December 16, 2013

Dennis Demarco
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6100 Broken Sound Parkway, Suite 6
Boca Raton, FL 33487

CALTROP Corporation
3400 Lakeside Drive, Suite 525
Miramar, FL 33027
(954) 874-7870

Subject:	**Rigorous Structural Analysis Report**
Carrier Designation:	**AT&T: FL71**
CALTROP Project Number:	**130-729.03**
Site Information:	**5555 Regency Lakes Boulevard** **Coconut Creek, Broward County, FL 33073** **Latitude 26.310034°N, Longitude 80.199431°W** **118.5' Monopole Tower**

Dear Mr. Demarco:

CALTROP Corporation (CALTROP) is pleased to submit this Rigorous Structural Analysis Report to determine if the subject tower is able to support certain proposed additional loads.

It is our understanding that AT&T, who retained MasTec Network Solutions, LLC (MNS), desires to install new telecommunication equipment on the subject tower. This analysis was based on the supporting information listed in Table 3.0. Our services were performed in accordance with the terms and conditions of the existing field services agreement between CALTROP and MNS. This report summarizes the results of our findings.

The purpose of this analysis is to determine the suitability of the aforementioned tower to support the loading indicated in Table 2.2. This analysis has been performed in accordance with the TIA-222-G standard, based upon a nominal 3-second gust reference wind speed of 132 mph with no ice. Based on our analysis, subject to the assumptions noted, it is our opinion that the tower superstructure and the foundation system **can adequately resist** the proposed loading, subject to the assumptions noted, without modification.

Tower: Pass at 74.9%, Foundation: Pass at 71.3%

This report has been prepared for the purpose of providing a structural evaluation of the subject telecommunications tower for the loading conditions indicated. It is intended for the exclusive use of AT&T and MNS. The information, assumptions, and recommendations contained in this report should not be used by others for any purpose without express written authorization from CALTROP. We appreciate the opportunity to provide our professional services to you and look forward to continuing our relationship. If we can be of any further assistance, please do not hesitate to call.

Sincerely,

CALTROP CORPORATION

Dully M. Amaya, E.I.
Junior Project Engineer
Registered, Florida 100800943

Michael A. Phillips, P.E.
Principal Engineer
Registered, Florida 68312

MICHAEL A. PHILLIPS LICENSE No. 68312 STATE OF FLORIDA PROFESSIONAL ENGINEER

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1.0 INTRODUCTION

The subject tower is a 118.5' monopole tower.

2.0 ANALYSIS CRITERIA

The tower was analyzed in accordance with the criteria indicated in Table 2.1 for the proposed and existing/reserved antennas, transmission lines, and mountings shown in Table 2.2.

Table 2.1— Analysis Criteria

Criteria	Description
Building Code	Florida Building Code 2010 with 2012 Supplement.
Standard	TIA-222-G *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures* (FBC 3108.1)
Ultimate Wind Speed	170 mph, 3-Second Gust (per FBC 1620.2)
Nominal Wind Speed	132 mph, (per FBC 1609.3.1 for use with TIA-222-G)
Exposure	C
Structure Class	II (Importance Factor = 1.0)
Radial Ice Thickness	Zero Inches
Topographic Factor	1
Crest Height	Zero Feet

Table 2.2—Appurtenance Loading

Center Line Elevation (feet)	Carrier Name	Number of Antennas	Antenna Mfr.	Antenna Model	Mount	Number of Feed Lines*	Feed Line Size (inches)
120	Sprint/ Nextel	~~3~~	~~Decibel~~	~~844G65VTZASX~~	Platform	~~6~~ 3 Hybrid	~~⅞~~ 39mm
		1	RFS	APXVERR18-C-8-1910I			
		1	RFS	APXVERR18-C-1-1910I			
		1	RFS	APXVERR18-C-0-1910I			
120	Sprint/ Nextel	9	RFS	ACU-A20-N (RET)	Platform	-	-
120	Sprint/ Nextel	12	Ericsson	RRUS-11	Platform	-	-

Center Line Elevation (feet)	**Carrier Name**	**Number of Antennas**	**Antenna Mfr.**	**Antenna Model**	**Mount**	**Number of Feed Lines***	**Feed Line Size** (inches)
120	Sprint/ Nextel	3	Ericsson	RRUS-A2 Module	Platform	-	-
120	Sprint/ Nextel	3	RFS	IBC1900HG-1 (Combiner)	Platform	-	-
120	Sprint/ Nextel	3	Ericsson	800 SMR (Filter)	Platform	-	-
110	T-Mobile	6	RFS	APX17DWV-17DWV-S-E	T-Arm	6 1	⅞ 1¼
		3	RFS	APXV18-206517S-C-A20	T-Arm		
110	T-Mobile	2	Nokia	FXFB (RRU)	T-Arm	-	-
110	T-Mobile	3	Nokia	FRIG (RRU)	T-Arm	-	-
110	T-Mobile	1	Raycap	RNSNDC-7771-PF-48 (COVP)	T-Arm	-	-
110	T-Mobile	6	RFS	ATMAP 1412D-1A20	T-Arm	-	-
105	Coconut Creek	1	Unknown	6' Omni	Standoff	1	1⅝
101	**AT&T**	**9**	**Kathrein**	**800-10865**	**Platform**	2 DC **4 DC** 1 Fiber **2 Fiber**	⅞ **⅞** ⅜ **⅜**
101	AT&T	3	Ericsson	700(RRUS-11)	**Platform**	-	-
101	**AT&T**	**3**	**Ericsson**	**AWS(RRUS-32)**	**Platform**	-	-
101	**AT&T**	**3**	**Ericsson**	**WCS(RRUS-32)**	**Platform**	-	-
101	**AT&T**	**3**	**Ericsson**	**1900/PCS (RRUS-32)**	**Platform**	-	-
101	AT&T	1	Raycap	DC6-48-60-18-8F	**Platform**	-	-
101	**AT&T**	**2**	**Raycap**	**DC6-48-60-18-8F**	**Platform**	-	-

Legend: **Proposed Appurtenances (Bold)**
Existing Appurtenances (Regular)
Future/Reserved Appurtenances (Italic)
~~Appurtenances to be Removed (Strikethrough)~~

3.0 ANALYSIS PROCEDURES

This analysis is based on published catalog information, the supporting information listed in Table 3.0, and appurtenance information provided by AT&T.

Table 3.0—Supporting Information

Date	Description	By
November 12, 2013	Site Walk	CALTROP Corporation
October 28, 2013	Radio Frequency Data Sheet	AT&T
June 6, 2013	Foundation Mapping	Tower Engineering Professionals
July 2, 2013	Tower Analysis	AMEC, E & I, Inc.
May 10, 2013	Geotechnical Report	Terracon Consultants, Inc.
March 20, 2013	Tower Analysis (for T-Mobile)	CALTROP Corporation
January 28, 2013	Tower Analysis (for AT&T)	CALTROP Corporation
March 28, 2012	Tower Mapping	Unknown
Various	Miscellaneous Information	AT&T/MNS

3.1 Analysis Methods

The tower superstructure analysis was performed with the use of tnxTower, a commercially available software program designed for the analysis of telecommunications towers. The program was used to create a three-dimensional mathematical model of the tower and to calculate member stresses under the appropriate dead, live, and wind loads. Loads were computed in accordance with applicable portions of the TIA-222-G standard. Selected output from the tnxTower analysis is included in Appendix A.

A separate analysis of the tower foundation system was performed by comparing the factored reactions from the tnxTower output to the capacities derived from the foundation reactions indicated in the original tower design. These capacities were derived by multiplying the original service design reactions by a minimum factor of safety of 2.0 and a reduction factor of 0.75 per TIA-222-G, Section 9.4.1. The original tower design is included in Appendix B

3.2 Analysis Assumptions and Limitations

- Information in the original design drawings or in the previous analysis that could not be verified by CALTROP personnel is assumed to be correct.
- All tower components are assumed to be in adequate condition to carry their full design capacity.
- The configuration of antennas, transmission cables, mounts and other appurtenances is assumed to be as specified in this report.
- Limitations for antenna twist, tilt, roll, or lateral translation are not considered in this analysis, since the effects of these factors on structural tower performance are typically negligible.
- Emergency/essential communication equipment is not located on the tower.
- The foundation was designed using a minimum factor of safety of 2.0.
- The foundation system was constructed to develop its full design capacity.

If any of the above assumptions are not valid or have been made in error, this analysis may be affected, and CALTROP should be allowed to review any new information to determine its effect on the structural integrity of the tower.

4.0 ANALYSIS RESULTS

The following tables summarize analysis results for the tower superstructure and foundation system.

Table 4.1 – Tower Component Results

Section No.	Component	Elevation (Ft. AGL)	Percent Capacity Used	Results
L1	Monopole	118.5 – 85.08	74.9	Pass
L2	Monopole	85.08 – 46.67	61.1	Pass
L3	Monopole	46.67 - 0	61.4	Pass
Base Plate		0	49.8	Pass
Anchor Bolts		0	61.2	Pass

*Note: Existing structural component stress ratios up to 105% are considered acceptable.

Table 4.2 – Foundation Component Capacity

Component (Factored)	Reaction	Est. Capacity	Percent Capacity Used	Results
Moment	5406 kips-ft.	7579 kip-ft.	71.3	Pass
Shear	60.6 kips	89.9 kips	67.4	Pass

*Note: Existing structural component stress ratios up to 105% are considered acceptable.

APPENDIX A

Tower Input Data

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

- Tower is located in Broward County, Florida.
- Basic wind speed of 132 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	118.50-85.08	33.42	3.92	18	13.5000	30.2080	0.3125	1.2500	A572-65 (65 ksi)
L2	85.08-46.67	42.33	6.33	18	27.6232	48.7874	0.4375	1.7500	A572-65 (65 ksi)
L3	46.67-0.00	53.00		18	44.7475	71.2429	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	*Tip Dia.* *in*	*Area* in^2	*I* in^4	*r* *in*	*C* *in*	*I/C* in^3	*J* in^4	*It/Q* in^2	*w* *in*	*w/t*
L1	13.7083	13.0804	287.3967	4.6816	6.8580	41.9068	575.1716	6.5414	1.8260	5.843
	30.6740	29.6526	3348.2036	10.6129	15.3457	218.1856	6700.8128	14.8291	4.7666	15.253
L2	30.0395	37.7508	3524.8908	9.6509	14.0326	251.1929	7054.4197	18.8790	4.0917	9.352

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
	49.5400	67.1399	19829.3816	17.1642	24.7840	800.0881	39684.8552	33.5763	7.8166	17.866
L3	48.6511	61.5300	15262.5962	15.7301	22.7317	671.4222	30545.2754	30.7709	7.1056	16.241
	72.3419	98.3221	62276.1236	25.1359	36.1914	1720.7440	124634.1917	49.1704	11.7688	26.9

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 118.50-85.08				1	1	1		
L2 85.08-46.67				1	1	1		
L3 46.67-0.00				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	24
Embedment length	72.0000 in
f'_c	3 ksi
Grout space	2.0000 in
Base plate grade	A633-60
Base plate thickness	2.7500 in
Bolt circle diameter	78.0000 in
Outer diameter	84.0000 in
Inner diameter	68.0000 in
Base plate type	Plain Plate

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 plf
7/8 (SPRINT/NEXTEL)	A	Surface Af (CaAa)	118.50 - 0.00	6	6	-0.300 0.200	1.1100	3.4872	0.54

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
39mm Hybrid (1.535in) (SPRINT/NEXTEL)	A	No	Inside Pole	118.50 - 0.00	3	No Ice	0.00	1.70
1 5/8 (CITY OF CC)	C	No	Inside Pole	105.00 - 0.00	1	No Ice	0.00	1.04
7/8 (AT&T DC)	B	No	Inside Pole	95.00 - 0.00	6	No Ice	0.00	0.54
3/8 (AT&T (Fiber))	B	No	Inside Pole	95.00 - 0.00	3	No Ice	0.00	0.13
1 1/4 (T-Mobile)	B	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	0.66
7/8 (T-Mobile)	B	No	Inside Pole	110.00 - 0.00	6	No Ice	0.00	0.54

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	B	No	Inside Pole	110.00 - 0.00	6	No Ice	0.00	1.04

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	118.50-85.08	A	0.000	0.000	37.096	0.000	0.28
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	0.000	0.000	0.02
L2	85.08-46.67	A	0.000	0.000	42.635	0.000	0.32
		B	0.000	0.000	0.000	0.000	0.53
		C	0.000	0.000	0.000	0.000	0.04
L3	46.67-0.00	A	0.000	0.000	51.804	0.000	0.39
		B	0.000	0.000	0.000	0.000	0.64
		C	0.000	0.000	0.000	0.000	0.05

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	118.50-85.08	-1.0049	-0.3352	-1.0049	-0.3352
L2	85.08-46.67	-1.1904	-0.3955	-1.1904	-0.3955
L3	46.67-0.00	-1.2954	-0.4296	-1.2954	-0.4296

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	7/8	85.08 - 118.50	1.0000	1.0000
L2	1	7/8	46.67 - 85.08	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
800 SMR Filter (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.30	0.84	0.02
800 SMR Filter (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.30	0.84	0.02
800 SMR Filter (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.30	0.84	0.02
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	1.38	0.41	0.02
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	B	From Leg	3.00 0.00	0.0000	120.00	No Ice	1.38	0.41	0.02

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						
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	1.38	0.41	0.02
RRUS-A2 Module (side) (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.50	1.87	0.02
RRUS-A2 Module (side) (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.50	1.87	0.02
RRUS-A2 Module (side) (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.50	1.87	0.02
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	2.94	3.04	0.11
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	2.94	3.04	0.11
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	2.94	3.04	0.11
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.08	0.14	0.00
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.08	0.14	0.00
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	0.08	0.14	0.00
APXVERR18-C (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	8.26	5.28	0.06
APXVERR18-C (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	8.26	5.28	0.06
APXVERR18-C (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	8.26	5.28	0.06
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	6.55	5.63	0.04
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	6.55	5.63	0.04
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice	6.55	5.63	0.04
FWT Low Profile Platform (SPRINT/NEXTEL)	A	None		0.0000	118.50	No Ice	56.00	56.00	2.70
6' Omni (CITY OF CC)	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice	2.09	2.09	0.04
4' Standoff (CITY OF CC)	B	None		0.0000	105.00	No Ice	0.79	0.79	0.02
(3) 800-10865 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	10.91	5.40	0.09
(3) 800-10865 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	10.91	5.40	0.09
(3) 800-10865	C	From Leg	3.00	0.0000	101.00	No Ice	10.91	5.40	0.09

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*
(AT&T)			0.00 0.00						
Raycap DC6-48-60-18-8F (AT&T)	A	From Leg	0.50 0.00 0.00	0.0000	101.00	No Ice	1.47	1.47	0.02
Raycap DC6-48-60-18-8F (AT&T)	B	From Leg	0.50 0.00 0.00	0.0000	101.00	No Ice	1.47	1.47	0.02
Raycap DC6-48-60-18-8F (AT&T)	C	From Leg	0.50 0.00 0.00	0.0000	101.00	No Ice	1.47	1.47	0.02
RRUS-11 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	2.94	1.52	0.05
RRUS-11 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	2.94	1.52	0.05
RRUS-11 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	2.94	1.52	0.05
(3) RRUS-32 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	3.87	2.88	0.08
(3) RRUS-32 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	3.87	2.88	0.08
(3) RRUS-32 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice	3.87	2.88	0.08
Connect-IT LPPS-14-12-96-HD-PHK (AT&T)	C	None		0.0000	98.50	No Ice	55.00	55.00	2.00
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	9.68	5.00	0.05
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	9.68	5.00	0.05
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	9.68	5.00	0.05
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	5.64	4.94	0.06
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	5.64	4.94	0.06
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	5.64	4.94	0.06
ASU9338TYP01 (RNSNDC-7771-PF-48) (COVP High) (T-Mobile)	C	None		0.0000	110.00	No Ice	2.96	1.08	0.02
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	1.17	0.47	0.01
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	1.17	0.47	0.01
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	1.17	0.47	0.01

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*
FXxx (RF Module) (T-Mobile)	A	None		0.0000	110.00	No Ice	4.17	1.12	0.06
FXxx (RF Module) (T-Mobile)	B	None		0.0000	110.00	No Ice	4.17	1.12	0.06
FRIG (RF Module) (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	2.98	1.02	0.05
FRIG (RF Module) (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	2.98	1.02	0.05
FRIG (RF Module) (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	110.00	No Ice	2.98	1.02	0.05
Valmont T-Arm (1) (T-Mobile)	A	None		0.0000	110.00	No Ice	10.54	10.54	0.34
Valmont T-Arm (1) (T-Mobile)	B	None		0.0000	110.00	No Ice	10.54	10.54	0.34
Valmont T-Arm (1) (T-Mobile)	C	None		0.0000	110.00	No Ice	10.54	10.54	0.34

Tower Pressures - No Ice

G_H = 1.100

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 118.50-85.08	99.80	1.265	54	61.802	A	0.000	61.802	61.802	100.00	37.096	0.000
					B	0.000	61.802		100.00	0.000	0.000
					C	0.000	61.802		100.00	0.000	0.000
L2 85.08-46.67	64.60	1.154	49	127.360	A	0.000	127.360	127.360	100.00	42.635	0.000
					B	0.000	127.360		100.00	0.000	0.000
					C	0.000	127.360		100.00	0.000	0.000
L3 46.67-0.00	22.82	0.927	39	235.281	A	0.000	235.281	235.281	100.00	51.804	0.000
					B	0.000	235.281		100.00	0.000	0.000
					C	0.000	235.281		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

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 118.50-85.08	99.80	1.265	10	61.802	A	0.000	61.802	61.802	100.00	37.096	0.000
					B	0.000	61.802		100.00	0.000	0.000
					C	0.000	61.802		100.00	0.000	0.000
L2 85.08-46.67	64.60	1.154	9	127.360	A	0.000	127.360	127.360	100.00	42.635	0.000
					B	0.000	127.360		100.00	0.000	0.000
					C	0.000	127.360		100.00	0.000	0.000
L3 46.67-0.00	22.82	0.927	7	235.281	A	0.000	235.281	235.281	100.00	51.804	0.000
					B	0.000	235.281		100.00	0.000	0.000
					C	0.000	235.281		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 118.50-85.08	0.59	2.43	A	1	0.65	54	1	1	61.802	2.37	70.82	C
			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	49	1	1	127.360	4.44	115.66	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	39	1	1	235.281	6.58	141.00	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	673.37 kip-ft	13.39		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 118.50-85.08	0.59	2.43	A	1	0.65	54	1	1	61.802	2.37	70.82	C
			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	49	1	1	127.360	4.44	115.66	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	39	1	1	235.281	6.58	141.00	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	673.37 kip-ft	13.39		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 118.50-85.08	0.59	2.43	A	1	0.65	54	1	1	61.802	2.37	70.82	C
			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	49	1	1	127.360	4.44	115.66	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	39	1	1	235.281	6.58	141.00	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	673.37 kip-ft	13.39		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 118.50-	0.59	2.43	A	1	0.65	10	1	1	61.802	0.44	13.09	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
85.08			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	9	1	1	127.360	0.82	21.38	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	7	1	1	235.281	1.22	26.07	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	124.48 kip-ft	2.48		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 118.50-85.08	0.59	2.43	A	1	0.65	10	1	1	61.802	0.44	13.09	C
			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	9	1	1	127.360	0.82	21.38	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	7	1	1	235.281	1.22	26.07	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	124.48 kip-ft	2.48		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 118.50-85.08	0.59	2.43	A	1	0.65	10	1	1	61.802	0.44	13.09	C
			B	1	0.65		1	1	61.802			
			C	1	0.65		1	1	61.802			
L2 85.08-46.67	0.89	7.55	A	1	0.65	9	1	1	127.360	0.82	21.38	C
			B	1	0.65		1	1	127.360			
			C	1	0.65		1	1	127.360			
L3 46.67-0.00	1.08	14.41	A	1	0.65	7	1	1	235.281	1.22	26.07	C
			B	1	0.65		1	1	235.281			
			C	1	0.65		1	1	235.281			
Sum Weight:	2.56	24.40						OTM	124.48 kip-ft	2.48		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	24.40					
Bracing Weight	0.00					
Total Member Self-Weight	24.40			-0.12	0.49	
Total Weight	36.44			-0.12	0.49	
Wind 0 deg - No Ice		0.00	-37.86	-3335.65	0.49	0.52
Wind 30 deg - No Ice		18.93	-32.79	-2888.77	-1667.28	0.60

Load Case	*Vertical Forces K*	*Sum of Forces X K*	*Sum of Forces Z K*	*Sum of Overturning Moments, M_x kip-ft*	*Sum of Overturning Moments, M_z kip-ft*	*Sum of Torques kip-ft*
Wind 60 deg - No Ice		32.79	-18.93	-1667.89	-2888.17	0.52
Wind 90 deg - No Ice		37.86	0.00	-0.12	-3335.04	0.30
Wind 120 deg - No Ice		32.79	18.93	1667.64	-2888.17	0.00
Wind 150 deg - No Ice		18.93	32.79	2888.53	-1667.28	-0.30
Wind 180 deg - No Ice		0.00	37.86	3335.41	0.49	-0.52
Wind 210 deg - No Ice		-18.93	32.79	2888.53	1668.25	-0.60
Wind 240 deg - No Ice		-32.79	18.93	1667.64	2889.14	-0.52
Wind 270 deg - No Ice		-37.86	0.00	-0.12	3336.02	-0.30
Wind 300 deg - No Ice		-32.79	-18.93	-1667.89	2889.14	0.00
Wind 330 deg - No Ice		-18.93	-32.79	-2888.77	1668.25	0.30
Total Weight	36.44			-0.12	0.49	
Wind 0 deg - Service		0.00	-7.00	-616.52	-0.17	0.10
Wind 30 deg - Service		3.50	-6.06	-533.91	-308.48	0.11
Wind 60 deg - Service		6.06	-3.50	-308.21	-534.17	0.10
Wind 90 deg - Service		7.00	0.00	0.10	-616.78	0.06
Wind 120 deg - Service		6.06	3.50	308.40	-534.17	0.00
Wind 150 deg - Service		3.50	6.06	534.10	-308.48	-0.06
Wind 180 deg - Service		0.00	7.00	616.71	-0.17	-0.10
Wind 210 deg - Service		-3.50	6.06	534.10	308.14	-0.11
Wind 240 deg - Service		-6.06	3.50	308.40	533.84	-0.10
Wind 270 deg - Service		-7.00	0.00	0.10	616.45	-0.06
Wind 300 deg - Service		-6.06	-3.50	-308.21	533.84	0.00
Wind 330 deg - Service		-3.50	-6.06	-533.91	308.14	0.06

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
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

Comb. No.	Description
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	118.5 - 85.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	1	-12.05	-0.08	-0.07
			Max. Mx	8	-11.76	-835.25	-0.07
			Max. My	14	-11.76	-0.07	-835.23
			Max. Vy	20	-43.19	835.05	-0.07
			Max. Vx	14	43.19	-0.07	-835.23
			Max. Torque	5			-0.96
L2	85.08 - 46.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-21.84	-2494.41	-0.01
			Max. Mx	20	-21.84	2494.64	-0.01
			Max. My	14	-21.84	0.12	-2494.54
			Max. Vy	20	-49.35	2494.64	-0.01
			Max. Vx	2	-49.35	0.12	2494.52
			Max. Torque	5			-0.96
L3	46.67 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-43.70	-4680.32	-2702.38
			Max. Mx	20	-43.70	5405.50	0.15
			Max. My	2	-43.70	0.59	5405.06
			Max. Vy	20	-60.60	5405.50	0.15
			Max. Vx	2	-60.60	0.59	5405.06
			Max. Torque	5			-0.95

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	6	43.73	-52.47	30.29
	Max. H_x	21	32.80	60.58	-0.00
	Max. H_z	3	32.80	-0.00	60.58
	Max. M_x	2	5405.06	-0.00	60.58
	Max. M_z	8	5404.32	-60.58	-0.00
	Max. Torsion	17	0.95	30.29	-52.47
	Min. Vert	21	32.80	60.58	-0.00
	Min. H_x	9	32.80	-60.58	-0.00
	Min. H_z	15	32.80	-0.00	-60.58
	Min. M_x	14	-5404.77	-0.00	-60.58
	Min. M_z	20	-5405.50	60.58	-0.00
	Min. Torsion	5	-0.95	-30.29	52.47

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	36.44	0.00	0.00	-0.12	0.49	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	43.73	0.00	-60.58	-5405.06	0.59	0.82
0.9 Dead+1.6 Wind 0 deg -	32.80	0.00	-60.58	-5386.67	0.44	0.82

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
No Ice						
1.2 Dead+1.6 Wind 30 deg - No Ice	43.73	30.29	-52.47	-4681.06	-2701.93	0.95
0.9 Dead+1.6 Wind 30 deg - No Ice	32.80	30.29	-52.47	-4665.09	-2692.89	0.95
1.2 Dead+1.6 Wind 60 deg - No Ice	43.73	52.47	-30.29	-2702.67	-4680.32	0.82
0.9 Dead+1.6 Wind 60 deg - No Ice	32.80	52.47	-30.29	-2693.44	-4664.54	0.82
1.2 Dead+1.6 Wind 90 deg - No Ice	43.73	60.58	0.00	-0.15	-5404.32	0.48
0.9 Dead+1.6 Wind 90 deg - No Ice	32.80	60.58	0.00	-0.11	-5386.12	0.48
1.2 Dead+1.6 Wind 120 deg - No Ice	43.73	52.47	30.29	2702.38	-4680.32	-0.00
0.9 Dead+1.6 Wind 120 deg - No Ice	32.80	52.47	30.29	2693.22	-4664.54	-0.00
1.2 Dead+1.6 Wind 150 deg - No Ice	43.73	30.29	52.47	4680.77	-2701.94	-0.48
0.9 Dead+1.6 Wind 150 deg - No Ice	32.80	30.29	52.47	4664.88	-2692.89	-0.48
1.2 Dead+1.6 Wind 180 deg - No Ice	43.73	0.00	60.58	5404.77	0.59	-0.82
0.9 Dead+1.6 Wind 180 deg - No Ice	32.80	0.00	60.58	5386.45	0.44	-0.82
1.2 Dead+1.6 Wind 210 deg - No Ice	43.73	-30.29	52.47	4680.77	2703.12	-0.95
0.9 Dead+1.6 Wind 210 deg - No Ice	32.80	-30.29	52.47	4664.87	2693.77	-0.95
1.2 Dead+1.6 Wind 240 deg - No Ice	43.73	-52.47	30.29	2702.38	4681.50	-0.82
0.9 Dead+1.6 Wind 240 deg - No Ice	32.80	-52.47	30.29	2693.22	4665.43	-0.82
1.2 Dead+1.6 Wind 270 deg - No Ice	43.73	-60.58	0.00	-0.15	5405.50	-0.48
0.9 Dead+1.6 Wind 270 deg - No Ice	32.80	-60.58	0.00	-0.11	5387.00	-0.48
1.2 Dead+1.6 Wind 300 deg - No Ice	43.73	-52.47	-30.29	-2702.67	4681.50	0.00
0.9 Dead+1.6 Wind 300 deg - No Ice	32.80	-52.47	-30.29	-2693.44	4665.43	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice	43.73	-30.29	-52.47	-4681.06	2703.12	0.48
0.9 Dead+1.6 Wind 330 deg - No Ice	32.80	-30.29	-52.47	-4665.09	2693.77	0.48
Dead+Wind 0 deg - Service	36.44	0.00	-7.00	-623.64	0.49	0.10
Dead+Wind 30 deg - Service	36.44	3.50	-6.06	-540.11	-311.27	0.11
Dead+Wind 60 deg - Service	36.44	6.06	-3.50	-311.88	-539.49	0.10
Dead+Wind 90 deg - Service	36.44	7.00	-0.00	-0.12	-623.03	0.06
Dead+Wind 120 deg - Service	36.44	6.06	3.50	311.64	-539.49	-0.00
Dead+Wind 150 deg - Service	36.44	3.50	6.06	539.86	-311.27	-0.06
Dead+Wind 180 deg - Service	36.44	0.00	7.00	623.40	0.49	-0.10
Dead+Wind 210 deg - Service	36.44	-3.50	6.06	539.86	312.25	-0.11
Dead+Wind 240 deg - Service	36.44	-6.06	3.50	311.64	540.47	-0.10
Dead+Wind 270 deg - Service	36.44	-7.00	-0.00	-0.12	624.01	-0.06
Dead+Wind 300 deg - Service	36.44	-6.06	-3.50	-311.88	540.47	0.00
Dead+Wind 330 deg - Service	36.44	-3.50	-6.06	-540.11	312.25	0.06

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-36.44	0.00	0.00	36.44	0.00	0.000%
2	0.00	-43.73	-60.58	-0.00	43.73	60.58	0.002%
3	0.00	-32.80	-60.58	-0.00	32.80	60.58	0.001%
4	30.29	-43.73	-52.47	-30.29	43.73	52.47	0.000%
5	30.29	-32.80	-52.47	-30.29	32.80	52.47	0.000%
6	52.47	-43.73	-30.29	-52.47	43.73	30.29	0.000%
7	52.47	-32.80	-30.29	-52.47	32.80	30.29	0.000%
8	60.58	-43.73	0.00	-60.58	43.73	-0.00	0.002%
9	60.58	-32.80	0.00	-60.58	32.80	-0.00	0.001%
10	52.47	-43.73	30.29	-52.47	43.73	-30.29	0.000%
11	52.47	-32.80	30.29	-52.47	32.80	-30.29	0.000%
12	30.29	-43.73	52.47	-30.29	43.73	-52.47	0.000%
13	30.29	-32.80	52.47	-30.29	32.80	-52.47	0.000%
14	0.00	-43.73	60.58	-0.00	43.73	-60.58	0.002%
15	0.00	-32.80	60.58	-0.00	32.80	-60.58	0.001%
16	-30.29	-43.73	52.47	30.29	43.73	-52.47	0.000%
17	-30.29	-32.80	52.47	30.29	32.80	-52.47	0.000%
18	-52.47	-43.73	30.29	52.47	43.73	-30.29	0.000%
19	-52.47	-32.80	30.29	52.47	32.80	-30.29	0.000%
20	-60.58	-43.73	0.00	60.58	43.73	-0.00	0.002%
21	-60.58	-32.80	0.00	60.58	32.80	-0.00	0.001%
22	-52.47	-43.73	-30.29	52.47	43.73	30.29	0.000%
23	-52.47	-32.80	-30.29	52.47	32.80	30.29	0.000%
24	-30.29	-43.73	-52.47	30.29	43.73	52.47	0.000%
25	-30.29	-32.80	-52.47	30.29	32.80	52.47	0.000%
26	0.00	-36.44	-7.00	-0.00	36.44	7.00	0.002%
27	3.50	-36.44	-6.06	-3.50	36.44	6.06	0.002%
28	6.06	-36.44	-3.50	-6.06	36.44	3.50	0.002%
29	7.00	-36.44	0.00	-7.00	36.44	0.00	0.002%
30	6.06	-36.44	3.50	-6.06	36.44	-3.50	0.002%
31	3.50	-36.44	6.06	-3.50	36.44	-6.06	0.002%
32	0.00	-36.44	7.00	-0.00	36.44	-7.00	0.002%
33	-3.50	-36.44	6.06	3.50	36.44	-6.06	0.002%
34	-6.06	-36.44	3.50	6.06	36.44	-3.50	0.002%
35	-7.00	-36.44	0.00	7.00	36.44	0.00	0.002%
36	-6.06	-36.44	-3.50	6.06	36.44	3.50	0.002%
37	-3.50	-36.44	-6.06	3.50	36.44	6.06	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00009222
3	Yes	9	0.00000001	0.00007225
4	Yes	11	0.00000001	0.00006482
5	Yes	11	0.00000001	0.00004652
6	Yes	11	0.00000001	0.00006316
7	Yes	11	0.00000001	0.00004529
8	Yes	9	0.00000001	0.00008925
9	Yes	9	0.00000001	0.00007005
10	Yes	11	0.00000001	0.00006392
11	Yes	11	0.00000001	0.00004585
12	Yes	11	0.00000001	0.00006436
13	Yes	11	0.00000001	0.00004618
14	Yes	9	0.00000001	0.00009222
15	Yes	9	0.00000001	0.00007225
16	Yes	11	0.00000001	0.00006306
17	Yes	11	0.00000001	0.00004522
18	Yes	11	0.00000001	0.00006471
19	Yes	11	0.00000001	0.00004643

20	Yes	9	0.00000001	0.00008926
21	Yes	9	0.00000001	0.00007006
22	Yes	11	0.00000001	0.00006392
23	Yes	11	0.00000001	0.00004585
24	Yes	11	0.00000001	0.00006349
25	Yes	11	0.00000001	0.00004553
26	Yes	8	0.00000001	0.00009761
27	Yes	8	0.00000001	0.00009102
28	Yes	8	0.00000001	0.00009062
29	Yes	8	0.00000001	0.00009758
30	Yes	8	0.00000001	0.00009077
31	Yes	8	0.00000001	0.00009090
32	Yes	8	0.00000001	0.00009764
33	Yes	8	0.00000001	0.00009064
34	Yes	8	0.00000001	0.00009101
35	Yes	8	0.00000001	0.00009762
36	Yes	8	0.00000001	0.00009079
37	Yes	8	0.00000001	0.00009068

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		*°*	*°*
L1	118.5 - 85.08	6.583	34	0.6284	0.0006
L2	89 - 46.67	3.257	35	0.4095	0.0002
L3	53 - 0	1.017	35	0.1901	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	*°*	*°*	*ft*
120.00	800 SMR Filter	34	6.583	0.6284	0.0006	34854
118.50	FWT Low Profile Platform	34	6.583	0.6284	0.0006	34854
110.00	(2) APX17DWV-17DWV-S-E-A20	34	5.547	0.5638	0.0005	20502
105.00	6' Omni	35	4.955	0.5261	0.0004	12909
101.00	(3) 800-10865	35	4.497	0.4963	0.0004	9958
98.50	Connect-IT LPPS-14-12-96-HD-PHK	35	4.221	0.4779	0.0004	8713

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		*°*	*°*
L1	118.5 - 85.08	57.019	20	5.4453	0.0056
L2	89 - 46.67	28.221	20	3.5498	0.0021
L3	53 - 0	8.812	20	1.6473	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	*°*	*°*	*ft*
120.00	800 SMR Filter	20	57.019	5.4453	0.0056	4082
118.50	FWT Low Profile Platform	20	57.019	5.4453	0.0056	4082
110.00	(2) APX17DWV-17DWV-S-E-A20	20	48.049	4.8861	0.0044	2400
105.00	6' Omni	20	42.920	4.5600	0.0038	1510
101.00	(3) 800-10865	20	38.957	4.3019	0.0033	1164
98.50	Connect-IT LPPS-14-12-96-HD-	20	36.563	4.1421	0.0031	1018

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	PHK					

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual / Allowable Ratio Bolt Tension K	Actual / Allowable Ratio Bolt Compression K	Actual / Allowable Ratio Plate Stress ksi	Actual / Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
2.7500	24	2.2500	136.79 223.65 0.61	140.43 371.27 0.38	26.909 54.000 0.50		Bolt T	0.61 ✔

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	118.5 - 85.08 (1)	TP30.208x13.5x0.3125	33.42	118.50	143.4	27.7088	-11.76	304.46	0.039
L2	85.08 - 46.67 (2)	TP48.7874x27.6232x0.4375	42.33	118.50	113.2	49.1340	-16.42	866.11	0.019
L3	46.67 - 0 (3)	TP71.2429x44.7475x0.4375	53.00	118.50	84.4	65.9242	-25.50	2067.21	0.012

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	118.5 - 85.08 (1)	TP30.208x13.5x0.3125	835.28	1178.68	0.709	0.00	1178.68	0.000
L2	85.08 - 46.67 (2)	TP48.7874x27.6232x0.4375	1563.78	2644.20	0.591	0.00	2644.20	0.000
L3	46.67 - 0 (3)	TP71.2429x44.7475x0.4375	2811.44	4673.81	0.602	0.00	4673.81	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	118.5 - 85.08 (1)	TP30.208x13.5x0.3125	43.19	1029.31	0.042	0.48	2360.26	0.000
L2	85.08 - 46.67 (2)	TP48.7874x27.6232x0.4375	46.05	1871.17	0.025	0.48	5294.87	0.000
L3	46.67 - 0 (3)	TP71.2429x44.7475x0.4375	51.26	2441.34	0.021	0.82	9359.08	0.000

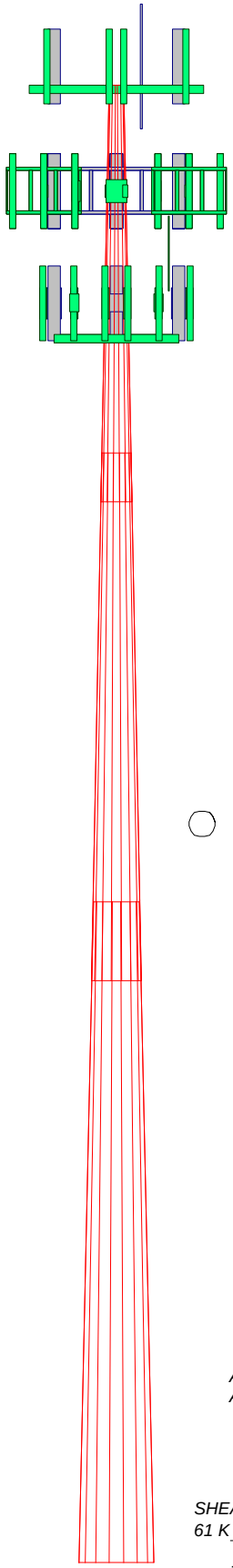
Pole Interaction Design Data

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	118.5 - 85.08 (1)	0.039	0.709	0.000	0.042	0.000	0.749 ✔	1.000	4.8.2 ✔
L2	85.08 - 46.67 (2)	0.019	0.591	0.000	0.025	0.000	0.611 ✔	1.000	4.8.2 ✔
L3	46.67 - 0 (3)	0.012	0.602	0.000	0.021	0.000	0.614 ✔	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	118.5 - 85.08	Pole	TP30.208x13.5x0.3125	1	-11.76	304.46	74.9	Pass
L2	85.08 - 46.67	Pole	TP48.7874x27.6232x0.4375	2	-16.42	866.11	61.1	Pass
L3	46.67 - 0	Pole	TP71.2429x44.7475x0.4375	3	-25.50	2067.21	61.4	Pass
							Summary	
						Pole (L1)	74.9	Pass
						Base Plate	61.2	Pass
						RATING =	**74.9**	**Pass**

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	33.42	18	0.3125	3.92	13.5000	30.2080		2.4
2	42.33	18	0.4375	6.33	27.6232	48.7874	A572-65	7.6
3	53.00	18	0.4375		44.7475	71.2429		14.4
								24.4



ALL REACTIONS ARE FACTORED

AXIAL 44 K

SHEAR 61 K

MOMENT 5406 kip-ft

TORQUE 1 kip-ft

REACTIONS - 132 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
800 SMR Filter (SPRINT/NEXTEL)	120
800 SMR Filter (SPRINT/NEXTEL)	120
800 SMR Filter (SPRINT/NEXTEL)	120
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	120
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	120
IBC1900HG-1 (Combiner) (SPRINT/NEXTEL)	120
RRUS-A2 Module (side) (SPRINT/NEXTEL)	120
RRUS-A2 Module (side) (SPRINT/NEXTEL)	120
RRUS-A2 Module (side) (SPRINT/NEXTEL)	120
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	120
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	120
(2) RRUS-11 (2, stacked) (SPRINT/NEXTEL)	120
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	120
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	120
(3) ACU-A20-N (RET) (SPRINT/NEXTEL)	120
APXVERR18-C (SPRINT/NEXTEL)	120
APXVERR18-C (SPRINT/NEXTEL)	120
APXVERR18-C (SPRINT/NEXTEL)	120
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	120
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	120
844G65VTZASX w/Mount Pipe (SPRINT/NEXTEL)	120
FWT Low Profile Platform (SPRINT/NEXTEL)	118.5
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	110
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	110

TYPE	ELEVATION
(2) APX17DWV-17DWV-S-E-A20 (T-Mobile)	110
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	110
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	110
APXV18-206517S-C-A20 w/ Pipe (T-Mobile)	110
ASU9338TYP01 (RNSNDC-7771-PF-48) (COVP High) (T-Mobile)	110
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	110
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	110
(2) ATMAP1412D-1A20 (TMA) (T-Mobile)	110
FXxx (RF Module) (T-Mobile)	110
FXxx (RF Module) (T-Mobile)	110
FRIG (RF Module) (T-Mobile)	110
FRIG (RF Module) (T-Mobile)	110
FRIG (RF Module) (T-Mobile)	110
Valmont T-Arm (1) (T-Mobile)	110
Valmont T-Arm (1) (T-Mobile)	110
Valmont T-Arm (1) (T-Mobile)	110
6' Omni (CITY OF CC)	105
4' Standoff (CITY OF CC)	105
Raycap DC6-48-60-18-8F (ATI)	101
Raycap DC6-48-60-18-8F (ATI)	101
Raycap DC6-48-60-18-8F (ATI)	101
RRUS-11 (ATI)	101
RRUS-11 (ATI)	101
RRUS-11 (ATI)	101
(3) RRUS-32 (ATI)	101
(3) RRUS-32 (ATI)	101
(3) RRUS-32 (ATI)	101
(3) 800-10865 (ATI)	101
(3) 800-10865 (ATI)	101
(3) 800-10865 (ATI)	101
Connect-IT LPPS-14-12-96-HD-PHK (ATI)	98.5

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 0.00 ft
7. TOWER RATING: 74.9%

CALTROP CORP
3400 Lakeside Drive, Suite 252
Miramar, FL
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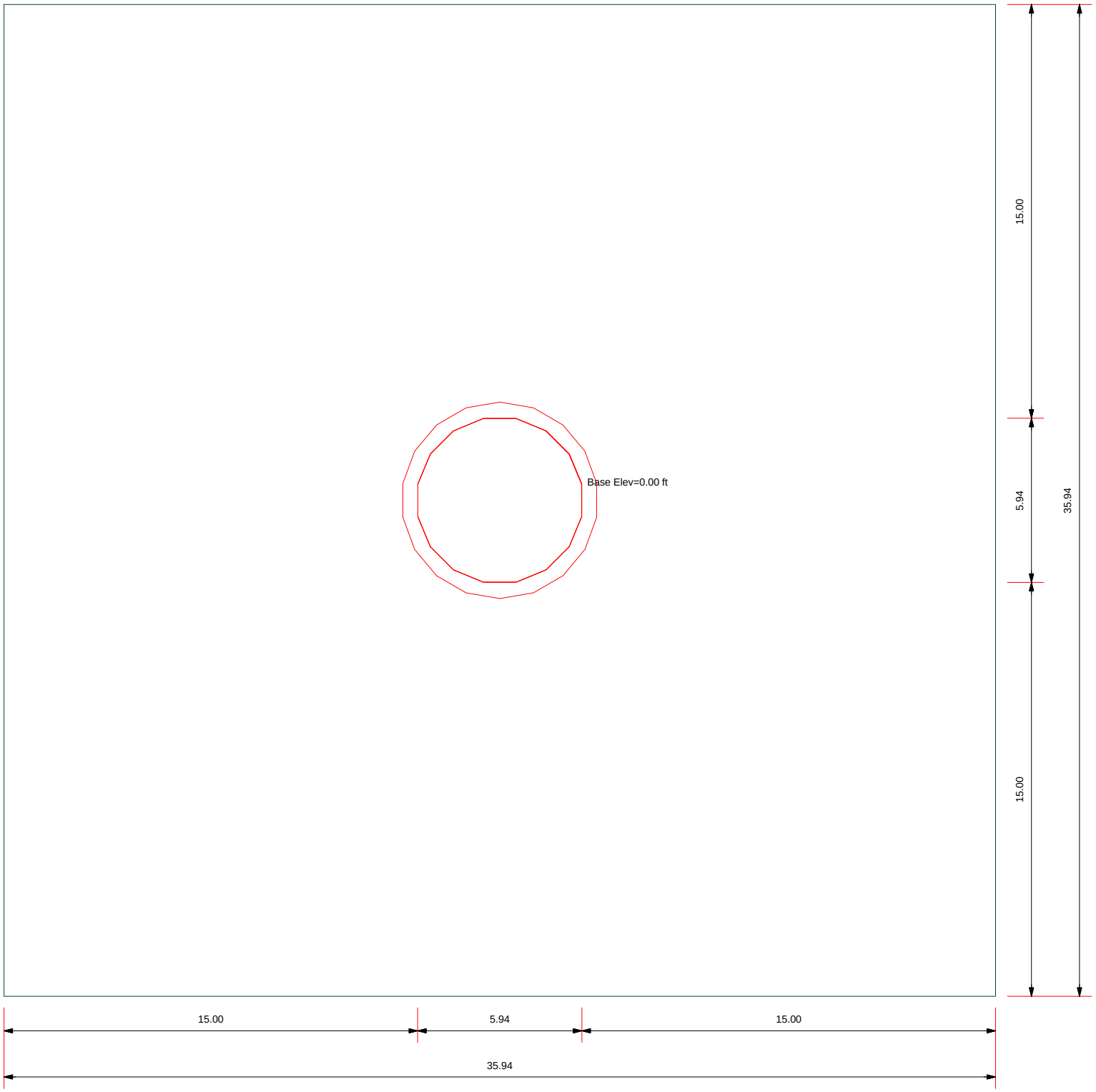
FAX: (954) 874-7868

Job: ***FL71 (COCCFL-FL71)***		
Project: ***(LTE Installation - Analysis)***		
Client: AT&T	Drawn by: damaya	App'd:
Code: TIA-222-G	Date: 12/16/13	Scale: NTS
Path:		Dwg No. E-1

Plot Plan

Total Area - 0.03 Acres



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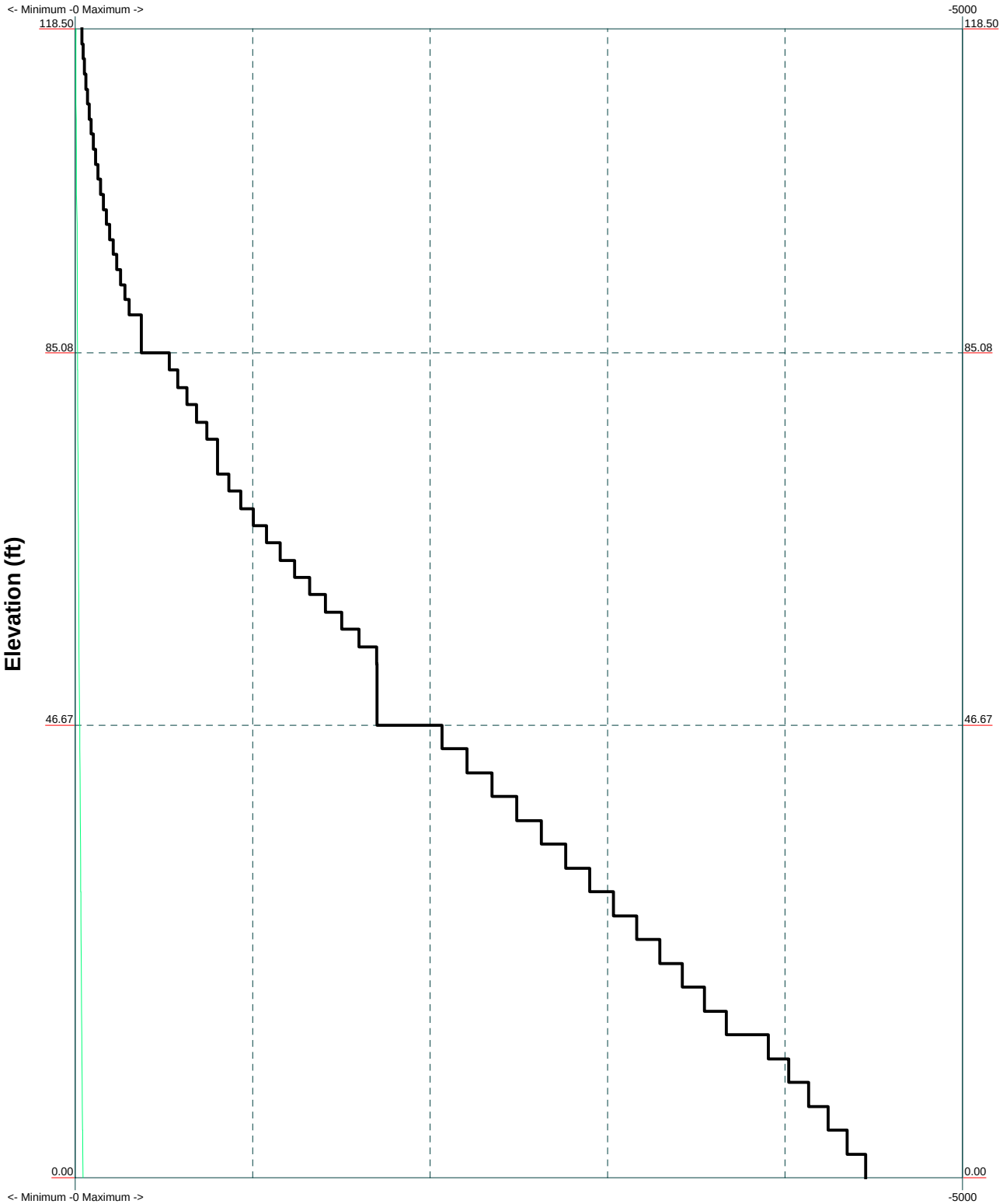
Path:		Dwg No. E-2

TIA-222-G - 132 mph Exposure C

Leg Capacity ——— **Leg Compression (K)**



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Path:		Dwg No. E-3	

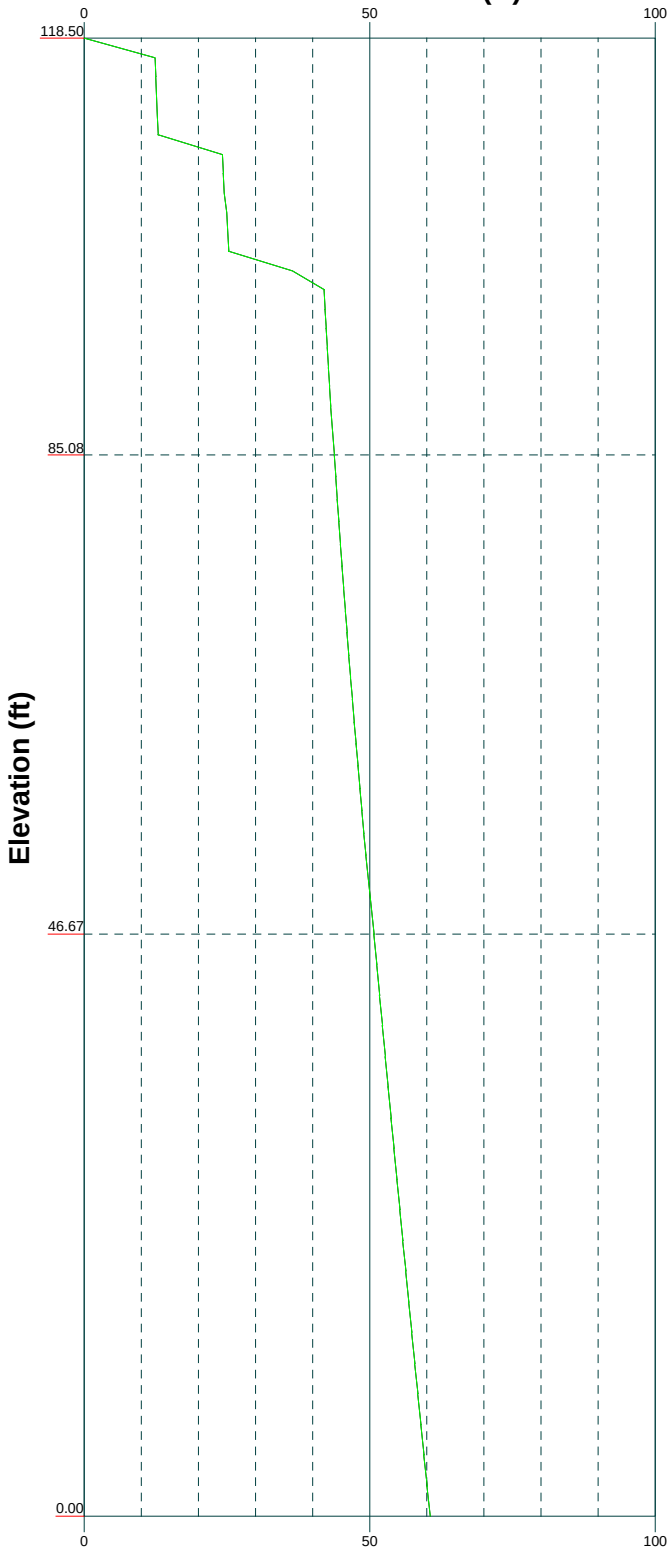
TIA-222-G - 132 mph Exposure C

Vx Vz

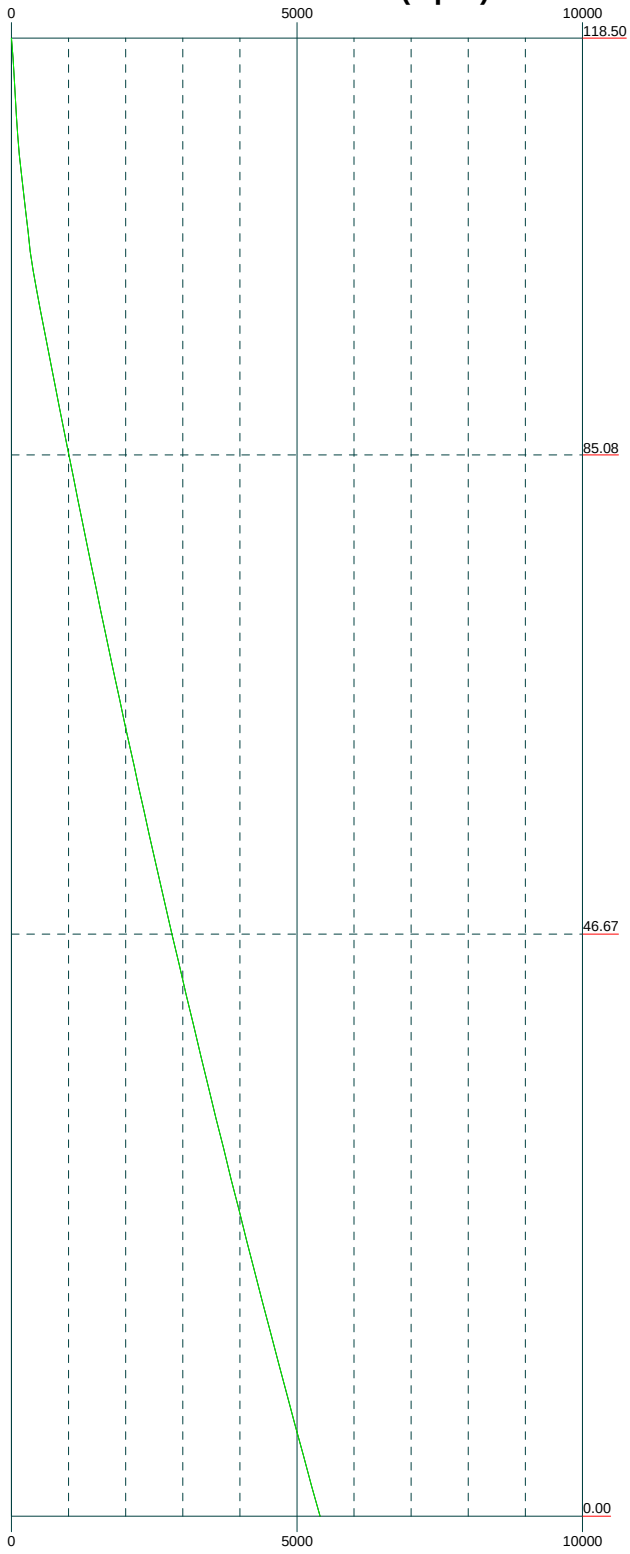
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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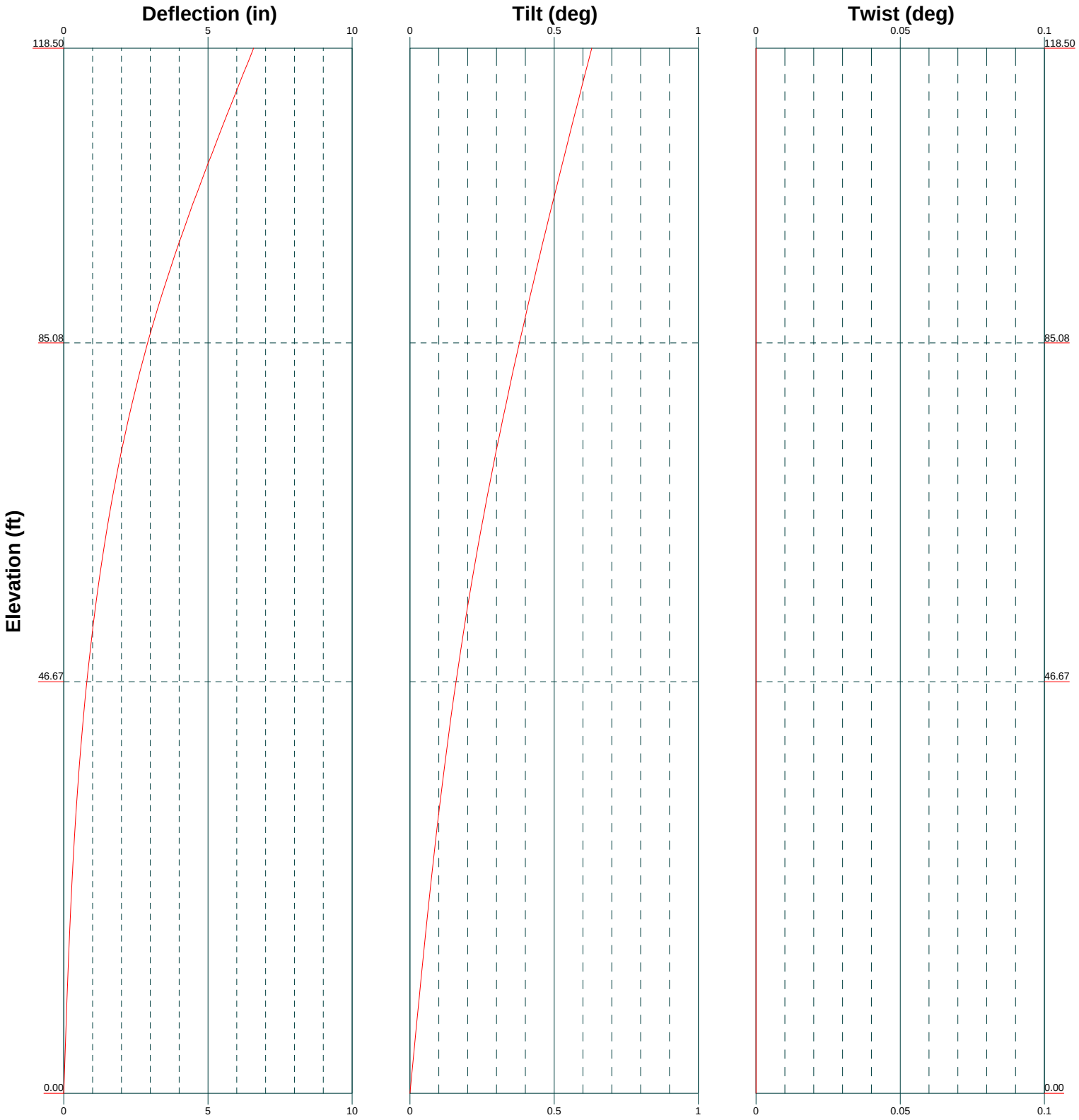
Code: TIA-222-G	Date: 12/16/13	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values



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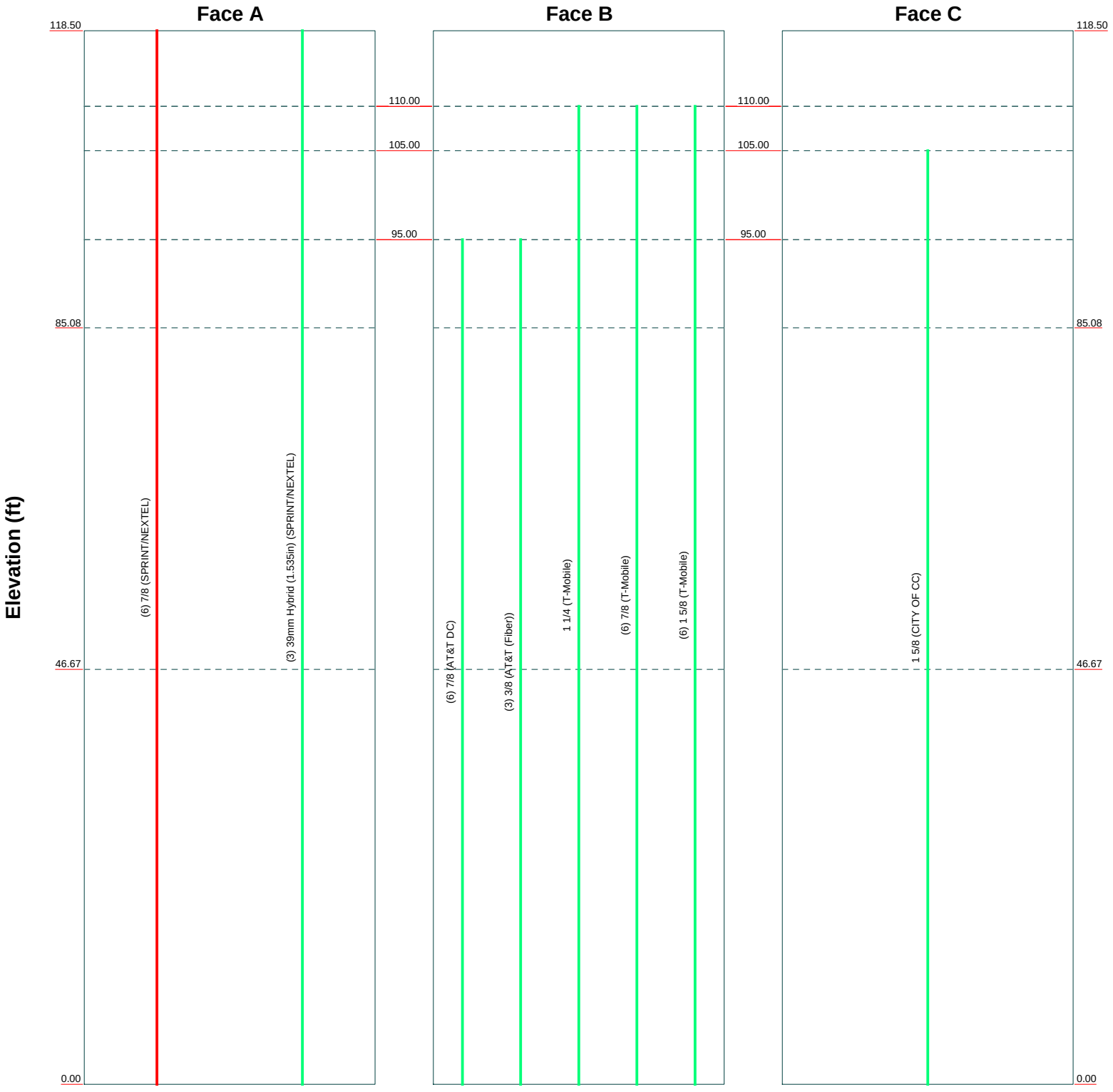
Project: ***(LTE Installation - Analysis)***		
Client: AT&T	Drawn by: damaya	App'd:
Code: TIA-222-G	Date: 12/16/13	Scale: NTS
Path:		Dwg No. E-5

Feed Line Distribution Chart
0' - 118'6"

Round | Flat | App In Face | App Out Face | Truss Leg



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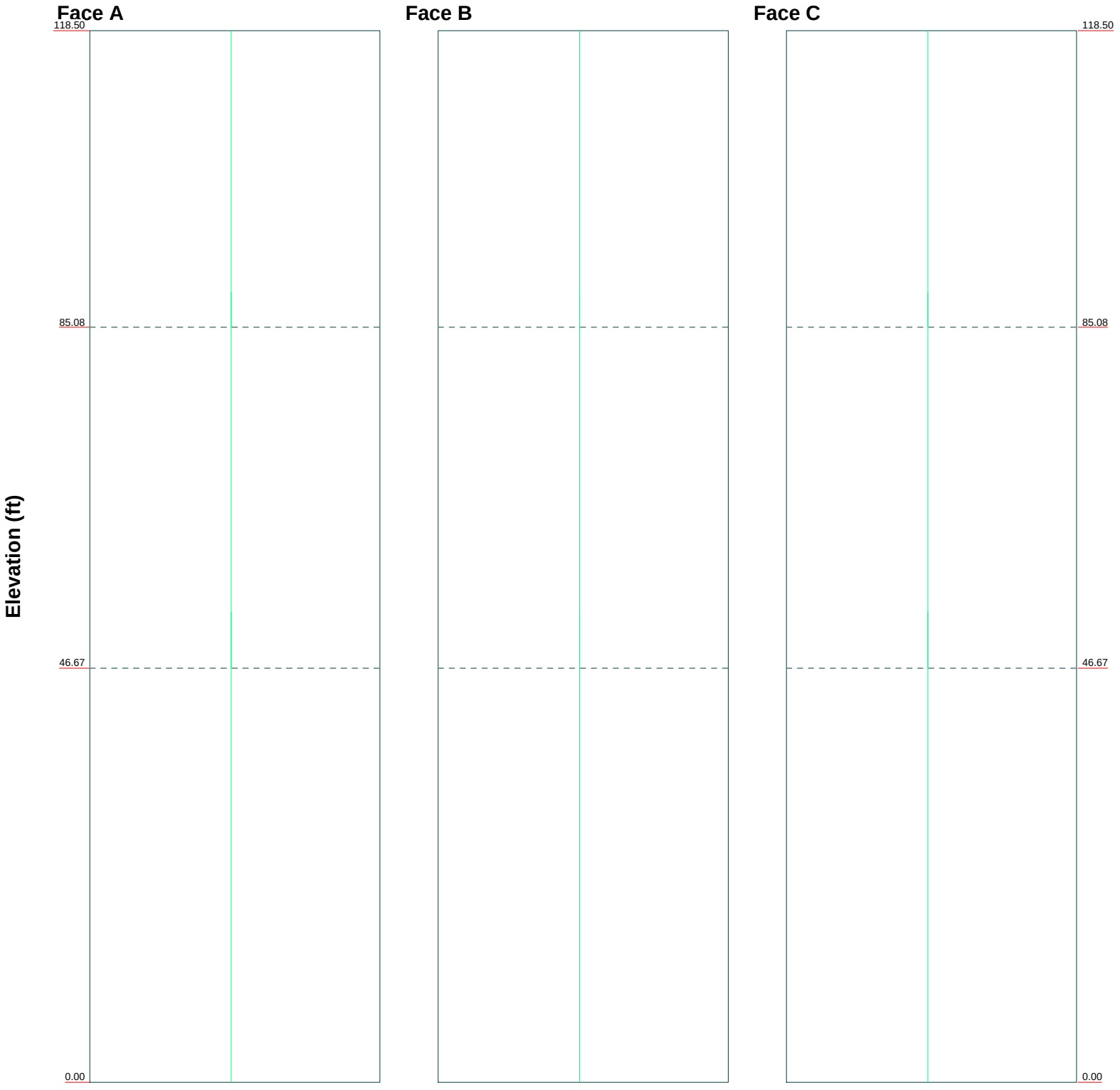
Code: TIA-222-G	Date: 12/16/13	Scale: NTS
Path:		Dwg No. E-7

Stress Distribution Chart
0' - 118'6"

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



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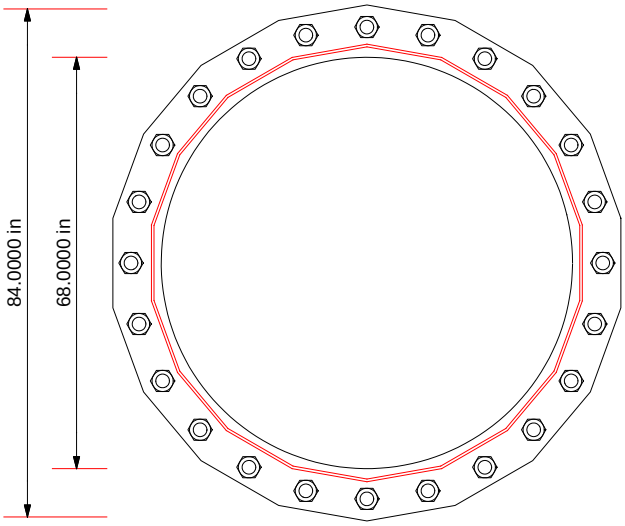
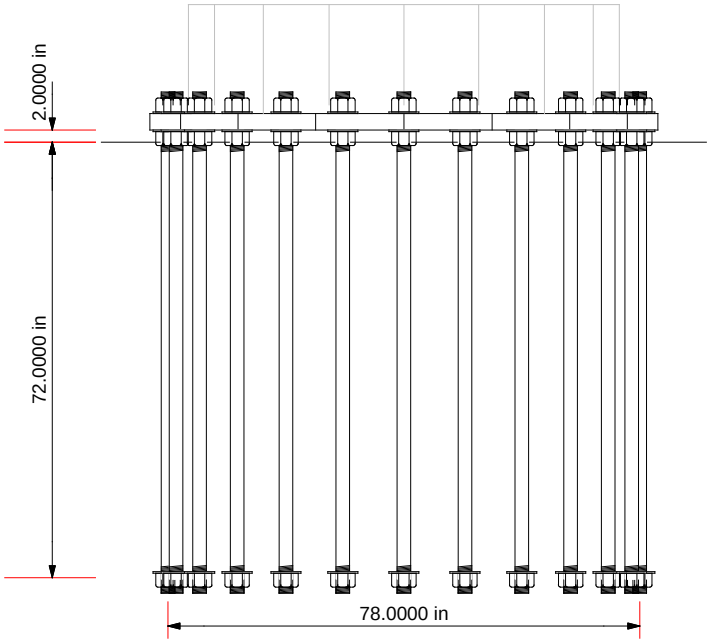
Job: ***FL71 (COCCFL-FL71)***			
Project: ***(LTE Installation - Analysis)***			
Client: AT&T	Drawn by: damaya	App'd:	
Code: TIA-222-G	Date: 12/16/13	Scale: NTS	
Path:		Dwg No. E-8	





FOUNDATION NOTES

1. Plate thickness is 2.7500 in.
2. Plate grade is A633-60.
3. Anchor bolt grade is A615-75.
4. f'c is 3 ksi.

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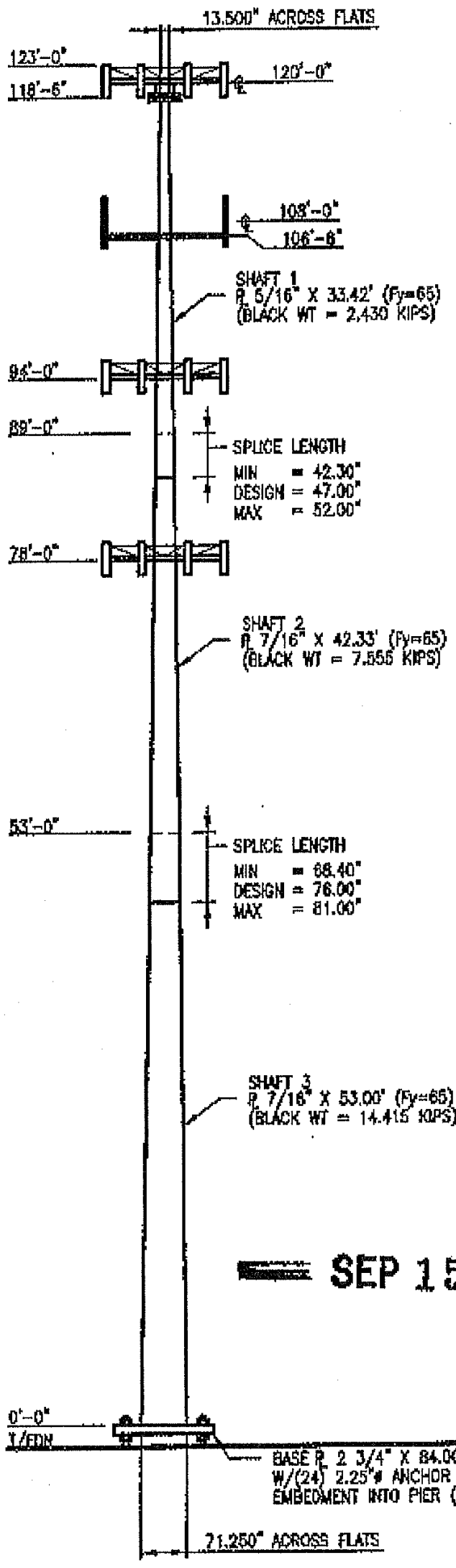
Path:		Dwg No. F-1

APPENDIX B

APPROXIMATE WEIGHT OF GALVANIZED POLE SHAFTS (LBS)		
TOP PLATE + SHAFT 1	3050	NOTE: WEIGHTS SHOWN DO NOT INCLUDE ANY ATTACHMENTS, MOUNTS, PLATFORMS, HANDHOLES, ETC. FIELD VERIFY WEIGHTS PRIOR TO LIFTING.
SHAFT 2	8700	
BASE PLATE + SHAFT 3	23250	
APPROXIMATE TOTAL	35000	



FWT

P.O. BOX 8597 FORT WORTH, TX 76124-0597
PHONE: (800) 433-1816 FAX: (817) 429-6010

JOB DATA			
Page 1 of 1		Job No.	17967
By	JS/PS	Design No.	M98-1772-A
Chk'd By	TWL 9/15/98 /mb	Date	08-31-1998
		Rev. No. / Rev. Date	
Pole	120 FT MONOPOLE		
Site	FL1609A, COCONUT CREEK, BROWARD CO., FL		
Owner	NEXTEL COMMUNICATIONS		
Ref. No.			
Design	ASCE7-88, SFBC CHAPTER 23 & TIA/EIA-222-F 1996		

NOTE: DUE TO REGIONAL AND/OR LOCAL CODE REQUIREMENTS, THIS DESIGN DOES NOT INCORPORATE A ONE THIRD (1/3) INCREASE IN ALLOWABLE STRESSES.

FINAL DESIGN - FOR FABRICATION

LOAD CASES		
CASE 1	120 MPH WITH NO ICE	DESIGN WIND
CASE 2	50 MPH WITH NO ICE	OPERATIONAL WIND

POLE SPECIFICATIONS	
Pole Shape Type:	18-SIDED POLYGON
Taper:	0.500000 IN/FT
Shaft Steel:	ASTM A572 GRADE 65
Base PL Steel:	ASTM A633 GR. E (60 KSI)
Anchor Bolts:	2 1/4"ø x 7'-0" LONG #18J ASTM A615 GRADE 75

ANTENNA LIST			
	No.	Elev.	Description
	-	TOP	3/4" LIGHTNING ROD
	1-12	120.00	(12) DB 848H90(E)-XY ANTENNA
	-	120.00	14-FT PLATFORM W/SERVICE GRATING & HANDRAILS
(FUT)	13-15	108.00	(3) DB810-3T
(FUT)	-	108.00	(3) 6-FT SIDE ARM MOUNT
(FUT)	16-27	94.00	(12) DB 848H90(E)-XY ANTENNA
(FUT)	-	94.00	14-FT PLATFORM W/SERVICE GRATING & HANDRAILS
(FUT)	28-39	78.00	(12) DB 848H90(E)-XY ANTENNA
(FUT)	-	78.00	14-FT PLATFORM W/SERVICE GRATING & HANDRAILS

STEP BOLTS FULL HEIGHT FROM 9'-6" ABOVE BASE PLATE.
ANTENNA FEED LINES RUN INSIDE OF POLE.

	120 MPH WIND		50 MPH WIND	
Elevation	Lateral Deflection (Inches)	Rotation (sway) (degrees)	Lateral Deflection (Inches)	Rotation (sway) (degrees)
TOP	52.4	4.892	9.1	0.849

SHAFT SECTION DATA					
Shaft Section	Section Length (feet)	Plate Thickness (in.)	Lap Splice (In.)	Diameter Across Flats (inches) @ Top	@ Bottom
1	33.42	0.3125	47.00	13.500	30.208
2	42.33	0.4375	76.00	27.625	48.792
3	53.00	0.4375		44.750	71.250

UNFACTORED BASE REACTIONS

MOMENT =	5053 ft-kips
SHEAR =	59.9 kips
AXIAL =	38.8 kips
EST. SHAFT + BASE PL WT. =	28.7 kips

SEP 15 1998