

Phone: (860) 827-2935 Fax: (860) 827-2950 E-Mail: <u>siting.council@ct.gov</u> Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

April 26, 2024

Jeffrey Barbadora Permitting Specialist Crown Castle 1800 West Park Drive Westborough, MA 01581 Jeff.Barbadora@crowncastle.com

RE: **EM-VER-168-230927** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1440 Main Street North, Woodbury, Connecticut. Request for Project Change.

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated April 24, 2024 and the associated Structural Analysis dated October 18, 2023, regarding a project change for the above-referenced exempt modification request acknowledged by the Council on October 30, 2023.

Pursuant to Condition No. 1 of the Council's October 30, 2023 exempt modification approval, the request to increase the number of Kaelus interference mitigation filters to be installed from one to two is hereby approved.

This approval applies only to the project change in the correspondence dated April 24, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman Executive Director

MAB/ANM/laf

c: The Honorable Barbara Perkinson, First Selectperson, Town of Woodbury (barbaraperkinson@woodburyct.org)

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com> Sent: Wednesday, April 24, 2024 12:59 PM To: CSC-DL Siting Council <Siting.Council@ct.gov> Subject: EM-VER-168-230927 - 1440 Main Street North, Woodbury - 876379

Good afternoon,

Would the CSC please update the approval for EM-VER-168-230927 to include a total of 2 filters?

The original SA submitted with the application and dated 8/01/2023 stated only 1 filter and should have stated 2 filters.

Please see updated SA stating 2 filters and let me know if you have any questions.

Thanks,

Jeffrey Barbadora Permitting Specialist 781-970-0053

Crown Castle 1800 W. Park Drive, Suite 250 Westborough, MA 01581 Date: October 18, 2023



Crown Castle 2000 Corporate Drive Canonsburg PA 15317 (724) 416-2000

Subject:	Structural Analysis Report	
Carrier Designation:	<i>Verizon Wireless</i> Co-Locate Site Number: Site Name:	5000244828 WOODBURY N CT
Crown Castle Designation:	BU Number: Site Name:	876379 N. WOODBURY / WOLFF
	JDE Job Number: Work Order Number: Order Number:	2103468 2264925 658777 Rev. 0
Engineering Firm Designation:	Crown Castle Project Number:	2264925
Site Data:	1440 Main Street North, WOODBU Latitude <i>41° 35' 23.81"</i> , Longitude 163.007 Foot - Monopole Tower	IRY, LITCHFIELD County, CT -73° 10' 11.52''

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above-mentioned tower.

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: Proposed Equipment Configuration

Sufficient Capacity-53.8%

This analysis has been performed in accordance with the 2021 International Building Code based upon an ultimate 3-second gust wind speed of 116 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Didi Rossmiller

Respectfully submitted by:

Rohit Soni, P.E. Senior Project Engineer



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1) INTRODUCTION

This tower is a 163.007 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC..

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	116 mph
Exposure Category:	С
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	
		2	kaelus	BSF0020F3V1			
	151.0	3	samsung telecom.	RFV01U-D1A			
		3	samsung telecom.	RFV01U-D2A			
	150.0	150.0 2 rfs celwave DB-C1-12C-24AB-0Z					
1/0 0	149.0		6	antel	LPA-80080/6CF w/ Mount Pipe	7	1_5/8
149.0		1	tower mounts	Platform Mount [LP 405- 1_KCKR-HR-1]		1-5/0	
	1		tower mounts	Side Arm Mount [SO 103-3]			
	1/2 0	6	andrew	SBNHH-1D65B w/ Mount Pipe			
	140.0	3	samsung telecom.	MT6407-77A w/ Mount Pipe			

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	nna Antenna Model		Feed Line Size (in)
159.0	172.0	1	sinclair	SC229-SFXLDF w/ Mount Pipe		
100.0	158.0	1	tower mounts	Pipe Mount [PM 601-1]	-	-
159.0	159.0	3	rfs celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
	158.0	3	commscope	HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe		
		1	ericsson	RADIO 2X2212 B2		
157.0		3	ericsson	RADIO 4415 B66A_CCIV3	2	1 5/0
157.0		3	ericsson	RADIO 4449 B71 B85A_T- MOBILE	5	1-5/6
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
	157.0	2	ericsson	RADIO 2X2212 B2		
		1	tower mounts	Platform Mount [LP 602-1]		
139.0	142.0	3	fujitsu	TA08025-B604	1	1-3/4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	fujitsu	TA08025-B605		
	140.0	3	commscope	FFVV-65B-R2 w/ Mount Pipe		
	139.0	1	tower mounts	Commscope MC-PK8-DSH		
	138.0	1	raycap	RDIDC-9181-PF-48		
	124.0	1	raycap	DC6-48-60-0-8C-EV		
	102.0	1	ericsson	RRUS 4449 B5/B12		
	123.0	2	ericsson	RRUS 4478 B14		
	122.0	1	ericsson	RRUS 4449 B5/B12		
	121.0	1	ericsson	RRUS 4449 B5/B12		
		1	ericsson	RRUS 4478 B14		
		1	ericsson	RRUS 8843 B2/B66A		
		2	powerwave tech.	7770.00 w/ Mount Pipe	2	3/8
119.0		1	raycap	DC6-48-60-18-8F	2	Conduit
		6	commscope	NNHH-65B-R4 w/ Mount Pipe	12	1-5/8
	120.0	2	ericsson	RRUS 8843 B2/B66A		
	120.0	1	powerwave tech.	7770.00 w/ Mount Pipe		
		1	powerwave tech.	TT19-08BP111-001		
	440.0	1	tower mounts	Platform Mount [LP 405- 1_KCKR-HR-1]		
	119.0	1	tower mounts	Side Arm Mount [SO 103-3]		
		2 powerwave tech. TT19-08BP111-001				
106.0	106.0	1	telewave	ANT150D6-9	1	1/2
21.0	23.0	1	lucent	KS24019-L112A w/ Mount Pipe	1	1/2
21.0	21.0	1	tower mounts	Side Arm Mount [SO 701-1]		1/2

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1531966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1614612	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1613543	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Section No.	Elevation (ft)	Component Type	Size	Critical Element	Р (К)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	163.007 - 121.587	Pole	TP42.37x34.28x0.3125	1	-17.39	2492.97	17.0	Pass
L2	121.587 - 84.67	Pole	TP48.83x40.6057x0.375	2	-32.08	3448.83	32.8	Pass
L3	84.67 - 42.2067	Pole	TP56.25x46.7975x0.4375	3	-47.34	4636.15	41.6	Pass
L4	42.2067 - 0	Pole	TP63.5x53.916x0.5	4	-71.04	6141.33	46.1	Pass
							Summary	
						Pole (L4)	46.1	Pass
						Rating =	46.1	Pass

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.6	Pass
1	Base Plate	0	45.5	Pass
1	Base Foundation (Structure)	0	53.8	Pass
1	Base Foundation (Soil Interaction)	0	25.5	Pass

	Structure Rating (max from all components) =	53.8%
Notes:	Con additional documentation in "Annondix C Additional Calculations" for calculations supporting	the 0/ conceits/

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

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT



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

TOWER DESIGN NOTES

- 1. Tower designed for Exposure C to the TIA-222-H Standard.
- 2. Tower designed for a 116 mph basic wind in accordance with the TIA-222-H Standard.
- 3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase Tower is also designed for a so mph basic wind with in thickness with height.
 Deflections are based upon a 60 mph wind.
 Tower Risk Category II.
 Topographic Category 1 with Crest Height of 0.00 ft
 TOWER RATING: 46.1%

AXIAL 95 K

Ĵ,

AXIAL 71 K

MOMENT

MOMENT

4185 kip-ft

1232 kip-ft

	Crown Castle	^{Job:} BU# 876379		
CROWN	2000 Corporate Drive	Project:		
CASTLE	Canonsburg PA 15317	Client: Crown Castle	Drawn by: Didi Rossmiller	App'd:
The Foundation for a Wireless World	Phone: (724) 416-2000	Code: TIA-222-H	Date: 10/18/23	Scale: NTS
	FAX: (724) 416-4623	Path: C:\Users\DRossmiller\Desktop\te	mporary\876379\WO 2264925 - SA\Prod\876379.ei	Dwg No. E-1

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard. The following design criteria apply:

- Tower base elevation above sea level: 490.00 ft.
- Basic wind speed of 116 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

			Options		
	Consider Moments - Legs Consider Moments - Horizontals		Distribute Leg Loads As Uniform Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules Calculate Forces in Supporting Bracing Members
$\sqrt{1}$	Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity	\checkmark \checkmark \checkmark \checkmark \checkmark	Assume Rigid Index Plate Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension Bypass Mast Stability Checks Use Azimuth Dish Coefficients Project Wind Area of Appurt. Autocalc Torque Arm Areas	\checkmark	Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption
L S U S S	Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	V	Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	V	Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation	Section	Splice	Number	Тор	Bottom	Wall	Bend	Pole Grade
		Length	Length	of	Diameter	Diameter	Thickness	Radius	
	ft	fť	fť	Sides	in	in	in	in	
L1	163.01-121.59	41.42	5.83	18	34.2800	42.3700	0.3125	1.2500	A572-65 (65 ksi)
L2	121.59-84.67	42.75	6.67	18	40.6057	48.8300	0.3750	1.5000	Á572-65 (65 ksi)

163.007 Ft Monopole Tower Structural Analysis Project Number 2264925, Order 658777, Revision 0

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	84.67-42.21	49.13	7.58	18	46.7975	56.2500	0.4375	1.7500	A572-65 (65 ksi)
L4	42.21-0.00	49.79		18	53.9160	63.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	1	r	С	I/C	J	lt/Q	W	w/t
	in	in ²	in⁴	in	in	in³	in ⁴	in ²	in	
L1	34.7606	33.6915	4911.1720	12.0585	17.4142	282.0205	9828.8063	16.8490	5.4833	17.546
	42.9754	41.7158	9322.3361	14.9304	21.5240	433.1144	18656.938 7	20.8619	6.9071	22.103
L2	42.3138	47.8845	9791.4486	14.2819	20.6277	474.6754	19595.781 1	23.9468	6.4866	17.298
	49.5254	57.6736	17107.692 4	17.2015	24.8056	689.6695	34237.895 6	28.8423	7.9341	21.158
L3	48.7543	64.3766	17480.398 7	16.4578	23.7731	735.3015	34983.798 6	32.1944	7.4664	17.066
	57.0503	77.5026	30501.195 3	19.8134	28.5750	1067.4084	61042.524 8	38.7587	9.1300	20.869
L4	56.1528	84.7712	30558.207 9	18.9627	27.3893	1115.6981	61156.625 1	42.3936	8.6092	17.218
	64.4025	99.9810	50134.423 5	22.3650	32.2580	1554.1702	100334.81 52	50.0000	10.2960	20.592

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in				in	in	in
L1 163.01-			1	1	1			
121.59								
L2 121.59-			1	1	1			
84.67								
L3 84.67-			1	1	1			
42.21								
L4 42.21-0.00			1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude	Componen	Placement	Total	Number	Start/En	Width or	Perimete	Weight
		FIOIII	l Turno	#	number	Per Row	U Desition	Diamete	ľ	plf
		Coloulation	туре	п			POSILION	l in	in	ριι
*****		Calculation						111	111	
Safety Line 3/8	С	No	Surface Ar (CaAa)	163.00 - 0.00	1	1	-0.167 -0.167	0.3750		0.22
*** 21 ***										
LDF4-50A(1/2)	С	No	Surface Ar (CaAa)	21.00 - 0.00	1	1	0.167 0.167	0.6300		0.15

Feed Line/Linear Appurtenances - Entered As Area

Description	Face	Allow	Exclude	Componen	Placement	Total Numbor		$C_A A_A$	Weight
	Leg	Sillelu	Torque Calculation	Type	ft	Number		ft²/ft	plf
*** 158 ***									
LDF4-50A(1/2)	В	No	No	Inside Pole	158.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
*** 157 ***						-			
HB158-21U6S24-	A	No	No	Inside Pole	157.00 - 0.00	3	No Ice	0.00	2.50
xxM_TMO(1-5/8)							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
*** 149 ***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	149.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
HB158-1-13U6-	A	No	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	1.90
S6F18(1-5/8)							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
*** 139 ***	-				100.00 0.00			0.00	0.70
CU12PSM6P4XXX	В	No	No	Inside Pole	139.00 - 0.00	1	No Ice	0.00	2.72
(1-3/4)							1/2" Ice	0.00	2.72
							1" Ice	0.00	2.72
^^^ 119 ^^^	~				440.00 0.00	0		0.00	0.04
2" Flexible Conduit	C	No	No	Inside Pole	119.00 - 0.00	2	No Ice	0.00	0.34
							1/2" Ice	0.00	0.34
	~	NL .	NL.		110.00 0.00	4	1" Ice	0.00	0.34
FB-L98B-002-	C	INO	NO	Inside Pole	119.00 - 0.00	1	NO ICE	0.00	0.06
75000(3/8)							1/2" ICe	0.00	0.06
	~	NL .	Ν.		110.00 0.00	4	1 ICe	0.00	0.06
FB-L98B-034-	C	INO	NO	Inside Pole	119.00 - 0.00	1	NO ICE	0.00	0.06
XXX(3/8)							1/2 ICe	0.00	0.06
	~	Nia	Nie	Incide Dala	110.00 0.00	0		0.00	0.06
WR-VG0051-	C	INO	INO	Inside Pole	119.00 - 0.00	2	INO ICE	0.00	0.91
BRD(7/8)							1/2 ICe	0.00	0.91
	C	No	No	Incida Dala	110.00 0.00	2		0.00	0.91
VVK-VG0031-	C	INO	INO	Inside Pole	119.00 - 0.00	2		0.00	0.00
BRDA(110)								0.00	0.00
	0	No	No	Incida Dala	110.00 0.00	10		0.00	0.00
LCF 130-30A(1-	C	INO	INO	Inside Pole	119.00 - 0.00	12		0.00	0.00
5/6)							1/2 100	0.00	0.00
*** 106 ***							i ice	0.00	0.00
100 $1 \text{ DE4}_{50}(1/2)$	R	No	No	Inside Polo	106.00 - 0.00	1	No Ice	0.00	0 15
LDI 4-30A(1/2)	U	UVI	NU	Inside FUIE	100.00 - 0.00	I	1/2" Ico	0.00	0.15
							1" 100	0.00	0.15
*****							1 100	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower	Tower	Face	A _R	AF	CAAA	CAAA	Weight
Sectio	Elevation				In Face	Out Face	
n	ft		ft ²	ft ²	ft ²	ft ²	K
L1	163.01-121.59	А	0.000	0.000	0.000	0.000	0.45
		В	0.000	0.000	0.000	0.000	0.05
		С	0.000	0.000	1.553	0.000	0.01
L2	121.59-84.67	Α	0.000	0.000	0.000	0.000	0.53
		В	0.000	0.000	0.000	0.000	0.11
		С	0.000	0.000	1.384	0.000	0.47
L3	84.67-42.21	A	0.000	0.000	0.000	0.000	0.61
		В	0.000	0.000	0.000	0.000	0.13
		С	0.000	0.000	1.592	0.000	0.59
L4	42.21-0.00	А	0.000	0.000	0.000	0.000	0.60
		В	0.000	0.000	0.000	0.000	0.13

Tower	Tower	Face	A _R	AF	C _A A _A	C _A A _A	Weight
Sectio	Elevation				In Face	Out Face	
п	ft		ft²	ft ²	ft ²	ft ²	K
		С	0.000	0.000	2.906	0.000	0.59

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower	Tower	Face	lce Thicknoss	A _R	A _F	C _A A _A	C _A A _A	Weight
Secilo	Lievalion #	100	in	f #2	# 2			K
	п	Ley	111	п	п	п	п	N
L1	163.01-121.59	A	0.983	0.000	0.000	0.000	0.000	0.45
		В		0.000	0.000	0.000	0.000	0.05
		С		0.000	0.000	9.698	0.000	0.08
L2	121.59-84.67	А	0.952	0.000	0.000	0.000	0.000	0.53
		В		0.000	0.000	0.000	0.000	0.11
		С		0.000	0.000	8.645	0.000	0.53
L3	84.67-42.21	А	0.907	0.000	0.000	0.000	0.000	0.61
		В		0.000	0.000	0.000	0.000	0.13
		С		0.000	0.000	9.680	0.000	0.65
L4	42.21-0.00	А	0.814	0.000	0.000	0.000	0.000	0.60
		В		0.000	0.000	0.000	0.000	0.13
		С		0.000	0.000	14.373	0.000	0.68

		Feed Line Center of Pressure									
Section	Elevation	CP _X	CPz	CP _X	CPz						
				Ice	Ice						
	ft	in	in	in	in						
L1	163.01-121.59	0.1035	0.2838	0.3596	0.9858						
L2	121.59-84.67	0.1036	0.2841	0.3651	1.0010						
L3	84.67-42.21	0.1037	0.2843	0.3600	0.9871						
L4	42.21-0.00	0.0136	0.5268	0.1454	1.4851						

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower	Feed Line	Description	Feed Line	Ka	Ka
Section	Record No.	-	Segment	No Ice	lce
			Ēlev.		
L1	2	Safety Line 3/8	121.59 -	1.0000	1.0000
			163.00		
L2	2	Safety Line 3/8	84.67 -	1.0000	1.0000
			121.59		
L3	2	Safety Line 3/8	42.21 -	1.0000	1.0000
		-	84.67		
L4	2	Safety Line 3/8	0.00 - 42.21	1.0000	1.0000
L4	26	LDF4-50A(1/2)	0.00 - 21.00	1.0000	1.0000

Discrete Tower Loads

Description	Face	Offset	Offsets:	Azimuth	Placement
	or Leg	Туре	Horz Lateral	Adjustment	
			Vert	٥	#
			ft		п
			ft		

*** 158 ***					
Pipe Mount [PM 601-1]	А	From Leg	0.50	0.0000	158.00
			0.00		
SC220 SEXLDE w/ Mount Pino	۸	FromLog	0.00	0 0000	158.00
SCZ29-SI XEDI W/ Would Fipe	A	FIOILEG	0.00	0.0000	130.00
			14.00		
*** 157 ***	~			0.0000	157.00
Platform Mount [LP 602-1] 8' Ladder	C	None From Centroid-Face	2.00	0.0000	157.00
0 Ladder	C		0.00	0.0000	157.00
			-4.00		
6' x 2" Mount Pipe	A	From Centroid-Leg	4.00	0.0000	157.00
			0.00		
6' x 2" Mount Pipe	В	From Centroid-Leg	4.00	0.0000	157.00
		Ũ	0.00		
Clas Of Masurat Dire	0	Enorm Combraid Lon	0.00	0.0000	457.00
6 x 2 Mount Pipe	C	From Centrold-Leg	4.00	0.0000	157.00
			0.00		
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	А	From Leg	4.00	0.0000	157.00
			0.00		
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	в	From Lea	4.00	0 0000	157 00
	D	Tront Log	0.00	0.0000	101100
	-		1.00		
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	С	From Leg	4.00	0.0000	157.00
			1.00		
AIR6449 B41_T-MOBILE w/ Mount Pipe	А	From Leg	4.00	0.0000	157.00
			0.00		
AIR6440 R41 T MORILE w/ Mount Pino	P	FromLog	0.00	0 0000	157.00
	D	T IOIII Leg	0.00	0.0000	157.00
			0.00		
AIR6449 B41_T-MOBILE w/ Mount Pipe	С	From Leg	4.00	0.0000	157.00
			0.00		
APXVAALL24 43-U-NA20 TMO w/ Mount Pipe	А	From Leg	4.00	0.0000	157.00
		-	0.00		
ADXV/AALL24 42 LLNA20 TMO w/ Mount Ding	D	From Log	2.00	0.0000	157.00
AFXVAALL24_43-0-INA20_TIMO W/ Mount Fipe	D	FIOIIILeg	0.00	0.0000	157.00
			2.00		
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	С	From Leg	4.00	0.0000	157.00
			0.00		
RADIO 2X2212 B2	А	From Leg	4.00	0.0000	157.00
		5	0.00		
	-	E	0.00	0.0000	457.00
RADIU 2X2212 B2	В	From Leg	4.00	0.0000	157.00
			1.00		
RADIO 2X2212 B2	С	From Leg	4.00	0.0000	157.00
			0.00		
RADIO 4415 B66A CCIV3	А	From Lea	4.00	0.000	157.00
			0.00	0.0000	

Description	Face	Offset	Offsets:	Azimuth	Placement
	or	Туре	Horz	Adjustment	
	Leg		Lateral		
			Vert		
			ft	0	ft
			ft ft		
			1.00		
RADIO 4415 B66A CCIV3	в	From Lea	4.00	0.0000	157.00
	_	1.10111 209	0.00		
			1.00		
RADIO 4415 B66A_CCIV3	С	From Leg	4.00	0.0000	157.00
			0.00		
	٨	Energy Law	1.00	0.0000	457.00
RADIO 4449 B71 B85A_1-MOBILE	A	From Leg	4.00	0.0000	157.00
			1 00		
RADIO 4449 B71 B85A T-MOBILE	В	From Lea	4.00	0.0000	157.00
			0.00		
			1.00		
RADIO 4449 B71 B85A_T-MOBILE	С	From Leg	4.00	0.0000	157.00
			0.00		
*** 140 ***			1.00		
BSE0020E3\/1	В	From Lea	4 00	0 0000	149 00
DOI 00201 0V 1	Б	TIOIN LOg	0.00	0.0000	140.00
			2.00		
BSF0020F3V1	С	From Leg	4.00	0.0000	149.00
			0.00		
		_ .	2.00		
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00
			-1.00		
(2) SBNHH-1D65B w/ Mount Pipe	в	From Lea	4 00	0 0000	149 00
	D	Troin Log	0.00	0.0000	140.00
			-1.00		
(2) SBNHH-1D65B w/ Mount Pipe	С	From Leg	4.00	0.0000	149.00
			0.00		
	٨	Energy Law	-1.00	0.0000	140.00
(2) LPA-80080/6CF w/ Wount Pipe	A	From Leg	4.00	0.0000	149.00
			0.00		
(2) LPA-80080/6CF w/ Mount Pipe	В	From Leg	4.00	0.0000	149.00
		0	0.00		
			0.00		
(2) LPA-80080/6CF w/ Mount Pipe	С	From Leg	4.00	0.0000	149.00
			0.00		
MT6407 77A w/ Mount Pino	٨	FromLog	0.00	0.0000	140.00
WT0407-77A W/ Would Fipe	A	FIOILES	4.00	0.0000	149.00
			-1.00		
MT6407-77A w/ Mount Pipe	В	From Leg	4.00	0.0000	149.00
			0.00		
		_ .	-1.00		
M16407-77A w/ Mount Pipe	С	From Leg	4.00	0.0000	149.00
			-1.00		
(2) DB-C1-12C-24AB-0Z	А	From Lea	4.00	0.0000	149.00
		1.10111 209	0.00	0.0000	
			1.00		
RFV01U-D1A	А	From Leg	4.00	0.0000	149.00
			0.00		
	P	From Law	2.00	0.0000	140.00
KEVU1U-D1A	В	From Leg	4.00	0.0000	149.00
			2 00		
RFV01U-D1A	С	From Lea	4.00	0.0000	149.00
	-		0.00		
			2.00		
RFV01U-D2A	А	From Leg	4.00	0.0000	149.00
			0.00		
			2.00		

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustment	Placement
	C		Vert ft ft	٥	ft
RFV01U-D2A	В	From Leg	4.00 0.00	0.0000	149.00
RFV01U-D2A	С	From Leg	2.00 4.00 0.00 2.00	0.0000	149.00
Platform Mount [LP 405-1_KCKR-HR-1] Side Arm Mount [SO 103-3] *** 139 ***	C C	None None	2.00	0.0000 0.0000	149.00 149.00
FFVV-65B-R2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	139.00
FFVV-65B-R2 w/ Mount Pipe	В	From Leg	4.00	0.0000	139.00
FFVV-65B-R2 w/ Mount Pipe	С	From Leg	4.00	0.0000	139.00
TA08025-B604	А	From Leg	4.00 0.00	0.0000	139.00
TA08025-B604	В	From Leg	3.00 4.00 0.00	0.0000	139.00
TA08025-B604	С	From Leg	3.00 4.00 0.00	0.0000	139.00
TA08025-B605	А	From Leg	3.00 4.00 0.00	0.0000	139.00
TA08025-B605	В	From Leg	3.00 4.00 0.00	0.0000	139.00
TA08025-B605	С	From Leg	3.00 4.00 0.00	0.0000	139.00
RDIDC-9181-PF-48	А	From Leg	3.00 4.00 0.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	А	From Centroid-Leg	-1.00 4.00 0.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	А	From Centroid-Leg	0.00 4.00 0.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	А	From Centroid-Leg	0.00 4.00 0.00	0.0000	139.00
Commscope MC-PK8-DSH *** 119 ***	С	None	0.00	0.0000	139.00
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	119.00
(2) NNHH-65B-R4 w/ Mount Pipe	В	From Leg	4.00 0.00 1.00	0.0000	119.00
(2) NNHH-65B-R4 w/ Mount Pipe	С	From Leg	4.00 0.00	0.0000	119.00
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	119.00
7770.00 w/ Mount Pipe	В	From Leg	4.00 0.00 2.00	0.0000	119.00

163.007 Ft Monopole Tower Structural Analysis Project Number 2264925, Order 658777, Revision 0

or Type Horz Adjustment Leg Lateral Vert it ° ft ° it it ° 7770.00 w/ Mount Pipe C From Leg 4.00 0.000 RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00 2.00 0.000 0.000 0.000	ft 119.00
Leg Lateral Vert ft ft ° ft ft 7770.00 w/ Mount Pipe C From Leg 4.00 0.0000 0.00 2.00 2.00 2.00 0.0000 RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00 2.00 0.0000 0.0000 0.0000	ft 119.00
Vert ft ° ft ft ft ft 7770.00 w/ Mount Pipe C From Leg 4.00 0.000 2.00 2.00 2.00 0.000 0.000 RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00 2.00 0.000 0.000 0.000	ft 119.00
n n ft ft 7770.00 w/ Mount Pipe C From Leg 4.00 0.000 0.00 2.00 2.00 0.000 0.000 RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.000 0.00 2.00 0.00 0.000 0.0000 0.000	n 119.00
n n 7770.00 w/ Mount Pipe C From Leg 4.00 0.000 0.00 2.00 2.00 0.000 0.000 RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00 2.00 0.000 0.000 0.000	119.00
7770.00 w/ Mount Pipe C From Leg 4.00 0.0000 0.00 2.00 2.00 0.0000 </td <td>119.00</td>	119.00
RRUS 4449 B5/B12 A From Leg 4.00 0.000 0.00 0.00 0.00 0.00 0.00 0.0	
RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00	
RRUS 4449 B5/B12 A From Leg 4.00 0.0000 0.00	
0.00	119.00
2.00	
3.00	
RRUS 4449 B5/B12 B From Leg 4.00 0.0000	119.00
0.00	
4.00 PPUS 4440 P5/P12 C From Log 4.00 0.0000	110.00
1.000 4449 B3/B12 C Hom Leg 0.000	119.00
2 00	
RRUS 4478 B14 A From Leg 4.00 0.0000	119.00
0.00	
4.00	
RRUS 4478 B14 B From Leg 4.00 0.0000	119.00
0.00	
4.00	110.00
RRUS 4478 B14 C From Leg 4.00 0.0000	119.00
2.00	
2.00 2.00 2.00 RRUS 8843 B2/R66A A From Leg 4.00 0.0000	119.00
	110.00
1.00	
RRUS 8843 B2/B66A B From Leg 4.00 0.0000	119.00
0.00	
2.00	
RRUS 8843 B2/B66A C From Leg 4.00 0.0000	119.00
0.00	
	110.00
1119-06BPT11-001 A From Leg 4.00 0.0000	119.00
0.00	
TT19-08BP111-001 B From Leg 4.00 0.0000	119.00
0.00	
0.00	
TT19-08BP111-001 C From Leg 4.00 0.0000	119.00
0.00	
1.00	
DC6-48-60-0-8C-EV C From Leg 4.00 0.0000	119.00
5.00	
DC6-48-60-18-8E A From Leg 4.00 0.0000	119.00
	110.00
2.00	
Platform Mount [LP 405-1 KCKR-HR-1] C None 0.0000	119.00
Side Arm Mount [SO 103-3]CNone0.0000	119.00
6' x 2" Mount Pipe A From Centroid-Leg 4.00 0.0000	119.00
0.00	
	440.00
6" X 2" Mount Pipe B From Centroid-Leg 4.00 0.0000	119.00
0.00	
6' x 2" Mount Pine C From Centroid-Leg 4.00 0.000	119.00
	110.00
0.00	
*** 106 ***	
	106.00
ANT150D6-9 A From Leg 4.00 0.0000	
ANT150D6-9 A From Leg 4.00 0.0000 0.00	
ANT150D6-9 A From Leg 4.00 0.0000 0.00 0.00	
ANT150D6-9 A From Leg 4.00 0.000 0.00 *** 21 *** (221404) 4404 m/ Meant Dires D From Leg 4.00 0.000 0.00	04.00
ANT150D6-9 A From Leg 4.00 0.000 0.00 *** 21 *** KS24019-L112A w/ Mount Pipe B From Leg 4.00 0.000	21.00
ANT150D6-9 A From Leg 4.00 0.000 *** 21 *** KS24019-L112A w/ Mount Pipe B From Leg 4.00 0.000 0.00	21.00
ANT150D6-9 A From Leg 4.00 0.000 *** 21 *** KS24019-L112A w/ Mount Pipe B From Leg 4.00 0.000 Side Arm Mount [SO 701-1] C From Leg 1.50 0.0000	21.00

Description	Face	Offset	Offsets:	Azimuth	Placement
	or	Type	Horz	Adjustment	
	log	. , , , , , , , , , , , , , , , , , , ,	Latoral	, laja eti nome	
	Leg		Laterai		
			Vert		
			ft	0	ft
			ft		
			ft		
			0.00		
			0.00		
**					

Load Combinations

Comb.	Description
No.	· · · · · · · · · · · · · · · · · · ·
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 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
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

Comb.

Description

No.	
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum	Member	Forces

Sectio	Elevation	Component	Condition	Gov.	Axial	Major Axis	Minor Axis
n	ft	Type		Load	K	Moment	Moment
	400.007			Comb.	<u></u>	kip-ft	kip-ft
L1	163.007 - 121.587	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	26	-29.14	0.01	4.83
			Max. Mx	20	-17.39	392.56	1.74
			Max. My	2	-17.39	0.00	391.20
			Max. Vy	20	-17.89	392.56	1.74
			Max. Vx	2	-17.78	0.00	391.20
			Max. Torque	9			5.56
L2	121.587 - 84.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.96	0.38	4.91
			Max. Mx	20	-32.08	1247.40	1.92
			Max. My	2	-32.08	0.23	1242.10
			Max. Vy	20	-26.91	1247.40	1.92
			Max. Vx	2	-26.80	0.23	1242.10
			Max. Torque	9			6.58
L3	84.67 - 42.2067	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.81	0.38	4.74
			Max. Mx	20	-47.34	2469.84	2.00
			Max. My	2	-47.35	0.24	2460.18
			Max. Vy	20	-31.82	2469.84	2.00
			Max. Vx	2	-31.72	0.24	2460.18
			Max. Torque	9			6.58
L4	42.2067 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-94.52	0.60	4.16
			Max. Mx	20	-71.04	4184.50	2.02
			Max. My	2	-71.04	0.68	4169.57
			Max. Vy	20	-36.71	4184.50	2.02
			Max. Vx	2	-36.62	0.68	4169.57
			Max. Torque	9			6.58

Maximum Reactions

Location	Condition	Gov.	Vertical	Horizontal, X	Horizontal, Z
		Load	K	K	K
		Comb.			
Pole	Max. Vert	27	94.52	0.00	10.83
	Max. H _x	20	71.06	36.68	0.01
	Max. H _z	2	71.06	0.01	36.59
	Max. M _x	2	4169.57	0.01	36.59
	Max. M _z	8	4183.72	-36.68	-0.01
	Max. Torsion	9	6.44	-36.68	-0.01
	Min. Vert	17	53.29	18.33	-31.68
	Min. H _x	8	71.06	-36.68	-0.01
	Min. H _z	14	71.06	-0.01	-36.59
	Min. M _x	14	-4166.07	-0.01	-36.59
	Min. M _z	20	-4184.50	36.68	0.01
	Min. Torsion	21	-6.44	36.68	0.01

Tower Mast Reaction Summary

Load	Vertical	Shearx	Shearz	Overturning	Overturning	Torque
Combination	K	К	K	Moment, M _x kip-ft	Moment, Mz kip-ft	kip-ft
Dead Only 1.2 Dead+1.0 Wind 0 deg -	59.21 71.06	0.00 -0.01	0.00 -36.59	-1.37 -4169.57	0.32 0.68	0.00 -0.31
No Ice 0.9 Dead+1.0 Wind 0 deg -	53.29	-0.01	-36.59	-4135.44	0.57	-0.31
No Ice 1.2 Dead+1.0 Wind 30 deg -	71.06	18.33	-31.68	-3611.05	-2091.43	-3.48
No Ice 0.9 Dead+1.0 Wind 30 deg -	53.29	18.33	-31.68	-3581.42	-2074.61	-3.49
1.2 Dead+1.0 Wind 60 deg -	71.06	31.76	-18.28	-2085.40	-3623.02	-5.73
0.9 Dead+1.0 Wind 60 deg - No Ice	53.29	31.76	-18.28	-2068.10	-3593.82	-5.73
1.2 Dead+1.0 Wind 90 deg - No Ice	71.06	36.68	0.01	-1.45	-4183.72	-6.43
0.9 Dead+1.0 Wind 90 deg - No Ice	53.29	36.68	0.01	-1.00	-4149.98	-6.44
1.2 Dead+1.0 Wind 120 deg - No Ice	71.06	31.77	18.30	2082.41	-3623.29	-5.42
0.9 Dead+1.0 Wind 120 deg - No Ice	53.29	31.77	18.30	2066.03	-3594.09	-5.42
1.2 Dead+1.0 Wind 150 deg - No Ice	71.06	18.35	31.69	3607.83	-2091.91	-2.95
0.9 Dead+1.0 Wind 150 deg - No Ice	53.29	18.35	31.69	3579.12	-2075.09	-2.95
1.2 Dead+1.0 Wind 180 deg - No Ice	71.06	0.01	36.59	4166.07	0.11	0.31
0.9 Dead+1.0 Wind 180 deg - No Ice	53.29	0.01	36.59	4132.85	0.01	0.31
1.2 Dead+1.0 Wind 210 deg - No Ice	71.06	-18.33	31.68	3607.55	2092.20	3.48
0.9 Dead+1.0 Wind 210 deg - No Ice	53.29	-18.33	31.68	3578.84	2075.18	3.49
1.2 Dead+1.0 Wind 240 deg - No Ice	71.06	-31.76	18.28	2081.92	3623.79	5.73
0.9 Dead+1.0 Wind 240 deg - No Ice	53.29	-31.76	18.28	2065.54	3594.39	5.73
1.2 Dead+1.0 Wind 270 deg - No Ice	71.06	-36.68	-0.01	-2.02	4184.50	6.43
0.9 Dead+1.0 Wind 270 deg - No Ice	53.29	-36.68	-0.01	-1.56	4150.57	6.44
1.2 Dead+1.0 Wind 300 deg - No Ice	71.06	-31.77	-18.30	-2085.89	3624.09	5.42
0.9 Dead+1.0 Wind 300 deg - No Ice	53.29	-31.77	-18.30	-2068.59	3594.69	5.42
1.2 Dead+1.0 Wind 330 deg - No Ice	71.06	-18.35	-31.69	-3611.33	2092.71	2.95
0.9 Dead+1.0 Wind 330 deg - No Ice	53.29	-18.35	-31.69	-3581.70	2075.69	2.95
1.2 Dead+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 0	94.52 94.52	-0.00 -0.00	-0.00 -10.83	4.16- 1231.08-	0.60 0.71	0.00 -0.10
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 30	94.52	5.42	-9.38	-1066.69	-614.03	-1.09
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 60	94.52	9.39	-5.41	-617.66	-1064.07	-1.79
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 90	94.52	10.84	0.00	-4.31	-1228.82	-2.01
deg+1.0 ice+1.0 iemp 1.2 Dead+1.0 Wind 120	94.52	9.39	5.42	609.01	-1064.15	-1.69
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 150	94.52	5.42	9.38	1057.98	-614.17	-0.92
1.2 Dead+1.0 Wind 180	94.52	0.00	10.83	1222.27	0.53	0.10
1.2 Dead+1.0 Wind 210	94.52	-5.42	9.38	1057.89	615.27	1.09
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	94.52	-9.39	5.41	608.86	1065.30	1.79

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Load	Vertical	Shearx	Shear₂	Overturning Moment M.	Overturning Moment M-	Torque
Combination	K	К	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 270	94.52	-10.84	-0.00	-4.48	1230.06	, 2.01
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	94.52	-9.39	-5.42	-617.81	1065.39	1.69
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	94.52	-5.42	-9.38	-1066.77	615.42	0.92
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	59.21	-0.00	-9.22	-1046.66	0.40	-0.09
Dead+Wind 30 deg - Service	59.21	4.62	-7.98	-906.60	-524.26	-0.89
Dead+Wind 60 deg - Service	59.21	8.00	-4.61	-523.99	-908.36	-1.45
Dead+Wind 90 deg - Service	59.21	9.24	0.00	-1.38	-1048.97	-1.63
Dead+Wind 120 deg -	59.21	8.01	4.61	521.22	-908.43	-1.37
Service						
Dead+Wind 150 deg -	59.21	4.62	7.99	903.77	-524.38	-0.74
Service						
Dead+Wind 180 deg -	59.21	0.00	9.22	1043.76	0.25	0.09
Service						
Dead+Wind 210 deg -	59.21	-4.62	7.98	903.70	524.91	0.89
Service						
Dead+Wind 240 deg -	59.21	-8.00	4.61	521.10	909.01	1.45
Service						
Dead+Wind 270 deg -	59.21	-9.24	-0.00	-1.52	1049.62	1.63
Service						
Dead+Wind 300 deg -	59.21	-8.01	-4.61	-524.12	909.08	1.37
Service						
Dead+Wind 330 deg -	59.21	-4.62	-7.99	-906.67	525.04	0.74
Service						

Solution Summary

	Sun	n of Applied Force	es		Sum of Reactions			
Load	PX	PY	PZ	PX	PY	PZ	% Error	
Comb.	K	K	K	K	K	K		
1	0.00	-59.21	0.00	0.00	59.21	0.00	0.000%	
2	-0.01	-71.06	-36.59	0.01	71.06	36.59	0.000%	
3	-0.01	-53.29	-36.59	0.01	53.29	36.59	0.000%	
4	18.33	-71.06	-31.68	-18.33	71.06	31.68	0.000%	
5	18.33	-53.29	-31.68	-18.33	53.29	31.68	0.000%	
6	31.76	-71.06	-18.28	-31.76	71.06	18.28	0.000%	
7	31.76	-53.29	-18.28	-31.76	53.29	18.28	0.000%	
8	36.68	-71.06	0.01	-36.68	71.06	-0.01	0.000%	
9	36.68	-53.29	0.01	-36.68	53.29	-0.01	0.000%	
10	31.77	-71.06	18.30	-31.77	71.06	-18.30	0.000%	
11	31.77	-53.29	18.30	-31.77	53.29	-18.30	0.000%	
12	18.35	-71.06	31.69	-18.35	71.06	-31.69	0.000%	
13	18.35	-53.29	31.69	-18.35	53.29	-31.69	0.000%	
14	0.01	-71.06	36.59	-0.01	71.06	-36.59	0.000%	
15	0.01	-53.29	36.59	-0.01	53.29	-36.59	0.000%	
16	-18.33	-71.06	31.68	18.33	71.06	-31.68	0.000%	
17	-18.33	-53.29	31.68	18.33	53.29	-31.68	0.000%	
18	-31.76	-71.06	18.28	31.76	71.06	-18.28	0.000%	
19	-31.76	-53.29	18.28	31.76	53.29	-18.28	0.000%	
20	-36.68	-71.06	-0.01	36.68	71.06	0.01	0.000%	
21	-36.68	-53.29	-0.01	36.68	53.29	0.01	0.000%	
22	-31.77	-71.06	-18.30	31.77	71.06	18.30	0.000%	
23	-31.77	-53.29	-18.30	31.77	53.29	18.30	0.000%	
24	-18.35	-71.06	-31.69	18.35	71.06	31.69	0.000%	
25	-18.35	-53.29	-31.69	18.35	53.29	31.69	0.000%	
26	0.00	-94.52	0.00	0.00	94.52	0.00	0.000%	
27	-0.00	-94.52	-10.83	0.00	94.52	10.83	0.000%	
28	5.42	-94.52	-9.38	-5.42	94.52	9.38	0.000%	
29	9.39	-94.52	-5.41	-9.39	94.52	5.41	0.000%	
30	10.84	-94.52	0.00	-10.84	94.52	-0.00	0.000%	
31	9.39	-94.52	5.42	-9.39	94.52	-5.42	0.000%	
32	5.42	-94.52	9.38	-5.42	94.52	-9.38	0.000%	
33	0.00	-94.52	10.83	-0.00	94.52	-10.83	0.000%	
34	-5.42	-94.52	9.38	5.42	94.52	-9.38	0.000%	

	Sun	n of Applied Force	es		Sum of Reaction	ns	
Load	PX	PY	PZ	PX	PY	PZ	% Error
Comb.	K	K	K	K	K	K	
35	-9.39	-94.52	5.41	9.39	94.52	-5.41	0.000%
36	-10.84	-94.52	-0.00	10.84	94.52	0.00	0.000%
37	-9.39	-94.52	-5.42	9.39	94.52	5.42	0.000%
38	-5.42	-94.52	-9.38	5.42	94.52	9.38	0.000%
39	-0.00	-59.21	-9.22	0.00	59.21	9.22	0.000%
40	4.62	-59.21	-7.98	-4.62	59.21	7.98	0.000%
41	8.00	-59.21	-4.61	-8.00	59.21	4.61	0.000%
42	9.24	-59.21	0.00	-9.24	59.21	-0.00	0.000%
43	8.01	-59.21	4.61	-8.01	59.21	-4.61	0.000%
44	4.62	-59.21	7.99	-4.62	59.21	-7.99	0.000%
45	0.00	-59.21	9.22	-0.00	59.21	-9.22	0.000%
46	-4.62	-59.21	7.98	4.62	59.21	-7.98	0.000%
47	-8.00	-59.21	4.61	8.00	59.21	-4.61	0.000%
48	-9.24	-59.21	-0.00	9.24	59.21	0.00	0.000%
49	-8.01	-59.21	-4.61	8.01	59.21	4.61	0.000%
50	-4.62	-59.21	-7.99	4.62	59.21	7.99	0.000%

Non-Linear Convergence Results

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Combination of Cycles Tolerance Tolerance 1 Yes 4 0.0000001 0.0000001 2 Yes 4 0.0000001 0.0002806 3 Yes 4 0.0000001 0.0002806 4 Yes 5 0.0000001 0.0002935 6 Yes 5 0.0000001 0.0002826 7 Yes 5 0.0000001 0.0002820 10 Yes 5 0.0000001 0.0002820 10 Yes 5 0.0000001 0.0002832 11 Yes 5 0.0000001 0.0002328 12 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.0002866 23 Yes 5 0.0000001 0.00023509 17 Yes	Load	Converged?	Number	Displacement	Force
1 Yes 4 0.0000001 0.0000001 2 Yes 4 0.0000001 0.0001525 3 Yes 4 0.0000001 0.0002586 5 Yes 5 0.0000001 0.0002586 6 Yes 5 0.0000001 0.00024966 7 Yes 5 0.0000001 0.0002328 6 Yes 5 0.0000001 0.0002323 10 Yes 5 0.0000001 0.00023328 11 Yes 5 0.0000001 0.00023328 12 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.0001347 14 Yes 5 0.0000001 0.00023508 17 Yes 5 0.0000001 0.00023508 18 Yes 5 0.0000001 0.00023508 19 Yes 5 0.0000001 0.00023508 20 Yes <td>Combination</td> <td>5</td> <td>of Cycles</td> <td>Tolerance</td> <td>Tolerance</td>	Combination	5	of Cycles	Tolerance	Tolerance
2 Yes 4 0.0000001 0.00015525 3 Yes 5 0.0000001 0.0002058 5 Yes 5 0.0000001 0.0002935 6 Yes 5 0.0000001 0.0002935 7 Yes 5 0.0000001 0.0002920 9 Yes 5 0.0000001 0.0002921 10 Yes 5 0.0000001 0.0002923 11 Yes 5 0.0000001 0.00023328 12 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.0001383 15 Yes 5 0.0000001 0.0001383 16 Yes 5 0.0000001 0.0001448 15 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.00029570 20 Yes 5 0.0000001 0.0002921 22 Yes	1	Yes	4	0.00000001	0.0000001
3 Yes 4 0.0000001 0.0000806 4 Yes 5 0.0000001 0.0002936 5 Yes 5 0.0000001 0.0002935 6 Yes 5 0.0000001 0.0002935 6 Yes 5 0.0000001 0.00012171 8 Yes 5 0.0000001 0.0002320 10 Yes 5 0.0000001 0.0002328 11 Yes 5 0.0000001 0.00013282 13 Yes 5 0.0000001 0.000132328 13 Yes 5 0.0000001 0.000132328 15 Yes 4 0.0000001 0.0001448 15 Yes 5 0.0000001 0.0001448 16 Yes 5 0.0000001 0.0001440 18 Yes 5 0.0000001 0.0002970 20 Yes 5 0.0000001 0.0002971 21 Yes	2	Yes	4	0.00000001	0.00015525
4 Yes 5 0.0000001 0.00029586 5 Yes 5 0.0000001 0.00024966 7 Yes 5 0.0000001 0.00024966 7 Yes 5 0.0000001 0.00024966 7 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0002933 12 Yes 5 0.0000001 0.0002328 13 Yes 5 0.0000001 0.00023328 13 Yes 4 0.0000001 0.00015488 15 Yes 5 0.0000001 0.00015488 15 Yes 5 0.0000001 0.0001548 16 Yes 5 0.0000001 0.0001487 18 Yes 5 0.0000001 0.0001837 19 Yes 5 0.0000001 0.0002570 20 Yes 5 0.0000001 0.00024866 23 Yes </td <td>3</td> <td>Yes</td> <td>4</td> <td>0.00000001</td> <td>0.00008006</td>	3	Yes	4	0.00000001	0.00008006
5 Yes 5 0.0000001 0.0000935 6 Yes 5 0.0000001 0.00024966 7 Yes 5 0.0000001 0.00012171 8 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0002321 11 Yes 5 0.0000001 0.00019822 11 Yes 5 0.0000001 0.0002328 12 Yes 5 0.0000001 0.0001987 13 Yes 5 0.0000001 0.0001987 16 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.00019837 18 Yes 5 0.0000001 0.0002921 20 Yes 5 0.0000001 0.0002921 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002921 23 Yes <td>4</td> <td>Yes</td> <td>5</td> <td>0.00000001</td> <td>0.00020586</td>	4	Yes	5	0.00000001	0.00020586
6 Yes 5 0.0000001 0.0024966 7 Yes 5 0.0000001 0.00012171 8 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0002921 11 Yes 5 0.0000001 0.0002933 12 Yes 5 0.0000001 0.00023328 13 Yes 4 0.0000001 0.0001548 15 Yes 4 0.0000001 0.0001787 16 Yes 5 0.0000001 0.0001787 16 Yes 5 0.0000001 0.0001787 19 Yes 5 0.0000001 0.0002370 20 Yes 5 0.0000001 0.0002971 21 Yes 5 0.0000001 0.0002971 22 Yes 5 0.0000001 0.0002971 24 Yes 5 0.0000001 0.0002712 25 Yes	5	Yes	5	0.00000001	0.00009935
7 Yes 5 0.0000001 0.00012171 8 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0002923 11 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00015488 15 Yes 5 0.0000001 0.00015488 16 Yes 5 0.0000001 0.00018337 18 Yes 5 0.0000001 0.00018337 19 Yes 5 0.0000001 0.0002921 20 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.00022712 25 Yes 5 0.0000001 0.00012117 24 Y	6	Yes	5	0.00000001	0.00024966
8 Yes 5 0.0000001 0.00005834 9 Yes 5 0.0000001 0.00019882 10 Yes 5 0.0000001 0.00019882 11 Yes 5 0.0000001 0.00019882 11 Yes 5 0.0000001 0.00019882 13 Yes 5 0.0000001 0.00013238 13 Yes 5 0.0000001 0.0001387 16 Yes 5 0.0000001 0.00019887 16 Yes 5 0.0000001 0.00019837 19 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.0002857 20 Yes 5 0.0000001 0.0002821 21 Yes 5 0.0000001 0.0002837 21 Yes 5 0.0000001 0.0002821 22 Yes 5 0.0000001 0.000121717 24 <td< td=""><td>7</td><td>Yes</td><td>5</td><td>0.00000001</td><td>0.00012171</td></td<>	7	Yes	5	0.00000001	0.00012171
9 Yes 5 0.0000001 0.0002920 10 Yes 5 0.0000001 0.0009593 11 Yes 5 0.0000001 0.0009593 12 Yes 5 0.0000001 0.00019548 13 Yes 4 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00015488 15 Yes 5 0.0000001 0.00015488 16 Yes 5 0.0000001 0.0001837 19 Yes 5 0.0000001 0.0001837 20 Yes 5 0.0000001 0.00023509 21 Yes 5 0.0000001 0.00029570 20 Yes 5 0.0000001 0.00022921 22 Yes 5 0.0000001 0.00022921 23 Yes 5 0.0000001 0.00022712 24 Yes 5 0.0000001 0.00012171 24 <ty< td=""><td>8</td><td>Yes</td><td>5</td><td>0.00000001</td><td>0.00005834</td></ty<>	8	Yes	5	0.00000001	0.00005834
10 Yes 5 0.0000001 0.00019882 11 Yes 5 0.0000001 0.00019883 12 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.00023328 14 Yes 4 0.0000001 0.00023509 15 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.00019837 18 Yes 5 0.0000001 0.00019837 20 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002971 23 Yes 5 0.0000001 0.0002712 24 Yes 5 0.0000001 0.00012717 24 Yes 5 0.0000001 0.0001177 25 Yes 5 0.0000001 0.00012711 30 <	9	Yes	5	0.00000001	0.00002920
11 Yes 5 0.0000001 0.0000993 12 Yes 5 0.0000001 0.0002328 13 Yes 5 0.0000001 0.00011347 14 Yes 4 0.0000001 0.00023328 15 Yes 4 0.0000001 0.00023509 16 Yes 5 0.0000001 0.00023509 17 Yes 5 0.0000001 0.0002877 19 Yes 5 0.0000001 0.0002871 20 Yes 5 0.0000001 0.0002871 21 Yes 5 0.0000001 0.0002866 23 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.00012712 26 Yes 5 0.0000001 0.00012713 29 Yes 5 0.0000001 0.00012513 29	10	Yes	5	0.00000001	0.00019882
12 Yes 5 0.0000001 0.00023328 13 Yes 5 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00015488 16 Yes 5 0.0000001 0.00023309 17 Yes 5 0.0000001 0.0001987 18 Yes 5 0.0000001 0.00019837 19 Yes 5 0.0000001 0.00024866 21 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.0002712 24 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.0002712 26 Yes 5 0.0000001 0.00011017 27 Yes 5 0.0000001 0.00011271 30 Yes 5 0.0000001 0.00012355 32 <	11	Yes	5	0.00000001	0.00009593
12 Yes 5 0.0000001 0.00011347 14 Yes 4 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00023509 16 Yes 5 0.0000001 0.00013837 19 Yes 5 0.0000001 0.0002870 20 Yes 5 0.0000001 0.0002921 20 Yes 5 0.0000001 0.0002921 20 Yes 5 0.0000001 0.0002921 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002912 23 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.00011178 26 Yes 5 0.0000001 0.00011271 30 Yes 5 0.0000001 0.00012712 31 Yes 5 0.0000001 0.00012712 32	12	Yes	5	0.00000001	0.00023328
16 Yes 4 0.0000001 0.00015488 15 Yes 4 0.0000001 0.00015488 15 Yes 5 0.0000001 0.00015488 16 Yes 5 0.0000001 0.00015488 17 Yes 5 0.0000001 0.00019837 19 Yes 5 0.0000001 0.00005877 20 Yes 5 0.0000001 0.00023637 21 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.0002712 26 Yes 5 0.0000001 0.00012717 27 Yes 5 0.0000001 0.00012717 28 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012711 30	12	Ves	5	0.00000001	0.00020020
14 163 4 0.0000001 0.0001380 15 Yes 4 0.0000001 0.00023509 16 Yes 5 0.0000001 0.0001387 18 Yes 5 0.0000001 0.0001387 19 Yes 5 0.0000001 0.0001387 20 Yes 5 0.0000001 0.00005837 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002921 23 Yes 5 0.0000001 0.0002712 24 Yes 5 0.0000001 0.00020712 25 Yes 5 0.0000001 0.0002712 26 Yes 5 0.0000001 0.00012713 29 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012713 29 Y	1/	Vec	1	0.00000001	0.00011347
15 Tes 4 0.0000001 0.0000350 16 Yes 5 0.0000001 0.0001350 17 Yes 5 0.0000001 0.0001440 18 Yes 5 0.0000001 0.0001937 19 Yes 5 0.0000001 0.0000970 20 Yes 5 0.0000001 0.0002837 21 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00024712 25 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.0001217 26 Yes 5 0.0000001 0.00012712 27 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012372 31 Ye	14	Voc	4	0.00000001	0.00013400
10 1es 5 0.0000001 0.0002303 17 Yes 5 0.0000001 0.00011440 18 Yes 5 0.0000001 0.0001837 19 Yes 5 0.0000001 0.0002970 20 Yes 5 0.0000001 0.0002837 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00029712 25 Yes 5 0.0000001 0.0002996 26 Yes 4 0.0000001 0.0001177 27 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.0012711 30 Yes 5 0.0000001 0.0012711 30 Yes 5 0.0000001 0.0012711 30 Yes 5 0.0000001 0.0012355 32 Yes<	15	Voc	4	0.00000001	0.00007907
17 19s 5 0.0000001 0.0001440 18 Yes 5 0.0000001 0.00019837 19 Yes 5 0.0000001 0.0002921 20 Yes 5 0.0000001 0.0002921 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00020712 25 Yes 5 0.0000001 0.00020712 26 Yes 4 0.0000001 0.0001177 27 Yes 5 0.0000001 0.0001127 30 Yes 5 0.0000001 0.0011271 30 Yes 5 0.0000001 0.0012355 32 Yes 5 0.0000001 0.0012372 31 Yes 5 0.0000001 0.0012372 36 Yes 5 0.0000001 0.0012372 36 Yes<	10	Vee	5	0.00000001	0.00023309
10 1es 5 0.0000001 0.0001857 19 Yes 5 0.0000001 0.0002570 20 Yes 5 0.0000001 0.00025837 21 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00024866 23 Yes 5 0.0000001 0.00020712 25 Yes 5 0.0000001 0.00020712 26 Yes 4 0.0000001 0.0001177 27 Yes 5 0.0000001 0.0001177 28 Yes 5 0.0000001 0.00012513 29 Yes 5 0.0000001 0.00012271 30 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.00012416 34 <	10	Yes	5	0.00000001	0.00011440
19 165 5 0.0000001 0.0000870 20 Yes 5 0.0000001 0.00005837 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002921 23 Yes 5 0.0000001 0.0002712 24 Yes 5 0.0000001 0.0002712 25 Yes 5 0.0000001 0.00021712 26 Yes 5 0.0000001 0.0001177 27 Yes 5 0.0000001 0.0001177 28 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012416 33	10	Yes	5	0.00000001	0.00019037
20 1 es 5 0.0000001 0.0000337 21 Yes 5 0.0000001 0.0002921 22 Yes 5 0.0000001 0.0002921 23 Yes 5 0.0000001 0.0002921 24 Yes 5 0.0000001 0.0002921 25 Yes 5 0.0000001 0.0002996 26 Yes 4 0.0000001 0.000117 27 Yes 5 0.0000001 0.00012513 29 Yes 5 0.0000001 0.00012271 30 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012372 31 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 38 Yes 4 0.0000001 0.00012372 39	19	Yes	5 F	0.00000001	0.00009570
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	20	Yes	5 F	0.0000001	0.000000001
22Yes5 0.0000001 0.0024866 23Yes5 0.0000001 0.00012117 24Yes5 0.0000001 0.0002712 25Yes5 0.0000001 0.0002712 26Yes4 0.0000001 0.0001017 27Yes5 0.0000001 0.0001178 28Yes5 0.0000001 0.00012713 29Yes5 0.0000001 0.00012711 30Yes5 0.0000001 0.00012711 31Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012489 34Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012372 37Yes5 0.0000001 0.00012719 38Yes5 0.0000001 0.00012712 39Yes4 0.0000001 0.00012577 39Yes4 0.0000001 0.0001394 44Yes4 0.0000001 0.0001394 45Yes4 0.0000001 0.0001394 44Yes4 0.0000001 0.0001394 45Yes4 0.0000001 0.0001394 44Yes4 0.0000001 0.0001394 45Yes4 0.0000001 0.000112422 47Yes4 0.0000001 0.000112422 47Yes4 0.0000001	21	Yes	5	0.0000001	0.00002921
23Yes5 0.0000001 $0.0001211/$ 24Yes5 0.0000001 0.0000996 25Yes4 0.0000001 0.0000996 26Yes4 0.0000001 0.000117 27Yes5 0.0000001 0.000117 28Yes5 0.0000001 0.00012513 29Yes5 0.0000001 0.00012711 30Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012277 39Yes4 0.0000001 0.00012527 39Yes4 0.0000001 0.00012527 39Yes4 0.0000001 0.0001998 41Yes4 0.0000001 0.0001998 42Yes4 0.0000001 0.0001998 43Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.00014292 47Yes4 0.0000001 0.00011291 48Yes4 0.0000001 0.00011291 49Yes4 0.0000001 0.0001777 50Yes4 0.0000001 <td>22</td> <td>Yes</td> <td>5</td> <td>0.0000001</td> <td>0.00024866</td>	22	Yes	5	0.0000001	0.00024866
24Yes5 0.0000001 0.00020712 25 Yes5 0.0000001 0.00009996 26 Yes4 0.0000001 0.0000117 27 Yes5 0.0000001 0.0001178 28 Yes5 0.0000001 0.00012513 29 Yes5 0.0000001 0.00012711 30 Yes5 0.0000001 0.00012711 30 Yes5 0.0000001 0.00012355 32 Yes5 0.0000001 0.00012416 33 Yes5 0.0000001 0.00012439 34 Yes5 0.0000001 0.00012372 36 Yes5 0.0000001 0.00012372 36 Yes5 0.0000001 0.00012372 37 Yes5 0.0000001 0.00012527 39 Yes4 0.0000001 0.00012527 39 Yes4 0.0000001 0.00012527 42 Yes4 0.0000001 0.00011756 41 Yes4 0.0000001 0.00013918 45 Yes4 0.0000001 0.00013918 45 Yes4 0.0000001 0.00013918 45 Yes4 0.0000001 0.00013914 46 Yes4 0.0000001 0.00013914 47 Yes4 0.0000001 0.00013914 49 Yes4 0.0000001 0.00013914 <td>23</td> <td>Yes</td> <td>5</td> <td>0.0000001</td> <td>0.00012117</td>	23	Yes	5	0.0000001	0.00012117
25 Yes 5 0.00000001 0.0000996 26 Yes 4 0.0000001 0.000117 27 Yes 5 0.0000001 0.000117 28 Yes 5 0.0000001 0.00012513 29 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012372 34 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00013914 40 Yes 4 0.0000001 0.00016553 42 <	24	Yes	5	0.0000001	0.00020712
26Yes4 0.0000001 0.0001017 27Yes5 0.0000001 0.0001178 28Yes5 0.0000001 0.00012513 29Yes5 0.0000001 0.00012711 30Yes5 0.0000001 0.000122771 31Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012416 33Yes5 0.0000001 0.00012439 34Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012719 38Yes5 0.0000001 0.00012527 39Yes4 0.0000001 0.0001756 41Yes4 0.0000001 0.0001756 41Yes4 0.0000001 0.0001186 43Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.0001227 46Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.00013918 45Yes4 0.0000001 0.00011291 48Yes4 0.0000001 0.00011291 49Yes4 0.0000001 0.00016727 50Yes4 0.0000001 0.00016768	25	Yes	5	0.0000001	0.00009996
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	26	Yes	4	0.0000001	0.00001017
28 Yes 5 0.0000001 0.00012513 29 Yes 5 0.0000001 0.00012711 30 Yes 5 0.0000001 0.00012713 30 Yes 5 0.0000001 0.00012713 31 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.00012439 34 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012719 38 Yes 4 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00010553 42 Yes 4 0.0000001 0.00010553 42 Yes 4 0.0000001 0.00013184 45	27	Yes	5	0.00000001	0.00011178
29Yes5 0.0000001 0.00012711 30Yes5 0.0000001 0.00011227 31Yes5 0.0000001 0.00012355 32Yes5 0.0000001 0.00012416 33Yes5 0.0000001 0.00012416 34Yes5 0.0000001 0.00012439 35Yes5 0.0000001 0.00012372 36Yes5 0.0000001 0.00012372 37Yes5 0.0000001 0.00012372 38Yes5 0.0000001 0.00012527 39Yes4 0.0000001 0.0001756 41Yes4 0.0000001 0.0001756 41Yes4 0.0000001 0.00013184 45Yes4 0.0000001 0.00013174 46Yes4 0.0000001 0.00013174 46Yes4 0.0000001 0.0001291 47Yes4 0.0000001 0.0001291 48Yes4 0.0000001 0.00010194 49Yes4 0.0000001 0.00010194 49Yes4 0.0000001 0.00010768	28	Yes	5	0.00000001	0.00012513
30Yes 5 0.0000001 0.00011227 31 Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.00012419 34 Yes 5 0.0000001 0.00012439 35 Yes 5 0.0000001 0.00012439 35 Yes 5 0.0000001 0.00012422 36 Yes 5 0.0000001 0.0001272 36 Yes 5 0.0000001 0.00012272 37 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00013174 46 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.0001194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.0000001 0.00010768	29	Yes	5	0.00000001	0.00012711
31Yes 5 0.0000001 0.00012355 32 Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.0001994 34 Yes 5 0.0000001 0.00012439 35 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00012527 39 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 44 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00011291 46 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.00011291 49 Yes 4 0.0000001 0.00010194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.0000001 0.00010768	30	Yes	5	0.00000001	0.00011227
32Yes 5 0.0000001 0.00012416 33 Yes 5 0.0000001 0.0001994 34 Yes 5 0.0000001 0.00012439 35 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00012527 39 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.00016953 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 44 Yes 4 0.0000001 0.00011291 46 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.00011291 49 Yes 4 0.0000001 0.00010194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.0000001 0.00010768	31	Yes	5	0.0000001	0.00012355
33 Yes 5 0.0000001 0.00010994 34 Yes 5 0.0000001 0.00012439 35 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.00000001 0.0001756 41 Yes 4 0.00000001 0.00016953 42 Yes 4 0.00000001 0.0001186 43 Yes 4 0.00000001 0.0001186 43 Yes 4 0.00000001 0.00013174 46 Yes 4 0.00000001 0.00014292 47 Yes 4 0.00000001 0.00011291 48 Yes 4 0.00000001 0.00011291 48	32	Yes	5	0.0000001	0.00012416
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	33	Yes	5	0.0000001	0.00010994
35 Yes 5 0.0000001 0.00012372 36 Yes 5 0.0000001 0.00011242 37 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.0001394 40 Yes 4 0.0000001 0.00016953 41 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00013818 45 Yes 4 0.0000001 0.00013174 46 Yes 4 0.0000001 0.00013174 46 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.0001194 49 Yes 4 0.0000001 0.00016727 50 <	34	Yes	5	0.0000001	0.00012439
36 Yes 5 0.0000001 0.00011242 37 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00003194 40 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.00018653 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00013174 45 Yes 4 0.00000001 0.00014292 47 Yes 4 0.00000001 0.00011291 48 Yes 4 0.00000001 0.0001194 49 <	35	Yes	5	0.0000001	0.00012372
37 Yes 5 0.0000001 0.00012719 38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00003194 40 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.00018653 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.00000001 0.0001186 43 Yes 4 0.00000001 0.00013918 45 Yes 4 0.0000001 0.00013174 46 Yes 4 0.00000001 0.00014292 47 Yes 4 0.00000001 0.00011291 48 Yes 4 0.00000001 0.0001194 49 Yes 4 0.00000001 0.00016727 50 Yes 4 0.00000001 0.00016727	36	Yes	5	0.0000001	0.00011242
38 Yes 5 0.0000001 0.00012527 39 Yes 4 0.0000001 0.00003194 40 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.00016953 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00013918 45 Yes 4 0.0000001 0.00014292 46 Yes 4 0.0000001 0.00011291 48 Yes 4 0.00000001 0.0001194 49 Yes 4 0.00000001 0.00016727 50 Yes 4 0.00000001 0.00016727	37	Yes	5	0.0000001	0.00012719
39 Yes 4 0.0000001 0.00003194 40 Yes 4 0.0000001 0.0001756 41 Yes 4 0.0000001 0.00016953 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.00013918 45 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.0001291 48 Yes 4 0.0000001 0.00010194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.00000001 0.0001768	38	Yes	5	0.0000001	0.00012527
40 Yes 4 0.0000001 0.00010756 41 Yes 4 0.0000001 0.00016953 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001184 44 Yes 4 0.0000001 0.00013918 45 Yes 4 0.0000001 0.0001374 46 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.0001094 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.0000001 0.0001768	39	Yes	4	0.0000001	0.00003194
41 Yes 4 0.0000001 0.00016953 42 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 43 Yes 4 0.0000001 0.0001186 44 Yes 4 0.0000001 0.00013918 45 Yes 4 0.0000001 0.00003174 46 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.00010194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.0000001 0.0001768	40	Yes	4	0.0000001	0.00010756
42 Yes 4 0.0000001 0.00010186 43 Yes 4 0.0000001 0.0001184 44 Yes 4 0.0000001 0.00013918 45 Yes 4 0.0000001 0.00003174 46 Yes 4 0.0000001 0.00014292 47 Yes 4 0.0000001 0.00011291 48 Yes 4 0.0000001 0.00010194 49 Yes 4 0.0000001 0.00016727 50 Yes 4 0.00000001 0.0001768	41	Yes	4	0.0000001	0.00016953
43Yes40.00000010.0001118444Yes40.00000010.0001391845Yes40.00000010.000317446Yes40.00000010.0001429247Yes40.00000010.0001129148Yes40.00000010.000119449Yes40.00000010.0001672750Yes40.00000010.0001768	42	Yes	4	0.0000001	0.00010186
44Yes40.00000010.0001391845Yes40.00000010.0000317446Yes40.000000010.0001429247Yes40.000000010.0001129148Yes40.000000010.0001019449Yes40.000000010.0001672750Yes40.000000010.00010768	43	Yes	4	0.0000001	0.00011184
45Yes40.00000010.0000317446Yes40.000000010.0001429247Yes40.000000010.0001129148Yes40.000000010.0001019449Yes40.000000010.0001672750Yes40.000000010.00010768	44	Yes	4	0.00000001	0.00013918
46Yes40.00000010.0001429247Yes40.00000010.0001129148Yes40.000000010.0001019449Yes40.000000010.0001672750Yes40.000000010.00010768	45	Yes	4	0.00000001	0.00003174
47Yes40.00000010.0001129148Yes40.000000010.0001019449Yes40.000000010.0001672750Yes40.000000010.00010768	46	Yes	4	0.00000001	0.00014292
48Yes40.00000010.0001019449Yes40.000000010.0001672750Yes40.000000010.00010768	47	Yes	4	0.0000001	0.00011291
49Yes40.00000010.001672750Yes40.000000010.00010768	48	Yes	4	0.0000001	0.00010194
50 Yes 4 0.0000001 0.00010768	49	Yes	4	0.0000001	0.00016727
	50	Yes	4	0.0000001	0.00010768

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	0	٥
L1	163.007 - 121.587	14.457	49	0.6940	0.0048
L2	127.42 - 84.67	9.384	49	0.6461	0.0032
L3	91.3367 - 42.2067	4.974	48	0.4969	0.0017
L4	49.79 - 0	1.528	48	0.2735	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	٥	0	ft
158.00	Pipe Mount [PM 601-1]	49	13.726	0.6905	0.0046	140727
157.00	Platform Mount [LP 602-1]	49	13.580	0.6897	0.0045	117299
149.00	BSF0020F3V1	49	12.418	0.6829	0.0042	50303
139.00	FFVV-65B-R2 w/ Mount Pipe	49	10.988	0.6703	0.0037	29349
119.00	(2) NNHH-65B-R4 w/ Mount Pipe	49	8.267	0.6200	0.0028	17334
106.00	ANT150D6-9	49	6.640	0.5676	0.0023	14532
21.00	KS24019-L112A w/ Mount Pipe	48	0.430	0.1151	0.0003	19032

Maximum Tower Deflections - Design Wind

Section	Elevation	Horz.	Gov.	Tilt	Twist
No.		Deflection	Load		
	ft	in	Comb.	0	0
L1	163.007 - 121 587	57.667	20	2.7667	0.0191
1.2	107 40 04 67	27 1 12	20	2 5777	0.0107
LZ	121.42 - 04.01	37.443	20	2.5777	0.0127
L3	91.3367 - 42.2067	19.847	20	1.9833	0.0069
L4	49.79 - 0	6.093	20	1.0911	0.0028

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	0	0	ft
158.00	Pipe Mount [PM 601-1]	20	54.752	2.7530	0.0182	35731
157.00	Platform Mount [LP 602-1]	20	54.171	2.7502	0.0180	29782
149.00	BSF0020F3V1	20	49.539	2.7235	0.0166	12771
139.00	FFVV-65B-R2 w/ Mount Pipe	20	43.838	2.6737	0.0148	7450
119.00	(2) NNHH-65B-R4 w/ Mount Pipe	20	32.986	2.4739	0.0112	4382
106.00	ANT150D6-9	20	26.496	2.2653	0.0091	3659
21.00	KS24019-L112A w/ Mount Pipe	20	1.715	0.4593	0.0010	4769

Compression Checks

	Pole Design Data											
Section No.	Elevation	Size	L	Lu	Kl/r	A	Pu	φPn	Ratio Pu			
	ft		ft	ft		in²	K	K	ϕP_n			
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	41.42	0.00	0.0	40.585 7	-17.39	2374.26	0.007			
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	42.75	0.00	0.0	56.147 0	-32.08	3284.60	0.010			
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	49.13	0.00	0.0	75.476 6	-47.34	4415.38	0.011			
L4	42.2067 - Ó (4)	TP63.5x53.916x0.5	49.79	0.00	0.0	99.981 0	-71.04	5848.89	0.012			

	Pole Bending Design Data											
Section No.	Elevation	Size	Mux	φM _{nx}	Ratio M _{ux}	Muy	φ M _{ny}	Ratio M _{uy}				
	ft		kip-ft	kip-ft	ϕM_{nx}	kip-ft	kip-ft	φ M _{ny}				
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	392.69	2309.38	0.170	0.00	2309.38	0.000				
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	1247.41	3734.23	0.334	0.00	3734.23	0.000				
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	2469.83	5807.86	0.425	0.00	5807.86	0.000				
L4	42.2067 - 0 (4)	TP63.5x53.916x0.5	4184.51	8875.75	0.471	0.00	8875.75	0.000				

Pole Shear Design Data

Section No.	Elevation	Size	Actual V _u	φVn	Ratio Vu	Actual T _u	ϕT_n	Ratio T _u
	ft		K	K	φVn	kip-ft	kip-ft	ϕT_n
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	17.86	712.28	0.025	4.81	2552.38	0.002
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	26.91	985.38	0.027	6.58	4070.72	0.002
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	31.82	1324.61	0.024	6.57	6305.17	0.001
L4	42.2067 - Ó (4)	TP63.5x53.916x0.5	36.71	1754.67	0.021	6.43	9680.92	0.001

Pole Interaction Design Data

Section No.	Elevation	Ratio Pu	Ratio M _{ux}	Ratio M _{uy}	Ratio V _u	Ratio T _u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	п	ϕP_n	φ M nx	φMny	ϕV_n	φIn	Tano	Natio	
L1	163.007 - 121.587 (1)	0.007	0.170	0.000	0.025	0.002	0.178	1.050	4.8.2
L2	121.587 - 84.67 (2)	0.010	0.334	0.000	0.027	0.002	0.345	1.050	4.8.2
L3	84.67 - 42.2067 (3)	0.011	0.425	0.000	0.024	0.001	0.437	1.050	4.8.2
L4	42.2067 - 0 (4)	0.012	0.471	0.000	0.021	0.001	0.484	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP _{allow} K	% Capacity	Pass Fail
L1	163.007 - 121.587	Pole	TP42.37x34.28x0.3125	1	-17.39	2492.97	17.0	Pass
L2	121.587 - 84.67	Pole	TP48.83x40.6057x0.375	2	-32.08	3448.83	32.8	Pass
L3	84.67 - 42.2067	Pole	TP56.25x46.7975x0.4375	3	-47.34	4636.15	41.6	Pass
L4	42.2067 - 0	Pole	TP63.5x53.916x0.5	4	-71.04	6141.33	46.1	Pass
							Summary	
						Pole (L4)	46.1	Pass

Section	Elevation	Component	Size	Critical	P	øP _{allow}	%	Pass
No.	ft	Type		Element	K	K	Capacity	Fail
						RATING =	46.1	Pass

APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Base Plate Connection



Site Info		
	BU #	876379
	Site Name	OODBURY / WOLFF PA
	Order #	

Analysis Considerations	
TIA-222 Revision	Н
Grout Considered:	No
l _{ar} (in)	0.5

Applied Loads					
Moment (kip-ft)	4184.50				
Axial Force (kips)	71.04				
Shear Force (kips) 36.71					
* = 1	1. 1				

*TIA-222-H Section 15.5 Applied



Connection Properties

Anchor Rod Data

(22) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 73" BC

Base Plate Data

79" OD x 2.5" Plate (A871 GR60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

63.5" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary	((units of kips, kip-in)
Pu_t = 121.79	φPn_t = 243.75	Stress Rating
Vu = 1.67	φVn = 149.1	47.6%
Mu = n/a	φMn = n/a	Pass
Base Plate Summary		
Max Stress (ksi):	25.8	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	45.5%	Pass

Drilled Pier Foundation

BU # :	876379
Site Name:	N. WOODWAY / WOLFF P.
Order Number:	
TIA-222 Revison:	Н
Tower Type:	Monopole

Applied Loads							
Comp. Uplift							
Moment (kip-ft)	4184.5						
Axial Force (kips)	71.06						
Shear Force (kips)	36.68						

Materia	Rebar 2, Fy		
Concrete Strength, f'c:	4	ksi	(ksi)
Rebar Strength, Fy:	60	ksi	
Tie Yield Strength, Fyt:	40	ksi	

	Pier De	esign Data		Rebar & Pier O
	Depth	28	ft	
	Ext. Above Grade	1	ft	Embedded Pole
	Pier	Section 1		Belled Pier Ir
	From 1' above gra	ade to 28' below g	ırade	
	Pier Diameter	8	ft	
	Rebar Quantity	32		
	Rebar Size	11		
	Clear Cover to Ties	4	in	
	Tie Size	5]
_	Tie Spacing		in	

	Analysis	s Results	
	Soil Lateral Check	Compression	Uplift
	D _{v=0} (ft from TOC)	7.53	-
	Soil Safety Factor	4.96	-
	Max Moment (kip-ft)	4508.03	-
	Rating*	25.5%	-
	Soil Vertical Check	Compression	Uplift
	Skin Friction (kips)	557.95	-
	End Bearing (kips)	1206.37	-
	Weight of Concrete (kips)	211.52	-
	Total Capacity (kips)	1764.32	-
	Axial (kips)	282.58	-
Options	Rating*	15.3%	-
	Reinforced Concrete Flexure	Compression	Uplift
<u>e Inputs</u>	Critical Depth (ft from TOC)	7.21	-
nputs	Critical Moment (kip-ft)	4507.13	-
	Critical Moment Capacity	9260.68	-
	Rating*	46.4%	-
	Reinforced Concrete Shear	Compression	Uplift
	Critical Depth (ft from TOC)	20.60	-
	Critical Shear (kip)	453.34	-
	Critical Shear Capacity	803.15	_
	Rating*	53.8%	-

Structural Foundation Rating*	53.8%
Soil Interaction Rating*	25.5%
*Rating per TIA-222-H Sectio	n 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	✓
N/A	
Additional Longitudinal Reb	bar
Input Effective Depths (else Actual):	\checkmark
Shear Design Options	
Check Shear along Depth of Pier:	\checkmark
Utilize Shear-Friction Methodology:	
Override Critical Depth:	
Go to Soil Ca	lculations

							Soil Pr	ofile				
Groundwa	ter Depth	14.5				# of Layers	4					
								-				
							Angle of	Calculated	Calculated	Ultimate Skin	Liltimata Chin	Ult. Gross
	Тор	Dettern (ft)	Thickness	Ysoil	Yconcrete	Cohesion	Angle of	Ultimate Skin	Ultimate Skin	Friction Comp	Olumate Skin	Bearing
Layer	(ft)	Bottom (ft)	(ft)	(ncf)	(ncf)	(ksf)	Friction	Friction Comp	Friction Unlift	Override	Friction Uplift	Canacity

La	yer	Top (ft)	Bottom (ft)	Thickness (ft)	Y _{soil} (pcf)	Yconcrete (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
	1	0	4	4	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
	2	4	14.5	10.5	135	150	0	38	0.000	0.000	0.80	0.80			Cohesionless
	3	14.5	15	0.5	75	87.6	0	38	0.000	0.000	0.80	0.80			Cohesionless
	4	15	28	13	75	87.6	0	38	0.000	0.000	1.60	1.60	32		Cohesionless



ASCE 7 Hazards Report

ASCE/SEI 7-16 Standard:

Risk Category: II

Soil Class: D - Default (see Section 11.4.3)

41.589947 Latitude: Longitude: -73.169867 Elevation: 490.0342742670543 ft (NAVD 88)



Wind

Results:

Wind Speed	116 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	96 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Wed Oct 18 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.



Site Soil Class:

Results:

S _S :	0.19	S _{D1} :	0.087
S ₁ :	0.054	Τ _L :	6
F _a :	1.6	PGA :	0.104
F _v :	2.4	PGA M :	0.166
S _{MS} :	0.304	F _{PGA} :	1.592
S _{M1} :	0.13	l _e :	1
S _{DS} :	0.202	C _v :	0.7







Data Accessed:

Wed Oct 18 2023

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.



Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Oct 18 2023

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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