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 21, 2012

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

RE: **EM-CING-168-121205A** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 86 Minortown Road, Woodbury, 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:

- Prior to antenna installation, the tower modifications identified in the Structural Modification Report prepared by Paul J. Ford and Company dated November 19, 2012, and stamped by Joseph Jacobs shall be implemented; and
- Not more than 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower does not exceed 100 percent of the post-construction structural rating.
- 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 December 3, 2012 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 Gerald D. Stomski, First Selectman, Town of Woodbury
Donna Suszynski, Land Use Admin. Asst., Town of Woodbury

EM-CING-168-121205A

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

December 3, 2012

ORIGINAL
RECEIVED
DEC - 5 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
86 Minortown Road, Woodbury

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 Woodbury.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 186 Minortown Road, Woodbury (coordinates 41°-34'-04.79" N, 73°-10'-46.85" 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, subject to modifications detailed in the attached structural documentation. 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 and add one (1) surge arrestor on new pipe mounts to the existing T-arms at a centerline height of approximately 78'. Six (6) RRUS (remote radio units) will be attached to the Pole at a centerline height of approximately 76'. 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 110' structure.

2. AT&T will place related equipment in the existing Equipment Shelter, and will also mount a new GPS antenna to the existing Equipment 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 5.29%; the combined site operations will result in a total power density of approximately 45.03%.

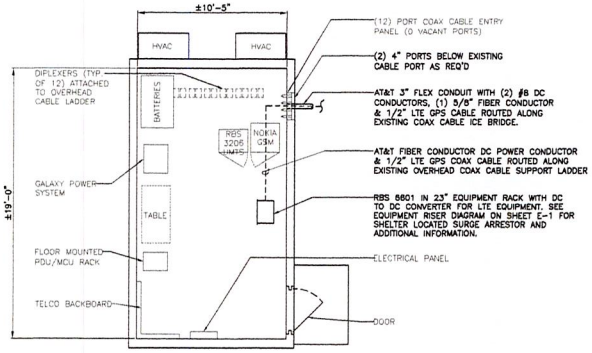
Please contact me by phone at (203) 610-1071, or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

cc: Honorable Jeremy Stomski, First Selectman, Town of Woodbury
Raymond A. Hardisty (underlying property owner)



2 / C-1 EQUIPMENT BUILDING FLOOR PLAN

SCALE: 1/4" = 1'-0"

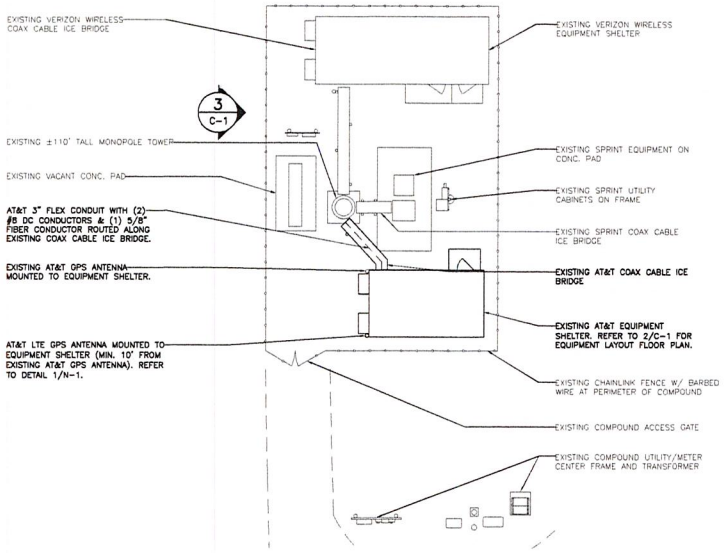
APPROX. NORTH

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)

1 inch = 4 ft.



1 / C-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

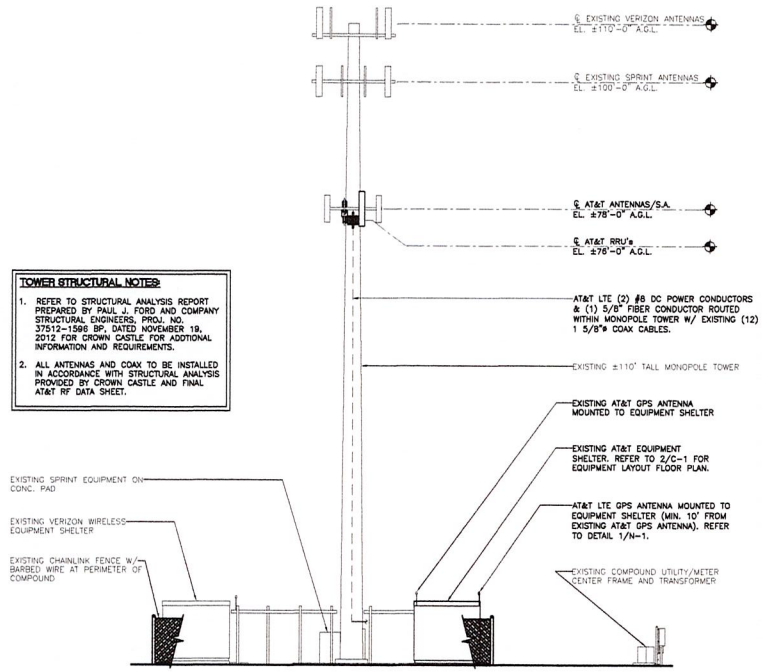
APPROX. NORTH

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.



TOWER STRUCTURAL NOTES:

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS, PROJ. NO. 37512-1598 BP, DATED NOVEMBER 19, 2012 FOR CROWN CASTLE FOR ADDTIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

3 / C-1 WEST ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

DESIGNED BY:	HMR
DRAWN BY:	HMR
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	11/30/12	HMR	DEB	CONSTRUCTION - CLIENT REVIEW
0	08/13/12	CLT	DEB	CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE

CT11168

CROWN SITE # 876405

WOODBURY - MINORTOWN ROAD

156 MINORTOWN ROAD
WOODBURY, CT 06798

DATE: 11/30/12

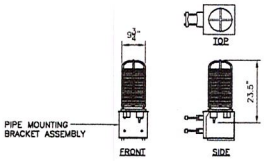
SCALE: AS NOTED

JOB NO. 12063.C024

PLANS AND ELEVATION

C-1

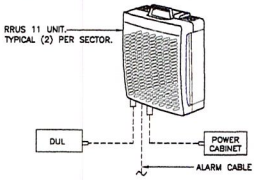
Sheet No. 3 of 5



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

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

8 C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



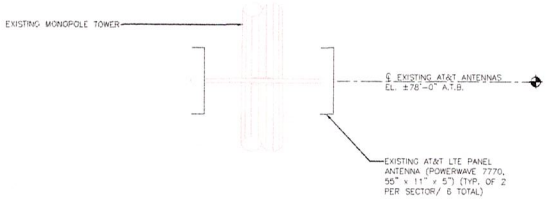
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

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

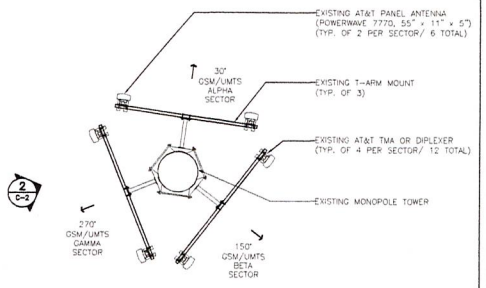
7 C-2 RRU DETAIL
NOT TO SCALE

NOTE:
1. REFER TO CROWN CASTLE AND FINAL AT&T RF DATA SHEET PRIOR TO INSTALLATION OF TOWER MOUNTED LTE RELATED ANTENNAS, CABLES AND RELATED EQUIPMENT.
2. COORDINATE ANTENNA CENTERLINE ELEVATION, RRU/SURGE ARRESTOR MOUNTING ELEVATION, ATTACHMENT HARDWARE WITH CROWN CASTLE.

NOTES:
1. PAN EXISTING ANTENNA TO ACQUIRE PROPOSEED AZIMUTH.
2. PROVIDE MOUNTING PIPES, CROSSOVERS & ASSOCIATED HARDWARE TO COMPLETE THE PROPOSED UPGRADE.



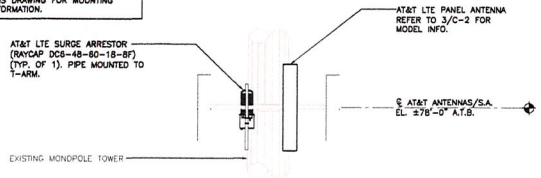
2 C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



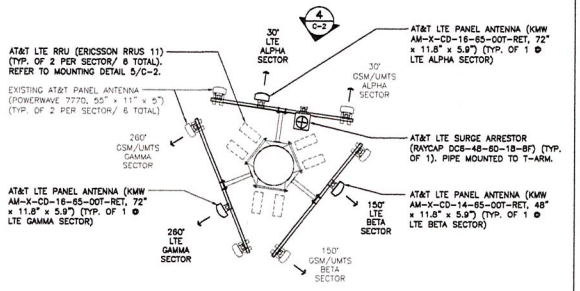
1 C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

NOTE:
RRU's NOT SHOWN FOR CLARITY. REFER TO SEPARATE DETAILS IN THIS DRAWING FOR MOUNTING INFORMATION.

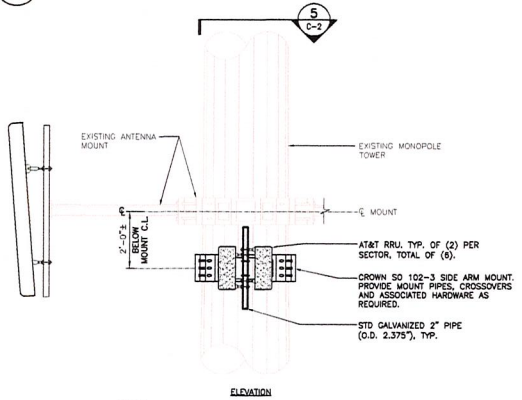


4 C-2 PROPOSED LTE ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"

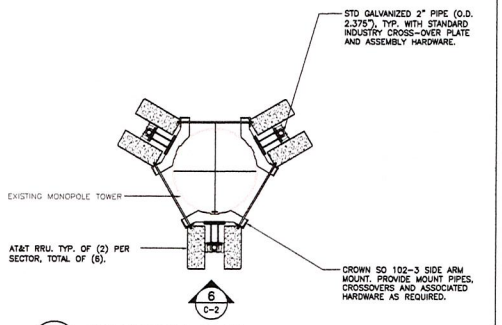


3 C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH



6 C-2 RRU MOUNTING DETAIL
NOT TO SCALE



5 C-2 RRU MOUNTING PLAN
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY
1	11/30/12	HMR	DEB
0	08/13/12	CLT	DEB

DESIGNED BY: HMR
DRAWN BY: HMR
CHK'D BY: CFC

CONSTRUCTION - CLIENT REVIEW
CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT11168
CROWN SITE # 876405
WOODBURY - MINORTOWN ROAD
156 MINORTOWN ROAD
WOODBURY, CT 06798

DATE: 11/30/12
SCALE: AS NOTED
JOB NO. 12063.C024

LTE EQUIPMENT DETAILS

C-2

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

Calculated Radio Frequency Emissions

at&t

CT1168

(Woodbury – Minortown Road)

186 Minortown Road, Woodbury, CT 06798

November 29, 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 186 Minortown Road in Woodbury, CT. The coordinates of the tower are 41° 34' 4.76" N, 73° 10' 46.82 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	*80*	*880*	*6*	*296*	*0.0998*	*0.5867*	*17.01%*
Cingular	*80*	*1930*	*3*	*427*	*0.0720*	*1.0000*	*7.20%*
Sprint	100	1962.5	11	249.5	0.0987	1.0000	9.87%
Verizon PCS	108	1970	11	269	0.0912	1.0000	9.12%
Verizon cellular	108	869	9	269	0.0746	0.5793	12.88%
Verizon AWS	108	2145	1	670	0.0207	1.0000	2.07%
Verizon LTE	108	698	1	877	0.0270	0.4653	5.81%
AT&T UMTS	78	880	2	565	0.0067	0.5867	1.14%
AT&T UMTS	78	1900	2	875	0.0103	1.0000	1.03%
AT&T LTE	78	734	1	1313	0.0078	0.4893	1.59%
AT&T GSM	78	880	1	283	0.0017	0.5867	0.29%
AT&T GSM	78	1900	4	525	0.0124	1.0000	1.24%
						Total	**45.03%**

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 Paul J. Ford and Company Structural Analysis dated November 19, 2012.

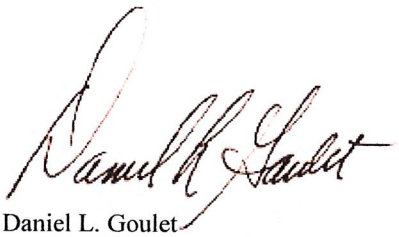
5. Conclusion

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 **45.03% 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 29, 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.

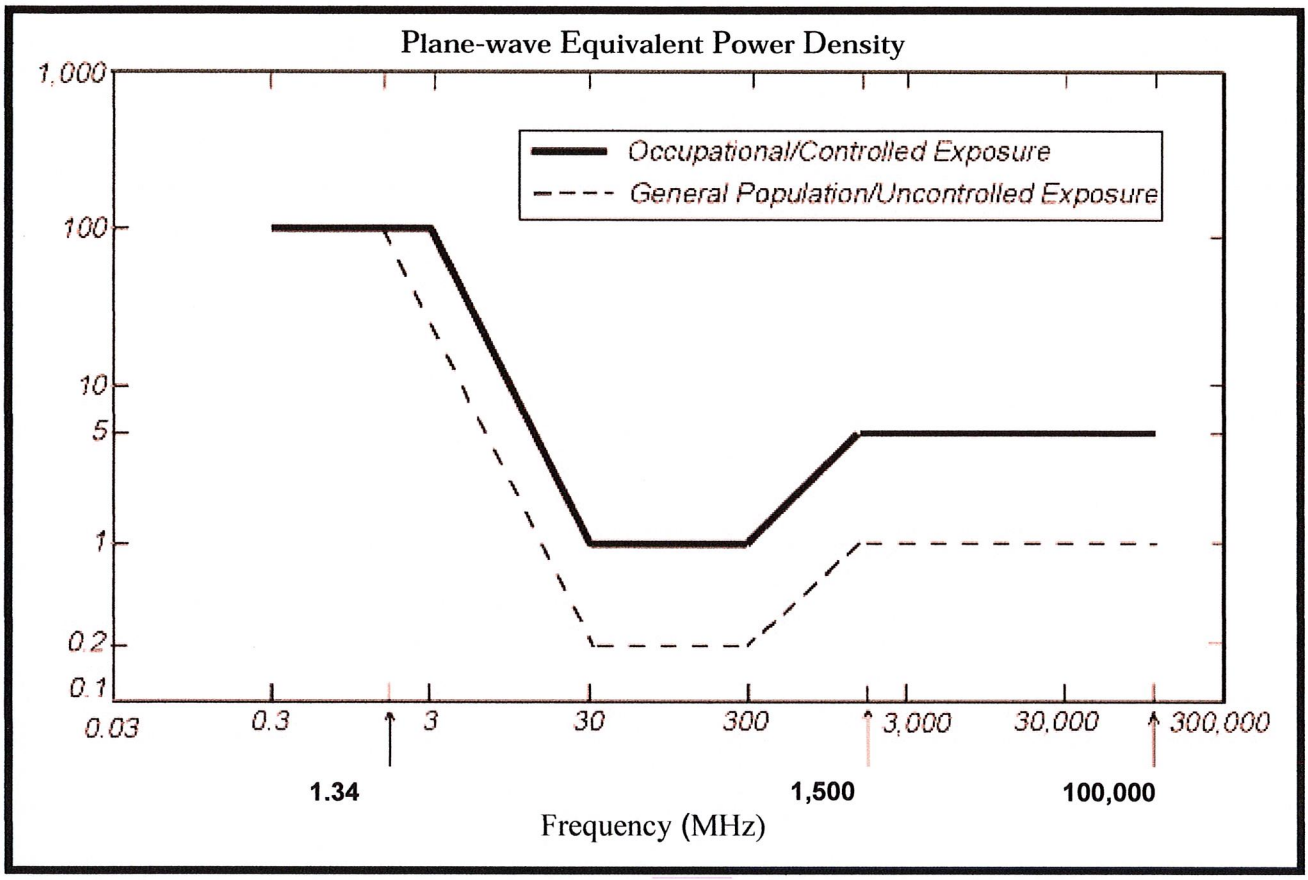
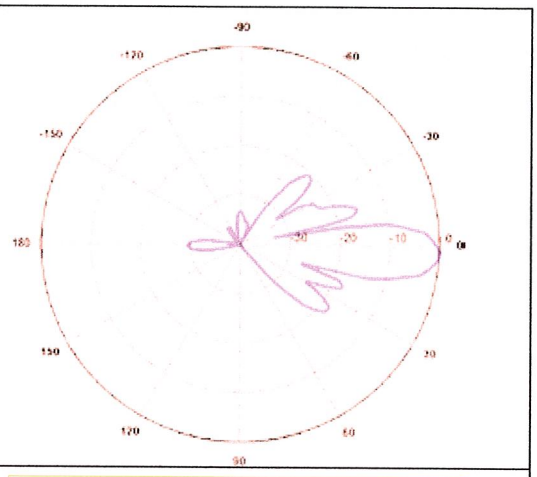


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

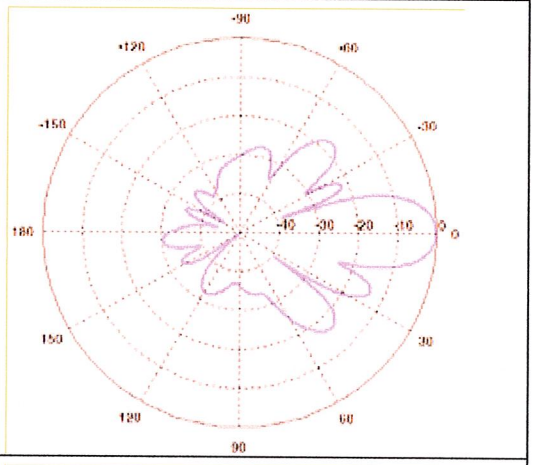
700 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	698-806 MHz
Gain:	13.4 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"



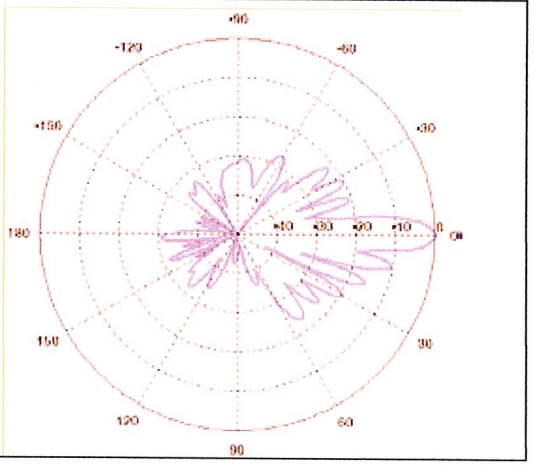
850 MHz

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:	55.0" 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:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **November 19, 2012**

Ben Goodhart
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6545

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
(614) 221-6679
kthorpe@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1168
	Carrier Site Name:	Woodbury Minor Town Rd
Crown Castle Designation:	**Crown Castle BU Number:**	876405
	Crown Castle Site Name:	WOODBURY NORTH
	Crown Castle JDE Job Number:	199134
	Crown Castle Work Order Number:	550981
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1596 BP
Site Data:	**186 MinorTown, WOODBURY, Litchfield County, CT**	
	Latitude *41° 34' 4.79"*, Longitude *-73° 10' 46.85"*	
	110 Foot - Monopole Tower	

Dear Ben Goodhart,

Paul J. Ford and Company is pleased to submit this **"Structural Modification 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 501928, in accordance with application 157751, 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:

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer BKT

tnxTower Report - version 6.0.3.0

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER
NOV 21 2012

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 110 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in April of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 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
78.0	78.0	1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe	2 (E) 1 (I)	3/8 3/8	-
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
76.0	76.0	6	ericsson	RRUS 11	-	-	-
		1	tower mounts	Side Arm Mount [SO 102-3]			

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
108.0	110.0	1	antel	BXA-80080/4CF w/ Mount Pipe	-	-	3
		3	decibel	DB932DG90E-M w/ Mount Pipe			
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe	-	-	2
		2	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-70063/6CF-2 w/ Mount Pipe			
		1	antel	BXA-80063/4CFx5 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		2	antel	BXA-80080/4CF w/ Mount Pipe	12 (I)	1-5/8	1
	108.0	1	tower mounts	T-Arm Mount [TA 602-3]			
100.0	102.0	6	decibel	DB980F90E-M w/ Mount Pipe	6 (I)	1-5/8	3
	100.0	3	alcatel lucent	1900MHz RRH (65MHz)	3 (E)	1-1/4	2
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 403-1]	-	-	1
78.0	78.0	12	lgp telecom	TMA-DD 1900	12 (I)	1-5/8	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		1	tower mounts	T-Arm Mount [TA 602-3]			
50.0	51.0	1	lucent	KS24019-L112A	1 (I)	1/2	1
	50.0	1	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed – Not Included in this Report
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.
(I) Coax to be mounted internally and shielded from the wind. See coax layout in Appendix B.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 03/20/03	2158106	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 3017725, 12/06/05	1956156	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 11560, 04/24/03	1613643	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 11560, 04/21/03	1614551	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 41708-0085, 07/24/08	2177138	CCISITES
4-POST-MODIFICATION INSPECTION	Reliapole, 11/14/2012	3373272	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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) Monopole was reinforced in conformance with the referenced modification drawings.
5) The Semaan base plate stiffeners were found to be failing per CCI ID# 3373272 and, therefore, were not considered in this analysis.
6) Monopole will be reinforced in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	110 - 98.58	Pole	TP14.978x12.7x0.1875	1	-3.56	457.60	26.0	Pass
L2	98.58 - 79.33	Pole	TP18.8141x14.978x0.1875	2	-4.55	576.29	71.9	Pass
L3	79.33 - 47.21	Pole	TP25.215x18.8141x0.4204	3	-9.73	1500.89	62.5	Pass
L4	47.21 - 14.83	Pole	TP31.2941x23.6429x0.4258	4	-15.90	1959.59	74.1	Pass
L5	14.83 - 13.83	Pole	TP31.4934x31.2941x0.5356	5	-16.12	2253.30	65.4	Pass
L6	13.83 - 6	Pole	TP33.0541x31.4934x0.4415	6	-17.58	2098.46	74.2	Pass
L7	6 - 3.3333	Pole	TP33.5856x33.0541x0.5253	7	-18.16	2360.77	67.6	Pass
L8	3.3333 - 0	Pole	TP34.25x33.5856x0.4279	8	-18.80	2106.17	77.1	Pass
							Summary	
						Pole (L8)	77.1	Pass
						Rating =	77.1	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	57.3	Pass
1	Base Plate	0	88.7	Pass
1	Base Foundation Steel	0	47.2	Pass
1	Base Foundation Soil Interaction	0	82.6	Pass

Structure Rating (max from all components) =	88.7%

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

4.1) Recommendations

See attached proposed modification drawings, dated 11/19/2012.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

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	110.00-98.58	11.42	0.00	18	12.7000	14.9780	0.1875	0.7500	A572-65 (65 ksi)
L2	98.58-79.33	19.25	0.00	18	14.9780	18.8141	0.1875	0.7500	A572-65 (65 ksi)
L3	79.33-47.21	32.12	3.67	18	18.8141	25.2150	0.4204	1.6814	Reinf 58.45 ksi (58 ksi)
L4	47.21-14.83	36.05	0.00	18	23.6429	31.2941	0.4258	1.7032	Reinf 58.73 ksi (59 ksi)
L5	14.83-13.83	1.00	0.00	18	31.2941	31.4934	0.5356	2.1425	Reinf 53.53 ksi (54 ksi)
L6	13.83-6.00	7.83	0.00	18	31.4934	33.0541	0.4415	1.7660	Reinf 57.41 ksi (57 ksi)
L7	6.00-3.33	2.67	0.00	18	33.0541	33.5856	0.5253	2.1012	Reinf 53.55 ksi (54 ksi)
L8	3.33-0.00	3.33		18	33.5856	34.2500	0.4279	1.7115	Reinf 57.33 ksi (57 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	12.8959	7.4465	147.2916	4.4419	6.4516	22.8302	294.7770	3.7240	1.9052	10.161
	15.2091	8.8022	243.2732	5.2506	7.6088	31.9725	486.8664	4.4019	2.3061	12.299
L2	15.2091	8.8022	243.2732	5.2506	7.6088	31.9725	486.8664	4.4019	2.3061	12.299
	19.1044	11.0852	485.9018	6.6125	9.5576	50.8394	972.4430	5.5436	2.9813	15.9
L3	19.1044	24.5414	1049.0061	6.5298	9.5576	109.7565	2099.3925	12.2730	2.5715	6.117
	25.6040	33.0816	2569.4441	8.8021	12.8092	200.5933	5142.2692	16.5439	3.6980	8.797
L4	24.7986	31.3777	2136.8558	8.2421	12.0106	177.9141	4276.5234	15.6918	3.4117	8.013
	31.7768	41.7181	5022.1227	10.9582	15.8974	315.9086	10050.853 7	20.8630	4.7584	11.175
L5	31.7768	52.2921	6250.3251	10.9192	15.8974	393.1667	12508.874	26.1510	4.5650	8.523

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
	31.9792	52.6310	6372.6237	10.9900	15.9986	398.3227	12753.6325	26.3205	4.6001	8.588
L6	31.9792	43.5147	5300.8930	11.0234	15.9986	331.3338	10608.7610	21.7615	4.7658	10.794
	33.5640	45.7017	6141.0126	11.5775	16.7915	365.7221	12290.1057	22.8552	5.0405	11.416
L7	33.5640	54.2343	7250.1540	11.5477	16.7915	431.7759	14509.8480	27.1223	4.8930	9.315
	34.1037	55.1205	7611.4021	11.7364	17.0615	446.1159	15232.8194	27.5655	4.9866	9.493
L8	34.1037	45.0312	6254.9052	11.7710	17.0615	366.6096	12518.0408	22.5199	5.1580	12.055
	34.7784	45.9335	6638.4829	12.0069	17.3990	381.5439	13285.7008	22.9711	5.2749	12.328

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 110.00-98.58				1	1	1		
L2 98.58-79.33				1	1	1		
L3 79.33-47.21				1	1	1		
L4 47.21-14.83				1	1	1		
L5 14.83-13.83				1	1	1		
L6 13.83-6.00				1	1	1		
L7 6.00-3.33				1	1	1		
L8 3.33-0.00				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
LDF7-50A(1-5/8")	C	No	Inside Pole	108.00 - 0.00	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
**********								
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	100.00 - 0.00	2	No Ice	0.00	1.20
						1/2" Ice	0.00	2.45
						1" Ice	0.00	4.30
						2" Ice	0.00	9.85
						4" Ice	0.00	28.27
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	100.00 - 0.00	1	No Ice	0.15	1.20
						1/2" Ice	0.25	2.45
						1" Ice	0.35	4.30
						2" Ice	0.55	9.85
						4" Ice	0.95	28.27
**********								
LDF7-50A(1-5/8")	C	No	Inside Pole	78.00 - 0.00	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
FB-L98B-002-75000(3/8")	C	No	Inside Pole	78.00 - 0.00	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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.00	0.06
WR-VG122ST-BRDA(3/8)	C	No	CaAa (Out Of Face)	78.00 - 0.00	1	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
WR-VG122ST-BRDA(3/8)	C	No	CaAa (Out Of Face)	78.00 - 0.00	1	No Ice	0.04	0.20
						1/2" Ice	0.14	0.74
						1" Ice	0.24	1.89
						2" Ice	0.44	6.03
						4" Ice	0.84	21.63
**********								
LDF4-50A(1/2")	C	No	Inside Pole	50.00 - 0.00	1	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
**********								
Aero MP3-05	C	No	CaAa (Out Of Face)	81.58 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
						4" Ice	1.32	0.00

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
2.375" OD x 5' Mount Pipe	A	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	1.19	1.19	0.02
						1/2" Ice	1.50	1.50	0.03
						1" Ice	1.81	1.81	0.04
						2" Ice	2.46	2.46	0.08
						4" Ice	3.92	3.92	0.20
2.375" OD x 5' Mount Pipe	B	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	1.19	1.19	0.02
						1/2" Ice	1.50	1.50	0.03
						1" Ice	1.81	1.81	0.04
						2" Ice	2.46	2.46	0.08
						4" Ice	3.92	3.92	0.20
2.375" OD x 5' Mount Pipe	C	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	1.19	1.19	0.02
						1/2" Ice	1.50	1.50	0.03
						1" Ice	1.81	1.81	0.04
						2" Ice	2.46	2.46	0.08
						4" Ice	3.92	3.92	0.20
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.97	4.60	0.10
						2" Ice	4.86	5.90	0.19
						4" Ice	6.77	8.89	0.49
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.97	4.60	0.10
						2" Ice	4.86	5.90	0.19
						4" Ice	6.77	8.89	0.49
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.00 / 0.00 / 2.00	0.0000	108.00	No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.96	4.60	0.10

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	4.85	5.89	0.19
						2" Ice	6.77	8.89	0.49
						4" Ice			
BXA-70063/6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
BXA-70063/6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
BXA-70063/6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
BXA-80063/4CFx5 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.62 4.22 4.83 6.16 9.18	0.03 0.07 0.12 0.23 0.57
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 2.00	0.0000	108.00	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	0.0000	108.00	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	0.0000	108.00	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
BXA-80080/4CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.49 5.94 6.40 7.35 9.39	4.03 4.65 5.30 6.70 9.78	0.03 0.07 0.13 0.25 0.60
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.49 5.94 6.40 7.35 9.39	4.03 4.65 5.30 6.70 9.78	0.03 0.07 0.13 0.25 0.60
T-Arm Mount [TA 602-3]	C	None		0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	0.77 0.99 1.21 1.64 2.50
**********									
(3) 2.375" OD x 5' Mount	A	From Leg	4.00	0.0000	100.00	No Ice	1.19	1.19	0.02

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
Pipe			0.00			1/2"	1.50	1.50	0.03
			2.00			Ice	1.81	1.81	0.04
						1" Ice	2.46	2.46	0.08
						2" Ice	3.92	3.92	0.20
						4" Ice			
(3) 2.375" OD x 5' Mount Pipe	B	From Leg	4.00	0.0000	100.00	No Ice	1.19	1.19	0.02
			0.00			1/2"	1.50	1.50	0.03
			2.00			Ice	1.81	1.81	0.04
						1" Ice	2.46	2.46	0.08
						2" Ice	3.92	3.92	0.20
						4" Ice			
(3) 2.375" OD x 5' Mount Pipe	C	From Leg	4.00	0.0000	100.00	No Ice	1.19	1.19	0.02
			0.00			1/2"	1.50	1.50	0.03
			2.00			Ice	1.81	1.81	0.04
						1" Ice	2.46	2.46	0.08
						2" Ice	3.92	3.92	0.20
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	100.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.22
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	100.00	No Ice	8.50	7.47	0.09
			0.00			1/2"	9.15	8.66	0.16
			0.00			Ice	9.77	9.56	0.23
						1" Ice	11.03	11.39	0.42
						2" Ice	13.68	15.53	0.94
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	100.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.22
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00	0.0000	100.00	No Ice	0.77	0.37	0.01
			0.00			1/2"	0.89	0.46	0.02
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00	0.0000	100.00	No Ice	0.77	0.37	0.01
			0.00			1/2"	0.89	0.46	0.02
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00	0.0000	100.00	No Ice	0.77	0.37	0.01
			0.00			1/2"	0.89	0.46	0.02
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
800MHZ RRH	A	From Leg	4.00	0.0000	100.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			0.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
800MHZ RRH	B	From Leg	4.00	0.0000	100.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			0.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			

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
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
1900MHz RRH (65MHz)	C	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
Platform Mount [LP 403-1]	C	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.85 24.30 29.75 40.65 62.45	18.85 24.30 29.75 40.65 62.45	1.50 1.80 2.09 2.69 3.87
HANDRAIL KIT [NA507-1]	C	From Face	0.00 0.00 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.80 6.70 8.60 12.40 20.00	4.80 6.70 8.60 12.40 20.00	0.25 0.29 0.34 0.44 0.64
**********									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice 1/2" Ice 1" Ice	5.74 6.20 6.66 7.62	4.02 4.63 5.28 6.68	0.03 0.08 0.13 0.25

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
						2" Ice	9.67	9.74	0.61
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	8.50	6.30	0.07
						1/2" Ice	9.15	7.48	0.14
						1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	1.47	1.47	0.02
						1/2" Ice	1.67	1.67	0.04
						1" Ice	1.88	1.88	0.06
						2" Ice	2.33	2.33	0.11
						4" Ice	3.38	3.38	0.24
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(4) TMA-DD 1900	A	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
(4) TMA-DD 1900	B	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
(4) TMA-DD 1900	C	From Leg	4.00 0.00 0.00	0.0000	78.00	No Ice	0.59	0.28	0.01
						1/2" Ice	0.69	0.36	0.01
						1" Ice	0.81	0.46	0.02
						2" Ice	1.06	0.67	0.04
						4" Ice	1.68	1.19	0.09
T-Arm Mount [TA 602-3]	C	None		0.0000	78.00	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
						4" Ice	42.39	42.39	2.50
**********									
(2) RRUS 11	A	From Leg	4.00 0.00 0.00	0.0000	76.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS 11	B	From Leg	4.00 0.00	0.0000	76.00	No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	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
			0.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.0000	76.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			
**********									
KS24019-L112A	B	From Leg	4.00 0.00 1.00	0.0000	50.00	No Ice 1/2" Ice	0.16 0.22 0.30	0.16 0.22 0.30	0.01 0.01 0.01
						1" Ice	0.48	0.48	0.02
						2" Ice	0.95	0.95	0.06
						4" Ice			
Pipe Mount [PM 601-1]	C	None		0.0000	50.00	No Ice	3.00	0.90	0.07
						1/2"	3.74	1.12	0.08
						Ice	4.48	1.34	0.09
						1" Ice	5.96	1.78	0.12
						2" Ice	8.92	2.66	0.18
						4" Ice			

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 110.00-98.58	104.13	1.389	23	13.170	A	0.000	13.170	13.170	100.00	0.000	0.000
					B	0.000	13.170		100.00	0.000	0.000
					C	0.000	13.170		100.00	0.000	0.219
L2 98.58-79.33	88.59	1.326	22	27.104	A	0.000	27.104	27.104	100.00	0.000	0.000
					B	0.000	27.104		100.00	0.000	0.000
					C	0.000	27.104		100.00	0.000	3.747
L3 79.33-47.21	62.78	1.202	20	58.926	A	0.000	58.926	58.926	100.00	0.000	0.000
					B	0.000	58.926		100.00	0.000	0.000
					C	0.000	58.926		100.00	0.000	17.303
L4 47.21-14.83	30.54	1	17	75.170	A	0.000	75.170	75.170	100.00	0.000	0.000
					B	0.000	75.170		100.00	0.000	0.000
					C	0.000	75.170		100.00	0.000	17.495
L5 14.83-13.83	14.33	1	16	2.616	A	0.000	2.616	2.616	100.00	0.000	0.000
					B	0.000	2.616		100.00	0.000	0.000
					C	0.000	2.616		100.00	0.000	0.540
L6 13.83-6.00	9.88	1	16	21.059	A	0.000	21.059	21.059	100.00	0.000	0.000
					B	0.000	21.059		100.00	0.000	0.000
					C	0.000	21.059		100.00	0.000	4.230
L7 6.00-3.33	4.66	1	16	7.405	A	0.000	7.405	7.405	100.00	0.000	0.000
					B	0.000	7.405		100.00	0.000	0.000
					C	0.000	7.405		100.00	0.000	1.441

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L8 3.33-0.00	1.66	1	16	9.422	A	0.000	9.422	9.422	100.00	0.000	0.000
					B	0.000	9.422		100.00	0.000	0.000
					C	0.000	9.422		100.00	0.000	1.801

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.00-98.58	104.13	1.389	3	1.1479	15.355	A	0.000	15.355	15.355	100.00	0.000	0.000
						B	0.000	15.355		100.00	0.000	0.000
						C	0.000	15.355		100.00	0.000	0.545
L2 98.58-79.33	88.59	1.326	3	1.1258	30.716	A	0.000	30.716	30.716	100.00	0.000	0.000
						B	0.000	30.716		100.00	0.000	0.000
						C	0.000	30.716		100.00	0.000	8.839
L3 79.33-47.21	62.78	1.202	2	1.0802	64.709	A	0.000	64.709	64.709	100.00	0.000	0.000
						B	0.000	64.709		100.00	0.000	0.000
						C	0.000	64.709		100.00	0.000	41.385
L4 47.21-14.83	30.54	1	2	1.0000	81.000	A	0.000	81.000	81.000	100.00	0.000	0.000
						B	0.000	81.000		100.00	0.000	0.000
						C	0.000	81.000		100.00	0.000	42.061
L5 14.83-13.83	14.33	1	2	1.0000	2.783	A	0.000	2.783	2.783	100.00	0.000	0.000
						B	0.000	2.783		100.00	0.000	0.000
						C	0.000	2.783		100.00	0.000	1.249
L6 13.83-6.00	9.88	1	2	1.0000	22.364	A	0.000	22.364	22.364	100.00	0.000	0.000
						B	0.000	22.364		100.00	0.000	0.000
						C	0.000	22.364		100.00	0.000	9.780
L7 6.00-3.33	4.66	1	2	1.0000	7.849	A	0.000	7.849	7.849	100.00	0.000	0.000
						B	0.000	7.849		100.00	0.000	0.000
						C	0.000	7.849		100.00	0.000	3.331
L8 3.33-0.00	1.66	1	2	1.0000	9.977	A	0.000	9.977	9.977	100.00	0.000	0.000
						B	0.000	9.977		100.00	0.000	0.000
						C	0.000	9.977		100.00	0.000	4.163

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.00-98.58	104.13	1.389	9	13.170	A	0.000	13.170	13.170	100.00	0.000	0.000
					B	0.000	13.170		100.00	0.000	0.000
					C	0.000	13.170		100.00	0.000	0.219
L2 98.58-79.33	88.59	1.326	8	27.104	A	0.000	27.104	27.104	100.00	0.000	0.000
					B	0.000	27.104		100.00	0.000	0.000
					C	0.000	27.104		100.00	0.000	3.747
L3 79.33-47.21	62.78	1.202	8	58.926	A	0.000	58.926	58.926	100.00	0.000	0.000
					B	0.000	58.926		100.00	0.000	0.000
					C	0.000	58.926		100.00	0.000	17.303
L4 47.21-14.83	30.54	1	7	75.170	A	0.000	75.170	75.170	100.00	0.000	0.000
					B	0.000	75.170		100.00	0.000	0.000
					C	0.000	75.170		100.00	0.000	17.495
L5 14.83-13.83	14.33	1	6	2.616	A	0.000	2.616	2.616	100.00	0.000	0.000
					B	0.000	2.616		100.00	0.000	0.000
					C	0.000	2.616		100.00	0.000	0.540

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L6 13.83-6.00	9.88	1	6	21.059	A	0.000	21.059	21.059	100.00	0.000	0.000
					B	0.000	21.059		100.00	0.000	0.000
					C	0.000	21.059		100.00	0.000	4.230
L7 6.00-3.33	4.66	1	6	7.405	A	0.000	7.405	7.405	100.00	0.000	0.000
					B	0.000	7.405		100.00	0.000	0.000
					C	0.000	7.405		100.00	0.000	1.441
L8 3.33-0.00	1.66	1	6	9.422	A	0.000	9.422	9.422	100.00	0.000	0.000
					B	0.000	9.422		100.00	0.000	0.000
					C	0.000	9.422		100.00	0.000	1.801

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 98.58	26.088	34	2.2248	0.0017
L2	98.58 - 79.33	20.834	34	2.1406	0.0016
L3	79.33 - 47.21	13.193	34	1.5893	0.0005
L4	50.88 - 14.83	5.350	34	1.0200	0.0003
L5	14.83 - 13.83	0.415	34	0.2688	0.0001
L6	13.83 - 6	0.361	34	0.2529	0.0001
L7	6 - 3.3333	0.068	34	0.1044	0.0000
L8	3.3333 - 0	0.022	34	0.0626	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	2.375" OD x 5' Mount Pipe	34	25.152	2.2191	0.0017	6192
100.00	(3) 2.375" OD x 5' Mount Pipe	34	21.468	2.1619	0.0016	3178
78.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	34	12.737	1.5519	0.0005	2206
76.00	(2) RRUS 11	34	12.068	1.4992	0.0005	2239
50.00	KS24019-L112A	34	5.165	1.0031	0.0003	3022

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 98.58	66.503	9	5.6739	0.0044
L2	98.58 - 79.33	53.134	9	5.4595	0.0040
L3	79.33 - 47.21	33.674	9	4.0572	0.0013
L4	50.88 - 14.83	13.664	9	2.6052	0.0008
L5	14.83 - 13.83	1.061	9	0.6870	0.0002
L6	13.83 - 6	0.922	9	0.6462	0.0002
L7	6 - 3.3333	0.175	9	0.2667	0.0001
L8	3.3333 - 0	0.056	9	0.1600	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	2.375" OD x 5' Mount Pipe	9	64.121	5.6594	0.0044	2479
100.00	(3) 2.375" OD x 5' Mount Pipe	9	54.747	5.5138	0.0041	1271
78.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	9	32.510	3.9619	0.0012	875
76.00	(2) RRUS 11	9	30.806	3.8277	0.0012	888
50.00	KS24019-L112A	9	13.191	2.5620	0.0008	1188

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	110 - 98.58 (1)	TP14.978x12.7x0.1875	11.42	0.00	0.0	39.000	8.8022	-3.56	343.29	0.010
L2	98.58 - 79.33 (2)	TP18.8141x14.978x0.1875	19.25	0.00	0.0	39.000	11.0852	-4.55	432.32	0.011
L3	79.33 - 47.21 (3)	TP25.215x18.8141x0.4204	32.12	0.00	0.0	35.070	32.1058	-9.73	1125.95	0.009
L4	47.21 - 14.83 (4)	TP31.2941x23.6429x0.4258	36.05	0.00	0.0	35.238	41.7181	-15.90	1470.06	0.011
L5	14.83 - 13.83 (5)	TP31.4934x31.2941x0.5356	1.00	0.00	0.0	32.118	52.6310	-16.12	1690.40	0.010
L6	13.83 - 6 (6)	TP33.0541x31.4934x0.4415	7.83	0.00	0.0	34.446	45.7017	-17.58	1574.24	0.011
L7	6 - 3.3333 (7)	TP33.5856x33.0541x0.5253	2.67	0.00	0.0	32.130	55.1205	-18.16	1771.02	0.010
L8	3.3333 - 0 (8)	TP34.25x33.5856x0.4279	3.33	0.00	0.0	34.398	45.9335	-18.80	1580.02	0.012

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	110 - 98.58 (1)	TP14.978x12.7x0.1875	34.81	13.064	39.000	0.335	0.00	0.000	39.000	0.000
L2	98.58 - 79.33 (2)	TP18.8141x14.978x0.1875	156.46	36.930	39.000	0.947	0.00	0.000	39.000	0.000
L3	79.33 - 47.21 (3)	TP25.215x18.8141x0.4204	454.63	28.890	35.070	0.824	0.00	0.000	35.070	0.000
L4	47.21 - 14.83 (4)	TP31.2941x23.6429x0.4258	906.22	34.423	35.238	0.977	0.00	0.000	35.238	0.000
L5	14.83 - 13.83 (5)	TP31.4934x31.2941x0.5356	919.67	27.706	32.118	0.863	0.00	0.000	32.118	0.000
L6	13.83 - 6 (6)	TP33.0541x31.4934x0.4415	1026.77	33.690	34.446	0.978	0.00	0.000	34.446	0.000
L7	6 - 3.3333 (7)	TP33.5856x33.0541x0.5253	1063.96	28.619	32.130	0.891	0.00	0.000	32.130	0.000
L8	3.3333 - 0 (8)	TP34.25x33.5856x0.4279	1110.97	34.941	34.398	1.016	0.00	0.000	34.398	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	110 - 98.58 (1)	TP14.978x12.7x0.1875	5.95	0.676	26.000	0.052	0.18	0.033	26.000	0.001
L2	98.58 - 79.33 (2)	TP18.8141x14.978x0.1875	6.71	0.605	26.000	0.047	0.17	0.020	26.000	0.001
L3	79.33 - 47.21 (3)	TP25.215x18.8141x0.4204	11.49	0.358	23.380	0.031	0.01	0.000	23.380	0.000
L4	47.21 - 14.83 (4)	TP31.2941x23.6429x0.4258	13.44	0.322	23.492	0.027	0.05	0.001	23.492	0.000
L5	14.83 - 13.83 (5)	TP31.4934x31.2941x0.5356	13.48	0.256	21.412	0.024	0.05	0.001	21.412	0.000
L6	13.83 - 6 (6)	TP33.0541x31.4934x0.4415	13.88	0.304	22.964	0.026	0.06	0.001	22.964	0.000
L7	6 - 3.3333 (7)	TP33.5856x33.0541x0.5253	14.02	0.254	21.420	0.024	0.07	0.001	21.420	0.000
L8	3.3333 - 0 (8)	TP34.25x33.5856x0.4279	14.19	0.309	22.932	0.027	0.07	0.001	22.932	0.000

Pole Interaction Design Data

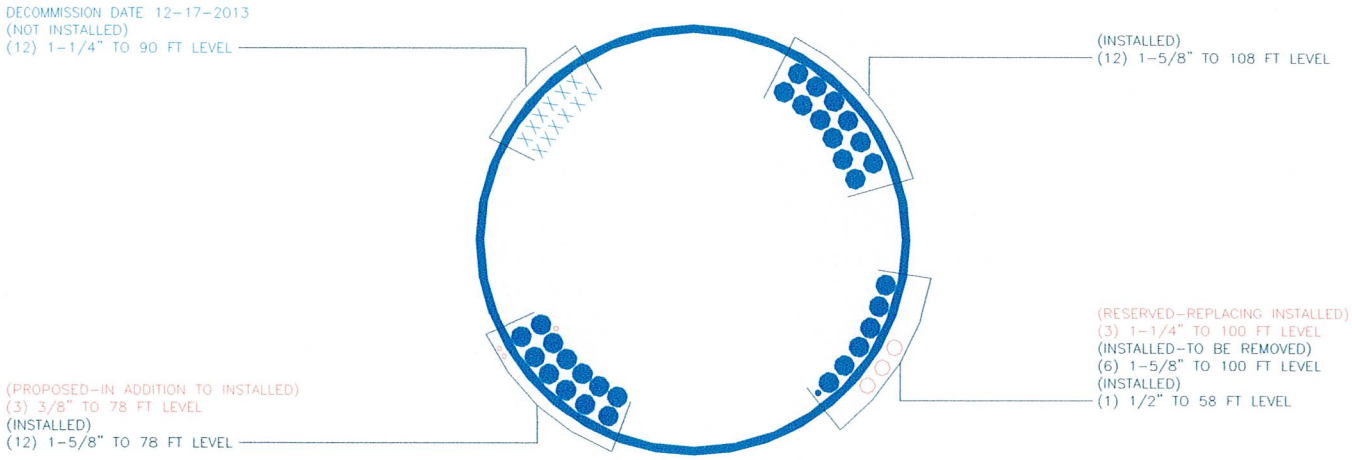
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 98.58 (1)	0.010	0.335	0.000	0.052	0.001	0.346 ✔	1.333	H1-3+VT ✔
L2	98.58 - 79.33 (2)	0.011	0.947	0.000	0.047	0.001	0.958 ✔	1.333	H1-3+VT ✔
L3	79.33 - 47.21 (3)	0.009	0.824	0.000	0.031	0.000	0.833 ✔	1.333	H1-3+VT ✔
L4	47.21 - 14.83 (4)	0.011	0.977	0.000	0.027	0.000	0.988 ✔	1.333	H1-3+VT ✔
L5	14.83 - 13.83 (5)	0.010	0.863	0.000	0.024	0.000	0.872 ✔	1.333	H1-3+VT ✔
L6	13.83 - 6 (6)	0.011	0.978	0.000	0.026	0.000	0.989 ✔	1.333	H1-3+VT ✔
L7	6 - 3.3333 (7)	0.010	0.891	0.000	0.024	0.000	0.901 ✔	1.333	H1-3+VT ✔
L8	3.3333 - 0 (8)	0.012	1.016	0.000	0.027	0.000	1.028 ✔	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	110 - 98.58	Pole	TP14.978x12.7x0.1875	1	-3.56	457.60	26.0	Pass
L2	98.58 - 79.33	Pole	TP18.8141x14.978x0.1875	2	-4.55	576.29	71.9	Pass
L3	79.33 - 47.21	Pole	TP25.215x18.8141x0.4204	3	-9.73	1500.89	62.5	Pass
L4	47.21 - 14.83	Pole	TP31.2941x23.6429x0.4258	4	-15.90	1959.59	74.1	Pass
L5	14.83 - 13.83	Pole	TP31.4934x31.2941x0.5356	5	-16.12	2253.30	65.4	Pass
L6	13.83 - 6	Pole	TP33.0541x31.4934x0.4415	6	-17.58	2098.46	74.2	Pass
L7	6 - 3.3333	Pole	TP33.5856x33.0541x0.5253	7	-18.16	2360.77	67.6	Pass
L8	3.3333 - 0	Pole	TP34.25x33.5856x0.4279	8	-18.80	2106.17	77.1	Pass
						Summary		
						Pole (L8)	77.1	Pass
						RATING =	**77.1**	**Pass**

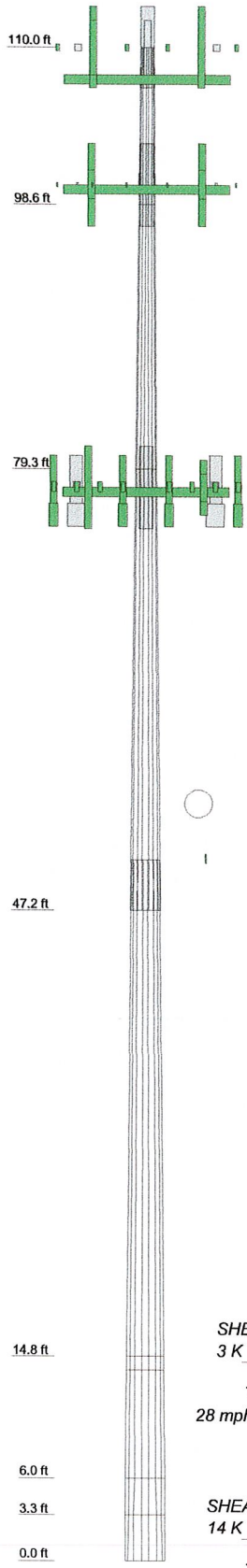
APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS



Section	1	2	3	4	5	6	7	8
Length (ft)	11.42	19.25	32.12	36.05	1.00	7.83	2.67	3.33
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.4204	0.4258	0.5356	0.4415	0.5253	0.4279
Socket Length (ft)			3.67					
Top Dia (in)	12.7000	14.9780	18.8141	23.6429	31.2941	31.4934	33.0541	33.5856
Bot Dia (in)	14.9780	18.8141	25.2150	31.2941	31.4934	33.0541	33.5856	34.2500
Grade	A572-65	A572-65	A572-65	Reinf 58.45 ksi	Reinf 58.73 ksi	Reinf 57.41 ksi	Reinf 53.55 ksi	Reinf 53.53 ksi
Weight (K)	0.3	0.7	3.1	4.5	0.2	1.2	0.5	0.5

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
2.375" OD x 5' Mount Pipe	108	800MHZ RRH	100
2.375" OD x 5' Mount Pipe	108	1900MHz RRH (65MHz)	100
2.375" OD x 5' Mount Pipe	108	1900MHz RRH (65MHz)	100
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	108	1900MHz RRH (65MHz)	100
		(3) ACU-A20-N	100
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	108	(3) ACU-A20-N	100
		(3) ACU-A20-N	100
BXA-171063-8BF-2 w/ Mount Pipe	108	Platform Mount [LP 403-1]	100
BXA-70063/6CF-2 w/ Mount Pipe	108	HANDRAIL KIT [NA507-1]	100
BXA-70063/6CF-2 w/ Mount Pipe	108	AM-X-CD-16-65-00T-RET w/ Mount Pipe	78
BXA-70063/6CF-2 w/ Mount Pipe	108		
BXA-80063/4CFx5 w/ Mount Pipe	108	AM-X-CD-14-65-00T-RET w/ Mount Pipe	78
(2) FD9R6004/2C-3L	108		
(2) FD9R6004/2C-3L	108	AM-X-CD-16-65-00T-RET w/ Mount Pipe	78
(2) FD9R6004/2C-3L	108		
BXA-80080/4CF w/ Mount Pipe	108	DC6-48-60-18-8F	78
BXA-80080/4CF w/ Mount Pipe	108	(2) 7770.00 w/ Mount Pipe	78
T-Arm Mount [TA 602-3]	108	(2) 7770.00 w/ Mount Pipe	78
(3) 2.375" OD x 5' Mount Pipe	100	(2) 7770.00 w/ Mount Pipe	78
(3) 2.375" OD x 5' Mount Pipe	100	(4) TMA-DD 1900	78
(3) 2.375" OD x 5' Mount Pipe	100	(4) TMA-DD 1900	78
APXVSPP18-C-A20 w/ Mount Pipe	100	(4) TMA-DD 1900	78
APXV9ERR18-C-A20 w/ Mount Pipe	100	T-Arm Mount [TA 602-3]	78
APXVSPP18-C-A20 w/ Mount Pipe	100	(2) RRUS 11	76
800 EXTERNAL NOTCH FILTER	100	(2) RRUS 11	76
800 EXTERNAL NOTCH FILTER	100	(2) RRUS 11	76
800 EXTERNAL NOTCH FILTER	100	Side Arm Mount [SO 102-3]	76
800MHZ RRH	100	KS24019-L112A	50
800MHZ RRH	100	Pipe Mount [PM 601-1]	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 57.41 ksi	57 ksi	65 ksi
Reinf 58.45 ksi	58 ksi	74 ksi	Reinf 53.55 ksi	54 ksi	67 ksi
Reinf 58.73 ksi	59 ksi	74 ksi	Reinf 57.33 ksi	57 ksi	72 ksi
Reinf 53.53 ksi	54 ksi	67 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 77.1%

AXIAL
30 K
SHEAR
3 K
MOMENT
217 kip-ft
TORQUE 0 kip-ft
28 mph WIND - 1.0000 in ICE
AXIAL
19 K
SHEAR
14 K
MOMENT
1111 kip-ft
TORQUE 0 kip-ft
REACTIONS - 80 mph WIND

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
Phone: (614) 221-6679
FAX: (614) 448-4118

Job:	***110-ft Monopole, Woodbury North, CT***		
Project:	***PJF#: 37512-1596 BP / BU#: 876405***		
Client: Crown Castle	Drawn by: Kyle Thorpe		App'd:
Code: TIA/EIA-222-F	Date: 11/19/12		Scale: NTS
Path:			Dwg No. E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

v4.1 - Effective 7-3-12

Date: 11/21/2012
PJF Project: 37512-1596 BP
Client Ref. # BU 876405
Site Name: Woodbury North
Description: 100-ft Monopole
Owner: CCI
Engineer: KAT

Asymmetric Anchor Rod Analysis

Moment =	1111	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	19.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	14.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	11							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	42.00	0.00	3.98	113.72	110.27	110.27	0.00	195.00	56.5%
2	2.250	#18J A615 Gr 75	75	100	45.0	42.00	0.00	3.98	105.75	102.29	102.29	0.00	195.00	52.5%
3	2.250	#18J A615 Gr 75	75	100	90.0	42.00	0.00	3.98	103.00	99.55	99.55	0.00	195.00	51.1%
4	2.250	#18J A615 Gr 75	75	100	135.0	42.00	0.00	3.98	111.12	107.66	107.66	0.00	195.00	55.2%
5	2.250	#18J A615 Gr 75	75	100	180.0	42.00	0.00	3.98	115.12	111.67	111.67	0.00	195.00	57.3%
6	2.250	#18J A615 Gr 75	75	100	225.0	42.00	0.00	3.98	109.57	106.11	106.11	0.00	195.00	54.4%
7	2.250	#18J A615 Gr 75	75	100	270.0	42.00	0.00	3.98	107.01	103.56	103.56	0.00	195.00	53.1%
8	2.250	#18J A615 Gr 75	75	100	315.0	42.00	0.00	3.98	112.76	109.30	109.30	0.00	195.00	56.1%
9	2.250	A193 Gr B7	105	125	22.5	47.25	0.00	3.98	123.84	120.39	120.39	0.00	218.68	55.1%
10	2.250	A193 Gr B7	105	125	128.5	47.25	0.00	3.98	123.32	119.87	119.87	0.00	218.68	54.8%
11	2.250	A193 Gr B7	105	125	256.5	47.25	0.00	3.98	119.40	115.95	115.95	0.00	218.68	53.0%
								43.77						

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

TIA Rev F

Site Data

BU#: *876405*
Site Name: *Woodbury North*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	793.8	ft-kips
Axial:	13.8	kips
Shear:	10.2	kips

Reactions modified to account for post-installed anchor rods

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	42	in

Plate Data		
Diam:	48	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	13.59	in

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

Pole Data		
Diam:	34.25	in
Thick:	0.25	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	

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

Anchor Rod Results

		Non-Rigid
Maximum Rod Tension:	111.7 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	57.3% **Pass**	

Base Plate Results

	Flexural Check	Non-Rigid
Base Plate Stress:	53.2 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	88.7% **Pass**	Y.L. Length: 24.31

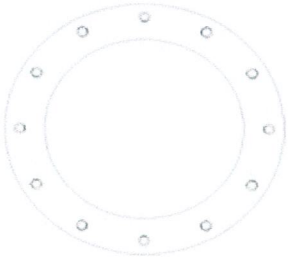
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



* 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

PJF job no. **37512-1596 BP** Project name **BU 876405**

Foundation Loads:

Pole weight or tower leg compression =	**19**	(kips)
Horizontal load at top of pier =	**14**	(kips)
Overturning moment at top of pier=	**1111**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**125**	(pcf)
Allowable soil bearing =	**6**	(ksf)
Depth to water table =	**99**	(ft)

Dimensions:

Pier shape (round or square)	**S**	("R" or "S")
Pier width =	**5.5**	(ft)
Pier height above grade =	**1**	(ft)
depth to bottom of footing =	**6.5**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**16.5**	(ft)
Footing length =	**16.5**	(ft)

Concrete:

Concrete strength =	**4**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

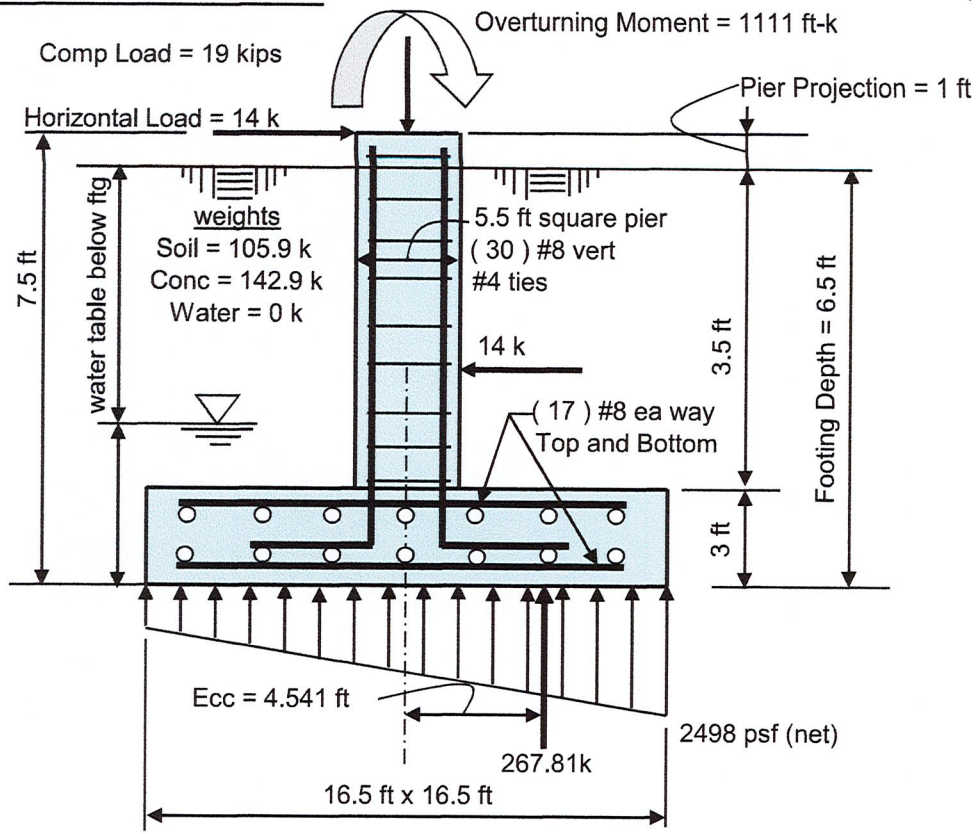
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#8**	bar
quantity of pad rebar =	**17**	(ea direction)

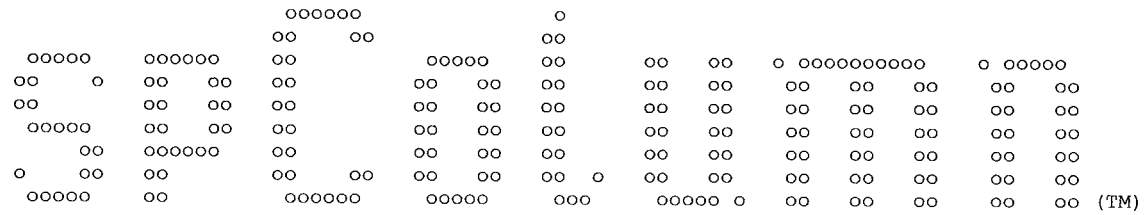
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#8**	bar
vertical rebar quantity =	**30**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 35.3 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.498 ksf Allowable Net Soil Bearing = 6 ksf **Soil Bearing Stress Ratio = 0.42 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 25 psi **Bending Shear Stress Ratio = 0.2 Okay**
Ftg Overturning Resistance = 2209 ft-kips Overturning Moment = 1216 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.817 **Ratio = 0.83 Okay**	Pad Bending Moment Capacity= 1868 ft-k Pad Bending Moment = 503 ft-k **Bending Moment Stress Ratio = 0.27 OK**



spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections

General Information:

File Name: G:\TOWER\375_Crown_Castle\2012\37512-1596 BU 876405\WO 55...\37512-1596 BP_Pier Check.col
Project: 37512-1596
Column:
Code: ACI 318-02
Engineer: BKK
Units: English

Run Option: Investigation
Run Axis: X-axis
Slenderness: Not considered
Column Type: Structural

Material Properties:

f'c = 4 ksi
Ec = 3605 ksi
fy = 60 ksi
Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:

Rectangular: Width = 66 in
Depth = 66 in

Gross section area, Ag = 4356 in^2
Ix = 1.58123e+006 in^4
Iy = 1.58123e+006 in^4
rx = 19.0526 in
ry = 19.0526 in
Xo = 0 in
Yo = 0 in

Reinforcement:

Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

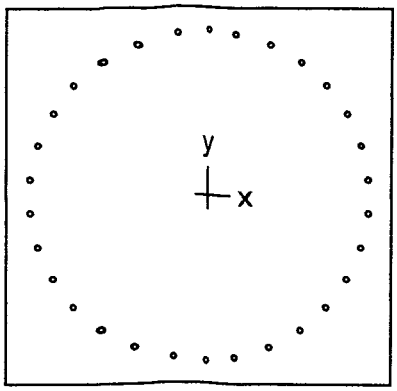
Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 23.70 in^2 at rho = 0.54% (Note: rho < 1.0%)
Minimum clear spacing = 5.06 in

30 #8 Cover = 3 in

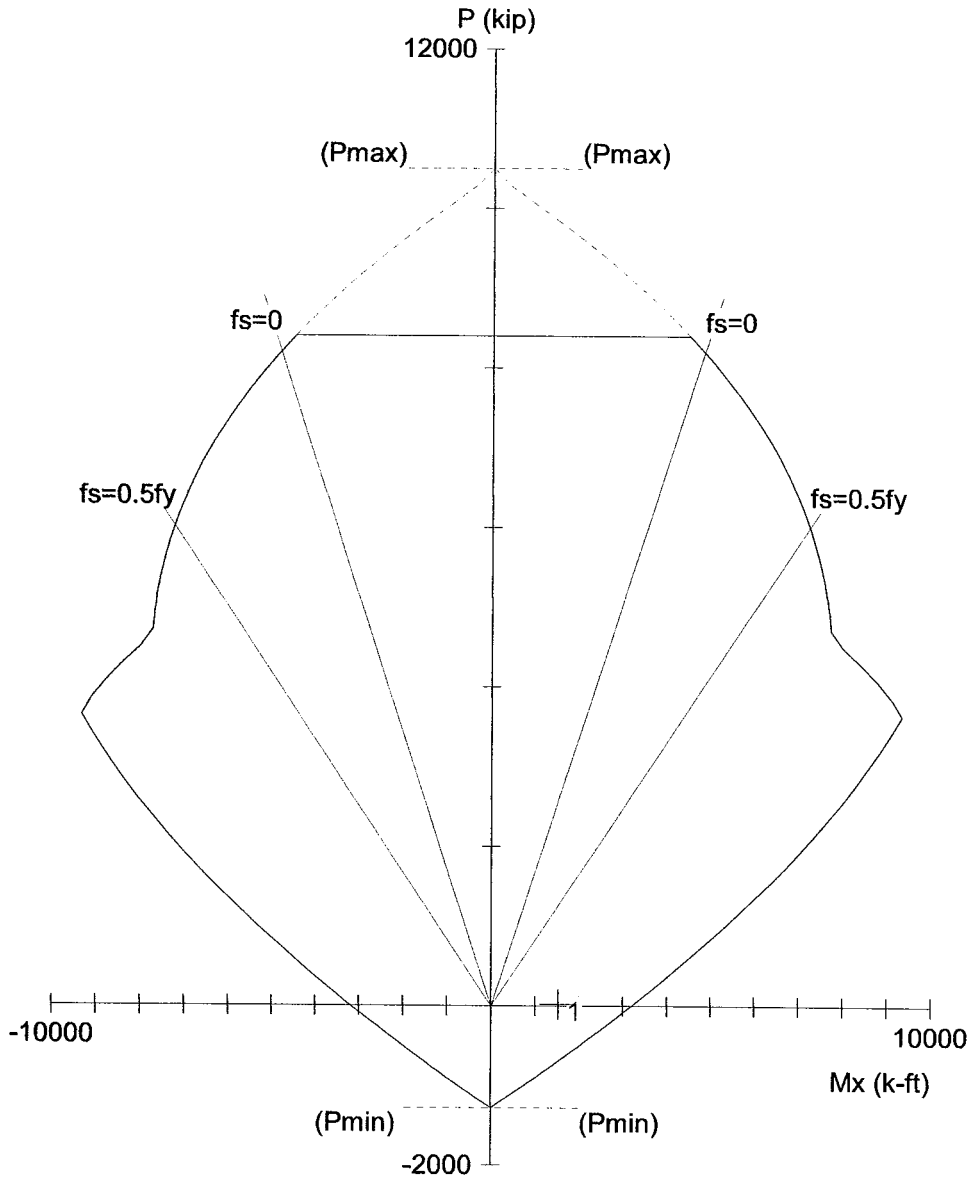
Factored Loads and Moments with Corresponding Capacities:

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	19.00	1526.20	3234.48	2.119	6.05	62.00	0.02775	0.900

*** End of output ***



66 x 66 in



Code: ACI 318-02

Units: English

Run axis: About X-axis

Run option: Investigation

Slenderness: Not considered

Column type: Structural

Bars: ASTM A615

Date: 11/20/12

Time: 17:08:28

File: G:\TOWER\375_Crown_Castle\2012\37512-1596 BU 876405\WO 550981 BU 876405 - BP\37512-1596 BP_Pier Check.col

Project: 37512-1596

Column:

Engineer: BKK

f'c = 4 ksi	fy = 60 ksi	Ag = 4356 in^2	30 #8 bars
Ec = 3605 ksi	Es = 29000 ksi	As = 23.70 in^2	rho = 0.54%
fc = 3.4 ksi		Xo = 0.00 in	Ix = 1.58123e+006 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 1.58123e+006 in^4
Beta1 = 0.85		Min clear spacing = 5.06 in	Clear cover = 3.50 in

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

CROWN CASTLE PROJECT BU #876405, WOODBURY NORTH; WOODBURY, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 80 MPH AND 28.1 MPH + 1" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND IT'S COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT."
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. "LOW HEAT" WELDING PROCEDURES:

1. ANY AND ALL FIELD WELDING REQUIRED ON THIS PROJECT SHALL BE PERFORMED BY AWS CERTIFIED WELDERS USING "LOW HEAT" WELDING TECHNIQUES.
2. FOR THE PURPOSES OF THIS PROJECT, "LOW HEAT" WELDING IS DEFINED AS A CAREFUL AND CONTROLLED WELDING PROCESS, PERFORMED BY EXPERIENCED AWS CERTIFIED WELDERS, SUCH THAT THE CORRECT AMOUNT OF WELD METAL IS DEPOSITED AND IS PROPERLY FUSED IN SUCH A WAY THAT EXCESSIVE AMOUNTS OF HEAT BUILDUP AT THE WELDED JOINT, DUE TO EXCESSIVE MOLTEN WELD METAL POOLING, IS AVOIDED.
3. THE "LOW HEAT" WELDING PROCESS SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH OR OTHERWISE DAMAGE THE EXISTING GALVANIZED SURFACE ON THE INSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
4. THE "LOW HEAT" WELDING PROCESS, USED IN CONJUNCTION WITH THE CROWN CASTLE COAX PROTECTION AND FIRE SAFETY GUIDELINES, SHALL BE SET UP SO THAT ANY FIELD WELDING ACTIVITY ON THE POLE STRUCTURE DOES NOT SCORCH AND/OR OTHERWISE DAMAGE THE EXISTING COAX CABLES THAT RUN ON THE INSIDE AND/OR OUTSIDE OF THE POLE SHAFT IN AND AROUND THE REGION OF THE WELD.
5. "LOW HEAT" WELD DEMONSTRATION REQUIRED. PRIOR TO BEGINNING THE FIELD WELDING FOR THE REINFORCEMENT WORK, THE CONTRACTOR'S AWS CERTIFIED WELDER SHALL DEMONSTRATE THE "LOW HEAT" WELDING PROCESS THAT WILL BE USED ON THIS PROJECT SO THAT CROWN CASTLE REPRESENTATIVES CAN OBSERVE AND VERIFY THAT THE PROPOSED PROCESS DOES NOT DAMAGE THE EXISTING GALVANIZED SURFACE ON THE BACK SIDE OF THE SAMPLE PLATE THAT IS BEING WELDED. THE CONTRACTOR SHALL USE TEMPERATURE MONITORING DEVICES SUCH AS THERMOCOUPLE, HEAT CRAYON, AND/OR INFRARED SENSOR TO MEASURE AND DEMONSTRATE THE TEMPERATURE OF THE STEEL ON THE BACK SURFACE IN THE REGION OF THE WELD. THE "LOW HEAT" WELD DEMONSTRATION SHALL BE CARRIED OUT ON-SITE AND USING A GALVANIZED STEEL PLATE SAMPLE WITH A THICKNESS EQUAL TO THE MINIMUM SHAFT THICKNESS THAT WILL BE REINFORCED. ONLY AFTER THE "LOW HEAT" TECHNIQUES HAVE BEEN SUCCESSFULLY DEMONSTRATED AND ARE APPROVED BY CROWN CASTLE REPRESENTATIVES, CAN THE CONTRACTOR PROCEED WITH THE FIELD WELDING ON THE STRUCTURE.
6. CAUTION: THE CONTRACTOR SHALL CAREFULLY FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE SAFETY, AND ALL OTHER SAFETY GUIDELINES WHICH ALSO INCLUDE "LOW HEAT" WELDING TECHNIQUES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR MAINTAINING THE SAFETY AND STABILITY OF THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE HELD FULLY LIABLE FOR ANY DAMAGE (INCLUDING HEAT AND FIRE DAMAGE CAUSED BY FIELD WELDING) TO THE STRUCTURE AND ANY OF ITS COMPONENTS WHICH OCCURS DURING CONSTRUCTION.

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10056 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   - (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   - (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL:
   - (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

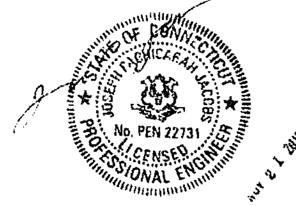
D. STRUCTURAL STEEL
   - (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS
   - (2.) CHECK MILL CERTIFICATIONS.
   - (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
   - (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
   - (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
   - (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
   - (7.) CHECK FOR SURFACE FINISH SPECIFIED: GALVANIZED.
   - (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD

E. WELDING:
   - (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1
   - (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1
   - (3.) APPROVE FIELD WELDING SEQUENCE
     - (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
   - (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
     - (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS
     - (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
     - (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
     - (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
     - (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
     - (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS
     - (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
     - (H.) REVIEW THE REPORTS BY TESTING LABS.
     - (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG
     - (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
     - (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)

G. REPORTS:
   - (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277

BU #876405; WOODBURY NORTH
WOODBURY, CT.
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No 37512-1596	ISSUE DATE OF PERMIT: 11-19-2012
DRAWN BY: BMS	
CHECKED BY: KAT	
APPROVED BY: BKK	S-1
DATE 11-19-2012	

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
    - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
    - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
    - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS

1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BAR CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BAR ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.
2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A153. ALTERNATIVELY, ALL REINFORCING ANCHOR RODS MAY BE EPOXY COATED PER ASTM A775.
3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
4. ULTRABOND 1, HILTI HIT RE-500 OR ANCHORTITE EPOXY SHALL BE USED TO ANCHOR THE 150 KSI ALL-THREAD BAR IN THE DRILL HOLES. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO PAUL J FORD AND COMPANY FOR REVIEW PRIOR TO CONSTRUCTION. AS NOTED ABOVE, FOLLOW ALL EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHOR RODS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING DRAWING SHEETS FOR SPECIFIED ANCHOR ROD PROOF LOAD.
6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED AND BASE PLATE / BEARING PLATE GROUT HAS CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED AFTER TESTING), CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
NOV 2 1 2012

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 1500 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (704) 321-3845 FAX: (704) 416-4350

BU #876405; WOODBURY NORTH
WOODBURY, CT.
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

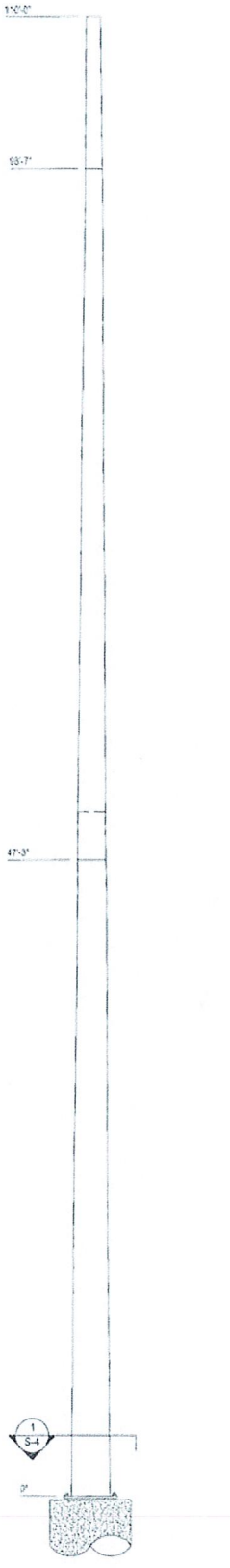
PROJECT No: 37512-1596	ISSUE DATE OF PERMIT: 11-19-2012
DRAWN BY: B.M.S.	
CHECKED BY: K.A.T.	
APPROVED BY: BKK	S-2
DATE: 11-19-2012	

NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-1596), DATED 11-19-2012.

POLE SPECIFICATIONS	
POLE SHAPE/TYP:	18-SIDED POLYGON
TAPER:	0.190318 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A572 GRADE 60 (60 KSI)
ANCHOR RODS:	2 1/4"Ø #18 / ASTM A615 GRADE 75

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	11.42	0.1875	44.04	12.700	14.976
2	51.37	0.1875		14.976	25.215
3	50.85	0.2500		24.109	34.256
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					



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JOSEPH PACHICARELLI JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
NOV 2 1 2012

POLE ELEVATION 1 / S-3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 1500 · Columbus, Ohio 43215
(614) 221-6679
www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277
PH: (704) 521-3545 FAX: (704) 416-4950

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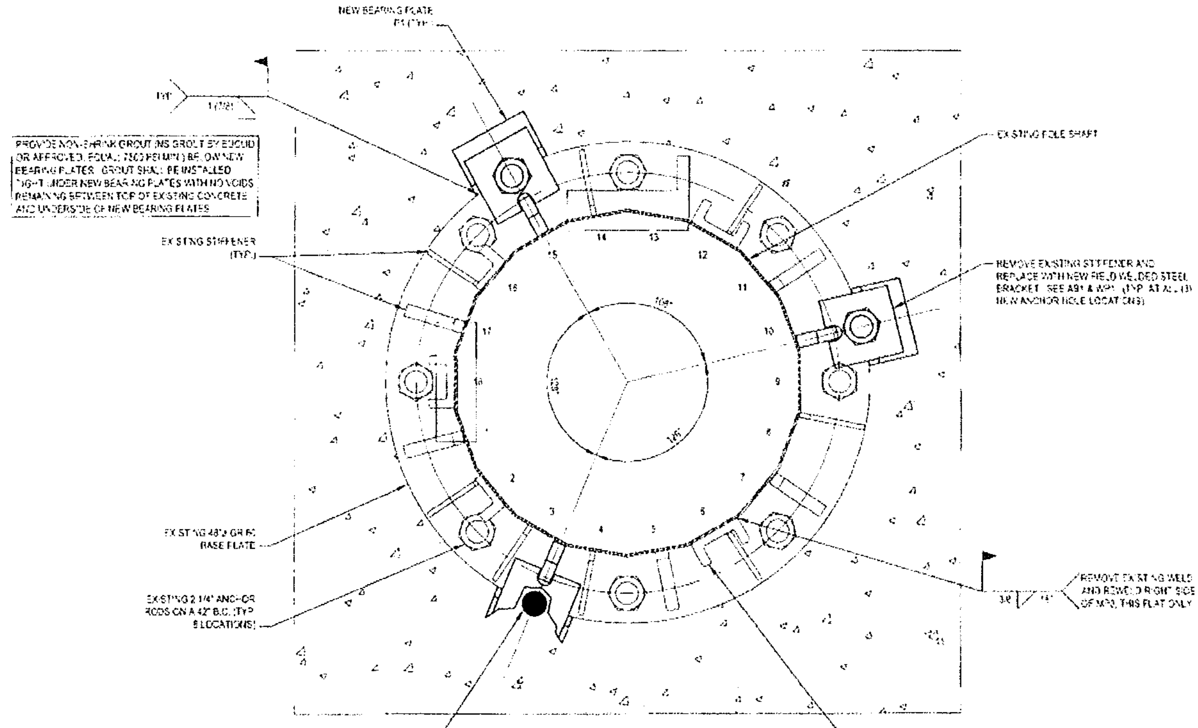
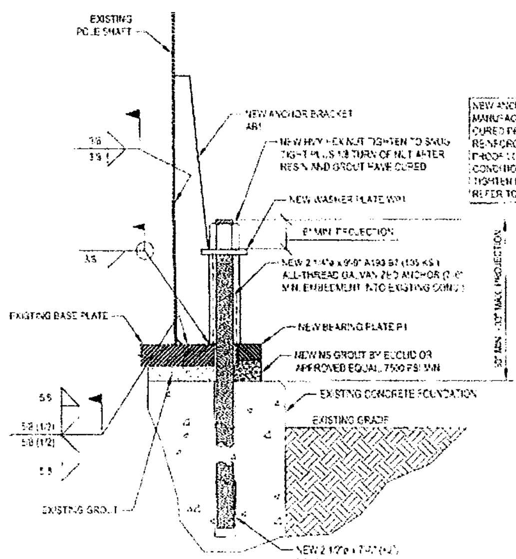
S-3

GENERAL NOTES

1. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-[illegible] FOR PRODUCT INFORMATION.
2. EPOXY MUST BE HILTI RE-500.
3. ALL WELD ELECTRODES SHALL BE E70XX.



BASE PLATE (1 / S-4)



NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED PRIOR TO GROUTING, ALL NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 273 KIPS. ONCE THE PROOF LOAD HAS BEEN RELEASED, TIGHTEN NUT TO SNUG TIGHT CONDITION AND INSTALL GROUT. AFTER GROUT HAS CURED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/3 TURN OF NUT. REFER TO SHEET S-7, SECTION # FOR ADDITIONAL INFORMATION.

NEW ANCHOR & BRACKET DETAIL (2 / S-4)

STATE OF CONNECTICUT — JOSEPH ZACHARIAH JACOBS — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

NOV 21 2012

PAUL J. FORD AND COMPANY
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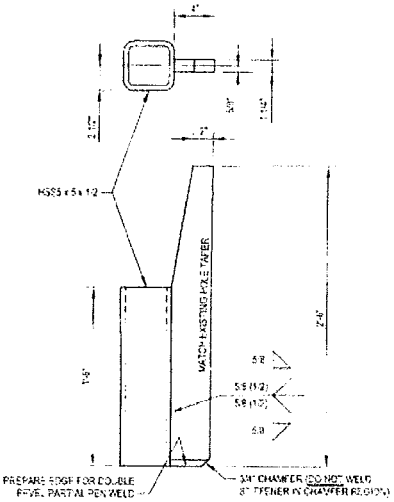
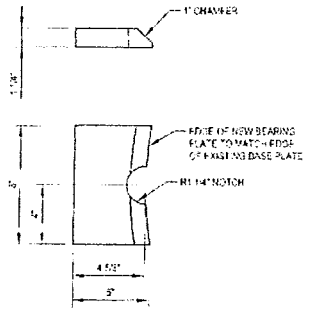


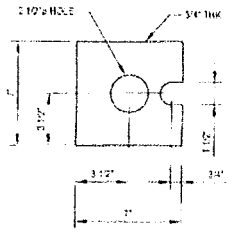
ANCHOR BRACKET MK~AB1

(3 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 50 KSI)



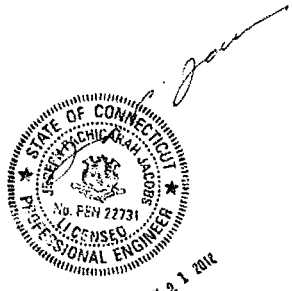
BEARING PLATE MK~P1

(3 REQUIRED) (Fy = 50 KSI)



WASHER PLATE MK~WP1

(3 REQUIRED) (Fy = 50 KSI)



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CROWN CASTLE

BU #876405; WOODBURY NORTH
WOODBURY, CT
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MODIFICATION INSPECTION NOTES

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTION AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN, EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL WORK SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (ASV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SOW-1000, LIST OF APPROVED VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT HAS NOT BEEN MADE, CONTACT YOUR CROWN REPRESENTATIVE (ROC).

REFER TO ENG-SOW-1000, MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR
THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.

THE MI INSPECTOR IS RESPONSIBLE FOR COMPILING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR
THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT (OR AT A MINIMUM):

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-1000.

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT.

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE (PREFERABLE 10 TO 15 BUSINESS DAYS) TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTIONS TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI
IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY THIRD (3) TRAVEL AND LODGING, COSTS OF RENTING EQUIPMENT ON SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MIS
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI (FAILED MI), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATIONS RE-ENGINEER AS NECESSARY TO ACCEPT THE AS-BUILT CONDITION.

MI VERIFICATION INSPECTIONS
CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTIONS FOR TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-1000.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/ASV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASS AS MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS
BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/INSPECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INSTALLED CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-1000.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORTED
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS

ADDITIONAL TESTING AND INSPECTIONS:

	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK LIFT AND DENSITY
X	ON-SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	INSPECTION OF BOLT PRETENSION PER A 325 BOLT SPEC
NA	INSPECTION OF ANX BOLTS AND ITS PER REQUIREMENTS ON SHEET E-1

ADDITIONAL TESTING AND INSPECTIONS:

	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS

ADDITIONAL TESTING AND INSPECTIONS:

NOTE: "X" DENOTES A DOCUMENT NEEDED FOR THE MI REPORT.
"NA" DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
CROWN CASTLE
2000 CORPORATION DRIVE, SUITE 200, CHARLOTTE, NC 28277
PH: (704) 227-1845 FAX: (704) 416-4550

BU #876405; WOODBURY NORTH
WOODBURY, CT.
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