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Raynham, MA 02767
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5/17/2017

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

RE: Tower of Sharing Application // Site Number: CT1304

136 Wright Road Torrington, CT 06757 (Site Name: Torrington Wright Road)

N 41.82733 // W -73.170519

Dear Ms. Bachman:

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5/17/2017

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

RE: Tower of Sharing Application // Site Number: CT1304

136 Wright Road Torrington, CT 06757 (Site Name: Torrington Wright Road)

N 41.82733 // W -73.170519

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Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT1304

Torrington Wright Road
136 Wright Road
Torrington, CT 6757

April 28, 2017

Centerline Communications Project Number: 950012-001

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**4.91 %**

April 28, 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: **CT1304 – Torrington Wright Road**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **136 Wright Road, Torrington, 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 **136 Wright Road, Torrington, 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

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 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-H8	128
A	2	CCI HPA-65R-BUU-H8 (Future)	128
A	3	CCI HPA-65R-BUU-H8 (Future)	128
A	4	CCI HPA-65R-BUU-H8 (Future)	128
B	1	CCI HPA-65R-BUU-H8	128
B	2	CCI HPA-65R-BUU-H8 (Future)	128
B	3	CCI HPA-65R-BUU-H8 (Future)	128
B	4	CCI HPA-65R-BUU-H8 (Future)	128
C	1	CCI HPA-65R-BUU-H8	128
C	2	CCI HPA-65R-BUU-H8 (Future)	128
C	3	CCI HPA-65R-BUU-H8 (Future)	128
C	4	CCI HPA-65R-BUU-H8 (Future)	128

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-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	2.19
Antenna A2	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna A3	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna A4	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
						Sector A Composite MPE%	**2.19**
Antenna B1	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	2.19
Antenna B2	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna B3	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna B4	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
						Sector B Composite MPE%	**2.19**
Antenna C1	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)		4	240	6,229.75	2.19
Antenna C2	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna C3	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
Antenna C4	CCI HPA-65R-BUU-H8	Future Antenna	N/A	N/A	N/A	N/A	N/A
						Sector C Composite MPE%	**2.19**

Table 3: AT&T Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**2.19 %**
Verizon Wireless	2.10 %
Sprint	0.62 %
Site Total MPE %:	**4.91 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	2.19 %
AT&T Sector B Total:	2.19 %
AT&T Sector C Total:	2.19 %
Site Total:	4.91 %

Table 5: Site MPE Summary

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

AT&T _ Max Power Values per Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 700 MHz LTE	2	1,239.23	128	5.99	700 MHz	467	1.28%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	128	9.06	1900 MHz (PCS)	1000	0.91%
						Total:	**2.19%**

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:	2.19 %
Sector B:	2.19 %
Sector C:	2.19 %
AT&T Maximum Total (per sector):	2.19 %
Site Total:	4.91 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **4.91 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	136 WRIGHT ROAD TORRINGTON, CT 06757
LATITUDE: LONGITUDE:	41° 49' 38" N 73° 10' 14" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
DESIGN GUIDELINE:	LTE NSB

SITE NUMBER: CT1304

SITE NAME: TORRINGTON WRIGHT ROAD

136 WRIGHT ROAD
TORRINGTON, CT 06757
LITCHFIELD COUNTY

APPROVED
By Radu Alecsandru at 5:29 pm, Apr 07, 2017

DRAWING INDEX

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LOCUS MAP

DRIVING DIRECTIONS FROM 550 COCHITUATE ROAD, FRAMINGHAM, MA:

1. Head northeast, Turn right toward Speen St, Turn right onto Speen St, Turn right onto Cochituate Rd
2. Use the right lane to take the ramp to I-90/Masspike/Springfield/Boston
3. Keep left at the fork, follow signs for Interstate 90 W/Massachusetts Turnpike/Worchester/Springfield and merge onto I-90 W/Massachusetts Turnpike, Merge onto I-90 W/Massachusetts Turnpike
4. Use the right 2 lanes to take exit 9 for I-84 toward US-20/Hartford/New York City
5. Continue onto I-84, Keep right to stay on I-84, Keep left to stay on I-84
6. Use the right 2 lanes to take exit 39 toward Farmington/CT-4
7. Continue onto State Hwy 508, State Hwy 508 turns slightly right and becomes CT-4 W
8. Slight right to stay on CT-4 W, Turn left onto CT-4
9. Turn right onto Birge Park Rd
10. Continue onto New Harwinton Rd
11. Turn left onto E Main St
12. Turn right onto E Elm St
13. Continue onto Migeon Ave
14. Continue onto Goshen Rd
15. Turn right onto Wright Rd

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

STATE OF CONNECTICUT
MARC R. CHRETIEN
No. 28307
LICENSED
PROFESSIONAL ENGINEER

CONNECTICUT
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0	03/01/17	ISSUED FOR REVIEW	AAB	MRC
1	03/16/17	REVISION	AAB	MRC
2	04/05/17	REVISION	AAB	MRC

TITLE SHEET

SHEET NO. T-1

GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE LESEE/LICENSEE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.

4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS / CONTRACT DOCUMENTS.

7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.

9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

12. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.

13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.

14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.

15. THE CONTRACTOR SHALL NOTIFY THE LESEE/LICENSEE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESEE/LICENSEE REPRESENTATIVE.

16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.

17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK. CALL THE FOLLOWING FOR ALL PRE-CONSTRUCTION NOTIFICATION 72-HOURS PRIOR TO ANY EXCAVATION ACTIVITY: DIG SAFE SYSTEM (MA, ME, NH, RI, VT): 1-888-344-7233 CALL BEFORE YOU DIG (CT): 1-800-922-4455

18. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS SHOWN HEREIN.

19. ALL DIMENSIONS SHOWN THUS ± ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS WHICH EFFECT THE CONTRACTORS WORK. CONTRACTOR TO VERIFY ALL DIMENSIONS WITH PROJECT OWNER PRIOR TO CONSTRUCTION.

20. NORTH ARROW SHOWN ON PLANS REFERS TO APPROXIMATE TRUE NORTH. PRIOR TO THE START OF CONSTRUCTION, ORDERING OR FABRICATING OF ANTENNA MOUNTS, CONTRACTOR SHALL CONSULT WITH PROJECT OWNER'S RF ENGINEER AND FIELD VERIFY ALL ANTENNA SECTOR LOCATIONS AND ANTENNA AZIMUTHS.

21. THE CONTRACTOR AND OR HIS SUB CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

22. ANTENNA INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS, TRANSMISSION LINES AND SUPPORT STRUCTURES.

23. COAXIAL CABLE CONNECTORS AND TRANSMITTER EQUIPMENT SHALL BE PROVIDED BY THE PROJECT OWNER AND IS NOT INCLUDED IN THESE CONSTRUCTION DOCUMENTS. A SCHEDULE OF PROJECT OWNER SUPPLIED MATERIALS IS ATTACHED TO THE BID DOCUMENTS (SEE EXHIBIT 3). ALL OTHER HARDWARE TO BE PROVIDED BY THE CONTRACTOR. CONNECTION HARDWARE SHALL BE STAINLESS STEEL.

24. WHEN "PAINT TO MATCH" IS SPECIFIED FOR ANTENNA CONCEALMENT, PAINT PRODUCT FOR ANTENNA RADOME SHALL BE SHERWIN WILLIAMS COROTHANE II. SURFACE PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND PROJECT OWNER'S GUIDELINE'S.

25. COORDINATION, LAYOUT, AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

26. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.

27. ALL (E)ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW.

28. ALL (E)INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF UTILITY COMPANY ENGINEERING. THE AREAS OF THE PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE EQUIPMENT, DRIVEWAY OR

29. GRAVEL, SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED AND COVERED WITH MULCH UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN SOIL EROSION AND SEDIMENTATION CONTROLS AT ALL TIMES

30. DURING CONSTRUCTION. PER FCC MANDATE, ENHANCED EMERGENCY (E911) SERVICE IS REQUIRED TO MEET NATIONWIDE STANDARDS

31. FOR WIRELESS COMMUNICATIONS SYSTEMS. PROJECT OWNER'S IMPLEMENTATION REQUIRES DEPLOYMENT OF EQUIPMENT AND ANTENNAS GENERALLY DEPICTED ON THIS PLAN, ATTACHED TO OR MOUNTED IN CLOSE PROXIMITY TO THE BTS RADIO CABINETS. PROJECT OWNER RESERVES THE RIGHT TO MAKE REASONABLE MODIFICATIONS TO E911 EQUIPMENT AND LOCATION AS TECHNOLOGY EVOLVES TO MEET REQUIRED SPECIFICATIONS.

32. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:

2009 INTERNATIONAL BUILDING CODE
2005 CT STATE BUILDING CODE
ELECTRICAL CODE: NEC 2014
LIGHTING CODE: NEC 2014

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.

2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.

3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.

4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.

5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.

6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.

7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION.

8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.

9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE AND GREENLEE CONDUIT MEASURING TAPE IN EACH INSTALLED TELCO CONDUIT.

10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.

11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.

12. PPC SUPPLIED BY PROJECT OWNER.

13. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "T-MOBILE BTS SITE GROUNDING STANDARDS".

14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.

16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.

17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.

18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.

19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.

20. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.

21. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ (E) MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.

22. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MAXIMUM RESISTANCE REQUIRED.

23.CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

STATE OF CONNECTICUT
MARC R. CHRETIEN
No. 29307
LICENSED
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ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	(P)	PROPOSED/NEW	TBR	TO BE REMOVED
(E)	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE		
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED	TYP	TYPICAL
(F)	FUTURE				

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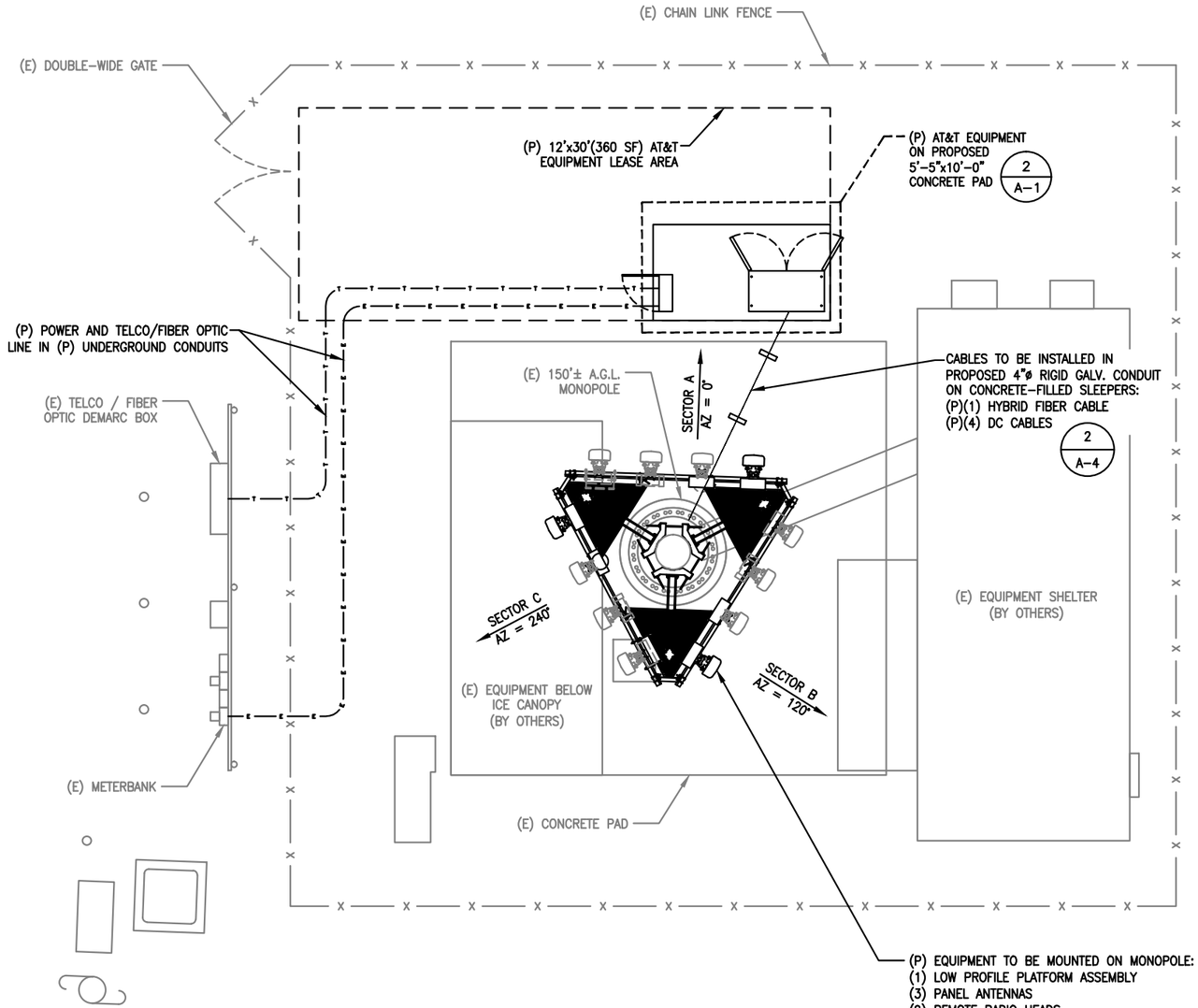
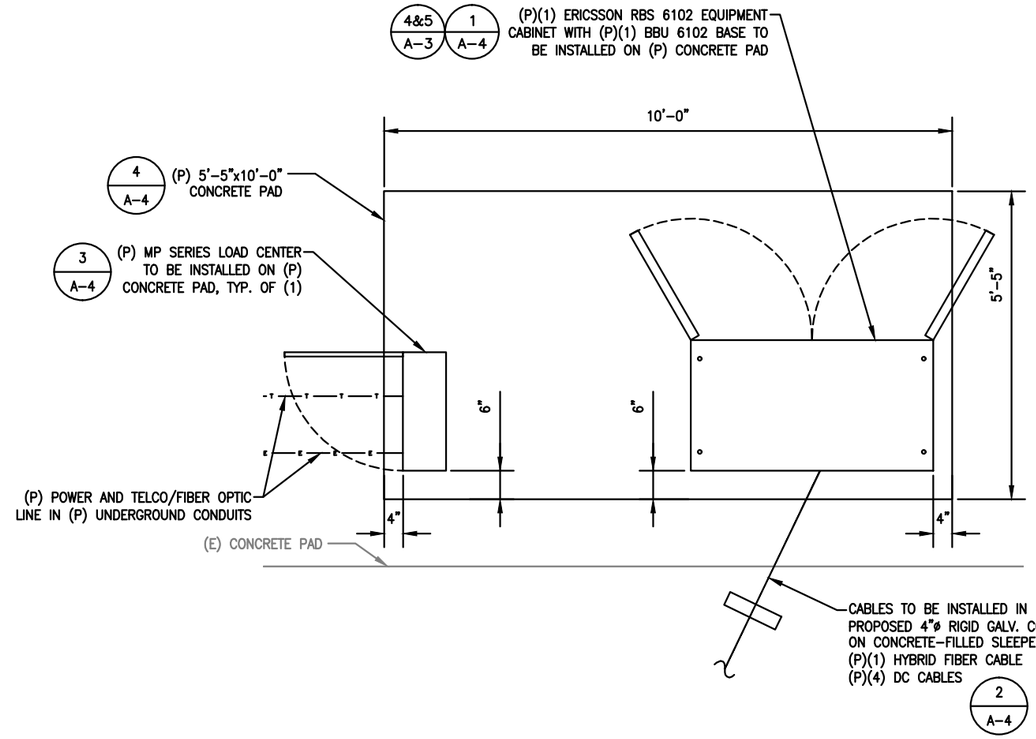
GENERAL NOTES

SHEET NO. **GN-1**

HALF SIZE PRINT
THIS DRAWING IS SCALEABLE AT HALF THE NOTED SCALE



NORTH 1 A-1 COMPOUND PLAN
SCALE: 1/4"=1'-0"



NORTH 2 A-1 EQUIPMENT SHELTER PLAN
SCALE: 3/4"=1'-0"

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COMPOUND AND EQUIPMENT PLANS

SHEET NO. A-1

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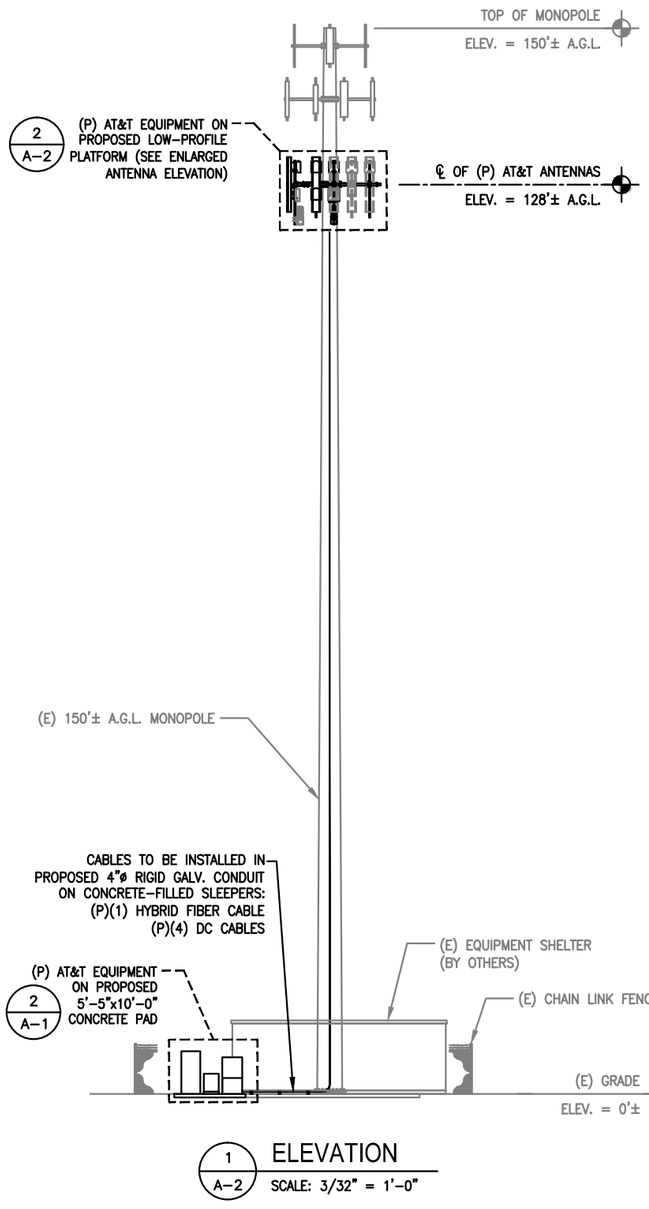
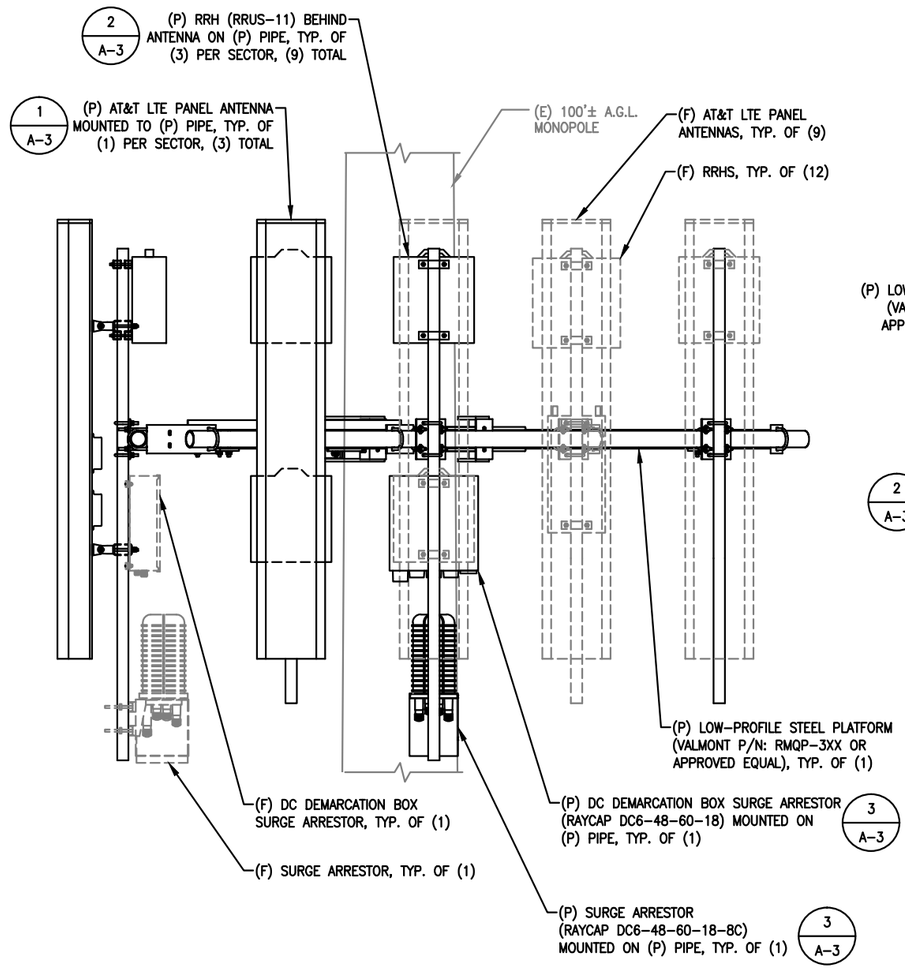
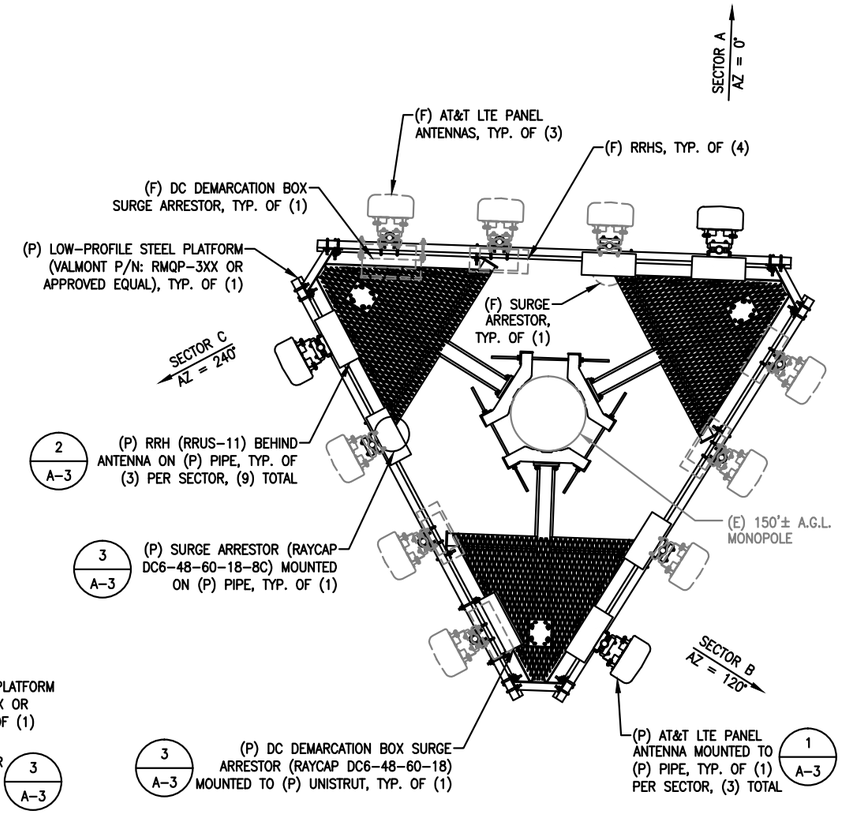


1 A-2 ELEVATION
SCALE: 3/32" = 1'-0"



2 A-2 ENLARGED ANTENNA ELEVATION
SCALE: 3/4" = 1'-0"



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

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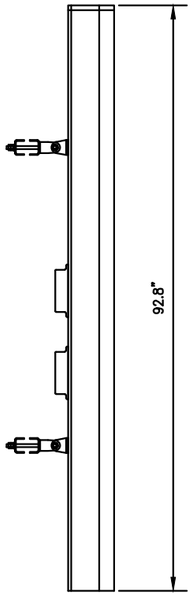
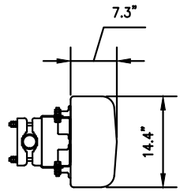
ELEVATIONS AND ANTENNA PLANS

SHEET NO. A-2





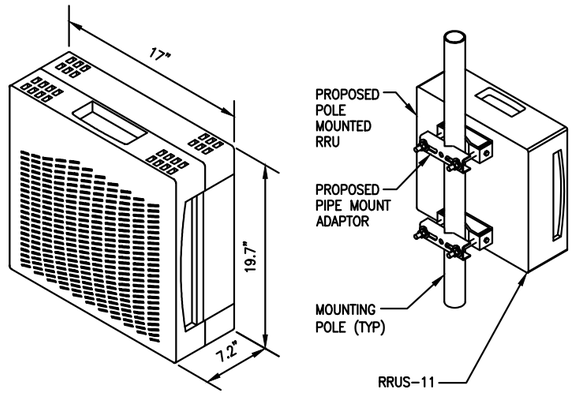
HPA-65R-BUU-H8

MANUFACTURER: CCI
DIMENSIONS: (HxWxD) 92.8"x14.4"x7.3"
WEIGHT: 53.0 LBS.
(EXCLUDES MOUNTS & RET SYSTEM)

1 / A-3 ANTENNA DETAILS
SCALE: N.T.S.

ERICSSON RRUS-11

-DIMENSIONS (H x W x D): 19.7" x 17.0" x 7.2" (INCLUDES SUNSHIELD)
-WEIGHT: 50 LBS
-CLIMATE: -40°C TO +55°C (SELF CONVECTION SILENT, NO FANS, IP55)
-POWER CONSUMPTION: 200 WATTS (TYP.)

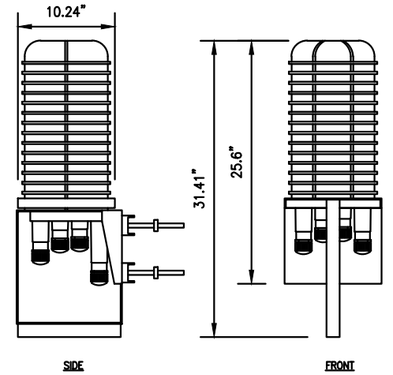


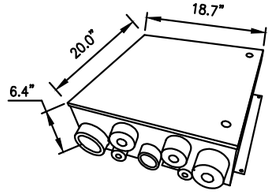
NOTES:
RRU CAN ONLY BE PAINTED ON SOLAR SHIELD.

2 / A-3 REMOTE RADIO HEAD (RRH) DETAILS
SCALE: N.T.S.

RAYCAP DC6-48-60-18-8c

NUMBER OF RADIOS PROTECTED:	6
SUPPRESSION CONNECTION METHOD:	COMPRESSION LUG, #2-#14 AWG
COPPER, #2-#12	ALUMINUM
ENVIRONMENTAL RATING:	IP 68, 7M 72HRS
WEIGHT:	26.2 LBS





DC SURGE SUPPRESSOR
RAYCAP MODEL#
DC6-48-60-18

3 / A-3 SURGE ARRESTOR DETAILS
SCALE: N.T.S.

RBS 6102 OUTDOOR DIMENSIONS

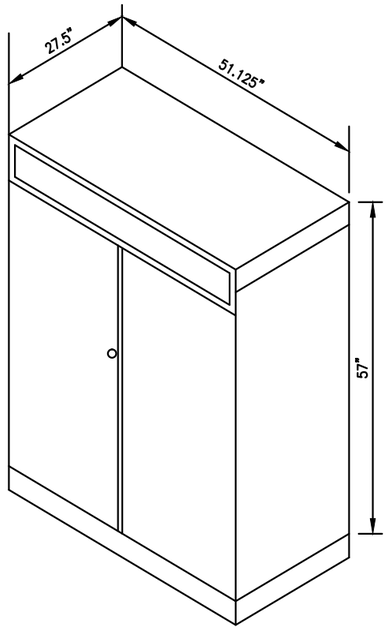
CABINET	DEPTH x WIDTH x HEIGHT
OUTDOOR RBS 6102	27.5" x 51.125" x 57"

RBS 6102 OUTDOOR WEIGHT

CABINET	APPROX. MAX WEIGHT	MAX. FLOOR LOADING
OUTDOOR RBS 6102	1028 LBS.	

RBS 6102 MINIMUM CLEARANCE

DIRECTION	MINIMUM CLEARANCE
CABINET REAR	8"
CABINET SIDES	4"
ABOVE THE CABINET	20"
IN FRONT OF THE CABINET	28"



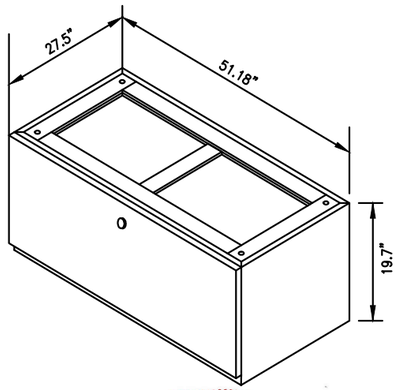
4 / A-3 RBS 6102 CABINET
SCALE: N.T.S.

BBU 6102 OUTDOOR DIMENSIONS

CABINET	DEPTH x WIDTH x HEIGHT
OUTDOOR RBS 6102	27.5" x 51.18" x 19.7"

BBU 6102 MINIMUM CLEARANCE

DIRECTION	MINIMUM CLEARANCE
CABINET REAR	8"
CABINET SIDES	4"
ABOVE THE CABINET	20"
IN FRONT OF THE CABINET	28"



5 / A-3 BBU 6102 CABINET
SCALE: N.T.S.

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136 WRIGHT ROAD
TORRINGTON, CT 06757
LITCHFIELD COUNTY

at&t
550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681

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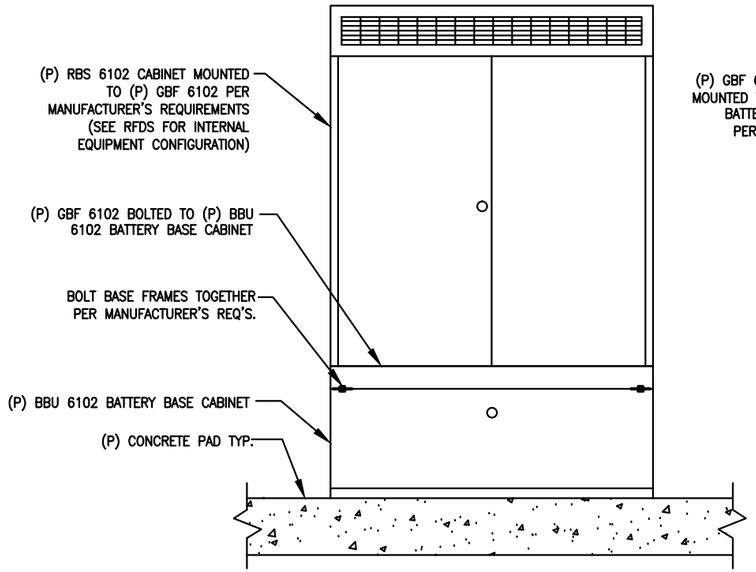
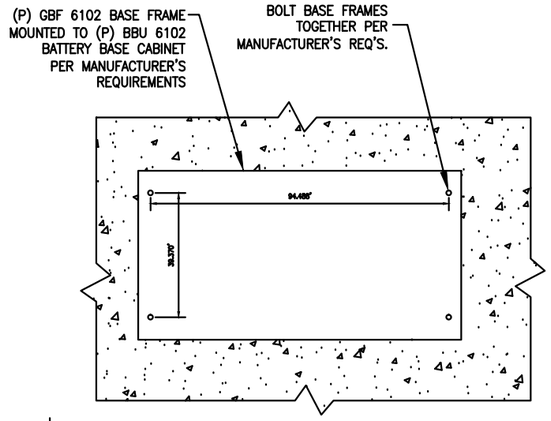
DETAILS

SHEET NO. A-3



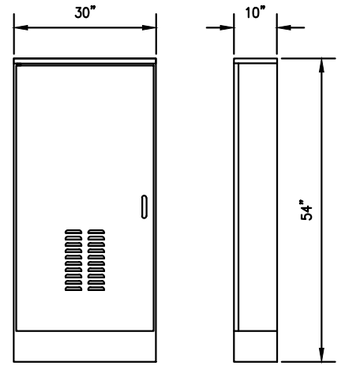
ELEVATION



PLAN

1 A–4 RBS 6102 MOUNTING DETAIL

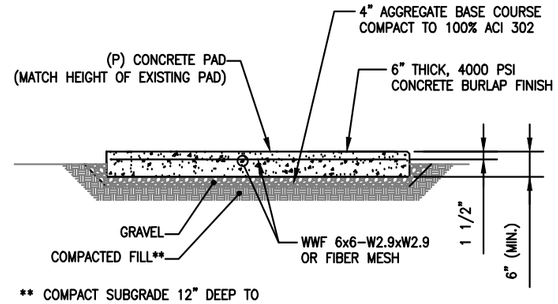
SCALE: 1"=2'–0"



PPC CABINET
DIMENSIONS (H x W x D): 54" x 30" x 10"

3 A–4 MP SERIES LOAD CENTER DETAIL

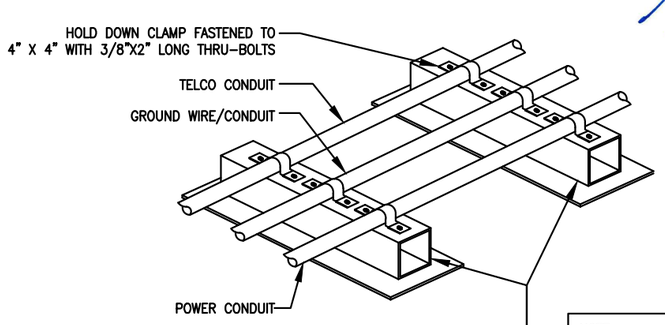
SCALE: N.T.S.



** COMPACT SUBGRADE 12" DEEP TO 95% RELATIVE COMPACTION PER ASTM D1557.

4 A–4 CONCRETE PAD DETAIL

SCALE: N.T.S.



NOTE:
PVC SLEEPERS TO BE FILLED WITH CONCRETE EVERY 4'–0"

2 A–4 CONDUIT SUPPORT

SCALE: N.T.S.

RF SYSTEM SCHEDULE & B.O.M.

RRH INFORMATION					ANTENNA INFORMATION								
	MAKE	MODEL	(P) QTY	(F) QTY	SECTOR	MAKE	MODEL	FEED	AZIMUTH	RAD CTR (AGL)	FIBER/POWER LENGTH	FEEDERS	MECHANICAL DOWNTILT
ALPHA	ERICSSON	RRUS–11	3	2	IA	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	0°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–12	0	0	IIA	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	0°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–A2	0	0	IIIA	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	0°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–E2	0	1	IVA	CCI	HPA–65R–BUU–H8 (P)	BOTTOM	0°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–32	0	1									
BETA	ERICSSON	RRUS–11	3	2	IB	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	120°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–12	0	0	IIB	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	120°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–A2	0	0	IIIB	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	120°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–E2	0	1	IVB	CCI	HPA–65R–BUU–H8 (P)	BOTTOM	120°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–32	0	1									
GAMMA	ERICSSON	RRUS–11	3	2	IC	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	240°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–12	0	0	IIC	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	240°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–A2	0	0	IIIC	CCI	HPA–65R–BUU–H8 (F)	BOTTOM	240°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–E2	0	1	IVC	CCI	HPA–65R–BUU–H8 (P)	BOTTOM	240°	128±	145±	FIBER/DC POWER	0°
	ERICSSON	RRUS–32	0	1									

* CONTRACTOR TO VERIFY FINAL RFDS AND CABLE LENGTHS PRIOR TO CONSTRUCTION

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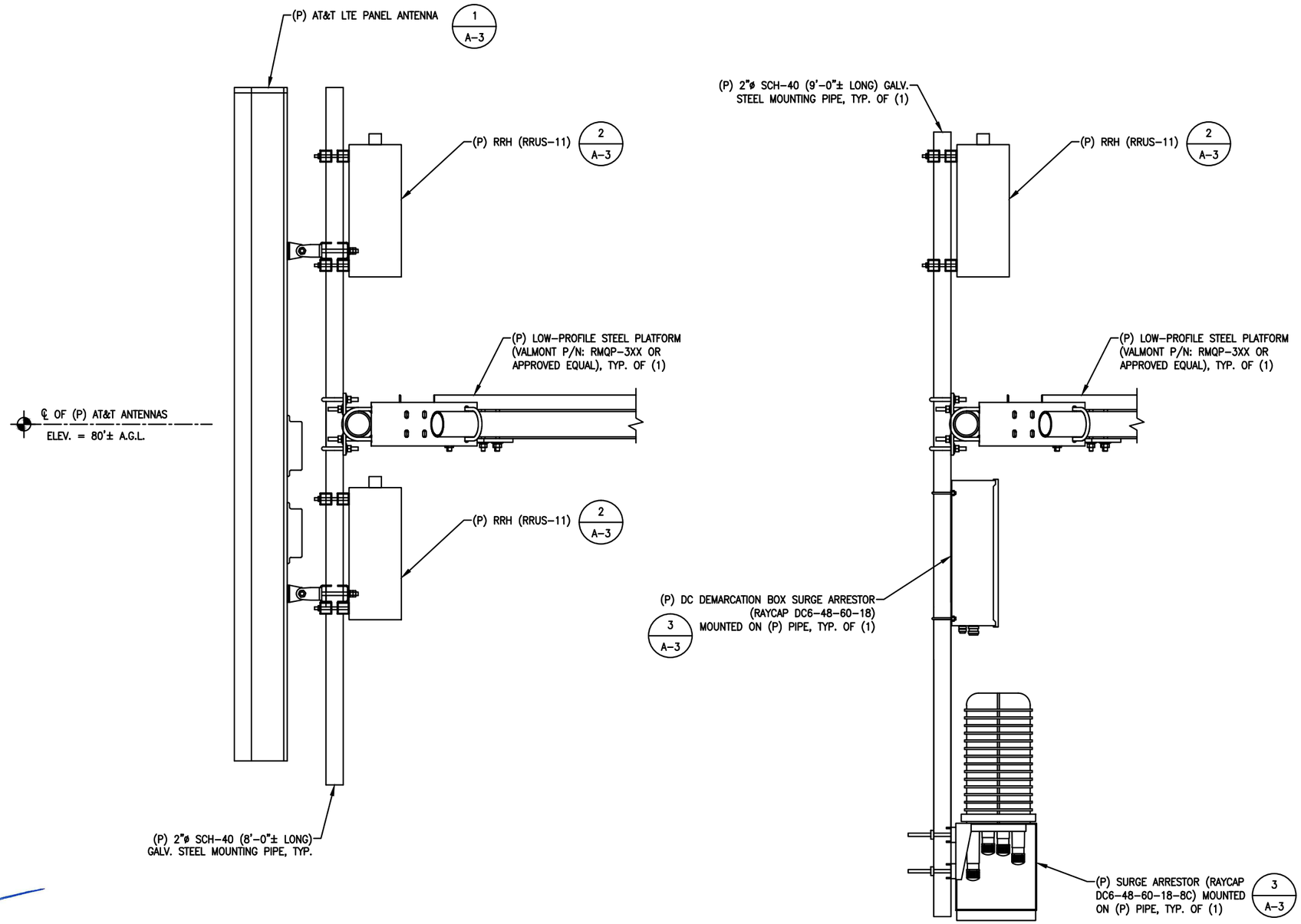
DETAILS

SHEET NO. A-4



1 S-1 MOUNTING DETAILS
SCALE: 1 1/2" = 1'-0"

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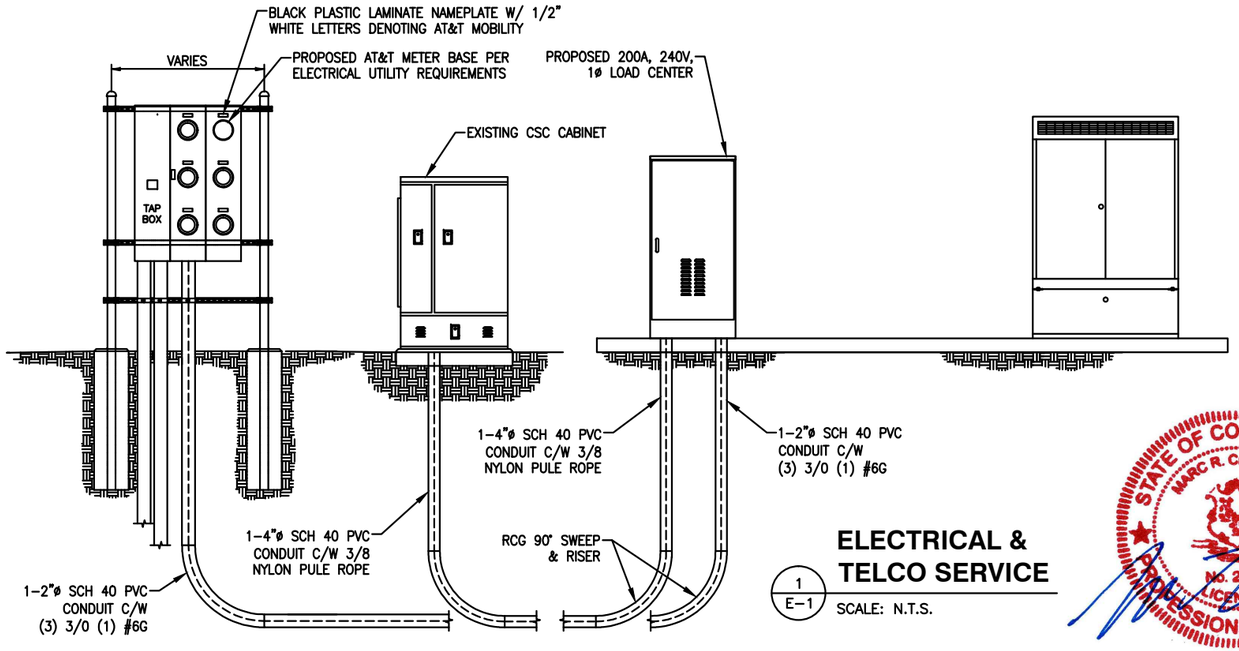
STRUCTURAL DETAILS

SHEET NO. S-1



ELECTRICAL & TELCO SERVICE

1 / E-1 SCALE: N.T.S.

GENERAL ELECTRICAL NOTES

1. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH ALL GOVERNING STATE, COUNTY AND LOCAL CODES, O.S.H.A.. NEC 2008, NFPA P70, AT&T MOBILITY SPECIFICATIONS. AND THE SPECIFICATIONS DETAILED IN THESE PLANS.

2. SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

3. CONTRACTOR SHALL PERFORM ALL VERIFICATION, OBSERVATION, TESTS. AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS. FAULTY EQUIPMENT. AND DISCREPANCIES.

4. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE. CONTRACTOR SHALL ENSURE THAT ACCESS TO EQUIPMENT IS MAINTAINED IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS AND ALL APPLICABLE CODES.

5. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX. J--BOX, SWITCH BOX, ETC.. IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

6. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION. ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM, ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS. AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.

7. ALL MATER1ALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORY AND SHALL BEAR THE INSPECTION LABEL 'J' WHERE SUBJECT TO SUCH APPROVAL MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES NAN1NG JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI. NEMA, IEEE, AND NFPA.

8. ALL CONDUIT INSTALLED MAY BE SURFACE MOUNTED UNLESS OTHERWISE NOTED.

9. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE. UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

10. ALL "CONDUIT ONLY" (CO.) INSTALLATIONS SHALL HAVE A 3/8" PULL WIRE OR ROPE.

11. CONTRACTOR SHALL PROVIDE AT&T MOBILITY MANAGER WITH ONE SET OF COMPLETE ELECTRICAL 'AS INSTALLED' DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROISINGS, AND CIRCUITS,

12. ALL BROCHURES. OPERATING MANUALS. CATALOGS, SHOP DRAWINGS. ETC. SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION.

13. POWER WIRE AND CABLE CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID.

14. ALL CONDUCTORS LARGER THAN 110 AWG SHALL BE STRANDED COPPER WITH THWN 600V INSULATION. UNLESS NOTED OTHERWISE.

15. ALL MATING SURFACES OF GROUND CONNECTIONS SHALL BE CLEANED SMOOTH AND COATED WITH ANTIOXIDANT PRIOR TO ATTACHMENT,

16. ALL GROUND CONNECTIONS BELOW GRADE MUST BE EXOTHERMICALLY WELDED (CAD WELD OR APPROVED EQUAL)

17. ALL EXTERIOR GROUNDING CONDUCTORS SHALL BE 2 AND SOLID TINNED BARE COPPER WIRE UNLESS NOTED OTHERWISE.

18. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C. COORDINATE SHORT CIRCUIT REQUIREMENTS WITH LOCAL UTILITY COMPANY.

19. CONTRACTOR SHALL PATCH. REPAIR. AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.

20. IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSES, OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, M PIPE RUNS, ETC., IT MUST BE CLEARLY UNDERSTOOD THAT TENDONS AND/OR REINFORCING STEEL WILL NOT BE DRILLED INTO, CUT OR DAMAGED UNDER ANY CIRCUMSTANCES.

21. LOCATION OF TENDONS AND/OR REINFORCING STEEL ARE NOT DEFINITELY KNOWN AND, THEREFORE, MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT VIA X-RAY OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING AND/OR STEEL TENDONS.

22. PENETRATIONS IN FIRE RATED WALLS SHALL BE SEALED IN ACCORDANCE WITH ALL APPLICABLE CODES.

23. ALL MATERIALS SHALL BE U.L. LISTED

24. CONDUIT:
a. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS. IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.
b. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL FITTINGS SHALL BE GLAND RING COMPRESSION TYPE EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
c. FLEXIBLE METALLIC CONDUIT SHALL NAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITT1NGS SHALL BE 'JAKE' OR 'SQUEEZE' TYPE, SEAL TIGHT FLEXIBLE CONDUIT. ALL CONDUIT SHALL NAVE FULL SIZE GROUND WIRE
d. CONDUIT RUNS MAY BE SURFACE MOUNTED IN CEILINGS OR WALLS UNLESS INDICATED OTHERWISE. CONDUIT SHALL RUN PARALLEL OR AT RIGHT ANGLES TO CEILING, FLOOR OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH ENGINEER PRIOR TO INSTALLING.

25. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS.

26. CONTRACTOR SHALL COORDINATE THE ELECTRICAL SERVICE ATTN AT&T MOBILITY" AND LOCAL UTILITY.

27. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY NEC AND ALL APPLICABLE CODES.

28. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE OWNER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE. CONTRACTOR SHALL SUBMIT TO THE PROJECT MANAGER ALL TEST REPORTS AND ONE COMPLETE SET OF PRINTS SHOWING 'INSTALLED WORK'.

29. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL SUBMIT TEST REPORTS TO PROJECT MANAGER. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION.

30. ALL EXPOSED GROUND WIRES ROUTED ALONG THE SIDE OF EQUIPMENT SHELTERS OR ROUTED OVER CONCRETE FOUNDATIONS OR OTHER EXISI1NG STRUCTURES SHALL BE INSTALLED IN PROPERLY ANCHORED 3/4"ø (MIN.) PVC CONDUIT.

31. CONTRACTOR SHALL NOT DISTURB EXISTING GROUNDING SYSTEM. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY AT NO ADDITIONAL COST.

32. ALL ELEMENTS OF ICE BRIDGE AND AT&T MOBILITY UTILITY BACKBOARD MUST BE BONDED AND JUMPERED TO GROUNDED COMPONENTS OF THESE SYSTEMS.

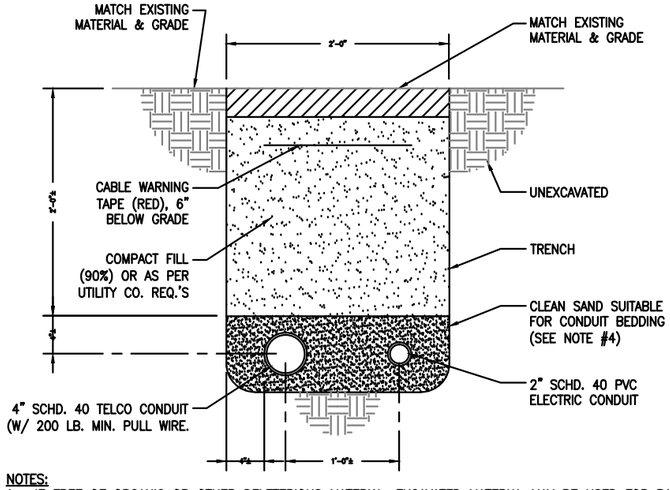
33. ALL INTERIOR CABLES AND WIRING SHALL BE NEATLY ROUTED IN OVERHEAD LADDER RACK AND FASTENED TO LADDER RACK.

34. ALL GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARDS FROM POINT OF ORIGIN TO TERMINATION POINT (GROUND BAR, GROUND RING, ETC.

35. GROUNDING CONDUCTORS SHALL NOT REVERSE DIRECTION (EXCEPT HALO & BURIED GROUND RINGS). OTHER EXCEPTIONS NEED TO BE APPROVED BY AT&T MOBILITY CONSTRUCTION MANAGER PRIOR TO INSTALLATION.

36. GROUNDING CONDUCTORS SHALL HAVE A MINIMUM BENDING RADIUS OF 8".

37. ALL CONNECTIONS TO GROUND PLATES SHALL BE CAD WELDED TO THE CENTER OF THE PLATE. ALL DETAILS SHOWING CONNECTIONS TO GROUND RODS ARE ALSO VALID FOR SIMILAR CONNECTIONS TO GROUND PLATES.



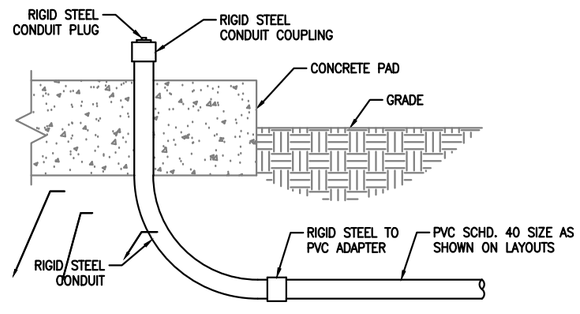
NOTES:
1. IF FREE OF ORGANIC OR OTHER DELETERIOUS MATERIAL, EXCAVATED MATERIAL MAY BE USED FOR BACKFILL
2. IF NOT, PROVIDE CLEAN MATERIAL & COMPACT IN 8" LIFTS. REMOVE ANY LARGE ROCKS PRIOR TO BACKFILLING. CONTRACTOR TO VERIFY LOCATION OF EXISTING U/G UTILITIES PRIOR TO DIGGING.
3. IF CURRENT AS-BUILT DRAWINGS ARE NOT AVAILABLE CONTRACTOR SHALL HAND DIG U/G TRENCHING.
4. ENCASE CONDUIT IN CONCRETE WHEN TRENCHING UNDER ROADS/DRIVEWAYS.

ELECTRIC & TELEPHONE/FIBER JOINT SERVICE TRENCH CONDUIT

2 / E-1 SCALE: N.T.S.

ELECTRICAL AND TELEPHONE GENERAL NOTES

1. FOLLOWING COMPLETION OF WORK, PROVIDE OWNER WITH AS-BUILT DRAWINGS SHOWING TELEPHONE AND ELECTRIC LOCATIONS.
2. WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE, NEC 2008.
3. COORDINATE WITH UT1UTY AND LOCAL ELECTRICAL INSPECTOR FOR FINAL POWER CONNECTION.
4. UTILITY WILL SUPPLY METER. COORDINATE WITH UTILITY FOR METER TYPE AND INTERCONNECTION.
5. ALL EXISTING UNDERGROUND LINES ON SITE TO BE LOCATED PRIOR TO CONSTRUCTION. CALL 1-888-DIG-SAFE PRIOR TO CONSTRUCTION.
6. SEAL ALL SERVICE ENTRANCES INTO SHELTER FOLLOWING INSTALLATION.
7. SEE PAGE G-1 FOR GENERAL GROUNDING NOTES.
8. COORDINATE WITH LOCAL TELEPHONE COMPANY FOR ALL ROUTING AND DESIGN.
9. CONTRACTOR TO VERIFY CONTROL WIRING SIZE WITH GENERATOR MANUFACTURER PRIOR TO CONSTRUCTION.



UNDERGROUND CONDUIT STUB UP DETAIL

3 / E-1 SCALE: N.T.S.

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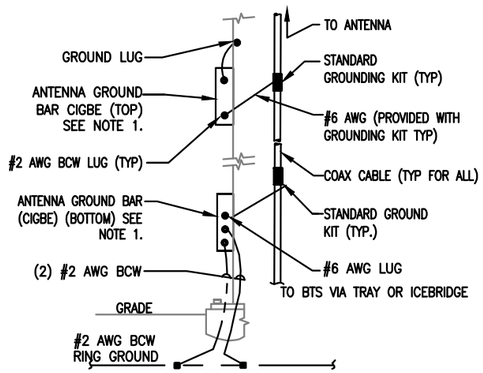
ELECTRICAL DETAILS AND ONE LINE DIAGRAM

SHEET NO. **E-1**

	CIRCUIT BREAKER	ACCA	ANTENNA CABLE COVER ASSEMBLY
E	ELECTRIC BOX	AWG	AMERICAN WIRE GAUGE
	ELECTRICAL CONDUIT	BTCW	BARE TINNED COPPER WIRE
		C	CONDUIT
		CIGBE	COAX INSULATED GROUND BAR EXTERNAL
	EXOTHERMIC CONNECTION (CADWELD) TO GROUND RING AND COMPRESSION TO GROUND HALO	CO	CONDUIT ONLY
		DWG	DRAWING
		EGB	EXTERNAL GROUND BAR
		EMT	ELECTRICAL METALLIC TUBING
	DISCONNECT SWITH	(E)	EXISTING
		(F)	FUTURE
	GROUND ROD	GEN	GENERATOR
	GROUND ROD WITH ACCESS	GFI	GROUND FAULT CIRCUIT INTERRUPTER
	MECHANICAL GROUND CONN.	GND	GROUND
		GPS	GLOBAL POSITIONING SYSTEM
	GROUND ACCESS WELL	GR	GROWTH
		IGR	INTERIOR GROUND RING (HALO)
G	GROUNDING WIRE	MIGB	MASTER ISOLATED GROUND BAR
		(P)	PROPOSED, NEW (PROVIDE AND INSTALL UNLESS NOTED OTHERWISE)
G	GENERATOR	PCS	PERSONAL COMMUNICATION SERVICE
	FUSE	PPC	POWER PROTECTION CABINET
	GROUND BUS BAR	PRC	PRIMARY RADIO CABINET
		PVC	POLYVINYL CHLORIDE CONDUIT
	REVISION	RGS	RIGID GALVANIZED STEEL
T	TELEPHONE BOX	RWY	RACEWAY
		S.L.D.	SINGLE LINE DIAGRAM
M	UTILITY METER	TEL	TELEPHONE
		TYP.	TYPICAL
	XIT GROUND ROD	WP	WEATHERPROOF EQUIPMENT

1 G-1 ELEC. / GROUNDING LEGEND

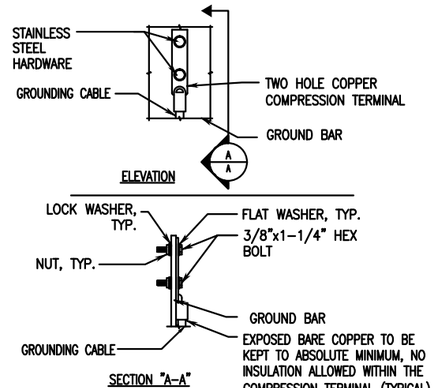
SCALE: N.T.S.



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

2 G-1 TYP. ANTENNA CABLE GROUNDING

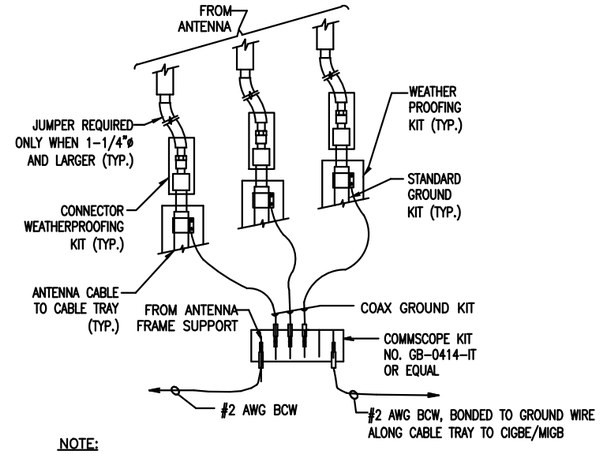
SCALE: N.T.S.



NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.
4. ALL GROUND LUGS MUST BE HEAT SHRUNK AT WIRE/LUG CONNECTION

3 G-1 TYP. GROUND BAR CONNECTION

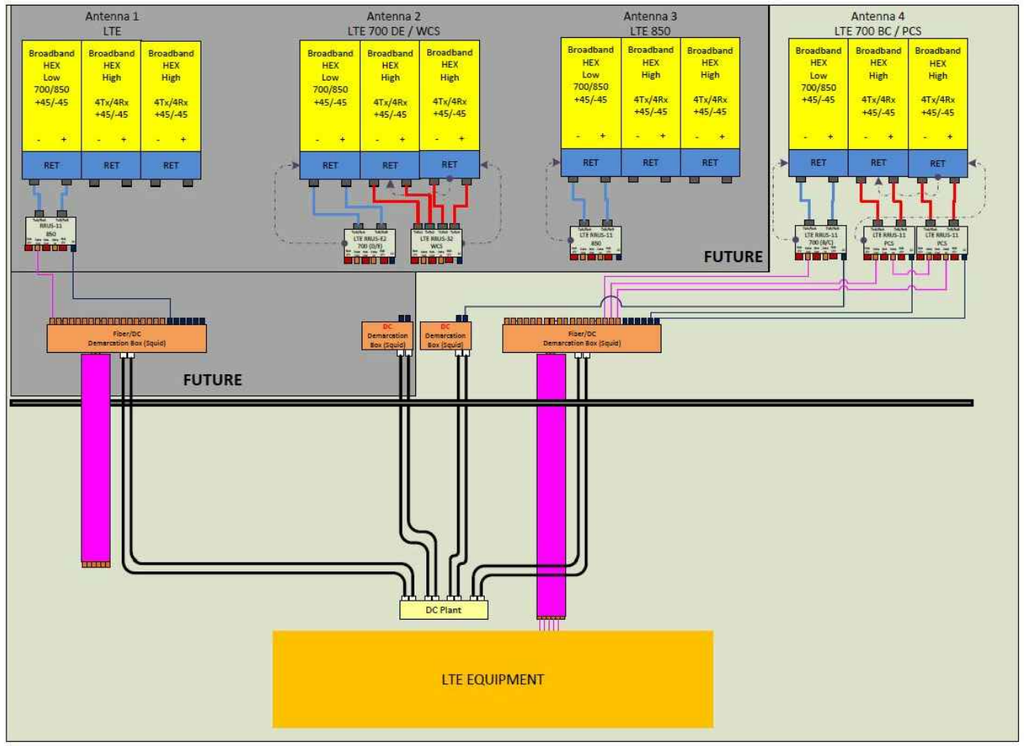
SCALE: N.T.S.



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

4 G-1 TYP. GROUND WIRE TO GROUND BAR CONN.

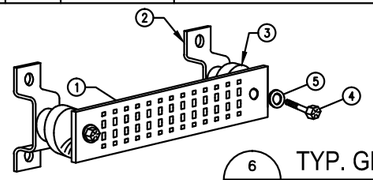
SCALE: N.T.S.



5 G-1 ONE LINE PLUMBING DIAGRAM

SCALE: N.T.S.

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
1	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
2	2	———	WALL MTG. BRKT.
3	2	———	INSULATORS
4	4	———	5/8"-11x1" H.H.C.S.
5	4	———	5/8 LOCKWASHER



6 G-1 TYP. GROUND BAR CONN.

SCALE: N.T.S.

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

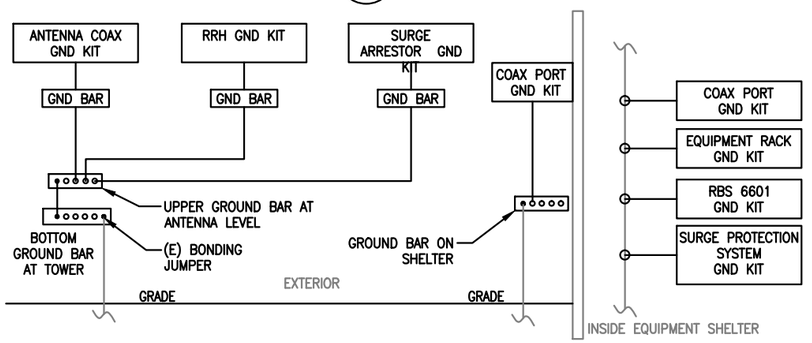
SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLY RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

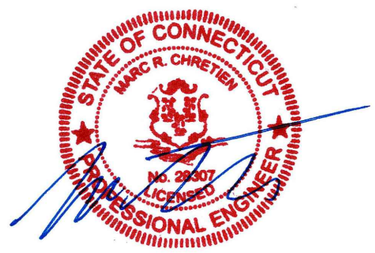
INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

GROUNDING NOTES:
ALL GROUNDING SHALL BE DONE IN ACCORDANCE WITH THE AT&T MOBILITY GROUNDING GUIDE.



7 G-1 ONE LINE GROUNDING DIAGRAM

SCALE: N.T.S.



ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development - Surveying - Telecommunications
500 North Broadway
East Providence, RI 02914
Phone: (401) 354-2403
Fax: (401) 633-6354

CENTERLINE COMMUNICATIONS
95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767

SITE NUMBER: CT1304
SITE NAME: TORRINGTON WRIGHT ROAD
136 WRIGHT ROAD
TORRINGTON, CT 06757
LITCHFIELD COUNTY

at&t
550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681

NO.	DATE	REVISIONS	BY	CHK
0	03/01/17	ISSUED FOR REVIEW	AAB	MRC
1	03/16/17	REVISION	AAB	MRC
2	04/05/17	REVISION	AAB	MRC

GROUNDING DETAILS AND ONE LINE DIAGRAM

SHEET NO. **G-1**

March 27, 2017

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

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1304
	Carrier Site Name:	Torrington Wright Road
Crown Castle Designation:	**Crown Castle BU Number:**	876373
	Crown Castle Site Name:	Long Eddy / Wright Property
	Crown Castle JDE Job Number:	427346
	Crown Castle Work Order Number:	1381942
	Crown Castle Application Number:	378332 Rev. 2
Engineering Firm Designation:	**B+T Group Project Number:**	89028.006.01
Site Data:	**136 Wright Rd., Torrington, Litchfield County, CT** **Latitude *41° 49' 38.34"*, Longitude *-73° 10' 13.97"*** **148 Foot - Monopole Tower**	

Dear Charles McGuirt,

B+T Group 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 1016487, in accordance with application 378332, 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 + SLA Equipment + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 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 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

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

We at *B+T Group* 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:
B+T Engineering, Inc.

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

John Landon
Project Engineer

Scott S. Vance, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2018

3/27/17

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft. Monopole tower designed by Summit manufacturing in June of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.This tower has been modified by B+T Group in February of 2014 and those modifications are incorporated in our Analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 40 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	128.0	3	CCI Antennas	HPA-65R-BUU-H8	5 1	3/4 3/8	--
		9	Ericsson	RRU-11			
		2	Raycap	DC6-48-60-18-8F			
		1	--	Sector Mount [SM 406-3]			

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
149.0	149.0	3	Alcatel Lucent	TME-1900MHz RRH (65MHz)	--	--	1
		3	Alcatel Lucent	TME-800MHZ RRH			
		1	--	Pipe Mount [PM 601-3]			
148.0	149.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4	1
		9	Rfs Celwave	ACU-A20-N			
		3	Rfs Celwave	APXVSPP18-C-A20			
	148.0	1	--	Platform Mount [LP 712-1]			
138.0	138.0	1	Antel	BXA-171063-8BF-2	18	1-5/8	1
		2	Antel	BXA-171085-8BF-EDIN-2			
		3	Antel	BXA-70063-6CF-2			
		2	Antel	LPA-80063/6CF			
		4	Antel	LPA-80080/6CF			
		1	--	Platform Mount [LP 712-1]			
128.0	128.0	12	CCI Antennas	HPA-65R-BUU-H8	8 3 2	3/4 5/16 3/8	2
		3	Ericsson	KRF 102 361/1			
		9	Ericsson	RRU-11			
		6	Ericsson	RRUS 12-B2			
		6	Ericsson	RRUS A2			
		3	Ericsson	RRUS E2 B29			
		3	Ericsson	RRUS-32 B30			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		4	Raycap	DC6-48-60-18-8F			
79.0	84.0	1	Rfs Celwave	PD1109E	1	1/2	1
	79.0	1	--	Side Arm Mount [SO 701-1]			
45.0	45.0	1	Gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			
13.0	13.0	1	Gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) SLA Equipment; Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148	148	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
140	140	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
130	130	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
120	120	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
76	76	1	Generic	GPS Antenna	--	--
		1	Generic	GPS Stand-on Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	AT&T Mobility Co-locate, Revision# 2	378332	CCI Sites
Tower Manufacturer Drawing	Summit, Date: 06/23/2000	1631601	CCI Sites
Tower Modification Drawing	B+T Group, Project No. 89028.003.01	4491592	CCI Sites
Post Modification Inspection	TEP, Project No. 52429.14747	5215998	CCI Sites
Foundation Drawing	Summit, Job No. 10185	1634518	CCI Sites
Geotech Report	Clerence Welti Assoc., Inc., Date: 05/12/2000	1531964	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 03/06/2017	CCI Sites

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) Mount areas and weights are assumed based on photographs provided.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group 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	148 - 116.5	Pole	TP29.48x24x0.219	1	-11.599	1273.620	35.3	Pass
L2	116.5 - 98.5	Pole	TP32.175x28.39x0.25	2	-14.888	1751.620	58.2	Pass
L3	98.5 - 80.25	Pole	TP35.35x32.175x0.434	3	-17.904	2235.790	60.3	Pass
L4	80.25 - 70.5	Pole	TP36.547x34.067x0.487	4	-22.445	2653.470	63.4	Pass
L5	70.5 - 39.75	Pole	TP41.9x36.547x0.591	5	-30.635	3874.320	56.6	Pass
L6	39.75 - 31.75	Pole	TP42.666x40.361x0.643	6	-37.154	4394.700	56.3	Pass
L7	31.75 - 17.75	Pole	TP45.102x42.666x0.626	7	-42.513	4539.090	59.7	Pass
L8	17.75 - 14.25	Pole	TP45.711x45.102x0.728	8	-44.114	4902.000	56.7	Pass
L9	14.25 - 0	Pole	TP48.19x45.711x0.619	9	-50.195	4669.620	64.0	Pass
							Summary	
						Pole (L9)	64.0	Pass
						Rating =	64.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rod Bracket	Base	77.4	Pass
1	Anchor Rods	Base	50.9	Pass
1	Base Plate	Base	49.5	Pass
1	Base Foundation(Structure)	Base	48.7	Pass
1	Base Foundation (Soil Interaction)	Base	76.9	Pass

Structure Rating (max from all components) =	**77.4%**

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

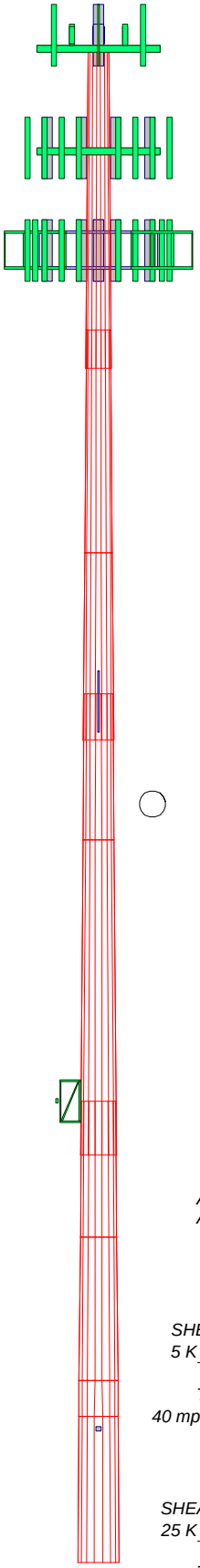
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	31.500	18	0.219	3.750	24.000	29.480	A607-60	2.0
2	21.750	18	0.250		28.390	32.175		1.8
3	18.250	18	0.434	4.500	32.175	35.350	A607-65	2.7
4	14.250	18	0.487		34.067	36.547	41.599417ksi	2.5
5	30.750	18	0.591	5.250	36.547	41.900	41.661197ksi	7.2
6	13.250	18	0.643		40.361	42.666	44.711572ksi	3.6
7	14.000	18	0.626		42.666	45.102	44.81049ksi	3.9
8	3.500	18	0.728		45.102	45.711	44.910822ksi	1.2
9	14.250	18	0.619		45.711	48.190	43.725232ksi	4.5



ALL REACTIONS ARE FACTORED

AXIAL 88 K
SHEAR 5 K
MOMENT 571 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 0.750 in ICE

AXIAL 50 K
SHEAR 25 K
MOMENT 2859 kip-ft
TORQUE 1 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Top Hat (E)	149.5	(3) RRU-11 (P)	128
TME-1900MHz RRH (65MHz) (E)	149	(3) RRU-11 (P)	128
TME-1900MHz RRH (65MHz) (E)	149	(2) DC6-48-60-18-8F (P)	128
TME-1900MHz RRH (65MHz) (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (ATI--SLA)	128
TME-800MHZ RRH (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (SLA)	128
TME-800MHZ RRH (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (SLA)	128
TME-800MHZ RRH (E)	149	RRUS E2 B29 (SLA)	128
Pipe Mount [PM 601-3] (E)	149	RRUS E2 B29 (SLA)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	RRUS E2 B29 (SLA)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	(3) RRU-11 (SLA)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	(3) RRU-11 (SLA)	128
(3) ACU-A20-N (E)	148	(3) RRU-11 (SLA)	128
(3) ACU-A20-N (E)	148	RRUS-32 B30 (SLA)	128
(3) ACU-A20-N (E)	148	RRUS-32 B30 (SLA)	128
800 EXTERNAL NOTCH FILTER (E)	148	RRUS-32 B30 (SLA)	128
800 EXTERNAL NOTCH FILTER (E)	148	DC6-48-60-18-8F (SLA)	128
800 EXTERNAL NOTCH FILTER (E)	148	(2) DC6-48-60-18-8F (SLA)	128
(2) 6' x 2" Mount Pipe (E)	148	DC6-48-60-18-8F (SLA)	128
(2) 6' x 2" Mount Pipe (E)	148	(2) RRUS 12-B2 (SLA)	128
(2) 6' x 2" Mount Pipe (E)	148	(2) RRUS 12-B2 (SLA)	128
Platform Mount [LP 712-1] (E-12'/TIA)	148	(2) RRUS 12-B2 (SLA)	128
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	(2) RRUS A2 (SLA)	128
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	(2) RRUS A2 (SLA)	128
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	(2) RRUS A2 (SLA)	128
BXA-171085-8BF-EDIN-2 w/ Mount Pipe (E)	138	KRF 102 361/1 (SLA)	128
BXA-171085-8BF-EDIN-2 w/ Mount Pipe (E)	138	KRF 102 361/1 (SLA)	128
BXA-171063-8BF-2 w/ Mount Pipe (E)	138	KRF 102 361/1 (SLA)	128
(2) LPA-80063/6CF w/ Mount Pipe (E)	138	Sector Mount [SM 406-3] (P)	128
(2) LPA-80080/6CF w/ Mount Pipe (E)	138	PD1109E (E)	79
(2) LPA-80080/6CF w/ Mount Pipe (E)	138	Side Arm Mount [SO 701-1] (E)	79
Platform Mount [LP 712-1] (E)	138	GPS_A (E)	45
HPA-65R-BUU-H8 w/ Mount Pipe (ATI--P)	128	Side Arm Mount [SO 701-1] (E)	45
HPA-65R-BUU-H8 w/ Mount Pipe (P)	128	GPS_A (E-CL/TIA)	13
HPA-65R-BUU-H8 w/ Mount Pipe (P)	128	Side Arm Mount [SO 701-1] (E-Mount Ht./TIA)	13
(3) RRU-11 (P)	128		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	44.81049ksi	45 ksi	60 ksi
A607-65	65 ksi	80 ksi	44.910822ksi	45 ksi	60 ksi
41.599417ksi	42 ksi	57 ksi	41.277494ksi	41 ksi	56 ksi
41.661197ksi	42 ksi	57 ksi	43.725232ksi	44 ksi	59 ksi
44.711572ksi	45 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 64%

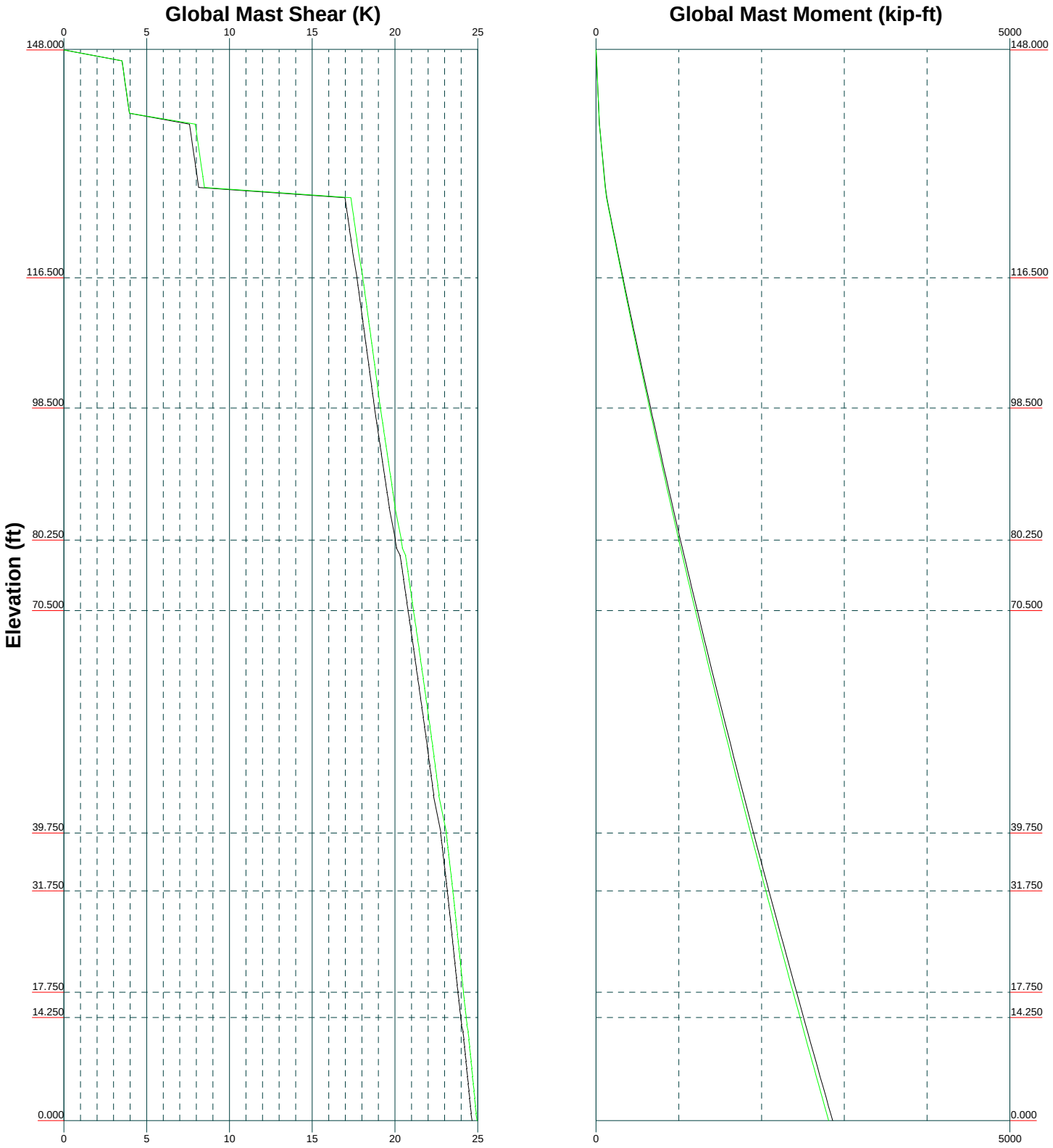
B+T Group
1717 S.Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	**89028.006.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637**		
Project:			
Client: Crown Castle	Drawn by: Pavan Pai	App'd:	
Code: TIA-222-G	Date: 03/23/17	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-G - 93 mph/40 mph 0.750 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



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Phone: (918) 587-4630
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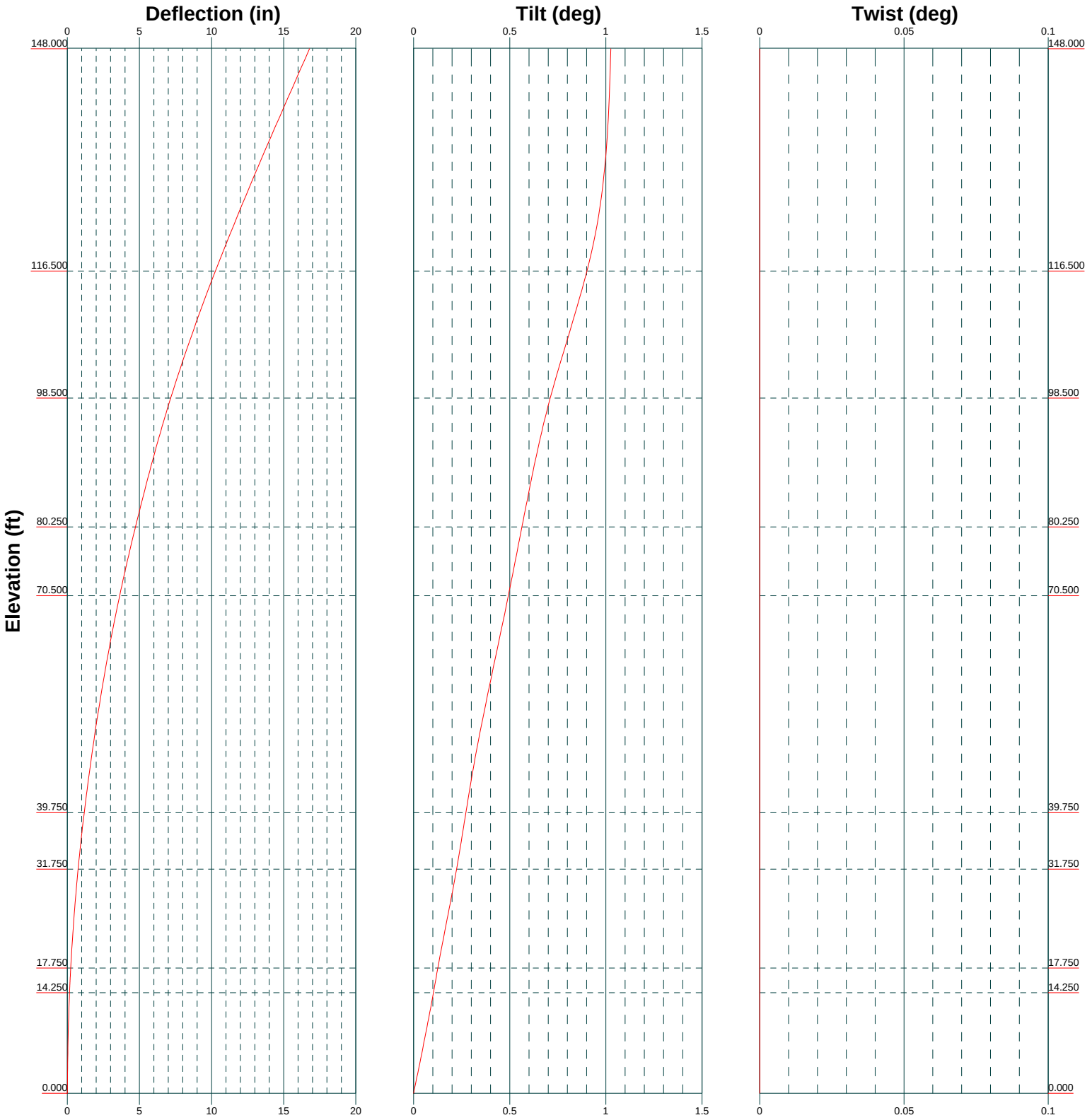
Job: 89028.006.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637		
Project:		
Client: Crown Castle	Drawn by: Pavan Pai	App'd:
Code: TIA-222-G	Date: 03/23/17	Scale: NTS
Path:		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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Phone: (918) 587-4630
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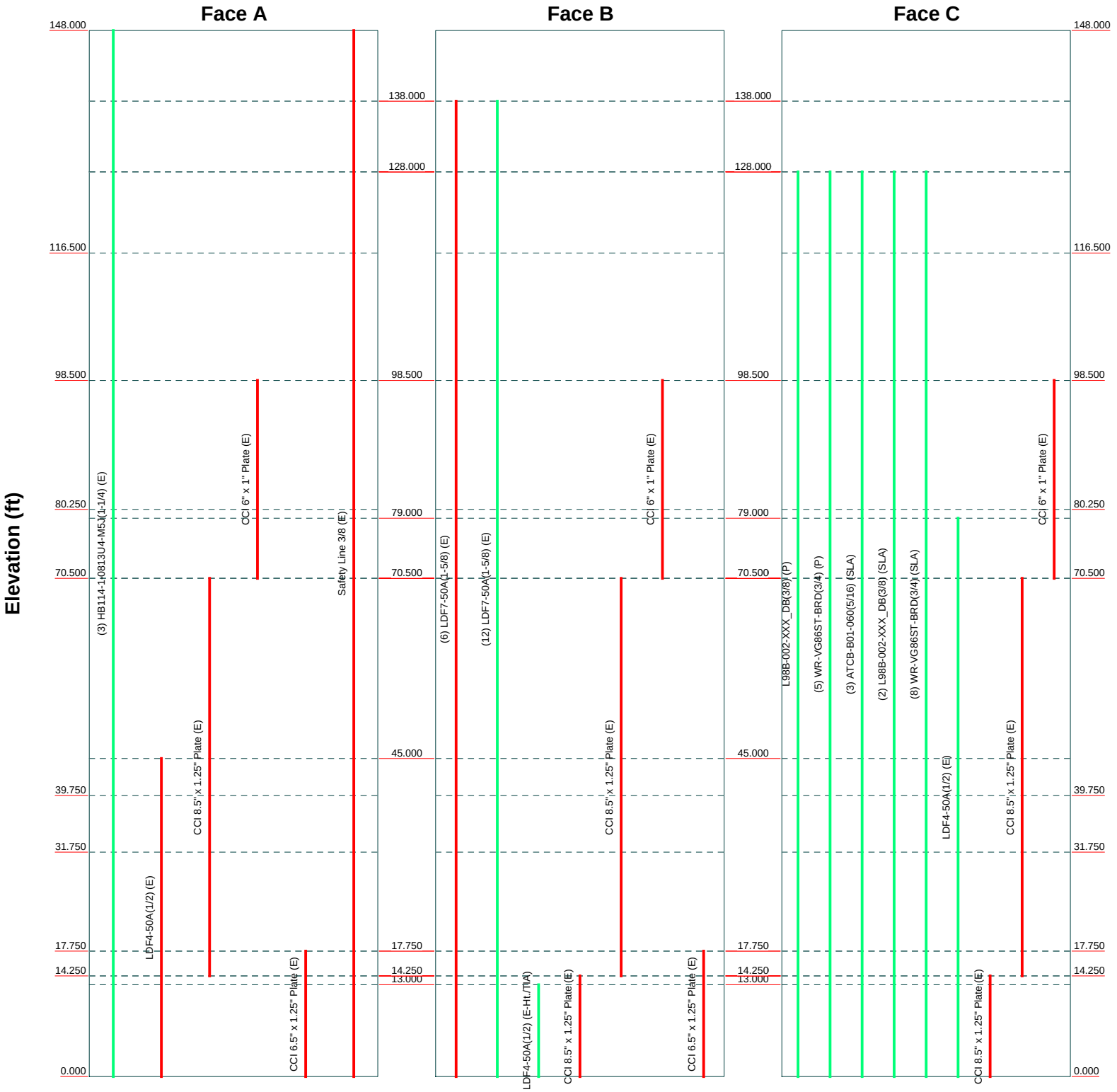
Job: 89028.006.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637			
Project:			
Client: Crown Castle	Drawn by: Pavan Pai	App'd:	
Code: TIA-222-G	Date: 03/23/17	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 148'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T Group
1717 S.Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***89028.006.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637***		
Project:			
Client: Crown Castle	Drawn by: Pavan Pai	App'd:	
Code: TIA-222-G	Date: 03/23/17	Scale: NTS	
Path:		Dwg No. E-7	

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Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	148.000-116.500	31.500	3.750	18	24.000	29.480	0.219	0.875	A607-60 (60 ksi)
L2	116.500-98.500	21.750	0.000	18	28.390	32.175	0.250	1.000	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	98.500-80.250	18.250	4.500	18	32.175	35.350	0.434	1.736	41.599417ksi (42 ksi)
L4	80.250-70.500	14.250	0.000	18	34.067	36.547	0.487	1.947	41.661197ksi (42 ksi)
L5	70.500-39.750	30.750	5.250	18	36.547	41.900	0.591	2.365	44.711572ksi (45 ksi)
L6	39.750-31.750	13.250	0.000	18	40.361	42.666	0.643	2.573	44.81049ksi (45 ksi)
L7	31.750-17.750	14.000	0.000	18	42.666	45.102	0.626	2.506	44.910822ksi (45 ksi)
L8	17.750-14.250	3.500	0.000	18	45.102	45.711	0.728	2.911	41.277494ksi (41 ksi)
L9	14.250-0.000	14.250		18	45.711	48.190	0.619	2.475	43.725232ksi (44 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.370	16.512	1179.768	8.442	12.192	96.766	2361.088	8.257	3.839	17.55
	29.935	20.316	2197.713	10.388	14.976	146.751	4398.319	10.160	4.803	21.959
L2	29.491	22.329	2233.892	9.990	14.422	154.893	4470.723	11.167	4.557	18.227
	32.671	25.332	3261.812	11.333	16.345	199.564	6527.916	12.668	5.223	20.891
L3	32.671	43.726	5565.479	11.268	16.345	340.507	11138.281	21.867	4.899	11.287
	35.895	48.100	7408.540	12.395	17.958	412.553	14826.827	24.055	5.458	12.575
L4	35.388	51.890	7392.471	11.921	17.306	427.161	14794.670	25.950	5.139	10.555
	37.111	55.723	9154.622	12.802	18.566	493.082	18321.290	27.867	5.575	11.452
L5	37.111	67.480	11022.014	12.764	18.566	593.663	22058.531	33.747	5.392	9.119
	42.546	77.526	16713.430	14.665	21.285	785.214	33448.852	38.770	6.334	10.712
L6	41.911	81.096	16162.580	14.100	20.503	788.285	32346.427	40.556	5.971	9.282
	43.325	85.803	19143.219	14.918	21.674	883.214	38311.628	42.910	6.377	9.913
L7	43.325	83.582	18662.634	14.924	21.674	861.042	37349.825	41.799	6.407	10.228
	45.798	88.424	22097.930	15.789	22.912	964.478	44224.937	44.221	6.836	10.913
L8	45.798	102.493	25497.284	15.753	22.912	1112.845	51028.117	51.256	6.657	9.148
	46.416	103.899	26561.387	15.969	23.221	1143.846	53157.724	51.960	6.764	9.295
L9	46.416	88.564	22750.786	16.008	23.221	979.745	45531.507	44.291	6.956	11.241
	48.933	93.434	26713.350	16.888	24.481	1091.208	53461.849	46.726	7.392	11.946

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 148.000-116.500				1	1	1			
L2 116.500-98.500				1	1	1			
L3 98.500-80.250				1	1	0.962717			
L4 80.250-70.500				1	1	0.968696			
L5 70.500-39.750				1	1	0.953422			

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
L6 39.750-31.750				1	1	0.958861			
L7 31.750-17.750				1	1	0.963264			
L8 17.750-14.250				1	1	0.983373			
L9 14.250-0.000				1	1	1.01129			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
/>									
LDF7-50A(1-5/8) (E)	B	Surface Ar (CaAa)	138.000 - 0.000	6	6	-0.350 -0.200	1.980		0.001
/>									
LDF4-50A(1/2) (E)	A	Surface Ar (CaAa)	45.000 - 0.000	1	1	-0.210 -0.200	0.630		0.000
/>									
CCI 8.5" x 1.25" Plate (E)	B	Surface Af (CaAa)	14.250 - 0.000	1	1	0.000 0.000	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate (E)	C	Surface Af (CaAa)	14.250 - 0.000	1	1	0.000 0.000	8.500	19.500	0.000
/>									
CCI 8.5" x 1.25" Plate (E)	A	Surface Af (CaAa)	70.500 - 14.250	1	1	0.000 0.000	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate (E)	B	Surface Af (CaAa)	70.500 - 14.250	1	1	0.000 0.000	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate (E)	C	Surface Af (CaAa)	70.500 - 14.250	1	1	0.000 0.000	8.500	19.500	0.000
/>									
CCI 6" x 1" Plate (E)	A	Surface Af (CaAa)	98.500 - 70.500	1	1	0.000 0.000	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	B	Surface Af (CaAa)	98.500 - 70.500	1	1	0.000 0.000	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	98.500 - 70.500	1	1	0.000 0.000	6.000	14.000	0.000
/>									
CCI 6.5" x 1.25" Plate (E)	A	Surface Af (CaAa)	17.750 - 0.000	1	1	0.000 0.000	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (E)	B	Surface Af (CaAa)	17.750 - 0.000	1	1	0.000 0.000	6.500	15.500	0.000
/>									
Safety Line 3/8 (E)	A	Surface Ar (CaAa)	148.000 - 0.000	1	1	-0.210 -0.200	0.375		0.000
/>									

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 klf
HB114-1-0813U4-M5J(1-1/4) (E)	A	No	Inside Pole	148.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8) (E)	B	No	Inside Pole	138.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
/>								
L98B-002-XXX_DB(3/8) (P)	C	No	Inside Pole	128.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (P)	C	No	Inside Pole	128.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
ATCB-B01-060(5/16) (SLA)	C	No	Inside Pole	128.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
L98B-002-XXX_DB(3/8) (SLA)	C	No	Inside Pole	128.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (SLA)	C	No	Inside Pole	128.000 - 0.000	8	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
/>								
LDF4-50A(1/2) (E)	C	No	Inside Pole	79.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
/>								
LDF4-50A(1/2) (E-Ht./TIA)	B	No	Inside Pole	13.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
/>								

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	148.000-116.500	A	0.000	0.000	1.181	0.000	0.120
		B	0.000	0.000	25.542	0.000	0.317
		C	0.000	0.000	0.000	0.000	0.092
L2	116.500-98.500	A	0.000	0.000	0.675	0.000	0.069
		B	0.000	0.000	21.384	0.000	0.266
		C	0.000	0.000	0.000	0.000	0.144
L3	98.500-80.250	A	0.000	0.000	18.934	0.000	0.070
		B	0.000	0.000	39.931	0.000	0.269
		C	0.000	0.000	18.250	0.000	0.146
L4	80.250-70.500	A	0.000	0.000	10.116	0.000	0.037
		B	0.000	0.000	21.333	0.000	0.144
		C	0.000	0.000	9.750	0.000	0.079
L5	70.500-39.750	A	0.000	0.000	45.046	0.000	0.118
		B	0.000	0.000	80.094	0.000	0.454
		C	0.000	0.000	43.563	0.000	0.250
L6	39.750-31.750	A	0.000	0.000	12.137	0.000	0.032
		B	0.000	0.000	20.837	0.000	0.118
		C	0.000	0.000	11.333	0.000	0.065
L7	31.750-17.750	A	0.000	0.000	21.240	0.000	0.056
		B	0.000	0.000	36.465	0.000	0.207
		C	0.000	0.000	19.833	0.000	0.114

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
L8	17.750-14.250	A	0.000	0.000	9.102	0.000	0.014
		B	0.000	0.000	12.908	0.000	0.052
		C	0.000	0.000	4.958	0.000	0.028
L9	14.250-0.000	A	0.000	0.000	16.870	0.000	0.057
		B	0.000	0.000	52.554	0.000	0.212
		C	0.000	0.000	20.188	0.000	0.116

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	148.000-116.500	A	1.723	0.000	0.000	12.035	0.000	0.259
		B		0.000	0.000	41.188	0.000	0.805
		C		0.000	0.000	0.000	0.000	0.092
L2	116.500-98.500	A	1.688	0.000	0.000	6.877	0.000	0.148
		B		0.000	0.000	34.483	0.000	0.674
		C		0.000	0.000	0.000	0.000	0.144
L3	98.500-80.250	A	1.657	0.000	0.000	31.030	0.000	0.383
		B		0.000	0.000	58.958	0.000	0.905
		C		0.000	0.000	24.298	0.000	0.384
L4	80.250-70.500	A	1.629	0.000	0.000	16.577	0.000	0.205
		B		0.000	0.000	31.498	0.000	0.483
		C		0.000	0.000	12.981	0.000	0.207
L5	70.500-39.750	A	1.579	0.000	0.000	66.124	0.000	0.738
		B		0.000	0.000	111.074	0.000	1.570
		C		0.000	0.000	53.272	0.000	0.731
L6	39.750-31.750	A	1.512	0.000	0.000	19.716	0.000	0.221
		B		0.000	0.000	28.897	0.000	0.408
		C		0.000	0.000	13.860	0.000	0.190
L7	31.750-17.750	A	1.457	0.000	0.000	33.480	0.000	0.352
		B		0.000	0.000	49.803	0.000	0.671
		C		0.000	0.000	23.913	0.000	0.312
L8	17.750-14.250	A	1.395	0.000	0.000	12.976	0.000	0.123
		B		0.000	0.000	17.090	0.000	0.202
		C		0.000	0.000	5.935	0.000	0.076
L9	14.250-0.000	A	1.286	0.000	0.000	27.778	0.000	0.282
		B		0.000	0.000	65.256	0.000	0.768
		C		0.000	0.000	20.497	0.000	0.290

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.000-116.500	0.397	-0.863	0.193	-0.942
L2	116.500-98.500	0.538	-1.134	0.354	-1.212
L3	98.500-80.250	0.318	-0.670	0.227	-0.766
L4	80.250-70.500	0.327	-0.690	0.235	-0.795
L5	70.500-39.750	0.288	-0.622	0.198	-0.753
L6	39.750-31.750	0.267	-0.645	0.067	-0.780
L7	31.750-17.750	0.274	-0.662	0.085	-0.802
L8	17.750-14.250	0.227	-1.095	0.078	-1.198
L9	14.250-0.000	0.984	-0.857	0.699	-1.092

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	LDF7-50A(1-5/8)	116.50 - 138.00	1.0000	1.0000
L1	32	Safety Line 3/8	116.50 - 148.00	1.0000	1.0000
L3	3	LDF7-50A(1-5/8)	80.25 - 98.50	1.0000	1.0000
L3	25	CCI 6" x 1" Plate	80.25 - 98.50	1.0000	1.0000
L3	26	CCI 6" x 1" Plate	80.25 - 98.50	1.0000	1.0000
L3	27	CCI 6" x 1" Plate	80.25 - 98.50	1.0000	1.0000
L3	32	Safety Line 3/8	80.25 - 98.50	1.0000	1.0000
L5	3	LDF7-50A(1-5/8)	39.75 - 70.50	1.0000	1.0000
L5	14	LDF4-50A(1/2)	39.75 - 45.00	1.0000	1.0000
L5	21	CCI 8.5" x 1.25" Plate	39.75 - 70.50	1.0000	1.0000
L5	22	CCI 8.5" x 1.25" Plate	39.75 - 70.50	1.0000	1.0000
L5	23	CCI 8.5" x 1.25" Plate	39.75 - 70.50	1.0000	1.0000
L5	32	Safety Line 3/8	39.75 - 70.50	1.0000	1.0000
L7	3	LDF7-50A(1-5/8)	17.75 - 31.75	1.0000	1.0000
L7	14	LDF4-50A(1/2)	17.75 - 31.75	1.0000	1.0000
L7	21	CCI 8.5" x 1.25" Plate	17.75 - 31.75	1.0000	1.0000
L7	22	CCI 8.5" x 1.25" Plate	17.75 - 31.75	1.0000	1.0000
L7	23	CCI 8.5" x 1.25" Plate	17.75 - 31.75	1.0000	1.0000
L7	32	Safety Line 3/8	17.75 - 31.75	1.0000	1.0000
L8	3	LDF7-50A(1-5/8)	14.25 - 17.75	1.0000	1.0000
L8	14	LDF4-50A(1/2)	14.25 - 17.75	1.0000	1.0000
L8	21	CCI 8.5" x 1.25" Plate	14.25 - 17.75	1.0000	1.0000
L8	22	CCI 8.5" x 1.25" Plate	14.25 - 17.75	1.0000	1.0000
L8	23	CCI 8.5" x 1.25" Plate	14.25 - 17.75	1.0000	1.0000
L8	29	CCI 6.5" x 1.25" Plate	14.25 - 17.75	1.0000	1.0000
L8	30	CCI 6.5" x 1.25" Plate	14.25 - 17.75	1.0000	1.0000
L8	32	Safety Line 3/8	14.25 - 17.75	1.0000	1.0000
L9	3	LDF7-50A(1-5/8)	0.00 - 14.25	1.0000	1.0000
L9	14	LDF4-50A(1/2)	0.00 - 14.25	1.0000	1.0000
L9	18	CCI 8.5" x 1.25" Plate	0.00 - 14.25	1.0000	1.0000
L9	19	CCI 8.5" x 1.25" Plate	0.00 - 14.25	1.0000	1.0000
L9	29	CCI 6.5" x 1.25" Plate	0.00 - 14.25	1.0000	1.0000
L9	30	CCI 6.5" x 1.25" Plate	0.00 - 14.25	1.0000	1.0000
L9	32	Safety Line 3/8	0.00 - 14.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Top Hat	C	None		0.000	149.500	No Ice	3.000	3.000	0.081

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
(E)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
/>									
TME-1900MHz RRH	A	From Leg	2.000	0.000	149.000	No Ice	2.313	2.375	0.060
(65MHz)			0.000			1/2" Ice	2.517	2.581	0.084
(E)			0.000			1" Ice	2.728	2.794	0.111
TME-1900MHz RRH	B	From Leg	2.000	0.000	149.000	No Ice	2.313	2.375	0.060
(65MHz)			0.000			1/2" Ice	2.517	2.581	0.084
(E)			0.000			1" Ice	2.728	2.794	0.111
TME-1900MHz RRH	C	From Leg	2.000	0.000	149.000	No Ice	2.313	2.375	0.060
(65MHz)			0.000			1/2" Ice	2.517	2.581	0.084
(E)			0.000			1" Ice	2.728	2.794	0.111
TME-800MHZ RRH	A	From Leg	2.000	0.000	149.000	No Ice	2.134	1.773	0.053
(E)			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
TME-800MHZ RRH	B	From Leg	2.000	0.000	149.000	No Ice	2.134	1.773	0.053
(E)			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
TME-800MHZ RRH	C	From Leg	2.000	0.000	149.000	No Ice	2.134	1.773	0.053
(E)			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
Pipe Mount [PM 601-3]	C	None		0.000	149.000	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
/>									
APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	148.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(E)			1.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	148.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(E)			1.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	148.000	No Ice	8.262	6.946	0.083
Mount Pipe			0.000			1/2" Ice	8.822	8.127	0.151
(E)			1.000			1" Ice	9.346	9.021	0.227
(3) ACU-A20-N	A	From Leg	4.000	0.000	148.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
(3) ACU-A20-N	B	From Leg	4.000	0.000	148.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
(3) ACU-A20-N	C	From Leg	4.000	0.000	148.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
800 EXTERNAL NOTCH	A	From Leg	4.000	0.000	148.000	No Ice	0.660	0.321	0.011
FILTER			0.000			1/2" Ice	0.763	0.398	0.017
(E)			1.000			1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH	B	From Leg	4.000	0.000	148.000	No Ice	0.660	0.321	0.011
FILTER			0.000			1/2" Ice	0.763	0.398	0.017
(E)			1.000			1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH	C	From Leg	4.000	0.000	148.000	No Ice	0.660	0.321	0.011
FILTER			0.000			1/2" Ice	0.763	0.398	0.017
(E)			1.000			1" Ice	0.873	0.483	0.024
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	148.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			1.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	148.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033

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
			1.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	148.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			1.000			1" Ice	2.294	2.294	0.048
Platform Mount [LP 712-1]	C	None		0.000	148.000	No Ice	24.530	24.530	1.335
(E-12'/TIA)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
/>									
BXA-70063-6CF-2 w/ Mount	A	From Leg	4.000	0.000	138.000	No Ice	7.806	5.801	0.042
Pipe			0.000			1/2" Ice	8.357	6.953	0.103
(E)			0.000			1" Ice	8.872	7.819	0.171
BXA-70063-6CF-2 w/ Mount	B	From Leg	4.000	0.000	138.000	No Ice	7.806	5.801	0.042
Pipe			0.000			1/2" Ice	8.357	6.953	0.103
(E)			0.000			1" Ice	8.872	7.819	0.171
BXA-70063-6CF-2 w/ Mount	C	From Leg	4.000	0.000	138.000	No Ice	7.806	5.801	0.042
Pipe			0.000			1/2" Ice	8.357	6.953	0.103
(E)			0.000			1" Ice	8.872	7.819	0.171
BXA-171085-8BF-EDIN-2	A	From Leg	4.000	0.000	138.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			0.000			1" Ice	3.930	4.595	0.099
BXA-171085-8BF-EDIN-2	B	From Leg	4.000	0.000	138.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			0.000			1" Ice	3.930	4.595	0.099
BXA-171063-8BF-2 w/	C	From Leg	4.000	0.000	138.000	No Ice	3.179	3.353	0.029
Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			0.000			1" Ice	3.930	4.595	0.099
(2) LPA-80063/6CF w/	A	From Leg	4.000	0.000	138.000	No Ice	9.831	10.215	0.052
Mount Pipe			0.000			1/2" Ice	10.400	11.384	0.145
(E)			0.000			1" Ice	10.933	12.269	0.246
(2) LPA-80080/6CF w/	B	From Leg	4.000	0.000	138.000	No Ice	4.564	10.259	0.046
Mount Pipe			0.000			1/2" Ice	5.105	11.427	0.113
(E)			0.000			1" Ice	5.612	12.312	0.187
(2) LPA-80080/6CF w/	C	From Leg	4.000	0.000	138.000	No Ice	4.564	10.259	0.046
Mount Pipe			0.000			1/2" Ice	5.105	11.427	0.113
(E)			0.000			1" Ice	5.612	12.312	0.187
Platform Mount [LP 712-1]	C	None		0.000	138.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
/>									
HPA-65R-BUU-H8 w/	A	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
Mount Pipe			0.000			1/2" Ice	13.899	11.052	0.196
(AT&T--P)			0.000			1" Ice	14.587	12.496	0.303
HPA-65R-BUU-H8 w/	B	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
Mount Pipe			0.000			1/2" Ice	13.899	11.052	0.196
(P)			0.000			1" Ice	14.587	12.496	0.303
HPA-65R-BUU-H8 w/	C	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
Mount Pipe			0.000			1/2" Ice	13.899	11.052	0.196
(P)			0.000			1" Ice	14.587	12.496	0.303
(3) RRU-11	A	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(P)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078
(3) RRU-11	B	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(P)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078
(3) RRU-11	C	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(P)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) DC6-48-60-18-8F	B	From Leg	4.000	0.000	128.000	No Ice	0.917	0.917	0.019
(P)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
(4) HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
(AT&T--SLA)			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
(4) HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
(SLA)			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
(4) HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.000	0.000	128.000	No Ice	13.213	9.582	0.100
(SLA)			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
RRUS E2 B29	A	From Leg	4.000	0.000	128.000	No Ice	3.145	1.285	0.060
(SLA)			0.000			1/2" Ice	3.365	1.438	0.083
			0.000			1" Ice	3.592	1.600	0.110
RRUS E2 B29	B	From Leg	4.000	0.000	128.000	No Ice	3.145	1.285	0.060
(SLA)			0.000			1/2" Ice	3.365	1.438	0.083
			0.000			1" Ice	3.592	1.600	0.110
RRUS E2 B29	C	From Leg	4.000	0.000	128.000	No Ice	3.145	1.285	0.060
(SLA)			0.000			1/2" Ice	3.365	1.438	0.083
			0.000			1" Ice	3.592	1.600	0.110
(3) RRU-11	A	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(SLA)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078
(3) RRU-11	B	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(SLA)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078
(3) RRU-11	C	From Leg	4.000	0.000	128.000	No Ice	1.639	1.262	0.044
(SLA)			0.000			1/2" Ice	1.802	1.410	0.060
			0.000			1" Ice	1.972	1.566	0.078
RRUS-32 B30	A	From Leg	4.000	0.000	128.000	No Ice	3.314	2.424	0.077
(SLA)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
RRUS-32 B30	B	From Leg	4.000	0.000	128.000	No Ice	3.314	2.424	0.077
(SLA)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
RRUS-32 B30	C	From Leg	4.000	0.000	128.000	No Ice	3.314	2.424	0.077
(SLA)			0.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
DC6-48-60-18-8F	A	From Leg	4.000	0.000	128.000	No Ice	0.917	0.917	0.019
(SLA)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
(2) DC6-48-60-18-8F	B	From Leg	4.000	0.000	128.000	No Ice	0.917	0.917	0.019
(SLA)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
DC6-48-60-18-8F	C	From Leg	4.000	0.000	128.000	No Ice	0.917	0.917	0.019
(SLA)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
(2) RRUS 12-B2	A	From Leg	4.000	0.000	128.000	No Ice	3.143	1.282	0.058
(SLA)			0.000			1/2" Ice	3.363	1.434	0.081
			0.000			1" Ice	3.590	1.595	0.108
(2) RRUS 12-B2	B	From Leg	4.000	0.000	128.000	No Ice	3.143	1.282	0.058
(SLA)			0.000			1/2" Ice	3.363	1.434	0.081
			0.000			1" Ice	3.590	1.595	0.108
(2) RRUS 12-B2	C	From Leg	4.000	0.000	128.000	No Ice	3.143	1.282	0.058
(SLA)			0.000			1/2" Ice	3.363	1.434	0.081
			0.000			1" Ice	3.590	1.595	0.108

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) RRUS A2	A	From Leg	4.000	0.000	128.000	No Ice	2.066	0.498	0.022
(SLA)			0.000			1/2" Ice	2.245	0.607	0.035
			0.000			1" Ice	2.431	0.724	0.050
(2) RRUS A2	B	From Leg	4.000	0.000	128.000	No Ice	2.066	0.498	0.022
(SLA)			0.000			1/2" Ice	2.245	0.607	0.035
			0.000			1" Ice	2.431	0.724	0.050
(2) RRUS A2	C	From Leg	4.000	0.000	128.000	No Ice	2.066	0.498	0.022
(SLA)			0.000			1/2" Ice	2.245	0.607	0.035
			0.000			1" Ice	2.431	0.724	0.050
KRF 102 361/1	A	From Leg	4.000	0.000	128.000	No Ice	1.939	0.552	0.026
(SLA)			0.000			1/2" Ice	2.112	0.655	0.039
			0.000			1" Ice	2.294	0.766	0.055
KRF 102 361/1	B	From Leg	4.000	0.000	128.000	No Ice	1.939	0.552	0.026
(SLA)			0.000			1/2" Ice	2.112	0.655	0.039
			0.000			1" Ice	2.294	0.766	0.055
KRF 102 361/1	C	From Leg	4.000	0.000	128.000	No Ice	1.939	0.552	0.026
(SLA)			0.000			1/2" Ice	2.112	0.655	0.039
			0.000			1" Ice	2.294	0.766	0.055
Sector Mount [SM 406-3]	C	None		0.000	128.000	No Ice	19.830	19.830	0.923
(P)						1/2" Ice	29.410	29.410	1.326
						1" Ice	38.990	38.990	1.729
/>									
PD1109E	A	From Leg	3.000	0.000	79.000	No Ice	2.854	2.854	0.017
(E)			0.000			1/2" Ice	3.924	3.924	0.038
			5.000			1" Ice	5.010	5.010	0.066
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	79.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
/>									
GPS_A	C	From Leg	3.000	0.000	45.000	No Ice	0.255	0.255	0.001
(E)			0.000			1/2" Ice	0.320	0.320	0.005
			0.000			1" Ice	0.393	0.393	0.010
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	45.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
/>									
GPS_A	A	From Leg	3.000	0.000	13.000	No Ice	0.255	0.255	0.001
(E-CL/TIA)			0.000			1/2" Ice	0.320	0.320	0.005
			0.000			1" Ice	0.393	0.393	0.010
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	13.000	No Ice	0.850	1.670	0.065
(E-Mount Ht./TIA)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 116.5	Pole	Max Tension	26	0.000	0.000	-0.000
			Max. Compression	26	-32.760	-1.511	0.991
			Max. Mx	8	-11.647	-252.029	0.042
			Max. My	2	-11.599	-0.347	257.981
			Max. Vy	8	17.439	-252.029	0.042
			Max. Vx	2	-17.795	-0.347	257.981
			Max. Torque	5			-0.445

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	116.5 - 98.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.087	-1.831	1.844
			Max. Mx	8	-14.926	-646.215	0.197
			Max. My	2	-14.888	-0.429	659.990
			Max. Vy	8	18.773	-646.215	0.197
			Max. Vx	2	-19.129	-0.429	659.990
			Max. Torque	5			-0.445
L3	98.5 - 80.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-42.869	-2.044	2.434
			Max. Mx	8	-17.936	-910.422	0.314
			Max. My	2	-17.904	-0.485	929.142
			Max. Vy	8	19.665	-910.422	0.314
			Max. Vx	2	-20.021	-0.485	929.142
			Max. Torque	5			-0.445
L4	80.25 - 70.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-49.763	-2.266	3.954
			Max. Mx	8	-22.471	-1199.785	0.735
			Max. My	2	-22.445	-0.543	1223.724
			Max. Vy	8	20.798	-1199.785	0.735
			Max. Vx	2	-21.126	-0.543	1223.724
			Max. Torque	10			0.522
L5	70.5 - 39.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.560	-2.606	5.042
			Max. Mx	8	-30.651	-1750.176	0.977
			Max. My	2	-30.635	-0.653	1782.567
			Max. Vy	8	22.350	-1750.176	0.977
			Max. Vx	2	-22.675	-0.653	1782.567
			Max. Torque	10			0.521
L6	39.75 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-70.498	-2.320	5.381
			Max. Mx	8	-37.167	-2052.173	0.844
			Max. My	2	-37.154	-0.355	2089.189
			Max. Vy	8	23.173	-2052.173	0.844
			Max. Vx	2	-23.509	-0.355	2089.189
			Max. Torque	11			0.351
L7	31.75 - 17.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-77.786	-2.430	5.991
			Max. Mx	8	-42.520	-2381.016	0.844
			Max. My	2	-42.513	-0.271	2422.784
			Max. Vy	8	23.815	-2381.016	0.844
			Max. Vx	2	-24.147	-0.271	2422.784
			Max. Torque	11			0.351
L8	17.75 - 14.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-79.937	-2.460	6.220
			Max. Mx	8	-44.120	-2464.640	0.845
			Max. My	2	-44.114	-0.250	2507.588
			Max. Vy	8	23.985	-2464.640	0.845
			Max. Vx	2	-24.316	-0.250	2507.588
			Max. Torque	11			0.351
L9	14.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-87.931	-2.889	7.410
			Max. Mx	8	-50.195	-2811.416	1.122
			Max. My	2	-50.195	-0.168	2859.116
			Max. Vy	8	24.655	-2811.416	1.122
			Max. Vx	2	-24.959	-0.168	2859.116
			Max. Torque	11			0.507

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	87.931	-0.000	0.000
	Max. H_x	20	50.202	24.642	0.010
	Max. H_z	2	50.202	0.010	24.946
	Max. M_x	2	2859.116	0.010	24.946
	Max. M_z	8	2811.416	-24.642	-0.010
	Max. Torsion	11	0.507	-21.346	-12.482
	Min. Vert	19	37.651	21.335	-12.464
	Min. H_x	8	50.202	-24.642	-0.010
	Min. H_z	14	50.202	-0.010	-24.946
	Min. M_x	14	-2855.932	-0.010	-24.946
	Min. M_z	20	-2810.135	24.642	0.010
	Min. Torsion	23	-0.505	21.346	12.482

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	41.835	0.000	0.000	-1.288	-0.507	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	50.202	-0.010	-24.946	-2859.116	-0.168	0.206
0.9 Dead+1.6 Wind 0 deg - No Ice	37.651	0.021	-24.946	-2833.060	-0.019	0.209
1.2 Dead+1.6 Wind 30 deg - No Ice	50.202	12.312	-21.598	-2476.071	-1405.588	-0.054
0.9 Dead+1.6 Wind 30 deg - No Ice	37.651	12.312	-21.598	-2453.447	-1392.828	-0.050
1.2 Dead+1.6 Wind 60 deg - No Ice	50.202	21.335	-12.464	-1429.985	-2434.593	-0.299
0.9 Dead+1.6 Wind 60 deg - No Ice	37.651	21.335	-12.464	-1416.751	-2412.612	-0.297
1.2 Dead+1.6 Wind 90 deg - No Ice	50.202	24.642	0.010	-1.122	-2811.416	-0.465
0.9 Dead+1.6 Wind 90 deg - No Ice	37.651	24.642	0.010	-0.716	-2786.063	-0.464
1.2 Dead+1.6 Wind 120 deg - No Ice	50.202	21.346	12.482	1427.616	-2435.066	-0.506
0.9 Dead+1.6 Wind 120 deg - No Ice	37.651	21.346	12.482	1415.194	-2413.083	-0.507
1.2 Dead+1.6 Wind 150 deg - No Ice	50.202	12.330	21.609	2473.358	-1406.406	-0.411
0.9 Dead+1.6 Wind 150 deg - No Ice	37.651	12.330	21.609	2451.547	-1393.644	-0.413
1.2 Dead+1.6 Wind 180 deg - No Ice	50.202	0.010	24.946	2855.932	-1.112	-0.206
0.9 Dead+1.6 Wind 180 deg - No Ice	37.651	0.010	24.946	2830.690	-0.944	-0.209
1.2 Dead+1.6 Wind 210 deg - No Ice	50.202	-12.312	21.598	2472.886	1404.309	0.055
0.9 Dead+1.6 Wind 210 deg - No Ice	37.651	-12.312	21.598	2451.077	1391.882	0.052
1.2 Dead+1.6 Wind 240 deg - No Ice	50.202	-21.335	12.464	1426.798	2433.313	0.301
0.9 Dead+1.6 Wind 240 deg -	37.651	-21.335	12.464	1414.379	2411.666	0.298

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
No Ice 1.2 Dead+1.6 Wind 270 deg - No Ice	50.202	-24.642	-0.010	-2.066	2810.135	0.465
0.9 Dead+1.6 Wind 270 deg - No Ice	37.651	-24.642	-0.010	-1.656	2785.115	0.464
1.2 Dead+1.6 Wind 300 deg - No Ice	50.202	-21.346	-12.482	-1430.803	2433.784	0.505
0.9 Dead+1.6 Wind 300 deg - No Ice	37.651	-21.346	-12.482	-1417.565	2412.134	0.505
1.2 Dead+1.6 Wind 330 deg - No Ice	50.202	-12.330	-21.609	-2476.543	1405.124	0.410
0.9 Dead+1.6 Wind 330 deg - No Ice	37.651	-12.330	-21.609	-2453.917	1392.696	0.412
1.2 Dead+1.0 Ice+1.0 Temp	87.931	0.000	-0.000	-7.410	-2.889	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	87.931	-0.003	-4.877	-570.548	-2.832	0.045
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	87.931	2.421	-4.222	-495.059	-281.599	-0.022
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	87.931	4.196	-2.436	-288.956	-485.707	-0.082
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	87.931	4.847	0.003	-7.463	-560.465	-0.121
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	87.931	4.199	2.441	273.994	-485.842	-0.127
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	87.931	2.426	4.225	479.998	-281.833	-0.099
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	87.931	0.003	4.877	555.352	-3.102	-0.045
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	87.931	-2.421	4.222	479.864	275.666	0.021
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	87.931	-4.196	2.436	273.760	479.774	0.082
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	87.931	-4.847	-0.003	-7.733	554.532	0.121
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	87.931	-4.199	-2.441	-289.190	479.909	0.127
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	87.931	-2.426	-4.225	-495.195	275.899	0.099
Dead+Wind 0 deg - Service	41.835	-0.002	-5.806	-662.984	-0.422	0.049
Dead+Wind 30 deg - Service	41.835	2.866	-5.027	-574.283	-325.847	-0.012
Dead+Wind 60 deg - Service	41.835	4.966	-2.901	-332.058	-564.105	-0.069
Dead+Wind 90 deg - Service	41.835	5.736	0.002	-1.213	-651.353	-0.108
Dead+Wind 120 deg - Service	41.835	4.968	2.905	329.604	-564.214	-0.118
Dead+Wind 150 deg - Service	41.835	2.870	5.030	571.748	-326.037	-0.096
Dead+Wind 180 deg - Service	41.835	0.002	5.806	660.339	-0.641	-0.049
Dead+Wind 210 deg - Service	41.835	-2.866	5.027	571.639	324.784	0.012
Dead+Wind 240 deg - Service	41.835	-4.966	2.901	329.414	563.042	0.069
Dead+Wind 270 deg - Service	41.835	-5.736	-0.002	-1.432	650.291	0.108
Dead+Wind 300 deg - Service	41.835	-4.968	-2.905	-332.248	563.152	0.118
Dead+Wind 330 deg - Service	41.835	-2.870	-5.030	-574.393	324.974	0.096

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-41.835	0.000	0.000	41.835	0.000	0.000%
2	-0.010	-50.202	-24.945	0.010	50.202	24.946	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
3	-0.010	-37.651	-24.945	-0.021	37.651	24.946	0.068%
4	12.312	-50.202	-21.598	-12.312	50.202	21.598	0.000%
5	12.312	-37.651	-21.598	-12.312	37.651	21.598	0.000%
6	21.335	-50.202	-12.464	-21.335	50.202	12.464	0.000%
7	21.335	-37.651	-12.464	-21.335	37.651	12.464	0.000%
8	24.642	-50.202	0.010	-24.642	50.202	-0.010	0.000%
9	24.642	-37.651	0.010	-24.642	37.651	-0.010	0.000%
10	21.346	-50.202	12.482	-21.346	50.202	-12.482	0.000%
11	21.346	-37.651	12.482	-21.346	37.651	-12.482	0.000%
12	12.330	-50.202	21.609	-12.330	50.202	-21.609	0.000%
13	12.330	-37.651	21.609	-12.330	37.651	-21.609	0.000%
14	0.010	-50.202	24.945	-0.010	50.202	-24.946	0.000%
15	0.010	-37.651	24.945	-0.010	37.651	-24.946	0.000%
16	-12.312	-50.202	21.598	12.312	50.202	-21.598	0.000%
17	-12.312	-37.651	21.598	12.312	37.651	-21.598	0.000%
18	-21.335	-50.202	12.464	21.335	50.202	-12.464	0.000%
19	-21.335	-37.651	12.464	21.335	37.651	-12.464	0.000%
20	-24.642	-50.202	-0.010	24.642	50.202	0.010	0.000%
21	-24.642	-37.651	-0.010	24.642	37.651	0.010	0.000%
22	-21.346	-50.202	-12.482	21.346	50.202	12.482	0.000%
23	-21.346	-37.651	-12.482	21.346	37.651	12.482	0.000%
24	-12.330	-50.202	-21.609	12.330	50.202	21.609	0.000%
25	-12.330	-37.651	-21.609	12.330	37.651	21.609	0.000%
26	0.000	-87.931	0.000	-0.000	87.931	0.000	0.000%
27	-0.003	-87.931	-4.876	0.003	87.931	4.877	0.000%
28	2.421	-87.931	-4.222	-2.421	87.931	4.222	0.000%
29	4.196	-87.931	-2.436	-4.196	87.931	2.436	0.000%
30	4.847	-87.931	0.003	-4.847	87.931	-0.003	0.000%
31	4.199	-87.931	2.441	-4.199	87.931	-2.441	0.000%
32	2.426	-87.931	4.225	-2.426	87.931	-4.225	0.000%
33	0.003	-87.931	4.876	-0.003	87.931	-4.877	0.000%
34	-2.421	-87.931	4.222	2.421	87.931	-4.222	0.000%
35	-4.196	-87.931	2.436	4.196	87.931	-2.436	0.000%
36	-4.847	-87.931	-0.003	4.847	87.931	0.003	0.000%
37	-4.199	-87.931	-2.441	4.199	87.931	2.441	0.000%
38	-2.426	-87.931	-4.225	2.426	87.931	4.225	0.000%
39	-0.002	-41.835	-5.806	0.002	41.835	5.806	0.000%
40	2.866	-41.835	-5.027	-2.866	41.835	5.027	0.000%
41	4.966	-41.835	-2.901	-4.966	41.835	2.901	0.000%
42	5.736	-41.835	0.002	-5.736	41.835	-0.002	0.000%
43	4.968	-41.835	2.905	-4.968	41.835	-2.905	0.000%
44	2.870	-41.835	5.030	-2.870	41.835	-5.030	0.000%
45	0.002	-41.835	5.806	-0.002	41.835	-5.806	0.000%
46	-2.866	-41.835	5.027	2.866	41.835	-5.027	0.000%
47	-4.966	-41.835	2.901	4.966	41.835	-2.901	0.000%
48	-5.736	-41.835	-0.002	5.736	41.835	0.002	0.000%
49	-4.968	-41.835	-2.905	4.968	41.835	2.905	0.000%
50	-2.870	-41.835	-5.030	2.870	41.835	5.030	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00043366
3	Yes	4	0.00000001	0.00031730

4	Yes	5	0.00000001	0.00079841
5	Yes	5	0.00000001	0.00037024
6	Yes	5	0.00000001	0.00078828
7	Yes	5	0.00000001	0.00036582
8	Yes	4	0.00000001	0.00035762
9	Yes	4	0.00000001	0.00018818
10	Yes	5	0.00000001	0.00078296
11	Yes	5	0.00000001	0.00036344
12	Yes	5	0.00000001	0.00079958
13	Yes	5	0.00000001	0.00037101
14	Yes	4	0.00000001	0.00043782
15	Yes	4	0.00000001	0.00025066
16	Yes	5	0.00000001	0.00078717
17	Yes	5	0.00000001	0.00036502
18	Yes	5	0.00000001	0.00078769
19	Yes	5	0.00000001	0.00036605
20	Yes	4	0.00000001	0.00036007
21	Yes	4	0.00000001	0.00019020
22	Yes	5	0.00000001	0.00079337
23	Yes	5	0.00000001	0.00036856
24	Yes	5	0.00000001	0.00078635
25	Yes	5	0.00000001	0.00036438
26	Yes	4	0.00000001	0.00007774
27	Yes	5	0.00000001	0.00052012
28	Yes	5	0.00000001	0.00055675
29	Yes	5	0.00000001	0.00055319
30	Yes	5	0.00000001	0.00051132
31	Yes	5	0.00000001	0.00054205
32	Yes	5	0.00000001	0.00054236
33	Yes	5	0.00000001	0.00050513
34	Yes	5	0.00000001	0.00053536
35	Yes	5	0.00000001	0.00053336
36	Yes	5	0.00000001	0.00050221
37	Yes	5	0.00000001	0.00054469
38	Yes	5	0.00000001	0.00054991
39	Yes	4	0.00000001	0.00006861
40	Yes	4	0.00000001	0.00031988
41	Yes	4	0.00000001	0.00031133
42	Yes	4	0.00000001	0.00006590
43	Yes	4	0.00000001	0.00030492
44	Yes	4	0.00000001	0.00032079
45	Yes	4	0.00000001	0.00006840
46	Yes	4	0.00000001	0.00030614
47	Yes	4	0.00000001	0.00030974
48	Yes	4	0.00000001	0.00006572
49	Yes	4	0.00000001	0.00031661
50	Yes	4	0.00000001	0.00030565

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116.5	16.792	39	1.026	0.001
L2	120.25 - 98.5	10.991	39	0.934	0.000
L3	98.5 - 80.25	7.167	39	0.713	0.000
L4	84.75 - 70.5	5.277	39	0.598	0.000
L5	70.5 - 39.75	3.629	39	0.494	0.000
L6	45 - 31.75	1.498	39	0.303	0.000
L7	31.75 - 17.75	0.748	39	0.226	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L8	17.75 - 14.25	0.235	39	0.124	0.000
L9	14.25 - 0	0.152	39	0.102	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Top Hat	39	16.792	1.026	0.001	45945
149.000	TME-1900MHz RRH (65MHz)	39	16.792	1.026	0.001	45945
148.000	APXVSPP18-C-A20 w/ Mount Pipe	39	16.792	1.026	0.001	45945
138.000	BXA-70063-6CF-2 w/ Mount Pipe	39	14.643	1.012	0.001	22972
128.000	HPA-65R-BUU-H8 w/ Mount Pipe	39	12.547	0.981	0.001	11486
79.000	PD1109E	39	4.575	0.556	0.000	8161
45.000	GPS_A	39	1.498	0.303	0.000	9508
13.000	GPS_A	39	0.128	0.094	0.000	6796

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116.5	72.472	2	4.433	0.003
L2	120.25 - 98.5	47.438	2	4.033	0.002
L3	98.5 - 80.25	30.933	2	3.077	0.001
L4	84.75 - 70.5	22.776	2	2.580	0.001
L5	70.5 - 39.75	15.660	2	2.131	0.001
L6	45 - 31.75	6.464	2	1.310	0.000
L7	31.75 - 17.75	3.225	2	0.976	0.000
L8	17.75 - 14.25	1.012	2	0.535	0.000
L9	14.25 - 0	0.654	2	0.441	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Top Hat	2	72.472	4.433	0.003	10743
149.000	TME-1900MHz RRH (65MHz)	2	72.472	4.433	0.003	10743
148.000	APXVSPP18-C-A20 w/ Mount Pipe	2	72.472	4.433	0.003	10743
138.000	BXA-70063-6CF-2 w/ Mount Pipe	2	63.199	4.371	0.002	5371
128.000	HPA-65R-BUU-H8 w/ Mount Pipe	2	54.152	4.236	0.002	2684
79.000	PD1109E	2	19.746	2.399	0.001	1896
45.000	GPS_A	2	6.464	1.310	0.000	2204
13.000	GPS_A	2	0.551	0.406	0.000	1575

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	148 - 116.5 (1)	TP29.48x24x0.219	31.500	0.000	0.0	19.864	-11.599	1273.620	0.009
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	21.750	0.000	0.0	25.332	-14.888	1751.620	0.008
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	18.250	0.000	0.0	47.022	-17.904	2235.790	0.008
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	14.250	0.000	0.0	55.723	-22.445	2653.470	0.008
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	30.750	0.000	0.0	75.811	-30.635	3874.320	0.008
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	13.250	0.000	0.0	85.803	-37.154	4394.700	0.008
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	14.000	0.000	0.0	88.424	-42.513	4539.090	0.009
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	3.500	0.000	0.0	103.899	-44.114	4902.000	0.009
L9	14.25 - 0 (9)	TP48.19x45.711x0.619	14.250	0.000	0.0	93.434	-50.195	4669.620	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	148 - 116.5 (1)	TP29.48x24x0.219	257.981	749.418	0.344	0.000	749.418	0.000
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	659.991	1149.925	0.574	0.000	1149.925	0.000
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	929.142	1561.742	0.595	0.000	1561.742	0.000
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	1223.725	1956.667	0.625	0.000	1956.667	0.000
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	1782.567	3196.708	0.558	0.000	3196.708	0.000
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	2089.192	3769.733	0.554	0.000	3769.733	0.000
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	2422.783	4125.800	0.587	0.000	4125.800	0.000
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	2507.592	4497.242	0.558	0.000	4497.242	0.000
L9	14.25 - 0 (9)	TP48.19x45.711x0.619	2859.117	4544.692	0.629	0.000	4544.692	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	148 - 116.5 (1)	TP29.48x24x0.219	17.795	636.808	0.028	0.377	1500.667	0.000
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	19.129	875.812	0.022	0.377	2302.667	0.000
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	20.021	1117.890	0.018	0.377	3127.308	0.000
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	21.126	1326.740	0.016	0.376	3918.117	0.000
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	22.675	1937.160	0.012	0.376	6401.233	0.000
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	23.509	2188.250	0.011	0.206	7548.691	0.000
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	24.147	2260.670	0.011	0.206	8261.700	0.000
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	24.316	2439.940	0.010	0.206	9005.500	0.000
L9	14.25 - 0 (9)	TP48.19x45.711x0.619	24.959	2326.120	0.011	0.206	9100.500	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

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	148 - 116.5 (1)	0.009	0.344	0.000	0.028	0.000	0.354 ✔	1.000	4.8.2 ✔
L2	116.5 - 98.5 (2)	0.008	0.574	0.000	0.022	0.000	0.583 ✔	1.000	4.8.2 ✔
L3	98.5 - 80.25 (3)	0.008	0.595	0.000	0.018	0.000	0.603 ✔	1.000	4.8.2 ✔
L4	80.25 - 70.5 (4)	0.008	0.625	0.000	0.016	0.000	0.634 ✔	1.000	4.8.2 ✔
L5	70.5 - 39.75 (5)	0.008	0.558	0.000	0.012	0.000	0.566 ✔	1.000	4.8.2 ✔
L6	39.75 - 31.75 (6)	0.008	0.554	0.000	0.011	0.000	0.563 ✔	1.000	4.8.2 ✔
L7	31.75 - 17.75 (7)	0.009	0.587	0.000	0.011	0.000	0.597 ✔	1.000	4.8.2 ✔
L8	17.75 - 14.25 (8)	0.009	0.558	0.000	0.010	0.000	0.567 ✔	1.000	4.8.2 ✔
L9	14.25 - 0 (9)	0.011	0.629	0.000	0.011	0.000	0.640 ✔	1.000	4.8.2 ✔

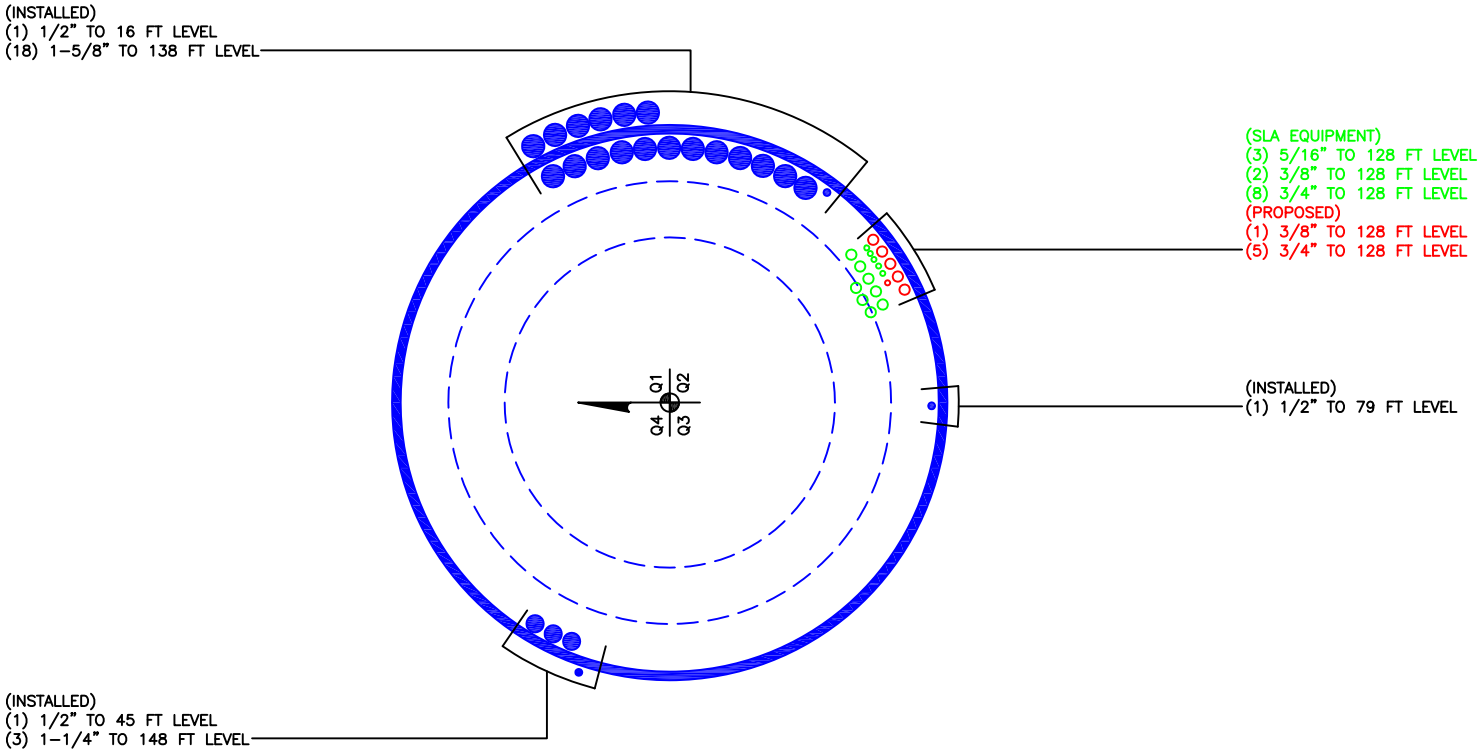
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	148 - 116.5	Pole	TP29.48x24x0.219	1	-11.599	1273.620	**	**
L2	116.5 - 98.5	Pole	TP32.175x28.39x0.25	2	-14.888	1751.620	**	**
L3	98.5 - 80.25	Pole	TP35.35x32.175x0.434	3	-17.904	2235.790	**	**
L4	80.25 - 70.5	Pole	TP36.547x34.067x0.487	4	-22.445	2653.470	**	**
L5	70.5 - 39.75	Pole	TP41.9x36.547x0.591	5	-30.635	3874.320	**	**
L6	39.75 - 31.75	Pole	TP42.666x40.361x0.643	6	-37.154	4394.700	**	**
L7	31.75 - 17.75	Pole	TP45.102x42.666x0.626	7	-42.513	4539.090	**	**
L8	17.75 - 14.25	Pole	TP45.711x45.102x0.728	8	-44.114	4902.000	**	**
L9	14.25 - 0	Pole	TP48.19x45.711x0.619	9	-50.195	4669.620	**	**
							Summary	
						Pole (L9)	**	**
						RATING =	**	**

**Check Additional Calculations

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876373

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	14.25	2	CI-XFP-08512	F	0	T&C
14.25	31.75	3	CI-XFP-08512	F	0	T&C
31.75	70.5	3	CI-XFP-08512	F	0	T&C
70.5	98.5	3	CI-XFP-06010	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

1

Reinforcement 2

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	17.75	2	CI-XFP-06512	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

1

Reinforcement 3

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.		Bottom Elevation Failure	Top Elevation Failure	Section Failure %
116.5000	148.0000	0.2188	60	75	35.3%										**35.3%**	148.0000	31.5000	3.7500	18	24.0000	29.4800	0.2188	60.0	1.00	1			
98.5000	120.2500	0.2500	65	80	58.2%										**58.2%**	120.2500	21.7500	0.0000	18	28.3901	32.1746	0.2500	65.0	1.00	2			
80.2500	98.5000	0.2500	65	80	48.7%	3	CI-XFP-06010	60.3%							**60.3%**	98.5000	18.2500	4.5000	18	32.1746	35.3500	0.4340	40.4	0.96	3			
70.5000	84.7500	0.3125	65	80	51.2%	3	CI-XFP-06010	63.4%							**63.4%**	84.7500	14.2500	0.0000	18	34.0670	36.5475	0.4869	40.5	0.97	4			
39.7500	70.5000	0.3125	65	80	49.2%	3	CI-XFP-08512	56.6%							**56.6%**	70.5000	30.7500	5.2500	18	36.5475	41.9000	0.5913	43.4	0.95	5			
31.7500	45.0000	0.3750	65	80	49.0%	3	CI-XFP-08512	56.3%							**56.3%**	45.0000	13.2500	0.0000	18	40.3612	42.6663	0.6433	43.4	0.96	6			
17.7500	31.7500	0.3750	65	80	52.1%	3	CI-XFP-08512	59.7%							**59.7%**	31.7500	14.0000	0.0000	18	42.6663	45.1020	0.6264	43.5	0.96	7			
14.2500	17.7500	0.3750	65	80	49.7%	3	CI-XFP-08512	56.7%	2	CI-XFP-06512	46.8%				**56.7%**	17.7500	3.5000	0.0000	18	45.1020	45.7109	0.7277	45.0	0.98	8			
0.0000	14.2500	0.3750	65	80	55.7%	2	CI-XFP-08512	49.4%	2	CI-XFP-06512	64.0%				**64.0%**	14.2500	14.2500	0.0000	18	45.7109	48.1900	0.6188	42.3	1.01	9			
																									10			
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Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	14.25	2	FP-085125	F	T&C
14.25	31.75	3	FP-085125	F	T&C
31.75	70.5	3	FP-085125	F	T&C
70.5	98.5	3	FP-060100	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
											1						1
					1						1						1
					1						1						1
					1						1						1

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0	17.75	2	FP-065125	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			1			1											

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CCI-XFP-060100	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.1875	65	80	0.80	16	1.00	16	189.3	252.3	Compress.	285.0	Rupture
CCI-XFP-065125	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.1875	65	80	0.80	19	1.00	19	260.4	347.2	Compress.	393.8	Rupture
CCI-XFP-085125	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.1875	65	80	0.80	17	1.00	17	350.9	467.9	Compress.	543.1	Compress.

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	876373
Name:	LONG EDDY - WRIGHT PROPERTY
App. #:	378332 Revision # 2

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	2859	ft-kip
Axial:	50	kip
Shear:	25	kip
Base Plate Type:	Square	

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	105%
eta Factor:	0.50

Original Anchor Rod Data

Quantity:	16	
Diameter:	2.25	in
Material:	A615 GR 75	
Bolt Circle:	55.0	in
Bolt Spacing:	6	in
Bolt Group Area:	63.62	in^2
Bolt Group MOIx:	24055	in^4

Reactions Seen by Original AR Group

Moment:	2309.0	kip-ft
Axial:	50.2	kip
Shear:	25.0	kip

Original AR Capacity Check

Combined Load:	132.2	kip
Allowable load:	259.8	kip
AR Capacity:	50.9%	**Pass**

First Added Anchor Rod Data

Quantity:	3	
Diameter:	2.25	in
Material:	A193 B7	
Bolt Circle:	62.0	in
Bolt Group Area:	11.93	in^2
Bolt Group MOIx:	5732	in^4

Reactions Seen by First Added AR Group

Moment:	550.1	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check

Combined Load:	134.2	kip
Allowable load:	324.8	kip
AR Capacity:	41.3%	**Pass**

Second Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Rev.4.1

Rev.4.1

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /C

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876373*
Site Name: *LONG EDDY - WRIGHT PI*
App #: *378332 Revision # 2*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	55	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	54	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	6	in

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

Pole Data		
Diam:	48.19	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	2308.97098	ft-kips
Factored Axial, Pu:	50.1951	kips
Factored Shear, Vu:	24.959102	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	132.2 Kips
Axial Design Strength, Φ*Fu*Anet:	260.0 Kips
Anchor Rod Stress Ratio:	50.8% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	24.5 ksi
PL Design Bending Strength, Φ*Fy:	49.5 ksi
Base Plate Stress Ratio:	49.5% **Pass**

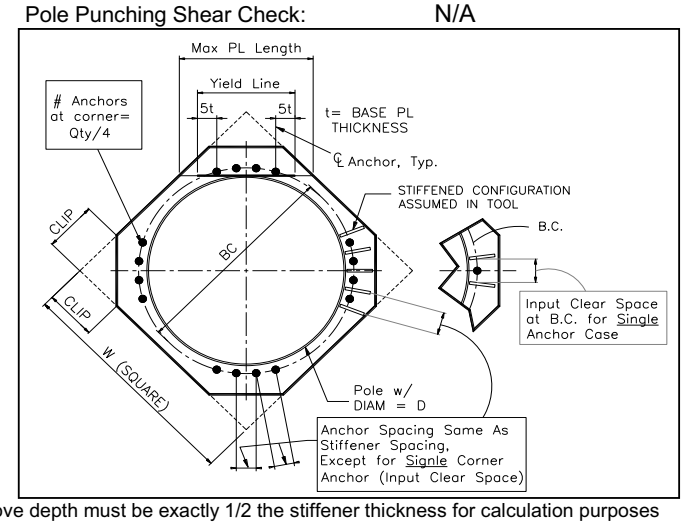
N/A - Unstiffened

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



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

Proj. Number	89028.006.01
Proj. Name	LONG EDDY / WRIGHT PROI
Code	Rev. G

Previously Added Anchor Rods

Diameter	2.25	in
Grade	A193 Gr B7	
Quantity	3	
Bolt Circle	62	in

Existing Mfg Anchor Rods

Diameter	2.25	in
Quantity	16	
Bolt Circle	55	in

Summary Output

- Anchor Rod Bracket Checks

Tube Stress:	**36.8%**
Max. Weld Stress:	**77.4%**

Analysis Criteria

Load for Calcs?	**Current Load**	
Current Load	134.2	kips
Capacity	325	kips

Foundation Properties

Type	Pad	
Pad Thickness	3.5	ft
f'_c	3000	psi
Clear Cover	3	inch
Pad Width	24.5	ft
	10	
	18	
	3	
	60	

Tower Properties

Fy_{pole} =	60	ksi
Fu_{pole} =	75	ksi
Fy_{base} =	55	ksi
Fu_{base} =	75	ksi

Anchor Rod Bracket Properties

Gusset Properties

Thickness	1.25	inch
Pole to Tube CL	6.8125	inch
Height	54	inch
Width at Tube	4.5625	inch
Fy_{plate} =	65	ksi
Fu_{plate} =	80	ksi
Gap =	0	inch
Notch =	0.75	inch

Pipe /Tube Properties

Size	4 XXS Pipe	
L_{pipe} =	14	inch
Length Above Gusset	3	inch
F_{ypipe} =	50	ksi
D_{pipe} =	4.5	inch
t_{pipe} =	0.674	inch
A_{pipe} =	8.101300374	$inch^2$
I_{pipe} =	15.28366215	$inch^4$
r_{pipe} =	1.373524299	inch

Weld Properties

F_{EXX} =	70	ksi	Weld Material Grade
Load Angle	45	degrees	

- Bracket to Tube Weld

Weld Type	Double Bevel+Fillet		
Fillet Size	6		Vertical fillet weld size in sixteenths
Bevel Depth	0.375	inch	Bevel Depth in inches
$l_{vweldpipe}$ =	11	inch	Length of Vertical Weld to Pipe

- Bracket to Pole Weld

Weld Type	Double Fillet		
D_{vpole} =	6		Vertical fillet weld size *in sixteenths*
H =	54	inch	Height of vertical weld from base plate

- Gusset to Base Plate Weld

Weld Type	Double Bevel+Fillet		
Bevel Depth	0.5	inch	Bevel depth in inches
Fillet Size	8		Fillet weld size in sixteenths

Additional Variables

C_1 =	1.00	Electrode Strength Coefficient
k_{rt} =	0	Transverse Reinforcement Index :
ψ_t =	1	Rebar Location Factor :

PROJECT	**876373 - LONG EDDY / WRIGHT PROPERTY, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**03-23-17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

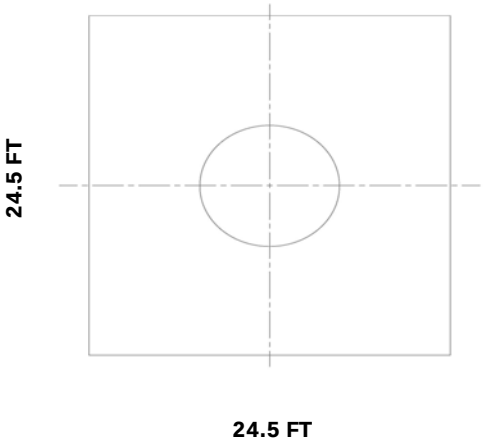
Rev. Type: G

Design Loads:

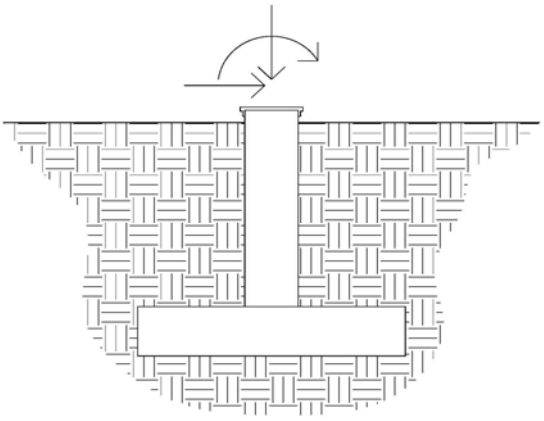
	Input factored loads	
Shear:	25.0	kips
Moment:	2,859.0	ft-kips
Tower Height:	148.0	ft
Tower Weight:	50.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	48.19	in
Bearing Depth:	3.5	ft
Pad Width:	24.5	ft
Neglected Depth:	3.3	ft
Thickness:	4.0	ft
Pier Diameter:	0.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	3.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	10	
Pier Rebar Quanity:	57	
Pad Rebar Size:	8	
Pad Rebar Quanity:	26	
Pier Tie Size:	4	
Tie Quanity:	7	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.120	kcf
Ult. Bearing Capacity:	12.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.300	

** Notes:

Summary of Results

Req'd Pier Diam.	No Good!
Overturning	76.9%
Shear Capacity	29.6%
Bearing	21.6%
Pad Shear - 1-way	30.7%
Pad Moment Capacity	48.7%