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

March 27, 2017

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 876331**
AT&T Site ID: CT1024
115 North Mountain Road, New Britain, CT 06053
Latitude: 41° 40' 35.72"/ Longitude: -72° 49' 17.09"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 100-foot level of the existing 118.9-foot monopole tower at 115 North Mountain Road in New Britain, CT. The tower and property is owned by Crown Castle. AT&T intends to replace three (3) RRU11/A2s with three (3) RRUS-32 B2 and install six (6) tower mounted switches.

The City of New Britain could not confirm the original date and conditions of zoning.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Erin Stewart, Mayor, City of New Britain, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: The Honorable Erin Stewart, Mayor
City of New Britain
27 West Main Street
New Britain, CT 06051

Planning & Zoning
City of New Britain
27 West Main Street
New Britain, CT 06051

October Twenty Four Inc.
190 Camp St, PO Box 279
Plainville, CT 06062

115 NORTH MOUNTAIN RD

Location	115 NORTH MOUNTAIN RD	**Mblu**	F2D/ 102/ / /
Acct#	66600115	**Owner**	OCTOBER TWENTY FOUR INC
Assessment	$232,330	**Appraisal**	$331,900
PID	1134	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$234,100	$97,800	$331,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$163,870	$68,460	$232,330

Owner of Record

Owner OCTOBER TWENTY FOUR INC
Co-Owner
Address C/O A AIUDI + SONS LLC
PO BOX 279
PLAINVILLE, CT 06062

Sale Price $550,000
Certificate 1
Book & Page 1826/ 309
Sale Date 09/29/2011
Instrument 19

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
OCTOBER TWENTY FOUR INC	$550,000	1	1826/ 309	19	09/29/2011
OCTOBER TWENTY FOUR INC	$0		733/ 284		02/02/1978
GIUSEPPE CACCAMO SALVATORE	$0		431/ 424		01/01/1900
	$0		224/ 239		01/01/1900

Building Information

Building 1 : Section 1

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

Building Photo

Building Attributes

Field	Description
Style	Outbuildings
Model	
Grade	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Central Heat Sys	
AC Type	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Whirlpool Tub	
Fireplaces	
Rec Room Finish	
Rec Room Qual	
Bsmt Garages	
Bldg Nbhd	

(http://images.vgsi.com/photos/NewBritainCTPhotos//default.jpg

Building Layout

Building Layout

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

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	4400
Description	Ind Ld De
Zone	TP
Neighborhood	101G
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.82
Depth	
Assessed Value	$68,460
Appraised Value	$97,800

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV5	Conc Pad			256 S.F.	$3,100	1
FN3	Fence-6' Chain			150 L.F.	$1,500	1
CB3	PreCastConcCel			286 S.F.	$89,200	1
CB3	PreCastConcCel			360 S.F.	$140,300	1

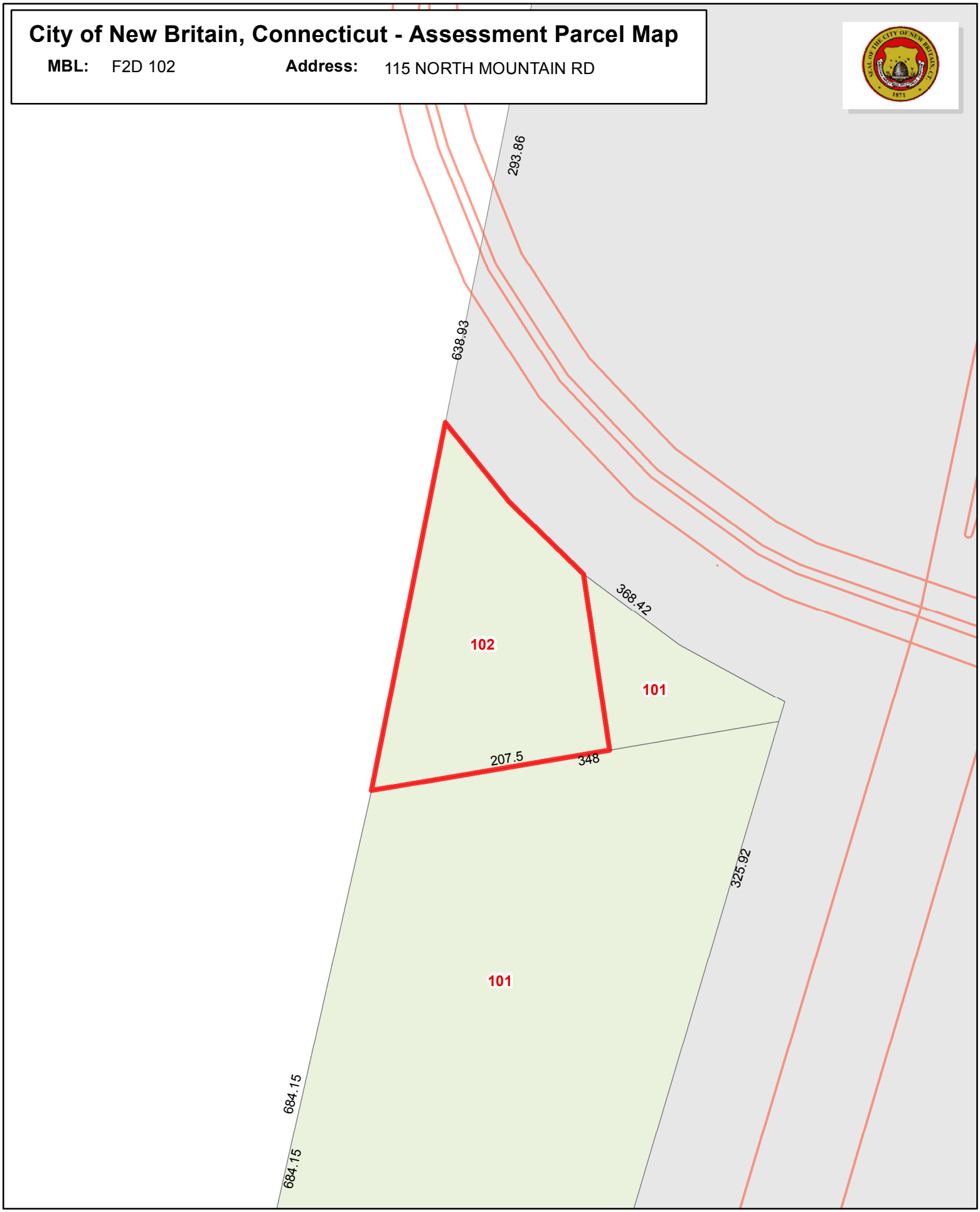
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$234,100	$97,800	$331,900
2014	$234,100	$97,800	$331,900
2013	$234,100	$97,800	$331,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$163,870	$68,460	$232,330
2014	$163,870	$68,460	$232,330
2013	$163,870	$68,460	$232,330

City of New Britain, Connecticut - Assessment Parcel Map

MBL: F2D 102 **Address:** 115 NORTH MOUNTAIN RD



N
W E
S

Approximate Scale:

1 inch = 100 feet

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The City of New Britain and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced January 2015

WIRELESS COMMUNICATIONS FACILITY
CT1024 - LTE BWE
CROWN CASTLE, INC. SITE NO: 876331
NEW BRITAIN LOON LAKE
115 NORTH MOUNTAIN ROAD
NEW BRITAIN, CT 06053

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

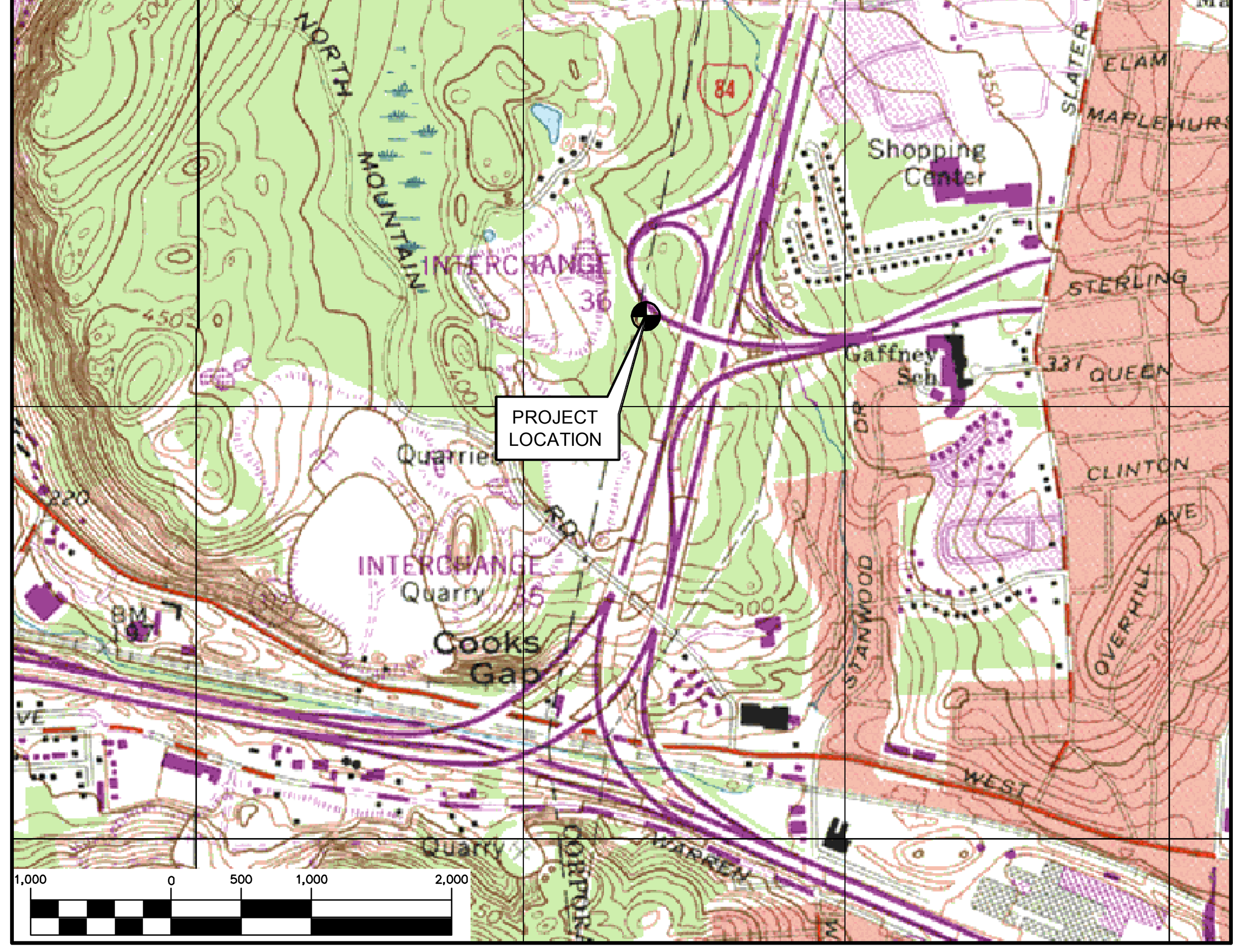
TO: 115 NORTH MOUNTAIN ROAD, NEW BRITAIN, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.31 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.27 MI
3.	TURN LEFT ONTO WEST ST	0.30 MI
4.	TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN	1.63 MI
5.	TAKE EXIT 22N ONTO CT-9	6.58 MI
6.	TAKE EXIT 28 ONTO CT-72	1.65 MI
7.	TAKE EXIT 7 ONTO CT-372	0.28 MI
8.	TURN RIGHT ONTO CORBIN AVE	0.14 MI
9.	TAKE FIRST LEFT ONTO W MAIN ST	0.67 MI
10.	TURN RIGHT ONTO N MOUNTAIN RD	0.24 MI
11.	115 N MOUNTAIN ROAD IS ON THE RIGHT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

A. REMOVE (3) EXISTING RRUS-11+RRUS-A2'S AND REPLACE WITH (3) NEW RRUS-32 B2'S, (1) PER SECTOR.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT1024
AT&T SITE NAME:	NEW BRITAIN LOON LAKE
SITE ADDRESS:	CROWN CASTLE, INC. SITE NO: 876331 115 NORTH MOUNTAIN ROAD NEW BRITAIN, CT 06053
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°-40'-35.724" N LONGITUDE: 72°-49'-17.076" W GROUND ELEVATION: ±412.0' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/24/17	KAM/JR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

NEW BRITAIN LOON LAKE

CT1024 - LTE BWE

115 NORTH MOUNTAIN ROAD
NEW BRITAIN, CT 06053

DATE:	01/23/17
SCALE:	AS NOTED
JOB NO.	17004.06

TITLE SHEET

T-1

Sheet No. 1 of 5

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

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

GENERAL NOTES:

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

STRUCTURAL STEEL

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

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

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

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:

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

2. COAXIAL CABLES:

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

EXAMINATION AND PREPARATION:

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

CLEANING:

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

APPLICATION:

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

COMPLETED WORK:

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/24/17	KAWJR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

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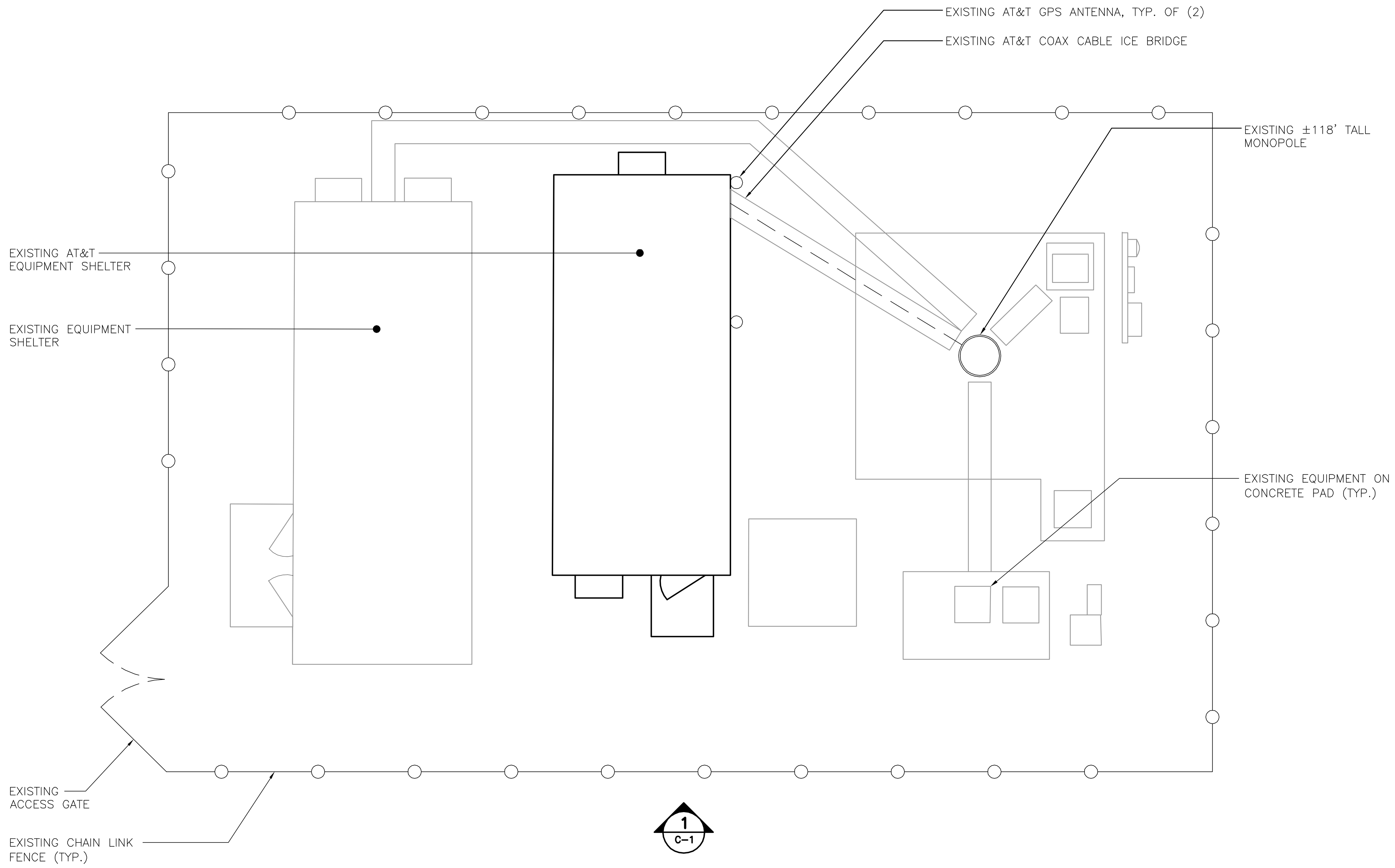
NEW BRITAIN LOON LAKE
CT1024 – LTE BWE
115 NORTH MOUNTAIN ROAD
NEW BRITAIN, CT 06053

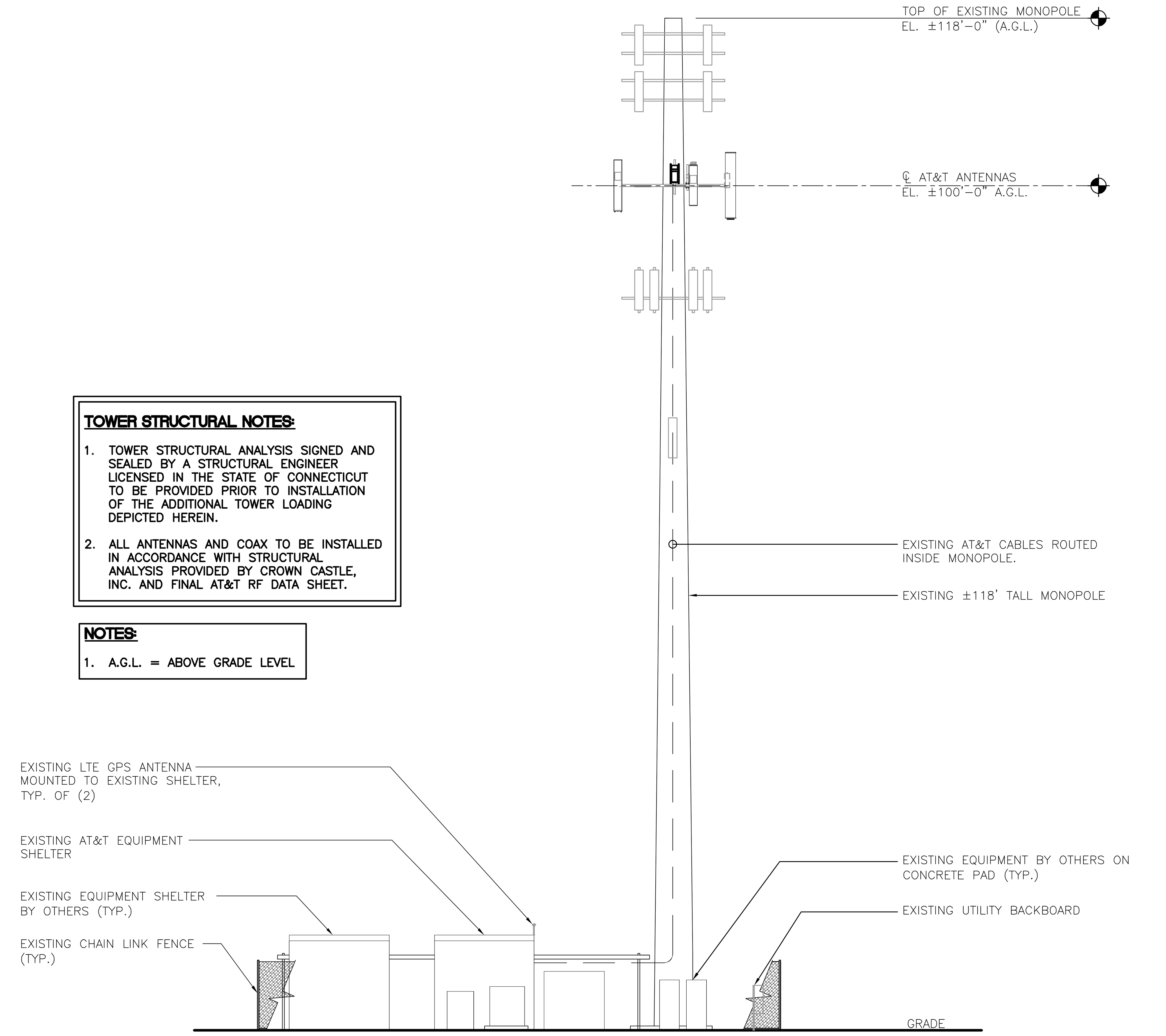
DATE:	01/23/17
SCALE:	AS NOTED
JOB NO.	17004.06

NOTES AND SPECIFICATIONS

N–1



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



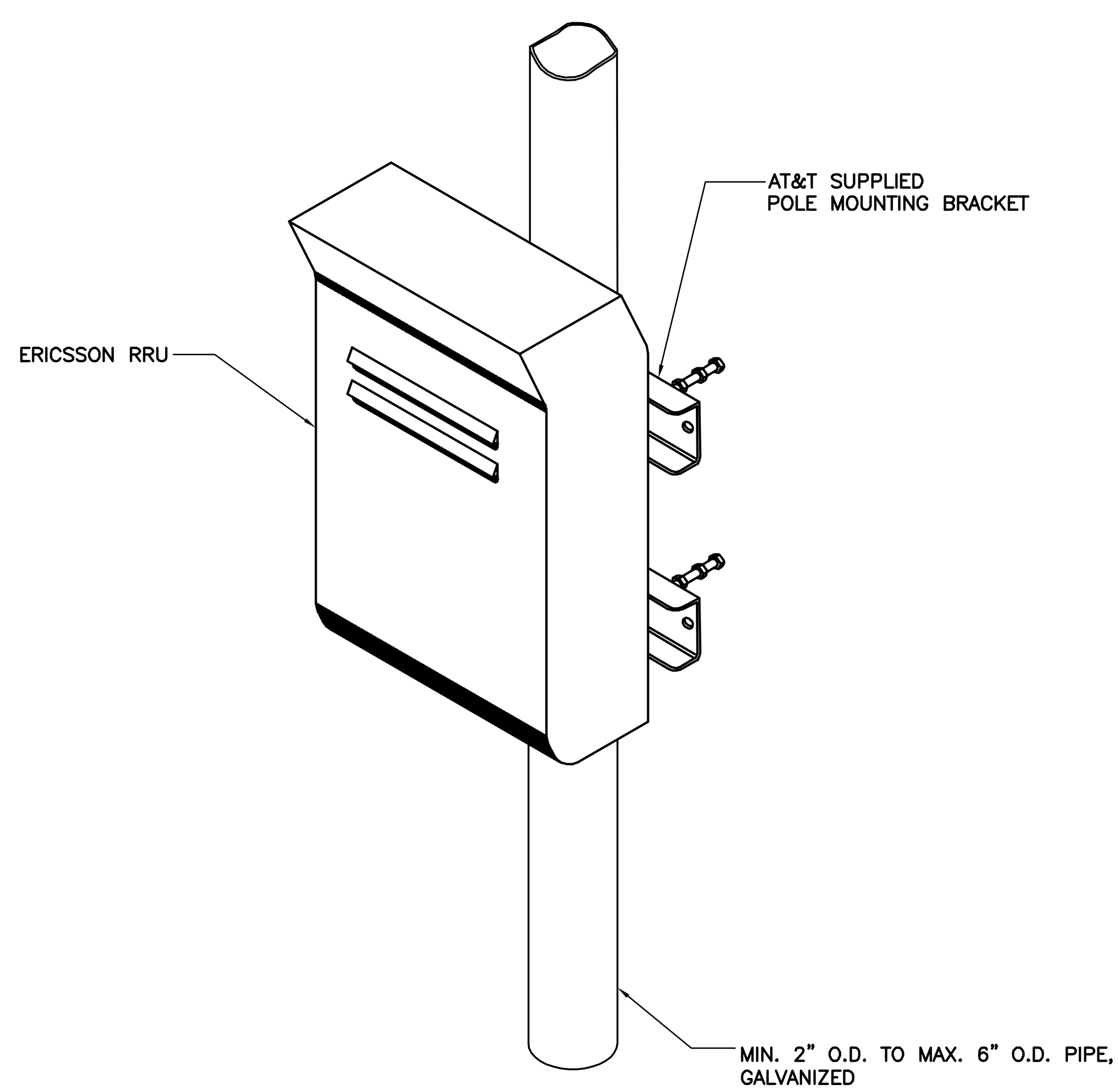
TOWER STRUCTURAL NOTES:

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

NOTES:

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

1 / C-1 **NORTHWEST ELEVATION**
SCALE: 1" = 10'

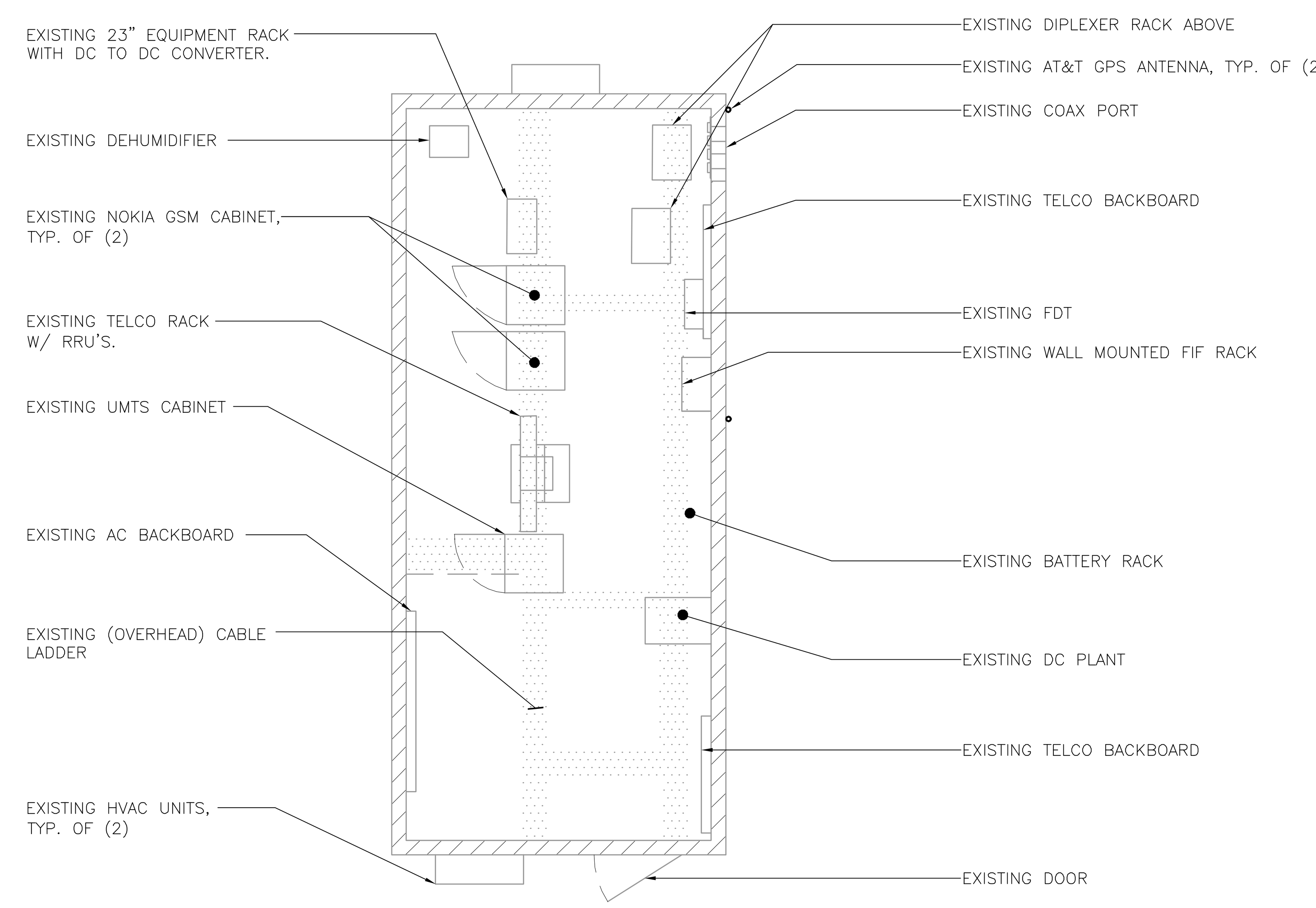


ISOMETRIC VIEW

NOTES:

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

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



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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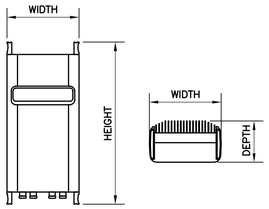
DATE: 01/23/17
SCALE: AS NOTED
JOB NO. 17004.06

PLANS, ELEVATION AND DETAILS

C-1

Sheet No. 3 of 6

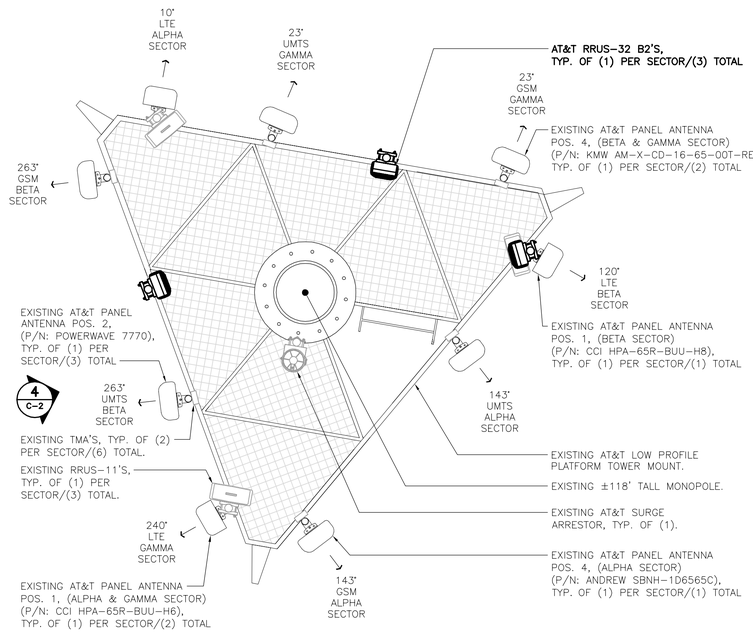


FRONT VIEW TOP VIEW

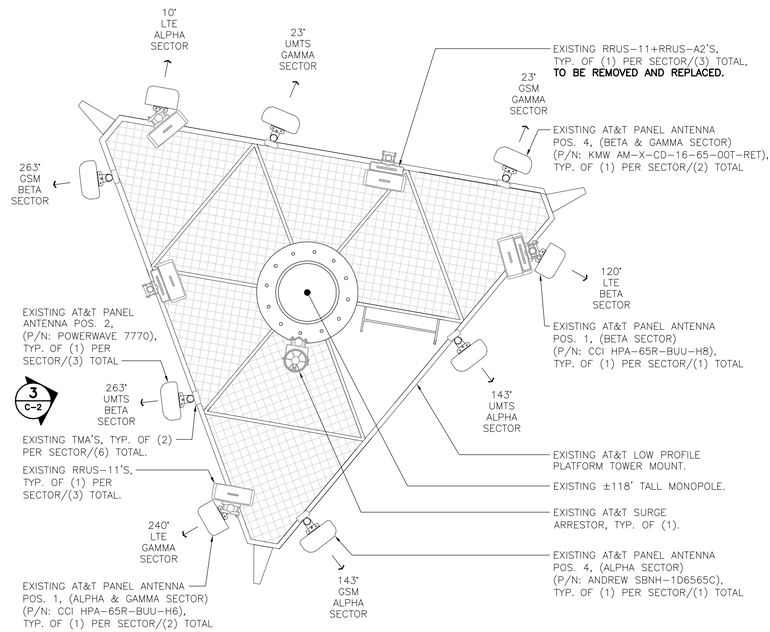
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B2	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

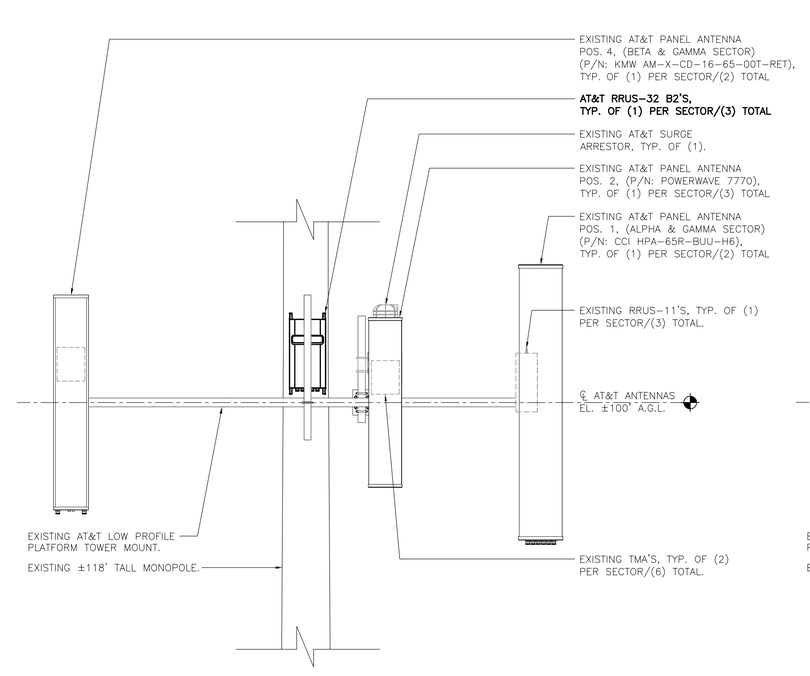
5 / C-2 **ERICSSON RRUS 32 B2 DETAIL**
SCALE: 1" = 1'-0"



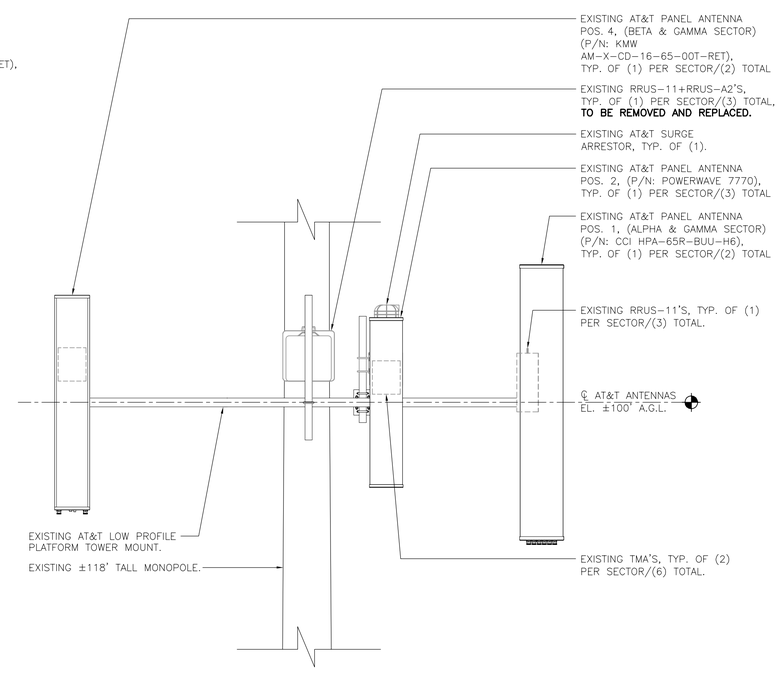
2 / C-2 **PROPOSED ANTENNA PLAN**
SCALE: 3/8" = 1'-0" NORTH



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



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



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

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DATE: 01/23/17
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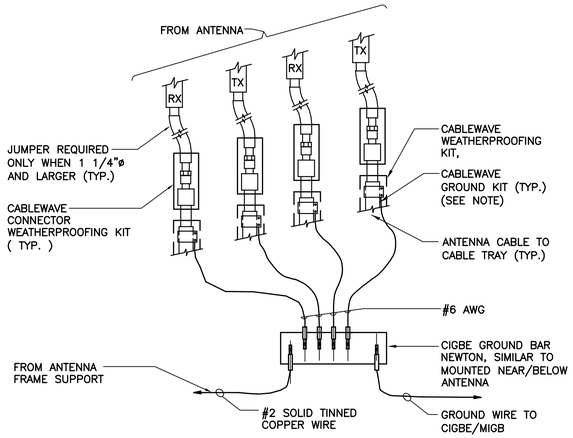
JOB NO. 17004.06

LTE BWE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 5

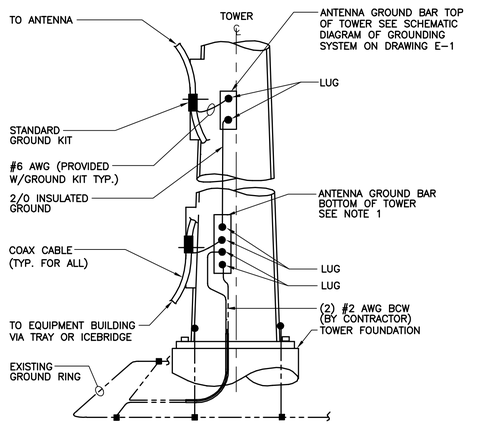


NOTE:

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

5 E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

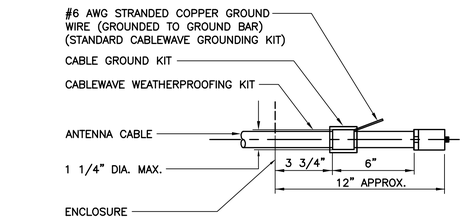


NOTES:

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 E-1 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

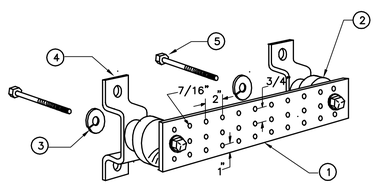


NOTE:

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

4 E-1 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

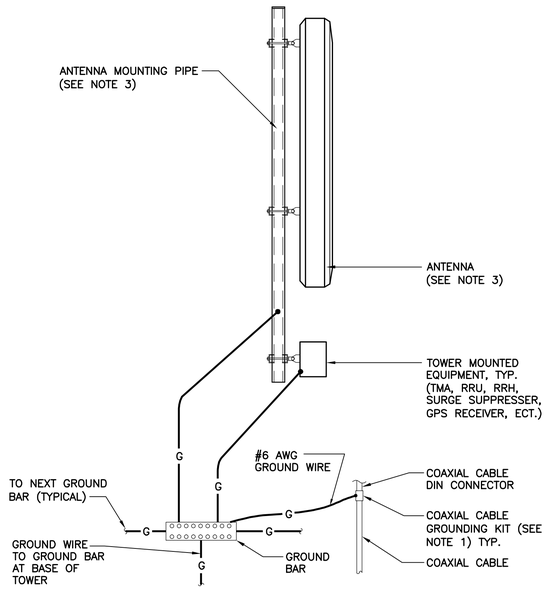


LEGEND

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

3 E-1 GROUND BAR DETAIL

NOT TO SCALE



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 E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

ELECTRICAL NOTES

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

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

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

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

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

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SCALE: AS NOTED
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TYPICAL ELECTRICAL DETAILS & NOTES

E-1

Sheet No. 5 of 5

PJF PAUL J. FORD & COMPANY

Date: **March 02, 2017**

Charles McGuirt
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Charlotte, NC 28277
704.405.6607

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1024
	Carrier Site Name:	NEW BRITAIN LOON LAKE
Crown Castle Designation:	**Crown Castle BU Number:**	876331
	Crown Castle Site Name:	NEW BRITAIN GRAVEL PIT
	Crown Castle JDE Job Number:	415757
	Crown Castle Work Order Number:	1352999
	Crown Castle Application Number:	374404 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0436.001.7805 *(Revised Foundation)*
Site Data:	**115 North Mountain Rd, NEW BRITAIN, Hartford County, CT**	
	Latitude 41° 40' 35.72", Longitude -72° 49' 17.09"	
	118 Foot - Monopole Tower	

Dear Charles McGuirt,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 994386, in accordance with application 374404, revision 2.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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

Respectfully submitted by:

Seth Tschanen

Seth Tschanen, E.I.
Structural Designer

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

3.2.17

Date: **March 02, 2017**

Charles McGuirt
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Charlotte, NC 28277
704.405.6607

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1024
	Carrier Site Name:	NEW BRITAIN LOON LAKE
Crown Castle Designation:	**Crown Castle BU Number:**	876331
	Crown Castle Site Name:	NEW BRITAIN GRAVEL PIT
	Crown Castle JDE Job Number:	415757
	Crown Castle Work Order Number:	1352999
	Crown Castle Application Number:	374404 Rev. 2
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Structural Designer

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1) INTRODUCTION

This tower is a 118 ft Monopole tower designed by ROHN in October of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	100.0	2	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	--	--	--
		1	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe			
		3	ericsson	RRUS 32 B2			
		6	powerwave	7020.00			
		3	powerwave	TT19-08BP111-001			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	116.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	--	--	1
		1	tower mounts	Pipe Mount [PM 601-3]			
	113.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
114.0	116.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	3	1 1/4	1
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	114.0	1	tower mounts	Platform Mount [LP 502-1]			
108.0	108.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	12 1	7/8 1 5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Sector Mount [SM 801-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	100.0	2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	--	--	2
		6	powerwave	LGP13519			
		1	andrew	SBNH-1D6565C w/ Mount Pipe			
		1	andrew	SBNH-1D6565C w/ Mount Pipe	12 1 2	7/8 3/8 3/4	1
		3	communication components	DTMABP7819VG12A			
		3	ericsson	RRUS 11 B12			
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	98.0	1	tower mounts	Platform Mount [LP 712-1]			
85.0	86.0	3	alcatel lucent	RRH2X60-AWS	13	1 5/8	1
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	CBC721-DF			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		2	antel	BXA-70040-6CF-EDIN-2 w/ Mount Pipe			
		4	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	rfs celwave	DB-B1-6C-12AB-0Z			
	85.0	1	tower mounts	Platform Mount [LP 303-1]			
80.0	81.0	1	lucent	KS24019-L112A	1	1/2	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			
72.0	74.0	2	argus	LLPX310R w/ Mount Pipe	3 3 2	5/8 1/4 1/2	1
		1	dragonwave	HORIZON COMPACT			
		1	samsung	WIMAX DAP HEAD			
	73.0	1	andrew	VHLP1-23			
		1	samsung	WIMAX DAP HEAD			
	72.0	1	argus	LLPX310R w/ Mount Pipe			
		1	dragonwave	A-ANT-18G-2-C			
		1	dragonwave	HORIZON COMPACT			
		1	samsung	WIMAX DAP HEAD			
		1	tower mounts	Side Arm Mount [SO 101-3]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-11435G, 01/23/2008	2192549	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 126879, 03/07/2013	3684848	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 10/24/1996	1947809	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 10/24/1996	1947800	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 145041, 11/21/2014	5407775	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 146127, 3/12/2015	5596857	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25663.40942, 3/9/2016	6131239	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 41707-0508, 5/23/2008	2268906	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	118 - 90	Pole	P24x0.25	1	-9.10	662.26	64.3	Pass
L2	90 - 76.5	Pole	P24x0.375	2	-15.09	1052.07	86.3	Pass
L3	76.5 - 74	Pole	RPS 24" x 0.58167"	3	-15.63	1387.68	69.2	Pass
L4	74 - 68.875	Pole	RPS 24" x 0.82296"	4	-17.66	1415.12	83.3	Pass
L5	68.875 - 64.5	Pole	RPS 24" x 0.81081"	5	-18.93	1374.22	99.1	Pass
L6	64.5 - 63	Pole	RPS 24" x 0.9855"	6	-19.44	1621.17	88.6	Pass
L7	63 - 60	Pole	RPS 24" x 0.94656"	7	-20.43	1569.62	99.8	Pass
L8	60 - 49.08	Pole	RPS 30" x 0.62249"	8	-25.07	1964.82	83.1	Pass
L9	49.08 - 42	Pole	RPS 30" x 0.77273"	9	-27.50	2168.58	88.3	Pass
L10	42 - 34.5	Pole	RPS 30" x 0.89547"	10	-30.43	2461.22	90.3	Pass
L11	34.5 - 34	Pole	RPS 30" x 1.00259"	11	-30.65	2741.39	82.1	Pass
L12	34 - 30	Pole	RPS 30" x 0.87892"	12	-32.21	2460.53	97.8	Pass
L13	30 - 28	Pole	RPS 36" x 0.67823"	13	-34.47	2277.92	90.6	Pass
L14	28 - 23.25	Pole	RPS 36" x 0.8198"	14	-36.48	2771.72	80.8	Pass
L15	23.25 - 21	Pole	RPS 36" x 0.93415"	15	-37.55	2972.10	78.4	Pass
L16	21 - 19	Pole	RPS 36" x 0.79024"	16	-38.38	2474.20	96.8	Pass
L17	19 - 18.5	Pole	RPS 36" x 0.9479"	17	-38.63	2943.26	82.3	Pass
L18	18.5 - 12.7	Pole	RPS 36" x 0.83577"	18	-41.15	2882.60	91.3	Pass
L19	12.7 - 10.5	Pole	RPS 36" x 0.84318"	19	-42.12	2774.28	97.9	Pass
L20	10.5 - 7.5	Pole	RPS 36" x 0.90546"	20	-43.53	3050.29	93.0	Pass
L21	7.5 - 7	Pole	RPS 36" x 0.93763"	21	-43.78	3097.21	92.3	Pass
L22	7 - 3.75	Pole	RPS 36" x 0.99306"	22	-45.42	3396.02	88.0	Pass
L23	3.75 - 2.75	Pole	RPS 36" x 1.57084"	23	-46.17	5046.20	61.0	Pass
L24	2.75 - 2	Pole	RPS 36" x 1.44941"	24	-46.70	4501.21	68.8	Pass
L25	2 - 0	Pole	RPS 36" x 1.28159"	25	-47.95	4200.66	75.3	Pass
							Summary	
						Pole (L7)	99.8	Pass
						Rating =	99.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.0	Pass
1	Base Plate	0	70.9	Pass
1	Base Foundation Steel	0	70.5	Pass
1	Base Foundation Soil Interaction	0	56.5	Pass
1	Flange Connection	30	71.1	Pass
1	Flange Connection	60	75.1	Pass
1	Flange Connection	90	35.0	Pass

Structure Rating (max from all components) =	99.8%

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

4.1) Recommendations

The monopole does not have sufficient capacity to carry the proposed loading configuration. Modifications will be required to bring the tower into compliance with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda for the proposed loading configuration The following components require modifications:

- Augment existing foundation site for bearing.

Further engineering and detailing is required to design the necessary modifications.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.0 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 1.00 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50.0 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60.0 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	118.00-90.00	28.00	P24x0.25	A572-42 (42 ksi)	
L2	90.00-76.50	13.50	P24x0.375	A572-42 (42 ksi)	
L3	76.50-74.00	2.50	RPS 24" x 0.58167"	Reinf 36.03 ksi (36 ksi)	
L4	74.00-68.88	5.13	RPS 24" x 0.82296"	Reinf 26.24 ksi (26 ksi)	
L5	68.88-64.50	4.38	RPS 24" x 0.81081"	Reinf 25.85 ksi (26 ksi)	

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L6	64.50-63.00	1.50	RPS 24" x 0.9855"	Reinf 25.28 ksi (25 ksi)	
L7	63.00-60.00	3.00	RPS 24" x 0.94656"	Reinf 25.44 ksi (25 ksi)	
L8	60.00-49.08	10.92	RPS 30" x 0.62249"	Reinf 38.03 ksi (38 ksi)	
L9	49.08-42.00	7.08	RPS 30" x 0.77273"	Reinf 33.96 ksi (34 ksi)	
L10	42.00-34.50	7.50	RPS 30" x 0.89547"	Reinf 33.40 ksi (33 ksi)	
L11	34.50-34.00	0.50	RPS 30" x 1.00259"	Reinf 33.35 ksi (33 ksi)	
L12	34.00-30.00	4.00	RPS 30" x 0.87892"	Reinf 34.00 ksi (34 ksi)	
L13	30.00-28.00	2.00	RPS 36" x 0.67823"	Reinf 33.63 ksi (34 ksi)	
L14	28.00-23.25	4.75	RPS 36" x 0.8198"	Reinf 33.99 ksi (34 ksi)	
L15	23.25-21.00	2.25	RPS 36" x 0.93415"	Reinf 32.09 ksi (32 ksi)	
L16	21.00-19.00	2.00	RPS 36" x 0.79024"	Reinf 31.45 ksi (31 ksi)	
L17	19.00-18.50	0.50	RPS 36" x 0.9479"	Reinf 31.33 ksi (31 ksi)	
L18	18.50-12.70	5.80	RPS 36" x 0.83577"	Reinf 34.69 ksi (35 ksi)	
L19	12.70-10.50	2.20	RPS 36" x 0.84318"	Reinf 33.10 ksi (33 ksi)	
L20	10.50-7.50	3.00	RPS 36" x 0.90546"	Reinf 33.95 ksi (34 ksi)	
L21	7.50-7.00	0.50	RPS 36" x 0.93763"	Reinf 33.32 ksi (33 ksi)	
L22	7.00-3.75	3.25	RPS 36" x 0.99306"	Reinf 34.55 ksi (35 ksi)	
L23	3.75-2.75	1.00	RPS 36" x 1.57084"	Reinf 33.41 ksi (33 ksi)	
L24	2.75-2.00	0.75	RPS 36" x 1.44941"	Reinf 31.79 ksi (32 ksi)	
L25	2.00-0.00	2.00	RPS 36" x 1.28159"	Reinf 33.39 ksi (33 ksi)	

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 118.00-90.00				1	1	1			
L2 90.00-76.50				1	1	1			
L3 76.50-74.00				1	1	1			
L4 74.00-68.88				1	1	1			
L5 68.88-64.50				1	1	1			
L6 64.50-63.00				1	1	1			
L7 63.00-60.00				1	1	1			
L8 60.00-49.08				1	1	1			
L9 49.08-42.00				1	1	1			
L10 42.00-34.50				1	1	1			
L11 34.50-34.00				1	1	1			
L12 34.00-30.00				1	1	1			
L13 30.00-28.00				1	1	1			
L14 28.00-23.25				1	1	1			
L15 23.25-21.00				1	1	1			
L16 21.00-19.00				1	1	1			
L17 19.00-18.50				1	1	1			
L18 18.50-12.70				1	1	1			
L19 12.70-10.50				1	1	1			
L20 10.50-7.50				1	1	1			
L21 7.50-7.00				1	1	1			
L22 7.00-3.75				1	1	1			
L23 3.75-2.75				1	1	1			
L24 2.75-2.00				1	1	1			
L25 2.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5J(1-1/4)	C	No	CaAa (Out Of Face)	114.00 - 0.00	1	No Ice	0.15	1.08
						1/2" Ice	0.25	2.33
						1" Ice	0.35	4.18

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement*	*Total Number*		*C_AA_A*	*Weight*
				ft			*ft^2/ft*	*plf*
HB114-1-08U4-M5J(1-1/4)	C	No	CaAa (Out Of Face)	114.00 - 0.00	2	No Ice	0.00	1.08
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.18
***								
AL5-50(7/8)	C	No	Inside Pole	108.00 - 0.00	12	No Ice	0.00	0.26
						1/2" Ice	0.00	0.26
						1" Ice	0.00	0.26
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	Inside Pole	108.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
***								
2" (Nominal) Conduit	C	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
FB-L98B-002-75000(3/8)	C	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	98.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF5-50A(7/8)	C	No	Inside Pole	98.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
***								
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
***								
1" Rigid Conduit (3/4" EMT)	C	No	CaAa (Out Of Face)	80.00 - 0.00	1	No Ice	0.00	0.46
						1/2" Ice	0.00	1.33
						1" Ice	0.00	2.81
LDF4-50A(1/2)	C	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	72.00 - 0.00	2	No Ice	0.00	0.72
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.84
HJ4.5-50(5/8)	C	No	Inside Pole	72.00 - 0.00	3	No Ice	0.00	0.40
						1/2" Ice	0.00	0.40
						1" Ice	0.00	0.40
FSJ1-50A(1/4)	C	No	Inside Pole	72.00 - 0.00	3	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
FSJ4P-50B-1(1/2)	C	No	CaAa (Out Of Face)	72.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.77
						1" Ice	0.00	2.01
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	78.00 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.50 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	50.25 - 35.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	75.00 - 60.00	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	118.00-90.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.696	0.20
L2	90.00-76.50	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	5.695	0.28
L3	76.50-74.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.917	0.06
L4	74.00-68.88	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	4.314	0.14
L5	68.88-64.50	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	3.682	0.12
L6	64.50-63.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.263	0.04
L7	63.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.525	0.08
L8	60.00-49.08	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	7.972	0.31
L9	49.08-42.00	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	5.959	0.20
L10	42.00-34.50	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	6.354	0.21
L11	34.50-34.00	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	0.442	0.01
L12	34.00-30.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.533	0.11
L13	30.00-28.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06
L14	28.00-23.25	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	4.196	0.13
L15	23.25-21.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.987	0.06
L16	21.00-19.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06
L17	19.00-18.50	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	0.442	0.01
L18	18.50-12.70	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	5.123	0.16
L19	12.70-10.50	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	1.943	0.06
L20	10.50-7.50	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	2.650	0.08
L21	7.50-7.00	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	0.442	0.01
L22	7.00-3.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.871	0.09

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L23	3.75-2.75	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	0.883	0.03
L24	2.75-2.00	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	0.662	0.02
L25	2.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	118.00-90.00	A	2.243	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	14.464	0.98
L2	90.00-76.50	A	2.194	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	19.809	2.01
L3	76.50-74.00	A	2.172	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.864	0.53
L4	74.00-68.88	A	2.161	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.879	1.21
L5	68.88-64.50	A	2.146	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.487	1.10
L6	64.50-63.00	A	2.136	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.609	0.37
L7	63.00-60.00	A	2.128	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.194	0.74
L8	60.00-49.08	A	2.103	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	27.402	2.64
L9	49.08-42.00	A	2.065	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	21.232	1.66
L10	42.00-34.50	A	2.030	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	22.254	1.70
L11	34.50-34.00	A	2.007	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.490	0.11
L12	34.00-30.00	A	1.994	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.863	0.88
L13	30.00-28.00	A	1.974	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	5.891	0.44
L14	28.00-23.25	A	1.950	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.870	1.02
L15	23.25-21.00	A	1.922	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.503	0.48
L16	21.00-19.00	A	1.902	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	5.740	0.42
L17	19.00-18.50	A	1.890	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.429	0.10
L18	18.50-12.70	A	1.856	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.364	1.18
L19	12.70-10.50	A	1.801	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.083	0.43
L20	10.50-7.50	A	1.756	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.153	0.57
L21	7.50-7.00	A	1.719	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.339	0.09
L22	7.00-3.75	A	1.668	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.533	0.59
L23	3.75-2.75	A	1.586	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.540	0.17
L24	2.75-2.00	A	1.537	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.867	0.12
L25	2.00-0.00	A	1.410	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.712	0.30

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
Pipe Mount [PM 601-3]	C	None		0.000	116.00	No Ice 1/2" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
(3) 2.375" OD x 3' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
(3) 2.375" OD x 3' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
(3) 2.375" OD x 3' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
Platform Mount [LP 502-1]	C	None		0.000	114.00	No Ice 1/2" Ice 1" Ice	32.35 45.67 58.99	32.35 45.67 58.99	0.93 1.19 1.46
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00	0.000	108.00	No Ice 1/2"	6.32 6.76	5.63 6.42	0.11 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	7.20	7.12	0.23
						1" Ice			
KRY 112 144/1	A	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	B	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	C	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
Sector Mount [SM 801-3]	C	None		0.000	108.00	No Ice	20.40	20.40	0.88
						1/2"	26.30	26.30	1.25
						Ice	32.20	32.20	1.63
						1" Ice			
2.375" OD x 6' Mount Pipe	A	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	B	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	C	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
***									
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	11.56	9.72	0.10
			0.00			1/2"	12.22	11.19	0.19
			0.00			Ice	12.89	12.59	0.28
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	0.14
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	0.14
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
DTMABP7819VG12A	A	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	B	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	C	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.000	98.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.64	1.64	0.06
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	13.21	9.58	0.10
			0.00			1/2"	13.90	11.05	0.20
			0.00			Ice	14.59	12.50	0.30
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
RRUS 32 B2	A	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
TT19-08BP111-001	A	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03
						1" Ice			
TT19-08BP111-001	B	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03
						1" Ice			
TT19-08BP111-001	C	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(2) 7020.00	A	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	B	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	C	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
Platform Mount [LP 712-1]	C	None		0.000	98.00	No Ice 1/2" Ice 1" Ice	24.53 29.94 35.35	24.53 29.94 35.35	1.34 1.65 1.96
***									
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) BXA-70040-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	14.65 15.26 15.84	7.37 8.54 9.42	0.06 0.16 0.27
(2) BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
(2) BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
(2) CBC721-DF	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	0.39 0.46 0.55	0.11 0.17 0.23	0.00 0.01 0.01
(4) CBC721-DF	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	0.39 0.46 0.55	0.11 0.17 0.23	0.00 0.01 0.01
(2) RRH2X60-AWS	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-PCS	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
(2) RRH2X60-PCS	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice	2.20 2.39	1.72 1.90	0.06 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice			
DB-B1-6C-12AB-0Z	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	3.36 3.60 3.84	2.19 2.39 2.61	0.03 0.06 0.09
Platform Mount [LP 303-1]	C	None		0.000	85.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
***									
KS24019-L112A	A	From Leg	3.00 0.00 1.00	0.000	80.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.000	80.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									
LLPX310R w/ Mount Pipe	A	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	B	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	C	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
WIMAX DAP HEAD	A	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	2.00 0.00 1.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
HORIZON COMPACT	A	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
HORIZON COMPACT	C	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
Side Arm Mount [SO 101-3]	C	None		0.000	72.00	No Ice 1/2" Ice 1" Ice	7.50 8.90 10.30	7.50 8.90 10.30	0.25 0.33 0.41
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	90.00	No Ice 1/2" Ice 1" Ice	11.39 11.92 12.46	1.46 2.25 3.06	0.43 0.48 0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	90.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.43 0.48 0.53
Bridge Stiffener (84" x	C	None		0.000	90.00	No Ice	0.00	0.00	0.43

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
14.5" x 1.25")						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	60.00	No Ice	11.39	1.46	0.43
						1/2" Ice	11.92	2.25	0.48
						1" Ice	12.46	3.06	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	60.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	C	None		0.000	60.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	30.00	No Ice	11.39	1.46	0.43
						1/2" Ice	11.92	2.25	0.48
						1" Ice	12.46	3.06	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	30.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	C	None		0.000	30.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-18G-2-C	A	Paraboloid w/Radome	From Leg	2.00 0.00 0.00	0.000		72.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.04 0.05
VHLP1-23	B	Paraboloid w/o Radome	From Leg	2.00 0.00 1.00	0.000		72.00	1.27	No Ice 1/2" Ice 1" Ice	1.28 1.45 1.62	0.01 0.02 0.03

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 118.00-90.00	104.00	1.276	29	56.000	A	0.000	56.000	56.000	100.00	0.000	0.000
					B	0.000	56.000		100.00	0.000	0.000
					C	0.000	56.000		100.00	0.000	3.696
L2 90.00-76.50	83.25	1.218	28	27.000	A	0.000	27.000	27.000	100.00	0.000	0.000
					B	0.000	27.000		100.00	0.000	0.000
					C	0.000	27.000		100.00	0.000	5.695
L3 76.50-74.00	75.25	1.192	27	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
					C	0.000	5.000		100.00	0.000	1.917
L4 74.00-68.88	71.44	1.179	27	10.250	A	0.000	10.250	10.250	100.00	0.000	0.000
					B	0.000	10.250		100.00	0.000	0.000
					C	0.000	10.250		100.00	0.000	4.314
L5 68.88-64.50	66.69	1.162	27	8.750	A	0.000	8.750	8.750	100.00	0.000	0.000
					B	0.000	8.750		100.00	0.000	0.000
					C	0.000	8.750		100.00	0.000	3.682
L6 64.50-63.00	63.75	1.151	26	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	1.263
L7 63.00-60.00	61.50	1.142	26	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	2.525
L8 60.00-49.08	54.54	1.114	25	27.300	A	0.000	27.300	27.300	100.00	0.000	0.000
					B	0.000	27.300		100.00	0.000	0.000
					C	0.000	27.300		100.00	0.000	7.972
L9 49.08-42.00	45.54	1.072	25	17.700	A	0.000	17.700	17.700	100.00	0.000	0.000
					B	0.000	17.700		100.00	0.000	0.000
					C	0.000	17.700		100.00	0.000	5.959
L10 42.00-34.50	38.25	1.034	24	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	6.354
L11 34.50-34.00	34.25	1.01	23	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.442
L12 34.00-30.00	32.00	0.996	23	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	3.533
L13 30.00-28.00	29.00	0.975	22	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L14 28.00-23.25	25.63	0.95	22	14.250	A	0.000	14.250	14.250	100.00	0.000	0.000
					B	0.000	14.250		100.00	0.000	0.000
					C	0.000	14.250		100.00	0.000	4.196
L15 23.25-21.00	22.13	0.921	21	6.750	A	0.000	6.750	6.750	100.00	0.000	0.000
					B	0.000	6.750		100.00	0.000	0.000
					C	0.000	6.750		100.00	0.000	1.987
L16 21.00-19.00	20.00	0.902	21	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L17 19.00-18.50	18.75	0.89	20	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L18 18.50-12.70	15.60	0.856	20	17.400	A	0.000	17.400	17.400	100.00	0.000	0.000
					B	0.000	17.400		100.00	0.000	0.000
					C	0.000	17.400		100.00	0.000	5.123
L19 12.70-10.50	11.60	0.85	19	6.600	A	0.000	6.600	6.600	100.00	0.000	0.000
					B	0.000	6.600		100.00	0.000	0.000
					C	0.000	6.600		100.00	0.000	1.943
L20 10.50-7.50	9.00	0.85	19	9.000	A	0.000	9.000	9.000	100.00	0.000	0.000
					B	0.000	9.000		100.00	0.000	0.000
					C	0.000	9.000		100.00	0.000	2.650
L21 7.50-7.00	7.25	0.85	19	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L22 7.00-3.75	5.38	0.85	19	9.750	A	0.000	9.750	9.750	100.00	0.000	0.000
					B	0.000	9.750		100.00	0.000	0.000
					C	0.000	9.750		100.00	0.000	2.871
L23 3.75-2.75	3.25	0.85	19	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.883
L24 2.75-2.00	2.38	0.85	19	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.662
L25 2.00-0.00	1.00	0.85	19	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 118.00-90.00	104.00	1.276	8	2.24	66.469	A	0.000	66.469	66.469	100.00	0.000	0.000
						B	0.000	66.469		100.00	0.000	0.000
						C	0.000	66.469		100.00	0.000	14.464
L2 90.00-76.50	83.25	1.218	7	2.19	31.936	A	0.000	31.936	31.936	100.00	0.000	0.000
						B	0.000	31.936		100.00	0.000	0.000
						C	0.000	31.936		100.00	0.000	19.809
L3 76.50-74.00	75.25	1.192	7	2.17	5.905	A	0.000	5.905	5.905	100.00	0.000	0.000
						B	0.000	5.905		100.00	0.000	0.000
						C	0.000	5.905		100.00	0.000	6.864
L4 74.00-68.88	71.44	1.179	7	2.16	12.095	A	0.000	12.095	12.095	100.00	0.000	0.000
						B	0.000	12.095		100.00	0.000	0.000
						C	0.000	12.095		100.00	0.000	15.879
L5 68.88-64.50	66.69	1.162	7	2.15	10.315	A	0.000	10.315	10.315	100.00	0.000	0.000
						B	0.000	10.315		100.00	0.000	0.000
						C	0.000	10.315		100.00	0.000	13.487
L6 64.50-63.00	63.75	1.151	7	2.14	3.534	A	0.000	3.534	3.534	100.00	0.000	0.000
						B	0.000	3.534		100.00	0.000	0.000
						C	0.000	3.534		100.00	0.000	4.609
L7 63.00-60.00	61.50	1.142	7	2.13	7.064	A	0.000	7.064	7.064	100.00	0.000	0.000
						B	0.000	7.064		100.00	0.000	0.000
						C	0.000	7.064		100.00	0.000	9.194
L8 60.00-49.08	54.54	1.114	7	2.10	31.128	A	0.000	31.128	31.128	100.00	0.000	0.000
						B	0.000	31.128		100.00	0.000	0.000
						C	0.000	31.128		100.00	0.000	27.402
L9 49.08-42.00	45.54	1.072	7	2.07	20.137	A	0.000	20.137	20.137	100.00	0.000	0.000
						B	0.000	20.137		100.00	0.000	0.000
						C	0.000	20.137		100.00	0.000	21.232
L10 42.00-34.50	38.25	1.034	6	2.03	21.287	A	0.000	21.287	21.287	100.00	0.000	0.000
						B	0.000	21.287		100.00	0.000	0.000
						C	0.000	21.287		100.00	0.000	22.254
L11 34.50-34.00	34.25	1.01	6	2.01	1.417	A	0.000	1.417	1.417	100.00	0.000	0.000
						B	0.000	1.417		100.00	0.000	0.000
						C	0.000	1.417		100.00	0.000	1.490
L12 34.00-30.00	32.00	0.996	6	1.99	11.329	A	0.000	11.329	11.329	100.00	0.000	0.000
						B	0.000	11.329		100.00	0.000	0.000
						C	0.000	11.329		100.00	0.000	11.863
L13 30.00-28.00	29.00	0.975	6	1.97	6.658	A	0.000	6.658	6.658	100.00	0.000	0.000
						B	0.000	6.658		100.00	0.000	0.000
						C	0.000	6.658		100.00	0.000	5.891
L14 28.00-23.25	25.63	0.95	6	1.95	15.794	A	0.000	15.794	15.794	100.00	0.000	0.000
						B	0.000	15.794		100.00	0.000	0.000
						C	0.000	15.794		100.00	0.000	13.870
L15 23.25-21.00	22.13	0.921	6	1.92	7.471	A	0.000	7.471	7.471	100.00	0.000	0.000
						B	0.000	7.471		100.00	0.000	0.000
						C	0.000	7.471		100.00	0.000	6.503
L16 21.00-19.00	20.00	0.902	5	1.90	6.634	A	0.000	6.634	6.634	100.00	0.000	0.000
						B	0.000	6.634		100.00	0.000	0.000
						C	0.000	6.634		100.00	0.000	5.740
L17 19.00-18.50	18.75	0.89	5	1.89	1.658	A	0.000	1.658	1.658	100.00	0.000	0.000
						B	0.000	1.658		100.00	0.000	0.000
						C	0.000	1.658		100.00	0.000	1.429
L18 18.50-12.70	15.60	0.856	5	1.86	19.194	A	0.000	19.194	19.194	100.00	0.000	0.000
						B	0.000	19.194		100.00	0.000	0.000
						C	0.000	19.194		100.00	0.000	16.364
L19 12.70-10.50	11.60	0.85	5	1.80	7.261	A	0.000	7.261	7.261	100.00	0.000	0.000
						B	0.000	7.261		100.00	0.000	0.000
						C	0.000	7.261		100.00	0.000	6.083
L20 10.50-7.50	9.00	0.85	5	1.76	9.878	A	0.000	9.878	9.878	100.00	0.000	0.000
						B	0.000	9.878		100.00	0.000	0.000
						C	0.000	9.878		100.00	0.000	8.153
L21 7.50-7.00	7.25	0.85	5	1.72	1.643	A	0.000	1.643	1.643	100.00	0.000	0.000
						B	0.000	1.643		100.00	0.000	0.000
						C	0.000	1.643		100.00	0.000	1.339

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L22 7.00-3.75	5.38	0.85	5	1.67	10.654	A	0.000	10.654	10.654	100.00	0.000	0.000
						B	0.000	10.654		100.00	0.000	0.000
						C	0.000	10.654		100.00	0.000	8.533
L23 3.75-2.75	3.25	0.85	5	1.59	3.264	A	0.000	3.264	3.264	100.00	0.000	0.000
						B	0.000	3.264		100.00	0.000	0.000
						C	0.000	3.264		100.00	0.000	2.540
L24 2.75-2.00	2.38	0.85	5	1.54	2.442	A	0.000	2.442	2.442	100.00	0.000	0.000
						B	0.000	2.442		100.00	0.000	0.000
						C	0.000	2.442		100.00	0.000	1.867
L25 2.00-0.00	1.00	0.85	5	1.41	6.470	A	0.000	6.470	6.470	100.00	0.000	0.000
						B	0.000	6.470		100.00	0.000	0.000
						C	0.000	6.470		100.00	0.000	4.712

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 118.00-90.00	104.00	1.276	10	56.000	A	0.000	56.000	56.000	100.00	0.000	0.000
					B	0.000	56.000		100.00	0.000	0.000
					C	0.000	56.000		100.00	0.000	3.696
L2 90.00-76.50	83.25	1.218	10	27.000	A	0.000	27.000	27.000	100.00	0.000	0.000
					B	0.000	27.000		100.00	0.000	0.000
					C	0.000	27.000		100.00	0.000	5.695
L3 76.50-74.00	75.25	1.192	9	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000
					C	0.000	5.000		100.00	0.000	1.917
L4 74.00-68.88	71.44	1.179	9	10.250	A	0.000	10.250	10.250	100.00	0.000	0.000
					B	0.000	10.250		100.00	0.000	0.000
					C	0.000	10.250		100.00	0.000	4.314
L5 68.88-64.50	66.69	1.162	9	8.750	A	0.000	8.750	8.750	100.00	0.000	0.000
					B	0.000	8.750		100.00	0.000	0.000
					C	0.000	8.750		100.00	0.000	3.682
L6 64.50-63.00	63.75	1.151	9	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	1.263
L7 63.00-60.00	61.50	1.142	9	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	2.525
L8 60.00-49.08	54.54	1.114	9	27.300	A	0.000	27.300	27.300	100.00	0.000	0.000
					B	0.000	27.300		100.00	0.000	0.000
					C	0.000	27.300		100.00	0.000	7.972
L9 49.08-42.00	45.54	1.072	8	17.700	A	0.000	17.700	17.700	100.00	0.000	0.000
					B	0.000	17.700		100.00	0.000	0.000
					C	0.000	17.700		100.00	0.000	5.959
L10 42.00-34.50	38.25	1.034	8	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	6.354
L11 34.50-34.00	34.25	1.01	8	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.442
L12 34.00-30.00	32.00	0.996	8	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	3.533
L13 30.00-28.00	29.00	0.975	8	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L14 28.00-23.25	25.63	0.95	7	14.250	A	0.000	14.250	14.250	100.00	0.000	0.000
					B	0.000	14.250		100.00	0.000	0.000
					C	0.000	14.250		100.00	0.000	4.196
L15 23.25-21.00	22.13	0.921	7	6.750	A	0.000	6.750	6.750	100.00	0.000	0.000
					B	0.000	6.750		100.00	0.000	0.000
					C	0.000	6.750		100.00	0.000	1.987

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L16 21.00-19.00	20.00	0.902	7	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L17 19.00-18.50	18.75	0.89	7	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L18 18.50-12.70	15.60	0.856	7	17.400	A	0.000	17.400	17.400	100.00	0.000	0.000
					B	0.000	17.400		100.00	0.000	0.000
					C	0.000	17.400		100.00	0.000	5.123
L19 12.70-10.50	11.60	0.85	7	6.600	A	0.000	6.600	6.600	100.00	0.000	0.000
					B	0.000	6.600		100.00	0.000	0.000
					C	0.000	6.600		100.00	0.000	1.943
L20 10.50-7.50	9.00	0.85	7	9.000	A	0.000	9.000	9.000	100.00	0.000	0.000
					B	0.000	9.000		100.00	0.000	0.000
					C	0.000	9.000		100.00	0.000	2.650
L21 7.50-7.00	7.25	0.85	7	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L22 7.00-3.75	5.38	0.85	7	9.750	A	0.000	9.750	9.750	100.00	0.000	0.000
					B	0.000	9.750		100.00	0.000	0.000
					C	0.000	9.750		100.00	0.000	2.871
L23 3.75-2.75	3.25	0.85	7	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.883
L24 2.75-2.00	2.38	0.85	7	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.662
L25 2.00-0.00	1.00	0.85	7	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
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	118 - 90	Pole	Max Tension	14	0.00	0	0
			Max. Compression	26	-28.98	2	5
			Max. Mx	20	-9.13	247	1
			Max. My	2	-9.10	1	249
			Max. Vy	20	-15.49	247	1
			Max. Vx	2	-15.59	1	249
			Max. Torque	19			-3
L2	90 - 76.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-45.45	1	6
			Max. Mx	20	-15.14	522	1
			Max. My	2	-15.09	1	528
			Max. Vy	20	-22.60	522	1
			Max. Vx	2	-23.07	1	528
			Max. Torque	21			-3
L3	76.5 - 74	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-46.61	1	6
			Max. Mx	20	-15.68	579	1
			Max. My	2	-15.63	1	586
			Max. Vy	20	-22.97	579	1
			Max. Vx	2	-23.45	1	586
			Max. Torque	21			-3
L4	74 - 68.875	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-51.44	1	6
			Max. Mx	20	-17.71	702	2
			Max. My	2	-17.66	1	713
			Max. Vy	20	-24.90	702	2
			Max. Vx	14	25.42	-1	-711
			Max. Torque	21			-3
L5	68.875 - 64.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-53.92	1	6
			Max. Mx	20	-18.98	813	2
			Max. My	2	-18.93	2	826
			Max. Vy	20	-25.56	813	2
			Max. Vx	14	26.08	-1	-824
			Max. Torque	21			-3
L6	64.5 - 63	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-54.84	1	6
			Max. Mx	20	-19.48	851	2
			Max. My	2	-19.44	2	865
			Max. Vy	20	-25.79	851	2
			Max. Vx	14	26.30	-1	-863
			Max. Torque	21			-3

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L7	63 - 60	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-56.64	1	6
			Max. Mx	20	-20.48	929	2
			Max. My	2	-20.43	2	944
			Max. Vy	20	-26.22	929	2
			Max. Vx	14	26.74	-1	-943
			Max. Torque	21			-3
L8	60 - 49.08	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-65.10	1	7
			Max. Mx	20	-25.11	1232	3
			Max. My	2	-25.07	4	1252
			Max. Vy	20	-28.55	1232	3
			Max. Vx	14	29.07	-2	-1250
			Max. Torque	21			-3
L9	49.08 - 42	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-69.43	1	7
			Max. Mx	20	-27.54	1438	4
			Max. My	2	-27.50	5	1462
			Max. Vy	20	-29.65	1438	4
			Max. Vx	14	30.16	-2	-1460
			Max. Torque	21			-3
L10	42 - 34.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-74.28	1	7
			Max. Mx	20	-30.46	1664	4
			Max. My	2	-30.43	6	1692
			Max. Vy	20	-30.74	1664	4
			Max. Vx	14	31.26	-3	-1690
			Max. Torque	21			-3
L11	34.5 - 34	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-74.62	1	7
			Max. Mx	20	-30.68	1679	4
			Max. My	2	-30.65	6	1708
			Max. Vy	20	-30.80	1679	4
			Max. Vx	14	31.32	-3	-1706
			Max. Torque	21			-3
L12	34 - 30	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-77.15	1	7
			Max. Mx	20	-32.23	1804	4
			Max. My	2	-32.21	6	1834
			Max. Vy	20	-31.34	1804	4
			Max. Vx	14	31.86	-3	-1832
			Max. Torque	21			-3
L13	30 - 28	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-80.62	1	7
			Max. Mx	20	-34.50	1868	5
			Max. My	2	-34.47	6	1899
			Max. Vy	20	-32.14	1868	5
			Max. Vx	14	32.65	-3	-1897
			Max. Torque	21			-3
L14	28 - 23.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-83.86	1	7
			Max. Mx	20	-36.50	2022	5
			Max. My	2	-36.48	7	2056
			Max. Vy	20	-32.88	2022	5
			Max. Vx	14	33.39	-3	-2054
			Max. Torque	21			-3
L15	23.25 - 21	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-85.49	1	7
			Max. Mx	20	-37.57	2096	5
			Max. My	2	-37.55	7	2131
			Max. Vy	20	-33.21	2096	5
			Max. Vx	14	33.72	-3	-2129
			Max. Torque	21			-3
L16	21 - 19	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-86.81	1	7
			Max. Mx	20	-38.39	2163	5
			Max. My	2	-38.38	7	2199
			Max. Vy	20	-33.49	2163	5
			Max. Vx	14	34.00	-3	-2197

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	21			-3
L17	19 - 18.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-87.18	1	7
			Max. Mx	20	-38.64	2180	5
			Max. My	2	-38.63	8	2216
			Max. Vy	20	-33.55	2180	5
			Max. Vx	14	34.07	-3	-2214
			Max. Torque	21			-3
L18	18.5 - 12.7	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-91.07	1	7
			Max. Mx	20	-41.16	2376	6
			Max. My	2	-41.15	8	2416
			Max. Vy	20	-34.31	2376	6
			Max. Vx	14	34.82	-4	-2414
			Max. Torque	21			-3
L19	12.7 - 10.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-92.54	1	7
			Max. Mx	20	-42.13	2452	6
			Max. My	2	-42.12	9	2492
			Max. Vy	20	-34.58	2452	6
			Max. Vx	14	35.08	-4	-2491
			Max. Torque	21			-3
L20	10.5 - 7.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-94.60	1	7
			Max. Mx	20	-43.54	2556	6
			Max. My	2	-43.53	9	2598
			Max. Vy	20	-34.94	2556	6
			Max. Vx	14	35.44	-4	-2596
			Max. Torque	21			-3
L21	7.5 - 7	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-94.95	1	7
			Max. Mx	20	-43.79	2574	6
			Max. My	2	-43.78	9	2616
			Max. Vy	20	-34.99	2574	6
			Max. Vx	14	35.50	-4	-2614
			Max. Torque	21			-3
L22	7 - 3.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-97.25	1	7
			Max. Mx	20	-45.42	2688	6
			Max. My	2	-45.42	9	2732
			Max. Vy	20	-35.39	2688	6
			Max. Vx	14	35.90	-4	-2730
			Max. Torque	21			-3
L23	3.75 - 2.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-98.19	1	7
			Max. Mx	20	-46.18	2724	6
			Max. My	2	-46.17	10	2768
			Max. Vy	20	-35.52	2724	6
			Max. Vx	14	36.02	-4	-2766
			Max. Torque	21			-3
L24	2.75 - 2	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-98.86	1	7
			Max. Mx	20	-46.70	2750	6
			Max. My	2	-46.70	10	2795
			Max. Vy	20	-35.61	2750	6
			Max. Vx	14	36.11	-4	-2793
			Max. Torque	21			-3
L25	2 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-100.44	1	7
			Max. Mx	20	-47.95	2822	7
			Max. My	2	-47.95	10	2867
			Max. Vy	20	-35.86	2822	7
			Max. Vx	14	36.36	-4	-2866
			Max. Torque	21			-3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	100.44	-0.00	-0.00
	Max. H_x	21	35.97	35.85	0.07
	Max. H_z	3	35.97	0.12	36.34
	Max. M_x	2	2867	0.12	36.34
	Max. M_z	8	2819	-35.82	-0.07
	Max. Torsion	9	3	-35.82	-0.07
	Min. Vert	15	35.97	-0.05	-36.35
	Min. H_x	9	35.97	-35.82	-0.07
	Min. H_z	15	35.97	-0.05	-36.35
	Min. M_x	14	-2866	-0.05	-36.35
	Min. M_z	20	-2822	35.85	0.07
	Min. Torsion	21	-3	35.85	0.07

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	39.97	-0.00	-0.00	-1	0	0
1.2 Dead+1.6 Wind 0 deg - No Ice	47.96	-0.12	-36.34	-2867	10	-1
0.9 Dead+1.6 Wind 0 deg - No Ice	35.97	-0.12	-36.34	-2844	10	-1
1.2 Dead+1.6 Wind 30 deg - No Ice	47.96	17.87	-31.40	-2478	-1406	-2
0.9 Dead+1.6 Wind 30 deg - No Ice	35.97	17.87	-31.40	-2458	-1395	-2
1.2 Dead+1.6 Wind 60 deg - No Ice	47.96	30.99	-18.08	-1427	-2439	-3
0.9 Dead+1.6 Wind 60 deg - No Ice	35.97	30.99	-18.08	-1415	-2420	-3
1.2 Dead+1.6 Wind 90 deg - No Ice	47.96	35.82	0.07	5	-2819	-3
0.9 Dead+1.6 Wind 90 deg - No Ice	35.97	35.82	0.07	5	-2797	-3
1.2 Dead+1.6 Wind 120 deg - No Ice	47.96	31.08	18.22	1437	-2446	-2
0.9 Dead+1.6 Wind 120 deg - No Ice	35.97	31.08	18.22	1425	-2427	-2
1.2 Dead+1.6 Wind 150 deg - No Ice	47.96	17.99	31.52	2485	-1416	-1
0.9 Dead+1.6 Wind 150 deg - No Ice	35.97	17.99	31.52	2465	-1405	-1
1.2 Dead+1.6 Wind 180 deg - No Ice	47.96	0.05	36.35	2866	-4	0
0.9 Dead+1.6 Wind 180 deg - No Ice	35.97	0.05	36.35	2843	-4	0
1.2 Dead+1.6 Wind 210 deg - No Ice	47.96	-17.89	31.45	2479	1408	2
0.9 Dead+1.6 Wind 210 deg - No Ice	35.97	-17.89	31.45	2460	1397	2
1.2 Dead+1.6 Wind 240 deg - No Ice	47.96	-31.07	18.08	1425	2446	3
0.9 Dead+1.6 Wind 240 deg - No Ice	35.97	-31.07	18.08	1414	2426	3
1.2 Dead+1.6 Wind 270 deg - No Ice	47.96	-35.85	-0.07	-7	2822	3
0.9 Dead+1.6 Wind 270 deg - No Ice	35.97	-35.85	-0.07	-6	2799	3
1.2 Dead+1.6 Wind 300 deg - No Ice	47.96	-31.08	-18.19	-1436	2446	2
0.9 Dead+1.6 Wind 300 deg	35.97	-31.08	-18.19	-1425	2427	2

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 1.2 Dead+1.6 Wind 330 deg	47.96	-18.02	-31.47	-2484	1418	1
- No Ice 0.9 Dead+1.6 Wind 330 deg	35.97	-18.02	-31.47	-2464	1407	1
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	100.44	0.00	0.00	-7	1	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	100.44	-0.03	-10.42	-907	3	0
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	100.44	5.17	-9.01	-785	-445	0
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	100.44	8.96	-5.19	-455	-773	-1
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	100.44	10.35	0.02	-5	-894	-1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	100.44	8.98	5.22	445	-775	-1
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	100.44	5.20	9.04	774	-448	0
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	100.44	0.01	10.42	894	0	0
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	100.44	-5.17	9.02	772	447	0
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	100.44	-8.98	5.19	441	776	1
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	100.44	-10.36	-0.02	-8	896	1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	100.44	-8.98	-5.22	-458	777	1
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	100.44	-5.20	-9.03	-787	450	0
Dead+Wind 0 deg - Service	39.97	-0.03	-7.78	-611	2	0
Dead+Wind 30 deg - Service	39.97	3.82	-6.72	-528	-299	0
Dead+Wind 60 deg - Service	39.97	6.63	-3.87	-305	-519	-1
Dead+Wind 90 deg - Service	39.97	7.66	0.01	0	-600	-1
Dead+Wind 120 deg - Service	39.97	6.65	3.90	305	-521	-1
Dead+Wind 150 deg - Service	39.97	3.85	6.74	529	-301	0
Dead+Wind 180 deg - Service	39.97	0.01	7.78	610	-1	0
Dead+Wind 210 deg - Service	39.97	-3.83	6.73	528	300	0
Dead+Wind 240 deg - Service	39.97	-6.65	3.87	303	521	1
Dead+Wind 270 deg - Service	39.97	-7.67	-0.01	-2	601	1
Dead+Wind 300 deg - Service	39.97	-6.65	-3.89	-306	521	1
Dead+Wind 330 deg - Service	39.97	-3.85	-6.73	-530	302	0

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-39.97	0.00	0.00	39.97	0.00	0.000%
2	-0.12	-47.96	-36.34	0.12	47.96	36.34	0.002%
3	-0.12	-35.97	-36.34	0.12	35.97	36.34	0.002%
4	17.87	-47.96	-31.40	-17.87	47.96	31.40	0.000%
5	17.87	-35.97	-31.40	-17.87	35.97	31.40	0.000%
6	30.99	-47.96	-18.08	-30.99	47.96	18.08	0.000%
7	30.99	-35.97	-18.08	-30.99	35.97	18.08	0.000%
8	35.82	-47.96	0.07	-35.82	47.96	-0.07	0.001%
9	35.82	-35.97	0.07	-35.82	35.97	-0.07	0.001%
10	31.08	-47.96	18.22	-31.08	47.96	-18.22	0.000%
11	31.08	-35.97	18.22	-31.08	35.97	-18.22	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	17.99	-47.96	31.52	-17.99	47.96	-31.52	0.000%
13	17.99	-35.97	31.52	-17.99	35.97	-31.52	0.000%
14	0.05	-47.96	36.35	-0.05	47.96	-36.35	0.006%
15	0.05	-35.97	36.35	-0.05	35.97	-36.35	0.005%
16	-17.89	-47.96	31.45	17.89	47.96	-31.45	0.000%
17	-17.89	-35.97	31.45	17.89	35.97	-31.45	0.000%
18	-31.07	-47.96	18.08	31.07	47.96	-18.08	0.000%
19	-31.07	-35.97	18.08	31.07	35.97	-18.08	0.000%
20	-35.85	-47.96	-0.07	35.85	47.96	0.07	0.001%
21	-35.85	-35.97	-0.07	35.85	35.97	0.07	0.001%
22	-31.08	-47.96	-18.19	31.08	47.96	18.19	0.000%
23	-31.08	-35.97	-18.19	31.08	35.97	18.19	0.000%
24	-18.02	-47.96	-31.47	18.02	47.96	31.47	0.000%
25	-18.02	-35.97	-31.47	18.02	35.97	31.47	0.000%
26	0.00	-100.44	0.00	-0.00	100.44	-0.00	0.001%
27	-0.03	-100.44	-10.42	0.03	100.44	10.42	0.000%
28	5.17	-100.44	-9.01	-5.17	100.44	9.01	0.000%
29	8.96	-100.44	-5.19	-8.96	100.44	5.19	0.000%
30	10.35	-100.44	0.02	-10.35	100.44	-0.02	0.000%
31	8.98	-100.44	5.22	-8.98	100.44	-5.22	0.000%
32	5.20	-100.44	9.04	-5.20	100.44	-9.04	0.000%
33	0.01	-100.44	10.43	-0.01	100.44	-10.42	0.000%
34	-5.17	-100.44	9.02	5.17	100.44	-9.02	0.000%
35	-8.98	-100.44	5.19	8.98	100.44	-5.19	0.000%
36	-10.36	-100.44	-0.02	10.36	100.44	0.02	0.000%
37	-8.98	-100.44	-5.22	8.98	100.44	5.22	0.000%
38	-5.20	-100.44	-9.03	5.20	100.44	9.03	0.000%
39	-0.03	-39.97	-7.78	0.03	39.97	7.78	0.002%
40	3.82	-39.97	-6.72	-3.82	39.97	6.72	0.002%
41	6.63	-39.97	-3.87	-6.63	39.97	3.87	0.002%
42	7.66	-39.97	0.01	-7.66	39.97	-0.01	0.002%
43	6.65	-39.97	3.90	-6.65	39.97	-3.90	0.002%
44	3.85	-39.97	6.74	-3.85	39.97	-6.74	0.002%
45	0.01	-39.97	7.78	-0.01	39.97	-7.78	0.002%
46	-3.83	-39.97	6.73	3.83	39.97	-6.73	0.002%
47	-6.65	-39.97	3.87	6.65	39.97	-3.87	0.002%
48	-7.67	-39.97	-0.01	7.67	39.97	0.01	0.002%
49	-6.65	-39.97	-3.89	6.65	39.97	3.89	0.002%
50	-3.85	-39.97	-6.73	3.85	39.97	6.73	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00000001	0.00007132
3	Yes	13	0.00000001	0.00005824
4	Yes	16	0.00000001	0.00007776
5	Yes	16	0.00000001	0.00005655
6	Yes	16	0.00000001	0.00008616
7	Yes	16	0.00000001	0.00006298
8	Yes	14	0.00000001	0.00008127
9	Yes	14	0.00000001	0.00006376
10	Yes	16	0.00000001	0.00007782
11	Yes	16	0.00000001	0.00005666
12	Yes	16	0.00000001	0.00008362
13	Yes	16	0.00000001	0.00006094
14	Yes	12	0.00008932	0.00014392
15	Yes	12	0.00006126	0.00012262
16	Yes	16	0.00000001	0.00008493
17	Yes	16	0.00000001	0.00006198
18	Yes	16	0.00000001	0.00007632
19	Yes	16	0.00000001	0.00005557
20	Yes	14	0.00000001	0.00008911
21	Yes	14	0.00000001	0.00006977
22	Yes	16	0.00000001	0.00008583
23	Yes	16	0.00000001	0.00006264

24	Yes	16	0.00000001	0.00008033
25	Yes	16	0.00000001	0.00005841
26	Yes	9	0.00000001	0.00007938
27	Yes	15	0.00000001	0.00008996
28	Yes	15	0.00000001	0.00010605
29	Yes	15	0.00000001	0.00010718
30	Yes	15	0.00000001	0.00008812
31	Yes	15	0.00000001	0.00010303
32	Yes	15	0.00000001	0.00010400
33	Yes	15	0.00000001	0.00008710
34	Yes	15	0.00000001	0.00010441
35	Yes	15	0.00000001	0.00010306
36	Yes	15	0.00000001	0.00008865
37	Yes	15	0.00000001	0.00010794
38	Yes	15	0.00000001	0.00010726
39	Yes	12	0.00000001	0.00003442
40	Yes	12	0.00000001	0.00004011
41	Yes	12	0.00000001	0.00007212
42	Yes	12	0.00000001	0.00004662
43	Yes	12	0.00000001	0.00003976
44	Yes	12	0.00000001	0.00005728
45	Yes	12	0.00000001	0.00003401
46	Yes	12	0.00000001	0.00006535
47	Yes	12	0.00000001	0.00003952
48	Yes	12	0.00000001	0.00004761
49	Yes	12	0.00000001	0.00006766
50	Yes	12	0.00000001	0.00004447

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 90	14.66	39	1.061	0.005
L2	90 - 76.5	8.60	39	0.951	0.004
L3	76.5 - 74	6.11	39	0.791	0.002
L4	74 - 68.875	5.70	39	0.762	0.002
L5	68.875 - 64.5	4.91	39	0.712	0.002
L6	64.5 - 63	4.28	39	0.661	0.002
L7	63 - 60	4.07	39	0.644	0.002
L8	60 - 49.08	3.68	39	0.608	0.001
L9	49.08 - 42	2.41	39	0.491	0.001
L10	42 - 34.5	1.74	39	0.414	0.001
L11	34.5 - 34	1.15	39	0.332	0.001
L12	34 - 30	1.12	39	0.326	0.001
L13	30 - 28	0.87	39	0.276	0.000
L14	28 - 23.25	0.76	39	0.257	0.000
L15	23.25 - 21	0.52	39	0.216	0.000
L16	21 - 19	0.42	39	0.198	0.000
L17	19 - 18.5	0.34	39	0.179	0.000
L18	18.5 - 12.7	0.33	39	0.175	0.000
L19	12.7 - 10.5	0.15	39	0.118	0.000
L20	10.5 - 7.5	0.10	39	0.095	0.000
L21	7.5 - 7	0.05	39	0.065	0.000
L22	7 - 3.75	0.04	39	0.060	0.000
L23	3.75 - 2.75	0.01	39	0.028	0.000
L24	2.75 - 2	0.01	39	0.022	0.000
L25	2 - 0	0.00	39	0.016	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.00	PCS 1900MHz 4x45W-65MHz	39	14.21	1.059	0.005	37555
114.00	APXVSPP18-C-A20 w/ Mount Pipe	39	13.76	1.056	0.005	37555
108.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	39	12.42	1.047	0.005	18777
98.00	SBNH-1D6565C w/ Mount Pipe	39	10.25	1.011	0.005	9388
90.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	8.60	0.951	0.004	6585
85.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	39	7.62	0.897	0.003	5203
80.00	KS24019-L112A	39	6.71	0.835	0.003	4268
73.00	VHLP1-23	39	5.54	0.752	0.002	5407
72.00	A-ANT-18G-2-C	39	5.38	0.742	0.002	5559
60.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	3.68	0.608	0.001	5313
30.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	0.87	0.276	0.000	5253

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 90	68.67	2	4.970	0.024
L2	90 - 76.5	40.31	2	4.459	0.018
L3	76.5 - 74	28.64	2	3.710	0.012
L4	74 - 68.875	26.73	2	3.575	0.011
L5	68.875 - 64.5	23.02	2	3.340	0.009
L6	64.5 - 63	20.06	2	3.100	0.008
L7	63 - 60	19.10	2	3.023	0.008
L8	60 - 49.08	17.26	2	2.854	0.007
L9	49.08 - 42	11.33	2	2.305	0.005
L10	42 - 34.5	8.17	2	1.944	0.004
L11	34.5 - 34	5.42	2	1.557	0.003
L12	34 - 30	5.26	2	1.531	0.003
L13	30 - 28	4.07	2	1.295	0.002
L14	28 - 23.25	3.55	2	1.205	0.002
L15	23.25 - 21	2.44	2	1.014	0.002
L16	21 - 19	1.98	2	0.930	0.002
L17	19 - 18.5	1.61	2	0.839	0.001
L18	18.5 - 12.7	1.53	2	0.819	0.001
L19	12.7 - 10.5	0.69	2	0.552	0.001
L20	10.5 - 7.5	0.46	2	0.445	0.001
L21	7.5 - 7	0.23	2	0.304	0.000
L22	7 - 3.75	0.20	2	0.280	0.000
L23	3.75 - 2.75	0.05	2	0.133	0.000
L24	2.75 - 2	0.03	2	0.102	0.000
L25	2 - 0	0.02	2	0.076	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.00	PCS 1900MHz 4x45W-65MHz	2	66.57	4.960	0.024	8185
114.00	APXVSPP18-C-A20 w/ Mount Pipe	2	64.47	4.950	0.024	8185
108.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	58.20	4.905	0.023	4092
98.00	SBNH-1D6565C w/ Mount Pipe	2	48.03	4.736	0.021	2044
90.00	Bridge Stiffener (84" x 14.5" x	2	40.31	4.459	0.018	1431

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	1.25")					
85.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	2	35.74	4.204	0.016	1125
80.00	KS24019-L112A	2	31.45	3.914	0.013	920
73.00	VHLP1-23	2	25.98	3.528	0.010	1163
72.00	A-ANT-18G-2-C	2	25.25	3.483	0.010	1195
60.00	Bridge Stiffener (84" x 14.5" x 1.25")	2	17.26	2.854	0.007	1138
30.00	Bridge Stiffener (84" x 14.5" x 1.25")	2	4.07	1.295	0.002	1120

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	118 - 90 (1)	P24x0.25	28.00	0.00	0.0	18.65	-9.10	662.26	0.014
L2	90 - 76.5 (2)	P24x0.375	13.50	0.00	0.0	27.83	-15.09	1052.07	0.014
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	2.50	0.00	0.0	42.79	-15.63	1387.68	0.011
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	5.13	0.00	0.0	59.92	-17.66	1415.12	0.012
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	4.38	0.00	0.0	59.07	-18.93	1374.22	0.014
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	1.50	0.00	0.0	71.25	-19.44	1621.17	0.012
L7	63 - 60 (7)	RPS 24" x 0.94656"	3.00	0.00	0.0	68.55	-20.43	1569.62	0.013
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	10.92	0.00	0.0	57.45	-25.07	1964.82	0.013
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	7.08	0.00	0.0	70.95	-27.50	2168.58	0.013
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	7.50	0.00	0.0	81.88	-30.43	2461.22	0.012
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	0.50	0.00	0.0	91.33	-30.65	2741.39	0.011
L12	34 - 30 (12)	RPS 30" x 0.87892"	4.00	0.00	0.0	80.41	-32.21	2460.53	0.013
L13	30 - 28 (13)	RPS 36" x 0.67823"	2.00	0.00	0.0	75.26	-34.47	2277.92	0.015
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	4.75	0.00	0.0	90.61	-36.48	2771.72	0.013
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	2.25	0.00	0.0	102.91	-37.55	2972.10	0.013
L16	21 - 19 (16)	RPS 36" x 0.79024"	2.00	0.00	0.0	87.41	-38.38	2474.20	0.016
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	0.50	0.00	0.0	104.38	-38.63	2943.26	0.013
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	5.80	0.00	0.0	92.33	-41.15	2882.60	0.014
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	2.20	0.00	0.0	93.13	-42.12	2774.28	0.015
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	3.00	0.00	0.0	99.83	-43.53	3050.29	0.014
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	0.50	0.00	0.0	103.28	-43.78	3097.21	0.014
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	3.25	0.00	0.0	109.21	-45.42	3396.02	0.013
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	1.00	0.00	0.0	169.91	-46.17	5046.20	0.009
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	0.75	0.00	0.0	157.32	-46.70	4501.21	0.010
L25	2 - 0 (25)	RPS 36" x 1.28159"	2.00	0.00	0.0	139.78	-47.95	4200.66	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	118 - 90 (1)	P24x0.25	249	397	0.627	0	397	0.000
L2	90 - 76.5 (2)	P24x0.375	528	624	0.847	0	624	0.000
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	586	862	0.680	0	862	0.000
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	713	870	0.819	0	870	0.000
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	826	846	0.976	0	846	0.000

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	865	990	0.873	0	990	0.000
L7	63 - 60 (7)	RPS 24" x 0.94656"	944	960	0.983	0	960	0.000
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	1252	1531	0.818	0	1531	0.000
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	1462	1682	0.869	0	1682	0.000
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	1692	1901	0.890	0	1901	0.000
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	1708	2109	0.810	0	2109	0.000
L12	34 - 30 (12)	RPS 30" x 0.87892"	1834	1901	0.965	0	1901	0.000
L13	30 - 28 (13)	RPS 36" x 0.67823"	1899	2135	0.890	0	2135	0.000
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	2056	2587	0.795	0	2587	0.000
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	2131	2765	0.771	0	2765	0.000
L16	21 - 19 (16)	RPS 36" x 0.79024"	2199	2311	0.951	0	2311	0.000
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	2216	2737	0.810	0	2737	0.000
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	2416	2689	0.898	0	2689	0.000
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	2492	2588	0.963	0	2588	0.000
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	2598	2840	0.915	0	2840	0.000
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	2616	2881	0.908	0	2881	0.000
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	2732	3154	0.866	0	3154	0.000
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	2768	4612	0.600	0	4612	0.000
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	2795	4128	0.677	0	4128	0.000
L25	2 - 0 (25)	RPS 36" x 1.28159"	2867	3870	0.741	0	3870	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		K	K		kip-ft	kip-ft	
L1	118 - 90 (1)	P24x0.25	15.59	331.13	0.047	1	649	0.001
L2	90 - 76.5 (2)	P24x0.375	23.07	526.03	0.044	1	1020	0.001
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	23.45	693.84	0.034	1	1322	0.001
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	25.42	707.56	0.036	1	1321	0.000
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	26.07	687.11	0.038	1	1285	0.000
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	26.30	810.58	0.032	1	1493	0.000
L7	63 - 60 (7)	RPS 24" x 0.94656"	26.74	784.81	0.034	1	1451	0.000
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	29.07	982.41	0.030	1	2356	0.000
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	30.16	1084.29	0.028	1	2575	0.000
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	31.25	1230.61	0.025	1	2898	0.000
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	31.32	1370.69	0.023	1	3205	0.000
L12	34 - 30 (12)	RPS 30" x 0.87892"	31.85	1230.26	0.026	1	2901	0.000
L13	30 - 28 (13)	RPS 36" x 0.67823"	32.65	1138.96	0.029	1	3291	0.000
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	33.38	1385.86	0.024	1	3973	0.000
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	33.72	1486.05	0.023	1	4233	0.000
L16	21 - 19 (16)	RPS 36" x 0.79024"	34.00	1237.10	0.027	1	3552	0.000
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	34.06	1471.63	0.023	1	4189	0.000
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	34.81	1441.30	0.024	1	4128	0.000
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	35.08	1387.14	0.025	1	3971	0.000
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	35.44	1525.14	0.023	1	4351	0.000
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	35.49	1548.60	0.023	1	4410	0.000
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	35.89	1698.01	0.021	1	4821	0.000
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	36.02	2523.10	0.014	1	6938	0.000
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	36.11	2250.61	0.016	1	6230	0.000
L25	2 - 0 (25)	RPS 36" x 1.28159"	36.36	2100.33	0.017	1	5868	0.000

Pole Interaction Design Data

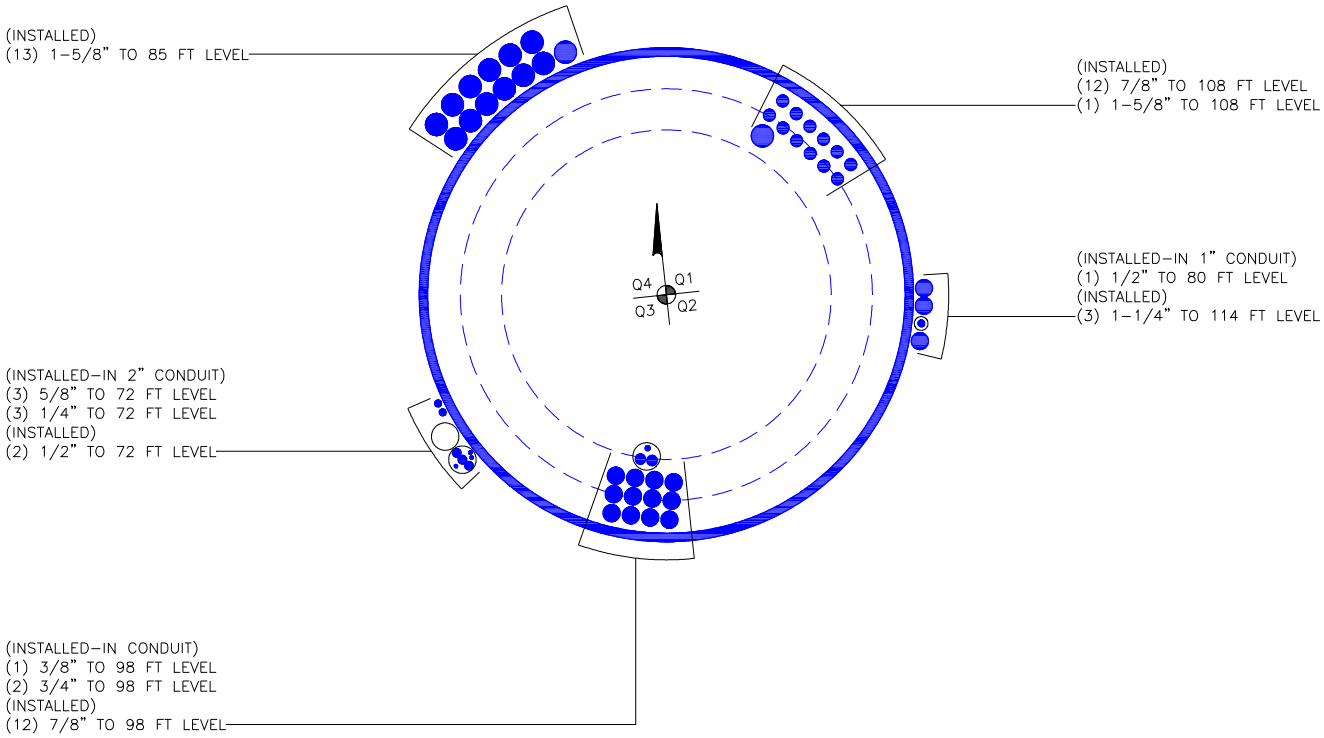
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	118 - 90 (1)	0.014	0.627	0.000	0.047	0.001	0.643 ✔	1.000	4.8.2 ✔
L2	90 - 76.5 (2)	0.014	0.847	0.000	0.044	0.001	0.863 ✔	1.000	4.8.2 ✔
L3	76.5 - 74 (3)	0.011	0.680	0.000	0.034	0.001	0.692 ✔	1.000	4.8.2 ✔
L4	74 - 68.875 (4)	0.012	0.819	0.000	0.036	0.000	0.833 ✔	1.000	4.8.2 ✔
L5	68.875 - 64.5 (5)	0.014	0.976	0.000	0.038	0.000	0.991 ✔	1.000	4.8.2 ✔
L6	64.5 - 63 (6)	0.012	0.873	0.000	0.032	0.000	0.886 ✔	1.000	4.8.2 ✔
L7	63 - 60 (7)	0.013	0.983	0.000	0.034	0.000	0.998 ✔	1.000	4.8.2 ✔
L8	60 - 49.08 (8)	0.013	0.818	0.000	0.030	0.000	0.831 ✔	1.000	4.8.2 ✔
L9	49.08 - 42 (9)	0.013	0.869	0.000	0.028	0.000	0.883 ✔	1.000	4.8.2 ✔
L10	42 - 34.5 (10)	0.012	0.890	0.000	0.025	0.000	0.903 ✔	1.000	4.8.2 ✔
L11	34.5 - 34 (11)	0.011	0.810	0.000	0.023	0.000	0.821 ✔	1.000	4.8.2 ✔
L12	34 - 30 (12)	0.013	0.965	0.000	0.026	0.000	0.978 ✔	1.000	4.8.2 ✔
L13	30 - 28 (13)	0.015	0.890	0.000	0.029	0.000	0.906 ✔	1.000	4.8.2 ✔
L14	28 - 23.25 (14)	0.013	0.795	0.000	0.024	0.000	0.808 ✔	1.000	4.8.2 ✔
L15	23.25 - 21 (15)	0.013	0.771	0.000	0.023	0.000	0.784 ✔	1.000	4.8.2 ✔
L16	21 - 19 (16)	0.016	0.951	0.000	0.027	0.000	0.968 ✔	1.000	4.8.2 ✔
L17	19 - 18.5 (17)	0.013	0.810	0.000	0.023	0.000	0.823 ✔	1.000	4.8.2 ✔
L18	18.5 - 12.7 (18)	0.014	0.898	0.000	0.024	0.000	0.913 ✔	1.000	4.8.2 ✔
L19	12.7 - 10.5 (19)	0.015	0.963	0.000	0.025	0.000	0.979 ✔	1.000	4.8.2 ✔
L20	10.5 - 7.5 (20)	0.014	0.915	0.000	0.023	0.000	0.930 ✔	1.000	4.8.2 ✔
L21	7.5 - 7 (21)	0.014	0.908	0.000	0.023	0.000	0.923 ✔	1.000	4.8.2 ✔
L22	7 - 3.75 (22)	0.013	0.866	0.000	0.021	0.000	0.880 ✔	1.000	4.8.2 ✔
L23	3.75 - 2.75 (23)	0.009	0.600	0.000	0.014	0.000	0.610 ✔	1.000	4.8.2 ✔
L24	2.75 - 2 (24)	0.010	0.677	0.000	0.016	0.000	0.688 ✔	1.000	4.8.2 ✔
L25	2 - 0 (25)	0.011	0.741	0.000	0.017	0.000	0.753 ✔	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	118 - 90	Pole	P24x0.25	1	-9.10	662.26	64.3	Pass
L2	90 - 76.5	Pole	P24x0.375	2	-15.09	1052.07	86.3	Pass
L3	76.5 - 74	Pole	RPS 24" x 0.58167"	3	-15.63	1387.68	69.2	Pass
L4	74 - 68.875	Pole	RPS 24" x 0.82296"	4	-17.66	1415.12	83.3	Pass
L5	68.875 - 64.5	Pole	RPS 24" x 0.81081"	5	-18.93	1374.22	99.1	Pass
L6	64.5 - 63	Pole	RPS 24" x 0.9855"	6	-19.44	1621.17	88.6	Pass
L7	63 - 60	Pole	RPS 24" x 0.94656"	7	-20.43	1569.62	99.8	Pass
L8	60 - 49.08	Pole	RPS 30" x 0.62249"	8	-25.07	1964.82	83.1	Pass
L9	49.08 - 42	Pole	RPS 30" x 0.77273"	9	-27.50	2168.58	88.3	Pass
L10	42 - 34.5	Pole	RPS 30" x 0.89547"	10	-30.43	2461.22	90.3	Pass
L11	34.5 - 34	Pole	RPS 30" x 1.00259"	11	-30.65	2741.39	82.1	Pass
L12	34 - 30	Pole	RPS 30" x 0.87892"	12	-32.21	2460.53	97.8	Pass
L13	30 - 28	Pole	RPS 36" x 0.67823"	13	-34.47	2277.92	90.6	Pass
L14	28 - 23.25	Pole	RPS 36" x 0.8198"	14	-36.48	2771.72	80.8	Pass
L15	23.25 - 21	Pole	RPS 36" x 0.93415"	15	-37.55	2972.10	78.4	Pass
L16	21 - 19	Pole	RPS 36" x 0.79024"	16	-38.38	2474.20	96.8	Pass
L17	19 - 18.5	Pole	RPS 36" x 0.9479"	17	-38.63	2943.26	82.3	Pass
L18	18.5 - 12.7	Pole	RPS 36" x 0.83577"	18	-41.15	2882.60	91.3	Pass
L19	12.7 - 10.5	Pole	RPS 36" x 0.84318"	19	-42.12	2774.28	97.9	Pass
L20	10.5 - 7.5	Pole	RPS 36" x 0.90546"	20	-43.53	3050.29	93.0	Pass
L21	7.5 - 7	Pole	RPS 36" x 0.93763"	21	-43.78	3097.21	92.3	Pass
L22	7 - 3.75	Pole	RPS 36" x 0.99306"	22	-45.42	3396.02	88.0	Pass
L23	3.75 - 2.75	Pole	RPS 36" x 1.57084"	23	-46.17	5046.20	61.0	Pass
L24	2.75 - 2	Pole	RPS 36" x 1.44941"	24	-46.70	4501.21	68.8	Pass
L25	2 - 0	Pole	RPS 36" x 1.28159"	25	-47.95	4200.66	75.3	Pass
							Summary	
						Pole (L7)	99.8	Pass
						RATING =	**99.8**	**Pass**

APPENDIX B

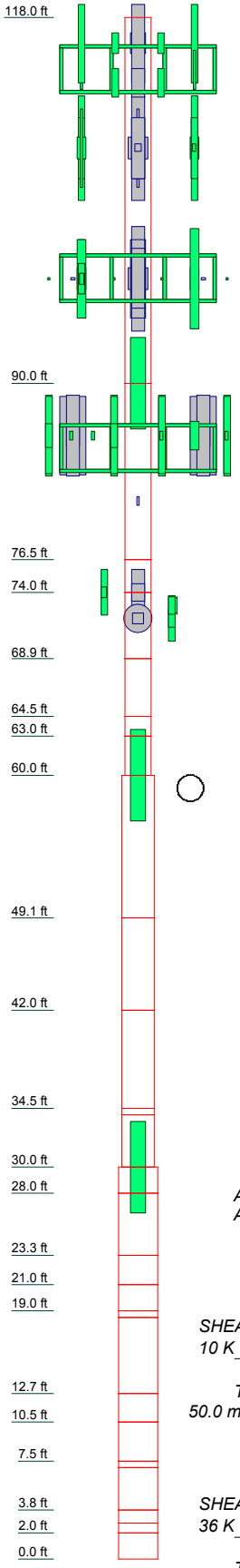
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Size	P24x0.25	P24x0.375	0.58167"					RPS 30" x 0.6224"	RPS 30" x 0.7727"	RPS 30" x 0.895"															
Length (ft)	28.00	13.50	2.50	5.13	4.38	1.50	3.00	10.92	7.08	7.50	0.50	4.00	2.00	4.75	2.25	2.00	0.50	5.80	2.20	8.00	3.250	1.00	2.00		
Grade	A572-42							Reinf 38.03 ksi	Reinf 33.96 ksi	Reinf 33.40 ksi															
Weight (K)	1.8	1.3	0.4	1.0	0.9	0.4	0.7	2.1	1.7	2.1	0.2	1.1	0.5	1.5	0.8	0.6	0.2	1.8	0.7	1.0	0.2	1.2	0.6	24.0	



ALL REACTIONS ARE FACTORED

AXIAL 100 K

SHEAR 10 K *MOMENT 907*

TORQUE 1 kip-ft
50.0 mph WIND - 1.00 in ICE

AXIAL 48 K

SHEAR 36 K *MOMENT 2867 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 97.0 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PCS 1900MHz 4x45W-65MHz	116	DTMABP7819VG12A	98
PCS 1900MHz 4x45W-65MHz	116	DC6-48-60-18-8F	98
PCS 1900MHz 4x45W-65MHz	116	HPA-65R-BUU-H6 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	HPA-65R-BUU-H8 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	HPA-65R-BUU-H6 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	RRUS 32 B2	98
Pipe Mount [PM 601-3]	116	RRUS 32 B2	98
APXVSPP18-C-A20 w/ Mount Pipe	114	RRUS 32 B2	98
APXVSPP18-C-A20 w/ Mount Pipe	114	TT19-08BP111-001	98
APXV9ERR18-C-A20 w/ Mount Pipe	114	TT19-08BP111-001	98
(3) 2.375" OD x 3' Mount Pipe	114	TT19-08BP111-001	98
(3) 2.375" OD x 3' Mount Pipe	114	(2) 7020.00	98
(3) 2.375" OD x 3' Mount Pipe	114	(2) 7020.00	98
Platform Mount [LP 502-1]	114	(2) 7020.00	98
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	Platform Mount [LP 712-1]	98
		Bridge Stiffener (84" x 14.5" x 1.25")	90
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	Bridge Stiffener (84" x 14.5" x 1.25")	90
		Bridge Stiffener (84" x 14.5" x 1.25")	90
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	(2) BXA-70040-6CF-EDIN-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) BXA-70063-6CF-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) BXA-70063-6CF-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) CBC721-DF	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	(4) CBC721-DF	85
		(2) RRH2X60-AWS	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	RRH2X60-AWS	85
		RRH2X60-PCS	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	(2) RRH2X60-PCS	85
KRY 112 144/1	108	DB-B1-6C-12AB-0Z	85
KRY 112 144/1	108	Platform Mount [LP 303-1]	85
KRY 112 144/1	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	KS24019-L112A	80
Sector Mount [SM 801-3]	108	Side Arm Mount [SO 701-1]	80
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
SBNH-1D6565C w/ Mount Pipe	98	HORIZON COMPACT	72
AM-X-CD-16-65-00T-RET w/ Mount Pipe	98	HORIZON COMPACT	72
		Side Arm Mount [SO 101-3]	72
AM-X-CD-16-65-00T-RET w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	A-ANT-18G-2-C	72
RRUS 11 B12	98	VHLP1-23	72
RRUS 11 B12	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
RRUS 11 B12	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
DTMABP7819VG12A	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
DTMABP7819VG12A	98	Bridge Stiffener (84" x 14.5" x 1.25")	30
		Bridge Stiffener (84" x 14.5" x 1.25")	30
		Bridge Stiffener (84" x 14.5" x 1.25")	30

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-42	42 ksi	60 ksi	Reinf 33.99 ksi	34 ksi	43 ksi
Reinf 36.03 ksi	36 ksi	46 ksi	Reinf 32.09 ksi	32 ksi	41 ksi
Reinf 26.24 ksi	26 ksi	33 ksi	Reinf 31.45 ksi	31 ksi	40 ksi
Reinf 25.85 ksi	26 ksi	33 ksi	Reinf 31.33 ksi	31 ksi	40 ksi
Reinf 25.28 ksi	25 ksi	32 ksi	Reinf 34.69 ksi	35 ksi	44 ksi
Reinf 25.44 ksi	25 ksi	32 ksi	Reinf 33.10 ksi	33 ksi	42 ksi
Reinf 38.03 ksi	38 ksi	48 ksi	Reinf 33.95 ksi	34 ksi	43 ksi
Reinf 33.96 ksi	34 ksi	43 ksi	Reinf 33.32 ksi	33 ksi	42 ksi
Reinf 33.40 ksi	33 ksi	42 ksi	Reinf 34.55 ksi	35 ksi	44 ksi
Reinf 33.35 ksi	33 ksi	42 ksi	Reinf 33.41 ksi	33 ksi	42 ksi
Reinf 34.00 ksi	34 ksi	43 ksi	Reinf 31.79 ksi	32 ksi	40 ksi
Reinf 33.63 ksi	34 ksi	43 ksi	Reinf 33.39 ksi	33 ksi	42 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.8%

PJF *Paul J Ford and Company*
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	***118 ft Monopole / New Gravel Pit***		
Project:	***PJF 37517-0436 / BU 876331***		
Client: Crown Castle	Drawn by: Seth Tschanen	App'd:	
Code: TIA-222-G	Date: 02/02/17	Scale: NTS	
Path:		Dwg No. E-1	

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v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	90.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	249.0	k-ft
Axial, Puf:	9.1	kips
Shear, Vf:	15.6	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	24.00	in
Pole Thickness, tp:	0.2500	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	32.00	32.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	0	
Upper Weld Length, L1:	39.00	0.00	in
Lower Weld Length, L2:	39.00	0.00	in
Weld Size, w:	0.3750	0.0000	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.50	0.00	in
Stiffener Thickness, ts:	1.25	0.00	in
Notch, n:	0.50	0.00	in
Stiffener Fy:	65	0	ksi
Stiffener Fu:	80	0	ksi
Unbraced Length, L:	4.63	0.00	in
K:	0.80	0.00	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	37.50	32.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	6.75	4.00	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	6.75	4.00	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.00	0.00	in
Bolt Circle:	29.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	0	Num. of Sixteenths in Weld
a:	0.1731	0.0000	= e1 / L1
k:	0	0	
C:	3.5962	3.7100	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	109.6	0.0	kips
Axial Capacity, ΦPn:	631.1	0.0	kips = Φ C C1 D L
Ratio:	17.4%	0.0%	
Lower Pole			
D:	6	0	Num. of Sixteenths in Weld
a:	0.1731	0.0000	= e2 / L2
k:	0	0	
C:	3.5962	3.7100	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	109.6	0.0	kips
Axial Capacity, ΦPn:	631.1	0.0	kips = Φ C C1 D L
Ratio:	17.4%	0.0%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	109.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fuv:	1.4	0.0	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	0.0	in^2 = $L1^2$ / 3
Bending Stress, fub:	1.5	0.0	kips/in = Pu e1 / S
Combined Stress, fu:	2.0	0.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	0.0000	
Stress Capacity, ΦFn	6.3	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	32.2%	0.0%	
Lower Pole			
Stiffener Axial, Pu:	109.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fuv:	1.4	0.0	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	0.0	in^2 = $L2^2$ / 3
Bending Stress, fub:	1.5	0.0	ksi = Pu e2 / S
Combined Stress, fu:	2.0	0.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	0.0000	
Stress Capacity, ΦFn	9.5	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	21.4%	0.0%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	5.6250	in^2
Effective Net Area, Aen:	5.2284	in^2 = Ag U, where U = 0.929
Stiffener Axial, Pu:	109.6	kips
Stiffener Stress, fu:	19.5	ksi = Pu / Ag
b:	9.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	7.2000	in
Q, Where Qa = 1.0:	1.0000	
r:	0.3608	in^3
K L / r:	10.2537	
Φ:	0.9000	
Axial Capacity, ΦFcr:	57.92	ksi = Φ $[0.658^{Fy/Fe}]$ Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	55.77	ksi = Φ Fu (Aen / Ag)
Ratio:	35.0%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	0.0000	in^2
Effective Net Area, Aen:	0.0000	in^2
Stiffener Axial, Pu:	0.0	kips
Stiffener Stress, fu:	0.0	ksi = Pu / Ag
b:	0.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	0.0000	in
Q, Where Qa = 1.0:	0.0000	
r:	0.0000	in^3
K L / r:	0.0000	
Φ:	0.0000	
Axial Capacity, ΦFcr:	0.00	ksi = Φ Fy
Φ:	0.0000	
Ten. Yielding Cap., ΦFnt:	0.00	ksi = Φ Fy
Φ:	0.0000	
Ten. Rupture Cap., ΦFnr:	0.00	ksi = Φ Fu (Aen / Ag)
Ratio:	0.0%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 17.4% PASS	Weld Analysis Ratio: 0.0% PASS
Pole Analysis Ratio: 32.2% PASS	Pole Analysis Ratio: 0.0% PASS
Stiffener Analysis Ratio: 35.0% PASS	Stiffener Analysis Ratio: 0.0% PASS

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v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	944.0	k-ft
Axial, Puf:	20.4	kips
Shear, Vf:	26.7	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	30.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	41.00	41.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	39.00	23.25	in
Lower Weld Length, L2:	39.00	20.00	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.50	3.00	in
Stiffener Thickness, ts:	1.25	1.00	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	5.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	46.50	45.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	11.25	10.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	8.25	7.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	35.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.2885	0.4516	= e1 / L1
k:	0	0	
C:	3.1408	2.4690	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	221.3	114.3	kips
Axial Capacity, ΦPn:	551.2	258.3	kips = Φ C C1 D L
Ratio:	40.1%	44.2%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2115	0.3750	= e2 / L2
k:	0	0	
C:	3.4638	2.7675	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	221.3	114.3	kips
Axial Capacity, ΦPn:	607.9	249.1	kips = Φ C C1 D L
Ratio:	36.4%	45.9%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	221.3	114.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.8	2.5	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	180.2	in^2 = $L1^2$ / 3
Bending Stress, fub:	4.9	6.7	kips/in = Pu e1 / S
Combined Stress, fu:	5.7	7.1	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	60.0%	75.1%	
Lower Pole			
Stiffener Axial, Pu:	221.3	114.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.8	2.9	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	133.3	in^2 = $L2^2$ / 3
Bending Stress, fub:	3.6	6.4	ksi = Pu e2 / S
Combined Stress, fu:	4.6	7.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	48.5%	74.5%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	5.6250	in^2
Effective Net Area, Aen:	5.2284	in^2 = Ag U, where U = 0.929
Stiffener Axial, Pu:	221.3	kips
Stiffener Stress, fu:	39.3	ksi = Pu / Ag
b:	13.5000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	10.8000	in
Q, Where Qa = 1.0:	0.9514	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.3608	in^3
K L / r:	12.4708	
Φ:	0.9000	
Axial Capacity, ΦFcr:	54.88	ksi = Φ Q [0.658$^{Q\,Fy\,/\,Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	55.77	ksi = Φ Fu (Aen / Ag)
Ratio:	71.7%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	3.0000	in^2
Effective Net Area, Aen:	2.7000	in^2 = Ag U, where U = 0.900
Stiffener Axial, Pu:	114.3	kips
Stiffener Stress, fu:	38.1	ksi = Pu / Ag
b:	12.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.0000	in
Q, Where Qa = 1.0:	0.9082	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.2887	in^3
K L / r:	15.5885	
Φ:	0.9000	
Axial Capacity, ΦFcr:	52.03	ksi = Φ Q [0.658$^{Q\,Fy\,/\,Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	54.00	ksi = Φ Fu (Aen / Ag)
Ratio:	73.2%	

Analysis Summary:

Bridge Stiffener Type 1	*Bridge Stiffener Type 2*
Weld Analysis Ratio: 40.1% PASS	Weld Analysis Ratio: 45.9% PASS
Pole Analysis Ratio: 60.0% PASS	Pole Analysis Ratio: 75.1% PASS
Stiffener Analysis Ratio: 71.7% PASS	Stiffener Analysis Ratio: 73.2% PASS

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v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	1834.0	k-ft
Axial, Puf:	32.2	kips
Shear, Vf:	31.9	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	47.00	47.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	39.00	32.25	in
Lower Weld Length, L2:	39.00	28.25	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	7.20	5.50	in
Stiffener Thickness, ts:	1.47	1.00	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	5.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	55.20	53.50	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.60	11.75	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.60	8.75	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	41.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.3231	0.3643	= e1 / L1
k:	0	0	
C:	2.9908	2.8133	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	364.5	183.7	kips
Axial Capacity, ΦPn:	524.9	408.3	kips = Φ C C1 D L
Ratio:	69.4%	45.0%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2462	0.3097	= e2 / L2
k:	0	0	
C:	3.3254	3.0481	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	364.5	183.7	kips
Axial Capacity, ΦPn:	583.6	387.5	kips = Φ C C1 D L
Ratio:	62.5%	47.4%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	364.5	183.7	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	4.7	2.8	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	346.7	$in^2 = L1^2 / 3$
Bending Stress, fub:	4.5	3.1	kips/in = Pu e1 / (2 S)
Combined Stress, fu:	6.5	4.2	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	68.4%	44.2%	
Lower Pole			
Stiffener Axial, Pu:	364.5	183.7	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	4.7	3.3	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	266.0	$in^2 = L2^2 / 3$
Bending Stress, fub:	3.4	3.0	kips/in = Pu e1 / (2 S)
Combined Stress, fu:	5.8	4.4	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	61.1%	46.3%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	10.5840	in^2
Effective Net Area, Aen:	9.4713	in^2 = Ag U, where U = 0.895
Stiffener Axial, Pu:	364.5	kips
Stiffener Stress, fu:	34.4	ksi = Pu / Ag
b:	16.2000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	11.0204	in
Q, Where Qa = 1.0:	0.9435	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.4244	in^3
K L / r:	10.6044	
Φ:	0.9000	
Axial Capacity, ΦFcr:	54.64	ksi = Φ Q [0.658$^{Q Fy / Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	53.69	ksi = Φ Fu (Aen / Ag)
Ratio:	64.1%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	5.5000	in^2
Effective Net Area, Aen:	4.8673	in^2 = Ag U, where U = 0.885
Stiffener Axial, Pu:	183.7	kips
Stiffener Stress, fu:	33.4	ksi = Pu / Ag
b:	14.5000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	14.5000	in
Q, Where Qa = 1.0:	0.8183	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.2887	in^3
K L / r:	15.5885	
Φ:	0.9000	
Axial Capacity, ΦFcr:	46.97	ksi = Φ Q [0.658$^{Q Fy / Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	53.10	ksi = Φ Fu (Aen / Ag)
Ratio:	71.1%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 69.4% PASS	Weld Analysis Ratio: 47.4% PASS
Pole Analysis Ratio: 68.4% PASS	Pole Analysis Ratio: 46.3% PASS
Stiffener Analysis Ratio: 64.1% PASS	Stiffener Analysis Ratio: 71.1% PASS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
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v4.4 - Effective 7-12-13

Date: 2/2/2017
PJF Project: 37517-0436.001.7805
Client Ref. # BU 876331
Site Name: New Britain Gravel Pit
Description: 118' Monopole
Owner: Crown Castle
Engineer: SJT

Asymmetric Anchor Rod Analysis

Moment =	2867	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	48.0	kips	ASIF =	N/A	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	36.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	23							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	41.00	0.00	1.77	90.15	86.65	92.78	0.00	141.00	65.8%
2	1.500	A354 Gr BC	109	125	22.5	41.00	0.00	1.77	94.48	90.98	97.11	0.00	141.00	68.9%
3	1.500	A354 Gr BC	109	125	45.0	41.00	0.00	1.77	99.03	95.52	101.65	0.00	141.00	72.1%
4	1.500	A354 Gr BC	109	125	67.5	41.00	0.00	1.77	100.46	96.96	103.09	0.00	141.00	73.1%
5	1.500	A354 Gr BC	109	125	90.0	41.00	0.00	1.77	97.35	93.85	99.98	0.00	141.00	70.9%
6	1.500	A354 Gr BC	109	125	112.5	41.00	0.00	1.77	90.66	87.16	93.29	0.00	141.00	66.2%
7	1.500	A354 Gr BC	109	125	135.0	41.00	0.00	1.77	83.74	80.24	86.37	0.00	141.00	61.3%
8	1.500	A354 Gr BC	109	125	157.5	41.00	0.00	1.77	81.13	77.63	83.76	0.00	141.00	59.4%
9	1.500	A354 Gr BC	109	125	180.0	41.00	0.00	1.77	85.21	81.71	87.84	0.00	141.00	62.3%
10	1.500	A354 Gr BC	109	125	202.5	41.00	0.00	1.77	93.68	90.18	96.31	0.00	141.00	68.3%
11	1.500	A354 Gr BC	109	125	225.0	41.00	0.00	1.77	101.94	98.44	104.57	0.00	141.00	74.2%
12	1.500	A354 Gr BC	109	125	247.5	41.00	0.00	1.77	106.42	102.91	109.04	0.00	141.00	77.3%
13	1.500	A354 Gr BC	109	125	270.0	41.00	0.00	1.77	105.68	102.18	108.31	0.00	141.00	76.8%
14	1.500	A354 Gr BC	109	125	292.5	41.00	0.00	1.77	100.58	97.08	103.21	0.00	141.00	73.2%
15	1.500	A354 Gr BC	109	125	315.0	41.00	0.00	1.77	93.94	90.44	96.57	0.00	141.00	68.5%
16	1.500	A354 Gr BC	109	125	337.5	41.00	0.00	1.77	89.63	86.12	92.25	0.00	141.00	65.4%
17	1.750	Dywidag (150 ksi)	127.7	150	60.0	51.50	0.00	2.71	193.89	188.51	197.92	217.53	217.53	91.0%
18	1.750	Dywidag (150 ksi)	127.7	150	146.0	51.50	0.00	2.71	158.64	153.27	162.68	217.53	217.53	74.8%
19	1.750	Dywidag (150 ksi)	127.7	150	244.0	51.50	0.00	2.71	202.60	197.22	206.63	217.53	217.53	95.0%
20	1.750	Dywidag (150 ksi)	127.7	150	326.0	51.50	0.00	2.71	173.44	168.06	177.47	217.53	217.53	81.6%
21	2.250	A193 Gr B7	105	125	191.3	51.50	0.00	3.98	251.76	243.88	257.68	0.00	325.00	79.3%
22	1.750	Williams R71	127.7	150	350.0	64.50	0.00	2.66	207.18	201.90	211.14	0.00	312.00	67.7%
23	1.750	Williams R71	127.7	150	106.0	64.50	0.00	2.66	222.61	217.33	226.57	0.00	312.00	72.6%
								48.42						

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

TIA Rev G

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

Site Data

BU#: *876331*
Site Name: *Great Britain Gravel Pit*
App #:

Pole Manufacturer:	*Other*

Reactions			
Mu:	1430.4	ft-kips	Reactions adjusted to account for additional anchor rods.
Axial, Pu:	28	kips	
Shear, Vu:	21	kips	
Eta Factor, η	0.5	TIA G (Fig. 4-4)	

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

Anchor Rod Data		
Qty:	16	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	41	in

Anchor Rod Results

			Rigid
Max Rod (Cu+ Vu/ń):	109.0	Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	141.0	Kips	φ*Tn
Anchor Rod Stress Ratio:	77.3%	**Pass**	

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.07	in

Base Plate Results Flexural Check

			Rigid
Base Plate Stress:	23.0	ksi	AISC LRFD
Allowable Plate Stress:	32.4	ksi	φ*Fy
Base Plate Stress Ratio:	70.9%	**Pass**	Y.L. Length: 19.62

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

n/a

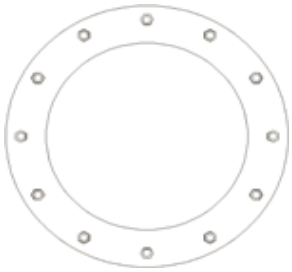
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None



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

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

Plate Forces (My) taken at face of pole from RISA-3D:

Compression (1.2)	Tension (0.9)
-17.717	-7.154
-18.192	-7.936
-17.937	-8.276
-16.99	-8.408
-15.339	-8.506
-12.929	-8.751
-9.634	-9.402
-5.186	-10.866
0.97	-13.833
9.942	-19.531
24.026	-30.36
47.568	-50.761
90.642	-90.913
164.206	-161.903
260.242	-255.742
334.157	-327.642
334.723	-326.099
261.948	-251.145
167.076	-154.387
94.718	-80.806
52.906	-38.885
30.695	-17.271
18.002	-4.831
10.459	2.879
5.726	7.306
2.63	9.406
0.541	10.361
-0.897	10.767
-1.91	10.989
-2.673	11.275
-3.349	11.843
-4.095	12.951
1784.329	-1805.631 k-ft
892.1645	**-902.8155** k-ft

(per linear ft of plate)

(Divide by 2 for a 0.5 ft plate)

Anchor Spring Constant

Ag =	1.68	in^2
E =	29000	ksi
Lu =	15	ft
k = An*E / Lu =	270.67	k/in

Subgrade Modulus

k =	2000	pci
k =	3456	kcf

Pier Weight

Number Sides =	4	
Width/Diameter =		ft
Pier Height =		ft
Concrete Desnity =		pcf
Volume =	0	ft^3
Weight =	0	kips

Applied Reactions for RISA 3D

TNX Moment =	2867	k-ft
TNX Axial =	48	kips
TNX Shear =	36	kips
Total Unfactored Axial =	**40.00**	**kips**
Side Bending Moment =	**3083**	**k-ft**
Corner Bending Moment =	**2180**	**k-ft**

Tension from Anchors (Tension side only)

	Load (kips)	Distance to Center (ft)
1	132.9	6
2	131.7	3
3		
4		
5		
6		

Pole/Pier Diameter =		inches
Bending Moment = ∑P*(D-d) =	14310	k-in
Bending Moment (Tension) =	1192.5	k-ft

Anchor Capacity

Max Tension from RISA =	133.7	kips
Anchor Type =	Rock Anchor	
Fu =	150	ksi
An =	1.58	in^2
Capacity (Kips) = 0.8*Fu*An =	189.6	
Ratio = 133.7 / 189.6 =	**70.5%**	

Soil Weight

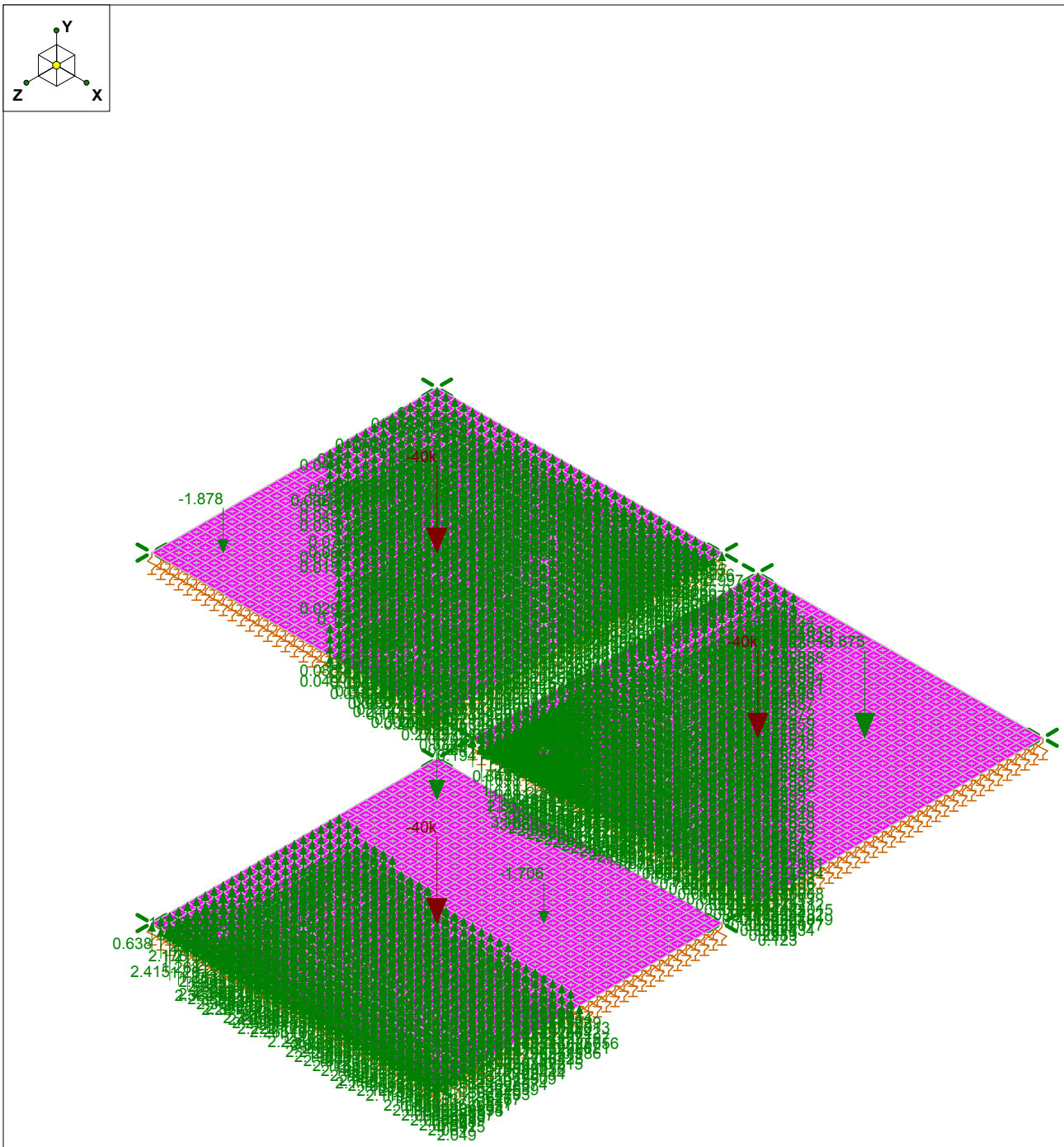
Height Above Grade =		ft
Soil Unit Weight =		pcf
Pad Width =		ft
Pad Length =		ft
Volume =	0.00	ft^3
Weight =	0.00	kips
Weight per Sq. Ft =	0	psf

Pad/Mat Analysis

Thickness	6	ft
Width	16	ft
f'c	3	ksi
Top Bar Quantity	17	
Top Bar Size #	8	
Top Clear Spacing	3	in
Bot Bar Quantity	17	
Bot Bar Size #	8	
Bot Clear Spacing	3	in
As,min	24.8832	in^2
As, compression	13.43	in^2
d,compression	67.5	in
a	19.8	in
c	28.8	in
c/d	0.427	
Ø	0.819	
ØMn,compression	3667	k-ft
Mu	892.2	k-ft
Ratio =	**24.3%**	
As, Tension	13.43	in^2
d,tension	67.5	in
a	19.8	in
c	28.8	in
c/d	0.427	
Ø	0.819	
ØMn,tension	3667	k-ft
Mu	1192.5	k-ft
Ratio =	**32.5%**	

Bearing Check

Max Bearing Load =	3.18	kip
Plate Size =	0.5	ft
Ult. Bearing Capacity =	30	ksf
Bearing Pressure =	12.72	ksf
Ratio =	**56.5%**	



Loads: BLC 1, Dead
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company	BU 876331	SK - 1
KAT		Mar 2, 2017 at 6:19 AM
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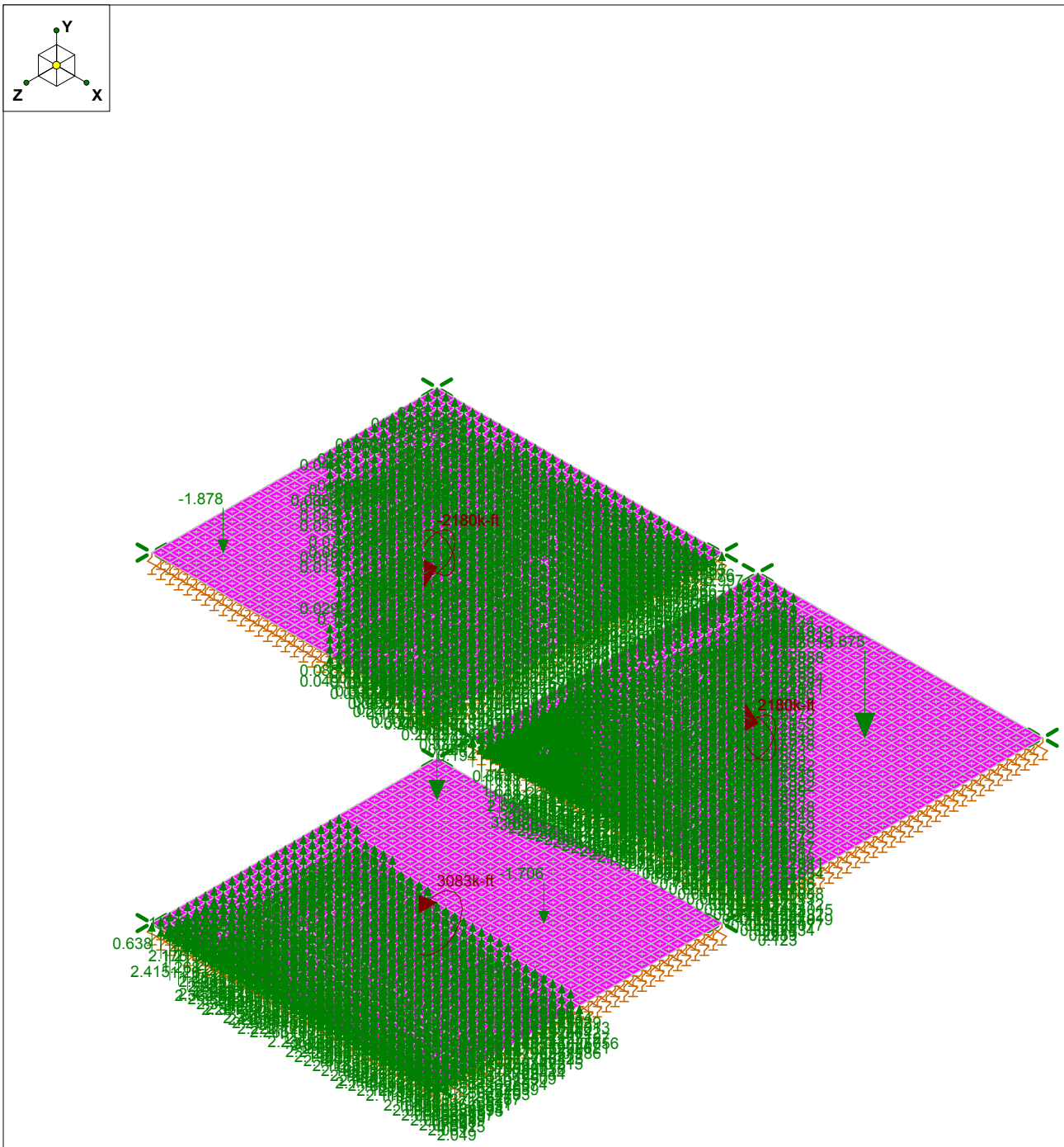

Loads: BLC 2, Moment
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company	BU 876331	SK - 2
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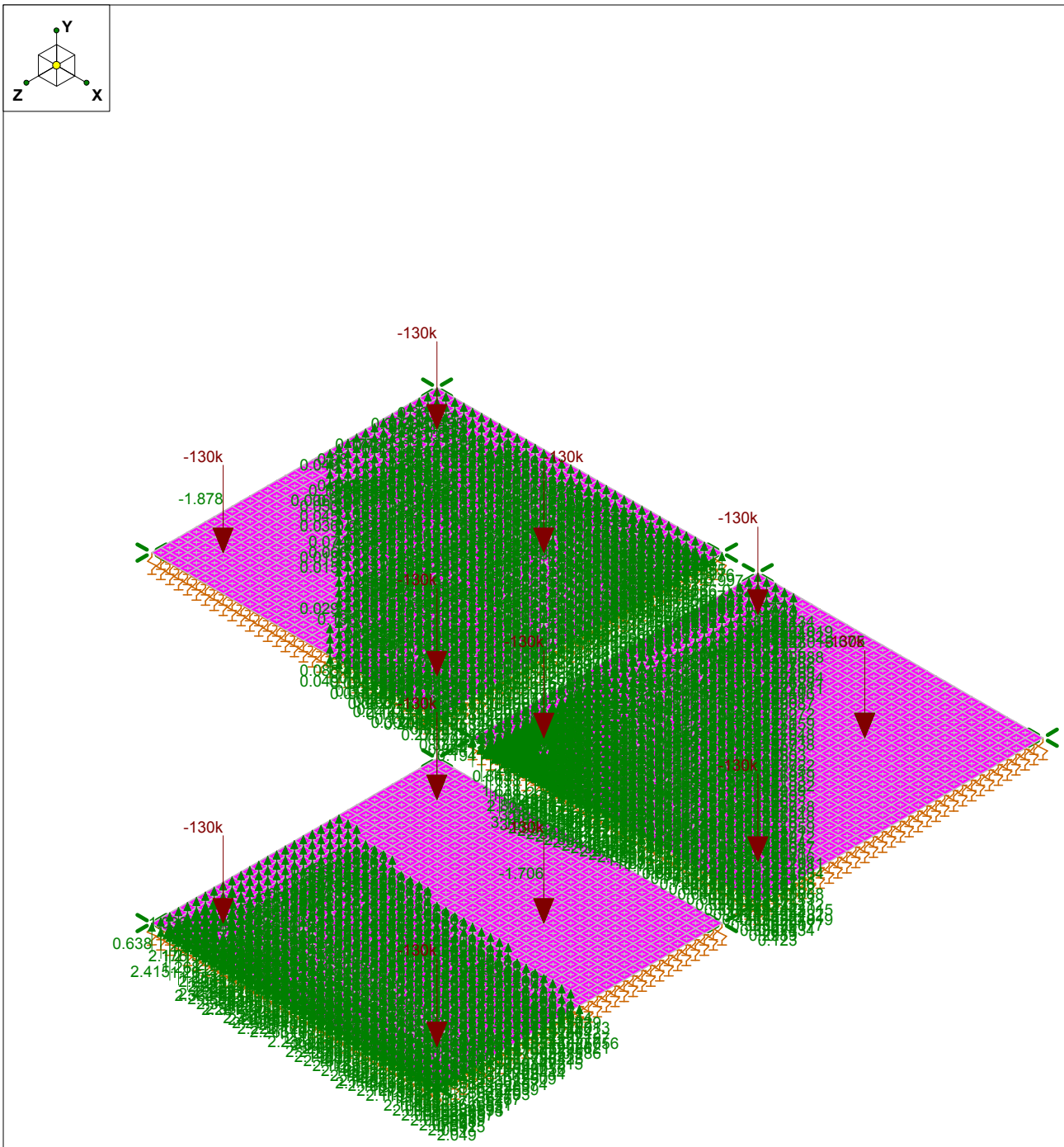

Loads: BLC 3, Pretension
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company	BU 876331	SK - 3
KAT		Mar 2, 2017 at 6:19 AM
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(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	None
Aluminum Code	None - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1		3				
2	Moment	None				5				
3	Pretension	None				12				

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2 Dead + moment	Yes	Y		1	1.2	2	1	3	1														
2	0.9 Dead+moment	Yes	Y		1	.9	2	1	3	.9														

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	SIDE	L	Y	-40
2	CORNER	L	Y	-40
3	N2179	L	Y	-40

Joint Loads and Enforced Displacements (BLC 2 : Moment)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	SIDE	L	Mx	3083
2	CORNER	L	Mx	2180
3	CORNER	L	Mz	2180
4	N2179	L	Mx	-2180
5	N2179	L	Mz	-2180

Joint Loads and Enforced Displacements (BLC 3 : Pretension)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	N226	L	Y	-130

Joint Loads and Enforced Displacements (BLC 3 : Pretension) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
2	N250	L	Y	-130
3	N801	L	Y	-130
4	N969	L	Y	-130
5	N1315	L	Y	-130
6	N1339	L	Y	-130
7	N1890	L	Y	-130
8	N2058	L	Y	-130
9	N2404	L	Y	-130
10	N2428	L	Y	-130
11	N2979	L	Y	-130
12	N3147	L	Y	-130

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	.145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	.145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	.11	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	.11	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	.11	4	.75	60	60

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT1024

New Britain Loon Lake
115 North Mountain Road
New Britain, CT 6053

February 27, 2017

Centerline Communications Project Number: 950006-038

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**19.79 %**

February 27, 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: **CT1024 – New Britain Loon Lake**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **115 North Mountain Road, New Britain, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **115 North Mountain Road, New Britain, 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)
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
GSM	850 MHz	2	30
GSM	1900 MHz (PCS)	2	30

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

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	CCI HPA-65R-BUU-H6	100
A	2	Powerwave 7770	100
A	3	Commscope SBNH-1D6565C	100
B	1	CCI HPA-65R-BUU-H8	100
B	2	Powerwave 7770	100
B	3	KMW AM-X-CD-16-65-00T-RET	100
C	1	CCI HPA-65R-BUU-H6	100
C	2	Powerwave 7770	100
C	3	KMW AM-X-CD-16-65-00T-RET	100

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	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	3.10
Antenna A2	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.13
Antenna A3	Commscope SBNH-1D6565C	850 MHz / 1900 MHz (PCS)	14.45 / 15.85	4	120	3,979.22	2.14
						Sector A Composite MPE%	**6.36**
Antenna B1	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	3.69
Antenna B2	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.13
Antenna B3	KMW AM-X-CD-16-65-00T-RET	850 MHz / 1900 MHz (PCS)	13.85 / 15.25	4	120	3,465.76	1.86
						Sector B Composite MPE%	**6.68**
Antenna C1	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	3.10
Antenna C2	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.13
Antenna C3	KMW AM-X-CD-16-65-00T-RET	850 MHz / 1900 MHz (PCS)	13.85 / 15.25	4	120	3,465.76	1.86
						Sector C Composite MPE%	**6.09**

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 sector with the largest calculated MPE% is Sector B. *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	**6.68 %**
Clearwire	0.43 %
Sprint	1.27 %
T-Mobile	2.65 %
Verizon Wireless	8.76 %
Site Total MPE %:	**19.79 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	6.36 %
AT&T Sector B Total:	6.68 %
AT&T Sector C Total:	6.09 %
Site Total:	19.79 %

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 sector with the largest calculated MPE% is Sector B.

AT&T _ Frequency Band / Technology Max Values (Sector B)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 700 MHz LTE	2	1,239.23	100	10.08	700 MHz	467	2.16%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	100	15.26	1900 MHz (PCS)	1000	1.53%
AT&T 850 MHz UMTS	2	414.12	100	3.37	850 MHz	567	0.59%
AT&T 1900 MHz (PCS) UMTS	2	656.33	100	5.34	1900 MHz (PCS)	1000	0.53%
AT&T 850 MHz GSM	2	727.98	100	5.92	850 MHz	567	1.04%
AT&T 1900 MHz (PCS) GSM	2	1,004.90	100	8.18	1900 MHz (PCS)	1000	0.82%
						Total:	6.68%

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:	6.36 %
Sector B:	6.68 %
Sector C:	6.09 %
AT&T Maximum Total (per sector):	6.68 %
Site Total:	19.79 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **19.79 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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