Date: **January 11, 2014**

Jeremy Henson
Crown Castle
12725 Morris Road Extension, Suite 400
Alpharetta, GA 30004

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10023512
	Carrier Site Name:	CCCN
Crown Castle Designation:	**Crown Castle BU Number:**	851864
	Crown Castle Site Name:	CCCN
	Crown Castle JDE Job Number:	254857
	Crown Castle Work Order Number:	698143
	Crown Castle Application Number:	209953 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	698143
Site Data:	**7650 LYONS ROAD, Coconut Creek, Broward County, FL** **Latitude *26° 19' 27.31"*, Longitude *-80° 10' 50.83"*** **100 Foot - Monopole Tower**	

Dear Jeremy Henson,

Crown Castle is pleased to submit this **"Structural Analysis 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 698143, in accordance with application 209953, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2010 Florida Building Code based upon an ultimate 3-second gust wind speed of 170 mph converted to a nominal 3-second gust wind speed of 132 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

Structural analysis prepared by: Randall Ashworth, Associate Design Engineer / TS
Respectfully submitted by:

JOSEPH Y. KIM LICENSE No 73331 STATE OF FLORIDA PROFESSIONAL ENGINEER 3/10/14

Joseph Y. Kim, P.E.
Manager Engineering

Joseph Y. Kim, P.E.
Professional Engineer License: #73331
Crown Castle USA, Inc.
Certificate of Authorization: #28970

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1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by FWT INC. in August of 1997. The tower was originally designed for a wind speed of 126 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 132 mph with no ice and 60 mph under service loads, exposure category C.

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
85.0	85.0	9	ericsson	RRUS-32 B30 (PLACE HOLDER)	2 4	3/8 3/4	-
		6	kathrein	800 10865 w/ Mount Pipe			
		3	kathrein	80010866 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Miscellaneous [NA 509-3]			
		1	tower mounts	Platform Mount [LP 302-1]			

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
95.0	98.0	1	andrew	VHLP2-11	6 2	5/16 1/2	1
		1	andrew	VHLP2-23-CR1			
	97.0	3	powerwave technologies	P65-18-XXW2-RR w/ Mount Pipe			
	95.0	3	clearwire	Type IV BTS DAP			
		1	tower mounts	Side Arm Mount [SO 101-3]			
85.0	85.0	3	ericsson	RRUS-11	18 4 2	7/8 3/8 3/4	1
		2	raycap	DC6-48-60-18-8F			
		3	ericsson	RRUS-11	-	-	3
		2	kathrein	742-264 w/ Mount Pipe			
		4	kathrein	800 10122 w/ Mount Pipe			
		1	kathrein	800 10764 K w/ Mount Pipe			
		2	kathrein	800 10765 K w/ Mount Pipe			
		6	kathrein	860 10025			
		2	rfs celwave	ATM192012B-0			
		4	rfs celwave	ATM19801712-0			
		6	rfs celwave	FDGW5504/3C-3L			
		1	tower mounts	Platform Mount [LP 712-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
70.0	73.0	3	cellmax technologies	CMA-B/6520/E0-8 w/ Mount Pipe	12	7/8	1
		6	cellmax technologies	CMA-BDHH/6520/E0-8 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20	1	1-1/4	2
	70.0	3	nokia	FRIG	-	-	1
		2	nokia	RG20-FXFB			
		1	raycap	ASU9338TYP01			
		1	tower mounts	Platform Mount [LP 306-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed, Not Considered in this Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
97	97	12	Decibel	Shielded DB874H Panel	-	-
		12	Generic	Canister Antenna Shroud (3' Diam.x54" High)		
93	93	2	Generic	HP 6' Diam.	-	-
75	75	12	Decibel	Shielded DB874H Panel	-	-
		12	Generic	Canister Antenna Shroud (3' Diam.x54" High)		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	PSI	2314469	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	WAYNE E. VENSEL	448042	CCISITES
4-TOWER MANUFACTURER DRAWINGS	FWT	792925	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.

3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	100 - 95.5	Pole	TP14x14x0.438	1	-0.411	1429.000	1.0	Pass
L2	95.5 - 42.0833	Pole	TP40.777x14x0.438	2	-16.532	3885.920	35.5	Pass
L3	42.0833 - 0	Pole	TP61x37.228x0.5	3	-34.613	6758.790	33.3	Pass
							Summary	
						Pole (L2)	35.5	Pass
						Rating =	35.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	39.7	Pass
1	Base Plate	0	27.3	Pass
1	Base Foundation Soil Interaction	0	29.4	Pass

Structure Rating (max from all components) =	39.7%

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

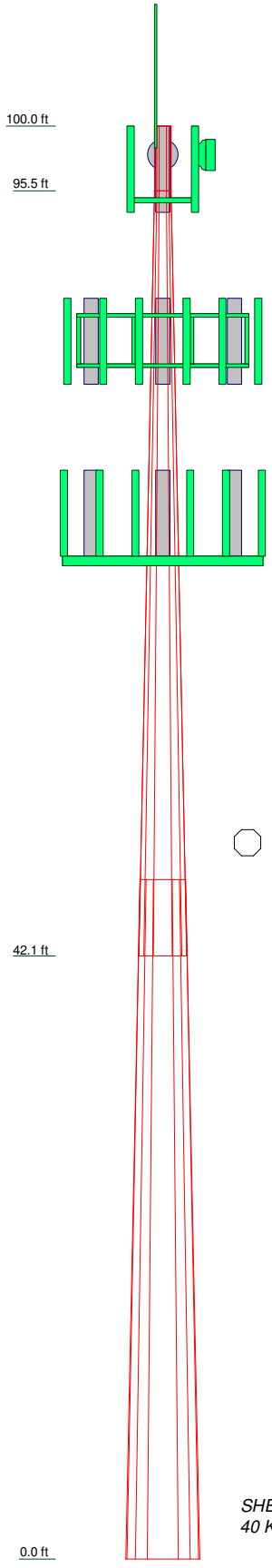
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	4'6"	8	0.438		14.000	14.000		0.3
2	53'5"	18	0.438	5'4"	14.000	40.777	A572-65	6.8
3	47'5"	18	0.500		37.228	61.000		12.4
								19.6



ALL REACTIONS ARE FACTORED

AXIAL 35 K

SHEAR 40 K

MOMENT 2758 kip-ft

TORQUE 2 kip-ft

REACTIONS - 132 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8" x 7'	100	Platform Mount [LP 302-1]	85
P65-18-XXW2-RR w/ Mount Pipe	95	Miscellaneous [NA 509-3]	85
P65-18-XXW2-RR w/ Mount Pipe	95	(3) 800 10865 w/ Mount Pipe	85
P65-18-XXW2-RR w/ Mount Pipe	95	(3) 800 10865 w/ Mount Pipe	85
Type IV BTS DAP	95	(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	70
Type IV BTS DAP	95		
Type IV BTS DAP	95	CMA-B/6520/E0-8 w/ Mount Pipe	70
Side Arm Mount [SO 101-3]	95	CMA-B/6520/E0-8 w/ Mount Pipe	70
6' x 2" Mount Pipe	95	CMA-B/6520/E0-8 w/ Mount Pipe	70
6' x 2" Mount Pipe	95	FRIG	70
6' x 2" Mount Pipe	95	FRIG	70
VHLP2-23-CR1	95	FRIG	70
VHLP2-11	95	ASU9338TYP01	70
(3) 80010866 w/ Mount Pipe	85	RG20-FXFB	70
(2) RRUS-11	85	RG20-FXFB	70
(2) RRUS-11	85	ATMAA1412D-1A20	70
(2) RRUS-11	85	ATMAA1412D-1A20	70
DC6-48-60-18-8F	85	ATMAA1412D-1A20	70
DC6-48-60-18-8F	85	Platform Mount [LP 306-1]	70
(3) RRUS-32 B30 (PLACE HOLDER)	85	(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	70
(3) RRUS-32 B30 (PLACE HOLDER)	85		
(3) RRUS-32 B30 (PLACE HOLDER)	85	(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	70
DC6-48-60-18-8F	85		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Broward County, Florida.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 132 mph basic wind in accordance with the TIA-222-G Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0'
7. TOWER RATING: 35.5%

CROWN CASTLE
We Are Solutions

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2257

Job: ***BU# 851864***			
Project:			
Client: Crown Castle	Drawn by: RAshworth		App'd:
Code: TIA-222-G	Date: 01/11/14		Scale: NTS
Path: C:\Users\RAshworth\Desktop\851864\851864.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Broward County, Florida.
2) Basic wind speed of 132 mph.
3) Structure Class II.
4) Exposure Category C.
5) Topographic Category 1.
6) Crest Height 0'.
7) Deflections calculated using a wind speed of 60 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.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	100'-95'6"	4'6"	0'	8	14.000	14.000	0.438	1.750	A572-65 (65 ksi)
L2	95'6"-42'1"	53'5"	5'4"	18	14.000	40.777	0.438	1.750	A572-65 (65 ksi)
L3	42'1"-0'	47'5"		18	37.228	61.000	0.500	2.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	*Tip Dia.*	*Area*	*I*	*r*	*C*	*I/C*	*J*	*It/Q*	*w*	*w/t*
	in	in^2	in^4	*in*	*in*	in^3	in^4	in^3	*in*	
L1	15.153	19.700	478.048	4.937	7.574	63.117	979.213	9.601	3.985	9.108
	15.153	19.700	478.048	4.937	7.574	63.117	979.213	9.601	3.985	9.108
L2	14.216	18.833	437.665	4.815	7.112	61.539	875.906	9.418	1.694	3.872
	41.406	56.016	11516.326	14.321	20.715	555.949	23047.806	28.014	6.407	14.644

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L3	40.518	58.288	9933.977	13.039	18.912	525.272	19881.025	29.150	5.672	11.344
	61.941	96.013	44399.748	21.477	30.988	1432.805	88857.917	48.016	9.856	19.712

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 100'-95'6"				1	1	1		
L2 95'6"-42'1"				1	1	1		
L3 42'1"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
LCF78-50J(7/8")	B	Surface Ar (CaAa)	85' - 0'	6	6	-0.120 0.000	1.100		0.001
860 10014(3/8)	B	Surface Ar (CaAa)	85' - 0'	4	2	0.030 0.040	0.375		0.000
WR-VG86ST-BRD(3/4)	B	Surface Ar (CaAa)	85' - 0'	2	2	0.000 0.030	0.774		0.001
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
EC4-50(1/2")	C	No	Inside Pole	95' - 0'	2	No Ice	0.000	0.000
RG-11(5/16")	C	No	Inside Pole	95' - 0'	6	No Ice	0.000	0.000
3" Conduit	C	No	Inside Pole	95' - 0'	2	No Ice	0.000	0.003
***								
LCF78-50J(7/8")	B	No	Inside Pole	85' - 0'	12	No Ice	0.000	0.001
FB-L98B-034-XXXXXX(3/8")	B	No	Inside Pole	85' - 0'	2	No Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	85' - 0'	4	No Ice	0.000	0.001
***								
EC5-50(7/8")	C	No	Inside Pole	70' - 0'	12	No Ice	0.000	0.000
ASU9323TYP01(1-1/4)	C	No	Inside Pole	70' - 0'	1	No Ice	0.000	0.001
***								

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	100'-95'6"	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	95'6"-42'1"	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	38.187	0.000	0.566
		C	0.000	0.000	0.000	0.000	0.491
L3	42'1"-0'	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	37.446	0.000	0.555
		C	0.000	0.000	0.000	0.000	0.497

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	100'-95'6"	0.000	0.000	0.000	0.000
L2	95'6"-42'1"	0.750	-0.519	0.750	-0.519
L3	42'1"-0'	0.910	-0.630	0.910	-0.630

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	6	LCF78-50J(7/8")	42.08 - 85.00	1.0000	1.0000
L2	7	860 10014(3/8)	42.08 - 85.00	1.0000	1.0000
L2	9	WR-VG86ST-BRD(3/4)	42.08 - 85.00	1.0000	1.0000

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
Lightning Rod 5/8" x 7' ***	C	From Leg	0.000 0' 3'6"	0.000	100'	No Ice	0.438	0.438	0.030
P65-18-XXW2-RR w/ Mount Pipe	A	From Leg	2.000 0' 2'	0.000	95'	No Ice	6.537	3.237	0.038
P65-18-XXW2-RR w/ Mount Pipe	B	From Leg	2.000 0' 2'	0.000	95'	No Ice	6.537	3.237	0.038
P65-18-XXW2-RR w/ Mount Pipe	C	From Leg	2.000 0' 2'	0.000	95'	No Ice	6.537	3.237	0.038
Type IV BTS DAP	A	From Leg	2.000 0' 0'	0.000	95'	No Ice	1.050	2.275	0.045
Type IV BTS DAP	B	From Leg	2.000 0' 0'	0.000	95'	No Ice	1.050	2.275	0.045
Type IV BTS DAP	C	From Leg	2.000 0' 0'	0.000	95'	No Ice	1.050	2.275	0.045
Side Arm Mount [SO 101-3]	C	None		0.000	95'	No Ice	7.500	7.500	0.252
6' x 2" Mount Pipe	A	From Leg	2.000 0'	0.000	95'	No Ice	1.425	1.425	0.022

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
6' x 2" Mount Pipe	B	From Leg	2' 2.000 0'	0.000	95'	No Ice	1.425	1.425	0.022
6' x 2" Mount Pipe	C	From Leg	2' 2.000 0'	0.000	95'	No Ice	1.425	1.425	0.022
***									
(3) 800 10865 w/ Mount Pipe	A	From Leg	2' 4.000 0'	0.000	85'	No Ice	11.542	7.430	0.094
(3) 800 10865 w/ Mount Pipe	B	From Leg	0' 4.000 0'	0.000	85'	No Ice	11.542	7.430	0.094
(3) 80010866 w/ Mount Pipe	C	From Leg	0' 4.000 0'	0.000	85'	No Ice	14.123	9.541	0.110
(2) RRUS-11	A	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.249	1.373	0.048
(2) RRUS-11	B	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.249	1.373	0.048
(2) RRUS-11	C	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.249	1.373	0.048
DC6-48-60-18-8F	A	From Leg	0' 4.000 0'	0.000	85'	No Ice	1.266	1.266	0.020
DC6-48-60-18-8F	B	From Leg	0' 4.000 0'	0.000	85'	No Ice	1.266	1.266	0.020
(3) RRUS-32 B30 (PLACE HOLDER)	A	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.789	2.706	0.077
(3) RRUS-32 B30 (PLACE HOLDER)	B	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.789	2.706	0.077
(3) RRUS-32 B30 (PLACE HOLDER)	C	From Leg	0' 4.000 0'	0.000	85'	No Ice	3.789	2.706	0.077
DC6-48-60-18-8F	C	From Leg	0' 4.000 0'	0.000	85'	No Ice	1.266	1.266	0.020
Platform Mount [LP 302-1]	C	None	0'	0.000	85'	No Ice	33.030	33.030	1.709
Miscellaneous [NA 509-3]	C	None		0.000	85'	No Ice	11.840	11.840	0.275
***									
(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	A	From Leg	3' 4.000 0'	0.000	70'	No Ice	10.224	5.099	0.085
(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	B	From Leg	3' 4.000 0'	0.000	70'	No Ice	10.224	5.099	0.085
(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	C	From Leg	3' 4.000 0'	0.000	70'	No Ice	10.224	5.099	0.085
CMA-B/6520/E0-8 w/ Mount Pipe	A	From Leg	3' 4.000 0'	0.000	70'	No Ice	5.234	4.994	0.052
CMA-B/6520/E0-8 w/ Mount Pipe	B	From Leg	3' 4.000 0'	0.000	70'	No Ice	5.234	4.994	0.052
CMA-B/6520/E0-8 w/ Mount Pipe	C	From Leg	3' 4.000 0'	0.000	70'	No Ice	5.234	4.994	0.052
			3'						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FRIG	A	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	2.793	1.103	0.057
FRIG	B	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	2.793	1.103	0.057
FRIG	C	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	2.793	1.103	0.057
ASU9338TYP01	A	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	3.737	1.155	0.019
RG20-FXFB	B	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	4.168	1.117	0.055
RG20-FXFB	C	From Leg	4.000 / 0' / 0'	0.000	70'	No Ice	4.168	1.117	0.055
ATMAA1412D-1A20	A	From Leg	4.000 / 0' / 3'	0.000	70'	No Ice	0.467	1.167	0.013
ATMAA1412D-1A20	B	From Leg	4.000 / 0' / 3'	0.000	70'	No Ice	0.467	1.167	0.013
ATMAA1412D-1A20	C	From Leg	4.000 / 0' / 3'	0.000	70'	No Ice	0.467	1.167	0.013
Platform Mount [LP 306-1] ***	C	None		0.000	70'	No Ice	20.810	20.810	1.616

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-23-CR1	A	Paraboloid w/Shroud (HP)	From Leg	2.000 / 0' / 3'	0.000		95'	2.175	No Ice	3.720	0.031
VHLP2-11 ***	B	Paraboloid w/Shroud (HP)	From Leg	2.000 / 0' / 3'	0.000		95'	2.175	No Ice	3.720	0.027

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice

Comb. No.	Description
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	100 - 95.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-0.420	-2.740	1.594
			Max. Mx	21	-0.298	3.331	0.462
			Max. My	14	-0.412	-0.383	-3.519
			Max. Vy	20	-1.326	3.329	0.473
			Max. Vx	14	1.398	-0.383	-3.519
			Max. Torque	17			0.455
L2	95.5 - 42.0833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	4	-16.537	-519.838	903.884
			Max. Mx	20	-16.532	1047.826	7.301
			Max. My	14	-16.532	-5.445	-1048.987
			Max. Vy	20	-31.818	1047.826	7.301
			Max. Vx	14	31.805	-5.445	-1048.987
			Max. Torque	24			1.868
L3	42.0833 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	4	-34.613	-1370.809	2379.022
			Max. Mx	20	-34.613	2755.291	14.008
			Max. My	14	-34.613	-10.356	-2755.983
			Max. Vy	20	-40.423	2755.291	14.008
			Max. Vx	14	40.410	-10.356	-2755.983
			Max. Torque	12			-1.862

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	34.627	-0.094	-40.398
	Max. H_x	21	25.970	40.411	0.134
	Max. H_z	2	34.627	0.177	40.332
	Max. M_x	2	2749.652	0.177	40.332
	Max. M_z	8	2747.555	-40.324	-0.031
	Max. Torsion	24	1.861	20.241	34.977
	Min. Vert	5	25.970	-20.135	34.909
	Min. H_x	8	34.627	-40.324	-0.031
	Min. H_z	14	34.627	-0.094	-40.398
	Min. M_x	14	-2755.983	-0.094	-40.398
	Min. M_z	20	-2755.291	40.411	0.134
	Min. Torsion	12	-1.861	-20.195	-35.003

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	28.856	0.000	0.000	-0.099	-0.366	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	34.627	-0.177	-40.332	-2749.652	17.711	-1.619
0.9 Dead+1.6 Wind 0 deg - No Ice	25.970	-0.177	-40.332	-2743.997	17.775	-1.618
1.2 Dead+1.6 Wind 30 deg - No Ice	34.627	20.135	-34.909	-2379.022	-1370.809	-0.694
0.9 Dead+1.6 Wind 30 deg - No Ice	25.970	20.135	-34.909	-2374.127	-1367.899	-0.695
1.2 Dead+1.6 Wind 60 deg - No Ice	34.627	34.922	-20.146	-1372.356	-2379.236	-0.008
0.9 Dead+1.6 Wind 60 deg - No Ice	25.970	34.922	-20.146	-1369.521	-2374.262	-0.009
1.2 Dead+1.6 Wind 90 deg - No Ice	34.627	40.324	0.031	3.566	-2747.555	0.680
0.9 Dead+1.6 Wind 90 deg - No Ice	25.970	40.324	0.031	3.585	-2741.828	0.679
1.2 Dead+1.6 Wind 120 deg - No Ice	34.627	34.868	20.320	1390.371	-2374.539	1.611
0.9 Dead+1.6 Wind 120 deg - No Ice	25.970	34.868	20.320	1387.546	-2369.576	1.609
1.2 Dead+1.6 Wind 150 deg - No Ice	34.627	20.195	35.003	2388.734	-1377.760	1.861
0.9 Dead+1.6 Wind 150 deg - No Ice	25.970	20.195	35.003	2383.871	-1374.830	1.860
1.2 Dead+1.6 Wind 180 deg - No Ice	34.627	0.094	40.398	2755.983	-10.356	1.468
0.9 Dead+1.6 Wind 180 deg - No Ice	25.970	0.094	40.398	2750.369	-10.218	1.468
1.2 Dead+1.6 Wind 210 deg - No Ice	34.627	-20.089	35.036	2391.356	1365.395	0.659
0.9 Dead+1.6 Wind 210 deg - No Ice	25.970	-20.089	35.036	2386.487	1362.718	0.659
1.2 Dead+1.6 Wind 240 deg - No Ice	34.627	-34.956	20.165	1374.069	2381.726	0.008
0.9 Dead+1.6 Wind 240 deg - No Ice	25.970	-34.956	20.165	1371.288	2376.965	0.009
1.2 Dead+1.6 Wind 270 deg - No Ice	34.627	-40.411	-0.134	-14.008	2755.291	-0.645
0.9 Dead+1.6 Wind 270 deg - No Ice	25.970	-40.411	-0.134	-13.942	2749.763	-0.644
1.2 Dead+1.6 Wind 300 deg - No Ice	34.627	-34.967	-20.281	-1386.753	2383.461	-1.460
0.9 Dead+1.6 Wind 300 deg - No Ice	25.970	-34.967	-20.281	-1383.879	2378.694	-1.458
1.2 Dead+1.6 Wind 330 deg - No Ice	34.627	-20.241	-34.977	-2386.332	1381.443	-1.861

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 330 deg - No Ice	25.970	-20.241	-34.977	-2381.418	1378.724	-1.860
Dead+Wind 0 deg - Service	28.856	-0.021	-4.660	-317.400	1.727	-0.187
Dead+Wind 30 deg - Service	28.856	2.326	-4.033	-274.628	-158.511	-0.080
Dead+Wind 60 deg - Service	28.856	4.035	-2.328	-158.457	-274.886	-0.001
Dead+Wind 90 deg - Service	28.856	4.659	0.004	0.327	-317.390	0.079
Dead+Wind 120 deg - Service	28.856	4.029	2.348	160.367	-274.344	0.186
Dead+Wind 150 deg - Service	28.856	2.333	4.044	275.581	-159.313	0.215
Dead+Wind 180 deg - Service	28.856	0.011	4.668	317.963	-1.511	0.170
Dead+Wind 210 deg - Service	28.856	-2.321	4.048	275.884	157.254	0.076
Dead+Wind 240 deg - Service	28.856	-4.039	2.330	158.487	274.540	0.001
Dead+Wind 270 deg - Service	28.856	-4.669	-0.016	-1.700	317.650	-0.075
Dead+Wind 300 deg - Service	28.856	-4.040	-2.343	-160.118	274.741	-0.169
Dead+Wind 330 deg - Service	28.856	-2.339	-4.041	-275.472	159.105	-0.215

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-28.856	0.000	0.000	28.856	0.000	0.000%
2	-0.177	-34.627	-40.332	0.177	34.627	40.332	0.000%
3	-0.177	-25.970	-40.332	0.177	25.970	40.332	0.000%
4	20.135	-34.627	-34.909	-20.135	34.627	34.909	0.000%
5	20.135	-25.970	-34.909	-20.135	25.970	34.909	0.000%
6	34.922	-34.627	-20.146	-34.922	34.627	20.146	0.000%
7	34.922	-25.970	-20.146	-34.922	25.970	20.146	0.000%
8	40.324	-34.627	0.031	-40.324	34.627	-0.031	0.000%
9	40.324	-25.970	0.031	-40.324	25.970	-0.031	0.000%
10	34.868	-34.627	20.320	-34.868	34.627	-20.320	0.000%
11	34.868	-25.970	20.320	-34.868	25.970	-20.320	0.000%
12	20.195	-34.627	35.003	-20.195	34.627	-35.003	0.000%
13	20.195	-25.970	35.003	-20.195	25.970	-35.003	0.000%
14	0.094	-34.627	40.398	-0.094	34.627	-40.398	0.000%
15	0.094	-25.970	40.398	-0.094	25.970	-40.398	0.000%
16	-20.089	-34.627	35.036	20.089	34.627	-35.036	0.000%
17	-20.089	-25.970	35.036	20.089	25.970	-35.036	0.000%
18	-34.956	-34.627	20.165	34.956	34.627	-20.165	0.000%
19	-34.956	-25.970	20.165	34.956	25.970	-20.165	0.000%
20	-40.411	-34.627	-0.134	40.411	34.627	0.134	0.000%
21	-40.411	-25.970	-0.134	40.411	25.970	0.134	0.000%
22	-34.967	-34.627	-20.281	34.967	34.627	20.281	0.000%
23	-34.967	-25.970	-20.281	34.967	25.970	20.281	0.000%
24	-20.241	-34.627	-34.977	20.241	34.627	34.977	0.000%
25	-20.241	-25.970	-34.977	20.241	25.970	34.977	0.000%
26	-0.021	-28.856	-4.660	0.021	28.856	4.660	0.000%
27	2.326	-28.856	-4.033	-2.326	28.856	4.033	0.000%
28	4.035	-28.856	-2.328	-4.035	28.856	2.328	0.000%
29	4.659	-28.856	0.004	-4.659	28.856	-0.004	0.000%
30	4.029	-28.856	2.348	-4.029	28.856	-2.348	0.000%
31	2.333	-28.856	4.044	-2.333	28.856	-4.044	0.000%
32	0.011	-28.856	4.668	-0.011	28.856	-4.668	0.000%
33	-2.321	-28.856	4.048	2.321	28.856	-4.048	0.000%
34	-4.039	-28.856	2.330	4.039	28.856	-2.330	0.000%
35	-4.669	-28.856	-0.016	4.669	28.856	0.016	0.000%
36	-4.040	-28.856	-2.343	4.040	28.856	2.343	0.000%
37	-2.339	-28.856	-4.041	2.339	28.856	4.041	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000794
3	Yes	4	0.00000001	0.00000466
4	Yes	4	0.00000001	0.00003812
5	Yes	4	0.00000001	0.00002195
6	Yes	4	0.00000001	0.00003911
7	Yes	4	0.00000001	0.00002255
8	Yes	4	0.00000001	0.00000312
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00004369
11	Yes	4	0.00000001	0.00002527
12	Yes	4	0.00000001	0.00003648
13	Yes	4	0.00000001	0.00002093
14	Yes	4	0.00000001	0.00000564
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00004031
17	Yes	4	0.00000001	0.00002326
18	Yes	4	0.00000001	0.00003929
19	Yes	4	0.00000001	0.00002264
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00003750
23	Yes	4	0.00000001	0.00002153
24	Yes	4	0.00000001	0.00004461
25	Yes	4	0.00000001	0.00002583
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95.5	2.888	31	0.265	0.001
L2	95.5 - 42.0833	2.639	31	0.265	0.001
L3	47.4167 - 0	0.570	31	0.118	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100'	Lightning Rod 5/8" x 7'	31	2.888	0.265	0.001	43493
98'	VHLP2-23-CR1	31	2.777	0.265	0.001	43493
95'	P65-18-XXW2-RR w/ Mount Pipe	31	2.611	0.264	0.001	43493
85'	(3) 800 10865 w/ Mount Pipe	31	2.080	0.251	0.001	27748

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
70'	(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	31	1.367	0.205	0.001	19430

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95.5	25.014	12	2.297	0.007
L2	95.5 - 42.0833	22.852	12	2.293	0.008
L3	47.4167 - 0	4.941	12	1.025	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100'	Lightning Rod 5/8" x 7'	12	25.014	2.297	0.007	5048
98'	VHLP2-23-CR1	12	24.050	2.297	0.007	5048
95'	P65-18-XXW2-RR w/ Mount Pipe	12	22.614	2.291	0.008	5048
85'	(3) 800 10865 w/ Mount Pipe	12	18.011	2.172	0.008	3214
70'	(2) CMA-BDHH/6520/E0-8 w/ Mount Pipe	12	11.843	1.779	0.006	2247

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	100 - 95.5 (1)	TP14x14x0.438	4'6"	0'	0.0	19.699	-0.411	1429.000	0.000
L2	95.5 - 42.0833 (2)	TP40.777x14x0.438	53'5"	0'	0.0	52.304	-16.532	3885.920	0.004
L3	42.0833 - 0 (3)	TP61x37.228x0.5	47'5"	0'	0.0	96.013	-34.613	6758.790	0.005

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	100 - 95.5 (1)	TP14x14x0.438	3.649	381.543	0.010	0.000	381.543	0.000
L2	95.5 - 42.0833 (2)	TP40.777x14x0.438	1049.733	2998.608	0.350	0.000	2998.608	0.000
L3	42.0833 - 0 (3)	TP61x37.228x0.5	2757.583	8405.083	0.328	0.000	8405.083	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	100 - 95.5 (1)	TP14x14x0.438	1.428	714.502	0.002	0.352	781.252	0.000
L2	95.5 - 42.0833 (2)	TP40.777x14x0.438	31.818	1942.960	0.016	1.862	6004.558	0.000
L3	42.0833 - 0 (3)	TP61x37.228x0.5	40.423	3379.400	0.012	1.861	16830.749	0.000

Pole Interaction Design Data

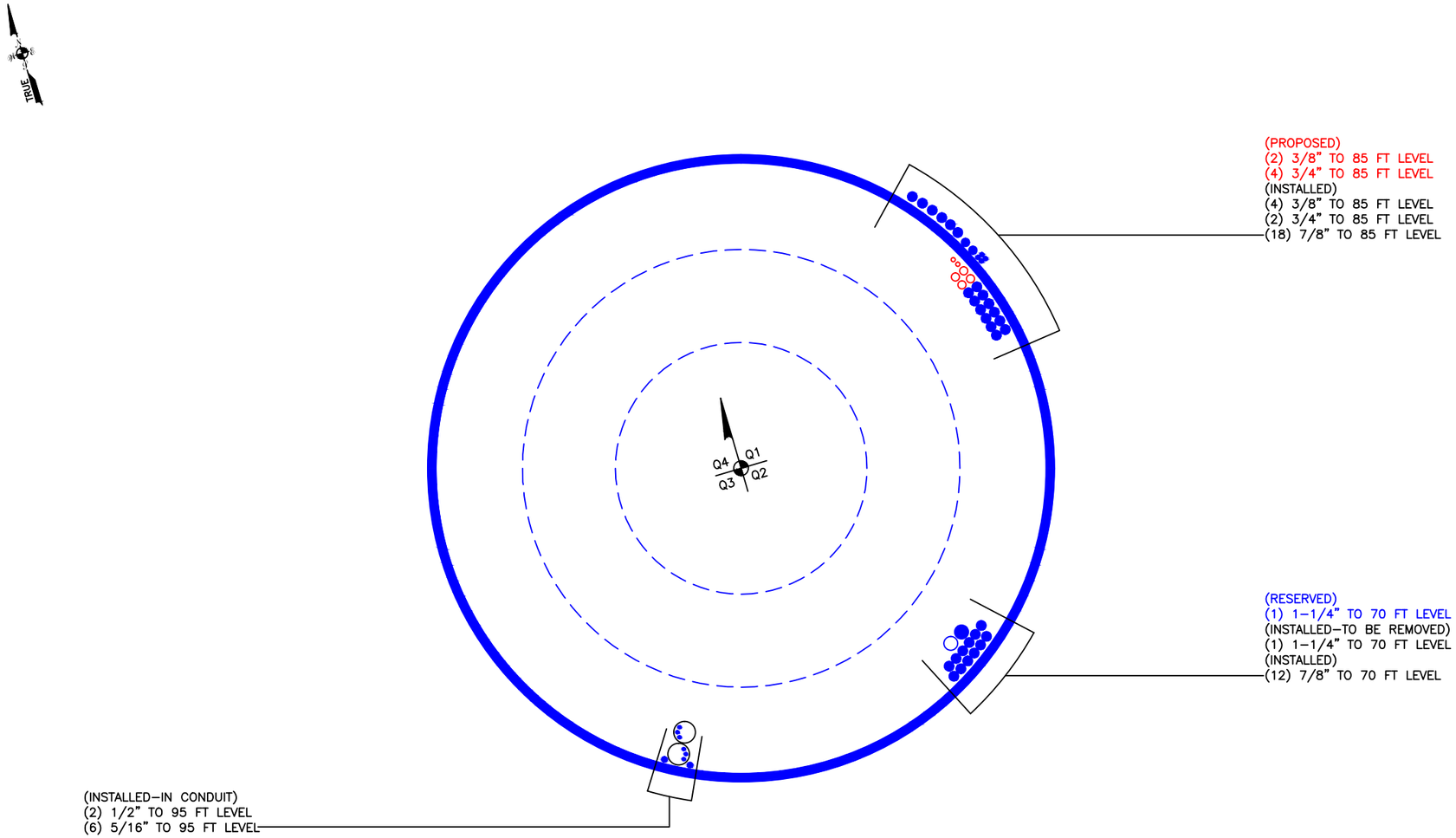
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 95.5 (1)	0.000	0.010	0.000	0.002	0.000	0.010 ✔	1.000	4.8.2 ✔
L2	95.5 - 42.0833 (2)	0.004	0.350	0.000	0.016	0.000	0.355 ✔	1.000	4.8.2 ✔
L3	42.0833 - 0 (3)	0.005	0.328	0.000	0.012	0.000	0.333 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	100 - 95.5	Pole	TP14x14x0.438	1	-0.411	1429.000	1.0	Pass
L2	95.5 - 42.0833	Pole	TP40.777x14x0.438	2	-16.532	3885.920	35.5	Pass
L3	42.0833 - 0	Pole	TP61x37.228x0.5	3	-34.613	6758.790	33.3	Pass
							Summary	
						Pole (L2)	35.5	Pass
						RATING =	**35.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 851864 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	*851864*
Site Name:	*CCCN*
App #:	*209953 Rev.1*
Pole Manufacturer:	*Other*

Reactions		
Mu:	2758	ft-kips
Axial, Pu:	35	kips
Shear, Vu:	40	kips
Eta Factor, ɳ	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	68	in

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

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ɳ):	103.1 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	39.7% **Pass**	

Plate Data		
Diam:	74	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	9.68	in

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	14.8 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	27.3% **Pass**	Y.L. Length: 30.05

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

n/a

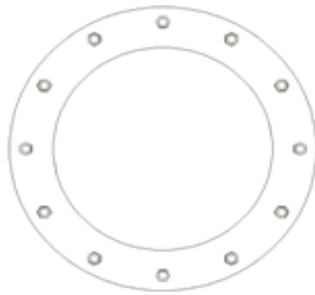
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	61	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 1/11/2014

BU:	851864
Site Name:	CCCN
App Number:	209953 Rev. 1
Work Order:	698143

Monopole Drilled Pier

Input

Criteria

TIA Revision:	G
ACI 318 Revision:	2005
Seismic Category:	B

Forces

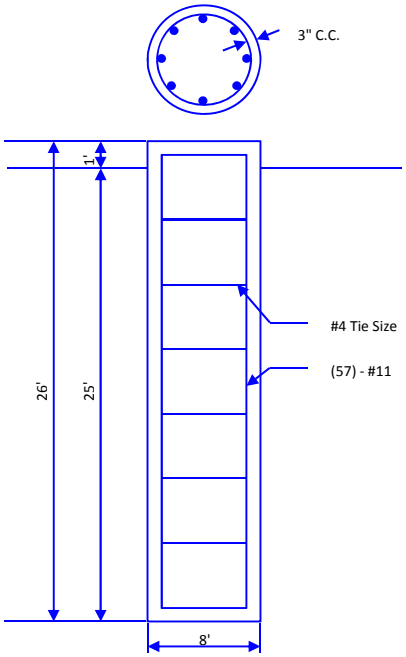
Compression	35	kips
Shear	40	kips
Moment	2758	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	8	ft
Ext. above grade:	1	ft
Depth below grade:	25	ft

Material Properties

Number of Rebar:	57	
Rebar Size:	11	
Tie Size	4	
Rebar tensile strength:	60	ksi
Concrete Strength:	3000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	3	in



Soil Profile: Soil 1

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	2	0	2	120	0	0			0	
2	2	2	4	110	2000	0				18
3	6	4	10	47.6	2000	0				18
4	6	10	16	57.6	0	32				12
5	8	16	24	57.6	0	32				33
6	1	24	25	57.6	0	36				32

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	3.47	ft
Max Moment, Mu:	2918.01	k-ft
Soil Safety Factor:	4.53	
Safety Factor Req'd:	1.33	
RATING:	29.4%	

Soil Axial Capacity

Skin Friction (k):	292.52	kips
End Bearing (k):	1269.16	kips
Comp. Capacity (k), ϕCn:	1561.69	kips
Comp. (k), Cu:	35.00	kips
RATING:	2.2%	

Concrete/Steel Check

Mu (from soil analysis)	2918.01	k-ft
ϕMn	14948.67	k-ft
RATING:	19.5%	

rho provided	1.23	
rho required	0.33	OK

Rebar Spacing	3.42	
Spacing required	22.56	OK

Dev. Length required	21.28	
Dev. Length provided	61.78	OK

Overall Foundation Rating: 29.4%