Good afternoon,

I apologize for the error on our part. The tower is structurally feasible to support the AT&T changes.

Please see attached 4.1 Recommendations on page 8 of the structural analysis.

Please let me know if any additional information is required.

Jeff Barbadora

From: Maine, Brennan [mailto:Brennan.Maine@ct.gov]
Sent: Friday, April 07, 2017 2:09 PM
To: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Incompleteltr-EM-AT&T-089-2170328_NorthMountainRd_NewBritain

Please see attached correspondence.

Brennan Maine
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051
(860) 827-2940
Brennan.maine@ct.gov

PJF PAUL J. FORD & COMPANY

Date: **March 02, 2017**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1024
	Carrier Site Name:	NEW BRITAIN LOON LAKE
Crown Castle Designation:	**Crown Castle BU Number:**	876331
	Crown Castle Site Name:	NEW BRITAIN GRAVEL PIT
	Crown Castle JDE Job Number:	415757
	Crown Castle Work Order Number:	1352999
	Crown Castle Application Number:	374404 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0436.001.7805 *(Revised Foundation)*
Site Data:	**115 North Mountain Rd, NEW BRITAIN, Hartford County, CT**	
	Latitude 41° 40' 35.72", Longitude -72° 49' 17.09"	
	118 Foot - Monopole Tower	

Dear Charles McGuirt,

Paul J Ford and Company 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 994386, in accordance with application 374404, revision 2.

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:

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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

Respectfully submitted by:

Seth Tschanen

Seth Tschanen, E.I.
Structural Designer

STATE OF CONNECTICUT JUSTIN T. KLINE No. 30301 LICENSED PROFESSIONAL ENGINEER

3.2.17

Date: **March 02, 2017**

Charles McGuirt
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3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J Ford and Company
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Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1024
	Carrier Site Name:	NEW BRITAIN LOON LAKE
Crown Castle Designation:	**Crown Castle BU Number:**	876331
	Crown Castle Site Name:	NEW BRITAIN GRAVEL PIT
	Crown Castle JDE Job Number:	415757
	Crown Castle Work Order Number:	1352999
	Crown Castle Application Number:	374404 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0436.001.7805 *(Revised Foundation)*
Site Data:	**115 North Mountain Rd, NEW BRITAIN, Hartford County, CT**	
	Latitude *41° 40' 35.72"*, Longitude *-72° 49' 17.09"*	
	118 Foot - Monopole Tower	

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Respectfully submitted by:

Seth Tschanen, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 118 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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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
98.0	100.0	2	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	--	--	--
		1	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe			
		3	ericsson	RRUS 32 B2			
		6	powerwave	7020.00			
		3	powerwave	TT19-08BP111-001			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	116.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	--	--	1
		1	tower mounts	Pipe Mount [PM 601-3]			
	113.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
114.0	116.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	3	1 1/4	1
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	114.0	1	tower mounts	Platform Mount [LP 502-1]			
108.0	108.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	12 1	7/8 1 5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Sector Mount [SM 801-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	100.0	2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	--	--	2
		6	powerwave	LGP13519			
		1	andrew	SBNH-1D6565C w/ Mount Pipe			
		1	andrew	SBNH-1D6565C w/ Mount Pipe	12 1 2	7/8 3/8 3/4	1
		3	communication components	DTMABP7819VG12A			
		3	ericsson	RRUS 11 B12			
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	98.0	1	tower mounts	Platform Mount [LP 712-1]			
85.0	86.0	3	alcatel lucent	RRH2X60-AWS	13	1 5/8	1
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	CBC721-DF			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		2	antel	BXA-70040-6CF-EDIN-2 w/ Mount Pipe			
		4	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	rfs celwave	DB-B1-6C-12AB-0Z			
	85.0	1	tower mounts	Platform Mount [LP 303-1]			
80.0	81.0	1	lucent	KS24019-L112A	1	1/2	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			
72.0	74.0	2	argus	LLPX310R w/ Mount Pipe	3 3 2	5/8 1/4 1/2	1
		1	dragonwave	HORIZON COMPACT			
		1	samsung	WIMAX DAP HEAD			
	73.0	1	andrew	VHLP1-23			
		1	samsung	WIMAX DAP HEAD			
	72.0	1	argus	LLPX310R w/ Mount Pipe			
		1	dragonwave	A-ANT-18G-2-C			
		1	dragonwave	HORIZON COMPACT			
		1	samsung	WIMAX DAP HEAD			
		1	tower mounts	Side Arm Mount [SO 101-3]			

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

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)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-11435G, 01/23/2008	2192549	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 126879, 03/07/2013	3684848	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 10/24/1996	1947809	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 10/24/1996	1947800	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 145041, 11/21/2014	5407775	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 146127, 3/12/2015	5596857	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25663.40942, 3/9/2016	6131239	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 41707-0508, 5/23/2008	2268906	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) Monopole was reinforced in conformance with the referenced 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 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	118 - 90	Pole	P24x0.25	1	-9.10	662.26	64.3	Pass
L2	90 - 76.5	Pole	P24x0.375	2	-15.09	1052.07	86.3	Pass
L3	76.5 - 74	Pole	RPS 24" x 0.58167"	3	-15.63	1387.68	69.2	Pass
L4	74 - 68.875	Pole	RPS 24" x 0.82296"	4	-17.66	1415.12	83.3	Pass
L5	68.875 - 64.5	Pole	RPS 24" x 0.81081"	5	-18.93	1374.22	99.1	Pass
L6	64.5 - 63	Pole	RPS 24" x 0.9855"	6	-19.44	1621.17	88.6	Pass
L7	63 - 60	Pole	RPS 24" x 0.94656"	7	-20.43	1569.62	99.8	Pass
L8	60 - 49.08	Pole	RPS 30" x 0.62249"	8	-25.07	1964.82	83.1	Pass
L9	49.08 - 42	Pole	RPS 30" x 0.77273"	9	-27.50	2168.58	88.3	Pass
L10	42 - 34.5	Pole	RPS 30" x 0.89547"	10	-30.43	2461.22	90.3	Pass
L11	34.5 - 34	Pole	RPS 30" x 1.00259"	11	-30.65	2741.39	82.1	Pass
L12	34 - 30	Pole	RPS 30" x 0.87892"	12	-32.21	2460.53	97.8	Pass
L13	30 - 28	Pole	RPS 36" x 0.67823"	13	-34.47	2277.92	90.6	Pass
L14	28 - 23.25	Pole	RPS 36" x 0.8198"	14	-36.48	2771.72	80.8	Pass
L15	23.25 - 21	Pole	RPS 36" x 0.93415"	15	-37.55	2972.10	78.4	Pass
L16	21 - 19	Pole	RPS 36" x 0.79024"	16	-38.38	2474.20	96.8	Pass
L17	19 - 18.5	Pole	RPS 36" x 0.9479"	17	-38.63	2943.26	82.3	Pass
L18	18.5 - 12.7	Pole	RPS 36" x 0.83577"	18	-41.15	2882.60	91.3	Pass
L19	12.7 - 10.5	Pole	RPS 36" x 0.84318"	19	-42.12	2774.28	97.9	Pass
L20	10.5 - 7.5	Pole	RPS 36" x 0.90546"	20	-43.53	3050.29	93.0	Pass
L21	7.5 - 7	Pole	RPS 36" x 0.93763"	21	-43.78	3097.21	92.3	Pass
L22	7 - 3.75	Pole	RPS 36" x 0.99306"	22	-45.42	3396.02	88.0	Pass
L23	3.75 - 2.75	Pole	RPS 36" x 1.57084"	23	-46.17	5046.20	61.0	Pass
L24	2.75 - 2	Pole	RPS 36" x 1.44941"	24	-46.70	4501.21	68.8	Pass
L25	2 - 0	Pole	RPS 36" x 1.28159"	25	-47.95	4200.66	75.3	Pass
							Summary	
						Pole (L7)	99.8	Pass
						Rating =	99.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.0	Pass
1	Base Plate	0	70.9	Pass
1	Base Foundation Steel	0	70.5	Pass
1	Base Foundation Soil Interaction	0	56.5	Pass
1	Flange Connection	30	71.1	Pass
1	Flange Connection	60	75.1	Pass
1	Flange Connection	90	35.0	Pass

Structure Rating (max from all components) =	99.8%

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

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 Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.0 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 1.00 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50.0 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60.0 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	118.00-90.00	28.00	P24x0.25	A572-42 (42 ksi)	
L2	90.00-76.50	13.50	P24x0.375	A572-42 (42 ksi)	
L3	76.50-74.00	2.50	RPS 24" x 0.58167"	Reinf 36.03 ksi (36 ksi)	
L4	74.00-68.88	5.13	RPS 24" x 0.82296"	Reinf 26.24 ksi (26 ksi)	
L5	68.88-64.50	4.38	RPS 24" x 0.81081"	Reinf 25.85 ksi (26 ksi)	

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L6	64.50-63.00	1.50	RPS 24" x 0.9855"	Reinf 25.28 ksi (25 ksi)	
L7	63.00-60.00	3.00	RPS 24" x 0.94656"	Reinf 25.44 ksi (25 ksi)	
L8	60.00-49.08	10.92	RPS 30" x 0.62249"	Reinf 38.03 ksi (38 ksi)	
L9	49.08-42.00	7.08	RPS 30" x 0.77273"	Reinf 33.96 ksi (34 ksi)	
L10	42.00-34.50	7.50	RPS 30" x 0.89547"	Reinf 33.40 ksi (33 ksi)	
L11	34.50-34.00	0.50	RPS 30" x 1.00259"	Reinf 33.35 ksi (33 ksi)	
L12	34.00-30.00	4.00	RPS 30" x 0.87892"	Reinf 34.00 ksi (34 ksi)	
L13	30.00-28.00	2.00	RPS 36" x 0.67823"	Reinf 33.63 ksi (34 ksi)	
L14	28.00-23.25	4.75	RPS 36" x 0.8198"	Reinf 33.99 ksi (34 ksi)	
L15	23.25-21.00	2.25	RPS 36" x 0.93415"	Reinf 32.09 ksi (32 ksi)	
L16	21.00-19.00	2.00	RPS 36" x 0.79024"	Reinf 31.45 ksi (31 ksi)	
L17	19.00-18.50	0.50	RPS 36" x 0.9479"	Reinf 31.33 ksi (31 ksi)	
L18	18.50-12.70	5.80	RPS 36" x 0.83577"	Reinf 34.69 ksi (35 ksi)	
L19	12.70-10.50	2.20	RPS 36" x 0.84318"	Reinf 33.10 ksi (33 ksi)	
L20	10.50-7.50	3.00	RPS 36" x 0.90546"	Reinf 33.95 ksi (34 ksi)	
L21	7.50-7.00	0.50	RPS 36" x 0.93763"	Reinf 33.32 ksi (33 ksi)	
L22	7.00-3.75	3.25	RPS 36" x 0.99306"	Reinf 34.55 ksi (35 ksi)	
L23	3.75-2.75	1.00	RPS 36" x 1.57084"	Reinf 33.41 ksi (33 ksi)	
L24	2.75-2.00	0.75	RPS 36" x 1.44941"	Reinf 31.79 ksi (32 ksi)	
L25	2.00-0.00	2.00	RPS 36" x 1.28159"	Reinf 33.39 ksi (33 ksi)	

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	Double Angle Stitch Bolt Spacing Redundants in
L1 118.00-90.00				1	1	1			
L2 90.00-76.50				1	1	1			
L3 76.50-74.00				1	1	1			
L4 74.00-68.88				1	1	1			
L5 68.88-64.50				1	1	1			
L6 64.50-63.00				1	1	1			
L7 63.00-60.00				1	1	1			
L8 60.00-49.08				1	1	1			
L9 49.08-42.00				1	1	1			
L10 42.00-34.50				1	1	1			
L11 34.50-34.00				1	1	1			
L12 34.00-30.00				1	1	1			
L13 30.00-28.00				1	1	1			
L14 28.00-23.25				1	1	1			
L15 23.25-21.00				1	1	1			
L16 21.00-19.00				1	1	1			
L17 19.00-18.50				1	1	1			
L18 18.50-12.70				1	1	1			
L19 12.70-10.50				1	1	1			
L20 10.50-7.50				1	1	1			
L21 7.50-7.00				1	1	1			
L22 7.00-3.75				1	1	1			
L23 3.75-2.75				1	1	1			
L24 2.75-2.00				1	1	1			
L25 2.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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)	C	No	CaAa (Out Of Face)	114.00 - 0.00	1	No Ice	0.15	1.08
						1/2" Ice	0.25	2.33
						1" Ice	0.35	4.18

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement*	*Total Number*		*C_AA_A*	*Weight*
				ft			*ft^2/ft*	*plf*
HB114-1-08U4-M5J(1-1/4)	C	No	CaAa (Out Of Face)	114.00 - 0.00	2	No Ice	0.00	1.08
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.18
***								
AL5-50(7/8)	C	No	Inside Pole	108.00 - 0.00	12	No Ice	0.00	0.26
						1/2" Ice	0.00	0.26
						1" Ice	0.00	0.26
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	Inside Pole	108.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
***								
2" (Nominal) Conduit	C	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
FB-L98B-002-75000(3/8)	C	No	Inside Pole	98.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	98.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF5-50A(7/8)	C	No	Inside Pole	98.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
***								
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	85.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
***								
1" Rigid Conduit (3/4" EMT)	C	No	CaAa (Out Of Face)	80.00 - 0.00	1	No Ice	0.00	0.46
						1/2" Ice	0.00	1.33
						1" Ice	0.00	2.81
LDF4-50A(1/2)	C	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	72.00 - 0.00	2	No Ice	0.00	0.72
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.84
HJ4.5-50(5/8)	C	No	Inside Pole	72.00 - 0.00	3	No Ice	0.00	0.40
						1/2" Ice	0.00	0.40
						1" Ice	0.00	0.40
FSJ1-50A(1/4)	C	No	Inside Pole	72.00 - 0.00	3	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
FSJ4P-50B-1(1/2)	C	No	CaAa (Out Of Face)	72.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.77
						1" Ice	0.00	2.01
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	78.00 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.50 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	50.25 - 35.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	75.00 - 60.00	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	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	118.00-90.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.696	0.20
L2	90.00-76.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.695	0.28
L3	76.50-74.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.917	0.06
L4	74.00-68.88	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.314	0.14
L5	68.88-64.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.682	0.12
L6	64.50-63.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.263	0.04
L7	63.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.525	0.08
L8	60.00-49.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.972	0.31
L9	49.08-42.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.959	0.20
L10	42.00-34.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.354	0.21
L11	34.50-34.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.442	0.01
L12	34.00-30.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.533	0.11
L13	30.00-28.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06
L14	28.00-23.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.196	0.13
L15	23.25-21.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.987	0.06
L16	21.00-19.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06
L17	19.00-18.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.442	0.01
L18	18.50-12.70	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.123	0.16
L19	12.70-10.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.943	0.06
L20	10.50-7.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.650	0.08
L21	7.50-7.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.442	0.01
L22	7.00-3.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.871	0.09

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
L23	3.75-2.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.883	0.03
L24	2.75-2.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.662	0.02
L25	2.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.767	0.06

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	118.00-90.00	A	2.243	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.464	0.98
L2	90.00-76.50	A	2.194	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.809	2.01
L3	76.50-74.00	A	2.172	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.864	0.53
L4	74.00-68.88	A	2.161	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.879	1.21
L5	68.88-64.50	A	2.146	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.487	1.10
L6	64.50-63.00	A	2.136	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.609	0.37
L7	63.00-60.00	A	2.128	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.194	0.74
L8	60.00-49.08	A	2.103	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.402	2.64
L9	49.08-42.00	A	2.065	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.232	1.66
L10	42.00-34.50	A	2.030	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.254	1.70
L11	34.50-34.00	A	2.007	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.490	0.11
L12	34.00-30.00	A	1.994	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.863	0.88
L13	30.00-28.00	A	1.974	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.891	0.44
L14	28.00-23.25	A	1.950	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.870	1.02
L15	23.25-21.00	A	1.922	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.503	0.48
L16	21.00-19.00	A	1.902	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.740	0.42
L17	19.00-18.50	A	1.890	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.429	0.10
L18	18.50-12.70	A	1.856	0.000	0.000	0.000	0.000	0.00

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
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.364	1.18
L19	12.70-10.50	A	1.801	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.083	0.43
L20	10.50-7.50	A	1.756	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.153	0.57
L21	7.50-7.00	A	1.719	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.339	0.09
L22	7.00-3.75	A	1.668	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.533	0.59
L23	3.75-2.75	A	1.586	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.540	0.17
L24	2.75-2.00	A	1.537	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.867	0.12
L25	2.00-0.00	A	1.410	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.712	0.30

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

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
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 -3.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 0.00	0.000	116.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
Pipe Mount [PM 601-3]	C	None		0.000	116.00	No Ice 1/2" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28

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			
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
(3) 2.375" OD x 3' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
(3) 2.375" OD x 3' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
(3) 2.375" OD x 3' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	114.00	No Ice 1/2" Ice 1" Ice	0.58 0.77 0.97	0.58 0.77 0.97	0.03 0.03 0.04
Platform Mount [LP 502-1]	C	None		0.000	114.00	No Ice 1/2" Ice 1" Ice	32.35 45.67 58.99	32.35 45.67 58.99	0.93 1.19 1.46
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00	0.000	108.00	No Ice 1/2"	6.32 6.76	5.63 6.42	0.11 0.17

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			Ice	7.20	7.12	0.23
						1" Ice			
KRY 112 144/1	A	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	B	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	C	From Leg	4.00	0.000	108.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			0.00			Ice	0.51	0.30	0.02
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.000	108.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
Sector Mount [SM 801-3]	C	None		0.000	108.00	No Ice	20.40	20.40	0.88
						1/2"	26.30	26.30	1.25
						Ice	32.20	32.20	1.63
						1" Ice			
2.375" OD x 6' Mount Pipe	A	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	B	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
2.375" OD x 6' Mount Pipe	C	From Leg	4.00	0.000	108.00	No Ice	1.43	1.43	0.03
			0.00			1/2"	1.92	1.92	0.04
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
***									
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	11.56	9.72	0.10
			0.00			1/2"	12.22	11.19	0.19
			0.00			Ice	12.89	12.59	0.28
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	0.14
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	0.14
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	5.82	4.64	0.09
			0.00			1/2"	6.27	5.51	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
			0.00			Ice	6.70	6.21	0.21
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.000	98.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			0.00			Ice	3.26	1.48	0.10
						1" Ice			
DTMABP7819VG12A	A	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	B	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	C	From Leg	4.00	0.000	98.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.000	98.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.64	1.64	0.06
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.000	98.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.000	98.00	No Ice	13.21	9.58	0.10
			0.00			1/2"	13.90	11.05	0.20
			0.00			Ice	14.59	12.50	0.30
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.000	98.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
RRUS 32 B2	A	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.00	0.000	98.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
TT19-08BP111-001	A	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03
						1" Ice			
TT19-08BP111-001	B	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03
						1" Ice			
TT19-08BP111-001	C	From Leg	4.00	0.000	98.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			0.00			Ice	0.75	0.63	0.03

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			
(2) 7020.00	A	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	B	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	C	From Leg	4.00 0.00 0.00	0.000	98.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
Platform Mount [LP 712-1]	C	None		0.000	98.00	No Ice 1/2" Ice 1" Ice	24.53 29.94 35.35	24.53 29.94 35.35	1.34 1.65 1.96
***									
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) BXA-70040-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	14.65 15.26 15.84	7.37 8.54 9.42	0.06 0.16 0.27
(2) BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
(2) BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.80 6.95 7.82	0.04 0.10 0.17
(2) CBC721-DF	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	0.39 0.46 0.55	0.11 0.17 0.23	0.00 0.01 0.01
(4) CBC721-DF	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	0.39 0.46 0.55	0.11 0.17 0.23	0.00 0.01 0.01
(2) RRH2X60-AWS	A	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-PCS	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
(2) RRH2X60-PCS	C	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice	2.20 2.39	1.72 1.90	0.06 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice			
DB-B1-6C-12AB-0Z	B	From Leg	4.00 0.00 1.00	0.000	85.00	No Ice 1/2" Ice 1" Ice	3.36 3.60 3.84	2.19 2.39 2.61	0.03 0.06 0.09
Platform Mount [LP 303-1]	C	None		0.000	85.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
***									
KS24019-L112A	A	From Leg	3.00 0.00 1.00	0.000	80.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.000	80.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									
LLPX310R w/ Mount Pipe	A	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	B	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	C	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
WIMAX DAP HEAD	A	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	2.00 0.00 1.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
HORIZON COMPACT	A	From Leg	2.00 0.00 0.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
HORIZON COMPACT	C	From Leg	2.00 0.00 2.00	0.000	72.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
Side Arm Mount [SO 101-3]	C	None		0.000	72.00	No Ice 1/2" Ice 1" Ice	7.50 8.90 10.30	7.50 8.90 10.30	0.25 0.33 0.41
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	90.00	No Ice 1/2" Ice 1" Ice	11.39 11.92 12.46	1.46 2.25 3.06	0.43 0.48 0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	90.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.43 0.48 0.53
Bridge Stiffener (84" x	C	None		0.000	90.00	No Ice	0.00	0.00	0.43

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
14.5" x 1.25")						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	60.00	No Ice	11.39	1.46	0.43
						1/2" Ice	11.92	2.25	0.48
						1" Ice	12.46	3.06	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	60.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	C	None		0.000	60.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									
Bridge Stiffener (84" x 14.5" x 1.25")	A	None		0.000	30.00	No Ice	11.39	1.46	0.43
						1/2" Ice	11.92	2.25	0.48
						1" Ice	12.46	3.06	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	B	None		0.000	30.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
Bridge Stiffener (84" x 14.5" x 1.25")	C	None		0.000	30.00	No Ice	0.00	0.00	0.43
						1/2" Ice	0.00	0.00	0.48
						1" Ice	0.00	0.00	0.53
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-18G-2-C	A	Paraboloid w/Radome	From Leg	2.00 0.00 0.00	0.000		72.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.04 0.05
VHLP1-23	B	Paraboloid w/o Radome	From Leg	2.00 0.00 1.00	0.000		72.00	1.27	No Ice 1/2" Ice 1" Ice	1.28 1.45 1.62	0.01 0.02 0.03

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 118.00-90.00	104.00	1.276	29	56.000	A	0.000	56.000	56.000	100.00	0.000	0.000
					B	0.000	56.000		100.00	0.000	0.000
					C	0.000	56.000		100.00	0.000	3.696
L2 90.00-76.50	83.25	1.218	28	27.000	A	0.000	27.000	27.000	100.00	0.000	0.000
					B	0.000	27.000		100.00	0.000	0.000
					C	0.000	27.000		100.00	0.000	5.695
L3 76.50-74.00	75.25	1.192	27	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
					C	0.000	5.000		100.00	0.000	1.917
L4 74.00-68.88	71.44	1.179	27	10.250	A	0.000	10.250	10.250	100.00	0.000	0.000
					B	0.000	10.250		100.00	0.000	0.000
					C	0.000	10.250		100.00	0.000	4.314
L5 68.88-64.50	66.69	1.162	27	8.750	A	0.000	8.750	8.750	100.00	0.000	0.000
					B	0.000	8.750		100.00	0.000	0.000
					C	0.000	8.750		100.00	0.000	3.682
L6 64.50-63.00	63.75	1.151	26	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	1.263
L7 63.00-60.00	61.50	1.142	26	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	2.525
L8 60.00-49.08	54.54	1.114	25	27.300	A	0.000	27.300	27.300	100.00	0.000	0.000
					B	0.000	27.300		100.00	0.000	0.000
					C	0.000	27.300		100.00	0.000	7.972
L9 49.08-42.00	45.54	1.072	25	17.700	A	0.000	17.700	17.700	100.00	0.000	0.000
					B	0.000	17.700		100.00	0.000	0.000
					C	0.000	17.700		100.00	0.000	5.959
L10 42.00-34.50	38.25	1.034	24	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	6.354
L11 34.50-34.00	34.25	1.01	23	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.442
L12 34.00-30.00	32.00	0.996	23	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	3.533
L13 30.00-28.00	29.00	0.975	22	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L14 28.00-23.25	25.63	0.95	22	14.250	A	0.000	14.250	14.250	100.00	0.000	0.000
					B	0.000	14.250		100.00	0.000	0.000
					C	0.000	14.250		100.00	0.000	4.196
L15 23.25-21.00	22.13	0.921	21	6.750	A	0.000	6.750	6.750	100.00	0.000	0.000
					B	0.000	6.750		100.00	0.000	0.000
					C	0.000	6.750		100.00	0.000	1.987
L16 21.00-19.00	20.00	0.902	21	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L17 19.00-18.50	18.75	0.89	20	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L18 18.50-12.70	15.60	0.856	20	17.400	A	0.000	17.400	17.400	100.00	0.000	0.000
					B	0.000	17.400		100.00	0.000	0.000
					C	0.000	17.400		100.00	0.000	5.123
L19 12.70-10.50	11.60	0.85	19	6.600	A	0.000	6.600	6.600	100.00	0.000	0.000
					B	0.000	6.600		100.00	0.000	0.000
					C	0.000	6.600		100.00	0.000	1.943
L20 10.50-7.50	9.00	0.85	19	9.000	A	0.000	9.000	9.000	100.00	0.000	0.000
					B	0.000	9.000		100.00	0.000	0.000
					C	0.000	9.000		100.00	0.000	2.650
L21 7.50-7.00	7.25	0.85	19	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L22 7.00-3.75	5.38	0.85	19	9.750	A	0.000	9.750	9.750	100.00	0.000	0.000
					B	0.000	9.750		100.00	0.000	0.000
					C	0.000	9.750		100.00	0.000	2.871
L23 3.75-2.75	3.25	0.85	19	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.883
L24 2.75-2.00	2.38	0.85	19	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.662
L25 2.00-0.00	1.00	0.85	19	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767

Tower Pressure - With Ice

G_H = 1.100

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 118.00-90.00	104.00	1.276	8	2.24	66.469	A	0.000	66.469	66.469	100.00	0.000	0.000
						B	0.000	66.469		100.00	0.000	0.000
						C	0.000	66.469		100.00	0.000	14.464
L2 90.00-76.50	83.25	1.218	7	2.19	31.936	A	0.000	31.936	31.936	100.00	0.000	0.000
						B	0.000	31.936		100.00	0.000	0.000
						C	0.000	31.936		100.00	0.000	19.809
L3 76.50-74.00	75.25	1.192	7	2.17	5.905	A	0.000	5.905	5.905	100.00	0.000	0.000
						B	0.000	5.905		100.00	0.000	0.000
						C	0.000	5.905		100.00	0.000	6.864
L4 74.00-68.88	71.44	1.179	7	2.16	12.095	A	0.000	12.095	12.095	100.00	0.000	0.000
						B	0.000	12.095		100.00	0.000	0.000
						C	0.000	12.095		100.00	0.000	15.879
L5 68.88-64.50	66.69	1.162	7	2.15	10.315	A	0.000	10.315	10.315	100.00	0.000	0.000
						B	0.000	10.315		100.00	0.000	0.000
						C	0.000	10.315		100.00	0.000	13.487
L6 64.50-63.00	63.75	1.151	7	2.14	3.534	A	0.000	3.534	3.534	100.00	0.000	0.000
						B	0.000	3.534		100.00	0.000	0.000
						C	0.000	3.534		100.00	0.000	4.609
L7 63.00-60.00	61.50	1.142	7	2.13	7.064	A	0.000	7.064	7.064	100.00	0.000	0.000
						B	0.000	7.064		100.00	0.000	0.000
						C	0.000	7.064		100.00	0.000	9.194
L8 60.00-49.08	54.54	1.114	7	2.10	31.128	A	0.000	31.128	31.128	100.00	0.000	0.000
						B	0.000	31.128		100.00	0.000	0.000
						C	0.000	31.128		100.00	0.000	27.402
L9 49.08-42.00	45.54	1.072	7	2.07	20.137	A	0.000	20.137	20.137	100.00	0.000	0.000
						B	0.000	20.137		100.00	0.000	0.000
						C	0.000	20.137		100.00	0.000	21.232
L10 42.00-34.50	38.25	1.034	6	2.03	21.287	A	0.000	21.287	21.287	100.00	0.000	0.000
						B	0.000	21.287		100.00	0.000	0.000
						C	0.000	21.287		100.00	0.000	22.254
L11 34.50-34.00	34.25	1.01	6	2.01	1.417	A	0.000	1.417	1.417	100.00	0.000	0.000
						B	0.000	1.417		100.00	0.000	0.000
						C	0.000	1.417		100.00	0.000	1.490
L12 34.00-30.00	32.00	0.996	6	1.99	11.329	A	0.000	11.329	11.329	100.00	0.000	0.000
						B	0.000	11.329		100.00	0.000	0.000
						C	0.000	11.329		100.00	0.000	11.863
L13 30.00-28.00	29.00	0.975	6	1.97	6.658	A	0.000	6.658	6.658	100.00	0.000	0.000
						B	0.000	6.658		100.00	0.000	0.000
						C	0.000	6.658		100.00	0.000	5.891
L14 28.00-23.25	25.63	0.95	6	1.95	15.794	A	0.000	15.794	15.794	100.00	0.000	0.000
						B	0.000	15.794		100.00	0.000	0.000
						C	0.000	15.794		100.00	0.000	13.870
L15 23.25-21.00	22.13	0.921	6	1.92	7.471	A	0.000	7.471	7.471	100.00	0.000	0.000
						B	0.000	7.471		100.00	0.000	0.000
						C	0.000	7.471		100.00	0.000	6.503
L16 21.00-19.00	20.00	0.902	5	1.90	6.634	A	0.000	6.634	6.634	100.00	0.000	0.000
						B	0.000	6.634		100.00	0.000	0.000
						C	0.000	6.634		100.00	0.000	5.740
L17 19.00-18.50	18.75	0.89	5	1.89	1.658	A	0.000	1.658	1.658	100.00	0.000	0.000
						B	0.000	1.658		100.00	0.000	0.000
						C	0.000	1.658		100.00	0.000	1.429
L18 18.50-12.70	15.60	0.856	5	1.86	19.194	A	0.000	19.194	19.194	100.00	0.000	0.000
						B	0.000	19.194		100.00	0.000	0.000
						C	0.000	19.194		100.00	0.000	16.364
L19 12.70-10.50	11.60	0.85	5	1.80	7.261	A	0.000	7.261	7.261	100.00	0.000	0.000
						B	0.000	7.261		100.00	0.000	0.000
						C	0.000	7.261		100.00	0.000	6.083
L20 10.50-7.50	9.00	0.85	5	1.76	9.878	A	0.000	9.878	9.878	100.00	0.000	0.000
						B	0.000	9.878		100.00	0.000	0.000
						C	0.000	9.878		100.00	0.000	8.153
L21 7.50-7.00	7.25	0.85	5	1.72	1.643	A	0.000	1.643	1.643	100.00	0.000	0.000
						B	0.000	1.643		100.00	0.000	0.000
						C	0.000	1.643		100.00	0.000	1.339

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
L22 7.00-3.75	5.38	0.85	5	1.67	10.654	A	0.000	10.654	10.654	100.00	0.000	0.000
						B	0.000	10.654		100.00	0.000	0.000
						C	0.000	10.654		100.00	0.000	8.533
L23 3.75-2.75	3.25	0.85	5	1.59	3.264	A	0.000	3.264	3.264	100.00	0.000	0.000
						B	0.000	3.264		100.00	0.000	0.000
						C	0.000	3.264		100.00	0.000	2.540
L24 2.75-2.00	2.38	0.85	5	1.54	2.442	A	0.000	2.442	2.442	100.00	0.000	0.000
						B	0.000	2.442		100.00	0.000	0.000
						C	0.000	2.442		100.00	0.000	1.867
L25 2.00-0.00	1.00	0.85	5	1.41	6.470	A	0.000	6.470	6.470	100.00	0.000	0.000
						B	0.000	6.470		100.00	0.000	0.000
						C	0.000	6.470		100.00	0.000	4.712

Tower Pressure - Service

G_H = 1.100

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 118.00-90.00	104.00	1.276	10	56.000	A	0.000	56.000	56.000	100.00	0.000	0.000
					B	0.000	56.000		100.00	0.000	0.000
					C	0.000	56.000		100.00	0.000	3.696
L2 90.00-76.50	83.25	1.218	10	27.000	A	0.000	27.000	27.000	100.00	0.000	0.000
					B	0.000	27.000		100.00	0.000	0.000
					C	0.000	27.000		100.00	0.000	5.695
L3 76.50-74.00	75.25	1.192	9	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000
					C	0.000	5.000		100.00	0.000	1.917
L4 74.00-68.88	71.44	1.179	9	10.250	A	0.000	10.250	10.250	100.00	0.000	0.000
					B	0.000	10.250		100.00	0.000	0.000
					C	0.000	10.250		100.00	0.000	4.314
L5 68.88-64.50	66.69	1.162	9	8.750	A	0.000	8.750	8.750	100.00	0.000	0.000
					B	0.000	8.750		100.00	0.000	0.000
					C	0.000	8.750		100.00	0.000	3.682
L6 64.50-63.00	63.75	1.151	9	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	1.263
L7 63.00-60.00	61.50	1.142	9	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	2.525
L8 60.00-49.08	54.54	1.114	9	27.300	A	0.000	27.300	27.300	100.00	0.000	0.000
					B	0.000	27.300		100.00	0.000	0.000
					C	0.000	27.300		100.00	0.000	7.972
L9 49.08-42.00	45.54	1.072	8	17.700	A	0.000	17.700	17.700	100.00	0.000	0.000
					B	0.000	17.700		100.00	0.000	0.000
					C	0.000	17.700		100.00	0.000	5.959
L10 42.00-34.50	38.25	1.034	8	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	6.354
L11 34.50-34.00	34.25	1.01	8	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.442
L12 34.00-30.00	32.00	0.996	8	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	3.533
L13 30.00-28.00	29.00	0.975	8	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L14 28.00-23.25	25.63	0.95	7	14.250	A	0.000	14.250	14.250	100.00	0.000	0.000
					B	0.000	14.250		100.00	0.000	0.000
					C	0.000	14.250		100.00	0.000	4.196
L15 23.25-21.00	22.13	0.921	7	6.750	A	0.000	6.750	6.750	100.00	0.000	0.000
					B	0.000	6.750		100.00	0.000	0.000
					C	0.000	6.750		100.00	0.000	1.987

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
L16 21.00-19.00	20.00	0.902	7	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767
L17 19.00-18.50	18.75	0.89	7	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L18 18.50-12.70	15.60	0.856	7	17.400	A	0.000	17.400	17.400	100.00	0.000	0.000
					B	0.000	17.400		100.00	0.000	0.000
					C	0.000	17.400		100.00	0.000	5.123
L19 12.70-10.50	11.60	0.85	7	6.600	A	0.000	6.600	6.600	100.00	0.000	0.000
					B	0.000	6.600		100.00	0.000	0.000
					C	0.000	6.600		100.00	0.000	1.943
L20 10.50-7.50	9.00	0.85	7	9.000	A	0.000	9.000	9.000	100.00	0.000	0.000
					B	0.000	9.000		100.00	0.000	0.000
					C	0.000	9.000		100.00	0.000	2.650
L21 7.50-7.00	7.25	0.85	7	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500		100.00	0.000	0.000
					C	0.000	1.500		100.00	0.000	0.442
L22 7.00-3.75	5.38	0.85	7	9.750	A	0.000	9.750	9.750	100.00	0.000	0.000
					B	0.000	9.750		100.00	0.000	0.000
					C	0.000	9.750		100.00	0.000	2.871
L23 3.75-2.75	3.25	0.85	7	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.883
L24 2.75-2.00	2.38	0.85	7	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.662
L25 2.00-0.00	1.00	0.85	7	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.767

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	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	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 - 90	Pole	Max Tension	14	0.00	0	0
			Max. Compression	26	-28.98	2	5
			Max. Mx	20	-9.13	247	1
			Max. My	2	-9.10	1	249
			Max. Vy	20	-15.49	247	1
			Max. Vx	2	-15.59	1	249
			Max. Torque	19			-3
L2	90 - 76.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-45.45	1	6
			Max. Mx	20	-15.14	522	1
			Max. My	2	-15.09	1	528
			Max. Vy	20	-22.60	522	1
			Max. Vx	2	-23.07	1	528
			Max. Torque	21			-3
L3	76.5 - 74	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-46.61	1	6
			Max. Mx	20	-15.68	579	1
			Max. My	2	-15.63	1	586
			Max. Vy	20	-22.97	579	1
			Max. Vx	2	-23.45	1	586
			Max. Torque	21			-3
L4	74 - 68.875	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-51.44	1	6
			Max. Mx	20	-17.71	702	2
			Max. My	2	-17.66	1	713
			Max. Vy	20	-24.90	702	2
			Max. Vx	14	25.42	-1	-711
			Max. Torque	21			-3
L5	68.875 - 64.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-53.92	1	6
			Max. Mx	20	-18.98	813	2
			Max. My	2	-18.93	2	826
			Max. Vy	20	-25.56	813	2
			Max. Vx	14	26.08	-1	-824
			Max. Torque	21			-3
L6	64.5 - 63	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-54.84	1	6
			Max. Mx	20	-19.48	851	2
			Max. My	2	-19.44	2	865
			Max. Vy	20	-25.79	851	2
			Max. Vx	14	26.30	-1	-863
			Max. Torque	21			-3

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L7	63 - 60	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-56.64	1	6
			Max. Mx	20	-20.48	929	2
			Max. My	2	-20.43	2	944
			Max. Vy	20	-26.22	929	2
			Max. Vx	14	26.74	-1	-943
			Max. Torque	21			-3
L8	60 - 49.08	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-65.10	1	7
			Max. Mx	20	-25.11	1232	3
			Max. My	2	-25.07	4	1252
			Max. Vy	20	-28.55	1232	3
			Max. Vx	14	29.07	-2	-1250
			Max. Torque	21			-3
L9	49.08 - 42	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-69.43	1	7
			Max. Mx	20	-27.54	1438	4
			Max. My	2	-27.50	5	1462
			Max. Vy	20	-29.65	1438	4
			Max. Vx	14	30.16	-2	-1460
			Max. Torque	21			-3
L10	42 - 34.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-74.28	1	7
			Max. Mx	20	-30.46	1664	4
			Max. My	2	-30.43	6	1692
			Max. Vy	20	-30.74	1664	4
			Max. Vx	14	31.26	-3	-1690
			Max. Torque	21			-3
L11	34.5 - 34	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-74.62	1	7
			Max. Mx	20	-30.68	1679	4
			Max. My	2	-30.65	6	1708
			Max. Vy	20	-30.80	1679	4
			Max. Vx	14	31.32	-3	-1706
			Max. Torque	21			-3
L12	34 - 30	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-77.15	1	7
			Max. Mx	20	-32.23	1804	4
			Max. My	2	-32.21	6	1834
			Max. Vy	20	-31.34	1804	4
			Max. Vx	14	31.86	-3	-1832
			Max. Torque	21			-3
L13	30 - 28	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-80.62	1	7
			Max. Mx	20	-34.50	1868	5
			Max. My	2	-34.47	6	1899
			Max. Vy	20	-32.14	1868	5
			Max. Vx	14	32.65	-3	-1897
			Max. Torque	21			-3
L14	28 - 23.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-83.86	1	7
			Max. Mx	20	-36.50	2022	5
			Max. My	2	-36.48	7	2056
			Max. Vy	20	-32.88	2022	5
			Max. Vx	14	33.39	-3	-2054
			Max. Torque	21			-3
L15	23.25 - 21	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-85.49	1	7
			Max. Mx	20	-37.57	2096	5
			Max. My	2	-37.55	7	2131
			Max. Vy	20	-33.21	2096	5
			Max. Vx	14	33.72	-3	-2129
			Max. Torque	21			-3
L16	21 - 19	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-86.81	1	7
			Max. Mx	20	-38.39	2163	5
			Max. My	2	-38.38	7	2199
			Max. Vy	20	-33.49	2163	5
			Max. Vx	14	34.00	-3	-2197

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	21			-3
L17	19 - 18.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-87.18	1	7
			Max. Mx	20	-38.64	2180	5
			Max. My	2	-38.63	8	2216
			Max. Vy	20	-33.55	2180	5
			Max. Vx	14	34.07	-3	-2214
			Max. Torque	21			-3
L18	18.5 - 12.7	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-91.07	1	7
			Max. Mx	20	-41.16	2376	6
			Max. My	2	-41.15	8	2416
			Max. Vy	20	-34.31	2376	6
			Max. Vx	14	34.82	-4	-2414
			Max. Torque	21			-3
L19	12.7 - 10.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-92.54	1	7
			Max. Mx	20	-42.13	2452	6
			Max. My	2	-42.12	9	2492
			Max. Vy	20	-34.58	2452	6
			Max. Vx	14	35.08	-4	-2491
			Max. Torque	21			-3
L20	10.5 - 7.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-94.60	1	7
			Max. Mx	20	-43.54	2556	6
			Max. My	2	-43.53	9	2598
			Max. Vy	20	-34.94	2556	6
			Max. Vx	14	35.44	-4	-2596
			Max. Torque	21			-3
L21	7.5 - 7	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-94.95	1	7
			Max. Mx	20	-43.79	2574	6
			Max. My	2	-43.78	9	2616
			Max. Vy	20	-34.99	2574	6
			Max. Vx	14	35.50	-4	-2614
			Max. Torque	21			-3
L22	7 - 3.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-97.25	1	7
			Max. Mx	20	-45.42	2688	6
			Max. My	2	-45.42	9	2732
			Max. Vy	20	-35.39	2688	6
			Max. Vx	14	35.90	-4	-2730
			Max. Torque	21			-3
L23	3.75 - 2.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-98.19	1	7
			Max. Mx	20	-46.18	2724	6
			Max. My	2	-46.17	10	2768
			Max. Vy	20	-35.52	2724	6
			Max. Vx	14	36.02	-4	-2766
			Max. Torque	21			-3
L24	2.75 - 2	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-98.86	1	7
			Max. Mx	20	-46.70	2750	6
			Max. My	2	-46.70	10	2795
			Max. Vy	20	-35.61	2750	6
			Max. Vx	14	36.11	-4	-2793
			Max. Torque	21			-3
L25	2 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-100.44	1	7
			Max. Mx	20	-47.95	2822	7
			Max. My	2	-47.95	10	2867
			Max. Vy	20	-35.86	2822	7
			Max. Vx	14	36.36	-4	-2866
			Max. Torque	21			-3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	100.44	-0.00	-0.00
	Max. H_x	21	35.97	35.85	0.07
	Max. H_z	3	35.97	0.12	36.34
	Max. M_x	2	2867	0.12	36.34
	Max. M_z	8	2819	-35.82	-0.07
	Max. Torsion	9	3	-35.82	-0.07
	Min. Vert	15	35.97	-0.05	-36.35
	Min. H_x	9	35.97	-35.82	-0.07
	Min. H_z	15	35.97	-0.05	-36.35
	Min. M_x	14	-2866	-0.05	-36.35
	Min. M_z	20	-2822	35.85	0.07
	Min. Torsion	21	-3	35.85	0.07

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	39.97	-0.00	-0.00	-1	0	0
1.2 Dead+1.6 Wind 0 deg - No Ice	47.96	-0.12	-36.34	-2867	10	-1
0.9 Dead+1.6 Wind 0 deg - No Ice	35.97	-0.12	-36.34	-2844	10	-1
1.2 Dead+1.6 Wind 30 deg - No Ice	47.96	17.87	-31.40	-2478	-1406	-2
0.9 Dead+1.6 Wind 30 deg - No Ice	35.97	17.87	-31.40	-2458	-1395	-2
1.2 Dead+1.6 Wind 60 deg - No Ice	47.96	30.99	-18.08	-1427	-2439	-3
0.9 Dead+1.6 Wind 60 deg - No Ice	35.97	30.99	-18.08	-1415	-2420	-3
1.2 Dead+1.6 Wind 90 deg - No Ice	47.96	35.82	0.07	5	-2819	-3
0.9 Dead+1.6 Wind 90 deg - No Ice	35.97	35.82	0.07	5	-2797	-3
1.2 Dead+1.6 Wind 120 deg - No Ice	47.96	31.08	18.22	1437	-2446	-2
0.9 Dead+1.6 Wind 120 deg - No Ice	35.97	31.08	18.22	1425	-2427	-2
1.2 Dead+1.6 Wind 150 deg - No Ice	47.96	17.99	31.52	2485	-1416	-1
0.9 Dead+1.6 Wind 150 deg - No Ice	35.97	17.99	31.52	2465	-1405	-1
1.2 Dead+1.6 Wind 180 deg - No Ice	47.96	0.05	36.35	2866	-4	0
0.9 Dead+1.6 Wind 180 deg - No Ice	35.97	0.05	36.35	2843	-4	0
1.2 Dead+1.6 Wind 210 deg - No Ice	47.96	-17.89	31.45	2479	1408	2
0.9 Dead+1.6 Wind 210 deg - No Ice	35.97	-17.89	31.45	2460	1397	2
1.2 Dead+1.6 Wind 240 deg - No Ice	47.96	-31.07	18.08	1425	2446	3
0.9 Dead+1.6 Wind 240 deg - No Ice	35.97	-31.07	18.08	1414	2426	3
1.2 Dead+1.6 Wind 270 deg - No Ice	47.96	-35.85	-0.07	-7	2822	3
0.9 Dead+1.6 Wind 270 deg - No Ice	35.97	-35.85	-0.07	-6	2799	3
1.2 Dead+1.6 Wind 300 deg - No Ice	47.96	-31.08	-18.19	-1436	2446	2
0.9 Dead+1.6 Wind 300 deg	35.97	-31.08	-18.19	-1425	2427	2

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 330 deg	47.96	-18.02	-31.47	-2484	1418	1
- No Ice 0.9 Dead+1.6 Wind 330 deg	35.97	-18.02	-31.47	-2464	1407	1
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	100.44	0.00	0.00	-7	1	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	100.44	-0.03	-10.42	-907	3	0
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	100.44	5.17	-9.01	-785	-445	0
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	100.44	8.96	-5.19	-455	-773	-1
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	100.44	10.35	0.02	-5	-894	-1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	100.44	8.98	5.22	445	-775	-1
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	100.44	5.20	9.04	774	-448	0
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	100.44	0.01	10.42	894	0	0
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	100.44	-5.17	9.02	772	447	0
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	100.44	-8.98	5.19	441	776	1
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	100.44	-10.36	-0.02	-8	896	1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	100.44	-8.98	-5.22	-458	777	1
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	100.44	-5.20	-9.03	-787	450	0
Dead+Wind 0 deg - Service	39.97	-0.03	-7.78	-611	2	0
Dead+Wind 30 deg - Service	39.97	3.82	-6.72	-528	-299	0
Dead+Wind 60 deg - Service	39.97	6.63	-3.87	-305	-519	-1
Dead+Wind 90 deg - Service	39.97	7.66	0.01	0	-600	-1
Dead+Wind 120 deg - Service	39.97	6.65	3.90	305	-521	-1
Dead+Wind 150 deg - Service	39.97	3.85	6.74	529	-301	0
Dead+Wind 180 deg - Service	39.97	0.01	7.78	610	-1	0
Dead+Wind 210 deg - Service	39.97	-3.83	6.73	528	300	0
Dead+Wind 240 deg - Service	39.97	-6.65	3.87	303	521	1
Dead+Wind 270 deg - Service	39.97	-7.67	-0.01	-2	601	1
Dead+Wind 300 deg - Service	39.97	-6.65	-3.89	-306	521	1
Dead+Wind 330 deg - Service	39.97	-3.85	-6.73	-530	302	0

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	0.00	-39.97	0.00	0.00	39.97	0.00	0.000%
2	-0.12	-47.96	-36.34	0.12	47.96	36.34	0.002%
3	-0.12	-35.97	-36.34	0.12	35.97	36.34	0.002%
4	17.87	-47.96	-31.40	-17.87	47.96	31.40	0.000%
5	17.87	-35.97	-31.40	-17.87	35.97	31.40	0.000%
6	30.99	-47.96	-18.08	-30.99	47.96	18.08	0.000%
7	30.99	-35.97	-18.08	-30.99	35.97	18.08	0.000%
8	35.82	-47.96	0.07	-35.82	47.96	-0.07	0.001%
9	35.82	-35.97	0.07	-35.82	35.97	-0.07	0.001%
10	31.08	-47.96	18.22	-31.08	47.96	-18.22	0.000%
11	31.08	-35.97	18.22	-31.08	35.97	-18.22	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	17.99	-47.96	31.52	-17.99	47.96	-31.52	0.000%
13	17.99	-35.97	31.52	-17.99	35.97	-31.52	0.000%
14	0.05	-47.96	36.35	-0.05	47.96	-36.35	0.006%
15	0.05	-35.97	36.35	-0.05	35.97	-36.35	0.005%
16	-17.89	-47.96	31.45	17.89	47.96	-31.45	0.000%
17	-17.89	-35.97	31.45	17.89	35.97	-31.45	0.000%
18	-31.07	-47.96	18.08	31.07	47.96	-18.08	0.000%
19	-31.07	-35.97	18.08	31.07	35.97	-18.08	0.000%
20	-35.85	-47.96	-0.07	35.85	47.96	0.07	0.001%
21	-35.85	-35.97	-0.07	35.85	35.97	0.07	0.001%
22	-31.08	-47.96	-18.19	31.08	47.96	18.19	0.000%
23	-31.08	-35.97	-18.19	31.08	35.97	18.19	0.000%
24	-18.02	-47.96	-31.47	18.02	47.96	31.47	0.000%
25	-18.02	-35.97	-31.47	18.02	35.97	31.47	0.000%
26	0.00	-100.44	0.00	-0.00	100.44	-0.00	0.001%
27	-0.03	-100.44	-10.42	0.03	100.44	10.42	0.000%
28	5.17	-100.44	-9.01	-5.17	100.44	9.01	0.000%
29	8.96	-100.44	-5.19	-8.96	100.44	5.19	0.000%
30	10.35	-100.44	0.02	-10.35	100.44	-0.02	0.000%
31	8.98	-100.44	5.22	-8.98	100.44	-5.22	0.000%
32	5.20	-100.44	9.04	-5.20	100.44	-9.04	0.000%
33	0.01	-100.44	10.43	-0.01	100.44	-10.42	0.000%
34	-5.17	-100.44	9.02	5.17	100.44	-9.02	0.000%
35	-8.98	-100.44	5.19	8.98	100.44	-5.19	0.000%
36	-10.36	-100.44	-0.02	10.36	100.44	0.02	0.000%
37	-8.98	-100.44	-5.22	8.98	100.44	5.22	0.000%
38	-5.20	-100.44	-9.03	5.20	100.44	9.03	0.000%
39	-0.03	-39.97	-7.78	0.03	39.97	7.78	0.002%
40	3.82	-39.97	-6.72	-3.82	39.97	6.72	0.002%
41	6.63	-39.97	-3.87	-6.63	39.97	3.87	0.002%
42	7.66	-39.97	0.01	-7.66	39.97	-0.01	0.002%
43	6.65	-39.97	3.90	-6.65	39.97	-3.90	0.002%
44	3.85	-39.97	6.74	-3.85	39.97	-6.74	0.002%
45	0.01	-39.97	7.78	-0.01	39.97	-7.78	0.002%
46	-3.83	-39.97	6.73	3.83	39.97	-6.73	0.002%
47	-6.65	-39.97	3.87	6.65	39.97	-3.87	0.002%
48	-7.67	-39.97	-0.01	7.67	39.97	0.01	0.002%
49	-6.65	-39.97	-3.89	6.65	39.97	3.89	0.002%
50	-3.85	-39.97	-6.73	3.85	39.97	6.73	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	13	0.00000001	0.00007132
3	Yes	13	0.00000001	0.00005824
4	Yes	16	0.00000001	0.00007776
5	Yes	16	0.00000001	0.00005655
6	Yes	16	0.00000001	0.00008616
7	Yes	16	0.00000001	0.00006298
8	Yes	14	0.00000001	0.00008127
9	Yes	14	0.00000001	0.00006376
10	Yes	16	0.00000001	0.00007782
11	Yes	16	0.00000001	0.00005666
12	Yes	16	0.00000001	0.00008362
13	Yes	16	0.00000001	0.00006094
14	Yes	12	0.00008932	0.00014392
15	Yes	12	0.00006126	0.00012262
16	Yes	16	0.00000001	0.00008493
17	Yes	16	0.00000001	0.00006198
18	Yes	16	0.00000001	0.00007632
19	Yes	16	0.00000001	0.00005557
20	Yes	14	0.00000001	0.00008911
21	Yes	14	0.00000001	0.00006977
22	Yes	16	0.00000001	0.00008583
23	Yes	16	0.00000001	0.00006264

24	Yes	16	0.00000001	0.00008033
25	Yes	16	0.00000001	0.00005841
26	Yes	9	0.00000001	0.00007938
27	Yes	15	0.00000001	0.00008996
28	Yes	15	0.00000001	0.00010605
29	Yes	15	0.00000001	0.00010718
30	Yes	15	0.00000001	0.00008812
31	Yes	15	0.00000001	0.00010303
32	Yes	15	0.00000001	0.00010400
33	Yes	15	0.00000001	0.00008710
34	Yes	15	0.00000001	0.00010441
35	Yes	15	0.00000001	0.00010306
36	Yes	15	0.00000001	0.00008865
37	Yes	15	0.00000001	0.00010794
38	Yes	15	0.00000001	0.00010726
39	Yes	12	0.00000001	0.00003442
40	Yes	12	0.00000001	0.00004011
41	Yes	12	0.00000001	0.00007212
42	Yes	12	0.00000001	0.00004662
43	Yes	12	0.00000001	0.00003976
44	Yes	12	0.00000001	0.00005728
45	Yes	12	0.00000001	0.00003401
46	Yes	12	0.00000001	0.00006535
47	Yes	12	0.00000001	0.00003952
48	Yes	12	0.00000001	0.00004761
49	Yes	12	0.00000001	0.00006766
50	Yes	12	0.00000001	0.00004447

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 90	14.66	39	1.061	0.005
L2	90 - 76.5	8.60	39	0.951	0.004
L3	76.5 - 74	6.11	39	0.791	0.002
L4	74 - 68.875	5.70	39	0.762	0.002
L5	68.875 - 64.5	4.91	39	0.712	0.002
L6	64.5 - 63	4.28	39	0.661	0.002
L7	63 - 60	4.07	39	0.644	0.002
L8	60 - 49.08	3.68	39	0.608	0.001
L9	49.08 - 42	2.41	39	0.491	0.001
L10	42 - 34.5	1.74	39	0.414	0.001
L11	34.5 - 34	1.15	39	0.332	0.001
L12	34 - 30	1.12	39	0.326	0.001
L13	30 - 28	0.87	39	0.276	0.000
L14	28 - 23.25	0.76	39	0.257	0.000
L15	23.25 - 21	0.52	39	0.216	0.000
L16	21 - 19	0.42	39	0.198	0.000
L17	19 - 18.5	0.34	39	0.179	0.000
L18	18.5 - 12.7	0.33	39	0.175	0.000
L19	12.7 - 10.5	0.15	39	0.118	0.000
L20	10.5 - 7.5	0.10	39	0.095	0.000
L21	7.5 - 7	0.05	39	0.065	0.000
L22	7 - 3.75	0.04	39	0.060	0.000
L23	3.75 - 2.75	0.01	39	0.028	0.000
L24	2.75 - 2	0.01	39	0.022	0.000
L25	2 - 0	0.00	39	0.016	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.00	PCS 1900MHz 4x45W-65MHz	39	14.21	1.059	0.005	37555
114.00	APXVSPP18-C-A20 w/ Mount Pipe	39	13.76	1.056	0.005	37555
108.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	39	12.42	1.047	0.005	18777
98.00	SBNH-1D6565C w/ Mount Pipe	39	10.25	1.011	0.005	9388
90.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	8.60	0.951	0.004	6585
85.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	39	7.62	0.897	0.003	5203
80.00	KS24019-L112A	39	6.71	0.835	0.003	4268
73.00	VHLP1-23	39	5.54	0.752	0.002	5407
72.00	A-ANT-18G-2-C	39	5.38	0.742	0.002	5559
60.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	3.68	0.608	0.001	5313
30.00	Bridge Stiffener (84" x 14.5" x 1.25")	39	0.87	0.276	0.000	5253

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 90	68.67	2	4.970	0.024
L2	90 - 76.5	40.31	2	4.459	0.018
L3	76.5 - 74	28.64	2	3.710	0.012
L4	74 - 68.875	26.73	2	3.575	0.011
L5	68.875 - 64.5	23.02	2	3.340	0.009
L6	64.5 - 63	20.06	2	3.100	0.008
L7	63 - 60	19.10	2	3.023	0.008
L8	60 - 49.08	17.26	2	2.854	0.007
L9	49.08 - 42	11.33	2	2.305	0.005
L10	42 - 34.5	8.17	2	1.944	0.004
L11	34.5 - 34	5.42	2	1.557	0.003
L12	34 - 30	5.26	2	1.531	0.003
L13	30 - 28	4.07	2	1.295	0.002
L14	28 - 23.25	3.55	2	1.205	0.002
L15	23.25 - 21	2.44	2	1.014	0.002
L16	21 - 19	1.98	2	0.930	0.002
L17	19 - 18.5	1.61	2	0.839	0.001
L18	18.5 - 12.7	1.53	2	0.819	0.001
L19	12.7 - 10.5	0.69	2	0.552	0.001
L20	10.5 - 7.5	0.46	2	0.445	0.001
L21	7.5 - 7	0.23	2	0.304	0.000
L22	7 - 3.75	0.20	2	0.280	0.000
L23	3.75 - 2.75	0.05	2	0.133	0.000
L24	2.75 - 2	0.03	2	0.102	0.000
L25	2 - 0	0.02	2	0.076	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.00	PCS 1900MHz 4x45W-65MHz	2	66.57	4.960	0.024	8185
114.00	APXVSPP18-C-A20 w/ Mount Pipe	2	64.47	4.950	0.024	8185
108.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2	58.20	4.905	0.023	4092
98.00	SBNH-1D6565C w/ Mount Pipe	2	48.03	4.736	0.021	2044
90.00	Bridge Stiffener (84" x 14.5" x	2	40.31	4.459	0.018	1431

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	1.25")					
85.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	2	35.74	4.204	0.016	1125
80.00	KS24019-L112A	2	31.45	3.914	0.013	920
73.00	VHLP1-23	2	25.98	3.528	0.010	1163
72.00	A-ANT-18G-2-C	2	25.25	3.483	0.010	1195
60.00	Bridge Stiffener (84" x 14.5" x 1.25")	2	17.26	2.854	0.007	1138
30.00	Bridge Stiffener (84" x 14.5" x 1.25")	2	4.07	1.295	0.002	1120

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 - 90 (1)	P24x0.25	28.00	0.00	0.0	18.65	-9.10	662.26	0.014
L2	90 - 76.5 (2)	P24x0.375	13.50	0.00	0.0	27.83	-15.09	1052.07	0.014
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	2.50	0.00	0.0	42.79	-15.63	1387.68	0.011
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	5.13	0.00	0.0	59.92	-17.66	1415.12	0.012
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	4.38	0.00	0.0	59.07	-18.93	1374.22	0.014
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	1.50	0.00	0.0	71.25	-19.44	1621.17	0.012
L7	63 - 60 (7)	RPS 24" x 0.94656"	3.00	0.00	0.0	68.55	-20.43	1569.62	0.013
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	10.92	0.00	0.0	57.45	-25.07	1964.82	0.013
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	7.08	0.00	0.0	70.95	-27.50	2168.58	0.013
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	7.50	0.00	0.0	81.88	-30.43	2461.22	0.012
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	0.50	0.00	0.0	91.33	-30.65	2741.39	0.011
L12	34 - 30 (12)	RPS 30" x 0.87892"	4.00	0.00	0.0	80.41	-32.21	2460.53	0.013
L13	30 - 28 (13)	RPS 36" x 0.67823"	2.00	0.00	0.0	75.26	-34.47	2277.92	0.015
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	4.75	0.00	0.0	90.61	-36.48	2771.72	0.013
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	2.25	0.00	0.0	102.91	-37.55	2972.10	0.013
L16	21 - 19 (16)	RPS 36" x 0.79024"	2.00	0.00	0.0	87.41	-38.38	2474.20	0.016
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	0.50	0.00	0.0	104.38	-38.63	2943.26	0.013
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	5.80	0.00	0.0	92.33	-41.15	2882.60	0.014
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	2.20	0.00	0.0	93.13	-42.12	2774.28	0.015
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	3.00	0.00	0.0	99.83	-43.53	3050.29	0.014
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	0.50	0.00	0.0	103.28	-43.78	3097.21	0.014
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	3.25	0.00	0.0	109.21	-45.42	3396.02	0.013
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	1.00	0.00	0.0	169.91	-46.17	5046.20	0.009
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	0.75	0.00	0.0	157.32	-46.70	4501.21	0.010
L25	2 - 0 (25)	RPS 36" x 1.28159"	2.00	0.00	0.0	139.78	-47.95	4200.66	0.011

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 - 90 (1)	P24x0.25	249	397	0.627	0	397	0.000
L2	90 - 76.5 (2)	P24x0.375	528	624	0.847	0	624	0.000
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	586	862	0.680	0	862	0.000
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	713	870	0.819	0	870	0.000
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	826	846	0.976	0	846	0.000

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	865	990	0.873	0	990	0.000
L7	63 - 60 (7)	RPS 24" x 0.94656"	944	960	0.983	0	960	0.000
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	1252	1531	0.818	0	1531	0.000
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	1462	1682	0.869	0	1682	0.000
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	1692	1901	0.890	0	1901	0.000
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	1708	2109	0.810	0	2109	0.000
L12	34 - 30 (12)	RPS 30" x 0.87892"	1834	1901	0.965	0	1901	0.000
L13	30 - 28 (13)	RPS 36" x 0.67823"	1899	2135	0.890	0	2135	0.000
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	2056	2587	0.795	0	2587	0.000
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	2131	2765	0.771	0	2765	0.000
L16	21 - 19 (16)	RPS 36" x 0.79024"	2199	2311	0.951	0	2311	0.000
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	2216	2737	0.810	0	2737	0.000
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	2416	2689	0.898	0	2689	0.000
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	2492	2588	0.963	0	2588	0.000
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	2598	2840	0.915	0	2840	0.000
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	2616	2881	0.908	0	2881	0.000
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	2732	3154	0.866	0	3154	0.000
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	2768	4612	0.600	0	4612	0.000
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	2795	4128	0.677	0	4128	0.000
L25	2 - 0 (25)	RPS 36" x 1.28159"	2867	3870	0.741	0	3870	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		K	K		kip-ft	kip-ft	
L1	118 - 90 (1)	P24x0.25	15.59	331.13	0.047	1	649	0.001
L2	90 - 76.5 (2)	P24x0.375	23.07	526.03	0.044	1	1020	0.001
L3	76.5 - 74 (3)	RPS 24" x 0.58167"	23.45	693.84	0.034	1	1322	0.001
L4	74 - 68.875 (4)	RPS 24" x 0.82296"	25.42	707.56	0.036	1	1321	0.000
L5	68.875 - 64.5 (5)	RPS 24" x 0.81081"	26.07	687.11	0.038	1	1285	0.000
L6	64.5 - 63 (6)	RPS 24" x 0.9855"	26.30	810.58	0.032	1	1493	0.000
L7	63 - 60 (7)	RPS 24" x 0.94656"	26.74	784.81	0.034	1	1451	0.000
L8	60 - 49.08 (8)	RPS 30" x 0.62249"	29.07	982.41	0.030	1	2356	0.000
L9	49.08 - 42 (9)	RPS 30" x 0.77273"	30.16	1084.29	0.028	1	2575	0.000
L10	42 - 34.5 (10)	RPS 30" x 0.89547"	31.25	1230.61	0.025	1	2898	0.000
L11	34.5 - 34 (11)	RPS 30" x 1.00259"	31.32	1370.69	0.023	1	3205	0.000
L12	34 - 30 (12)	RPS 30" x 0.87892"	31.85	1230.26	0.026	1	2901	0.000
L13	30 - 28 (13)	RPS 36" x 0.67823"	32.65	1138.96	0.029	1	3291	0.000
L14	28 - 23.25 (14)	RPS 36" x 0.8198"	33.38	1385.86	0.024	1	3973	0.000
L15	23.25 - 21 (15)	RPS 36" x 0.93415"	33.72	1486.05	0.023	1	4233	0.000
L16	21 - 19 (16)	RPS 36" x 0.79024"	34.00	1237.10	0.027	1	3552	0.000
L17	19 - 18.5 (17)	RPS 36" x 0.9479"	34.06	1471.63	0.023	1	4189	0.000
L18	18.5 - 12.7 (18)	RPS 36" x 0.83577"	34.81	1441.30	0.024	1	4128	0.000
L19	12.7 - 10.5 (19)	RPS 36" x 0.84318"	35.08	1387.14	0.025	1	3971	0.000
L20	10.5 - 7.5 (20)	RPS 36" x 0.90546"	35.44	1525.14	0.023	1	4351	0.000
L21	7.5 - 7 (21)	RPS 36" x 0.93763"	35.49	1548.60	0.023	1	4410	0.000
L22	7 - 3.75 (22)	RPS 36" x 0.99306"	35.89	1698.01	0.021	1	4821	0.000
L23	3.75 - 2.75 (23)	RPS 36" x 1.57084"	36.02	2523.10	0.014	1	6938	0.000
L24	2.75 - 2 (24)	RPS 36" x 1.44941"	36.11	2250.61	0.016	1	6230	0.000
L25	2 - 0 (25)	RPS 36" x 1.28159"	36.36	2100.33	0.017	1	5868	0.000

Pole Interaction Design Data

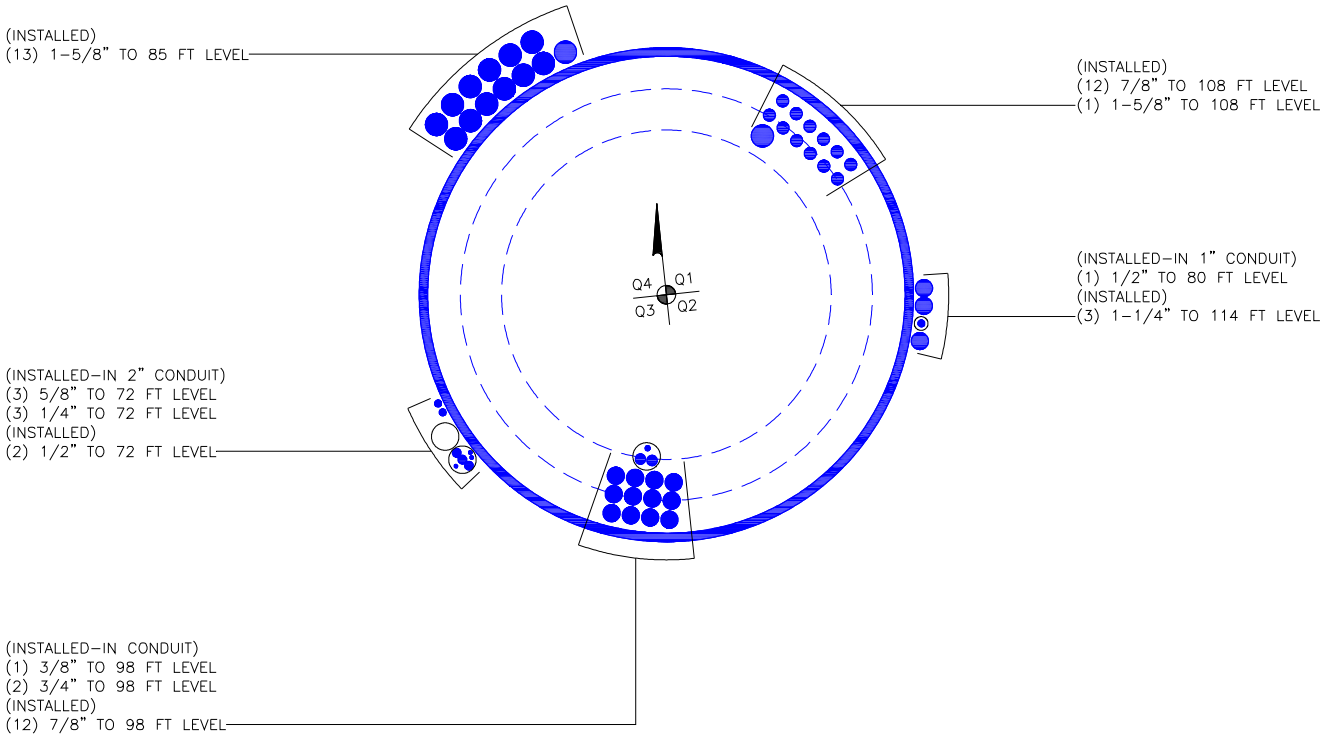
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	118 - 90 (1)	0.014	0.627	0.000	0.047	0.001	0.643 ✔	1.000	4.8.2 ✔
L2	90 - 76.5 (2)	0.014	0.847	0.000	0.044	0.001	0.863 ✔	1.000	4.8.2 ✔
L3	76.5 - 74 (3)	0.011	0.680	0.000	0.034	0.001	0.692 ✔	1.000	4.8.2 ✔
L4	74 - 68.875 (4)	0.012	0.819	0.000	0.036	0.000	0.833 ✔	1.000	4.8.2 ✔
L5	68.875 - 64.5 (5)	0.014	0.976	0.000	0.038	0.000	0.991 ✔	1.000	4.8.2 ✔
L6	64.5 - 63 (6)	0.012	0.873	0.000	0.032	0.000	0.886 ✔	1.000	4.8.2 ✔
L7	63 - 60 (7)	0.013	0.983	0.000	0.034	0.000	0.998 ✔	1.000	4.8.2 ✔
L8	60 - 49.08 (8)	0.013	0.818	0.000	0.030	0.000	0.831 ✔	1.000	4.8.2 ✔
L9	49.08 - 42 (9)	0.013	0.869	0.000	0.028	0.000	0.883 ✔	1.000	4.8.2 ✔
L10	42 - 34.5 (10)	0.012	0.890	0.000	0.025	0.000	0.903 ✔	1.000	4.8.2 ✔
L11	34.5 - 34 (11)	0.011	0.810	0.000	0.023	0.000	0.821 ✔	1.000	4.8.2 ✔
L12	34 - 30 (12)	0.013	0.965	0.000	0.026	0.000	0.978 ✔	1.000	4.8.2 ✔
L13	30 - 28 (13)	0.015	0.890	0.000	0.029	0.000	0.906 ✔	1.000	4.8.2 ✔
L14	28 - 23.25 (14)	0.013	0.795	0.000	0.024	0.000	0.808 ✔	1.000	4.8.2 ✔
L15	23.25 - 21 (15)	0.013	0.771	0.000	0.023	0.000	0.784 ✔	1.000	4.8.2 ✔
L16	21 - 19 (16)	0.016	0.951	0.000	0.027	0.000	0.968 ✔	1.000	4.8.2 ✔
L17	19 - 18.5 (17)	0.013	0.810	0.000	0.023	0.000	0.823 ✔	1.000	4.8.2 ✔
L18	18.5 - 12.7 (18)	0.014	0.898	0.000	0.024	0.000	0.913 ✔	1.000	4.8.2 ✔
L19	12.7 - 10.5 (19)	0.015	0.963	0.000	0.025	0.000	0.979 ✔	1.000	4.8.2 ✔
L20	10.5 - 7.5 (20)	0.014	0.915	0.000	0.023	0.000	0.930 ✔	1.000	4.8.2 ✔
L21	7.5 - 7 (21)	0.014	0.908	0.000	0.023	0.000	0.923 ✔	1.000	4.8.2 ✔
L22	7 - 3.75 (22)	0.013	0.866	0.000	0.021	0.000	0.880 ✔	1.000	4.8.2 ✔
L23	3.75 - 2.75 (23)	0.009	0.600	0.000	0.014	0.000	0.610 ✔	1.000	4.8.2 ✔
L24	2.75 - 2 (24)	0.010	0.677	0.000	0.016	0.000	0.688 ✔	1.000	4.8.2 ✔
L25	2 - 0 (25)	0.011	0.741	0.000	0.017	0.000	0.753 ✔	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 - 90	Pole	P24x0.25	1	-9.10	662.26	64.3	Pass
L2	90 - 76.5	Pole	P24x0.375	2	-15.09	1052.07	86.3	Pass
L3	76.5 - 74	Pole	RPS 24" x 0.58167"	3	-15.63	1387.68	69.2	Pass
L4	74 - 68.875	Pole	RPS 24" x 0.82296"	4	-17.66	1415.12	83.3	Pass
L5	68.875 - 64.5	Pole	RPS 24" x 0.81081"	5	-18.93	1374.22	99.1	Pass
L6	64.5 - 63	Pole	RPS 24" x 0.9855"	6	-19.44	1621.17	88.6	Pass
L7	63 - 60	Pole	RPS 24" x 0.94656"	7	-20.43	1569.62	99.8	Pass
L8	60 - 49.08	Pole	RPS 30" x 0.62249"	8	-25.07	1964.82	83.1	Pass
L9	49.08 - 42	Pole	RPS 30" x 0.77273"	9	-27.50	2168.58	88.3	Pass
L10	42 - 34.5	Pole	RPS 30" x 0.89547"	10	-30.43	2461.22	90.3	Pass
L11	34.5 - 34	Pole	RPS 30" x 1.00259"	11	-30.65	2741.39	82.1	Pass
L12	34 - 30	Pole	RPS 30" x 0.87892"	12	-32.21	2460.53	97.8	Pass
L13	30 - 28	Pole	RPS 36" x 0.67823"	13	-34.47	2277.92	90.6	Pass
L14	28 - 23.25	Pole	RPS 36" x 0.8198"	14	-36.48	2771.72	80.8	Pass
L15	23.25 - 21	Pole	RPS 36" x 0.93415"	15	-37.55	2972.10	78.4	Pass
L16	21 - 19	Pole	RPS 36" x 0.79024"	16	-38.38	2474.20	96.8	Pass
L17	19 - 18.5	Pole	RPS 36" x 0.9479"	17	-38.63	2943.26	82.3	Pass
L18	18.5 - 12.7	Pole	RPS 36" x 0.83577"	18	-41.15	2882.60	91.3	Pass
L19	12.7 - 10.5	Pole	RPS 36" x 0.84318"	19	-42.12	2774.28	97.9	Pass
L20	10.5 - 7.5	Pole	RPS 36" x 0.90546"	20	-43.53	3050.29	93.0	Pass
L21	7.5 - 7	Pole	RPS 36" x 0.93763"	21	-43.78	3097.21	92.3	Pass
L22	7 - 3.75	Pole	RPS 36" x 0.99306"	22	-45.42	3396.02	88.0	Pass
L23	3.75 - 2.75	Pole	RPS 36" x 1.57084"	23	-46.17	5046.20	61.0	Pass
L24	2.75 - 2	Pole	RPS 36" x 1.44941"	24	-46.70	4501.21	68.8	Pass
L25	2 - 0	Pole	RPS 36" x 1.28159"	25	-47.95	4200.66	75.3	Pass
							Summary	
						Pole (L7)	99.8	Pass
						RATING =	**99.8**	**Pass**

APPENDIX B

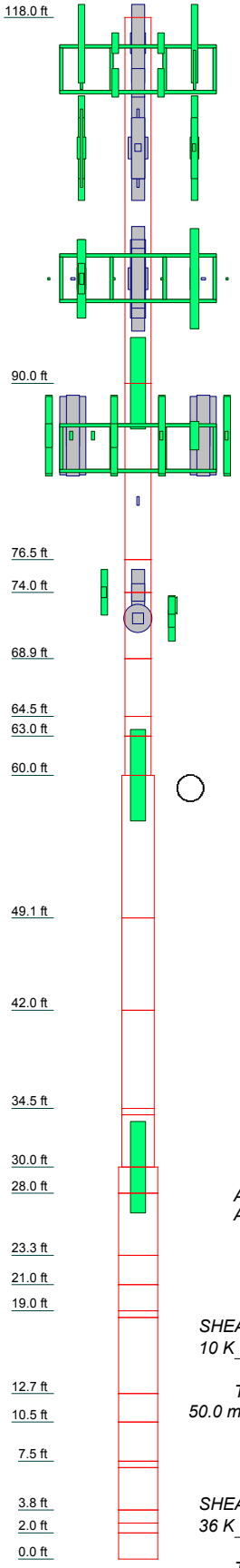
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Size	P24x0.25	P24x0.375	0.58167"					RPS 30" x 0.6224"	RPS 30" x 0.7727"	RPS 30" x 0.895"															
Length (ft)	28.00	13.50	2.50	5.13	4.38	1.50	3.00	10.92	7.08	7.50	0.50	4.00	2.00	4.75	2.25	2.00	0.50	5.80	2.20	8.00	3.250	1.00	2.00		
Grade	A572-42							Reinf 38.03 ksi	Reinf 33.96 ksi	Reinf 33.40 ksi															
Weight (K)	1.8	1.3	0.4	1.0	0.9	0.4	0.7	2.1	1.7	2.1	0.2	1.1	0.5	1.5	0.8	0.6	0.2	1.8	0.7	1.0	0.2	1.2	0.6	24.0	



ALL REACTIONS ARE FACTORED

AXIAL 100 K

SHEAR 10 K *MOMENT 907*

TORQUE 1 kip-ft
50.0 mph WIND - 1.00 in ICE

AXIAL 48 K

SHEAR 36 K *MOMENT 2867 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 97.0 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PCS 1900MHz 4x45W-65MHz	116	DTMABP7819VG12A	98
PCS 1900MHz 4x45W-65MHz	116	DC6-48-60-18-8F	98
PCS 1900MHz 4x45W-65MHz	116	HPA-65R-BUU-H6 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	HPA-65R-BUU-H8 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	HPA-65R-BUU-H6 w/ Mount Pipe	98
800MHz 2X50W RRH W/FILTER	116	RRUS 32 B2	98
Pipe Mount [PM 601-3]	116	RRUS 32 B2	98
APXVSPP18-C-A20 w/ Mount Pipe	114	RRUS 32 B2	98
APXVSPP18-C-A20 w/ Mount Pipe	114	TT19-08BP111-001	98
APXV9ERR18-C-A20 w/ Mount Pipe	114	TT19-08BP111-001	98
(3) 2.375" OD x 3' Mount Pipe	114	TT19-08BP111-001	98
(3) 2.375" OD x 3' Mount Pipe	114	(2) 7020.00	98
(3) 2.375" OD x 3' Mount Pipe	114	(2) 7020.00	98
Platform Mount [LP 502-1]	114	(2) 7020.00	98
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	Platform Mount [LP 712-1]	98
		Bridge Stiffener (84" x 14.5" x 1.25")	90
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	Bridge Stiffener (84" x 14.5" x 1.25")	90
		Bridge Stiffener (84" x 14.5" x 1.25")	90
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	108	(2) BXA-70040-6CF-EDIN-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) BXA-70063-6CF-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) BXA-70063-6CF-2 w/ Mount Pipe	85
LNX-6515DS-VTM w/ Mount Pipe	108	(2) CBC721-DF	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	(4) CBC721-DF	85
		(2) RRH2X60-AWS	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	RRH2X60-AWS	85
		RRH2X60-PCS	85
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	108	(2) RRH2X60-PCS	85
KRY 112 144/1	108	DB-B1-6C-12AB-0Z	85
KRY 112 144/1	108	Platform Mount [LP 303-1]	85
KRY 112 144/1	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	(2) HBXX-6517DS-A2M w/ Mount Pipe	85
RRUS 11 B12	108	KS24019-L112A	80
Sector Mount [SM 801-3]	108	Side Arm Mount [SO 701-1]	80
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
2.375" OD x 6' Mount Pipe	108	WIMAX DAP HEAD	72
SBNH-1D6565C w/ Mount Pipe	98	HORIZON COMPACT	72
AM-X-CD-16-65-00T-RET w/ Mount Pipe	98	HORIZON COMPACT	72
		Side Arm Mount [SO 101-3]	72
AM-X-CD-16-65-00T-RET w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
7770.00 w/ Mount Pipe	98	A-ANT-18G-2-C	72
RRUS 11 B12	98	VHLP1-23	72
RRUS 11 B12	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
RRUS 11 B12	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
DTMABP7819VG12A	98	Bridge Stiffener (84" x 14.5" x 1.25")	60
DTMABP7819VG12A	98	Bridge Stiffener (84" x 14.5" x 1.25")	30
		Bridge Stiffener (84" x 14.5" x 1.25")	30
		Bridge Stiffener (84" x 14.5" x 1.25")	30

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-42	42 ksi	60 ksi	Reinf 33.99 ksi	34 ksi	43 ksi
Reinf 36.03 ksi	36 ksi	46 ksi	Reinf 32.09 ksi	32 ksi	41 ksi
Reinf 26.24 ksi	26 ksi	33 ksi	Reinf 31.45 ksi	31 ksi	40 ksi
Reinf 25.85 ksi	26 ksi	33 ksi	Reinf 31.33 ksi	31 ksi	40 ksi
Reinf 25.28 ksi	25 ksi	32 ksi	Reinf 34.69 ksi	35 ksi	44 ksi
Reinf 25.44 ksi	25 ksi	32 ksi	Reinf 33.10 ksi	33 ksi	42 ksi
Reinf 38.03 ksi	38 ksi	48 ksi	Reinf 33.95 ksi	34 ksi	43 ksi
Reinf 33.96 ksi	34 ksi	43 ksi	Reinf 33.32 ksi	33 ksi	42 ksi
Reinf 33.40 ksi	33 ksi	42 ksi	Reinf 34.55 ksi	35 ksi	44 ksi
Reinf 33.35 ksi	33 ksi	42 ksi	Reinf 33.41 ksi	33 ksi	42 ksi
Reinf 34.00 ksi	34 ksi	43 ksi	Reinf 31.79 ksi	32 ksi	40 ksi
Reinf 33.63 ksi	34 ksi	43 ksi	Reinf 33.39 ksi	33 ksi	42 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.8%

PJF *Paul J Ford and Company*
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	***118 ft Monopole / New Gravel Pit***		
Project:	***PJF 37517-0436 / BU 876331***		
Client: Crown Castle	Drawn by: Seth Tschanen	App'd:	
Code: TIA-222-G	Date: 02/02/17	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	90.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	249.0	k-ft
Axial, Puf:	9.1	kips
Shear, Vf:	15.6	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	24.00	in
Pole Thickness, tp:	0.2500	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	32.00	32.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	0	
Upper Weld Length, L1:	39.00	0.00	in
Lower Weld Length, L2:	39.00	0.00	in
Weld Size, w:	0.3750	0.0000	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.50	0.00	in
Stiffener Thickness, ts:	1.25	0.00	in
Notch, n:	0.50	0.00	in
Stiffener Fy:	65	0	ksi
Stiffener Fu:	80	0	ksi
Unbraced Length, L:	4.63	0.00	in
K:	0.80	0.00	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	37.50	32.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	6.75	4.00	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	6.75	4.00	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.00	0.00	in
Bolt Circle:	29.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	0	Num. of Sixteenths in Weld
a:	0.1731	0.0000	= e1 / L1
k:	0	0	
C:	3.5962	3.7100	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	109.6	0.0	kips
Axial Capacity, ΦPn:	631.1	0.0	kips = Φ C C1 D L
Ratio:	17.4%	0.0%	
Lower Pole			
D:	6	0	Num. of Sixteenths in Weld
a:	0.1731	0.0000	= e2 / L2
k:	0	0	
C:	3.5962	3.7100	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	109.6	0.0	kips
Axial Capacity, ΦPn:	631.1	0.0	kips = Φ C C1 D L
Ratio:	17.4%	0.0%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	109.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fuv:	1.4	0.0	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	0.0	in^2 = $L1^2$ / 3
Bending Stress, fub:	1.5	0.0	kips/in = Pu e1 / S
Combined Stress, fu:	2.0	0.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	0.0000	
Stress Capacity, ΦFn	6.3	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	32.2%	0.0%	
Lower Pole			
Stiffener Axial, Pu:	109.6	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fuv:	1.4	0.0	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	0.0	in^2 = $L2^2$ / 3
Bending Stress, fub:	1.5	0.0	ksi = Pu e2 / S
Combined Stress, fu:	2.0	0.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	0.0000	
Stress Capacity, ΦFn	9.5	0.0	kips/in = Φ 0.6 Fy tp
Ratio:	21.4%	0.0%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	5.6250	in^2
Effective Net Area, Aen:	5.2284	in^2 = Ag U, where U = 0.929
Stiffener Axial, Pu:	109.6	kips
Stiffener Stress, fu:	19.5	ksi = Pu / Ag
b:	9.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	7.2000	in
Q, Where Qa = 1.0:	1.0000	
r:	0.3608	in^3
K L / r:	10.2537	
Φ:	0.9000	
Axial Capacity, ΦFcr:	57.92	ksi = Φ $[0.658^{Fy/Fe}]$ Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	55.77	ksi = Φ Fu (Aen / Ag)
Ratio:	35.0%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	0.0000	in^2
Effective Net Area, Aen:	0.0000	in^2
Stiffener Axial, Pu:	0.0	kips
Stiffener Stress, fu:	0.0	ksi = Pu / Ag
b:	0.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	0.0000	in
Q, Where Qa = 1.0:	0.0000	
r:	0.0000	in^3
K L / r:	0.0000	
Φ:	0.0000	
Axial Capacity, ΦFcr:	0.00	ksi = Φ Fy
Φ:	0.0000	
Ten. Yielding Cap., ΦFnt:	0.00	ksi = Φ Fy
Φ:	0.0000	
Ten. Rupture Cap., ΦFnr:	0.00	ksi = Φ Fu (Aen / Ag)
Ratio:	0.0%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 17.4% PASS	Weld Analysis Ratio: 0.0% PASS
Pole Analysis Ratio: 32.2% PASS	Pole Analysis Ratio: 0.0% PASS
Stiffener Analysis Ratio: 35.0% PASS	Stiffener Analysis Ratio: 0.0% PASS

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com

v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	944.0	k-ft
Axial, Puf:	20.4	kips
Shear, Vf:	26.7	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	30.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	41.00	41.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	39.00	23.25	in
Lower Weld Length, L2:	39.00	20.00	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	4.50	3.00	in
Stiffener Thickness, ts:	1.25	1.00	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	5.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	46.50	45.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	11.25	10.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	8.25	7.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	35.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.2885	0.4516	= e1 / L1
k:	0	0	
C:	3.1408	2.4690	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	221.3	114.3	kips
Axial Capacity, ΦPn:	551.2	258.3	kips = Φ C C1 D L
Ratio:	40.1%	44.2%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2115	0.3750	= e2 / L2
k:	0	0	
C:	3.4638	2.7675	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	221.3	114.3	kips
Axial Capacity, ΦPn:	607.9	249.1	kips = Φ C C1 D L
Ratio:	36.4%	45.9%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	221.3	114.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.8	2.5	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	180.2	in^2 = $L1^2$ / 3
Bending Stress, fub:	4.9	6.7	kips/in = Pu e1 / S
Combined Stress, fu:	5.7	7.1	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	60.0%	75.1%	
Lower Pole			
Stiffener Axial, Pu:	221.3	114.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.8	2.9	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	133.3	in^2 = $L2^2$ / 3
Bending Stress, fub:	3.6	6.4	ksi = Pu e2 / S
Combined Stress, fu:	4.6	7.0	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	48.5%	74.5%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	5.6250	in^2
Effective Net Area, Aen:	5.2284	in^2 = Ag U, where U = 0.929
Stiffener Axial, Pu:	221.3	kips
Stiffener Stress, fu:	39.3	ksi = Pu / Ag
b:	13.5000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	10.8000	in
Q, Where Qa = 1.0:	0.9514	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.3608	in^3
K L / r:	12.4708	
Φ:	0.9000	
Axial Capacity, ΦFcr:	54.88	ksi = Φ Q [0.658$^{Q\,Fy\,/\,Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	55.77	ksi = Φ Fu (Aen / Ag)
Ratio:	71.7%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	3.0000	in^2
Effective Net Area, Aen:	2.7000	in^2 = Ag U, where U = 0.900
Stiffener Axial, Pu:	114.3	kips
Stiffener Stress, fu:	38.1	ksi = Pu / Ag
b:	12.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.0000	in
Q, Where Qa = 1.0:	0.9082	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.2887	in^3
K L / r:	15.5885	
Φ:	0.9000	
Axial Capacity, ΦFcr:	52.03	ksi = Φ Q [0.658$^{Q\,Fy\,/\,Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	54.00	ksi = Φ Fu (Aen / Ag)
Ratio:	73.2%	

Analysis Summary:

Bridge Stiffener Type 1	*Bridge Stiffener Type 2*
Weld Analysis Ratio: 40.1% PASS	Weld Analysis Ratio: 45.9% PASS
Pole Analysis Ratio: 60.0% PASS	Pole Analysis Ratio: 75.1% PASS
Stiffener Analysis Ratio: 71.7% PASS	Stiffener Analysis Ratio: 73.2% PASS

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v2.0, Effective Date: 1-12-12

Date: 2/2/2017
Project No: 37517-0436.001.7805
Site Name: New Britain Gravel Pit
Site Number/BUN: 876331
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	1834.0	k-ft
Axial, Puf:	32.2	kips
Shear, Vf:	31.9	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	47.00	47.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	39.00	32.25	in
Lower Weld Length, L2:	39.00	28.25	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	7.20	5.50	in
Stiffener Thickness, ts:	1.47	1.00	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	5.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	55.20	53.50	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.60	11.75	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.60	8.75	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	41.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Tables 8-4 & 8-3:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.3231	0.3643	= e1 / L1
k:	0	0	
C:	2.9908	2.8133	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	364.5	183.7	kips
Axial Capacity, ΦPn:	524.9	408.3	kips = Φ C C1 D L
Ratio:	69.4%	45.0%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2462	0.3097	= e2 / L2
k:	0	0	
C:	3.3254	3.0481	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
Φ:	0.7500	0.7500	
Stiffener Axial, Pu:	364.5	183.7	kips
Axial Capacity, ΦPn:	583.6	387.5	kips = Φ C C1 D L
Ratio:	62.5%	47.4%	

Pole Analysis per AISC Table J2.5 & Sect. J4.2:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, Pu:	364.5	183.7	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	4.7	2.8	kips/in= Pu / (2 L1)
Section Modulus, S:	507.0	346.7	$in^2 = L1^2 / 3$
Bending Stress, fub:	4.5	3.1	kips/in = Pu e1 / (2 S)
Combined Stress, fu:	6.5	4.2	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	68.4%	44.2%	
Lower Pole			
Stiffener Axial, Pu:	364.5	183.7	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	4.7	3.3	ksi = Pu / (2 L2)
Section Modulus, S:	507.0	266.0	$in^2 = L2^2 / 3$
Bending Stress, fub:	3.4	3.0	kips/in = Pu e1 / (2 S)
Combined Stress, fu:	5.8	4.4	kips/in = $(fuv^2 + fub^2)^{1/2}$
Φ:	1.0000	1.0000	
Stress Capacity, ΦFn	9.5	9.5	kips/in = Φ 0.6 Fy tp
Ratio:	61.1%	46.3%	

Stiffener 1 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 1	
Gross Area, Ag:	10.5840	in^2
Effective Net Area, Aen:	9.4713	in^2 = Ag U, where U = 0.895
Stiffener Axial, Pu:	364.5	kips
Stiffener Stress, fu:	34.4	ksi = Pu / Ag
b:	16.2000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	11.0204	in
Q, Where Qa = 1.0:	0.9435	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.4244	in^3
K L / r:	10.6044	
Φ:	0.9000	
Axial Capacity, ΦFcr:	54.64	ksi = Φ Q [0.658$^{Q Fy / Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	53.69	ksi = Φ Fu (Aen / Ag)
Ratio:	64.1%	

Stiffener 2 Analysis per AISC Sect. D2, E3 & E7

	Stiffener Type 2	
Gross Area, Ag:	5.5000	in^2
Effective Net Area, Aen:	4.8673	in^2 = Ag U, where U = 0.885
Stiffener Axial, Pu:	183.7	kips
Stiffener Stress, fu:	33.4	ksi = Pu / Ag
b:	14.5000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	14.5000	in
Q, Where Qa = 1.0:	0.8183	= Qa 1.34 - 0.76 (b / ts) (Fy / E)$^{1/2}$
r:	0.2887	in^3
K L / r:	15.5885	
Φ:	0.9000	
Axial Capacity, ΦFcr:	46.97	ksi = Φ Q [0.658$^{Q Fy / Fe}$] Fy
Φ:	0.9000	
Ten. Yielding Cap., ΦFnt:	58.50	ksi = Φ Fy
Φ:	0.7500	
Ten. Rupture Cap., ΦFnr:	53.10	ksi = Φ Fu (Aen / Ag)
Ratio:	71.1%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 69.4% PASS	Weld Analysis Ratio: 47.4% PASS
Pole Analysis Ratio: 68.4% PASS	Pole Analysis Ratio: 46.3% PASS
Stiffener Analysis Ratio: 64.1% PASS	Stiffener Analysis Ratio: 71.1% PASS

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v4.4 - Effective 7-12-13

Date: 2/2/2017
PJF Project: 37517-0436.001.7805
Client Ref. # BU 876331
Site Name: New Britain Gravel Pit
Description: 118' Monopole
Owner: Crown Castle
Engineer: SJT

Asymmetric Anchor Rod Analysis

Moment =	2867	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	48.0	kips	ASIF =	N/A	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	36.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	23							

**** 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	41.00	0.00	1.77	90.15	86.65	92.78	0.00	141.00	65.8%
2	1.500	A354 Gr BC	109	125	22.5	41.00	0.00	1.77	94.48	90.98	97.11	0.00	141.00	68.9%
3	1.500	A354 Gr BC	109	125	45.0	41.00	0.00	1.77	99.03	95.52	101.65	0.00	141.00	72.1%
4	1.500	A354 Gr BC	109	125	67.5	41.00	0.00	1.77	100.46	96.96	103.09	0.00	141.00	73.1%
5	1.500	A354 Gr BC	109	125	90.0	41.00	0.00	1.77	97.35	93.85	99.98	0.00	141.00	70.9%
6	1.500	A354 Gr BC	109	125	112.5	41.00	0.00	1.77	90.66	87.16	93.29	0.00	141.00	66.2%
7	1.500	A354 Gr BC	109	125	135.0	41.00	0.00	1.77	83.74	80.24	86.37	0.00	141.00	61.3%
8	1.500	A354 Gr BC	109	125	157.5	41.00	0.00	1.77	81.13	77.63	83.76	0.00	141.00	59.4%
9	1.500	A354 Gr BC	109	125	180.0	41.00	0.00	1.77	85.21	81.71	87.84	0.00	141.00	62.3%
10	1.500	A354 Gr BC	109	125	202.5	41.00	0.00	1.77	93.68	90.18	96.31	0.00	141.00	68.3%
11	1.500	A354 Gr BC	109	125	225.0	41.00	0.00	1.77	101.94	98.44	104.57	0.00	141.00	74.2%
12	1.500	A354 Gr BC	109	125	247.5	41.00	0.00	1.77	106.42	102.91	109.04	0.00	141.00	77.3%
13	1.500	A354 Gr BC	109	125	270.0	41.00	0.00	1.77	105.68	102.18	108.31	0.00	141.00	76.8%
14	1.500	A354 Gr BC	109	125	292.5	41.00	0.00	1.77	100.58	97.08	103.21	0.00	141.00	73.2%
15	1.500	A354 Gr BC	109	125	315.0	41.00	0.00	1.77	93.94	90.44	96.57	0.00	141.00	68.5%
16	1.500	A354 Gr BC	109	125	337.5	41.00	0.00	1.77	89.63	86.12	92.25	0.00	141.00	65.4%
17	1.750	Dywidag (150 ksi)	127.7	150	60.0	51.50	0.00	2.71	193.89	188.51	197.92	217.53	217.53	91.0%
18	1.750	Dywidag (150 ksi)	127.7	150	146.0	51.50	0.00	2.71	158.64	153.27	162.68	217.53	217.53	74.8%
19	1.750	Dywidag (150 ksi)	127.7	150	244.0	51.50	0.00	2.71	202.60	197.22	206.63	217.53	217.53	95.0%
20	1.750	Dywidag (150 ksi)	127.7	150	326.0	51.50	0.00	2.71	173.44	168.06	177.47	217.53	217.53	81.6%
21	2.250	A193 Gr B7	105	125	191.3	51.50	0.00	3.98	251.76	243.88	257.68	0.00	325.00	79.3%
22	1.750	Williams R71	127.7	150	350.0	64.50	0.00	2.66	207.18	201.90	211.14	0.00	312.00	67.7%
23	1.750	Williams R71	127.7	150	106.0	64.50	0.00	2.66	222.61	217.33	226.57	0.00	312.00	72.6%
								48.42						

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#: *876331*
Site Name: *Great Britain Gravel Pit*
App #:

Pole Manufacturer:	*Other*

Reactions			
Mu:	1430.4	ft-kips	Reactions adjusted to account for additional anchor rods.
Axial, Pu:	28	kips	
Shear, Vu:	21	kips	
Eta Factor, η	0.5	TIA G (Fig. 4-4)	

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

Anchor Rod Data		
Qty:	16	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	41	in

Anchor Rod Results

			Rigid
Max Rod (Cu+ Vu/ń):	109.0	Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	141.0	Kips	φ*Tn
Anchor Rod Stress Ratio:	77.3%	**Pass**	

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.07	in

Base Plate Results Flexural Check

			Rigid
Base Plate Stress:	23.0	ksi	AISC LRFD
Allowable Plate Stress:	32.4	ksi	φ*Fy
Base Plate Stress Ratio:	70.9%	**Pass**	Y.L. Length: 19.62

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

n/a

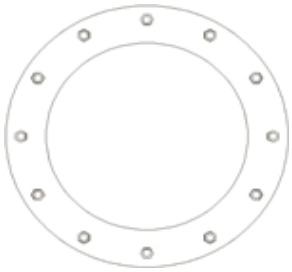
Stiffener Results

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:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	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

Plate Forces (My) taken at face of pole from RISA-3D:

Compression (1.2)	Tension (0.9)
-17.717	-7.154
-18.192	-7.936
-17.937	-8.276
-16.99	-8.408
-15.339	-8.506
-12.929	-8.751
-9.634	-9.402
-5.186	-10.866
0.97	-13.833
9.942	-19.531
24.026	-30.36
47.568	-50.761
90.642	-90.913
164.206	-161.903
260.242	-255.742
334.157	-327.642
334.723	-326.099
261.948	-251.145
167.076	-154.387
94.718	-80.806
52.906	-38.885
30.695	-17.271
18.002	-4.831
10.459	2.879
5.726	7.306
2.63	9.406
0.541	10.361
-0.897	10.767
-1.91	10.989
-2.673	11.275
-3.349	11.843
-4.095	12.951
1784.329	-1805.631 k-ft
892.1645	**-902.8155** k-ft

(per linear ft of plate)

(Divide by 2 for a 0.5 ft plate)

Anchor Spring Constant

Ag =	1.68	in^2
E =	29000	ksi
Lu =	15	ft
k = An*E / Lu =	270.67	k/in

Subgrade Modulus

k =	2000	pci
k =	3456	kcf

Pier Weight

Number Sides =	4	
Width/Diameter =		ft
Pier Height =		ft
Concrete Desnity =		pcf
Volume =	0	ft^3
Weight =	0	kips

Applied Reactions for RISA 3D

TNX Moment =	2867	k-ft
TNX Axial =	48	kips
TNX Shear =	36	kips
Total Unfactored Axial =	**40.00**	**kips**
Side Bending Moment =	**3083**	**k-ft**
Corner Bending Moment =	**2180**	**k-ft**

Tension from Anchors (Tension side only)

	Load (kips)	Distance to Center (ft)
1	132.9	6
2	131.7	3
3		
4		
5		
6		

Pole/Pier Diameter =		inches
Bending Moment = ∑P*(D-d) =	14310	k-in
Bending Moment (Tension) =	1192.5	k-ft

Anchor Capacity

Max Tension from RISA =	133.7	kips
Anchor Type =	Rock Anchor	
Fu =	150	ksi
An =	1.58	in^2
Capacity (Kips) = 0.8*Fu*An =	189.6	
Ratio = 133.7 / 189.6 =	**70.5%**	

Soil Weight

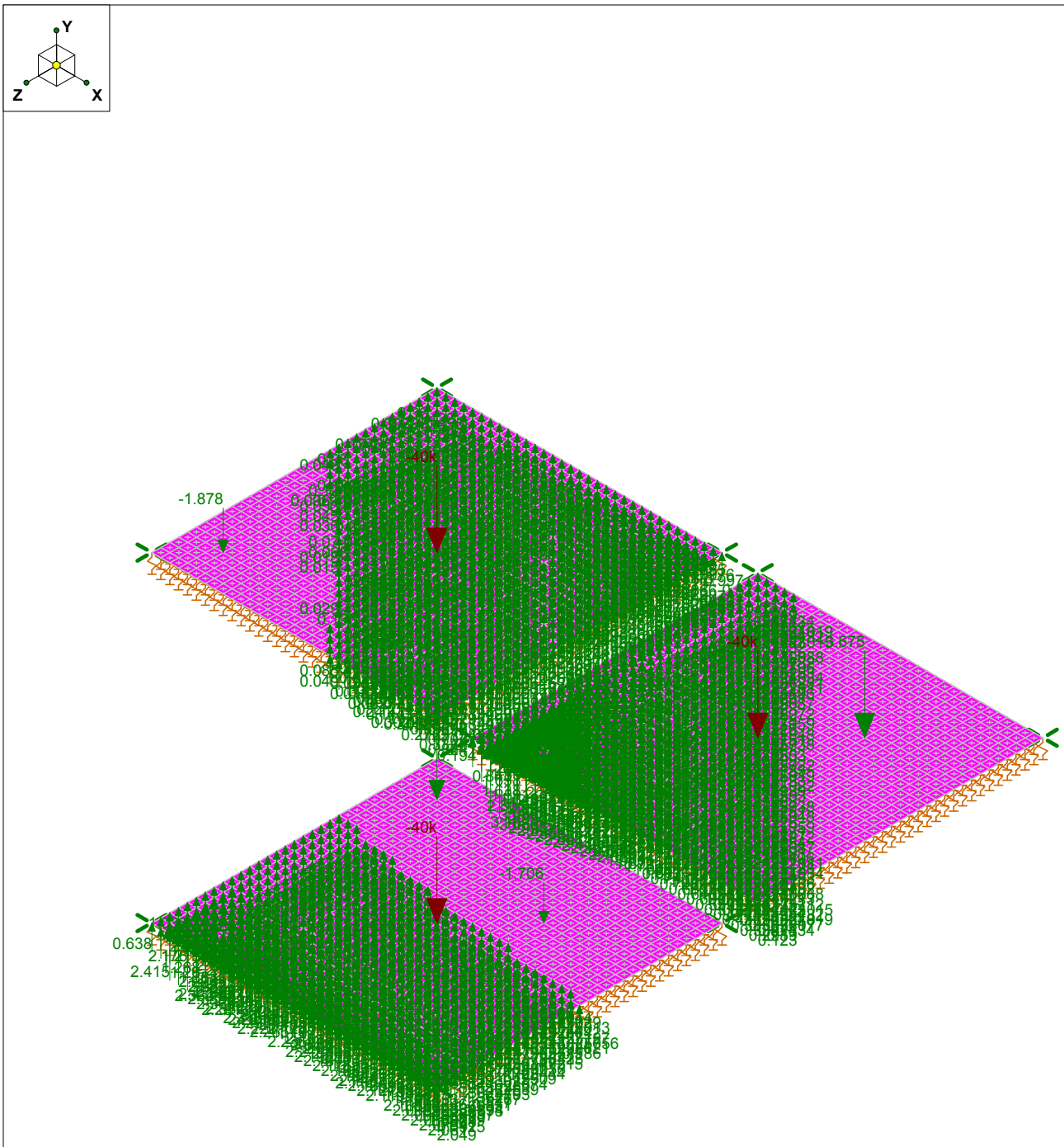
Height Above Grade =		ft
Soil Unit Weight =		pcf
Pad Width =		ft
Pad Length =		ft
Volume =	0.00	ft^3
Weight =	0.00	kips
Weight per Sq. Ft =	0	psf

Pad/Mat Analysis

Thickness	6	ft
Width	16	ft
f'c	3	ksi
Top Bar Quantity	17	
Top Bar Size #	8	
Top Clear Spacing	3	in
Bot Bar Quantity	17	
Bot Bar Size #	8	
Bot Clear Spacing	3	in
As,min	24.8832	in^2
As, compression	13.43	in^2
d,compression	67.5	in
a	19.8	in
c	28.8	in
c/d	0.427	
Ø	0.819	
ØMn,compression	3667	k-ft
Mu	892.2	k-ft
Ratio =	**24.3%**	
As, Tension	13.43	in^2
d,tension	67.5	in
a	19.8	in
c	28.8	in
c/d	0.427	
Ø	0.819	
ØMn,tension	3667	k-ft
Mu	1192.5	k-ft
Ratio =	**32.5%**	

Bearing Check

Max Bearing Load =	3.18	kip
Plate Size =	0.5	ft
Ult. Bearing Capacity =	30	ksf
Bearing Pressure =	12.72	ksf
Ratio =	**56.5%**	



Loads: BLC 1, Dead
Y-direction Reaction Units are k and k-ft

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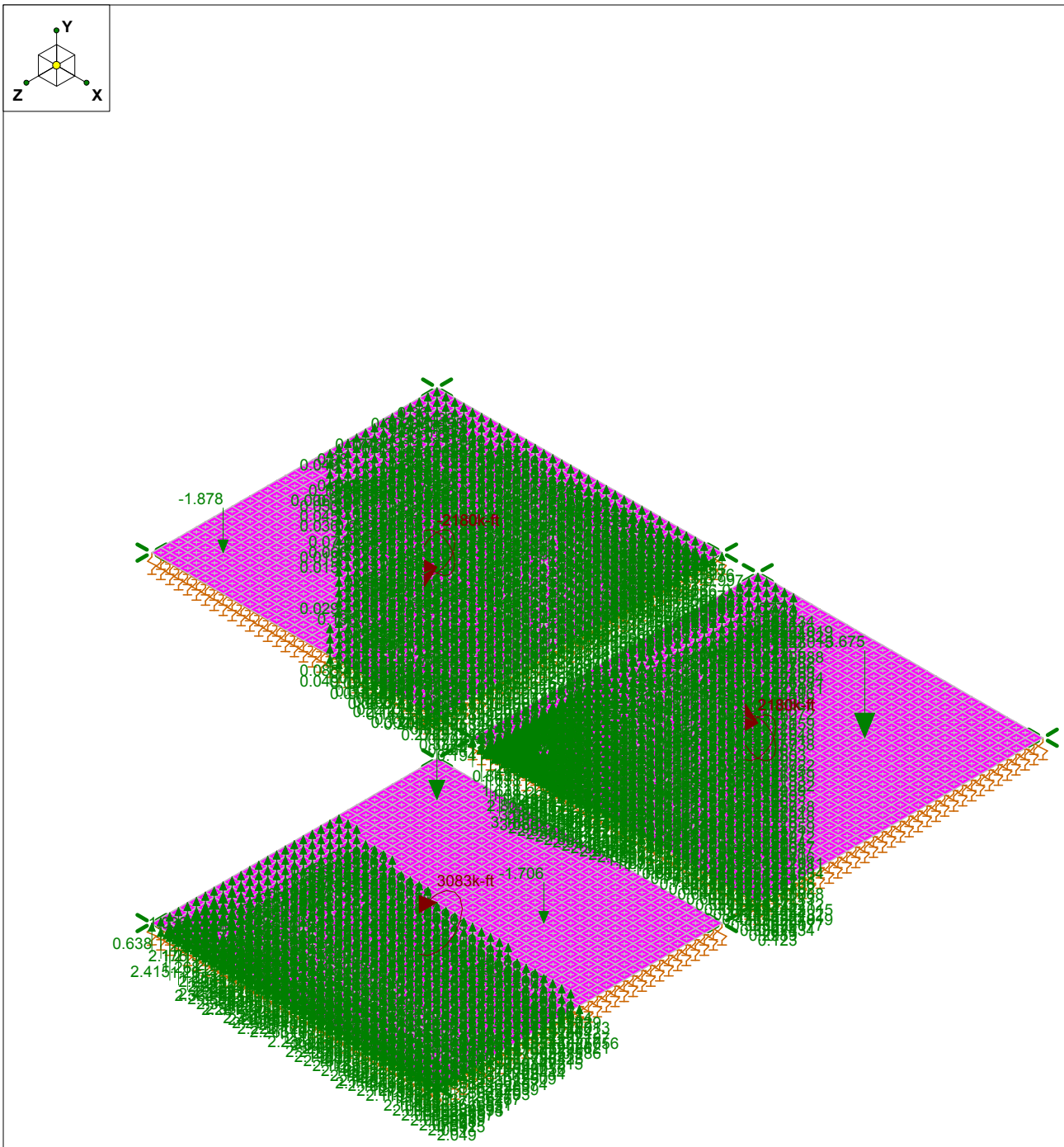
KAT		Mar 2, 2017 at 6:19 AM
37517-0436.001.7805		37517-0436.001.7805_Composite ...



Loads: BLC 2, Moment
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company	BU 876331	SK - 2
KAT		Mar 2, 2017 at 6:19 AM
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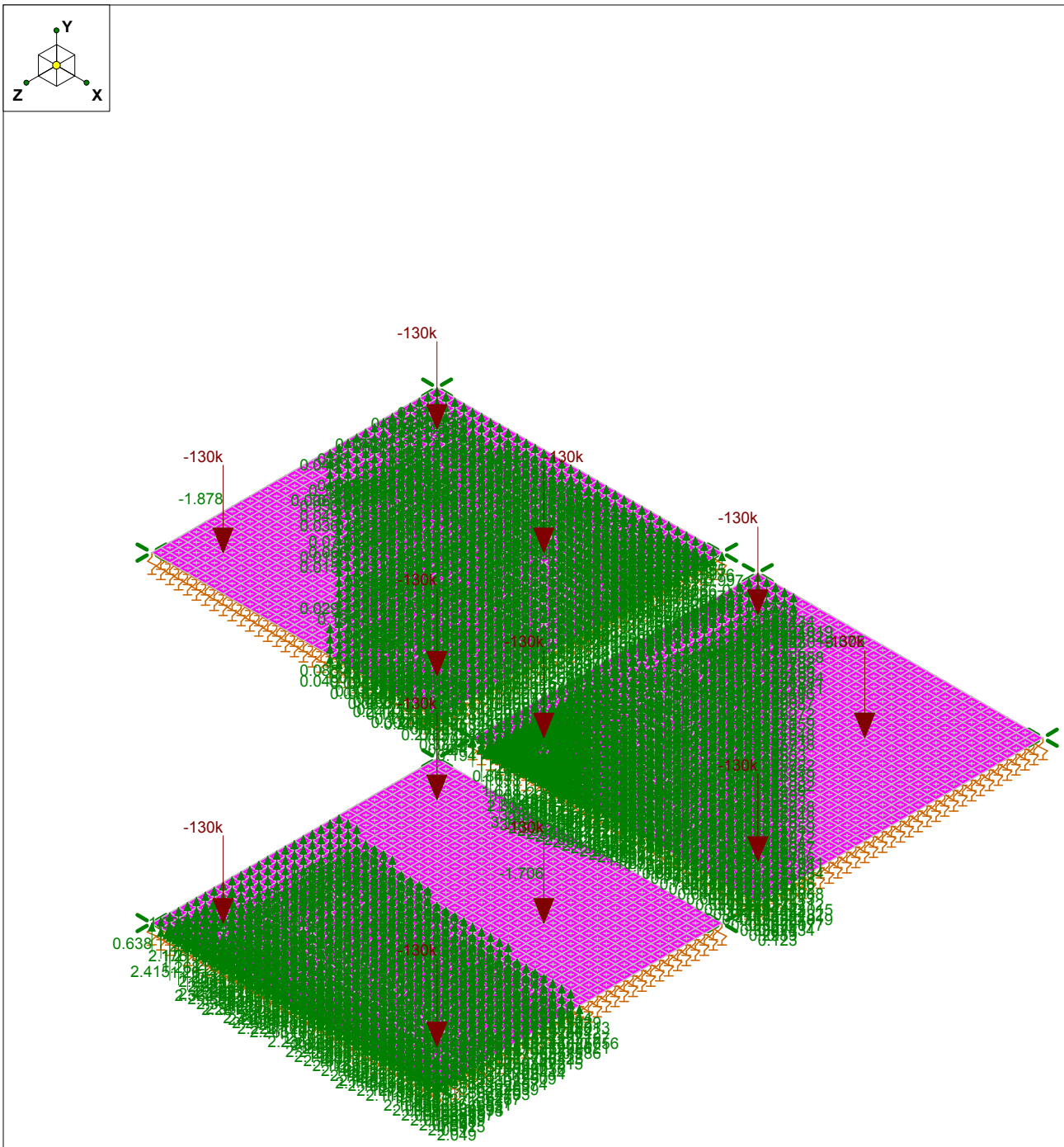

Loads: BLC 3, Pretension
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company	BU 876331	SK - 3
KAT		Mar 2, 2017 at 6:19 AM
37517-0436.001.7805		37517-0436.001.7805_Composite ...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	None
Aluminum Code	None - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1		3				
2	Moment	None				5				
3	Pretension	None				12				

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2 Dead + moment	Yes	Y		1	1.2	2	1	3	1														
2	0.9 Dead+moment	Yes	Y		1	.9	2	1	3	.9														

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	SIDE	L	Y	-40
2	CORNER	L	Y	-40
3	N2179	L	Y	-40

Joint Loads and Enforced Displacements (BLC 2 : Moment)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	SIDE	L	Mx	3083
2	CORNER	L	Mx	2180
3	CORNER	L	Mz	2180
4	N2179	L	Mx	-2180
5	N2179	L	Mz	-2180

Joint Loads and Enforced Displacements (BLC 3 : Pretension)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	N226	L	Y	-130

Joint Loads and Enforced Displacements (BLC 3 : Pretension) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
2	N250	L	Y	-130
3	N801	L	Y	-130
4	N969	L	Y	-130
5	N1315	L	Y	-130
6	N1339	L	Y	-130
7	N1890	L	Y	-130
8	N2058	L	Y	-130
9	N2404	L	Y	-130
10	N2428	L	Y	-130
11	N2979	L	Y	-130
12	N3147	L	Y	-130

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	.145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	.145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	.11	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	.11	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	.11	4	.75	60	60