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

November 16, 2012

Jennifer Young Gaudet
HPC Wireless Services
46 Mill Plain Road, Floor 2
Danbury, CT 06811

RE: **EM-CING-026-121031** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 49 Wig Hill Road, Chester, Connecticut.

Dear Ms. Gaudet:

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:

- 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 less 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 October 26, 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.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding

the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Edmund Meehan, First Selectman, Town of Chester
Judy Brown, Zoning Enforcement Officer, Town of Chester

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 31, 2012

The Honorable Edmund Meehan
First Selectman
Town of Chester
203 Middlesex Avenue
Chester, CT 06412-0218

RE: **EM-CING-026-121031** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 49 Wig Hill Road, Chester, Connecticut.

Dear First Selectman Meehan:

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 November 14, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

c: Judy Brown, Zoning Enforcement Officer, Town of Chester

EM-CING-026-121031

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

HPC WIRELESS SERVICES

ORIGINAL

October 26, 2012

VIA OVERNIGHT COURIER

RECEIVED
OCT 31 2012
CONNECTICUT
SITING COUNCIL

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

Re: New Cingular Wireless PCS, LLC – Exempt Modification
49 Wig Hill Road, Chester, Connecticut

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 First Selectman of the Town of Chester.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 49 Wig Hill Road, Chester (coordinates 41° -24'-14" N, 72°-28'-20.8" 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 pipe mounts and attached to the platform at a centerline height of approximately 132'. Six (6) RRHs (remote radio units) and a Surge Arrestor will be placed on new pipe mounts behind the LTE antennas at a centerline height of approximately 130'. AT&T will also place DC power and fiber

runs along the existing coaxial cable run. These changes will not extend the height of the approximately 150' structure.

2. AT&T will place related equipment in the existing Shelter, and mount a new GPS antenna on the existing Shelter. 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 1.84%; the combined site operations will result in a total power density of approximately 51.57%.

Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet (by JYG)

Attachments

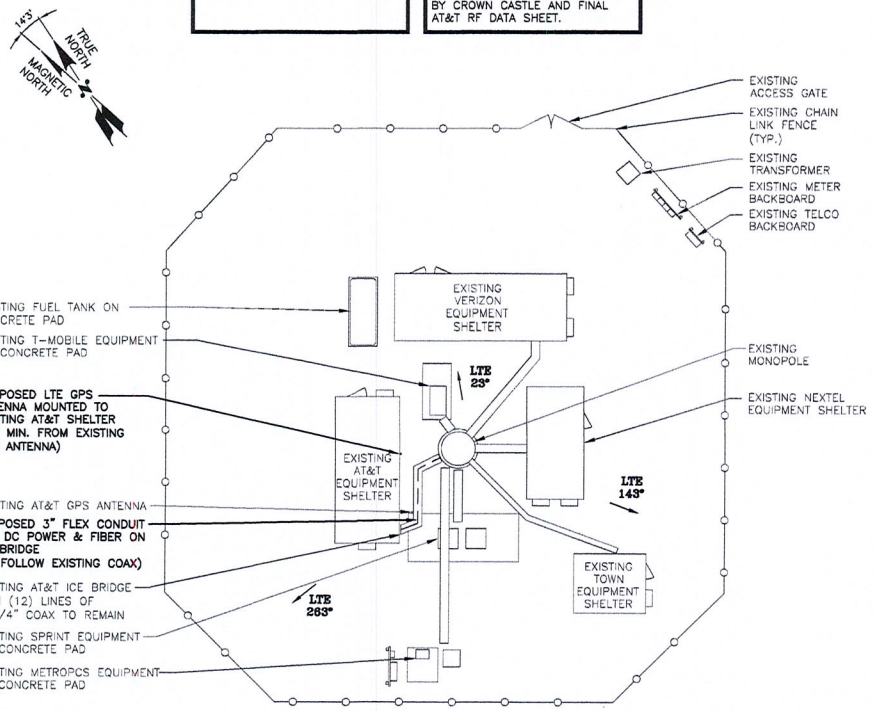
cc: Honorable Edmund Meehan, First Selectman, Town of Chester
Bruce A and Mary C Rayner (underlying property owners)

NOTE:

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

NOTE:

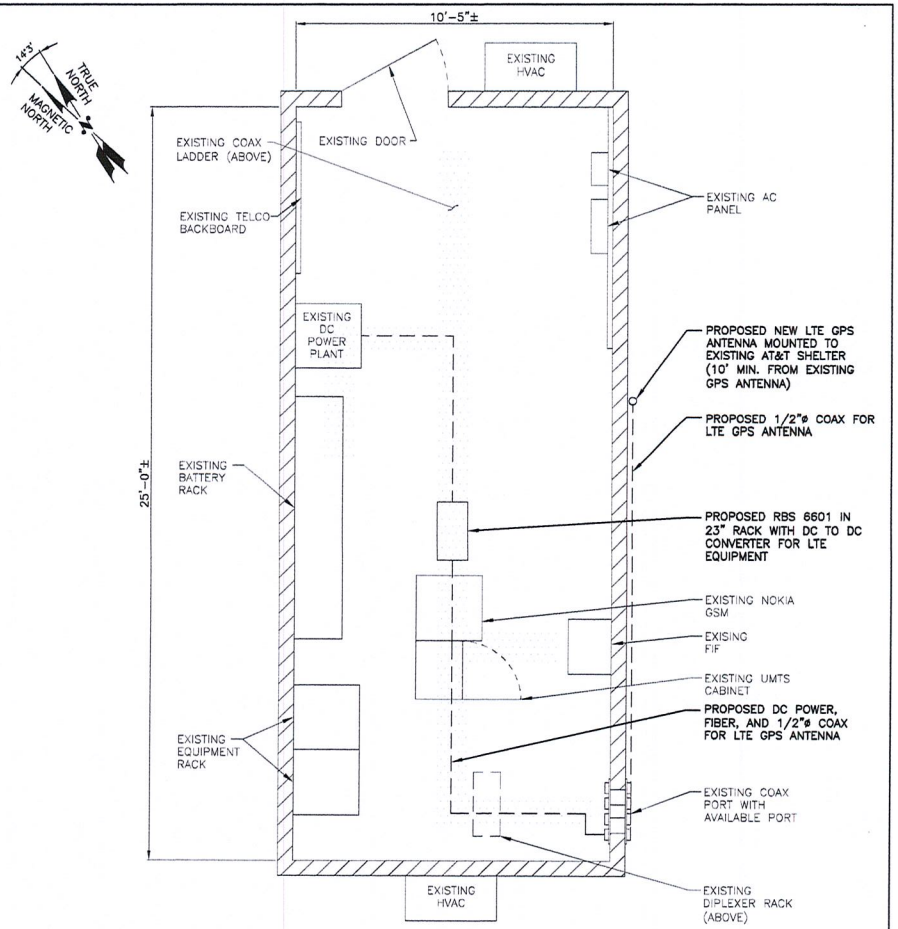
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



COMPOUND PLAN

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

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



EQUIPMENT PLAN

SCALE: 1/2"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2090
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: CT2179
SITE NAME: CHESTER - BAM
CROWN CASTLE ID: 800515
49 WIG HILL ROAD
CHESTER, CT 06412
MIDDLESEX 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	08/05/12	ISSUED FOR REVIEW	RS	DC	DPH

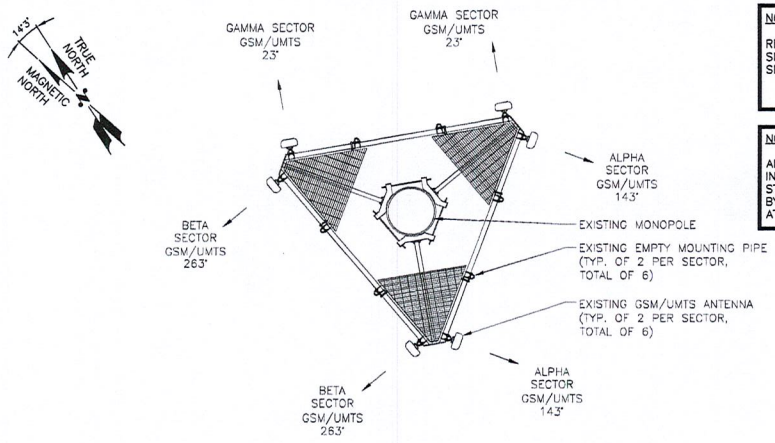
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RS

STATE OF CONNECTICUT DANIEL P. HAMM No. 21178 LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND PLAN & EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2179.01	A-1	1



EXISTING GSM/UMTS ANTENNA PLAN

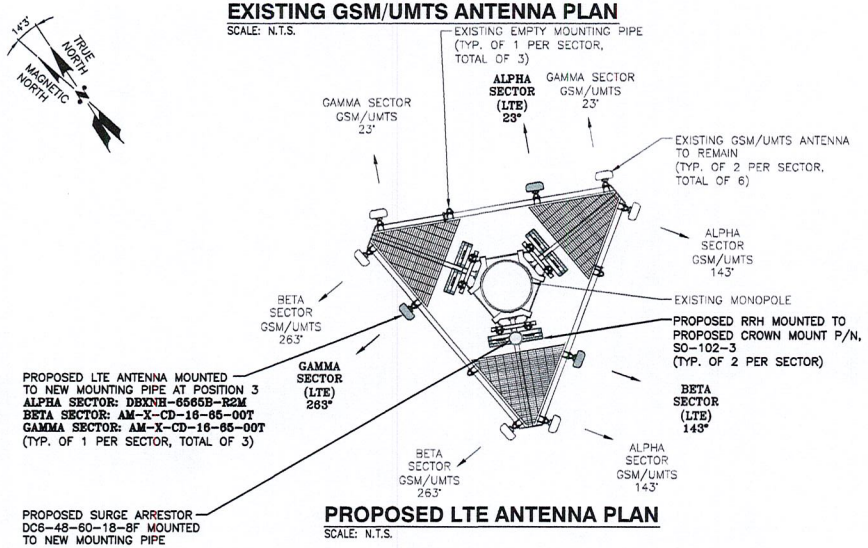
SCALE: N.T.S.

NOTE:

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

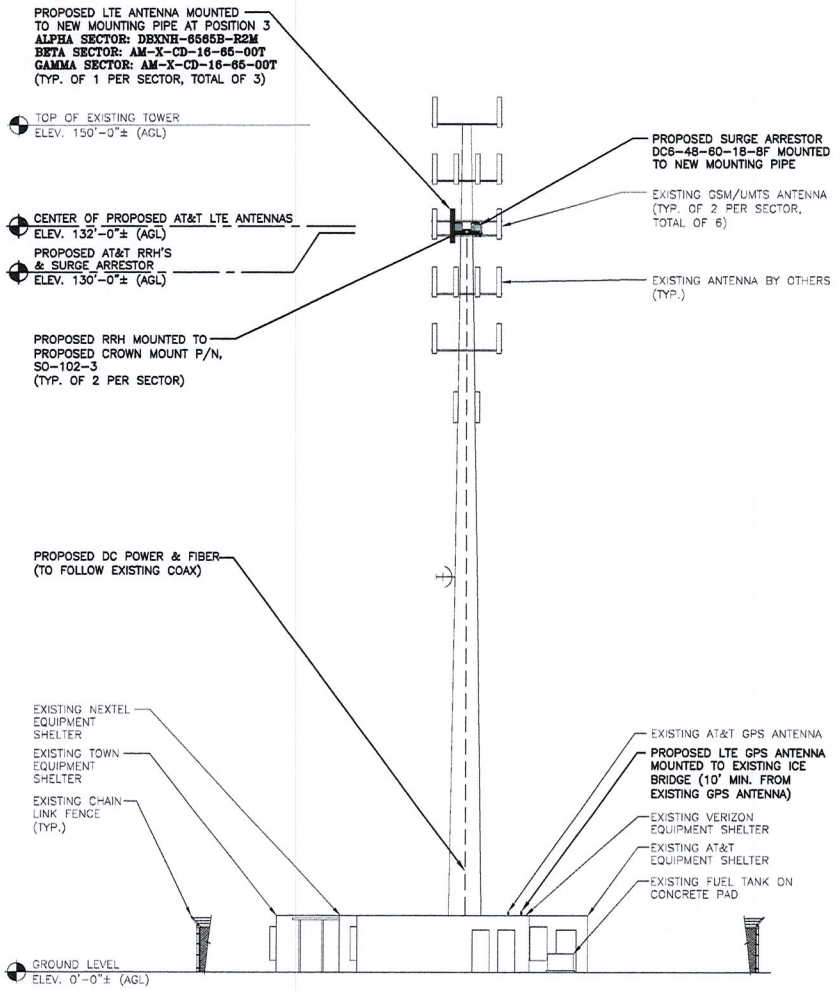
NOTE:

ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



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 Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2090
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: CT2179
SITE NAME: CHESTER - BAM
CROWN CASTLE ID: 800515
49 WIG HILL ROAD
CHESTER, CT 06412
MIDDLESEX 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	08/05/12	ISSUED FOR REVIEW	RS	DC	DPH

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

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24175 — LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA PLAN & ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2179.01	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

CT2179

(Chester Wig Hill Road)

49 Wig Hill Road, Chester, CT 06412

a.k.a. (Chester – Wig Hill Road)

October 23, 2012

Table of Contents

List of Tables

List of Figures

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 on 49 Wig Hill Road in Chester, CT. The coordinates of the tower are 41° 24' 14.0" N, 72° 28' 20.6" 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
AT&T UMTS	*132*	*880*	*1*	*500*	*0.0103*	*0.5867*	*1.76%*
AT&T GSM	*132*	*880*	*4*	*296*	*0.0244*	*0.5867*	*4.16%*
AT&T GSM	*132*	*1930*	*2*	*427*	*0.0176*	*1.0000*	*1.76%*
Pocket	96	2130	6	631	0.1477	1.0000	14.77%
Verizon cellular	140	869	9	268	0.0442	0.5793	7.64%
Verizon PCS	140	1970	7	274	0.0352	1.0000	3.52%
Verizon AWS	140	2145	1	686	0.0126	1.0000	1.26%
Verizon LTE	140	698	2	790	0.0290	0.4653	6.23%
Sprint+Nextel+Omnpt	No data available						12.52%
VSECI	170	933.175	1	29.39024	0.0004	0.6221	0.06%
VSECI	170	46.18	1	300	0.0037	0.2000	1.87%
VSECI	170	46.44	1	300	0.0037	0.2000	1.87%
AT&T UMTS	132	880	2	565	0.0023	0.5867	0.40%
AT&T UMTS	132	1900	2	875	0.0036	1.0000	0.36%
AT&T LTE	132	734	1	1313	0.0027	0.4893	0.55%
AT&T GSM	132	880	1	283	0.0006	0.5867	0.10%
AT&T GSM	132	1900	4	525	0.0043	1.0000	0.43%
						Total	**51.57%**

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

[1] The existing CSC filing for AT&T 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 GPD Group Structural Analysis dated August 27, 2012.

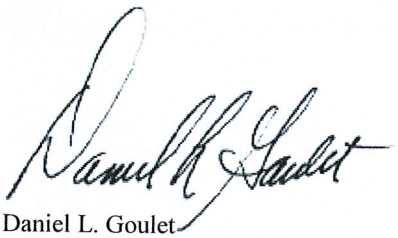
5. Conclusion

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 **51.57% 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

October 23, 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.

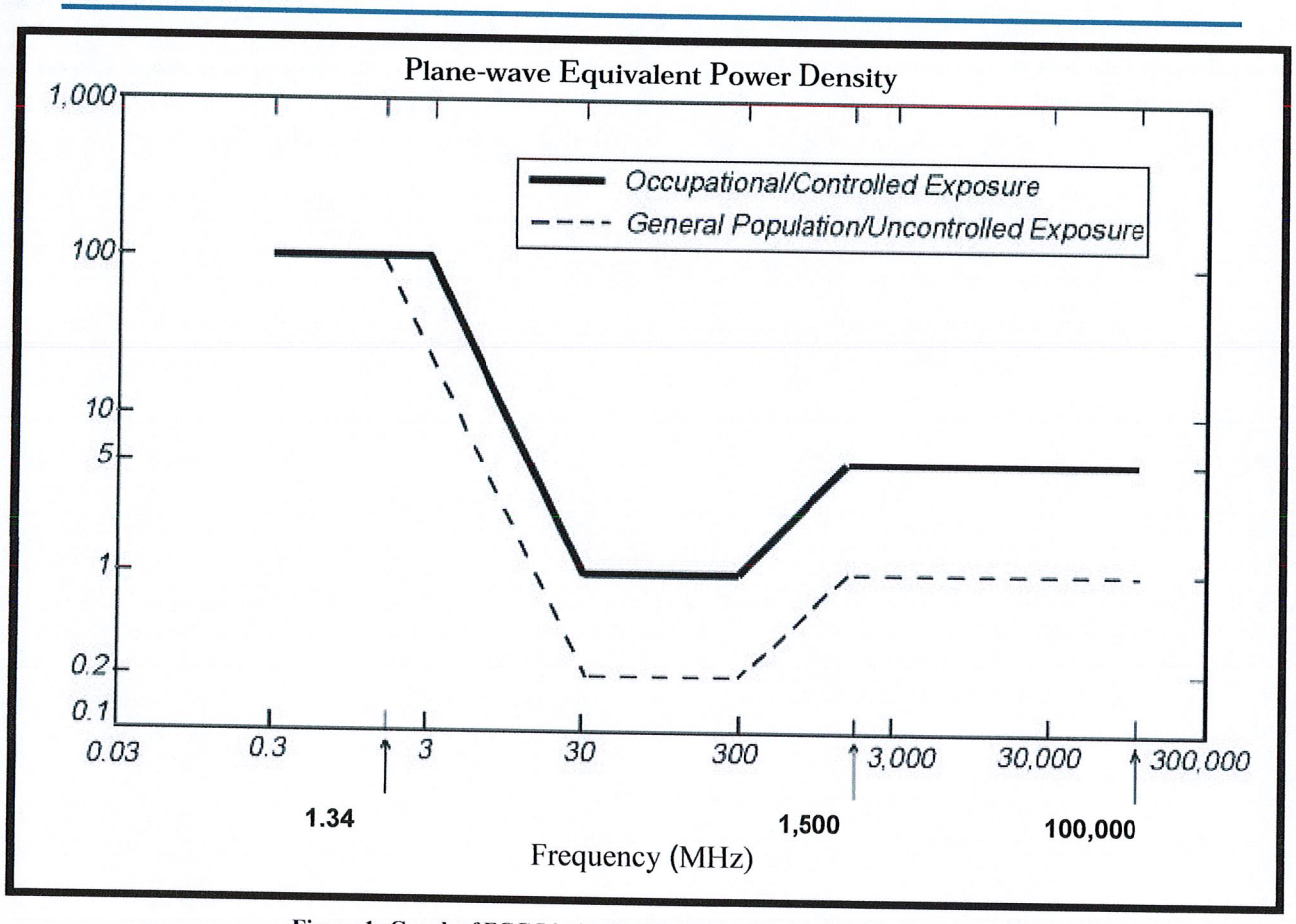
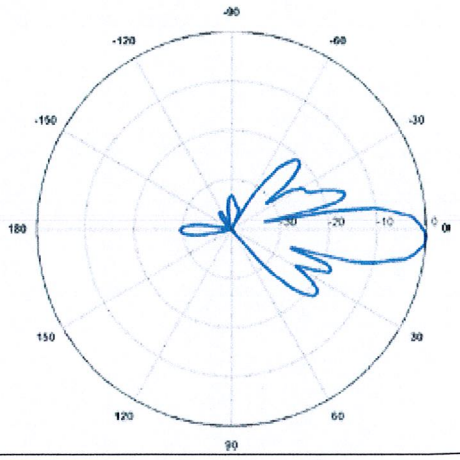


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

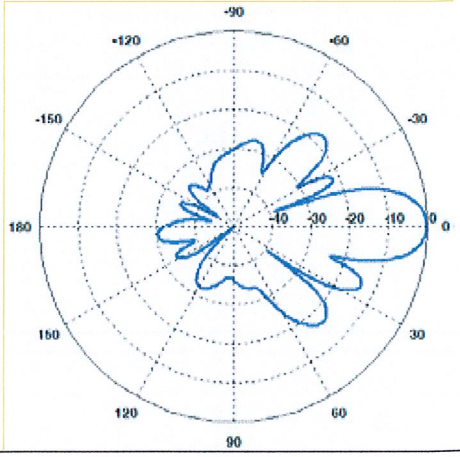
700 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	698-806 MHz
Gain:	13.35 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



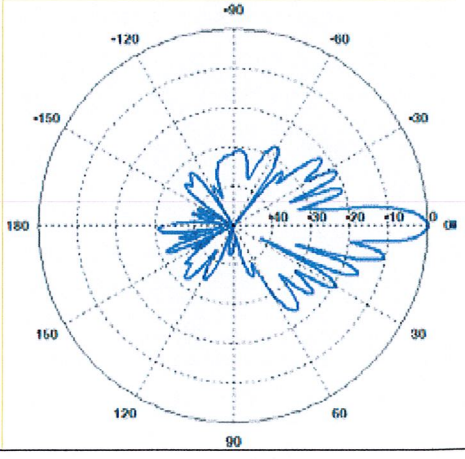
850 MHz

Manufacturer:	Powerwave
Model #:	7770.00
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" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	± 45°
Size L x W x D:	55" x 11.0" x 5.0"



Date: **August 27, 2012**

Eva Morales
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6612

GPD Group
520 South Main Street, Suite 2531
Akron, OH 44311
(614) 859-1607
dpalkovic@gpdgroup.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2179
	Carrier Site Name:	Chester-Wig Hill Road
Crown Castle Designation:	**Crown Castle BU Number:**	800515
	Crown Castle Site Name:	CT Chester CAC 800515
	Crown Castle JDE Job Number:	199422
	Crown Castle Work Order Number:	520285
	Crown Castle Application Number:	158067 Rev. 1
Engineering Firm Designation:	**GPD Group Project Number:**	2012775.800515.02
Site Data:	**Wig Hill Road, Chester, Middlesex County, CT 06412** **Latitude *41° 24' 13.93"*, Longitude *-72° 28' 20.82"*** **150 Foot – Modified EEI Monopole Tower**	

Dear Eva Morales,

GPD Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 483768, in accordance with application 158067, revision 1.

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

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

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

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

Respectfully submitted by:

David B. Granger, P.E.
Connecticut #: 17557

TABLE OF CONTENTS

1) INTRODUCTION

The existing monopole has four major sections connected by slip joints. It has 18 sides and is evenly tapered from 62" (flat-flat) at the base to 21" (flat-flat) at the top. The structure is galvanized and has no tower lighting.

This tower is a 150 ft Monopole tower designed by EEI in August of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

Modifications by GPD (Project #: 2005078.33, dated 2/24/2005) consisting of adding stiffeners to the base plate have been considered in the 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 mph with 0.75 inch ice thickness (in accordance with ASCE 7 ice conditions) 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
132	132	1	Andrew	DBXNH-6565B-R2M	3	3/8	1
		2	KMW	AM-X-CD-16-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			
130	130	6	Ericsson	TME-RRUS-11			
		1		Side Arm Mount [SO 102-3]			

Notes:
1) See Appendix B for the coax layout.

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
150	152	6	Decibel	DB980H90E-M	6	1-5/8	
		1		Platform Mount [LP 713-1]			
	163	1	RFS Celwave	PD1142-1			
	162	1	Decibel	DB636-A			
148	159	1	Decibel	DB636-A	4	7/8	
		1	RFS Celwave	PD1142-1			
	148	1		Side Arm Mount [SO 702-4]			
	142	3	Antel	BXA-171085-8BF-EDIN-2	12 3 1	1-5/8 13/64 7/8	
		3	Antel	BXA-70063-6CF-2			
139		6	Antel	LPA-80080-4CF-EDIN-0			
		1	Decibel	DB810KE-YP			
		6	RFS Celwave	FD9R6004/2C-3L			
	139	1		Platform Mount [LP 713-1]			
132	132	6	Powerwave	7770.00	12	1-1/4	
		6	Powerwave	LGP21401			
		8	Powerwave	LGP21901			
		1		Platform Mount [LP 713-1]			
116	120	2	Allgon	GPS_A	12 2	1-1/4 1/2	
	118	12		7120.16			
	116	1		Platform Mount [LP 713-1]			
106	108	6	Dapa	59212	6	1-5/8	
	106	1		Platform Mount [LP 713-1]			
96	96	3	RFS Celwave	APXV18-206517LS	6	1-1/4	
		1		Side Arm Mount [SO 102-3]			
75	75	1		3' Sidearm - Round	1	1/2	
		1		GPS_RESERVED			
70	70	1	Kathrein	PR-950	1	WEP65	
		1		Side Arm Mount [SO 103-1]			

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)
150	150	12		ALP 9212		
140	140	12		ALP 9212		
130	130	12		ALP 9212		
116	116	12		ALP 9212		
106	106	12		ALP 9212		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, dated 10/27/1998	2301672	CCISITES
4-POST-MODIFICATION INSPECTION	GPD Project #: 2006185.04, dated 10/5/2006	1285403	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	TEP Project #: 081974, dated 7/31/2008	671930	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI Job #: 4123, dated 8/7/1998	671925	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD Project #: 2005078.33, dated 2/24/2005	1037702	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	GPD Project #: 2011181.800515.01, dated 10/5/2011	2972452	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount sizes, weights, and manufacturers are best estimates based on site photos provided and were determined without the benefit of a site visit by GPD.
6) All member connections and foundation steel reinforcing are assumed designed to meet or exceed the load carrying capacity of the connected member and surrounding soils respectively unless otherwise specified in this report.
7) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package dated 8/21/12 with any adjustments as noted below.
   -The proposed 1/2" coax listed to the 150 ft level in the base level drawing has not been modeled based on the elevation drawing.
   -The omni and (1) 7/8" coax with the centerline elevation of 142' has been modeled off of the mount at 139' per recent site photos.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 122.92	Pole	TP28.83x21x0.1875	1	-7.592	848.860	48.7	Pass
L2	122.92 - 84.26	Pole	TP39.51x27.2493x0.375	2	-18.125	2324.152	61.7	Pass
L3	84.26 - 41.55	Pole	TP50.99x37.1855x0.4375	3	-29.950	3506.363	68.0	Pass
L4	41.55 - 0	Pole	TP62x48.1335x0.5	4	-46.865	4970.730	64.0	Pass
							Summary	
						Pole (L3)	68.0	Pass
						Rating =	68.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	57.4	Pass
1	Base Plate	0	44.9	Pass
1	Base Foundation	0	70.2	Pass

Structure Rating (max from all components) =	70.2%

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

4.1) Recommendations

The modified tower and its foundation are sufficient for the proposed loading and do not require further modifications.

5) DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD GROUP in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD GROUP does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD GROUP provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

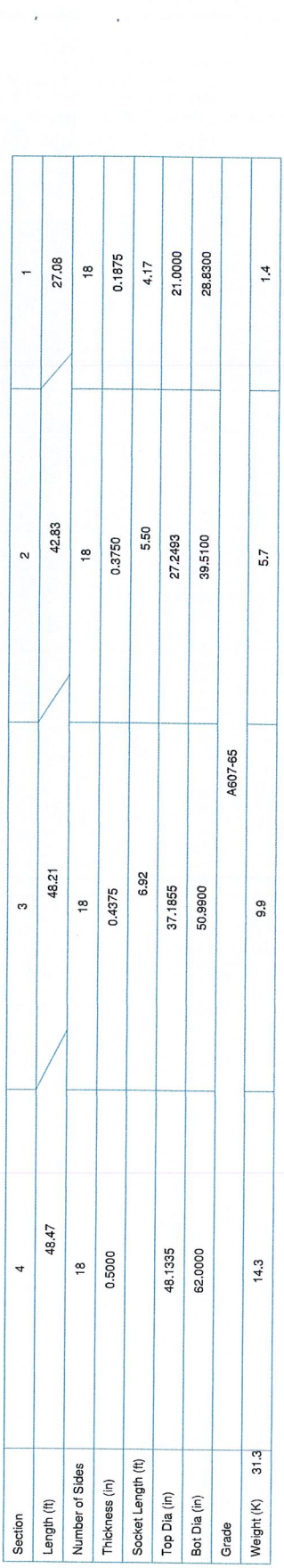
The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD GROUP, but are beyond the scope of this report.

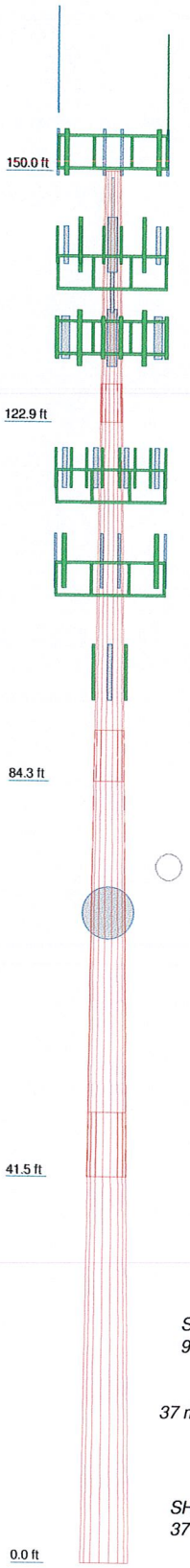
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

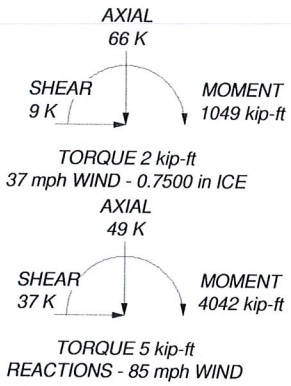
GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

TNXTOWER OUTPUT







DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 713-1]	152	(2) 7770.00 w/ Mount Pipe	132
9' Ladder	150	(2) 7770.00 w/ Mount Pipe	132
(2) DB980H90E-M w/ Mount Pipe	150	DBXNH-6565B-R2M w/ Mount Pipe	132
(2) DB980H90E-M w/ Mount Pipe	150	AM-X-CD-16-65-00T-RET w/ Mount Pipe	132
(2) DB980H90E-M w/ Mount Pipe	150		
(2) 6' x 2" Mount Pipe	150	AM-X-CD-16-65-00T-RET w/ Mount Pipe	132
(2) 6' x 2" Mount Pipe	150		
(2) 6' x 2" Mount Pipe	150	6' x 2" Mount Pipe	132
Side Arm Mount [SO 702-4]	148	6' x 2" Mount Pipe	132
PD1142-1	148	6' x 2" Mount Pipe	132
DB636-A	148	(2) LGP21401	132
PD1142-1	148	(2) LGP21401	132
DB636-A	148	(2) LGP21401	132
8' x 3" Mount Pipe	148	(4) LGP21901	132
8' x 3" Mount Pipe	148	(2) LGP21901	132
8' x 3" Mount Pipe	148	(2) LGP21901	132
8' x 3" Mount Pipe	148	DC6-48-60-18-8F	132
Platform Mount [LP 713-1]	139	Side Arm Mount [SO 102-3]	130
9' Ladder	139	(2) TME-RRUS-11	130
8' x 3" Mount Pipe	139	(2) TME-RRUS-11	130
8' x 3" Mount Pipe	139	(2) TME-RRUS-11	130
DB810KE-YP	139	Platform Mount [LP 713-1]	116
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	139	9' Ladder	116
		(4) 7120.16 w/ Mount Pipe	116
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	139	(4) 7120.16 w/ Mount Pipe	116
		(4) 7120.16 w/ Mount Pipe	116
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	139	(2) GPS_A	116
		Platform Mount [LP 713-1]	106
BXA-70063-6CF-2 w/ Mount Pipe	139	9' Ladder	106
BXA-70063-6CF-2 w/ Mount Pipe	139	(2) 59212 w/ Mount Pipe	106
BXA-70063-6CF-2 w/ Mount Pipe	139	(2) 59212 w/ Mount Pipe	106
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	139	(2) 59212 w/ Mount Pipe	106
		6' x 2" Mount Pipe	106
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	139	6' x 2" Mount Pipe	106
		6' x 2" Mount Pipe	106
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	139	Side Arm Mount [SO 102-3]	96
		APXV18-206517LS w/ Mount Pipe	96
(2) FD9R6004/2C-3L	139	APXV18-206517LS w/ Mount Pipe	96
(2) FD9R6004/2C-3L	139	APXV18-206517LS w/ Mount Pipe	96
(2) FD9R6004/2C-3L	139	3' Sidearm - Round	75
Platform Mount [LP 713-1]	132	GPS_RESERVED	75
9' Ladder	132	Side Arm Mount [SO 103-1]	70
(2) 7770.00 w/ Mount Pipe	132	PR-950	70

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Middlesex 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 37 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: 68%

GPD GROUP
Consulting Engineers
GPD Group
520 South Main Street
Akron, Ohio 44311
Phone: 330.572.2100
FAX: 330.572.2103

Job:	CT CHESTER CAC 800515
Project:	2012775.800515.02
Client:	Crown Castle USA Inc
Drawn by:	jnine
App'd:	
Code:	TIA/EIA-222-F
Date:	08/27/12
Scale:	NTS
Path:	\\AKRN03\Data\2011\2011181\800515\02\TNX\800515.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:

2) Tower is located in Middlesex County, Connecticut.
3) Basic wind speed of 85 mph.
4) Nominal ice thickness of 0.7500 in.
5) Ice thickness is considered to increase with height.
6) Ice density of 56 pcf.
7) A wind speed of 37 mph is used in combination with ice.
8) Temperature drop of 50 °F.
9) Deflections calculated using a wind speed of 50 mph.
10) A non-linear (P-delta) analysis was used.
11) Pressures are calculated at each section.
12) Stress ratio used in pole design is 1.333.
13) Local bending stresses due to climbing loads, feedline 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		

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	150.00-122.92	27.08	4.17	18	21.0000	28.8300	0.1875	0.7500	A607-65 (65 ksi)
L2	122.92-84.26	42.83	5.50	18	27.2493	39.5100	0.3750	1.5000	A607-65 (65 ksi)
L3	84.26-41.55	48.21	6.92	18	37.1855	50.9900	0.4375	1.7500	A607-65 (65 ksi)
L4	41.55-0.00	48.47		18	48.1335	62.0000	0.5000	2.0000	A607-65 (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
	29.2747	17.0459	1766.7635	10.1681	14.6456	120.6341	3535.8517	8.5246	4.7441	25.302
L2	28.8818	31.9871	2918.6755	9.5404	13.8426	210.8469	5841.1915	15.9966	4.1359	11.029
	40.1195	46.5804	9013.0474	13.8929	20.0711	449.0564	18037.954	23.2946	6.2938	16.783

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
L3	39.3584	51.0293	8706.1286	13.0456	18.8903	460.8793	17423.7124	25.5195	5.7747	13.199
	51.7766	70.1985	22664.7192	17.9461	25.9029	874.9870	45359.2613	35.1059	8.2042	18.753
L4	50.8863	75.5944	21669.6835	16.9099	24.4518	886.2193	43367.8806	37.8044	7.5915	15.183
	62.9564	97.6005	46637.9792	21.8325	31.4960	1480.7588	93337.3258	48.8095	10.0320	20.064

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 150.00-122.92				1	1	1		
L2 122.92-84.26				1	1	1		
L3 84.26-41.55				1	1	1		
L4 41.55-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HJ7-50A(1-5/8")	A	No	Inside Pole	139.00 - 8.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
						2" Ice	0.00	1.04
						4" Ice	0.00	1.04
CATEGORY 5e(13/64")	A	No	Inside Pole	139.00 - 8.00	3	No Ice	0.00	0.02
						1/2" Ice	0.00	0.02
						1" Ice	0.00	0.02
						2" Ice	0.00	0.02
						4" Ice	0.00	0.02
WEP65(ELLIPTICAL)	A	No	CaAa (Out Of Face)	70.00 - 8.00	1	No Ice	0.20	0.53
						1/2" Ice	0.30	2.08
						1" Ice	0.40	4.23
						2" Ice	0.60	10.38
						4" Ice	1.00	30.00
LCF114-50J(1-1/4")	A	No	Inside Pole	132.00 - 8.00	12	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
						2" Ice	0.00	0.70
						4" Ice	0.00	0.70
FB-L98B-002-75000(3/8")	A	No	Inside Pole	132.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG122ST-BRDA(3/8)	A	No	CaAa (Out Of Face)	132.00 - 8.00	2	No Ice	0.00	0.20
						1/2" Ice	0.00	0.74
						1" Ice	0.00	1.89
						2" Ice	0.00	6.03
						4" Ice	0.00	21.63
LDF4-50A(1/2")	B	No	Inside Pole	116.00 - 8.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
CR 1480 PE(1-1/4")	B	No	Inside Pole	116.00 - 8.00	12	No Ice	0.00	0.55
						1/2" Ice	0.00	0.55
						1" Ice	0.00	0.55

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.00	0.55
						4" Ice	0.00	0.55
LDF7-50A(1-5/8")	B	No	Inside Pole	106.00 - 8.00	6	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
FLC 12-50J(1/2")	B	No	CaAa (Out Of Face)	75.00 - 8.00	1	No Ice	0.06	0.17
						1/2" Ice	0.16	0.87
						1" Ice	0.26	2.17
						2" Ice	0.46	6.62
						4" Ice	0.86	22.85
LDF6-50A(1-1/4")	B	No	Inside Pole	96.00 - 8.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
Step Pegs	B	No	CaAa (Out Of Face)	150.00 - 8.00	1	No Ice	0.08	2.72
						1/2" Ice	0.18	3.51
						1" Ice	0.28	4.92
						2" Ice	0.48	9.56
						4" Ice	0.88	26.18
Safety Line 3/8	B	No	CaAa (Out Of Face)	150.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
LCF78-50A(7/8")	C	No	Inside Pole	139.00 - 8.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	0.34
						1" Ice	0.00	0.34
						2" Ice	0.00	0.34
						4" Ice	0.00	0.34
LDF7-50A(1-5/8")	C	No	Inside Pole	150.00 - 8.00	6	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
HJ5-50(7/8")	C	No	Inside Pole	148.00 - 8.00	4	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
						2" Ice	0.00	0.54
						4" Ice	0.00	0.54

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	150.00-122.92	A	0.000	0.000	0.000	0.000	0.282
		B	0.000	0.000	0.000	3.182	0.080
		C	0.000	0.000	0.000	0.000	0.193
L2	122.92-84.26	A	0.000	0.000	0.000	0.000	0.827
		B	0.000	0.000	0.000	4.543	0.486
		C	0.000	0.000	0.000	0.000	0.287
L3	84.26-41.55	A	0.000	0.000	0.000	5.775	0.929
		B	0.000	0.000	0.000	7.159	0.805
		C	0.000	0.000	0.000	0.000	0.317
L4	41.55-0.00	A	0.000	0.000	0.000	6.811	0.736
		B	0.000	0.000	0.000	6.089	0.634
		C	0.000	0.000	0.000	0.000	0.249

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	150.00-122.92	A	0.889	0.000	0.000	0.000	0.000	0.308
		B		0.000	0.000	0.000	12.809	0.156
		C		0.000	0.000	0.000	0.000	0.193
L2	122.92-84.26	A	0.860	0.000	0.000	0.000	0.000	0.938
		B		0.000	0.000	0.000	18.286	0.595
		C		0.000	0.000	0.000	0.000	0.287
L3	84.26-41.55	A	0.810	0.000	0.000	0.000	10.666	1.134
		B		0.000	0.000	0.000	27.594	0.976
		C		0.000	0.000	0.000	0.000	0.317
L4	41.55-0.00	A	0.750	0.000	0.000	0.000	12.243	0.917
		B		0.000	0.000	0.000	22.388	0.769
		C		0.000	0.000	0.000	0.000	0.249

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-122.92	0.1445	0.0834	0.4729	0.2731
L2	122.92-84.26	0.1466	0.0846	0.5039	0.2909
L3	84.26-41.55	0.2032	-0.0789	0.6623	0.0759
L4	41.55-0.00	0.1749	-0.1249	0.5679	-0.0307

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 713-1]	C	None		0.0000	152.00	No Ice	31.27	31.27	1.510
						1/2" Ice	39.68	39.68	1.929
						1" Ice	48.09	48.09	2.348
						2" Ice	64.91	64.91	3.186
						4" Ice	98.55	98.55	4.862
9' Ladder	A	From Centroid-Leg	3.00 0.00 0.00	0.0000	150.00	No Ice	4.50	2.25	0.076
						1/2" Ice	5.50	2.75	0.122
						1" Ice	6.50	3.25	0.167
						2" Ice	8.50	4.25	0.259
						4" Ice	12.50	6.25	0.443
(2) DB980H90E-M w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 2.00	0.0000	150.00	No Ice	4.04	3.62	0.030
						1/2" Ice	4.50	4.48	0.064
						1" Ice	4.95	5.22	0.107
						2" Ice	5.87	6.74	0.216
						4" Ice	8.05	10.00	0.549
(2) DB980H90E-M w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 2.00	0.0000	150.00	No Ice	4.04	3.62	0.030
						1/2" Ice	4.50	4.48	0.064
						1" Ice	4.95	5.22	0.107
						2" Ice	5.87	6.74	0.216
						4" Ice	8.05	10.00	0.549
(2) DB980H90E-M w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 2.00	0.0000	150.00	No Ice	4.04	3.62	0.030
						1/2" Ice	4.50	4.48	0.064
						1" Ice	4.95	5.22	0.107
						2" Ice	5.87	6.74	0.216
						4" Ice	8.05	10.00	0.549

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			
(2) 6' x 2" Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	150.00	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	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	150.00	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	0.022 0.033 0.048 0.090 0.231
(2) 6' x 2" Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	150.00	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	0.022 0.033 0.048 0.090 0.231
Side Arm Mount [SO 702-4]	C	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.86 6.60 8.34 11.82 18.78	4.86 6.60 8.34 11.82 18.78	0.108 0.152 0.196 0.284 0.460
PD1142-1	A	From Leg	6.00 0.00 15.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.32 3.21 5.12 8.99 16.94	1.32 3.21 5.12 8.99 16.94	0.010 0.024 0.049 0.136 0.457
DB636-A	B	From Leg	6.00 0.00 11.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.78 3.96 5.16 7.24 10.16	2.78 3.96 5.16 7.24 10.16	0.030 0.051 0.079 0.159 0.414
PD1142-1	C	From Leg	6.00 0.00 11.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.32 3.21 5.12 8.99 16.94	1.32 3.21 5.12 8.99 16.94	0.010 0.024 0.049 0.136 0.457
DB636-A	A	From Face	6.00 0.00 14.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.78 3.96 5.16 7.24 10.16	2.78 3.96 5.16 7.24 10.16	0.030 0.051 0.079 0.159 0.414
8' x 3" Mount Pipe	A	From Leg	6.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 3.19 3.67 4.68 6.79	2.40 3.19 3.67 4.68 6.79	0.041 0.058 0.081 0.143 0.339
8' x 3" Mount Pipe	B	From Leg	6.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 3.19 3.67 4.68 6.79	2.40 3.19 3.67 4.68 6.79	0.041 0.058 0.081 0.143 0.339
8' x 3" Mount Pipe	C	From Leg	6.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.40 3.19 3.67 4.68	2.40 3.19 3.67 4.68	0.041 0.058 0.081 0.143

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							2" Ice	6.79	6.79	0.339
							4" Ice			
8' x 3" Mount Pipe	A	From Face	6.00	0.00	0.0000	148.00	No Ice	2.40	2.40	0.041
			0.00	4.00			1/2"	3.19	3.19	0.058
							Ice	3.67	3.67	0.081
							1" Ice	4.68	4.68	0.143
							2" Ice	6.79	6.79	0.339
							4" Ice			
Platform Mount [LP 713-1]	C	None			0.0000	139.00	No Ice	31.27	31.27	1.510
							1/2"	39.68	39.68	1.929
							Ice	48.09	48.09	2.348
							1" Ice	64.91	64.91	3.186
							2" Ice	98.55	98.55	4.862
							4" Ice			
9' Ladder	A	From Centroid-Leg	3.00	0.00	0.0000	139.00	No Ice	4.50	2.25	0.076
			0.00	0.00			1/2"	5.50	2.75	0.122
							Ice	6.50	3.25	0.167
							1" Ice	8.50	4.25	0.259
							2" Ice	12.50	6.25	0.443
							4" Ice			
8' x 3" Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	2.40	2.40	0.041
			0.00	-2.00			1/2"	3.19	3.19	0.058
							Ice	3.67	3.67	0.081
							1" Ice	4.68	4.68	0.143
							2" Ice	6.79	6.79	0.339
							4" Ice			
8' x 3" Mount Pipe	A	From Centroid-Leg	8.00	0.00	0.0000	139.00	No Ice	2.40	2.40	0.041
			0.00	-6.00			1/2"	3.19	3.19	0.058
							Ice	3.67	3.67	0.081
							1" Ice	4.68	4.68	0.143
							2" Ice	6.79	6.79	0.339
							4" Ice			
DB810KE-YP	A	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	4.37	4.37	0.035
			0.00	3.00			1/2"	5.86	5.86	0.067
							Ice	7.37	7.37	0.107
							1" Ice	10.43	10.43	0.218
							2" Ice	14.16	14.16	0.558
							4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	3.41	3.58	0.032
			0.00	3.00			1/2"	3.88	4.38	0.065
							Ice	4.35	5.06	0.106
							1" Ice	5.36	6.47	0.208
							2" Ice	7.52	9.64	0.522
							4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	3.41	3.58	0.032
			0.00	3.00			1/2"	3.88	4.38	0.065
							Ice	4.35	5.06	0.106
							1" Ice	5.36	6.47	0.208
							2" Ice	7.52	9.64	0.522
							4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	3.41	3.58	0.032
			0.00	3.00			1/2"	3.88	4.38	0.065
							Ice	4.35	5.06	0.106
							1" Ice	5.36	6.47	0.208
							2" Ice	7.52	9.64	0.522
							4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	7.97	5.80	0.042
			0.00	3.00			1/2"	8.61	6.95	0.100
							Ice	9.22	7.82	0.170
							1" Ice	10.46	9.60	0.335
							2" Ice	13.07	13.37	0.803
							4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	139.00	No Ice	7.97	5.80	0.042
			0.00	3.00			1/2"	8.61	6.95	0.100
							Ice	9.22	7.82	0.170

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	10.46	9.60	0.335
						2" Ice	13.07	13.37	0.803
						4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	7.97	5.80	0.042
						1/2" Ice	8.61	6.95	0.100
						1" Ice	9.22	7.82	0.170
						2" Ice	10.46	9.60	0.335
						4" Ice	13.07	13.37	0.803
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	2.86	7.23	0.030
						1/2" Ice	3.22	7.92	0.074
						1" Ice	3.59	8.63	0.127
						2" Ice	4.45	10.11	0.253
						4" Ice	6.32	13.34	0.613
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	2.86	7.23	0.030
						1/2" Ice	3.22	7.92	0.074
						1" Ice	3.59	8.63	0.127
						2" Ice	4.45	10.11	0.253
						4" Ice	6.32	13.34	0.613
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	2.86	7.23	0.030
						1/2" Ice	3.22	7.92	0.074
						1" Ice	3.59	8.63	0.127
						2" Ice	4.45	10.11	0.253
						4" Ice	6.32	13.34	0.613
(2) FD9R6004/2C-3L	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	0.37	0.08	0.003
						1/2" Ice	0.45	0.14	0.005
						1" Ice	0.54	0.20	0.009
						2" Ice	0.75	0.34	0.020
						4" Ice	1.28	0.74	0.063
(2) FD9R6004/2C-3L	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	0.37	0.08	0.003
						1/2" Ice	0.45	0.14	0.005
						1" Ice	0.54	0.20	0.009
						2" Ice	0.75	0.34	0.020
						4" Ice	1.28	0.74	0.063
(2) FD9R6004/2C-3L	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	139.00	No Ice	0.37	0.08	0.003
						1/2" Ice	0.45	0.14	0.005
						1" Ice	0.54	0.20	0.009
						2" Ice	0.75	0.34	0.020
						4" Ice	1.28	0.74	0.063
Platform Mount [LP 713-1]	C	None		0.0000	132.00	No Ice	31.27	31.27	1.510
						1/2" Ice	39.68	39.68	1.929
						1" Ice	48.09	48.09	2.348
						2" Ice	64.91	64.91	3.186
						4" Ice	98.55	98.55	4.862
9' Ladder	A	From Centroid-Leg	3.00 0.00 0.00	0.0000	132.00	No Ice	4.50	2.25	0.076
						1/2" Ice	5.50	2.75	0.122
						1" Ice	6.50	3.25	0.167
						2" Ice	8.50	4.25	0.259
						4" Ice	12.50	6.25	0.443
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	6.12	4.25	0.055
						1/2" Ice	6.63	5.01	0.101
						1" Ice	7.13	5.71	0.155
						2" Ice	8.16	7.16	0.287
						4" Ice	10.36	10.41	0.665
(2) 7770.00 w/ Mount Pipe	B	From Centroid-	4.00 0.00	0.0000	132.00	No Ice	6.12	4.25	0.055
						1/2" Ice	6.63	5.01	0.101

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
		Leg	0.00			Ice	7.13	5.71	0.155
						1" Ice	8.16	7.16	0.287
						2" Ice	10.36	10.41	0.665
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	6.12	4.25	0.055
						1/2"	6.63	5.01	0.101
						Ice	7.13	5.71	0.155
						1" Ice	8.16	7.16	0.287
						2" Ice	10.36	10.41	0.665
						4" Ice			
DBXNH-6565B-R2M w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	8.70	7.13	0.080
						1/2"	9.35	8.32	0.146
						Ice	9.97	9.22	0.225
						1" Ice	11.24	11.06	0.409
						2" Ice	13.90	15.10	0.920
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	8.50	6.30	0.074
						1/2"	9.15	7.48	0.136
						Ice	9.77	8.37	0.210
						1" Ice	11.03	10.18	0.385
						2" Ice	13.68	14.02	0.874
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	8.50	6.30	0.074
						1/2"	9.15	7.48	0.136
						Ice	9.77	8.37	0.210
						1" Ice	11.03	10.18	0.385
						2" Ice	13.68	14.02	0.874
						4" Ice			
6' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	1.43	1.43	0.022
						1/2"	1.92	1.92	0.033
						Ice	2.29	2.29	0.048
						1" Ice	3.06	3.06	0.090
						2" Ice	4.70	4.70	0.231
						4" Ice			
6' x 2" Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	1.43	1.43	0.022
						1/2"	1.92	1.92	0.033
						Ice	2.29	2.29	0.048
						1" Ice	3.06	3.06	0.090
						2" Ice	4.70	4.70	0.231
						4" Ice			
6' x 2" Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	1.43	1.43	0.022
						1/2"	1.92	1.92	0.033
						Ice	2.29	2.29	0.048
						1" Ice	3.06	3.06	0.090
						2" Ice	4.70	4.70	0.231
						4" Ice			
(2) LGP21401	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	0.00	0.23	0.014
						1/2"	0.00	0.31	0.021
						Ice	0.00	0.40	0.030
						1" Ice	0.00	0.61	0.055
						2" Ice	0.00	1.12	0.135
						4" Ice			
(2) LGP21401	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	0.00	0.23	0.014
						1/2"	0.00	0.31	0.021
						Ice	0.00	0.40	0.030
						1" Ice	0.00	0.61	0.055
						2" Ice	0.00	1.12	0.135
						4" Ice			
(2) LGP21401	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	132.00	No Ice	0.00	0.23	0.014
						1/2"	0.00	0.31	0.021
						Ice	0.00	0.40	0.030
						1" Ice	0.00	0.61	0.055
						2" Ice	0.00	1.12	0.135
						4" Ice			
(4) LGP21901	A	From	4.00	0.0000	132.00	No Ice	0.00	0.18	0.006

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00	0.00			1/2" Ice	0.00	0.25	0.008
							1" Ice	0.00	0.32	0.011
							2" Ice	0.00	0.49	0.022
							4" Ice	0.00	0.94	0.066
(2) LGP21901	B	From Centroid-Leg	4.00	0.00	0.0000	132.00	No Ice	0.00	0.18	0.006
			0.00	0.00			1/2" Ice	0.00	0.25	0.008
							1" Ice	0.00	0.32	0.011
							2" Ice	0.00	0.49	0.022
							4" Ice	0.00	0.94	0.066
(2) LGP21901	C	From Centroid-Leg	4.00	0.00	0.0000	132.00	No Ice	0.00	0.18	0.006
			0.00	0.00			1/2" Ice	0.00	0.25	0.008
							1" Ice	0.00	0.32	0.011
							2" Ice	0.00	0.49	0.022
							4" Ice	0.00	0.94	0.066
DC6-48-60-18-8F	B	From Centroid-Leg	4.00	0.00	0.0000	132.00	No Ice	2.22	2.22	0.020
			0.00	0.00			1/2" Ice	2.44	2.44	0.039
							1" Ice	2.66	2.66	0.061
							2" Ice	3.15	3.15	0.116
							4" Ice	4.21	4.21	0.268
Side Arm Mount [SO 102-3]	C	None			0.0000	130.00	No Ice	3.00	3.00	0.081
							1/2" Ice	3.48	3.48	0.111
							1" Ice	3.96	3.96	0.141
							2" Ice	4.92	4.92	0.201
							4" Ice	6.84	6.84	0.321
(2) TME-RRUS-11	A	From Leg	0.50	0.00	0.0000	130.00	No Ice	3.25	1.37	0.048
			0.00	0.00			1/2" Ice	3.49	1.55	0.068
							1" Ice	3.74	1.74	0.092
							2" Ice	4.27	2.14	0.150
							4" Ice	5.43	3.04	0.310
(2) TME-RRUS-11	B	From Leg	0.50	0.00	0.0000	130.00	No Ice	3.25	1.37	0.048
			0.00	0.00			1/2" Ice	3.49	1.55	0.068
							1" Ice	3.74	1.74	0.092
							2" Ice	4.27	2.14	0.150
							4" Ice	5.43	3.04	0.310
(2) TME-RRUS-11	C	From Leg	0.50	0.00	0.0000	130.00	No Ice	3.25	1.37	0.048
			0.00	0.00			1/2" Ice	3.49	1.55	0.068
							1" Ice	3.74	1.74	0.092
							2" Ice	4.27	2.14	0.150
							4" Ice	5.43	3.04	0.310
Platform Mount [LP 713-1]	C	None			0.0000	116.00	No Ice	31.27	31.27	1.510
							1/2" Ice	39.68	39.68	1.929
							1" Ice	48.09	48.09	2.348
							2" Ice	64.91	64.91	3.186
							4" Ice	98.55	98.55	4.862
9' Ladder	B	From Centroid-Leg	3.00	0.00	0.0000	116.00	No Ice	4.50	2.25	0.076
			0.00	0.00			1/2" Ice	5.50	2.75	0.122
							1" Ice	6.50	3.25	0.167
							2" Ice	8.50	4.25	0.259
							4" Ice	12.50	6.25	0.443
(4) 7120.16 w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	116.00	No Ice	3.52	6.22	0.035
			0.00	2.00			1/2" Ice	3.92	6.99	0.078
							1" Ice	4.33	7.74	0.131
							2" Ice	5.26	9.28	0.257
							4" Ice	7.26	12.59	0.621

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) 7120.16 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.52 3.92 4.33 5.26 7.26	6.22 6.99 7.74 9.28 12.59	0.035 0.078 0.131 0.257 0.621
(4) 7120.16 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.52 3.92 4.33 5.26 7.26	6.22 6.99 7.74 9.28 12.59	0.035 0.078 0.131 0.257 0.621
(2) GPS_A	A	From Centroid-Leg	4.00 0.00 4.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.001 0.005 0.010 0.025 0.079
Platform Mount [LP 713-1]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.27 39.68 48.09 64.91 98.55	31.27 39.68 48.09 64.91 98.55	1.510 1.929 2.348 3.186 4.862
9' Ladder	A	From Centroid-Leg	3.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.50 5.50 6.50 8.50 12.50	2.25 2.75 3.25 4.25 6.25	0.076 0.122 0.167 0.259 0.443
(2) 59212 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.51 6.02 7.06 9.35	4.27 5.43 6.28 8.02 11.70	0.040 0.079 0.129 0.253 0.634
(2) 59212 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.51 6.02 7.06 9.35	4.27 5.43 6.28 8.02 11.70	0.040 0.079 0.129 0.253 0.634
(2) 59212 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.51 6.02 7.06 9.35	4.27 5.43 6.28 8.02 11.70	0.040 0.079 0.129 0.253 0.634
6' x 2" Mount Pipe	A	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	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	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	B	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	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	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	C	From Centroid-Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.022 0.033 0.048 0.090 0.231

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 102-3]	C	None			0.0000	96.00	4" Ice 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	0.081 0.111 0.141 0.201 0.321
APXV18-206517LS w/ Mount Pipe	A	From Leg	0.50 0.00	0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.29 5.84 6.36 7.42 9.77	4.67 5.82 6.69 8.46 12.21	0.053 0.095 0.148 0.279 0.674
APXV18-206517LS w/ Mount Pipe	B	From Leg	0.50 0.00	0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.29 5.84 6.36 7.42 9.77	4.67 5.82 6.69 8.46 12.21	0.053 0.095 0.148 0.279 0.674
APXV18-206517LS w/ Mount Pipe	C	From Leg	0.50 0.00	0.00	0.0000	96.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.29 5.84 6.36 7.42 9.77	4.67 5.82 6.69 8.46 12.21	0.053 0.095 0.148 0.279 0.674
3' Sidearm - Round	C	From Face	1.50 0.00	0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.80 1.05 1.30 1.80 2.80	1.40 1.75 2.10 2.80 4.20	0.034 0.044 0.053 0.072 0.110
GPS_RESERVED	C	From Face	3.00 0.00	0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.001 0.005 0.010 0.025 0.079
Side Arm Mount [SO 103-1]	A	None			0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.70 7.00 8.30 10.90 16.10	0.60 0.90 1.20 1.80 3.00	0.078 0.106 0.134 0.190 0.302

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PR-950	A	Grid	From Leg	1.00 0.00	0.00	45.0000		70.00	5.67	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	25.25 26.00 26.74 28.24 31.23	0.038 0.100 0.200 0.300 0.500

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	150 - 122.92	Pole	Max Tension	1	0.000	0.00	0.00
			Max. Compression	14	-15.454	0.41	3.18
			Max. Mx	11	-7.626	223.19	1.33
			Max. My	2	-7.592	0.14	228.62
			Max. Vy	5	16.529	-222.84	1.32
			Max. Vx	2	-16.809	0.14	228.62
			Max. Torque	5			3.80
L2	122.92 - 84.26	Pole	Max Tension	1	0.000	0.00	0.00
			Max. Compression	14	-31.281	-0.26	3.58
			Max. Mx	5	-18.156	-1073.81	0.38
			Max. My	2	-18.125	1.00	1090.12
			Max. Vy	5	27.782	-1073.81	0.38
			Max. Vx	2	-28.113	1.00	1090.12
			Max. Torque	11			-4.03
L3	84.26 - 41.55	Pole	Max Tension	1	0.000	0.00	0.00
			Max. Compression	14	-45.186	-0.72	3.98
			Max. Mx	5	-29.965	-2318.40	0.38
			Max. My	2	-29.950	0.78	2347.45

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-32.456	2318.04	2.91
			Max. Vx	8	32.760	-1.74	-2344.73
			Max. Torque	11			-5.30
L4	41.55 - 0	Pole	Max Tension	1	0.000	0.00	0.00
			Max. Compression	14	-66.282	-1.27	4.22
			Max. Mx	5	-48.508	-3998.98	2.35
			Max. My	2	-48.508	-1.48	4042.36
			Max. Vy	11	-36.902	3998.93	1.38
			Max. Vx	8	37.199	-0.50	-4040.53
			Max. Torque	11			-5.35

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	66.282	0.003	9.283
	Max. H_x	11	48.525	36.879	-0.031
	Max. H_z	2	48.525	-0.042	37.160
	Max. M_x	2	4042.36	-0.042	37.160
	Max. M_z	5	3998.98	-36.863	0.042
	Max. Torsion	5	5.30	-36.863	0.042
	Min. Vert	1	48.525	0.000	0.000
	Min. H_x	5	48.525	-36.863	0.042
	Min. H_z	8	48.525	0.031	-37.176
	Min. M_x	8	-4040.53	0.031	-37.176
	Min. M_z	11	-3998.93	36.879	-0.031
	Min. Torsion	11	-5.35	36.879	-0.031

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	48.525	0.000	0.000	-1.44	-0.59	0.00
Dead+Wind 0 deg - No Ice	48.525	0.042	-37.160	-4042.36	-1.48	-0.23
Dead+Wind 30 deg - No Ice	48.525	18.488	-32.265	-3505.84	-2001.96	-2.88
Dead+Wind 60 deg - No Ice	48.525	32.007	-18.636	-2024.12	-3468.14	-4.90
Dead+Wind 90 deg - No Ice	48.525	36.863	-0.042	-2.35	-3998.98	-5.30
Dead+Wind 120 deg - No Ice	48.525	31.874	18.492	2014.49	-3460.74	-4.31
Dead+Wind 150 deg - No Ice	48.525	18.378	32.072	3491.26	-1997.77	-2.34
Dead+Wind 180 deg - No Ice	48.525	-0.031	37.176	4040.53	-0.50	0.20
Dead+Wind 210 deg - No Ice	48.525	-18.439	32.243	3501.33	1997.29	2.74
Dead+Wind 240 deg - No Ice	48.525	-31.986	18.588	2017.72	3465.38	4.85
Dead+Wind 270 deg - No Ice	48.525	-36.879	0.031	-1.37	3998.93	5.35
Dead+Wind 300 deg - No Ice	48.525	-31.814	-18.527	-2019.95	3455.32	4.16
Dead+Wind 330 deg - No Ice	48.525	-18.343	-32.131	-3498.45	1994.08	2.22
Dead+Ice+Temp	66.282	0.000	-0.000	-4.22	-1.27	0.00
Dead+Wind 0 deg+Ice+Temp	66.282	-0.003	-9.283	-1048.76	-0.56	-0.02
Dead+Wind 30 deg+Ice+Temp	66.282	4.619	-8.072	-910.88	-518.44	-0.90
Dead+Wind 60 deg+Ice+Temp	66.282	8.002	-4.659	-527.32	-897.75	-1.58
Dead+Wind 90 deg+Ice+Temp	66.282	9.203	0.003	-3.62	-1034.07	-1.68
Dead+Wind 120 deg+Ice+Temp	66.282	7.973	4.580	513.90	-896.23	-1.39
Dead+Wind 150 deg+Ice+Temp	66.282	4.455	8.132	907.04	-507.72	-0.25
Dead+Wind 180	66.282	-0.206	9.379	1046.90	12.85	0.82

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
deg+Ice+Temp						
Dead+Wind 210 deg+Ice+Temp	66.282	-4.743	8.123	905.78	524.73	1.35
Dead+Wind 240 deg+Ice+Temp	66.282	-8.053	4.783	527.48	898.78	1.61
Dead+Wind 270 deg+Ice+Temp	66.282	-9.299	0.206	9.78	1038.34	1.73
Dead+Wind 300 deg+Ice+Temp	66.282	-8.063	-4.495	-516.60	900.04	1.54
Dead+Wind 330 deg+Ice+Temp	66.282	-4.540	-8.043	-909.36	511.15	0.58
Dead+Wind 0 deg - Service	48.525	0.014	-12.858	-1400.58	-0.90	-0.08
Dead+Wind 30 deg - Service	48.525	6.397	-11.164	-1214.82	-693.54	-1.00
Dead+Wind 60 deg - Service	48.525	11.075	-6.449	-701.80	-1201.16	-1.70
Dead+Wind 90 deg - Service	48.525	12.755	-0.014	-1.80	-1384.96	-1.84
Dead+Wind 120 deg - Service	48.525	11.029	6.398	696.50	-1198.61	-1.50
Dead+Wind 150 deg - Service	48.525	6.359	11.097	1207.81	-692.09	-0.81
Dead+Wind 180 deg - Service	48.525	-0.011	12.864	1397.99	-0.57	0.07
Dead+Wind 210 deg - Service	48.525	-6.380	11.157	1211.29	691.13	0.95
Dead+Wind 240 deg - Service	48.525	-11.068	6.432	697.61	1199.42	1.69
Dead+Wind 270 deg - Service	48.525	-12.761	0.011	-1.46	1384.15	1.86
Dead+Wind 300 deg - Service	48.525	-11.008	-6.411	-700.35	1195.94	1.45
Dead+Wind 330 deg - Service	48.525	-6.347	-11.118	-1212.26	690.02	0.77

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-48.525	0.000	0.000	48.525	0.000	0.000%
2	0.042	-48.525	-37.160	-0.042	48.525	37.160	0.000%
3	18.488	-48.525	-32.265	-18.488	48.525	32.265	0.000%
4	32.007	-48.525	-18.636	-32.007	48.525	18.636	0.000%
5	36.863	-48.525	-0.042	-36.863	48.525	0.042	0.000%
6	31.874	-48.525	18.492	-31.874	48.525	-18.492	0.000%
7	18.378	-48.525	32.072	-18.378	48.525	-32.072	0.000%
8	-0.031	-48.525	37.176	0.031	48.525	-37.176	0.000%
9	-18.439	-48.525	32.243	18.439	48.525	-32.243	0.000%
10	-31.986	-48.525	18.588	31.986	48.525	-18.588	0.000%
11	-36.879	-48.525	0.031	36.879	48.525	-0.031	0.000%
12	-31.814	-48.525	-18.527	31.814	48.525	18.527	0.000%
13	-18.343	-48.525	-32.131	18.343	48.525	32.131	0.000%
14	0.000	-66.282	0.000	-0.000	66.282	0.000	0.000%
15	-0.003	-66.282	-9.283	0.003	66.282	9.283	0.000%
16	4.619	-66.282	-8.072	-4.619	66.282	8.072	0.000%
17	8.002	-66.282	-4.659	-8.002	66.282	4.659	0.000%
18	9.203	-66.282	0.003	-9.203	66.282	-0.003	0.000%
19	7.973	-66.282	4.580	-7.973	66.282	-4.580	0.000%
20	4.455	-66.282	8.132	-4.455	66.282	-8.132	0.000%
21	-0.206	-66.282	9.379	0.206	66.282	-9.379	0.000%
22	-4.743	-66.282	8.123	4.743	66.282	-8.123	0.000%
23	-8.053	-66.282	4.783	8.053	66.282	-4.783	0.000%
24	-9.299	-66.282	0.206	9.299	66.282	-0.206	0.000%
25	-8.063	-66.282	-4.495	8.063	66.282	4.495	0.000%
26	-4.540	-66.282	-8.043	4.540	66.282	8.043	0.000%
27	0.014	-48.525	-12.858	-0.014	48.525	12.858	0.000%
28	6.397	-48.525	-11.164	-6.397	48.525	11.164	0.000%
29	11.075	-48.525	-6.449	-11.075	48.525	6.449	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
30	12.755	-48.525	-0.014	-12.755	48.525	0.014	0.000%
31	11.029	-48.525	6.398	-11.029	48.525	-6.398	0.000%
32	6.359	-48.525	11.097	-6.359	48.525	-11.097	0.000%
33	-0.011	-48.525	12.864	0.011	48.525	-12.864	0.000%
34	-6.380	-48.525	11.157	6.380	48.525	-11.157	0.000%
35	-11.068	-48.525	6.432	11.068	48.525	-6.432	0.000%
36	-12.761	-48.525	0.011	12.761	48.525	-0.011	0.000%
37	-11.008	-48.525	-6.411	11.008	48.525	6.411	0.000%
38	-6.347	-48.525	-11.118	6.347	48.525	11.118	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	0.00013370
3	Yes	5	0.00000001	0.00010107
4	Yes	5	0.00000001	0.00011991
5	Yes	4	0.00000001	0.00081072
6	Yes	5	0.00000001	0.00009918
7	Yes	5	0.00000001	0.00011228
8	Yes	4	0.00000001	0.00012523
9	Yes	5	0.00000001	0.00011511
10	Yes	5	0.00000001	0.00009780
11	Yes	4	0.00000001	0.00082134
12	Yes	5	0.00000001	0.00011761
13	Yes	5	0.00000001	0.00010354
14	Yes	4	0.00000001	0.00000756
15	Yes	4	0.00000001	0.00095846
16	Yes	5	0.00000001	0.00005369
17	Yes	5	0.00000001	0.00005517
18	Yes	4	0.00000001	0.00095616
19	Yes	5	0.00000001	0.00005248
20	Yes	5	0.00000001	0.00005312
21	Yes	4	0.00000001	0.00094593
22	Yes	5	0.00000001	0.00005422
23	Yes	5	0.00000001	0.00005282
24	Yes	4	0.00000001	0.00095693
25	Yes	5	0.00000001	0.00005461
26	Yes	5	0.00000001	0.00005362
27	Yes	4	0.00000001	0.00003139
28	Yes	4	0.00000001	0.00024778
29	Yes	4	0.00000001	0.00035740
30	Yes	4	0.00000001	0.00014441
31	Yes	4	0.00000001	0.00024100
32	Yes	4	0.00000001	0.00030236
33	Yes	4	0.00000001	0.00003076
34	Yes	4	0.00000001	0.00032275
35	Yes	4	0.00000001	0.00024082
36	Yes	4	0.00000001	0.00014524
37	Yes	4	0.00000001	0.00034012
38	Yes	4	0.00000001	0.00025537

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 122.92	23.768	27	1.4868	0.0119
L2	127.09 - 84.26	16.928	27	1.3131	0.0062

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	89.76 - 41.55	8.096	27	0.9001	0.0026
L4	48.47 - 0	2.249	27	0.4302	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Platform Mount [LP 713-1]	27	23.768	1.4868	0.0119	23404
150.00	9' Ladder	27	23.768	1.4868	0.0119	23404
148.00	Side Arm Mount [SO 702-4]	27	23.153	1.4730	0.0113	23404
139.00	Platform Mount [LP 713-1]	27	20.408	1.4091	0.0089	10638
132.00	Platform Mount [LP 713-1]	27	18.332	1.3549	0.0072	6501
130.00	Side Arm Mount [SO 102-3]	27	17.754	1.3383	0.0068	5868
116.00	Platform Mount [LP 713-1]	27	13.960	1.2044	0.0045	5092
106.00	Platform Mount [LP 713-1]	27	11.533	1.0934	0.0036	5078
96.00	Side Arm Mount [SO 102-3]	27	9.343	0.9753	0.0029	5065
75.00	3' Sidearm - Round	27	5.518	0.7240	0.0019	4864
70.00	PR-950	27	4.765	0.6658	0.0017	4802

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 122.92	68.437	2	4.2723	0.0343
L2	127.09 - 84.26	48.781	2	3.7804	0.0179
L3	89.76 - 41.55	23.348	2	2.5950	0.0075
L4	48.47 - 0	6.489	2	1.2412	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Platform Mount [LP 713-1]	2	68.437	4.2723	0.0343	8300
150.00	9' Ladder	2	68.437	4.2723	0.0343	8300
148.00	Side Arm Mount [SO 702-4]	2	66.670	4.2333	0.0326	8300
139.00	Platform Mount [LP 713-1]	2	58.784	4.0529	0.0256	3772
132.00	Platform Mount [LP 713-1]	2	52.818	3.8995	0.0208	2304
130.00	Side Arm Mount [SO 102-3]	2	51.157	3.8523	0.0195	2079
116.00	Platform Mount [LP 713-1]	2	40.244	3.4697	0.0130	1794
106.00	Platform Mount [LP 713-1]	2	33.254	3.1512	0.0102	1781
96.00	Side Arm Mount [SO 102-3]	2	26.942	2.8114	0.0084	1769
75.00	3' Sidearm - Round	2	15.915	2.0879	0.0056	1691
70.00	PR-950	2	13.745	1.9201	0.0049	1669

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	150 - 122.92 (1)	TP28.83x21x0.1875	27.08	0.00	0.0	39.000	16.3283	-7.592	636.804	0.012
L2	122.92 - 84.26 (2)	TP39.51x27.2493x0.375	42.83	0.00	0.0	39.000	44.7064	-18.125	1743.550	0.010
L3	84.26 - 41.55 (3)	TP50.99x37.1855x0.4375	48.21	0.00	0.0	39.000	67.4469	-29.950	2630.430	0.011
L4	41.55 - 0 (4)	TP62x48.1335x0.5	48.47	0.00	0.0	39.000	95.6148	-46.865	3728.980	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 122.92 (1)	TP28.83x21x0.1875	228.62	24.792	39.000	0.636	0.00	0.000	39.000	0.000
L2	122.92 - 84.26 (2)	TP39.51x27.2493x0.375	1090.13	31.637	39.000	0.811	0.00	0.000	39.000	0.000
L3	84.26 - 41.55 (3)	TP50.99x37.1855x0.4375	2347.45	34.887	39.000	0.895	0.00	0.000	39.000	0.000
L4	41.55 - 0 (4)	TP62x48.1335x0.5	3880.73	32.775	39.000	0.840	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 122.92 (1)	TP28.83x21x0.1875	16.809	1.029	26.000	0.079	0.70	0.037	26.000	0.001
L2	122.92 - 84.26 (2)	TP39.51x27.2493x0.375	28.113	0.629	26.000	0.048	0.40	0.006	26.000	0.000
L3	84.26 - 41.55 (3)	TP50.99x37.1855x0.4375	32.745	0.485	26.000	0.037	0.31	0.002	26.000	0.000
L4	41.55 - 0 (4)	TP62x48.1335x0.5	36.976	0.387	26.000	0.029	0.24	0.001	26.000	0.000

Pole Interaction Design Data

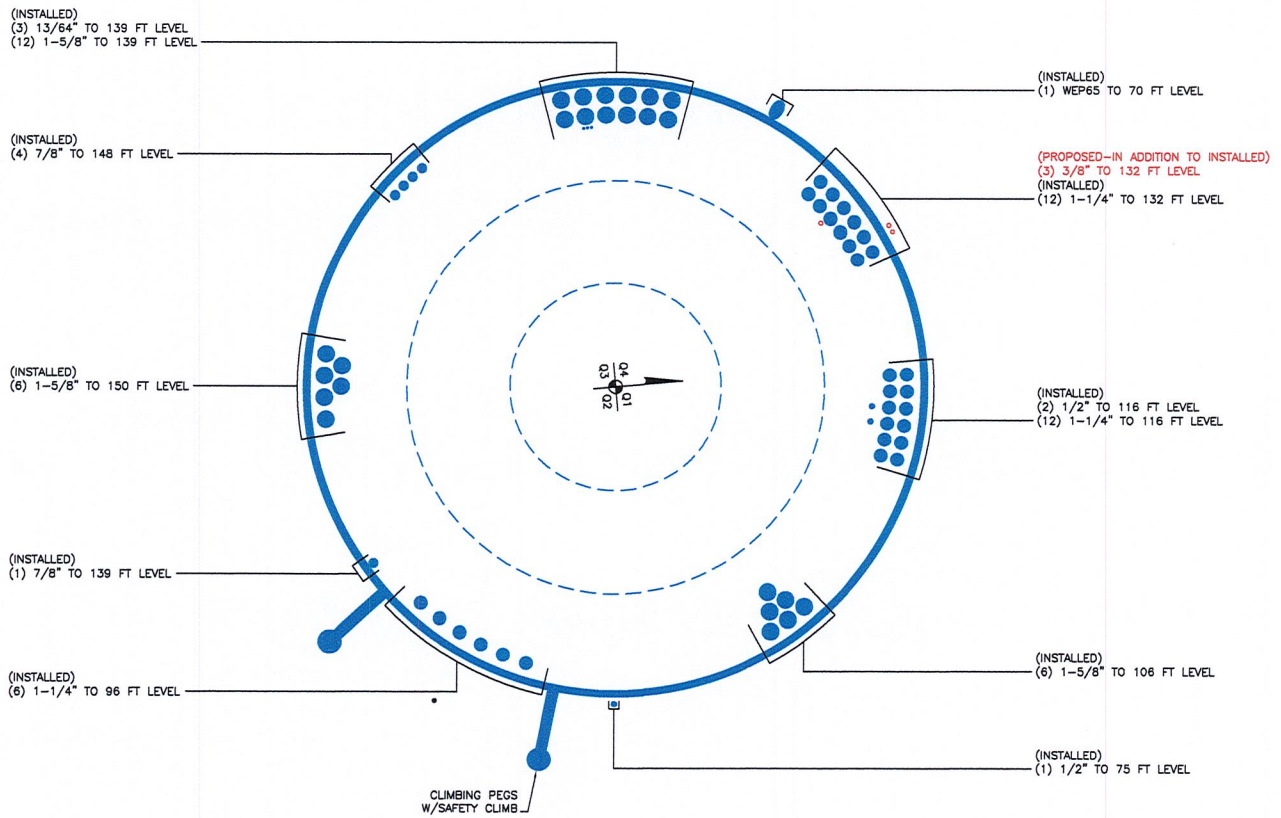
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 122.92 (1)	0.012	0.636	0.000	0.079	0.001	0.649 ✔	1.333	H1-3+VT ✔
L2	122.92 - 84.26 (2)	0.010	0.811	0.000	0.048	0.000	0.822 ✔	1.333	H1-3+VT ✔
L3	84.26 - 41.55 (3)	0.011	0.895	0.000	0.037	0.000	0.906 ✔	1.333	H1-3+VT ✔
L4	41.55 - 0 (4)	0.013	0.840	0.000	0.029	0.000	0.853 ✔	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	150 - 122.92	Pole	TP28.83x21x0.1875	1	-7.592	848.860	48.7	Pass
L2	122.92 - 84.26	Pole	TP39.51x27.2493x0.375	2	-18.125	2324.152	61.7	Pass
L3	84.26 - 41.55	Pole	TP50.99x37.1855x0.4375	3	-29.950	3506.363	68.0	Pass
L4	41.55 - 0	Pole	TP62x48.1335x0.5	4	-46.865	4970.730	64.0	Pass
						Summary	ELC:	Load Case 5
						Pole (L3)	68.0	Pass
						Rating =	68.0	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 800515 TOWER ID: C_BASELEVEL

BASE LEVEL DRAWING | 1

PLOT DATE: 6/21/2012 FILE NAME:

CROWN REGION ADDRESS

USA

19/11/08	UPDATED # APPLICATION ADDED PER WORK ORDER # 232944	ATF
22/01/08	CHANGED PER WORK ORDER # 249742	TE
03/06/09	UPDATED PER WORK ORDER # 282366	ATF
15/07/10	AS-BUILT INFORMATION ADDED PER WORK ORDER # 340064	SN
07/10/11	APPLICATION ADDED PER WORK ORDER # 443163	BBF
18/01/12	AS-BUILT INFORMATION ADDED PER WORK ORDER # 460007	MDB
09/03/12	APPLICATION ADDED PER WORK ORDER # 476535	VP
31/05/12	AS-BUILT INFORMATION ADDED PER WORK ORDER # 497333	KHH
21/06/12	APPLICATION ADDED PER WORK ORDER # 500284	AK

DRAWN BY: JPD
CHECKED BY:
DRAWING DATE: 31/05/03

SITE NUMBER:
SITE NAME:

SITE NAME

CHESTER

BUSINESS UNIT NUMBER

800515

SITE ADDRESS

WIG HILL ROAD
CHESTER, CT 06412
MIDDLESEX COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *800515*
Site Name: *CT CHESTER CAC 80051*
App #: *158067 Rev. 1*

Pole Manufacturer:	*Other*

Reactions		
Moment:	4042	ft-kips
Axial:	49	kips
Shear:	37	kips

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

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	71	in

Plate Data		
Diam:	77	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	8.20	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	1	in
Width:	6	in
Height:	16	in
Thick:	1	in
Notch:	1	in
Grade:	65	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	62	in
Thick:	0.5	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:	111.8 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	57.4% **Pass**	

Base Plate Results

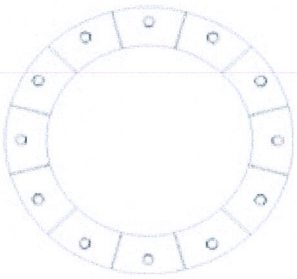
	Flexural Check	Stiffened
Base Plate Stress:	26.9 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	44.9% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	30.5% **Pass**
Vertical Weld:	14.2% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	7.6% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	29.5% **Pass**
Plate Comp. (AISC Bracket):	31.6% **Pass**

Pole Results

Pole Punching Shear Check:	8.5% **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

GPD GROUP

Mat Foundation Analysis
CT CHESTER CAC 800515
2012775.880515.02

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Rock
Foundation Type	Mono Pad
Pier Type	Round
Reinforcing Known	Yes
Max Capacity	1.1

Tower Reactions		
Moment, M	4042	k-ft
Axial, P	49	k
Shear, V	37	k

Pad & Pier Geometry		
Pier Diameter, ø	7.5	ft
Pad Length, L	28	ft
Pad Width, W	28	ft
Pad Thickness, t	3	ft
Depth, D	5.167	ft
Height Above Grade, HG	0.5	ft

Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	4	ksi
Clear Cover	4	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 8	
Pad Quantity Per Layer	24	
Pier Rebar Size	# 8	
Pier Quantity of Rebar	12	

Soil Properties		
Soil Type	Granular	
Soil Unit Weight	120	pcf
Angle of Friction, ø	30	°
Bearing Type	Gross	
Ultimate Bearing	40	ksf
Water Table Depth	20	ft
Frost Depth	3.5	ft

Bearing Summary			Load Case
Qxmax	3.20	ksf	0.9D+1.6W
Qymax	3.20	ksf	0.9D+1.6W
Qmax @ 45°	4.16	ksf	0.9D+1.6W
$Q_{(all)\ Gross}$	30.00	ksf	
Controlling Capacity	**13.9%**	**Pass**	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	1.42	≥1.0	0.9D+1.6W
FS(ot)y	1.42	≥1.0	0.9D+1.6W
Controlling Capacity	**70.2%**	**Pass**