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April 7, 2015

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

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	625 Spring Street, Southington CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 160 foot monopole ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antennas at 156 feet. The tower is controlled by Crown Castle. The Council approved the previous application on June 1, 2012 reference number EM-CING-131-120831. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-CING-131-120831.

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

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

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 156' foot level of the 160' foot Monopole
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

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

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standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the July 15,2011 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by FDH September 09, 2014).

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

Sincerely,

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Gary Brumback, Town manager, Southington CT
Michael DelSanto, Town Planner, Southington CT
Crown Castle
Global Signal Acquisitions II LLC, Property Owner

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

CT5250

Date: **September 09, 2014**

David Smith
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
919.755.1012

Subject: **Structural Modification Report**

Carrier Designation:	***Sprint PCS* Co-Locate** **Carrier Site Number:**	 CT03XC087
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	876334 SOUTHINGTON, SMORON 286430 906287 245386 Rev. 1
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	146AZR1400 (R1)
Site Data:	**625 Spring Street, SOUTHINGTON, Hartford County, CT** **Latitude *41° 37' 56.9"*, Longitude *-72° 53' 39.3"*** **160 Foot - Monopole Tower**	

Dear David Smith,

FDH Engineering, Inc. 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 679589, in accordance with application 245386, revision 1.

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

LC4.5: Modified Structure w/ Existing + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2009 North Carolina Building Code and the based upon a wind speed of 80 mph fastest mile.

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

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

Respectfully submitted by:

Shiva Shankar
Project Engineer

Reviewed By:

Bradley R. Newman, PE
Senior Project Engineer
CT PE License No. 29630

STATE OF CONNECTICUT
BRADLEY R. NEWMAN
29630
LICENSED
PROFESSIONAL ENGINEER

9/9/14

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by SUMMIT in November of 1996. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-E&F. The tower modifications outlined in the FDH Engineering, Inc. (Project No. 146AZR1400) Modification Drawings for a 160' Monopole dated June 24, 2014 were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
146.0	147.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	157.0	4	andrew	SBNH-1D6565C w/ Mount Pipe	8 1 2	1-5/8 3/8 3/4	1
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	communication components inc.	DTMABP7819VG12A			
		4	powerwave technologies	LGP21401			
		6	ericsson	RRUS-11			
		1	raycap	DC6-48-60-18-8F			
	156.0	1	tower mounts	T-Arm Mount [TA 703-3]			
148.0	148.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 103-3]			
146.0	147.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	1 3	1/2 1-1/4	1
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	146.0	3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	tower mounts	6' x 2.375" Pipe Mount			
		1	tower mounts	Platform Mount [LP 712-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
139.0	139.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 501-3]			
131.0	133.0	3	antel	BXA-171063/8CF-EDIN-2 w/ Mount Pipe	19	1-5/8	1
		3	antel	BXA-185085/12CFx2 w/ Mount Pipe			
		3	antel	BXA-70063/6CFx2 w/ Mount Pipe			
		3	antel	BXA-80080-6CF-EDIN-X w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe	-	-	2
		1	rfs celwave	DB-T1-6Z-8AB-0Z	-	-	1
		3	alcatel lucent	RRH2x40-AWS			
	131.0	1	tower mounts	Platform Mount [LP 712-1]			
121.0	122.0	1	andrew	VHLP2-18	3	1/4	1
		2	andrew	VHLP800-11			
		3	Dragonwave	HORIZON COMPACT	3 3	1/2 5/16	2
		2	Samsung telecommunications	WIMAX DAP HEAD			
		1	argus technologies	LLPX310R w/ Mount Pipe			
		1	kathrein	840 10054 w/ Mount Pipe			
	121.0	1	Samsung telecommunications	WIMAX DAP HEAD			
		1	argus technologies	LLPX310R w/ Mount Pipe			
		1	tower mounts	T-Arm Mount [TA 602-3]	-	-	1
110.0	111.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	7/8	1
	110.0	1	tower mounts	Platform Mount [LP 712-1]			
101.0	102.0	1	symmetricom	58532A	1	1/2	1
	101.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed; not considered in analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
146	146	12	-	D890H PCS	-	-
		1	-	14' LP Platform		
130	130	12	-	Panel Antennas	-	-
		1	-	14' LP Platform		
110	110	12	-	Panel Antennas	-	-
		1	-	14' LP Platform		
100	100	1	-	GPS Antenna w/ Mount	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	LAW	80296	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Piedmont Olsen Hensley	80276	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	80294	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF	3160661	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	FDH Engineering, Inc.	Project No. 146AZR1400	Appendix D

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Modifications outlined in FDH Engineering, Inc. (Project No. 146AZR1400) Modification Drawings for a 160' Monopole dated June 24, 2014 must be installed for this analysis to be valid.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
160 - 150	Pole	TP16x16x0.375	Pole	17.9%	Pass
150 - 146.5	Pole	TP16x16x0.375	Pole	28.7%	Pass
146.5 - 146	Pole	TP22x22x0.375	Pole	15.9%	Pass
146 - 136	Pole	TP23.848x22x0.25	Pole	38.7%	Pass
136 - 126	Pole	TP25.696x23.848x0.25	Pole	63.7%	Pass
126 - 116	Pole	TP27.544x25.696x0.25	Pole	87.7%	Pass
116 - 115.5	Pole	TP27.637x27.544x0.25	Pole	88.8%	Pass
115.5 - 107.5	Pole + Reinf	TP29.808x27.637x0.41	Reinf. 10 Compression	80.9%	Pass
107.5 - 98.5	Pole + Reinf	TP30.277x28.615x0.4675	Reinf. 10 Compression	84.8%	Pass
98.5 - 88.5	Pole + Reinf	TP32.125x30.277x0.4425	Pole	83.8%	Pass
88.5 - 80.5	Pole + Reinf	TP33.602x32.125x0.4375	Pole	91.1%	Pass
80.5 - 73	Pole + Reinf	TP35.819x33.602x0.4325	Pole	97.3%	Pass
73 - 63	Pole + Reinf	TP36.21x34.363x0.5	Reinf. 8 Tension Rupture	95.4%	Pass
63 - 61.5	Pole + Reinf	TP36.487x36.21x0.5	Reinf. 8 Tension Rupture	96.3%	Pass
61.5 - 60.5	Pole + Reinf	TP36.672x36.487x0.52	Pole	93.0%	Pass
60.5 - 50.5	Pole + Reinf	TP38.52x36.672x0.61	Reinf. 4 Tension Rupture	86.2%	Pass
50.5 - 40.5	Pole + Reinf	TP40.367x38.52x0.595	Reinf. 4 Tension Rupture	90.8%	Pass
40.5 - 39	Pole + Reinf	TP41.568x40.367x0.59	Reinf. 4 Tension Rupture	91.5%	Pass
39 - 31.5	Pole + Reinf	TP41.28x39.894x0.59	Reinf. 4 Tension Rupture	97.6%	Pass
31.5 - 30.5	Pole + Reinf	TP41.465x41.28x0.595	Reinf. 4 Tension Rupture	97.7%	Pass
30.5 - 20.5	Pole + Reinf	TP43.312x41.465x0.615	Reinf. 1 Tension Rupture	94.9%	Pass
20.5 - 14.08	Pole + Reinf	TP44.499x43.312x0.61	Reinf. 6 Tension Rupture	97.1%	Pass
14.08 - 11.5	Pole + Reinf	TP44.975x44.499x0.65	Reinf. 1 Tension Rupture	94.6%	Pass
11.5 - 1.5	Pole + Reinf	TP46.823x44.975x0.615	Reinf. 1 Tension Rupture	98.4%	Pass
1.5 - 0	Pole + Reinf	TP47.1x46.823x0.615	Reinf. 1 Tension Rupture	98.8%	Pass
				Summary	
			Pole	97.3%	Pass
			Reinforcement	98.8%	Pass
			Overall	98.8%	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4.5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	89.3	Pass
1	Base Plate	0	97.8	Pass
1	Flange Plate	146	74.7	Pass
1	Flange Bolts	146	28.8	Pass
1	Base Foundation	0	50.8	Pass
1	Base Foundation Soil Interaction	0	74.1	Pass

Structure Rating (max from all components) =	**98.8%**

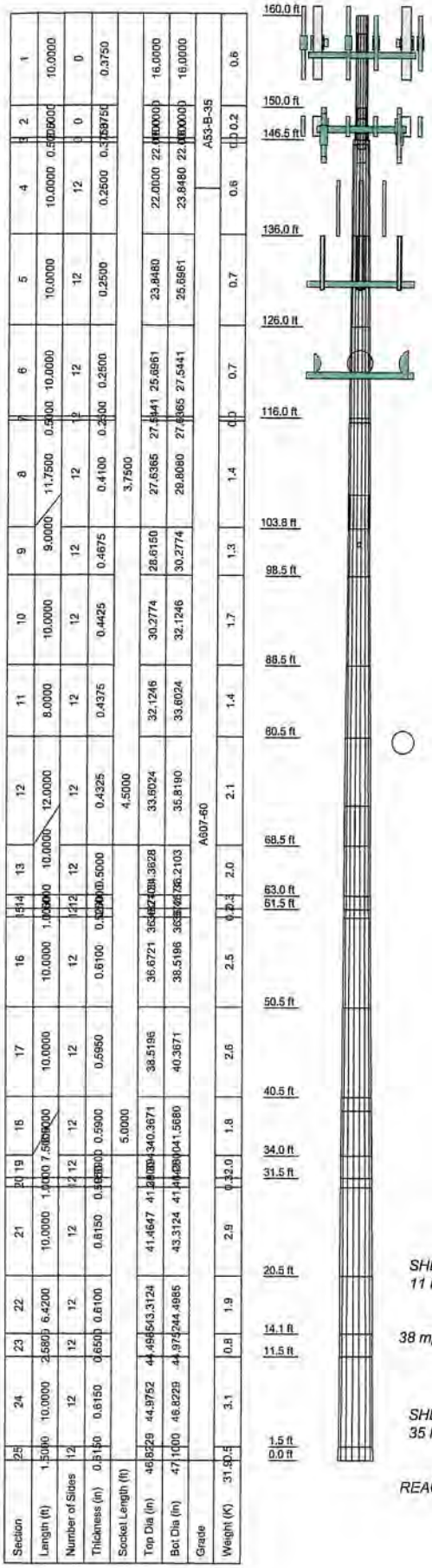
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

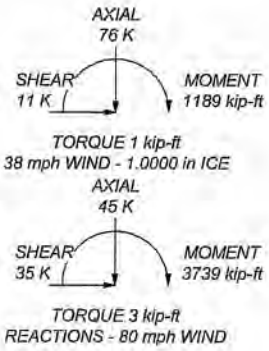
The tower modifications outlined in FDH Engineering, Inc. (Project No. 146AZR1400) Modification Drawings for a 160' Monopole dated June 24, 2014 must be installed for this analysis to be valid.

APPENDIX A

TNXTOWER OUTPUT



Section	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Length (ft)	1.5000	10.0000	2.5800	6.4200	10.0000	1.4000	7.5000	10.0000	10.0000	10.0000	5.0000	1.0000	10.0000	12.0000	8.0000	10.0000	9.0000	11.7500	0.5000	10.0000	10.0000	10.0000	0.5000	10.0000	10.0000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0
Thickness (in)	0.8150	0.6150	0.6500	0.6100	0.8150	0.3600	0.3600	0.5900	0.5950	0.6100	0.5900	0.3600	0.5000	0.4325	0.4375	0.4425	0.4675	0.4100	0.2500	0.2500	0.2500	0.2500	0.3750	0.3750	0.3750
Socket Length (ft)								5.0000						4.5000				3.7500							
Top Dia (in)	46.8229	44.9752	44.4965	43.3124	41.4647	41.2800	41.1400	40.3671	38.5196	36.6721	36.4874	36.3028	36.1181	33.8024	32.1246	30.2774	28.6150	27.6365	27.5441	25.6861	23.8480	22.0000	22.0000	22.0000	16.0000
Bot Dia (in)	47.1000	46.8229	44.9752	44.4965	43.3124	41.4647	41.2800	41.1400	40.3671	38.5196	38.3349	36.4874	36.3028	35.8190	33.6024	32.1246	30.2774	29.8080	27.6365	27.5441	25.6861	23.8480	22.0000	22.0000	16.0000
Grade	A607-60																							A53-B-35	
Weight (K)	31.9[illegible]	3.1	0.8	1.9	2.9	0.3	2.0	1.8	2.6	2.5	1.2	0.2	2.0	2.1	1.4	1.7	1.3	1.4	0.0	0.7	0.7	0.6	0.2	0.2	0.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) LGP21401	156	TD-RRH8x20-25	146
(2) SBNH-1D6565C w/ Mount Pipe	156	Platform Mount [LP 712-1]	146
DTMABP7819VG12A	156	APXV18-206517S-C w/ Mount Pipe	139
(2) RRUS-11	156	APXV18-206517S-C w/ Mount Pipe	139
DC6-48-60-18-8F	156	APXV18-206517S-C w/ Mount Pipe	139
DTMABP7819VG12A	156	Pipe Mount [PM 501-3]	139
(2) RRUS-11	156	BXA-185085/12CFx2 w/ Mount Pipe	131
(2) LGP21401	156	BXA-70063/6CFx2 w/ Mount Pipe	131
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	156	BXA-185085/12CFx2 w/ Mount Pipe	131
		BXA-70063/6CFx2 w/ Mount Pipe	131
DTMABP7819VG12A	156	BXA-185085/12CFx2 w/ Mount Pipe	131
(2) SBNH-1D6565C w/ Mount Pipe	156	BXA-70063/6CFx2 w/ Mount Pipe	131
(2) RRUS-11	156	RRH2x40-AWS	131
T-Arm Mount [TA 703-3]	156	BXA-171063/8CF-EDIN-2 w/ Mount Pipe	131
800MHz 2X50W RRH W/FILTER	148		
(2) PCS 1900MHz 4x45W-65MHz	148	BXA-80080-6CF-EDIN-X w/ Mount Pipe	131
800MHz 2X50W RRH W/FILTER	148	RRH2x40-AWS	131
(2) PCS 1900MHz 4x45W-65MHz	148	BXA-171063/8CF-EDIN-2 w/ Mount Pipe	131
800MHz 2X50W RRH W/FILTER	148	BXA-80080-6CF-EDIN-X w/ Mount Pipe	131
(2) PCS 1900MHz 4x45W-65MHz	148	DB-T1-6Z-8AB-0Z	131
Side Arm Mount [SO 103-3]	148	RRH2x40-AWS	131
APXV9ERR18-C-A20 w/ Mount Pipe	145	BXA-171063/8CF-EDIN-2 w/ Mount Pipe	131
APXVSPP18-C-A20 w/ Mount Pipe	145	BXA-80080-6CF-EDIN-X w/ Mount Pipe	131
APXVSPP18-C-A20 w/ Mount Pipe	146		
6' x 2.375" Pipe Mount	146		
6' x 2.375" Pipe Mount	146		
6' x 2.375" Pipe Mount	146		
IBC1900BB-1	146		
IBC1900HG-2A	146		
IBC1900BB-1	146		
IBC1900HG-2A	146		
IBC1900BB-1	146		
IBC1900HG-2A	146		
APXVTM14-C-120 w/ Mount Pipe	146		
APXVTM14-C-120 w/ Mount Pipe	146		
APXVTM14-C-120 w/ Mount Pipe	146		
TD-RRH8x20-25	146		
TD-RRH8x20-25	146		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A607-60	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
Phone: 919.755.1012
FAX: 919.755.1031
Tower Analysis

Job: Southington, Smoron - 876334			
Project: 146AZR1400 (R1)			
Client: Crown Castle	Drawn by: Shiva Shankar		App'd:
Code: TIA/EIA-222-F	Date: 09/09/14		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 38 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt	Include Angle Block Shear Check
Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.0000-150.0000	10.0000	0.00	Round	16.0000	16.0000	0.3750		A53-B-35 (35 ksi)
L2	150.0000-146.5000	3.5000	0.00	Round	16.0000	16.0000	0.3750		A53-B-35 (35 ksi)
L3	146.5000-146.0000	0.5000	0.00	Round	22.0000	22.0000	0.3750		A53-B-35 (35 ksi)
L4	146.0000-136.0000	10.0000	0.00	12	22.0000	23.8480	0.2500	1.0000	A607-60 (60 ksi)
L5	136.0000-126.0000	10.0000	0.00	12	23.8480	25.6961	0.2500	1.0000	A607-60 (60 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
L6	126.0000-116.0000	10.0000	0.00	12	25.6961	27.5441	0.2500	1.0000	A607-60 (60 ksi)
L7	116.0000-115.5000	0.5000	0.00	12	27.5441	27.6365	0.2500	1.0000	A607-60 (60 ksi)
L8	115.5000-103.7500	11.7500	3.75	12	27.6365	29.8080	0.4100	1.6400	A607-60 (60 ksi)
L9	103.7500-98.5000	9.0000	0.00	12	28.6150	30.2774	0.4675	1.8700	A607-60 (60 ksi)
L10	98.5000-88.5000	10.0000	0.00	12	30.2774	32.1246	0.4425	1.7700	A607-60 (60 ksi)
L11	88.5000-80.5000	8.0000	0.00	12	32.1246	33.6024	0.4375	1.7500	A607-60 (60 ksi)
L12	80.5000-68.5000	12.0000	4.50	12	33.6024	35.8190	0.4325	1.7300	A607-60 (60 ksi)
L13	68.5000-63.0000	10.0000	0.00	12	34.3628	36.2103	0.5000	2.0000	A607-60 (60 ksi)
L14	63.0000-61.5000	1.5000	0.00	12	36.2103	36.4874	0.5000	2.0000	A607-60 (60 ksi)
L15	61.5000-60.5000	1.0000	0.00	12	36.4874	36.6721	0.5200	2.0800	A607-60 (60 ksi)
L16	60.5000-50.5000	10.0000	0.00	12	36.6721	38.5196	0.6100	2.4400	A607-60 (60 ksi)
L17	50.5000-40.5000	10.0000	0.00	12	38.5196	40.3671	0.5950	2.3800	A607-60 (60 ksi)
L18	40.5000-34.0000	6.5000	5.00	12	40.3671	41.5680	0.5900	2.3600	A607-60 (60 ksi)
L19	34.0000-31.5000	7.5000	0.00	12	39.8943	41.2800	0.5900	2.3600	A607-60 (60 ksi)
L20	31.5000-30.5000	1.0000	0.00	12	41.2800	41.4647	0.5950	2.3800	A607-60 (60 ksi)
L21	30.5000-20.5000	10.0000	0.00	12	41.4647	43.3124	0.6150	2.4600	A607-60 (60 ksi)
L22	20.5000-14.0800	6.4200	0.00	12	43.3124	44.4985	0.6100	2.4400	A607-60 (60 ksi)
L23	14.0800-11.5000	2.5800	0.00	12	44.4985	44.9752	0.6500	2.6000	A607-60 (60 ksi)
L24	11.5000-1.5000	10.0000	0.00	12	44.9752	46.8229	0.6150	2.4600	A607-60 (60 ksi)
L25	1.5000-0.0000	1.5000		12	46.8229	47.1000	0.6150	2.4600	A607-60 (60 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	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
L2	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
L3	22.0000	25.4764	1489.6700	7.6467	11.0000	135.4245	2979.3401	12.7306	0.0000	0
	22.0000	25.4764	1489.6700	7.6467	11.0000	135.4245	2979.3401	12.7306	0.0000	0
L4	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	24.6893	18.9964	1350.2370	8.4481	12.3533	109.3018	2735.9463	9.3495	5.7213	22.885
L5	24.6893	18.9964	1350.2370	8.4481	12.3533	109.3018	2735.9463	9.3495	5.7213	22.885
	26.6026	20.4841	1692.9544	9.1097	13.3106	127.1887	3430.3846	10.0817	6.2166	24.866
L6	26.6026	20.4841	1692.9544	9.1097	13.3106	127.1887	3430.3846	10.0817	6.2166	24.866

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
	28.5158	21.9718	2089.2488	9.7713	14.2679	146.4304	4233.3846	10.8138	6.7118	26.847
L7	28.5158	21.9718	2089.2488	9.7713	14.2679	146.4304	4233.3846	10.8138	6.7118	26.847
	28.6115	22.0462	2110.5397	9.8044	14.3157	147.4280	4276.5256	10.8505	6.7366	26.946
L8	28.6115	35.9445	3400.9734	9.7471	14.3157	237.5690	6891.2941	17.6908	6.3078	15.385
	30.8595	38.8112	4281.3333	10.5245	15.4405	277.2787	8675.1419	19.1017	6.8897	16.804
L9	30.3415	42.3718	4284.9138	10.0768	14.8226	289.0805	8682.3970	20.8541	6.4159	13.724
	31.3455	44.8744	5089.8747	10.6720	15.6837	324.5324	10313.4661	22.0858	6.8615	14.677
L10	31.3455	42.5103	4829.8201	10.6809	15.6837	307.9512	9786.5249	20.9223	6.9285	15.658
	33.2579	45.1423	5783.6006	11.3422	16.6406	347.5605	11719.1428	22.2177	7.4235	16.776
L11	33.2579	44.6392	5720.9569	11.3440	16.6406	343.7960	11592.2098	21.9701	7.4369	16.999
	34.7877	46.7210	6559.2643	11.8730	17.4060	376.8386	13290.8478	22.9947	7.8329	17.904
L12	34.7877	46.1940	6487.2345	11.8748	17.4060	372.7004	13144.8958	22.7353	7.8463	18.142
	37.0826	49.2810	7876.6358	12.6684	18.5542	424.5194	15960.1995	24.2546	8.4404	19.515
L13	36.4357	54.5191	7979.5638	12.1229	17.7999	448.2923	16168.7597	26.8326	7.8692	15.738
	37.4876	57.4935	9358.1709	12.7843	18.7569	498.9184	18962.1914	28.2966	8.3644	16.729
L14	37.4876	57.4935	9358.1709	12.7843	18.7569	498.9184	18962.1914	28.2966	8.3644	16.729
	37.7745	57.9397	9577.7339	12.8835	18.9005	506.7459	19407.0856	28.5162	8.4386	16.877
L15	37.7745	60.2238	9944.2453	12.8763	18.9005	526.1376	20149.7370	29.6403	8.3850	16.125
	37.9658	60.5331	10098.2725	12.9425	18.9962	531.5953	20461.8380	29.7926	8.4345	16.22
L16	37.9658	70.8332	11757.7991	12.9102	18.9962	618.9564	23824.4886	34.8620	8.1933	13.432
	39.8785	74.4621	13659.0458	13.5716	19.9532	684.5552	27676.9300	36.6480	8.6885	14.243
L17	39.8785	72.6598	13338.9890	13.5770	19.9532	668.5148	27028.4080	35.7609	8.7287	14.67
	41.7911	76.1994	15384.9211	14.2384	20.9102	735.7625	31174.0212	37.5030	9.2238	15.502
L18	41.7911	75.5686	15261.3904	14.2402	20.9102	729.8548	30923.7145	37.1926	9.2372	15.656
	43.0344	77.8500	16685.7644	14.6701	21.5322	774.9206	33809.8825	38.3154	9.5590	16.202
L19	42.2580	74.6702	14723.5468	14.0709	20.6652	712.4795	29833.8975	36.7504	9.1105	15.441
	42.7362	77.3028	16336.3880	14.5670	21.3830	763.9886	33101.9510	38.0461	9.4818	16.071
L20	42.7362	77.9483	16468.7594	14.5652	21.3830	770.1791	33370.1714	38.3638	9.4684	15.913
	42.9275	78.3023	16694.1490	14.6314	21.4787	777.2409	33826.8718	38.5380	9.5179	15.997
L21	42.9275	80.8947	17229.9771	14.6242	21.4787	802.1878	34912.6049	39.8139	9.4643	15.389
	44.8403	84.5536	19675.2427	15.2857	22.4358	876.9573	39867.3760	41.6147	9.9595	16.194
L22	44.8403	83.8760	19522.1381	15.2874	22.4358	870.1332	39557.1445	41.2812	9.9729	16.349
	46.0683	86.2059	21194.5919	15.7121	23.0502	919.4953	42945.9893	42.4279	10.2908	16.87
L23	46.0683	91.7750	22522.7072	15.6978	23.0502	977.1136	45637.1110	45.1689	10.1836	15.667
	46.5618	92.7727	23265.2709	15.8684	23.2972	998.6309	47141.7463	45.6599	10.3114	15.864
L24	46.5618	87.8466	22064.7112	15.8810	23.2972	947.0984	44709.0868	43.2354	10.4052	16.919
	48.4746	91.5054	24938.1591	16.5424	24.2542	1028.1979	50531.4715	45.0362	10.9003	17.724
L25	48.4746	91.5054	24938.1591	16.5424	24.2542	1028.1979	50531.4715	45.0362	10.9003	17.724
	48.7615	92.0542	25389.5757	16.6416	24.3978	1040.6502	51446.1639	45.3063	10.9746	17.845

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
L1 160.0000-150. 0000				1	1	1		
L2 150.0000-146. 5000				1	1	1		
L3 146.5000-146. 0000				1	1	1		
L4 146.0000-136. 0000				1	1	1		
L5 136.0000-126. 0000				1	1	1		
L6				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft²	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
126.0000-116.0000 L7				1	1	1		
116.0000-115.5000 L8				1	1	0.969901		
115.5000-103.7500 L9				1	1	0.973196		
103.7500-98.5000 L10				1	1	1.10842		
98.5000-88.5000 L11				1	1	1.1028		
88.5000-80.5000 L12				1	1	1.09963		
80.5000-68.5000 L13				1	1	1.06615		
68.5000-63.0000 L14				1	1	1.06372		
63.0000-61.5000 L15				1	1	1.09016		
61.5000-60.5000 L16				1	1	1.02728		
60.5000-50.5000 L17				1	1	1.03313		
50.5000-40.5000 L18				1	1	1.03895		
40.5000-34.0000 L19				1	1	1.03265		
34.0000-31.5000 L20				1	1	1.04175		
31.5000-30.5000 L21				1	1	1.02712		
30.5000-20.5000 L22				1	1	1.02405		
20.5000-14.0800 L23				1	1	1.04693		
14.0800-11.5000 L24				1	1	1.02398		
11.5000-1.5000 L25				1	1	1.02151		
1.5000-0.0000								

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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
FB-L98B-002-75000(3/8")	C	No	Inside Pole	156.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	156.0000 - 0.0000	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
2" Conduit (1 1/2" EMT)	A	No	CaAa (Out Of Face)	156.0000 - 8.0000	1	No Ice	0.1740	0.00
						1/2" Ice	0.2740	0.00
						1" Ice	0.3740	0.00
						2" Ice	0.5740	0.01
						4" Ice	0.9740	0.03
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	156.0000 - 8.0000	4	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	156.0000 - 8.0000	1	No Ice	0.1980	0.00
						1/2" Ice	0.2980	0.00
						1" Ice	0.3980	0.00
						2" Ice	0.5980	0.01
						4" Ice	0.9980	0.03
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	156.0000 - 8.0000	3	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
***								
HB114-21U3M12-XXX F(1-1/4")	A	No	CaAa (Out Of Face)	146.0000 - 8.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	146.0000 - 8.0000	3	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
***								
AVA7-50(1-5/8)	C	No	Inside Pole	139.0000 - 0.0000	6	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.0000	0.00
***								
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	131.0000 - 8.0000	1	No Ice	0.1980	0.00
						1/2" Ice	0.2980	0.00
						1" Ice	0.3980	0.00
						2" Ice	0.5980	0.01
						4" Ice	0.9980	0.03
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	131.0000 - 8.0000	9	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	131.0000 - 8.0000	9	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
2" Rigid Conduit	A	No	CaAa (Out Of Face)	121.0000 - 8.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.01
						4" Ice	0.0000	0.03
FSJ1-50A(1/4")	C	No	Inside Pole	121.0000 - 0.0000	3	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
***								
LDF4-50A(1/2")	C	No	Inside Pole	101.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
Aero MP305	A	No	CaAa (Out Of Face)	31.5000 - 0.5000	1	No Ice	0.3483	0.00
						1/2" Ice	0.4594	0.00
						1" Ice	0.5706	0.00
						2" Ice	0.7928	0.00
						4" Ice	1.2372	0.00
Aero MP305	B	No	CaAa (Out Of Face)	31.5000 - 0.5000	1	No Ice	0.3483	0.00
						1/2" Ice	0.4594	0.00
						1" Ice	0.5706	0.00
						2" Ice	0.7928	0.00
						4" Ice	1.2372	0.00
Aero MP305	C	No	Inside Pole	31.5000 - 0.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
Aero MP304	A	No	CaAa (Out Of Face)	61.5000 - 31.5000	1	No Ice	0.2680	0.00
						1/2" Ice	0.9078	0.00
						1" Ice	1.0189	0.00
						2" Ice	1.2411	0.00
						4" Ice	1.6856	0.00
Aero MP304	B	No	CaAa (Out Of Face)	61.5000 - 31.5000	1	No Ice	0.2680	0.00
						1/2" Ice	0.9078	0.00
						1" Ice	1.0189	0.00
						2" Ice	1.2411	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2 ft	Weight klf
Aero MP304	C	No	Inside Pole	61.5000 - 0.5000	1	4" Ice	1.6856	0.00
						No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
Aero MP304	C	No	Inside Pole	61.5000 - 0.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
Aero MP304	C	No	Inside Pole	61.5000 - 0.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
6" x 1" Flat Plate (F)	A	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
6" x 1" Flat Plate (F)	B	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
6" x 1" Flat Plate (F)	C	No	Inside Pole	30.5000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
6.5" x 1.25" Flat Plate (F)	A	No	CaAa (Out Of Face)	60.5000 - 30.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
6.5" x 1.25" Flat Plate (F)	B	No	CaAa (Out Of Face)	60.5000 - 30.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
6.5" x 1.25" Flat Plate (F)	C	No	Inside Pole	60.5000 - 30.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
6" x 1" Flat Plate (F)	A	No	CaAa (Out Of Face)	100.5000 - 61.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
6" x 1" Flat Plate (F)	B	No	CaAa (Out Of Face)	100.5000 - 61.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
6" x 1" Flat Plate (F)	C	No	Inside Pole	100.5000 - 60.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
4.5" x 1" Flat Plate (F)	A	No	CaAa (Out Of Face)	117.0000 - 97.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
4.5" x 1" Flat Plate (F)	B	No	CaAa (Out Of Face)	117.0000 - 97.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
4.5" x 1" Flat Plate (F)	C	No	Inside Pole	117.0000 - 97.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								

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	160.0000-150.000	A	0.000	0.000	0.000	1.044	0.01
	0	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.188	0.05
L2	150.0000-146.500	A	0.000	0.000	0.000	0.609	0.00
	0	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.693	0.03
L3	146.5000-146.000	A	0.000	0.000	0.000	0.087	0.00
	0	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.099	0.00
L4	146.0000-136.000	A	0.000	0.000	0.000	1.740	0.02
	0	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.980	0.12
L5	136.0000-126.000	A	0.000	0.000	0.000	2.730	0.03
	0	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.980	0.27
L6	126.0000-116.000	A	0.000	0.000	0.000	3.887	0.04
	0	B	0.000	0.000	0.000	0.167	0.00
		C	0.000	0.000	0.000	1.980	0.39
L7	116.0000-115.500	A	0.000	0.000	0.000	0.269	0.00
	0	B	0.000	0.000	0.000	0.083	0.00
		C	0.000	0.000	0.000	0.099	0.02
L8	115.5000-103.750	A	0.000	0.000	0.000	6.329	0.05
	0	B	0.000	0.000	0.000	1.958	0.00
		C	0.000	0.000	0.000	2.326	0.46
L9	103.7500-98.5000	A	0.000	0.000	0.000	3.161	0.02
		B	0.000	0.000	0.000	1.208	0.00
		C	0.000	0.000	0.000	1.040	0.20
L10	98.5000-88.5000	A	0.000	0.000	0.000	5.637	0.05
		B	0.000	0.000	0.000	1.917	0.00
		C	0.000	0.000	0.000	1.980	0.39
L11	88.5000-80.5000	A	0.000	0.000	0.000	4.309	0.04
		B	0.000	0.000	0.000	1.333	0.00

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
		C	0.000	0.000	0.000	1.584	0.31
L12	80.5000-68.5000	A	0.000	0.000	0.000	6.464	0.06
		B	0.000	0.000	0.000	2.000	0.00
		C	0.000	0.000	0.000	2.376	0.47
L13	68.5000-63.0000	A	0.000	0.000	0.000	2.963	0.03
		B	0.000	0.000	0.000	0.917	0.00
		C	0.000	0.000	0.000	1.089	0.21
L14	63.0000-61.5000	A	0.000	0.000	0.000	0.808	0.01
		B	0.000	0.000	0.000	0.250	0.00
		C	0.000	0.000	0.000	0.297	0.06
L15	61.5000-60.5000	A	0.000	0.000	0.000	0.640	0.00
		B	0.000	0.000	0.000	0.268	0.00
		C	0.000	0.000	0.000	0.198	0.04
L16	60.5000-50.5000	A	0.000	0.000	0.000	6.400	0.05
		B	0.000	0.000	0.000	2.680	0.00
		C	0.000	0.000	0.000	1.980	0.39
L17	50.5000-40.5000	A	0.000	0.000	0.000	6.400	0.05
		B	0.000	0.000	0.000	2.680	0.00
		C	0.000	0.000	0.000	1.980	0.39
L18	40.5000-34.0000	A	0.000	0.000	0.000	4.160	0.03
		B	0.000	0.000	0.000	1.742	0.00
		C	0.000	0.000	0.000	1.287	0.25
L19	34.0000-31.5000	A	0.000	0.000	0.000	1.600	0.01
		B	0.000	0.000	0.000	0.670	0.00
		C	0.000	0.000	0.000	0.495	0.10
L20	31.5000-30.5000	A	0.000	0.000	0.000	0.720	0.00
		B	0.000	0.000	0.000	0.348	0.00
		C	0.000	0.000	0.000	0.198	0.04
L21	30.5000-20.5000	A	0.000	0.000	0.000	7.203	0.05
		B	0.000	0.000	0.000	3.483	0.00
		C	0.000	0.000	0.000	1.980	0.39
L22	20.5000-14.0800	A	0.000	0.000	0.000	4.625	0.03
		B	0.000	0.000	0.000	2.236	0.00
		C	0.000	0.000	0.000	1.271	0.25
L23	14.0800-11.5000	A	0.000	0.000	0.000	1.858	0.01
		B	0.000	0.000	0.000	0.899	0.00
		C	0.000	0.000	0.000	0.511	0.10
L24	11.5000-1.5000	A	0.000	0.000	0.000	4.785	0.02
		B	0.000	0.000	0.000	3.483	0.00
		C	0.000	0.000	0.000	0.693	0.17
L25	1.5000-0.0000	A	0.000	0.000	0.000	0.348	0.00
		B	0.000	0.000	0.000	0.348	0.00
		C	0.000	0.000	0.000	0.000	0.01

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.0000-150.000	A	1.204	0.000	0.000	0.000	2.489	0.03
	0	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.633	0.28
L2	150.0000-146.500	A	1.198	0.000	0.000	0.000	1.447	0.02
	0	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.531	0.16
L3	146.5000-146.000	A	1.196	0.000	0.000	0.000	0.207	0.00
	0	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.219	0.02

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
L4	146.0000-136.000	A	1.190	0.000	0.000	0.000	4.121	0.11
	0	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.361	0.63
L5	136.0000-126.000	A	1.180	0.000	0.000	0.000	6.270	0.14
	0	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.340	0.98
L6	126.0000-116.000	A	1.169	0.000	0.000	0.000	8.821	0.20
	0	B		0.000	0.000	0.000	0.426	0.00
		C		0.000	0.000	0.000	4.317	1.30
L7	116.0000-115.500	A	1.163	0.000	0.000	0.000	0.631	0.01
	0	B		0.000	0.000	0.000	0.213	0.00
		C		0.000	0.000	0.000	0.215	0.06
L8	115.5000-103.750	A	1.155	0.000	0.000	0.000	14.773	0.26
	0	B		0.000	0.000	0.000	4.974	0.00
		C		0.000	0.000	0.000	5.040	1.51
L9	103.7500-98.5000	A	1.144	0.000	0.000	0.000	7.447	0.12
		B		0.000	0.000	0.000	3.069	0.00
		C		0.000	0.000	0.000	2.252	0.68
L10	98.5000-88.5000	A	1.133	0.000	0.000	0.000	13.064	0.22
		B		0.000	0.000	0.000	4.812	0.00
		C		0.000	0.000	0.000	4.246	1.26
L11	88.5000-80.5000	A	1.119	0.000	0.000	0.000	9.881	0.17
		B		0.000	0.000	0.000	3.323	0.00
		C		0.000	0.000	0.000	3.375	1.00
L12	80.5000-68.5000	A	1.103	0.000	0.000	0.000	14.696	0.25
		B		0.000	0.000	0.000	4.940	0.00
		C		0.000	0.000	0.000	5.022	1.47
L13	68.5000-63.0000	A	1.086	0.000	0.000	0.000	6.736	0.11
		B		0.000	0.000	0.000	2.264	0.00
		C		0.000	0.000	0.000	2.302	0.67
L14	63.0000-61.5000	A	1.079	0.000	0.000	0.000	1.815	0.03
		B		0.000	0.000	0.000	0.610	0.00
		C		0.000	0.000	0.000	0.621	0.18
L15	61.5000-60.5000	A	1.077	0.000	0.000	0.000	1.838	0.02
		B		0.000	0.000	0.000	1.036	0.00
		C		0.000	0.000	0.000	0.413	0.12
L16	60.5000-50.5000	A	1.064	0.000	0.000	0.000	18.309	0.20
		B		0.000	0.000	0.000	10.332	0.00
		C		0.000	0.000	0.000	4.109	1.18
L17	50.5000-40.5000	A	1.039	0.000	0.000	0.000	18.153	0.19
		B		0.000	0.000	0.000	10.276	0.00
		C		0.000	0.000	0.000	4.058	1.15
L18	40.5000-34.0000	A	1.015	0.000	0.000	0.000	11.700	0.12
		B		0.000	0.000	0.000	6.644	0.00
		C		0.000	0.000	0.000	2.606	0.73
L19	34.0000-31.5000	A	1.000	0.000	0.000	0.000	4.500	0.05
		B		0.000	0.000	0.000	2.555	0.00
		C		0.000	0.000	0.000	1.002	0.28
L20	31.5000-30.5000	A	1.000	0.000	0.000	0.000	1.343	0.02
		B		0.000	0.000	0.000	0.571	0.00
		C		0.000	0.000	0.000	0.398	0.11
L21	30.5000-20.5000	A	1.000	0.000	0.000	0.000	13.426	0.18
		B		0.000	0.000	0.000	5.706	0.00
		C		0.000	0.000	0.000	3.980	1.10
L22	20.5000-14.0800	A	1.000	0.000	0.000	0.000	8.619	0.12
		B		0.000	0.000	0.000	3.663	0.00
		C		0.000	0.000	0.000	2.555	0.71
L23	14.0800-11.5000	A	1.000	0.000	0.000	0.000	3.464	0.05
		B		0.000	0.000	0.000	1.472	0.00
		C		0.000	0.000	0.000	1.027	0.28
L24	11.5000-1.5000	A	1.000	0.000	0.000	0.000	8.408	0.06

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		B		0.000	0.000	0.000	5.706	0.00
		C		0.000	0.000	0.000	1.393	0.42
L25	1.5000-0.0000	A	1.000	0.000	0.000	0.000	0.571	0.00
		B		0.000	0.000	0.000	0.571	0.00
		C		0.000	0.000	0.000	0.000	0.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.0000-150.0000	-0.1322	-0.0578	-0.2229	-0.1146
L2	150.0000-146.5000	-0.2011	-0.0880	-0.3179	-0.1634
L3	146.5000-146.0000	-0.2138	-0.0935	-0.3611	-0.1856
L4	146.0000-136.0000	-0.2153	-0.0942	-0.3660	-0.1880
L5	136.0000-126.0000	-0.2094	-0.2148	-0.3503	-0.3859
L6	126.0000-116.0000	-0.1847	-0.3321	-0.2964	-0.5699
L7	116.0000-115.5000	-0.0292	-0.3837	-0.0036	-0.6241
L8	115.5000-103.7500	-0.0295	-0.3880	-0.0038	-0.6355
L9	103.7500-98.5000	0.0301	-0.4117	0.0993	-0.6654
L10	98.5000-88.5000	-0.0066	-0.4045	0.0372	-0.6650
L11	88.5000-80.5000	-0.0306	-0.4019	-0.0046	-0.6712
L12	80.5000-68.5000	-0.0310	-0.4073	-0.0050	-0.6846
L13	68.5000-63.0000	-0.0312	-0.4100	-0.0051	-0.6930
L14	63.0000-61.5000	-0.0314	-0.4117	-0.0055	-0.6937
L15	61.5000-60.5000	0.0667	-0.4480	0.3784	-0.7817
L16	60.5000-50.5000	0.0672	-0.4512	0.3846	-0.7913
L17	50.5000-40.5000	0.0680	-0.4568	0.3957	-0.8073
L18	40.5000-34.0000	0.0687	-0.4611	0.4048	-0.8190
L19	34.0000-31.5000	0.0687	-0.4613	0.4052	-0.8198
L20	31.5000-30.5000	0.1428	-0.4905	0.1304	-0.7491
L21	30.5000-20.5000	0.1437	-0.4937	0.1317	-0.7567
L22	20.5000-14.0800	0.1451	-0.4983	0.1336	-0.7676
L23	14.0800-11.5000	0.1458	-0.5006	0.1347	-0.7734
L24	11.5000-1.5000	0.2946	-0.3263	0.3883	-0.5002
L25	1.5000-0.0000	0.2694	-0.1555	0.3991	-0.2304

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
(2) LGP21401	A	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.2326 0.3134 0.4028 0.6076 1.1210	0.01 0.02 0.03 0.05 0.14
(2) SBNH-1D6565C w/	A	From Leg	4.0000	0.00	156.0000	No Ice	11.6828	9.8418	0.10

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
Mount Pipe			0.00 1.00			1/2" Ice	12.4043	11.3657	0.19
						1" Ice	13.1351	12.9138	0.29
						2" Ice	14.6007	15.2672	0.52
						4" Ice	17.8748	20.1392	1.17
DTMABP7819VG12A	A	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	1.1389	0.3907	0.02
						1/2" Ice	1.2835	0.4884	0.03
						1" Ice	1.4368	0.5947	0.04
						2" Ice	1.7693	0.8334	0.06
						4" Ice	2.5380	1.4144	0.14
(2) RRUS-11	A	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	2.9419	1.2460	0.06
						1/2" Ice	3.1718	1.4124	0.07
						1" Ice	3.4103	1.5874	0.10
						2" Ice	3.9133	1.9633	0.15
						4" Ice	5.0229	2.8188	0.30
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	2.5667	4.3167	0.03
						1/2" Ice	2.7978	4.5965	0.06
						1" Ice	3.0377	4.8849	0.10
						2" Ice	3.5432	5.4877	0.18
						4" Ice	4.6580	6.7969	0.40
DTMABP7819VG12A	B	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	1.1389	0.3907	0.02
						1/2" Ice	1.2835	0.4884	0.03
						1" Ice	1.4368	0.5947	0.04
						2" Ice	1.7693	0.8334	0.06
						4" Ice	2.5380	1.4144	0.14
(2) RRUS-11	B	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	2.9419	1.2460	0.06
						1/2" Ice	3.1718	1.4124	0.07
						1" Ice	3.4103	1.5874	0.10
						2" Ice	3.9133	1.9633	0.15
						4" Ice	5.0229	2.8188	0.30
(2) LGP21401	B	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	1.2880	0.2326	0.01
						1/2" Ice	1.4453	0.3134	0.02
						1" Ice	1.6112	0.4028	0.03
						2" Ice	1.9690	0.6076	0.05
						4" Ice	2.7882	1.1210	0.14
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	8.4975	6.3042	0.07
						1/2" Ice	9.1490	7.4790	0.14
						1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
DTMABP7819VG12A	C	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	1.1389	0.3907	0.02
						1/2" Ice	1.2835	0.4884	0.03
						1" Ice	1.4368	0.5947	0.04
						2" Ice	1.7693	0.8334	0.06
						4" Ice	2.5380	1.4144	0.14
(2) SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	11.6828	9.8418	0.10
						1/2" Ice	12.4043	11.3657	0.19
						1" Ice	13.1351	12.9138	0.29
						2" Ice	14.6007	15.2672	0.52
						4" Ice	17.8748	20.1392	1.17
(2) RRUS-11	C	From Leg	4.0000 0.00 1.00	0.00	156.0000	No Ice	2.9419	1.2460	0.06
						1/2" Ice	3.1718	1.4124	0.07
						1" Ice	3.4103	1.5874	0.10
						2" Ice	3.9133	1.9633	0.15
						4" Ice	5.0229	2.8188	0.30
T-Arm Mount [TA 703-3]	C	None		0.00	156.0000	No Ice	14.2000	14.2000	0.45
						1/2" Ice	18.5000	18.5000	0.65
						1" Ice	22.8000	22.8000	0.84

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	31.4000	31.4000	1.24
						4" Ice	48.6000	48.6000	2.03
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09
						1" Ice	2.8335	2.6753	0.11
						2" Ice	3.3002	3.1316	0.17
						4" Ice	4.3372	4.1479	0.34
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.7087	2.6111	0.06
						1/2" Ice	2.9477	2.8475	0.08
						1" Ice	3.1953	3.0925	0.11
						2" Ice	3.7164	3.6084	0.17
						4" Ice	4.8623	4.7439	0.35
800MHz 2X50W RRH W/FILTER	B	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09
						1" Ice	2.8335	2.6753	0.11
						2" Ice	3.3002	3.1316	0.17
						4" Ice	4.3372	4.1479	0.34
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.7087	2.6111	0.06
						1/2" Ice	2.9477	2.8475	0.08
						1" Ice	3.1953	3.0925	0.11
						2" Ice	3.7164	3.6084	0.17
						4" Ice	4.8623	4.7439	0.35
800MHz 2X50W RRH W/FILTER	C	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09
						1" Ice	2.8335	2.6753	0.11
						2" Ice	3.3002	3.1316	0.17
						4" Ice	4.3372	4.1479	0.34
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	4.0000 0.00 0.00	0.00	148.0000	No Ice	2.7087	2.6111	0.06
						1/2" Ice	2.9477	2.8475	0.08
						1" Ice	3.1953	3.0925	0.11
						2" Ice	3.7164	3.6084	0.17
						4" Ice	4.8623	4.7439	0.35
Side Arm Mount [SO 103-3]	C	None		0.00	148.0000	No Ice	9.5000	9.5000	0.22
						1/2" Ice	11.8000	11.8000	0.32
						1" Ice	14.1000	14.1000	0.41
						2" Ice	18.7000	18.7000	0.60
						4" Ice	27.9000	27.9000	0.97
***									
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	-30.00	146.0000	No Ice	8.4975	7.4708	0.09
						1/2" Ice	9.1490	8.6564	0.16
						1" Ice	9.7672	9.5559	0.24
						2" Ice	11.0311	11.3884	0.42
						4" Ice	13.6786	15.5274	0.94
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	-15.00	146.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	-30.00	146.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.23
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
6' x 2.375" Pipe Mount	A	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.4250	1.4250	0.02
						1/2" Ice	1.9250	1.9250	0.03
						1" Ice	2.2939	2.2939	0.05

tnxTower	Job: Southington, Smoron - 876334	Page: 14 of 41
FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: 919.755.1012 FAX: 919.755.1031	Project: 146AZR1400 (R1)	Date: 11:47:59 09/09/14
	Client: Crown Castle	Designed by: Shiva Shankar

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.0596	3.0596	0.09
						4" Ice	4.7022	4.7022	0.23
6' x 2.375" Pipe Mount	B	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.4250	1.4250	0.02
						1/2" Ice	1.9250	1.9250	0.03
						1" Ice	2.2939	2.2939	0.05
						2" Ice	3.0596	3.0596	0.09
						4" Ice	4.7022	4.7022	0.23
6' x 2.375" Pipe Mount	C	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.4250	1.4250	0.02
						1/2" Ice	1.9250	1.9250	0.03
						1" Ice	2.2939	2.2939	0.05
						2" Ice	3.0596	3.0596	0.09
						4" Ice	4.7022	4.7022	0.23
IBC1900BB-1	A	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
IBC1900HG-2A	A	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
IBC1900BB-1	B	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
IBC1900HG-2A	B	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
IBC1900BB-1	C	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
IBC1900HG-2A	C	From Leg	4.0000 0.00 0.00	0.00	146.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
						1" Ice	1.4269	0.7699	0.04
						2" Ice	1.7613	1.0415	0.06
						4" Ice	2.5339	1.6883	0.15
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	146.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	146.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	146.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
						1" Ice	8.1830	6.4723	0.19
						2" Ice	9.2563	8.0099	0.34
						4" Ice	11.5262	11.4120	0.75

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
TD-RRH8x20-25	A	From Leg	4.0000	0.00	0.00	146.0000	No Ice	4.7198	1.7001	0.07
			0.00				1/2" Ice	5.0138	1.9170	0.10
			1.00				1" Ice	5.3165	2.1426	0.13
							2" Ice	5.9478	2.6196	0.20
							4" Ice	7.3141	3.6774	0.40
TD-RRH8x20-25	B	From Leg	4.0000	0.00	0.00	146.0000	No Ice	4.7198	1.7001	0.07
			0.00				1/2" Ice	5.0138	1.9170	0.10
			1.00				1" Ice	5.3165	2.1426	0.13
							2" Ice	5.9478	2.6196	0.20
							4" Ice	7.3141	3.6774	0.40
TD-RRH8x20-25	C	From Leg	4.0000	0.00	0.00	146.0000	No Ice	4.7198	1.7001	0.07
			0.00				1/2" Ice	5.0138	1.9170	0.10
			1.00				1" Ice	5.3165	2.1426	0.13
							2" Ice	5.9478	2.6196	0.20
							4" Ice	7.3141	3.6774	0.40
Platform Mount [LP 712-1]	C	None			0.00	146.0000	No Ice	24.5300	24.5300	1.34
							1/2" Ice	29.9400	29.9400	1.65
							1" Ice	35.3500	35.3500	1.96
							2" Ice	46.1700	46.1700	2.58
							4" Ice	67.8100	67.8100	3.82
***										
APXV18-206517S-C w/ Mount Pipe	A	From Leg	2.0000	0.00	30.00	139.0000	No Ice	5.4042	4.7000	0.05
			0.00				1/2" Ice	5.9597	5.8600	0.10
							1" Ice	6.4808	6.7338	0.15
							2" Ice	7.5467	8.5150	0.28
							4" Ice	9.9193	12.2774	0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	2.0000	0.00	30.00	139.0000	No Ice	5.4042	4.7000	0.05
			0.00				1/2" Ice	5.9597	5.8600	0.10
							1" Ice	6.4808	6.7338	0.15
							2" Ice	7.5467	8.5150	0.28
							4" Ice	9.9193	12.2774	0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	2.0000	0.00	30.00	139.0000	No Ice	5.4042	4.7000	0.05
			0.00				1/2" Ice	5.9597	5.8600	0.10
							1" Ice	6.4808	6.7338	0.15
							2" Ice	7.5467	8.5150	0.28
							4" Ice	9.9193	12.2774	0.68
Pipe Mount [PM 501-3]	C	None			0.00	139.0000	No Ice	5.7800	5.7800	0.16
							1/2" Ice	7.3700	7.3700	0.18
							1" Ice	8.9600	8.9600	0.20
							2" Ice	12.1400	12.1400	0.24
							4" Ice	18.5000	18.5000	0.32
***										
BXA-185085/12CFx2 w/ Mount Pipe	A	From Leg	4.0000	0.00	-15.00	131.0000	No Ice	5.0088	5.3098	0.04
			0.00				1/2" Ice	5.5629	6.4812	0.08
			2.00				1" Ice	6.0832	7.3708	0.14
							2" Ice	7.1461	9.1718	0.27
							4" Ice	9.4122	12.9739	0.67
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.0000	0.00	-15.00	131.0000	No Ice	7.9686	5.3981	0.04
			0.00				1/2" Ice	8.6091	6.5465	0.10
			2.00				1" Ice	9.2158	7.4089	0.17
							2" Ice	10.4591	9.1837	0.33
							4" Ice	13.0655	12.9333	0.79
BXA-185085/12CFx2 w/ Mount Pipe	B	From Leg	4.0000	0.00	-15.00	131.0000	No Ice	5.0088	5.3098	0.04
			0.00				1/2" Ice	5.5629	6.4812	0.08
			2.00				1" Ice	6.0832	7.3708	0.14
							2" Ice	7.1461	9.1718	0.27
							4" Ice	9.4122	12.9739	0.67

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
BXA-70063/6CFx2 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.3981 6.5465 7.4089 9.1837 12.9333	0.04 0.10 0.17 0.33 0.79
BXA-185085/12CFx2 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	-20.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.0088 5.5629 6.0832 7.1461 9.4122	5.3098 6.4812 7.3708 9.1718 12.9739	0.04 0.08 0.14 0.27 0.67
BXA-70063/6CFx2 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	-20.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.3981 6.5465 7.4089 9.1837 12.9333	0.04 0.10 0.17 0.33 0.79
RRH2x40-AWS	A	From Leg	4.0000 0.00 1.50	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0980 1.1990 1.3000 1.5020 1.9060	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1396 3.5152 3.9152 4.8036 6.7148	3.5101 4.1303 4.7565 6.0591 9.0948	0.03 0.06 0.10 0.20 0.49
BXA-80080-6CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0062 6.5619 7.0826 8.1672 10.6907	6.2035 7.3594 8.2293 10.0193 13.8398	0.04 0.10 0.16 0.31 0.75
RRH2x40-AWS	B	From Leg	4.0000 0.00 1.50	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0980 1.1990 1.3000 1.5020 1.9060	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1396 3.5152 3.9152 4.8036 6.7148	3.5101 4.1303 4.7565 6.0591 9.0948	0.03 0.06 0.10 0.20 0.49
BXA-80080-6CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0062 6.5619 7.0826 8.1672 10.6907	6.2035 7.3594 8.2293 10.0193 13.8398	0.04 0.10 0.16 0.31 0.75
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 1.50	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.7333 3.9436 4.1539 4.5745 5.4157	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
RRH2x40-AWS	C	From Leg	4.0000 0.00 1.50	-15.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0980 1.1990 1.3000 1.5020 1.9060	1.5894 1.7953 2.0098 2.4648 3.4785	0.04 0.06 0.08 0.13 0.28
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.0000 0.00	-20.00	131.0000	No Ice 1/2" Ice	3.1396 3.5152	3.5101 4.1303	0.03 0.06

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
			2.00			1" Ice	3.9152	4.7565	0.10
						2" Ice	4.8036	6.0591	0.20
						4" Ice	6.7148	9.0948	0.49
BXA-80080-6CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	-20.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0062 6.5619 7.0826 8.1672 10.6907	6.2035 7.3594 8.2293 10.0193 13.8398	0.04 0.10 0.16 0.31 0.75
Platform Mount [LP 712-1]	C	None		0.00	131.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.5300 29.9400 35.3500 46.1700 67.8100	24.5300 29.9400 35.3500 46.1700 67.8100	1.34 1.65 1.96 2.58 3.82
***									
6' x 2.375" Pipe Mount	A	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
6' x 2.375" Pipe Mount	B	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
6' x 2.375" Pipe Mount	C	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
T-Arm Mount [TA 602-3]	C	None		0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.5900 15.4400 19.2900 26.9900 42.3900	11.5900 15.4400 19.2900 26.9900 42.3900	0.77 0.99 1.21 1.64 2.50
***									
***									
58532A	A	From Leg	2.0000 0.00 1.00	0.00	101.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2209 0.2897 0.3672 0.5481 1.0137	0.2209 0.2897 0.3672 0.5481 1.0137	0.00 0.00 0.01 0.02 0.06
Side Arm Mount [SO 701-1]	A	From Leg	1.0000 0.00 0.00	0.00	101.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8500 1.1400 1.4300 2.0100 3.1700	1.6700 2.3400 3.0100 4.3500 7.0300	0.07 0.08 0.09 0.12 0.18
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
VHLP2-18	C	Paraboloid w/o Radome	From Leg	4.0000 0.00 1.00	0.00		121.0000	2.1750	No Ice	3.7200	0.03
									1/2" Ice	4.0100	0.05
									1" Ice	4.3000	0.07
									2" Ice	4.8800	0.11
									4" Ice	6.0400	0.20
VHLP800-11	A	Paraboloid w/o Radome	From Leg	4.0000 0.00 1.00	0.00		121.0000	2.9167	No Ice	6.6800	0.02
									1/2" Ice	7.0700	0.06
									1" Ice	7.4600	0.09
									2" Ice	8.2300	0.17
									4" Ice	9.7800	0.31
VHLP800-11	B	Paraboloid w/o Radome	From Leg	4.0000 0.00 1.00	0.00		121.0000	2.9167	No Ice	6.6800	0.02
									1/2" Ice	7.0700	0.06
									1" Ice	7.4600	0.09
									2" Ice	8.2300	0.17
									4" Ice	9.7800	0.31

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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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

Comb. No.	Description
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	160 - 150	Pole	Max Tension	33	0.00	-0.00	0.00
			Max. Compression	14	-4.98	0.61	1.05
			Max. Mx	11	-1.62	31.41	0.52
			Max. My	2	-1.63	0.44	31.23
			Max. Vy	11	-4.71	31.41	0.52
			Max. Vx	2	-4.67	0.44	31.23
			Max. Torque	10			-2.03
L2	150 - 146.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-7.02	0.72	1.01
			Max. Mx	11	-2.46	50.46	0.72
			Max. My	2	-2.46	0.65	50.10
			Max. Vy	11	-6.37	50.46	0.72
			Max. Vx	2	-6.32	0.65	50.10
			Max. Torque	10			-2.03
L3	146.5 - 146	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-7.11	0.74	1.00
			Max. Mx	11	-2.50	53.65	0.75
			Max. My	2	-2.51	0.68	53.27
			Max. Vy	11	-6.41	53.65	0.75
			Max. Vx	2	-6.36	0.68	53.27
			Max. Torque	10			-2.03
L4	146 - 136	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.95	1.32	0.86
			Max. Mx	11	-5.20	166.16	1.45
			Max. My	2	-5.20	1.43	165.23
			Max. Vy	11	-12.18	166.16	1.45
			Max. Vx	2	-12.14	1.43	165.23
			Max. Torque	10			-2.22
L5	136 - 126	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.60	1.60	0.19
			Max. Mx	11	-7.67	319.87	2.14
			Max. My	2	-7.69	2.21	318.10
			Max. Vy	11	-17.43	319.87	2.14
			Max. Vx	2	-17.35	2.21	318.10
			Max. Torque	10			-2.23
L6	126 - 116	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.95	2.69	-0.18
			Max. Mx	11	-9.69	507.32	4.15
			Max. My	2	-9.68	4.25	505.15
			Max. Vy	11	-19.90	507.32	4.15
			Max. Vx	2	-19.95	4.25	505.15
			Max. Torque	11			-1.88
L7	116 - 115.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.09	2.76	-0.20
			Max. Mx	11	-9.76	517.30	4.30
			Max. My	2	-9.75	4.39	515.14
			Max. Vy	11	-19.97	517.30	4.30
			Max. Vx	2	-20.02	4.39	515.14
			Max. Torque	11			-1.88
L8	115.5 - 103.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.61	3.78	-0.54

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-11.11	681.49	6.64
			Max. My	2	-11.11	6.49	679.49
			Max. Vy	11	-21.05	681.49	6.64
			Max. Vx	2	-21.10	6.49	679.49
			Max. Torque	11			-1.92
L9	103.75 - 98.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.41	4.96	-0.70
			Max. Mx	11	-13.36	877.40	9.41
			Max. My	2	-13.36	8.87	875.64
			Max. Vy	11	-22.45	877.40	9.41
			Max. Vx	2	-22.47	8.87	875.64
			Max. Torque	11			-2.12
L10	98.5 - 88.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.00	6.32	-1.16
			Max. Mx	11	-15.55	1108.92	12.33
			Max. My	2	-15.55	11.54	1107.03
			Max. Vy	11	-23.82	1108.92	12.33
			Max. Vx	2	-23.84	11.54	1107.03
			Max. Torque	11			-2.16
L11	88.5 - 80.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.91	7.44	-1.54
			Max. Mx	11	-17.39	1303.88	14.66
			Max. My	2	-17.39	13.68	1301.88
			Max. Vy	11	-24.89	1303.88	14.66
			Max. Vx	2	-24.90	13.68	1301.88
			Max. Torque	11			-2.20
L12	80.5 - 68.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.68	8.52	-1.91
			Max. Mx	11	-19.17	1494.26	16.84
			Max. My	2	-19.17	15.69	1492.12
			Max. Vy	11	-25.85	1494.26	16.84
			Max. Vx	2	-25.87	15.69	1492.12
			Max. Torque	11			-2.23
L13	68.5 - 63	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.69	9.98	-2.40
			Max. Mx	11	-22.58	1760.07	19.75
			Max. My	2	-22.58	18.38	1757.76
			Max. Vy	11	-27.22	1760.07	19.75
			Max. Vx	2	-27.24	18.38	1757.76
			Max. Torque	11			-2.27
L14	63 - 61.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.29	10.20	-2.48
			Max. Mx	11	-22.98	1801.07	20.18
			Max. My	2	-22.98	18.78	1798.73
			Max. Vy	11	-27.41	1801.07	20.18
			Max. Vx	2	-27.43	18.78	1798.73
			Max. Torque	11			-2.28
L15	61.5 - 60.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.70	10.34	-2.53
			Max. Mx	11	-23.27	1828.55	20.47
			Max. My	2	-23.27	19.05	1826.20
			Max. Vy	11	-27.54	1828.55	20.47
			Max. Vx	2	-27.55	19.05	1826.20
			Max. Torque	11			-2.28
L16	60.5 - 50.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.13	11.81	-3.03
			Max. Mx	11	-26.40	2110.67	23.36
			Max. My	2	-26.40	21.75	2108.12
			Max. Vy	11	-28.86	2110.67	23.36
			Max. Vx	2	-28.87	21.75	2108.12
			Max. Torque	11			-2.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L17	50.5 - 40.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.62	13.29	-3.54
			Max. Mx	11	-29.64	2405.63	26.22
			Max. My	2	-29.64	24.45	2402.86
			Max. Vy	11	-30.10	2405.63	26.22
			Max. Vx	2	-30.12	24.45	2402.86
			Max. Torque	11			-2.39
L18	40.5 - 34	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-56.30	13.51	-3.62
			Max. Mx	11	-30.13	2450.94	26.65
			Max. My	2	-30.13	24.86	2448.13
			Max. Vy	11	-30.28	2450.94	26.65
			Max. Vx	2	-30.30	24.86	2448.13
			Max. Torque	11			-2.39
L19	34 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.30	14.62	-4.00
			Max. Mx	11	-33.92	2681.89	28.79
			Max. My	2	-33.92	26.89	2678.91
			Max. Vy	11	-31.23	2681.89	28.79
			Max. Vx	2	-31.25	26.89	2678.91
			Max. Torque	11			-2.43
L20	31.5 - 30.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.76	14.77	-4.05
			Max. Mx	11	-34.27	2713.19	29.08
			Max. My	2	-34.27	27.16	2710.19
			Max. Vy	11	-31.34	2713.19	29.08
			Max. Vx	2	-31.36	27.16	2710.19
			Max. Torque	11			-2.44
L21	30.5 - 20.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.48	16.23	-4.56
			Max. Mx	11	-37.81	3032.50	31.90
			Max. My	2	-37.81	29.85	3029.25
			Max. Vy	11	-32.48	3032.50	31.90
			Max. Vx	2	-32.50	29.85	3029.25
			Max. Torque	11			-2.49
L22	20.5 - 14.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-69.57	17.17	-4.89
			Max. Mx	11	-40.14	3243.51	33.70
			Max. My	2	-40.14	31.58	3240.10
			Max. Vy	11	-33.22	3243.51	33.70
			Max. Vx	2	-33.24	31.58	3240.10
			Max. Torque	11			-2.53
L23	14.08 - 11.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-70.90	17.56	-5.02
			Max. Mx	11	-41.16	3329.65	34.42
			Max. My	2	-41.16	32.27	3326.16
			Max. Vy	11	-33.52	3329.65	34.42
			Max. Vx	2	-33.54	32.27	3326.16
			Max. Torque	11			-2.54
L24	11.5 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-75.09	18.09	-5.20
			Max. Mx	11	-44.72	3669.95	37.26
			Max. My	2	-44.72	34.71	3666.50
			Max. Vy	11	-34.55	3669.95	37.26
			Max. Vx	2	-34.57	34.71	3666.50
			Max. Torque	11			-2.58
L25	1.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-75.67	18.09	-5.20
			Max. Mx	11	-45.24	3721.86	37.69
			Max. My	2	-45.24	35.06	3718.44
			Max. Vy	11	-34.70	3721.86	37.69

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-34.72	35.06	3718.44
			Max. Torque	11			-2.58

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	75.67	10.46	0.08
	Max. H_x	11	45.26	34.68	0.29
	Max. H_z	2	45.26	0.23	34.70
	Max. M_x	2	3718.44	0.23	34.70
	Max. M_z	5	3707.51	-34.62	0.04
	Max. Torsion	4	2.38	-29.98	17.21
	Min. Vert	1	45.26	0.00	0.00
	Min. H_x	5	45.26	-34.62	0.04
	Min. H_z	8	45.26	-0.09	-34.66
	Min. M_x	8	-3715.22	-0.09	-34.66
	Min. M_z	11	-3721.86	34.68	0.29
	Min. Torsion	11	-2.58	34.68	0.29

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	45.26	0.00	0.00	0.77	3.59	0.00
Dead+Wind 0 deg - No Ice	45.26	-0.23	-34.70	-3718.44	35.06	-0.71
Dead+Wind 30 deg - No Ice	45.26	17.34	-29.79	-3186.41	-1853.89	-1.86
Dead+Wind 60 deg - No Ice	45.26	29.98	-17.21	-1839.32	-3209.26	-2.38
Dead+Wind 90 deg - No Ice	45.26	34.62	-0.04	-1.42	-3707.51	-2.26
Dead+Wind 120 deg - No Ice	45.26	30.11	17.55	1887.53	-3227.24	-1.67
Dead+Wind 150 deg - No Ice	45.26	17.26	30.12	3232.36	-1847.05	-0.67
Dead+Wind 180 deg - No Ice	45.26	0.09	34.66	3715.22	-10.55	0.48
Dead+Wind 210 deg - No Ice	45.26	-17.09	30.00	3214.39	1829.47	1.54
Dead+Wind 240 deg - No Ice	45.26	-30.11	17.28	1850.10	3232.51	2.38
Dead+Wind 270 deg - No Ice	45.26	-34.68	-0.29	-37.69	3721.86	2.58
Dead+Wind 300 deg - No Ice	45.26	-30.14	-17.41	-1868.70	3239.04	1.90
Dead+Wind 330 deg - No Ice	45.26	-17.61	-29.92	-3204.91	1899.25	0.67
Dead+Ice	75.67	-0.00	0.00	5.20	18.09	0.00
Dead+Wind 0 deg+Ice	75.67	-0.06	-10.45	-1163.12	26.88	-0.15
Dead+Wind 30 deg+Ice	75.67	5.23	-8.98	-997.34	-566.26	-0.55
Dead+Wind 60 deg+Ice	75.67	9.04	-5.18	-573.22	-993.53	-0.78
Dead+Wind 90 deg+Ice	75.67	10.45	-0.01	5.28	-1150.77	-0.80
Dead+Wind 120 deg+Ice	75.67	9.08	5.27	596.96	-999.08	-0.64
Dead+Wind 150 deg+Ice	75.67	5.21	9.07	1020.11	-565.63	-0.31
Dead+Wind 180 deg+Ice	75.67	0.03	10.44	1172.24	13.69	0.09
Dead+Wind 210 deg+Ice	75.67	-5.16	9.03	1014.69	594.11	0.48
Dead+Wind 240 deg+Ice	75.67	-9.08	5.20	586.03	1033.91	0.79
Dead+Wind 270 deg+Ice	75.67	-10.46	-0.08	-5.60	1188.81	0.88
Dead+Wind 300 deg+Ice	75.67	-9.09	-5.24	-582.15	1036.37	0.69
Dead+Wind 330 deg+Ice	75.67	-5.30	-9.01	-1002.90	613.65	0.31
Dead+Wind 0 deg - Service	45.26	-0.09	-13.55	-1454.22	15.97	-0.28

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+Wind 30 deg - Service	45.26	6.77	-11.64	-1246.06	-722.99	-0.74
Dead+Wind 60 deg - Service	45.26	11.71	-6.72	-719.08	-1253.23	-0.94
Dead+Wind 90 deg - Service	45.26	13.52	-0.01	-0.08	-1448.17	-0.89
Dead+Wind 120 deg - Service	45.26	11.76	6.85	738.92	-1260.31	-0.66
Dead+Wind 150 deg - Service	45.26	6.74	11.77	1265.03	-720.34	-0.26
Dead+Wind 180 deg - Service	45.26	0.04	13.54	1453.91	-1.87	0.19
Dead+Wind 210 deg - Service	45.26	-6.68	11.72	1257.97	717.96	0.61
Dead+Wind 240 deg - Service	45.26	-11.76	6.75	724.26	1266.86	0.94
Dead+Wind 270 deg - Service	45.26	-13.54	-0.11	-14.27	1458.31	1.02
Dead+Wind 300 deg - Service	45.26	-11.77	-6.80	-730.60	1269.44	0.75
Dead+Wind 330 deg - Service	45.26	-6.88	-11.69	-1253.34	745.28	0.26

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-45.26	0.00	0.00	45.26	0.00	0.000%
2	-0.23	-45.26	-34.70	0.23	45.26	34.70	0.000%
3	17.34	-45.26	-29.79	-17.34	45.26	29.79	0.000%
4	29.98	-45.26	-17.21	-29.98	45.26	17.21	0.000%
5	34.62	-45.26	-0.04	-34.62	45.26	0.04	0.000%
6	30.11	-45.26	17.55	-30.11	45.26	-17.55	0.000%
7	17.26	-45.26	30.12	-17.26	45.26	-30.12	0.000%
8	0.09	-45.26	34.66	-0.09	45.26	-34.66	0.000%
9	-17.09	-45.26	30.00	17.09	45.26	-30.00	0.000%
10	-30.11	-45.26	17.28	30.11	45.26	-17.28	0.000%
11	-34.68	-45.26	-0.29	34.68	45.26	0.29	0.000%
12	-30.14	-45.26	-17.41	30.14	45.26	17.41	0.000%
13	-17.61	-45.26	-29.92	17.61	45.26	29.92	0.000%
14	0.00	-75.67	0.00	0.00	75.67	-0.00	0.000%
15	-0.06	-75.67	-10.45	0.06	75.67	10.45	0.000%
16	5.23	-75.67	-8.98	-5.23	75.67	8.98	0.000%
17	9.04	-75.67	-5.18	-9.04	75.67	5.18	0.000%
18	10.45	-75.67	-0.01	-10.45	75.67	0.01	0.000%
19	9.08	-75.67	5.27	-9.08	75.67	-5.27	0.000%
20	5.21	-75.67	9.07	-5.21	75.67	-9.07	0.000%
21	0.03	-75.67	10.44	-0.03	75.67	-10.44	0.000%
22	-5.16	-75.67	9.03	5.16	75.67	-9.03	0.000%
23	-9.08	-75.67	5.20	9.08	75.67	-5.20	0.000%
24	-10.46	-75.67	-0.08	10.46	75.67	0.08	0.000%
25	-9.09	-75.67	-5.24	9.09	75.67	5.24	0.000%
26	-5.30	-75.67	-9.01	5.30	75.67	9.01	0.000%
27	-0.09	-45.26	-13.55	0.09	45.26	13.55	0.000%
28	6.77	-45.26	-11.64	-6.77	45.26	11.64	0.000%
29	11.71	-45.26	-6.72	-11.71	45.26	6.72	0.000%
30	13.52	-45.26	-0.01	-13.52	45.26	0.01	0.000%
31	11.76	-45.26	6.85	-11.76	45.26	-6.85	0.000%
32	6.74	-45.26	11.77	-6.74	45.26	-11.77	0.000%
33	0.04	-45.26	13.54	-0.04	45.26	-13.54	0.000%
34	-6.68	-45.26	11.72	6.68	45.26	-11.72	0.000%
35	-11.76	-45.26	6.75	11.76	45.26	-6.75	0.000%
36	-13.54	-45.26	-0.11	13.54	45.26	0.11	0.000%
37	-11.77	-45.26	-6.80	11.77	45.26	6.80	0.000%
38	-6.88	-45.26	-11.69	6.88	45.26	11.69	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	0.00018087
3	Yes	6	0.00000001	0.00012150
4	Yes	6	0.00000001	0.00013182
5	Yes	5	0.00000001	0.00019254
6	Yes	6	0.00000001	0.00012531
7	Yes	6	0.00000001	0.00012764
8	Yes	5	0.00000001	0.00005788
9	Yes	6	0.00000001	0.00012991
10	Yes	6	0.00000001	0.00012168
11	Yes	5	0.00000001	0.00031000
12	Yes	6	0.00000001	0.00013193
13	Yes	6	0.00000001	0.00012769
14	Yes	4	0.00000001	0.00001780
15	Yes	5	0.00000001	0.00015648
16	Yes	5	0.00000001	0.00093472
17	Yes	6	0.00000001	0.00010679
18	Yes	5	0.00000001	0.00017423
19	Yes	6	0.00000001	0.00009956
20	Yes	6	0.00000001	0.00010222
21	Yes	5	0.00000001	0.00012785
22	Yes	6	0.00000001	0.00011233
23	Yes	6	0.00000001	0.00010038
24	Yes	5	0.00000001	0.00021601
25	Yes	6	0.00000001	0.00011461
26	Yes	6	0.00000001	0.00010807
27	Yes	4	0.00000001	0.00080578
28	Yes	5	0.00000001	0.00035184
29	Yes	5	0.00000001	0.00040495
30	Yes	5	0.00000001	0.00005182
31	Yes	5	0.00000001	0.00037488
32	Yes	5	0.00000001	0.00038439
33	Yes	4	0.00000001	0.00050545
34	Yes	5	0.00000001	0.00039734
35	Yes	5	0.00000001	0.00035764
36	Yes	5	0.00000001	0.00006765
37	Yes	5	0.00000001	0.00041030
38	Yes	5	0.00000001	0.00038800

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150	47.08	37	2.64	0.01
L2	150 - 146.5	41.55	37	2.62	0.01
L3	146.5 - 146	39.64	37	2.59	0.01
L4	146 - 136	39.37	37	2.59	0.01
L5	136 - 126	34.03	37	2.49	0.01
L6	126 - 116	28.99	37	2.32	0.01
L7	116 - 115.5	24.38	37	2.07	0.00
L8	115.5 - 103.75	24.17	37	2.06	0.00
L9	107.5 - 98.5	20.84	37	1.91	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L10	98.5 - 88.5	17.34	37	1.78	0.00
L11	88.5 - 80.5	13.83	37	1.57	0.00
L12	80.5 - 68.5	11.35	37	1.39	0.00
L13	73 - 63	9.30	37	1.22	0.00
L14	63 - 61.5	6.89	37	1.06	0.00
L15	61.5 - 60.5	6.56	37	1.02	0.00
L16	60.5 - 50.5	6.35	37	1.00	0.00
L17	50.5 - 40.5	4.43	37	0.83	0.00
L18	40.5 - 34	2.87	37	0.65	0.00
L19	39 - 31.5	2.67	37	0.63	0.00
L20	31.5 - 30.5	1.74	37	0.54	0.00
L21	30.5 - 20.5	1.63	37	0.52	0.00
L22	20.5 - 14.08	0.73	37	0.34	0.00
L23	14.08 - 11.5	0.34	37	0.23	0.00
L24	11.5 - 1.5	0.23	37	0.19	0.00
L25	1.5 - 0	0.00	37	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.0000	(2) LGP21401	37	44.86	2.65	0.01	21015
148.0000	800MHz 2X50W RRH W/FILTER	37	40.46	2.60	0.01	8247
146.0000	APXV9ERR18-C-A20 w/ Mount Pipe	37	39.37	2.59	0.01	7589
139.0000	APXV18-206517S-C w/ Mount Pipe	37	35.61	2.53	0.01	4986
131.0000	BXA-185085/12CFx2 w/ Mount Pipe	37	31.47	2.41	0.01	3284
122.0000	VHLP2-18	37	27.09	2.23	0.00	2422
121.0000	6' x 2.375" Pipe Mount	37	26.62	2.20	0.00	2357
101.0000	58532A	37	18.28	1.82	0.00	3179

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150	119.77	12	6.74	0.04
L2	150 - 146.5	105.75	12	6.68	0.03
L3	146.5 - 146	100.89	12	6.61	0.02
L4	146 - 136	100.20	12	6.60	0.02
L5	136 - 126	86.66	12	6.35	0.02
L6	126 - 116	73.84	12	5.90	0.01
L7	116 - 115.5	62.13	12	5.28	0.01
L8	115.5 - 103.75	61.58	12	5.25	0.01
L9	107.5 - 98.5	53.10	12	4.88	0.01
L10	98.5 - 88.5	44.20	12	4.54	0.01
L11	88.5 - 80.5	35.27	12	4.00	0.01
L12	80.5 - 68.5	28.95	12	3.55	0.00
L13	73 - 63	23.72	12	3.12	0.00
L14	63 - 61.5	17.57	12	2.69	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L15	61.5 - 60.5	16.74	12	2.61	0.00
L16	60.5 - 50.5	16.20	12	2.56	0.00
L17	50.5 - 40.5	11.29	12	2.12	0.00
L18	40.5 - 34	7.33	12	1.67	0.00
L19	39 - 31.5	6.82	12	1.60	0.00
L20	31.5 - 30.5	4.45	12	1.37	0.00
L21	30.5 - 20.5	4.17	12	1.32	0.00
L22	20.5 - 14.08	1.87	12	0.88	0.00
L23	14.08 - 11.5	0.88	12	0.59	0.00
L24	11.5 - 1.5	0.58	12	0.49	0.00
L25	1.5 - 0	0.01	12	0.06	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.0000	(2) LGP21401	12	114.14	6.74	0.04	8672
148.0000	800MHz 2X50W RRH W/FILTER	12	102.97	6.63	0.03	3370
146.0000	APXV9ERR18-C-A20 w/ Mount Pipe	12	100.20	6.60	0.02	3090
139.0000	APXV18-206517S-C w/ Mount Pipe	12	90.66	6.45	0.02	2018
131.0000	BXA-185085/12CFx2 w/ Mount Pipe	12	80.13	6.15	0.02	1322
122.0000	VHLP2-18	12	69.00	5.68	0.01	971
121.0000	6' x 2.375" Pipe Mount	12	67.82	5.62	0.01	944
101.0000	58532A	12	46.60	4.64	0.01	1265

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	160 - 159	TP16x16x0.375	10.0000	0.0000	0.0	21.00	18.4078	-0.12	386.56	0.000 *
	159 - 158					21.00	18.4078	-0.24	386.56	0.001 *
	158 - 157					21.00	18.4078	-0.19	386.56	0.000
	157 - 156					21.00	18.4078	-0.25	386.56	0.001
	156 - 155					21.00	18.4078	-1.30	386.56	0.003
	155 - 154					21.00	18.4078	-1.36	386.56	0.004
	154 - 153					21.00	18.4078	-1.42	386.56	0.004
	153 - 152					21.00	18.4078	-1.49	386.56	0.004
	152 - 151					21.00	18.4078	-1.55	386.56	0.004
	151 - 150					21.00	18.4078	-1.61	386.56	0.004
L2	150 - 148.833	TP16x16x0.375	3.5000	0.0000	0.0	21.00	18.4078	-1.69	386.56	0.004
	148.833 - 147.667					21.00	18.4078	-2.37	386.56	0.006
	147.667 - 146.5					21.00	18.4078	-2.45	386.56	0.006
L3	146.5 - 146 (3)	TP22x22x0.375	0.5000	0.0000	0.0	21.00	25.4764	-2.50	535.00	0.005

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 $\frac{P}{P_a}$
L4	146 - 145	TP23.848x22x0.25	10.0000	0.0000	0.0	36.00	17.6575	-4.35	635.67	0.007
	145 - 144					36.00	17.8063	-4.41	641.03	0.007
	144 - 143					36.00	17.9551	-4.48	646.38	0.007
	143 - 142					36.00	18.1038	-4.55	651.74	0.007
	142 - 141					36.00	18.2526	-4.62	657.09	0.007
	141 - 140					36.00	18.4014	-4.69	662.45	0.007
	140 - 139					36.00	18.5501	-4.76	667.80	0.007
	139 - 138					36.00	18.6989	-5.04	673.16	0.007
	138 - 137					36.00	18.8477	-5.11	678.52	0.008
	137 - 136					36.00	18.9964	-5.18	683.87	0.008
L5	136 - 135	TP25.6961x23.848x0.25	10.0000	0.0000	0.0	36.00	19.1452	-5.28	689.23	0.008
	135 - 134					36.00	19.2940	-5.37	694.58	0.008
	134 - 133					36.00	19.4427	-5.46	699.94	0.008
	133 - 132					36.00	19.5915	-5.55	705.29	0.008
	132 - 131					36.00	19.7403	-5.65	710.65	0.008
	131 - 130					36.00	19.8890	-7.25	716.01	0.010
	130 - 129					36.00	20.0378	-7.35	721.36	0.010
	129 - 128					36.00	20.1866	-7.45	726.72	0.010
	128 - 127					36.00	20.3353	-7.56	732.07	0.010
	127 - 126					36.00	20.4841	-7.66	737.43	0.010
L6	126 - 125	TP27.5441x25.6961x0.25	10.0000	0.0000	0.0	36.00	20.6329	-7.78	742.78	0.010
	125 - 124					36.00	20.7816	-7.90	748.14	0.011
	124 - 123					36.00	20.9304	-8.01	753.50	0.011
	123 - 122					36.00	21.0792	-8.14	758.85	0.011
	122 - 121					36.00	21.2279	-8.26	764.21	0.011
	121 - 120					36.00	21.3767	-9.15	769.56	0.012
	120 - 119					36.00	21.5255	-9.28	774.92	0.012
	119 - 118					36.00	21.6742	-9.41	780.27	0.012
	118 - 117					36.00	21.8230	-9.53	785.63	0.012
	117 - 116					36.00	21.9718	-9.66	790.98	0.012
L7	116 - 115.5 (7)	TP27.6365x27.5441x0.25	0.5000	0.0000	0.0	36.00	22.0462	-9.73	793.66	0.012
L8	115.5 - 114.5	TP29.808x27.6365x0.41	11.7500	0.0000	0.0	36.00	36.1885	-9.90	1302.78	0.008
	114.5 - 113.5					36.00	36.4324	-10.06	1311.57	0.008
	113.5 - 112.5					36.00	36.6764	-10.23	1320.35	0.008
	112.5 - 111.5					36.00	36.9204	-10.40	1329.13	0.008
	111.5 - 110.5					36.00	37.1644	-10.57	1337.92	0.008
	110.5 - 109.5					36.00	37.4084	-10.74	1346.70	0.008
	109.5 - 108.5					36.00	37.6523	-10.92	1355.48	0.008
	108.5 - 107.5					36.00	37.8963	-11.09	1364.27	0.008
	107.5 - 103.75					36.00	38.8112	-5.81	1397.20	0.004
L9	107.5 - 103.75	TP30.2774x28.615x0.4675	9.0000	0.0000	0.0	36.00	43.4146	-6.43	1562.92	0.004
	103.75 - 102.7					36.00	43.7065	-12.45	1573.44	0.008
	102.7 - 101.65					36.00	43.9985	-12.65	1583.95	0.008
	101.65 - 100.6					36.00	44.2905	-12.92	1594.46	0.008
	100.6 - 99.55					36.00	44.5824	-13.13	1604.97	0.008
	99.55 - 98.5					36.00	44.8744	-13.34	1615.48	0.008
L10	98.5 - 97.5	TP32.1246x30.2774x0.4425	10.0000	0.0000	0.0	36.00	42.7735	-13.55	1539.85	0.009
	97.5 - 96.5					36.00	43.0367	-13.77	1549.32	0.009
	96.5 - 95.5					36.00	43.2999	-13.98	1558.80	0.009
	95.5 - 94.5					36.00	43.5631	-14.20	1568.27	0.009
	94.5 - 93.5					36.00	43.8263	-14.42	1577.75	0.009
	93.5 - 92.5					36.00	44.0895	-14.64	1587.22	0.009
	92.5 - 91.5					36.00	44.3527	-14.86	1596.70	0.009
	91.5 - 90.5					36.00	44.6159	-15.09	1606.17	0.009
	90.5 - 89.5					36.00	44.8791	-15.31	1615.65	0.009
	89.5 - 88.5					36.00	45.1423	-15.54	1625.12	0.010
L11	88.5 - 87.5	TP33.6024x32.1246x0.4375	8.0000	0.0000	0.0	36.00	44.8995	-15.76	1616.38	0.010
	87.5 - 86.5					36.00	45.1597	-15.99	1625.75	0.010
	86.5 - 85.5					36.00	45.4199	-16.21	1635.12	0.010
	85.5 - 84.5					36.00	45.6801	-16.44	1644.48	0.010

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 $\frac{P}{P_a}$
	84.5 - 83.5					36.00	45.9404	-16.67	1653.85	0.010
	83.5 - 82.5					36.00	46.2006	-16.91	1663.22	0.010
	82.5 - 81.5					36.00	46.4608	-17.14	1672.59	0.010
	81.5 - 80.5					36.00	46.7210	-17.37	1681.96	0.010
L12	80.5 - 79.4286	TP35.819x33.6024x0.4325	12.0000	0.0000	0.0	36.00	46.4697	-17.62	1672.91	0.011
	79.4286 - 78.3571					36.00	46.7453	-17.87	1682.83	0.011
	78.3571 - 77.2857					36.00	47.0209	-18.13	1692.75	0.011
	77.2857 - 76.2143					36.00	47.2965	-18.38	1702.67	0.011
	76.2143 - 75.1429					36.00	47.5721	-18.64	1712.60	0.011
	75.1429 - 74.0714					36.00	47.8478	-18.89	1722.52	0.011
	74.0714 - 73					36.00	48.1234	-19.15	1732.44	0.011
	73 - 68.5					36.00	49.2810	-9.93	1774.12	0.006
L13	73 - 68.5	TP36.2103x34.3628x0.5	10.0000	0.0000	0.0	36.00	55.8576	-11.15	2010.87	0.006
	68.5 - 67.4					36.00	56.1848	-21.38	2022.65	0.011
	67.4 - 66.3					36.00	56.5119	-21.68	2034.43	0.011
	66.3 - 65.2					36.00	56.8391	-21.97	2046.21	0.011
	65.2 - 64.1					36.00	57.1663	-22.27	2057.99	0.011
	64.1 - 63					36.00	57.4935	-22.56	2069.77	0.011
L14	63 - 61.5 (14)	TP36.4874x36.2103x0.5	1.5000	0.0000	0.0	36.00	57.9397	-22.97	2085.83	0.011
L15	61.5 - 60.5 (15)	TP36.6721x36.4874x0.52	1.0000	0.0000	0.0	36.00	60.5331	-23.26	2179.19	0.011
L16	60.5 - 59.5	TP38.5196x36.6721x0.61	10.0000	0.0000	0.0	36.00	71.1961	-23.57	2563.06	0.009
	59.5 - 58.5					36.00	71.5590	-23.87	2576.12	0.009
	58.5 - 57.5					36.00	71.9219	-24.18	2589.19	0.009
	57.5 - 56.5					36.00	72.2848	-24.50	2602.25	0.009
	56.5 - 55.5					36.00	72.6477	-24.81	2615.32	0.009
	55.5 - 54.5					36.00	73.0106	-25.12	2628.38	0.010
	54.5 - 53.5					36.00	73.3734	-25.44	2641.44	0.010
	53.5 - 52.5					36.00	73.7363	-25.76	2654.51	0.010
	52.5 - 51.5					36.00	74.0992	-26.07	2667.57	0.010
	51.5 - 50.5					36.00	74.4621	-26.39	2680.64	0.010
L17	50.5 - 49.5	TP40.3671x38.5196x0.595	10.0000	0.0000	0.0	36.00	73.0138	-26.71	2628.50	0.010
	49.5 - 48.5					36.00	73.3677	-27.03	2641.24	0.010
	48.5 - 47.5					36.00	73.7217	-27.35	2653.98	0.010
	47.5 - 46.5					36.00	74.0757	-27.67	2666.72	0.010
	46.5 - 45.5					36.00	74.4296	-27.99	2679.47	0.010
	45.5 - 44.5					36.00	74.7836	-28.32	2692.21	0.011
	44.5 - 43.5					36.00	75.1375	-28.65	2704.95	0.011
	43.5 - 42.5					36.00	75.4915	-28.97	2717.69	0.011
	42.5 - 41.5					36.00	75.8455	-29.30	2730.44	0.011
	41.5 - 40.5					36.00	76.1994	-29.63	2743.18	0.011
L18	40.5 - 39	TP41.568x40.3671x0.59	6.5000	0.0000	0.0	36.00	76.0951	-30.12	2739.42	0.011
	39 - 34					36.00	77.8500	-16.73	2802.60	0.006
L19	39 - 34	TP41.28x39.8943x0.59	7.5000	0.0000	0.0	36.00	76.4253	-16.32	2751.31	0.006
	34 - 32.75					36.00	76.8640	-33.49	2767.11	0.012
	32.75 - 31.5					36.00	77.3028	-33.91	2782.90	0.012
L20	31.5 - 30.5 (20)	TP41.4647x41.28x0.595	1.0000	0.0000	0.0	36.00	78.3023	-34.26	2818.88	0.012
L21	30.5 - 29.5	TP43.3124x41.4647x0.615	10.0000	0.0000	0.0	36.00	81.2606	-34.61	2925.38	0.012
	29.5 - 28.5					36.00	81.6265	-34.96	2938.55	0.012
	28.5 - 27.5					36.00	81.9924	-35.31	2951.73	0.012
	27.5 - 26.5					36.00	82.3583	-35.66	2964.90	0.012
	26.5 - 25.5					36.00	82.7242	-36.02	2978.07	0.012
	25.5 - 24.5					36.00	83.0900	-36.37	2991.24	0.012
	24.5 - 23.5					36.00	83.4559	-36.73	3004.41	0.012
	23.5 - 22.5					36.00	83.8218	-37.09	3017.59	0.012
	22.5 - 21.5					36.00	84.1877	-37.45	3030.76	0.012

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 $\frac{P}{P_a}$
	21.5 - 20.5					36.00	84.5536	-37.81	3043.93	0.012
L22	20.5 - 19.43	TP44.4985x43.3124x0.61	6.4200	0.0000	0.0	36.00	84.2643	-38.19	3033.51	0.013
	19.43 - 18.36					36.00	84.6526	-38.58	3047.49	0.013
	18.36 - 17.29					36.00	85.0409	-38.97	3061.47	0.013
	17.29 - 16.22					36.00	85.4292	-39.36	3075.45	0.013
	16.22 - 15.15					36.00	85.8176	-39.75	3089.43	0.013
	15.15 - 14.08					36.00	86.2059	-40.14	3103.41	0.013
L23	14.08 - 12.79	TP44.9752x44.4985x0.65	2.5800	0.0000	0.0	36.00	92.2738	-40.65	3321.86	0.012
	12.79 - 11.5					36.00	92.7727	-41.16	3339.82	0.012
L24	11.5 - 10.5	TP46.8229x44.9752x0.615	10.0000	0.0000	0.0	36.00	88.2124	-41.51	3175.65	0.013
	10.5 - 9.5					36.00	88.5783	-41.86	3188.82	0.013
	9.5 - 8.5					36.00	88.9442	-42.21	3201.99	0.013
	8.5 - 7.5					36.00	89.3101	-42.57	3215.16	0.013
	7.5 - 6.5					36.00	89.6760	-42.92	3228.34	0.013
	6.5 - 5.5					36.00	90.0419	-43.28	3241.51	0.013
	5.5 - 4.5					36.00	90.4078	-43.64	3254.68	0.013
	4.5 - 3.5					36.00	90.7736	-44.00	3267.85	0.013
	3.5 - 2.5					36.00	91.1395	-44.36	3281.02	0.014
	2.5 - 1.5					36.00	91.5054	-44.72	3294.20	0.014
L25	1.5 - 0 (25)	TP47.1x46.8229x0.615	1.5000	0.0000	0.0	36.00	92.0542	-45.24	3313.95	0.014

* DL controls

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	160 - 159	TP16x16x0.375	0.02	0.00	23.10	0.000	0.00	0.00	23.10	0.000
	159 - 158		0.03	0.01	23.10	0.000	0.00	0.00	23.10	0.000
	158 - 157		0.24	0.04	23.10	0.002	0.00	0.00	23.10	0.000
	157 - 156		0.42	0.07	23.10	0.003	0.00	0.00	23.10	0.000
	156 - 155		8.67	1.48	23.10	0.064	0.00	0.00	23.10	0.000
	155 - 154		13.19	2.25	23.10	0.098	0.00	0.00	23.10	0.000
	154 - 153		17.76	3.03	23.10	0.131	0.00	0.00	23.10	0.000
	153 - 152		22.39	3.82	23.10	0.166	0.00	0.00	23.10	0.000
	152 - 151		27.06	4.62	23.10	0.200	0.00	0.00	23.10	0.000
	151 - 150		31.79	5.43	23.10	0.235	0.00	0.00	23.10	0.000
L2	150 - 148.833	TP16x16x0.375	37.37	6.38	23.10	0.276	0.00	0.00	23.10	0.000
	148.833 - 147.667		43.52	7.43	23.10	0.322	0.00	0.00	23.10	0.000
	147.667 - 146.5		50.95	8.70	23.10	0.377	0.00	0.00	23.10	0.000
L3	146.5 - 146 (3)	TP22x22x0.375	54.17	4.80	23.10	0.208	0.00	0.00	23.10	0.000
L4	146 - 145	TP23.848x22x0.25	66.71	8.48	36.00	0.236	0.00	0.00	36.00	0.000
	145 - 144		77.15	9.65	36.00	0.268	0.00	0.00	36.00	0.000
	144 - 143		87.69	10.78	36.00	0.300	0.00	0.00	36.00	0.000
	143 - 142		98.33	11.89	36.00	0.330	0.00	0.00	36.00	0.000
	142 - 141		109.08	12.98	36.00	0.360	0.00	0.00	36.00	0.000
	141 - 140		119.93	14.04	36.00	0.390	0.00	0.00	36.00	0.000
	140 - 139		130.89	15.07	36.00	0.419	0.00	0.00	36.00	0.000
	139 - 138		142.85	16.19	36.00	0.450	0.00	0.00	36.00	0.000
	138 - 137		154.92	17.28	36.00	0.480	0.00	0.00	36.00	0.000
	137 - 136		167.10	18.35	36.00	0.510	0.00	0.00	36.00	0.000
L5	136 - 135	TP25.6961x23.848x0.25	179.39	19.39	36.00	0.539	0.00	0.00	36.00	0.000
	135 - 134		191.79	20.41	36.00	0.567	0.00	0.00	36.00	0.000

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 $\frac{f_{by}}{F_{by}}$
	134 - 133		204.30	21.41	36.00	0.595	0.00	0.00	36.00	0.000
	133 - 132		216.92	22.38	36.00	0.622	0.00	0.00	36.00	0.000
	132 - 131		229.65	23.34	36.00	0.648	0.00	0.00	36.00	0.000
	131 - 130		252.16	25.24	36.00	0.701	0.00	0.00	36.00	0.000
	130 - 129		269.25	26.55	36.00	0.738	0.00	0.00	36.00	0.000
	129 - 128		286.45	27.83	36.00	0.773	0.00	0.00	36.00	0.000
	128 - 127		303.77	29.08	36.00	0.808	0.00	0.00	36.00	0.000
	127 - 126		321.20	30.30	36.00	0.842	0.00	0.00	36.00	0.000
L6	126 - 125	TP27.5441x25.6961x0.25	338.75	31.50	36.00	0.875	0.00	0.00	36.00	0.000
	125 - 124		356.41	32.67	36.00	0.907	0.00	0.00	36.00	0.000
	124 - 123		374.19	33.81	36.00	0.939	0.00	0.00	36.00	0.000
	123 - 122		392.09	34.92	36.00	0.970	0.00	0.00	36.00	0.000
	122 - 121		410.81	36.08	36.00	1.002	0.00	0.00	36.00	0.000
	121 - 120		430.34	37.27	36.00	1.035	0.00	0.00	36.00	0.000
	120 - 119		449.98	38.43	36.00	1.067	0.00	0.00	36.00	0.000
	119 - 118		469.75	39.56	36.00	1.099	0.00	0.00	36.00	0.000
	118 - 117		489.63	40.68	36.00	1.130	0.00	0.00	36.00	0.000
	117 - 116		509.63	41.76	36.00	1.160	0.00	0.00	36.00	0.000
L7	116 - 115.5 (7)	TP27.6365x27.5441x0.25	519.67	42.30	36.00	1.175	0.00	0.00	36.00	0.000
L8	115.5 - 114.5	TP29.808x27.6365x0.41	539.86	26.90	36.00	0.747	0.00	0.00	36.00	0.000
	114.5 - 113.5		560.19	27.54	36.00	0.765	0.00	0.00	36.00	0.000
	113.5 - 112.5		580.64	28.16	36.00	0.782	0.00	0.00	36.00	0.000
	112.5 - 111.5		601.24	28.77	36.00	0.799	0.00	0.00	36.00	0.000
	111.5 - 110.5		621.97	29.37	36.00	0.816	0.00	0.00	36.00	0.000
	110.5 - 109.5		642.83	29.96	36.00	0.832	0.00	0.00	36.00	0.000
	109.5 - 108.5		663.84	30.54	36.00	0.848	0.00	0.00	36.00	0.000
	108.5 - 107.5		684.97	31.10	36.00	0.864	0.00	0.00	36.00	0.000
	107.5 - 103.75		368.89	15.96	36.00	0.443	0.00	0.00	36.00	0.000
L9	107.5 - 103.75	TP30.2774x28.615x0.4675	396.70	15.68	36.00	0.436	0.00	0.00	36.00	0.000
	103.75 - 102.7		788.55	30.75	36.00	0.854	0.00	0.00	36.00	0.000
	102.7 - 101.65		811.67	31.23	36.00	0.867	0.00	0.00	36.00	0.000
	101.65 - 100.6		835.04	31.70	36.00	0.881	0.00	0.00	36.00	0.000
	100.6 - 99.55		858.54	32.17	36.00	0.894	0.00	0.00	36.00	0.000
	99.55 - 98.5		882.19	32.62	36.00	0.906	0.00	0.00	36.00	0.000
L10	98.5 - 97.5	TP32.1246x30.2774x0.4425	904.87	34.82	36.00	0.967	0.00	0.00	36.00	0.000
	97.5 - 96.5		927.67	35.26	36.00	0.980	0.00	0.00	36.00	0.000
	96.5 - 95.5		950.61	35.69	36.00	0.992	0.00	0.00	36.00	0.000
	95.5 - 94.5		973.69	36.12	36.00	1.003	0.00	0.00	36.00	0.000
	94.5 - 93.5		996.90	36.53	36.00	1.015	0.00	0.00	36.00	0.000
	93.5 - 92.5		1020.25	36.94	36.00	1.026	0.00	0.00	36.00	0.000
	92.5 - 91.5		1043.74	37.34	36.00	1.037	0.00	0.00	36.00	0.000
	91.5 - 90.5		1067.37	37.73	36.00	1.048	0.00	0.00	36.00	0.000
	90.5 - 89.5		1091.13	38.12	36.00	1.059	0.00	0.00	36.00	0.000
	89.5 - 88.5		1115.03	38.50	36.00	1.069	0.00	0.00	36.00	0.000
L11	88.5 - 87.5	TP33.6024x32.1246x0.4375	1139.08	39.30	36.00	1.092	0.00	0.00	36.00	0.000
	87.5 - 86.5		1163.25	39.67	36.00	1.102	0.00	0.00	36.00	0.000
	86.5 - 85.5		1187.55	40.03	36.00	1.112	0.00	0.00	36.00	0.000
	85.5 - 84.5		1211.98	40.39	36.00	1.122	0.00	0.00	36.00	0.000
	84.5 - 83.5		1236.55	40.74	36.00	1.132	0.00	0.00	36.00	0.000
	83.5 - 82.5		1261.25	41.08	36.00	1.141	0.00	0.00	36.00	0.000
	82.5 - 81.5		1286.08	41.42	36.00	1.150	0.00	0.00	36.00	0.000
	81.5 - 80.5		1311.05	41.75	36.00	1.160	0.00	0.00	36.00	0.000
L12	80.5 - 79.4286	TP35.819x33.6024x0.4325	1337.95	42.57	36.00	1.182	0.00	0.00	36.00	0.000
	79.4286 - 78.3571		1364.99	42.91	36.00	1.192	0.00	0.00	36.00	0.000
	78.3571 - 77.2857		1392.18	43.25	36.00	1.201	0.00	0.00	36.00	0.000
	77.2857 - 76.2143		1419.52	43.59	36.00	1.211	0.00	0.00	36.00	0.000
	76.2143 -		1447.00	43.91	36.00	1.220	0.00	0.00	36.00	0.000

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 $\frac{f_{by}}{F_{by}}$
	75.1429									
	75.1429 - 74.0714		1474.63	44.23	36.00	1.229	0.00	0.00	36.00	0.000
	74.0714 - 73		1502.41	44.55	36.00	1.237	0.00	0.00	36.00	0.000
	73 - 68.5		776.14	21.94	36.00	0.609	0.00	0.00	36.00	0.000
L13	73 - 68.5	TP36.2103x34.3628x0.5	844.78	21.54	36.00	0.598	0.00	0.00	36.00	0.000
	68.5 - 67.4		1650.34	41.58	36.00	1.155	0.00	0.00	36.00	0.000
	67.4 - 66.3		1679.92	41.83	36.00	1.162	0.00	0.00	36.00	0.000
	66.3 - 65.2		1709.63	42.08	36.00	1.169	0.00	0.00	36.00	0.000
	65.2 - 64.1		1739.51	42.32	36.00	1.176	0.00	0.00	36.00	0.000
	64.1 - 63		1769.53	42.56	36.00	1.182	0.00	0.00	36.00	0.000
L14	63 - 61.5 (14)	TP36.4874x36.2103x0.5	1810.72	42.88	36.00	1.191	0.00	0.00	36.00	0.000
L15	61.5 - 60.5 (15)	TP36.6721x36.4874x0.52	1838.34	41.50	36.00	1.153	0.00	0.00	36.00	0.000
L16	60.5 - 59.5	TP38.5196x36.6721x0.61	1866.09	35.81	36.00	0.995	0.00	0.00	36.00	0.000
	59.5 - 58.5		1893.97	35.97	36.00	0.999	0.00	0.00	36.00	0.000
	58.5 - 57.5		1921.98	36.13	36.00	1.004	0.00	0.00	36.00	0.000
	57.5 - 56.5		1950.13	36.29	36.00	1.008	0.00	0.00	36.00	0.000
	56.5 - 55.5		1978.41	36.45	36.00	1.012	0.00	0.00	36.00	0.000
	55.5 - 54.5		2006.81	36.60	36.00	1.017	0.00	0.00	36.00	0.000
	54.5 - 53.5		2035.35	36.75	36.00	1.021	0.00	0.00	36.00	0.000
	53.5 - 52.5		2064.03	36.90	36.00	1.025	0.00	0.00	36.00	0.000
	52.5 - 51.5		2092.82	37.05	36.00	1.029	0.00	0.00	36.00	0.000
	51.5 - 50.5		2121.77	37.19	36.00	1.033	0.00	0.00	36.00	0.000
L17	50.5 - 49.5	TP40.3671x38.5196x0.595	2150.83	38.23	36.00	1.062	0.00	0.00	36.00	0.000
	49.5 - 48.5		2180.03	38.37	36.00	1.066	0.00	0.00	36.00	0.000
	48.5 - 47.5		2209.33	38.52	36.00	1.070	0.00	0.00	36.00	0.000
	47.5 - 46.5		2238.78	38.65	36.00	1.074	0.00	0.00	36.00	0.000
	46.5 - 45.5		2268.33	38.79	36.00	1.077	0.00	0.00	36.00	0.000
	45.5 - 44.5		2298.03	38.92	36.00	1.081	0.00	0.00	36.00	0.000
	44.5 - 43.5		2327.83	39.05	36.00	1.085	0.00	0.00	36.00	0.000
	43.5 - 42.5		2357.77	39.18	36.00	1.088	0.00	0.00	36.00	0.000
	42.5 - 41.5		2387.82	39.31	36.00	1.092	0.00	0.00	36.00	0.000
	41.5 - 40.5		2418.02	39.44	36.00	1.095	0.00	0.00	36.00	0.000
L18	40.5 - 39	TP41.568x40.3671x0.59	2463.52	39.94	36.00	1.109	0.00	0.00	36.00	0.000
	39 - 34		1345.46	20.84	36.00	0.579	0.00	0.00	36.00	0.000
L19	39 - 34	TP41.28x39.8943x0.59	1271.88	20.44	36.00	0.568	0.00	0.00	36.00	0.000
	34 - 32.75		2656.30	42.20	36.00	1.172	0.00	0.00	36.00	0.000
	32.75 - 31.5		2695.43	42.34	36.00	1.176	0.00	0.00	36.00	0.000
L20	31.5 - 30.5 (20)	TP41.4647x41.28x0.595	2726.86	42.10	36.00	1.169	0.00	0.00	36.00	0.000
L21	30.5 - 29.5	TP43.3124x41.4647x0.615	2758.41	40.89	36.00	1.136	0.00	0.00	36.00	0.000
	29.5 - 28.5		2790.07	40.99	36.00	1.139	0.00	0.00	36.00	0.000
	28.5 - 27.5		2821.83	41.08	36.00	1.141	0.00	0.00	36.00	0.000
	27.5 - 26.5		2853.72	41.17	36.00	1.144	0.00	0.00	36.00	0.000
	26.5 - 25.5		2885.72	41.27	36.00	1.146	0.00	0.00	36.00	0.000
	25.5 - 24.5		2917.83	41.36	36.00	1.149	0.00	0.00	36.00	0.000
	24.5 - 23.5		2950.07	41.44	36.00	1.151	0.00	0.00	36.00	0.000
	23.5 - 22.5		2982.41	41.53	36.00	1.154	0.00	0.00	36.00	0.000
	22.5 - 21.5		3014.87	41.62	36.00	1.156	0.00	0.00	36.00	0.000
	21.5 - 20.5		3047.43	41.70	36.00	1.158	0.00	0.00	36.00	0.000
L22	20.5 - 19.43	TP44.4985x43.3124x0.61	3082.42	42.12	36.00	1.170	0.00	0.00	36.00	0.000
	19.43 - 18.36		3117.53	42.20	36.00	1.172	0.00	0.00	36.00	0.000
	18.36 - 17.29		3152.77	42.29	36.00	1.175	0.00	0.00	36.00	0.000
	17.29 - 16.22		3188.13	42.37	36.00	1.177	0.00	0.00	36.00	0.000
	16.22 - 15.15		3223.63	42.45	36.00	1.179	0.00	0.00	36.00	0.000
	15.15 - 14.08		3259.27	42.54	36.00	1.182	0.00	0.00	36.00	0.000
L23	14.08 - 12.79	TP44.9752x44.4985x0.65	3302.39	40.12	36.00	1.114	0.00	0.00	36.00	0.000
	12.79 - 11.5		3345.72	40.20	36.00	1.117	0.00	0.00	36.00	0.000
L24	11.5 - 10.5	TP46.8229x44.9752x0.615	3379.42	42.46	36.00	1.179	0.00	0.00	36.00	0.000
	10.5 - 9.5		3413.22	42.53	36.00	1.181	0.00	0.00	36.00	0.000
	9.5 - 8.5		3447.12	42.60	36.00	1.183	0.00	0.00	36.00	0.000

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 $\frac{f_{by}}{F_{by}}$
	8.5 - 7.5		3481.13	42.66	36.00	1.185	0.00	0.00	36.00	0.000
	7.5 - 6.5		3515.23	42.73	36.00	1.187	0.00	0.00	36.00	0.000
	6.5 - 5.5		3549.44	42.79	36.00	1.189	0.00	0.00	36.00	0.000
	5.5 - 4.5		3583.76	42.85	36.00	1.190	0.00	0.00	36.00	0.000
	4.5 - 3.5		3618.18	42.92	36.00	1.192	0.00	0.00	36.00	0.000
	3.5 - 2.5		3652.70	42.98	36.00	1.194	0.00	0.00	36.00	0.000
	2.5 - 1.5		3687.33	43.03	36.00	1.195	0.00	0.00	36.00	0.000
L25	1.5 - 0 (25)	TP47.1x46.8229x0.615	3739.44	43.12	36.00	1.198	0.00	0.00	36.00	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	160 - 159	TP16x16x0.375	0.00	0.00	14.00	0.000	0.00	0.00	14.00	0.000
	159 - 158		0.00	0.00	14.00	0.000	0.00	0.00	14.00	0.000
	158 - 157		0.15	0.01	14.00	0.001	0.00	0.00	14.00	0.000
	157 - 156		0.20	0.01	14.00	0.002	0.00	0.00	14.00	0.000
	156 - 155		4.49	0.24	14.00	0.035	0.85	0.07	14.00	0.005
	155 - 154		4.55	0.25	14.00	0.035	0.85	0.07	14.00	0.005
	154 - 153		4.60	0.25	14.00	0.036	0.85	0.07	14.00	0.005
	153 - 152		4.65	0.25	14.00	0.036	0.85	0.07	14.00	0.005
	152 - 151		4.70	0.26	14.00	0.036	0.85	0.07	14.00	0.005
	151 - 150		4.75	0.26	14.00	0.037	0.85	0.07	14.00	0.005
L2	150 - 148.833	TP16x16x0.375	4.82	0.26	14.00	0.037	0.85	0.07	14.00	0.005
	148.833 - 147.667		6.34	0.34	14.00	0.049	0.85	0.07	14.00	0.005
	147.667 - 146.5		6.41	0.35	14.00	0.050	0.85	0.07	14.00	0.005
L3	146.5 - 146 (3)	TP22x22x0.375	6.44	0.25	14.00	0.036	0.85	0.04	14.00	0.003
L4	146 - 145	TP23.848x22x0.25	10.38	0.59	24.00	0.050	0.96	0.06	24.00	0.002
	145 - 144		10.49	0.59	24.00	0.050	0.96	0.06	24.00	0.002
	144 - 143		10.59	0.59	24.00	0.050	0.96	0.06	24.00	0.002
	143 - 142		10.69	0.59	24.00	0.050	0.96	0.05	24.00	0.002
	142 - 141		10.79	0.59	24.00	0.050	0.96	0.05	24.00	0.002
	141 - 140		10.90	0.59	24.00	0.050	0.96	0.05	24.00	0.002
	140 - 139		11.00	0.59	24.00	0.050	0.96	0.05	24.00	0.002
	139 - 138		12.01	0.64	24.00	0.054	0.96	0.05	24.00	0.002
	138 - 137		12.12	0.64	24.00	0.054	0.96	0.05	24.00	0.002
	137 - 136		12.23	0.64	24.00	0.054	0.96	0.05	24.00	0.002
L5	136 - 135	TP25.6961x23.848x0.25	12.34	0.64	24.00	0.055	0.96	0.05	24.00	0.002
	135 - 134		12.45	0.65	24.00	0.055	0.96	0.05	24.00	0.002
	134 - 133		12.56	0.65	24.00	0.055	0.96	0.05	24.00	0.002
	133 - 132		12.67	0.65	24.00	0.055	0.96	0.05	24.00	0.002
	132 - 131		12.78	0.65	24.00	0.055	0.96	0.05	24.00	0.002
	131 - 130		17.03	0.86	24.00	0.072	0.89	0.04	24.00	0.002
	130 - 129		17.14	0.86	24.00	0.072	0.89	0.04	24.00	0.002
	129 - 128		17.25	0.85	24.00	0.072	0.89	0.04	24.00	0.002
	128 - 127		17.37	0.85	24.00	0.072	0.89	0.04	24.00	0.002
	127 - 126		17.48	0.85	24.00	0.072	0.89	0.04	24.00	0.002
L6	126 - 125	TP27.5441x25.6961x0.25	17.60	0.85	24.00	0.072	0.89	0.04	24.00	0.002
	125 - 124		17.71	0.85	24.00	0.072	0.90	0.04	24.00	0.002
	124 - 123		17.83	0.85	24.00	0.072	0.90	0.04	24.00	0.002
	123 - 122		17.95	0.85	24.00	0.072	0.90	0.04	24.00	0.002
	122 - 121		18.74	0.88	24.00	0.075	1.24	0.05	24.00	0.002
	121 - 120		19.58	0.92	24.00	0.078	1.24	0.05	24.00	0.002

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_w ksi	Allow. F_w ksi	Ratio $\frac{f_w}{F_w}$
	120 - 119		19.70	0.91	24.00	0.077	1.24	0.05	24.00	0.002
	119 - 118		19.81	0.91	24.00	0.077	1.24	0.05	24.00	0.002
	118 - 117		19.93	0.91	24.00	0.077	1.24	0.05	24.00	0.002
	117 - 116		20.05	0.91	24.00	0.077	1.25	0.05	24.00	0.002
L7	116 - 115.5 (7)	TP27.6365x27.5441x0.25	20.11	0.91	24.00	0.077	1.25	0.05	24.00	0.002
L8	115.5 - 114.5	TP29.808x27.6365x0.41	20.25	0.56	24.00	0.047	1.25	0.03	24.00	0.001
	114.5 - 113.5		20.38	0.56	24.00	0.047	1.25	0.03	24.00	0.001
	113.5 - 112.5		20.51	0.56	24.00	0.047	1.26	0.03	24.00	0.001
	112.5 - 111.5		20.65	0.56	24.00	0.047	1.26	0.03	24.00	0.001
	111.5 - 110.5		20.79	0.56	24.00	0.047	1.26	0.03	24.00	0.001
	110.5 - 109.5		20.92	0.56	24.00	0.047	1.27	0.03	24.00	0.001
	109.5 - 108.5		21.06	0.56	24.00	0.047	1.27	0.03	24.00	0.001
	108.5 - 107.5		21.20	0.56	24.00	0.047	1.27	0.03	24.00	0.001
	107.5 - 103.75		10.62	0.27	24.00	0.023	0.62	0.01	24.00	0.001
L9	107.5 - 103.75	TP30.2774x28.615x0.4675	11.16	0.26	24.00	0.022	0.66	0.01	24.00	0.001
	103.75 - 102.7		21.93	0.50	24.00	0.042	1.29	0.02	24.00	0.001
	102.7 - 101.65		22.08	0.50	24.00	0.042	1.30	0.02	24.00	0.001
	101.65 - 100.6		22.29	0.50	24.00	0.043	1.44	0.03	24.00	0.001
	100.6 - 99.55		22.44	0.50	24.00	0.043	1.45	0.03	24.00	0.001
	99.55 - 98.5		22.59	0.50	24.00	0.043	1.45	0.03	24.00	0.001
L10	98.5 - 97.5	TP32.1246x30.2774x0.4425	22.73	0.53	24.00	0.045	1.46	0.03	24.00	0.001
	97.5 - 96.5		22.86	0.53	24.00	0.045	1.46	0.03	24.00	0.001
	96.5 - 95.5		23.00	0.53	24.00	0.045	1.46	0.03	24.00	0.001
	95.5 - 94.5		23.14	0.53	24.00	0.045	1.47	0.03	24.00	0.001
	94.5 - 93.5		23.27	0.53	24.00	0.045	1.47	0.03	24.00	0.001
	93.5 - 92.5		23.41	0.53	24.00	0.045	1.47	0.03	24.00	0.001
	92.5 - 91.5		23.55	0.53	24.00	0.045	1.48	0.02	24.00	0.001
	91.5 - 90.5		23.69	0.53	24.00	0.045	1.48	0.02	24.00	0.001
	90.5 - 89.5		23.82	0.53	24.00	0.045	1.49	0.02	24.00	0.001
	89.5 - 88.5		23.96	0.53	24.00	0.045	1.49	0.02	24.00	0.001
L11	88.5 - 87.5	TP33.6024x32.1246x0.4375	24.09	0.54	24.00	0.045	1.49	0.02	24.00	0.001
	87.5 - 86.5		24.23	0.54	24.00	0.045	1.50	0.02	24.00	0.001
	86.5 - 85.5		24.36	0.54	24.00	0.045	1.50	0.02	24.00	0.001
	85.5 - 84.5		24.49	0.54	24.00	0.045	1.50	0.02	24.00	0.001
	84.5 - 83.5		24.62	0.54	24.00	0.045	1.51	0.02	24.00	0.001
	83.5 - 82.5		24.76	0.54	24.00	0.045	1.51	0.02	24.00	0.001
	82.5 - 81.5		24.89	0.54	24.00	0.045	1.51	0.02	24.00	0.001
	81.5 - 80.5		25.03	0.54	24.00	0.045	1.52	0.02	24.00	0.001
L12	80.5 - 79.4286	TP35.819x33.6024x0.4325	25.16	0.54	24.00	0.046	1.52	0.02	24.00	0.001
	79.4286 - 78.3571		25.30	0.54	24.00	0.046	1.53	0.02	24.00	0.001
	78.3571 - 77.2857		25.44	0.54	24.00	0.046	1.53	0.02	24.00	0.001
	77.2857 - 76.2143		25.57	0.54	24.00	0.046	1.53	0.02	24.00	0.001
	76.2143 - 75.1429		25.71	0.54	24.00	0.046	1.54	0.02	24.00	0.001
	75.1429 - 74.0714		25.85	0.54	24.00	0.046	1.54	0.02	24.00	0.001
	74.0714 - 73		25.99	0.54	24.00	0.046	1.54	0.02	24.00	0.001
	73 - 68.5		12.93	0.26	24.00	0.022	0.75	0.01	24.00	0.000
L13	73 - 68.5	TP36.2103x34.3628x0.5	13.75	0.25	24.00	0.021	0.81	0.01	24.00	0.000
	68.5 - 67.4		26.81	0.48	24.00	0.040	1.57	0.02	24.00	0.001
	67.4 - 66.3		26.94	0.48	24.00	0.040	1.57	0.02	24.00	0.001
	66.3 - 65.2		27.08	0.48	24.00	0.040	1.57	0.02	24.00	0.001
	65.2 - 64.1		27.22	0.48	24.00	0.040	1.58	0.02	24.00	0.001
	64.1 - 63		27.36	0.48	24.00	0.040	1.58	0.02	24.00	0.001
L14	63 - 61.5 (14)	TP36.4874x36.2103x0.5	27.55	0.48	24.00	0.040	1.59	0.02	24.00	0.001
L15	61.5 - 60.5 (15)	TP36.6721x36.4874x0.52	27.67	0.46	24.00	0.039	1.59	0.02	24.00	0.001
L16	60.5 - 59.5	TP38.5196x36.6721x0.61	27.80	0.39	24.00	0.033	1.60	0.01	24.00	0.001

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 $\frac{f_{vt}}{F_{vt}}$
	59.5 - 58.5		27.94	0.39	24.00	0.033	1.60	0.01	24.00	0.001
	58.5 - 57.5		28.07	0.39	24.00	0.033	1.61	0.01	24.00	0.001
	57.5 - 56.5		28.20	0.39	24.00	0.033	1.61	0.01	24.00	0.001
	56.5 - 55.5		28.33	0.39	24.00	0.033	1.62	0.01	24.00	0.001
	55.5 - 54.5		28.46	0.39	24.00	0.033	1.62	0.01	24.00	0.001
	54.5 - 53.5		28.59	0.39	24.00	0.033	1.63	0.01	24.00	0.001
	53.5 - 52.5		28.73	0.39	24.00	0.033	1.63	0.01	24.00	0.001
	52.5 - 51.5		28.86	0.39	24.00	0.033	1.63	0.01	24.00	0.001
	51.5 - 50.5		28.99	0.39	24.00	0.033	1.64	0.01	24.00	0.001
L17	50.5 - 49.5	TP40.3671x38.5196x0.595	29.12	0.40	24.00	0.034	1.64	0.01	24.00	0.001
	49.5 - 48.5		29.24	0.40	24.00	0.034	1.65	0.01	24.00	0.001
	48.5 - 47.5		29.37	0.40	24.00	0.034	1.65	0.01	24.00	0.001
	47.5 - 46.5		29.49	0.40	24.00	0.034	1.66	0.01	24.00	0.001
	46.5 - 45.5		29.61	0.40	24.00	0.034	1.66	0.01	24.00	0.001
	45.5 - 44.5		29.74	0.40	24.00	0.034	1.67	0.01	24.00	0.001
	44.5 - 43.5		29.86	0.40	24.00	0.034	1.67	0.01	24.00	0.001
	43.5 - 42.5		29.99	0.40	24.00	0.034	1.68	0.01	24.00	0.001
	42.5 - 41.5		30.11	0.40	24.00	0.034	1.68	0.01	24.00	0.001
	41.5 - 40.5		30.24	0.40	24.00	0.034	1.69	0.01	24.00	0.001
L18	40.5 - 39	TP41.568x40.3671x0.59	30.42	0.40	24.00	0.034	1.69	0.01	24.00	0.001
	39 - 34		16.15	0.21	24.00	0.018	0.89	0.01	24.00	0.000
L19	39 - 34	TP41.28x39.8943x0.59	14.97	0.20	24.00	0.017	0.83	0.01	24.00	0.000
	34 - 32.75		31.23	0.41	24.00	0.034	1.72	0.01	24.00	0.001
	32.75 - 31.5		31.37	0.41	24.00	0.034	1.73	0.01	24.00	0.001
L20	31.5 - 30.5 (20)	TP41.4647x41.28x0.595	31.48	0.40	24.00	0.034	1.74	0.01	24.00	0.001
L21	30.5 - 29.5	TP43.3124x41.4647x0.615	31.59	0.39	24.00	0.033	1.74	0.01	24.00	0.001
	29.5 - 28.5		31.71	0.39	24.00	0.033	1.75	0.01	24.00	0.001
	28.5 - 27.5		31.82	0.39	24.00	0.033	1.75	0.01	24.00	0.000
	27.5 - 26.5		31.93	0.39	24.00	0.033	1.76	0.01	24.00	0.000
	26.5 - 25.5		32.05	0.39	24.00	0.033	1.76	0.01	24.00	0.000
	25.5 - 24.5		32.16	0.39	24.00	0.033	1.77	0.01	24.00	0.000
	24.5 - 23.5		32.28	0.39	24.00	0.033	1.77	0.01	24.00	0.000
	23.5 - 22.5		32.39	0.39	24.00	0.033	1.78	0.01	24.00	0.000
	22.5 - 21.5		32.51	0.39	24.00	0.033	1.79	0.01	24.00	0.000
	21.5 - 20.5		32.62	0.39	24.00	0.033	1.79	0.01	24.00	0.000
L22	20.5 - 19.43	TP44.4985x43.3124x0.61	32.74	0.39	24.00	0.033	1.80	0.01	24.00	0.000
	19.43 - 18.36		32.87	0.39	24.00	0.033	1.80	0.01	24.00	0.000
	18.36 - 17.29		32.99	0.39	24.00	0.033	1.81	0.01	24.00	0.000
	17.29 - 16.22		33.11	0.39	24.00	0.033	1.82	0.01	24.00	0.000
	16.22 - 15.15		33.23	0.39	24.00	0.033	1.82	0.01	24.00	0.000
	15.15 - 14.08		33.35	0.39	24.00	0.033	1.83	0.01	24.00	0.000
L23	14.08 - 12.79	TP44.9752x44.4985x0.65	33.50	0.36	24.00	0.031	1.84	0.01	24.00	0.000
	12.79 - 11.5		33.65	0.36	24.00	0.031	1.84	0.01	24.00	0.000
L24	11.5 - 10.5	TP46.8229x44.9752x0.615	33.75	0.38	24.00	0.032	1.85	0.01	24.00	0.000
	10.5 - 9.5		33.86	0.38	24.00	0.032	1.85	0.01	24.00	0.000
	9.5 - 8.5		33.96	0.38	24.00	0.032	1.86	0.01	24.00	0.000
	8.5 - 7.5		34.06	0.38	24.00	0.032	1.86	0.01	24.00	0.000
	7.5 - 6.5		34.17	0.38	24.00	0.032	1.87	0.01	24.00	0.000
	6.5 - 5.5		34.27	0.38	24.00	0.032	1.87	0.01	24.00	0.000
	5.5 - 4.5		34.38	0.38	24.00	0.032	1.88	0.01	24.00	0.000
	4.5 - 3.5		34.48	0.38	24.00	0.032	1.88	0.01	24.00	0.000
	3.5 - 2.5		34.58	0.38	24.00	0.032	1.89	0.01	24.00	0.000
	2.5 - 1.5		34.69	0.38	24.00	0.032	1.89	0.01	24.00	0.000
L25	1.5 - 0 (25)	TP47.1x46.8229x0.615	34.83	0.38	24.00	0.032	1.90	0.01	24.00	0.000

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FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: 919.755.1012 FAX: 919.755.1031	Project: 146AZR1400 (R1)	Date: 11:47:59 09/09/14
	Client: Crown Castle	Designed by: Shiva Shankar

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	160 - 159	0.000	0.000	0.000	0.000	0.000	0.000* ✓	1.000	H1-3+VT ✓
	159 - 158	0.001	0.000	0.000	0.000	0.000	0.001* ✓	1.000	H1-3+VT ✓
	158 - 157	0.000	0.002	0.000	0.001	0.000	0.002 ✓	1.333	H1-3+VT ✓
	157 - 156	0.001	0.003	0.000	0.002	0.000	0.004 ✓	1.333	H1-3+VT ✓
	156 - 155	0.003	0.064	0.000	0.035	0.005	0.068 ✓	1.333	H1-3+VT ✓
	155 - 154	0.004	0.098	0.000	0.035	0.005	0.102 ✓	1.333	H1-3+VT ✓
	154 - 153	0.004	0.131	0.000	0.036	0.005	0.136 ✓	1.333	H1-3+VT ✓
	153 - 152	0.004	0.166	0.000	0.036	0.005	0.170 ✓	1.333	H1-3+VT ✓
	152 - 151	0.004	0.200	0.000	0.036	0.005	0.205 ✓	1.333	H1-3+VT ✓
	151 - 150	0.004	0.235	0.000	0.037	0.005	0.240 ✓	1.333	H1-3+VT ✓
L2	150 - 148.833	0.004	0.276	0.000	0.037	0.005	0.281 ✓	1.333	H1-3+VT ✓
	148.833 - 147.667	0.006	0.322	0.000	0.049	0.005	0.329 ✓	1.333	H1-3+VT ✓
	147.667 - 146.5	0.006	0.377	0.000	0.050	0.005	0.384 ✓	1.333	H1-3+VT ✓
L3	146.5 - 146 (3)	0.005	0.208	0.000	0.036	0.003	0.213 ✓	1.333	H1-3+VT ✓
L4	146 - 145	0.007	0.236	0.000	0.050	0.002	0.243 ✓	1.333	H1-3+VT ✓
	145 - 144	0.007	0.268	0.000	0.050	0.002	0.276 ✓	1.333	H1-3+VT ✓
	144 - 143	0.007	0.300	0.000	0.050	0.002	0.307 ✓	1.333	H1-3+VT ✓
	143 - 142	0.007	0.330	0.000	0.050	0.002	0.338 ✓	1.333	H1-3+VT ✓
	142 - 141	0.007	0.360	0.000	0.050	0.002	0.368 ✓	1.333	H1-3+VT ✓
	141 - 140	0.007	0.390	0.000	0.050	0.002	0.398 ✓	1.333	H1-3+VT ✓
	140 - 139	0.007	0.419	0.000	0.050	0.002	0.427 ✓	1.333	H1-3+VT ✓
	139 - 138	0.007	0.450	0.000	0.054	0.002	0.458 ✓	1.333	H1-3+VT ✓
	138 - 137	0.008	0.480	0.000	0.054	0.002	0.488 ✓	1.333	H1-3+VT ✓
	137 - 136	0.008	0.510	0.000	0.054	0.002	0.518 ✓	1.333	H1-3+VT ✓
L5	136 - 135	0.008	0.539	0.000	0.055	0.002	0.547 ✓	1.333	H1-3+VT ✓
	135 - 134	0.008	0.567	0.000	0.055	0.002	0.575 ✓	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
	134 - 133	0.008	0.595	0.000	0.055	0.002	0.603	1.333	H1-3+VT
	133 - 132	0.008	0.622	0.000	0.055	0.002	0.630	1.333	H1-3+VT
	132 - 131	0.008	0.648	0.000	0.055	0.002	0.657	1.333	H1-3+VT
	131 - 130	0.010	0.701	0.000	0.072	0.002	0.713	1.333	H1-3+VT
	130 - 129	0.010	0.738	0.000	0.072	0.002	0.749	1.333	H1-3+VT
	129 - 128	0.010	0.773	0.000	0.072	0.002	0.785	1.333	H1-3+VT
	128 - 127	0.010	0.808	0.000	0.072	0.002	0.820	1.333	H1-3+VT
	127 - 126	0.010	0.842	0.000	0.072	0.002	0.854	1.333	H1-3+VT
L6	126 - 125	0.010	0.875	0.000	0.072	0.002	0.887	1.333	H1-3+VT
	125 - 124	0.011	0.907	0.000	0.072	0.002	0.919	1.333	H1-3+VT
	124 - 123	0.011	0.939	0.000	0.072	0.002	0.951	1.333	H1-3+VT
	123 - 122	0.011	0.970	0.000	0.072	0.002	0.982	1.333	H1-3+VT
	122 - 121	0.011	1.002	0.000	0.075	0.002	1.014	1.333	H1-3+VT
	121 - 120	0.012	1.035	0.000	0.078	0.002	1.049	1.333	H1-3+VT
	120 - 119	0.012	1.067	0.000	0.077	0.002	1.081	1.333	H1-3+VT
	119 - 118	0.012	1.099	0.000	0.077	0.002	1.113	1.333	H1-3+VT
	118 - 117	0.012	1.130	0.000	0.077	0.002	1.144	1.333	H1-3+VT
	117 - 116	0.012	1.160	0.000	0.077	0.002	1.174	1.333	H1-3+VT
L7	116 - 115.5 (7)	0.012	1.175	0.000	0.077	0.002	1.189	1.333	H1-3+VT
L8	115.5 - 114.5	0.008	0.747	0.000	0.047	0.001	0.755	1.333	H1-3+VT
	114.5 - 113.5	0.008	0.765	0.000	0.047	0.001	0.773	1.333	H1-3+VT
	113.5 - 112.5	0.008	0.782	0.000	0.047	0.001	0.791	1.333	H1-3+VT
	112.5 - 111.5	0.008	0.799	0.000	0.047	0.001	0.808	1.333	H1-3+VT
	111.5 - 110.5	0.008	0.816	0.000	0.047	0.001	0.824	1.333	H1-3+VT
	110.5 - 109.5	0.008	0.832	0.000	0.047	0.001	0.841	1.333	H1-3+VT
	109.5 - 108.5	0.008	0.848	0.000	0.047	0.001	0.857	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	108.5 - 107.5	0.008	0.864	0.000	0.047	0.001	0.873	1.333	H1-3+VT
	107.5 - 103.75	0.004	0.443	0.000	0.023	0.001	0.448	1.333	H1-3+VT
L9	107.5 - 103.75	0.004	0.436	0.000	0.022	0.001	0.440	1.333	H1-3+VT
	103.75 - 102.7	0.008	0.854	0.000	0.042	0.001	0.863	1.333	H1-3+VT
	102.7 - 101.65	0.008	0.867	0.000	0.042	0.001	0.876	1.333	H1-3+VT
	101.65 - 100.6	0.008	0.881	0.000	0.043	0.001	0.889	1.333	H1-3+VT
	100.6 - 99.55	0.008	0.894	0.000	0.043	0.001	0.902	1.333	H1-3+VT
	99.55 - 98.5	0.008	0.906	0.000	0.043	0.001	0.915	1.333	H1-3+VT
L10	98.5 - 97.5	0.009	0.967	0.000	0.045	0.001	0.977	1.333	H1-3+VT
	97.5 - 96.5	0.009	0.980	0.000	0.045	0.001	0.989	1.333	H1-3+VT
	96.5 - 95.5	0.009	0.992	0.000	0.045	0.001	1.001	1.333	H1-3+VT
	95.5 - 94.5	0.009	1.003	0.000	0.045	0.001	1.013	1.333	H1-3+VT
	94.5 - 93.5	0.009	1.015	0.000	0.045	0.001	1.024	1.333	H1-3+VT
	93.5 - 92.5	0.009	1.026	0.000	0.045	0.001	1.036	1.333	H1-3+VT
	92.5 - 91.5	0.009	1.037	0.000	0.045	0.001	1.047	1.333	H1-3+VT
	91.5 - 90.5	0.009	1.048	0.000	0.045	0.001	1.058	1.333	H1-3+VT
	90.5 - 89.5	0.009	1.059	0.000	0.045	0.001	1.069	1.333	H1-3+VT
	89.5 - 88.5	0.010	1.069	0.000	0.045	0.001	1.079	1.333	H1-3+VT
L11	88.5 - 87.5	0.010	1.092	0.000	0.045	0.001	1.102	1.333	H1-3+VT
	87.5 - 86.5	0.010	1.102	0.000	0.045	0.001	1.112	1.333	H1-3+VT
	86.5 - 85.5	0.010	1.112	0.000	0.045	0.001	1.122	1.333	H1-3+VT
	85.5 - 84.5	0.010	1.122	0.000	0.045	0.001	1.132	1.333	H1-3+VT
	84.5 - 83.5	0.010	1.132	0.000	0.045	0.001	1.142	1.333	H1-3+VT
	83.5 - 82.5	0.010	1.141	0.000	0.045	0.001	1.152	1.333	H1-3+VT
	82.5 - 81.5	0.010	1.150	0.000	0.045	0.001	1.161	1.333	H1-3+VT
	81.5 - 80.5	0.010	1.160	0.000	0.045	0.001	1.171	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
L12	80.5 - 79.4286	0.011	1.182	0.000	0.046	0.001	1.193 ✔	1.333	H1-3+VT ✔
	79.4286 - 78.3571	0.011	1.192	0.000	0.046	0.001	1.203 ✔	1.333	H1-3+VT ✔
	78.3571 - 77.2857	0.011	1.201	0.000	0.046	0.001	1.213 ✔	1.333	H1-3+VT ✔
	77.2857 - 76.2143	0.011	1.211	0.000	0.046	0.001	1.222 ✔	1.333	H1-3+VT ✔
	76.2143 - 75.1429	0.011	1.220	0.000	0.046	0.001	1.231 ✔	1.333	H1-3+VT ✔
	75.1429 - 74.0714	0.011	1.229	0.000	0.046	0.001	1.240 ✔	1.333	H1-3+VT ✔
	74.0714 - 73	0.011	1.237	0.000	0.046	0.001	1.249 ✔	1.333	H1-3+VT ✔
	73 - 68.5	0.006	0.609	0.000	0.022	0.000	0.615 ✔	1.333	H1-3+VT ✔
L13	73 - 68.5	0.006	0.598	0.000	0.021	0.000	0.604 ✔	1.333	H1-3+VT ✔
	68.5 - 67.4	0.011	1.155	0.000	0.040	0.001	1.166 ✔	1.333	H1-3+VT ✔
	67.4 - 66.3	0.011	1.162	0.000	0.040	0.001	1.173 ✔	1.333	H1-3+VT ✔
	66.3 - 65.2	0.011	1.169	0.000	0.040	0.001	1.180 ✔	1.333	H1-3+VT ✔
	65.2 - 64.1	0.011	1.176	0.000	0.040	0.001	1.187 ✔	1.333	H1-3+VT ✔
	64.1 - 63	0.011	1.182	0.000	0.040	0.001	1.194 ✔	1.333	H1-3+VT ✔
L14	63 - 61.5 (14)	0.011	1.191	0.000	0.040	0.001	1.203 ✔	1.333	H1-3+VT ✔
L15	61.5 - 60.5 (15)	0.011	1.153	0.000	0.039	0.001	1.164 ✔	1.333	H1-3+VT ✔
L16	60.5 - 59.5	0.009	0.995	0.000	0.033	0.001	1.004 ✔	1.333	H1-3+VT ✔
	59.5 - 58.5	0.009	0.999	0.000	0.033	0.001	1.009 ✔	1.333	H1-3+VT ✔
	58.5 - 57.5	0.009	1.004	0.000	0.033	0.001	1.013 ✔	1.333	H1-3+VT ✔
	57.5 - 56.5	0.009	1.008	0.000	0.033	0.001	1.018 ✔	1.333	H1-3+VT ✔
	56.5 - 55.5	0.009	1.012	0.000	0.033	0.001	1.022 ✔	1.333	H1-3+VT ✔
	55.5 - 54.5	0.010	1.017	0.000	0.033	0.001	1.027 ✔	1.333	H1-3+VT ✔
	54.5 - 53.5	0.010	1.021	0.000	0.033	0.001	1.031 ✔	1.333	H1-3+VT ✔
	53.5 - 52.5	0.010	1.025	0.000	0.033	0.001	1.035 ✔	1.333	H1-3+VT ✔
	52.5 - 51.5	0.010	1.029	0.000	0.033	0.001	1.039 ✔	1.333	H1-3+VT ✔
	51.5 - 50.5	0.010	1.033	0.000	0.033	0.001	1.043 ✔	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
L17	50.5 - 49.5	0.010	1.062	0.000	0.034	0.001	1.072	1.333	H1-3+VT
	49.5 - 48.5	0.010	1.066	0.000	0.034	0.001	1.076	1.333	H1-3+VT
	48.5 - 47.5	0.010	1.070	0.000	0.034	0.001	1.080	1.333	H1-3+VT
	47.5 - 46.5	0.010	1.074	0.000	0.034	0.001	1.084	1.333	H1-3+VT
	46.5 - 45.5	0.010	1.077	0.000	0.034	0.001	1.088	1.333	H1-3+VT
	45.5 - 44.5	0.011	1.081	0.000	0.034	0.001	1.092	1.333	H1-3+VT
	44.5 - 43.5	0.011	1.085	0.000	0.034	0.001	1.096	1.333	H1-3+VT
	43.5 - 42.5	0.011	1.088	0.000	0.034	0.001	1.099	1.333	H1-3+VT
	42.5 - 41.5	0.011	1.092	0.000	0.034	0.001	1.103	1.333	H1-3+VT
	41.5 - 40.5	0.011	1.095	0.000	0.034	0.001	1.107	1.333	H1-3+VT
L18	40.5 - 39	0.011	1.109	0.000	0.034	0.001	1.121	1.333	H1-3+VT
	39 - 34	0.006	0.579	0.000	0.018	0.000	0.585	1.333	H1-3+VT
L19	39 - 34	0.006	0.568	0.000	0.017	0.000	0.574	1.333	H1-3+VT
	34 - 32.75	0.012	1.172	0.000	0.034	0.001	1.185	1.333	H1-3+VT
	32.75 - 31.5	0.012	1.176	0.000	0.034	0.001	1.189	1.333	H1-3+VT
L20	31.5 - 30.5 (20)	0.012	1.169	0.000	0.034	0.001	1.182	1.333	H1-3+VT
L21	30.5 - 29.5	0.012	1.136	0.000	0.033	0.001	1.148	1.333	H1-3+VT
	29.5 - 28.5	0.012	1.139	0.000	0.033	0.001	1.151	1.333	H1-3+VT
	28.5 - 27.5	0.012	1.141	0.000	0.033	0.000	1.153	1.333	H1-3+VT
	27.5 - 26.5	0.012	1.144	0.000	0.033	0.000	1.156	1.333	H1-3+VT
	26.5 - 25.5	0.012	1.146	0.000	0.033	0.000	1.159	1.333	H1-3+VT
	25.5 - 24.5	0.012	1.149	0.000	0.033	0.000	1.161	1.333	H1-3+VT
	24.5 - 23.5	0.012	1.151	0.000	0.033	0.000	1.164	1.333	H1-3+VT
	23.5 - 22.5	0.012	1.154	0.000	0.033	0.000	1.166	1.333	H1-3+VT
	22.5 - 21.5	0.012	1.156	0.000	0.033	0.000	1.169	1.333	H1-3+VT
	21.5 - 20.5	0.012	1.158	0.000	0.033	0.000	1.171	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
L22	20.5 - 19.43	0.013	1.170	0.000	0.033	0.000	1.183	1.333	H1-3+VT
	19.43 - 18.36	0.013	1.172	0.000	0.033	0.000	1.185	1.333	H1-3+VT
	18.36 - 17.29	0.013	1.175	0.000	0.033	0.000	1.188	1.333	H1-3+VT
	17.29 - 16.22	0.013	1.177	0.000	0.033	0.000	1.190	1.333	H1-3+VT
	16.22 - 15.15	0.013	1.179	0.000	0.033	0.000	1.192	1.333	H1-3+VT
	15.15 - 14.08	0.013	1.182	0.000	0.033	0.000	1.195	1.333	H1-3+VT
L23	14.08 - 12.79	0.012	1.114	0.000	0.031	0.000	1.127	1.333	H1-3+VT
	12.79 - 11.5	0.012	1.117	0.000	0.031	0.000	1.129	1.333	H1-3+VT
L24	11.5 - 10.5	0.013	1.179	0.000	0.032	0.000	1.193	1.333	H1-3+VT
	10.5 - 9.5	0.013	1.181	0.000	0.032	0.000	1.195	1.333	H1-3+VT
	9.5 - 8.5	0.013	1.183	0.000	0.032	0.000	1.197	1.333	H1-3+VT
	8.5 - 7.5	0.013	1.185	0.000	0.032	0.000	1.199	1.333	H1-3+VT
	7.5 - 6.5	0.013	1.187	0.000	0.032	0.000	1.200	1.333	H1-3+VT
	6.5 - 5.5	0.013	1.189	0.000	0.032	0.000	1.202	1.333	H1-3+VT
	5.5 - 4.5	0.013	1.190	0.000	0.032	0.000	1.204	1.333	H1-3+VT
	4.5 - 3.5	0.013	1.192	0.000	0.032	0.000	1.206	1.333	H1-3+VT
	3.5 - 2.5	0.014	1.194	0.000	0.032	0.000	1.208	1.333	H1-3+VT
	2.5 - 1.5	0.014	1.195	0.000	0.032	0.000	1.209	1.333	H1-3+VT
L25	1.5 - 0 (25)	0.014	1.198	0.000	0.032	0.000	1.212	1.333	H1-3+VT

* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 150	Pole	TP16x16x0.375	1	-1.61	515.29	18.0	Pass
L2	150 - 146.5	Pole	TP16x16x0.375	2	-2.45	515.29	28.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L3	146.5 - 146	Pole	TP22x22x0.375	3	-2.50	713.16	16.0	Pass
L4	146 - 136	Pole	TP23.848x22x0.25	4	-5.18	911.60	38.9	Pass
L5	136 - 126	Pole	TP25.6961x23.848x0.25	5	-7.66	982.99	64.0	Pass
L6	126 - 116	Pole	TP27.5441x25.6961x0.25	6	-9.66	1054.38	88.1	Pass
L7	116 - 115.5	Pole	TP27.6365x27.5441x0.25	7	-9.73	1057.95	89.2	Pass
L8	115.5 - 103.75	Pole	TP29.808x27.6365x0.41	8	-11.09	1818.57	65.5	Pass
L9	103.75 - 98.5	Pole	TP30.2774x28.615x0.4675	9	-13.34	2153.43	68.6	Pass
L10	98.5 - 88.5	Pole	TP32.1246x30.2774x0.4425	10	-15.54	2166.28	81.0	Pass
L11	88.5 - 80.5	Pole	TP33.6024x32.1246x0.4375	11	-17.37	2242.05	87.8	Pass
L12	80.5 - 68.5	Pole	TP35.819x33.6024x0.4325	12	-19.15	2309.34	93.7	Pass
L13	68.5 - 63	Pole	TP36.2103x34.3628x0.5	13	-22.56	2759.00	89.5	Pass
L14	63 - 61.5	Pole	TP36.4874x36.2103x0.5	14	-22.97	2780.41	90.2	Pass
L15	61.5 - 60.5	Pole	TP36.6721x36.4874x0.52	15	-23.26	2904.86	87.3	Pass
L16	60.5 - 50.5	Pole	TP38.5196x36.6721x0.61	16	-26.39	3573.29	78.3	Pass
L17	50.5 - 40.5	Pole	TP40.3671x38.5196x0.595	17	-29.63	3656.66	83.0	Pass
L18	40.5 - 34	Pole	TP41.568x40.3671x0.59	18	-30.12	3651.65	84.1	Pass
L19	34 - 31.5	Pole	TP41.28x39.8943x0.59	19	-33.91	3709.61	89.2	Pass
L20	31.5 - 30.5	Pole	TP41.4647x41.28x0.595	20	-34.26	3757.57	88.7	Pass
L21	30.5 - 20.5	Pole	TP43.3124x41.4647x0.615	21	-37.81	4057.56	87.8	Pass
L22	20.5 - 14.08	Pole	TP44.4985x43.3124x0.61	22	-40.14	4136.85	89.6	Pass
L23	14.08 - 11.5	Pole	TP44.9752x44.4985x0.65	23	-41.16	4451.98	84.7	Pass
L24	11.5 - 1.5	Pole	TP46.8229x44.9752x0.615	24	-44.72	4391.17	90.7	Pass
L25	1.5 - 0	Pole	TP47.1x46.8229x0.615	25	-45.24	4417.50	90.9	Pass
							Summary	
						Pole (L12)	93.7	Pass
						RATING =	**93.7**	**Pass**

CCIpole

per TIA-222- F

Site BU: _____

Work Order: _____

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	160	13.5	0	0	16	16	0.375	n/a	A53-B-35
2	146.5	0.5	0	0	22.00	22	0.375	n/a	A53-B-35
3	146	42.25	3.75	12	22.00	29.808	0.25	1	A607-60
4	107.5	39	4.5	12	28.61	35.819	0.3125	1.25	A607-60
5	73	39	5	12	34.36	41.568	0.375	1.5	A607-60
6	39	39	0	12	39.89	47.1	0.375	1.5	A607-60

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	30.5	channel	MP3-05 (1.25")	2					10				10			
2	11.5	31.5	channel	MP3-05 (1.25")	1	10											
3	0	14.08	channel	MP3-04 (1.25")	2		10										10
4	30.5	60.5	channel	MP3-04 (1.25")	2					10				10			
5	31.5	61.5	channel	MP3-04 (1.25")	1	10											
6	0	30.5	plate	MS-600 (1.25")	3			12					12			12	
7	30.5	60.5	plate	MS-600 (1.25")	3			12					12			12	
8	60.5	80.5	plate	MS-600 (1.25")	3			12					12			12	
9	80.5	98.5	plate	MS-600 (1.25")	3			12					12			12	
10	98.5	115.5	plate	CCI-SFP-045100	3		P				P				P		
11																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	I_x (in^4)	I_y (in^4)	L_u (in)	Connection Length (in)	Bolt Hole Size (in)	Reinforcement Material
1	5.33	2.09	5.65	0.79	2.150	20.790	18.000	18.000	1.2500	A572-65
2	5.33	2.09	5.65	0.79	2.150	20.790	18.000	18.000	1.2500	A572-65
3	4.78	1.61	4.13	0.61	0.910	11.860	18.000	18.000	1.2500	A572-65
4	4.78	1.61	4.13	0.61	0.910	11.860	18.000	18.000	1.2500	A572-65
5	4.78	1.61	4.13	0.61	0.910	11.860	18.000	18.000	1.2500	A572-65
6	6	1	6	0.5	0.500	18.000	16.375	n/a	1.2500	A572-65
7	6	1	6	0.5	0.500	18.000	16.375	n/a	1.2500	A572-65
8	6	1	6	0.5	0.500	18.000	16.375	n/a	1.2500	A572-65
9	6	1	6	0.5	0.500	18.000	16.375	n/a	1.2500	A572-65
10	4.5	1	4.5	0.5	0.375	7.594	20.000	n/a	1.1875	A572-65

TNX Geometry Input

Increment (ft): 10

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	160 - 150	10		0	16.000	16.000	0.375	A53-B-35	1.000
2	150 - 146.5	3.5	0	0	16.000	16.000	0.375	A53-B-35	1.000
3	146.5 - 146	0.5	0	0	22.000	22.000	0.375	A53-B-35	1.000
4	146 - 136	10		12	22.000	23.848	0.25	A607-60	1.000
5	136 - 126	10		12	23.848	25.696	0.25	A607-60	1.000
6	126 - 116	10		12	25.696	27.544	0.25	A607-60	1.000
7	116 - 115.5	0.5		12	27.544	27.637	0.25	A607-60	1.000
8	115.5 - 107.5	11.75	3.75	12	27.637	29.808	0.41	A607-60	0.970
9	107.5 - 98.5	9		12	28.615	30.277	0.4675	A607-60	0.973
10	98.5 - 88.5	10		12	30.277	32.125	0.4425	A607-60	1.108
11	88.5 - 80.5	8		12	32.125	33.602	0.4375	A607-60	1.103
12	80.5 - 73	12	4.5	12	33.602	35.819	0.4325	A607-60	1.100
13	73 - 63	10		12	34.363	36.210	0.5	A607-60	1.066
14	63 - 61.5	1.5		12	36.210	36.487	0.5	A607-60	1.064
15	61.5 - 60.5	1		12	36.487	36.672	0.52	A607-60	1.090
16	60.5 - 50.5	10		12	36.672	38.520	0.61	A607-60	1.027
17	50.5 - 40.5	10		12	38.520	40.367	0.595	A607-60	1.033
18	40.5 - 39	6.5	5	12	40.367	41.568	0.59	A607-60	1.039
19	39 - 31.5	7.5		12	39.894	41.280	0.59	A607-60	1.033
20	31.5 - 30.5	1		12	41.280	41.465	0.595	A607-60	1.042
21	30.5 - 20.5	10		12	41.465	43.312	0.615	A607-60	1.027
22	20.5 - 14.08	6.42		12	43.312	44.499	0.61	A607-60	1.024
23	14.08 - 11.5	2.58		12	44.499	44.975	0.65	A607-60	1.047
24	11.5 - 1.5	10		12	44.975	46.823	0.615	A607-60	1.024
25	1.5 - 0	1.5		12	46.823	47.100	0.615	A607-60	1.022

TNX Section Forces

Increment (ft):	10	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	160 - 150	1.6149	31.788	4.7492
2	150 - 146.5	2.4492	50.953	6.4057
3	146.5 - 146	2.495	54.167	6.4417
4	146 - 136	5.185	167.1	12.226
5	136 - 126	7.6595	321.2	17.479
6	126 - 116	9.6627	509.63	20.05
7	116 - 115.5	9.7338	519.67	20.112
8	115.5 - 107.5	11.09	684.97	21.197
9	107.5 - 98.5	13.338	882.19	22.592
10	98.5 - 88.5	15.536	1115	23.963
11	88.5 - 80.5	17.372	1311.1	25.025
12	80.5 - 73	19.152	1502.4	25.988
13	73 - 63	22.563	1769.5	27.359
14	63 - 61.5	22.965	1810.7	27.549
15	61.5 - 60.5	23.258	1838.3	27.675
16	60.5 - 50.5	26.394	2121.8	28.994
17	50.5 - 40.5	29.631	2418	30.238
18	40.5 - 39	30.122	2463.5	30.419
19	39 - 31.5	33.913	2695.4	31.369
20	31.5 - 30.5	34.259	2726.9	31.479
21	30.5 - 20.5	37.808	3047.4	32.621
22	20.5 - 14.08	40.14	3259.3	33.353
23	14.08 - 11.5	41.157	3345.7	33.654
24	11.5 - 1.5	44.722	3687.3	34.687
25	1.5 - 0	45.24	3739.4	34.834

Analysis Results

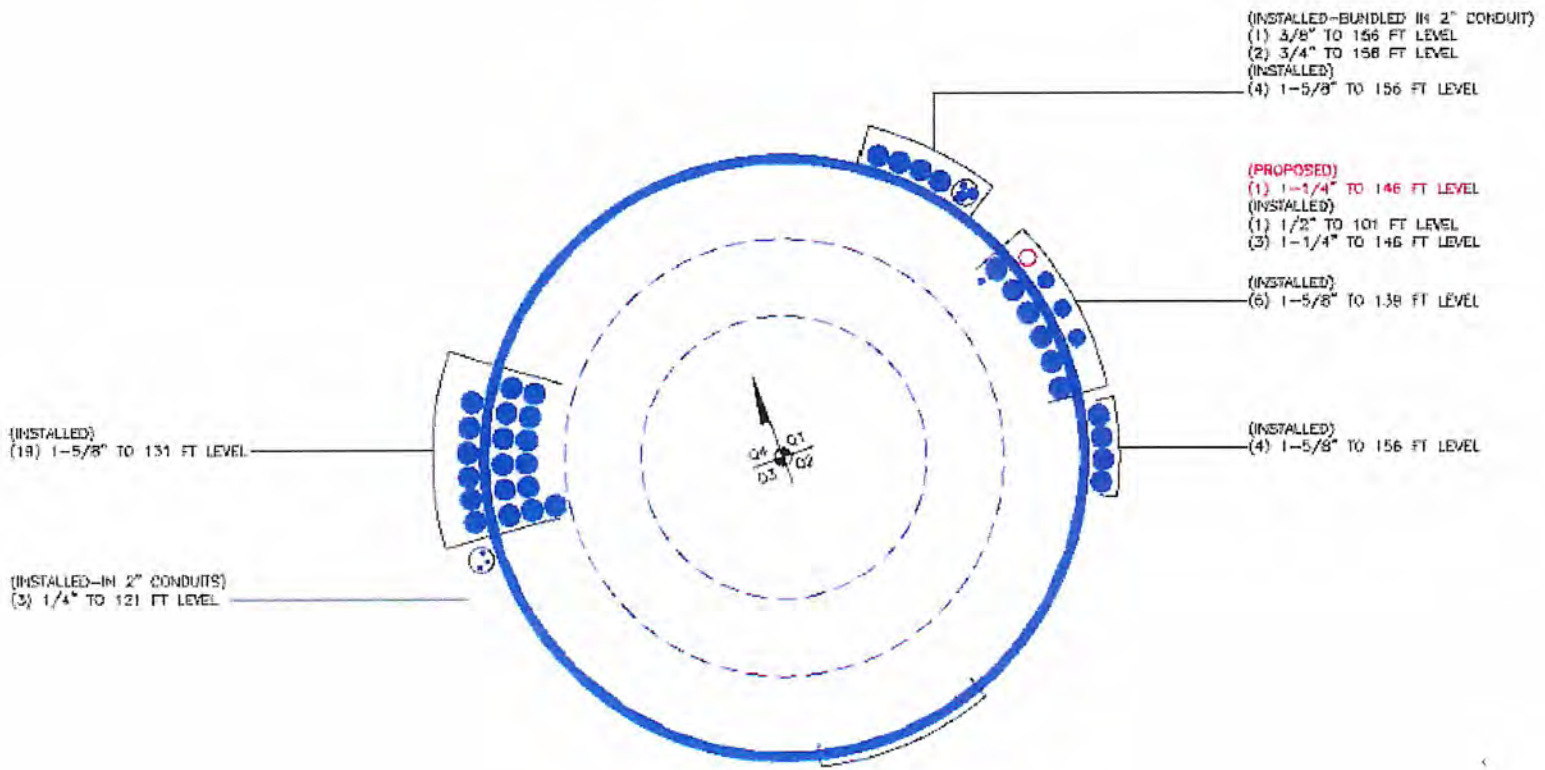
Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
160 - 150	Pole	TP16x16x0.375	Pole	17.9%	Pass
150 - 146.5	Pole	TP16x16x0.375	Pole	28.7%	Pass
146.5 - 146	Pole	TP22x22x0.375	Pole	15.9%	Pass
146 - 136	Pole	TP23.848x22x0.25	Pole	38.7%	Pass
136 - 126	Pole	TP25.696x23.848x0.25	Pole	63.7%	Pass
126 - 116	Pole	TP27.544x25.696x0.25	Pole	87.7%	Pass
116 - 115.5	Pole	TP27.637x27.544x0.25	Pole	88.8%	Pass
115.5 - 107.5	Pole + Reinf.	TP29.808x27.637x0.41	Reinf. 10 Compression	80.9%	Pass
107.5 - 98.5	Pole + Reinf.	TP30.277x28.615x0.4675	Reinf. 10 Compression	84.8%	Pass
98.5 - 88.5	Pole + Reinf.	TP32.125x30.277x0.4425	Pole	83.8%	Pass
88.5 - 80.5	Pole + Reinf.	TP33.602x32.125x0.4375	Pole	91.1%	Pass
80.5 - 73	Pole + Reinf.	TP35.819x33.602x0.4325	Pole	97.3%	Pass
73 - 63	Pole + Reinf.	TP36.21x34.363x0.5	Reinf. 8 Tension Rupture	95.4%	Pass
63 - 61.5	Pole + Reinf.	TP36.487x36.21x0.5	Reinf. 8 Tension Rupture	96.3%	Pass
61.5 - 60.5	Pole + Reinf.	TP36.672x36.487x0.52	Pole	93.0%	Pass
60.5 - 50.5	Pole + Reinf.	TP38.52x36.672x0.61	Reinf. 4 Tension Rupture	86.2%	Pass
50.5 - 40.5	Pole + Reinf.	TP40.367x38.52x0.595	Reinf. 4 Tension Rupture	90.8%	Pass
40.5 - 39	Pole + Reinf.	TP41.568x40.367x0.59	Reinf. 4 Tension Rupture	91.5%	Pass
39 - 31.5	Pole + Reinf.	TP41.28x39.894x0.59	Reinf. 4 Tension Rupture	97.6%	Pass
31.5 - 30.5	Pole + Reinf.	TP41.465x41.28x0.595	Reinf. 4 Tension Rupture	97.7%	Pass
30.5 - 20.5	Pole + Reinf.	TP43.312x41.465x0.615	Reinf. 1 Tension Rupture	94.9%	Pass
20.5 - 14.08	Pole + Reinf.	TP44.499x43.312x0.61	Reinf. 6 Tension Rupture	97.1%	Pass
14.08 - 11.5	Pole + Reinf.	TP44.975x44.499x0.65	Reinf. 1 Tension Rupture	94.6%	Pass
11.5 - 1.5	Pole + Reinf.	TP46.823x44.975x0.615	Reinf. 1 Tension Rupture	98.4%	Pass
1.5 - 0	Pole + Reinf.	TP47.1x46.823x0.615	Reinf. 1 Tension Rupture	98.8%	Pass
				Summary	
			Pole	97.3%	Pass
			Reinforcement	98.8%	Pass
			Overall	98.8%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity										
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
160 - 150	562	n/a	562	18.41	n/a	18.41	17.9%										
150 - 146.5	562	n/a	562	18.41	n/a	18.41	28.7%										
146.5 - 146	1490	n/a	1490	25.48	n/a	25.48	15.9%										
146 - 136	1352	n/a	1352	18.97	n/a	18.97	38.7%										
136 - 126	1695	n/a	1695	20.45	n/a	20.45	63.7%										
126 - 116	2092	n/a	2092	21.94	n/a	21.94	87.7%										
116 - 115.5	2113	n/a	2113	22.01	n/a	22.01	88.8%										
115.5 - 107.5	2474	1542	4017	23.20	13.50	36.70	62.7%										80.9%
107.5 - 98.5	3460	1663	5123	30.11	13.50	43.61	65.9%										84.8%
98.5 - 88.5	4164	1682	5846	31.97	18.00	49.97	83.8%									82.0%	
88.5 - 80.5	4770	1834	6603	33.45	18.00	51.45	91.1%									89.3%	
80.5 - 73	5389	1982	7371	34.84	18.00	52.84	97.3%								95.5%		
73 - 63	7135	2324	9458	43.21	18.00	61.21	91.8%								95.4%		
63 - 61.5	7301	2358	9659	43.54	18.00	61.54	92.7%								96.3%		
61.5 - 60.5	7493	2762	10255	43.77	22.13	65.90	92.9%					56.7%			86.9%		
60.5 - 50.5	8592	5148	13739	45.99	30.39	76.38	79.7%				86.2%	46.3%		84.8%			
50.5 - 40.5	9900	5637	15536	48.22	30.39	78.61	84.1%				90.8%	48.9%		89.6%			
40.5 - 39	10106	5680	15786	48.56	30.39	78.95	85.0%				91.5%	50.7%		90.3%			
39 - 31.5	10592	5886	16479	49.32	30.39	79.71	90.3%				97.6%	52.6%		96.3%			
31.5 - 30.5	10756	6164	16919	49.54	31.91	81.45	90.1%		49.6%		97.7%			94.5%			
30.5 - 20.5	12245	7671	19916	51.77	34.95	86.72	88.5%	94.9%	51.7%				94.8%				
20.5 - 14.08	13287	8083	21370	53.20	34.95	88.15	90.6%	97.1%	52.9%				97.1%				
14.08 - 11.5	13842	9785	23627	53.78	43.21	96.99	88.0%	94.6%	45.0%	74.5%			87.5%				
11.5 - 1.5	15517	9624	25140	56.01	37.56	93.57	92.7%	98.4%		85.3%			97.0%				
1.5 - 0	15796	9735	25531	56.34	37.56	93.90	93.1%	98.8%		85.7%			97.4%				

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876334 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

FDH ENGINEERING INNOVATION
FDH Engineering, Inc., 6521 Meridien Dr. Raleigh, NC 27616, Ph. 919.755.1012, Fax 919.755.1031

Anchor Rod Design

Site Name:	
Job No. :	
Elevation:	
	Input Cells in Yellow

*Note: Use Anchor Rod Transfer Plate Design Tab in Conjunction

Legend
Input
Output/ Notes

Code (F or G):	F	Pull Down
Anchor Bolts (Yes or No)	Yes	Pull Down
P (from RISA)	45	kips
V (from RISA)	35	kips
M (from RISA)	3739	ft-kips

Existing Rods		
y	27.5	in
No. Bolts	16	
BC	55	in
I	24079	in^4
Bolt Grade	A615-75	Pull Down
Thread Form	Non-Upset	-
d (in)	2.25	Pull Down
Ag	3.98	in^2
Ae	3.25	in^2
Fy	75	ksi
Fu	100	ksi

Itot	27870.989	in^4

T	173.755	kips
V	1.900	kips

Existing Rods		
y new	29.55	in
No. Bolts new	4	
BC new	59.1	in
Inew	3,792	in^4
Bolt Grade	F1554 Gr. 105	Pull Down
Thread Form	Non-Upset	Pull Down
d new (in)	1.75	Pull Down
Ag new	2.41	in^2
Ae new	1.90	in^2
Fy new	105	ksi
Fu new	125	ksi

Tnew	113.167	kips
Vnew	1.150	kips

Capacity (%)					Pullout Test Value
Tn/Ω	194.5	kips	OK	89.33	111 kips
Tn/Ω, new	132.55	kips	OK	85.38	
øTn	260	kips			
øTn, new	190	kips			

Req'd Embedment Length for New Rods		
f'c, caisson's concrete strength	3000	psi
fy, rebar yield strength	60000	psi
d_b, diameter of vertical rebar	1.41	in
vertical rebar cage BC ø	80	in
vertical rebar top cover distance	4	in
τ, Ultimate Hilti Bond Resistance	1.8	ksi

Note For New Anchor Rods:
Williams Bars (Upset)
A722 (Fy=127.7 ksi, Fu=150 ksi)
A615-75 (Fy=75 ksi, Fu=100 ksi)

l_d (vertical rebar dev. Length)	46.337	in
l_{dH} (Hilti dev. length)	57.599	in
G/1.5	6.967	in

Total Embed. Length of New Bolts	71.70	in
	5.98	ft

Bearing Strength Check of Anchor Rod Pipe Sleeve		
New Anchor Rod Diameter	1.75	in
Selected Pipe Sleeve Area	6.02	in^2
Selected Pipe Sleeve Fy	46	ksi
Rn/Ω (Rev F) or øRn (Rev G)	332.30	k
% Capacity (Analysis)	34.06%	OK
% Capacity (Design)	39.89%	OK

Equations:

= (M*y*Ag)/Itot-P*(Ag/Atotal)

Tn/Ω = 0.33*Fu*Ag*(4/3)

= 0.8*Fu*Ae (anchor bolts only) øTn = 0.75*Fu*Ae (non anchor bolts)

I = (No. Bolts/8)*BC^2*Ag

Notes:

*Ag and Ae are taken from AISC 13th Ed. Manual (pg. 7-83)

*I calc. will only work for symmetric bolt group, otherwise use CAD

Equivalent BC		
No. Existing Rebar		
Existing Rebar BC		in
Area rebar		in^2
Irebar	0	in^4
Itot	3,792	in^4
Equivalent Area	2.410	in^2
Equivalent BC	56.097	in
Total Area	9.64	in^2

(assuming new bolts are reinforcement)

Interaction Equation Checks (Rev. G: Section 4.9.9) (works for Rev F also)			
Detail Type (hover for detail)	d	Pull Down	
η	0.5		
l_{gr}, for Detail Type d only	0	in	(top of concrete to bottom of leveling nut)
øRnt	194.5	kips	
øRnv	119.4	kips	
øRnm	94.922	kip-in	
Mu	0	kip-in	
(Pu+Vu/η)/øRnt < 1?	0.913	OK	
$(Vu/øRnv)^2$ + $((Pu/øRnt)+(Mu/øRnm))^2$	0.798	OK	(only applicable for Detail Type d)

$l_d = [(fy*\psi_t\psi_e\lambda)/(20*\sqrt{f'c})]*d_b$ PER ACI 12.2.2

$l_{dH} = (øTn*FS)/(\tau*pi*d_{new})$

See Worksheet "New (Design Procedure)"

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *811642*
Site Name: *B-3 MTSO NAS141*
App #: *246431*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	2927.6	ft-kips (* Note)
Max. Service Shaft P:	45	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Load Factor	Shaft Factored Loads		
1.30	Mu:	3805.88	ft-kips
1.30	Pu:	58.5	kips

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	32	
As Total=	49.92	in^2
A s/ Aconc, Rho:	0.0090	0.90%

Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	C	
Seismic Risk =	**Moderate**	

Solve (Run) <-- Press Upon Completing All Input

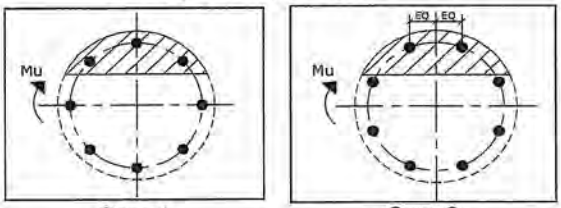
ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **16.92** in

Extreme Steel Strain, εt: **0.0109**

εt > 0.0050, Tension Controlled

Reduction Factor,φ: **0.900**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.90%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8839.70	kips
at Mu=(ϕ=0.65)Mn=	5309.39	ft-kips
Max Tu, (φ=0.9) Tn =	2695.68	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	58.50	kips
Drilled Shaft Moment Capacity, φMn:	**7493.67**	ft-kips
Drilled Shaft Superimposed Mu:	**3805.88**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**50.8%**

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

Site ID: *66576-A*
Site Name: *Brewster Blvd*
Job No.: *1464EP1400*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	3	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	23	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	23	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	529.00	ft^2
Pier Height:	1.00	ft
Soil (above pad) Height:	0.00	ft

Soil Parameters		
Unit Weight, γ:	100.0	pcf
Ultimate Bearing Capacity, qn:	6.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	0.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	4.50	ksf
Passive Pres. Coeff., Kp	1.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	7.8	kips
Pad Force Location Above D:	1.00	ft
ϕ(Passive Pressure Moment):	7.76	ft-kips
Factored O.T. M(WL), "1.6W":	1539.0	ft-kips
Factored OT (MW-Msoil), M1	1531.24	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	317.4	kips
Unfactored (Total ftg-soil Wt):	317.40	kips
1.2D. **No Soil Wedges.**	434.88	kips
0.9D. **With Soil Wedges**	326.16	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	45	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	35	kips
Unfactored WL Moment, M:	1000	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	54	kips
0.90	0.9D+1.6W, Pu:	40.5	kips
1.35	Vu:	47.25	kips
	Mu:	1350	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	434.88	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	1531.24	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	3.52	ft
Orthogonal qu=	1.33	ksf
qu/ϕ*qn Ratio=	**29.46%**	Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	2.49	ft
Diagonal qu=	1.34	ksf
qu/ϕ*qn Ratio=	**29.76%**	Pass

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	326.16	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	1531.24	ft-kips

Orthogonal ecc3 = M2/P2 =	4.69	ft
Ortho Non Bearing Length,NBL=	9.39	ft
Orthogonal qu=	1.12	ksf
Diagonal qu=	1.22	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	1000.00		
M Orthogonal:	2263.47	**44.18%**	Pass
M Diagonal:	2263.47	**44.18%**	Pass

APPENDIX D

MODIFICATION DRAWINGS

THE MODIFICATIONS DEPICTED ON THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL ANALYSIS COMPLETED BY PAUL J. FORD AND COMPANY, PROJECT NO: 37513-0627R1 DATED MAY 16, 2014.

FOR PASSING STRUCTURAL ANALYSIS WITH MODIFICATIONS IN PLACE SEE FDH ENGINEERING, INC., (PROJECT NO. 146AZR1400), CROWN SDD WO# 906287 FOR SPRINT APPLICATION 245386 REV. 1 DATED SEPTEMEBER 4, 2014.

ALL DIMENSIONS, MEASUREMENTS, QUANTITIES, PART NUMBERS AND COAX/ANTENNA PLACEMENTS TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO MATERIAL ORDERS AND CONSTRUCTION.

THIS MODIFICATION DESIGN HAS BEEN PERFORMED IN ACCORDANCE WITH THE ANSI / TIA-222-F "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES"

TOWER MANUFACTURER : PAUL J. FORD & COMPANY
DRAWING# 29298-187

PROJECT CONTACTS:

CROWN CASTLE TSA
DAVID SMITH
DAVID.SMITH@CROWNCASTLE.COM
(704) 405-6618

FDH PROJECT ENGINEER
SIVAH SHANKAR
SSHANKAR@FDH-INC.COM
(919) 755-1012

FDH ENGINEER (EOR)
BRADLEY R. NEWMAN, P.E.
BNEWMAN@FDH-INC.COM
(919) 755-1012

PROJECT DESCRIPTION:

MODIFICATION DRAWINGS FOR A 160' MONOPOLE

CROWN CASTLE

SITE NAME:

SOUTHINGTON, SMORON

SITE NUMBER:

876334

SITE ADDRESS:
625 SPRING STREET
SOUTHINGTON, CT 06489

COORDINATES:
LATITUDE: 41.6325°
LONGITUDE: -72.8942°

SHEET INDEX

SHT. NO.	DESCRIPTION
S-1	TITLE SHEET
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	GENERAL NOTES
S-4	MODIFICATION SCHEDULE & FLAT PLATE INSTALLATION DETAILS

PREPARED BY:
FDH ENGINEERING INNOVATION
6521 MERIDIEN DRIVE
RALEIGH, NC 27616
PHONE: 919-755-1012
FAX: 919-755-1031

PREPARED FOR:
CROWN CASTLE

STATE OF CONNECTICUT
BRADLEY R. NEWMAN
29630
LICENSED
PROFESSIONAL ENGINEER

9/4/14
BRADLEY R. NEMAN, P.E.
CONNECTICUT LIC. NO. 29630

DRAWN BY:	JAT
CHECKED BY:	SS
ENG APPV'D:	BRN
PROJECT NO:	146AZR1400

SUBMITTALS

DATE	DESCRIPTION	REV
9/4/14	CONSTRUCTION	0

SITE NAME:
SOUTHINGTON, SMORON

SITE NUMBER:
876334

SITE ADDRESS:
625 SPRING STREET
SOUTHINGTON, CT 06489

SHEET TITLE
TITLE SHEET

SHEET NUMBER
S-1

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR APPROVAL
N/A	FABRICATION INSPECTION
N/A	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS
N/A	POST INSTALLED ANCHOR ROD VERIFICATION
N/A	BASE PLATE GROUT VERIFICATION
N/A	CONTRACTOR'S CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

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 MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

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

REQUIRED PHOTOS

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.

PREPARED BY:
FDH
6521 MERIDIEN DRIVE
RALEIGH, NC 27616
PHONE: 919-755-1012
FAX: 919-755-1031
ENGINEERING INNOVATION

PREPARED FOR:
CROWN CASTLE

STATE OF CONNECTICUT
BRADLEY R. NEMAN
29630
LICENSED
PROFESSIONAL ENGINEER
9/4/14

BRADLEY R. NEMAN, P.E.
CONNECTICUT LIC. NO. 29630

DRAWN BY:	JAT
CHECKED BY:	SS
ENG APPVD:	BRN
PROJECT NO:	146AZR1400

SUBMITTALS

DATE	DESCRIPTION	REV
9/4/14	CONSTRUCTION	0

SITE NAME:
SOUTHINGTON, SMORON

SITE NUMBER:
876334

SITE ADDRESS:
625 SPRING STREET
SOUTHINGTON, CT 06489

SHEET TITLE
MODIFICATION
INSPECTION CHECKLIST

SHEET NUMBER
S-2

GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND ORDINANCES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL PERMITS NECESSARY TO COMPLETE THE PROJECT AND ABIDE BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, ELEVATIONS AND EXISTING CONDITIONS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO FDH ENGINEERING FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
3. INCORRECTLY FABRICATED, DAMAGED, OTHERWISE MISFITTING, OR NON-CONFORMING MATERIALS AND CONDITIONS SHALL BE REPORTED TO FDH ENGINEERING PRIOR TO ANY REMEDIAL OR CORRECTIVE ACTION. ALL ACTIONS SHALL REQUIRE FDH ENGINEERING APPROVAL.
4. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AFTER THE COMPLETION OF THE PROJECT.
5. CONTRACTOR SHALL PROMPTLY REMOVE ANY & ALL DEBRIS FROM SITE AND RESTORE AS BEST AS POSSIBLE TO PRECONSTRUCTION CONDITION.
6. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE CROWN ENGINEERING GROUP (OR ENGINEER OF RECORD)

CONTRACTOR QUALIFICATION NOTES:

1. ALL REPAIRS SHALL BE PERFORMED BY A TOWER CONTRACTOR WITH A MINIMUM 5 YEARS EXPERIENCE IN TOWER ERECTION AND RETROFIT AND WITH WORKING KNOWLEDGE OF THE TIA/EIA 222-F "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES".
2. CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MEANS AND METHODS. SHOULD THE CONTRACTOR REQUIRE DIRECT CONSULTATION, FDH ENGINEERING, INC. IS WILLING TO OFFER SERVICES BASED UPON AN AGREED FEE FOR THE WORK REQUIRED.
3. ALL SUBMITTAL INFORMATION MUST BE SENT TO FDH ENGINEERING, INC. 6521 MERIDIEN DRIVE, RALEIGH NC, 27616, TEL. (919) 755-1012, FAX. (919) 755-1031, E-MAIL INFO@FDH-INC.COM. ANY VARIATION OF THESE SPECIFICATIONS OR DRAWINGS WITHOUT CONSENT FROM FDH ENGINEERING, INC. WILL VOID ANY RESPONSIBILITY OR LIABILITY FOR DAMAGE (MATERIAL OR PHYSICAL) TOWARDS FDH ENGINEERING, INC.
4. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE TIA-1019-A STANDARD.

JOB SITE SAFETY & NOTES:

1. NEITHER THE PROFESSIONAL ACTIVITIES OF FDH ENGINEERING, INC. NOR THE PRESENCE OF FDH ENGINEERING, INC. OR EMPLOYEES AND SUB-CONSULTANTS AT THE CONSTRUCTION SITE, SHALL RELIEVE THE GENERAL CONTRACTOR AND OR SUBCONTRACTORS AND ANY OTHER ENTITY OF THEIR OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ANY HEALTH OR SAFETY PRECAUTIONS REQUIRED BY ANY REGULATORY AGENCIES. THE GENERAL CONTRACTOR AND OR SUBCONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SAFETY, AND WARRANTS THAT THIS INTENT IS EVIDENT BY ACCEPTING THIS WORK.

STEEL:

1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE AND ASTM SPECIFICATIONS.

   *ALL FLAT PLATE STEEL SHALL BE ASTM A572-65 (Fy=65KSI) UNLESS OTHERWISE SPECIFIED.
2. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED WELDS WITH WELDING ELECTRODES E-80XX OR SPECIFIED HIGH STRENGTH BOLTS TO BE ASTM A325N, THREAD INCLUDED WITH SHEAR PLANE (UNLESS OTHERWISE NOTED).
3. ALL BOLTED CONNECTIONS TO BE INSTALLED TO A SNUG-TIGHTENED CONDITION IN ACCORDANCE WITH AISC 13 PART 16.2, "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", SECTION 8.1, UNLESS OTHERWISE SPECIFIED. WHEN "X" TYPE BOLTS ARE USED, CONTRACTOR MAY BE REQUIRED TO STACK ADDITIONAL WASHERS TO OBTAIN PROPER SNUG TIGHT INSTALLATION. ALL NUTS SHALL BE HEAVY HEX UNLESS OTHERWISE NOTED.
4. ALL STEEL, AFTER FABRICATION, SHALL BE HOT DIPPED GALVANIZED PER ASTM A-123. ALL DAMAGED SURFACES, WELDED AREAS AND AUTHORIZED NON-GALVANIZED MEMBERS OR PARTS (EXISTING OR NEW) SHALL BE PAINTED WITH MULTIPLE COATS OF ZRC COLD GALVANIZING COMPOUND ACHEIVING A MINIMUM OF 4 MILS DRY FILM PER ASTM A 780.
5. ALL SHOP AND FIELD WELDING SHALL BE DONE BY WELDERS QUALIFIED AS DESCRIBED IN THE "AMERICAN WELDING SOCIETY'S STANDARD QUALIFICATION PROCEDURE" TO PERFORM THE TYPE OF WORK REQUIRED. CONTRACTOR IS REQUIRED TO PROVIDE FDH ENGINEERING, INC. WITH A PASSING CERTIFIED WELDING INSPECTION FOR ALL WELDS.
6. STRUCTURAL STEEL MAY NOT BE TORCH CUT FOR FABRICATION. ALL STEEL FABRICATION MUST FOLLOW AISC STANDARDS.

MISC. NOTES:

1. ALL MODIFICATIONS ARE ASSUMED TO BE MADE ON AN EMPTY TOWER. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS AND TRANSMISSION LINES. MODIFICATIONS MUST BE CONTINUOUS THROUGH ALL AREAS SHOWN.
2. CONTRACTOR FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.

FABRICATION NOTES:

1. ALL DIMENSIONS ARE PRELIMINARY UNTIL FIELD VERIFIED BY CONTRACTOR. ANY CHANGES MUST BE APPROVED BY ENGINEER OF RECORD IN WRITING PRIOR TO FABRICATION AND INSTALLATION.
2. NEW STEEL MEMBERS MUST HAVE SINGLE DRILLED HOLES. SLOTTED AND DOUBLE DRILLED HOLES ARE NOT ACCEPTABLE MEANS OF FABRICATION.

SUBSTITUTES AND/OR EQUALS:

1. IF CONTRACTOR WISHES TO FURNISH OR USE A SUBSTITUTE ITEM OF MATERIAL OR EQUIPMENT, CONTRACTOR SHALL FIRST MAKE WRITTEN APPLICATION TO ENGINEER OF RECORD FOR ACCEPTANCE THEREOF, CERTIFYING THAT THE PROPOSED SUBSTITUTE WILL PERFORM ADEQUATELY THE FUNCTIONS AND ACHIEVE THE RESULTS CALLED FOR BY THE GENERAL DESIGN, BE SIMILAR IN SUBSTANCE TO THAT SPECIFIED AND SUITED TO THE SAME USE AS THAT SPECIFIED. ALL VARIATIONS OF THE PROPOSED SUBSTITUTE FROM THAT SPECIFIED WILL BE IDENTIFIED IN THE APPLICATION AND AVAILABLE MAINTENANCE, REPAIR AND REPLACEMENT SERVICE WILL BE INDICATED. THE APPLICATION WILL ALSO CONTAIN AN ITEMIZED ESTIMATE OF ALL COSTS OR CREDITS THAT WILL RESULT DIRECTLY OR INDIRECTLY FROM ACCEPTANCE OF SUCH SUBSTITUTE INCLUDING COSTS OF REDESIGN AND CLAIMS OF OTHER CONTRACTORS AFFECTED BY THE RESULTING CHANGE, ALL OF WHICH WILL BE CONSIDERED BY ENGINEER OF RECORD IN EVALUATION OF THE PROPOSED SUBSTITUTE. ENGINEER OF RECORD MAY REQUIRE CONTRACTOR TO FURNISH ADDITIONAL DATA ABOUT THE PROPOSED SUBSTITUTE.

NEW MONOPOLE REINFORCEMENT NOTES:

1. CONTRACTOR TO FIELD VERIFY PROPOSED LOCATION OF REINFORCEMENT TO ENSURE THAT PROPER SPACING CAN BE MET.
2. CONTRACTOR TO REPLACE AND/OR RELOCATE ANY CLIMBING PEGS THAT INTERFERE WITH THE INSTALLATION OF FLAT PLATE.
3. ALL AJAX CONNECTIONS TO USE HIGH TENSILE SLEEVE PROVIDED BY MANUFACTURER. AJAX BOLT ASSEMBLY TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS. SEE AJAX BOLT ASSEMBLY DETAIL ON SHEET S-3.
4. ALL SHEAR SLEEVES TO BE HOT DIPPED GALVANIZED PRIOR TO INSTALLATION.
5. PRIOR TO FLAT PLATE INSTALLATION, SLIP JOINTS MUST BE TIGHTENED WITH A MINIMUM JACKING FORCE OF 6000 LBS.
6. NEW REINFORCEMENT TO BE INSTALLED ON THE CENTER OF PROPOSED SIDE UNLESS OTHERWISE NOTED.
7. EXISTING COAX BANDS TO BE REPLACED AFTER REINFORCEMENT INSTALLATION. NEW FLAT PLATE TO BE INSTALLED BENEATH EXISTING COAX BANDS.

CONSTRUCTION NOTES:

1. CONTRACTOR TO FIELD VERIFY PROPOSED REINFORCEMENT LAYOUT PRIOR TO CONSTRUCTION. IF ISSUES ARE PRESENT IN THE FIT OF THE REINFORCEMENT, CONTRACTOR TO CONTACT ENGINEER OF RECORD OR FDH ENGINEERING PROJECT MANAGER PRIOR TO PROCEEDING WITH PROPOSED MODIFICATION OR FABRICATION.

NDE INSPECTION:

1. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
2. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.

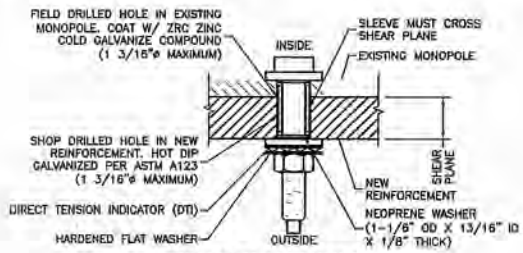
COLD GALVANIZATION/SURFACE PREPARATION NOTES:

1. CONTRACTOR TO USE ZINGA OR ZRC COLD GALVANIZATION COMPOUNDS OR APPROVED EQUIVALENT.
2. PREPARE RUSTED/CORRODED SURFACE FOR TREATMENT ACCORDING TO MANUFACTURE'S RECOMMENDATIONS.
3. CONTRACTOR TO APPLY (2) COATS OF COLD GALVANIZATION COMPOUND PER MANUFACTURER'S RECOMMENDATION. DRYING AND CURING TIMES MUST BE UTILIZED PER MANUFACTURER'S RECOMMENDATION.
4. APPLY ALL COATINGS BY BRUSH IN CALM WIND CONDITIONS. THE USE OF AEROSOL IS NOT PERMITTED.
5. IF THE TOWER IS PAINTED, BRUSH PAINT ALL TREATED AREAS TO MATCH TOWER AFTER COLD GALVANIZATION COMPOUND IS ALLOWED TO CURE.

AJAX PRETENSION JOINTS:

1. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) & HARDENED WASHERS. ALL AJAX M20 BOLTS WITH REAR SLEEVES SHALL BE PRETENSIONED & TIGHTENED UNTIL DIRECT TENSION INDICATOR (DTI) WASHER SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED.
2. ALL DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

   APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
   1413 ROCKINGHAM ROAD
   BELLOWS FALLS, VERMONT 05101, USA
   PHONE: 1-800-552-1999
   WEBSITE: WWW.APPLIEDBOLTING.COM
3. 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.
4. USE HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RE 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY 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.
5. CONTRACTOR SHALL FOLLOW DTI MANUFACTURES'S INSTRUCTION FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.
6. EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OFF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.
7. REQUIREMENT EFFECTIVE 04/20/2013 PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ('NON-TC') BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION. THE THIRD PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013, THE THIRD PARTY BOLT INSPECTION SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE



AJAX BOLT ASSEMBLY
SCALE: NTS

PREPARED BY:
FDH ENGINEERING INNOVATION
6521 MERIDIEN DRIVE
RALEIGH, NC 27616
PHONE: 919-755-1012
FAX: 919-755-1031

PREPARED FOR:

CROWN CASTLE

STATE OF CONNECTICUT
BRADLEY R. NEWMAN
29630
LICENSED PROFESSIONAL ENGINEER
9/4/14

BRADLEY R. NEMAN, P.E.
CONNECTICUT LIC. NO. 29630

DRAWN BY:	JAT
CHECKED BY:	SS
ENG APPVD:	BRN
PROJECT NO:	146A2R1400

SUBMITTALS

DATE	DESCRIPTION	REV
9/4/14	CONSTRUCTION	0

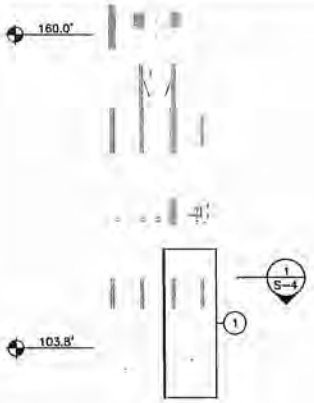
SITE NAME:
SOUTHINGTON, SMORON

SITE NUMBER:
876334

SITE ADDRESS:
825 SPRING STREET
SOUTHINGTON, CT 06489

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
S-3



TOWER ELEVATION
SCALE: NTS

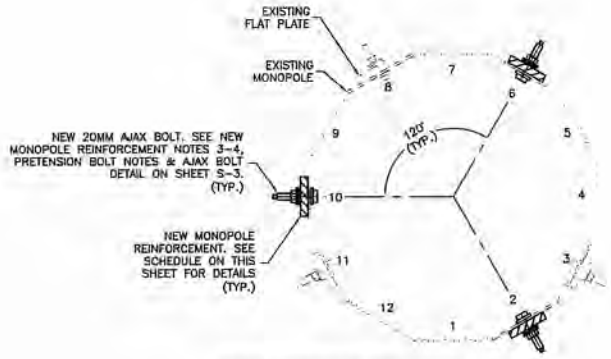
- CONTRACTOR SHALL VERIFY ALL APPURTENANCE CONDITIONS AND DIMENSIONS IN RELATIONSHIP TO THIS MODIFICATION. APPURTENANCES MAY NEED TO BE TEMPORARILY REMOVED OR MOVED DURING THE INSTALLATION OF THIS MODIFICATION. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE PRIOR TO PROCEEDING WITH THE WORK.
- ALL MODIFICATIONS TO BE INSTALLED CONTINUOUSLY THROUGH EXISTING EQUIPMENT. ALL EXISTING EQUIPMENT NOT TO BE DAMAGED OR TAKEN OFF AIR DURING INSTALLATION.
- SEE STRUCTURAL ANALYSIS REPORT FOR EXISTING ANTENNA LOADING.
- CONTRACTOR TO FIELD VERIFY DIMENSIONS & LOCATIONS OF PROPOSED MODIFICATIONS PRIOR TO STEEL FABRICATION.
- CONTRACTOR MAY BE REQUIRED TO REMOVE AND REPLACE STEP PEGS TO ALLOW SPACE FOR THE INSTALLATION OF THE PROPOSED FLAT PLATE

TOWER MODIFICATION SCHEDULE

NO.	TYPE OF MODIFICATION	BOTTOM ELEV. (FT)	TOP ELEV. (FT)
1	INSTALLATION OF NEW MONOPOLE REINFORCEMENT. SEE THIS SHEET FOR DETAILS.	97.0±	117.0±
	REFER TO STRUCTURAL ANALYSIS FOR COAX INFORMATION		

CROWN CASTLE REINFORCEMENT INSTALLATION SCHEDULE

ELEVATION**	QTY.	FLAT NUMBER	CCI-65FP PLATE (65 KSI)	MAX. STITCH BOLT SPACING	AJAX BOLT QUANTITY	STEEL WEIGHT (LBS.)
97'-0"± TO 117'-0"±	3	2 - 6 - 10	CCI-SFP-04510020	1'-8"	22*	306.0*
*QUANTITY SHOWN IS FOR (1) REINFORCEMENT PLATE.				TOTAL	66	918.0



MONOPOLE REINFORCEMENT LAYOUT
SECTION VIEW

1/S-4 SECTION
NTS

PREPARED BY:
FDH
6521 MERIDIEN DRIVE
RALEIGH, NC 27616
PHONE: 919-755-1012
FAX: 919-755-1031
ENGINEERING INNOVATION

PREPARED FOR:
CROWN CASTLE

STATE OF CONNECTICUT
BRADLEY R. NEWMAN
29630
LICENSED
PROFESSIONAL ENGINEER
9/4/14

BRADLEY R. NEMAN, P.E.
CONNECTICUT LIC. NO. 29630

DRAWN BY:	JAT
CHECKED BY:	SS
ENG APPVD:	BRN
PROJECT NO:	146AZR1400

SUBMITTALS

DATE	DESCRIPTION	REV
9/4/14	CONSTRUCTION	0

SITE NAME:
SOUTHINGTON, SMORON

SITE NUMBER:
876334

SITE ADDRESS:
625 SPRING STREET
SOUTHINGTON, CT 06489

SHEET TITLE
MODIFICATION SCHEDULE
&
FLAT PLATE INSTALLATION DETAILS

SHEET NUMBER
S-4

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

CT 5250

September 14, 2012

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

RE: **EM-CING-131-120831** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 625 Spring Street, Southington, Connecticut.

Dear Ms. Gaudet:

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

- The tower shall be reinforced in accordance with the recommendations made in the Structural Modification Report prepared by Paul J. Ford and Company dated August 17, 2012 , and stamped by Joseph Jacobs; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

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

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

August 21, 2012

The Honorable Edward S. Pocock III
Chairman
Town of Southington
Town Office Building
75 Main Street
Southington, CT 06489

RE: **EM-CING-131-120821** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 625 Spring Street, Southington, Connecticut.

Dear Chairman Pocock:

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 September 4, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Garry Brumback, Town Manager, Town of Southington
Mary Savage, Town Planner, Town of Southington

CONNECTICUT SITING COUNCIL

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

EM-CING-131-120821

HPC WIRELESS SERVICES

August 20, 2012

RECEIVED
AUG 21 2012
CONNECTICUT
SITING COUNCIL

VIA OVERNIGHT COURIER

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

Re: New Cingular Wireless PCS, LLC – Exempt Modification
625 Spring Street, Southington, 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 Chairman of the Town Council of the Town of Southington.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 625 Spring Street, Southington, (coordinates 41°-37'-56" N, 72°-53'-48" 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 replace the existing pole extension, install T-arm mounts, relocate two (2) UMTS/GSM antennas to the new mounts, and add one (1) UMTS and three (3) LTE panel antennas, all at a center line of approximately 156'. Six (6) RRHs (remote radio heads) will be mounted behind the LTE antennas and a surge arrestor will be mounted to

the T-arm pipe. AT&T will also place a DC power and fiber run from the equipment to the antennas along the existing coaxial cable run. These changes will not extend the height of the approximately 160' structure.

2. AT&T will place related equipment in its existing equipment shelter, and will mount a new GPS antenna to 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 2.11%; the combined site operations will result in a total power density of approximately 28.38%.

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

Jennifer Young Gaudet

Attachments

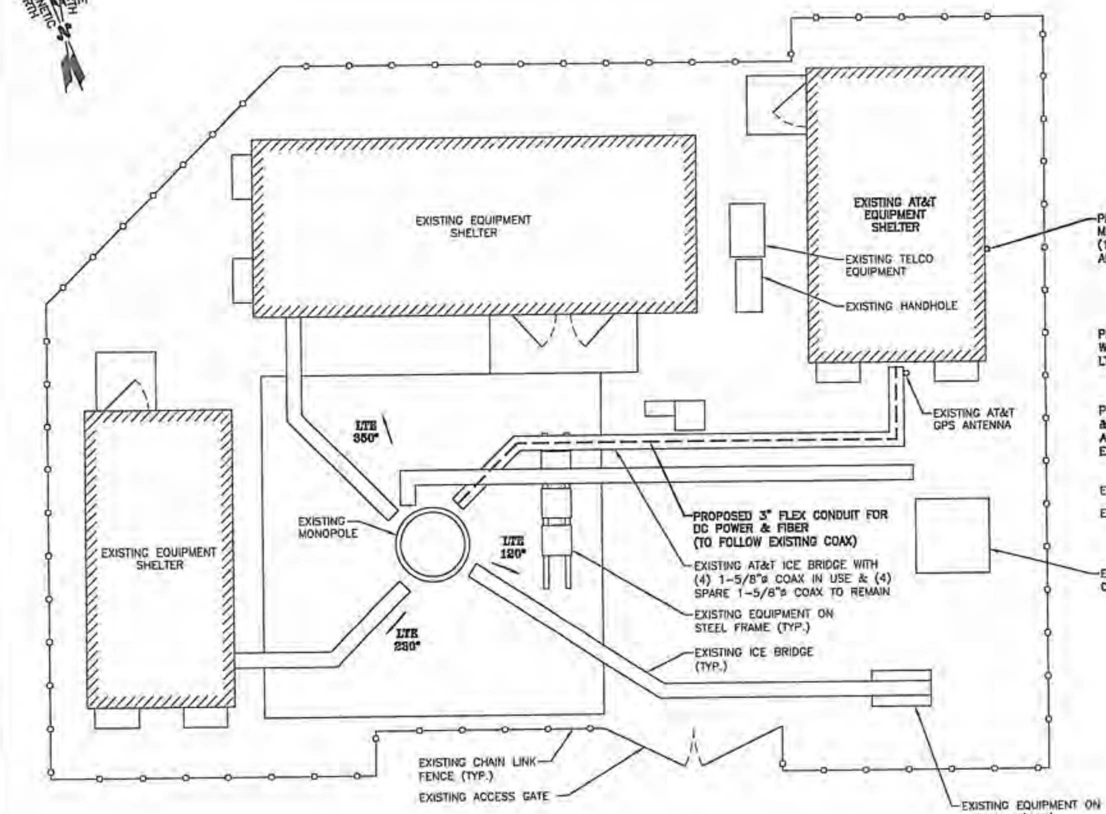
cc: Honorable John C. Dobbins, Chairman, Town Council, Town of Southington
Garry Brumback, Town Manager, Town of Southington
Spring Meadow Corporation (underlying property owner)

NOTE:

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

NOTE:

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

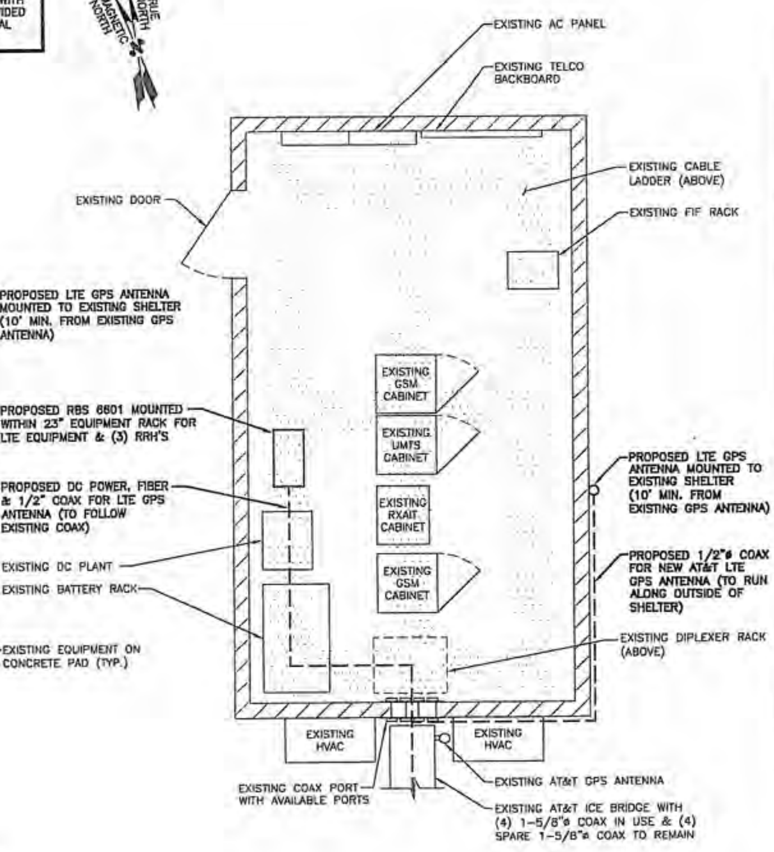


14.08°
TRUE NORTH
MAGNETIC NORTH
EXISTING EQUIPMENT SHELTER
EXISTING EQUIPMENT SHELTER
EXISTING AT&T EQUIPMENT SHELTER
EXISTING TELCO EQUIPMENT
EXISTING HANDHOLE
PROPOSED LTE GPS ANTENNA MOUNTED TO EXISTING SHELTER (10' MIN. FROM EXISTING GPS ANTENNA)
EXISTING AT&T GPS ANTENNA
LTE 350°
LTE 120°
LTE 230°
EXISTING MONOPOLE
PROPOSED 3" FLEX CONDUIT FOR DC POWER & FIBER (TO FOLLOW EXISTING COAX)
EXISTING AT&T ICE BRIDGE WITH (4) 1-5/8"ø COAX IN USE & (4) SPARE 1-5/8"ø COAX TO REMAIN
EXISTING EQUIPMENT ON STEEL FRAME (TYP.)
EXISTING ICE BRIDGE (TYP.)
EXISTING EQUIPMENT ON CONCRETE PAD (TYP.)
EXISTING CHAIN LINK FENCE (TYP.)
EXISTING ACCESS GATE
EXISTING EQUIPMENT ON H-FRAME (TYP.)

COMPOUND PLAN

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

0 2'-0" 4'-0" 8'-0" 12'-0"



14.08°
TRUE NORTH
MAGNETIC NORTH
EXISTING AC PANEL
EXISTING TELCO BACKBOARD
EXISTING CABLE LADDER (ABOVE)
EXISTING FIF RACK
EXISTING DOOR
EXISTING GSM CABINET
EXISTING UMTS CABINET
EXISTING RXAIT CABINET
EXISTING GSM CABINET
PROPOSED RBS 6601 MOUNTED WITHIN 23" EQUIPMENT RACK FOR LTE EQUIPMENT & (3) RRH'S
PROPOSED DC POWER, FIBER & 1/2" COAX FOR LTE GPS ANTENNA (TO FOLLOW EXISTING COAX)
EXISTING DC PLANT
EXISTING BATTERY RACK
PROPOSED LTE GPS ANTENNA MOUNTED TO EXISTING SHELTER (10' MIN. FROM EXISTING GPS ANTENNA)
PROPOSED 1/2"ø COAX FOR NEW AT&T LTE GPS ANTENNA (TO RUN ALONG OUTSIDE OF SHELTER)
EXISTING DIPLEXER RACK (ABOVE)
EXISTING HVAC
EXISTING HVAC
EXISTING AT&T GPS ANTENNA
EXISTING COAX PORT WITH AVAILABLE PORTS
EXISTING AT&T ICE BRIDGE WITH (4) 1-5/8"ø COAX IN USE & (4) SPARE 1-5/8"ø COAX TO REMAIN

EQUIPMENT PLAN

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

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

Hudson Design Group LLC
1600 OSGOOD STREET, BUILDING 20 NORTH, SUITE 2-101, N. ANDOVER, MA 01845
TEL: (978) 557-5553 FAX: (978) 336-5586

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

SITE NUMBER: CT5250
SITE NAME: SOUTHINGTON FLORIANS POND
CROWN SITE# 876334
625 SPRING STREET
SOUTHINGTON, CT 06489
HARTFORD COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	08/16/12	CONSTRUCTION REVISED		DC	DPH
2	07/08/12	CONSTRUCTION REVISED		DC	DPH
1	06/22/12	ISSUED FOR CONSTRUCTION			
0	04/08/12	ISSUED FOR REVIEW	DB	DC	DPH

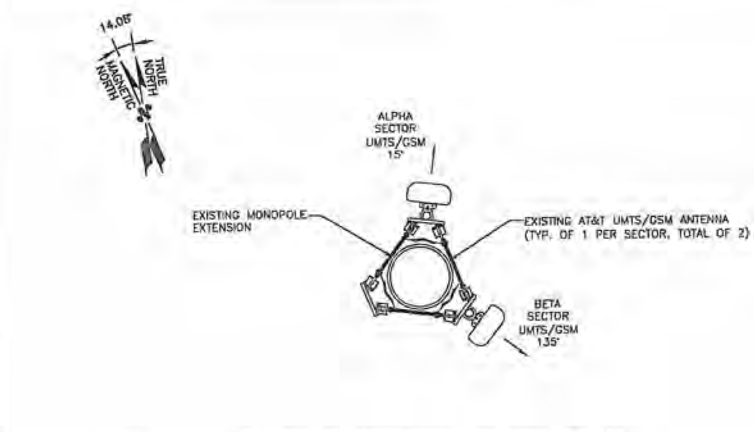
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

AT&T

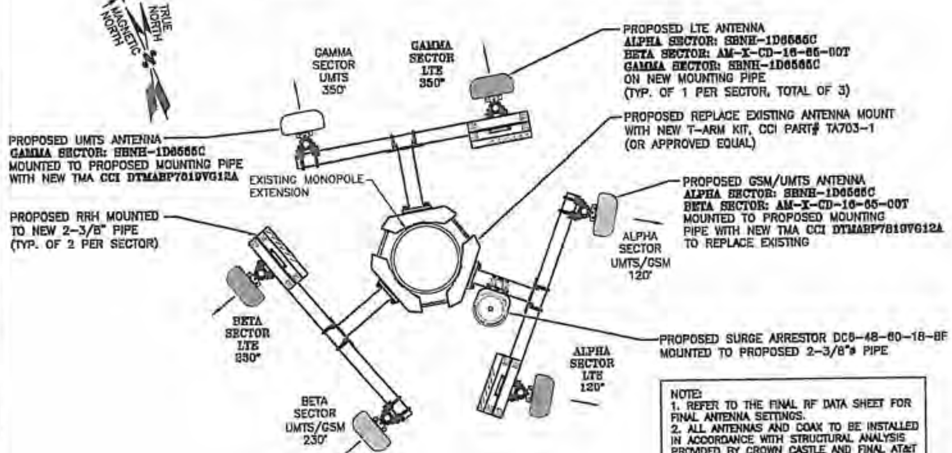
COMPOUND & EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5250.01	A–1	3



EXISTING UMTS/GSM ANTENNA PLAN

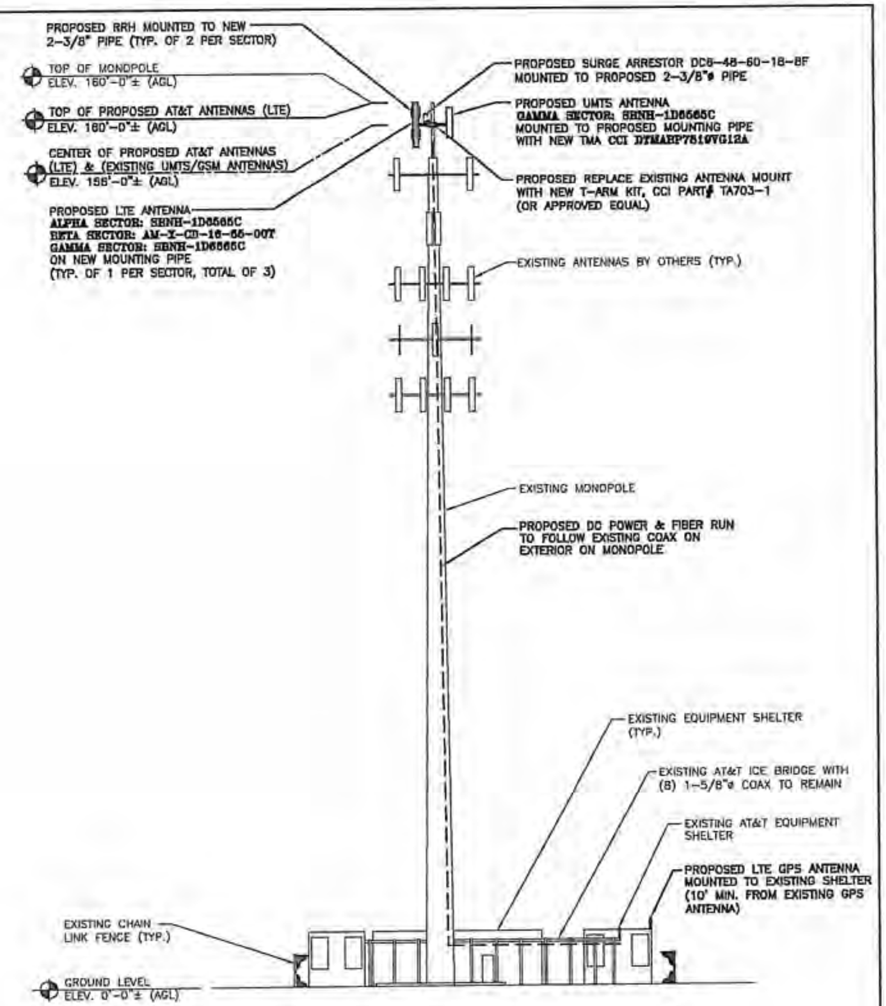
SCALE: N.T.S.


14.08°
TRUE NORTH
MAGNETIC NORTH
GAMMA SECTOR UMTS 350°
GAMMA SECTOR LTE 350°
PROPOSED LTE ANTENNA
ALPHA SECTOR: SBNH-1D6565C
BETA SECTOR: AM-X-CD-16-65-00T
GAMMA SECTOR: SBNH-1D6565C
ON NEW MOUNTING PIPE
(TYP. OF 1 PER SECTOR, TOTAL OF 3)
PROPOSED REPLACE EXISTING ANTENNA MOUNT WITH NEW T-ARM KIT, CCI PART# TA703-1 (OR APPROVED EQUAL)
PROPOSED UMTS ANTENNA
GAMMA SECTOR: SBNH-1D6565C
MOUNTED TO PROPOSED MOUNTING PIPE WITH NEW TMA CCI DTMABP7819VG12A
EXISTING MONOPOLE EXTENSION
PROPOSED GSM/UMTS ANTENNA
ALPHA SECTOR: SBNH-1D6565C
BETA SECTOR: AM-X-CD-16-65-00T
MOUNTED TO PROPOSED MOUNTING PIPE WITH NEW TMA CCI DTMABP7819VG12A TO REPLACE EXISTING
PROPOSED RRH MOUNTED TO NEW 2-3/8" PIPE (TYP. OF 2 PER SECTOR)
ALPHA SECTOR UMTS/GSM 120°
BETA SECTOR LTE 230°
ALPHA SECTOR LTE 120°
PROPOSED SURGE ARRESTOR DC6-48-60-18-8F MOUNTED TO PROPOSED 2-3/8"ø PIPE
BETA SECTOR UMTS/GSM 230°

NOTE:
1. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.
3. PROPOSED RE-ROUTE UMTS AND GSM JUMPERS. MODIFY COLOR CODING AS NECESSARY.

PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.


PROPOSED RRH MOUNTED TO NEW 2-3/8" PIPE (TYP. OF 2 PER SECTOR)
TOP OF MONOPOLE ELEV. 160'-0"± (AGL)
TOP OF PROPOSED AT&T ANTENNAS (LTE) ELEV. 160'-0"± (AGL)
CENTER OF PROPOSED AT&T ANTENNAS (LTE) & (EXISTING UMTS/GSM ANTENNAS) ELEV. 156'-0"± (AGL)
PROPOSED LTE ANTENNA
ALPHA SECTOR: SBNH-1D6565C
BETA SECTOR: AM-X-CD-16-65-00T
GAMMA SECTOR: SBNH-1D6565C
ON NEW MOUNTING PIPE
(TYP. OF 1 PER SECTOR, TOTAL OF 3)
PROPOSED SURGE ARRESTOR DC6-48-60-18-8F MOUNTED TO PROPOSED 2-3/8"ø PIPE
PROPOSED UMTS ANTENNA
GAMMA SECTOR: SBNH-1D6565C
MOUNTED TO PROPOSED MOUNTING PIPE WITH NEW TMA CCI DTMABP7819VG12A
PROPOSED REPLACE EXISTING ANTENNA MOUNT WITH NEW T-ARM KIT, CCI PART# TA703-1 (OR APPROVED EQUAL)
EXISTING ANTENNAS BY OTHERS (TYP.)
EXISTING MONOPOLE
PROPOSED DC POWER & FIBER RUN TO FOLLOW EXISTING COAX ON EXTERIOR ON MONOPOLE
EXISTING EQUIPMENT SHELTER (TYP.)
EXISTING AT&T ICE BRIDGE WITH (8) 1-5/8"ø COAX TO REMAIN
EXISTING AT&T EQUIPMENT SHELTER
PROPOSED LTE GPS ANTENNA MOUNTED TO EXISTING SHELTER (10' MIN. FROM EXISTING GPS ANTENNA)
EXISTING CHAIN LINK FENCE (TYP.)
GROUND LEVEL ELEV. 0'-0"± (AGL)

SOUTH ELEVATION

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

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

Hudson Design Group LLC

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

SITE NUMBER: CT5250
SITE NAME: SOUTHINGTON FLORIANS POND
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SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: DB

STATE OF CONNECTICUT DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

AT&T
ANTENNA LAYOUT AND ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
5250.01	A-2	3

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

Date: **August 17, 2012**

Veronica Harris
Crown Castle USA Inc.
1200 McArthur Blvd
Mahwah, NJ 07430

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

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5250
	Carrier Site Name:	AWE-Southington North
Crown Castle Designation:	**Crown Castle BU Number:**	876334
	Crown Castle Site Name:	SOUTHINGTON, SMORON
	Crown Castle JDE Job Number:	183507
	Crown Castle Work Order Number:	521146
	Crown Castle Application Number:	145048 Rev. 5
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37512-1266 R2
Site Data:	**625 Spring Street, SOUTHINGTON, Hartford County, CT**	
	Latitude *41° 37' 56.86"*, Longitude *-72° 53' 39.28"*	
	160 Foot - Monopole Tower	

Dear Veronica Harris,

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 482442, in accordance with application 145048, revision 5.

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:

LC4.5: Modified Structure w/ Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT Building Code based upon a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

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

Respectfully submitted by:

Corey McCartney, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0

AUG 17 2012

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160-ft Monopole tower designed by SUMMIT in March of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	156.0	4	andrew	SBNH-1D6565C w/ Mount Pipe	1 2	3/8 3/4	-
		3	communication	DTMABP7819VG12A			
		6	ericsson	RRUS-11			
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	T-Arm Mount [TA 703-3]			

Table 2 - Existing 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
156.0	156.0	4	powerwave	LGP21401	8	1-5/8	1
		2	powerwave	7770.00 w/ Mount Pipe	-	-	2
		1	tower mounts	Side Arm Mount [SO 309-3]			
146.0	147.0	6	decibel	DB980H90T2E-M w/ Mount Pipe	6	1-5/8	1
	146.0	1	tower mounts	Platform Mount [LP 601-1]			
139.0	139.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 501-3]			
131.0	133.0	3	antel	BXA-70063/6CFx2 w/ Mount Pipe	18	1-5/8	1
		6	antel	LPA-80080/6CF w/ Mount Pipe			
	132.0	3	antel	BXA-185085/12CFx2 w/ Mount Pipe			
	131.0	1	tower mounts	Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
121.0	122.0	1	andrew	VHLP2-18	3 3* 3*	1/2 1/4 5/16	1
		2	andrew	VHLP800-11			
		1	argus technologies	LLPX310R w/ Mount Pipe			
		3	dragonwave	HORIZON COMPACT			
		1	kathrein	840 10054 w/ Mount Pipe			
		2	samsung	WIMAX DAP HEAD			
	121.0	1	argus technologies	LLPX310R w/ Mount Pipe			
		1	samsung	WIMAX DAP HEAD			
		1	tower mounts	T-Arm Mount [TA 602-3]			
110.0	111.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	7/8	1
	110.0	1	tower mounts	Platform Mount [LP 601-1]			
101.0	101.0	1	symmetricom	58532A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed
* Coax installed inside a 2" conduit

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	SEA, 97421.03G, 12/11/97	1530919	CCISITES
POST-MODIFICATION INSPECTION	PJF, 41709-0146, 01/29/10	2588175	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29298-187, 03/19/98	1999756	CCISITES
TOWER MANUFACTURER DRAWINGS	PJF, 29298-187, 03/19/98	1614569	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, A41709-0146, 01/29/10	2588177	CCISITES
POLE EXTENSION	URS, 300-250, 04/22/02	1801427	CCISITES
TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-1266R1, 06/15/12	3245190	CCISITES
PROPOSED TOWER MODIFICATION DRAWING	PJF, 37512-1266BP, 07/26/12	-	PJF

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.
5) Monopole will be reinforced in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 146.5	Pole	TP16x16x0.375	1	-1.73	515.29	25.5	Pass
L2	146.5 - 146	Pole	TP22x16x0.375	2	-1.73	515.29	25.5	Pass
L3	146 - 103.75	Pole	TP29.808x22x0.25	3	-10.39	1115.06	92.8	Pass
L4	103.75 - 98.5	Pole	TP30.2775x28.615x0.3125	4	-12.16	1446.94	92.9	Pass
L5	98.5 - 68.5	Pole	TP35.819x30.2775x0.4282	5	-17.75	2194.10	95.5	Pass
L6	68.5 - 60.5	Pole	TP36.6722x34.1314x0.4862	6	-21.66	2602.79	95.3	Pass
L7	60.5 - 59.5	Pole	TP36.8569x36.6722x0.5677	7	-21.95	2923.59	86.1	Pass
L8	59.5 - 34	Pole	TP41.568x36.8569x0.617	8	-28.68	3654.46	83.3	Pass
L9	34 - 31.5	Pole	TP41.28x39.4103x0.6127	9	-31.70	3634.48	89.1	Pass
L10	31.5 - 30.5	Pole	TP41.4648x41.28x0.6287	10	-32.89	3712.39	89.2	Pass
L11	30.5 - 14	Pole	TP44.5133x41.4648x0.5971	11	-38.72	3800.57	97.1	Pass
L12	14 - 0	Pole	TP47.1x44.5133x0.5938	12	-43.93	4094.99	97.7	Pass
							Summary	
						Pole (L12)	97.7	Pass
						Rating =	97.7	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	87.6	Pass
1	Base Plate	0	93.4	Pass
1	Base Foundation Steel	0	65.4	Pass
1, 2	Base Foundation Soil Interaction	0	96.1	Pass
1	Flange Connection	146	92.6	Pass

Structure Rating (max from all components) =	97.7%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

4.1) Recommendations

1) See attached proposed modification drawings.

CROWN CASTLE PROJECT: BU #876334; SMORON; SOUTHINGTON, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 80 MPH AND 38 MPH + 1" RADIAL ICE

A. GENERAL NOTES

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

B. "LOW HEAT" WELDING PROCEDURES - (NOT REQUIRED)

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 - (NOT REQUIRED)

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

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

SABRE 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: (704) 405-6618

BU #876334; SMORON
SOUTHINGTON, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1266	ISSUE DATE OF PERMIT: 7-26-2012
DRAWN BY: S.S.	
CHECKED BY: D.S.K.	
APPROVED BY:	S-1B
DATE: 7-26-2012	

D. **STRUCTURAL STEEL**

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

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

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

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

E. **BASE PLATE GROUT**

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

F. **FOUNDATION WORK**

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

G. **CAST-IN-PLACE CONCRETE**

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).
2. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.
3. 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.
4. 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.
5. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL OPENINGS, SLEEVES, ANCHOR RODS, INSERTS, ETC., AS REQUIRED BEFORE CONCRETE IS PLACED.
6. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED.
7. 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.
8. 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.
9. 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.
10. 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.
11. FOOTING BARS SHALL BE BENT 1'-6" AROUND CORNERS, OR PROVIDE CORNER BARS WITH A 2'-0" LAP ON EACH LEG.
12. TESTING LABORATORY SHALL SUBMIT ONE COPY OF ALL CONCRETE TEST REPORTS DIRECTLY TO THE ENGINEER.
13. 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".

SABRE 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: (704) 405-6618

BU #876334; SMORON
SOUTHINGTON, CT
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AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

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

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

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

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

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

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

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

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

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

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

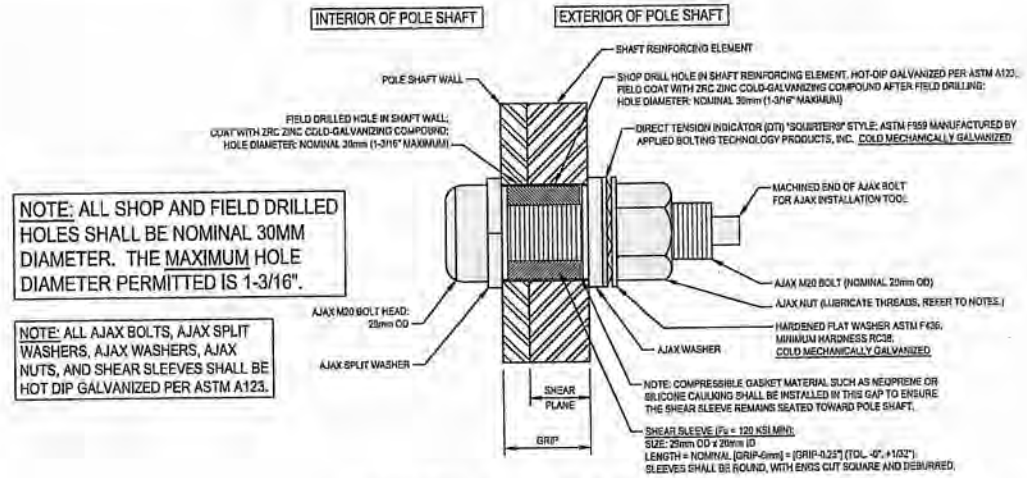
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY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

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

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

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

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



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

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

TYPICAL AJAX BOLT DETAIL 1 / S-3B

SABRE SHAFT REINFORCING OPTION

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37512-1266 PERMIT.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#37512-1266), DATED 7-26-2012.

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON; ROUND
TAPER:	0.184766 IN/FT
SHAFT STEEL:	ASTM A607 GRADE 60, 65; ASTM 53-B GRADE 35
BASE PL STEEL:	ASTM A572 GR. 50 (50 KSI)
ANCHOR RODS:	2 1/4"Ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	14.00	0.3750		16.000	16.000
2	42.25	0.2500	45.00	22.000	29.808
3	39.00	0.3125	54.00	28.613	35.819
4	39.00	0.3750	60.00	34.362	41.568
5	39.00	0.3750		39.694	47.100

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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

NOTES:

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

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

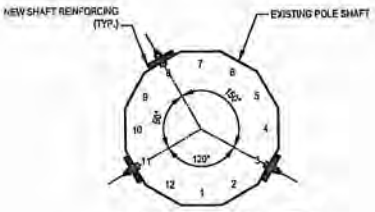
3. * ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. DTI'S REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 35 OR HIGHER.

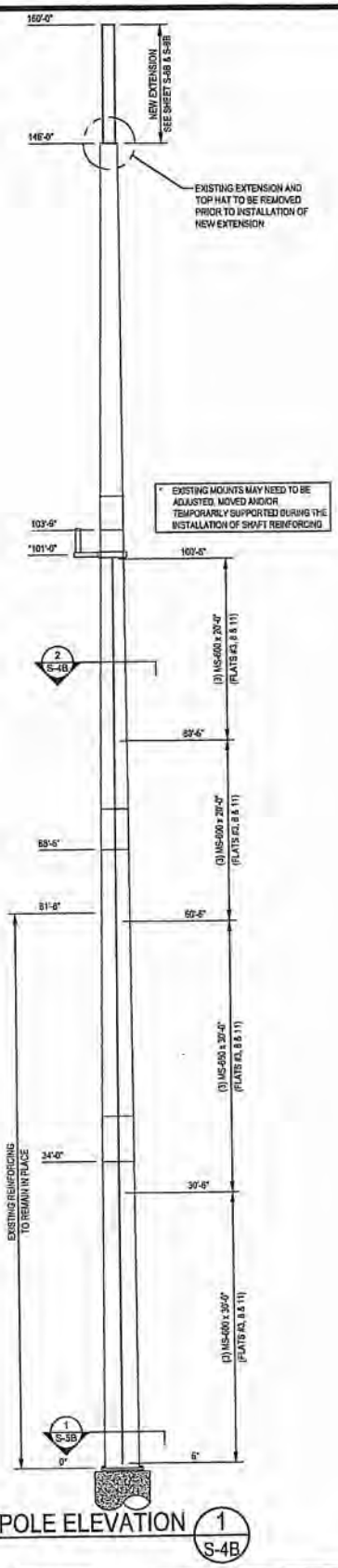
5. NUT LUBRICATION REQUIRED: * PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.

6. AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 33MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* AS OF 5/28/2012, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, INSTALLER SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.



SHAFT PLAN 2 / S-4B



POLE ELEVATION 1 / S-4B

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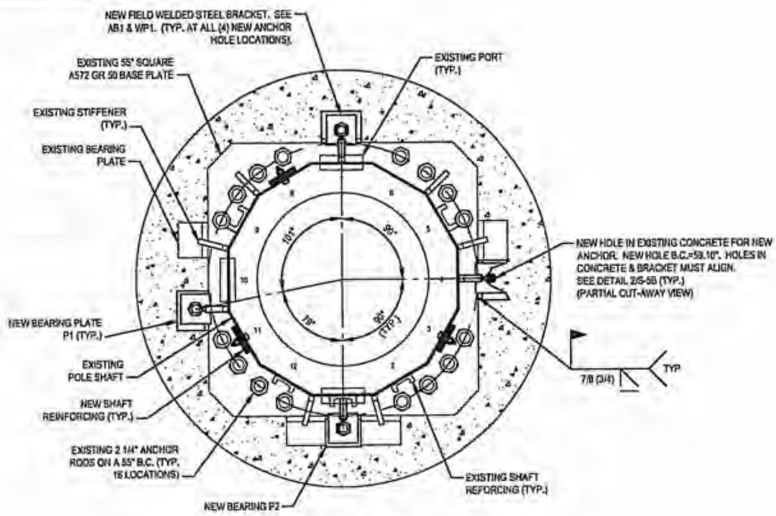
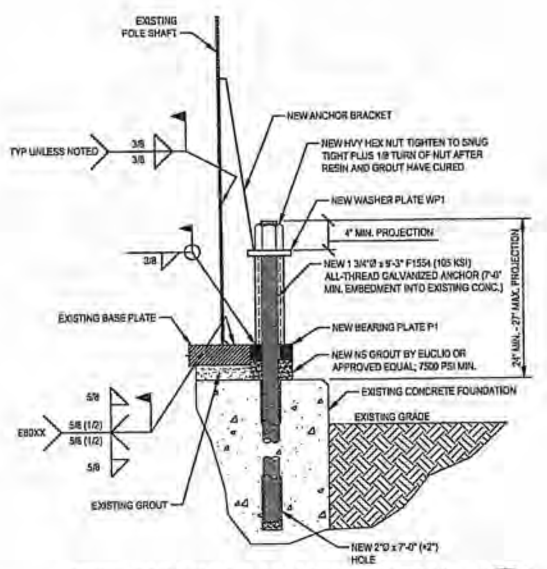
PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL; 7500 PSI MIN.) BELOW NEW BEARING PLATES. GROUT SHALL BE INSTALLED TIGHT UNDER NEW BEARING PLATES WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF NEW BEARING PLATES.


NEW FIELD WELDED STEEL BRACKET. SEE AB1 & WP1. (TYP. AT ALL (4) NEW ANCHOR HOLE LOCATIONS).
EXISTING 55" SQUARE A572 GR 50 BASE PLATE
EXISTING PORT (TYP.)
EXISTING STIFFENER (TYP.)
EXISTING BEARING PLATE
NEW HOLE IN EXISTING CONCRETE FOR NEW ANCHOR. NEW HOLE B.C.=59.10". HOLES IN CONCRETE & BRACKET MUST ALIGN. SEE DETAIL 2/S-5B (TYP.) (PARTIAL CUT-AWAY VIEW)
NEW BEARING PLATE P1 (TYP.)
EXISTING POLE SHAFT
NEW SHAFT REINFORCING (TYP.)
EXISTING 2 1/4" ANCHOR RODS ON A 55" B.C. (TYP. 16 LOCATIONS)
NEW BEARING P2
EXISTING SHAFT REFORCING (TYP.)
7/8 (3/4)
TYP
101°
90°
79°
90° (TYP.)

BASE PLATE 1 / S-5B


EXISTING POLE SHAFT
NEW ANCHOR BRACKET
NEW HVY HEX NUT TIGHTEN TO SNUG TIGHT PLUS 1/8 TURN OF NUT AFTER RESIN AND GROUT HAVE CURED
TYP UNLESS NOTED
3/8
3/8
NEW WASHER PLATE WP1
4" MIN. PROJECTION
3/8
NEW 1 3/4"Ø x 9'-3" F1554 (105 KSI) ALL-THREAD GALVANIZED ANCHOR (7'-0" MIN. EMBEDMENT INTO EXISTING CONC.)
24" MIN. - 27" MAX. PROJECTION
EXISTING BASE PLATE
NEW BEARING PLATE P1
NEW NS GROUT BY EUCLID OR APPROVED EQUAL; 7500 PSI MIN.
EXISTING CONCRETE FOUNDATION
EXISTING GRADE
5/8
E80XX
5/8 (1/2)
5/8 (1/2)
5/8
EXISTING GROUT
NEW 2"Ø x 7'-0" (+2") HOLE

NEW ANCHOR & BRACKET DETAIL 2 / S-5B

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.

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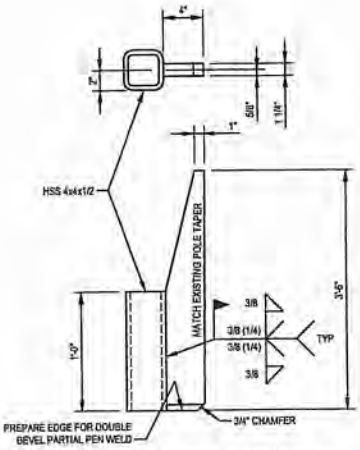
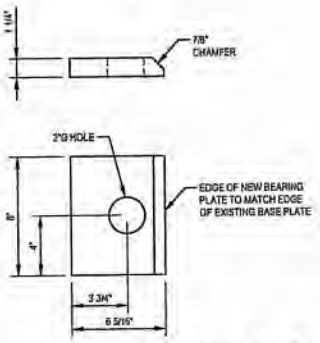


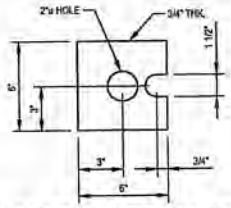
ANCHOR BRACKET MK~AB1

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



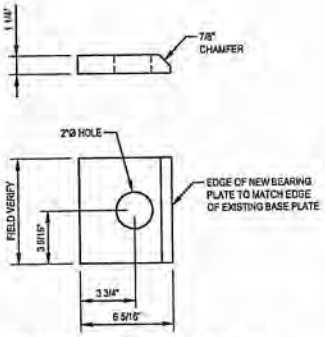
BEARING PLATE MK~P1

(3 REQUIRED) (Fy = 50 KSI)



WASHER PLATE MK~WP1

(4 REQUIRED) (Fy = 50 KSI)



BEARING PLATE MK~P2

(1 REQUIRED) (Fy = 50 KSI)

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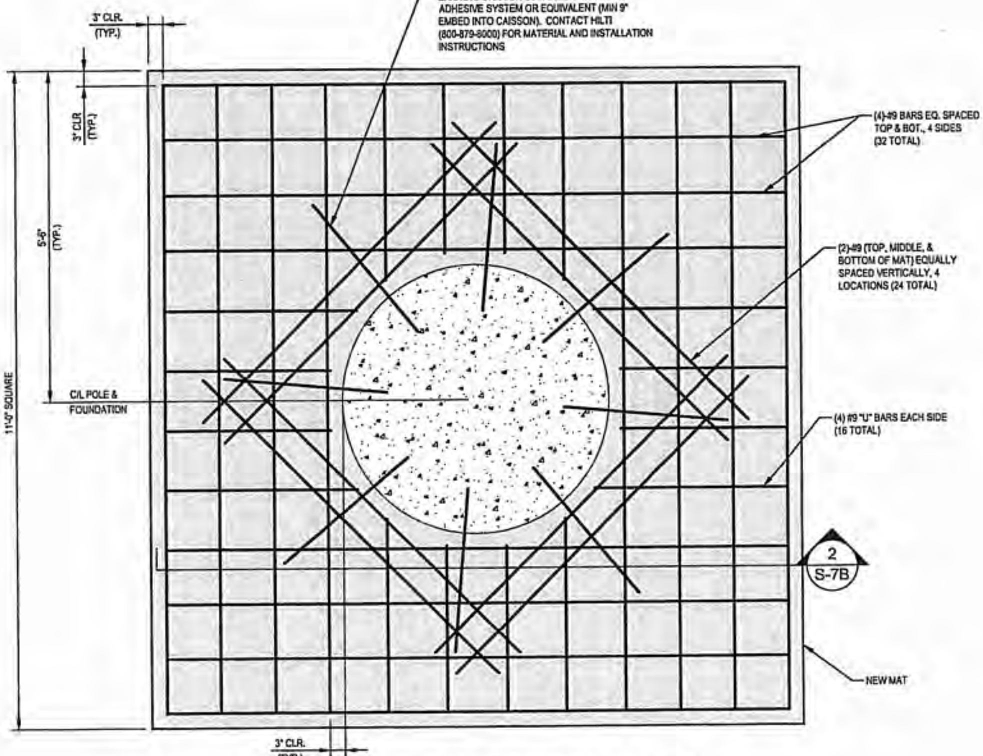
SOUTHINGTON, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

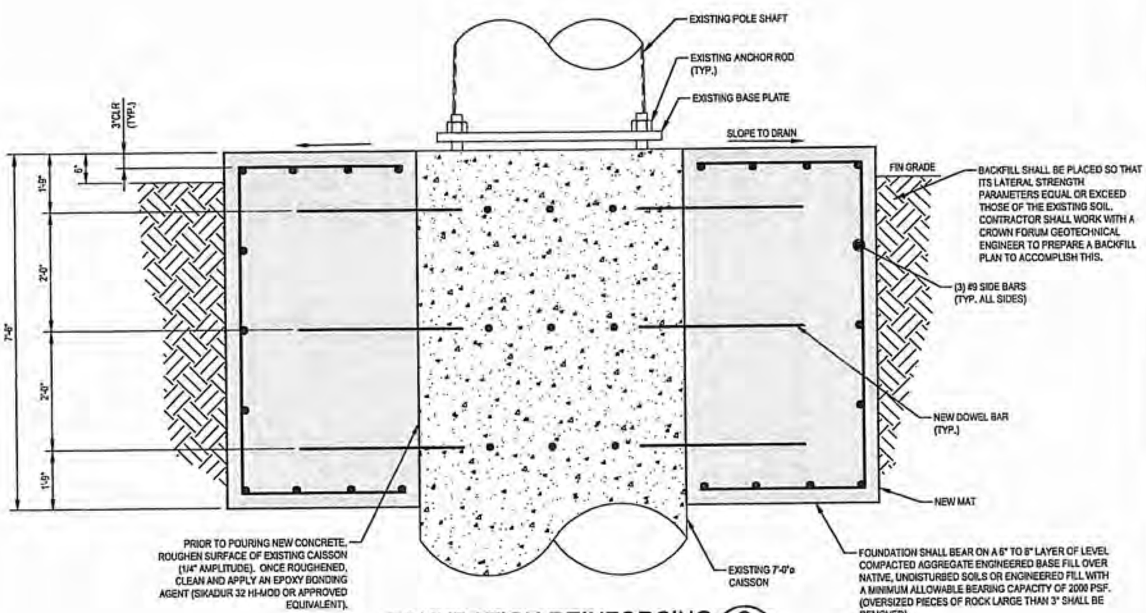
PROJECT No: 37512-1266	ISSUE DATE OF PERMIT: 7-26-2012
DRAWN BY: S.S.	
CHECKED BY: D.S.K.	
APPROVED BY:	S-6B
DATE: 7-26-2012	

37512-1266 PERMIT.DWG



(3) LAYERS OF (8) #9 X 2'-9" BARS DOWELED INTO EXISTING CAISSON USING HILTI HIT RE-500 ADHESIVE SYSTEM OR EQUIVALENT (MIN 9" EMBED INTO CAISSON). CONTACT HILTI (800-879-8000) FOR MATERIAL AND INSTALLATION INSTRUCTIONS
3" CLR. (TYP.)
3" CLR (TYP.)
5'-6" (TYP.)
11'-0" SQUARE
C/L POLE & FOUNDATION
(4)-#9 BARS EQ. SPACED TOP & BOT., 4 SIDES (32 TOTAL)
(2)-#9 (TOP, MIDDLE, & BOTTOM OF MAT) EQUALLY SPACED VERTICALLY, 4 LOCATIONS (24 TOTAL)
(4) #9 "U" BARS EACH SIDE (16 TOTAL)
2
S-7B
NEW MAT
3" CLR. (TYP.)

FOUNDATION REINFORCING PLAN (1 / S-7B)



EXISTING POLE SHAFT
EXISTING ANCHOR ROD (TYP.)
EXISTING BASE PLATE
SLOPE TO DRAIN
3"CLR (TYP.)
6"
1'-6"
2'-0"
2'-0"
1'-6"
7'-6"
FIN GRADE
BACKFILL SHALL BE PLACED SO THAT ITS LATERAL STRENGTH PARAMETERS EQUAL OR EXCEED THOSE OF THE EXISTING SOIL. CONTRACTOR SHALL WORK WITH A CROWN FORUM GEOTECHNICAL ENGINEER TO PREPARE A BACKFILL PLAN TO ACCOMPLISH THIS.
(3) #9 SIDE BARS (TYP. ALL SIDES)
NEW DOWEL BAR (TYP.)
NEW MAT
PRIOR TO POURING NEW CONCRETE, ROUGHEN SURFACE OF EXISTING CAISSON (1/4" AMPLITUDE). ONCE ROUGHENED, CLEAN AND APPLY AN EPOXY BONDING AGENT (SIKADUR 32 HI-MOD OR APPROVED EQUIVALENT).
EXISTING 7'-0"ø CAISSON
FOUNDATION SHALL BEAR ON A 6" TO 8" LAYER OF LEVEL COMPACTED AGGREGATE ENGINEERED BASE FILL OVER NATIVE, UNDISTURBED SOILS OR ENGINEERED FILL WITH A MINIMUM ALLOWABLE BEARING CAPACITY OF 2000 PSF. (OVERSIZED PIECES OF ROCK LARGE THAN 3" SHALL BE REMOVED)

FOUNDATION REINFORCING (2 / S-7B)

SABRE 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: (704) 405-6618

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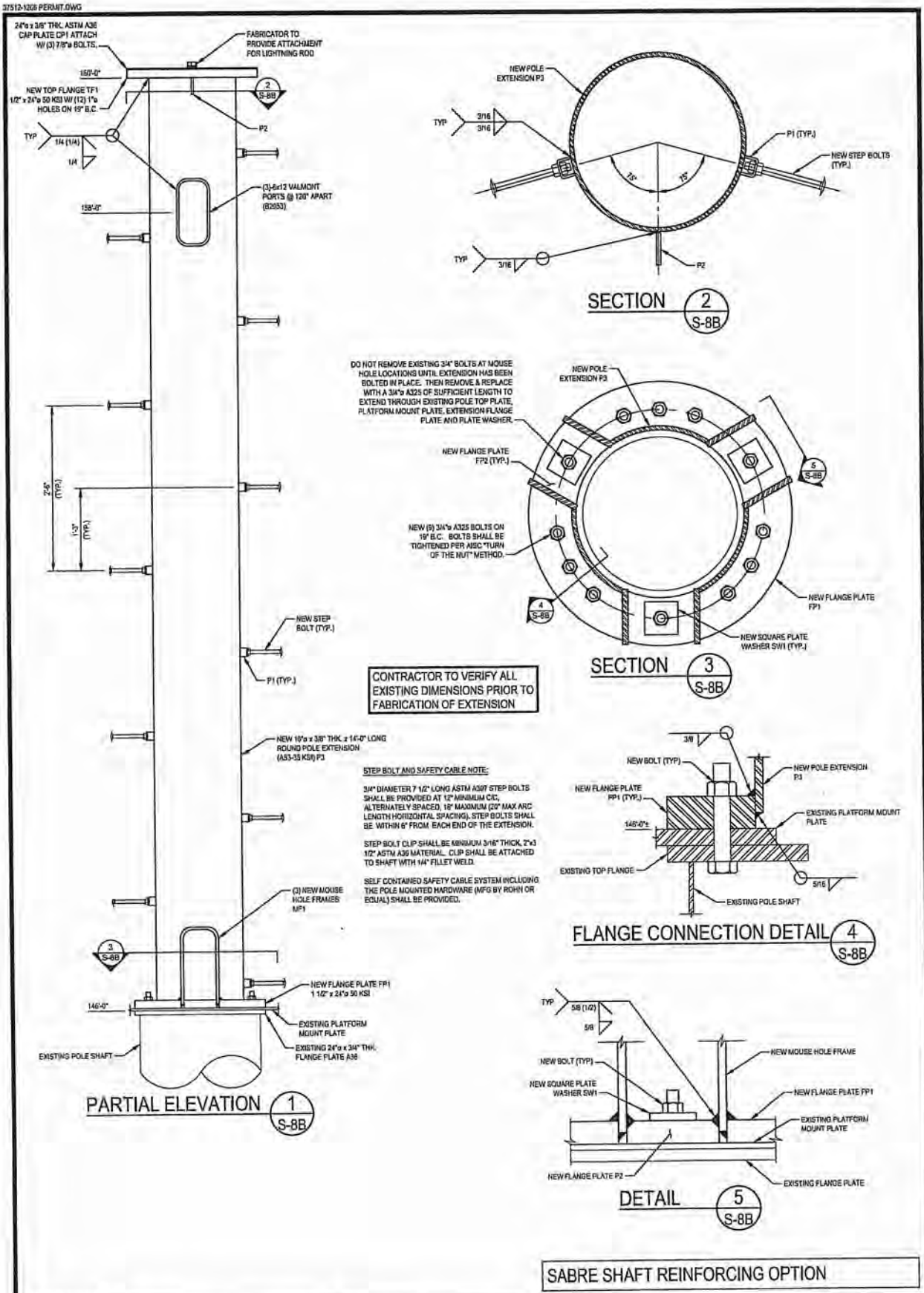

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PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 1200 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300, CHARLOTTE, NC 28277
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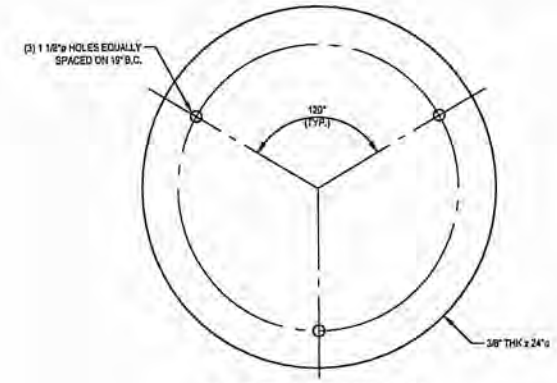
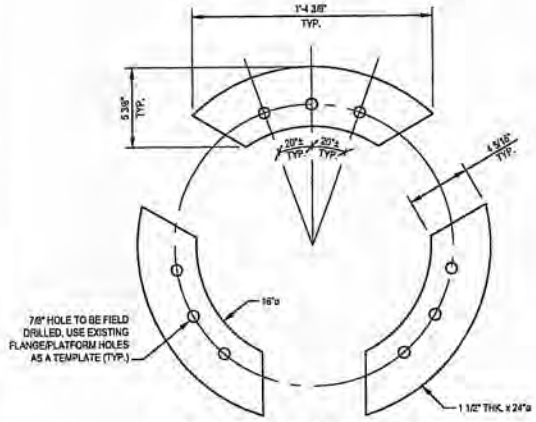
MONOPOLE EXTENSION MATERIAL LIST

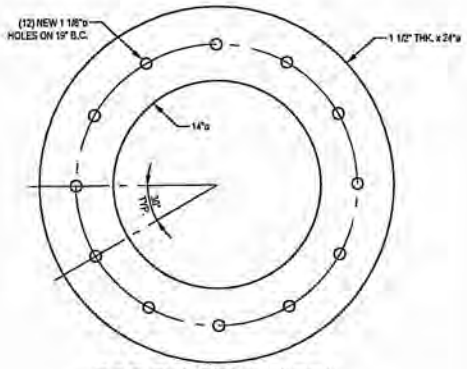
MARK	QTY	MATERIAL	APPROX. LENGTH	STEEL WEIGHT
CP1	1	CAP PLATE 3/8" x 24"ø		49
FP1	1	FLANGE PLATE 1 1/2" x 24"ø		72
FP2	3	FLANGE PLATE 1 1/2" x 4 9/16"±	0'-6"	35
MF1	3	BENT PLATE 1/2 x 5"	2'-5"	71
P1	11	PLATE 3/16" x 1 1/2"	0'-4 5/8"	4
P2	1	PLATE 3/8" x 3"	0'-3"	1
P3	1	EXTENSION PIPE 16"ø x 3/8"	14'-0"	
SW1	3	SQUARE PLATE WASHER 1/2" x 3"	0'-3"	4
TF1	1	TOP FLANGE 1 1/2" x 24"ø		127
	3	VALMONT PORT		
	9	3/4" A325 BOLTS		
	3	1" A325 BOLTS		
	3	MOUSE HOLE		
	11	5/8"ø STEP BOLT	7"	
	22	LOCK WASHERS AND NUTS FOR 5/8"ø BOLTS		
			TOTAL (LBS)	383



CAP PLATE MK-CP1
(1 REQUIRED) (Fy = 50 KSI)



FLANGE PLATE MK-FP1
(1 REQUIRED) (Fy = 50 KSI)



TOP FLANGE MK-TF1
(1 REQUIRED) (Fy = 50 KSI)

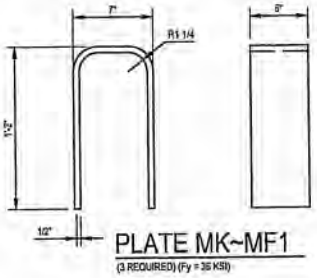


PLATE MK~MF1
(3 REQUIRED) (Fy = 36 KSI)

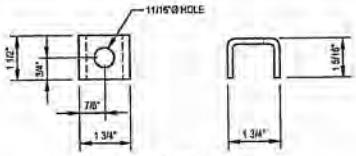


PLATE MK~P1
(11 REQUIRED) (Fy = 36 KSI)

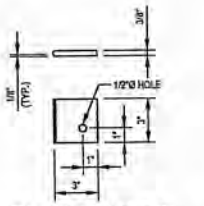
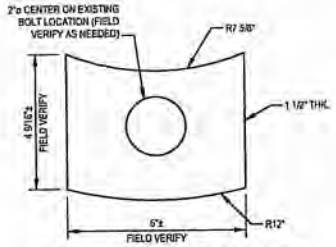
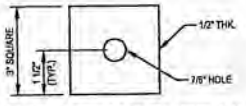


PLATE MK~P2
(1 REQUIRED) (Fy = 36 KSI)



FLANGE PLATE MK-FP2
(3 REQUIRED) (Fy = 50 KSI)



SQUARE PLATE WASHER MK-SW1
(3 REQUIRED) (Fy = 50 KSI)

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MODIFICATION INSPECTION NOTES:

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

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

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SUL-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 (ENG-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 SUSINESS 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.

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
NA	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
X	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC.
X	INSPECTION OF AJAX BOLTS AND DTIS PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

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250 East Broad Street - Suite 1500 - Columbus, Ohio 43215
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C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

at&t

CT5250 – AWE Southington North

625 Spring Street, Southington, CT 06489

August 1, 2012

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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 625 Spring Street, Southington, CT. The coordinates of the tower are 41° 37' 56.86" N, 72° 53' 39.28" W.

AT&T is proposing the following modifications:

1) Replace two dual-band (850/1900 MHz) antennas with six multi-band (700/850/1900/2100) antennas[1]

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.

[1] Existing configuration consists of 2 sectors, 1 antenna per sector. Proposed modifications include adding one panel antenna to each existing sector, and adding a 3rd sector to consist of two antennas.

3. RF Exposure Prediction Methods

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

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

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

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

4. Calculation Results

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

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular GSM	*156*	*1900*	*4*	*625*	*0.0369*	*1.0000*	*3.69%*
Cingular UMTS	*156*	*880*	*1*	*500*	*0.0074*	*0.5867*	*1.26%*
Sprint	146	1960	11	122	0.0226	1.0000	2.26%
Pocket	139	2130	3	631	0.0352	1.0000	3.52%
Verizon	132	869	9	336	0.0624	0.5793	10.77%
Verizon	132	1970	3	352	0.0218	1.0000	2.18%
Verizon	132	757	1	788	0.0163	0.5047	3.22%
Nextel	115	851	9	100	0.0245	0.5673	4.31%
AT&T UMTS	156	880	2	1077	0.0032	0.5867	0.54%
AT&T UMTS	156	1900	2	1556	0.0046	1.0000	0.46%
AT&T LTE	156	734	1	1375	0.0020	0.4893	0.42%
AT&T GSM	156	880	1	538	0.0008	0.5867	0.14%
AT&T GSM	156	1900	4	934	0.0055	1.0000	0.55%
						Total	**28.38%**

Table 1: Carrier Information[2] [3] [4]

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

[3] 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.

[4] Antenna height listed for AT&T is in reference to the Paul J Ford and Company Structural Engineers Structural Analysis Report dated July 26, 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 **28.38% 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

August 1, 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[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)
0.3-3.0	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[6]

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)

[5] 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.

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

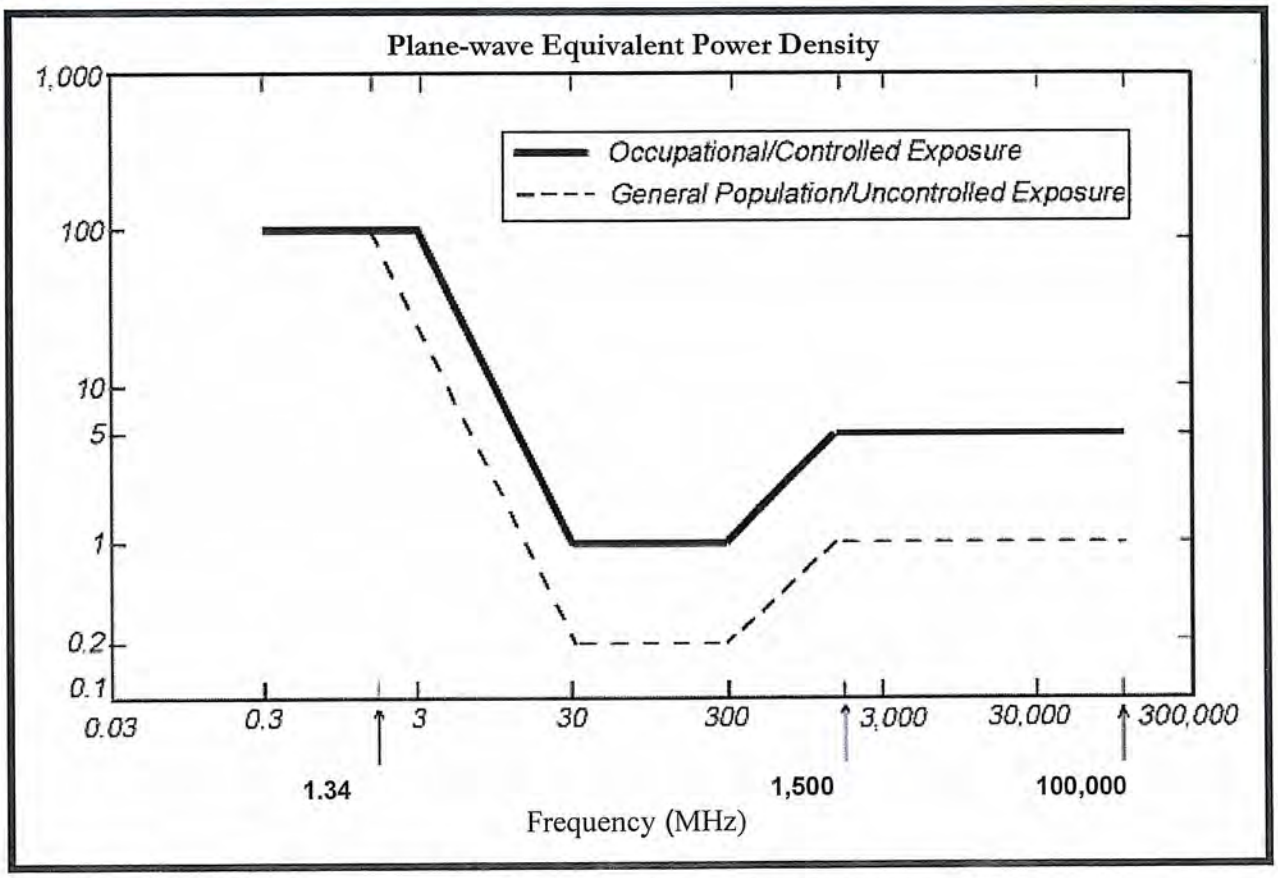
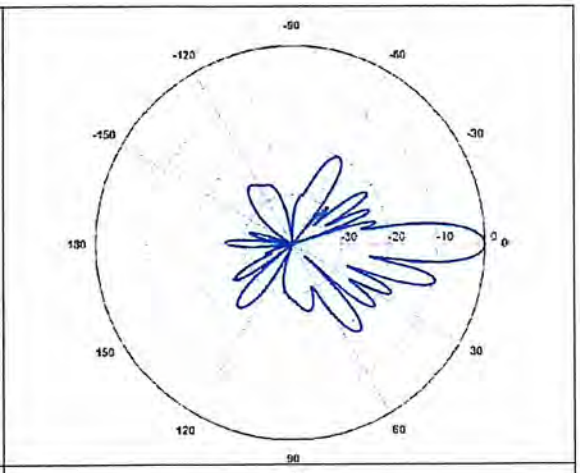


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

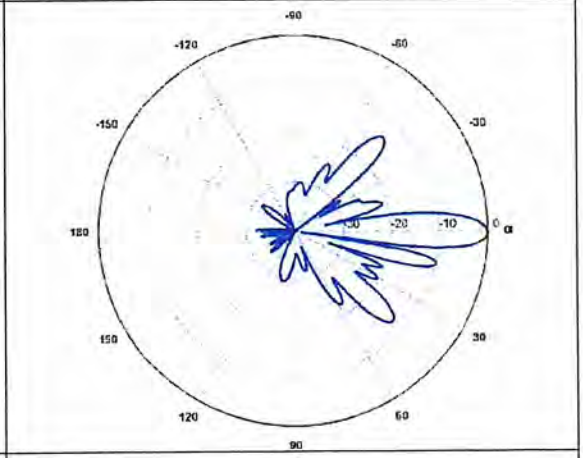
700 MHz

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



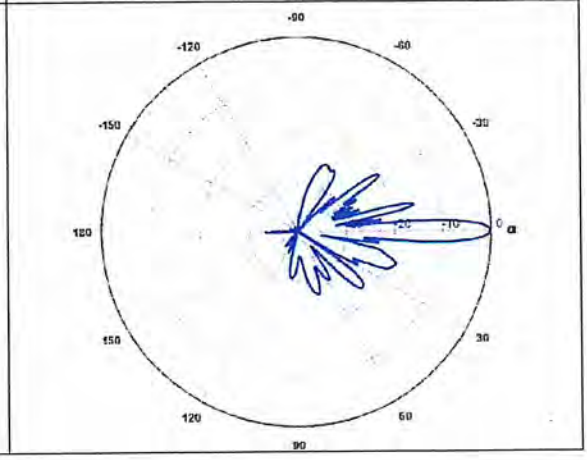
850 MHz

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



1900 MHz

Manufacturer:	Commscope
Model #:	SBNH-1D6565C
Frequency Band:	1850-1990 MHz
Gain:	15.9 dBd
Vertical Beamwidth:	5.1°
Horizontal Beamwidth:	57°
Polarization:	±45°
Size L x W x D:	96.42" x 11.85" x 7.1"



HPC DEVELOPMENT LLC

Vendor Purchase Order Request Form

HPC Proj #7003 T-Mobile CT

Vendor Name:	EBI Consulting		
Requested By:	Ashley Bonavenia	E-Mail:	abonavenia@ebiconsulting.com
Site #:	CTNH622A	Date:	6/11/2012

Phase	Type	Item	Description	Price
001	SAC	100	Candidate Qualification Package	
001	SAC	101	Exhaustion Package	
002	A&E	200	Site Design Visit	
002	A&E	201	Lease Exhibits	
002	LEG	202	40-Year Title Report	
002	ENV	203	Phase I Environmental Site Assessment	
002	ENV	204	Phase II Environmental Site Assessment	
002	ENV	205	NEPA (including SHPO)*	1300*
002	A&E	206	Structural Letter	
003	SAC	300	Lease Fully Executed	
003	LEG	310	Lease Negotiation & Construction Handoff	
003	LEG	311	Lease Amendment	
003	LEG	312	Misc Document	
004	A&E	400	Zoning Drawings	
004	A&E	401	Boundary Survey (up to 2 acres)	
004	A&E	402	2C Survey	
004	ENV	410	FAA 7460-1 filing	
004	ENV	420	Health & Safety Report	
004	ENV	421	MPE Report	
004	ENV	422	Intermodulation Report	
004	A&E	430	Photo Simulations (each)	
004	A&E	440	Hearing Attendance	
004	A&E	450	Construction Drawings	
004	ENV	463	Phase 1 Update	
004	ENV	464	SHPO Update	
006	A&E	600	As-Built Construction Drawings	

Other (1)	*Tribal Consultation Fees are not included and TBD	
Other (2)		
Other (3)		
Other (4)		
Other (5)		

Total $ -

Justification for "Other" items: