.000	4.8.2 ✓
	121.449 - 120.392	0.122	0.645	0.000	0.023	0.002	0.767	1.000	4.8.2 ✓
	120.392 - 119.334	0.121	0.655	0.000	0.023	0.002	0.776	1.000	4.8.2 ✓
	119.334 - 118.277	0.119	0.665	0.000	0.023	0.001	0.785	1.000	4.8.2 ✓
	118.277 - 117.219	0.118	0.675	0.000	0.023	0.001	0.794	1.000	4.8.2 ✓
	117.219 - 116.162	0.116	0.685	0.000	0.023	0.001	0.802	1.000	4.8.2 ✓
	116.162 - 115.105	0.115	0.694	0.000	0.023	0.001	0.810	1.000	4.8.2 ✓
	115.105 - 114.047	0.114	0.703	0.000	0.023	0.001	0.817	1.000	4.8.2 ✓
	114.047 - 112.99	0.125	0.712	0.000	0.027	0.002	0.838	1.000	4.8.2 ✓
L4	112.99 - 111.937	0.112	0.656	0.000	0.024	0.001	0.769	1.000	4.8.2 ✓
	111.937 - 110.885	0.111	0.667	0.000	0.024	0.001	0.778	1.000	4.8.2 ✓
	110.885 - 109.832	0.110	0.677	0.000	0.024	0.001	0.787	1.000	4.8.2 ✓
	109.832 - 108.779	0.108	0.687	0.000	0.024	0.001	0.795	1.000	4.8.2 ✓
	108.779 - 107.727	0.107	0.696	0.000	0.024	0.001	0.804	1.000	4.8.2 ✓
	107.727 - 106.674	0.106	0.705	0.000	0.024	0.001	0.811	1.000	4.8.2 ✓
	106.674 - 105.622	0.105	0.714	0.000	0.024	0.001	0.819	1.000	4.8.2 ✓

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Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	105.622 - 104.569	0.103	0.722	0.000	0.024	0.001	0.826	1.000	4.8.2 ✓
	104.569 - 103.516	0.102	0.731	0.000	0.024	0.001	0.833	1.000	4.8.2 ✓
	103.516 - 102.464	0.101	0.738	0.000	0.023	0.001	0.840	1.000	4.8.2 ✓
	102.464 - 101.411	0.100	0.746	0.000	0.023	0.001	0.847	1.000	4.8.2 ✓
	101.411 - 100.358	0.099	0.754	0.000	0.023	0.001	0.853	1.000	4.8.2 ✓
	100.358 - 99.3058	0.098	0.761	0.000	0.023	0.001	0.859	1.000	4.8.2 ✓
	99.3058 - 98.2532	0.097	0.768	0.000	0.023	0.001	0.865	1.000	4.8.2 ✓
	98.2532 - 97.2005	0.096	0.775	0.000	0.023	0.001	0.871	1.000	4.8.2 ✓
	97.2005 - 96.1479	0.095	0.781	0.000	0.023	0.001	0.877	1.000	4.8.2 ✓
	96.1479 - 95.0953	0.094	0.787	0.000	0.023	0.001	0.882	1.000	4.8.2 ✓
	95.0953 - 94.0426	0.093	0.793	0.000	0.023	0.001	0.887	1.000	4.8.2 ✓
	94.0426 - 92.99	0.092	0.799	0.000	0.023	0.001	0.892	1.000	4.8.2 ✓
	92.99 - 87.99	0.042	0.397	0.000	0.011	0.000	0.439	1.000	4.8.2 ✓
L5	92.99 - 87.99	0.044	0.387	0.000	0.010	0.000	0.431	1.000	4.8.2 ✓
	87.99 - 85.8839	0.082	0.753	0.000	0.019	0.001	0.836	1.000	4.8.2 ✓
	85.8839 - 83.7778	0.081	0.761	0.000	0.019	0.001	0.842	1.000	4.8.2 ✓
	83.7778 - 81.6717	0.079	0.769	0.000	0.019	0.001	0.848	1.000	4.8.2 ✓
	81.6717 - 79.5656	0.078	0.775	0.000	0.019	0.001	0.853	1.000	4.8.2 ✓
	79.5656 - 77.4594	0.076	0.782	0.000	0.019	0.001	0.858	1.000	4.8.2 ✓
	77.4594 - 75.3533	0.075	0.787	0.000	0.019	0.001	0.863	1.000	4.8.2 ✓
	75.3533 - 73.2472	0.074	0.793	0.000	0.018	0.001	0.867	1.000	4.8.2 ✓
	73.2472 - 71.1411	0.072	0.798	0.000	0.018	0.001	0.871	1.000	4.8.2 ✓
	71.1411 - 69.035	0.071	0.803	0.000	0.018	0.001	0.874	1.000	4.8.2 ✓
	69.035 - 66.9289	0.070	0.807	0.000	0.018	0.001	0.877	1.000	4.8.2 ✓
	66.9289 - 64.8228	0.069	0.811	0.000	0.018	0.001	0.880	1.000	4.8.2 ✓
	64.8228 - 62.7167	0.068	0.815	0.000	0.018	0.001	0.883	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.27 - CT5448	Page 41 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 17:11:00 06/14/17
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	62.7167 - 60.6106	0.067	0.818	0.000	0.018	0.001	0.885	1.000	4.8.2 ✓
	60.6106 - 58.5044	0.066	0.821	0.000	0.018	0.001	0.887	1.000	4.8.2 ✓
	58.5044 - 56.3983	0.065	0.824	0.000	0.017	0.001	0.889	1.000	4.8.2 ✓
	56.3983 - 54.2922	0.064	0.827	0.000	0.017	0.001	0.891	1.000	4.8.2 ✓
	54.2922 - 52.1861	0.063	0.829	0.000	0.017	0.001	0.892	1.000	4.8.2 ✓
	52.1861 - 50.08	0.062	0.832	0.000	0.017	0.001	0.894	1.000	4.8.2 ✓
	50.08 - 43.91	0.029	0.411	0.000	0.008	0.000	0.441	1.000	4.8.2 ✓
L6	50.08 - 43.91	0.031	0.402	0.000	0.008	0.000	0.432	1.000	4.8.2 ✓
	43.91 - 41.6516	0.058	0.790	0.000	0.015	0.000	0.848	1.000	4.8.2 ✓
	41.6516 - 39.3932	0.059	0.790	0.000	0.015	0.000	0.849	1.000	4.8.2 ✓
	39.3932 - 37.1347	0.058	0.791	0.000	0.015	0.000	0.849	1.000	4.8.2 ✓
	37.1347 - 34.8763	0.057	0.792	0.000	0.015	0.000	0.849	1.000	4.8.2 ✓
	34.8763 - 32.6179	0.056	0.793	0.000	0.015	0.000	0.849	1.000	4.8.2 ✓
	32.6179 - 30.3595	0.055	0.793	0.000	0.015	0.000	0.848	1.000	4.8.2 ✓
	30.3595 - 28.1011	0.054	0.793	0.000	0.015	0.000	0.848	1.000	4.8.2 ✓
	28.1011 - 25.8426	0.053	0.794	0.000	0.015	0.000	0.847	1.000	4.8.2 ✓
	25.8426 - 23.5842	0.053	0.794	0.000	0.015	0.000	0.846	1.000	4.8.2 ✓
	23.5842 - 21.3258	0.052	0.794	0.000	0.014	0.000	0.846	1.000	4.8.2 ✓
	21.3258 - 19.0674	0.051	0.793	0.000	0.014	0.000	0.845	1.000	4.8.2 ✓
	19.0674 - 16.8089	0.050	0.793	0.000	0.014	0.000	0.844	1.000	4.8.2 ✓
	16.8089 - 14.5505	0.050	0.793	0.000	0.014	0.000	0.843	1.000	4.8.2 ✓
	14.5505 - 12.2921	0.049	0.792	0.000	0.014	0.000	0.841	1.000	4.8.2 ✓
	12.2921 - 10.0337	0.048	0.792	0.000	0.014	0.000	0.840	1.000	4.8.2 ✓
	10.0337 - 7.77526	0.048	0.791	0.000	0.014	0.000	0.839	1.000	4.8.2 ✓
	7.77526 - 5.51684	0.047	0.790	0.000	0.014	0.000	0.837	1.000	4.8.2 ✓
	5.51684 - 3.25842	0.046	0.789	0.000	0.014	0.000	0.836	1.000	4.8.2 ✓

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 17004.27 - CT5448	Page 42 of 42
	Project 183' EEI Monopole - 239 Middle Turnpike Manchester, CT	Date 17:11:00 06/14/17
	Client AT&T Mobility	Designed by TJJ

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	3.25842 - 1	0.046	0.789	0.000	0.014	0.000	0.834	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	184 - 166.5	Pole	TP19.42x15.5x0.1875	1	-6.36	13.20	51.6	Pass
L2	166.5 - 133.08	Pole	TP26.41x18.373x0.25	2	-51.13	66.61	97.3	Pass
L3	133.08 - 112.99	Pole	TP30.28x25.0648x0.375	3	-23.52	187.93	83.8	Pass
L4	112.99 - 87.99	Pole	TP35.88x30.28x0.415	4	-29.01	315.05	89.2	Pass
L5	87.99 - 43.91	Pole	TP44.88x33.93x0.485	5	-44.64	723.51	89.4	Pass
L6	43.91 - 1	Pole	TP53.5x42.5334x0.54	6	-51.03	884.57	84.9	Pass
Summary								
Pole (L2)							97.3	Pass
Base Plate							84.7	Pass
RATING =							97.3	Pass

Caisson Foundation:

Input Data:

Shear Force =	S := 46k	<i>USER INPUT-FROM tnxTower</i>
Overturing Moment =	M := 5770ft-k	<i>USER INPUT-FROM tnxTower</i>
Applied Axial Load =	A1 := 67k	<i>USER INPUT-FROM tnxTower</i>
Bending Moment =	Mu := 6045ft-k	<i>USER INPUT-FROM LPILE</i>
Moment Capacity =	Mn := 7489ft-k	<i>USER INPUT-FROM LPILE</i>
Foundation Diameter =	d := 7.0ft	<i>USER INPUT</i>
Overall Length of Caisson =	Lc := 32ft	<i>USER INPUT</i>
Depth From Top of Caisson to Grade =	Lpag := 1.0ft	<i>USER INPUT</i>
Number of Rebar =	n := 27	<i>USER INPUT</i>
Area of Rebar =	Ar := 1.560in ²	<i>USER INPUT</i>
Rebar Yield Strength =	fy := 60ksi	<i>USER INPUT</i>
Concrete Comp Strength =	fc := 4ksi	<i>USER INPUT</i>

Check Moment Capacity:

Factor of Safety =	$FS := \frac{0.9Mn}{Mu} = 1.115$
Factor of Safety Required =	FS _{reqd} := 1.0
	FOSCheck := if(FS ≥ FS _{reqd} , "OK", "NO GOOD")
	FOSCheck = "OK"

Manchester Green Caisson Analysis.lpo

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1700400.WI\27_Manchester Central
CT5448\04_Structural\Tower\Backup Documentation\Foundation\
Name of input data file: Manchester Green Caisson Analysis.lpd
Name of output file: Manchester Green Caisson Analysis.lpo
Name of plot output file: Manchester Green Caisson Analysis.lpp
Name of runtime file: Manchester Green Caisson Analysis.lpr

Time and Date of Analysis

Date: June 14, 2017 Time: 17:15:38

Problem Title

17004.27 - CT5448

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Manchester Green Caisson Analysis.lpo

Basic Program Options:

Analysis Type 3:

- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:

- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

- Pile Length = 384.00 in
- Depth of ground surface below top of pile = 12.00 in
- Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	84.00000000	2443920.	5541.8000	3604997.
2	384.0000	84.00000000	2443920.	5541.8000	3604997.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness

Manchester Green Caisson Analysis.lpo

that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 60.000 in
p-y subgrade modulus k for top of soil layer = 1.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 1.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 60.000 in
Distance from top of pile to bottom of layer = 120.000 in
p-y subgrade modulus k for top of soil layer = 40.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 40.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 120.000 in
Distance from top of pile to bottom of layer = 192.000 in
p-y subgrade modulus k for top of soil layer = 40.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 40.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 192.000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 200.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 200.000 lbs/in**3

(Depth of lowest layer extends 36.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800

Manchester Green Caisson Analysis.lpo

2	60.00	0.05800
3	60.00	0.04100
4	120.00	0.04100
5	120.00	0.04100
6	192.00	0.04100
7	192.00	0.04100
8	420.00	0.04100

 Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	30.00	-----	-----
2	60.000	0.00000	30.00	-----	-----
3	60.000	0.00000	38.00	-----	-----
4	120.000	0.00000	38.00	-----	-----
5	120.000	0.00000	38.00	-----	-----
6	192.000	0.00000	38.00	-----	-----
7	192.000	0.00000	38.00	-----	-----
8	420.000	0.00000	38.00	-----	-----

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k_rm are reported only for weak rock strata.

 Loading Type

Static loading criteria was used for computation of p-y curves.

 Pile-head Loading and Pile-head Fixity Conditions

Manchester Green Caisson Analysis.lpo

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 46000.000 lbs

Bending moment at pile head = 69240000.000 in-lbs

Axial load at pile head = 67000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 17000.000 lbs

Bending moment at pile head = 26604000.000 in-lbs

Axial load at pile head = 67000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 84.0000 in

Material Properties:

Compressive Strength of Concrete = 4.000 kip/in**2

Yield Stress of Reinforcement = 60. kip/in**2

Modulus of Elasticity of Reinforcement = 29000. kip/in**2

Number of Reinforcing Bars = 27

Area of Single Bar = 1.56000 in**2

Number of Rows of Reinforcing Bars = 27

Manchester Green Caisson Analysis.lpo

Area of Steel = 42.120 in**2
 Area of Shaft = 5541.769 in**2
 Percentage of Steel Reinforcement = 0.760 percent
 Cover Thickness (edge to bar center) = 5.688 in

Unfactored Axial Squash Load Capacity = 21226.01 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	36.251
2	1.560	35.761
3	1.560	34.787
4	1.560	33.343
5	1.560	31.448
6	1.560	29.127
7	1.560	26.413
8	1.560	23.341
9	1.560	19.954
10	1.560	16.297
11	1.560	12.420
12	1.560	8.374
13	1.560	4.216
14	1.560	0.000
15	1.560	-4.216
16	1.560	-8.374
17	1.560	-12.420
18	1.560	-16.297
19	1.560	-19.954
20	1.560	-23.341
21	1.560	-26.413
22	1.560	-29.127
23	1.560	-31.448
24	1.560	-33.343
25	1.560	-34.787
26	1.560	-35.761
27	1.560	-36.251

Axial Thrust Force = 68000.00 lbs

Bending Max. Steel Moment Stress in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi
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Manchester Green Caisson Analysis.lpo

psi

6045486. 752.98213	9.672778E+12	6.250000E-07	0.00002956	47.29277676	105.07550
12038485. 1413.60868	9.630788E+12	0.00000125	0.00005593	44.74503654	197.27117
17977041. 2073.18233	9.587755E+12	0.00000188	0.00008227	43.87642604	288.03229
23862441. 2732.74644	9.544977E+12	0.00000250	0.00010860	43.44198936	377.48771
29697671. 3394.97183	9.503255E+12	0.00000313	0.00013503	43.21069318	465.94861
29697671. 5985.51126	7.919379E+12	0.00000375	0.00008704	23.21188098	300.07163
29697671. 7042.14774	6.788039E+12	0.00000438	0.00009952	22.74645227	341.71697
29697671. 8098.40444	5.939534E+12	0.00000500	0.00011200	22.39999992	383.12555
29697671. 9149.02895	5.279586E+12	0.00000563	0.00012468	22.16506380	424.91259
29697671. 10206.86221	4.751627E+12	0.00000625	0.00013711	21.93734246	465.56845
29697671. 11264.30970	4.319661E+12	0.00000688	0.00014955	21.75295991	505.98925
29697671. 12321.36870	3.959689E+12	0.00000750	0.00016201	21.60109395	546.17435
29697671. 13378.03776	3.655098E+12	0.00000813	0.00017448	21.47424692	586.12298
29697671. 14434.31460	3.394020E+12	0.00000875	0.00018696	21.36706656	625.83447
29697671. 15490.19637	3.167752E+12	0.00000938	0.00019946	21.27563006	665.30817
29697671. 16545.68076	2.969767E+12	0.00001000	0.00021197	21.19699341	704.54339
29697671. 17600.76599	2.795075E+12	0.00001063	0.00022449	21.12890357	743.53935
29697671. 18655.44948	2.639793E+12	0.00001125	0.00023703	21.06961066	782.29538
29697671. 19709.72878	2.500856E+12	0.00001188	0.00024959	21.01773280	820.81076
29697671. 20753.51152	2.375814E+12	0.00001250	0.00026250	20.99999875	860.17847
29697671. 21797.52834	2.262680E+12	0.00001313	0.00027541	20.98333865	899.21825
29697671. 22850.75682	2.159831E+12	0.00001375	0.00028800	20.94509178	936.97257
29697671. 23903.53709	2.065925E+12	0.00001438	0.00030060	20.91124588	974.48720

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29697671.	1.979845E+12	0.00001500	0.00031322	20.88125271	1011.76114
24955.86835					
29697671.	1.900651E+12	0.00001563	0.00032585	20.85465914	1048.79371
26007.74640					
30075097.	1.850775E+12	0.00001625	0.00033851	20.83107716	1085.58401
27059.16927					
31156791.	1.846328E+12	0.00001688	0.00035117	20.81018132	1122.13138
28110.13245					
32237340.	1.842134E+12	0.00001750	0.00036385	20.79168874	1158.43495
29160.63345					
33316738.	1.838165E+12	0.00001813	0.00037655	20.77535659	1194.49388
30210.66923					
34394978.	1.834399E+12	0.00001875	0.00038927	20.76097459	1230.30734
31260.23666					
35472054.	1.830816E+12	0.00001938	0.00040200	20.74835998	1265.87451
32309.33238					
36547954.	1.827398E+12	0.00002000	0.00041475	20.73735005	1301.19439
33357.95467					
37622684.	1.824130E+12	0.00002063	0.00042751	20.72780961	1336.26643
34406.09713					
38696229.	1.820999E+12	0.00002125	0.00044029	20.71961099	1371.08956
35453.75853					
39768581.	1.817992E+12	0.00002188	0.00045309	20.71264404	1405.66288
36500.93579					
40839735.	1.815099E+12	0.00002250	0.00046590	20.70681113	1439.98550
37547.62565					
41909691.	1.812311E+12	0.00002313	0.00047873	20.70202965	1474.05680
38593.82183					
42978434.	1.809618E+12	0.00002375	0.00049158	20.69821697	1507.87557
39639.52408					
44045954.	1.807013E+12	0.00002438	0.00050445	20.69530302	1541.44087
40684.72925					
46177325.	1.802042E+12	0.00002563	0.00053023	20.69193846	1607.80813
42773.62591					
48303739.	1.797348E+12	0.00002688	0.00055608	20.69150037	1673.15084
44860.48568					
50425145.	1.792894E+12	0.00002813	0.00058201	20.69363827	1737.46159
46945.27618					
52541477.	1.788646E+12	0.00002938	0.00060801	20.69805676	1800.73241
49027.96889					
54652668.	1.784577E+12	0.00003063	0.00063408	20.70451051	1862.95524
51108.53370					
56758669.	1.780664E+12	0.00003188	0.00066022	20.71279925	1924.12229
53186.93440					
58859415.	1.776888E+12	0.00003313	0.00068644	20.72275025	1984.22527
55263.13736					
60954825.	1.773231E+12	0.00003438	0.00071274	20.73421079	2043.25524
57337.11404					
63044845.	1.769680E+12	0.00003563	0.00073911	20.74706072	2101.20390

Manchester Green Caisson Analysis.lpo

59408.82442						
64906951.	1.760188E+12	0.00003688	0.00076462	20.73556262	2155.98427	
60000.00000						
66391515.	1.741417E+12	0.00003813	0.00078859	20.68423802	2206.25287	
60000.00000						
67696053.	1.719265E+12	0.00003938	0.00081181	20.61742491	2253.92675	
60000.00000						
68852580.	1.694833E+12	0.00004063	0.00083441	20.53937906	2299.33974	
60000.00000						
69877906.	1.668726E+12	0.00004188	0.00085643	20.45215827	2342.66020	
60000.00000						
70859716.	1.643124E+12	0.00004313	0.00087830	20.36633939	2384.79779	
60000.00000						
71696681.	1.615700E+12	0.00004438	0.00089947	20.26968080	2424.72431	
60000.00000						
72531391.	1.589729E+12	0.00004563	0.00092068	20.17920560	2463.92710	
60000.00000						
73247718.	1.562618E+12	0.00004688	0.00094128	20.08062440	2501.19271	
60000.00000						
73943163.	1.536481E+12	0.00004813	0.00096181	19.98575324	2537.57702	
60000.00000						
74620553.	1.511302E+12	0.00004938	0.00098229	19.89448196	2573.10302	
60000.00000						
75192526.	1.485284E+12	0.00005063	0.00100218	19.79609102	2606.84830	
60000.00000						
75762744.	1.460487E+12	0.00005188	0.00102210	19.70310491	2639.94975	
60000.00000						
76331172.	1.436822E+12	0.00005313	0.00104205	19.61514312	2672.40362	
60000.00000						
76873086.	1.413758E+12	0.00005438	0.00106537	19.59297556	2709.66244	
60000.00000						
77327818.	1.390163E+12	0.00005563	0.00108423	19.49183089	2738.82731	
60000.00000						
77781116.	1.367580E+12	0.00005688	0.00110313	19.39569801	2767.41323	
60000.00000						
78232950.	1.345943E+12	0.00005813	0.00112206	19.30425400	2795.41686	
60000.00000						
78644764.	1.324543E+12	0.00005938	0.00114071	19.21191627	2822.36440	
60000.00000						
79004468.	1.303166E+12	0.00006063	0.00115897	19.11705762	2848.13563	
60000.00000						
79362901.	1.282633E+12	0.00006188	0.00117727	19.02651232	2873.36134	
60000.00000						
79720027.	1.262892E+12	0.00006313	0.00119559	18.94002253	2898.03837	
60000.00000						
80075877.	1.243897E+12	0.00006438	0.00121394	18.85736293	2922.16466	
60000.00000						
80422933.	1.225492E+12	0.00006563	0.00123226	18.77726179	2945.64527	
60000.00000						

Manchester Green Caisson Analysis.lpo

80702461.	1.206766E+12	0.00006688	0.00124999	18.69144541	2967.77944
60000.00000					
80980839.	1.188710E+12	0.00006813	0.00126775	18.60918635	2989.39607
60000.00000					
81258069.	1.171287E+12	0.00006938	0.00128554	18.53029686	3010.49279
60000.00000					
81534133.	1.154466E+12	0.00007063	0.00130336	18.45459920	3031.06693
60000.00000					
81809031.	1.138213E+12	0.00007188	0.00132120	18.38193065	3051.11603
60000.00000					
82082754.	1.122499E+12	0.00007313	0.00133908	18.31213850	3070.63748
60000.00000					
82338500.	1.107072E+12	0.00007438	0.00135680	18.24267679	3089.43221
60000.00000					
82833040.	1.077503E+12	0.00007688	0.00139772	18.18173665	3130.99388
60000.00000					
83238186.	1.048670E+12	0.00007938	0.00143127	18.03174323	3162.53788
60000.00000					
83639541.	1.021552E+12	0.00008188	0.00146492	17.89220649	3192.21081
60000.00000					
84037052.	9.959947E+11	0.00008438	0.00149869	17.76221520	3219.99419
60000.00000					
84368189.	9.711446E+11	0.00008688	0.00153167	17.63078696	3245.18382
60000.00000					
84664236.	9.472921E+11	0.00008938	0.00156432	17.50284845	3268.22861
60000.00000					
84956846.	9.247004E+11	0.00009188	0.00159706	17.38297838	3289.48397
60000.00000					
85245977.	9.032686E+11	0.00009438	0.00162991	17.27055091	3308.93238
60000.00000					
85531570.	8.829065E+11	0.00009688	0.00166286	17.16500276	3326.55582
60000.00000					
85813584.	8.635329E+11	0.00009938	0.00169592	17.06583077	3342.33604
60000.00000					
86033701.	8.445026E+11	0.00010188	0.00172808	16.96271092	3355.83861
60000.00000					
86239159.	8.262434E+11	0.00010438	0.00176014	16.86360651	3367.50844
60000.00000					
86654761.	8.108048E+11	0.00010688	0.00179550	16.80000025	3378.35876
60000.00000					
86720161.	7.928700E+11	0.00010938	0.00183540	16.78083175	3388.01287
60000.00000					
86904743.	7.768022E+11	0.00011188	0.00186651	16.68385524	3393.51326
60000.00000					
87086358.	7.614108E+11	0.00011438	0.00189771	16.59202319	3397.34852
60000.00000					
87264968.	7.466521E+11	0.00011688	0.00192902	16.50502020	3399.50092
60000.00000					
87438945.	7.324728E+11	0.00011938	0.00196044	16.42255837	3398.14746

Manchester Green Caisson Analysis.lpo

60000.00000						
87569598.	7.185198E+11	0.00012188	0.00199106	16.33686465	3390.52111	
60000.00000						
87684094.	7.049977E+11	0.00012438	0.00202139	16.25240260	3388.30561	
60000.00000						
87797232.	6.919979E+11	0.00012688	0.00205183	16.17206115	3393.06070	
60000.00000						
87909035.	6.794901E+11	0.00012938	0.00208237	16.09561998	3396.59379	
60000.00000						
88019439.	6.674460E+11	0.00013188	0.00211302	16.02286381	3398.88975	
60000.00000						
88128425.	6.558394E+11	0.00013438	0.00214376	15.95359987	3399.93325	
60000.00000						
88234339.	6.446344E+11	0.00013688	0.00217471	15.88829881	3395.40131	
60000.00000						
88338404.	6.338181E+11	0.00013938	0.00220579	15.82627970	3388.57707	
60000.00000						
88441464.	6.233760E+11	0.00014188	0.00223695	15.76704937	3383.69706	
60000.00000						
88543492.	6.132883E+11	0.00014438	0.00226820	15.71047014	3388.87054	
60000.00000						
88644486.	6.035369E+11	0.00014688	0.00229954	15.65641683	3393.07400	
60000.00000						
88729817.	5.940071E+11	0.00014938	0.00233046	15.60142475	3396.23572	
60000.00000						
88795543.	5.846620E+11	0.00015188	0.00236083	15.54459018	3398.39747	
60000.00000						
88860389.	5.756139E+11	0.00015438	0.00239129	15.49013633	3399.65306	
60000.00000						
88924017.	5.668463E+11	0.00015688	0.00242185	15.43809325	3399.22870	
60000.00000						
88924017.	5.579546E+11	0.00015938	0.00245437	15.39999908	3392.94688	
60000.00000						
88924017.	5.493376E+11	0.00016188	0.00249287	15.39999908	3385.08602	
60000.00000						
88931021.	5.410252E+11	0.00016438	0.00253137	15.39999908	3379.85511	
60000.00000						
89241353.	5.347796E+11	0.00016688	0.00256764	15.38660592	3386.01670	
60000.00000						
89294505.	5.272000E+11	0.00016938	0.00259742	15.33529633	3389.80540	
60000.00000						
89347184.	5.198382E+11	0.00017188	0.00262726	15.28584927	3393.00722	
60000.00000						
89399399.	5.126847E+11	0.00017438	0.00265716	15.23819214	3395.61579	
60000.00000						
89502398.	4.989681E+11	0.00017938	0.00271717	15.14796728	3399.02664	
60000.00000						
89602993.	4.859823E+11	0.00018438	0.00277749	15.06436139	3398.89425	
60000.00000						

Manchester Green Caisson Analysis.lpo

89698718. 60000.00000	4.736566E+11	0.00018938	0.00283840	14.98827320	3389.27292
89776167. 60000.00000	4.618710E+11	0.00019438	0.00289844	14.91158420	3379.88349
89827914. 60000.00000	4.505475E+11	0.00019938	0.00295711	14.83189613	3372.28517
89878852. 60000.00000	4.397742E+11	0.00020438	0.00301594	14.75687689	3380.53148
89928978. 60000.00000	4.295115E+11	0.00020938	0.00307492	14.68620855	3387.36107
89978267. 60000.00000	4.197237E+11	0.00021438	0.00313408	14.61960071	3392.74867
90026697. 60000.00000	4.103781E+11	0.00021938	0.00319340	14.55679053	3396.66821
90074252. 60000.00000	4.014451E+11	0.00022438	0.00325289	14.49754018	3399.09279
90120903. 60000.00000	3.928977E+11	0.00022938	0.00331255	14.44163185	3399.99458
90164340. 60000.00000	3.847012E+11	0.00023438	0.00337274	14.39035481	3393.04873
90207143. 60000.00000	3.768445E+11	0.00023938	0.00343306	14.34178144	3385.43240
90243476. 60000.00000	3.692828E+11	0.00024438	0.00349434	14.29907852	3377.56536
90275559. 60000.00000	3.620073E+11	0.00024938	0.00355625	14.26065141	3369.52941
90307147. 60000.00000	3.550158E+11	0.00025438	0.00361829	14.22422701	3361.46039
90338203. 60000.00000	3.482919E+11	0.00025938	0.00368045	14.18969518	3366.13922
90354594. 60000.00000	3.417668E+11	0.00026438	0.00374312	14.15835768	3374.34083
90355109. 60000.00000	3.354250E+11	0.00026938	0.00380473	14.12429148	3381.12387

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 89865.05218
in-kip

Axial Thrust Force = 68000.00 lbs

Bending Max. Steel Moment Stress in-lbs psi	Bending Stiffness lb-in ²	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi
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Manchester Green Caisson Analysis.lpo

6045486. 752.98213	9.672778E+12	6.250000E-07	0.00002956	47.29277676	105.07550
12038485. 1413.60868	9.630788E+12	0.00000125	0.00005593	44.74503654	197.27117
17977041. 2073.18233	9.587755E+12	0.00000188	0.00008227	43.87642604	288.03229
23862441. 2732.74644	9.544977E+12	0.00000250	0.00010860	43.44198936	377.48771
29697671. 3394.97183	9.503255E+12	0.00000313	0.00013503	43.21069318	465.94861
29697671. 5985.51126	7.919379E+12	0.00000375	0.00008704	23.21188098	300.07163
29697671. 7042.14774	6.788039E+12	0.00000438	0.00009952	22.74645227	341.71697
29697671. 8098.40444	5.939534E+12	0.00000500	0.00011200	22.39999992	383.12555
29697671. 9149.02895	5.279586E+12	0.00000563	0.00012468	22.16506380	424.91259
29697671. 10206.86221	4.751627E+12	0.00000625	0.00013711	21.93734246	465.56845
29697671. 11264.30970	4.319661E+12	0.00000688	0.00014955	21.75295991	505.98925
29697671. 12321.36870	3.959689E+12	0.00000750	0.00016201	21.60109395	546.17435
29697671. 13378.03776	3.655098E+12	0.00000813	0.00017448	21.47424692	586.12298
29697671. 14434.31460	3.394020E+12	0.00000875	0.00018696	21.36706656	625.83447
29697671. 15490.19637	3.167752E+12	0.00000938	0.00019946	21.27563006	665.30817
29697671. 16545.68076	2.969767E+12	0.00001000	0.00021197	21.19699341	704.54339
29697671. 17600.76599	2.795075E+12	0.00001063	0.00022449	21.12890357	743.53935
29697671. 18655.44948	2.639793E+12	0.00001125	0.00023703	21.06961066	782.29538
29697671. 19709.72878	2.500856E+12	0.00001188	0.00024959	21.01773280	820.81076
29697671. 20753.51152	2.375814E+12	0.00001250	0.00026250	20.99999875	860.17847
29697671. 21797.52834	2.262680E+12	0.00001313	0.00027541	20.98333865	899.21825
29697671. 22850.75682	2.159831E+12	0.00001375	0.00028800	20.94509178	936.97257
29697671. 23903.53709	2.065925E+12	0.00001438	0.00030060	20.91124588	974.48720
29697671.	1.979845E+12	0.00001500	0.00031322	20.88125271	1011.76114

Manchester Green Caisson Analysis.lpo

24955.86835						
29697671.	1.900651E+12	0.00001563	0.00032585	20.85465914	1048.79371	
26007.74640						
30075097.	1.850775E+12	0.00001625	0.00033851	20.83107716	1085.58401	
27059.16927						
31156791.	1.846328E+12	0.00001688	0.00035117	20.81018132	1122.13138	
28110.13245						
32237340.	1.842134E+12	0.00001750	0.00036385	20.79168874	1158.43495	
29160.63345						
33316738.	1.838165E+12	0.00001813	0.00037655	20.77535659	1194.49388	
30210.66923						
34394978.	1.834399E+12	0.00001875	0.00038927	20.76097459	1230.30734	
31260.23666						
35472054.	1.830816E+12	0.00001938	0.00040200	20.74835998	1265.87451	
32309.33238						
36547954.	1.827398E+12	0.00002000	0.00041475	20.73735005	1301.19439	
33357.95467						
37622684.	1.824130E+12	0.00002063	0.00042751	20.72780961	1336.26643	
34406.09713						
38696229.	1.820999E+12	0.00002125	0.00044029	20.71961099	1371.08956	
35453.75853						
39768581.	1.817992E+12	0.00002188	0.00045309	20.71264404	1405.66288	
36500.93579						
40839735.	1.815099E+12	0.00002250	0.00046590	20.70681113	1439.98550	
37547.62565						
41909691.	1.812311E+12	0.00002313	0.00047873	20.70202965	1474.05680	
38593.82183						
42978434.	1.809618E+12	0.00002375	0.00049158	20.69821697	1507.87557	
39639.52408						
44045954.	1.807013E+12	0.00002438	0.00050445	20.69530302	1541.44087	
40684.72925						
46177325.	1.802042E+12	0.00002563	0.00053023	20.69193846	1607.80813	
42773.62591						
48303739.	1.797348E+12	0.00002688	0.00055608	20.69150037	1673.15084	
44860.48568						
50425145.	1.792894E+12	0.00002813	0.00058201	20.69363827	1737.46159	
46945.27618						
52541477.	1.788646E+12	0.00002938	0.00060801	20.69805676	1800.73241	
49027.96889						
54652668.	1.784577E+12	0.00003063	0.00063408	20.70451051	1862.95524	
51108.53370						
56758669.	1.780664E+12	0.00003188	0.00066022	20.71279925	1924.12229	
53186.93440						
58859415.	1.776888E+12	0.00003313	0.00068644	20.72275025	1984.22527	
55263.13736						
60954825.	1.773231E+12	0.00003438	0.00071274	20.73421079	2043.25524	
57337.11404						
63044845.	1.769680E+12	0.00003563	0.00073911	20.74706072	2101.20390	
59408.82442						

Manchester Green Caisson Analysis.lpo

64906951. 60000.00000	1.760188E+12	0.00003688	0.00076462	20.73556262	2155.98427
66391515. 60000.00000	1.741417E+12	0.00003813	0.00078859	20.68423802	2206.25287
67696053. 60000.00000	1.719265E+12	0.00003938	0.00081181	20.61742491	2253.92675
68852580. 60000.00000	1.694833E+12	0.00004063	0.00083441	20.53937906	2299.33974
69877906. 60000.00000	1.668726E+12	0.00004188	0.00085643	20.45215827	2342.66020
70859716. 60000.00000	1.643124E+12	0.00004313	0.00087830	20.36633939	2384.79779
71696681. 60000.00000	1.615700E+12	0.00004438	0.00089947	20.26968080	2424.72431
72531391. 60000.00000	1.589729E+12	0.00004563	0.00092068	20.17920560	2463.92710
73247718. 60000.00000	1.562618E+12	0.00004688	0.00094128	20.08062440	2501.19271
73943163. 60000.00000	1.536481E+12	0.00004813	0.00096181	19.98575324	2537.57702
74620553. 60000.00000	1.511302E+12	0.00004938	0.00098229	19.89448196	2573.10302
75192526. 60000.00000	1.485284E+12	0.00005063	0.00100218	19.79609102	2606.84830
75762744. 60000.00000	1.460487E+12	0.00005188	0.00102210	19.70310491	2639.94975
76331172. 60000.00000	1.436822E+12	0.00005313	0.00104205	19.61514312	2672.40362
76873086. 60000.00000	1.413758E+12	0.00005438	0.00106537	19.59297556	2709.66244
77327818. 60000.00000	1.390163E+12	0.00005563	0.00108423	19.49183089	2738.82731
77781116. 60000.00000	1.367580E+12	0.00005688	0.00110313	19.39569801	2767.41323
78232950. 60000.00000	1.345943E+12	0.00005813	0.00112206	19.30425400	2795.41686
78644764. 60000.00000	1.324543E+12	0.00005938	0.00114071	19.21191627	2822.36440
79004468. 60000.00000	1.303166E+12	0.00006063	0.00115897	19.11705762	2848.13563
79362901. 60000.00000	1.282633E+12	0.00006188	0.00117727	19.02651232	2873.36134
79720027. 60000.00000	1.262892E+12	0.00006313	0.00119559	18.94002253	2898.03837
80075877. 60000.00000	1.243897E+12	0.00006438	0.00121394	18.85736293	2922.16466
80422933. 60000.00000	1.225492E+12	0.00006563	0.00123226	18.77726179	2945.64527
80702461. 60000.00000	1.206766E+12	0.00006688	0.00124999	18.69144541	2967.77944

Manchester Green Caisson Analysis.lpo

60000.00000						
80980839.	1.188710E+12	0.00006813	0.00126775	18.60918635	2989.39607	
60000.00000						
81258069.	1.171287E+12	0.00006938	0.00128554	18.53029686	3010.49279	
60000.00000						
81534133.	1.154466E+12	0.00007063	0.00130336	18.45459920	3031.06693	
60000.00000						
81809031.	1.138213E+12	0.00007188	0.00132120	18.38193065	3051.11603	
60000.00000						
82082754.	1.122499E+12	0.00007313	0.00133908	18.31213850	3070.63748	
60000.00000						
82338500.	1.107072E+12	0.00007438	0.00135680	18.24267679	3089.43221	
60000.00000						
82833040.	1.077503E+12	0.00007688	0.00139772	18.18173665	3130.99388	
60000.00000						
83238186.	1.048670E+12	0.00007938	0.00143127	18.03174323	3162.53788	
60000.00000						
83639541.	1.021552E+12	0.00008188	0.00146492	17.89220649	3192.21081	
60000.00000						
84037052.	9.959947E+11	0.00008438	0.00149869	17.76221520	3219.99419	
60000.00000						
84368189.	9.711446E+11	0.00008688	0.00153167	17.63078696	3245.18382	
60000.00000						
84664236.	9.472921E+11	0.00008938	0.00156432	17.50284845	3268.22861	
60000.00000						
84956846.	9.247004E+11	0.00009188	0.00159706	17.38297838	3289.48397	
60000.00000						
85245977.	9.032686E+11	0.00009438	0.00162991	17.27055091	3308.93238	
60000.00000						
85531570.	8.829065E+11	0.00009688	0.00166286	17.16500276	3326.55582	
60000.00000						
85813584.	8.635329E+11	0.00009938	0.00169592	17.06583077	3342.33604	
60000.00000						
86033701.	8.445026E+11	0.00010188	0.00172808	16.96271092	3355.83861	
60000.00000						
86239159.	8.262434E+11	0.00010438	0.00176014	16.86360651	3367.50844	
60000.00000						
86654761.	8.108048E+11	0.00010688	0.00179550	16.80000025	3378.35876	
60000.00000						
86720161.	7.928700E+11	0.00010938	0.00183540	16.78083175	3388.01287	
60000.00000						
86904743.	7.768022E+11	0.00011188	0.00186651	16.68385524	3393.51326	
60000.00000						
87086358.	7.614108E+11	0.00011438	0.00189771	16.59202319	3397.34852	
60000.00000						
87264968.	7.466521E+11	0.00011688	0.00192902	16.50502020	3399.50092	
60000.00000						
87438945.	7.324728E+11	0.00011938	0.00196044	16.42255837	3398.14746	
60000.00000						

Manchester Green Caisson Analysis.lpo

87569598.	7.185198E+11	0.00012188	0.00199106	16.33686465	3390.52111
60000.00000					
87684094.	7.049977E+11	0.00012438	0.00202139	16.25240260	3388.30561
60000.00000					
87797232.	6.919979E+11	0.00012688	0.00205183	16.17206115	3393.06070
60000.00000					
87909035.	6.794901E+11	0.00012938	0.00208237	16.09561998	3396.59379
60000.00000					
88019439.	6.674460E+11	0.00013188	0.00211302	16.02286381	3398.88975
60000.00000					
88128425.	6.558394E+11	0.00013438	0.00214376	15.95359987	3399.93325
60000.00000					
88234339.	6.446344E+11	0.00013688	0.00217471	15.88829881	3395.40131
60000.00000					
88338404.	6.338181E+11	0.00013938	0.00220579	15.82627970	3388.57707
60000.00000					
88441464.	6.233760E+11	0.00014188	0.00223695	15.76704937	3383.69706
60000.00000					
88543492.	6.132883E+11	0.00014438	0.00226820	15.71047014	3388.87054
60000.00000					
88644486.	6.035369E+11	0.00014688	0.00229954	15.65641683	3393.07400
60000.00000					
88729817.	5.940071E+11	0.00014938	0.00233046	15.60142475	3396.23572
60000.00000					
88795543.	5.846620E+11	0.00015188	0.00236083	15.54459018	3398.39747
60000.00000					
88860389.	5.756139E+11	0.00015438	0.00239129	15.49013633	3399.65306
60000.00000					
88924017.	5.668463E+11	0.00015688	0.00242185	15.43809325	3399.22870
60000.00000					
88924017.	5.579546E+11	0.00015938	0.00245437	15.39999908	3392.94688
60000.00000					
88924017.	5.493376E+11	0.00016188	0.00249287	15.39999908	3385.08602
60000.00000					
88931021.	5.410252E+11	0.00016438	0.00253137	15.39999908	3379.85511
60000.00000					
89241353.	5.347796E+11	0.00016688	0.00256764	15.38660592	3386.01670
60000.00000					
89294505.	5.272000E+11	0.00016938	0.00259742	15.33529633	3389.80540
60000.00000					
89347184.	5.198382E+11	0.00017188	0.00262726	15.28584927	3393.00722
60000.00000					
89399399.	5.126847E+11	0.00017438	0.00265716	15.23819214	3395.61579
60000.00000					
89502398.	4.989681E+11	0.00017938	0.00271717	15.14796728	3399.02664
60000.00000					
89602993.	4.859823E+11	0.00018438	0.00277749	15.06436139	3398.89425
60000.00000					
89698718.	4.736566E+11	0.00018938	0.00283840	14.98827320	3389.27292

Manchester Green Caisson Analysis.lpo

60000.00000	89776167.	4.618710E+11	0.00019438	0.00289844	14.91158420	3379.88349
60000.00000	89827914.	4.505475E+11	0.00019938	0.00295711	14.83189613	3372.28517
60000.00000	89878852.	4.397742E+11	0.00020438	0.00301594	14.75687689	3380.53148
60000.00000	89928978.	4.295115E+11	0.00020938	0.00307492	14.68620855	3387.36107
60000.00000	89978267.	4.197237E+11	0.00021438	0.00313408	14.61960071	3392.74867
60000.00000	90026697.	4.103781E+11	0.00021938	0.00319340	14.55679053	3396.66821
60000.00000	90074252.	4.014451E+11	0.00022438	0.00325289	14.49754018	3399.09279
60000.00000	90120903.	3.928977E+11	0.00022938	0.00331255	14.44163185	3399.99458
60000.00000	90164340.	3.847012E+11	0.00023438	0.00337274	14.39035481	3393.04873
60000.00000	90207143.	3.768445E+11	0.00023938	0.00343306	14.34178144	3385.43240
60000.00000	90243476.	3.692828E+11	0.00024438	0.00349434	14.29907852	3377.56536
60000.00000	90275559.	3.620073E+11	0.00024938	0.00355625	14.26065141	3369.52941
60000.00000	90307147.	3.550158E+11	0.00025438	0.00361829	14.22422701	3361.46039
60000.00000	90338203.	3.482919E+11	0.00025938	0.00368045	14.18969518	3366.13922
60000.00000	90354594.	3.417668E+11	0.00026438	0.00374312	14.15835768	3374.34083
60000.00000	90355109.	3.354250E+11	0.00026938	0.00380473	14.12429148	3381.12387

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 89865.05218
in-kip

 Computed Values of Load Distribution and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
 Specified shear force at pile head = 46000.000 lbs
 Specified moment at pile head = 69240000.000 in-lbs
 Specified axial load at pile head = 67000.000 lbs

Manchester Green Caisson Analysis.lpo

Depth Es*h X F/L in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in
0.000	1.763	6.92E+07	46000.	-0.012192	1202.014	1.68E+12	0.000
0.000							
30.720	1.408	7.07E+07	45740.	-0.010903	1226.681	1.65E+12	-26.358
71.885							
61.440	1.094	7.21E+07	41205.	-0.009554	1250.891	1.60E+12	-1749.279
6142.217							
92.160	0.821530	7.24E+07	-22799.	-0.008157	1256.860	1.59E+12	-2323.563
10861.							
122.880	0.592101	7.06E+07	-96574.	-0.006794	1225.754	1.65E+12	-2469.917
16018.							
153.600	0.402942	6.65E+07	-1.69E+05	-0.005546	1155.550	1.74E+12	-2175.987
20737.							
184.320	0.249944	6.04E+07	-2.28E+05	-0.004437	1050.312	1.77E+12	-1656.888
25456.							
215.040	0.129003	5.18E+07	-3.43E+05	-0.003464	902.573	1.79E+12	-3992.216
1.19E+05							
245.760	0.035214	3.96E+07	-4.39E+05	-0.002680	692.748	1.82E+12	-1608.849
1.75E+05							
276.480	-0.038919	2.59E+07	-4.33E+05	-0.002273	457.514	9.53E+12	2017.230
1.99E+05							
307.200	-0.107672	1.39E+07	-3.40E+05	-0.002210	251.667	9.61E+12	3596.533
1.28E+05							
337.920	-0.175029	5.32E+06	-2.19E+05	-0.002180	103.471	9.67E+12	4186.705
91853.							
368.640	-0.241834	6.39E+05	-81623.	-0.002172	23.074	9.67E+12	4987.980
79203.							

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.76287390 in

Manchester Green Caisson Analysis.lpo

Computed slope at pile head = -0.01219209
 Maximum bending moment = 72535933. lbs-in
 Maximum shear force = -450042.59274 lbs
 Depth of maximum bending moment = 80.64000000 in
 Depth of maximum shear force = 261.12000 in
 Number of iterations = 16
 Number of zero deflection points = 1

 Computed Values of Load Distribution and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
 Specified shear force at pile head = 17000.000 lbs
 Specified moment at pile head = 26604000.000 in-lbs
 Specified axial load at pile head = 67000.000 lbs

Depth Es*h X F/L in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in
0.000	0.322152	2.66E+07	17000.	-0.001552	469.293	9.52E+12	0.000
0.000							
30.720	0.275794	2.71E+07	16950.	-0.001466	478.316	9.52E+12	-5.163
71.885							
61.440	0.232126	2.76E+07	15997.	-0.001377	487.255	9.52E+12	-371.294
6142.217							
92.160	0.191198	2.79E+07	1749.510	-0.001287	492.222	9.51E+12	-540.773
10861.							
122.880	0.153037	2.77E+07	-16340.	-0.001197	488.535	9.52E+12	-638.387
16018.							
153.600	0.117621	2.69E+07	-36088.	-0.001109	474.732	9.52E+12	-635.184
20737.							
184.320	0.084868	2.55E+07	-54650.	-0.001024	450.716	9.53E+12	-562.597
25456.							
215.040	0.054635	2.30E+07	-1.19E+05	-0.000946	406.753	9.55E+12	-2160.492
1.52E+05							
245.760	0.026654	1.84E+07	-1.72E+05	-0.000879	328.667	9.58E+12	-1217.791
1.75E+05							
276.480	0.000479	1.27E+07	-1.91E+05	-0.000829	231.159	9.62E+12	-24.833
1.99E+05							
307.200	-0.024446	7.07E+06	-1.71E+05	-0.000797	133.578	9.66E+12	1417.269

Manchester Green Caisson Analysis.lpo

2.23E+05
 337.920 -0.048669 2.69E+06 -1.11E+05 -0.000782 58.333 9.67E+12 2151.597
 1.70E+05
 368.640 -0.072613 3.24E+05 -41345. -0.000778 17.662 9.67E+12 2522.413
 1.33E+05

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.32215159 in
 Computed slope at pile head = -0.00155222
 Maximum bending moment = 27941271. lbs-in
 Maximum shear force = -191456.91917 lbs
 Depth of maximum bending moment = 96.00000000 in
 Depth of maximum shear force = 276.48000 in
 Number of iterations = 8
 Number of zero deflection points = 1

 Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacement in
 Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
 Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
 Type 4 = Deflection and Moment, S = Pile-head Slope, radians
 Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 46000.	M= 6.92E+07	67000.0000	1.7629	7.2536E+07	-450043.

Manchester Green Caisson Analysis.lpo

1 V= 17000. M= 2.66E+07 67000.0000 0.3221516 2.7941E+07 -191457.

 Computed Pile-head Stiffness Matrix Members
 K22, K23, K32, K33 for Superstructure

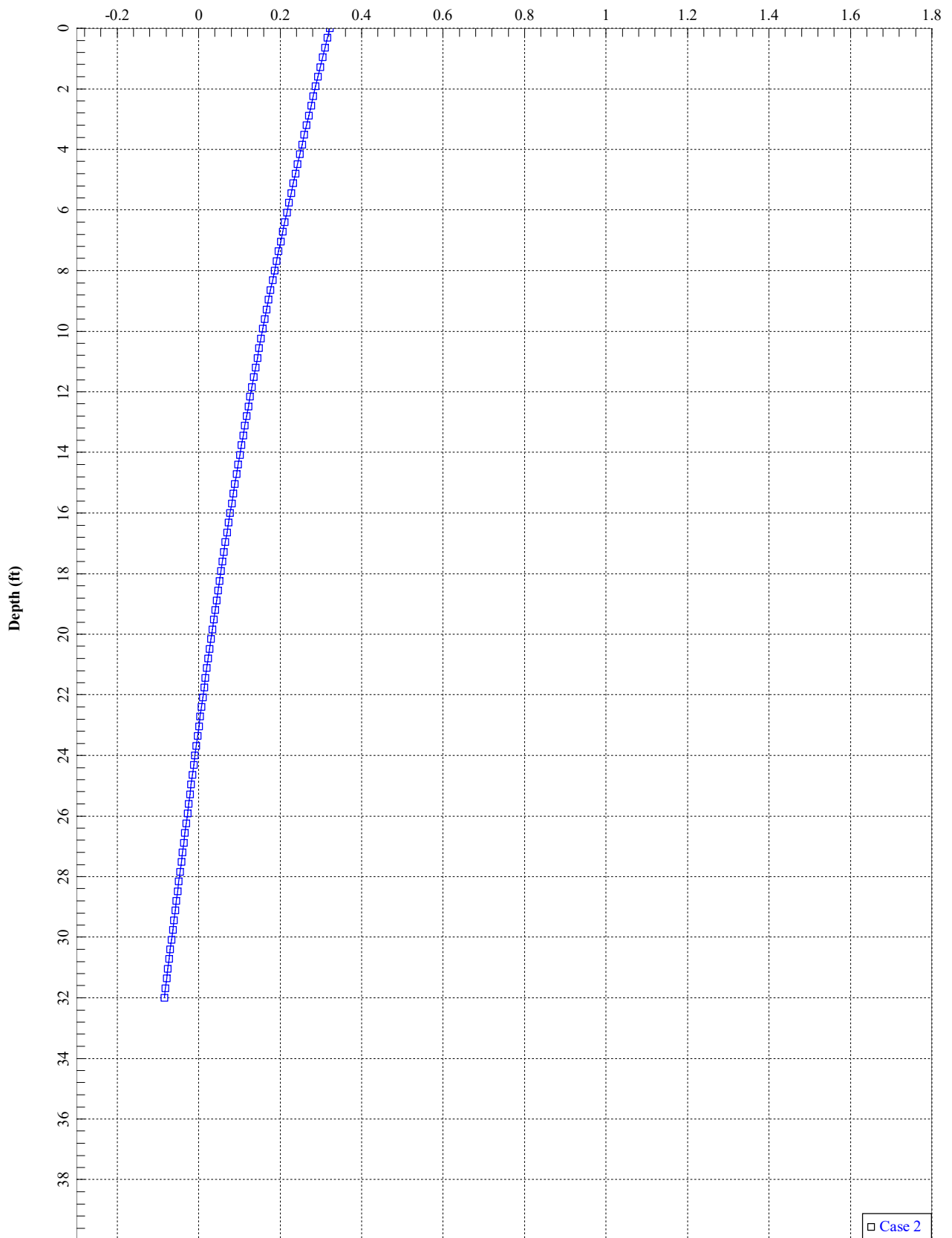
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00254571	4600.00007	911580.59486	1806964.	3.580855E+08
0.00766334	13847.37980	2744131.	1806964.	3.580855E+08
0.01214611	21947.57772	4349345.	1806964.	3.580855E+08
0.01532668	27694.75960	5488262.	1806964.	3.580855E+08
0.01779407	32152.62020	6371637.	1806929.	3.580765E+08
0.01981211	35794.95752	7093168.	1806721.	3.580218E+08
0.02151965	38874.50984	7703050.	1806466.	3.579543E+08
0.02299948	41542.13940	8231256.	1806221.	3.578888E+08
0.02430518	43895.15543	8697109.	1806000.	3.578295E+08
0.02547342	46000.00000	9113787.	1805804.	3.577763E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00007472	26752.19400	6924000.	3.580254E+08	9.266410E+10
0.00022628	80570.58914	20843317.	3.560597E+08	9.211133E+10
0.00037956	127834.96493	33035876.	3.367951E+08	8.703661E+10
0.00136677	174673.84962	41686634.	1.278004E+08	3.050008E+10
0.00179297	211733.74819	48396683.	1.180909E+08	2.699243E+10
0.00210771	242007.76268	53879193.	1.148203E+08	2.556293E+10
0.00237201	268274.27022	58514588.	1.130999E+08	2.466877E+10
0.00257807	289628.36166	62529951.	1.123432E+08	2.425459E+10
0.00276190	308614.91521	66071751.	1.117399E+08	2.392253E+10
0.00293551	325678.06895	69240000.	1.109443E+08	2.358704E+10

K22 = abs(Shear Reaction/Top y)
 K23 = abs(Shear Reaction/Top Rotation)
 K32 = abs(Moment Reaction/Top y)
 K33 = abs(Moment Reaction/Top Rotation)

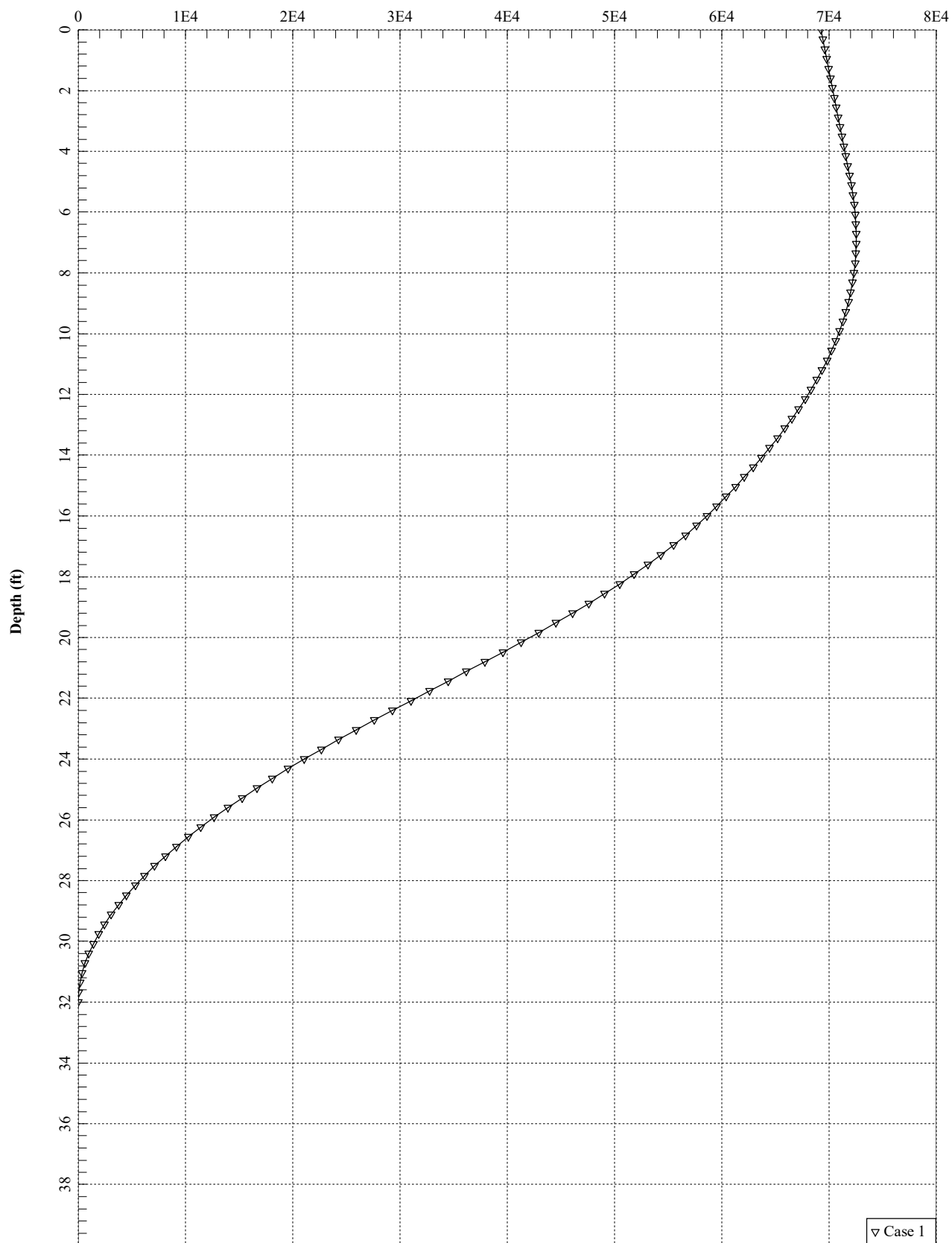
The analysis ended normally.

Lateral Deflection (in)

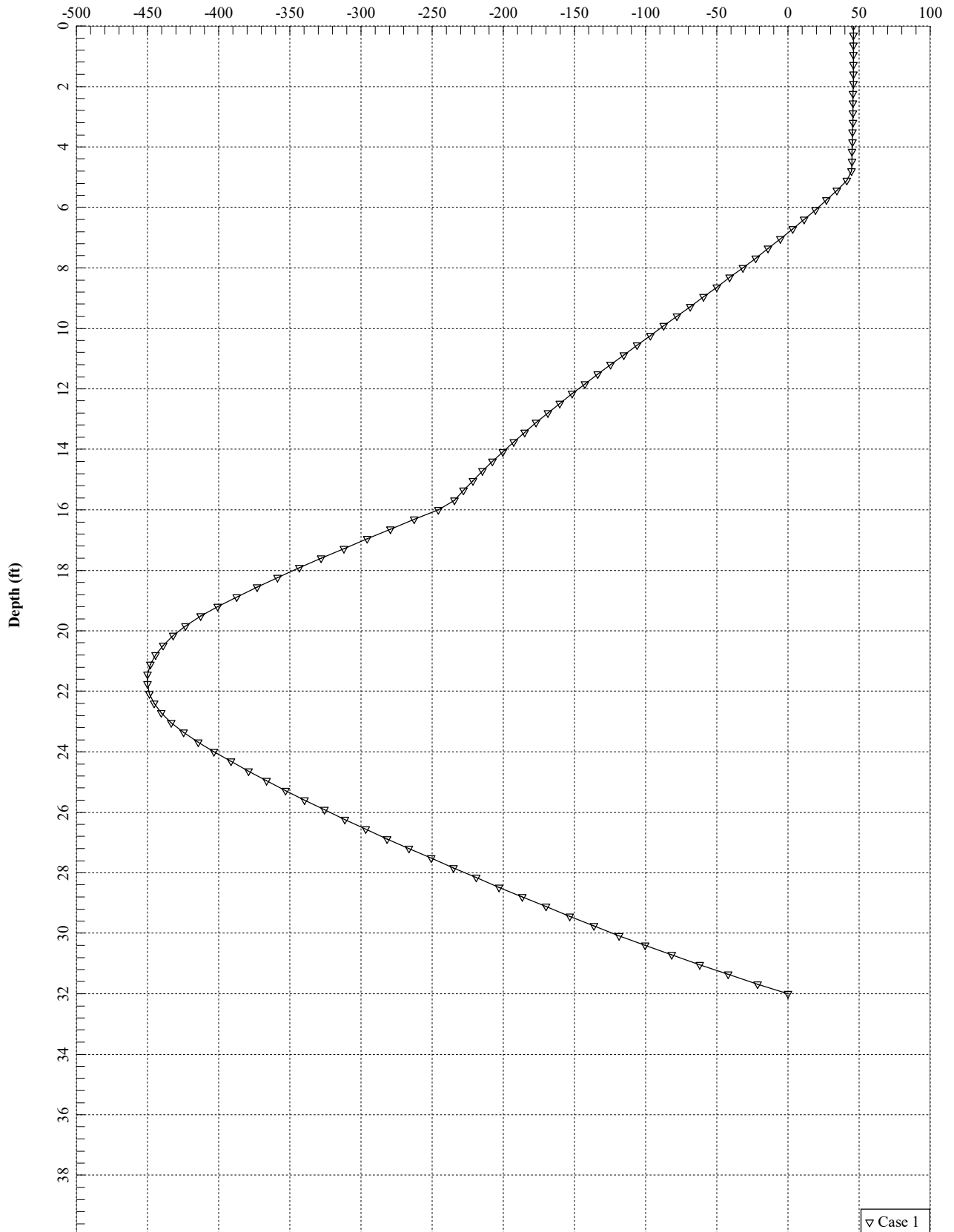


□ Case 2

Bending Moment (in-kips)



Shear Force (kips)



▽ Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTV5448	DATE:	03/09/2017	RF DESIGN ENG:	Omar Mohammed	RF PERF ENG:		RFDS PROGRAM TYPE:	2017 LTE Next Carrier
ISSUE:	1xXMU	Approved? (Y/N):	Yes	RF DESIGN PHONE:	860-721-4315	RF PERF PHONE:		RFDS TECHNOLOGY:	LTE 3C
REVISION:	Preliminary	RF MANAGER:	BENEDETTO, JOHN	RF DESIGN EMAIL:	om636a@att.com	RF PERF EMAIL:		STATE/STATUS:	Final/RF Approval
INITIATIVE /PROJECT:	LTE 3C Bronze RRH.					RFDS VERSION:	1.00	RFDS ID:	1679825
						GSM FREQUENCY:	om636a	Created By:	rx855w
						UMTS FREQUENCY:	850, 1900	Date Created:	3/8/2017 5:12:58 PM
						LTE FREQUENCY:	700, 1900, WCS	Date Updated:	5/16/2017 3:25:57 PM
						I-PLAN JOB # 1:	NER-RCTB-17-00657	IPLAN PRD GRP SUB GRP #1:	LTE Next Carrier LTE 3C
						I-PLAN JOB # 2:		IPLAN PRD GRP SUB GRP #2:	
						I-PLAN JOB # 3:		IPLAN PRD GRP SUB GRP #3:	
						I-PLAN JOB # 4:		IPLAN PRD GRP SUB GRP #4:	
						I-PLAN JOB # 5:		IPLAN PRD GRP SUB GRP #5:	
						I-PLAN JOB # 6:		IPLAN PRD GRP SUB GRP #6:	
						I-PLAN JOB # 7:		IPLAN PRD GRP SUB GRP #7:	
						I-PLAN JOB # 8:		IPLAN PRD GRP SUB GRP #8:	

Section 2 - LOCATION INFORMATION

USID:	26172	FA LOCATION CODE:	10071105	LOCATION NAME:	MANCHESTER CENTRAL	ORACLE PTN # 1:	2051A09HLP	PACE JOB # 1:	MRCTB022171
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PTN # 2:		PACE JOB # 2:	
ADDRESS:	239 MIDDLE TURNPIKE EAST	CITY:	MANCHESTER	STATE:	CT	ORACLE PTN # 3:		PACE JOB # 3:	
ZIP CODE:	06040	COUNTY:	HARTFORD	LONG (DEC. DEG.):	-72.5116989	ORACLE PTN # 4:		PACE JOB # 4:	
LATITUDE (D-M-S):	41d 47m 3.81084s	LONGITUDE (D-M-S):	-72d -30m -42.11604s	LAT (DEC. DEG.):	41.7843919	ORACLE PTN # 5:		PACE JOB # 5:	
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	<p>UPDATED 7/05 MANCHESTER DOWNTOWN-GSM CT-448 I-84 EAST, STAY IN YOUR RIGHT HAND LANE FOR ABOUT THREE MILES, YOU WILL THEN SEE SIGNS FOR I-384 GET ONTO THIS HIGHWAY, YOU WILL THEN GET OFF OF EXIT 3. WHEN YOU GET TO THE END OF THE EXIT GO EAST/NORTH ON ROUTE 83. STAY ON ROUTE 83 FOR ABOUT THREE MILES AND THEN TAKE A RIGHT ONTO MIDDLE TURNPIKE EAST, GO ABOUT A MILE DOWN THIS ROAD AND LOOK FOR THE MANCHESTER POLICE DEPARTMENT, OUR SITE IS IN THE BACK OF THE PARKING LOT AT THE POLICE DEPARTMENT. GO INTO THE MAIN ENTRANCE OF THE POLICE DEPARTMENT AND LET THE OFFICER AT THE FRONT DESK KNOW THAT YOU WILL BE WORKING IN THEIR BACK PARKING LOT. ADDRESS: 239 MIDDLE TURNPIKE EAST, MANCHESTER, CT 06045</p> <p>MANCHESTER POLICE DEPARTMENT : 860-645-5500</p> <p>LTE RADIOS: UP ON TOWER</p> <p>ACCESS: KEYED PADLOCK</p> <p>CONTACT: MANCHESTER POLICE</p> <p>SECURITY: NONE</p> <p>GROUND LEVEL: OUTDOOR CABINET</p> <p>POWER COMPANY: 89-095-485-2 NORTHEAST UTILITIES</p> <p>GENERATOR PLUG: CAMLOCK</p> <p>T-1 CIRCUIT NUMBERS: GSM: 705662-ET-229 GSM-710398-ET-249</p> <p>UMTS CIRCUITS: ON FIBER</p> <p>T-1 SMART CARDS LOCATED IN HOFFMAN BOX ON OUTSIDE OF COMPOUND.</p> <p>SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR)</p>					ORACLE PTN # 6:		PACE JOB # 6:	
						ORACLE PTN # 7:		PACE JOB # 7:	
						ORACLE PTN # 8:		PACE JOB # 8:	
						BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:	
						AM STUDY REQ'D (Y/N):	No	SEARCH_RING_ID:	
						FREQ COORD:		BTA:	
						OPS DISTRICT:	CT-North	LAC(GSM):	05009
						OPS ZONE:	NE_CT_N_TLDN_N_CS	LAC(UMTS):	05990
						RF DISTRICT:	NPO Triage	BSC(GSM):	BCT09
						RF ZONE:	Hotseat	RNC(UMTS):	MDTWCTNICRBR05
						PARENT NAME(GSM):	MIDDLETOWN-GSM MTSO-BSC-9	MME POOL ID(LTE):	FF01
						PARENT NAME(UMTS):	MIDDLETOWN RNC05		

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:		CGSA CALL SIGNS:
CGSA - MINOR FILING NEEDED (Yes/No):	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:		
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:				

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	MONOPOLE	MARKET LOCATION 700 MHz Band:	
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	199.00	FCC ASR NUMBER:	NR	MARKET LOCATION 850 MHz Band:	
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	199.00			MARKET LOCATION 1900 MHz Band:	
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:	
						MARKET LOCATION WCS Band:	
						MARKET LOCATION Future Band:	

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS						
RBS ID:	26421	237088	208938	300999	366991						
CTS COMMON ID:	184P5448	184D5448	CTV5448	CTU5448	CTL05448						
CELL ID / BCF:	184P5448	184D5448	CTV5448	CTV5448	CTL05448						
BTA/TID:	184P	184G	184U	184W	184L						
4-9 DIGIT SITE ID:	5448	5448	5448	5448	5448						
COW OR TOY?:	No	No	No	No	No						
CELL SITE TYPE:											
SITE TYPE:											
BTS LOCATION ID:											
BASE STATION TYPE:											
EQUIPMENT NAME:	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL						
DISASTER PRIORITY:											

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS						
RBS ID:	26421	237088	208938	300999	366991						
CTS COMMON ID:	184P5448	184D5448	CTV5448	CTU5448	CTL05448						
CELL ID / BCF:	184P5448	184D5448	CTV5448	CTV5448	CTL05448						
BTA/TID:	184P	184G	184U	184W	184L						
4-9 DIGIT SITE ID:	5448	5448	5448	5448	5448						
COW OR TOY?:	No	No	No	No	No						
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED						
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL						
BTS LOCATION ID:	GROUND	GROUND	GROUND	GROUND	INTERNAL						
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	BASE						
EQUIPMENT NAME:	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL	MANCHESTER CENTRAL						
DISASTER PRIORITY:	3	3	0	0	3						

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RAC:												
EQUIPMENT VENDOR:												
EQUIPMENT TYPE:												
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:												
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:					5448							

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RAC:												
EQUIPMENT VENDOR:	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON							
EQUIPMENT TYPE:	ULTRASITE	ULTRASITE	3106 OUTDOOR	3106 OUTDOOR	6601 INDOOR MU							
BASEBAND CONFIGURATION:	1x6601 / 1xDUS41 / 1xXMMU03	1x6601 / 1xDUS41 / 1xXMMU03	1x6601 / 1xDUS41 / 1xXMMU03	1x6601 / 1xDUS41 / 1xXMMU03	1x6201 / 2xDUS41(IDL) / 1xXMMU03							
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:					CT							
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:					5448							

Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121			OPA-65R-LCUU-H6			
ANTENNA VENDOR	Kathrein			CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9			72X14.8X7.4			
ANTENNA WEIGHT	44.1			73			
AZIMUTH	40			40			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143			143			
ANTENNA TIP HEIGHT	145			146			
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025			Internal		
SURGE ARRESTOR (QTY/MODEL)				1	DC/Fiber Squid		
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006			LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)	1	Powerwave LGP 12104					
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3	Baseband Config - 1 DUS + XMU DUS-1 - 7A-7B-7C:X1P1:X1P2_ XMU-1 - PA:PA2A-PC:PA2C-PB:PA2B_...D1E:D1D						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.A.850.3G.1	26172.A.850.3G.1	CTV54481	CTV54481		UMTS 850	800 10121 @850_Xpol_10dt	13.4	40	10	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850				249.46			1	
	PORT 3	26172.A.1900.3G.2	26172.A.1900.3G.2	CTU54487	CTU54487		UMTS 1900	800 10121 @1950_Xpol_4dt	16.89	40	4	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900				522.4			2	
	PORT 5	26172.A.850.25G.1	26172.A.850.25G.1	184G54481	184G54481		GSM 850	800 10121 @850_Xpol_10dt	13.22	40	10	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850				249.46			1	
	PORT 7	26172.A.1900.25G.1	26172.A.1900.25G.1	184P54484	184P54484		GSM 1900	800 10121 @1950_Xpol_4dt	16.89	40	4	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900		YES		522.4			2	
ANTENNA POSITION 4	PORT 1	26172.A.700.4G.1	26172.A.700.4G.1	CTL05448_7A_1	CTL05448_7A_1		LTE 700	OPA-65R-LCUU-H6_719MHz_02DT	14	40	2	Top	FIBER	0					1475.7065			7	

	PORT 3	26172.A.1900.4G.1	26172.A.1900.4G.1	CTL05448_9A_1	CTL05448_9A_1		LTE 1900	OPA-65R-LCUU- H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757	7	
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Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121			OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein			CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9			92.7X14.4X7			
ANTENNA WEIGHT	44.1			88			
AZIMUTH	160			160			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143			143			
ANTENNA TIP HEIGHT	145			147			
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025			Internal		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)					LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3	Baseband Config - 1 DUS + XMU DUS-1 - 7A-7B-7C:X1P1:X1P2_ XMU-1 - PA:PA2A-PC:PA2C-PB:PA2B_...D1E:D1D						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.B.850.3G.1	26172.B.850.3G.1	CTV54482	CTV54482		UMTS 850	800 10121 @850_Xpol_12dt	13.3	160	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		9	
	PORT 3	26172.B.1900.3G.2	26172.B.1900.3G.2	CTU54488	CTU54488		UMTS 1900	800 10121 @1950_Xpol_7dt	16.5	160	7	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900					476.43		10	
	PORT 5	26172.B.850.25G.1	26172.B.850.25G.1	184G54482	184G54482		GSM 850	800 10121 @850_Xpol_12dt	13.14	160	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		9	
	PORT 7	26172.B.1900.25G.1	26172.B.1900.25G.1	184P54485	184P54485		GSM 1900	800 10121 @1950_Xpol_7dt	16.45	160	7	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900			YES		476.43		10	
ANTENNA POSITION 4	PORT 1	26172.B.700.4G.1	26172.B.700.4G.1	CTL05448_7B_1	CTL05448_7B_1		LTE 700	OPA-65R-LCUU-H8_719MHz_08DT	14.6	160	8	Top	FIBER	0						1475.7065		15	

	PORT 3	26172.B.1900.4G.1	26172.B.1900.4G.1	CTL05448_9B_1	CTL05448_9B_1		LTE 1900	OPA-65R-LCUU- H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		15	
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Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121			OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein			CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9			92.7X14.4X7			
ANTENNA WEIGHT	44.1			88			
AZIMUTH	280			280			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143			143			
ANTENNA TIP HEIGHT	145			147			
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025			Internal		
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)					LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3	Baseband Config - 1 DUS + XMU DUS-1 - 7A-7B-7C:X1P1:X1P2_ XMU-1 - PA:PA2A-PC:PA2C-PB:PA2B_...D1E:D1D						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.C.850.3G.1	26172.C.850.3G.1	CTV54483	CTV54483		UMTS 850	800 10121 @850_Xpol_12dt	13.3	280	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		17	
	PORT 3	26172.C.1900.3G.2	26172.C.1900.3G.2	CTU54489	CTU54489		UMTS 1900	800 10121 @1950_Xpol_8dt	16.2	280	8	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900					444.63		18	
	PORT 5	26172.C.850.25G.1	26172.C.850.25G.1	184G54483	184G54483		GSM 850	800 10121 @850_Xpol_12dt	13.14	280	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		17	
	PORT 7	26172.C.1900.25G.1	26172.C.1900.25G.1	184P54486	184P54486		GSM 1900	800 10121 @1950_Xpol_8dt	16.17	280	8	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900			YES		444.63		18	
ANTENNA POSITION 4	PORT 1	26172.C.700.4G.1	26172.C.700.4G.1	CTL05448_7C_1	CTL05448_7C_1		LTE 700	OPA-65R-LCUU-H8_719MHz_08DT	14.6	280	8	Top	FIBER	0						1475.7065		23	

	PORT 3	26172.C.1900.4G.1	26172.C.1900.4G.1	CTL05448_9C_1	CTL05448_9C_1		LTE 1900	OPA-65R-LCUU- H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0						3664.3757		23	
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Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)		ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7															
Existing Antenna?																							
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H6																				
ANTENNA VENDOR			CCI Products																				
ANTENNA SIZE (H x W x D)			72X14.8X7.4																				
ANTENNA WEIGHT			73																				
AZIMUTH			40																				
MAGNETIC DECLINATION																							
RADIATION CENTER (feet)			143																				
ANTENNA TIP HEIGHT			146																				
MECHANICAL DOWNTILT			0																				
FEEDER AMOUNT																							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)																							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)																							
Antenna RET Motor (QTY/MODEL)				Internal																			
SURGE ARRESTOR (QTY/MODEL)			1	DC/Fiber Squid																			
DIPLEXER (QTY/MODEL)																							
DUPLEXER (QTY/MODEL)																							
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH																			
DC BLOCK (QTY/MODEL)																							
TMA/LNA (QTY/MODEL)																							
CURRENT INJECTORS FOR TMA (QTY/MODEL)																							
PDU FOR TMA (QTY/MODEL)																							
FILTER (QTY/MODEL)																							
SQUID (QTY/MODEL)																							
FIBER TRUNK (QTY/MODEL)																							
DC TRUNK (QTY/MODEL)																							
RRH - 700 band (QTY/MODEL)																							
RRH - 850 band (QTY/MODEL)																							
RRH - 1900 band (QTY/MODEL)																							
RRH - AWS band (QTY/MODEL)																							
RRH - WCS band (QTY/MODEL)			1	RRUS-32																			
Additional RRH #1 - any band (QTY/MODEL)																							
Additional RRH #2 - any band (QTY/MODEL)																							
Additional Component 1 (QTY/MODEL)																							
Additional Component 2 (QTY/MODEL)																							
Additional Component 3 (QTY/MODEL)																							
Local Market Note 1	Bronze Std - ADD 6/8/8' OCTOPORT ANTENNA. / ADD LTE WCS RRUS-32 ADD DC FIBER SQUID ADD DUS + IDL2																						
Local Market Note 2																							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.																						
PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/IT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		26172.A.WCS.4G.1	CTL05448_3A_1	CTL05448_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_04DT	17.8	40	4	Top	FIBER	0						1285.2866		7	

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)		ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7															
Existing Antenna?																							
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H8																				
ANTENNA VENDOR			CCI Products																				
ANTENNA SIZE (H x W x D)			92.7X14.4X7																				
ANTENNA WEIGHT			88																				
AZIMUTH			160																				
MAGNETIC DECLINATION																							
RADIATION CENTER (feet)			143																				
ANTENNA TIP HEIGHT			147																				
MECHANICAL DOWNTILT			0																				
FEEDER AMOUNT																							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)																							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)																							
Antenna RET Motor (QTY/MODEL)			Internal																				
SURGE ARRESTOR (QTY/MODEL)																							
DIPLEXER (QTY/MODEL)																							
DUPLEXER (QTY/MODEL)																							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH																				
DC BLOCK (QTY/MODEL)																							
TMA/LNA (QTY/MODEL)																							
CURRENT INJECTORS FOR TMA (QTY/MODEL)																							
PDU FOR TMA (QTY/MODEL)																							
FILTER (QTY/MODEL)																							
SQUID (QTY/MODEL)																							
FIBER TRUNK (QTY/MODEL)																							
DC TRUNK (QTY/MODEL)																							
RRH - 700 band (QTY/MODEL)																							
RRH - 850 band (QTY/MODEL)																							
RRH - 1900 band (QTY/MODEL)																							
RRH - AWS band (QTY/MODEL)																							
RRH - WCS band (QTY/MODEL)			1	RRUS-32																			
Additional RRH #1 - any band (QTY/MODEL)																							
Additional RRH #2 - any band (QTY/MODEL)																							
Additional Component 1 (QTY/MODEL)																							
Additional Component 2 (QTY/MODEL)																							
Additional Component 3 (QTY/MODEL)																							
Local Market Note 1	Bronze Std - ADD 6/8/8' OCTOPORT ANTENNA. / ADD LTE WCS RRUS-32 ADD DC FIBER SQUID ADD DUS + IDL2																						
Local Market Note 2																							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.																						
PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/IT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		26172.B.WCS.4G.1	CTL05448_3B_1	CTL05448_3B_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_06DT	17.4	160	6	Top	FIBER	0						1285.2866		15	

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)		ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7															
Existing Antenna?																							
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H8																				
ANTENNA VENDOR			CCI Products																				
ANTENNA SIZE (H x W x D)			92.7X14.4X7																				
ANTENNA WEIGHT			88																				
AZIMUTH			280																				
MAGNETIC DECLINATION																							
RADIATION CENTER (feet)			143																				
ANTENNA TIP HEIGHT			147																				
MECHANICAL DOWNTILT			0																				
FEEDER AMOUNT																							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)																							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)																							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)																							
Antenna RET Motor (QTY/MODEL)			Internal																				
SURGE ARRESTOR (QTY/MODEL)																							
DIPLEXER (QTY/MODEL)																							
DUPLEXER (QTY/MODEL)																							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH																				
DC BLOCK (QTY/MODEL)																							
TMA/LNA (QTY/MODEL)																							
CURRENT INJECTORS FOR TMA (QTY/MODEL)																							
PDU FOR TMA (QTY/MODEL)																							
FILTER (QTY/MODEL)																							
SQUID (QTY/MODEL)																							
FIBER TRUNK (QTY/MODEL)																							
DC TRUNK (QTY/MODEL)																							
RRH - 700 band (QTY/MODEL)																							
RRH - 850 band (QTY/MODEL)																							
RRH - 1900 band (QTY/MODEL)																							
RRH - AWS band (QTY/MODEL)																							
RRH - WCS band (QTY/MODEL)			1	RRUS-32																			
Additional RRH #1 - any band (QTY/MODEL)																							
Additional RRH #2 - any band (QTY/MODEL)																							
Additional Component 1 (QTY/MODEL)																							
Additional Component 2 (QTY/MODEL)																							
Additional Component 3 (QTY/MODEL)																							
Local Market Note 1	Bronze Std - ADD 6/8/8' OCTOPORT ANTENNA. / ADD LTE WCS RRUS-32 ADD DC FIBER SQUID ADD DUS + IDL2																						
Local Market Note 2																							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.																						
PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/IT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		26172.C.WCS.4G.1	CTL05448_3C_1	CTL05448_3C_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_05DT	17.4	280	5	Top	FIBER	0						1285.2866		23	

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H6		OPA-65R-LCUU-H6			
ANTENNA VENDOR	Kathrein	CCI Products		CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	72X14.8X7.4		72X14.8X7.4			
ANTENNA WEIGHT	44.1	73		73			
AZIMUTH	40	40		40			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143		143			
ANTENNA TIP HEIGHT	145	146		146			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Internal		Internal		
SURGE ARRESTOR (QTY/MODEL)		1	DC/Fiber Squid	1	DC/Fiber Squid		
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006	LTE RRH		LTE RRH		
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMA (QTY/MODEL)	1	Powerwave LGP 12104					
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	-Bronze Std - ADD 6/8/8' OCTOPORT ANTENNA. // ADD LTE WCS RRUS-32 // ADD DC FIBER SQUID // ADD DUS + IDL2						
Local Market Note 2							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.A.850.3G.1	26172.A.850.3G.1	CTV54481	CTV54481		UMTS 850	800 10121 @850_Xpol_10dtd	13.4	40	10	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					249.46		1	
	PORT 3	26172.A.1900.3G.2	26172.A.1900.3G.2	CTU54487	CTU54487		UMTS 1900	800 10121 @1950_Xpol_4dtd	16.89	40	4	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900					522.4		2	
	PORT 5	26172.A.850.25G.1	26172.A.850.25G.1	184G54481	184G54481		GSM 850	800 10121 @850_Xpol_10dtd	13.22	40	10	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					249.46		1	
	PORT 7	26172.A.1900.25G.1	26172.A.1900.25G.1	184P54484	184P54484		GSM 1900	800 10121 @1950_Xpol_4dtd	16.89	40	4	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900		YES			522.4		2	

ANTENNA POSITION 2	PORT 3	26172.A.WCS.4G.tmp1	26172.A.WCS.4G.1	CTL05448_3A_1	CTL05448_3A_1		LTE WCS	OPA-65R-LCUU- H6_2350MHz_04DT	17.8	40	4	Top	FIBER	0						1285.2866		7	
ANTENNA POSITION 4	PORT 1	26172.A.700.4G.1	26172.A.700.4G.1	CTL05448_7A_1	CTL05448_7A_1		LTE 700	OPA-65R-LCUU- H6_719MHz_02DT	14	40	2	Top	FIBER	0						1475.7065		7	
	PORT 3	26172.A.1900.4G.1	26172.A.1900.4G.1	CTL05448_9A_1	CTL05448_9A_1		LTE 1900	OPA-65R-LCUU- H6_1930MHz_04DT	17.4	40	4	Top	FIBER	0						3664.3757		7	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8		OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Products		CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7		92.7X14.4X7			
ANTENNA WEIGHT	44.1	88		88			
AZIMUTH	160	160		160			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143		143			
ANTENNA TIP HEIGHT	145	147		147			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Internal	Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Std - ADD 6'/8'/8' OCTOPORT ANTENNA. / ADD LTE WCS RRUS-32 ADD DC FIBER SQUID ADD DUS + IDL2						
Local Market Note 2							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.B.850.3G.1	26172.B.850.3G.1	CTV54482	CTV54482		UMTS 850	800 10121 @850_Xpol_12dt	13.3	160	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		9	
	PORT 3	26172.B.1900.3G.2	26172.B.1900.3G.2	CTU54488	CTU54488		UMTS 1900	800 10121 @1950_Xpol_7dt	16.5	160	7	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900					476.43		10	
	PORT 5	26172.B.850.25G.1	26172.B.850.25G.1	184G54482	184G54482		GSM 850	800 10121 @850_Xpol_12dt	13.14	160	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		9	
	PORT 7	26172.B.1900.25G.1	26172.B.1900.25G.1	184P54485	184P54485		GSM 1900	800 10121 @1950_Xpol_7dt	16.45	160	7	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900		YES			476.43		10	

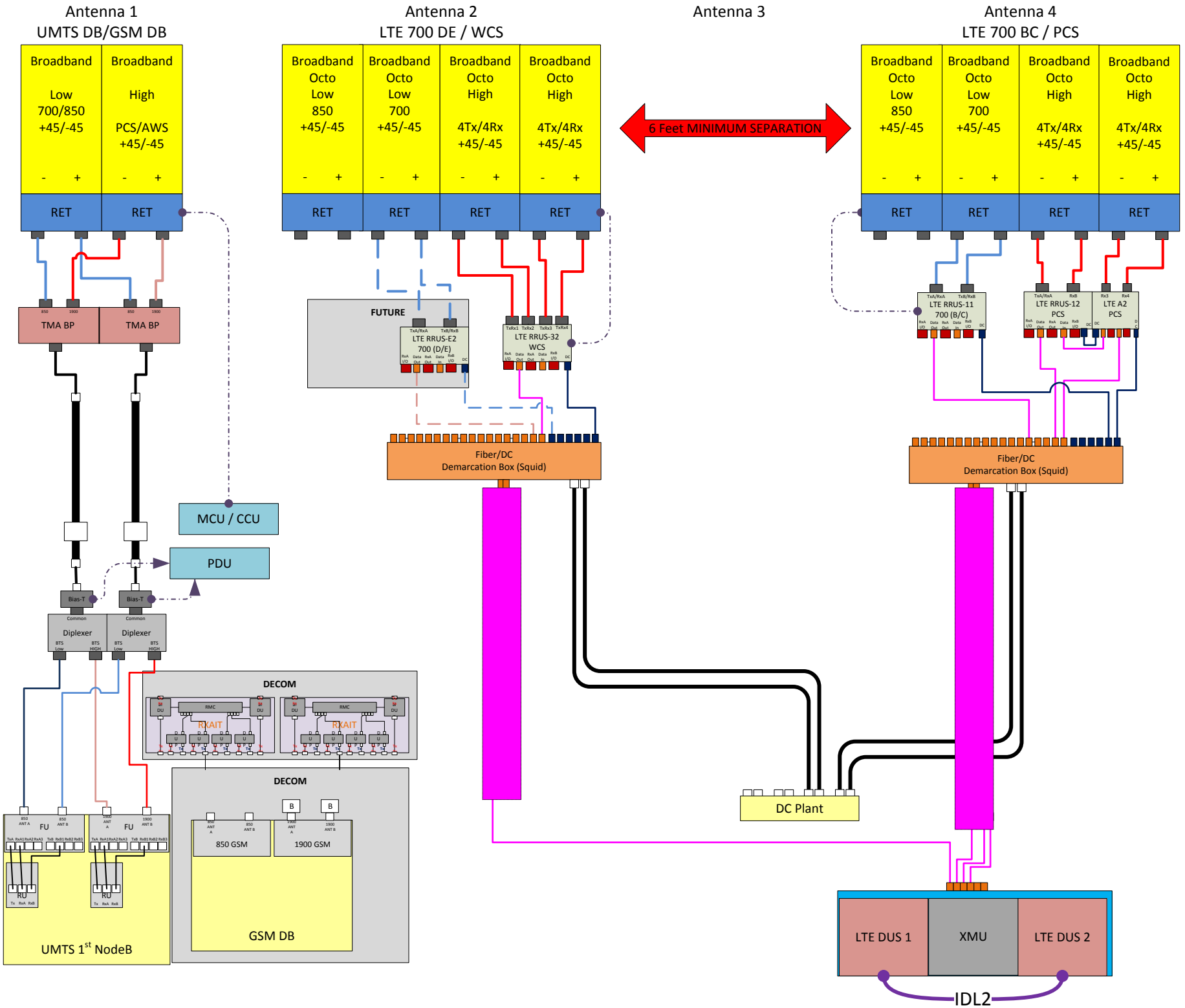
ANTENNA POSITION 2	PORT 3	26172.B.WCS.4G.tmp1	26172.B.WCS.4G.1	CTL05448_3B_1	CTL05448_3B_1		LTE WCS	OPA-65R-LCUU-H8_2350MHz_06DT	17.4	160	6	Top	FIBER	0						1285.2866		15	
ANTENNA POSITION 4	PORT 1	26172.B.700.4G.1	26172.B.700.4G.1	CTL05448_7B_1	CTL05448_7B_1		LTE 700	OPA-65R-LCUU-H8_719MHz_08DT	14.6	160	8	Top	FIBER	0						1475.7065		15	
	PORT 3	26172.B.1900.4G.1	26172.B.1900.4G.1	CTL05448_9B_1	CTL05448_9B_1		LTE 1900	OPA-65R-LCUU-H8_1930MHz_06DT	17.4	160	6	Top	FIBER	0						3664.3757		15	

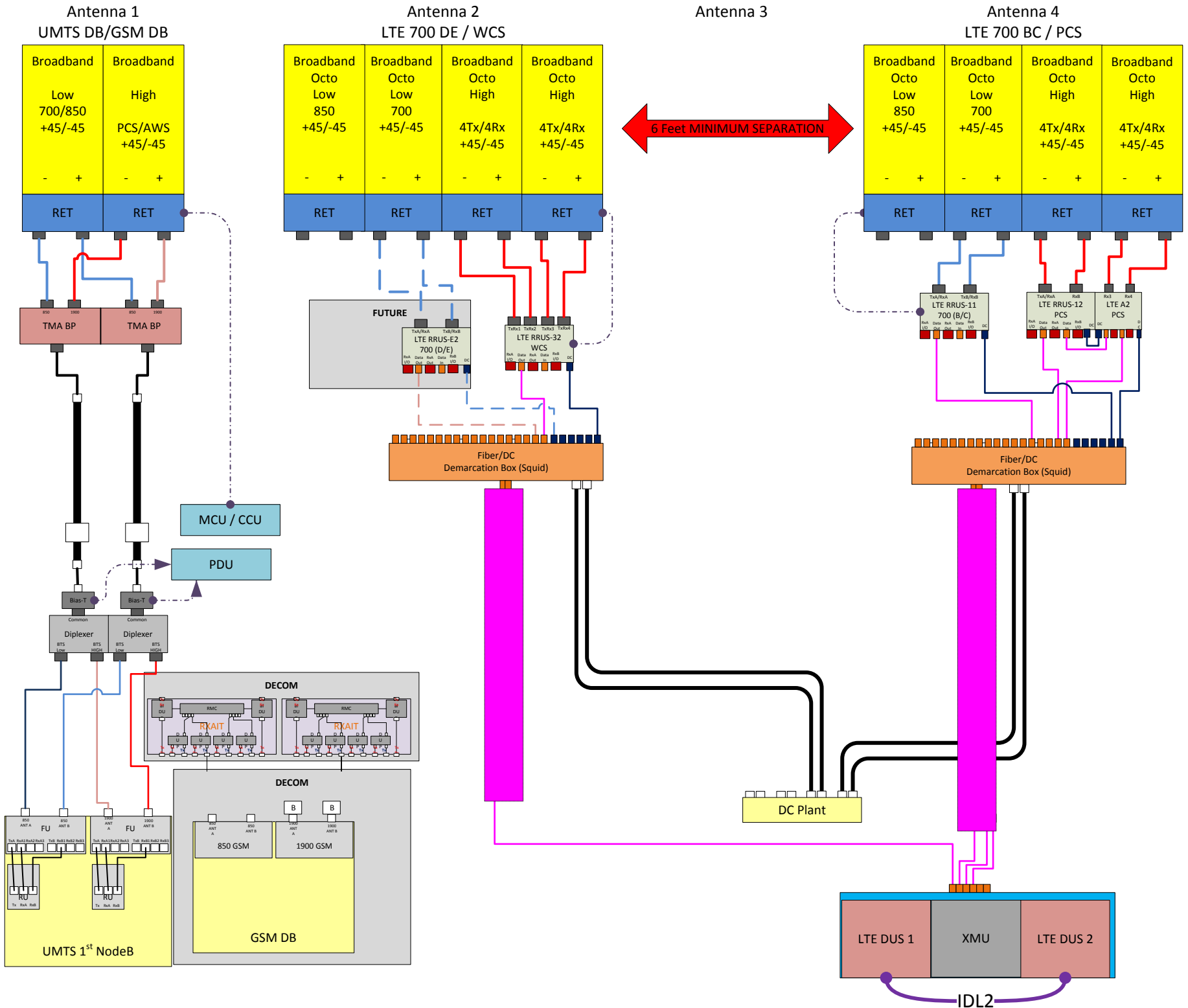
Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

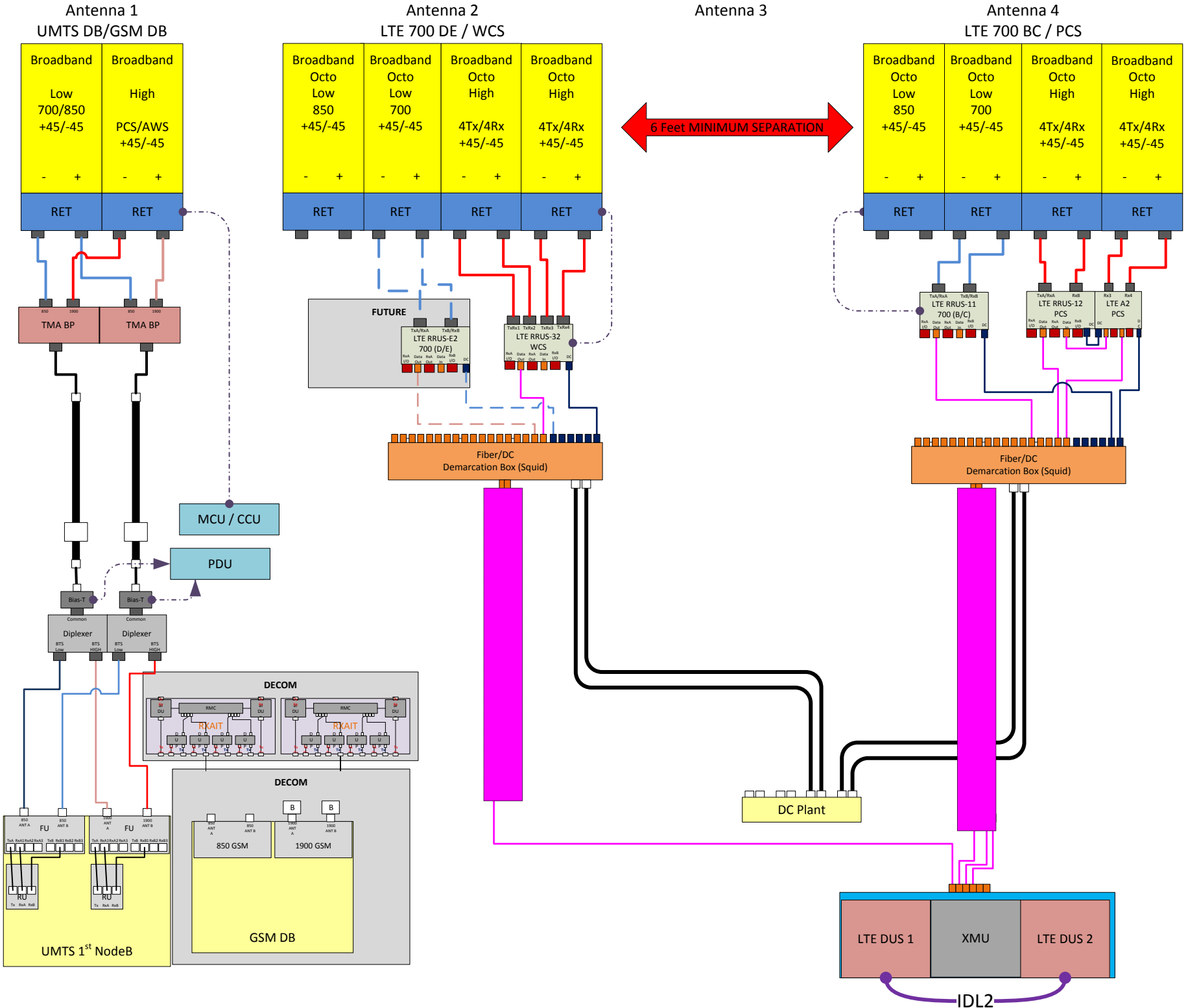
ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10121	OPA-65R-LCUU-H8		OPA-65R-LCUU-H8			
ANTENNA VENDOR	Kathrein	CCI Products		CCI Products			
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9	92.7X14.4X7		92.7X14.4X7			
ANTENNA WEIGHT	44.1	88		88			
AZIMUTH	280	280		280			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	143	143		143			
ANTENNA TIP HEIGHT	145	147		147			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025	Internal	Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 21901					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH	LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1	RRUS-11		
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-12+RRUS-A2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1	RRUS-32				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Std - ADD 6'/8'/8' OCTOPORT ANTENNA. / ADD LTE WCS RRUS-32 ADD DC FIBER SQUID ADD DUS + IDL2						
Local Market Note 2							
Local Market Note 3	Baseband Config - DUS+XMU+DUS+IDL2.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26172.C.850.3G.1	26172.C.850.3G.1	CTV54483	CTV54483		UMTS 850	800 10121 @850_Xpol_12dt	13.3	280	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		17	
	PORT 3	26172.C.1900.3G.2	26172.C.1900.3G.2	CTU54489	CTU54489		UMTS 1900	800 10121 @1950_Xpol_8dt	16.2	280	8	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900					444.63		18	
	PORT 5	26172.C.850.25G.1	26172.C.850.25G.1	184G54483	184G54483		GSM 850	800 10121 @850_Xpol_12dt	13.14	280	12	None	Andrew 1-5/8 (850)	180	CCI RxAIT 850					243.78		17	
	PORT 7	26172.C.1900.25G.1	26172.C.1900.25G.1	184P54486	184P54486		GSM 1900	800 10121 @1950_Xpol_8dt	16.17	280	8	None	Andrew 1-5/8 (1900)	180	CCI RxAIT 1900		YES			444.63		18	

ANTENNA POSITION 2	PORT 3	26172.C.WCS.4G.tmp1	26172.C.WCS.4G.1	CTL05448_3C_1	CTL05448_3C_1		LTE WCS	OPA-65R-LCUU- H8_2350MHz_05DT	17.4	280	5	Top	FIBER	0							1285.2866		23		
ANTENNA POSITION 4	PORT 1	26172.C.700.4G.1	26172.C.700.4G.1	CTL05448_7C_1	CTL05448_7C_1		LTE 700	OPA-65R-LCUU- H8_719MHz_08DT	14.6	280	8	Top	FIBER	0								1475.7065		23	
	PORT 3	26172.C.1900.4G.1	26172.C.1900.4G.1	CTL05448_9C_1	CTL05448_9C_1		LTE 1900	OPA-65R-LCUU- H8_1930MHz_05DT	17.3	280	5	Top	FIBER	0								3664.3757		23	







NOTES

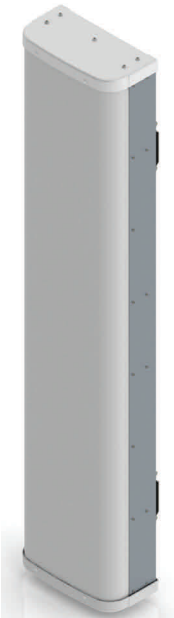
Date Time (Central)	Version	ATTUID	Note
3/9/2017 11:06:53 AM	1.00	om636a	New 8 port antenna on position 2. + RRUS-32 + Fiber/Dc squid. -Replacing existing RRUS-11 with RRUS-32 B2.

WORKFLOW SUMMARY

Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments	PACE Status
03/09/2017	Preliminary In Progress	om636a	Preliminary Submitted for Approval	RC475S	Promote	New 8 port antenna on position 2. + RRUS-32 + Fiber/Dc squid. - Replacing existing RRUS-11 with RRUS-32 B2.	NER-RCTB-17-00657 MRCTB022171 SUCCESS 03/09/2017 11:10:07 AM
03/13/2017	Preliminary Submitted for Approval	RC475S	Preliminary Modification Recommended	OM636A	Demote	Other - Missing PACE NUMBER	
03/13/2017	Preliminary Modification Recommended	OM636A	Preliminary Modification Recommended	RX855W	Reassign	Successfully Reassigned	
03/13/2017	Preliminary Modification Recommended	RX855W	Preliminary Submitted for Approval	RC475S	Promote	pace no updated	
03/13/2017	Preliminary Submitted for Approval	RC475S	Preliminary Approved	DC5778	Promote		
05/16/2017	Preliminary Approved	DC5778	Preliminary In Progress	rx855w	Pull Back	to update pd format.	
05/16/2017	Preliminary In Progress	rx855w	Preliminary In Progress	FF5901	Reassign	update rfds and pd reflecting 3c only.	
05/17/2017	Preliminary In Progress	FF5901	Preliminary Submitted for Approval	RC475S	Promote	RFDS Updated to reflect 3C only.	NER-RCTB-17-00657 FAILURE 05/17/2017 10:08:02 AM
05/17/2017	Preliminary Submitted for Approval	RC475S	Preliminary Approved	DC5778	Promote		
06/05/2017	Preliminary Approved	DC5778	Final RF Approval	OM636A	Promote	Promoting to final	

65° OctoPORT MULTI-BAND ANTENNA

Model OPA-65R-LCUU-H6



Octoport Multi-Band Antenna Array

The CCI Octoport Multi-Band Antenna Array is an industry first 8-port antenna with full WCS Band Coverage. With four high band ports covering PCS, AWS and WCS bands, two 700 MHz ports, and two 850 MHz ports our octoport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2155 MHz and WCS 2300 MHz coverage in a single enclosure.

Benefits

- ◆ RET System allows Independent Tilt of each band specific paired port
- ◆ Reduces tower loading
- ◆ Frees up space for tower mounted Remote Radio Heads
- ◆ Single radome with eight ports
- ◆ All Band design simplifies radio assignments
- ◆ Sharp elevation beam eases network planning

Features

- ◆ High Band Ports include WCS Band
- ◆ Four High Band ports with four Low Band ports in one antenna
- ◆ Sharp elevation beam
- ◆ Excellent elevation side-lobe performance
- ◆ Excellent MIMO performance due to array spacing
- ◆ Excellent PIM Performance
- ◆ A multi-network solution in one radome

Applications

- ◆ 4x4 MIMO on High Band and Dual 2x2 MIMO on 700 & 850 Low Bands
- ◆ Adding additional capacity without adding additional antennas
- ◆ Adding WCS Band without increasing antenna count



65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H6

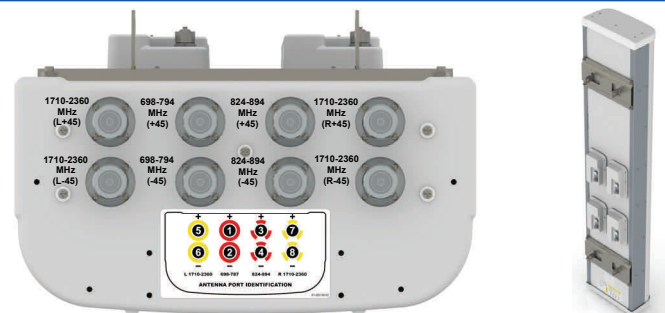
OPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports (L) which cover the range from 698-787	2 X Low Band Ports (C) which cover the range from 824-894	4 X High Band Ports (H1 & H2) which cover the full range from 1710-2360 MHz			
			1850-1990 MHz	1710-1755/2110-2170 MHz	2305-2360 MHz	
Gain	13.8 dBi	14.6 dBi	17.0 dBi	16.3 dBi	17.4 dBi	17.6 dBi
Azimuth Beamwidth (-3dB)	66°	61°	60°	68°	64°	60°
Elevation Beamwidth (-3dB)	12.2°	10.3°	5.7°	6.3°	5.1°	4.5°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -18 dB	< -19 dB	< -19 dB	< -18 dB	< -18 dB
Front-to-Back Ratio @180°	> 30 dB	> 27 dB	> 32 dB	> 32 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 27 dB	> 25 dB	> 27 dB	> 27 dB	> 28 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 22 dB	> 22 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 17 dB	> 17 dB	> 17 dB	> 17 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

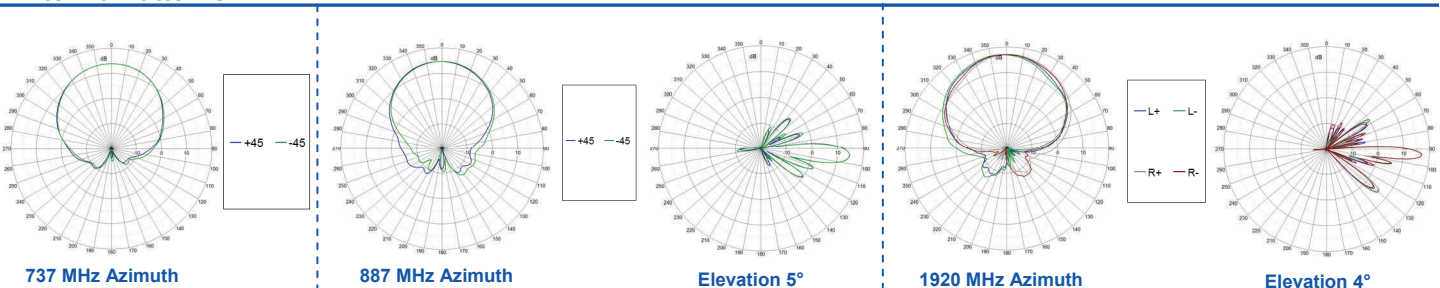
Dimensions (LxWxD)	72.0 x 14.8 x 7.4 inches (1828 x 376 x 189 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	247 lbs (1099 N) @ 100 mph
Side Wind Load	142 lbs (631 N) @ 100 mph
Equivalent Flat Plate Area	9.7 ft ² (0.9 m ²)
Weight (w/o RET/Mounting)	73 lbs (33 kg)
RET System Weight	7.0 lbs (3.0 kg)
Connector	8; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



Bottom View

Rear View

Antenna Patterns*



*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

65° OctoPORT MULTI-BAND ANTENNA

Model OPA-65R-LCUU-H8



The CCI Octoport Multi-Band Antenna Array is an industry first 8-port antenna with full WCS Band Coverage. With four high band ports covering PCS, AWS and WCS bands, two 700 MHz ports, and two 850 MHz ports our octoport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz, Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2155 MHz and WCS 2300 MHz coverage in a single enclosure.

All CCI antennas are manufactured under ISO 9001.

Octoport Multi-Band Antenna Array

Benefits

- ◆ RET System allows Independent Tilt of each band specific paired port
- ◆ Reduces tower loading
- ◆ Frees up space for tower mounted Remote Radio Heads
- ◆ Single radome with eight ports
- ◆ All Band design simplifies radio assignments
- ◆ Sharp elevation beam eases network planning

Features

- ◆ High Band Ports include WCS Band
- ◆ Four High Band ports with four Low Band ports in one antenna
- ◆ Sharp elevation beam
- ◆ Excellent elevation side-lobe performance
- ◆ Excellent MIMO performance due to array spacing
- ◆ Excellent PIM Performance
- ◆ A multi-network solution in one radome

Applications

- ◆ 4x4 MIMO on High Band and Dual 2x2 MIMO on 700 & 850 Low Bands
- ◆ Adding additional capacity without adding additional antennas
- ◆ Adding WCS Band without increasing antenna count



65° OctoPORT MULTI-BAND ANTENNA

Model OPA-65R-LCUU-H8

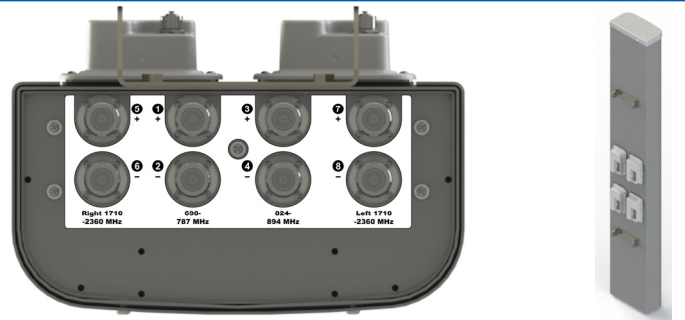
OPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports (L) which cover the range from 698-787 MHz	2 X Low Band Ports (C) which cover the range from 824-894 MHz	4 X High Band Ports (H1 & H2) which cover the full range from 1710-2360 MHz			
			1850-1990 MHz	1710-1755/2110-2170 MHz	2305-2360 MHz	
Gain	14.7 dBi	15.5 dBi	17.0 dBi	16.5 dBi	17.2 dBi	17.1 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	67°	64°	61°
Elevation Beamwidth (-3dB)	10.1°	8.5°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 28 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 27 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

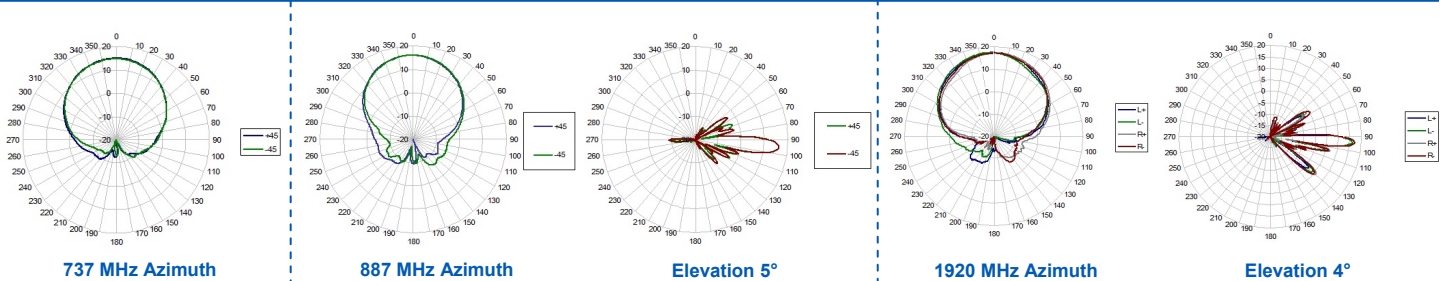
Dimensions (LxWxD)	92.7 x 14.4 x 7.0 inches (2355 x 366 x 179 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	327 lbs (1453 N) @ 100 mph (161 kph)
Side Wind Load	186 lbs (829 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	12.9 ft ² (1.2 m ²)
Weight (w/o RET/Mounting)	88 lbs (40 kg)
RET System Weight	7.0 lbs (3.0 kg)
Connector	8; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



Bottom View

Rear View

Antenna Patterns*



*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

RRUS 32 B30 Data Sheet

RRUS 32 B30

PRELIMINARY



- › WCS A+B blocks
 - TX = 2350 – 2360 MHz
 - RX = 2305 – 2315 MHz
- › RF output 4 x 25 Watts
- › 4T4R FDD
- › 10 MHz IBW for LTE
- › CPRI 2 ports x 10 Gbps
- › Dimensions (incl. feet and sunshield)
 - Height: 26.7” (678 mm)
 - Width: 12.1” (306 mm)
 - Depth: 6.7” (171 mm)
- › Weight, excl. mounting hardware
 - 60 lbs (23 kg)



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

James Davis, Zoning Enforcement Officer
 Town of Manchester
 Building Department
 P.O. Box 191
 Manchester, CT 06045



9590 9402 1223 5246 6327 36

2. Article Number (Transfer from service label)

7016 1370 0000 4740 7353

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

- Agent
- Addressee

B. Received by (Printed Name)

TELBOROUGH

C. Date of Delivery

7/10/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

191

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Greg Smith, Chief Building Inspector
 Town of Manchester
 P.O. Box 191
 Manchester, CT 06045



9590 9402 1223 5246 6327 43

2. Article Number (Transfer from service label)

7016 1370 0000 4740 7346

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

- Agent
- Addressee

B. Received by (Printed Name)

TELBOROUGH

C. Date of Delivery

7/10/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

191

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Scott Shanley, General Manager
 Town of Manchester
 41 Center Street
 Manchester, CT 06040



9590 9402 1223 5246 6327 50

2. Article Number (Transfer from service label)

7016 1370 0000 4740 7339

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *WR*

- Agent
 Addressee

B. Received by (Printed Name)

TRIOOK

C. Date of Delivery

7/10/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

191

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

The Honorable Jay Moran, Mayor
 Town of Manchester
 41 Center Street
 P.O. Box 191
 Manchester, CT 06045-0191



9590 9402 1223 5246 6327 67

2. Article Number (Transfer from service label)

7016 1370 0000 4740 7322

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *WR*

- Agent
 Addressee

B. Received by (Printed Name)

TRIOOK

C. Date of Delivery

7/10/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

191

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Domestic Return Receipt