Exhibit – 2

General Power Density Table – (RF Emissions Analysis Report)

(Insert MPE Certification – FST Task 37.5)

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT03XC064

Weston Square
92 Weston Street
Hartford, CT 06120

December 9, 2012

21 B Street Burlington, MA 01803 Tel: (781) 273.2500 Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

December 9, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT03XC064 – Weston Square**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 92 Weston Street, Hartford, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 92 Weston Street, Hartford, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 9 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **110 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC064 - Weston Square
Site Addresss	92 Weston Street, Hartford, CT, 06120
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	9	180	15.9	110	104	1/2 "	0.5	0	6241.2633	207.4492	20.74492%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	110	104	1/2 "	0.5	0	389.96892	12.96192	2.28605%
														Sector total Power Density Value:		23.031%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	9	180	15.9	110	104	1/2 "	0.5	0	6241.2633	207.4492	20.74492%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	110	104	1/2 "	0.5	0	389.96892	12.96192	2.28605%
														Sector total Power Density Value:		23.031%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	9	180	15.9	110	104	1/2 "	0.5	0	6241.2633	207.4492	20.74492%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	110	104	1/2 "	0.5	0	389.96892	12.96192	2.28605%
														Sector total Power Density Value:		23.031%	

Site Composite MPE %

Carrier	MPE %
Sprint	69.093%
AT&T	5.950%
T-Mobile	16.010%
Total Site MPE %	**91.053%**

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **69.093% (23.031from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **91.053%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Exhibit – 3

Structural Modification Report

(Insert SA– FST Task 9.8)

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

Date: **February 26, 2013**

Steve Tuttle
Crown Castle USA Inc.
8 Parkmeadow Drive
Pittsford, NY 14534

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:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC064
	Carrier Site Name:	CT03XC064
Crown Castle Designation:	**Crown Castle BU Number:**	876325
	Crown Castle Site Name:	WESTON SQUARE
	Crown Castle JDE Job Number:	190520
	Crown Castle Work Order Number:	580891
	Crown Castle Application Number:	165357 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-0620
Site Data:	**92 Weston Street, Hartford, Hartford County, CT**	
	Latitude *41° 47' 12.3"*, Longitude *-72° 39' 44.42"*	
	110 Foot - Monopole Tower	

Dear Steve Tuttle,

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 525016, in accordance with application 165357, revision 1.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

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

Respectfully submitted by:

Corey McCartney, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0

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

FEB 2 7 2013

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

Date: **February 26, 2013**

Steve Tuttle
Crown Castle USA Inc.
8 Parkmeadow Drive
Pittsford, NY 14534

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250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
cmccartney@pjfweb.com

Subject: Structural Modification Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC064
	Carrier Site Name:	CT03XC064
Crown Castle Designation:	**Crown Castle BU Number:**	876325
	Crown Castle Site Name:	WESTON SQUARE
	Crown Castle JDE Job Number:	190520
	Crown Castle Work Order Number:	580891
	Crown Castle Application Number:	165357 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-0620
Site Data:	**92 Weston Street, Hartford, Hartford County, CT** **Latitude *41° 47' 12.3"*, Longitude *-72° 39' 44.42"*** **110 Foot - Monopole Tower**	

Dear Steve Tuttle,

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Corey McCartney, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0

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1) INTRODUCTION

This tower is a 110-ft Monopole tower designed by ROHN in October of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

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
107.0	108.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	-
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
105.0	106.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER W/Mount pipes	-	-	-
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz w/Mount Pipe			
	105.0	1	tower mounts	Side Arm Mount [SO 102-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	108.0	2	andrew	UMWD-06517-XDH w/ Mount Pipe	6	1-5/8	3
		2	decibel	DB950G40E-M w/ Mount Pipe			
	107.0	1	tower mounts	Platform Mount [LP 502-1]	-	-	1
89.0	90.0	6	ericsson	RRUS-11	-	-	2
		3	kmw	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave	7750.00 w/ Mount Pipe	1	3/8	1
		6	powerwave	LGP21401	2	3/4	
		6	powerwave	LGP21903	12	1-5/8	
	89.0	1	raycap	DC6-48-60-18-8F	-	-	2
		1	tower mounts	Side Arm Mount [SO 102-3]			
		1	tower mounts	Platform Mount [LP 502-1]	-	-	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
80.0	81.0	6	andrew	E15S09P94	6 4	7/8 1-1/4	3
		6	rfs celwave	APX16DWV-16DWV-S -E-ACU w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	80.0	1	tower mounts	Platform Mount [LP 305-1]	12	1-1/4	1

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	FDH, 07-11432G, 01/24/08	2192540	CCISITES
POST-MODIFICATION INSPECTION	TEP, 060671, 06/28/06	1956491	CCISITES
POST-MODIFICATION INSPECTION	B&T, 79760, 11/24/09	2561266	CCISITES
POST-MODIFICATION INSPECTION	TEP, 126558, 10/22/12	3355603	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 10/18/96	1615433	CCISITES
TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 10/17/96	1615400	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B&T, 79760, 11/24/09	2356066	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 126558, 10/22/12	3187227	CCISITES
TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-1239 R1, 10/30/12	3361707	CCISITES
PROPOSED TOWER MODIFICATION DRAWINGS	PJF, 37513-0620, 02/26/13	-	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) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 105% or less, then the existing flange plates are at a usage capacity of 105% or less and no additional analysis of the flange plate is required.
5) Monopole was reinforced in conformance with the referenced modification drawings.
6) Monopole will be reinforced in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	110 - 90	Pole	P24x1/4	1	-3.30	589.19	27.2	Pass
L2	90 - 60	Pole	P24x3/8	2	-10.70	934.94	85.8	Pass
L3	60 - 39.5	Pole	30" x 0.375"	3	-13.78	1166.57	99.3	Pass
L4	39.5 - 30	Pole	RPS 30" x 0.483"	4	-15.53	1359.81	93.1	Pass
L5	30 - 17.75	Pole	P30x1/2	5	-18.25	1556.58	99.1	Pass
L6	17.75 - 8.25	Pole	RPS 30" x 0.63844"	6	-20.49	1807.27	98.4	Pass
L7	8.25 - 0	Pole	RPS 30" x 0.801"	7	-22.85	2467.02	80.9	Pass
							Summary	
						Pole (L3)	99.3	Pass
						Rating =	99.3	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 3	Anchor Rods	0	97.6	Pass
1	Base Plate	0	73.1	Pass
1	Base Foundation Steel	0	98.3	Pass
1, 2	Base Foundation Soil Interaction	0	24.7	Pass
1, 4	Flange Connection	90	14.1	Pass
1, 4	Flange Connection	60	84.9	Pass
1	Flange Connection	30	92.1	Pass

Structure Rating (max from all components) =	99.3%

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.
3) Worst case scenario between existing and post installed anchors.
4) See assumptions #4.

4.1) Recommendations

1) See attached modification drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

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

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
√ Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
√ Autocalc Torque Arm Areas
SR Members Have Cut Ends
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing

√ Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feedline Torque
Include Angle Block Shear Check

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	110.0000-90.0000	20.0000	P24x1/4	A53-B-42 (42 ksi)	5.00
L2	85.0000-55.0000	30.0000	P24x3/8	A53-B-42 (42 ksi)	5.00
L3	55.0000-34.5000	20.5000	30" x 0.375"	A53-B-42 (42 ksi)	5.00
L4	34.5000-25.0000	9.5000	RPS 30" x 0.483"	Reinf 37.96 ksi (38 ksi)	5.00
L5	25.0000-12.7500	12.2500	P30x1/2	A53-B-42 (42 ksi)	5.00
L6	12.7500-3.2500	9.5000	RPS 30" x 0.63844"	Reinf 38.37 ksi (38 ksi)	5.00
L7	3.2500-5.0000	8.2500	RPS 30" x 0.801"	Reinf 41.98 ksi (42 ksi)	

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	89.0000 - 0.0000	1	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	107.0000 - 89.0000	1	No Ice	0.1540	1.08
						1/2" Ice	0.2540	2.33
						1" Ice	0.3540	4.18
						2" Ice	0.5540	9.73
						4" Ice	0.9540	28.15
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	2	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
***								
WR-VG86ST-BRD (3/4")	B	No	Inside Pole	89.0000 - 0.0000	2	No Ice	0.0000	0.88
						1/2" Ice	0.0000	0.88
						1" Ice	0.0000	0.88
						2" Ice	0.0000	0.88
						4" Ice	0.0000	0.88
LDF2-50A (3/8 FOAM)	B	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.08
						1" Ice	0.0000	0.08
						2" Ice	0.0000	0.08
						4" Ice	0.0000	0.08
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	89.0000 - 0.0000	9	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	40.5000 - 30.5000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	89.0000 - 40.5000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
1-5/8 FOAM	B	No	CaAa (Out Of Face)	89.0000 - 0.0000	2	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
***								
AVA7-50(1-5/8")	C	No	CaAa (Out Of Face)	80.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.36
						2" Ice	0.0000	10.44
						4" Ice	0.0000	29.94
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	80.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
***								
Aero MP3-03	C	No	CaAa (Out Of Face)	40.5000 - 30.5000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.7069	0.00
						4" Ice	1.1514	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	10.5000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	20.5000 - 10.5000	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

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	110.0000-90.0000	A	0.000	0.000	0.000	2.618	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	90.0000-60.0000	A	0.000	0.000	0.000	0.154	0.10
		B	0.000	0.000	0.000	5.742	0.34
		C	0.000	0.000	0.000	0.000	0.17
L3	60.0000-39.5000	A	0.000	0.000	0.000	0.000	0.07
		B	0.000	0.000	0.000	3.861	0.24
		C	0.000	0.000	0.000	0.262	0.18
L4	39.5000-30.0000	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.099	0.10
		C	0.000	0.000	0.000	2.362	0.08
L5	30.0000-17.7500	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.426	0.14
		C	0.000	0.000	0.000	0.458	0.11
L6	17.7500-8.2500	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	1.881	0.11
		C	0.000	0.000	0.000	1.991	0.08
L7	8.2500-0.0000	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	1.634	0.10
		C	0.000	0.000	0.000	2.869	0.07

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	110.0000-90.0000	A	1.142	0.000	0.000	0.000	6.502	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	90.0000-60.0000	A	1.104	0.000	0.000	0.000	0.375	0.43
		B		0.000	0.000	0.000	12.142	0.71
		C		0.000	0.000	0.000	0.000	0.26
L3	60.0000-39.5000	A	1.050	0.000	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	7.958	0.48
		C		0.000	0.000	0.000	0.496	0.26
L4	39.5000-30.0000	A	1.006	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	0.200	0.22
		C		0.000	0.000	0.000	4.375	0.12
L5	30.0000-17.7500	A	1.000	0.000	0.000	0.000	0.000	0.15
		B		0.000	0.000	0.000	4.876	0.28
		C		0.000	0.000	0.000	1.069	0.15
L6	17.7500-8.2500	A	1.000	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	3.781	0.21
		C		0.000	0.000	0.000	4.297	0.12
L7	8.2500-0.0000	A	1.000	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	3.284	0.19
		C		0.000	0.000	0.000	5.417	0.10

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	110.0000-90.0000	0.0000	-0.1843	0.0000	-0.3877
L2	90.0000-60.0000	0.2264	0.1237	0.4043	0.2190
L3	60.0000-39.5000	0.2111	0.1396	0.3829	0.2504
L4	39.5000-30.0000	-0.2804	0.1761	-0.4532	0.2867
L5	30.0000-17.7500	0.1907	0.1614	0.3201	0.2887
L6	17.7500-8.2500	-0.0129	0.2628	-0.0501	0.4533
L7	8.2500-0.0000	-0.1597	0.3360	-0.2256	0.5314

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	107.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	107.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	107.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
IBC1900HG-2A	A	From Face	4.0000 0.00 1.00	0.00	107.0000	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 Face	4.0000 0.00 1.00	0.00	107.0000	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 Face	4.0000 0.00 1.00	0.00	107.0000	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	A	From Face	4.0000 0.00 1.00	0.00	107.0000	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 Face	4.0000 0.00 1.00	0.00	107.0000	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

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
IBC1900BB-1	C	From Face	4.0000	0.00	107.0000	No Ice	1.1270	0.5329	0.02
			0.00			1/2"	1.2726	0.6471	0.03
			1.00			Ice	1.4269	0.7699	0.04
						1" Ice	1.7613	1.0415	0.06
						2" Ice	2.5339	1.6883	0.15
						4" Ice			
(3) 4'x2" Pipe Mount	A	From Face	4.0000	0.00	107.0000	No Ice	0.7852	0.7852	0.03
			0.00			1/2"	1.0284	1.0284	0.03
			0.00			Ice	1.2809	1.2809	0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.16
						4" Ice			
(3) 4'x2" Pipe Mount	B	From Face	4.0000	0.00	107.0000	No Ice	0.7852	0.7852	0.03
			0.00			1/2"	1.0284	1.0284	0.03
			0.00			Ice	1.2809	1.2809	0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.16
						4" Ice			
(3) 4'x2" Pipe Mount	C	From Face	4.0000	0.00	107.0000	No Ice	0.7852	0.7852	0.03
			0.00			1/2"	1.0284	1.0284	0.03
			0.00			Ice	1.2809	1.2809	0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.16
						4" Ice			
Platform Mount [LP 502-1]	C	None		0.00	107.0000	No Ice	30.0000	30.0000	0.93
						1/2"	44.0000	44.0000	1.19
						Ice	58.9882	58.9882	1.46
						1" Ice	85.6292	85.6292	2.00
						2" Ice	138.9112	138.9112	3.07
						4" Ice			
****									
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	A	From Face	2.0000	0.00	105.0000	No Ice	3.1217	3.4768	0.07
			0.00			1/2"	3.4775	3.9581	0.11
			1.00			Ice	3.8464	4.4572	0.15
						1" Ice	4.6232	5.5092	0.24
						2" Ice	6.4022	7.9717	0.51
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	B	From Face	2.0000	0.00	105.0000	No Ice	3.1217	3.4768	0.07
			0.00			1/2"	3.4775	3.9581	0.11
			1.00			Ice	3.8464	4.4572	0.15
						1" Ice	4.6232	5.5092	0.24
						2" Ice	6.4022	7.9717	0.51
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	C	From Face	2.0000	0.00	105.0000	No Ice	3.1217	3.4768	0.07
			0.00			1/2"	3.4775	3.9581	0.11
			1.00			Ice	3.8464	4.4572	0.15
						1" Ice	4.6232	5.5092	0.24
						2" Ice	6.4022	7.9717	0.51
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	A	From Face	2.0000	0.00	105.0000	No Ice	2.7148	2.8803	0.08
			0.00			1/2"	3.0250	3.2839	0.10
			1.00			Ice	3.3485	3.7054	0.14
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	B	From Face	2.0000	0.00	105.0000	No Ice	2.7148	2.8803	0.08
			0.00			1/2"	3.0250	3.2839	0.10
			1.00			Ice	3.3485	3.7054	0.14
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	C	From Face	2.0000	0.00	105.0000	No Ice	2.7148	2.8803	0.08
			0.00			1/2"	3.0250	3.2839	0.10
			1.00			Ice	3.3485	3.7054	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	105.0000	No Ice	3.0000	3.0000	0.08
						1/2" Ice	3.4800	3.4800	0.11
						1" Ice	3.9600	3.9600	0.14
						2" Ice	4.9200	4.9200	0.20
						4" Ice	6.8400	6.8400	0.32
****									
(2) RRUS-11	A	From Face	4.0000	0.00	89.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			1.00			1" Ice	3.7411	1.7380	0.09
						2" Ice	4.2682	2.1381	0.15
						4" Ice	5.4260	3.0418	0.31
(2) RRUS-11	B	From Face	4.0000	0.00	89.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			1.00			1" Ice	3.7411	1.7380	0.09
						2" Ice	4.2682	2.1381	0.15
						4" Ice	5.4260	3.0418	0.31
(2) RRUS-11	C	From Face	4.0000	0.00	89.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2" Ice	3.4905	1.5510	0.07
			1.00			1" Ice	3.7411	1.7380	0.09
						2" Ice	4.2682	2.1381	0.15
						4" Ice	5.4260	3.0418	0.31
Side Arm Mount [SO 102-3]	C	None		0.00	89.0000	No Ice	3.0000	3.0000	0.08
						1/2" Ice	3.4800	3.4800	0.11
						1" Ice	3.9600	3.9600	0.14
						2" Ice	4.9200	4.9200	0.20
						4" Ice	6.8400	6.8400	0.32
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.0000	0.00	89.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2" Ice	9.1490	7.4790	0.14
			1.00			1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.0000	0.00	89.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2" Ice	9.1490	7.4790	0.14
			1.00			1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.0000	0.00	89.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2" Ice	9.1490	7.4790	0.14
			1.00			1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
DC6-48-60-18-8F	A	From Face	4.0000	0.00	89.0000	No Ice	1.4667	1.4667	0.02
			0.00			1/2" Ice	1.6667	1.6667	0.04
			1.00			1" Ice	1.8778	1.8778	0.06
						2" Ice	2.3333	2.3333	0.11
						4" Ice	3.3778	3.3778	0.24
(2) 7750.00 w/ Mount Pipe	A	From Face	4.0000	0.00	89.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2" Ice	6.6258	5.0137	0.10
			1.00			1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
(2) 7750.00 w/ Mount Pipe	B	From Face	4.0000	0.00	89.0000	No Ice	6.1194	4.2543	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	6.6258	5.0137	0.10
			1.00			Ice	7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(2) 7750.00 w/ Mount Pipe	C	From Face	4.0000	0.00	89.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2"	6.6258	5.0137	0.10
			1.00			Ice	7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(2) LGP21401	A	From Face	4.0000	0.00	89.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2"	1.4453	0.3134	0.02
			1.00			Ice	1.6112	0.4028	0.03
						1" Ice	1.9690	0.6076	0.05
						2" Ice	2.7882	1.1210	0.14
						4" Ice			
(2) LGP21401	B	From Face	4.0000	0.00	89.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2"	1.4453	0.3134	0.02
			1.00			Ice	1.6112	0.4028	0.03
						1" Ice	1.9690	0.6076	0.05
						2" Ice	2.7882	1.1210	0.14
						4" Ice			
(2) LGP21401	C	From Face	4.0000	0.00	89.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2"	1.4453	0.3134	0.02
			1.00			Ice	1.6112	0.4028	0.03
						1" Ice	1.9690	0.6076	0.05
						2" Ice	2.7882	1.1210	0.14
						4" Ice			
(2) LGP21903	A	From Face	4.0000	0.00	89.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2"	0.3432	0.2483	0.01
			1.00			Ice	0.4255	0.3216	0.02
						1" Ice	0.6160	0.4940	0.03
						2" Ice	1.1009	0.9425	0.07
						4" Ice			
(2) LGP21903	B	From Face	4.0000	0.00	89.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2"	0.3432	0.2483	0.01
			1.00			Ice	0.4255	0.3216	0.02
						1" Ice	0.6160	0.4940	0.03
						2" Ice	1.1009	0.9425	0.07
						4" Ice			
(2) LGP21903	C	From Face	4.0000	0.00	89.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2"	0.3432	0.2483	0.01
			1.00			Ice	0.4255	0.3216	0.02
						1" Ice	0.6160	0.4940	0.03
						2" Ice	1.1009	0.9425	0.07
						4" Ice			
6'x2" Pipe Mount	A	From Face	4.0000	0.00	89.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			
6'x2" Pipe Mount	B	From Face	4.0000	0.00	89.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			
6'x2" Pipe Mount	C	From Face	4.0000	0.00	89.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 502-1]	C	None		0.00	89.0000	No Ice	30.0000	30.0000	0.93
						1/2" Ice	44.0000	44.0000	1.19
						1" Ice	58.9882	58.9882	1.46
						2" Ice	85.6292	85.6292	2.00
						4" Ice	138.9112	138.9112	3.07
****									
6'x2" Pipe Mount	A	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2" Ice	1.8025	1.8025	0.08
			0.00			1" Ice	2.1698	2.1698	0.09
						2" Ice	2.9321	2.9321	0.13
						4" Ice	4.5679	4.5679	0.27
6'x2" Pipe Mount	B	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2" Ice	1.8025	1.8025	0.08
			0.00			1" Ice	2.1698	2.1698	0.09
						2" Ice	2.9321	2.9321	0.13
						4" Ice	4.5679	4.5679	0.27
6'x2" Pipe Mount	C	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2" Ice	1.8025	1.8025	0.08
			0.00			1" Ice	2.1698	2.1698	0.09
						2" Ice	2.9321	2.9321	0.13
						4" Ice	4.5679	4.5679	0.27
Platform Mount [LP 305-1]	C	None		0.00	80.0000	No Ice	18.0100	18.0100	1.12
						1/2" Ice	23.3300	23.3300	1.35
						1" Ice	28.6500	28.6500	1.58
						2" Ice	39.2900	39.2900	2.05
						4" Ice	60.5700	60.5700	2.97
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						2" Ice	8.9261	8.8640	0.38
						4" Ice	11.1755	12.2932	0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2" Ice	7.3471	6.4800	0.17
			1.00			1" Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38

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	11.1755	12.2932	0.81
						4" Ice			
KRY 112 144/1	A	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	B	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	C	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
****									
Bridge Stiffener (72" x 11" x 1.25")	C	None		0.00	30.0000	No Ice	1.2500	7.7000	0.35
						1/2"	1.9344	8.2423	0.38
						Ice	2.6312	8.7932	0.42
						1" Ice	3.6599	9.9210	0.51
						2" Ice	5.5091	12.2802	0.77
						4" Ice			

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 110.0000-90.0000	100.0000	1.373	22.49	40.000	A	0.000	40.000	40.000	100.00	0.000	2.618
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L2 90.0000-60.0000	75.0000	1.264	20.72	60.000	A	0.000	60.000	60.000	100.00	0.000	0.154
					B	0.000	60.000		100.00	0.000	5.742
					C	0.000	60.000		100.00	0.000	0.000
L3 60.0000-39.5000	49.7500	1.124	18.42	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
					B	0.000	51.250		100.00	0.000	3.861
					C	0.000	51.250		100.00	0.000	0.262
L4 39.5000-30.0000	34.7500	1.015	16.63	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	0.099
					C	0.000	23.750		100.00	0.000	2.362
L5 30.0000-17.7500	23.8750	1	16.38	30.625	A	0.000	30.625	30.625	100.00	0.000	0.000
					B	0.000	30.625		100.00	0.000	2.426
					C	0.000	30.625		100.00	0.000	0.458
L6 17.7500-8.2500	13.0000	1	16.38	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	1.881
					C	0.000	23.750		100.00	0.000	1.991
L7 8.2500-0.0000	4.1250	1	16.38	20.625	A	0.000	20.625	20.625	100.00	0.000	0.000
					B	0.000	20.625		100.00	0.000	1.634
					C	0.000	20.625		100.00	0.000	2.869

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.0000-90.0000	100.0000	1.373	4.97	1.1423	43.808	A	0.000	43.808	43.808	100.00	0.000	6.502
						B	0.000	43.808		100.00	0.000	0.000
						C	0.000	43.808		100.00	0.000	0.000
L2 90.0000-60.0000	75.0000	1.264	4.58	1.1035	65.518	A	0.000	65.518	65.518	100.00	0.000	0.375
						B	0.000	65.518		100.00	0.000	12.142
						C	0.000	65.518		100.00	0.000	0.000
L3 60.0000-39.5000	49.7500	1.124	4.07	1.0505	54.839	A	0.000	54.839	54.839	100.00	0.000	0.000
						B	0.000	54.839		100.00	0.000	7.958
						C	0.000	54.839		100.00	0.000	0.496
L4 39.5000-30.0000	34.7500	1.015	3.67	1.0062	25.343	A	0.000	25.343	25.343	100.00	0.000	0.000
						B	0.000	25.343		100.00	0.000	0.200
						C	0.000	25.343		100.00	0.000	4.375
L5 30.0000-17.7500	23.8750	1	3.62	1.0000	32.667	A	0.000	32.667	32.667	100.00	0.000	0.000
						B	0.000	32.667		100.00	0.000	4.876
						C	0.000	32.667		100.00	0.000	1.069
L6 17.7500-8.2500	13.0000	1	3.62	1.0000	25.333	A	0.000	25.333	25.333	100.00	0.000	0.000
						B	0.000	25.333		100.00	0.000	3.781
						C	0.000	25.333		100.00	0.000	4.297
L7 8.2500-0.0000	4.1250	1	3.62	1.0000	22.000	A	0.000	22.000	22.000	100.00	0.000	0.000
						B	0.000	22.000		100.00	0.000	3.284
						C	0.000	22.000		100.00	0.000	5.417

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.0000-90.0000	100.0000	1.373	8.79	40.000	A	0.000	40.000	40.000	100.00	0.000	2.618
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L2 90.0000-60.0000	75.0000	1.264	8.09	60.000	A	0.000	60.000	60.000	100.00	0.000	0.154
					B	0.000	60.000		100.00	0.000	5.742
					C	0.000	60.000		100.00	0.000	0.000
L3 60.0000-39.5000	49.7500	1.124	7.20	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
					B	0.000	51.250		100.00	0.000	3.861
					C	0.000	51.250		100.00	0.000	0.262
L4 39.5000-30.0000	34.7500	1.015	6.50	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	0.099
					C	0.000	23.750		100.00	0.000	2.362
L5 30.0000-17.7500	23.8750	1	6.40	30.625	A	0.000	30.625	30.625	100.00	0.000	0.000
					B	0.000	30.625		100.00	0.000	2.426
					C	0.000	30.625		100.00	0.000	0.458
L6 17.7500-8.2500	13.0000	1	6.40	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	1.881
					C	0.000	23.750		100.00	0.000	1.991
L7 8.2500-0.0000	4.1250	1	6.40	20.625	A	0.000	20.625	20.625	100.00	0.000	0.000
					B	0.000	20.625		100.00	0.000	1.634
					C	0.000	20.625		100.00	0.000	2.869

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice

Comb. No.	Description
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
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	110 - 90	Pole	Max Tension	18	0.00	0.00	-0.00
			Max. Compression	14	-6.77	0.00	0.25
			Max. Mx	11	-3.30	76.49	0.06
			Max. My	2	-3.30	0.00	76.54
			Max. Vy	11	-4.96	76.49	0.06
			Max. Vx	2	-4.96	0.00	76.54
			Max. Torque	5			0.02
L2	90 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.18	-0.02	0.57
			Max. Mx	11	-10.70	420.71	0.16
			Max. My	2	-10.70	0.03	420.83
			Max. Vy	5	12.95	-420.63	0.16
			Max. Vx	2	-12.95	0.03	420.83
			Max. Torque	9			-0.27
L3	60 - 39.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.45	-0.24	0.67
			Max. Mx	5	-13.78	-696.57	0.21
			Max. My	2	-13.78	-0.00	696.78
			Max. Vy	5	13.95	-696.57	0.21
			Max. Vx	2	-13.95	-0.00	696.78
			Max. Torque	9			-0.24
L4	39.5 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.71	-0.33	0.71
			Max. Mx	5	-15.53	-831.01	0.24
			Max. My	2	-15.53	-0.01	831.24
			Max. Vy	5	14.36	-831.01	0.24
			Max. Vx	2	-14.36	-0.01	831.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	9			-0.23
L5	30 - 17.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.11	-0.45	0.77
			Max. Mx	5	-18.25	-1012.29	0.26
			Max. My	2	-18.25	-0.03	1012.52
			Max. Vy	5	15.02	-1012.29	0.26
			Max. Vx	2	-15.02	-0.03	1012.52
			Max. Torque	9			-0.23
L6	17.75 - 8.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.82	-0.54	0.81
			Max. Mx	5	-20.49	-1156.63	0.28
			Max. My	2	-20.49	-0.05	1156.86
			Max. Vy	5	15.38	-1156.63	0.28
			Max. Vx	2	-15.38	-0.05	1156.86
			Max. Torque	9			-0.22
L7	8.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.59	-0.62	0.85
			Max. Mx	5	-22.85	-1284.82	0.30
			Max. My	2	-22.85	-0.07	1285.05
			Max. Vy	5	15.71	-1284.82	0.30
			Max. Vx	2	-15.71	-0.07	1285.05
			Max. Torque	9			-0.21

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	35.59	0.00	4.88
	Max. H_x	11	22.85	15.70	0.00
	Max. H_z	2	22.85	0.00	15.70
	Max. M_x	2	1285.05	0.00	15.70
	Max. M_z	5	1284.82	-15.70	0.00
	Max. Torsion	3	0.21	-7.85	13.59
	Min. Vert	1	22.85	0.00	0.00
	Min. H_x	5	22.85	-15.70	0.00
	Min. H_z	8	22.85	0.00	-15.70
	Min. M_x	8	-1284.45	0.00	-15.70
	Min. M_z	11	-1284.68	15.70	0.00
	Min. Torsion	9	-0.21	7.85	-13.59

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	22.85	0.00	0.00	-0.29	-0.07	0.00
Dead+Wind 0 deg - No Ice	22.85	-0.00	-15.70	-1285.05	-0.07	-0.19
Dead+Wind 30 deg - No Ice	22.85	7.85	-13.59	-1112.93	-642.44	-0.21
Dead+Wind 60 deg - No Ice	22.85	13.59	-7.85	-642.67	-1112.69	-0.17
Dead+Wind 90 deg - No Ice	22.85	15.70	0.00	-0.30	-1284.82	-0.08
Dead+Wind 120 deg - No Ice	22.85	13.59	7.85	642.08	-1112.69	0.02
Dead+Wind 150 deg - No Ice	22.85	7.85	13.59	1112.33	-642.44	0.13
Dead+Wind 180 deg - No Ice	22.85	-0.00	15.70	1284.45	-0.07	0.19
Dead+Wind 210 deg - No Ice	22.85	-7.85	13.59	1112.33	642.31	0.21
Dead+Wind 240 deg - No Ice	22.85	-13.59	7.85	642.08	1112.56	0.17
Dead+Wind 270 deg - No Ice	22.85	-15.70	0.00	-0.30	1284.68	0.08
Dead+Wind 300 deg - No Ice	22.85	-13.59	-7.85	-642.68	1112.56	-0.02
Dead+Wind 330 deg - No Ice	22.85	-7.85	-13.59	-1112.93	642.31	-0.13
Dead+Ice	35.59	0.00	0.00	-0.85	-0.62	0.00
Dead+Wind 0 deg+Ice	35.59	0.00	-4.88	-422.37	-0.65	-0.05
Dead+Wind 30 deg+Ice	35.59	2.44	-4.23	-365.91	-211.38	-0.05
Dead+Wind 60 deg+Ice	35.59	4.23	-2.44	-211.65	-365.64	-0.04
Dead+Wind 90 deg+Ice	35.59	4.88	-0.00	-0.92	-422.10	-0.02

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 120 deg+Ice	35.59	4.23	2.44	209.81	-365.64	0.01
Dead+Wind 150 deg+Ice	35.59	2.44	4.23	364.07	-211.38	0.03
Dead+Wind 180 deg+Ice	35.59	0.00	4.88	420.53	-0.65	0.05
Dead+Wind 210 deg+Ice	35.59	-2.44	4.23	364.07	210.08	0.05
Dead+Wind 240 deg+Ice	35.59	-4.23	2.44	209.81	364.34	0.04
Dead+Wind 270 deg+Ice	35.59	-4.88	-0.00	-0.92	420.80	0.02
Dead+Wind 300 deg+Ice	35.59	-4.23	-2.44	-211.65	364.34	-0.01
Dead+Wind 330 deg+Ice	35.59	-2.44	-4.23	-365.91	210.08	-0.03
Dead+Wind 0 deg - Service	22.85	0.00	-6.13	-502.53	-0.07	-0.08
Dead+Wind 30 deg - Service	22.85	3.07	-5.31	-435.24	-251.18	-0.08
Dead+Wind 60 deg - Service	22.85	5.31	-3.07	-251.41	-435.01	-0.07
Dead+Wind 90 deg - Service	22.85	6.13	0.00	-0.30	-502.29	-0.03
Dead+Wind 120 deg - Service	22.85	5.31	3.07	250.81	-435.01	0.01
Dead+Wind 150 deg - Service	22.85	3.07	5.31	434.64	-251.18	0.05
Dead+Wind 180 deg - Service	22.85	0.00	6.13	501.93	-0.07	0.08
Dead+Wind 210 deg - Service	22.85	-3.07	5.31	434.64	251.05	0.08
Dead+Wind 240 deg - Service	22.85	-5.31	3.07	250.81	434.88	0.07
Dead+Wind 270 deg - Service	22.85	-6.13	0.00	-0.30	502.16	0.03
Dead+Wind 300 deg - Service	22.85	-5.31	-3.07	-251.41	434.88	-0.01
Dead+Wind 330 deg - Service	22.85	-3.07	-5.31	-435.24	251.05	-0.05

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-22.85	0.00	0.00	22.85	0.00	0.000%
2	0.00	-22.85	-15.70	0.00	22.85	15.70	0.000%
3	7.85	-22.85	-13.59	-7.85	22.85	13.59	0.000%
4	13.59	-22.85	-7.85	-13.59	22.85	7.85	0.000%
5	15.70	-22.85	0.00	-15.70	22.85	0.00	0.000%
6	13.59	-22.85	7.85	-13.59	22.85	-7.85	0.000%
7	7.85	-22.85	13.59	-7.85	22.85	-13.59	0.000%
8	0.00	-22.85	15.70	0.00	22.85	-15.70	0.000%
9	-7.85	-22.85	13.59	7.85	22.85	-13.59	0.000%
10	-13.59	-22.85	7.85	13.59	22.85	-7.85	0.000%
11	-15.70	-22.85	0.00	15.70	22.85	0.00	0.000%
12	-13.59	-22.85	-7.85	13.59	22.85	7.85	0.000%
13	-7.85	-22.85	-13.59	7.85	22.85	13.59	0.000%
14	0.00	-35.59	0.00	0.00	35.59	0.00	0.000%
15	0.00	-35.59	-4.88	0.00	35.59	4.88	0.000%
16	2.44	-35.59	-4.23	-2.44	35.59	4.23	0.000%
17	4.23	-35.59	-2.44	-4.23	35.59	2.44	0.000%
18	4.88	-35.59	0.00	-4.88	35.59	0.00	0.000%
19	4.23	-35.59	2.44	-4.23	35.59	-2.44	0.000%
20	2.44	-35.59	4.23	-2.44	35.59	-4.23	0.000%
21	0.00	-35.59	4.88	0.00	35.59	-4.88	0.000%
22	-2.44	-35.59	4.23	2.44	35.59	-4.23	0.000%
23	-4.23	-35.59	2.44	4.23	35.59	-2.44	0.000%
24	-4.88	-35.59	0.00	4.88	35.59	0.00	0.000%
25	-4.23	-35.59	-2.44	4.23	35.59	2.44	0.000%
26	-2.44	-35.59	-4.23	2.44	35.59	4.23	0.000%
27	0.00	-22.85	-6.13	0.00	22.85	6.13	0.000%
28	3.07	-22.85	-5.31	-3.07	22.85	5.31	0.000%
29	5.31	-22.85	-3.07	-5.31	22.85	3.07	0.000%
30	6.13	-22.85	0.00	-6.13	22.85	0.00	0.000%
31	5.31	-22.85	3.07	-5.31	22.85	-3.07	0.000%
32	3.07	-22.85	5.31	-3.07	22.85	-5.31	0.000%
33	0.00	-22.85	6.13	0.00	22.85	-6.13	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
34	-3.07	-22.85	5.31	3.07	22.85	-5.31	0.000%
35	-5.31	-22.85	3.07	5.31	22.85	-3.07	0.000%
36	-6.13	-22.85	0.00	6.13	22.85	0.00	0.000%
37	-5.31	-22.85	-3.07	5.31	22.85	3.07	0.000%
38	-3.07	-22.85	-5.31	3.07	22.85	5.31	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 90	21.68	27	1.53	0.00
L2	90 - 60	15.32	27	1.48	0.00
L3	60 - 39.5	7.00	27	1.07	0.00
L4	39.5 - 30	3.06	27	0.74	0.00
L5	30 - 17.75	1.75	27	0.57	0.00
L6	17.75 - 8.25	0.59	27	0.32	0.00
L7	8.25 - 0	0.13	27	0.14	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.0000	APXVSPP18-C-A20 w/ Mount Pipe	27	20.71	1.53	0.00	39670
105.0000	(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	27	20.07	1.53	0.00	39670
89.0000	(2) RRUS-11	27	15.02	1.47	0.00	9114
80.0000	6'x2" Pipe Mount	27	12.31	1.38	0.00	5611
30.0000	Bridge Stiffener (72" x 11" x 1.25")	27	1.75	0.57	0.00	3012

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 90	55.37	2	3.91	0.00
L2	90 - 60	39.16	2	3.78	0.00
L3	60 - 39.5	17.90	2	2.74	0.00
L4	39.5 - 30	7.83	2	1.89	0.00
L5	30 - 17.75	4.48	2	1.46	0.00
L6	17.75 - 8.25	1.52	2	0.83	0.00
L7	8.25 - 0	0.32	2	0.37	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.0000	APXVSPP18-C-A20 w/ Mount Pipe	2	52.91	3.91	0.00	15676
105.0000	(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	2	51.27	3.91	0.00	15676
89.0000	(2) RRUS-11	2	38.37	3.76	0.00	3599
80.0000	6'x2" Pipe Mount	2	31.45	3.52	0.00	2212
30.0000	Bridge Stiffener (72" x 11" x 1.25")	2	4.48	1.46	0.00	1180

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	110 - 90 (1)	P24x1/4	20.0000	0.0000	0.0	23.70	18.6532	-3.30	442.00	0.007
L2	90 - 60 (2)	P24x3/8	30.0000	0.0000	0.0	25.20	27.8325	-10.70	701.38	0.015
L3	60 - 39.5 (3)	30" x 0.375"	20.5000	0.0000	0.0	25.07	34.9011	-13.78	875.15	0.016
L4	39.5 - 30 (4)	RPS 30" x 0.483"	9.5000	0.0000	0.0	22.78	44.7888	-15.53	1020.11	0.015
L5	30 - 17.75 (5)	P30x1/2	12.2500	0.0000	0.0	25.20	46.3385	-18.25	1167.73	0.016
L6	17.75 - 8.25 (6)	RPS 30" x 0.63844"	9.5000	0.0000	0.0	23.02	58.8910	-20.49	1355.79	0.015
L7	8.25 - 0 (7)	RPS 30" x 0.801"	8.2500	0.0000	0.0	25.19	73.4768	-22.85	1850.73	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	110 - 90 (1)	P24x1/4	76.54	8.38	23.70	0.354	0.00	0.00	23.70	0.000
L2	90 - 60 (2)	P24x3/8	420.83	31.20	27.72	1.126	0.00	0.00	27.72	0.000
L3	60 - 39.5 (3)	30" x 0.375"	696.78	32.75	25.07	1.306	0.00	0.00	25.07	0.000
L4	39.5 - 30 (4)	RPS 30" x 0.483"	831.24	30.67	25.05	1.224	0.00	0.00	25.05	0.000
L5	30 - 17.75 (5)	P30x1/2	1012.52	36.15	27.72	1.304	0.00	0.00	27.72	0.000
L6	17.75 - 8.25 (6)	RPS 30" x 0.63844"	1156.86	32.80	25.32	1.295	0.00	0.00	25.32	0.000
L7	8.25 - 0 (7)	RPS 30" x 0.801"	1285.05	29.52	27.71	1.065	0.00	0.00	27.71	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	110 - 90 (1)	P24x1/4	4.96	0.53	16.80	0.032	0.00	0.00	11.90	0.000
L2	90 - 60 (2)	P24x3/8	12.95	0.93	16.80	0.055	0.21	0.01	16.80	0.000
L3	60 - 39.5 (3)	30" x 0.375"	13.95	0.80	16.80	0.048	0.19	0.00	15.64	0.000
L4	39.5 - 30 (4)	RPS 30" x 0.483"	14.36	0.64	15.18	0.042	0.20	0.00	15.18	0.000
L5	30 - 17.75 (5)	P30x1/2	15.02	0.65	16.80	0.039	0.19	0.00	16.80	0.000
L6	17.75 - 8.25 (6)	RPS 30" x 0.63844"	15.38	0.52	15.35	0.034	0.19	0.00	15.35	0.000
L7	8.25 - 0 (7)	RPS 30" x 0.801"	15.71	0.43	16.79	0.025	0.19	0.00	16.79	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 90 (1)	0.007	0.354	0.000	0.032	0.000	0.362 ✔	1.333	H1-3+VT ✔
L2	90 - 60 (2)	0.015	1.126	0.000	0.055	0.000	1.144 ✔	1.333	H1-3+VT ✔
L3	60 - 39.5 (3)	0.016	1.306	0.000	0.048	0.000	1.324 ✔	1.333	H1-3+VT ✔
L4	39.5 - 30 (4)	0.015	1.224	0.000	0.042	0.000	1.241 ✔	1.333	H1-3+VT ✔
L5	30 - 17.75 (5)	0.016	1.304	0.000	0.039	0.000	1.321 ✔	1.333	H1-3+VT ✔

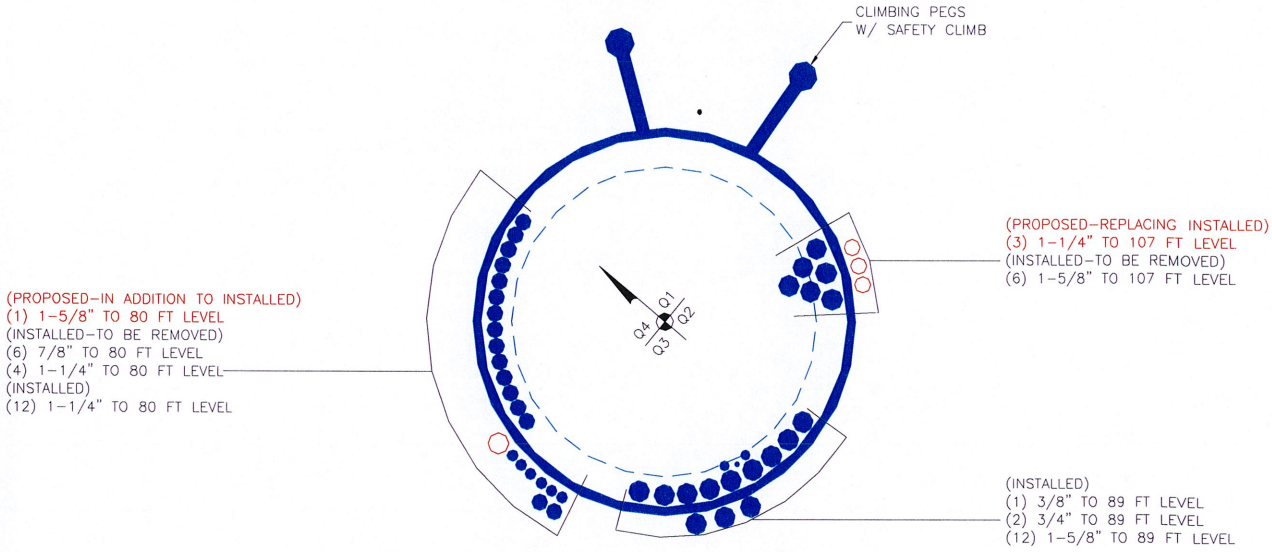
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L6	17.75 - 8.25 (6)	0.015	1.295	0.000	0.034	0.000	1.311 ✔	1.333	H1-3+VT ✔
L7	8.25 - 0 (7)	0.012	1.065	0.000	0.025	0.000	1.078 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	110 - 90	Pole	P24x1/4	1	-3.30	589.19	27.2	Pass
L2	90 - 60	Pole	P24x3/8	2	-10.70	934.94	85.8	Pass
L3	60 - 39.5	Pole	30" x 0.375"	3	-13.78	1166.57	99.3	Pass
L4	39.5 - 30	Pole	RPS 30" x 0.483"	4	-15.53	1359.81	93.1	Pass
L5	30 - 17.75	Pole	P30x1/2	5	-18.25	1556.58	99.1	Pass
L6	17.75 - 8.25	Pole	RPS 30" x 0.63844"	6	-20.49	1807.27	98.4	Pass
L7	8.25 - 0	Pole	RPS 30" x 0.801"	7	-22.85	2467.02	80.9	Pass
							Summary	
						Pole (L3)	99.3	Pass
						RATING =	**99.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

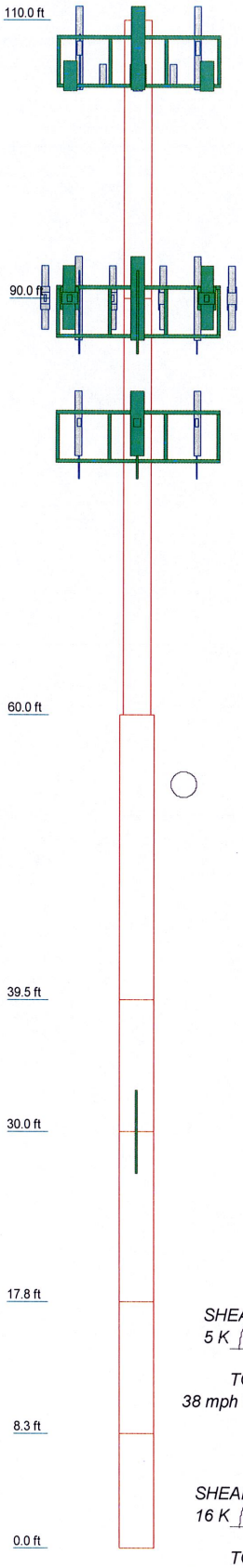


APPENDIX C

ADDITIONAL CALCULATIONS

CT03XC064

Section	Size	Length (ft)	Socket Length (ft)	Grade	Weight (K)
1	P24x1/4	20.0000	5.0000	A53-B-42	1.3
2	P24x3/8	30.0000	5.0000		2.8
3	30" x 0.375"	20.5000	5.0000		2.4
4	RPS 30" x 0.483"	9.5000	5.0000	Reinf 37.96 ksi	1.4
5	P30x1/2	12.2500	5.0000	A53-B-42	1.9
6	RPS 30" x 0.63844"	9.5000	5.0000	Reinf 38.37 ksi	1.9
7	RPS 30" x 0.801"	8.2500		Reinf 41.98 ksi	2.1
					13.9



AXIAL
36 K

SHEAR
5 K

MOMENT
423 kip-ft

TORQUE 0 kip-ft
38 mph WIND - 1.0000 in ICE

AXIAL
23 K

SHEAR
16 K

MOMENT
1285 kip-ft

TORQUE 0 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	107	DC6-48-60-18-8F	89
APXVSPP18-C-A20 w/ Mount Pipe	107	(2) 7750.00 w/ Mount Pipe	89
APXVSPP18-C-A20 w/ Mount Pipe	107	(2) 7750.00 w/ Mount Pipe	89
IBC1900HG-2A	107	(2) 7750.00 w/ Mount Pipe	89
IBC1900HG-2A	107	(2) LGP21401	89
IBC1900HG-2A	107	(2) LGP21401	89
IBC1900BB-1	107	(2) LGP21401	89
IBC1900BB-1	107	(2) LGP21903	89
IBC1900BB-1	107	(2) LGP21903	89
(3) 4'x2" Pipe Mount	107	(2) LGP21903	89
(3) 4'x2" Pipe Mount	107	6'x2" Pipe Mount	89
(3) 4'x2" Pipe Mount	107	6'x2" Pipe Mount	89
Platform Mount [LP 502-1]	107	6'x2" Pipe Mount	89
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	Platform Mount [LP 502-1]	89
		6'x2" Pipe Mount	80
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	6'x2" Pipe Mount	80
		6'x2" Pipe Mount	80
(2) PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	Platform Mount [LP 305-1]	80
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
Side Arm Mount [SO 102-3]	105	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
(2) RRUS-11	89	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
(2) RRUS-11	89		
(2) RRUS-11	89	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
Side Arm Mount [SO 102-3]	89		
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89	KRY 112 144/1	80
		KRY 112 144/1	80
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89	KRY 112 144/1	80
		Bridge Stiffener (72" x 11" x 1.25")	30
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 38.37 ksi	38 ksi	48 ksi
Reinf 37.96 ksi	38 ksi	48 ksi	Reinf 41.98 ksi	42 ksi	53 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.
5. TOWER RATING: 99.3%

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

Job: ***110' MP; Weston Square; Hartford, CT***		
Project: ***PJF# 37513-0620 (BU# 876325)***		
Client: CCI	Drawn by: Corey McCartney	App'd:
Code: TIA/EIA-222-F	Date: 02/27/13	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2013\37513-0620 BU 876325\37513-0620_Reinforced CCI.etr		Dwg No. E-1

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

CT03XC064

Job Number:	37513-0620	Page:	1
Site Number:	876325	By:	CMM
Site Name:	Weston Square	Date:	2/27/2013

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	1285.0		k-ft
Shear, V =	16.0		kips
Axial Load, P =	23.0		kips
OTM =	1293.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	5	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	37	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
+ Effective Soil Wt. - Buoyant Conc. Wt. ≥ Compression
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	16	
Rebar Size =	#9	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#4	
Side Clear Cover to Ties =	3	in

Soil Parameters

Water Table Depth =	15.00	ft
Depth to Ignore Soil =	3.33	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	2	120	1000		Clay		946	946	2
2	4	110		30	Sand		946	946	6
3	7	110	750		Clay		946	946	13
4	2	105		30	Sand		946	946	15
5	13	115		32	Sand		946	946	28
6	5	100	750		Clay		946	946	33
7	7	120	1500		Clay	9100	946	946	40
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	22.58	ft, from Grade
Bending Moment, M =	1654.27	k-ft, from COR
Resisting Moment, Ma =	6689.44	k-ft, from COR

MOMENT RATIO = 24.7% OK

Shear, V =	16.00	kips
Resisting Shear, Va =	64.70	kips

SHEAR RATIO = 24.7% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	316.93	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	23.00	kips
Allowable Comp. Cap., Ca =	310.22	kips

COMPRESSION RATIO = 7.4% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	9.42	sq in
Actual Steel Area =	16.00	sq in
Allowable Min Axial, Pa =	-664.62	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	3251.66	kips, Where Ma = 0 k-ft

Axial Load, P =	33.22	kips @ 8.25 ft Below Grade
Moment, M =	1388.22	k-ft @ 8.25 ft Below Grade
Allowable Moment, Ma =	1411.76	k-ft

MOMENT RATIO = 98.3% OK

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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#: *876325*
Site Name: *Weston Square*
App #:

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

Pier Properties		
Concrete:		
Pier Diameter =	5.0	ft
Concrete Area =	2827.4	in^2
Reinforcement:		
Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	4.32	ft
Vert. Cage Diameter =	51.87	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	16	
As Total=	16	in^2
A s/ Aconc, Rho:	0.0057	0.57%

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

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.57%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	4227.16	kips
at Mu=(ϕ=0.65)Mn=	1823.95	ft-kips
Max Tu, (φ=0.9) Tn =	864	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	1388.22	ft-kips **(* Note)**
Max. Service Shaft P:	33.22	kips
Max Axial Force Type:	Comp.	

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

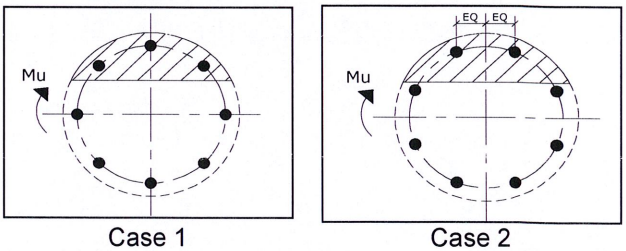
Load Factor	Shaft Factored Loads		
1.30	Mu:	1804.686	ft-kips
1.30	Pu:	43.186	kips

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 =	D	
Seismic Risk =	**High**	

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

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **10.00** in
Extreme Steel Strain, εt: **0.0138**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	43.19	kips
Drilled Shaft Moment Capacity, φMn:	**1835.29**	ft-kips
Drilled Shaft Superimposed Mu:	**1804.69**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**98.3%**

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v4.1 - Effective 7-3-12

CT03XC064

Date: 2/27/2013
PJF Project: 37513-0620
Client Ref. # BU 876325
Site Name: Weston Square
Description: 110' MP
Owner: CCI
Engineer: CMM

Asymmetric Anchor Rod Analysis

Moment =	1285	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	23.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	16.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	15							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
2	1.500	A354 Gr BC	109	125	30.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
3	1.500	A354 Gr BC	109	125	60.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
4	1.500	A354 Gr BC	109	125	90.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
5	1.500	A354 Gr BC	109	125	120.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
6	1.500	A354 Gr BC	109	125	150.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
7	1.500	A354 Gr BC	109	125	180.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
8	1.500	A354 Gr BC	109	125	210.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
9	1.500	A354 Gr BC	109	125	240.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
10	1.500	A354 Gr BC	109	125	270.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
11	1.500	A354 Gr BC	109	125	300.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
12	1.500	A354 Gr BC	109	125	330.0	35.00	0.00	1.77	92.03	89.26	89.26	0.00	97.19	91.8%
13	1.750	Dywidag (150 ksi)	127.7	150	15.0	44.50	0.00	2.71	178.99	174.74	174.74	0.00	178.99	97.6%
14	1.750	Dywidag (150 ksi)	127.7	150	135.0	44.50	0.00	2.71	178.99	174.74	174.74	0.00	178.99	97.6%
15	1.750	Dywidag (150 ksi)	127.7	150	255.0	44.50	0.00	2.71	178.99	174.74	174.74	0.00	178.99	97.6%
								29.34						

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

TIA Rev F

Site Data

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

Reactions		
Moment:	793.1	ft-kips
Axial:	16.6	kips
Shear:	11.6	kips

Moment adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	12	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	35	in

Plate Data		
Diam:	41	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.85	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	5	in
Height:	10	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	30	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

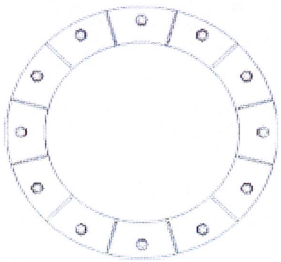
Stress Increase Factor		
ASIF:	1.333	

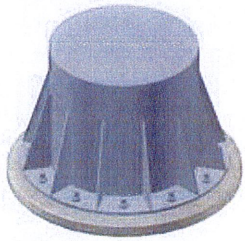
Anchor Rod Results			Stiffened
Maximum Rod Tension:	89.3	Kips	Service, ASD
Allowable Tension:	97.2	Kips	Fty*ASIF
Anchor Rod Stress Ratio:	91.9%	Pass	

Base Plate Results	Flexural Check		Stiffened
Base Plate Stress:	26.3	ksi	Service, ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	73.1%	Pass	Y.L. Length: N/A, Roark

Stiffener Results		
Horizontal Weld :	69.1%	Pass
Vertical Weld:	37.3%	Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.5%	Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	41.7%	Pass
Plate Comp. (AISC Bracket):	53.5%	Pass

Pole Results		
Pole Punching Shear Check:	15.4%	Pass





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

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

CROWN CASTLE PROJECT: BU #876325; WESTON SQUARE; HARTFORD, 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.
1. 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.
2. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
3. 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.
4. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

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

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

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

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

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

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

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

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

STATE OF CONNECTICUT
CARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

FEB 27 2013

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BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO: 37513-0820
DRAWN BY: B.M.S.
CHECKED BY: C.M.M.
APPROVED BY:
DATE: 2-26-2013

ISSUE DATE OF PERMIT: 2-26-2013

S-1

CT03XC064

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 E60XX 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 J 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 (EUCONS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. **FOUNDATION WORK - (NOT REQUIRED)**

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

H. **EPOXY GROUTED REINFORCING ANCHOR RODS - NOT REQUIRED)**

I. **TOUCH UP OF GALVANIZING**

1. THE CONTRACTOR SHALL TOUCH UP AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED DURING TRANSPORTATION OR ERECTION. **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 OR GALVANIZED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS [illegible] 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 HAS BEEN CLEARLY 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 IS TO 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 [illegible] COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION, FATIGUE 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 5, IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER ANY SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS.

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FEB 27 2013

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BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO. 876325
DRAWN BY: RMS
CHECKED BY: CSJ
APPROVED BY:
DATE: 2-26-2013

ISSUE DATE OF PERMIT: 2-26-13

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CT03XC064

AJAX BOLT NOTE SHEET: REV. 1.3, 11-07-2012

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 20 MM (M20) 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 20 MM (M20) 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 36 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.

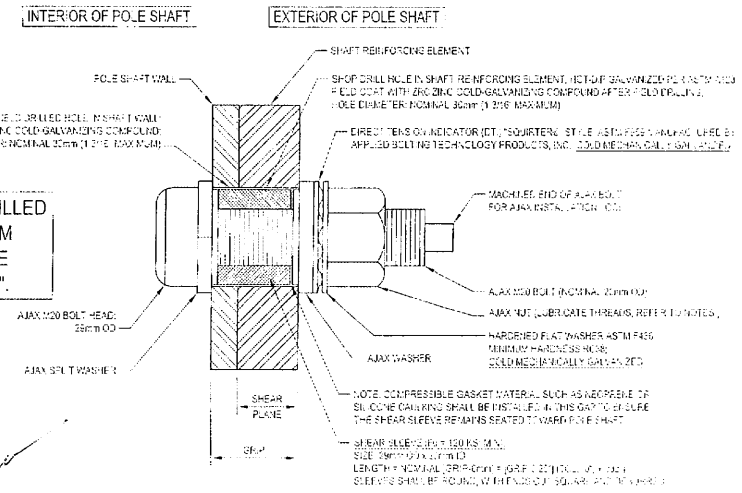
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE 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 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 / S-3

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BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO: J7513
DRAWN BY: RMB
CHECKED BY: JWV
APPROVED BY:
DATE: 2-26-2013

ISSUE DATE OF PERMIT: 2-26-2013

S-3

CT03XC064

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#37513-0620), DATED 2-26-2013.

POLE SPECIFICATIONS

POLE SHAFT TYPE:	ROUND
TAPER:	N/A
SHAFT STEEL:	ASTM A53-B 42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	1 1/2"Ø ASTM A36

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	22.00	0.2500		24.000	24.000
2	30.00	0.3750		24.000	24.000
3	30.00	0.3750		30.000	30.000
4	30.00	0.5000		30.000	30.000

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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 DETAILS ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. DTIS REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTER-9 STYLE, MADE TO ASTM F959 LATEST REVISION AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

5. NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW CT 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 3/4"Ø DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 13/16". REFER TO SHEET S-3.

AS OF 5/20/2013, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING ASC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR ASC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE RFI.

NOTE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED, PLEASE SEE ENG-STA-K335 TOWER BASE PLATE NOTE AND ENG-BUL-10051 NOTE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE SITE AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NOE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NOE SCOPE OF WORK.

NEW AEROSOLUTIONS MP3 REINFORCING (OPTION #1)

ELEVATION	DEGREE SPACING AROUND POLE	REINFORCING ELEMENT
6'-0" TO 21'-0"	0°, 90° & 180°	MP3SE

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A615 WITH MIN. F_u=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW SABRE FLAT PLATE REINFORCING (OPTION #2)

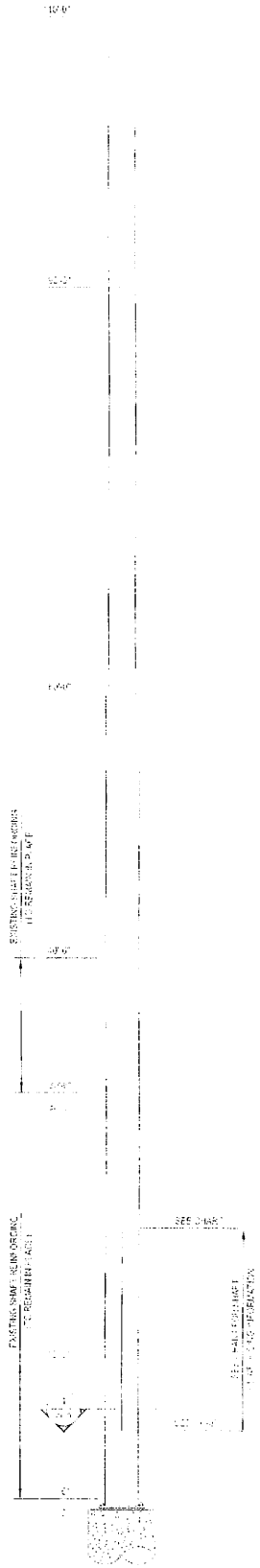
ELEVATION	DEGREE SPACING AROUND POLE	REINFORCING ELEMENT
6'-0" TO 21'-0"	0°, 90° & 180°	MS-FP3

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A615 WITH MIN. F_u=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW CCI FLAT PLATE (100 KSI) REINFORCING (OPTION #3)

ELEVATION	DEGREE SPACING AROUND POLE	REINFORCING ELEMENT
6'-0" TO 21'-0"	0°, 90° & 180°	SPF-FP3-100

NOTES FOR CROWN REINFORCING OPTION #3 100 KSI MATERIAL:
1. DO NOT FIELD WELD DIRECTLY TO THE 100 KSI MATERIAL.
2. THE 100 KSI MATERIAL SHALL CONFORM TO THE FOLLOWING:
A. MATERIAL SHALL BE ASTM A514, GRADE A, GRADE E, or GRADE P, HAVING A MINIMUM TENSILE STRENGTH (F_u) OF 110 KSI AND A MINIMUM YIELD STRENGTH (F_y) OF 100 KSI.
B. MATERIAL SHALL BE HEAT TREATED, QUENCHED AND TEMPERED PER ASTM A514.
C. MATERIAL SHALL HAVE CHARPY V-NOTCH (CVN) IMPACT VALUES OF NOT LESS THAN 15 FT-LB AT -20 DEGREES F IN ACCORDANCE WITH ASTM A370.
D. MINIMUM INSIDE BEND RADIUS FOR COLD BENDING, PER ASTM A6 TABLE X-4.2, SHALL BE 4.5t MINIMUM.
E. ANY AND ALL WELDING TO THE MATERIAL SHALL BE PERFORMED ACCORDING TO AN APPROVED WELDING PROCEDURE SPECIFICATION (WPS) SUITABLE FOR THE GRADE AND INTENDED USE AND SUBJECT. THE WPS SHALL BE DEVELOPED BY A QUALIFIED WELDER IN ACCORDANCE WITH AWS D1.1. PRIOR TO ANY WORK, PRIOR TO ANY WELDING, THE WPS SHALL BE SUBMITTED TO CROWN CASTLE AND PAUL J. FORD AND COMPANY FOR REVIEW.



POLE ELEVATION 1 / S-4

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

FEB 27 2013

PAUL J. FORD AND COMPANY
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CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO: 37513-0620
DRAWN BY: B.M.S.
CHECKED BY: O.M.M.
APPROVED BY:
DATE: 2-26-2013

ISSUE DATE OF PERMIT: 2-28-2013

S-4

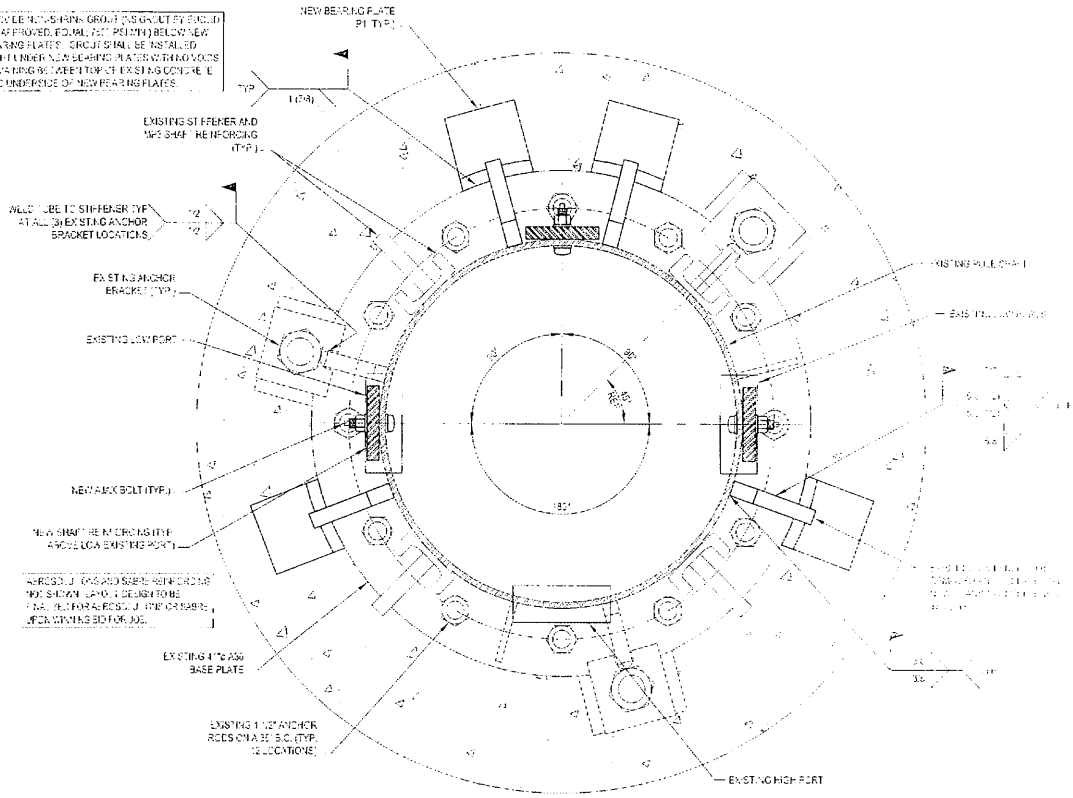
CT03XC064

SPECIAL INSPECTION OF EXISTING SHAFT-TO-PLANGE WELD CONNECTIONS

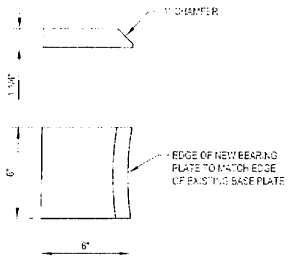
(1) PRIOR TO CONSTRUCTION, CONTRACTOR'S INSPECTION AGENCY SHALL INSPECT SECTION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENER PLATES. THE CONTRACTOR'S INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: METAL MAGNETIC PARTICLE AND/OR ULTRASONIC INSPECTION. OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE SAFE, QUICK, THOROUGH DOCUMENTATION OF THE INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.

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

PROVIDE NON-SHRINK GROUT (NS GROUT BY SIKA OR APPROVED EQUAL, NOT PEM-TI) BELOW NEW BEARING PLATES. GROUT SHALL BE INSTALLED TO FILL UNDER NEW BEARING PLATES WITHOUT VOIDS BEARING ON CAPS TOP OF EXISTING CONCRETE AND UNDERSIDE OF NEW BEARING PLATES.

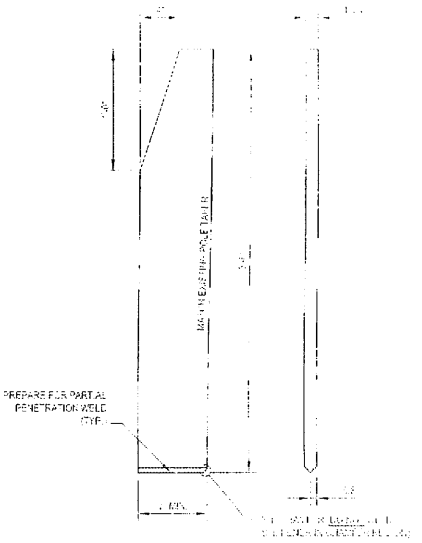


BASE PLATE 1 / S-5



BEARING PLATE MK~P1

(4 REQUIRED) (Fy = 50 KSI)



TRANSITION STIFFENER MK~TS1

(4 REQUIRED) (Fy = 50 KSI)

STATE OF CONNECTICUT
DIVISION OF PROFESSIONAL ENGINEERS
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BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO: 2013-0124
DRAWN BY: S.M.S.
CHECKED BY: J.M.J.
APPROVED BY:
DATE: 2-20-2013

ISSUE DATE OF PERMIT: 2-20-2013

S-5

CT03XC064

MODIFICATION INSPECTION NOTES:

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION PHOTOS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS (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 DESIGN OF THE INSTALLATION. THE MI INSPECTOR TAKES OWNERSHIP OF THE MODIFICATIONS ON OWNERSHIP OF THE ORIGINAL MODIFICATION DESIGN OF EQUIPMENTS AND CONSULTANTS RESIDES WITH THE FORMAL TAKES.

ALL MI'S SHALL BE CONDUCTED BY A PROVIDE ENGINEERING VENDOR AND/OR ENGINEERING SERVICE VENDOR (NESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR TOWER MODIFICATIONS (ALL TOWER MODIFICATIONS APPROVED VENDORS).

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN CONTACT YOUR ORGANIZATION'S 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 MODIFICATION 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
- GET THE LINEMEN AND 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 (MAY BE PREFERABLE) 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.
- WHENEVER 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 THE THIRD PARTY FOR ANY TAXI (EG TRAVEL AND LODGING), COSTS OF RENTING EQUIPMENT (CRANE, ETC), OR CROWN CONTRACTS OR FEES FOR A THIRD PARTY MI, EXCEPT ON MAY BE MADE IN THE EVENT THAT THE DELAY WAS DELAY CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

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

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENTAL MI
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO REMAIN AS THE MODIFICATION IS IN MOVEMENT 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 INSPECTIONS ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS AS THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG SOW 10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT THIRD PARTY AFTER A MODIFICATION PROJECT IS COMPLETED AND MARKED BY THE DATE OF AN ACCEPTED "PASS NO SIT" OR "PASS AS-BUILT 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 OVERSEEN AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG SOW 10007

MI CHECKLIST

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

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

STATE OF CONNECTICUT
JOSEPH DOUGLAS JACOBS
No. PEN 22731
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FEB 27 2013

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BU #876325; WESTON SQUARE
HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT NO. 2013-0020
DRAWN BY: BJS
CHECKED BY: CMP
APPROVED BY:
DATE: 2-26-2013

ISSUE DATE FOR PERMIT: [illegible]

S-6

CT03XC064

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STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

May 1, 2013

The Honorable Pedro E. Segarra
Mayor
City of Hartford
550 Main Street
Hartford, CT 06103

RE: **EM-SPRINT-NEXTEL-064-130429A** – Sprint Nextel notice of intent to modify an existing telecommunications facility located at 92 Weston Street, Hartford, Connecticut.

Dear Mayor Segarra:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by May 15, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Sandra Kee Borges, Acting Chief Operating Officer, City of Hartford

CSC
CONNECTICUT SITING COUNCIL