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

August 10, 2012

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

RE: **EM-CING-108-120723** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 20 Great Oak Road, Oxford, Connecticut.

Dear Ms. Gaudet:

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

- Modifications to the tower be completed in accordance with the recommendations made in the Structural Modification Report prepared by Paul J. Ford and Company dated July 19, 2012 , and stamped by Joseph Jacobs; and
- Prior to 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 and foundation will 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 less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated July 20, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are

conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable George R. Temple, First Selectman, Town of Oxford
Vincent Vizzo, Planning & Zoning Chairman, Town of Oxford

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

July 23, 2012

The Honorable George R. Temple
First Selectman
Town of Oxford
486 Oxford Road
Route 67
Oxford, CT 06478-1298

RE: **EM-CING-108-120723** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 20 Great Oak Road, Oxford, Connecticut.

Dear First Selectman Temple:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by August 6, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Vincent Vizzo, Planning & Zoning Chairman, Town of Oxford

HPC Wireless Services
46 Mill Plain Rd.
Floor 2
bury, CT, 06811
203.797.1112

EM-CING-108-120723

HPC WIRELESS SERVICES

July 20, 2012

ORIGINAL

RECEIVED
JUL 23 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
20 Great Oak Road, Oxford, Connecticut

Dear Ms. Roberts:

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

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 20 Great Oak Road, Oxford (coordinates 41°-25'-35" N, 73°-89'-39" 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 remove all existing antennas and install a new low profile platform on which three (3) LTE, three (3) UMTS and three (3) GSM panel antennas will be mounted at a center line height of approximately 128', for a total of nine (9) antennas. Six (6) RRUs (remote radio units) and one (1) surge arrestor will be mounted to the tower above

the new platform at a center line height of 129'. AT&T will also place a DC power and fiber run from the equipment to the antennas along the existing coaxial cable run. These changes will not extend the height of the approximately 150' structure.

2. AT&T will remove two (2) cabinets, and will mount add a new LTE GPS antenna mounted to the existing Ice Bridge. Two (2) cabinets will be removed, two (2) cabinets will be stacked and placed on the existing concrete pad, and a new DC Power Cabinet will be installed on an extension of the concrete pad. In addition, sections of the ice bridge will be replaced as necessary to accommodate the additional runs. 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 3.13%; the combined site operations will result in a total power density of approximately 11.96%.

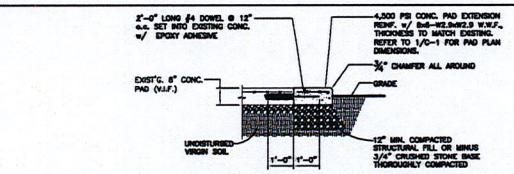
Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

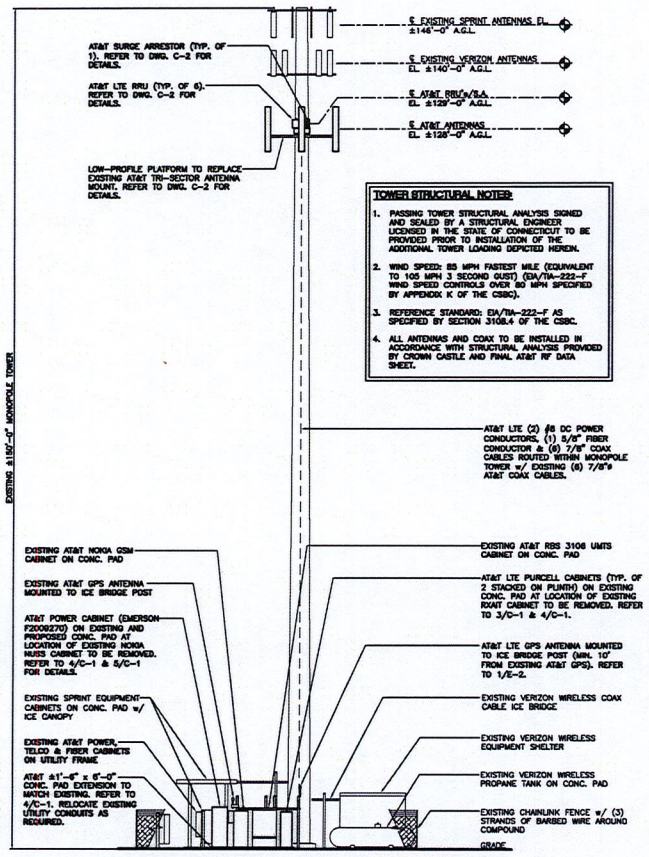
Jennifer Young Gaudet

Attachments

cc: Honorable George R. Temple, First Selectman, Town of Oxford
Town of Oxford (underlying property owner)



4 C-1 **SECTION • CONC. PAD EXTENSION**
NOT TO SCALE

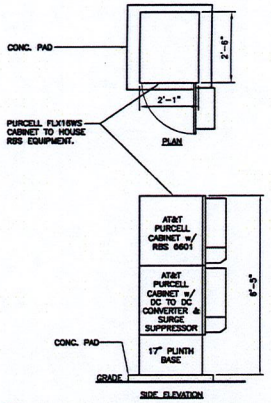


TOWER STRUCTURAL NOTES:

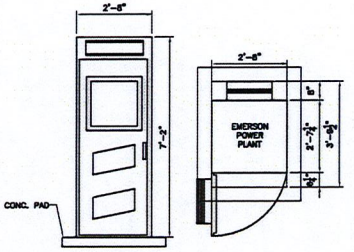
1. PASSING TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. WIND SPEED: 85 MPH FASTEST MILE (EQUIVALENT TO 105 MPH 3 SECOND GUST) (EIA/TIA-222-F WIND SPEED CONTROLS OVER 80 MPH SPECIFIED BY APPENDIX K OF THE CSBC).
3. REFERENCE STANDARD: EIA/TIA-222-F AS SPECIFIED BY SECTION 3108.4 OF THE CSBC.
4. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

2 C-1 **WEST ELEVATION**
SCALE: 1" = 10'-0"

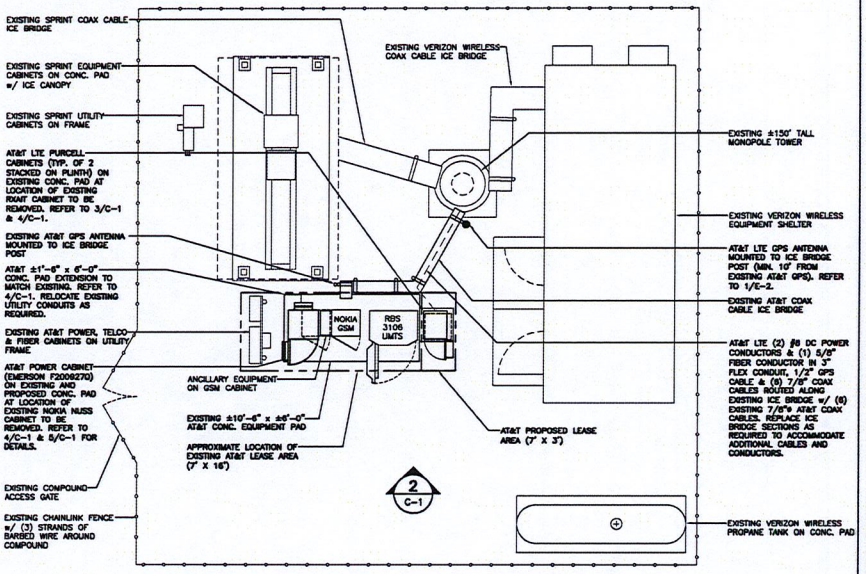
GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



3 C-1 **PURCELL CABINET MOUNTING DETAIL**
NOT TO SCALE



5 C-1 **EMERSON POWER CABINET**
NOT TO SCALE



1 C-1 **COMPOUND PLAN**
SCALE: 1" = 5'-0"

APPROX. NORTH

GRAPHIC SCALE
5 0 2.5 5 10 20
(IN FEET)
1 inch = 5 ft.

DESIGNED BY:	DEB
DRAWN BY:	HMR
CHK'D BY:	CPC

REV.	DATE	DRAWN BY	CHK'D BY	
3	7/20/12	HMR	DEB	CONSTRUCTION – CLIENT REVIEW
2	7/19/12	HMR	DEB	CONSTRUCTION – CLIENT REVIEW
1	7/10/12	FLD	DEB	CONSTRUCTION – CLIENT REVIEW
0	4/10/12	FLD	DEB	

PROFESSIONAL ENGINEER SEAL

REVIEW SET
NOT FOR CONSTRUCTION

at&t

NEXLINK

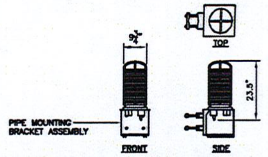
CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT5662
CROWN SITE # 876361
OXFORD CENTRAL
20 GREAT OAK ROAD
OXFORD, CT 06478

DATE:	07/20/12
SCALE:	AS NOTED
JOB NO.	11118.0063

PLANS, ELEVATION AND DETAILS

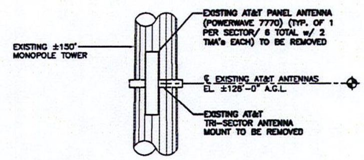
C-1
Sheet No. 3 of 5



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

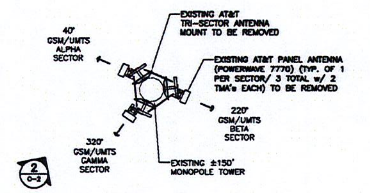
NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

6 C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE

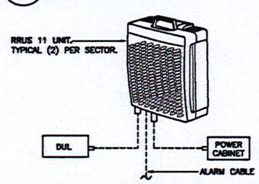


2 C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"

GRAPHIC SCALE
(IN FEET)
1 inch = 4 ft.


EXISTING AT&T TRI-SECTOR ANTENNA MOUNT TO BE REMOVED
40' GSM/UMTS ALPHA SECTOR
EXISTING AT&T PANEL ANTENNA (POWERWAVE 7770) (TYP. OF 1 PER SECTOR/ 3 TOTAL w/ 2 TMA's EACH) TO BE REMOVED
220' GSM/UMTS BETA SECTOR
320' GSM/UMTS GAMMA SECTOR
EXISTING ±150' MONOPOLE TOWER
2 C-2

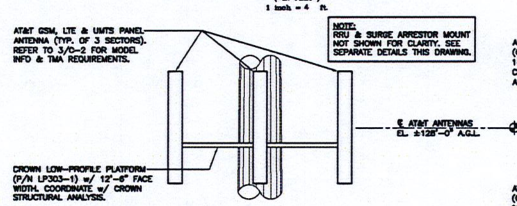
1 C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"
APPROX. NORTH



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.

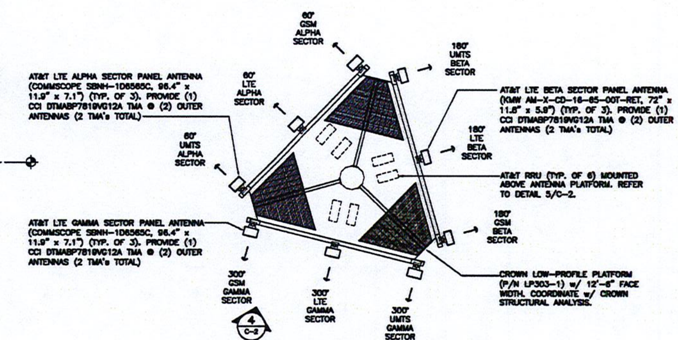
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

7 C-2 RRU DETAIL
NOT TO SCALE

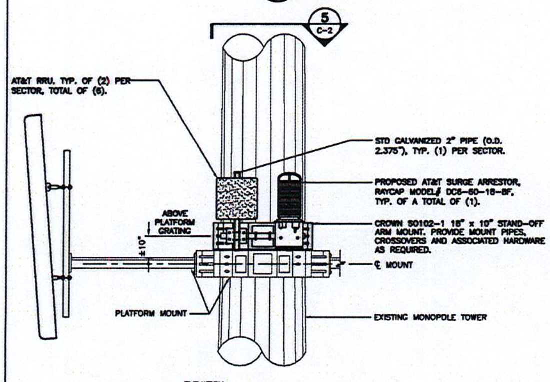

AT&T GSM, LTE & UMTS PANEL ANTENNA (TYP. OF 3 SECTORS). REFER TO 3/C-2 FOR MODEL INFO & TMA REQUIREMENTS.
NOTE: RRU & SURGE ARRESTOR MOUNT NOT SHOWN FOR CLARITY. SEE SEPARATE DETAILS THIS DRAWING.
℄ AT&T ANTENNAS EL. ±128'-0" A.G.L.
CROWN LOW-PROFILE PLATFORM (P/N LP303-1) w/ 12'-6" FACE WIDTH. COORDINATE w/ CROWN STRUCTURAL ANALYSIS.

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

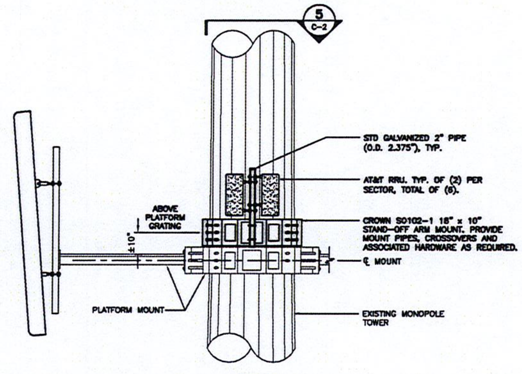
REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX


60' GSM ALPHA SECTOR
60' LTE ALPHA SECTOR
60' UMTS ALPHA SECTOR
180' UMTS BETA SECTOR
180' LTE BETA SECTOR
180' GSM BETA SECTOR
300' GSM GAMMA SECTOR
300' LTE GAMMA SECTOR
300' UMTS GAMMA SECTOR
AT&T LTE ALPHA SECTOR PANEL ANTENNA (COMMSCOPE SBNH-1D6565C, 96.4" x 11.9" x 7.1") (TYP. OF 3). PROVIDE (1) CCI DTMABP7819VG12A TMA @ (2) OUTER ANTENNAS (2 TMA's TOTAL)
AT&T LTE BETA SECTOR PANEL ANTENNA (KMW AM-X-CD-16-65-00T-RET, 72" x 11.8" x 5.9") (TYP. OF 3). PROVIDE (1) CCI DTMABP7819VG12A TMA @ (2) OUTER ANTENNAS (2 TMA's TOTAL)
AT&T RRU (TYP. OF 6) MOUNTED ABOVE ANTENNA PLATFORM. REFER TO DETAIL 5/C-2.
AT&T LTE GAMMA SECTOR PANEL ANTENNA (COMMSCOPE SBNH-1D6565C, 96.4" x 11.9" x 7.1") (TYP. OF 3). PROVIDE (1) CCI DTMABP7819VG12A TMA @ (2) OUTER ANTENNAS (2 TMA's TOTAL)
CROWN LOW-PROFILE PLATFORM (P/N LP303-1) w/ 12'-6" FACE WIDTH. COORDINATE w/ CROWN STRUCTURAL ANALYSIS.
4 C-2

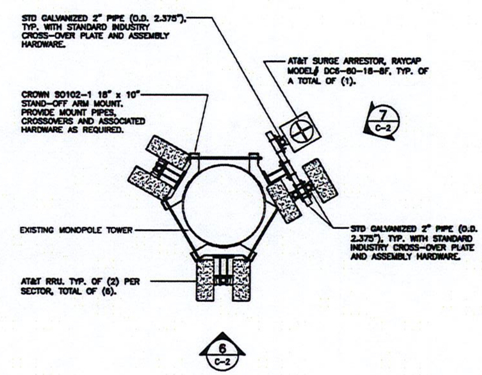
3 C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"
APPROX. NORTH


5 C-2
AT&T RRU, TYP. OF (2) PER SECTOR, TOTAL OF (6).
STD GALVANIZED 2" PIPE (O.D. 2.375"), TYP. (1) PER SECTOR.
PROPOSED AT&T SURGE ARRESTOR, RAYCAP MODEL# DC6-60-18-8F, TYP. OF A TOTAL OF (1).
ABOVE PLATFORM GRATING
±10"
CROWN S0102-1 18" x 10" STAND-OFF ARM MOUNT. PROVIDE MOUNT PIPES, CROSSOVERS AND ASSOCIATED HARDWARE AS REQUIRED.
℄ MOUNT
PLATFORM MOUNT
EXISTING MONOPOLE TOWER
ELEVATION

7 C-2 RRU AND SURGE ARRESTOR MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"


5 C-2
STD GALVANIZED 2" PIPE (O.D. 2.375"), TYP.
AT&T RRU, TYP. OF (2) PER SECTOR, TOTAL OF (6).
ABOVE PLATFORM GRATING
±10"
CROWN S0102-1 18" x 10" STAND-OFF ARM MOUNT. PROVIDE MOUNT PIPES, CROSSOVERS AND ASSOCIATED HARDWARE AS REQUIRED.
℄ MOUNT
PLATFORM MOUNT
EXISTING MONOPOLE TOWER
ELEVATION

6 C-2 RRU MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"


STD GALVANIZED 2" PIPE (O.D. 2.375"), TYP. WITH STANDARD INDUSTRY CROSS-OVER PLATE AND ASSEMBLY HARDWARE.
AT&T SURGE ARRESTOR, RAYCAP MODEL# DC6-60-18-8F, TYP. OF A TOTAL OF (1).
CROWN S0102-1 18" x 10" STAND-OFF ARM MOUNT. PROVIDE MOUNT PIPES, CROSSOVERS AND ASSOCIATED HARDWARE AS REQUIRED.
7 C-2
EXISTING MONOPOLE TOWER
STD GALVANIZED 2" PIPE (O.D. 2.375"), TYP. WITH STANDARD INDUSTRY CROSS-OVER PLATE AND ASSEMBLY HARDWARE.
AT&T RRU, TYP. OF (2) PER SECTOR, TOTAL OF (6).
6 C-2

5 C-2 RRU AND SURGE ARRESTOR MOUNTING PLAN
SCALE: 1/2" = 1'- 0"

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

REV.	DATE	DRAWN BY	CHK'D BY	
2	7/20/12	HMR	DEB	CONSTRUCTION - CLIENT REVIEW
1	7/19/12	HMR	DEB	CONSTRUCTION - CLIENT REVIEW
0	4/10/12	FLD	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

REVIEW SET
NOT FOR CONSTRUCTION

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT5662
CROWN SITE # 876361
OXFORD CENTRAL
20 GREAT OAK ROAD
OXFORD, CT 06478

DATE:	07/20/12
SCALE:	AS NOTED
JOB NO.	11118.0063

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 5

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

Date: **July 19, 2012**

Ben Goodhart
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
cmccartney@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	*AT&T Mobility* Co-Locate	
	Carrier Site Number:	CT5662
	Carrier Site Name:	AWE-Oxford Central
Crown Castle Designation:	**Crown Castle BU Number:**	876361
	Crown Castle Site Name:	Seymour 2 / Oxford Town Garage
	Crown Castle JDE Job Number:	183553
	Crown Castle Work Order Number:	505239
	Crown Castle Application Number:	145147 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37512-1818 Aero Revised Table
Site Data:	**20 Great Oak Rd., OXFORD, New Haven County, CT**	
	Latitude *41° 25' 34.91"*, Longitude *-73° 8' 39.33"*	
	150 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 471811, in accordance with application 145147, revision 0.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

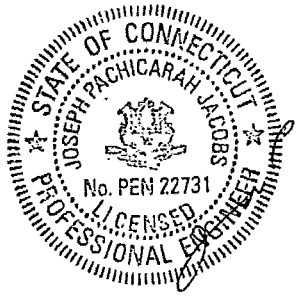
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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:

Corey McCartney, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0



JUL 19 2012

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

Date: **July 19, 2012**

Ben Goodhart
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
cmccartney@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5662
	Carrier Site Name:	AWE-Oxford Central
Crown Castle Designation:	**Crown Castle BU Number:**	876361
	Crown Castle Site Name:	Seymour 2 / Oxford Town Garage
	Crown Castle JDE Job Number:	183553
	Crown Castle Work Order Number:	505239
	Crown Castle Application Number:	145147 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37512-1818 Aero Revised Table
Site Data:	**20 Great Oak Rd., OXFORD, New Haven County, CT**	
	Latitude *41° 25' 34.91"*, Longitude *-73° 8' 39.33"*	
	150 Foot - Monopole Tower	

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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:

Corey McCartney, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150-ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in October of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
129.0	129.0	1	crown mounts	Side Arm Mount [SO 102-3]	1 2	3/8 3/4	-
		6	ericsson	RRUS-11			
127.0	128.0	6	andrew	SBNH-1D6565C w/ Mount Pipe			
		6	cci	DTMABP7819VG12A			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	127.0	1	crown mounts	T-Arm Mount [TA 601-3]			

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
152.0	152.0	1	crown mounts	Platform Mount [LP 602-1]	-	-	1
	148.0	6	decibel	980H90T3R-M w/ Mount Pipe	6	1-5/8	3
	147.0	3	alcatel lucent	1900MHz RRH (65MHz)	3	1-1/4	2
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
138.0	140.0	6	antel	LPA-185080/12CF w/ Mount Pipe	-	-	3
		6	antel	LPA-80080/8CF w/ Mount Pipe			
		3	antel	BXA-171063-12BF w/ Mount Pipe	6	1-5/8	2
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	antel	LPA-80063-6CF-EDIN-2 w/ Mount Pipe			
	138.0	1	crown mounts	Platform Mount [LP 601-1]	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
127.0	128.0	3	powerwave	7770.00 w/ Mount Pipe	-	-	3
		6	powerwave	LGP21401			
	127.0	1	crown mounts	Pipe Mount [PM 601-3]			
		-	-	-	6	1-1/4	1
85.0	86.0	1	lucent	KS24019-L112A	1	1/2	1
	85.0	1	crown mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Dr. Clarence Welti, CT23XC507, 09/22/99	1532984	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, CT23XC507, 06/23/00	1447042	CCISITES
TOWER MANUFACTURER DRAWINGS	EEI, 5723, 10/01/99	1446979	CCISITES
TOWER STRUCTURAL ANALYSIS REPORTS	FDH, 12-04574E S4, 06/18/12	3241229	CCISITES
TOWER PROPOSED MODIFICATION DRAWINGS	PJF, 37512-1818, 06/28/12	-	PJF

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 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	150 - 123.423	Pole	TP20.66x15x0.1875	1	-4.73	612.53	82.7	Pass
L2	123.423 - 118.25	Pole	TP21.3901x19.6105x0.25	2	-5.61	872.06	94.9	Pass
L3	118.25 - 90.5	Pole	TP27.3113x21.3901x0.483	3	-10.10	1864.63	89.4	Pass
L4	90.5 - 60.5	Pole	TP33.2114x27.3113x0.5991	4	-17.09	2820.72	85.1	Pass
L5	60.5 - 42.413	Pole	TP37.07x33.2114x0.5727	5	-20.37	2937.40	90.3	Pass
L6	42.413 - 30.5	Pole	TP38.9889x34.8222x0.6222	6	-22.92	3204.97	88.5	Pass
L7	30.5 - 0	Pole	TP45.5x38.9889x0.5742	7	-28.60	3366.18	93.4	Pass
							Summary	
						Pole (L2)	94.9	Pass
						Rating =	94.9	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.8	Pass
1	Base Plate	0	93.9	Pass
1	Base Foundation Steel	0	80.5	Pass
1	Base Foundation Soil Interaction	0	92.0	Pass

Structure Rating (max from all components) =	97.8%

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

4.1) Recommendations

1) See attached modification drawings

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:

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.0000-123.4230	26.5770	3.17	18	15.0000	20.6600	0.1875	0.7500	A572-65 (65 ksi)
L2	123.4230-118.2500	8.3400	0.00	18	19.6105	21.3901	0.2500	1.0000	A572-65 (65 ksi)
L3	118.2500-90.5000	27.7500	0.00	18	21.3901	27.3113	0.4830	1.9322	Reinf 56.68 ksi (57 ksi)
L4	90.5000-60.5000	30.0000	0.00	18	27.3113	33.2114	0.5991	2.3964	Reinf 56.87 ksi (57 ksi)
L5	60.5000-42.4130	18.0870	5.17	18	33.2114	37.0700	0.5727	2.2909	Reinf 57.08 ksi (57 ksi)
L6	42.4130-30.5000	17.0800	0.00	18	34.8222	38.9889	0.6222	2.4889	Reinf 57.22 ksi (57 ksi)
L7	30.5000-0.0000	30.5000		18	38.9889	45.5000	0.5742	2.2969	Reinf 57.67 ksi (58 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	15.2314	8.8153	244.3603	5.2584	7.6200	32.0683	489.0422	4.4085	2.3100	12.32
	20.9787	12.1837	645.1464	7.2677	10.4953	61.4701	1291.1417	6.0930	3.3062	17.633
L2	20.5992	15.3626	727.5059	6.8730	9.9622	73.0270	1455.9690	7.6828	3.0115	12.046
	21.7200	16.7746	947.1157	7.5047	10.8662	87.1620	1895.4776	8.3889	3.3247	13.299
L3	21.7200	32.0540	1770.1247	7.4220	10.8662	162.9027	3542.5787	16.0300	2.9145	6.034
	27.7326	41.1322	3740.2750	9.5240	13.8741	269.5864	7485.4715	20.5700	3.9566	8.191
L4	27.7326	50.7952	4579.0772	9.4828	13.8741	330.0444	9164.1796	25.4024	3.7523	6.263
	33.7237	62.0147	8332.8666	11.5774	16.8714	493.9053	16676.697 8	31.0132	4.7908	7.996
L5	33.7237	59.3320	7985.3005	11.5867	16.8714	473.3044	15981.108 3	29.6717	4.8372	8.446
	37.6419	66.3464	11165.429 8	12.9565	18.8316	592.9105	22345.551 4	33.1795	5.5163	9.632
L6	36.6394	67.5425	9980.8405	12.1410	17.6897	564.2178	19974.814 0	33.7777	5.0336	8.09
	39.5904	75.7714	14091.309 0	13.6202	19.8064	711.4535	28201.159 7	37.8929	5.7669	9.268
L7	39.5904	70.0136	13053.130 7	13.6372	19.8064	659.0371	26123.437 0	35.0135	5.8514	10.19
	46.2019	81.8806	20878.993 8	15.9487	23.1140	903.3051	41785.460 7	40.9481	6.9974	12.186

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	150.0000 - 0.0000	1	No Ice	0.1540	0.00
						1/2" Ice	0.2540	0.00
						1" Ice	0.3540	0.00
						2" Ice	0.5540	0.01
						4" Ice	0.9540	0.03
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	150.0000 - 0.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
**								
LDF7-50A(1-5/8")	C	No	Inside Pole	138.0000 - 0.0000	12	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice	0.1980	0.00
						1/2" Ice	0.2980	0.00
						1" Ice	0.3980	0.00
						2" Ice	0.5980	0.01
						4" Ice	0.9980	0.03
LDF7-50A(1-5/8")	C	No	Inside Pole	138.0000 - 0.0000	5	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
**								
LDF6-50A(1-1/4")	C	No	Inside Pole	127.0000 - 0.0000	6	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	127.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
WR-VG86ST-BRD(	C	No	Inside Pole	127.0000 - 0.0000	2	No Ice	0.0000	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
3/4)						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
**								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	85.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.02
**								
**								
Aero MP3-06	C	No	CaAa (Out Of Face)	92.0000 - 0.0000	1	No Ice	0.4343	0.00
						1/2" Ice	0.5454	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	122.0000 - 92.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.0000-123.4230	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.979	0.33
L2	123.4230-118.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.125	0.12
L3	118.2500-90.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	19.549	0.65
L4	90.5000-60.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.590	0.71
L5	60.5000-42.4130	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.222	0.43
L6	42.4130-30.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.367	0.28
L7	30.5000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.983	0.72

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.0000-123.4230	A	0.889	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.296	0.45
L2	123.4230-118.2500	A	0.876	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.909	0.15
L3	118.2500-90.5000	A	0.861	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.616	0.81
L4	90.5000-60.5000	A	0.828	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	39.040	0.91
L5	60.5000-42.4130	A	0.791	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	23.122	0.55
L6	42.4130-30.5000	A	0.759	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.229	0.36
L7	30.5000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	38.217	0.91

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.0000-123.4230	-0.2985	0.1723	-0.4912	0.2836
L2	123.4230-118.2500	-0.5840	0.3372	-0.8536	0.4928
L3	118.2500-90.5000	-0.6798	0.3925	-0.9791	0.5653
L4	90.5000-60.5000	-0.7787	0.4496	-1.0762	0.6214
L5	60.5000-42.4130	-0.8052	0.4649	-1.1209	0.6471
L6	42.4130-30.5000	-0.8163	0.4713	-1.1446	0.6608
L7	30.5000-0.0000	-0.8350	0.4821	-1.1698	0.6754

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert ft / ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
1900MHz RRH (65MHz)	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.6979 2.9362 3.1832 3.7030 4.8463	2.7708 3.0111 3.2600 3.7837 4.9348	0.06 0.08 0.11 0.18 0.35
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
(3) ACU-A20-N	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.22 0.41 0.91
1900MHz RRH (65MHz)	B	From Face	4.0000	0.00	152.0000	No Ice	2.6979	2.7708	0.06

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 -5.00			1/2" Ice	2.9362 3.1832	3.0111 3.2600	0.08 0.11
						1" Ice	3.7030	3.7837	0.18
						2" Ice	4.8463	4.9348	0.35
						4" Ice			
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	0.7701 0.8898	0.3747 0.4647	0.01 0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800MHZ RRH	B	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	2.4899 2.7061	2.0685 2.2705	0.05 0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
(3) ACU-A20-N	B	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	0.0778 0.1210	0.1361 0.1890	0.00 0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	8.4975 9.1490	6.9458 8.1266	0.08 0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
1900MHz RRH (65MHz)	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	2.6979 2.9362	2.7708 3.0111	0.06 0.08
						1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	0.7701 0.8898	0.3747 0.4647	0.01 0.02
						1" Ice	1.0181	0.5634	0.02
						2" Ice	1.3007	0.7868	0.04
						4" Ice	1.9696	1.3372	0.11
800MHZ RRH	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	2.4899 2.7061	2.0685 2.2705	0.05 0.07
						1" Ice	2.9310	2.4812	0.10
						2" Ice	3.4068	2.9284	0.16
						4" Ice	4.4620	3.9265	0.32
(3) ACU-A20-N	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	0.0778 0.1210	0.1361 0.1890	0.00 0.00
						1" Ice	0.1728	0.2506	0.00
						2" Ice	0.3025	0.3997	0.01
						4" Ice	0.6654	0.8015	0.04
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice	8.4975 9.1490	6.9458 8.1266	0.08 0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
Platform Mount [LP 602-1]	C	None		0.00	152.0000	No Ice 1/2" Ice	32.0300 38.7100	32.0300 38.7100	1.34 1.80
						1" Ice	45.3900	45.3900	2.26
						2" Ice	58.7500	58.7500	3.17
						4" Ice	85.4700	85.4700	5.00

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
(3) 6' x 2.375" Pipe Mount	A	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
(3) 6' x 2.375" Pipe Mount	B	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
(3) 6' x 2.375" Pipe Mount	C	From Face	4.0000 0.00 -5.00	0.00	152.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
***									
BXA-171063-12BF w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9710 5.5211 6.0361 7.0911 9.3593	5.2283 6.3892 7.2610 9.0462 12.8165	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-2 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.7445 11.4117 12.0450 13.3414 16.0541	10.7001 11.9672 12.9479 14.9632 19.2085	0.05 0.14 0.25 0.48 1.09
BXA-171063-12BF w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9710 5.5211 6.0361 7.0911 9.3593	5.2283 6.3892 7.2610 9.0462 12.8165	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-2 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.7445 11.4117 12.0450 13.3414 16.0541	10.7001 11.9672 12.9479 14.9632 19.2085	0.05 0.14 0.25 0.48 1.09
BXA-70063-6CF-2 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice	10.7445 11.4117 12.0450 13.3414	10.7001 11.9672 12.9479 14.9632	0.05 0.14 0.25 0.48

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 4" Ice	16.0541	19.2085	1.09
BXA-171063-12BF w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9710 5.5211 6.0361 7.0911 9.3593	5.2283 6.3892 7.2610 9.0462 12.8165	0.04 0.08 0.14 0.27 0.67
Platform Mount [LP 601-1]	C	None		0.00	138.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.4700 33.5900 38.7100 48.9500 69.4300	28.4700 33.5900 38.7100 48.9500 69.4300	1.12 1.51 1.91 2.69 4.26
***									
(3) SBNH-1D6565C w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.09 0.18 0.28 0.51 1.14
(2) DTMABP7819VG12A	A	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1389 1.2835 1.4368 1.7693 2.5380	0.3907 0.4884 0.5947 0.8334 1.4144	0.02 0.03 0.04 0.06 0.14
(2) RRUS-11	A	From Face	4.0000 0.00 0.00	0.00	129.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
DC6-48-60-18-8F	A	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7978 3.0377 3.5432 4.6580	4.3167 4.5965 4.8849 5.4877 6.7969	0.02 0.05 0.09 0.17 0.38
(2) DTMABP7819VG12A	B	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1389 1.2835 1.4368 1.7693 2.5380	0.3907 0.4884 0.5947 0.8334 1.4144	0.02 0.03 0.04 0.06 0.14
(2) RRUS-11	B	From Face	4.0000 0.00 0.00	0.00	129.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
(3) SBNH-1D6565C w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5561 12.2227 12.8929 14.2911 17.4280	9.7151 11.1857 12.5942 14.8689 19.6184	0.09 0.18 0.28 0.51 1.14
(2) DTMABP7819VG12A	C	From Face	4.0000 0.00	0.00	127.0000	No Ice 1/2"	1.1389 1.2835	0.3907 0.4884	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	1.4368	0.5947	0.04
						1" Ice	1.7693	0.8334	0.06
						2" Ice	2.5380	1.4144	0.14
						4" Ice			
(2) RRUS-11	C	From Face	4.0000	0.00	129.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2"	3.4905	1.5510	0.07
			0.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
T-Arm Mount [TA 601-3]	C	None		0.00	127.0000	No Ice	10.9000	10.9000	0.73
						1/2"	14.6500	14.6500	0.93
						Ice	18.4000	18.4000	1.13
						1" Ice	25.9000	25.9000	1.52
						2" Ice	40.9000	40.9000	2.32
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	129.0000	No Ice	3.0000	3.0000	0.08
						1/2"	3.4800	3.4800	0.11
						Ice	3.9600	3.9600	0.14
						1" Ice	4.9200	4.9200	0.20
						2" Ice	6.8400	6.8400	0.32
						4" Ice			
***									
KS24019-L112A	A	From Face	4.0000	0.00	85.0000	No Ice	0.1556	0.1556	0.01
			0.00			1/2"	0.2247	0.2247	0.01
			1.00			Ice	0.3025	0.3025	0.01
						1" Ice	0.4840	0.4840	0.02
						2" Ice	0.9506	0.9506	0.06
						4" Ice			
Side Arm Mount [SO 701-1]	A	None		0.00	85.0000	No Ice	0.8500	1.6700	0.07
						1/2"	1.1400	2.3400	0.08
						Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	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 150.0000-123.4230	136.0084	1.499	0.03	39.489	A	0.000	39.489	39.489	100.00	0.000	0.000
					B	0.000	39.489		100.00	0.000	0.000
					C	0.000	39.489		100.00	0.000	6.979
L2 123.4230-118.2500	120.8137	1.449	0.03	8.983	A	0.000	8.983	8.983	100.00	0.000	0.000
					B	0.000	8.983		100.00	0.000	0.000
					C	0.000	8.983		100.00	0.000	3.125
L3 118.2500-90.5000	103.8127	1.387	0.03	56.311	A	0.000	56.311	56.311	100.00	0.000	0.000
					B	0.000	56.311		100.00	0.000	0.000
					C	0.000	56.311		100.00	0.000	19.549
L4 90.5000-60.5000	75.0126	1.264	0.02	75.653	A	0.000	75.653	75.653	100.00	0.000	0.000
					B	0.000	75.653		100.00	0.000	0.000
					C	0.000	75.653		100.00	0.000	23.590
L5 60.5000-42.4130	51.2910	1.134	0.02	52.966	A	0.000	52.966	52.966	100.00	0.000	0.000
					B	0.000	52.966		100.00	0.000	0.000
					C	0.000	52.966		100.00	0.000	14.222
L6 42.4130-30.5000	36.3796	1.028	0.02	37.264	A	0.000	37.264	37.264	100.00	0.000	0.000
					B	0.000	37.264		100.00	0.000	0.000
					C	0.000	37.264		100.00	0.000	9.367
L7 30.5000-	14.8583	1	0.02	107.37	A	0.000	107.371	107.371	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	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
0.0000				1	B	0.000	107.371		100.00	0.000	0.000
					C	0.000	107.371		100.00	0.000	23.983

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	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 150.0000-123.4230	136.0084	1.499	0.01	0.8889	43.427	A	0.000	43.427	43.427	100.00	0.000	0.000
						B	0.000	43.427		100.00	0.000	0.000
						C	0.000	43.427		100.00	0.000	14.296
L2 123.4230-118.2500	120.8137	1.449	0.01	0.8764	9.749	A	0.000	9.749	9.749	100.00	0.000	0.000
						B	0.000	9.749		100.00	0.000	0.000
						C	0.000	9.749		100.00	0.000	5.909
L3 118.2500-90.5000	103.8127	1.387	0.01	0.8606	60.291	A	0.000	60.291	60.291	100.00	0.000	0.000
						B	0.000	60.291		100.00	0.000	0.000
						C	0.000	60.291		100.00	0.000	35.616
L4 90.5000-60.5000	75.0126	1.264	0.00	0.8277	79.792	A	0.000	79.792	79.792	100.00	0.000	0.000
						B	0.000	79.792		100.00	0.000	0.000
						C	0.000	79.792		100.00	0.000	39.040
L5 60.5000-42.4130	51.2910	1.134	0.00	0.7908	55.350	A	0.000	55.350	55.350	100.00	0.000	0.000
						B	0.000	55.350		100.00	0.000	0.000
						C	0.000	55.350		100.00	0.000	23.122
L6 42.4130-30.5000	36.3796	1.028	0.00	0.7588	38.834	A	0.000	38.834	38.834	100.00	0.000	0.000
						B	0.000	38.834		100.00	0.000	0.000
						C	0.000	38.834		100.00	0.000	15.229
L7 30.5000-0.0000	14.8583	1	0.00	0.7500	111.184	A	0.000	111.184	111.184	100.00	0.000	0.000
						B	0.000	111.184		100.00	0.000	0.000
						C	0.000	111.184		100.00	0.000	38.217

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	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 150.0000-123.4230	136.0084	1.499	0.01	39.489	A	0.000	39.489	39.489	100.00	0.000	0.000
					B	0.000	39.489		100.00	0.000	0.000
					C	0.000	39.489		100.00	0.000	6.979
L2 123.4230-118.2500	120.8137	1.449	0.01	8.983	A	0.000	8.983	8.983	100.00	0.000	0.000
					B	0.000	8.983		100.00	0.000	0.000
					C	0.000	8.983		100.00	0.000	3.125
L3 118.2500-90.5000	103.8127	1.387	0.01	56.311	A	0.000	56.311	56.311	100.00	0.000	0.000
					B	0.000	56.311		100.00	0.000	0.000
					C	0.000	56.311		100.00	0.000	19.549
L4 90.5000-60.5000	75.0126	1.264	0.01	75.653	A	0.000	75.653	75.653	100.00	0.000	0.000
					B	0.000	75.653		100.00	0.000	0.000
					C	0.000	75.653		100.00	0.000	23.590
L5 60.5000-42.4130	51.2910	1.134	0.01	52.966	A	0.000	52.966	52.966	100.00	0.000	0.000
					B	0.000	52.966		100.00	0.000	0.000
					C	0.000	52.966		100.00	0.000	14.222
L6 42.4130-30.5000	36.3796	1.028	0.01	37.264	A	0.000	37.264	37.264	100.00	0.000	0.000
					B	0.000	37.264		100.00	0.000	0.000
					C	0.000	37.264		100.00	0.000	9.367
L7 30.5000-0.0000	14.8583	1	0.01	107.371	A	0.000	107.371	107.371	100.00	0.000	0.000
					B	0.000	107.371		100.00	0.000	0.000
					C	0.000	107.371		100.00	0.000	23.983

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 123.423	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.70	1.21	-0.32
			Max. Mx	11	-4.74	203.23	-0.15
			Max. My	8	-4.74	0.22	-203.01
			Max. Vy	11	-17.84	203.23	-0.15
			Max. Vx	8	17.86	0.22	-203.01
			Max. Torque	8			-2.80
L2	123.423 - 118.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.75	1.27	-0.35
			Max. Mx	11	-5.62	354.61	-0.66
			Max. My	8	-5.62	0.77	-354.51
			Max. Vy	11	-18.48	354.61	-0.66
			Max. Vx	8	18.49	0.77	-354.51
			Max. Torque	2			2.82
L3	118.25 - 90.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.76	1.51	-0.47
			Max. Mx	11	-10.11	901.98	-2.32
			Max. My	8	-10.11	2.54	-902.31

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-21.04	901.98	-2.32
			Max. Vx	8	21.06	2.54	-902.31
			Max. Torque	2			2.94
L4	90.5 - 60.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.48	1.84	-0.62
			Max. Mx	11	-17.10	1577.80	-4.11
			Max. My	8	-17.10	4.43	-1578.56
			Max. Vy	11	-24.02	1577.80	-4.11
			Max. Vx	8	24.03	4.43	-1578.56
			Max. Torque	13			3.15
L5	60.5 - 42.413	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.04	1.98	-0.70
			Max. Mx	11	-20.38	1895.15	-4.88
			Max. My	8	-20.38	5.23	-1896.10
			Max. Vy	11	-25.13	1895.15	-4.88
			Max. Vx	8	25.15	5.23	-1896.10
			Max. Torque	13			3.24
L6	42.413 - 30.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.66	2.18	-0.81
			Max. Mx	11	-26.37	2337.68	-5.90
			Max. My	8	-26.37	6.28	-2338.90
			Max. Vy	5	26.61	-2336.44	5.44
			Max. Vx	8	26.62	6.28	-2338.90
			Max. Torque	13			3.36
L7	30.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.67	2.56	-1.04
			Max. Mx	11	-35.63	3183.04	-7.69
			Max. My	8	-35.63	8.10	-3184.71
			Max. Vy	11	-28.88	3183.04	-7.69
			Max. Vx	8	28.89	8.10	-3184.71
			Max. Torque	13			3.59

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	47.67	7.05	-0.02
	Max. H_x	11	35.64	28.86	-0.06
	Max. H_z	2	35.64	-0.06	28.87
	Max. M_x	2	3184.13	-0.06	28.87
	Max. M_z	5	3181.59	-28.86	0.06
	Max. Torsion	13	3.59	14.38	24.98
	Min. Vert	1	35.64	0.00	0.00
	Min. H_x	5	35.64	-28.86	0.06
	Min. H_z	8	35.64	0.06	-28.87
	Min. M_x	8	-3184.71	0.06	-28.87
	Min. M_z	11	-3183.04	28.86	-0.06
	Min. Torsion	7	-3.59	-14.38	-24.98

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	35.64	0.00	0.00	0.28	0.70	0.00
Dead+Wind 0 deg - No Ice	35.64	0.06	-28.87	-3184.13	-6.70	-3.53
Dead+Wind 30 deg - No Ice	35.64	14.48	-25.03	-2761.16	-1596.84	-2.52
Dead+Wind 60 deg - No Ice	35.64	25.02	-14.48	-1598.31	-2758.92	-0.84
Dead+Wind 90 deg - No Ice	35.64	28.86	-0.06	-7.12	-3181.59	1.07
Dead+Wind 120 deg - No Ice	35.64	24.96	14.39	1586.09	-2751.58	2.69
Dead+Wind 150 deg - No Ice	35.64	14.38	24.98	2754.39	-1584.06	3.59

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - No Ice	35.64	-0.06	28.87	3184.71	8.10	3.53
Dead+Wind 210 deg - No Ice	35.64	-14.48	25.03	2761.76	1598.26	2.52
Dead+Wind 240 deg - No Ice	35.64	-25.02	14.48	1598.90	2760.36	0.84
Dead+Wind 270 deg - No Ice	35.64	-28.86	0.06	7.69	3183.04	-1.07
Dead+Wind 300 deg - No Ice	35.64	-24.96	-14.39	-1585.54	2753.01	-2.69
Dead+Wind 330 deg - No Ice	35.64	-14.38	-24.98	-2753.84	1585.46	-3.59
Dead+Ice+Temp	47.67	-0.00	0.00	1.04	2.56	-0.00
Dead+Wind 0 deg+Ice+Temp	47.67	0.02	-7.05	-802.43	0.11	-0.91
Dead+Wind 30 deg+Ice+Temp	47.67	3.54	-6.11	-696.05	-401.64	-0.63
Dead+Wind 60 deg+Ice+Temp	47.67	6.12	-3.54	-402.88	-695.07	-0.19
Dead+Wind 90 deg+Ice+Temp	47.67	7.05	-0.02	-1.47	-801.54	0.31
Dead+Wind 120 deg+Ice+Temp	47.67	6.10	3.51	400.62	-692.52	0.72
Dead+Wind 150 deg+Ice+Temp	47.67	3.51	6.09	695.65	-397.24	0.94
Dead+Wind 180 deg+Ice+Temp	47.67	-0.02	7.05	804.57	5.20	0.91
Dead+Wind 210 deg+Ice+Temp	47.67	-3.54	6.11	698.20	406.96	0.63
Dead+Wind 240 deg+Ice+Temp	47.67	-6.12	3.54	405.03	700.38	0.19
Dead+Wind 270 deg+Ice+Temp	47.67	-7.05	0.02	3.62	806.85	-0.31
Dead+Wind 300 deg+Ice+Temp	47.67	-6.10	-3.51	-398.48	697.84	-0.72
Dead+Wind 330 deg+Ice+Temp	47.67	-3.51	-6.09	-693.51	402.55	-0.94
Dead+Wind 0 deg - Service	35.64	0.02	-9.99	-1103.91	-1.84	-1.24
Dead+Wind 30 deg - Service	35.64	5.01	-8.66	-957.26	-553.23	-0.89
Dead+Wind 60 deg - Service	35.64	8.66	-5.01	-554.03	-956.18	-0.30
Dead+Wind 90 deg - Service	35.64	9.98	-0.02	-2.27	-1102.74	0.37
Dead+Wind 120 deg - Service	35.64	8.64	4.98	550.17	-953.62	0.94
Dead+Wind 150 deg - Service	35.64	4.98	8.64	955.28	-548.78	1.26
Dead+Wind 180 deg - Service	35.64	-0.02	9.99	1104.49	3.30	1.24
Dead+Wind 210 deg - Service	35.64	-5.01	8.66	957.85	554.69	0.89
Dead+Wind 240 deg - Service	35.64	-8.66	5.01	554.62	957.65	0.30
Dead+Wind 270 deg - Service	35.64	-9.98	0.02	2.86	1104.20	-0.37
Dead+Wind 300 deg - Service	35.64	-8.64	-4.98	-549.59	955.09	-0.94
Dead+Wind 330 deg - Service	35.64	-4.98	-8.64	-954.70	550.25	-1.26

Solution Summary

Load Comb.	Sum of Applied Forces PX	PY	PZ	Sum of Reactions PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-35.64	0.00	0.00	35.64	0.00	0.000%
2	0.06	-35.64	-28.87	-0.06	35.64	28.87	0.000%
3	14.48	-35.64	-25.03	-14.48	35.64	25.03	0.000%
4	25.02	-35.64	-14.48	-25.02	35.64	14.48	0.000%
5	28.86	-35.64	-0.06	-28.86	35.64	0.06	0.000%
6	24.96	-35.64	14.39	-24.96	35.64	-14.39	0.000%
7	14.38	-35.64	24.98	-14.38	35.64	-24.98	0.000%
8	-0.06	-35.64	28.87	0.06	35.64	-28.87	0.000%
9	-14.48	-35.64	25.03	14.48	35.64	-25.03	0.000%
10	-25.02	-35.64	14.48	25.02	35.64	-14.48	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	-28.86	-35.64	0.06	28.86	35.64	-0.06	0.000%
12	-24.96	-35.64	-14.39	24.96	35.64	14.39	0.000%
13	-14.38	-35.64	-24.98	14.38	35.64	24.98	0.000%
14	0.00	-47.67	0.00	0.00	47.67	-0.00	0.000%
15	0.02	-47.67	-7.05	-0.02	47.67	7.05	0.000%
16	3.54	-47.67	-6.11	-3.54	47.67	6.11	0.000%
17	6.12	-47.67	-3.54	-6.12	47.67	3.54	0.000%
18	7.05	-47.67	-0.02	-7.05	47.67	0.02	0.000%
19	6.10	-47.67	3.51	-6.10	47.67	-3.51	0.000%
20	3.51	-47.67	6.09	-3.51	47.67	-6.09	0.000%
21	-0.02	-47.67	7.05	0.02	47.67	-7.05	0.000%
22	-3.54	-47.67	6.11	3.54	47.67	-6.11	0.000%
23	-6.12	-47.67	3.54	6.12	47.67	-3.54	0.000%
24	-7.05	-47.67	0.02	7.05	47.67	-0.02	0.000%
25	-6.10	-47.67	-3.51	6.10	47.67	3.51	0.000%
26	-3.51	-47.67	-6.09	3.51	47.67	6.09	0.000%
27	0.02	-35.64	-9.99	-0.02	35.64	9.99	0.000%
28	5.01	-35.64	-8.66	-5.01	35.64	8.66	0.000%
29	8.66	-35.64	-5.01	-8.66	35.64	5.01	0.000%
30	9.98	-35.64	-0.02	-9.98	35.64	0.02	0.000%
31	8.64	-35.64	4.98	-8.64	35.64	-4.98	0.000%
32	4.98	-35.64	8.64	-4.98	35.64	-8.64	0.000%
33	-0.02	-35.64	9.99	0.02	35.64	-9.99	0.000%
34	-5.01	-35.64	8.66	5.01	35.64	-8.66	0.000%
35	-8.66	-35.64	5.01	8.66	35.64	-5.01	0.000%
36	-9.98	-35.64	0.02	9.98	35.64	-0.02	0.000%
37	-8.64	-35.64	-4.98	8.64	35.64	4.98	0.000%
38	-4.98	-35.64	-8.64	4.98	35.64	8.64	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.423	42.69	34	2.82	0.01
L2	126.59 - 118.25	29.44	34	2.45	0.01
L3	118.25 - 90.5	25.34	34	2.21	0.01
L4	90.5 - 60.5	14.27	34	1.58	0.00
L5	60.5 - 42.413	6.20	34	1.00	0.00
L6	47.58 - 30.5	3.84	34	0.75	0.00
L7	30.5 - 0	1.55	34	0.50	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	1900MHz RRH (65MHz)	34	42.69	2.82	0.01	8942
138.0000	BXA-171063-12BF w/ Mount Pipe	34	35.68	2.67	0.01	3725
129.0000	(2) RRUS-11	34	30.70	2.50	0.01	2145
127.0000	(3) SBNH-1D6565C w/ Mount Pipe	34	29.65	2.46	0.01	2024
85.0000	KS24019-L112A	34	12.51	1.47	0.00	2775

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.423	122.48	9	8.10	0.03
L2	126.59 - 118.25	84.59	9	7.03	0.03
L3	118.25 - 90.5	72.84	9	6.37	0.02

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	90.5 - 60.5	41.08	9	4.54	0.01
L5	60.5 - 42.413	17.86	9	2.87	0.01
L6	47.58 - 30.5	11.05	9	2.17	0.00
L7	30.5 - 0	4.47	9	1.44	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	1900MHz RRH (65MHz)	9	122.48	8.10	0.03	3228
138.0000	BXA-171063-12BF w/ Mount Pipe	9	102.44	7.67	0.03	1343
129.0000	(2) RRUS-11	9	88.20	7.20	0.03	771
127.0000	(3) SBNH-1D6565C w/ Mount Pipe	9	85.19	7.06	0.03	726
85.0000	KS24019-L112A	9	36.00	4.23	0.01	977

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	150 - 123.423 (1)	TP20.66x15x0.1875	26.5770	0.0000	0.0	39.00	11.7823	-4.73	459.51	0.010
L2	123.423 - 118.25 (2)	TP21.3901x19.6105x0.25	8.3400	0.0000	0.0	39.00	16.7746	-5.61	654.21	0.009
L3	118.25 - 90.5 (3)	TP27.3113x21.3901x0.483	27.7500	0.0000	0.0	34.01	41.1322	-10.10	1398.82	0.007
L4	90.5 - 60.5 (4)	TP33.2114x27.3113x0.5991	30.0000	0.0000	0.0	34.12	62.0147	-17.09	2116.07	0.008
L5	60.5 - 42.413 (5)	TP37.07x33.2114x0.5727	18.0870	0.0000	0.0	34.25	64.3426	-20.37	2203.60	0.009
L6	42.413 - 30.5 (6)	TP38.9889x34.8222x0.6222	17.0800	0.0000	0.0	34.33	70.0319	-22.92	2404.33	0.010
L7	30.5 - 0 (7)	TP45.5x38.9889x0.5742	30.5000	0.0000	0.0	34.60	72.9804	-28.60	2525.27	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 123.423 (1)	TP20.66x15x0.1875	203.24	42.44	39.00	1.088	0.00	0.00	39.00	0.000
L2	123.423 - 118.25 (2)	TP21.3901x19.6105x0.25	355.14	48.89	39.00	1.254	0.00	0.00	39.00	0.000
L3	118.25 - 90.5 (3)	TP27.3113x21.3901x0.483	904.23	40.25	34.01	1.184	0.00	0.00	34.01	0.000
L4	90.5 - 60.5 (4)	TP33.2114x27.3113x0.5991	1581.91	38.43	34.12	1.126	0.00	0.00	34.12	0.000
L5	60.5 - 42.413 (5)	TP37.07x33.2114x0.5727	1900.06	40.91	34.25	1.194	0.00	0.00	34.25	0.000
L6	42.413 - 30.5 (6)	TP38.9889x34.8222x0.6222	2031.61	40.17	34.33	1.170	0.00	0.00	34.33	0.000
L7	30.5 - 0 (7)	TP45.5x38.9889x0.5742	2549.03	42.69	34.60	1.234	0.00	0.00	34.60	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 123.423 (1)	TP20.66x15x0.1875	17.90	1.52	26.00	0.117	2.09	0.21	26.00	0.008
L2	123.423 - 118.25 (2)	TP21.3901x19.6105x0.25	18.54	1.11	26.00	0.085	2.10	0.14	26.00	0.005
L3	118.25 - 90.5 (3)	TP27.3113x21.3901x0.483	21.11	0.51	22.67	0.045	2.17	0.05	22.67	0.002
L4	90.5 - 60.5 (4)	TP33.2114x27.3113x0.5991	24.08	0.39	22.75	0.034	2.30	0.03	22.75	0.001
L5	60.5 - 42.413 (5)	TP37.07x33.2114x0.5727	25.19	0.39	22.83	0.034	2.35	0.02	22.83	0.001
L6	42.413 - 30.5 (6)	TP38.9889x34.8222x0.6222	25.83	0.37	22.89	0.032	2.37	0.02	22.89	0.001
L7	30.5 - 0 (7)	TP45.5x38.9889x0.5742	27.34	0.37	23.07	0.032	2.44	0.02	23.07	0.001

Pole Interaction Design Data

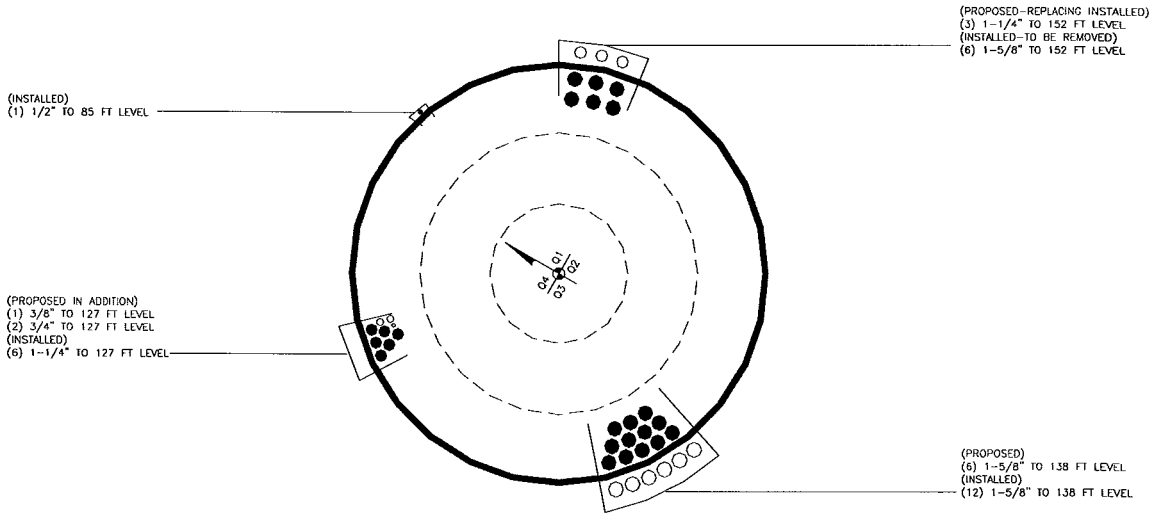
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123.423 (1)	0.010	1.088	0.000	0.117	0.008	1.103 ✔	1.333	H1-3+VT ✔
L2	123.423 - 118.25 (2)	0.009	1.254	0.000	0.085	0.005	1.265 ✔	1.333	H1-3+VT ✔
L3	118.25 - 90.5 (3)	0.007	1.184	0.000	0.045	0.002	1.191 ✔	1.333	H1-3+VT ✔
L4	90.5 - 60.5 (4)	0.008	1.126	0.000	0.034	0.001	1.135 ✔	1.333	H1-3+VT ✔
L5	60.5 - 42.413 (5)	0.009	1.194	0.000	0.034	0.001	1.204 ✔	1.333	H1-3+VT ✔
L6	42.413 - 30.5 (6)	0.010	1.170	0.000	0.032	0.001	1.180 ✔	1.333	H1-3+VT ✔
L7	30.5 - 0 (7)	0.011	1.234	0.000	0.032	0.001	1.245 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 123.423	Pole	TP20.66x15x0.1875	1	-4.73	612.53	82.7	Pass
L2	123.423 - 118.25	Pole	TP21.3901x19.6105x0.25	2	-5.61	872.06	94.9	Pass
L3	118.25 - 90.5	Pole	TP27.3113x21.3901x0.483	3	-10.10	1864.63	89.4	Pass
L4	90.5 - 60.5	Pole	TP33.2114x27.3113x0.5991	4	-17.09	2820.72	85.1	Pass
L5	60.5 - 42.413	Pole	TP37.07x33.2114x0.5727	5	-20.37	2937.40	90.3	Pass
L6	42.413 - 30.5	Pole	TP38.9889x34.8222x0.6222	6	-22.92	3204.97	88.5	Pass
L7	30.5 - 0	Pole	TP45.5x38.9889x0.5742	7	-28.60	3366.18	93.4	Pass
						Summary		
						Pole (L2)	94.9	Pass
						RATING =	**94.9**	**Pass**

APPENDIX B

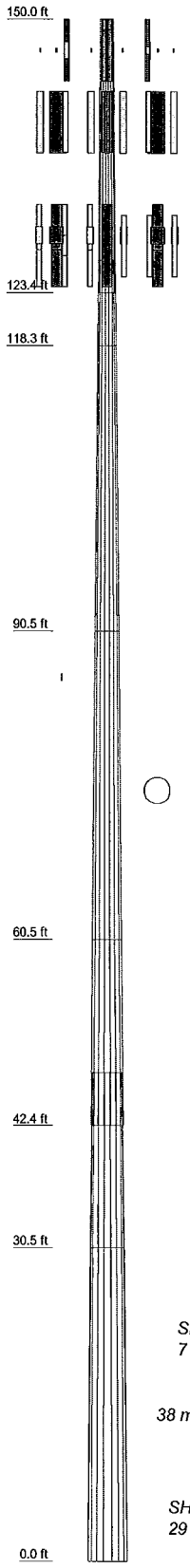
BASE LEVEL DRAWING

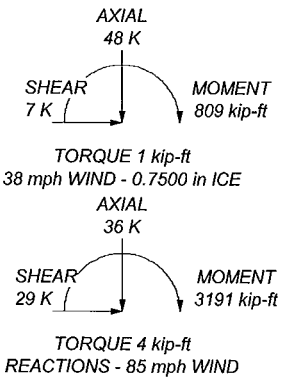


APPENDIX C

ADDITIONAL CALCULATIONS

Section	7	6	5	4	3	2	1
Length (ft)	30.5000	17.0800	18.0870	30.0000	27.7500	8.3400	26.5770
Number of Sides	18	18	18	18	18	18	18
Thickness (in)	0.5742	0.6222	0.5727	0.5991	0.4830	0.2500	0.1875
Socket Length (ft)			5.1670				3.1670
Top Dia (in)	38.9889	34.8222	33.2114	27.3113	21.3901	19.6105	15.0000
Bot Dia (in)	45.5000	38.9889	37.0700	33.2114	27.3113	21.3901	20.6600
Grade	Reinf 57.67 ksi	Reinf 57.22 ksi	Reinf 57.08 ksi	Reinf 56.87 ksi	Reinf 56.68 ksi	A572-65	
Weight (K)	7.9	4.2	3.9	5.8	3.5	0.5	0.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1900MHz RRH (65MHz)	152	BXA-70063-6CF-2 w/ Mount Pipe	138
800 EXTERNAL NOTCH FILTER	152	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
800MHZ RRH	152		
(3) ACU-A20-N	152	BXA-70063-6CF-2 w/ Mount Pipe	138
APXVSPP18-C-A20 w/ Mount Pipe	152	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
1900MHz RRH (65MHz)	152		
800 EXTERNAL NOTCH FILTER	152	BXA-171063-12BF w/ Mount Pipe	138
800MHZ RRH	152	Platform Mount [LP 601-1]	138
(3) ACU-A20-N	152	(2) RRUS-11	129
APXVSPP18-C-A20 w/ Mount Pipe	152	(2) RRUS-11	129
1900MHz RRH (65MHz)	152	(2) RRUS-11	129
800 EXTERNAL NOTCH FILTER	152	Side Arm Mount [SO 102-3]	129
800MHZ RRH	152	(2) DTMABP7819VG12A	127
(3) ACU-A20-N	152	(2) DTMABP7819VG12A	127
APXVSPP18-C-A20 w/ Mount Pipe	152	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	127
Platform Mount [LP 602-1]	152	(3) SBNH-1D6565C w/ Mount Pipe	127
(3) 6' x 2.375" Pipe Mount	152	(2) DTMABP7819VG12A	127
(3) 6' x 2.375" Pipe Mount	152	(3) SBNH-1D6565C w/ Mount Pipe	127
(3) 6' x 2.375" Pipe Mount	152	T-Arm Mount [TA 601-3]	127
BXA-171063-12BF w/ Mount Pipe	138	DC6-48-60-18-8F	127
BXA-70063-6CF-2 w/ Mount Pipe	138	KS24019-L112A	85
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138	Side Arm Mount [SO 701-1]	85
BXA-171063-12BF w/ Mount Pipe	138		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 57.08 ksi	57 ksi	72 ksi
Reinf 56.68 ksi	57 ksi	71 ksi	Reinf 57.22 ksi	57 ksi	72 ksi
Reinf 56.87 ksi	57 ksi	72 ksi	Reinf 57.67 ksi	58 ksi	73 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.9%

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *150' MP; Seymour 2/ Oxford Town Garage; Oxford, CT*		
Project: *PJF# 37512-1818 (BU# 876361)*		
Client: CCI	Drawn by: Corey McCartney	App'd:
Code: TIA/EIA-222-F	Date: 07/10/12	Scale: NTS
Path: G:\TOWER\375 Crown Castle\2012\37512-1818 BU 876361\37512-1818 Reinforced AERO.eri		Dwg No. E-1

PAUL J. FORD AND COMPANY
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v4.0 - Effective 1-12-12

Date: 7/10/2012
PJF Project: 37512-1818
Client Ref. # BU 876361
Site Name: Seymour 2/ Oxford Town Garage
Description: 150' MP
Owner: CCI
Engineer: CMM

Asymmetric Anchor Rod Analysis

Moment =	3191	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	36.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	29.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	15							

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

Item	Nominal Anchor Dia, in	Anchor 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	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
2	2.250	#18J A615 Gr 75	75	100	30.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
3	2.250	#18J A615 Gr 75	75	100	60.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
4	2.250	#18J A615 Gr 75	75	100	90.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
5	2.250	#18J A615 Gr 75	75	100	120.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
6	2.250	#18J A615 Gr 75	75	100	150.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
7	2.250	#18J A615 Gr 75	75	100	180.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
8	2.250	#18J A615 Gr 75	75	100	210.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
9	2.250	#18J A615 Gr 75	75	100	240.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
10	2.250	#18J A615 Gr 75	75	100	270.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
11	2.250	#18J A615 Gr 75	75	100	300.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
12	2.250	#18J A615 Gr 75	75	100	330.0	54.00	0.00	3.98	191.53	186.73	186.73	0.00	195.00	95.8%
13	2.250	A193 Gr B7	105	125	85.0	54.00	0.00	3.98	191.35	186.55	186.55	0.00	218.68	85.3%
14	2.250	A193 Gr B7	105	125	205.0	54.00	0.00	3.98	191.35	186.55	186.55	0.00	218.68	85.3%
15	2.250	A193 Gr B7	105	125	325.0	54.00	0.00	3.98	191.35	186.55	186.55	0.00	218.68	85.3%
								59.69						

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

TIA Rev F

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	54	in

Plate Data		
Diam:	60	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	12.03	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.3125	in
Width:	7	in
Height:	21	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	45.5	in
Thick:	0.375	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	

Reactions		
Moment:	2553.3	ft-kips
Axial:	28.8	kips
Shear:	23.2	kips

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

Anchor Rod Results | Stiffened

Maximum Rod Tension:	186.7 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	95.8% Pass	

Base Plate Results | Flexural Check | Stiffened

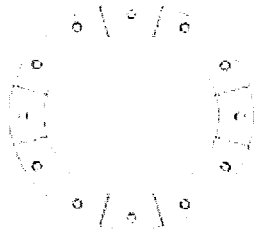
Base Plate Stress:	56.3 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	93.9% Pass	Y.L. Length: N/A, Roark

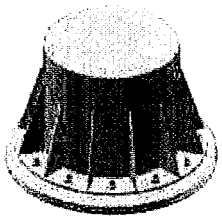
Stiffener Results

Horizontal Weld :	76.6% Pass
Vertical Weld:	51.7% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	18.0% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	67.3% Pass
Plate Comp. (AISC Bracket):	69.0% Pass

Pole Results

Pole Punching Shear Check:	11.6% Pass





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

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

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v4.0 - Effective 1-12-12

Date: 7/10/2012
PJF Project: 37512-1818
Client Ref.# BU 876361
Site Name: Seymour 2/ Oxford Town Garage
Description: 150' MP
Owner: CCI
Engineer: CMM

Micropiles

Moment =	500	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	0.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	0.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	3							

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

Item	Nominal Anchor Dia, in	Anchor 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	0.000		109	87	0.0	186.00	1.36	1.36	45.62	45.62	45.62	75.60	75.60	60.3%
2	0.000		109	87	90.0	186.00	1.36	1.36	64.52	64.52	64.52	75.60	75.60	85.3%
3	0.000		109	87	180.0	186.00	1.36	1.36	45.62	45.62	45.62	75.60	75.60	60.3%
								4.08						

Foundation Loads:

Tower leg compression =	36	(kips)
Horizontal load at top of pier =	29	(kips)
Overturning moment at top of pier=	2691	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	

Soil Properties:

Soil density =	120	(pcf)
Allowable soil bearing =	6	(ksf)
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	S	("R" or "S")
Pier width =	6	(ft)
Pier height above grade =	1	(ft)
depth to bottom of footing =	6	(ft)
Footing thickness =	3	(ft)
Footing width =	21.5	(ft)
Footing length =	21.5	(ft)

Concrete:

Concrete strength =	3	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

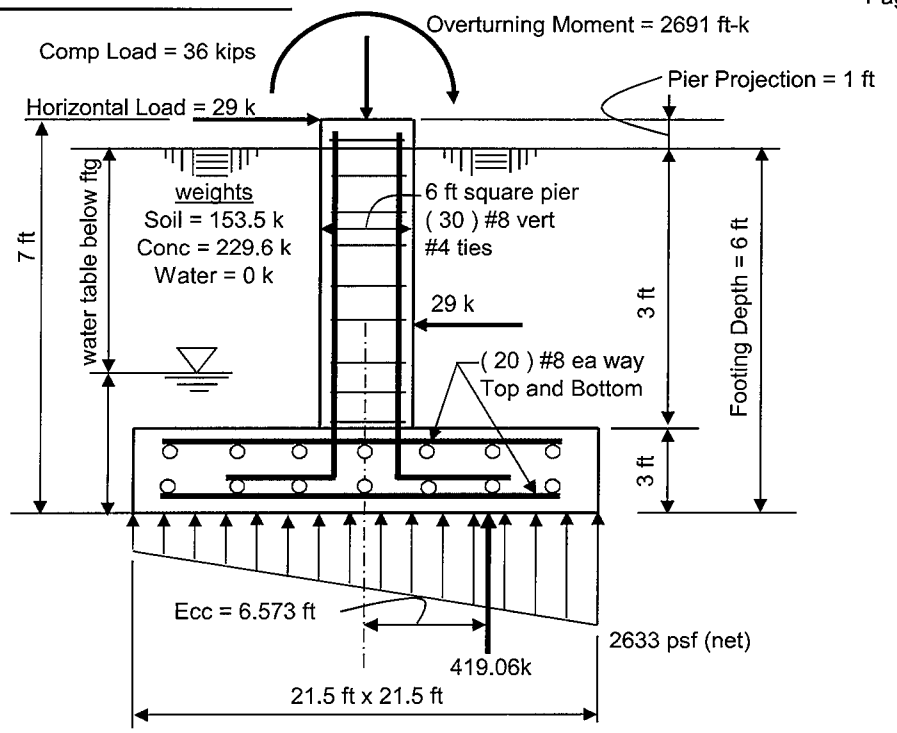
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#8	bar
quantity of pad rebar =	20	(ea direction)

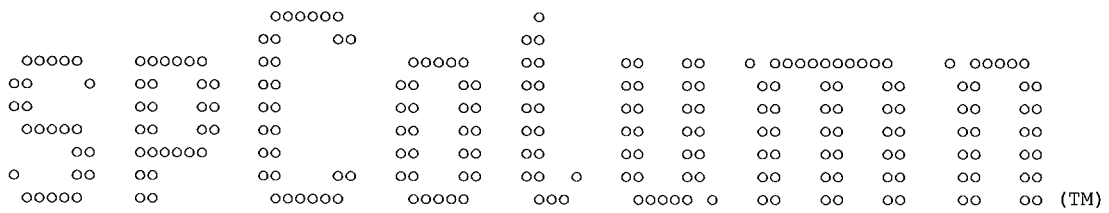
Reinforcing Steel:

	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 = 56.7 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.633 ksf Allowable Net Soil Bearing = 6 ksf **Soil Bearing Stress Ratio = 0.44 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 39 psi **Bending Shear Stress Ratio = 0.36 Okay**
Ftg Overturning Resistance = 4505 ft-kips Overturning Moment = 2755 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.635 **Ratio = 0.92 Okay**	Pad Bending Moment Capacity= 2188 ft-k Pad Bending Moment = 1393 ft-k **Bending Moment Stress Ratio = 0.64 OK**



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

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General Information:
==========

File Name: g:\tower\375_crown_castle\2012\37512-1818 bu 876361\37512-1818.col
Project: 37512-1818
Column: Engineer: CMM
Code: ACI 318-02 Units: English

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

Material Properties:
==========

f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:
==========

Rectangular: Width = 72 in Depth = 72 in

Gross section area, Ag = 5184 in^2
Ix = 2.23949e+006 in^4 Iy = 2.23949e+006 in^4
rx = 20.7846 in ry = 20.7846 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 #8 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 = 0.46% (Note: rho < 0.50%)
Minimum clear spacing = 4.96 in

30 #8 Cover = 6.5 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	36.00	2807.00	3489.36	1.243	7.99	64.50	0.02121	0.900

*** End of output ***

CROWN CASTLE PROJECT: BU #876361; SEYMOUR 2/OXFORD TOWN GARAGE; OXFORD, 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 85 MPH AND 38 MPH + 3/4" 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 ITS 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-10006 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:
- (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
- (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
- (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.

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.

STATE OF CONNECTICUT — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

JUL 1 9 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1818	ISSUE DATE OF PERMIT: 6-28-2012
DRAWN BY: B.M.S.	
CHECKED BY: C.M.M.	
APPROVED BY:	S-1A
DATE: 6-28-2012	

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**

1. THE CONTRACTOR SHALL PROTECT THE EXISTING MONOPOLE STRUCTURE, AS WELL AS ANY OTHER NEARBY EXISTING FOUNDATIONS FOR OTHER STRUCTURES OR EQUIPMENT, FROM LOSS OF SOIL AROUND AND/OR BENEATH FOOTINGS DURING ANY REQUIRED EXCAVATION. THE CONTRACTOR SHALL BRACE THE SIDES OF THE OPEN EXCAVATION AS REQUIRED.

2. THE EFFECT OF ADDITIONAL EXCAVATION (WHERE REQUIRED) FOR THE NEW MAT FOOTING (WHERE REQUIRED) OR OTHER FOUNDATION AUGMENTATION AND REINFORCING (WHERE REQUIRED) MAY HAVE IMPACT ON EXISTING EQUIPMENT AND/OR OTHER EXISTING STRUCTURES NEAR THE EXCAVATION. (ENGINEER-OF- RECORD) HAS NOT BEEN PROVIDED WITH ANY SPECIFIC INFORMATION OR DETAILS REGARDING EXISTING EQUIPMENT OR OTHER EXISTING STRUCTURES ON THE SITE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE IMPACT OR EFFECT THAT ANY REQUIRED EXCAVATION WORK HAS ON ANY EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES. CONTRACTOR SHALL COORDINATE THIS SITE-SPECIFIC INFORMATION WITH THE OWNER AND TESTING AGENCY PRIOR TO CONSTRUCTION AND FOUNDATION WORK. THE CONTRACTOR SHALL ADEQUATELY BRACE, SHORE, AND/OR RELOCATE (AFTER OBTAINING THE PRIOR WRITTEN PERMISSION OF THE OWNER), AS NECESSARY, THE INTERFERING EXISTING NEARBY EQUIPMENT AND/OR STRUCTURES.

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 ¼ 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
JUL 1 9 2012

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BU #876361; SEYMOUR 2/OXFORD TOWN GARAGE OXFORD, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT	PROJECT No: 37512-1818 DRAWN BY: B.M.S. CHECKED BY: C.M.M. APPROVED BY: DATE: 6-28-2012	ISSUE DATE OF PERMIT: 6-28-2012 S-2A

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AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

NOTES: 1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

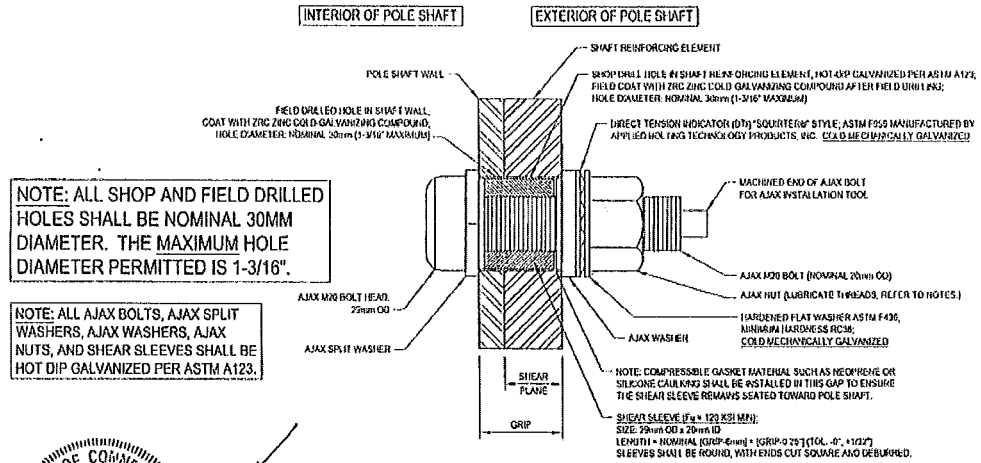
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123.

TYPICAL AJAX BOLT DETAIL 1 / S-3A

STATE OF CONNECTICUT — CHRISTOPHER M. JACOBS — LICENSED PROFESSIONAL ENGINEER

JUL 19 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876361; SEYMOUR 2/OXFORD TOWN GARAGE
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1818	ISSUE DATE OF PERMIT: 6-28-2012
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CHECKED BY: C.M.M.	
APPROVED BY	S-3A
DATE: 6-28-2012	

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#37512-1818), DATED 6-28-2012.

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.2133329 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A633 GR. E (60 KSI)
ANCHOR RODS:	2 1/4"Ø F16J ASTM A615 GRADE 75

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	26.50	0.1875	38.00	15.000	20.600
2	40.63	0.2500	48.00	19.611	28.200
3	47.63	0.3125	62.00	26.909	37.070
4	47.58	0.3750		35.343	45.500

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.

3. * ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

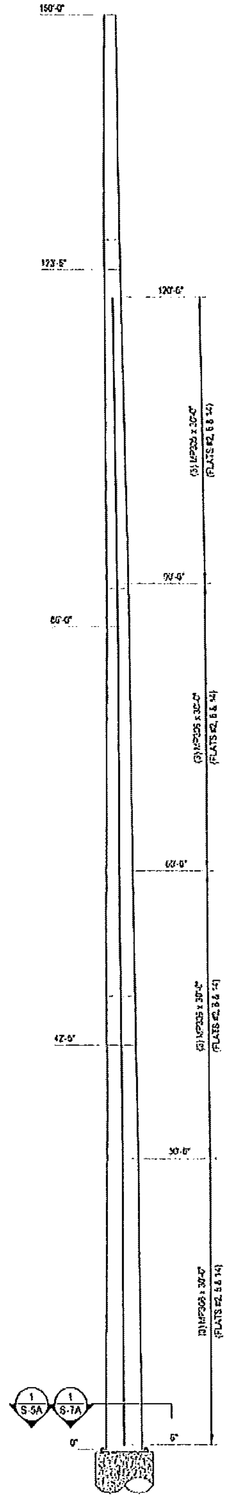
4. DTI'S REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

5. NUT LUBRICATION REQUIRED: * PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.

6. AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* AS OF 5/30/2012, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI.

NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-1033 : TOWER BASE PLATE NDE AND ENG-BUL-10051 : NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.



POLE ELEVATION 1 / S-4A

AEROSOLUTIONS SHAFT REINFORCING OPTION

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OXFORD, CT
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APPROVED BY:
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S-4A

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SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:

(1.) PRIOR TO CONSTRUCTION, CONTRACTOR'S INSPECTION AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE CONTRACTOR'S INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.

(2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE (1) ABOVE.

PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL; 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW BEARING PLATES. PRIOR TO GROUTING, INSTALL FOUR 1-INCH DIAMETER PVC DRAIN PIPES AT APPROXIMATELY NINETY (90) DEGREES APART THROUGH GROUT SPACE. 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 UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

GENERAL NOTES:

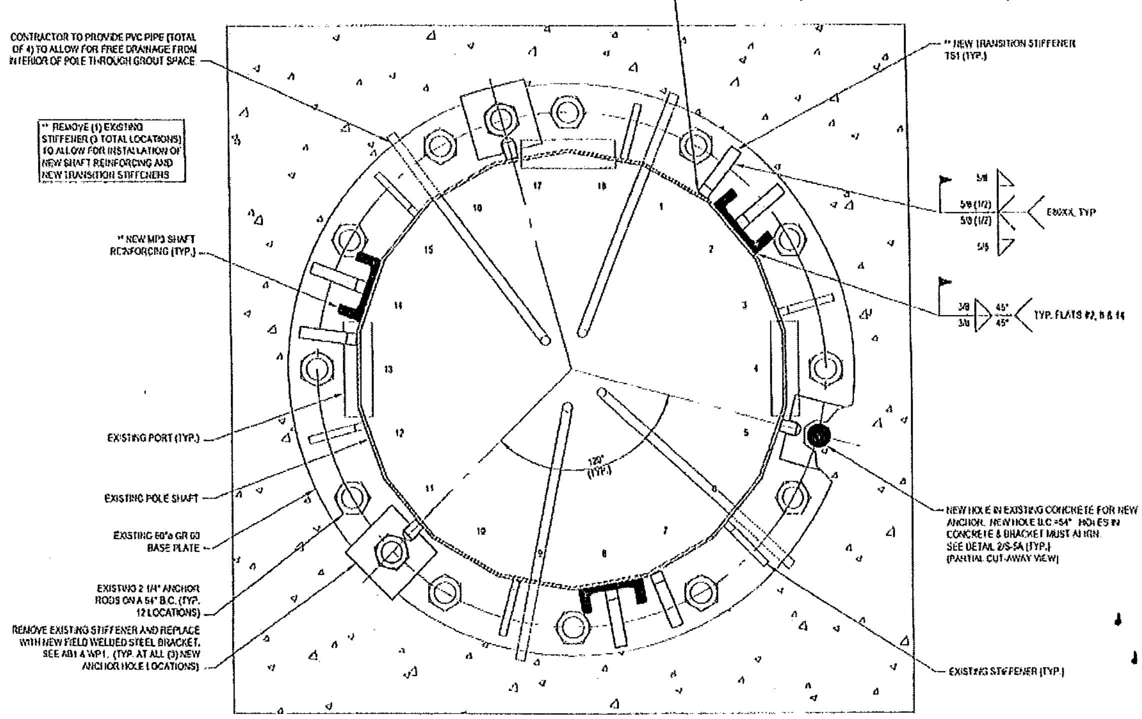
1. AJAX BOLTS ARE TO BE 20 mm Ø WITH CORRESPONDING 20 mm Ø SHEAR SLEEVE WITH MATCHING STEEL GRADE. DRILLED HOLE DIAMETERS IN REINFORCING STEEL AND EXISTING SHAFT SHALL BE 1 3/16"ø MAX.

2. 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 1-800-831-3275 FOR PRODUCT INFORMATION.

3. ALL SHAFT REINFORCING IS A572 GR 65.

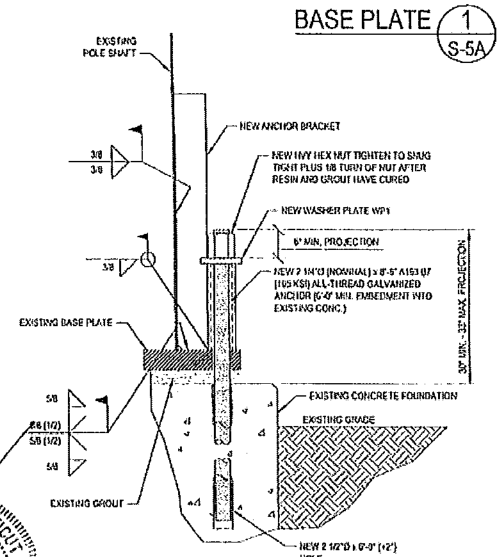
4. EPOXY MUST BE HILTI RE-500.

5. NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN AND GROUT HAVE CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 273 KIPS. ONCE THE PROOF LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT (REFER TO THE NEW ANCHOR & BRACKET DETAIL).



CONTRACTOR TO PROVIDE PVC PIPE (TOTAL OF 4) TO ALLOW FOR FREE DRAINAGE FROM INTERIOR OF POLE THROUGH GROUT SPACE
** REMOVE (1) EXISTING STIFFENER (3 TOTAL LOCATIONS) TO ALLOW FOR INSTALLATION OF NEW SHAFT REINFORCING AND NEW TRANSITION STIFFENERS
** NEW MP3 SHAFT REINFORCING (TYP.)
EXISTING PORT (TYP.)
EXISTING POLE SHAFT
EXISTING 60"ø GR 60 BASE PLATE
EXISTING 2 1/4" ANCHOR RODS ON A 54" B.C. (TYP. 12 LOCATIONS)
REMOVE EXISTING STIFFENER AND REPLACE WITH NEW FIELD WELDED STEEL BRACKET. SEE AB1 & WP1. (TYP. AT ALL (3) NEW ANCHOR HOLE LOCATIONS)
** NEW TRANSITION STIFFENER TS1 (TYP.)
E80XX, TYP.
TYP. FLATS #2, 8 & 14
NEW HOLE IN EXISTING CONCRETE FOR NEW ANCHOR. NEW HOLE B.C =54". HOLES IN CONCRETE & BRACKET MUST ALIGN. SEE DETAIL 2/S-5A (TYP.) (PARTIAL CUT-AWAY VIEW)
EXISTING STIFFENER (TYP.)
120° (TYP.)

BASE PLATE (1/S-5A)



EXISTING POLE SHAFT
NEW ANCHOR BRACKET
NEW HVY HEX NUT TIGHTEN TO SNUG TIGHT PLUS 1/8 TURN OF NUT AFTER RESIN AND GROUT HAVE CURED
NEW WASHER PLATE WP1
6" MIN. PROJECTION
NEW 2 1/4"Ø (NOMINAL) x 8'-5" A193 B7 (105 KSI) ALL-THREAD GALVANIZED ANCHOR (6'-0" MIN. EMBEDMENT INTO EXISTING CONC.)
30" MIN. - 33" MAX PROJECTION
EXISTING BASE PLATE
EXISTING CONCRETE FOUNDATION
EXISTING GRADE
EXISTING GROUT
NEW 2 1/2"Ø x 6'-0" (+2") HOLE

NEW ANCHOR & BRACKET DETAIL (2/S-5A)

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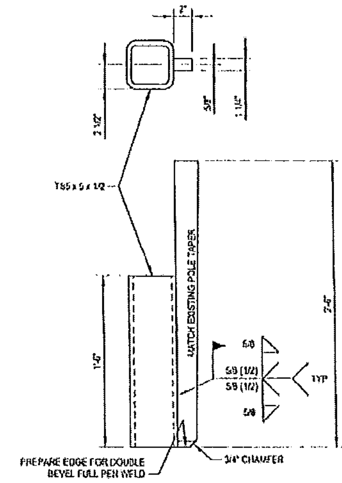
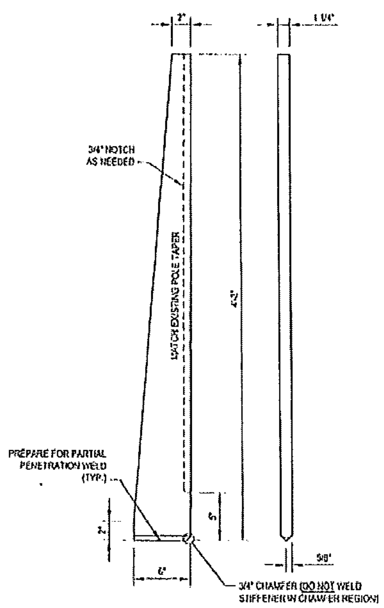


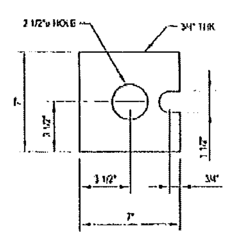
ANCHOR BRACKET MK~AB1

(3 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



TRANSITION STIFFENER MK~TS1

(6 TOTAL REQUIRED; 3 NOTCHED) (Fy = 65 KSI)



WASHER PLATE MK~WP1

(3 REQUIRED) (Fy = 50 KSI)

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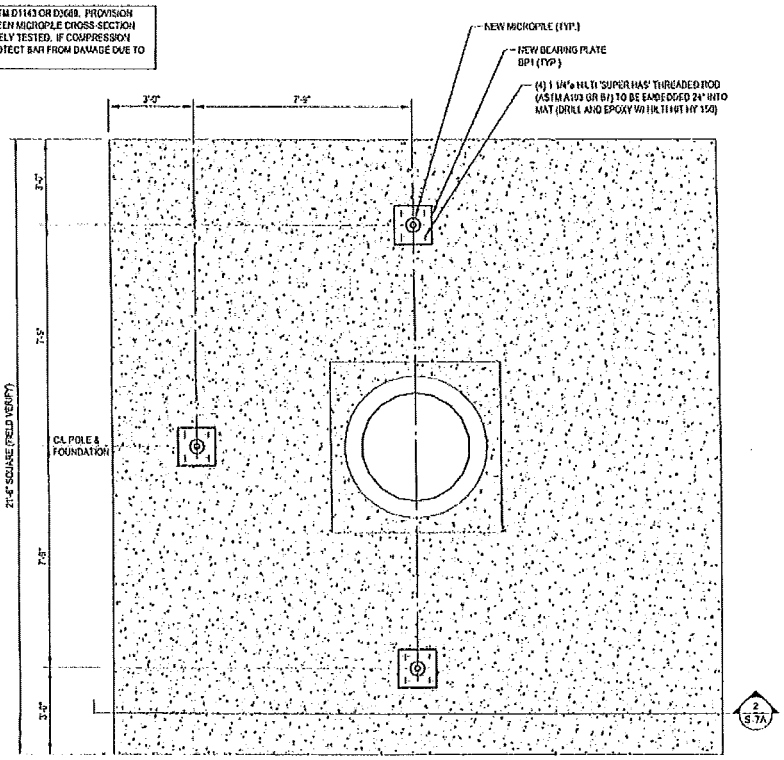
MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 2 LY PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS OF FOUNDATION) ARE TO BE TESTED TO 94.5k IN TENSION

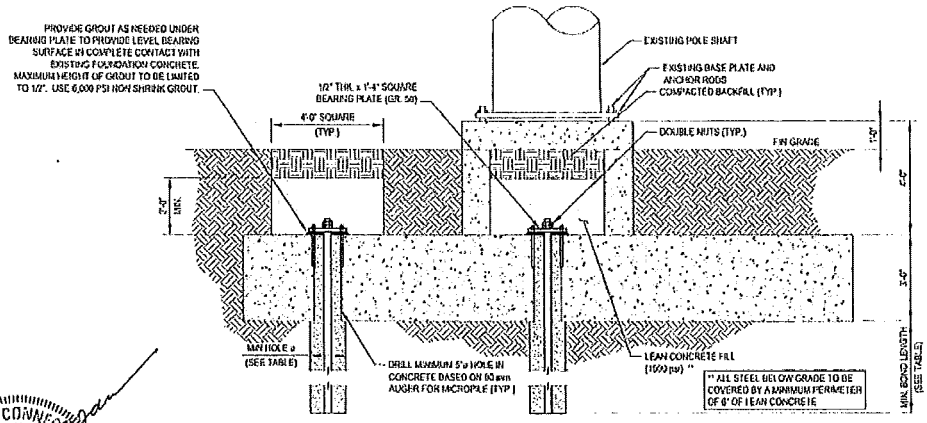
PROVIDE REPORT OF TEST RESULTS TO STRUCTURAL ENGINEER AND GEOTECHNICAL ENGINEER ALONG WITH RECOMMENDATIONS (IF ANY) FOR PRODUCTION PILE LENGTHS TO ACHIEVE THE 94.5K PILE WORKING CAPACITIES. (SF=2.0)

ALL PILE TESTING SHALL BE CARRIED OUT PER ASTM D1143 OR D3689. PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH WITHIN MAT THICKNESS

CONTECH'S 40/16 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.



FOUNDATION REINFORCING PLAN 1 S-7A



FOUNDATION REINFORCING 2 S-7A

STATE OF CONNECTICUT
JUL 19 2012

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37512-1818 PERMIT.DWG

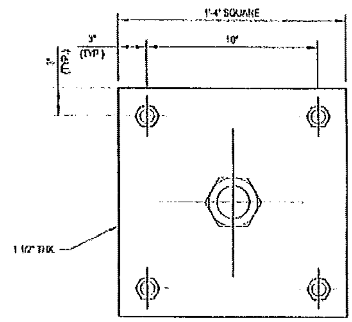
MICROPILE NOTES:

1. ALL BEARING PLATE STEEL SHALL CONFORM TO ASTM A572 (FY=50 KSI).
2. WELDED CONNECTIONS SHALL CONFORM TO THE LAST REVISED CODE OF THE AMERICAN WELDING SOCIETY A.W.S. D1.1.
3. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL REPORT PREPARED BY DR. CLARENCE WELTI, P.E., P.C. DATED SEPTEMBER 22 1999, PROJECT NAME CT23XC507
4. MICROPILE DESIGN BASED ON (3) 4"Ø DRILLED/GROUTED MICROPILES (MICROPILES MUST PROVIDE A 84.5 KIPS WORKING LOAD CAPACITY @ 29' MIN. ROCK EMBEDMENT) OR EQUIVALENT.
5. GROUT TO BE 4,000 PSI MIN COMPRESSION STRENGTH WITH 0.5 (MAXIMUM WATER/CEMENT) W/C RATIO (TO BE COLLOIDALLY MIXED FOR MICROPILE).
6. ALL THREADED RODS TO BE GALVANIZED PER ASTM A153, PLATES GALVANIZED PER ASTM A123.

PILE DESIGN PARAMETER SCHEDULE

OPTIONS \ PARAMETER	Ø/STEEL AREA	PILE CAPACITY (kips)	ULTIMATE SKIN FRICTION (PSF)	PRESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL EMBEDMENT LENGTH
MICROPILE	4"Ø / 1.36 IN² MIN.	84.5K	10000 PSF	0	29' MIN	N.A.	29'

*INSTALLED GROUT COLUMN IS BASED ON A 89MM AUGER W/ 52 ADAPTOR FOR ROCK



NEW BEARING PLATE MK~BP1

(Fy=50 KSI) (TYP 3 LOCATIONS)

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MODIFICATION INSPECTION NOTES:

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS 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 MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10172 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BE GIN 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 INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007, 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 COLLECTING 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 TO, 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 AN DENG-SOW-10007.

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 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 INSPECTION(S) 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 PENALTIS RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING 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 MI'S
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 CROWNS APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING 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 INSPECTION(S) ON 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-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AE/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING 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/ERECTION 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 INFIELD 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-10007.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
X	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTORS CERTIFIED WELD INSPECTION
NA	EARTHWORK LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC.
X	INSPECTION OF AJAX BOLTS AND DTIS PER REQUIREMENTS ON SHEET S-3
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 PMI REPORT. NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT.

STATE OF CONNECTICUT — CHRISTOPHER M. CHAMBERLAIN — LICENSED PROFESSIONAL ENGINEER

6 19 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876361; SEYMOUR 2/OXFORD TOWN GARAGE
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1818	ISSUE DATE OF PERMIT: 6-28-2012
DRAWN BY: B.M.S.	
CHECKED BY: C.M.M.	
APPROVED BY:	S-9A
DATE: 6-20-2012	

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(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

at&t

CT5662 – AWE Oxford Central

20 Great Oak Rd., Oxford, CT 06478

July 19, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 20 Great Oak Road in Oxford, CT. The coordinates of the tower are 41-25-34.91 N, -73-8-39.33 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (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 pattern 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 GSM	*130*	*880*	*4*	*296*	*5.5420*	*0.5867*	*4.29%*
Cingular GSM	*130*	*1945*	*2*	*427*	*17.6701*	*1.0000*	*1.82%*
Cingular UMTS	*130*	*880*	*1*	*500*	*9.3615*	*0.5867*	*1.81%*
Sprint	150	1955	4	500	0.0320	1.0000	3.20%
Verizon	140	880	9	200	0.0330	0.5867	5.63%
AT&T UMTS	128	880	2	1077	0.0047	0.5867	0.81%
AT&T UMTS	128	1900	2	1556	0.0068	1.0000	0.68%
AT&T LTE	128	734	1	1375	0.0030	0.4893	0.62%
AT&T GSM	128	880	1	538	0.0012	0.5867	0.20%
AT&T GSM	128	1900	4	934	0.0082	1.0000	0.82%
						Total	**11.96%**

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 3/29/2012. 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 Report dated July 2, 2012.

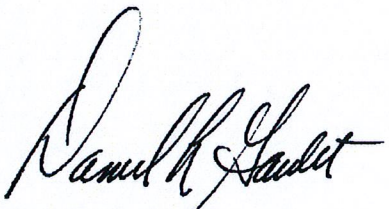
5. Conclusion

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 **11.96% 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

July 19, 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

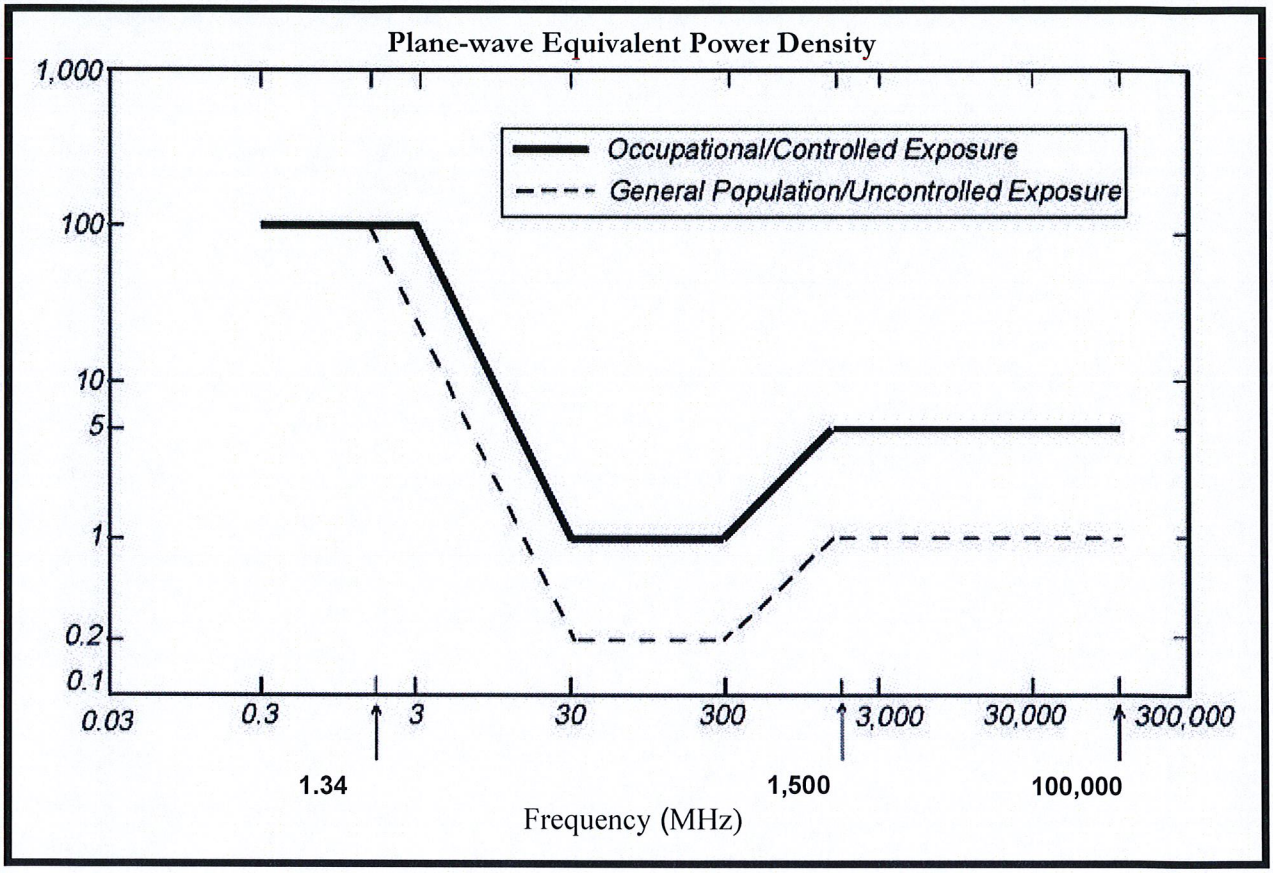
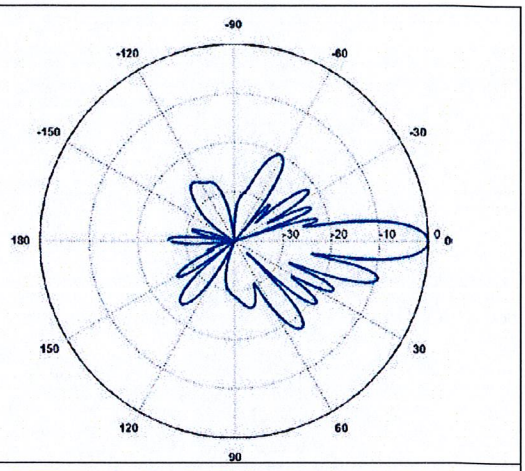


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

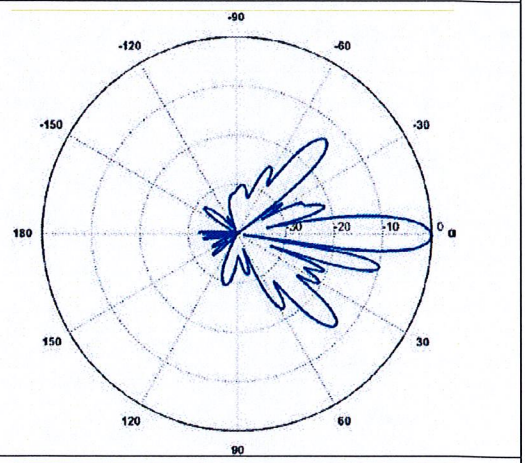
700 MHz

Manufacturer:	Commscope
Model #:	SBNH-1D6565C
Frequency Band:	698-806 MHz
Gain:	13.6 dBd
Vertical Beamwidth:	8.6°
Horizontal Beamwidth:	71°
Polarization:	± 45°
Size L x W x D:	96.42" x 11.85" x 7.1"



850 MHz

Manufacturer:	Commscope
Model #:	SBNH-1D6565C
Frequency Band:	806-896 MHz
Gain:	14.3 dBd
Vertical Beamwidth:	7.8°
Horizontal Beamwidth:	67°
Polarization:	±45°
Size L x W x D:	96.42" x 11.85" x 7.1"



1900 MHz

Manufacturer:	Commscope
Model #:	SBNH-1D6565C
Frequency Band:	1850-1990 MHz
Gain:	15.9 dBd
Vertical Beamwidth:	5.1°
Horizontal Beamwidth:	57°
Polarization:	±45°
Size L x W x D:	96.42" x 11.8" x 7.1"