EMPIRE
telecom

January 29, 2015

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

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	75 Roberts Road, Groton, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 144.5 foot Monopole ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 144.75 feet. The tower is controlled by Crown Castle, LLC. The Council approved the previous application on December 14th 2012 reference number EM-CING-059-121130. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-CING-059-121130.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager and the Town Planner for the Town of Groton. A copy of this letter is also being sent to Crown Castle, LLC, the owner of the structure that AT&T is located.

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

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 143 foot level of the 144.5 foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

EMPIRE
telecom

standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the December 14th 2012 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by C Squared Systems, LLC dated November 21, 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Mark R. Oefinger, Town Manager, Town of Groton
Jonathan J. Reiner, AICP, Director of Planning, Town of Groton
Philip A. Strickland & Daniel J. Perotta
Crown Castle, LLC

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

CT2182

December 14, 2012

Melanie Howlett
HPC Wireless Services
46 Mill Plain Road, Floor 2
Danbury, CT 06811

RE: EM-CING-059-121130 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 75 Roberts Road, Groton, Connecticut.

Dear Ms. Howlett:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Loading changes shall be implemented as recommended in the Structural Analysis Report prepared by Crown Castle dated August 15, 2012 and stamped by Jamal Huwel; and
- Not more than 45 days following completion of the antenna installation, AT&T shall provide documentation certifying that its installation complied with the engineer's recommendation.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not more than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated November 29, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

CSC
CONNECTICUT SITING COUNCIL

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

December 3, 2012

The Honorable Heather B. Somers
Mayor
Town of Groton
45 Fort Hill Road
Groton, CT 06340

RE: EM-CING-059-121130 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 75 Roberts Road, Groton, Connecticut.

Dear Mayor Somers:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by December 17, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

L. Roberts

Linda Roberts
Executive Director

LR/cm

c: James Sharrard, Town Planner, Town of Groton

EM-CING-059-121130

HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

HPC
WIRELESS SERVICES

ORIGINAL

November 29, 2012

RECEIVED
NOV 30 2012
CONNECTICUT
SITING COUNCIL

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Linda Roberts, Executive Director

Re: New Cingular Wireless PCS, LLC – Exempt Modification
75 Roberts Road, Groton

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of the Town of Groton.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 75 Roberts Road, Groton (coordinates 41°-24-12.42' N, 72°-44'-38.97" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. AT&T will add three (3) LTE panel antennas on new mounts to the existing platform. It should be noted that the Structural Analysis reflects a centerline height of 147' for both existing and proposed antennas. However, in order to retain the existing top of antenna height, the proposed LTE antennas will be mounted at a centerline height

of approximately 144.75'. Six (6) RRHS (remote radio units) on new mounts will be added at a centerline height of approximately 143'; and one (1) Surge Arrestor on a new mounting pipe will be added at a centerline height of approximately 144'. AT&T will also place DC power and fiber runs from the equipment to the antennas along the existing coaxial cable run. These changes will not extend the height of the approximately 144.5' structure.

2. AT&T will place related equipment in the existing Equipment Shelter located on the existing Concrete Pad, and will also mount a new GPS antenna to the existing Ice Bridge. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.61%; the combined site operations will result in a total power density of approximately 38.56%.

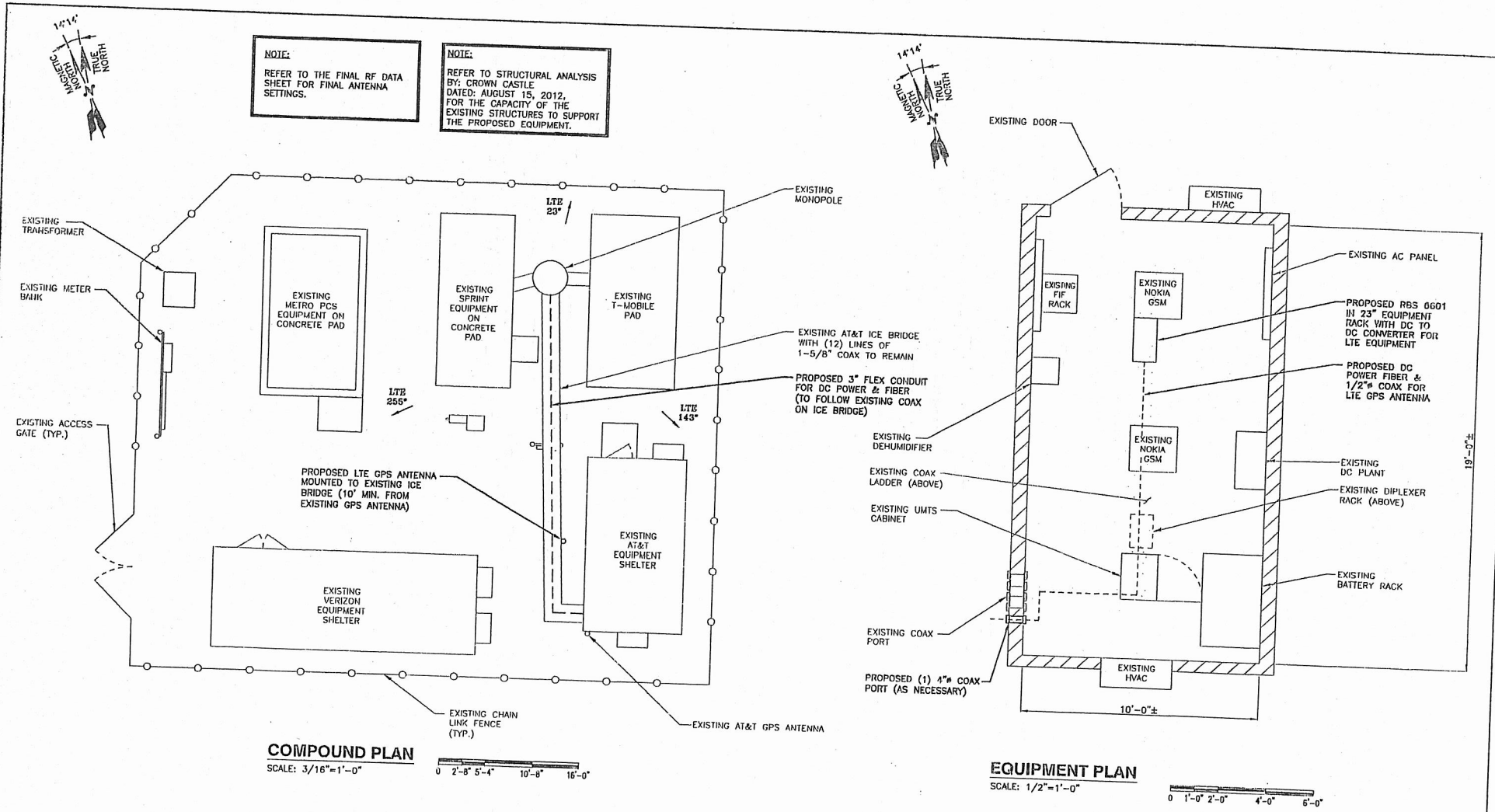
Please contact me by phone at (203) 610-1071, or by e-mail at mjhowlett@optonline.net, if there are any questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

cc: Honorable Heather Somers, Mayor, Town of Groton
Mark R. Oefinger, Town Manager, Town of Groton
Phillip A. Strickland and Daniel J. Perrotta (underlying property owners)



Hudson Design Group LLC
1473 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3010
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

SITE NUMBER: CT2182
SITE NAME: GROTON-ROBERTS ROAD
CROWN CASTLE ID: 881533
75 ROBERTS ROAD
GROTON, CT 06340
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/03/12	ISSUED FOR CONSTRUCTION	RS	DC	DPH
0	07/27/12	ISSUED FOR REVIEW	RS	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RS

STATE OF CONNECTICUT — DANIEL C. PARENTE — No. 21176 — LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND PLAN & EQUIPMENT PLAN (LTE)

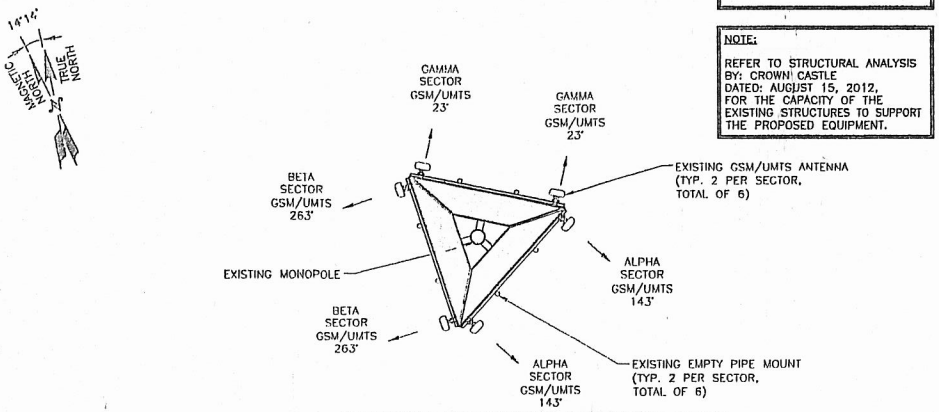
JOB NUMBER	DRAWING NUMBER	REV
2182.01	A-1	1

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

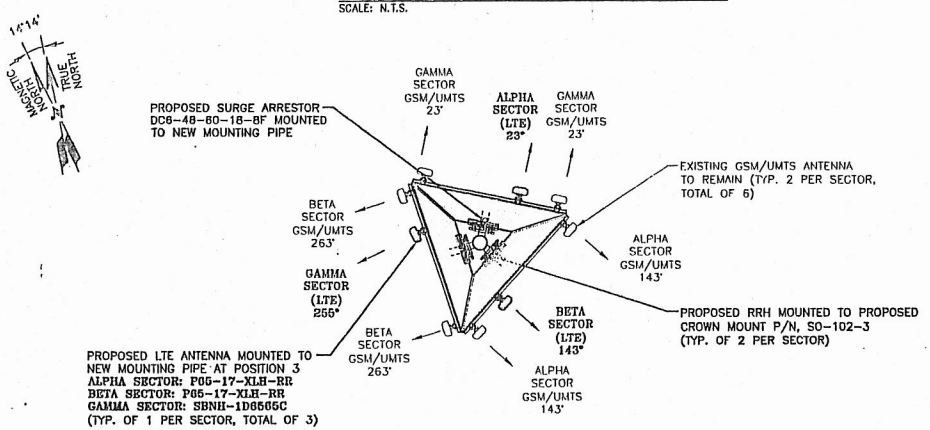
NOTE:

REFER TO STRUCTURAL ANALYSIS BY: CROWN CASTLE DATED: AUGUST 15, 2012. FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.



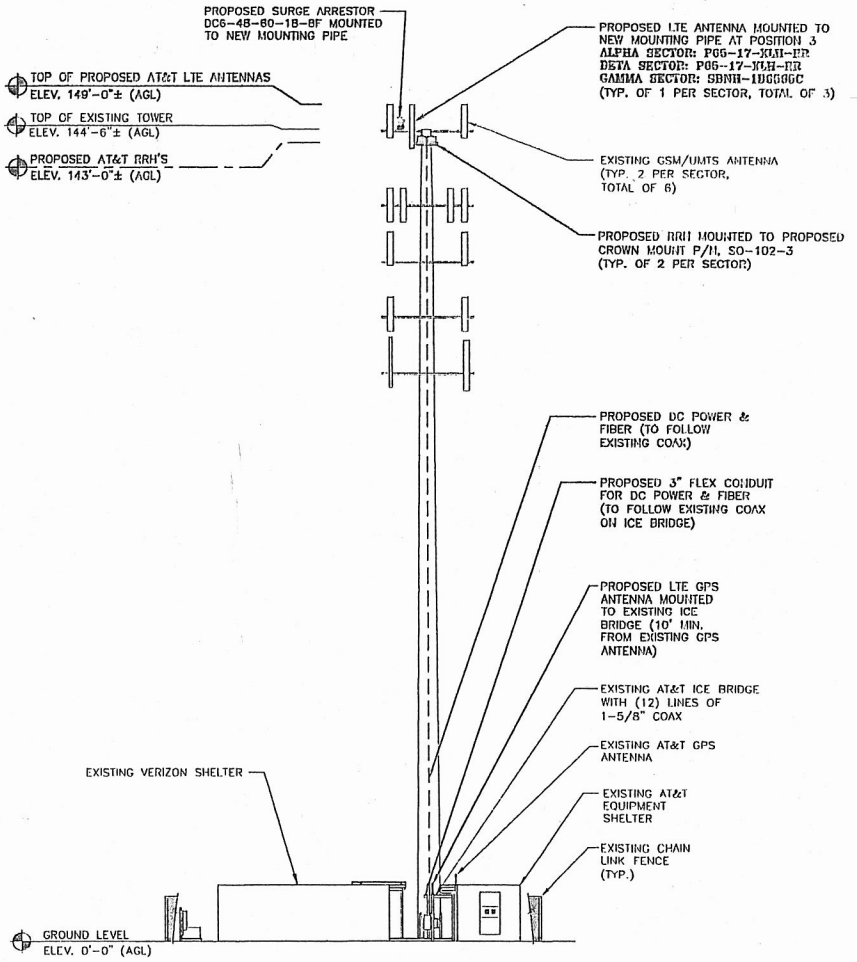
EXISTING GSM/UMTS ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.



SOUTH ELEVATION

SCALE: 3/32"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

Hudson Design Groupe LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2070
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a United GLOBAL SERVICES Company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

SITE NUMBER: CT2182
SITE NAME: GROTON-ROBERTS ROAD
CROWN CASTLE ID: 881533
75 ROBERTS ROAD
GROTON, CT 06340
NEW LONDON COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/03/12	ISSUED FOR CONSTRUCTION	DC	DPH	DPH
0	07/27/12	ISSUED FOR REVIEW	RS	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RS

STATE OF CONNECTICUT — LICENSED — No. 21175

AT&T

ANTENNA PLAN & ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2182.01	A-2	1

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

at&t

CT2182

(Groton-Candid Tower)

75 Roberts Road, Groton, CT 06340

November 21, 2012

Table of Contents

1. Introduction 1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits 1
3. RF Exposure Prediction Methods 2
4. Calculation Results 3
5. Conclusion 4
6. Statement of Certification 4
Attachment A: References 5
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE) 6
Attachment C: AT&T Antenna Data Sheets and Electrical Patterns 8

List of Tables

Table 1: Carrier Information 3
Table 2: FCC Limits for Maximum Permissible Exposure (MPE) 6

List of Figures

Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE) 7

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 75 Roberts Road in Groton, CT. The coordinates of the tower are 41° 21' 36.8" N, 72° 2' 55.1" W.

AT&T is proposing the following modifications:

1) Install three multi-band (700/850/1900/2100 MHz) antennas for their LTE network (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical patterns of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular UMTS	*147*	*880*	*1*	*500*	*0.0083*	*0.5867*	*1.42%*
Cingular GSM	*147*	*880*	*4*	*296*	*0.0197*	*0.5867*	*3.36%*
Cingular GSM	*147*	*1930*	*2*	*427*	*0.0142*	*1.0000*	*1.42%*
Verizon	135	880	9	285	0.0506	0.5867	8.63%
Verizon PCS	135	1900	3	400	0.0237	1.0000	2.37%
Sprint	117	1962.5	11	442.18	0.1278	1.0000	12.78%
MetroPCS	102	2140	3	727	0.0754	1.0000	7.54%
T-Mobile GSM	126	1945	8	129	0.0234	1.0000	2.34%
T-Mobile UMTS	126	2100	2	730	0.0331	1.0000	3.31%
AT&T UMTS	147	880	2	565	0.0019	0.5867	0.32%
AT&T UMTS	147	1900	2	875	0.0029	1.0000	0.29%
AT&T LTE	144.75	734	1	1615	0.0028	0.4893	0.57%
AT&T GSM	147	880	1	283	0.0005	0.5867	0.08%
AT&T GSM	147	1900	4	525	0.0035	1.0000	0.35%
						Total	**38.56%**

Table 1: Carrier Information[1] [2] [3]

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 7/26/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the Hudson Design Group Construction Drawing dated October 3, 2012.

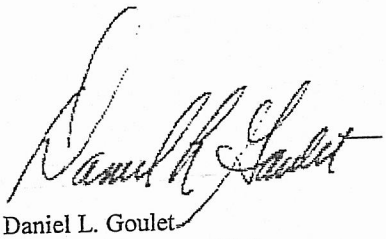
5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **38.56% of the FCC limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

November 21, 2012
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

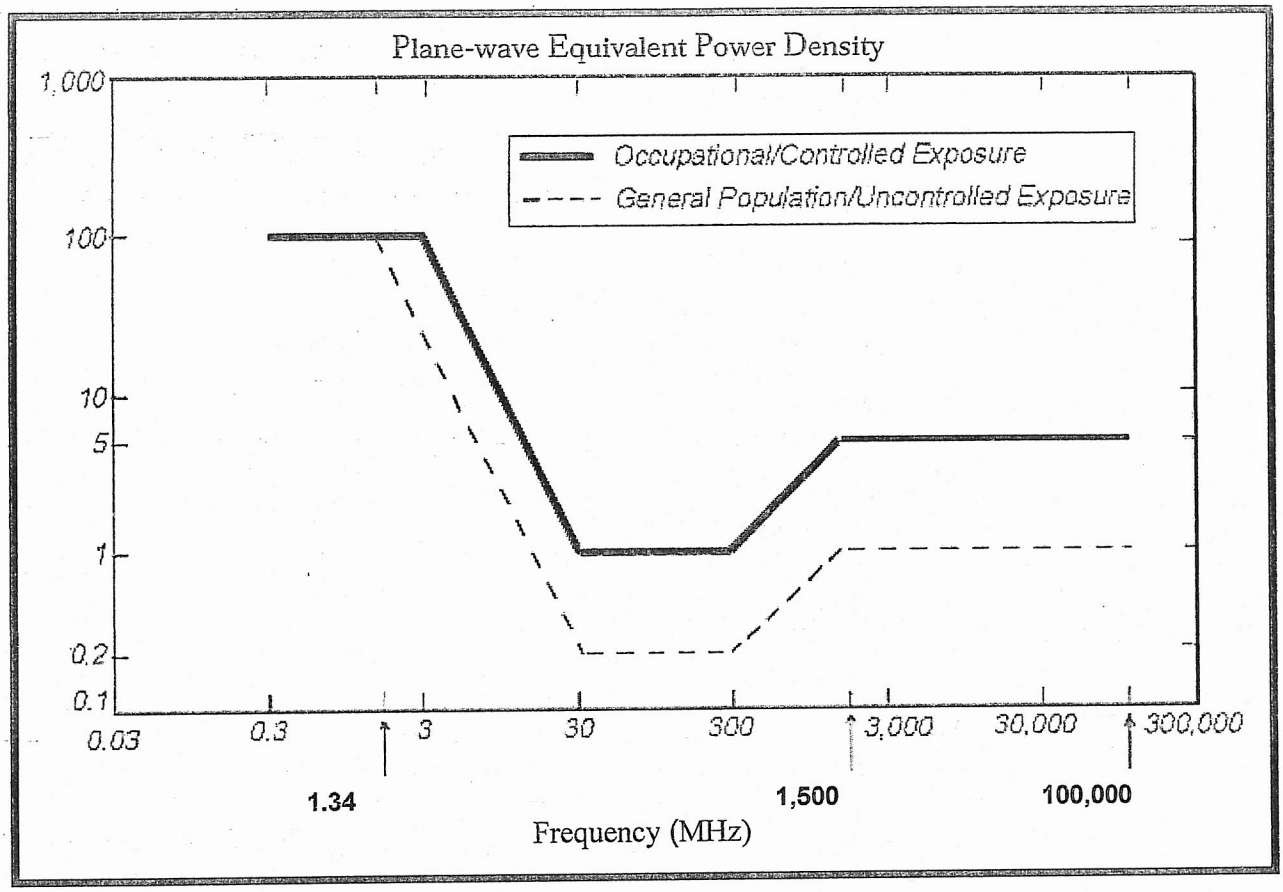
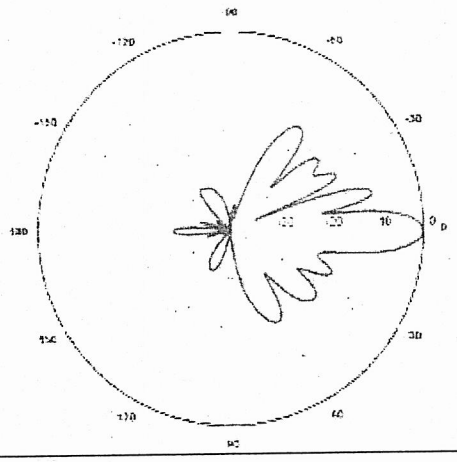


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

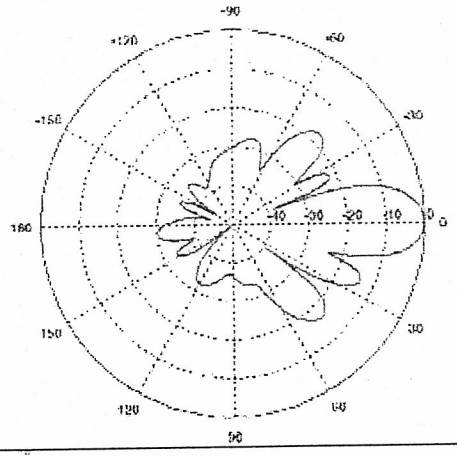
700 MHz

Manufacturer:	Powerwave
Model #:	P65-17-XLH-RR
Frequency Band:	698-806 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	8.4°
Horizontal Beamwidth:	70°
Polarization:	Dual Linear ± 45°
Size L x W x D:	96.0" x 12.0" x 6.0"



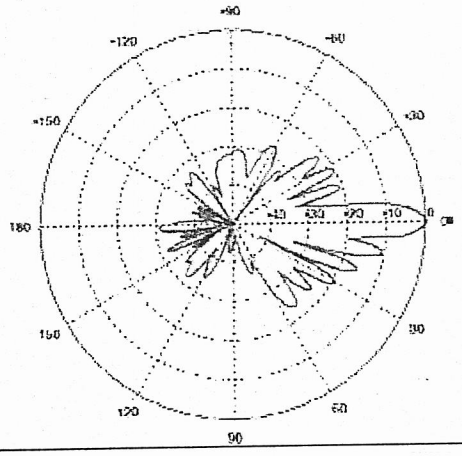
850 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



CT2182

Date: **May 21, 2014**

Patrick Byrum
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	**Scenario 2.5B**
	Carrier Site Number:	CT43XC854
Crown Castle Designation:	**Crown Castle BU Number:**	881533
	Crown Castle Site Name:	GROTON TOWER
	Crown Castle JDE Job Number:	286442
	Crown Castle Work Order Number:	759463
	Crown Castle Application Number:	245708 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	759463
Site Data:	**75 Roberts Road, Groton, New London County, CT** **Latitude *41° 21' 36.8"*, Longitude *-72° 2' 55.1"*** **144.5 Foot - Monopole Tower**	

Dear Patrick Byrum,

Crown Castle 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 759463, in accordance with application 245708, revision 0.

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

LC4.7: Existing + Reserved + Proposed Equipment w/ Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

Structural analysis prepared by: Christopher Hall, E.I.T. / CMS

Respectfully submitted by:

Jamal A. Huwel, P.E.
Manager Engineering

STATE OF CONNECTICUT
JAMAL A HUWEL
28893
LICENSED
PROFESSIONAL ENGINEER

Date Signed: 05/22/2014

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Antenna and Cable Information
Table 2 - Existing and Reserved Antenna and Cable Information
Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE
Table 4 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 5 - Section Capacity (Summary)
Table 6 – Tower Components vs. Capacity
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 144.5 ft Monopole tower designed by Engineered Endeavors, Inc. in January of 2001. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Walker Engineering, in August of 2007. Reinforcement consists of the addition of base plate stiffeners. The tower was later reinforced per reinforcement drawings prepared by Vertical Structures, in November of 2008. Reinforcement consists of weld size increases to the previous base plate stiffener modification.

The proposed modifications drawings, prepared by Crown Castle in February of 2014, consist of shaft reinforcement from 90' to 100', and were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
113.0	113.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
145.0	146.0	6	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD	12 3	1-5/8 3/8	1
		6	kathrein	782-10250			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
	145.0	1	andrew	SBNH-1D6565C			
		3	ericsson	RRUS 11			
		1	kmw communications	AM-X-CD-17-65-00T-RET			
		1	powerwave technologies	P65-17-XLH-RR			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 712-1]			
135.0	137.0	-	-	-	1	1-5/8	3
		3	alcatel lucent	RRH2X40-AWS	1	1-5/8	2
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	andrew	HBXX-6517DS-VTM w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	andrew	LNX-6512DS-VTM w/ Mount Pipe			
		6	andrew	CBC721-DF			
		3	antel	BXA-171063/8CF w/ Mount Pipe			
		3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	12	1-5/8	1
		6	rfs celwave	FD9R6004/2C-3L			
	135.0	1	tower mounts	Platform Mount [LP 712-1]			
125.0	126.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	KRY 112 144/1			
	125.0	1	tower mounts	Platform Mount [LP 712-1]	12	1-5/8	1
113.0	113.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 712-1]			
111.0	111.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]	-	-	1
	109.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
100.0	102.0	3	kathrein	800 10504 w/ Mount Pipe	1	3/8	1
	100.0	1	tower mounts	Platform Mount [LP 712-1]	6	7/8	
51.0	52.0	1	lucent	KS24019-L112A	1	1/2	1
	51.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Abandoned 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)
145	145	12	Allgon	7120.16	-	-
135	135	12	Allgon	7120.16	-	-
125	125	9	Allgon	7120.16	-	-
115	115	12	Allgon	7120.16	-	-
105	105	12	Allgon	7120.16	-	-
95	95	12	Allgon	7120.16	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti	1406209	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	URS	1405796	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	1405782	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	WEI	2048224	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	VS	2353860	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	CCI	4491288	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
144.5 - 139.5	Pole	TP22.09x21x0.1875	Pole	11.1%	Pass
139.5 - 134.5	Pole	TP23.179x22.09x0.1875	Pole	22.4%	Pass
134.5 - 129.5	Pole	TP24.269x23.179x0.1875	Pole	36.5%	Pass
129.5 - 124.5	Pole	TP25.358x24.269x0.1875	Pole	49.6%	Pass
124.5 - 121.46	Pole	TP26.875x25.358x0.1875	Pole	58.4%	Pass
121.46 - 116.46	Pole	TP26.718x25.646x0.25	Pole	55.4%	Pass

116.46 - 111.46	Pole	TP27.79x26.718x0.25	Pole	65.3%	Pass
111.46 - 106.46	Pole	TP28.863x27.79x0.25	Pole	76.2%	Pass
106.46 - 101.46	Pole	TP29.935x28.863x0.25	Pole	85.8%	Pass
101.46 - 98.5	Pole	TP30.57x29.935x0.25	Pole	91.4%	Pass
98.5 - 93.5	Pole + Reinf.	TP31.642x30.57x0.4	Reinf. 1 Compression	86.9%	Pass
93.5 - 91.84	Pole + Reinf.	TP33x31.642x0.4	Reinf. 1 Compression	89.5%	Pass
91.84 - 86.17	Pole	TP32.72x31.498x0.375	Pole	77.4%	Pass
86.17 - 81.17	Pole	TP33.798x32.72x0.375	Pole	81.7%	Pass
81.17 - 76.17	Pole	TP34.875x33.798x0.375	Pole	85.5%	Pass
76.17 - 71.17	Pole	TP35.952x34.875x0.375	Pole	88.9%	Pass
71.17 - 66.17	Pole	TP37.03x35.952x0.375	Pole	91.8%	Pass
66.17 - 61.17	Pole	TP38.107x37.03x0.375	Pole	94.4%	Pass
61.17 - 56.17	Pole	TP39.185x38.107x0.375	Pole	96.6%	Pass
56.17 - 51.17	Pole	TP40.262x39.185x0.375	Pole	98.6%	Pass
51.17 - 47.92	Pole	TP42.219x40.262x0.375	Pole	99.7%	Pass
47.92 - 41.09	Pole	TP41.679x40.212x0.4375	Pole	91.0%	Pass
41.09 - 36.09	Pole	TP42.752x41.679x0.4375	Pole	92.1%	Pass
36.09 - 31.09	Pole	TP43.826x42.752x0.4375	Pole	93.0%	Pass
31.09 - 26.09	Pole	TP44.899x43.826x0.4375	Pole	93.9%	Pass
26.09 - 21.09	Pole	TP45.972x44.899x0.4375	Pole	94.5%	Pass
21.09 - 16.09	Pole	TP47.046x45.972x0.4375	Pole	95.1%	Pass
16.09 - 11.09	Pole	TP48.119x47.046x0.4375	Pole	95.6%	Pass
11.09 - 6.09	Pole	TP49.193x48.119x0.4375	Pole	96.0%	Pass
6.09 - 1.09	Pole	TP50.266x49.193x0.4375	Pole	96.3%	Pass
1.09 - 0	Pole	TP50.5x50.266x0.4375	Pole	96.4%	Pass
				Summary	
			Pole	99.7%	Pass
			Reinforcement	89.5%	Pass
			Overall	99.7%	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	91.3	Pass
1	Base Plate	0	81.0	Pass
1	Base Foundation Soil Interaction	0	47.9	Pass

Structure Rating (max from all components) =	99.7%

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

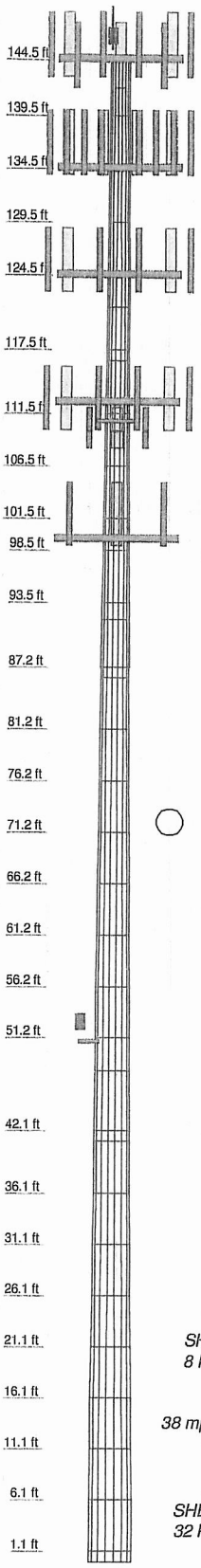
4.1) Recommendations

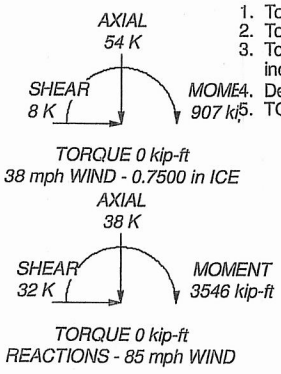
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads once the proposed modifications are installed.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.96	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.33	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1.00
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.1875	0.1875	0.1875	0.2500	0.2500	0.2500	0.2500	0.2500	0.4000	0.4000	0.3750	0.3750	0.3750	0.3750	0.3750	0.3750	0.3750	0.3750	0.3750	0.4375	0.4375	0.4375	0.4375	0.4375	0.4375	0.4375	0.4375	0.4375	0.4375
Socket Length (ft)					3.92							4.67									5.83										
Top Dia (in)	21.0000	22.0896	23.1792	24.2687	25.3583	26.4479	27.7985	28.8628	29.9352	30.5708	31.6426	33.0000	33.7205	33.7935	34.8751	35.9525	37.0299	38.1073	39.1847	40.2622	41.6768	42.7588	42.7522	43.8256	44.8990	45.9724	47.0458	48.1192	49.1926	50.2660	50.5080
Bot Dia (in)	22.0896	23.1792	24.2687	25.3583	26.4479	27.7985	28.8628	29.9352	30.5708	31.6426	33.0000	34.0696	33.7935	34.8751	35.9525	37.0299	38.1073	39.1847	40.2622	42.2188	42.7588	42.7522	43.8256	44.8990	45.9724	47.0458	48.1192	49.1926	50.2660	50.5080	50.5080
Grade	A572-65																														
Weight (K)	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.2	0.6	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	1.5	1.3	1.3	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	0.3





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 3/4" x 5'	145	LNX-6512DS-VTM w/ Mount Pipe	135
Flash Beacon Lighting	145	LNX-6512DS-VTM w/ Mount Pipe	135
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	145	DB-T1-6Z-8AB-0Z	135
		Platform Mount [LP 712-1]	135
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	145	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	145	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125
RRUS 11	145	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	125
RRUS 11	145	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	125
RRUS 11	145	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	125
(2) 782-10250	145	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	125
(2) 782-10250	145	KRY 112 144/1	125
(2) 782-10250	145	KRY 112 144/1	125
(2) 7770.00 w/ Mount Pipe	145	KRY 112 144/1	125
(2) 7770.00 w/ Mount Pipe	145	Platform Mount [LP 712-1]	125
(2) 7770.00 w/ Mount Pipe	145	APXVSPP18-C-A20 w/ Mount Pipe	113
(2) LGP13519	145	APXVSPP18-C-A20 w/ Mount Pipe	113
(2) LGP13519	145	APXVSPP18-C-A20 w/ Mount Pipe	113
(2) LGP13519	145	TD-RRH8x20-25	113
P65-17-XLH-RR	145	TD-RRH8x20-25	113
AM-X-CD-17-65-00T-RET	145	TD-RRH8x20-25	113
SBNH-1D6565C	145	APXVTM14-C-120 w/ Mount Pipe	113
DC6-48-60-18-8F	145	APXVTM14-C-120 w/ Mount Pipe	113
Platform Mount [LP 712-1]	145	APXVTM14-C-120 w/ Mount Pipe	113
8'x2" Antenna Mount Pipe	145	(2) 6' x 2" Mount Pipe	113
8'x2" Antenna Mount Pipe	145	(2) 6' x 2" Mount Pipe	113
8'x2" Antenna Mount Pipe	145	(2) 6' x 2" Mount Pipe	113
(2) CBC721-DF	135	Platform Mount [LP 712-1]	113
(2) CBC721-DF	135	800MHz 2X50W RRH W/FILTER	111
(2) CBC721-DF	135	800MHz 2X50W RRH W/FILTER	111
BXA-171063/8CF w/ Mount Pipe	135	800MHz 2X50W RRH W/FILTER	111
BXA-171063/8CF w/ Mount Pipe	135	PCS 1900MHz 4x45W-65MHz	111
BXA-171063/8CF w/ Mount Pipe	135	PCS 1900MHz 4x45W-65MHz	111
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	135	PCS 1900MHz 4x45W-65MHz	111
		Side Arm Mount [SO 102-3]	111
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	135	800 10504 w/ Mount Pipe	100
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	135	800 10504 w/ Mount Pipe	100
(2) FD9R6004/2C-3L	135	800 10504 w/ Mount Pipe	100
(2) FD9R6004/2C-3L	135	Platform Mount [LP 712-1]	100
(2) FD9R6004/2C-3L	135	6' x 2" Mount Pipe	100
RRH2X40-AWS	135	6' x 2" Mount Pipe	100
RRH2X40-AWS	135	6' x 2" Mount Pipe	100
RRH2X40-AWS	135	KS24019-L112A	51
HBXX-6517DS-VTM w/ Mount Pipe	135	Side Arm Mount [SO 701-1]	51
HBXX-6517DS-VTM w/ Mount Pipe	135		
HBXX-6517DS-VTM w/ Mount Pipe	135		
LNX-6512DS-VTM w/ Mount Pipe	135		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.7%

CROWN CASTLE
We Are Solutions
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: BU# 881533			
Project:			
Client: Crown Castle	Drawn by: chall	App'd:	
Code: TIA/EIA-222-F	Date: 05/19/14	Scale: NTS	
Path: X:\ENG Work Area\CHall\Production\Active\881533\shield\881533 mod.eri		Dwg No. E-1	

Tower Input Data

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

4) Tower is located in New London County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) TOWER RATING: 99.7%.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.333.
16) 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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice	
	Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	144.50-139.50	5.00	0.00	18	21.0000	22.0896	0.1875	0.7500	A572-65 (65 ksi)
L2	139.50-134.50	5.00	0.00	18	22.0896	23.1792	0.1875	0.7500	A572-65 (65 ksi)
L3	134.50-129.50	5.00	0.00	18	23.1792	24.2687	0.1875	0.7500	A572-65 (65 ksi)
L4	129.50-124.50	5.00	0.00	18	24.2687	25.3583	0.1875	0.7500	A572-65 (65 ksi)
L5	124.50-117.54	6.96	3.92	18	25.3583	26.8750	0.1875	0.7500	A572-65 (65 ksi)
L6	117.54-116.46	5.00	0.00	18	25.6458	26.7181	0.2500	1.0000	A572-65 (65 ksi)
L7	116.46-111.46	5.00	0.00	18	26.7181	27.7905	0.2500	1.0000	A572-65 (65 ksi)
L8	111.46-106.46	5.00	0.00	18	27.7905	28.8628	0.2500	1.0000	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L9	106.46-101.46	5.00	0.00	18	28.8628	29.9352	0.2500	1.0000	A572-65 (65 ksi)
L10	101.46-98.50	2.96	0.00	18	29.9352	30.5700	0.2500	1.0000	A572-65 (65 ksi)
L11	98.50-93.50	5.00	0.00	18	30.5700	31.6424	0.4000	1.6000	A572-65 (65 ksi)
L12	93.50-87.17	6.33	4.67	18	31.6424	33.0000	0.4000	1.6000	A572-65 (65 ksi)
L13	87.17-86.17	5.67	0.00	18	31.4984	32.7202	0.3750	1.5000	A572-65 (65 ksi)
L14	86.17-81.17	5.00	0.00	18	32.7202	33.7976	0.3750	1.5000	A572-65 (65 ksi)
L15	81.17-76.17	5.00	0.00	18	33.7976	34.8751	0.3750	1.5000	A572-65 (65 ksi)
L16	76.17-71.17	5.00	0.00	18	34.8751	35.9525	0.3750	1.5000	A572-65 (65 ksi)
L17	71.17-66.17	5.00	0.00	18	35.9525	37.0299	0.3750	1.5000	A572-65 (65 ksi)
L18	66.17-61.17	5.00	0.00	18	37.0299	38.1073	0.3750	1.5000	A572-65 (65 ksi)
L19	61.17-56.17	5.00	0.00	18	38.1073	39.1847	0.3750	1.5000	A572-65 (65 ksi)
L20	56.17-51.17	5.00	0.00	18	39.1847	40.2622	0.3750	1.5000	A572-65 (65 ksi)
L21	51.17-42.09	9.08	5.83	18	40.2622	42.2188	0.3750	1.5000	A572-65 (65 ksi)
L22	42.09-41.09	6.83	0.00	18	40.2125	41.6788	0.4375	1.7500	A572-65 (65 ksi)
L23	41.09-36.09	5.00	0.00	18	41.6788	42.7522	0.4375	1.7500	A572-65 (65 ksi)
L24	36.09-31.09	5.00	0.00	18	42.7522	43.8256	0.4375	1.7500	A572-65 (65 ksi)
L25	31.09-26.09	5.00	0.00	18	43.8256	44.8990	0.4375	1.7500	A572-65 (65 ksi)
L26	26.09-21.09	5.00	0.00	18	44.8990	45.9724	0.4375	1.7500	A572-65 (65 ksi)
L27	21.09-16.09	5.00	0.00	18	45.9724	47.0458	0.4375	1.7500	A572-65 (65 ksi)
L28	16.09-11.09	5.00	0.00	18	47.0458	48.1192	0.4375	1.7500	A572-65 (65 ksi)
L29	11.09-6.09	5.00	0.00	18	48.1192	49.1926	0.4375	1.7500	A572-65 (65 ksi)
L30	6.09-1.09	5.00	0.00	18	49.1926	50.2660	0.4375	1.7500	A572-65 (65 ksi)
L31	1.09-0.00	1.09		18	50.2660	50.5000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.3240	12.3860	677.8263	7.3884	10.6680	63.5383	1356.5444	6.1942	3.3660	17.952
	22.4303	13.0345	789.9536	7.7752	11.2215	70.3964	1580.9466	6.5185	3.5578	18.975
L2	22.4303	13.0345	789.9536	7.7752	11.2215	70.3964	1580.9466	6.5185	3.5578	18.975
	23.5367	13.6829	913.8108	8.1620	11.7750	77.6059	1828.8241	6.8428	3.7495	19.997
L3	23.5367	13.6829	913.8108	8.1620	11.7750	77.6059	1828.8241	6.8428	3.7495	19.997
	24.6431	14.3313	1049.9817	8.5488	12.3285	85.1669	2101.3449	7.1670	3.9413	21.02
L4	24.6431	14.3313	1049.9817	8.5488	12.3285	85.1669	2101.3449	7.1670	3.9413	21.02
	25.7495	14.9798	1199.0496	8.9356	12.8820	93.0793	2399.6769	7.4913	4.1331	22.043
L5	25.7495	14.9798	1199.0496	8.9356	12.8820	93.0793	2399.6769	7.4913	4.1331	22.043
	27.2896	15.8824	1429.1221	9.4741	13.6525	104.6784	2860.1246	7.9427	4.4000	23.467
L6	26.8951	20.1515	1641.9828	9.0155	13.0281	126.0344	3286.1262	10.0777	4.0737	16.295
	27.1303	21.0025	1858.8918	9.3962	13.5728	136.9570	3720.2296	10.5032	4.2624	17.05
L7	27.1303	21.0025	1858.8918	9.3962	13.5728	136.9570	3720.2296	10.5032	4.2624	17.05
	28.2192	21.8534	2094.1087	9.7769	14.1176	148.3335	4190.9728	10.9288	4.4511	17.805

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
L8	28.2192	21.8534	2094.1087	9.7769	14.1176	148.3335	4190.9728	10.9288	4.4511	17.805
	29.3081	22.7043	2348.3752	10.1576	14.6623	160.1639	4699.8404	11.3543	4.6399	18.559
L9	29.3081	22.7043	2348.3752	10.1576	14.6623	160.1639	4699.8404	11.3543	4.6399	18.559
	30.3970	23.5552	2622.4330	10.5382	15.2071	172.4481	5248.3167	11.7798	4.8286	19.314
L10	30.3970	23.5552	2622.4330	10.5382	15.2071	172.4481	5248.3167	11.7798	4.8286	19.314
	31.0416	24.0589	2794.3036	10.7636	15.5296	179.9343	5592.2840	12.0318	4.9403	19.761
L11	31.0416	38.3039	4404.8581	10.7104	15.5296	283.6431	8815.5122	19.1556	4.6763	11.691
	32.1305	39.6653	4891.4468	11.0911	16.0743	304.3016	9789.3298	19.8364	4.8651	12.163
L12	32.1305	39.6653	4891.4468	11.0911	16.0743	304.3016	9789.3298	19.8364	4.8651	12.163
	33.5091	41.3890	5557.2146	11.5730	16.7640	331.4969	11121.741 4	20.6984	5.1040	12.76
L13	33.0062	37.0446	4533.5405	11.0488	16.0012	283.3251	9073.0463	18.5258	4.8837	13.023
	33.2250	38.4989	5088.6862	11.4826	16.6219	306.1441	10184.068 2	19.2531	5.0988	13.597
L14	33.2250	38.4989	5088.6862	11.4826	16.6219	306.1441	10184.068 2	19.2531	5.0988	13.597
	34.3190	39.7813	5614.3259	11.8650	17.1692	326.9999	11236.039 2	19.8944	5.2884	14.102
L15	34.3190	39.7813	5614.3259	11.8650	17.1692	326.9999	11236.039 2	19.8944	5.2884	14.102
	35.4131	41.0637	6174.9712	12.2475	17.7165	348.5430	12358.067 6	20.5357	5.4780	14.608
L16	35.4131	41.0637	6174.9712	12.2475	17.7165	348.5430	12358.067 6	20.5357	5.4780	14.608
	36.5071	42.3461	6771.7506	12.6300	18.2639	370.7733	13552.411 6	21.1771	5.6676	15.114
L17	36.5071	42.3461	6771.7506	12.6300	18.2639	370.7733	13552.411 6	21.1771	5.6676	15.114
	37.6011	43.6285	7405.7925	13.0125	18.8112	393.6909	14821.329 7	21.8184	5.8573	15.619
L18	37.6011	43.6285	7405.7925	13.0125	18.8112	393.6909	14821.329 7	21.8184	5.8573	15.619
	38.6952	44.9109	8078.2254	13.3950	19.3585	417.2957	16167.080 2	22.4597	6.0469	16.125
L19	38.6952	44.9109	8078.2254	13.3950	19.3585	417.2957	16167.080 2	22.4597	6.0469	16.125
	39.7892	46.1933	8790.1777	13.7775	19.9058	441.5878	17591.921 7	23.1010	6.2365	16.631
L20	39.7892	46.1933	8790.1777	13.7775	19.9058	441.5878	17591.921 7	23.1010	6.2365	16.631
	40.8833	47.4757	9542.7779	14.1599	20.4532	466.5671	19098.112 3	23.7424	6.4261	17.136
L21	40.8833	47.4757	9542.7779	14.1599	20.4532	466.5671	19098.112 3	23.7424	6.4261	17.136
	42.8700	49.8045	11017.103 7	14.8545	21.4471	513.6867	22048.703 9	24.9070	6.7705	18.055
L22	42.1037	55.2325	11039.572 9	14.1201	20.4279	540.4154	22093.672 0	27.6215	6.3074	14.417
	42.3217	57.2686	12306.028 1	14.6406	21.1728	581.2186	24628.248 8	28.6398	6.5655	15.007
L23	42.3217	57.2686	12306.028 1	14.6406	21.1728	581.2186	24628.248 8	28.6398	6.5655	15.007
	43.4117	58.7592	13292.139 2	15.0217	21.7181	612.0306	26601.768 6	29.3852	6.7544	15.439
L24	43.4117	58.7592	13292.139 2	15.0217	21.7181	612.0306	26601.768 6	29.3852	6.7544	15.439
	44.5016	60.2497	14329.571 1	15.4028	22.2634	643.6385	28677.997 4	30.1306	6.9433	15.87
L25	44.5016	60.2497	14329.571 1	15.4028	22.2634	643.6385	28677.997 4	30.1306	6.9433	15.87
	45.5916	61.7403	15419.625 5	15.7838	22.8087	676.0421	30859.540 5	30.8760	7.1322	16.302
L26	45.5916	61.7403	15419.625 5	15.7838	22.8087	676.0421	30859.540 5	30.8760	7.1322	16.302
	46.6816	63.2309	16563.604 3	16.1649	23.3540	709.2416	33149.003 4	31.6214	7.3211	16.734
L27	46.6816	63.2309	16563.604 3	16.1649	23.3540	709.2416	33149.003 4	31.6214	7.3211	16.734
	47.7715	64.7214	17762.809 3	16.5459	23.8993	743.2369	35548.991 5	32.3669	7.5101	17.166

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
L28	47.7715	64.7214	17762.8093	16.5459	23.8993	743.2369	35548.9915	32.3669	7.5101	17.166
	48.8615	66.2120	19018.5426	16.9270	24.4445	778.0280	38062.1102	33.1123	7.6990	17.598
L29	48.8615	66.2120	19018.5426	16.9270	24.4445	778.0280	38062.1102	33.1123	7.6990	17.598
	49.9515	67.7025	20332.1058	17.3081	24.9898	813.6150	40690.9651	33.8577	7.8879	18.029
L30	49.9515	67.7025	20332.1058	17.3081	24.9898	813.6150	40690.9651	33.8577	7.8879	18.029
	51.0414	69.1931	21704.8009	17.6891	25.5351	849.9978	43438.1615	34.6031	8.0768	18.461
L31	51.0414	69.1931	21704.8009	17.6891	25.5351	849.9978	43438.1615	34.6031	8.0768	18.461
	51.2790	69.5180	22012.0267	17.7722	25.6540	858.0349	44053.0173	34.7656	8.1180	18.555

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
L1 144.50-139.50				1	1	1		
L2 139.50-134.50				1	1	1		
L3 134.50-129.50				1	1	1		
L4 129.50-124.50				1	1	1		
L5 124.50-117.54				1	1	1		
L6 117.54-116.46				1	1	1		
L7 116.46-111.46				1	1	1		
L8 111.46-106.46				1	1	1		
L9 106.46-101.46				1	1	1		
L10 101.46-98.50				1	1	1		
L11 98.50-93.50				1	1	0.96836		
L12 93.50-87.17				1	1	0.964492		
L13 87.17-86.17				1	1	1		
L14 86.17-81.17				1	1	1		
L15 81.17-76.17				1	1	1		
L16 76.17-71.17				1	1	1		
L17 71.17-66.17				1	1	1		
L18 66.17-61.17				1	1	1		
L19 61.17-56.17				1	1	1		
L20 56.17-51.17				1	1	1		
L21 51.17-42.09				1	1	1		
L22 42.09-41.09				1	1	1		
L23 41.09-36.09				1	1	1		
L24 36.09-				1	1	1		

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
31.09								
L25 31.09-26.09				1	1	1		
L26 26.09-21.09				1	1	1		
L27 21.09-16.09				1	1	1		
L28 16.09-11.09				1	1	1		
L29 11.09-6.09				1	1	1		
L30 6.09-1.09				1	1	1		
L31 1.09-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
**										
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	144.50 - 140.00	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	135.00 - 130.00	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	125.00 - 120.00	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	113.00 - 108.00	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	100.00 - 95.00	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96
**										
LDF7-50A(1-5/8")	C	No	Inside Pole	144.50 - 10.00	0.0000	0	1	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
CR 50 1873(1-5/8")	C	No	Inside Pole	144.50 - 10.00	0.0000	0	12	No Ice	0.00	0.83
								1/2" Ice	0.00	0.83

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
								1" Ice	0.00	0.83
								2" Ice	0.00	0.83
								4" Ice	0.00	0.83
FB-L98B-002-75000(3/8")	C	No	Inside Pole	144.50 - 10.00	0.0000	0	3	No Ice	0.00	0.06
								1/2" Ice	0.00	0.06
								1" Ice	0.00	0.06
								2" Ice	0.00	0.06
								4" Ice	0.00	0.06
2" Rigid Conduit	C	No	Inside Pole	144.50 - 10.00	0.0000	0	1	No Ice	0.00	2.80
								1/2" Ice	0.00	2.80
								1" Ice	0.00	2.80
								2" Ice	0.00	2.80
								4" Ice	0.00	2.80
*										
LDF7-50A(1-5/8")	A	No	Inside Pole	135.00 - 0.00	0.0000	0	12	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	135.00 - 0.00	0.0000	0	1	No Ice	0.20	1.30
								1/2" Ice	0.30	2.81
								1" Ice	0.40	4.94
								2" Ice	0.60	11.02
								4" Ice	1.00	30.52
*										
LDF7-50A(1-5/8")	B	No	Inside Pole	125.00 - 10.00	0.0000	0	10	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	B	No	Inside Pole	125.00 - 10.00	0.0000	0	1	No Ice	0.00	1.07
								1/2" Ice	0.00	1.07
								1" Ice	0.00	1.07
								2" Ice	0.00	1.07
								4" Ice	0.00	1.07
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	125.00 - 10.00	0.0000	0	1	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	125.00 - 10.00	0.0000	0	1	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
*										
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	113.00 - 0.00	0.0000	0	3	No Ice	0.00	1.08
								1/2" Ice	0.00	1.08
								1" Ice	0.00	1.08
								2" Ice	0.00	1.08
								4" Ice	0.00	1.08
HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	113.00 - 0.00	0.0000	0	1	No Ice	0.00	1.22
								1/2" Ice	0.00	1.22
								1" Ice	0.00	1.22
								2" Ice	0.00	1.22
								4" Ice	0.00	1.22
*										
FXL 780 PE(7/8)	B	No	CaAa (Out Of Face)	100.00 - 10.00	0.0000	0	6	No Ice	0.00	0.25
								1/2" Ice	0.00	1.22
								1" Ice	0.00	2.80
								2" Ice	0.00	7.80
								4" Ice	0.00	25.12
840 10414(3/8)	B	No	CaAa (Out Of Face)	100.00 - 10.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.54
								1" Ice	0.00	1.68
								2" Ice	0.00	5.81
								4" Ice	0.00	21.38
*										
LDF4-	C	No	CaAa (Out Of Face)	51.00 - 0.00	0.0000	0	1	No Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
50A(1/2")								1/2" Ice	0.00	0.84
								1" Ice	0.00	2.14
								2" Ice	0.00	6.58
								4" Ice	0.00	22.78
*										
CCI-65FP-045100	A	No	CaAa (Out Of Face)	100.00 - 90.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
CCI-65FP-045100	B	No	CaAa (Out Of Face)	100.00 - 90.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
CCI-65FP-045100	C	No	CaAa (Out Of Face)	100.00 - 90.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	144.50-139.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.630	0.02
		C	0.000	0.000	0.000	0.000	0.07
L2	139.50-134.50	A	0.000	0.000	0.000	0.099	0.01
		B	0.000	0.000	0.000	0.292	0.00
		C	0.000	0.000	0.000	0.000	0.07
L3	134.50-129.50	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	2.630	0.02
		C	0.000	0.000	0.000	0.000	0.07
L4	129.50-124.50	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.391	0.01
		C	0.000	0.000	0.000	0.000	0.07
L5	124.50-117.54	A	0.000	0.000	0.000	1.378	0.08
		B	0.000	0.000	0.000	4.008	0.10
		C	0.000	0.000	0.000	0.000	0.10
L6	117.54-116.46	A	0.000	0.000	0.000	0.214	0.01
		B	0.000	0.000	0.000	0.214	0.01
		C	0.000	0.000	0.000	0.000	0.01
L7	116.46-111.46	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	1.890	0.06
		C	0.000	0.000	0.000	0.000	0.08
L8	111.46-106.46	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	3.012	0.07
		C	0.000	0.000	0.000	0.000	0.09
L9	106.46-101.46	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.05
		C	0.000	0.000	0.000	0.000	0.09
L10	101.46-98.50	A	0.000	0.000	0.000	0.586	0.03
		B	0.000	0.000	0.000	1.463	0.04
		C	0.000	0.000	0.000	0.000	0.05
L11	98.50-93.50	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	3.035	0.08
		C	0.000	0.000	0.000	0.000	0.09
L12	93.50-87.17	A	0.000	0.000	0.000	1.253	0.07
		B	0.000	0.000	0.000	1.253	0.08
		C	0.000	0.000	0.000	0.000	0.12
L13	87.17-86.17	A	0.000	0.000	0.000	0.198	0.01
		B	0.000	0.000	0.000	0.198	0.01
		C	0.000	0.000	0.000	0.000	0.02

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
L14	86.17-81.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L15	81.17-76.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L16	76.17-71.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L17	71.17-66.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L18	66.17-61.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L19	61.17-56.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L20	56.17-51.17	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L21	51.17-42.09	A	0.000	0.000	0.000	1.798	0.10
		B	0.000	0.000	0.000	1.798	0.11
		C	0.000	0.000	0.000	0.000	0.17
L22	42.09-41.09	A	0.000	0.000	0.000	0.198	0.01
		B	0.000	0.000	0.000	0.198	0.01
		C	0.000	0.000	0.000	0.000	0.02
L23	41.09-36.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L24	36.09-31.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L25	31.09-26.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L26	26.09-21.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L27	21.09-16.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L28	16.09-11.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.990	0.06
		C	0.000	0.000	0.000	0.000	0.09
L29	11.09-6.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.216	0.01
		C	0.000	0.000	0.000	0.000	0.04
L30	6.09-1.09	A	0.000	0.000	0.000	0.990	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L31	1.09-0.00	A	0.000	0.000	0.000	0.216	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01

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	144.50-139.50	A	0.894	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	6.215	0.04
		C		0.000	0.000	0.000	0.000	0.07
L2	139.50-134.50	A	0.890	0.000	0.000	0.000	0.188	0.01
		B		0.000	0.000	0.000	0.689	0.00
		C		0.000	0.000	0.000	0.000	0.07

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
L3	134.50-129.50	A	0.886	0.000	0.000	0.000	1.876	0.07
		B		0.000	0.000	0.000	6.183	0.04
		C		0.000	0.000	0.000	0.000	0.07
L4	129.50-124.50	A	0.882	0.000	0.000	0.000	1.872	0.07
		B		0.000	0.000	0.000	0.872	0.01
		C		0.000	0.000	0.000	0.000	0.07
L5	124.50-117.54	A	0.877	0.000	0.000	0.000	2.598	0.10
		B		0.000	0.000	0.000	8.745	0.16
		C		0.000	0.000	0.000	0.000	0.10
L6	117.54-116.46	A	0.873	0.000	0.000	0.000	0.403	0.02
		B		0.000	0.000	0.000	0.403	0.02
		C		0.000	0.000	0.000	0.000	0.01
L7	116.46-111.46	A	0.870	0.000	0.000	0.000	1.860	0.07
		B		0.000	0.000	0.000	3.955	0.10
		C		0.000	0.000	0.000	0.000	0.08
L8	111.46-106.46	A	0.866	0.000	0.000	0.000	1.856	0.07
		B		0.000	0.000	0.000	6.548	0.12
		C		0.000	0.000	0.000	0.000	0.09
L9	106.46-101.46	A	0.861	0.000	0.000	0.000	1.851	0.07
		B		0.000	0.000	0.000	1.851	0.09
		C		0.000	0.000	0.000	0.000	0.09
L10	101.46-98.50	A	0.857	0.000	0.000	0.000	1.093	0.04
		B		0.000	0.000	0.000	3.116	0.09
		C		0.000	0.000	0.000	0.000	0.05
L11	98.50-93.50	A	0.853	0.000	0.000	0.000	1.843	0.07
		B		0.000	0.000	0.000	6.548	0.19
		C		0.000	0.000	0.000	0.000	0.09
L12	93.50-87.17	A	0.846	0.000	0.000	0.000	2.325	0.09
		B		0.000	0.000	0.000	2.325	0.20
		C		0.000	0.000	0.000	0.000	0.12
L13	87.17-86.17	A	0.842	0.000	0.000	0.000	0.367	0.01
		B		0.000	0.000	0.000	0.367	0.03
		C		0.000	0.000	0.000	0.000	0.02
L14	86.17-81.17	A	0.839	0.000	0.000	0.000	1.829	0.07
		B		0.000	0.000	0.000	1.829	0.16
		C		0.000	0.000	0.000	0.000	0.09
L15	81.17-76.17	A	0.832	0.000	0.000	0.000	1.822	0.07
		B		0.000	0.000	0.000	1.822	0.16
		C		0.000	0.000	0.000	0.000	0.09
L16	76.17-71.17	A	0.826	0.000	0.000	0.000	1.816	0.07
		B		0.000	0.000	0.000	1.816	0.16
		C		0.000	0.000	0.000	0.000	0.09
L17	71.17-66.17	A	0.819	0.000	0.000	0.000	1.809	0.07
		B		0.000	0.000	0.000	1.809	0.16
		C		0.000	0.000	0.000	0.000	0.09
L18	66.17-61.17	A	0.812	0.000	0.000	0.000	1.802	0.07
		B		0.000	0.000	0.000	1.802	0.16
		C		0.000	0.000	0.000	0.000	0.09
L19	61.17-56.17	A	0.804	0.000	0.000	0.000	1.794	0.07
		B		0.000	0.000	0.000	1.794	0.15
		C		0.000	0.000	0.000	0.000	0.09
L20	56.17-51.17	A	0.795	0.000	0.000	0.000	1.785	0.07
		B		0.000	0.000	0.000	1.785	0.15
		C		0.000	0.000	0.000	0.000	0.09
L21	51.17-42.09	A	0.782	0.000	0.000	0.000	3.217	0.13
		B		0.000	0.000	0.000	3.217	0.27
		C		0.000	0.000	0.000	0.000	0.18
L22	42.09-41.09	A	0.771	0.000	0.000	0.000	0.354	0.01
		B		0.000	0.000	0.000	0.354	0.03
		C		0.000	0.000	0.000	0.000	0.02
L23	41.09-36.09	A	0.764	0.000	0.000	0.000	1.754	0.07
		B		0.000	0.000	0.000	1.754	0.15
		C		0.000	0.000	0.000	0.000	0.10
L24	36.09-31.09	A	0.752	0.000	0.000	0.000	1.742	0.07
		B		0.000	0.000	0.000	1.742	0.15
		C		0.000	0.000	0.000	0.000	0.10
L25	31.09-26.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	1.740	0.15
		C		0.000	0.000	0.000	0.000	0.10

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
L26	26.09-21.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	1.740	0.15
		C		0.000	0.000	0.000	0.000	0.10
L27	21.09-16.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	1.740	0.15
		C		0.000	0.000	0.000	0.000	0.10
L28	16.09-11.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	1.740	0.15
		C		0.000	0.000	0.000	0.000	0.10
L29	11.09-6.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	0.379	0.03
		C		0.000	0.000	0.000	0.000	0.04
L30	6.09-1.09	A	0.750	0.000	0.000	0.000	1.740	0.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.03
L31	1.09-0.00	A	0.750	0.000	0.000	0.000	0.379	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	144.50-139.50	0.5271	0.3043	0.9072	0.5238
L2	139.50-134.50	0.0745	0.0139	0.1561	0.0409
L3	134.50-129.50	0.4990	0.0707	0.8481	0.1919
L4	129.50-124.50	0.0914	-0.2092	0.1729	-0.3203
L5	124.50-117.54	0.5481	0.0974	0.8923	0.2068
L6	117.54-116.46	0.2182	-0.1260	0.3457	-0.1996
L7	116.46-111.46	0.3942	-0.0093	0.6567	0.0250
L8	111.46-106.46	0.5821	0.1143	0.9554	0.2376
L9	106.46-101.46	0.2214	-0.1278	0.3534	-0.2040
L10	101.46-98.50	0.5052	0.0587	0.8465	0.1469
L11	98.50-93.50	0.5996	0.1196	0.9957	0.2502
L12	93.50-87.17	0.2242	-0.1295	0.3600	-0.2079
L13	87.17-86.17	0.2245	-0.1296	0.3608	-0.2083
L14	86.17-81.17	0.2251	-0.1299	0.3615	-0.2087
L15	81.17-76.17	0.2259	-0.1304	0.3633	-0.2098
L16	76.17-71.17	0.2268	-0.1309	0.3649	-0.2107
L17	71.17-66.17	0.2276	-0.1314	0.3664	-0.2115
L18	66.17-61.17	0.2283	-0.1318	0.3676	-0.2122
L19	61.17-56.17	0.2290	-0.1322	0.3686	-0.2128
L20	56.17-51.17	0.2297	-0.1326	0.3693	-0.2132
L21	51.17-42.09	0.2306	-0.1332	0.3700	-0.2136
L22	42.09-41.09	0.2308	-0.1333	0.3706	-0.2139
L23	41.09-36.09	0.2312	-0.1335	0.3688	-0.2129
L24	36.09-31.09	0.2318	-0.1338	0.3685	-0.2128
L25	31.09-26.09	0.2323	-0.1341	0.3699	-0.2136
L26	26.09-21.09	0.2329	-0.1344	0.3715	-0.2145
L27	21.09-16.09	0.2334	-0.1347	0.3730	-0.2154
L28	16.09-11.09	0.2339	-0.1350	0.3745	-0.2162
L29	11.09-6.09	0.0525	-0.2500	0.0861	-0.4101
L30	6.09-1.09	0.0000	-0.2835	0.0000	-0.4685
L31	1.09-0.00	0.0000	-0.2836	0.0000	-0.4691

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**									
Lighting Rod 3/4" x 5'	C	From Leg	0.00 0.00 2.50	0.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.38 0.89 1.36 1.99 3.38	0.38 0.89 1.36 1.99 3.38	0.03 0.03 0.04 0.07 0.16
Flash Beacon Lighting	C	From Leg	0.00 0.00 1.00	0.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 3.10 3.50 4.30 5.90	2.70 3.10 3.50 4.30 5.90	0.05 0.07 0.09 0.13 0.21
**									
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	A	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	B	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	C	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
RRUS 11	A	From Leg	4.00 0.00 0.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	0.00 0.00 0.00 0.00 0.00	0.05 0.07 0.09 0.15 0.31
RRUS 11	B	From Leg	4.00 0.00 0.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	0.00 0.00 0.00 0.00 0.00	0.05 0.07 0.09 0.15 0.31
RRUS 11	C	From Leg	4.00 0.00 0.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	0.00 0.00 0.00 0.00 0.00	0.05 0.07 0.09 0.15 0.31
(2) 782-10250	A	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.52 0.63 0.75 1.01 1.63	0.00 0.00 0.00 0.00 0.00	0.01 0.01 0.02 0.03 0.09
(2) 782-10250	B	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.52 0.63 0.75 1.01 1.63	0.00 0.00 0.00 0.00 0.00	0.01 0.01 0.02 0.03 0.09
(2) 782-10250	C	From Leg	4.00 0.00 1.00	90.00	145.00	No Ice 1/2" Ice	0.52 0.63 0.75	0.00 0.00 0.00	0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	1.01	0.00	0.03
						2" Ice	1.63	0.00	0.09
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	145.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			1.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.00	145.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			1.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.00	145.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			1.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) LGP13519	A	From Leg	4.00	90.00	145.00	No Ice	0.34	0.00	0.01
			0.00			1/2"	0.42	0.00	0.01
			1.00			Ice	0.51	0.00	0.01
						1" Ice	0.73	0.00	0.02
						2" Ice	1.25	0.00	0.07
						4" Ice			
(2) LGP13519	B	From Leg	4.00	90.00	145.00	No Ice	0.34	0.00	0.01
			0.00			1/2"	0.42	0.00	0.01
			1.00			Ice	0.51	0.00	0.01
						1" Ice	0.73	0.00	0.02
						2" Ice	1.25	0.00	0.07
						4" Ice			
(2) LGP13519	C	From Leg	4.00	90.00	145.00	No Ice	0.34	0.00	0.01
			0.00			1/2"	0.42	0.00	0.01
			1.00			Ice	0.51	0.00	0.01
						1" Ice	0.73	0.00	0.02
						2" Ice	1.25	0.00	0.07
						4" Ice			
P65-17-XLH-RR	A	From Leg	4.00	0.00	145.00	No Ice	11.47	6.80	0.06
			0.00			1/2"	12.08	7.38	0.12
			0.00			Ice	12.71	7.98	0.19
						1" Ice	14.07	9.18	0.35
						2" Ice	17.08	11.68	0.78
						4" Ice			
AM-X-CD-17-65-00T-RET	B	From Leg	4.00	0.00	145.00	No Ice	11.31	6.80	0.06
			0.00			1/2"	11.93	7.38	0.12
			0.00			Ice	12.55	7.98	0.19
						1" Ice	13.88	9.18	0.35
						2" Ice	16.88	11.68	0.77
						4" Ice			
SBNH-1D6565C	C	From Leg	4.00	0.00	145.00	No Ice	11.41	7.70	0.06
			0.00			1/2"	12.03	8.29	0.13
			0.00			Ice	12.65	8.89	0.20
						1" Ice	13.98	10.11	0.37
						2" Ice	17.00	12.65	0.81
						4" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.00	145.00	No Ice	1.27	1.27	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.66	1.66	0.05
						1" Ice	2.09	2.09	0.10
						2" Ice	3.10	3.10	0.21
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.00	145.00	No Ice	24.53	24.53	1.34
						1/2"	29.94	29.94	1.65

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
						Ice	35.35	35.35	1.96
						1" Ice	46.17	46.17	2.58
						2" Ice	67.81	67.81	3.82
						4" Ice			
8'x2" Antenna Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	0.03 0.04 0.06 0.12 0.30
8'x2" Antenna Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	0.03 0.04 0.06 0.12 0.30
8'x2" Antenna Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	0.03 0.04 0.06 0.12 0.30
*									
(2) CBC721-DF	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.45 0.54 0.64 0.87 1.44	0.12 0.18 0.26 0.43 0.88	0.00 0.01 0.01 0.02 0.07
(2) CBC721-DF	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.45 0.54 0.64 0.87 1.44	0.12 0.18 0.26 0.43 0.88	0.00 0.01 0.01 0.02 0.07
(2) CBC721-DF	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.45 0.54 0.64 0.87 1.44	0.12 0.18 0.26 0.43 0.88	0.00 0.01 0.01 0.02 0.07
BXA-171063/8CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
BXA-171063/8CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
BXA-171063/8CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80

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
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
RRH2X40-AWS	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0.04 0.06 0.08 0.13 0.28
RRH2X40-AWS	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0.04 0.06 0.08 0.13 0.28
RRH2X40-AWS	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0.04 0.06 0.08 0.13 0.28
HBXX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
HBXX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
HBXX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91

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
LNX-6512DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	135.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.79 6.25 6.71 7.67 9.72	4.50 5.17 5.85 7.27 10.37	0.04 0.09 0.14 0.27 0.64
LNX-6512DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.79 6.25 6.71 7.67 9.72	4.50 5.17 5.85 7.27 10.37	0.04 0.09 0.14 0.27 0.64
LNX-6512DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.79 6.25 6.71 7.67 9.72	4.50 5.17 5.85 7.27 10.37	0.04 0.09 0.14 0.27 0.64
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 2.00	0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
Platform Mount [LP 712-1]	C	None		0.00	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
*									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice 1/2" Ice	6.83 7.35 7.86	5.64 6.48 7.26	0.11 0.17 0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
KRY 112 144/1	A	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
KRY 112 144/1	B	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
KRY 112 144/1	C	From Leg	4.00 0.00 1.00	0.00	125.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
Platform Mount [LP 712-1]	C	None		0.00	125.00	No Ice	24.53	24.53	1.34
						1/2" Ice	29.94	29.94	1.65
						1" Ice	35.35	35.35	1.96
						2" Ice	46.17	46.17	2.58
						4" Ice	67.81	67.81	3.82
*									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.15	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.15	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.15	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
APXVTM14-C-120 w/	A	From Leg	4.00	0.00	113.00	No Ice	7.13	4.96	0.07

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
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	7.66 8.18 9.26 11.53	5.75 6.47 8.01 11.41	0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.07 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.07 0.13 0.19 0.34 0.75
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Platform Mount [LP 712-1]	C	None		0.00	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
*									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 -2.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 -2.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 -2.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0.00 0.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35

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
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0.00 0.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0.00 0.00	0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 102-3]	C	None		0.00	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
*									
800 10504 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
800 10504 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
800 10504 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
Platform Mount [LP 712-1]	C	None		0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
*									
KS24019-L112A	C	From Leg	2.00 0.00	0.00	51.00	No Ice 1/2"	0.10 0.18	0.10 0.18	0.01 0.01

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
			1.00			Ice	0.26	0.26	0.01
						1" Ice	0.42	0.42	0.01
						2" Ice	0.74	0.74	0.02
						4" Ice			
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0.00 0.00	-15.00	51.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	144.5 - 139.5	Pole	Max Tension	14	0.00	0.00	-0.00
			Max. Compression	14	-4.81	-0.11	-0.21
			Max. Mx	5	-2.10	-32.80	-0.15
			Max. My	8	-2.09	-0.14	-33.01
			Max. Vy	5	5.83	-32.80	-0.15
			Max. Vx	2	-5.86	0.05	32.82
			Max. Torque	5			-0.33
L2	139.5 - 134.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-9.31	-0.12	0.34
			Max. Mx	5	-3.86	-72.97	-0.09
			Max. My	2	-3.82	0.13	73.71
			Max. Vy	5	11.35	-72.97	-0.09
			Max. Vx	2	-11.53	0.13	73.71
			Max. Torque	5			-0.33
L3	134.5 - 129.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-9.86	-0.16	0.34
			Max. Mx	5	-4.21	-130.98	-0.18
			Max. My	2	-4.18	0.20	132.61
			Max. Vy	5	11.85	-130.98	-0.18
			Max. Vx	2	-12.03	0.20	132.61
			Max. Torque	11			-0.19
L4	129.5 - 124.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.64	-0.17	0.36
			Max. Mx	5	-6.29	-194.50	-0.26
			Max. My	2	-6.25	0.28	197.05
			Max. Vy	5	15.33	-194.50	-0.26
			Max. Vx	2	-15.52	0.28	197.05
			Max. Torque	11			-0.20
L5	124.5 - 117.54	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.05	-0.21	0.35
			Max. Mx	5	-6.57	-241.58	-0.31
			Max. My	2	-6.53	0.32	244.68
			Max. Vy	5	15.64	-241.58	-0.31
			Max. Vx	2	-15.83	0.32	244.68
			Max. Torque	11			-0.20
L6	117.54 - 116.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.12	-0.27	0.34
			Max. Mx	5	-7.30	-321.20	-0.40
			Max. My	2	-7.27	0.39	325.20
			Max. Vy	5	16.18	-321.20	-0.40
			Max. Vx	2	-16.37	0.39	325.20
			Max. Torque	11			-0.19
L7	116.46 - 111.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.52	-0.32	0.34
			Max. Mx	5	-9.61	-409.35	-0.49
			Max. My	2	-9.58	0.46	414.26
			Max. Vy	5	20.59	-409.35	-0.49
			Max. Vx	2	-20.78	0.46	414.26
			Max. Torque	6			0.20
L8	111.46 - 106.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.09	-0.39	0.32
			Max. Mx	5	-10.62	-516.75	-0.58
			Max. My	2	-10.59	0.52	522.57
			Max. Vy	5	21.94	-516.75	-0.58
			Max. Vx	2	-22.13	0.52	522.57
			Max. Torque	6			0.21
L9	106.46 - 101.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.89	-0.43	0.32
			Max. Mx	5	-11.30	-627.48	-0.67
			Max. My	2	-11.27	0.60	634.23

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	22.36	-627.48	-0.67
			Max. Vx	2	-22.55	0.60	634.23
			Max. Torque	6			0.22
L10	101.46 - 98.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.70	-0.50	0.30
			Max. Mx	5	-13.08	-697.66	-0.72
			Max. My	2	-13.05	0.64	704.95
			Max. Vy	5	24.45	-697.66	-0.72
			Max. Vx	2	-24.64	0.64	704.95
			Max. Torque	6			0.22
L11	98.5 - 93.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.87	-0.67	0.23
			Max. Mx	5	-14.01	-821.25	-0.82
			Max. My	2	-13.98	0.69	829.43
			Max. Vy	5	24.99	-821.25	-0.82
			Max. Vx	2	-25.18	0.69	829.43
			Max. Torque	6			0.23
L12	93.5 - 87.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.25	-0.71	0.22
			Max. Mx	5	-14.31	-862.85	-0.85
			Max. My	2	-14.28	0.71	871.34
			Max. Vy	5	25.14	-862.85	-0.85
			Max. Vx	2	-25.33	0.71	871.34
			Max. Torque	6			0.23
L13	87.17 - 86.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.33	-0.86	0.16
			Max. Mx	5	-15.94	-1007.08	-0.95
			Max. My	2	-15.91	0.79	1016.62
			Max. Vy	5	25.73	-1007.08	-0.95
			Max. Vx	2	-25.92	0.79	1016.62
			Max. Torque	6			0.24
L14	86.17 - 81.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.49	-1.00	0.11
			Max. Mx	5	-16.91	-1136.77	-1.04
			Max. My	2	-16.88	0.86	1147.24
			Max. Vy	5	26.16	-1136.77	-1.04
			Max. Vx	2	-26.35	0.86	1147.24
			Max. Torque	6			0.25
L15	81.17 - 76.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.68	-1.14	0.06
			Max. Mx	5	-17.91	-1268.60	-1.13
			Max. My	2	-17.88	0.93	1279.99
			Max. Vy	5	26.59	-1268.60	-1.13
			Max. Vx	2	-26.77	0.93	1279.99
			Max. Torque	6			0.26
L16	76.17 - 71.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.89	-1.28	0.01
			Max. Mx	5	-18.93	-1402.54	-1.22
			Max. My	2	-18.90	0.99	1414.86
			Max. Vy	5	27.01	-1402.54	-1.22
			Max. Vx	2	-27.19	0.99	1414.86
			Max. Torque	6			0.27
L17	71.17 - 66.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.13	-1.42	-0.04
			Max. Mx	5	-19.98	-1538.57	-1.31
			Max. My	2	-19.96	1.06	1551.80
			Max. Vy	5	27.42	-1538.57	-1.31
			Max. Vx	8	27.61	-1.69	-1551.67
			Max. Torque	6			0.28
L18	66.17 - 61.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.39	-1.57	-0.09
			Max. Mx	5	-21.06	-1676.63	-1.40

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-21.04	1.13	1690.79
			Max. Vy	5	27.82	-1676.63	-1.40
			Max. Vx	8	28.01	-1.80	-1690.66
			Max. Torque	6			0.28
L19	61.17 - 56.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.68	-1.72	-0.15
			Max. Mx	5	-22.16	-1816.70	-1.49
			Max. My	2	-22.14	1.19	1831.77
			Max. Vy	5	28.22	-1816.70	-1.49
			Max. Vx	8	28.41	-1.91	-1831.65
			Max. Torque	6			0.29
L20	56.17 - 51.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.99	-1.87	-0.20
			Max. Mx	5	-23.29	-1958.73	-1.58
			Max. My	2	-23.27	1.26	1974.71
			Max. Vy	5	28.61	-1958.73	-1.58
			Max. Vx	8	28.79	-2.02	-1974.59
			Max. Torque	6			0.30
L21	51.17 - 42.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.95	-1.74	-0.37
			Max. Mx	5	-24.11	-2052.05	-1.78
			Max. My	8	-24.09	-1.97	-2068.77
			Max. Vy	5	28.90	-2052.05	-1.78
			Max. Vx	8	29.08	-1.97	-2068.77
			Max. Torque	6			0.30
L22	42.09 - 41.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.18	-1.94	-0.46
			Max. Mx	5	-26.76	-2251.54	-2.00
			Max. My	8	-26.74	-2.22	-2269.52
			Max. Vy	5	29.52	-2251.54	-2.00
			Max. Vx	8	29.70	-2.22	-2269.52
			Max. Torque	6			0.16
L23	41.09 - 36.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.68	-2.08	-0.52
			Max. Mx	5	-28.07	-2399.97	-2.16
			Max. My	8	-28.06	-2.40	-2418.86
			Max. Vy	5	29.87	-2399.97	-2.16
			Max. Vx	8	30.06	-2.40	-2418.86
			Max. Torque	6			0.17
L24	36.09 - 31.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.21	-2.23	-0.58
			Max. Mx	5	-29.42	-2550.13	-2.33
			Max. My	8	-29.41	-2.59	-2569.92
			Max. Vy	5	30.21	-2550.13	-2.33
			Max. Vx	8	30.39	-2.59	-2569.92
			Max. Torque	6			0.18
L25	31.09 - 26.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.77	-2.38	-0.64
			Max. Mx	5	-30.79	-2701.96	-2.49
			Max. My	8	-30.78	-2.77	-2722.67
			Max. Vy	5	30.54	-2701.96	-2.49
			Max. Vx	8	30.73	-2.77	-2722.67
			Max. Torque	6			0.19
L26	26.09 - 21.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.36	-2.53	-0.71
			Max. Mx	5	-32.18	-2855.48	-2.65
			Max. My	8	-32.18	-2.95	-2877.08
			Max. Vy	5	30.88	-2855.48	-2.65
			Max. Vx	8	31.06	-2.95	-2877.08
			Max. Torque	6			0.20
L27	21.09 -	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	16.09						
			Max. Compression	14	-48.98	-2.68	-0.77
			Max. Mx	5	-33.61	-3010.67	-2.81
			Max. My	8	-33.60	-3.14	-3033.17
			Max. Vy	5	31.22	-3010.67	-2.81
			Max. Vx	8	31.40	-3.14	-3033.17
			Max. Torque	6			0.21
L28	16.09 - 11.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.64	-2.84	-0.84
			Max. Mx	5	-35.06	-3167.54	-2.97
			Max. My	8	-35.05	-3.32	-3190.93
			Max. Vy	5	31.55	-3167.54	-2.97
			Max. Vx	8	31.73	-3.32	-3190.93
			Max. Torque	6			0.22
L29	11.09 - 6.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.15	-2.87	-0.83
			Max. Mx	5	-36.43	-3326.01	-3.12
			Max. My	8	-36.43	-3.48	-3350.30
			Max. Vy	5	31.86	-3326.01	-3.12
			Max. Vx	8	32.05	-3.48	-3350.30
			Max. Torque	6			0.22
L30	6.09 - 1.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.65	-2.85	-0.80
			Max. Mx	5	-37.80	-3486.02	-3.26
			Max. My	8	-37.80	-3.63	-3511.20
			Max. Vy	5	32.17	-3486.02	-3.26
			Max. Vx	8	32.35	-3.63	-3511.20
			Max. Torque	6			0.23
L31	1.09 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.98	-2.85	-0.79
			Max. Mx	5	-38.10	-3521.11	-3.29
			Max. My	8	-38.10	-3.67	-3546.48
			Max. Vy	5	32.24	-3521.11	-3.29
			Max. Vx	8	32.42	-3.67	-3546.48
			Max. Torque	6			0.24

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	53.98	0.01	7.95
	Max. H_x	11	38.12	32.22	0.03
	Max. H_z	2	38.12	0.03	32.40
	Max. M_x	2	3546.40	0.03	32.40
	Max. M_z	5	3521.11	-32.22	-0.03
	Max. Torsion	6	0.24	-27.92	-16.23
	Min. Vert	1	38.12	0.00	0.00
	Min. H_x	5	38.12	-32.22	-0.03
	Min. H_z	8	38.12	-0.03	-32.40
	Min. M_x	8	-3546.48	-0.03	-32.40
	Min. M_z	11	-3520.28	32.22	0.03
	Min. Torsion	12	-0.22	27.92	16.23

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	38.12	0.00	0.00	0.04	-0.40	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - No Ice	38.12	-0.03	-32.40	-3546.40	2.84	0.13
Dead+Wind 30 deg - No Ice	38.12	16.08	-28.05	-3069.68	-1757.91	0.03
Dead+Wind 60 deg - No Ice	38.12	27.89	-16.17	-1770.42	-3047.79	-0.09
Dead+Wind 90 deg - No Ice	38.12	32.22	0.03	3.29	-3521.11	-0.19
Dead+Wind 120 deg - No Ice	38.12	27.92	16.23	1776.12	-3051.02	-0.24
Dead+Wind 150 deg - No Ice	38.12	16.14	28.08	3073.00	-1763.53	-0.22
Dead+Wind 180 deg - No Ice	38.12	0.03	32.40	3546.48	-3.67	-0.13
Dead+Wind 210 deg - No Ice	38.12	-16.08	28.05	3069.77	1757.08	-0.01
Dead+Wind 240 deg - No Ice	38.12	-27.89	16.17	1770.50	3046.96	0.10
Dead+Wind 270 deg - No Ice	38.12	-32.22	-0.03	-3.21	3520.28	0.19
Dead+Wind 300 deg - No Ice	38.12	-27.92	-16.23	-1776.04	3050.19	0.22
Dead+Wind 330 deg - No Ice	38.12	-16.14	-28.08	-3072.92	1762.70	0.20
Dead+Ice+Temp	53.98	0.00	-0.00	0.79	-2.85	0.00
Dead+Wind 0 deg+Ice+Temp	53.98	-0.01	-7.95	-904.91	-2.26	0.08
Dead+Wind 30 deg+Ice+Temp	53.98	3.95	-6.88	-783.19	-452.52	0.06
Dead+Wind 60 deg+Ice+Temp	53.98	6.85	-3.97	-451.38	-782.33	0.02
Dead+Wind 90 deg+Ice+Temp	53.98	7.91	0.01	1.59	-903.33	-0.02
Dead+Wind 120 deg+Ice+Temp	53.98	6.85	3.98	454.35	-783.10	-0.06
Dead+Wind 150 deg+Ice+Temp	53.98	3.96	6.89	785.59	-453.85	-0.08
Dead+Wind 180 deg+Ice+Temp	53.98	0.01	7.95	906.55	-3.80	-0.08
Dead+Wind 210 deg+Ice+Temp	53.98	-3.95	6.88	784.83	446.45	-0.06
Dead+Wind 240 deg+Ice+Temp	53.98	-6.85	3.97	453.02	776.27	-0.02
Dead+Wind 270 deg+Ice+Temp	53.98	-7.91	-0.01	0.05	897.27	0.02
Dead+Wind 300 deg+Ice+Temp	53.98	-6.85	-3.98	-452.71	777.04	0.06
Dead+Wind 330 deg+Ice+Temp	53.98	-3.96	-6.89	-783.95	447.78	0.08
Dead+Wind 0 deg - Service	38.12	-0.01	-11.21	-1229.35	0.71	0.05
Dead+Wind 30 deg - Service	38.12	5.57	-9.70	-1064.09	-609.65	0.01
Dead+Wind 60 deg - Service	38.12	9.65	-5.60	-613.68	-1056.77	-0.03
Dead+Wind 90 deg - Service	38.12	11.15	0.01	1.17	-1220.84	-0.07
Dead+Wind 120 deg - Service	38.12	9.66	5.62	615.71	-1057.90	-0.08
Dead+Wind 150 deg - Service	38.12	5.58	9.72	1065.29	-611.60	-0.07
Dead+Wind 180 deg - Service	38.12	0.01	11.21	1229.43	-1.54	-0.05
Dead+Wind 210 deg - Service	38.12	-5.57	9.70	1064.16	608.82	-0.01
Dead+Wind 240 deg - Service	38.12	-9.65	5.60	613.76	1055.94	0.03
Dead+Wind 270 deg - Service	38.12	-11.15	-0.01	-1.09	1220.01	0.07
Dead+Wind 300 deg - Service	38.12	-9.66	-5.62	-615.64	1057.07	0.08
Dead+Wind 330 deg - Service	38.12	-5.58	-9.72	-1065.21	610.77	0.07

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-38.12	0.00	0.00	38.12	0.00	0.000%
2	-0.03	-38.12	-32.40	0.03	38.12	32.40	0.000%
3	16.08	-38.12	-28.05	-16.08	38.12	28.05	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
4	27.89	-38.12	-16.17	-27.89	38.12	16.17	0.000%
5	32.22	-38.12	0.03	-32.22	38.12	-0.03	0.000%
6	27.92	-38.12	16.23	-27.92	38.12	-16.23	0.000%
7	16.14	-38.12	28.08	-16.14	38.12	-28.08	0.000%
8	0.03	-38.12	32.40	-0.03	38.12	-32.40	0.000%
9	-16.08	-38.12	28.05	16.08	38.12	-28.05	0.000%
10	-27.89	-38.12	16.17	27.89	38.12	-16.17	0.000%
11	-32.22	-38.12	-0.03	32.22	38.12	0.03	0.000%
12	-27.92	-38.12	-16.23	27.92	38.12	16.23	0.000%
13	-16.14	-38.12	-28.08	16.14	38.12	28.08	0.000%
14	0.00	-53.98	0.00	-0.00	53.98	0.00	0.000%
15	-0.01	-53.98	-7.95	0.01	53.98	7.95	0.000%
16	3.95	-53.98	-6.88	-3.95	53.98	6.88	0.000%
17	6.85	-53.98	-3.97	-6.85	53.98	3.97	0.000%
18	7.91	-53.98	0.01	-7.91	53.98	-0.01	0.000%
19	6.85	-53.98	3.98	-6.85	53.98	-3.98	0.000%
20	3.96	-53.98	6.89	-3.96	53.98	-6.89	0.000%
21	0.01	-53.98	7.95	-0.01	53.98	-7.95	0.000%
22	-3.95	-53.98	6.88	3.95	53.98	-6.88	0.000%
23	-6.85	-53.98	3.97	6.85	53.98	-3.97	0.000%
24	-7.91	-53.98	-0.01	7.91	53.98	0.01	0.000%
25	-6.85	-53.98	-3.98	6.85	53.98	3.98	0.000%
26	-3.96	-53.98	-6.89	3.96	53.98	6.89	0.000%
27	-0.01	-38.12	-11.21	0.01	38.12	11.21	0.000%
28	5.57	-38.12	-9.70	-5.57	38.12	9.70	0.000%
29	9.65	-38.12	-5.60	-9.65	38.12	5.60	0.000%
30	11.15	-38.12	0.01	-11.15	38.12	-0.01	0.000%
31	9.66	-38.12	5.62	-9.66	38.12	-5.62	0.000%
32	5.58	-38.12	9.72	-5.58	38.12	-9.72	0.000%
33	0.01	-38.12	11.21	-0.01	38.12	-11.21	0.000%
34	-5.57	-38.12	9.70	5.57	38.12	-9.70	0.000%
35	-9.65	-38.12	5.60	9.65	38.12	-5.60	0.000%
36	-11.15	-38.12	-0.01	11.15	38.12	0.01	0.000%
37	-9.66	-38.12	-5.62	9.66	38.12	5.62	0.000%
38	-5.58	-38.12	-9.72	5.58	38.12	9.72	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	0.00056139
3	Yes	6	0.00000001	0.00011086
4	Yes	6	0.00000001	0.00011091
5	Yes	4	0.00000001	0.00058361
6	Yes	6	0.00000001	0.00011056
7	Yes	6	0.00000001	0.00011148
8	Yes	4	0.00000001	0.00069015
9	Yes	6	0.00000001	0.00011081
10	Yes	6	0.00000001	0.00011051
11	Yes	4	0.00000001	0.00075011
12	Yes	6	0.00000001	0.00011133
13	Yes	6	0.00000001	0.00011066
14	Yes	4	0.00000001	0.00000255
15	Yes	5	0.00000001	0.00069800
16	Yes	5	0.00000001	0.00092781
17	Yes	5	0.00000001	0.00092418
18	Yes	5	0.00000001	0.00069597
19	Yes	5	0.00000001	0.00092649
20	Yes	5	0.00000001	0.00093088
21	Yes	5	0.00000001	0.00069839
22	Yes	5	0.00000001	0.00091877
23	Yes	5	0.00000001	0.00091827
24	Yes	5	0.00000001	0.00069104
25	Yes	5	0.00000001	0.00092040

26	Yes	5	0.00000001	0.00092015
27	Yes	4	0.00000001	0.00031303
28	Yes	5	0.00000001	0.00025419
29	Yes	5	0.00000001	0.00025386
30	Yes	4	0.00000001	0.00031370
31	Yes	5	0.00000001	0.00025266
32	Yes	5	0.00000001	0.00025701
33	Yes	4	0.00000001	0.00031633
34	Yes	5	0.00000001	0.00025339
35	Yes	5	0.00000001	0.00025171
36	Yes	4	0.00000001	0.00031793
37	Yes	5	0.00000001	0.00025568
38	Yes	5	0.00000001	0.00025336

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	38.30	27	2.39	0.00
L2	139.5 - 134.5	35.81	27	2.37	0.00
L3	134.5 - 129.5	33.33	27	2.35	0.00
L4	129.5 - 124.5	30.90	27	2.29	0.00
L5	124.5 - 117.54	28.54	27	2.22	0.00
L6	121.46 - 116.46	27.14	27	2.17	0.00
L7	116.46 - 111.46	24.89	27	2.12	0.00
L8	111.46 - 106.46	22.73	27	2.02	0.00
L9	106.46 - 101.46	20.66	27	1.92	0.00
L10	101.46 - 98.5	18.71	27	1.80	0.00
L11	98.5 - 93.5	17.62	33	1.73	0.00
L12	93.5 - 87.17	15.84	33	1.65	0.00
L13	91.84 - 86.17	15.28	33	1.62	0.00
L14	86.17 - 81.17	13.38	33	1.56	0.00
L15	81.17 - 76.17	11.80	33	1.46	0.00
L16	76.17 - 71.17	10.32	33	1.36	0.00
L17	71.17 - 66.17	8.96	33	1.26	0.00
L18	66.17 - 61.17	7.70	33	1.15	0.00
L19	61.17 - 56.17	6.54	33	1.05	0.00
L20	56.17 - 51.17	5.50	33	0.95	0.00
L21	51.17 - 42.09	4.57	33	0.84	0.00
L22	47.92 - 41.09	4.01	33	0.78	0.00
L23	41.09 - 36.09	2.95	33	0.70	0.00
L24	36.09 - 31.09	2.26	33	0.61	0.00
L25	31.09 - 26.09	1.67	33	0.52	0.00
L26	26.09 - 21.09	1.17	33	0.43	0.00
L27	21.09 - 16.09	0.76	33	0.35	0.00
L28	16.09 - 11.09	0.44	33	0.26	0.00
L29	11.09 - 6.09	0.21	33	0.18	0.00
L30	6.09 - 1.09	0.06	33	0.10	0.00
L31	1.09 - 0	0.00	33	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	Lighting Rod 3/4" x 5'	27	38.30	2.39	0.00	14001
135.00	(2) CBC721-DF	27	33.58	2.35	0.00	7680
125.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	27	28.77	2.23	0.00	3772
113.00	APXVSPP18-C-A20 w/ Mount Pipe	27	23.38	2.06	0.00	3118
111.00	800MHz 2X50W RRH W/FILTER	27	22.53	2.01	0.00	2888
100.00	800 10504 w/ Mount Pipe	33	18.17	1.77	0.00	2634

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
51.00	KS24019-L112A	33	4.54	0.84	0.00	3010

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	110.20	2	6.87	0.00
L2	139.5 - 134.5	103.04	2	6.83	0.00
L3	134.5 - 129.5	95.94	2	6.75	0.00
L4	129.5 - 124.5	88.95	2	6.60	0.00
L5	124.5 - 117.54	82.16	2	6.40	0.00
L6	121.46 - 116.46	78.14	2	6.24	0.00
L7	116.46 - 111.46	71.68	2	6.09	0.00
L8	111.46 - 106.46	65.45	2	5.83	0.00
L9	106.46 - 101.46	59.51	2	5.53	0.00
L10	101.46 - 98.5	53.90	8	5.20	0.00
L11	98.5 - 93.5	50.74	8	4.99	0.00
L12	93.5 - 87.17	45.65	8	4.75	0.00
L13	91.84 - 86.17	44.01	8	4.67	0.00
L14	86.17 - 81.17	38.56	8	4.49	0.00
L15	81.17 - 76.17	34.01	8	4.21	0.00
L16	76.17 - 71.17	29.76	8	3.91	0.00
L17	71.17 - 66.17	25.82	8	3.62	0.00
L18	66.17 - 61.17	22.19	8	3.32	0.00
L19	61.17 - 56.17	18.87	8	3.02	0.00
L20	56.17 - 51.17	15.86	8	2.72	0.00
L21	51.17 - 42.09	13.16	8	2.43	0.00
L22	47.92 - 41.09	11.57	8	2.24	0.00
L23	41.09 - 36.09	8.51	8	2.02	0.00
L24	36.09 - 31.09	6.53	8	1.76	0.00
L25	31.09 - 26.09	4.82	8	1.51	0.00
L26	26.09 - 21.09	3.37	8	1.25	0.00
L27	21.09 - 16.09	2.19	8	1.00	0.00
L28	16.09 - 11.09	1.27	8	0.76	0.00
L29	11.09 - 6.09	0.60	8	0.52	0.00
L30	6.09 - 1.09	0.18	8	0.28	0.00
L31	1.09 - 0	0.01	8	0.05	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	Lighting Rod 3/4" x 5'	2	110.20	6.87	0.00	5025
135.00	(2) CBC721-DF	2	96.64	6.76	0.00	2739
125.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	82.83	6.42	0.00	1343
113.00	APXVSPP18-C-A20 w/ Mount Pipe	2	67.34	5.92	0.00	1106
111.00	800MHz 2X50W RRH W/FILTER	2	64.89	5.80	0.00	1023
100.00	800 10504 w/ Mount Pipe	8	52.33	5.09	0.00	929
51.00	KS24019-L112A	8	13.08	2.42	0.00	1048

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	144.5 - 139.5 (1)	TP22.0896x21x0.1875	5.00	0.00	0.0	39.00	13.0345	-2.09	508.34	0.004
L2	139.5 - 134.5 (2)	TP23.1792x22.0896x0.1875	5.00	0.00	0.0	39.00	13.6829	-3.82	533.63	0.007
L3	134.5 - 129.5 (3)	TP24.2687x23.1792x0.1875	5.00	0.00	0.0	39.00	14.3313	-4.18	558.92	0.007
L4	129.5 - 124.5 (4)	TP25.3583x24.2687x0.1875	5.00	0.00	0.0	39.00	14.9798	-6.25	584.21	0.011
L5	124.5 - 117.54 (5)	TP26.875x25.3583x0.1875	6.96	0.00	0.0	39.00	15.3740	-6.53	599.59	0.011
L6	117.54 - 116.46 (6)	TP26.7181x25.6458x0.25	5.00	0.00	0.0	39.00	21.0025	-7.27	819.10	0.009
L7	116.46 - 111.46 (7)	TP27.7905x26.7181x0.25	5.00	0.00	0.0	39.00	21.8534	-9.58	852.28	0.011
L8	111.46 - 106.46 (8)	TP28.8628x27.7905x0.25	5.00	0.00	0.0	39.00	22.7043	-10.59	885.47	0.012
L9	106.46 - 101.46 (9)	TP29.9352x28.8628x0.25	5.00	0.00	0.0	39.00	23.5552	-11.27	918.65	0.012
L10	101.46 - 98.5 (10)	TP30.57x29.9352x0.25	2.96	0.00	0.0	39.00	24.0590	-13.05	938.30	0.014
L11	98.5 - 93.5 (11)	TP31.6424x30.57x0.4	5.00	0.00	0.0	39.00	39.6653	-13.98	1546.95	0.009
L12	93.5 - 87.17 (12)	TP33x31.6424x0.4	6.33	0.00	0.0	39.00	40.1174	-14.28	1564.58	0.009
L13	87.17 - 86.17 (13)	TP32.7202x31.4984x0.375	5.67	0.00	0.0	39.00	38.4989	-15.91	1501.46	0.011
L14	86.17 - 81.17 (14)	TP33.7976x32.7202x0.375	5.00	0.00	0.0	39.00	39.7813	-16.88	1551.47	0.011
L15	81.17 - 76.17 (15)	TP34.8751x33.7976x0.375	5.00	0.00	0.0	39.00	41.0637	-17.88	1601.48	0.011
L16	76.17 - 71.17 (16)	TP35.9525x34.8751x0.375	5.00	0.00	0.0	39.00	42.3461	-18.90	1651.50	0.011
L17	71.17 - 66.17 (17)	TP37.0299x35.9525x0.375	5.00	0.00	0.0	39.00	43.6285	-19.96	1701.51	0.012
L18	66.17 - 61.17 (18)	TP38.1073x37.0299x0.375	5.00	0.00	0.0	39.00	44.9109	-21.04	1751.52	0.012
L19	61.17 - 56.17 (19)	TP39.1847x38.1073x0.375	5.00	0.00	0.0	39.00	46.1933	-22.14	1801.54	0.012
L20	56.17 - 51.17 (20)	TP40.2622x39.1847x0.375	5.00	0.00	0.0	39.00	47.4757	-23.27	1851.55	0.013
L21	51.17 - 42.09 (21)	TP42.2188x40.2622x0.375	9.08	0.00	0.0	39.00	48.3092	-24.09	1884.06	0.013
L22	42.09 - 41.09 (22)	TP41.6788x40.2125x0.4375	6.83	0.00	0.0	39.00	57.2686	-26.74	2233.48	0.012
L23	41.09 - 36.09 (23)	TP42.7522x41.6788x0.4375	5.00	0.00	0.0	39.00	58.7592	-28.06	2291.61	0.012
L24	36.09 - 31.09 (24)	TP43.8256x42.7522x0.4375	5.00	0.00	0.0	39.00	60.2497	-29.41	2349.74	0.013
L25	31.09 - 26.09 (25)	TP44.899x43.8256x0.4375	5.00	0.00	0.0	39.00	61.7403	-30.78	2407.87	0.013
L26	26.09 - 21.09 (26)	TP45.9724x44.899x0.4375	5.00	0.00	0.0	39.00	63.2309	-32.18	2466.00	0.013
L27	21.09 - 16.09 (27)	TP47.0458x45.9724x0.4375	5.00	0.00	0.0	39.00	64.7214	-33.60	2524.14	0.013
L28	16.09 - 11.09 (28)	TP48.1192x47.0458x0.4375	5.00	0.00	0.0	39.00	66.2120	-35.05	2582.27	0.014
L29	11.09 - 6.09 (29)	TP49.1926x48.1192x0.4375	5.00	0.00	0.0	39.00	67.7025	-36.43	2640.40	0.014
L30	6.09 - 1.09 (30)	TP50.266x49.1926x0.4375	5.00	0.00	0.0	39.00	69.1931	-37.80	2698.53	0.014
L31	1.09 - 0 (31)	TP50.5x50.266x0.4375	1.09	0.00	0.0	39.00	69.5180	-38.10	2711.20	0.014

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	144.5 - 139.5 (1)	0.004	0.144	0.000	0.035	0.001	0.149	1.333	H1-3+VT
L2	139.5 - 134.5 (2)	0.007	0.292	0.000	0.065	0.000	0.300	1.333	H1-3+VT
L3	134.5 - 129.5 (3)	0.007	0.479	0.000	0.065	0.000	0.488	1.333	H1-3+VT
L4	129.5 - 124.5 (4)	0.011	0.651	0.000	0.080	0.000	0.664	1.333	H1-3+VT
L5	124.5 - 117.54 (5)	0.011	0.768	0.000	0.079	0.000	0.780	1.333	H1-3+VT
L6	117.54 - 116.46 (6)	0.009	0.731	0.000	0.060	0.000	0.740	1.333	H1-3+VT
L7	116.46 - 111.46 (7)	0.011	0.859	0.000	0.073	0.000	0.872	1.333	H1-3+VT
L8	111.46 - 106.46 (8)	0.012	1.004	0.000	0.075	0.000	1.017	1.333	H1-3+VT
L9	106.46 - 101.46 (9)	0.012	1.132	0.000	0.074	0.000	1.145	1.333	H1-3+VT
L10	101.46 - 98.5 (10)	0.014	1.205	0.000	0.079	0.000	1.221	1.333	H1-3+VT
L11	98.5 - 93.5 (11)	0.009	0.839	0.000	0.049	0.000	0.848	1.333	H1-3+VT
L12	93.5 - 87.17 (12)	0.009	0.861	0.000	0.049	0.000	0.871	1.333	H1-3+VT
L13	87.17 - 86.17 (13)	0.011	1.022	0.000	0.052	0.000	1.033	1.333	H1-3+VT
L14	86.17 - 81.17 (14)	0.011	1.079	0.000	0.051	0.000	1.091	1.333	H1-3+VT
L15	81.17 - 76.17 (15)	0.011	1.130	0.000	0.050	0.000	1.142	1.333	H1-3+VT
L16	76.17 - 71.17 (16)	0.011	1.174	0.000	0.049	0.000	1.186	1.333	H1-3+VT
L17	71.17 - 66.17 (17)	0.012	1.213	0.000	0.049	0.000	1.225	1.333	H1-3+VT
L18	66.17 - 61.17 (18)	0.012	1.247	0.000	0.048	0.000	1.259	1.333	H1-3+VT
L19	61.17 - 56.17 (19)	0.012	1.276	0.000	0.047	0.000	1.289	1.333	H1-3+VT
L20	56.17 - 51.17 (20)	0.013	1.302	0.000	0.047	0.000	1.315	1.333	H1-3+VT
L21	51.17 - 42.09 (21)	0.013	1.317	0.000	0.046	0.000	1.331	1.333	H1-3+VT
L22	42.09 - 41.09 (22)	0.012	1.201	0.000	0.040	0.000	1.214	1.333	H1-3+VT
L23	41.09 - 36.09 (23)	0.012	1.216	0.000	0.039	0.000	1.229	1.333	H1-3+VT
L24	36.09 - 31.09 (24)	0.013	1.229	0.000	0.039	0.000	1.241	1.333	H1-3+VT
L25	31.09 - 26.09 (25)	0.013	1.239	0.000	0.038	0.000	1.252	1.333	H1-3+VT
L26	26.09 - 21.09 (26)	0.013	1.248	0.000	0.038	0.000	1.262	1.333	H1-3+VT
L27	21.09 - 16.09 (27)	0.013	1.256	0.000	0.037	0.000	1.269	1.333	H1-3+VT
L28	16.09 - 11.09 (28)	0.014	1.262	0.000	0.037	0.000	1.276	1.333	H1-3+VT
L29	11.09 - 6.09	0.014	1.267	0.000	0.036	0.000	1.281	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(29)						✓		
L30	6.09 - 1.09	0.014	1.271	0.000	0.036	0.000	1.285	1.333	H1-3+VT ✓
	(30)						✓		
L31	1.09 - 0 (31)	0.014	1.272	0.000	0.036	0.000	1.286	1.333	H1-3+VT ✓
							✓		

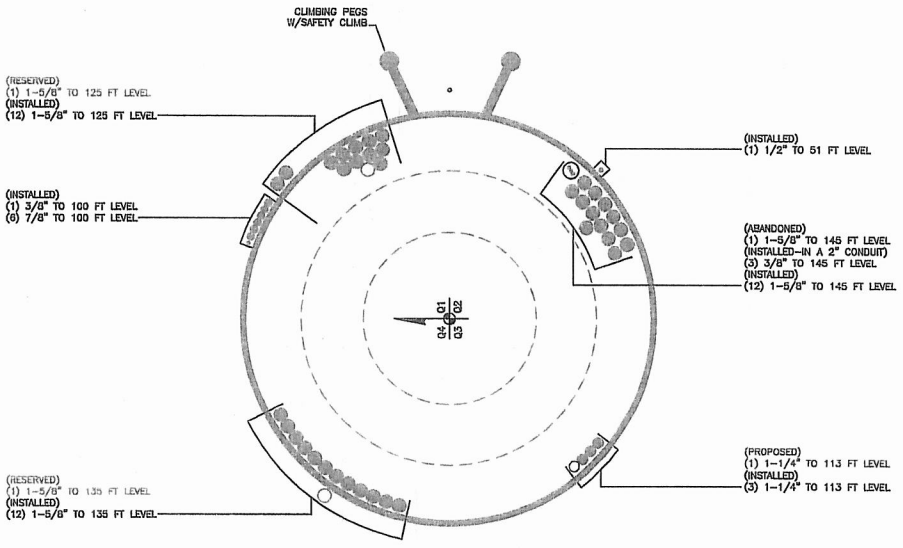
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	144.5 - 139.5	Pole	TP22.0896x21x0.1875	1	-2.09	677.62	11.2	Pass
L2	139.5 - 134.5	Pole	TP23.1792x22.0896x0.1875	2	-3.82	711.33	22.5	Pass
L3	134.5 - 129.5	Pole	TP24.2687x23.1792x0.1875	3	-4.18	745.04	36.6	Pass
L4	129.5 - 124.5	Pole	TP25.3583x24.2687x0.1875	4	-6.25	778.75	49.8	Pass
L5	124.5 - 117.54	Pole	TP26.875x25.3583x0.1875	5	-6.53	799.25	58.5	Pass
L6	117.54 - 116.46	Pole	TP26.7181x25.6458x0.25	6	-7.27	1091.85	55.5	Pass
L7	116.46 - 111.46	Pole	TP27.7905x26.7181x0.25	7	-9.58	1136.09	65.4	Pass
L8	111.46 - 106.46	Pole	TP28.8628x27.7905x0.25	8	-10.59	1180.33	76.3	Pass
L9	106.46 - 101.46	Pole	TP29.9352x28.8628x0.25	9	-11.27	1224.56	85.9	Pass
L10	101.46 - 98.5	Pole	TP30.57x29.9352x0.25	10	-13.05	1250.75	91.6	Pass
L11	98.5 - 93.5	Pole	TP31.6424x30.57x0.4	11	-13.98	2062.08	63.6	Pass
L12	93.5 - 87.17	Pole	TP33x31.6424x0.4	12	-14.28	2085.59	65.3	Pass
L13	87.17 - 86.17	Pole	TP32.7202x31.4984x0.375	13	-15.91	2001.45	77.5	Pass
L14	86.17 - 81.17	Pole	TP33.7976x32.7202x0.375	14	-16.88	2068.11	81.8	Pass
L15	81.17 - 76.17	Pole	TP34.8751x33.7976x0.375	15	-17.88	2134.77	85.7	Pass
L16	76.17 - 71.17	Pole	TP35.9525x34.8751x0.375	16	-18.90	2201.45	89.0	Pass
L17	71.17 - 66.17	Pole	TP37.0299x35.9525x0.375	17	-19.96	2268.11	91.9	Pass
L18	66.17 - 61.17	Pole	TP38.1073x37.0299x0.375	18	-21.04	2334.78	94.5	Pass
L19	61.17 - 56.17	Pole	TP39.1847x38.1073x0.375	19	-22.14	2401.45	96.7	Pass
L20	56.17 - 51.17	Pole	TP40.2622x39.1847x0.375	20	-23.27	2468.12	98.7	Pass
L21	51.17 - 42.09	Pole	TP42.2188x40.2622x0.375	21	-24.09	2511.45	99.8	Pass
L22	42.09 - 41.09	Pole	TP41.6788x40.2125x0.4375	22	-26.74	2977.23	91.1	Pass
L23	41.09 - 36.09	Pole	TP42.7522x41.6788x0.4375	23	-28.06	3054.72	92.2	Pass
L24	36.09 - 31.09	Pole	TP43.8256x42.7522x0.4375	24	-29.41	3132.20	93.1	Pass
L25	31.09 - 26.09	Pole	TP44.899x43.8256x0.4375	25	-30.78	3209.69	93.9	Pass
L26	26.09 - 21.09	Pole	TP45.9724x44.899x0.4375	26	-32.18	3287.18	94.6	Pass
L27	21.09 - 16.09	Pole	TP47.0458x45.9724x0.4375	27	-33.60	3364.68	95.2	Pass
L28	16.09 - 11.09	Pole	TP48.1192x47.0458x0.4375	28	-35.05	3442.17	95.7	Pass
L29	11.09 - 6.09	Pole	TP49.1926x48.1192x0.4375	29	-36.43	3519.65	96.1	Pass
L30	6.09 - 1.09	Pole	TP50.266x49.1926x0.4375	30	-37.80	3597.14	96.4	Pass
L31	1.09 - 0	Pole	TP50.5x50.266x0.4375	31	-38.10	3614.03	96.5	Pass
							Summary	
						Pole (L21)	99.8	Pass
						RATING =	**99.8**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881533 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity	
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1
144.5 - 139.5	790	n/a	790	13.03	n/a	13.03	11.1%	
139.5 - 134.5	913	n/a	913	13.68	n/a	13.68	22.4%	
134.5 - 129.5	1050	n/a	1050	14.33	n/a	14.33	36.5%	
129.5 - 124.5	1199	n/a	1199	14.98	n/a	14.98	49.6%	
124.5 - 121.46	1296	n/a	1296	15.37	n/a	15.37	58.4%	
121.46 - 116.46	1858	n/a	1858	21.00	n/a	21.00	55.4%	
116.46 - 111.46	2093	n/a	2093	21.85	n/a	21.85	65.3%	
111.46 - 106.46	2348	n/a	2348	22.70	n/a	22.70	76.2%	
106.46 - 101.46	2621	n/a	2621	23.55	n/a	23.55	85.8%	
101.46 - 98.5	2793	n/a	2793	24.06	n/a	24.06	91.4%	
98.5 - 93.5	3100	1810	4910	24.91	13.50	38.41	62.4%	86.9%
93.5 - 91.84	3207	1849	5056	25.19	13.50	38.69	64.8%	89.5%
91.84 - 86.17	5087	n/a	5087	38.50	n/a	38.50	77.4%	
86.17 - 81.17	5612	n/a	5612	39.78	n/a	39.78	81.7%	
81.17 - 76.17	6173	n/a	6173	41.06	n/a	41.06	85.5%	
76.17 - 71.17	6769	n/a	6769	42.34	n/a	42.34	88.9%	
71.17 - 66.17	7403	n/a	7403	43.63	n/a	43.63	91.8%	
66.17 - 61.17	8075	n/a	8075	44.91	n/a	44.91	94.4%	
61.17 - 56.17	8787	n/a	8787	46.19	n/a	46.19	96.6%	
56.17 - 51.17	9539	n/a	9539	47.47	n/a	47.47	98.6%	
51.17 - 47.92	10051	n/a	10051	48.31	n/a	48.31	99.7%	
47.92 - 41.09	12302	n/a	12302	57.27	n/a	57.27	91.0%	
41.09 - 36.09	13288	n/a	13288	58.76	n/a	58.76	92.1%	
36.09 - 31.09	14325	n/a	14325	60.25	n/a	60.25	93.0%	
31.09 - 26.09	15414	n/a	15414	61.74	n/a	61.74	93.9%	
26.09 - 21.09	16558	n/a	16558	63.23	n/a	63.23	94.5%	
21.09 - 16.09	17757	n/a	17757	64.72	n/a	64.72	95.1%	
16.09 - 11.09	19012	n/a	19012	66.21	n/a	66.21	95.6%	
11.09 - 6.09	20325	n/a	20325	67.70	n/a	67.70	96.0%	
6.09 - 1.09	21697	n/a	21697	69.19	n/a	69.19	96.3%	
1.09 - 0	22004	n/a	22004	69.52	n/a	69.52	96.4%	

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
144.5 - 139.5	Pole	TP22.09x21x0.1875	Pole	11.1%	Pass
139.5 - 134.5	Pole	TP23.179x22.09x0.1875	Pole	22.4%	Pass
134.5 - 129.5	Pole	TP24.269x23.179x0.1875	Pole	36.5%	Pass
129.5 - 124.5	Pole	TP25.358x24.269x0.1875	Pole	49.6%	Pass
124.5 - 121.46	Pole	TP26.875x25.358x0.1875	Pole	58.4%	Pass
121.46 - 116.46	Pole	TP26.718x25.646x0.25	Pole	55.4%	Pass
116.46 - 111.46	Pole	TP27.79x26.718x0.25	Pole	65.3%	Pass
111.46 - 106.46	Pole	TP28.863x27.79x0.25	Pole	76.2%	Pass
106.46 - 101.46	Pole	TP29.935x28.863x0.25	Pole	85.8%	Pass
101.46 - 98.5	Pole	TP30.57x29.935x0.25	Pole	91.4%	Pass
98.5 - 93.5	Pole + Reinf.	TP31.642x30.57x0.4	Reinf. 1 Compression	86.9%	Pass
93.5 - 91.84	Pole + Reinf.	TP33x31.642x0.4	Reinf. 1 Compression	89.5%	Pass
91.84 - 86.17	Pole	TP32.72x31.498x0.375	Pole	77.4%	Pass
86.17 - 81.17	Pole	TP33.798x32.72x0.375	Pole	81.7%	Pass
81.17 - 76.17	Pole	TP34.875x33.798x0.375	Pole	85.5%	Pass
76.17 - 71.17	Pole	TP35.952x34.875x0.375	Pole	88.9%	Pass
71.17 - 66.17	Pole	TP37.03x35.952x0.375	Pole	91.8%	Pass
66.17 - 61.17	Pole	TP38.107x37.03x0.375	Pole	94.4%	Pass
61.17 - 56.17	Pole	TP39.185x38.107x0.375	Pole	96.6%	Pass
56.17 - 51.17	Pole	TP40.262x39.185x0.375	Pole	98.6%	Pass
51.17 - 47.92	Pole	TP42.219x40.262x0.375	Pole	99.7%	Pass
47.92 - 41.09	Pole	TP41.679x40.212x0.4375	Pole	91.0%	Pass
41.09 - 36.09	Pole	TP42.752x41.679x0.4375	Pole	92.1%	Pass
36.09 - 31.09	Pole	TP43.826x42.752x0.4375	Pole	93.0%	Pass
31.09 - 26.09	Pole	TP44.899x43.826x0.4375	Pole	93.9%	Pass
26.09 - 21.09	Pole	TP45.972x44.899x0.4375	Pole	94.5%	Pass
21.09 - 16.09	Pole	TP47.046x45.972x0.4375	Pole	95.1%	Pass
16.09 - 11.09	Pole	TP48.119x47.046x0.4375	Pole	95.6%	Pass
11.09 - 6.09	Pole	TP49.193x48.119x0.4375	Pole	96.0%	Pass
6.09 - 1.09	Pole	TP50.266x49.193x0.4375	Pole	96.3%	Pass
1.09 - 0	Pole	TP50.5x50.266x0.4375	Pole	96.4%	Pass
				Summary	
			Pole	99.7%	Pass
			Reinforcement	89.5%	Pass
			Overall	99.7%	Pass

TNX Section Forces

Increment (ft): 5		TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	144.5 - 139.5	2.0889	33.059	5.8682
2	139.5 - 134.5	3.8243	73.707	11.535
3	134.5 - 129.5	4.1808	132.61	12.033
4	129.5 - 124.5	6.2511	197.05	15.518
5	124.5 - 121.46	6.5327	244.68	15.826
6	121.46 - 116.46	7.269	325.2	16.369
7	116.46 - 111.46	9.5756	414.26	20.776
8	111.46 - 106.46	10.589	522.57	22.127
9	106.46 - 101.46	11.269	634.23	22.55
10	101.46 - 98.5	13.046	704.95	24.64
11	98.5 - 93.5	13.981	829.43	25.179
12	93.5 - 91.84	14.283	871.34	25.332
13	91.84 - 86.17	15.912	1016.6	25.917
14	86.17 - 81.17	16.881	1147.2	26.349
15	81.17 - 76.17	17.879	1280	26.775
16	76.17 - 71.17	18.905	1414.9	27.195
17	71.17 - 66.17	19.957	1551.8	27.607
18	66.17 - 61.17	21.037	1690.8	28.012
19	61.17 - 56.17	22.143	1831.8	28.408
20	56.17 - 51.17	23.274	1974.7	28.794
21	51.17 - 47.92	24.091	2068.8	29.084
22	47.92 - 41.09	26.745	2269.5	29.705
23	41.09 - 36.09	28.062	2418.9	30.058
24	36.09 - 31.09	29.407	2569.9	30.395
25	31.09 - 26.09	30.779	2722.7	30.73
26	26.09 - 21.09	32.177	2877.1	31.064
27	21.09 - 16.09	33.601	3033.2	31.4
28	16.09 - 11.09	35.052	3190.9	31.735
29	11.09 - 6.09	36.427	3350.3	32.046
30	6.09 - 1.09	37.8	3511.2	32.351
31	1.09 - 0	38.101	3546.5	32.419

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	144.5 - 139.5	5		18	21.000	22.090	0.1875	A572-65	1.000
2	139.5 - 134.5	5		18	22.090	23.179	0.1875	A572-65	1.000
3	134.5 - 129.5	5		18	23.179	24.269	0.1875	A572-65	1.000
4	129.5 - 124.5	5		18	24.269	25.358	0.1875	A572-65	1.000
5	124.5 - 121.46	6.96	3.92	18	25.358	26.875	0.1875	A572-65	1.000
6	121.46 - 116.46	5		18	25.646	26.718	0.25	A572-65	1.000
7	116.46 - 111.46	5		18	26.718	27.790	0.25	A572-65	1.000
8	111.46 - 106.46	5		18	27.790	28.863	0.25	A572-65	1.000
9	106.46 - 101.46	5		18	28.863	29.935	0.25	A572-65	1.000
10	101.46 - 98.5	2.96		18	29.935	30.570	0.25	A572-65	1.000
11	98.5 - 93.5	5		18	30.570	31.642	0.4	A572-65	0.968
12	93.5 - 91.84	6.33	4.67	18	31.642	33.000	0.4	A572-65	0.964
13	91.84 - 86.17	5.67		18	31.498	32.720	0.375	A572-65	1.000
14	86.17 - 81.17	5		18	32.720	33.798	0.375	A572-65	1.000
15	81.17 - 76.17	5		18	33.798	34.875	0.375	A572-65	1.000
16	76.17 - 71.17	5		18	34.875	35.952	0.375	A572-65	1.000
17	71.17 - 66.17	5		18	35.952	37.030	0.375	A572-65	1.000
18	66.17 - 61.17	5		18	37.030	38.107	0.375	A572-65	1.000
19	61.17 - 56.17	5		18	38.107	39.185	0.375	A572-65	1.000
20	56.17 - 51.17	5		18	39.185	40.262	0.375	A572-65	1.000
21	51.17 - 47.92	9.08	5.83	18	40.262	42.219	0.375	A572-65	1.000
22	47.92 - 41.09	6.83		18	40.212	41.679	0.4375	A572-65	1.000
23	41.09 - 36.09	5		18	41.679	42.752	0.4375	A572-65	1.000
24	36.09 - 31.09	5		18	42.752	43.826	0.4375	A572-65	1.000
25	31.09 - 26.09	5		18	43.826	44.899	0.4375	A572-65	1.000
26	26.09 - 21.09	5		18	44.899	45.972	0.4375	A572-65	1.000
27	21.09 - 16.09	5		18	45.972	47.046	0.4375	A572-65	1.000
28	16.09 - 11.09	5		18	47.046	48.119	0.4375	A572-65	1.000
29	11.09 - 6.09	5		18	48.119	49.193	0.4375	A572-65	1.000
30	6.09 - 1.09	5		18	49.193	50.266	0.4375	A572-65	1.000
31	1.09 - 0	1.09		18	50.266	50.500	0.4375	A572-65	1.000

CCIpole

per TIA-222- F

Site BU: 881533

Work Order: 759463

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	144.5	26.96	3.92	18	21	26.875	0.1875	0.75	A572-65
2	121.46	34.29	4.67	18	25.65	33	0.25	1	A572-65
3	91.84	49.75	5.83	18	31.50	42.21875	0.375	1.5	A572-65
4	47.92	47.92	0	18	40.21	50.5	0.4375	1.75	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	91.5	98.5	plate	CCI-SFP-045100	3																		
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	I_x (in^4)	I_y (in^4)	L_u (in)	Connection Length (in)	Bolt Hole Size (in)	Reinforcement Material
1	4.5	1	4.5	0.5	0.375	7.594	20.000	n/a	1.1875	A572-65

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

TIA Rev F

Site Data

BU#: *881533*
Site Name: *GROTON TOWER*
App #: *245708 Rev.0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	3546	ft-kips
Axial:	38	kips
Shear:	32	kips

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59	in

Plate Data		
Diam:	65	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.02	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.375	in
Width:	6.75	in
Height:	17.75	in
Thick:	0.625	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	50.5	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	177.9 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	91.3% Pass	

Base Plate Results

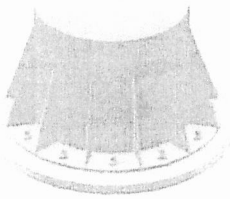
	Flexural Check	Stiffened
Base Plate Stress:	46.2 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	77.0% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	69.9% Pass
Vertical Weld:	45.8% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	26.3% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	75.7% Pass
Plate Comp. (AISC Bracket):	81.0% Pass

Pole Results

Pole Punching Shear Check:	11.6% Pass



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

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

Monopole Block Foundation

Checks capacity of monolithic block foundation for a monopole tower per TIA/EIA-222-F

BU #: 881533
Site Name: GROTON TOWER
App No.: 245708 Rev.0

CROWN CASTLE

Design Reactions		
Shear, S:	32.00	kips
Moment, M:	3546.00	ft*kips
Height, H:	144.50	ft
Weight, Wt:	38.00	kips
Base Diameter, BD:	50.5	in

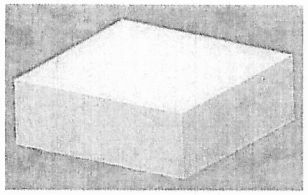
Foundation Dimensions		
Depth, D:	5.0	ft
Block Width, W:	30.0	ft
Neglected Depth, N:	3.3	ft
Ext. Above Grade, E:	0.0	ft
Anchor Steel Length, Lst:	72.0	in
Clear Cover, cc:	8.0	in

Soil Properties		
Soil Unit Weight, γ:	0.120	kcf
Allowable Bearing, Bc:	12.000	ksf
Int. Angle of Friction, Φ:	30.00	deg
Cohesion, Co:	0.000	ksf
Passive Pressure, Pp:	0.000	kcf
Base Friction, μ:	0.2	
Seismic Zone, z:	1	

Material Properties		
Rebar Yield Strength, Fy:	60000	psi
Concrete Strength, F'c:	4000	psi
Concrete Density, δc:	0.150	kcf

Rebar Properties		
Pad Rebar Size, sp:	8	
Rebar Quanity, mp:	45	

Design Checks	Capacity/ Availability	Demands/ Limits	Check	%
Shear (ksf)	71.30	32.00	OK	44.9%
Overturning (ft*kips):	7739.10	3706.00	OK	47.9%
Bearing (ksf):	12.00	1.62	OK	13.5%
Shear - 1-Way (kips):	2345.15	846.27	OK	36.1%
Pad Rebar Area (in²):	35.34	19.51	OK	N/A
Bar Spacing (in):	6.80	18 > Bs > 2	OK	N/A
Development Length (in):	172.00	37.00	OK	N/A



Modification Checks	Capacity/ Availability	Demands/ Limits	Check
Minimum Extra Thickness (in):	0.00	0.00	Not Used
Pad Rebar Area-short (in²):	6.84	1.95	Not Used
Pad Rebar Area-long (in2):	2.21	1.95	Not Used
Pad Rebar Spacing-short (in2):	17.32	18 > Bs > 2	Not Used
Pad Rebar Spacing-long (in2):	65.05	18 > Bs > 2	Not Used
End Cap Width (in):	0.00	0.00	Not Used
End Cap Rebar Area (in2):	4.61	0.00	Not Used
EC Rebar Spacing (in):	-3.16	18 > Bs > 2	Not Used
Tie Spacing (in):	17.61	344 > s > 4.5	Not Used
Dowel Area (in2):	8.84	0.00	Not Used
Dowel Embedment (in):	15.00	6.00	Not Used
Shear Strength of Cone (kips):	68.73	23.86	Not Used
Dowel Edge Distance (in):	12.00	14.51	Not Used
Dowel Spacing (in):	37.33	30.00	Not Used
Dowel Edge Distance (vert) (in):	30.00	14.51	Not Used
Dowel Devel. Length (in):	-8.00	13.32	Not Used

Modifications					
Pad Thickness, Te:	0	in	End Cap Width, Wec:	0	in
Revised Pad Thickness, Tx:	5	ft	Revised Width, Wx:	30	ft
Pad Rebar Size, Se:	6		EC Rebar Size, Sec:	7	per side, top & bottom
Rebar Quanity (long), me:	20		EC Rebar Quanity, mec:	8	
Rebar Quanity (short), mex:	5		EC Tie Size, Sect:	4	per side
Dowel Size, Sed:	7		Tie Quanity, mect:	20	
Dowel Quanity, med:	20		EC Dowel Size, Secd:	6	per side
			Dowel Quanity, mecd:	20	
			Rows of Dowels, Nd:	2	
			Dowel Depth, decd:	15	in
			Edge Distance, eecd:	12	in

Martin Pater

From: Jeannine Gosselin
Sent: Monday, March 23, 2015 12:31 PM
To: Billerica Warehouse
Cc: Grzegorz Dorman; Hal Giglio; Martin Pater; Bradford Matthews
Subject: BOM for CT1110
Attachments: CT1110 BOM jumpers 3-23-15.xlsx

Importance: High

Good afternoon,

Please see attached BOM. Let me know if you have any questions.

Thanks,

Jeannine S. Gosselin
Construction Manager
16 Esquire Road
Billerica, MA 01862

Desk: 978.608.8411
Cell: 978.604.3563
email: jgosselin@empiretelecomm.com
Website: **http://empiretelecomm.com/**

EMPIRE telecom

EMPIRE telecom

Date	3/23/15
FA Code (If Available)	10035406
Maxwell Project #	00001714
PTN (If Available)	2051782955
Site Name	Putnam
Construction Manager	Hal Giglio
General Contractor	Empire
Requestor	Hal Giglio
TRUCK NUMBER	

EX: 00000123

NEW ENGLAND - Kevin Bettencourt - 201.562.4837 UNY - Amanda Silino - 315.338.3579

ALL BOM REQUESTS MUST CONTAIN THE MAXWELL PROJECT # (IN 8 DIGIT FORMAT). IF YOU DO NOT KNOW YOUR MAXWELL PROJECT # PLEASE CONTACT THE FOLLOWING PROJECT ACCOUNTANT BASED ON YOUR MARKET---->

QTY Requested	QTY Used	QTY Returned	TELCOFLEX	UOM	Empire Part #
6		0	Andrew L4A-DMDM-20P 20' PIM rated DM to DM jumper	EACH	11707

Requestor (Print): Hal Giglio

Requestor (Signature): Hal Giglio

Date: 3/23/2015

Special Items
Picked By (Print Name)- Verified by(Print Name)-

Materials for Delivery Verified on Truck (Print Name)-

BOM Updated : 1/12/2015