EM-CING-108-120730

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

HPC WIRELESS SERVICES

ORIGINAL

July 26, 2012

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
338 Oxford 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 338 Oxford Road, Oxford (coordinates 41°-25'-40.55" N, 73°-06'-43" 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 and replace six (6) existing antenna panels, and relocate three (3) antennas on the existing platform, all at a center line of approximately 139'; the platform will be rotated to achieve required azimuths. Three (3) RRU (remote radio units) and a surge arrestor will be mounted above the platform. AT&T will also place a

DC cable 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 place related equipment in its existing equipment shelter and mount a new GPS antenna on the shelter. These changes will be within the existing compound and will have no effect on the site boundaries.

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

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 2.08%; the combined site operations will result in a total power density of approximately 25.18%.

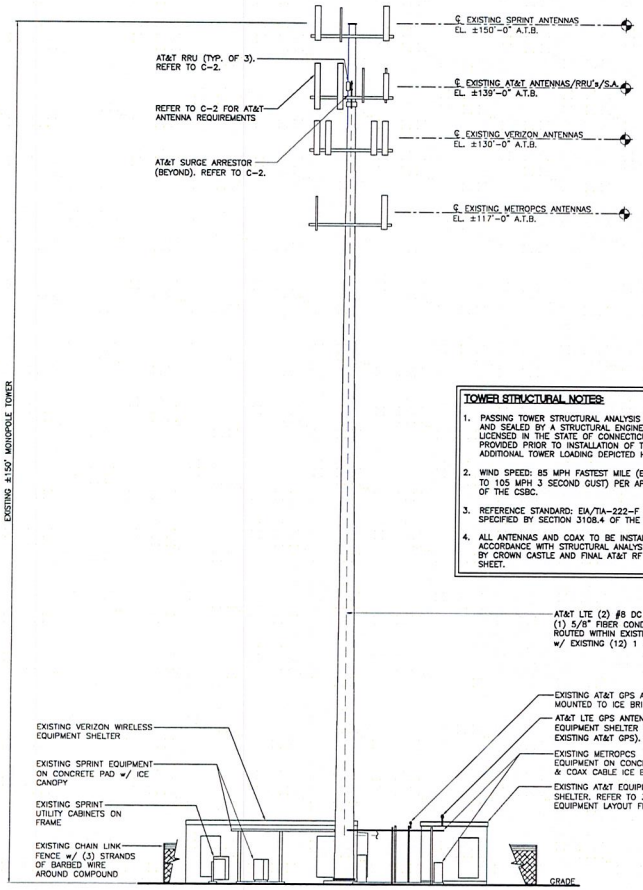
Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet

Attachments

cc: Honorable George R. Temple, First Selectman, Town of Oxford
William E. Jr. and Ellen S. Fritz (underlying property owner)



2 C-1 SOUTH ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE

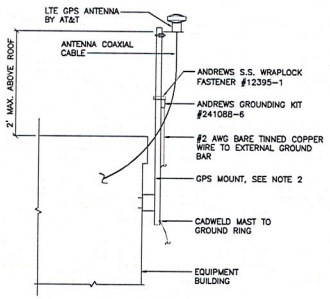
10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

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) PER 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.

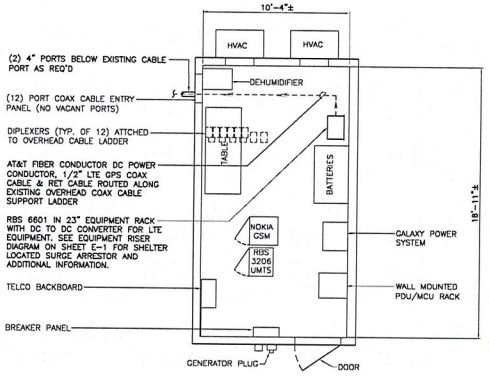


GPS ANTENNA MOUNTING NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND SHALL BE COORDINATED WITH AT&T'S CONSTRUCTION MANAGER.
2. GPS ANTENNA MOUNT, 3/4"ø THREADED MAST, 4 FEET LONG WITH (4) 7/16" MOUNTING HOLES AND 4" STANDOFF BY SITE PRO 1, INC., TELEPHONE 1-800-438-7761, PART NUMBER GPS1.
3. HOLLOW WALL KITS (HWK38) FOR "STICK BUILD" SHELTERS AND SOLID WALL KITS (SWK38) FOR CONCRETE SHELTERS ARE ALSO AVAILABLE FROM SITE PRO 1.

4 C-1 GPS ANTENNA MOUNTING DETAIL

NOT TO SCALE



3 C-1 EQUIPMENT SHELTER FLOOR PLAN

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

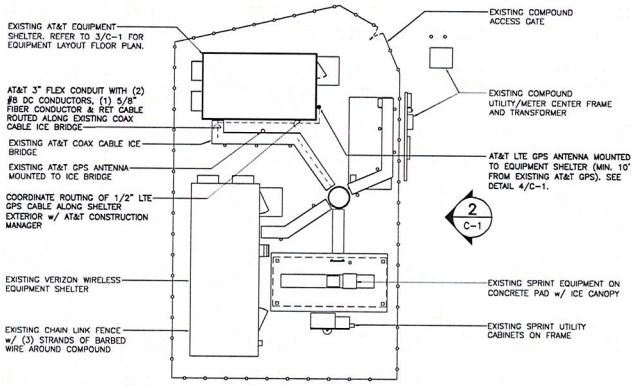
APPROX. NORTH

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)

1 inch = 4 ft.



1 C-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

APPROX. NORTH

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

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

REV.	DATE	DRAWN BY	CHK'D BY	
2	7/19/12	HAR	DEB	CONSTRUCTION - CLIENT REVIEW
1	7/17/12	HAR	DEB	CONSTRUCTION - CLIENT REVIEW
0	4/24/12	FLO	DEB	

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AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE

CT2090

CROWN SITE # 876362

OXFORD- EAST

338 OXFORD ROAD

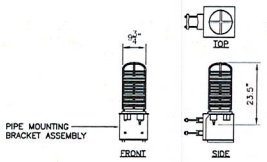
OXFORD, CT 06478

DATE:	07/19/12
SCALE:	AS NOTED
JOB NO.	11118.C018

PLANS, ELEVATION AND DETAIL

C-1

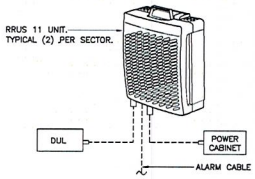
Sheet No. 3 of 6



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.

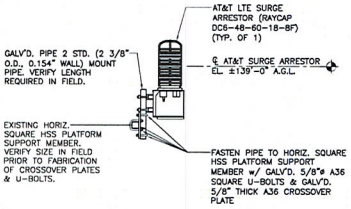
8 C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



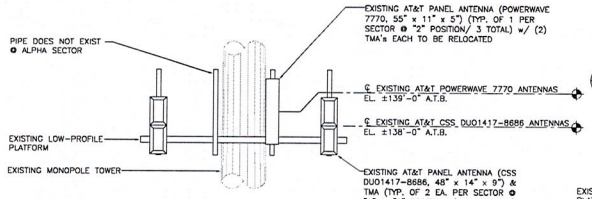
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

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

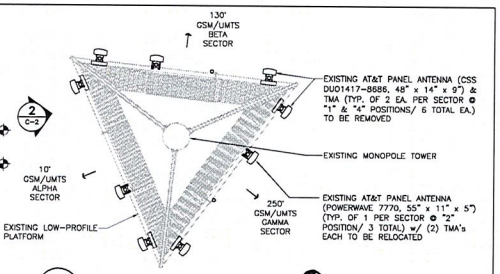
9 C-2 RRU DETAIL
NOT TO SCALE



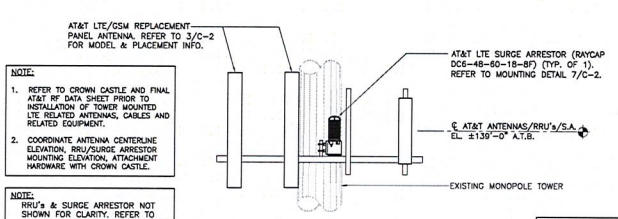
7 C-2 LTE SURGE ARRESTOR MOUNT DETAIL
SCALE: 1/2" = 1'-0"



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



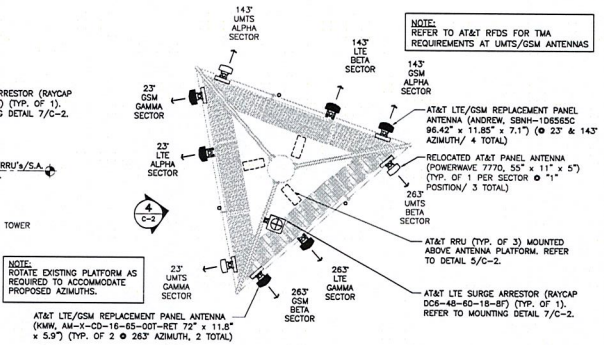
1 C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"



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

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

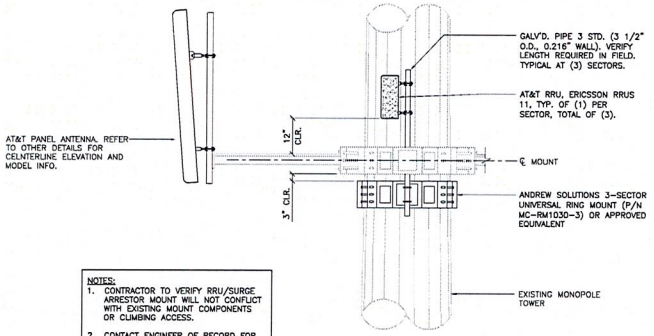
4 C-2 PROPOSED ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



NOTE:
REFER TO AT&T RFDS FOR TMA REQUIREMENTS AT UMTS/GSM ANTENNAS

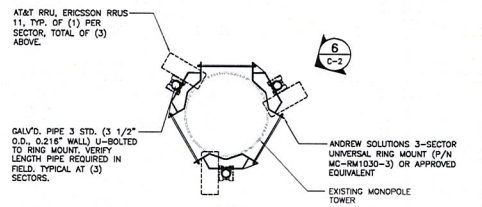
NOTE:
ROTATE EXISTING PLATFORM AS REQUIRED TO ACCOMMODATE PROPOSED AZIMUTHS.

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



NOTES:
1. CONTRACTOR TO VERIFY RRU/SURGE ARRESTOR MOUNT WILL NOT CONFLICT WITH EXISTING MOUNT COMPONENTS OR CLIMBING ACCESS.
2. CONTACT ENGINEER OF RECORD FOR ALTERNATE MOUNTING DETAIL AS REQUIRED AND CROWN CASTLE FOR APPROVAL.

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



NOTE:
ANTENNA MOUNTING PLATFORM AND SURGE ARRESTOR (BELOW) NOT SHOWN FOR CLARITY.

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

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

REV.	DATE	DRAWN BY	CHK'D BY	
2	7/19/12	HMR	DEB	CONSTRUCTION
1	7/10/12	HMR	DEB	CONSTRUCTION - CLIENT REVIEW
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DATE:	07/19/12
SCALE:	AS NOTED
JOB NO.	11118.C018

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 6

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

Date: **July 23, 2012**

Jason Rouse
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6605

Paul J. Ford and Company
250 East Broad St, Suite 1500
Columbus, OH 43215
614.221.6679
tdehnke@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2090
	Carrier Site Name:	Oxford Rd
Crown Castle Designation:	**Crown Castle BU Number:**	876362
	Crown Castle Site Name:	OXFORD / FRITZ PROPERTY
	Crown Castle JDE Job Number:	183460
	Crown Castle Work Order Number:	512743
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1027 BP R2 **Aero Solutions**
Site Data:	**338 Oxford Rd., OXFORD, New Haven County, CT** **Latitude *41° 25' 40.77"*, Longitude *-73° 6' 30.75"*** **150 Foot - Monopole Tower**	

Dear Jason Rouse,

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 476988, in accordance with application 144892, revision 3.

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 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 1.25 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:

Thomas J. Dehnke, E.I.T.
Project Engineer

tnxTower Report - version 6.0.3.0

STATE OF CONNECTICUT
DAVID L. SUMMERS
No. 21884
LICENSED
PROFESSIONAL ENGINEER

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

Date: **July 23, 2012**

Jason Rouse
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6605

Paul J. Ford and Company
250 East Broad St, Suite 1500
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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 1.25 inch ice thickness and 50 mph under service loads.

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Respectfully submitted by:

Thomas J. Dehnke, E.I.T.
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in September of 1999. The tower was originally designed for a wind speed of 89.25 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 1.25 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
137.0	139.0	4	andrew	SBNH-1D6565C w/ Mount Pipe	1 2	3/8 3/4	-
		6	communication components inc.	DTMABP7819VG12A			
		3	ericsson	RRUS-11			
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave	7020.00			
		1	raycap	DC6-48-60-18-8F			
	137.0	1	tower mounts	Collar Mount (MTC3335)			

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	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	3
		1	tower mounts	Platform Mount [LP 601-1]	-	-	1
		1	tower mounts	Miscellaneous [NA 507-1]	3	1-1/4	2
	150.0	3	RFS/CELWAVE	APXVSPP18-C-A20			
		9	RFS/CELWAVE	ACU-A20-N			
		3	ALCATEL	1900MHz RRH (65MHz)			
		3	ALCATEL	800MHz RRH			
		3	ALCATEL	800 EXTERNAL NOTCH FILTER			
137.0	139.0	6	adc	DD1900 FULL BAND w/850 BY-PASS MASTHEAD	12	1 1/4	1
		3	powerwave	7770.00 w/ Mount Pipe			
		6	powerwave	LGP21901			
	137.0	1	tower mounts	Platform Mount [LP 712-1]			
127.0	130.0	1	gps	GPS_A	1 12	1/2 1 5/8	1
	129.0	3	antel	BXA-171063-12BF w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		6	rfs celwave	APL866513-42T0 w/ Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	127.0	1	tower mounts	Platform Mount [LP 712-1]			
117.0	117.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	6 1	1 5/8 3/8	1
		1	tower mounts	T-Arm Mount [TA 601-3]			
75.0	76.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	75.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing equipment
2) Reserved equipment
3) Existing Equipment to be removed.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc., Sprint Site CT23xC508, 9/15/1999	1531939	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 5724,1/26/2000	1440552	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 99-1188, 9/21/1999	1441271	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 080876.07, 12/01/2008	2364904	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA (PROPOSED #1)	PJF 37511-1194 BP, 12/21/2011	3041498	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-1027R1 B, 06/06/2012	3232137	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Existing pier vertical reinforcing is assumed carry pole base shear across the interface between the pier and mat. The existing anchors are assumed to transfer the pole base moment directly into the mat portion of the foundation.
5) For the existing reinforcing, the monopole was reinforced in conformance with the referenced modification drawings.
6) Monopole will be reinforced in conformance to the referenced PJF proposed modification documents.
7) Monopole will be reinforced in conformance to the attached proposed modification documents.

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 - 123.42	Pole	TP20.74x15x0.1875	1	-5.59	614.69	78.5	Pass
L2	123.42 - 115.25	Pole	TP22.0918x19.6804x0.25	2	-7.46	901.01	94.5	Pass
L3	115.25 - 105.25	Pole	TP24.2182x22.0918x0.3845	3	-8.83	1293.52	88.9	Pass
L4	105.25 - 101.9	Pole	TP24.9305x24.2182x0.5774	4	-9.45	1426.64	88.2	Pass
L5	101.9 - 101.25	Pole	TP25.0687x24.9305x0.6054	5	-9.59	1621.83	78.8	Pass
L6	101.25 - 85.96	Pole	TP28.32x25.0687x0.5671	6	-11.77	1677.43	92.4	Pass
L7	85.96 - 76.25	Pole	TP29.8904x26.3182x0.6021	7	-15.43	1945.93	97.0	Pass
L8	76.25 - 75	Pole	TP30.1567x29.8904x0.599	8	-15.71	1954.55	97.8	Pass
L9	75 - 72.15	Pole	TP30.7639x30.1567x0.7005	9	-16.52	2327.11	85.3	Pass
L10	72.15 - 42.41	Pole	TP37.1x30.7639x0.6479	10	-23.13	2657.54	91.6	Pass
L11	42.41 - 31.25	Pole	TP38.849x34.7028x0.5358	11	-25.67	2781.17	93.0	Pass
L12	31.25 - 18.75	Pole	TP41.5094x38.849x0.5216	12	-30.23	3035.21	93.2	Pass
L13	18.75 - 0	Pole	TP45.5x41.5094x0.4491	13	-31.94	2925.92	99.6	Pass
							Summary	
						Pole (L13)	99.6	Pass
						RATING =	99.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	99.4	Pass
1	Base Plate	0	72.8	Pass
1	Base Foundation Soil Interaction	0	92.4	Pass
1	Base Foundation Structural Steel	0	52.8	Pass

Structure Rating (max from all components) =	99.6%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.

4.1) Recommendations

1) See attached proposed modification drawings
2) Existing empty pipe mounts at the 150-Ft elevation are to be removed upon installation of the proposed equipment.

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 1.2500 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	150.00-123.42	26.58	3.17	18	15.0000	20.7400	0.1875	0.7500	A572-65 (65 ksi)
L2	123.42-115.25	11.34	0.00	18	19.6804	22.0918	0.2500	1.0000	A572-65 (65 ksi)
L3	115.25-105.25	10.00	0.00	18	22.0918	24.2182	0.3845	1.5378	Reinf 55.61 ksi (56 ksi)
L4	105.25-101.90	3.35	0.00	18	24.2182	24.9305	0.5774	2.3094	Reinf 39.97 ksi (40 ksi)
L5	101.90-101.25	0.65	0.00	18	24.9305	25.0687	0.6054	2.4215	Reinf 43.14 ksi (43 ksi)
L6	101.25-85.96	15.29	4.08	18	25.0687	28.3200	0.5671	2.2684	Reinf 43.34 ksi (43 ksi)
L7	85.96-76.25	13.79	0.00	18	26.3182	29.8904	0.6021	2.4083	Reinf 43.47 ksi (43 ksi)
L8	76.25-75.00	1.25	0.00	18	29.8904	30.1567	0.5990	2.3958	Reinf 43.49 ksi (43 ksi)
L9	75.00-72.15	2.85	0.00	18	30.1567	30.7639	0.7005	2.8020	Reinf 43.53 ksi (44 ksi)
L10	72.15-42.41	29.74	5.17	18	30.7639	37.1000	0.6479	2.5914	Reinf 45.71 ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L11	42.41-31.25	16.33	0.00	18	34.7028	38.8490	0.5358	2.1432	(46 ksi) Reinf 57.63 ksi (58 ksi)
L12	31.25-18.75	12.50	0.00	18	38.8490	41.5094	0.5216	2.0864	Reinf 57.80 ksi (58 ksi)
L13	18.75-0.00	18.75		18	41.5094	45.5000	0.4491	1.7965	Reinf 62.50 ksi (63 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
	21.0599	12.2313	652.7391	7.2961	10.5359	61.9537	1306.3371	6.1168	3.3202	17.708
L2	20.6685	15.4180	735.4139	6.8978	9.9977	73.5586	1471.7954	7.7105	3.0238	12.095
	22.4326	17.3314	1044.5920	7.7538	11.2226	93.0792	2090.5584	8.6674	3.4481	13.793
L3	22.4326	26.4882	1576.8910	7.7061	11.2226	140.5102	3155.8568	13.2466	3.2115	8.354
	24.5918	29.0829	2087.1766	8.4610	12.3028	169.6502	4177.0995	14.5442	3.5858	9.327
L4	24.5918	43.3220	3058.9375	8.3925	12.3028	248.6370	6121.9000	21.6651	3.2463	5.623
	25.3151	44.6274	3343.8668	8.6454	12.6647	264.0306	6692.1336	22.3179	3.3716	5.84
L5	25.3151	46.7394	3494.0634	8.6354	12.6647	275.8901	6992.7243	23.3741	3.3223	5.488
	25.4554	47.0050	3553.9642	8.6845	12.7349	279.0726	7112.6049	23.5069	3.3466	5.528
L6	25.4554	44.1016	3344.8858	8.6981	12.7349	262.6548	6694.1729	22.0550	3.4140	6.02
	28.7569	49.9537	4860.9588	9.8523	14.3866	337.8819	9728.3139	24.9816	3.9862	7.029
L7	27.7974	49.1436	4105.9834	9.1292	13.3697	307.1118	8217.3695	24.5765	3.5724	5.933
	30.3515	55.9700	6065.6957	10.3973	15.1843	399.4713	12139.372 9	27.9903	4.2010	6.978
L8	30.3515	55.6859	6036.1917	10.3985	15.1843	397.5283	12080.326 0	27.8482	4.2065	7.023
	30.6219	56.1922	6202.3316	10.4930	15.3196	404.8627	12412.824 5	28.1014	4.2534	7.101
L9	30.6219	65.4916	7179.1996	10.4569	15.3196	468.6286	14367.845 8	32.7520	4.0747	5.817
	31.2385	66.8416	7632.3832	10.6725	15.6281	488.3772	15274.809 2	33.4271	4.1816	5.97
L10	31.2385	61.9278	7096.0762	10.6912	15.6281	454.0602	14201.489 6	30.9698	4.2742	6.597
	37.6723	74.9568	12583.302 2	12.9405	18.8468	667.6625	25183.161 9	37.4855	5.3894	8.319
L11	36.5711	58.1065	8569.8988	12.1293	17.6290	486.1243	17151.074 0	29.0588	5.1647	9.639
	39.4483	65.1578	12083.733 7	13.6012	19.7353	612.2901	24183.367 6	32.5851	5.8944	11.001
L12	39.4483	63.4545	11776.576 0	13.6062	19.7353	596.7263	23568.647 9	31.7333	5.9194	11.348
	42.1498	67.8590	14403.048 5	14.5507	21.0868	683.0367	28825.049 0	33.9360	6.3876	12.246
L13	42.1498	58.5330	12467.588 9	14.5764	21.0868	591.2513	24951.583 0	29.2721	6.5152	14.506
	46.2019	64.2218	16467.436 0	15.9931	23.1140	712.4442	32956.540 3	32.1170	7.2175	16.07

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 150.00-123.42				1	1	1		
L2 123.42-115.25				1	1	1		
L3 115.25-105.25				1	1	1		
L4 105.25-				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
101.90								
L5 101.90-101.25				1	1	1		
L6 101.25-85.96				1	1	1		
L7 85.96-76.25				1	1	1		
L8 76.25-75.00				1	1	1		
L9 75.00-72.15				1	1	1		
L10 72.15-42.41				1	1	1		
L11 42.41-31.25				1	1	1		
L12 31.25-18.75				1	1	1		
L13 18.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	137.00 - 0.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	CaAa (Out Of Face)	137.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.02
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	137.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.02
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	46.00 - 0.00	1	No Ice	0.08	0.00
						1/2" Ice	0.18	0.00
						1" Ice	0.28	0.00
						2" Ice	0.48	0.01
						4" Ice	0.88	0.02
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	76.00 - 46.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.02
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	137.00 - 76.00	1	No Ice	0.08	0.00
						1/2" Ice	0.18	0.00
						1" Ice	0.28	0.00
						2" Ice	0.48	0.01
						4" Ice	0.88	0.02
***								
LDF4-50A(1/2")	C	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	127.00 - 0.00	12	No Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
FXL-1873(1 5/8")	C	No	Inside Pole	117.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
860 10033(3/8)	C	No	Inside Pole	117.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	75.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.02
**								
LDF4-50A(1/2")	C	No	Inside Pole	60.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
**								
Aero MP3-03	C	No	CaAa (Out Of Face)	76.00 - 46.00	1	No Ice	0.26	0.00
						1/2" Ice	0.37	0.00
						1" Ice	0.48	0.00
						2" Ice	0.71	0.00
						4" Ice	1.15	0.00
**								
Aero MP3-05	A	No	CaAa (Out Of Face)	46.25 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
						4" Ice	1.32	0.00
Aero MP3-03	A	No	CaAa (Out Of Face)	76.00 - 46.25	1	No Ice	0.26	0.00
						1/2" Ice	0.37	0.00
						1" Ice	0.48	0.00
						2" Ice	0.71	0.00
						4" Ice	1.15	0.00
Aero MP3-03	A	No	CaAa (Out Of Face)	116.25 - 76.00	1	No Ice	0.26	0.00
						1/2" Ice	0.37	0.00
						1" Ice	0.48	0.00
						2" Ice	0.71	0.00
						4" Ice	1.15	0.00
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	116.25 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.03
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	150.00 - 116.25	1	No Ice	0.15	0.00
						1/2" Ice	0.25	0.00
						1" Ice	0.35	0.00
						2" Ice	0.55	0.01
						4" Ice	0.95	0.03
HB114-1-0813U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	150.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.01
						4" Ice	0.00	0.03

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.42	A	0.000	0.000	0.000	4.093	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.051	0.16
L2	123.42-115.25	A	0.000	0.000	0.000	1.367	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.632	0.16
L3	115.25-105.25	A	0.000	0.000	0.000	2.625	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.774	0.23
L4	105.25-101.90	A	0.000	0.000	0.000	0.879	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.259	0.08
L5	101.90-101.25	A	0.000	0.000	0.000	0.171	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.050	0.02
L6	101.25-85.96	A	0.000	0.000	0.000	4.013	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.183	0.35
L7	85.96-76.25	A	0.000	0.000	0.000	2.549	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.752	0.23
L8	76.25-75.00	A	0.000	0.000	0.000	0.328	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.282	0.03
L9	75.00-72.15	A	0.000	0.000	0.000	0.748	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.748	0.07
L10	72.15-42.41	A	0.000	0.000	0.000	8.133	0.11
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.141	0.70
L11	42.41-31.25	A	0.000	0.000	0.000	3.881	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.864	0.26
L12	31.25-18.75	A	0.000	0.000	0.000	4.347	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.968	0.30
L13	18.75-0.00	A	0.000	0.000	0.000	6.521	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.451	0.44

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.42	A	1.482	0.000	0.000	0.000	11.969	0.56
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.075	0.33
L2	123.42-115.25	A	1.458	0.000	0.000	0.000	3.820	0.17
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.053	0.27
L3	115.25-105.25	A	1.445	0.000	0.000	0.000	5.835	0.20
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.663	0.35
L4	105.25-101.90	A	1.434	0.000	0.000	0.000	1.947	0.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.220	0.12
L5	101.90-101.25	A	1.431	0.000	0.000	0.000	0.377	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.236	0.02
L6	101.25-85.96	A	1.416	0.000	0.000	0.000	8.825	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.515	0.53

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
L7	85.96-76.25	A	1.392	0.000	0.000	0.000	5.605	0.19
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.502	0.34
L8	76.25-75.00	A	1.381	0.000	0.000	0.000	0.712	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.658	0.04
L9	75.00-72.15	A	1.376	0.000	0.000	0.000	1.620	0.05
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.620	0.11
L10	72.15-42.41	A	1.334	0.000	0.000	0.000	17.283	0.55
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.853	1.11
L11	42.41-31.25	A	1.266	0.000	0.000	0.000	8.156	0.21
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.842	0.42
L12	31.25-18.75	A	1.250	0.000	0.000	0.000	8.901	0.21
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.093	0.45
L13	18.75-0.00	A	1.250	0.000	0.000	0.000	13.352	0.32
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.139	0.68

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-123.42	-0.0490	-0.1761	-0.1676	-0.3264
L2	123.42-115.25	-0.0883	-0.1700	-0.3005	-0.2613
L3	115.25-105.25	-0.0855	-0.2854	-0.2943	-0.3714
L4	105.25-101.90	-0.0862	-0.2879	-0.2997	-0.3792
L5	101.90-101.25	-0.0864	-0.2886	-0.3013	-0.3814
L6	101.25-85.96	-0.0872	-0.2912	-0.3067	-0.3897
L7	85.96-76.25	-0.0880	-0.2938	-0.3140	-0.3990
L8	76.25-75.00	-0.2452	-0.1879	-0.4469	-0.3002
L9	75.00-72.15	-0.2825	-0.1631	-0.4800	-0.2771
L10	72.15-42.41	-0.2620	-0.1971	-0.4683	-0.3234
L11	42.41-31.25	-0.0885	-0.4080	-0.3158	-0.5919
L12	31.25-18.75	-0.0892	-0.4114	-0.3098	-0.5993
L13	18.75-0.00	-0.0900	-0.4150	-0.3164	-0.6120

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***										
Side Arm Mount [SO 701-1]	C	None			0.00	75.00	No Ice	0.85	1.67	0.07
							1/2" Ice	1.14	2.34	0.08
							1" Ice	1.43	3.01	0.09
							2" Ice	2.01	4.35	0.12
							4" Ice	3.17	7.03	0.18
OG-860/1920/GPS-A	B	From Face	2.00	0.00	0.00	75.00	No Ice	0.33	0.40	0.00
							1/2" Ice	0.43	0.51	0.01
				1.00			1" Ice	0.55	0.63	0.01
								0.80	0.89	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
								2" Ice	1.41	1.52	0.08
								4" Ice			
***											
T-Arm Mount [TA 601-3]	C	None				0.00	117.00	No Ice	10.90	10.90	0.73
								1/2" Ice	14.65	14.65	0.93
								1" Ice	18.40	18.40	1.13
								2" Ice	25.90	25.90	1.52
								4" Ice	40.90	40.90	2.32
HBX-6516DS-VTM w/ Mount Pipe	A	From Face	4.00	0.00	0.00	0.00	117.00	No Ice	3.60	3.24	0.03
								1/2" Ice	4.00	3.91	0.06
								1" Ice	4.43	4.56	0.10
								2" Ice	5.37	5.91	0.20
								4" Ice	7.36	8.88	0.50
HBX-6516DS-VTM w/ Mount Pipe	B	From Face	4.00	0.00	0.00	0.00	117.00	No Ice	3.60	3.24	0.03
								1/2" Ice	4.00	3.91	0.06
								1" Ice	4.43	4.56	0.10
								2" Ice	5.37	5.91	0.20
								4" Ice	7.36	8.88	0.50
HBX-6516DS-VTM w/ Mount Pipe	C	From Face	4.00	0.00	0.00	0.00	117.00	No Ice	3.60	3.24	0.03
								1/2" Ice	4.00	3.91	0.06
								1" Ice	4.43	4.56	0.10
								2" Ice	5.37	5.91	0.20
								4" Ice	7.36	8.88	0.50
***											
Platform Mount [LP 712-1]	C	None				0.00	127.00	No Ice	24.53	24.53	1.34
								1/2" Ice	29.94	29.94	1.65
								1" Ice	35.35	35.35	1.96
								2" Ice	46.17	46.17	2.58
								4" Ice	67.81	67.81	3.82
GPS_A	B	From Face	4.00	0.00	3.00	0.00	127.00	No Ice	0.30	0.30	0.00
								1/2" Ice	0.37	0.37	0.00
								1" Ice	0.46	0.46	0.01
								2" Ice	0.65	0.65	0.02
								4" Ice	1.15	1.15	0.08
***											
7770.00 w/ Mount Pipe	A	From Face	4.00	0.00	2.00	0.00	137.00	No Ice	6.12	4.25	0.06
								1/2" Ice	6.63	5.01	0.10
								1" Ice	7.13	5.71	0.16
								2" Ice	8.16	7.16	0.29
								4" Ice	10.36	10.41	0.66
7770.00 w/ Mount Pipe	B	From Face	4.00	0.00	2.00	0.00	137.00	No Ice	6.12	4.25	0.06
								1/2" Ice	6.63	5.01	0.10
								1" Ice	7.13	5.71	0.16
								2" Ice	8.16	7.16	0.29
								4" Ice	10.36	10.41	0.66
7770.00 w/ Mount Pipe	C	From Face	4.00	0.00	2.00	0.00	137.00	No Ice	6.12	4.25	0.06
								1/2" Ice	6.63	5.01	0.10
								1" Ice	7.13	5.71	0.16
								2" Ice	8.16	7.16	0.29
								4" Ice	10.36	10.41	0.66
(2) LGP21901	A	From Face	4.00	0.00	2.00	0.00	137.00	No Ice	0.27	0.18	0.01
								1/2" Ice	0.34	0.25	0.01
								1" Ice	0.43	0.32	0.01
								2" Ice	0.62	0.49	0.02
								4" Ice	1.10	0.94	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LGP21901	B	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
(2) LGP21901	C	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	A	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.44 1.60 1.95 2.75	0.32 0.42 0.52 0.76 1.35	0.02 0.02 0.03 0.06 0.14
(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	B	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.44 1.60 1.95 2.75	0.32 0.42 0.52 0.76 1.35	0.02 0.02 0.03 0.06 0.14
(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	C	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.44 1.60 1.95 2.75	0.32 0.42 0.52 0.76 1.35	0.02 0.02 0.03 0.06 0.14
Platform Mount [LP 712-1]	C	None		0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
Collar Mount (MTC3335)	C	None		0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 7.22 8.44 10.88 15.76	6.00 7.22 8.44 10.88 15.76	0.15 0.19 0.23 0.32 0.50
(2) SBNH-1D6565C w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.56 12.22 12.89 14.29 17.43	9.72 11.19 12.59 14.87 19.62	0.09 0.18 0.28 0.51 1.14
(2) SBNH-1D6565C w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.56 12.22 12.89 14.29 17.43	9.72 11.19 12.59 14.87 19.62	0.09 0.18 0.28 0.51 1.14
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
(2) DTMABP7819VG12A	A	From Face	4.00 0.00 2.00	0.00	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) DTMABP7819VG12A	B	From Face	4.00	0.00	0.00	137.00	4" Ice			
			0.00	2.00			No Ice	1.14	0.39	0.02
							1/2" Ice	1.28	0.49	0.03
							1" Ice	1.44	0.59	0.04
							2" Ice	1.77	0.83	0.06
							4" Ice	2.54	1.41	0.14
(2) DTMABP7819VG12A	C	From Face	4.00	0.00	0.00	137.00	No Ice	1.14	0.39	0.02
			0.00	2.00			1/2" Ice	1.28	0.49	0.03
							1" Ice	1.44	0.59	0.04
							2" Ice	1.77	0.83	0.06
							4" Ice	2.54	1.41	0.14
7020.00	A	From Face	4.00	0.00	0.00	137.00	No Ice	0.12	0.20	0.00
			0.00	2.00			1/2" Ice	0.17	0.28	0.01
							1" Ice	0.23	0.36	0.01
							2" Ice	0.38	0.56	0.02
							4" Ice	0.78	1.05	0.07
7020.00	B	From Face	4.00	0.00	0.00	137.00	No Ice	0.12	0.20	0.00
			0.00	2.00			1/2" Ice	0.17	0.28	0.01
							1" Ice	0.23	0.36	0.01
							2" Ice	0.38	0.56	0.02
							4" Ice	0.78	1.05	0.07
7020.00	C	From Face	4.00	0.00	0.00	137.00	No Ice	0.12	0.20	0.00
			0.00	2.00			1/2" Ice	0.17	0.28	0.01
							1" Ice	0.23	0.36	0.01
							2" Ice	0.38	0.56	0.02
							4" Ice	0.78	1.05	0.07
RRUS-11	A	From Face	4.00	0.00	0.00	137.00	No Ice	4.42	1.19	0.05
			0.00	2.00			1/2" Ice	4.71	1.35	0.07
							1" Ice	5.00	1.53	0.10
							2" Ice	5.61	1.90	0.17
							4" Ice	6.94	2.75	0.36
RRUS-11	B	From Face	4.00	0.00	0.00	137.00	No Ice	4.42	1.19	0.05
			0.00	2.00			1/2" Ice	4.71	1.35	0.07
							1" Ice	5.00	1.53	0.10
							2" Ice	5.61	1.90	0.17
							4" Ice	6.94	2.75	0.36
RRUS-11	C	From Face	4.00	0.00	0.00	137.00	No Ice	4.42	1.19	0.05
			0.00	2.00			1/2" Ice	4.71	1.35	0.07
							1" Ice	5.00	1.53	0.10
							2" Ice	5.61	1.90	0.17
							4" Ice	6.94	2.75	0.36
DC6-48-60-18-8F	A	From Face	4.00	0.00	0.00	137.00	No Ice	2.57	4.32	0.02
			0.00	2.00			1/2" Ice	2.80	4.60	0.05
							1" Ice	3.04	4.88	0.09
							2" Ice	3.54	5.49	0.17
							4" Ice	4.66	6.80	0.38
***										
***										
(2) APL866513-42T0 w/ Mount Pipe	A	From Face	4.00	0.00	0.00	127.00	No Ice	4.53	4.92	0.03
			0.00	2.00			1/2" Ice	4.97	5.60	0.08
							1" Ice	5.41	6.28	0.13
							2" Ice	6.34	7.71	0.25
							4" Ice	8.32	10.83	0.60
(2) APL866513-42T0 w/ Mount Pipe	B	From Face	4.00	0.00	0.00	127.00	No Ice	4.53	4.92	0.03
			0.00				1/2" Ice	4.97	5.60	0.08

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
			2.00			Ice	5.41	6.28	0.13
						1" Ice	6.34	7.71	0.25
						2" Ice	8.32	10.83	0.60
						4" Ice			
(2) APL866513-42T0 w/ Mount Pipe	C	From Face	4.00	0.00	127.00	No Ice	4.53	4.92	0.03
			0.00			1/2"	4.97	5.60	0.08
			2.00			Ice	5.41	6.28	0.13
						1" Ice	6.34	7.71	0.25
						2" Ice	8.32	10.83	0.60
						4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.00	0.00	127.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.00	0.00	127.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.00	0.00	127.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
BXA-171063-12BF w/ Mount Pipe	A	From Face	4.00	0.00	127.00	No Ice	4.97	5.23	0.04
			0.00			1/2"	5.52	6.39	0.08
			2.00			Ice	6.04	7.26	0.14
						1" Ice	7.09	9.05	0.27
						2" Ice	9.36	12.82	0.67
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Face	4.00	0.00	127.00	No Ice	5.40	3.69	0.03
			0.00			1/2"	5.84	4.29	0.07
			2.00			Ice	6.30	4.91	0.12
						1" Ice	7.24	6.26	0.23
						2" Ice	9.26	9.29	0.58
						4" Ice			
BXA-171063-12BF w/ Mount Pipe	B	From Face	4.00	0.00	127.00	No Ice	4.97	5.23	0.04
			0.00			1/2"	5.52	6.39	0.08
			2.00			Ice	6.04	7.26	0.14
						1" Ice	7.09	9.05	0.27
						2" Ice	9.36	12.82	0.67
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Face	4.00	0.00	127.00	No Ice	5.40	3.69	0.03
			0.00			1/2"	5.84	4.29	0.07
			2.00			Ice	6.30	4.91	0.12
						1" Ice	7.24	6.26	0.23
						2" Ice	9.26	9.29	0.58
						4" Ice			
BXA-171063-12BF w/ Mount Pipe	C	From Face	4.00	0.00	127.00	No Ice	4.97	5.23	0.04
			0.00			1/2"	5.52	6.39	0.08
			2.00			Ice	6.04	7.26	0.14
						1" Ice	7.09	9.05	0.27
						2" Ice	9.36	12.82	0.67
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Face	4.00	0.00	127.00	No Ice	5.40	3.69	0.03
			0.00			1/2"	5.84	4.29	0.07
			2.00			Ice	6.30	4.91	0.12
						1" Ice	7.24	6.26	0.23
						2" Ice	9.26	9.29	0.58
						4" Ice			

***

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	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
800 EXTERNAL NOTCH FILTER	A	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	A	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
(3) ACU-A20-N	A	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
1900MHz RRH (65MHz)	B	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
800 EXTERNAL NOTCH FILTER	B	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	B	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
(3) ACU-A20-N	B	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
1900MHz RRH (65MHz)	C	From Face	4.00 0.00 -2.00	0.00	152.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35

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
800 EXTERNAL NOTCH FILTER	C	From Face	4.00 0.00 -2.00	0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	C	From Face	4.00 0.00 -2.00	0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
(3) ACU-A20-N	C	From Face	4.00 0.00 -2.00	0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.00 0.00 -2.00	0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.22 0.41 0.91
Platform Mount [LP 602-1]	C	None		0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1.34 1.80 2.26 3.17 5.00
8-ft Ladder	C	None		0.00	152.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.00 6.00 7.00 9.00 13.00	5.00 6.00 7.00 9.00 13.00	0.04 0.07 0.08 0.11 0.15

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 150.00-123.42	136.00	1.499	0.03	39.582	A	0.000	39.582	39.582	100.00	0.000	4.093
					B	0.000	39.582		100.00	0.000	0.000
					C	0.000	39.582		100.00	0.000	1.051
L2 123.42-115.25	119.28	1.444	0.03	14.449	A	0.000	14.449	14.449	100.00	0.000	1.367
					B	0.000	14.449		100.00	0.000	0.000
					C	0.000	14.449		100.00	0.000	0.632
L3 115.25-105.25	110.17	1.411	0.03	19.296	A	0.000	19.296	19.296	100.00	0.000	2.625
					B	0.000	19.296		100.00	0.000	0.000
					C	0.000	19.296		100.00	0.000	0.774
L4 105.25-101.90	103.57	1.386	0.03	6.860	A	0.000	6.860	6.860	100.00	0.000	0.879
					B	0.000	6.860		100.00	0.000	0.000
					C	0.000	6.860		100.00	0.000	0.259
L5 101.90-	101.57	1.379	0.03	1.354	A	0.000	1.354	1.354	100.00	0.000	0.171

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
101.25					B	0.000	1.354		100.00	0.000	0.000
					C	0.000	1.354		100.00	0.000	0.050
L6 101.25-85.96	93.45	1.346	0.02	34.013	A	0.000	34.013	34.013	100.00	0.000	4.013
					B	0.000	34.013		100.00	0.000	0.000
					C	0.000	34.013		100.00	0.000	1.183
L7 85.96-76.25	81.03	1.293	0.02	23.169	A	0.000	23.169	23.169	100.00	0.000	2.549
					B	0.000	23.169		100.00	0.000	0.000
					C	0.000	23.169		100.00	0.000	0.752
L8 76.25-75.00	75.62	1.267	0.02	3.127	A	0.000	3.127	3.127	100.00	0.000	0.328
					B	0.000	3.127		100.00	0.000	0.000
					C	0.000	3.127		100.00	0.000	0.282
L9 75.00-72.15	73.57	1.257	0.02	7.234	A	0.000	7.234	7.234	100.00	0.000	0.748
					B	0.000	7.234		100.00	0.000	0.000
					C	0.000	7.234		100.00	0.000	0.748
L10 72.15-42.41	56.82	1.168	0.02	84.095	A	0.000	84.095	84.095	100.00	0.000	8.133
					B	0.000	84.095		100.00	0.000	0.000
					C	0.000	84.095		100.00	0.000	7.141
L11 42.41-31.25	36.76	1.031	0.02	34.812	A	0.000	34.812	34.812	100.00	0.000	3.881
					B	0.000	34.812		100.00	0.000	0.000
					C	0.000	34.812		100.00	0.000	0.864
L12 31.25-18.75	24.93	1	0.02	41.853	A	0.000	41.853	41.853	100.00	0.000	4.347
					B	0.000	41.853		100.00	0.000	0.000
					C	0.000	41.853		100.00	0.000	0.968
L13 18.75-0.00	9.23	1	0.02	67.976	A	0.000	67.976	67.976	100.00	0.000	6.521
					B	0.000	67.976		100.00	0.000	0.000
					C	0.000	67.976		100.00	0.000	1.451

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 150.00-123.42	136.00	1.499	0.01	1.4815	46.145	A	0.000	46.145	46.145	100.00	0.000	11.969
						B	0.000	46.145		100.00	0.000	0.000
						C	0.000	46.145		100.00	0.000	5.075
L2 123.42-115.25	119.28	1.444	0.01	1.4584	16.467	A	0.000	16.467	16.467	100.00	0.000	3.820
						B	0.000	16.467		100.00	0.000	0.000
						C	0.000	16.467		100.00	0.000	3.053
L3 115.25-105.25	110.17	1.411	0.01	1.4446	21.703	A	0.000	21.703	21.703	100.00	0.000	5.835
						B	0.000	21.703		100.00	0.000	0.000
						C	0.000	21.703		100.00	0.000	3.663
L4 105.25-101.90	103.57	1.386	0.01	1.4339	7.661	A	0.000	7.661	7.661	100.00	0.000	1.947
						B	0.000	7.661		100.00	0.000	0.000
						C	0.000	7.661		100.00	0.000	1.220
L5 101.90-101.25	101.57	1.379	0.00	1.4305	1.509	A	0.000	1.509	1.509	100.00	0.000	0.377
						B	0.000	1.509		100.00	0.000	0.000
						C	0.000	1.509		100.00	0.000	0.236
L6 101.25-85.96	93.45	1.346	0.00	1.4163	37.622	A	0.000	37.622	37.622	100.00	0.000	8.825
						B	0.000	37.622		100.00	0.000	0.000
						C	0.000	37.622		100.00	0.000	5.515
L7 85.96-76.25	81.03	1.293	0.00	1.3923	25.461	A	0.000	25.461	25.461	100.00	0.000	5.605
						B	0.000	25.461		100.00	0.000	0.000
						C	0.000	25.461		100.00	0.000	3.502
L8 76.25-75.00	75.62	1.267	0.00	1.3808	3.415	A	0.000	3.415	3.415	100.00	0.000	0.712
						B	0.000	3.415		100.00	0.000	0.000
						C	0.000	3.415		100.00	0.000	0.658
L9 75.00-72.15	73.57	1.257	0.00	1.3762	7.888	A	0.000	7.888	7.888	100.00	0.000	1.620
						B	0.000	7.888		100.00	0.000	0.000
						C	0.000	7.888		100.00	0.000	1.620
L10 72.15-42.41	56.82	1.168	0.00	1.3342	90.708	A	0.000	90.708	90.708	100.00	0.000	17.283
						B	0.000	90.708		100.00	0.000	0.000
						C	0.000	90.708		100.00	0.000	15.853

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
L11 42.41-31.25	36.76	1.031	0.00	1.2663	37.294	A	0.000	37.294	37.294	100.00	0.000	8.156
						B	0.000	37.294		100.00	0.000	0.000
						C	0.000	37.294		100.00	0.000	3.842
L12 31.25-18.75	24.93	1	0.00	1.2500	44.458	A	0.000	44.458	44.458	100.00	0.000	8.901
						B	0.000	44.458		100.00	0.000	0.000
						C	0.000	44.458		100.00	0.000	4.093
L13 18.75-0.00	9.23	1	0.00	1.2500	71.882	A	0.000	71.882	71.882	100.00	0.000	13.352
						B	0.000	71.882		100.00	0.000	0.000
						C	0.000	71.882		100.00	0.000	6.139

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 150.00-123.42	136.00	1.499	0.01	39.582	A	0.000	39.582	39.582	100.00	0.000	4.093
					B	0.000	39.582		100.00	0.000	0.000
					C	0.000	39.582		100.00	0.000	1.051
L2 123.42-115.25	119.28	1.444	0.01	14.449	A	0.000	14.449	14.449	100.00	0.000	1.367
					B	0.000	14.449		100.00	0.000	0.000
					C	0.000	14.449		100.00	0.000	0.632
L3 115.25-105.25	110.17	1.411	0.01	19.296	A	0.000	19.296	19.296	100.00	0.000	2.625
					B	0.000	19.296		100.00	0.000	0.000
					C	0.000	19.296		100.00	0.000	0.774
L4 105.25-101.90	103.57	1.386	0.01	6.860	A	0.000	6.860	6.860	100.00	0.000	0.879
					B	0.000	6.860		100.00	0.000	0.000
					C	0.000	6.860		100.00	0.000	0.259
L5 101.90-101.25	101.57	1.379	0.01	1.354	A	0.000	1.354	1.354	100.00	0.000	0.171
					B	0.000	1.354		100.00	0.000	0.000
					C	0.000	1.354		100.00	0.000	0.050
L6 101.25-85.96	93.45	1.346	0.01	34.013	A	0.000	34.013	34.013	100.00	0.000	4.013
					B	0.000	34.013		100.00	0.000	0.000
					C	0.000	34.013		100.00	0.000	1.183
L7 85.96-76.25	81.03	1.293	0.01	23.169	A	0.000	23.169	23.169	100.00	0.000	2.549
					B	0.000	23.169		100.00	0.000	0.000
					C	0.000	23.169		100.00	0.000	0.752
L8 76.25-75.00	75.62	1.267	0.01	3.127	A	0.000	3.127	3.127	100.00	0.000	0.328
					B	0.000	3.127		100.00	0.000	0.000
					C	0.000	3.127		100.00	0.000	0.282
L9 75.00-72.15	73.57	1.257	0.01	7.234	A	0.000	7.234	7.234	100.00	0.000	0.748
					B	0.000	7.234		100.00	0.000	0.000
					C	0.000	7.234		100.00	0.000	0.748
L10 72.15-42.41	56.82	1.168	0.01	84.095	A	0.000	84.095	84.095	100.00	0.000	8.133
					B	0.000	84.095		100.00	0.000	0.000
					C	0.000	84.095		100.00	0.000	7.141
L11 42.41-31.25	36.76	1.031	0.01	34.812	A	0.000	34.812	34.812	100.00	0.000	3.881
					B	0.000	34.812		100.00	0.000	0.000
					C	0.000	34.812		100.00	0.000	0.864
L12 31.25-18.75	24.93	1	0.01	41.853	A	0.000	41.853	41.853	100.00	0.000	4.347
					B	0.000	41.853		100.00	0.000	0.000
					C	0.000	41.853		100.00	0.000	0.968
L13 18.75-0.00	9.23	1	0.01	67.976	A	0.000	67.976	67.976	100.00	0.000	6.521
					B	0.000	67.976		100.00	0.000	0.000
					C	0.000	67.976		100.00	0.000	1.451

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 - 123.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.32	0.60	1.61
			Max. Mx	11	-5.61	192.70	-0.33
			Max. My	2	-5.59	-0.44	193.86
			Max. Vy	11	-15.54	192.70	-0.33
			Max. Vx	2	-15.62	-0.44	193.86
			Max. Torque	10			-2.14
L2	123.42 - 115.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.94	0.73	1.82
			Max. Mx	11	-7.48	374.87	-0.67
			Max. My	2	-7.46	-0.83	376.93
			Max. Vy	11	-17.29	374.87	-0.67
			Max. Vx	2	-17.36	-0.83	376.93
			Max. Torque	10			-2.15
L3	115.25 - 105.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23.88	0.87	2.00
			Max. Mx	11	-8.84	551.22	-0.99
			Max. My	2	-8.83	-1.19	554.07
			Max. Vy	11	-18.00	551.22	-0.99
			Max. Vx	2	-18.08	-1.19	554.07
			Max. Torque	10			-2.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	105.25 - 101.9	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.72	0.91	2.06
			Max. Mx	11	-9.47	611.94	-1.10
			Max. My	2	-9.46	-1.30	615.05
			Max. Vy	11	-18.26	611.94	-1.10
			Max. Vx	2	-18.34	-1.30	615.05
			Max. Torque	10			-2.17
L5	101.9 - 101.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.89	0.92	2.07
			Max. Mx	11	-9.60	623.82	-1.12
			Max. My	2	-9.59	-1.33	626.99
			Max. Vy	11	-18.31	623.82	-1.12
			Max. Vx	2	-18.39	-1.33	626.99
			Max. Torque	10			-2.17
L6	101.25 - 85.96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.81	1.09	2.28
			Max. Mx	11	-11.78	833.96	-1.48
			Max. My	2	-11.77	-1.73	838.03
			Max. Vy	11	-19.19	833.96	-1.48
			Max. Vx	2	-19.27	-1.73	838.03
			Max. Torque	10			-2.19
L7	85.96 - 76.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.63	1.29	2.55
			Max. Mx	11	-15.44	1106.89	-1.92
			Max. My	2	-15.43	-2.22	1112.07
			Max. Vy	11	-20.34	1106.89	-1.92
			Max. Vx	2	-20.42	-2.22	1112.07
			Max. Torque	10			-2.21
L8	76.25 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.00	1.31	2.57
			Max. Mx	11	-15.73	1132.38	-1.96
			Max. My	2	-15.72	-2.26	1137.66
			Max. Vy	11	-20.45	1132.38	-1.96
			Max. Vx	2	-20.53	-2.26	1137.66
			Max. Torque	10			-2.21
L9	75 - 72.15	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.08	1.33	2.65
			Max. Mx	11	-16.54	1191.25	-2.05
			Max. My	2	-16.53	-2.36	1196.77
			Max. Vy	11	-20.78	1191.25	-2.05
			Max. Vx	2	-20.86	-2.36	1196.77
			Max. Torque	10			-2.22
L10	72.15 - 42.41	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.51	1.81	3.05
			Max. Mx	11	-23.14	1725.98	-2.81
			Max. My	2	-23.14	-3.20	1733.52
			Max. Vy	11	-22.79	1725.98	-2.81
			Max. Vx	2	-22.87	-3.20	1733.52
			Max. Torque	10			-2.26
L11	42.41 - 31.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.43	2.13	3.31
			Max. Mx	11	-28.55	2108.96	-3.32
			Max. My	2	-28.54	-3.76	2117.84
			Max. Vy	11	-24.01	2108.96	-3.32
			Max. Vx	2	-24.09	-3.76	2117.84
			Max. Torque	10			-2.30
L12	31.25 - 18.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.69	2.39	3.53
			Max. Mx	11	-31.92	2413.63	-3.70
			Max. My	2	-31.92	-4.18	2423.54
			Max. Vy	11	-24.77	2413.63	-3.70
			Max. Vx	2	-24.85	-4.18	2423.54

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	10			-2.34
L13	18.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-59.90	2.79	3.87
			Max. Mx	11	-36.77	2887.86	-4.27
			Max. My	2	-36.77	-4.80	2899.27
			Max. Vy	11	-25.85	2887.86	-4.27
			Max. Vx	2	-25.93	-4.80	2899.27
			Max. Torque	10			-2.39

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	59.90	-0.01	7.25
	Max. H_x	11	36.78	25.83	-0.03
	Max. H_z	2	36.78	-0.03	25.91
	Max. M_x	2	2899.27	-0.03	25.91
	Max. M_z	5	2887.27	-25.83	0.03
	Max. Torsion	4	2.38	-22.39	12.98
	Min. Vert	1	36.78	0.00	0.00
	Min. H_x	5	36.78	-25.83	0.03
	Min. H_z	8	36.78	0.03	-25.91
	Min. M_x	8	-2897.60	0.03	-25.91
	Min. M_z	11	-2887.86	25.83	-0.03
	Min. Torsion	10	-2.39	22.39	-12.98

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	36.78	0.00	0.00	-0.80	0.28	0.00
Dead+Wind 0 deg - No Ice	36.78	0.03	-25.91	-2899.27	-4.80	-0.83
Dead+Wind 30 deg - No Ice	36.78	12.95	-22.46	-2513.48	-1447.87	-1.85
Dead+Wind 60 deg - No Ice	36.78	22.39	-12.98	-1454.44	-2502.93	-2.38
Dead+Wind 90 deg - No Ice	36.78	25.83	-0.03	-5.90	-2887.27	-2.27
Dead+Wind 120 deg - No Ice	36.78	22.36	12.92	1444.02	-2497.87	-1.56
Dead+Wind 150 deg - No Ice	36.78	12.89	22.42	2506.77	-1439.08	-0.42
Dead+Wind 180 deg - No Ice	36.78	-0.03	25.91	2897.60	5.37	0.83
Dead+Wind 210 deg - No Ice	36.78	-12.95	22.46	2511.82	1448.43	1.86
Dead+Wind 240 deg - No Ice	36.78	-22.39	12.98	1452.81	2503.50	2.39
Dead+Wind 270 deg - No Ice	36.78	-25.83	0.03	4.27	2887.86	2.28
Dead+Wind 300 deg - No Ice	36.78	-22.36	-12.92	-1445.67	2498.47	1.55
Dead+Wind 330 deg - No Ice	36.78	-12.89	-22.42	-2508.44	1439.67	0.41
Dead+Ice+Temp	59.90	-0.00	-0.00	-3.87	2.79	-0.00
Dead+Wind 0 deg+Ice+Temp	59.90	0.01	-7.25	-870.49	1.74	-0.23
Dead+Wind 30 deg+Ice+Temp	59.90	3.61	-6.28	-754.97	-428.89	-0.50
Dead+Wind 60 deg+Ice+Temp	59.90	6.25	-3.63	-438.22	-743.84	-0.64
Dead+Wind 90 deg+Ice+Temp	59.90	7.22	-0.01	-5.13	-858.70	-0.61
Dead+Wind 120 deg+Ice+Temp	59.90	6.25	3.62	428.27	-742.70	-0.41
Dead+Wind 150 deg+Ice+Temp	59.90	3.60	6.27	745.85	-426.93	-0.10
Dead+Wind 180 deg+Ice+Temp	59.90	-0.01	7.25	862.50	4.01	0.23
Dead+Wind 210	59.90	-3.61	6.28	746.98	434.64	0.50

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+Ice+Temp						
Dead+Wind 240 deg+Ice+Temp	59.90	-6.25	3.63	430.24	749.59	0.64
Dead+Wind 270 deg+Ice+Temp	59.90	-7.22	0.01	-2.86	864.45	0.61
Dead+Wind 300 deg+Ice+Temp	59.90	-6.25	-3.62	-436.26	748.45	0.41
Dead+Wind 330 deg+Ice+Temp	59.90	-3.60	-6.27	-753.83	432.68	0.10
Dead+Wind 0 deg - Service	36.78	0.01	-8.97	-1005.73	-1.47	-0.29
Dead+Wind 30 deg - Service	36.78	4.48	-7.77	-871.99	-501.78	-0.65
Dead+Wind 60 deg - Service	36.78	7.75	-4.49	-504.82	-867.57	-0.84
Dead+Wind 90 deg - Service	36.78	8.94	-0.01	-2.61	-1000.81	-0.80
Dead+Wind 120 deg - Service	36.78	7.74	4.47	500.08	-865.81	-0.55
Dead+Wind 150 deg - Service	36.78	4.46	7.76	868.54	-498.73	-0.15
Dead+Wind 180 deg - Service	36.78	-0.01	8.97	1004.04	2.06	0.29
Dead+Wind 210 deg - Service	36.78	-4.48	7.77	870.30	502.37	0.65
Dead+Wind 240 deg - Service	36.78	-7.75	4.49	503.13	868.16	0.84
Dead+Wind 270 deg - Service	36.78	-8.94	0.01	0.92	1001.40	0.80
Dead+Wind 300 deg - Service	36.78	-7.74	-4.47	-501.77	866.40	0.55
Dead+Wind 330 deg - Service	36.78	-4.46	-7.76	-870.23	499.32	0.15

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-36.78	0.00	0.00	36.78	0.00	0.000%
2	0.03	-36.78	-25.91	-0.03	36.78	25.91	0.000%
3	12.95	-36.78	-22.46	-12.95	36.78	22.46	0.000%
4	22.39	-36.78	-12.98	-22.39	36.78	12.98	0.000%
5	25.83	-36.78	-0.03	-25.83	36.78	0.03	0.000%
6	22.36	-36.78	12.92	-22.36	36.78	-12.92	0.000%
7	12.89	-36.78	22.42	-12.89	36.78	-22.42	0.000%
8	-0.03	-36.78	25.91	0.03	36.78	-25.91	0.000%
9	-12.95	-36.78	22.46	12.95	36.78	-22.46	0.000%
10	-22.39	-36.78	12.98	22.39	36.78	-12.98	0.000%
11	-25.83	-36.78	0.03	25.83	36.78	-0.03	0.000%
12	-22.36	-36.78	-12.92	22.36	36.78	12.92	0.000%
13	-12.89	-36.78	-22.42	12.89	36.78	22.42	0.000%
14	0.00	-59.90	0.00	0.00	59.90	0.00	0.000%
15	0.01	-59.90	-7.25	-0.01	59.90	7.25	0.000%
16	3.61	-59.90	-6.28	-3.61	59.90	6.28	0.000%
17	6.25	-59.90	-3.63	-6.25	59.90	3.63	0.000%
18	7.22	-59.90	-0.01	-7.22	59.90	0.01	0.000%
19	6.25	-59.90	3.62	-6.25	59.90	-3.62	0.000%
20	3.60	-59.90	6.27	-3.60	59.90	-6.27	0.000%
21	-0.01	-59.90	7.25	0.01	59.90	-7.25	0.000%
22	-3.61	-59.90	6.28	3.61	59.90	-6.28	0.000%
23	-6.25	-59.90	3.63	6.25	59.90	-3.63	0.000%
24	-7.22	-59.90	0.01	7.22	59.90	-0.01	0.000%
25	-6.25	-59.90	-3.62	6.25	59.90	3.62	0.000%
26	-3.60	-59.90	-6.27	3.60	59.90	6.27	0.000%
27	0.01	-36.78	-8.97	-0.01	36.78	8.97	0.000%
28	4.48	-36.78	-7.77	-4.48	36.78	7.77	0.000%
29	7.75	-36.78	-4.49	-7.75	36.78	4.49	0.000%
30	8.94	-36.78	-0.01	-8.94	36.78	0.01	0.000%
31	7.74	-36.78	4.47	-7.74	36.78	-4.47	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
32	4.46	-36.78	7.76	-4.46	36.78	-7.76	0.000%
33	-0.01	-36.78	8.97	0.01	36.78	-8.97	0.000%
34	-4.48	-36.78	7.77	4.48	36.78	-7.77	0.000%
35	-7.75	-36.78	4.49	7.75	36.78	-4.49	0.000%
36	-8.94	-36.78	0.01	8.94	36.78	-0.01	0.000%
37	-7.74	-36.78	-4.47	7.74	36.78	4.47	0.000%
38	-4.46	-36.78	-7.76	4.46	36.78	7.76	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005624
3	Yes	6	0.00000001	0.00010859
4	Yes	6	0.00000001	0.00011754
5	Yes	5	0.00000001	0.00019467
6	Yes	6	0.00000001	0.00010860
7	Yes	6	0.00000001	0.00011260
8	Yes	5	0.00000001	0.00008226
9	Yes	6	0.00000001	0.00011640
10	Yes	6	0.00000001	0.00010760
11	Yes	5	0.00000001	0.00016803
12	Yes	6	0.00000001	0.00011511
13	Yes	6	0.00000001	0.00011096
14	Yes	4	0.00000001	0.00011724
15	Yes	6	0.00000001	0.00015600
16	Yes	6	0.00000001	0.00022561
17	Yes	6	0.00000001	0.00023103
18	Yes	6	0.00000001	0.00015412
19	Yes	6	0.00000001	0.00022077
20	Yes	6	0.00000001	0.00022349
21	Yes	6	0.00000001	0.00015384
22	Yes	6	0.00000001	0.00022892
23	Yes	6	0.00000001	0.00022306
24	Yes	6	0.00000001	0.00015523
25	Yes	6	0.00000001	0.00023067
26	Yes	6	0.00000001	0.00022837
27	Yes	4	0.00000001	0.00034387
28	Yes	5	0.00000001	0.00021835
29	Yes	5	0.00000001	0.00025331
30	Yes	4	0.00000001	0.00082439
31	Yes	5	0.00000001	0.00021642
32	Yes	5	0.00000001	0.00023159
33	Yes	4	0.00000001	0.00037501
34	Yes	5	0.00000001	0.00024808
35	Yes	5	0.00000001	0.00021436
36	Yes	4	0.00000001	0.00078710
37	Yes	5	0.00000001	0.00024281
38	Yes	5	0.00000001	0.00022641

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.42	41.41	28	2.71	0.01
L2	126.59 - 115.25	28.74	28	2.34	0.01
L3	115.25 - 105.25	23.52	28	2.02	0.01
L4	105.25 - 101.9	19.56	28	1.76	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	101.9 - 101.25	18.34	28	1.70	0.00
L6	101.25 - 85.96	18.11	28	1.69	0.00
L7	90.04 - 76.25	14.38	28	1.48	0.00
L8	76.25 - 75	10.39	28	1.26	0.00
L9	75 - 72.15	10.06	28	1.24	0.00
L10	72.15 - 42.41	9.34	28	1.19	0.00
L11	47.58 - 31.25	4.22	28	0.80	0.00
L12	31.25 - 18.75	1.84	28	0.56	0.00
L13	18.75 - 0	0.66	28	0.34	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	1900MHz RRH (65MHz)	28	41.41	2.71	0.01	9490
137.00	7770.00 w/ Mount Pipe	28	34.16	2.54	0.01	3649
127.00	Platform Mount [LP 712-1]	28	28.94	2.35	0.01	2112
117.00	T-Arm Mount [TA 601-3]	28	24.27	2.07	0.01	1926
75.00	Side Arm Mount [SO 701-1]	28	10.06	1.24	0.00	3287

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.42	118.96	2	7.80	0.04
L2	126.59 - 115.25	82.65	2	6.72	0.02
L3	115.25 - 105.25	67.66	2	5.80	0.02
L4	105.25 - 101.9	56.28	3	5.08	0.01
L5	101.9 - 101.25	52.79	3	4.90	0.01
L6	101.25 - 85.96	52.12	3	4.87	0.01
L7	90.04 - 76.25	41.41	3	4.27	0.01
L8	76.25 - 75	29.92	3	3.63	0.01
L9	75 - 72.15	28.98	3	3.56	0.01
L10	72.15 - 42.41	26.89	3	3.44	0.01
L11	47.58 - 31.25	12.16	3	2.32	0.00
L12	31.25 - 18.75	5.29	3	1.61	0.00
L13	18.75 - 0	1.91	3	0.99	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	1900MHz RRH (65MHz)	2	118.96	7.80	0.04	3421
137.00	7770.00 w/ Mount Pipe	2	98.20	7.31	0.03	1314
127.00	Platform Mount [LP 712-1]	2	83.23	6.75	0.02	757
117.00	T-Arm Mount [TA 601-3]	2	69.83	5.95	0.02	685
75.00	Side Arm Mount [SO 701-1]	3	28.98	3.56	0.01	1151

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 - 123.42 (1)	TP20.74x15x0.1875	26.58	0.00	0.0	39.00	11.8239	-5.59	461.13	0.012
L2	123.42 - 115.25 (2)	TP22.0918x19.6804x0.25	11.34	0.00	0.0	39.00	17.3314	-7.46	675.93	0.011
L3	115.25 - 105.25 (3)	TP24.2182x22.0918x0.3845	10.00	0.00	0.0	33.37	29.0829	-8.83	970.38	0.009
L4	105.25 - 101.9 (4)	TP24.9305x24.2182x0.5774	3.35	0.00	0.0	23.98	44.6274	-9.45	1070.25	0.009
L5	101.9 - 101.25 (5)	TP25.0687x24.9305x0.6054	0.65	0.00	0.0	25.88	47.0050	-9.59	1216.68	0.008
L6	101.25 - 85.96 (6)	TP28.32x25.0687x0.5671	15.29	0.00	0.0	26.00	48.3921	-11.77	1258.39	0.009
L7	85.96 - 76.25 (7)	TP29.8904x26.3182x0.6021	13.79	0.00	0.0	26.08	55.9700	-15.43	1459.81	0.011
L8	76.25 - 75 (8)	TP30.1567x29.8904x0.599	1.25	0.00	0.0	26.09	56.1922	-15.71	1466.28	0.011
L9	75 - 72.15 (9)	TP30.7639x30.1567x0.7005	2.85	0.00	0.0	26.12	66.8416	-16.52	1745.77	0.009
L10	72.15 - 42.41 (10)	TP37.1x30.7639x0.6479	29.74	0.00	0.0	27.43	72.6918	-23.13	1993.65	0.012
L11	42.41 - 31.25 (11)	TP38.849x34.7028x0.5358	16.33	0.00	0.0	34.58	60.3389	-25.67	2086.40	0.012
L12	31.25 - 18.75 (12)	TP41.5094x38.849x0.5216	12.50	0.00	0.0	34.68	65.6568	-30.23	2276.98	0.013
L13	18.75 - 0 (13)	TP45.5x41.5094x0.4491	18.75	0.00	0.0	37.50	58.5330	-31.94	2194.99	0.015

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 - 123.42 (1)	TP20.74x15x0.1875	193.94	40.21	39.00	1.031	0.00	0.00	39.00	0.000
L2	123.42 - 115.25 (2)	TP22.0918x19.6804x0.25	377.13	48.62	39.00	1.247	0.00	0.00	39.00	0.000
L3	115.25 - 105.25 (3)	TP24.2182x22.0918x0.3845	554.39	39.21	33.37	1.175	0.00	0.00	33.37	0.000
L4	105.25 - 101.9 (4)	TP24.9305x24.2182x0.5774	615.42	27.97	23.98	1.166	0.00	0.00	23.98	0.000
L5	101.9 - 101.25 (5)	TP25.0687x24.9305x0.6054	627.36	26.98	25.88	1.042	0.00	0.00	25.88	0.000
L6	101.25 - 85.96 (6)	TP28.32x25.0687x0.5671	838.53	31.75	26.00	1.221	0.00	0.00	26.00	0.000
L7	85.96 - 76.25 (7)	TP29.8904x26.3182x0.6021	1112.73	33.43	26.08	1.282	0.00	0.00	26.08	0.000
L8	76.25 - 75 (8)	TP30.1567x29.8904x0.599	1138.34	33.74	26.09	1.293	0.00	0.00	26.09	0.000
L9	75 - 72.15 (9)	TP30.7639x30.1567x0.7005	1197.47	29.42	26.12	1.127	0.00	0.00	26.12	0.000
L10	72.15 - 42.41 (10)	TP37.1x30.7639x0.6479	1734.47	33.16	27.43	1.209	0.00	0.00	27.43	0.000
L11	42.41 - 31.25 (11)	TP38.849x34.7028x0.5358	1854.07	42.42	34.58	1.227	0.00	0.00	34.58	0.000
L12	31.25 - 18.75 (12)	TP41.5094x38.849x0.5216	2270.68	42.63	34.68	1.229	0.00	0.00	34.68	0.000
L13	18.75 - 0 (13)	TP45.5x41.5094x0.4491	2424.78	49.21	37.50	1.312	0.00	0.00	37.50	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 - 123.42 (1)	TP20.74x15x0.1875	15.63	1.32	26.00	0.102	1.71	0.17	26.00	0.007
L2	123.42 - 115.25 (2)	TP22.0918x19.6804x0.25	17.38	1.00	26.00	0.077	1.68	0.11	26.00	0.004
L3	115.25 - 105.25 (3)	TP24.2182x22.0918x0.3845	18.09	0.62	22.24	0.056	1.69	0.06	22.24	0.003
L4	105.25 - 101.9 (4)	TP24.9305x24.2182x0.5774	18.35	0.41	15.99	0.051	1.70	0.04	15.99	0.002
L5	101.9 - 101.25 (5)	TP25.0687x24.9305x0.6054	18.40	0.39	17.26	0.045	1.70	0.04	17.26	0.002
L6	101.25 - 85.96 (6)	TP28.32x25.0687x0.5671	19.28	0.40	17.34	0.046	1.71	0.03	17.34	0.002
L7	85.96 - 76.25 (7)	TP29.8904x26.3182x0.6021	20.44	0.37	17.39	0.042	1.73	0.02	17.39	0.001
L8	76.25 - 75 (8)	TP30.1567x29.8904x0.599	20.54	0.37	17.40	0.042	1.73	0.02	17.40	0.001
L9	75 - 72.15 (9)	TP30.7639x30.1567x0.7005	20.88	0.31	17.41	0.036	1.71	0.02	17.41	0.001
L10	72.15 - 42.41 (10)	TP37.1x30.7639x0.6479	22.88	0.31	18.28	0.034	1.76	0.02	18.28	0.001
L11	42.41 - 31.25 (11)	TP38.849x34.7028x0.5358	23.46	0.39	23.05	0.033	1.78	0.02	23.05	0.001
L12	31.25 - 18.75 (12)	TP41.5094x38.849x0.5216	24.54	0.37	23.12	0.032	1.81	0.02	23.12	0.001
L13	18.75 - 0 (13)	TP45.5x41.5094x0.4491	24.92	0.43	25.00	0.034	1.82	0.02	25.00	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 - 123.42 (1)	0.012	1.031	0.000	0.102	0.007	1.046 ✔	1.333	H1-3+VT ✔
L2	123.42 - 115.25 (2)	0.011	1.247	0.000	0.077	0.004	1.260 ✔	1.333	H1-3+VT ✔
L3	115.25 - 105.25 (3)	0.009	1.175	0.000	0.056	0.003	1.185 ✔	1.333	H1-3+VT ✔
L4	105.25 - 101.9 (4)	0.009	1.166	0.000	0.051	0.002	1.176 ✔	1.333	H1-3+VT ✔
L5	101.9 - 101.25 (5)	0.008	1.042	0.000	0.045	0.002	1.051 ✔	1.333	H1-3+VT ✔
L6	101.25 - 85.96 (6)	0.009	1.221	0.000	0.046	0.002	1.231 ✔	1.333	H1-3+VT ✔
L7	85.96 - 76.25 (7)	0.011	1.282	0.000	0.042	0.001	1.293 ✔	1.333	H1-3+VT ✔
L8	76.25 - 75 (8)	0.011	1.293	0.000	0.042	0.001	1.304 ✔	1.333	H1-3+VT ✔
L9	75 - 72.15 (9)	0.009	1.127	0.000	0.036	0.001	1.136 ✔	1.333	H1-3+VT ✔
L10	72.15 - 42.41 (10)	0.012	1.209	0.000	0.034	0.001	1.221 ✔	1.333	H1-3+VT ✔
L11	42.41 - 31.25 (11)	0.012	1.227	0.000	0.033	0.001	1.239 ✔	1.333	H1-3+VT ✔
L12	31.25 - 18.75 (12)	0.013	1.229	0.000	0.032	0.001	1.243 ✔	1.333	H1-3+VT ✔
L13	18.75 - 0 (13)	0.015	1.312	0.000	0.034	0.001	1.327	1.333	H1-3+VT ✔

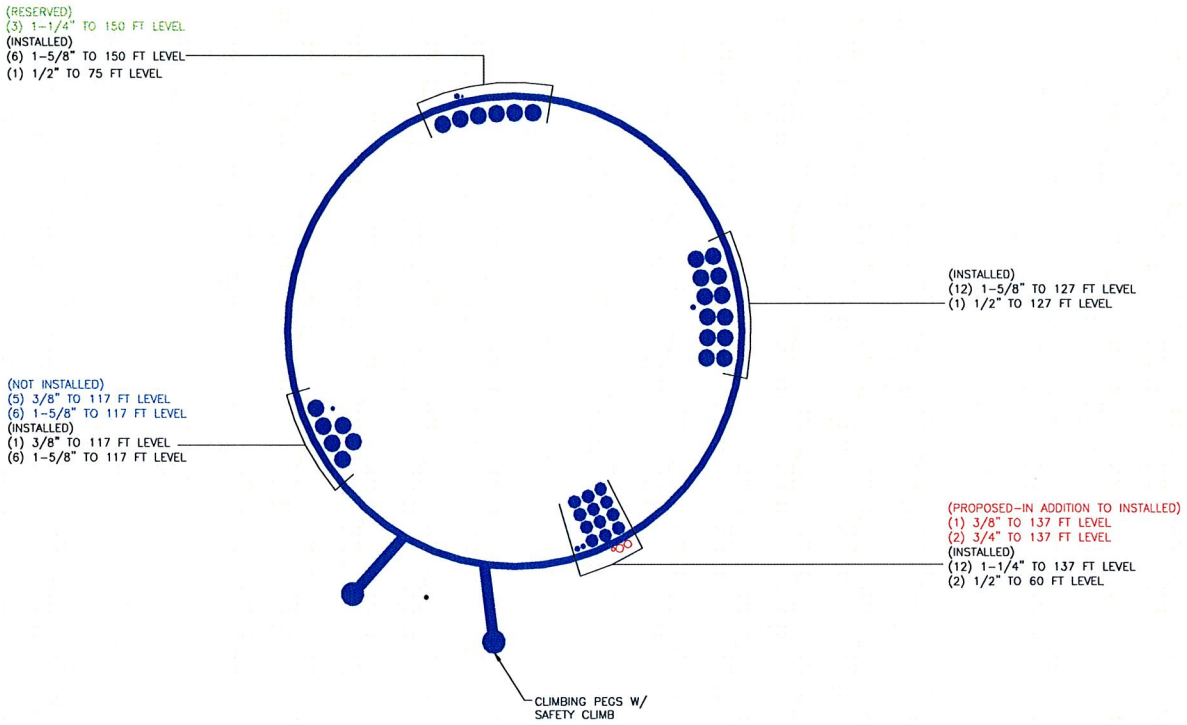
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
							✔		

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 123.42	Pole	TP20.74x15x0.1875	1	-5.59	614.69	78.5	Pass
L2	123.42 - 115.25	Pole	TP22.0918x19.6804x0.25	2	-7.46	901.01	94.5	Pass
L3	115.25 - 105.25	Pole	TP24.2182x22.0918x0.3845	3	-8.83	1293.52	88.9	Pass
L4	105.25 - 101.9	Pole	TP24.9305x24.2182x0.5774	4	-9.45	1426.64	88.2	Pass
L5	101.9 - 101.25	Pole	TP25.0687x24.9305x0.6054	5	-9.59	1621.83	78.8	Pass
L6	101.25 - 85.96	Pole	TP28.32x25.0687x0.5671	6	-11.77	1677.43	92.4	Pass
L7	85.96 - 76.25	Pole	TP29.8904x26.3182x0.6021	7	-15.43	1945.93	97.0	Pass
L8	76.25 - 75	Pole	TP30.1567x29.8904x0.599	8	-15.71	1954.55	97.8	Pass
L9	75 - 72.15	Pole	TP30.7639x30.1567x0.7005	9	-16.52	2327.11	85.3	Pass
L10	72.15 - 42.41	Pole	TP37.1x30.7639x0.6479	10	-23.13	2657.54	91.6	Pass
L11	42.41 - 31.25	Pole	TP38.849x34.7028x0.5358	11	-25.67	2781.17	93.0	Pass
L12	31.25 - 18.75	Pole	TP41.5094x38.849x0.5216	12	-30.23	3035.21	93.2	Pass
L13	18.75 - 0	Pole	TP45.5x41.5094x0.4491	13	-31.94	2925.92	99.6	Pass
							Summary	
						Pole (L13)	99.6	Pass
						RATING =	**99.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

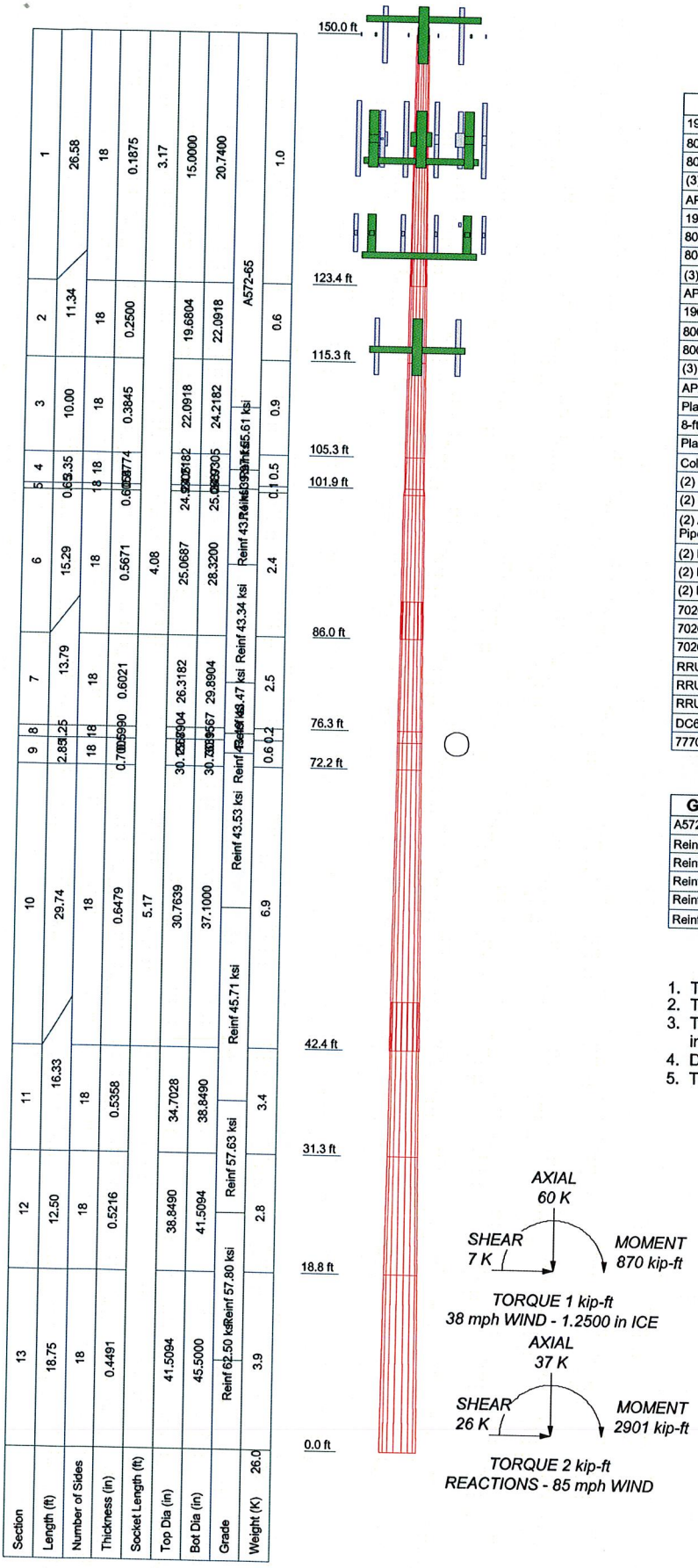

(RESERVED)
(3) 1-1/4" TO 150 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 150 FT LEVEL
(1) 1/2" TO 75 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 127 FT LEVEL
(1) 1/2" TO 127 FT LEVEL
(NOT INSTALLED)
(5) 3/8" TO 117 FT LEVEL
(6) 1-5/8" TO 117 FT LEVEL
(INSTALLED)
(1) 3/8" TO 117 FT LEVEL
(6) 1-5/8" TO 117 FT LEVEL
(PROPOSED-IN ADDITION TO INSTALLED)
(1) 3/8" TO 137 FT LEVEL
(2) 3/4" TO 137 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 137 FT LEVEL
(2) 1/2" TO 60 FT LEVEL
CLIMBING PEGS W/
SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 6.0.3.0 - 12/7/2011 File:T:/375_Crown_Castle/2012/37512-1027 BU 876362/37512-1027 BP R2 - WO512743 BU 876362/Aero/37512-1027 Reinforced - Aero - Check.eri

Program Version 6.0.3.0 - 12/7/2011 File:T:/375_Crown_Castle/2012/37512-1027 BU 876362/37512-1027 BP R2 - WO512743 BU 876362/Aero/37512-1027 Reinforced - Aero - Check.eri



Section	1	2	3	4	5	6	7	8	9	10	11	12	13
Length (ft)	26.58	11.34	10.00	9.35	0.65	15.29	13.79	2.25	2.88	29.74	16.33	12.50	18.75
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3845	0.3774	0.6053	0.5671	0.6021	0.5990	0.7005	0.6479	0.5358	0.5216	0.4491
Socket Length (ft)						4.08				5.17			
Top Dia (in)	3.17	19.6804	22.0918	24.2182	24.5305	25.0687	26.3182	29.8904	30.2389	30.7639	34.7028	38.8490	41.5094
Bot Dia (in)	15.0000	20.7400	22.0918	24.2182	24.5305	25.0687	26.3182	29.8904	30.2389	37.1000	38.8490	41.5094	45.5000
Grade	A572-65												
Weight (K)	1.0	0.6	0.9	0.5	0.1	2.4	2.5	0.2	0.6	6.9	3.4	2.8	3.9
26.0													

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1900MHz RRH (65MHz)	152	7770.00 w/ Mount Pipe	137
800 EXTERNAL NOTCH FILTER	152	7770.00 w/ Mount Pipe	137
800MHZ RRH	152	(2) LGP21901	137
(3) ACU-A20-N	152	(2) LGP21901	137
APXVSPP18-C-A20 w/ Mount Pipe	152	(2) LGP21901	137
1900MHz RRH (65MHz)	152	(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	137
800 EXTERNAL NOTCH FILTER	152		
800MHZ RRH	152	(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	137
(3) ACU-A20-N	152		
APXVSPP18-C-A20 w/ Mount Pipe	152	(2) DD1900 FULL BAND w/850 BY-PASS MASTHEAD	137
1900MHz RRH (65MHz)	152		
800 EXTERNAL NOTCH FILTER	152	BXA-70063-4CF-EDIN-X w/ Mount Pipe	127
800MHZ RRH	152	BXA-171063-12BF w/ Mount Pipe	127
(3) ACU-A20-N	152	BXA-70063-4CF-EDIN-X w/ Mount Pipe	127
APXVSPP18-C-A20 w/ Mount Pipe	152		
Platform Mount [LP 602-1]	152	Platform Mount [LP 712-1]	127
8-ft Ladder	152	GPS_A	127
Platform Mount [LP 712-1]	137	(2) APL866513-42T0 w/ Mount Pipe	127
Collar Mount (MTC3335)	137	(2) APL866513-42T0 w/ Mount Pipe	127
(2) SBNH-1D6565C w/ Mount Pipe	137	(2) APL866513-42T0 w/ Mount Pipe	127
(2) SBNH-1D6565C w/ Mount Pipe	137	(2) FD9R6004/2C-3L	127
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	137	(2) FD9R6004/2C-3L	127
		(2) FD9R6004/2C-3L	127
(2) DTMABP7819VG12A	137	BXA-171063-12BF w/ Mount Pipe	127
(2) DTMABP7819VG12A	137	BXA-70063-4CF-EDIN-X w/ Mount Pipe	127
(2) DTMABP7819VG12A	137		
7020.00	137	BXA-171063-12BF w/ Mount Pipe	127
7020.00	137	HBX-6516DS-VTM w/ Mount Pipe	117
7020.00	137	T-Arm Mount [TA 601-3]	117
RRUS-11	137	HBX-6516DS-VTM w/ Mount Pipe	117
RRUS-11	137	HBX-6516DS-VTM w/ Mount Pipe	117
RRUS-11	137	OG-860/1920/GPS-A	75
DC6-48-60-18-8F	137	Side Arm Mount [SO 701-1]	75
7770.00 w/ Mount Pipe	137		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 43.49 ksi	43 ksi	65 ksi
Reinf 55.61 ksi	56 ksi	70 ksi	Reinf 43.53 ksi	44 ksi	65 ksi
Reinf 39.97 ksi	40 ksi	65 ksi	Reinf 45.71 ksi	46 ksi	58 ksi
Reinf 43.14 ksi	43 ksi	65 ksi	Reinf 57.63 ksi	58 ksi	73 ksi
Reinf 43.34 ksi	43 ksi	55 ksi	Reinf 57.80 ksi	58 ksi	73 ksi
Reinf 43.47 ksi	43 ksi	55 ksi	Reinf 62.50 ksi	63 ksi	79 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 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.6%

TORQUE 1 kip-ft
38 mph WIND - 1.2500 in ICE

TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

Paul J. Ford and Company
250 East Broad St, Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX:

Job: *150' MP; Oxford, CT; Oxford/ Fritz Property*			
Project: *PJF 37512-1027 Rev (BU 876362)*			
Client: Crown Castle	Drawn by: TDehnke	App'd:	
Code: TIA/EIA-222-F	Date: 07/23/12	Scale: NTS	
Path:		Dwg No. E-1	

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

TIA Rev F

Site Data

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

Reactions		
Moment:	2332.44	ft-kips
Axial:	37	kips
Shear:	26	kips

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

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:	3	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6.75	in
Height:	13.75	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	80	ksi
Clear Space between Stiffeners (b):	5.5	in

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	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	169.7 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	87.0% Pass	

Base Plate Results

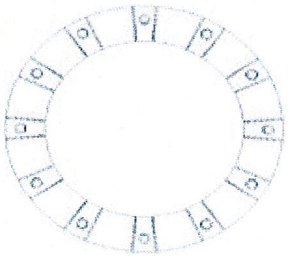
	Shear Check Only	Stiffened
Base Plate Stress:	7.4 ksi	Service, ASD
Allowable Plate Stress:	32.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	23.3% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	54.1% Pass
Vertical Weld:	33.0% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	28.2% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	56.7% Pass
Plate Comp. (AISC Bracket):	72.8% Pass

Pole Results

Pole Punching Shear Check:	13.2% 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

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

v4.1 - Effective 7-3-12

Date: 7/23/2012
PJF Project: 37512-1027
Client Ref. # 876362
Site Name:
Description:
Owner:
Engineer: TJD

Asymmetric Anchor Rod Analysis

Moment =	2901	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	37.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	26.0	kips	Max Ratio =	100.0%	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	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	175.05	169.69	169.69	0.00	195.00	87.0%
2	2.250	#18J A615 Gr 75	75	100	30.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
3	2.250	#18J A615 Gr 75	75	100	60.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
4	2.250	#18J A615 Gr 75	75	100	90.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
5	2.250	#18J A615 Gr 75	75	100	120.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
6	2.250	#18J A615 Gr 75	75	100	150.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
7	2.250	#18J A615 Gr 75	75	100	180.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
8	2.250	#18J A615 Gr 75	75	100	210.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
9	2.250	#18J A615 Gr 75	75	100	240.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
10	2.250	#18J A615 Gr 75	75	100	270.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
11	2.250	#18J A615 Gr 75	75	100	300.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
12	2.250	#18J A615 Gr 75	75	100	330.0	54.00	0.00	3.98	175.05	169.69	169.69	0.00	195.00	87.0%
13	1.750	A193 Gr B7	105	125	15.0	69.00	0.00	2.41	134.72	131.49	131.49	0.00	132.29	99.4%
14	1.750	A193 Gr B7	105	125	135.0	69.00	0.00	2.41	134.72	131.49	131.49	0.00	132.29	99.4%
15	1.750	A193 Gr B7	105	125	255.0	69.00	0.00	2.41	134.72	131.49	131.49	0.00	132.29	99.4%
								54.98						

PJF job no. **37512-1027R1 A** Project name **150' MP**

Foundation Loads:

Pole weight or tower leg compression =	37	(kips)
Horizontal load at top of pier =	26	(kips)
Overturning moment at top of pier=	2901	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	

Soil Properties:

Soil density =	100	(pcf)
Allowable soil bearing =	16	(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 =	5	(ft)
Footing thickness =	4.5	(ft)
Footing width =	22.75	(ft)
Footing length =	22.75	(ft)

Concrete:

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

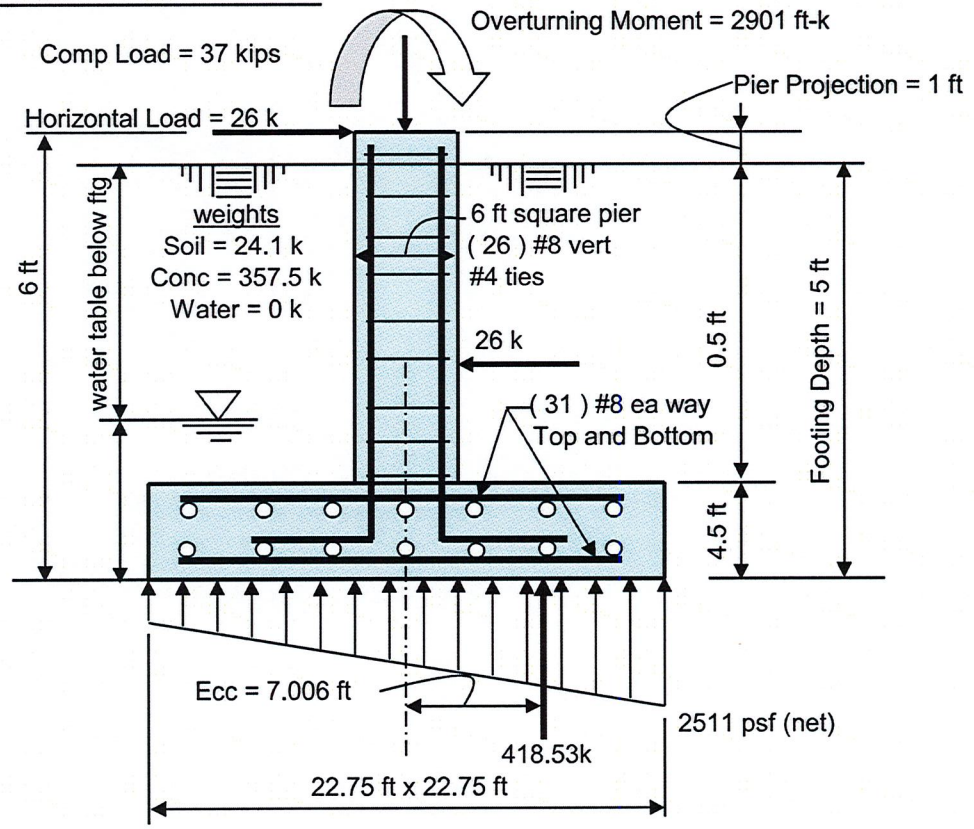
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#8	bar
quantity of pad rebar =	31	(ea direction)

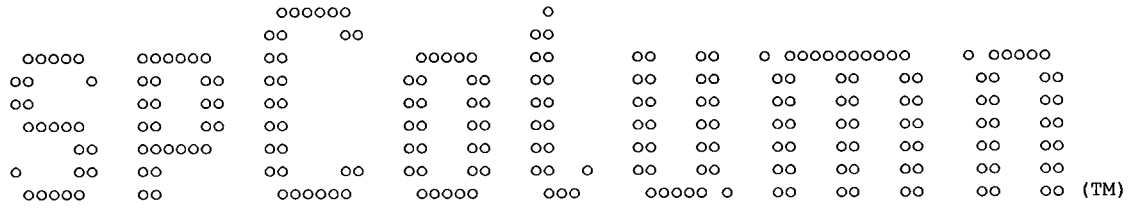
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#8	bar
vertical rebar quantity =	26	
size of pier ties =	#4	bar
minimum cover over rebar =	4.5	inches

Total volume of concrete = 88.3 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.511 ksf Allowable Net Soil Bearing = 16 ksf **Soil Bearing Stress Ratio = 0.16 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 23 psi **Bending Shear Stress Ratio = 0.18 Okay**
Ftg Overturning Resistance = 4761 ft-kips Overturning Moment = 2932 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.624 **Ratio = 0.92 Okay**	Pad Bending Moment Capacity= 5368 ft-k Pad Bending Moment = 1539 ft-k **Bending Moment Stress Ratio = 0.29 OK**



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

General Information:
==========
File Name: T:\375_Crown_Castle\2012\37512-1027 BU 876362\...\37512-1027R1_B_anchor fully develop.col
Project: 37512-1027
Column:
Code: ACI 318-08

Engineer: lgr
Units: English

Run Option: Investigation
Run Axis: X-axis

Slenderness: Not considered
Column Type: Structural

Material Properties:
==========
f'c = 4 ksi
Ec = 3605 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

fy = 60 ksi
Es = 29000 ksi

Section:
==========
Rectangular: Width = 72 in

Depth = 72 in

Gross section area, Ag = 5184 in^2
Ix = 2.23949e+006 in^4
rx = 20.7846 in
Xo = 0 in

Iy = 2.23949e+006 in^4
ry = 20.7846 in
Yo = 0 in

Reinforcement:
==========
Bar Set: ASTM A615

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

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

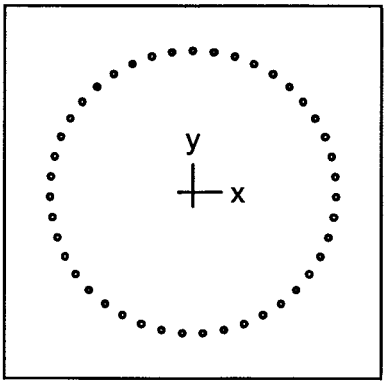
Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 54.61 in^2 at rho = 1.05%
Minimum clear spacing = 2.72 in

43 #10 Cover = 7.56 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	0.00	3822.00	7245.47	1.896	11.65	63.23	0.01330	0.900

*** End of output ***



72 x 72 in

Code: ACI 318-08

Units: English

Run axis: About X-axis

Run option: Investigation

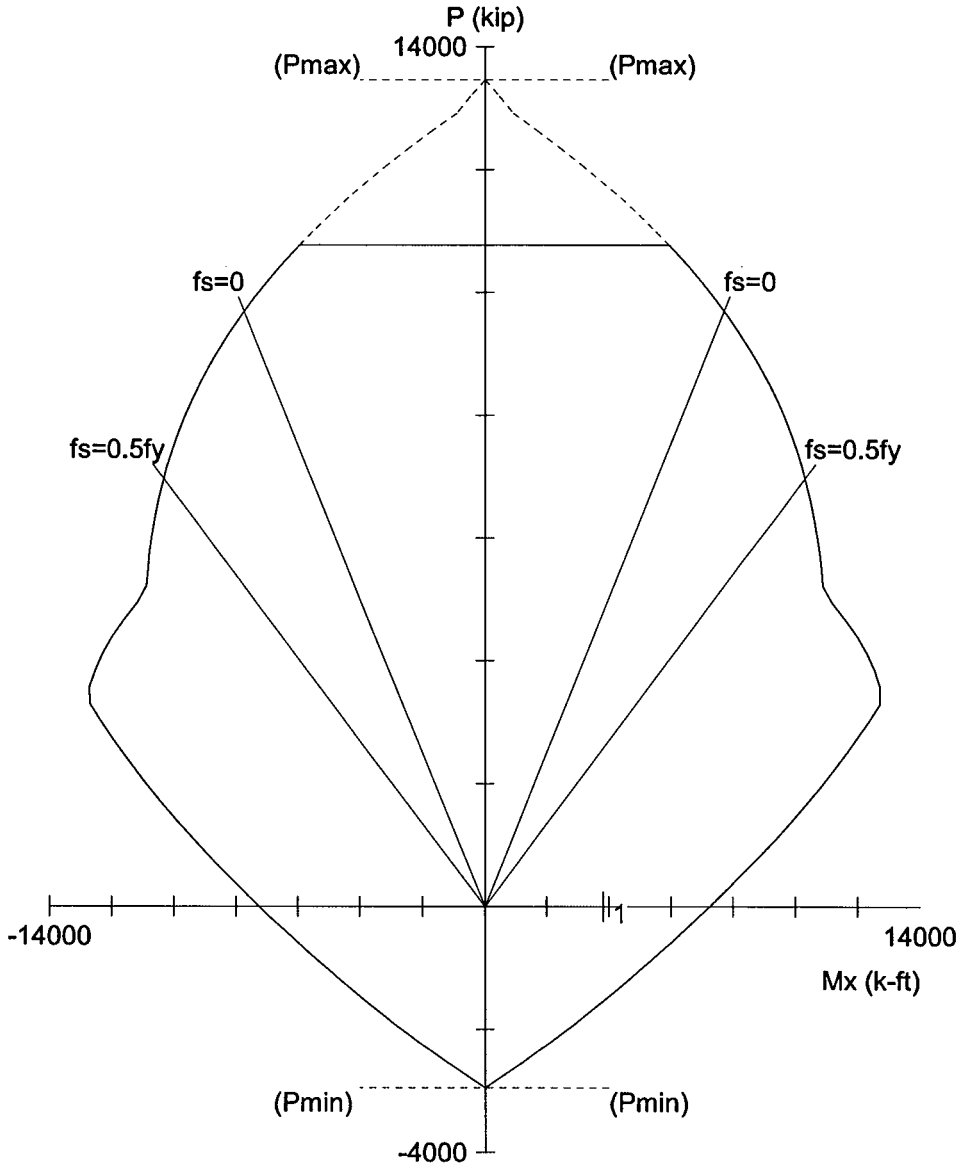
Slenderness: Not considered

Column type: Structural

Bars: ASTM A615

Date: 07/24/12

Time: 10:32:07



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Project: 37512-1027

Column:

Engineer: lgr

f'c = 4 ksi	fy = 60 ksi	Ag = 5184 in^2	43 #10 bars
Ec = 3605 ksi	Es = 29000 ksi	As = 54.61 in^2	rho = 1.05%
fc = 3.4 ksi		Xo = 0.00 in	Ix = 2.23949e+006 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 2.23949e+006 in^4
Beta1 = 0.85		Min clear spacing = 2.72 in	Clear cover = 8.06 in

Confinement: Tied

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

37512-1027 PERMIT.DWG

CROWN CASTLE PROJECT: BU #876362; OXFORD / FRITZ PROPERTY; 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 37.6 MPH + 1 1/4" 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 ENSURE 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 ENSURE 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-10066 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
- (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
- (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
- (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
- (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
- (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI
- (1.) INSPECTION OF PLACEMENT OF REINFORCING STEEL.
- (2.) INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE.
- (3.) VERIFYING USE OF REQUIRED MIX DESIGN.
- (4.) AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TEST AND DETERMINE TEMPERATURE OF THE CONCRETE.
- (5.) INSPECTION OF CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUE.
- (6.) INSPECTION OF SPECIFIED CURING AND TEMPERATURE TECHNIQUES.

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
DAVID L. SUMMERS
No. 21884
LICENSED PROFESSIONAL ENGINEER

7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1027	ISSUE DATE OF PERMIT: 7-6-2012
DRAWN BY: B.M.S.	
CHECKED BY: T.J.D.	
APPROVED BY	S-1A
DATE: 7-6-2012	

37512-1027 PERMIT.DWG

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
   A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
      (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
      (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
      (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
   B. BY THE AMERICAN WELDING SOCIETY (AWS):
      (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
      (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
    (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
    (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
    (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

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

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
   (A.) CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED (6% +/- 1.5%).
   (B.) WATER CEMENT RATIO = 0.52 (MAXIMUM).
1. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.
2. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318, LATEST EDITION.
   CONTRACTOR SHALL FOLLOW ALL APPLICABLE ACI PROCEDURES FOR COLD WEATHER CONCRETE PLACEMENT.
3. ALL REINFORCING DETAILS SHALL CONFORM TO "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" ACI 315, LATEST EDITION, UNLESS DETAILED OTHERWISE ON THE STRUCTURAL DRAWINGS.
4. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OPENINGS, SLEEVES, ANCHOR RODS, INSERTS, ETC., AS REQUIRED BEFORE CONCRETE IS PLACED.
5. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED.
6. CONTRACTOR SHALL PROVIDE SPACERS, CHAIRS, BOLSTERS, ETC., NECESSARY TO SUPPORT REINFORCING STEEL. CHAIRS WHICH BEAR ON EXPOSED CONCRETE SURFACES SHALL HAVE ENDS WHICH ARE PLASTIC TIPPED OR STAINLESS STEEL.
7. ALL STRUCTURAL MEMBERS SHALL BE POURED MONOLITHICALLY, EXCEPT FOR REQUIRED CONSTRUCTION JOINTS. CONTRACTOR SHALL SUBMIT PROPOSED CONSTRUCTION JOINT LOCATIONS AND DETAILS TO THE ENGINEER FOR REVIEW.
8. CONTRACTOR SHALL PROVIDE 3/4-INCH CHAMFER ON ALL EXPOSED CORNERS UNLESS OTHERWISE INDICATED ON THE DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL BE MAINTAINED AS SPECIFIED BY ACI.
9. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
   3" ..... CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.
   2" ..... CONCRETE EXPOSED TO EARTH OR WEATHER, #6 THROUGH #18 BARS.
   1-1/2" ..... CONCRETE EXPOSED TO EARTH OR WEATHER, #5 BAR AND SMALLER.
10. FOOTING BARS SHALL BE BENT 1'-6" AROUND CORNERS, OR PROVIDE CORNER BARS WITH A 2'-0" LAP ON EACH LEG.
11. TESTING LABORATORY SHALL SUBMIT ONE COPY OF ALL CONCRETE TEST REPORTS DIRECTLY TO THE ENGINEER.
12. CONTRACTOR SHALL KEEP A COPY OF "FIELD REFERENCE MANUAL" (ACI PUBLICATION SP-15, LATEST EDITION) AT THE PROJECT FIELD OFFICE.
    FLY ASH SHALL BE PERMITTED. FLY ASH CONTENT SHALL BE A MAXIMUM OF 25% OF CEMENT WEIGHT

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 SEI-ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING DRAWING SHEETS FOR SPECIFIED ANCHOR ROD PROOF LOAD.
6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED AND BASE PLATE / BEARING PLATE GROUT HAS CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED AFTER TESTING), CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

I. TOUCH UP OF GALVANIZING

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

J. HOT DIP GALVANIZING

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

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
   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".

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DAVID L. SUMMERS
No. 21884
LICENSED
PROFESSIONAL ENGINEER

7/27/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1027
DRAWN BY: B.M.S.
CHECKED BY: T.J.D.
APPROVED BY:
DATE: 7-6-2012

ISSUE DATE OF PERMIT: 7-6-2012

S-2A

37512-1027 PERMIT.DWG

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.

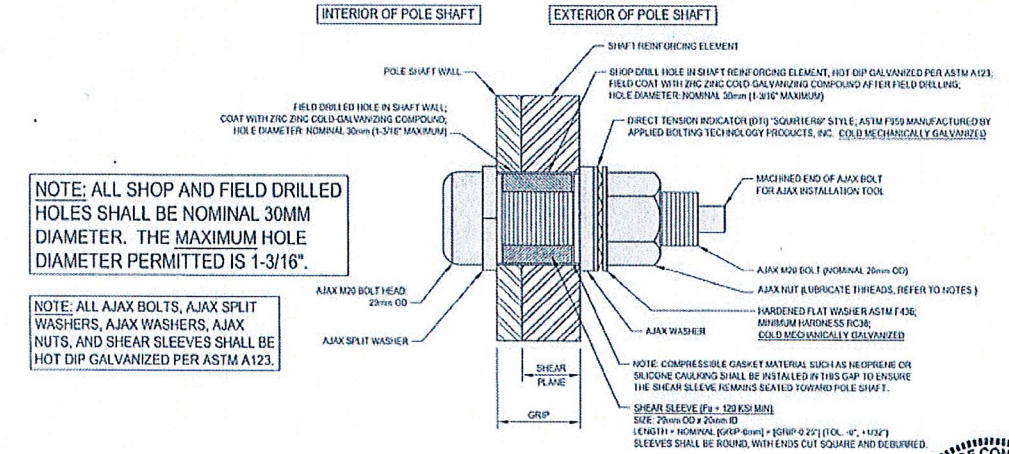
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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
DAVID L. SUMMERS
No. 21884
LICENSED PROFESSIONAL ENGINEER
7/24/12

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1027	ISSUE DATE OF PERMIT: 7-6-2012
DRAWN BY: B.M.S.	
CHECKED BY: T.J.D.	
APPROVED BY:	S-3A
DATE: 7-6-2012	

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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#37512-1027), DATED 7-23-2012.

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.2033 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A633 GR. E (60 KSI)
ANCHOR RODS:	2 1/4"Ø 4(B) ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	26.5500	0.1875	3.17	15.000	20.745
2	40.6300	0.2500	4.08	19.680	28.320
3	47.6300	0.3125	5.17	28.952	37.160
4	47.5800	0.3750		35.374	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.

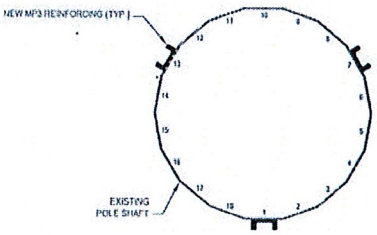
4. DTIS REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

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.

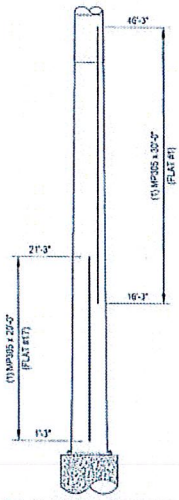
6. AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* 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 FMI.

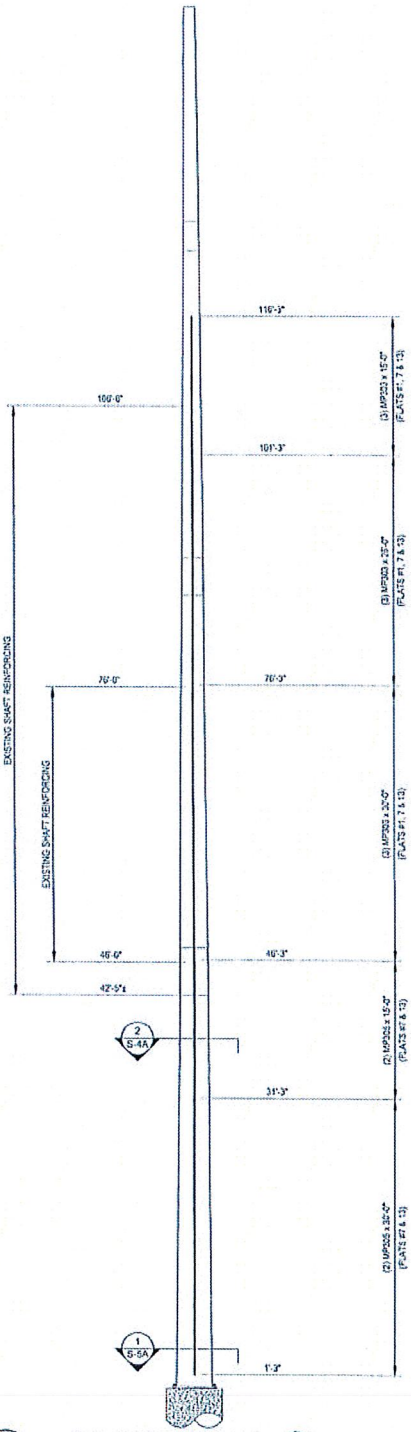
NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-1033 : TOWER BASE PLATE NDE AND ENG-BUL-10051 : NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR 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.



SECTION 2 / S-4A



POLE ELEVATION 2 / S-4A



POLE ELEVATION 1 / S-4A

STATE OF CONNECTICUT
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7/19/2012

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SPECIAL INSPECTION OF EXISTING SHAFT-TO FLANGE WELD CONNECTIONS:

(1.) PRIOR TO CONSTRUCTION, CONTRACTORS 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.

GENERAL NOTES:

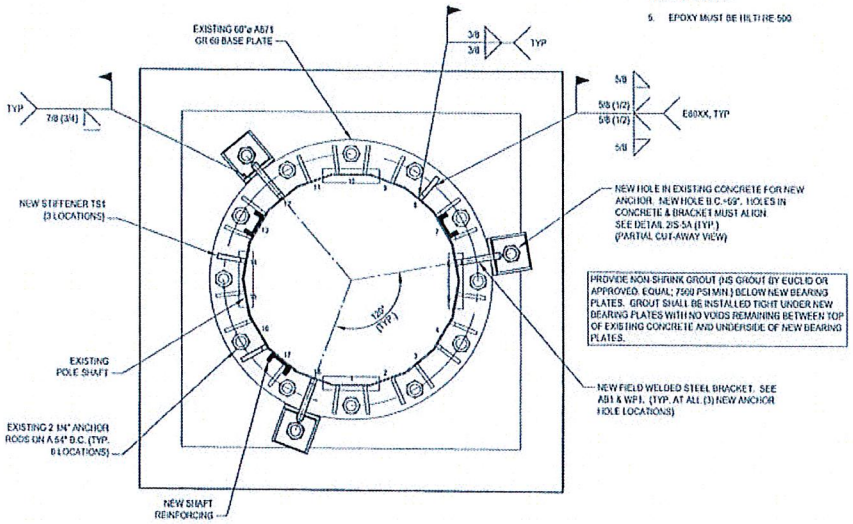
1. AJAX BOLTS ARE TO BE 20 mm Ø WITH CORRESPONDING 20 mm Ø SHEAR SLEEVE WITH MATCHING STEEL GRADE. DRILLED HOLE DIAMETERS IN REINFORCING STEEL AND EXISTING SHAFT SHALL BE ± 3/16"ø MAX.

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 1-800 631-3275 FOR PRODUCT INFORMATION.

3. ALL SHAFT REINFORCING IS A572 GR 65.

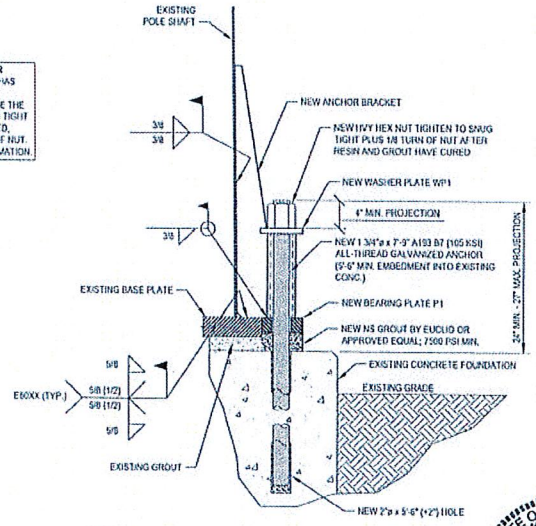
4. PRELIM DESIGN BASED ON FAILING SA BY PAUL J FORD & COMPANY, DATED JUNE 6, 2012.

5. EPOXY MUST BE HILTI HIT-RE 500



BASE PLATE 1 / S-5A

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED PRIOR TO GROUTING, ALL NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 160 KIPS. ONCE THE PROOF LOAD HAS BEEN RELEASED, TIGHTEN NUT TO SNUG TIGHT CONDITION AND INSTALL GROUT. AFTER GROUT HAS CURED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-2A, SECTION H FOR ADDITIONAL INFORMATION.



NEW ANCHOR & BRACKET DETAIL 2 / S-5A

STATE OF CONNECTICUT
PAUL L. SUMMERS
No. 21884
LICENSED
PROFESSIONAL ENGINEER

7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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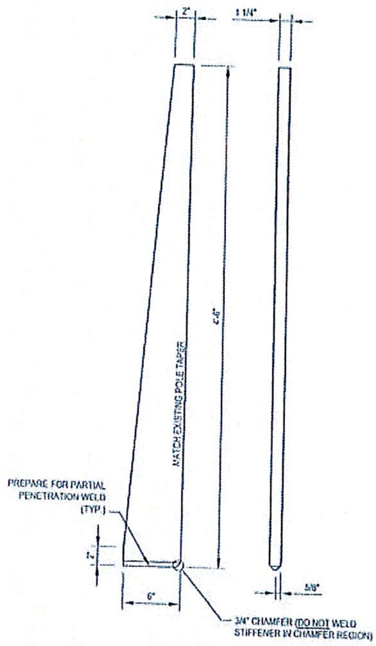
BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1027	ISSUE DATE OF PERMIT: 7-6-2012
DRAWN BY: B.M.S.	
CHECKED BY: T.J.D.	
APPROVED BY:	S-5A
DATE: 7-6-2012	

37512-1027 PERMIT.DWG



TRANSITION STIFFENER MK~TS1

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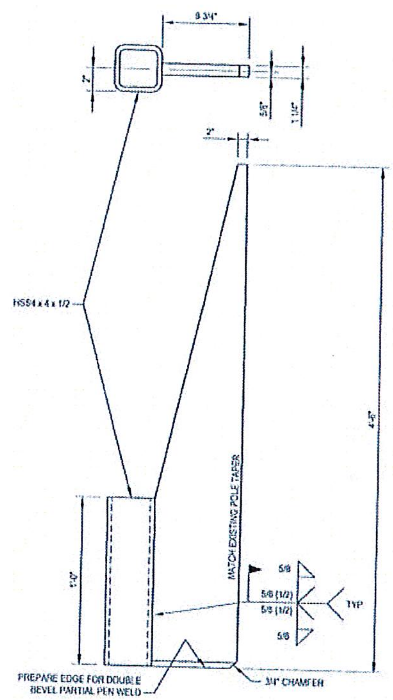

ANCHOR BRACKET MK~AB1

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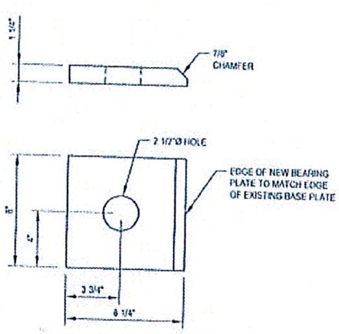
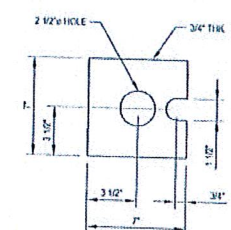


BEARING PLATE MK~P1

(4 REQUIRED) (Fy = 50 KSI)



WASHER PLATE MK~WP1

(3 REQUIRED) (Fy = 50 KSI)

STATE OF CONNECTICUT DAVID L. SUMMERS No. 21884 LICENSED PROFESSIONAL ENGINEER

7/24/2012

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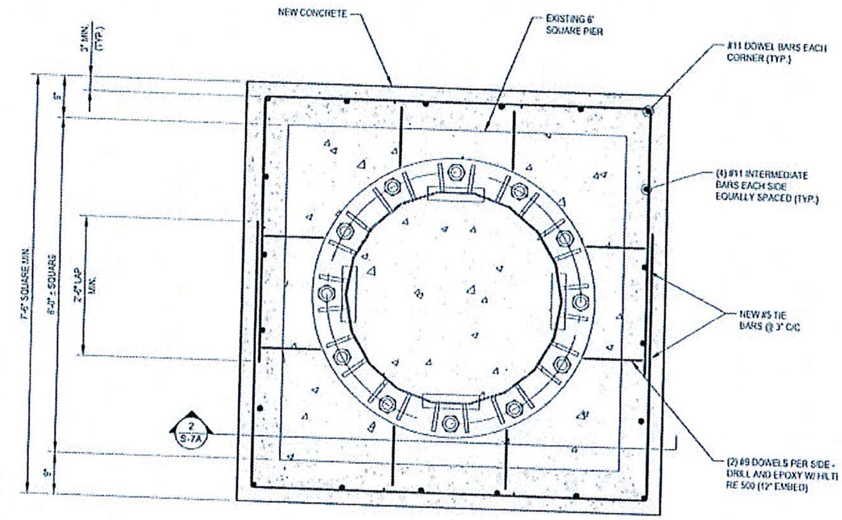
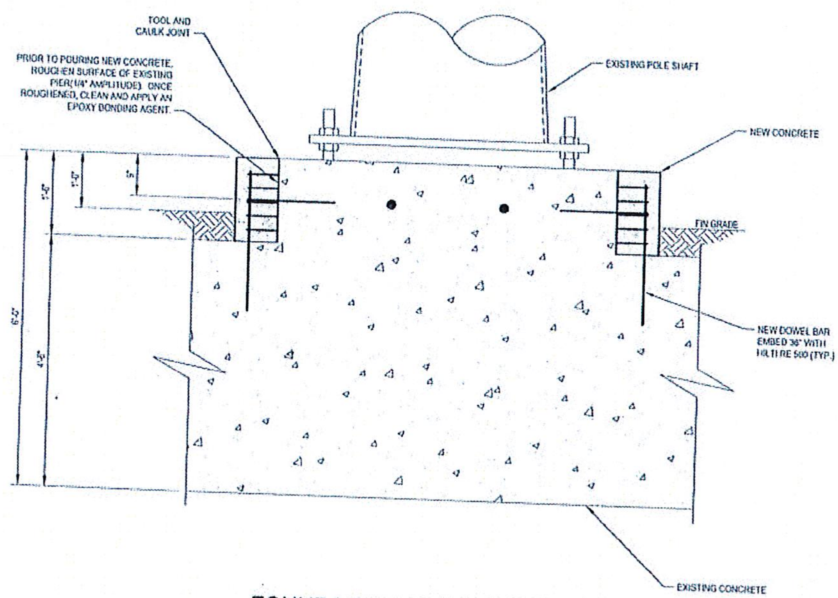


FOUNDATION REINFORCING PLAN (1 / S-7A)



FOUNDATION REINFORCING (2 / S-7A)

STATE OF CONNECTICUT
DAVID L. SUMMERS
No. 21884
LICENSED
PROFESSIONAL ENGINEER
7/24/2012

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S-7A

37512-1027 PERMIT.DWG

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-10173 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 BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT 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 PENALTIES 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 CROWN'S 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 AEV/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
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	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
X	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS BUILT DOCUMENTS
X	INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC.
X	INSPECTION OF AJAX BOLTS AND DTI'S 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
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DATE: 7-6-2012	S-8A

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

Calculated Radio Frequency Emissions

CT2090 – Oxford/Fritz Property

338 Oxford Road, Oxford, CT 06478

June 29, 2012

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 338 Oxford Road in Oxford, CT. The coordinates of the tower are 41° 25' 40.77" N, 73° 6' 30.75 W.

AT&T is proposing the following modifications:

1) Replace six of the nine existing dual-band (850/1900 MHz) panel antennas with six multi-band (700/850/1900/2100 MHz) antennas (two 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 UMTS	*140*	*880*	*1*	*500*	*0.0092*	*0.5867*	*1.56%*
Cingular GSM	*140*	*880*	*4*	*296*	*0.0217*	*0.5867*	*3.70%*
Cingular GSM	*140*	*1900*	*2*	*427*	*0.0157*	*1.0000*	*1.57%*
Verizon cellular	130	869	9	305	0.0584	0.5793	10.08%
Verizon PCS	130	1970	7	406	0.0605	1.0000	6.05%
Verizon AWS	130	2145	1	905	0.0193	1.0000	1.93%
Verizon LTE	130	698	1	636	0.0135	0.4653	2.91%
Sprint	150	1962.5	11	122	0.0214	1.0000	2.14%
AT&T UMTS	139	880	2	565	0.0021	0.5867	0.36%
AT&T UMTS	139	1900	2	875	0.0033	1.0000	0.33%
AT&T LTE	139	734	1	1375	0.0026	0.4893	0.52%
AT&T GSM	139	880	1	538	0.0010	0.5867	0.17%
AT&T GSM	139	1900	4	934	0.0070	1.0000	0.70%
						Total	**25.18%**

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 4/18/2012.

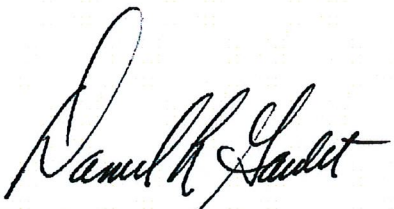
5. Conclusion

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 **25.18% 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

June 29, 2012
Date

Attachment A: References

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

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

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

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

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

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

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

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

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

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

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

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

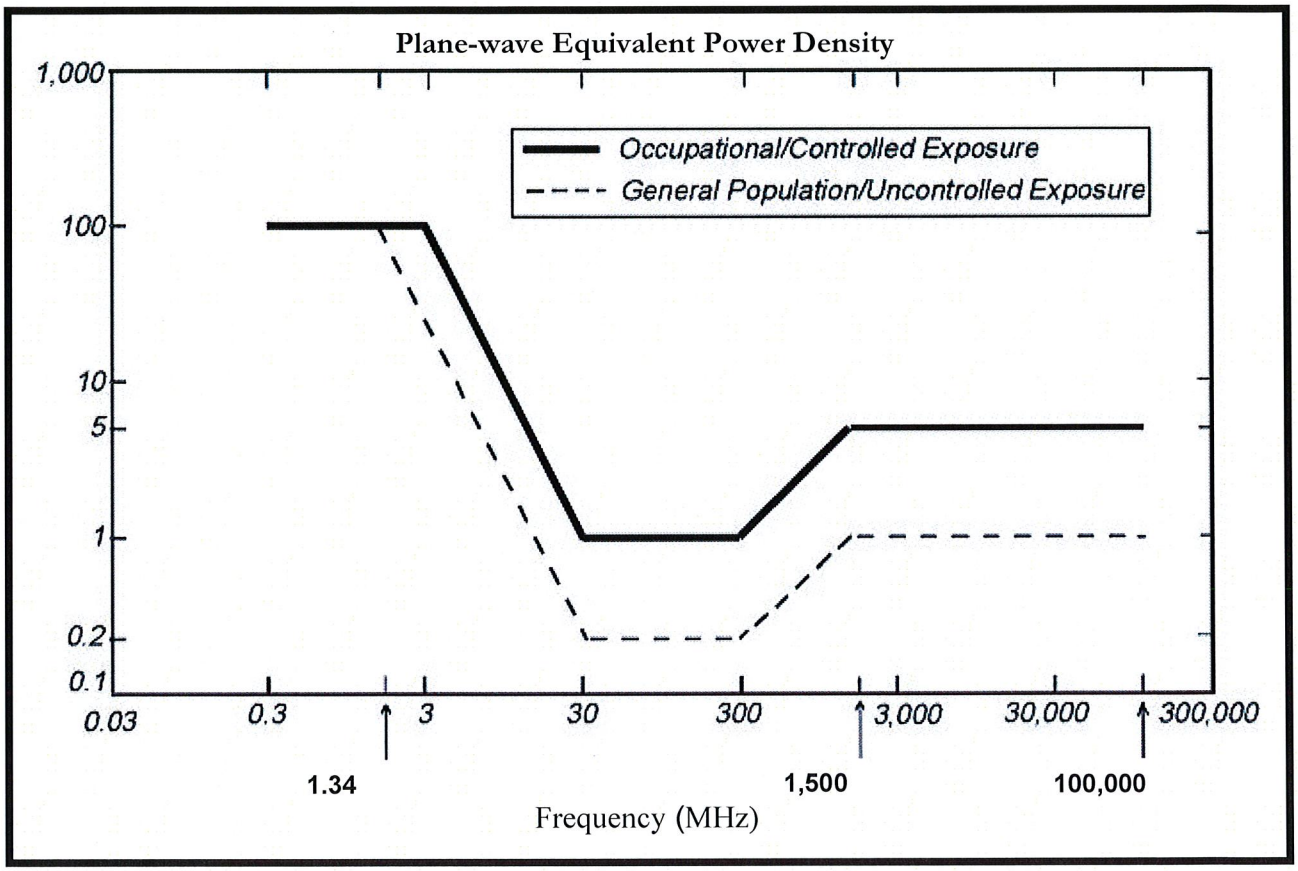
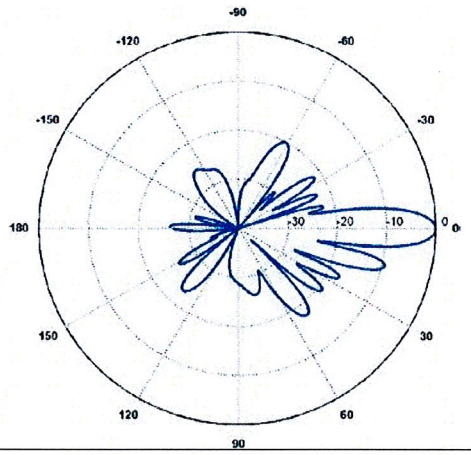


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

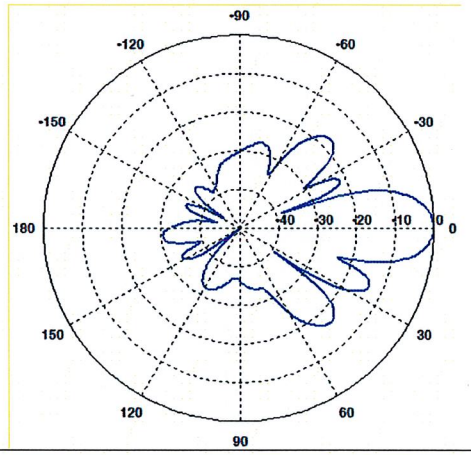
700 MHz

Manufacturer:	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"



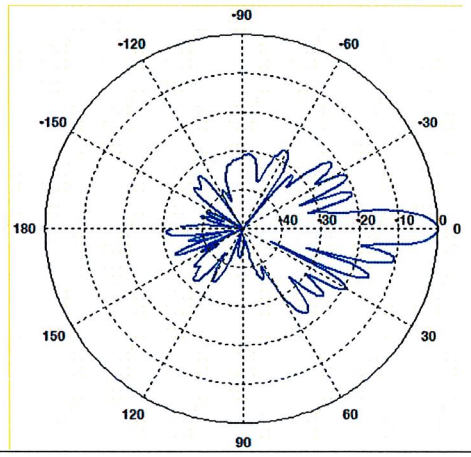
850 MHz UMTS

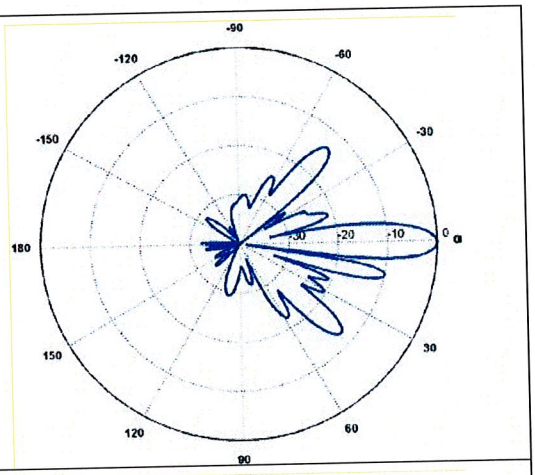
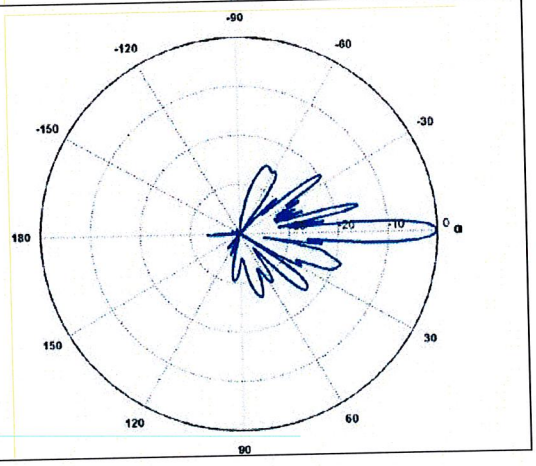
Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz UMTS

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	1850-1900 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.0" x 11.0" x 5.0"



850 MHz GSM 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 GSM Manufacturer: Commscope Model #: SBNH-1D6565C Frequency Band: 1850-1900 MHz Gain: 15.9 dBd Vertical Beamwidth: 5.1° Horizontal Beamwidth: 57° Polarization: ±45° Size L x W x D: 96.42" x 11.85" x 7.1"	

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

July 30, 2012

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

RE: **EM-CING-108-120730** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 338 Oxford 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 13, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

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

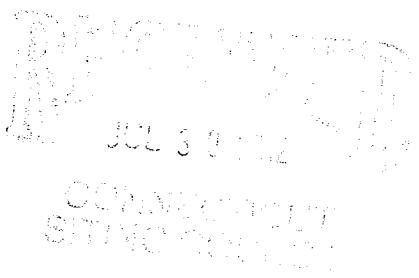
CSC
CONNECTICUT SITING COUNCIL

EM-CING-108-120730

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

HPC WIRELESS SERVICES

July 26, 2012



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
338 Oxford 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 338 Oxford Road, Oxford (coordinates 41°-25'-40.55" N, 73°-06'-43" 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 and replace six (6) existing antenna panels, and relocate three (3) antennas on the existing platform, all at a center line of approximately 139'; the platform will be rotated to achieve required azimuths. Three (3) RRU (remote radio units) and a surge arrestor will be mounted above the platform. AT&T will also place a

DC cable 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 place related equipment in its existing equipment shelter and mount a new GPS antenna on the shelter. These changes will be within the existing compound and will have no effect on the site boundaries.

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

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 2.08%; the combined site operations will result in a total power density of approximately 25.18%.

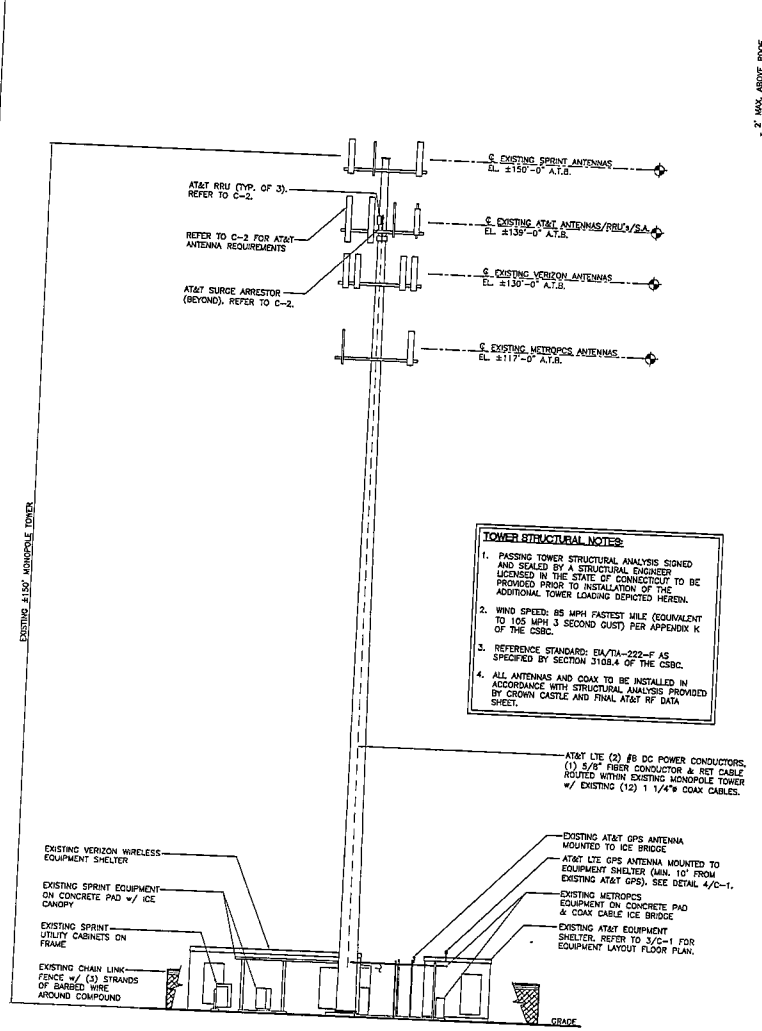
Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet

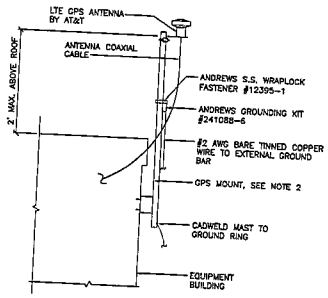
Attachments

cc: Honorable George R. Temple, First Selectman, Town of Oxford
William E. Jr. and Ellen S. Fritz (underlying property owner)



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

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



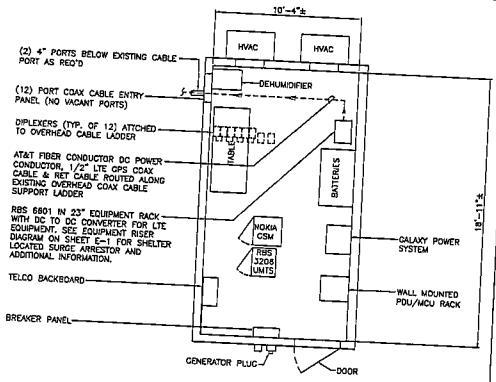
GPS ANTENNA MOUNTING NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND SHALL BE COORDINATED WITH AT&T'S CONSTRUCTION MANAGER.
2. GPS ANTENNA MOUNT, 3/4"ø THREADED MAST, 4 FEET LONG WITH (4) 7/16" MOUNTING HOLES AND 8" STANDOFF BY SITE PRO 1, INC., TELEPHONE 1-800-438-7761, PART NUMBER GPS1.
3. HOLLOW WALL KITS (HWK38) FOR "STICK BUILD" SHELTERS AND SOLID WALL KITS (SWK38) FOR CONCRETE SHELTERS ARE ALSO AVAILABLE FROM SITE PRO 1.

4 C-1 GPS ANTENNA MOUNTING DETAIL
NOT TO SCALE

TOWER STRUCTURAL NOTES:

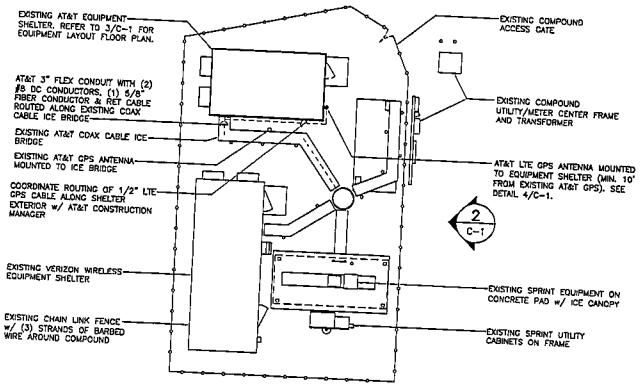
1. PASSING TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. WIND SPEED: 85 MPH FASTEST MILE (EQUIVALENT TO 105 MPH 3 SECOND GUST) PER APPENDIX K OF THE CSBC.
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.



3 C-1 EQUIPMENT SHELTER FLOOR PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.



1 C-1 COMPOUND PLAN
SCALE: 1" = 10'-0"

APPROX. NORTH

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

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

REV.	DATE	DRAWN BY	CHK'D BY
2	7/19/12	MAR	DEB
1	7/17/12	FLD	DEB
0	4/24/12	FLD	DEB

0 - CONSTRUCTION
1 - CLIENT REVIEW
2 - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

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

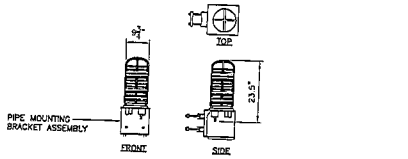
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2090
CROWN SITE # 876362
OXFORD- EAST
336 QUAKER FARMS ROAD
OXFORD, CT 06478

DATE:	07/19/12
SCALE:	AS NOTED
JOB NO.	11118.C018

PLANS, ELEVATION AND DETAIL

C-1

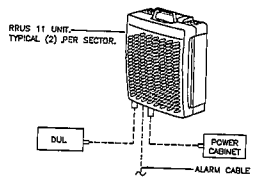
Sheet No. 3 of 8



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.

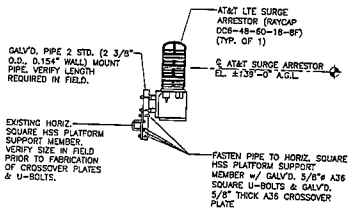
8 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



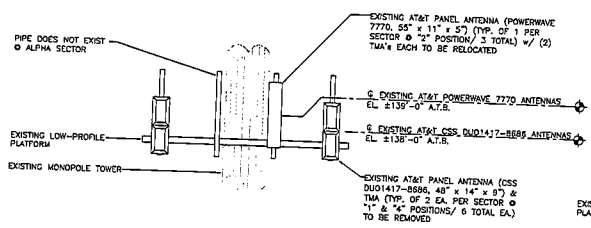
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

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

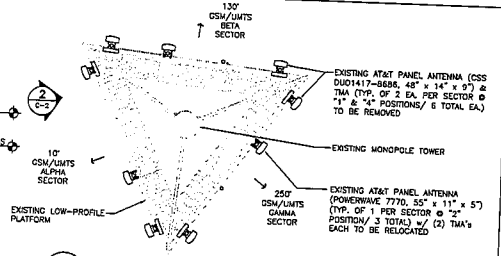
9 / C-2 RRU DETAIL
NOT TO SCALE



7 / C-2 LTE SURGE ARRESTOR MOUNT DETAIL
SCALE: 1/2" = 1'-0"

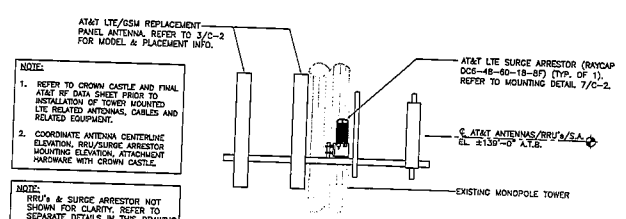


2 / C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"



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

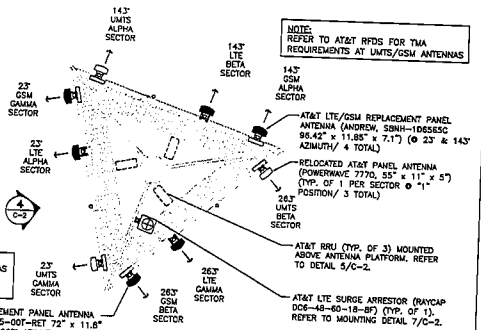
APPROX. NORTH



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

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

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

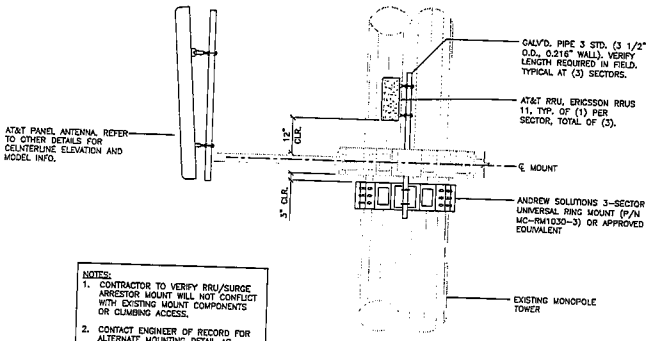


NOTE:
REFER TO AT&T RFDS FOR TMA REQUIREMENTS AT UMTS/GSM ANTENNAS

NOTE:
ROTATE EXISTING PLATFORM AS REQUIRED TO ACCOMMODATE PROPOSED AZIMUTHS.

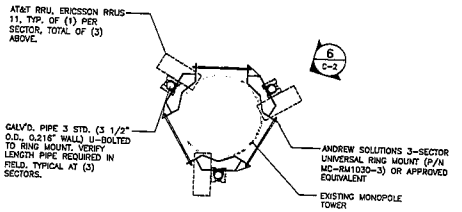
3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH



NOTES:
1. CONTRACTOR TO VERIFY RRU/SURGE ARRESTOR MOUNT WILL NOT CONFLICT WITH EXISTING MOUNT COMPONENTS OR CLIMBING ACCESS.
2. CONTACT ENGINEER OF RECORD FOR ALTERNATE MOUNTING DETAIL AS REQUIRED AND CROWN CASTLE FOR APPROVAL.

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



NOTE:
ANTENNA MOUNTING PLATFORM AND SURGE ARRESTOR (BELOW) NOT SHOWN FOR CLARITY.

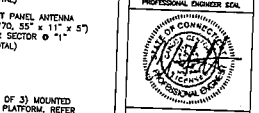
5 / C-2 RRU/SURGE ARRESTOR MOUNTING PLAN
SCALE: 1/2" = 1'- 0"

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

REV.	DATE	DRAWN BY	CHK'D BY
2	7/19/12	MAR	DEB
1	7/17/12	MAR	DEB
0	7/04/12	FLD	DEB

CONSTRUCTION - CLIENT REVIEW
CONSTRUCTION - CLIENT REVIEW
CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



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
CT2090
CROWN SITE # 876362
OXFORD- EAST
338 OXFORD ROAD
OXFORD, CT 06478

DATE: 07/19/12
SCALE: AS NOTED
JOB NO. 11118.0018

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 8

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

Date: **July 23, 2012**

Jason Rouse
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6605

Paul J. Ford and Company
250 East Broad St, Suite 1500
Columbus, OH 43215
614.221.6679
tdehnke@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2090
	Carrier Site Name:	Oxford Rd
Crown Castle Designation:	**Crown Castle BU Number:**	876362
	Crown Castle Site Name:	OXFORD / FRITZ PROPERTY
	Crown Castle JDE Job Number:	183460
	Crown Castle Work Order Number:	512743
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1027 BP R2 **Aero Solutions**
Site Data:	**338 Oxford Rd., OXFORD, New Haven County, CT** **Latitude *41° 25' 40.77"*, Longitude *-73° 6' 30.75"*** **150 Foot - Monopole Tower**	

Dear Jason Rouse,

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 476988, in accordance with application 144892, revision 3.

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 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 1.25 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:

Thomas J. Dehnke E.I.T.
Project Engineer

tnxTower Report - version 6.0.3.0

STATE OF CONNECTICUT
DAVID L. SUMMERS
No. 21884
LICENSED
PROFESSIONAL ENGINEER

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in September of 1999. The tower was originally designed for a wind speed of 89.25 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 1.25 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
137.0	139.0	4	andrew	SBNH-1D6565C w/ Mount Pipe	1 2	3/8 3/4	-
		6	communication components inc.	DTMABP7819VG12A			
		3	ericsson	RRUS-11			
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave	7020.00			
		1	raycap	DC6-48-60-18-8F			
	137.0	1	tower mounts	Collar Mount (MTC3335)			

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	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	3
		1	tower mounts	Platform Mount [LP 601-1]	-	-	1
		1	tower mounts	Miscellaneous [NA 507-1]	3	1-1/4	2
	150.0	3	RFS/CELWAVE	APXVSPP18-C-A20			
		9	RFS/CELWAVE	ACU-A20-N			
		3	ALCATEL	1900MHz RRH (65MHz)			
		3	ALCATEL	800MHz RRH			
		3	ALCATEL	800 EXTERNAL NOTCH FILTER			
137.0	139.0	6	adc	DD1900 FULL BAND w/850 BY-PASS MASTHEAD	12	1 1/4	1
		3	powerwave	7770.00 w/ Mount Pipe			
		6	powerwave	LGP21901			
	137.0	1	tower mounts	Platform Mount [LP 712-1]			
127.0	130.0	1	gps	GPS_A	1 12	1/2 1 5/8	1
	129.0	3	antel	BXA-171063-12BF w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		6	rfs celwave	APL866513-42T0 w/ Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	127.0	1	tower mounts	Platform Mount [LP 712-1]			
117.0	117.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	6 1	1 5/8 3/8	1
		1	tower mounts	T-Arm Mount [TA 601-3]			
75.0	76.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	75.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing equipment
2) Reserved equipment
3) Existing Equipment to be removed.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc., Sprint Site CT23xC508, 9/15/1999	1531939	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 5724,1/26/2000	1440552	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 99-1188, 9/21/1999	1441271	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 080876.07, 12/01/2008	2364904	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA (PROPOSED #1)	PJF 37511-1194 BP, 12/21/2011	3041498	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-1027R1 B, 06/06/2012	3232137	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Existing pier vertical reinforcing is assumed carry pole base shear across the interface between the pier and mat. The existing anchors are assumed to transfer the pole base moment directly into the mat portion of the foundation.
5) For the existing reinforcing, the monopole was reinforced in conformance with the referenced modification drawings.
6) Monopole will be reinforced in conformance to the referenced PJF proposed modification documents.
7) Monopole will be reinforced in conformance to the attached proposed modification documents.

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 - 123.42	Pole	TP20.74x15x0.1875	1	-5.59	614.69	78.5	Pass
L2	123.42 - 115.25	Pole	TP22.0918x19.6804x0.25	2	-7.46	901.01	94.5	Pass
L3	115.25 - 105.25	Pole	TP24.2182x22.0918x0.3845	3	-8.83	1293.52	88.9	Pass
L4	105.25 - 101.9	Pole	TP24.9305x24.2182x0.5774	4	-9.45	1426.64	88.2	Pass
L5	101.9 - 101.25	Pole	TP25.0687x24.9305x0.6054	5	-9.59	1621.83	78.8	Pass
L6	101.25 - 85.96	Pole	TP28.32x25.0687x0.5671	6	-11.77	1677.43	92.4	Pass
L7	85.96 - 76.25	Pole	TP29.8904x26.3182x0.6021	7	-15.43	1945.93	97.0	Pass
L8	76.25 - 75	Pole	TP30.1567x29.8904x0.599	8	-15.71	1954.55	97.8	Pass
L9	75 - 72.15	Pole	TP30.7639x30.1567x0.7005	9	-16.52	2327.11	85.3	Pass
L10	72.15 - 42.41	Pole	TP37.1x30.7639x0.6479	10	-23.13	2657.54	91.6	Pass
L11	42.41 - 31.25	Pole	TP38.849x34.7028x0.5358	11	-25.67	2781.17	93.0	Pass
L12	31.25 - 18.75	Pole	TP41.5094x38.849x0.5216	12	-30.23	3035.21	93.2	Pass
L13	18.75 - 0	Pole	TP45.5x41.5094x0.4491	13	-31.94	2925.92	99.6	Pass
							Summary	
						Pole (L13)	99.6	Pass
						RATING =	99.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	99.4	Pass
1	Base Plate	0	72.8	Pass
1	Base Foundation Soil Interaction	0	92.4	Pass
1	Base Foundation Structural Steel	0	52.8	Pass

Structure Rating (max from all components) =	99.6%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.

4.1) Recommendations

1) See attached proposed modification drawings
2) Existing empty pipe mounts at the 150-Ft elevation are to be removed upon installation of the proposed equipment.

CROWN CASTLE PROJECT: BU #876362; OXFORD / FRITZ PROPERTY; 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 37.6 MPH + 1 1/4" 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 ENSURE 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 ENSURE 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-10066 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
   - (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
   - (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
   - (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
   - (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
   - (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI
   - (1.) INSPECTION OF PLACEMENT OF REINFORCING STEEL.
   - (2.) INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE.
   - (3.) VERIFYING USE OF REQUIRED MIX DESIGN
   - (4.) AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TEST AND DETERMINE TEMPERATURE OF THE CONCRETE
   - (5.) INSPECTION OF CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUE.
   - (6.) INSPECTION OF SPECIFIED CURING AND TEMPERATURE TECHNIQUES.

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
DAVID L. SUMMERS
No. 21884
LICENSED PROFESSIONAL ENGINEER
7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1027
DRAWN BY: B.M.S.
CHECKED BY: T.J.D.
APPROVED BY:
DATE: 7-6-2012

ISSUE DATE OF PERMIT: 7-6-2012

S-1A

D. STRUCTURAL STEEL

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

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

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

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

E. BASE PLATE GROUT

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

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
   - (A.) CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED (6% +/- 1.5%).
   - (B.) WATER CEMENT RATIO = 0.52 (MAXIMUM).
1. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.
2. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318, LATEST EDITION. CONTRACTOR SHALL FOLLOW ALL APPLICABLE ACI PROCEDURES FOR COLD WEATHER CONCRETE PLACEMENT.
3. ALL REINFORCING DETAILS SHALL CONFORM TO "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" ACI 315, LATEST EDITION, UNLESS DETAILED OTHERWISE ON THE STRUCTURAL DRAWINGS.
4. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OPENINGS, SLEEVES, ANCHOR RODS, INSERTS, ETC., AS REQUIRED BEFORE CONCRETE IS PLACED.
5. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED.
6. CONTRACTOR SHALL PROVIDE SPACERS, CHAIRS, BOLSTERS, ETC., NECESSARY TO SUPPORT REINFORCING STEEL. CHAIRS WHICH BEAR ON EXPOSED CONCRETE SURFACES SHALL HAVE ENDS WHICH ARE PLASTIC TIPPED OR STAINLESS STEEL.
7. ALL STRUCTURAL MEMBERS SHALL BE POURED MONOLITHICALLY, EXCEPT FOR REQUIRED CONSTRUCTION JOINTS. CONTRACTOR SHALL SUBMIT PROPOSED CONSTRUCTION JOINT LOCATIONS AND DETAILS TO THE ENGINEER FOR REVIEW.
8. CONTRACTOR SHALL PROVIDE 3/4-INCH CHAMFER ON ALL EXPOSED CORNERS UNLESS OTHERWISE INDICATED ON THE DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL BE MAINTAINED AS SPECIFIED BY ACI
9. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:
   - 3" .... CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.
   - 2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #6 THROUGH #18 BARS
   - 1-1/2" .... CONCRETE EXPOSED TO EARTH OR WEATHER, #5 BAR AND SMALLER
10. FOOTING BARS SHALL BE BENT 1'-6" AROUND CORNERS, OR PROVIDE CORNER BARS WITH A 2'-0" LAP ON EACH LEG.
11. TESTING LABORATORY SHALL SUBMIT ONE COPY OF ALL CONCRETE TEST REPORTS DIRECTLY TO THE ENGINEER.
12. CONTRACTOR SHALL KEEP A COPY OF "FIELD REFERENCE MANUAL" (ACI PUBLICATION SP-15, LATEST EDITION) AT THE PROJECT FIELD OFFICE. FLY ASH SHALL BE PERMITTED. FLY ASH CONTENT SHALL BE A MAXIMUM OF 25% OF CEMENT WEIGHT

H. EPOXY GROUTED REINFORCING ANCHOR RODS

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

I. TOUCH UP OF GALVANIZING

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

J. HOT DIP GALVANIZING

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

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

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

STATE OF CONNECTICUT — DAVID L. SUMMERS — No. 21884 — LICENSED PROFESSIONAL ENGINEER

7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS 250 East Broad Street · Suite 1500 · Columbus, Ohio 43215 (614) 221-6679 · www.pjfweb.com CROWN CASTLE 3530 TORINGDON WAY, SUITE 300, CHARLOTTE, NC 28277 PH: (980) 759-7010 · FAX: (980) 759-5649	BU #876362; OXFORD / FRITZ PROPERTY OXFORD, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT	PROJECT No: 37512-1027 DRAWN BY: B.M.S CHECKED BY: T.J.D. APPROVED BY: DATE: 7-6-2012	ISSUE DATE OF PERMIT: 7-6-2012 S-2A

37512-1027 PERMIT.DWG

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

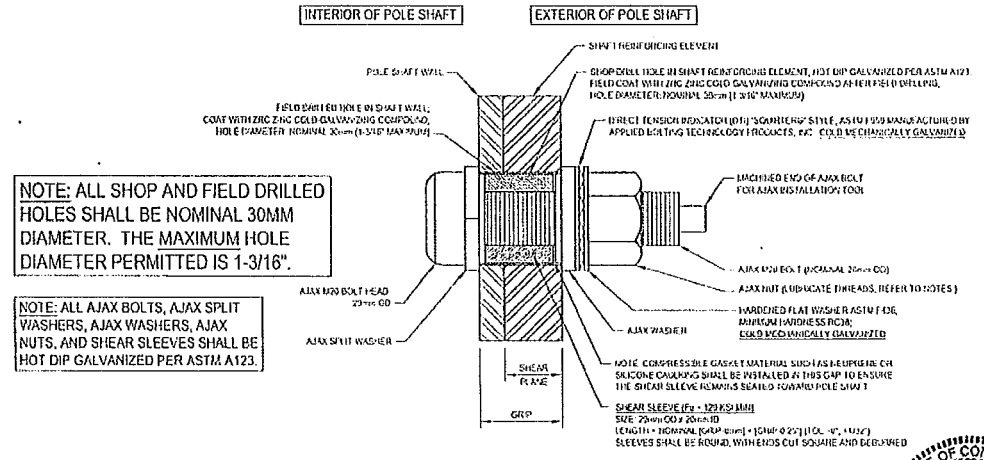
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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 CONNECTION DAVID L. SUMMERS No. 21884 LICENSED PROFESSIONAL ENGINEER

7/26/12

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No.	37512-1027
DRAWN BY:	B.M.S.
CHECKED BY	T.J.D.
APPROVED BY	
DATE:	7-6-2012

ISSUE DATE OF PERMIT: 7-6-2012

S-3A

37512-1027 PENSAT.DWG

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#37512-1027), DATED 7-23-2012.

POLE SPECIFICATIONS	
POLE SHAPE TYPE	18-SIDED POLYGON
TAPER	0.2033 IN/FT
SHAFT STEEL	ASTM A572 GRADE 65
BASE PL STEEL	ASTM A633 GR. E (80 KSI)
ANCHOR RODS	2 #11 @ 41BJ ASTM A615 GRADE 75

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	26.5500	0.1875	3.17	15.000	20.743
2	40.0000	0.2500	4.00	19.000	28.320
3	17.6250	0.3125	5.17	28.952	31.100
4	17.5000	0.3750		35.374	45.000

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

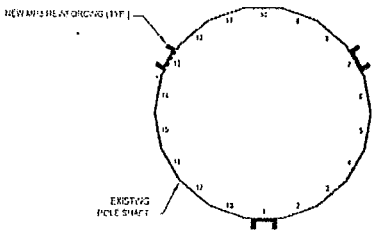
4. DTIS REQUIRED * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC35 OR HIGHER

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

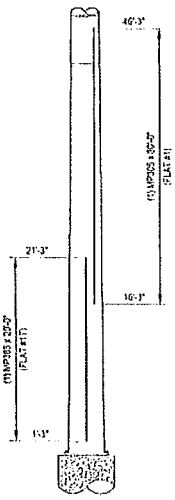
6. AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 20MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1.3MM. REFER TO SHEET S-3.

* 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 FIR

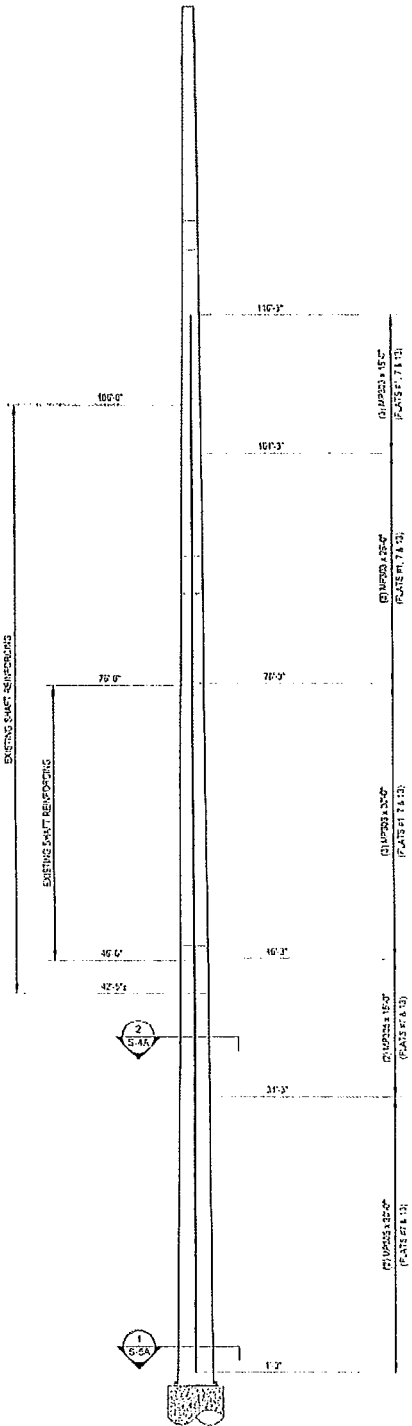
NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-1033 : LOWER BASE PLATE NDE AND ENG-BUL-1005I : NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR 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



SECTION 2 / S-4A



POLE ELEVATION 2 / S-4A



POLE ELEVATION 1 / S-4A

STATE OF CONNECTICUT DAVID L. SUMMERS No. 21884 LICENSED PROFESSIONAL ENGINEER

7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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37512-1027 PERMIT DWG

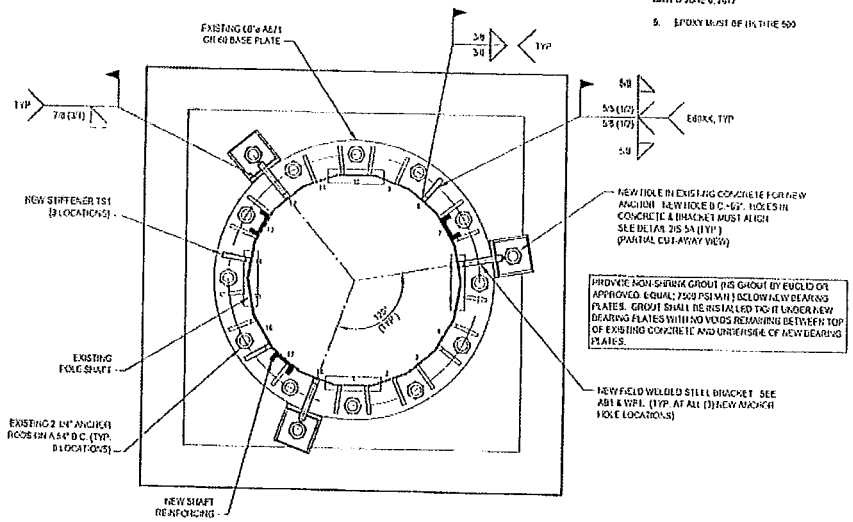
SPECIAL INSPECTION OF EXISTING SHAFT-TO FLANGE WELD CONNECTIONS:

(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, TEST AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND/OR WELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE (1) ABOVE

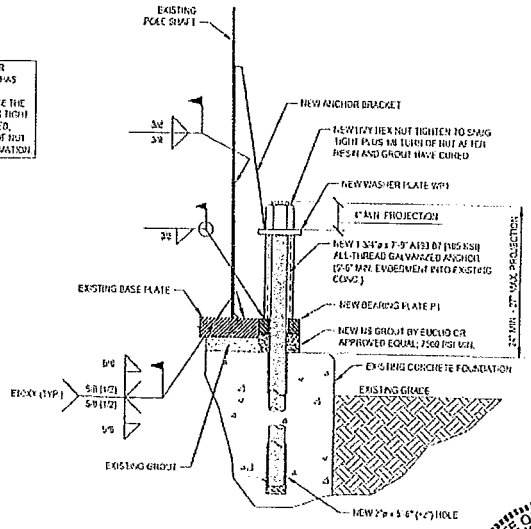
GENERAL NOTES:

1. AJAX BOLTS ARE TO BE 29 mm Ø WITH CORRESPONDING 29 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 FIELD CHECKS 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 1 800 631-3275 FOR PRODUCT INFORMATION.
3. ALL SHAFT REINFORCING IS A572 GR50.
4. PRELIM DESIGN BASED ON FAILING SA BY PAUL J FORD & COMPANY, DATED JUNE 6, 2012
5. EPOXY MUST BE ITA TYPE 500



BASE PLATE 1 / S-5A

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED PRIOR TO GROUTING, ALL NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 160 KIPS. ONCE THE PROOF LOAD HAS BEEN RELEASED, TIGHTEN NUT TO SNUG TIGHT CONDITION AND INSTALL GROUT. AFTER GROUT HAS CURED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-5A, SECTION 1 FOR ADDITIONAL INFORMATION.



NEW ANCHOR & BRACKET DETAIL

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DAVID L. SUMMERS
No. 21884
LICENSED PROFESSIONAL ENGINEER
7/24/2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #876362; OXFORD / FRITZ PROPERTY
OXFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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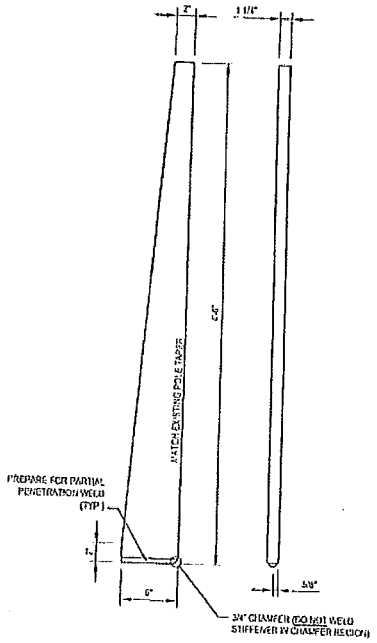
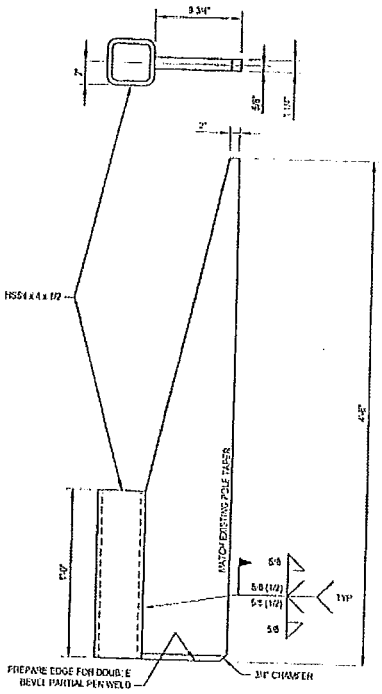
APPROVED BY	S-5A
DATE: 7-6-2012	

37512-1027 PERMIT.DWG



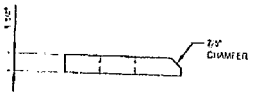
TRANSITION STIFFENER MK~TS1

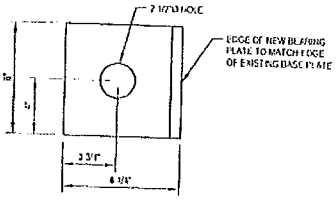
(3 REQUIRED) (Fy = 65 KSI)



ANCHOR BRACKET MK~AB1

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





BEARING PLATE MK~P1

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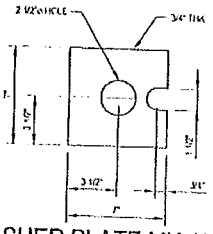

WASHER PLATE MK~WP1

(3 REQUIRED) (Fy = 50 KSI)

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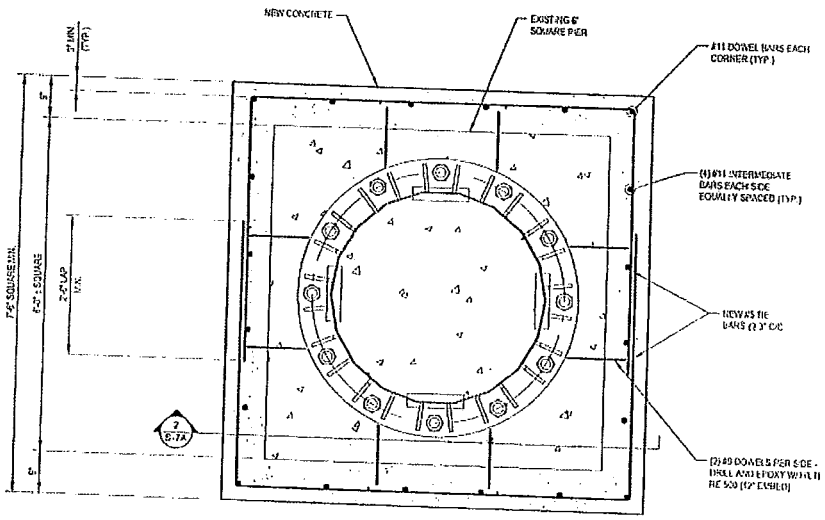
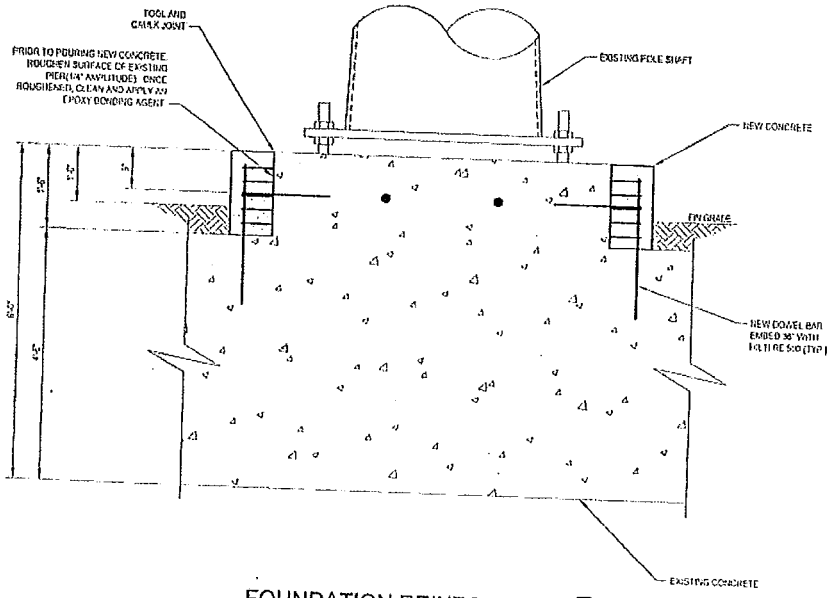


FOUNDATION REINFORCING PLAN 1 S-7A



FOUNDATION REINFORCING 2 S-7A

STATE OF CONNECTICUT
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7/24/2012

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37512-1027 PLIGHT DWG

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 (MEV) OR ENGINEERING SERVICE VENDOR (MESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10017 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 BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC)

REFER TO ENG-SOW-10027 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 AS DEFINED IN SOW 10027

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DETAILING 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 PENALTIES 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 SUPPLEMENTAL MI
- OR, WITH CROWN'S 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-10027

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT ANALYSIS FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING" OR "PASS AS NOTED" 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 WELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED MANDATORY

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-10027.

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
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	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
X	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS BUILT DOCUMENTS
X	INSPECTION OF BOLT PRETENSION PER ASC BOLT SPEC.
X	INSPECTION OF ANY 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 PRE REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE FINAL REPORT

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Calculated Radio Frequency Emissions

at&t

CT2090 – Oxford/Fritz Property

338 Oxford Road, Oxford, CT 06478

June 29, 2012

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 338 Oxford Road in Oxford, CT. The coordinates of the tower are 41° 25' 40.77" N, 73° 6' 30.75 W.

AT&T is proposing the following modifications:

1) Replace six of the nine existing dual-band (850/1900 MHz) panel antennas with six multi-band (700/850/1900/2100 MHz) antennas (two 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 UMTS	*140*	*880*	*1*	*500*	*0.0092*	*0.5867*	*1.56%*
Cingular GSM	*140*	*880*	*4*	*296*	*0.0217*	*0.5867*	*3.70%*
Cingular GSM	*140*	*1900*	*2*	*427*	*0.0157*	*1.0000*	*1.57%*
Verizon cellular	130	869	9	305	0.0584	0.5793	10.08%
Verizon PCS	130	1970	7	406	0.0605	1.0000	6.05%
Verizon AWS	130	2145	1	905	0.0193	1.0000	1.93%
Verizon LTE	130	698	1	636	0.0135	0.4653	2.91%
Sprint	150	1962.5	11	122	0.0214	1.0000	2.14%
AT&T UMTS	139	880	2	565	0.0021	0.5867	0.36%
AT&T UMTS	139	1900	2	875	0.0033	1.0000	0.33%
AT&T LTE	139	734	1	1375	0.0026	0.4893	0.52%
AT&T GSM	139	880	1	538	0.0010	0.5867	0.17%
AT&T GSM	139	1900	4	934	0.0070	1.0000	0.70%
						Total	**25.18%**

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 4/18/2012.

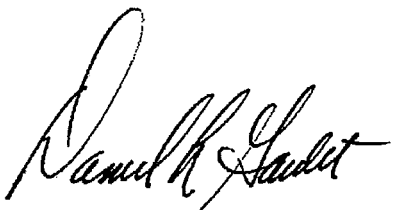
5. Conclusion

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 **25.18% 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

June 29, 2012
Date

Attachment A: References

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

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

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

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

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

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

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

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

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

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

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

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

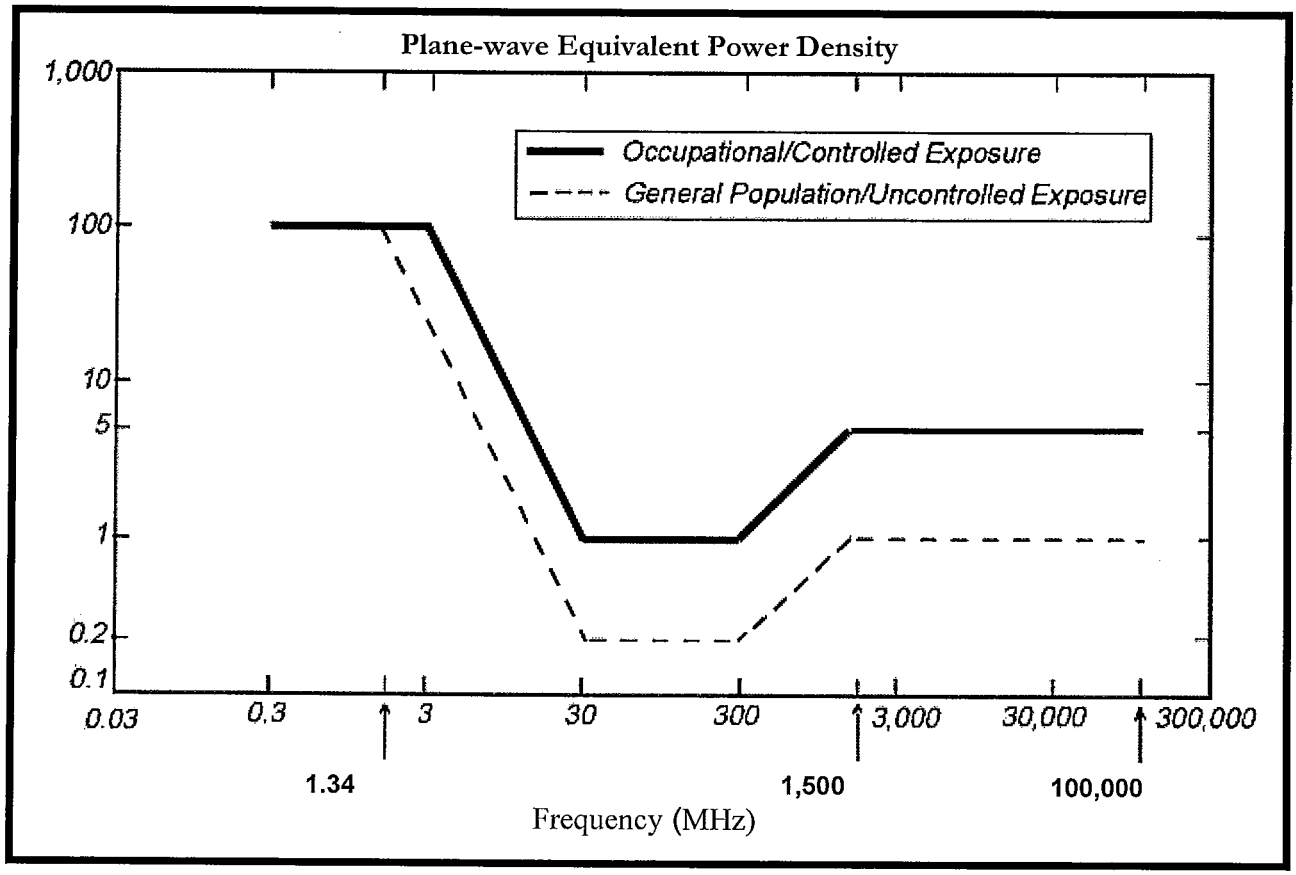
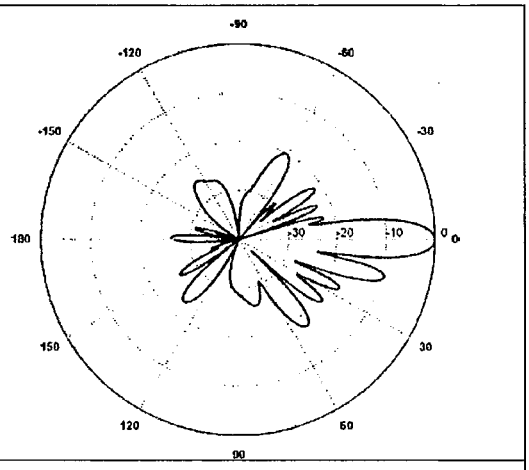


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

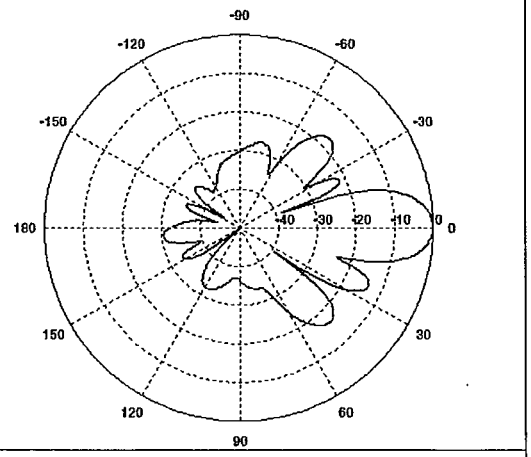
700 MHz

Manufacturer:	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"



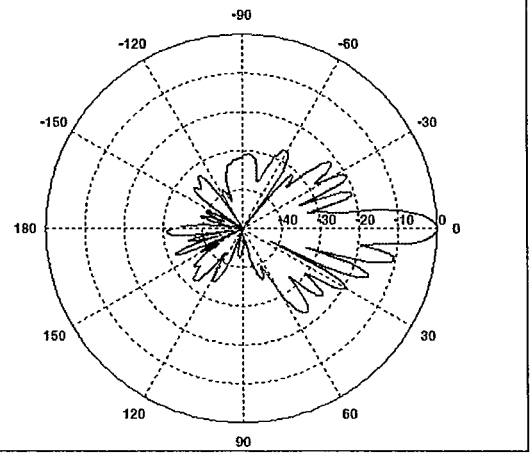
850 MHz UMTS

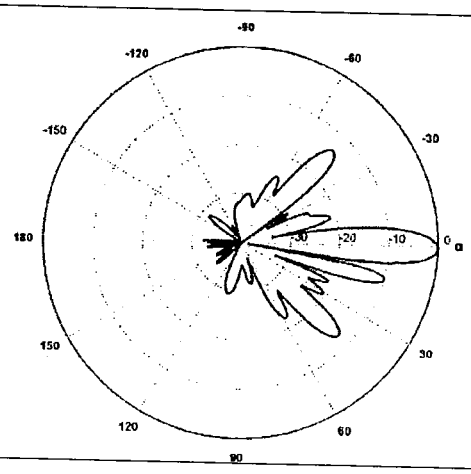
Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz UMTS

Manufacturer:	Powerwave
Model #:	7770
Frequency Band:	1850-1900 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.0" x 11.0" x 5.0"



850 MHz GSM 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 GSM Manufacturer: Commscope Model #: SBNH-1D6565C Frequency Band: 1850-1900 MHz Gain: 15.9 dBd Vertical Beamwidth: 5.1° Horizontal Beamwidth: 57° Polarization: ±45° Size L x W x D: 96.42" x 11.85" x 7.1"