

Date: **February 28, 2025**



326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 5000025228
Site Name: TMobile Little Gum Swamp

Crown Castle Designation: **BU Number:** 825403
Site Name: Little Gum Swamp
JDE Job Number: 2134143
Work Order Number: 2368048
Order Number: 689230 Rev. 0

Engineering Firm Designation: **TEP Project Number:** 26551.1070995

Site Data: **8381 NE Molino Rd, Lake City, Columbia County, FL 32055**
Latitude 30° 15' 39.98", Longitude -82° 28' 25.07"
150 Foot - Monopole Tower

TEP 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

This analysis utilizes an ultimate 3-second gust wind speed of 119 mph as required by the 2023 Florida Building Code, 8th Edition. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

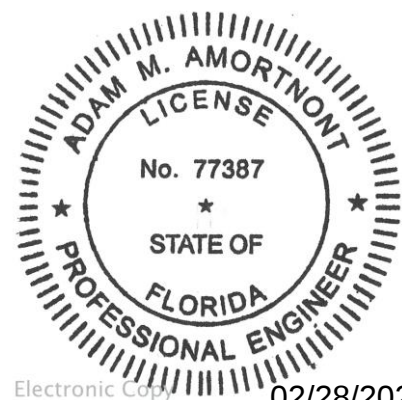
Structural analysis prepared by: SDD / TEPI

Respectfully submitted by:

Adam M. Amortnont, P.E.

This item has been digitally signed and sealed by Adam M. Amortnont, P.E. on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



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02/28/2025

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1) INTRODUCTION

This is a 150-ft monopole tower designed by Transamerican Power Products.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 119 mph
Exposure Category: B
Topographic Factor: 1.0
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)
133.0	136.0	3	Ericsson	AIR 6419 w/ Mount Pipe	2	2
		6	Commscope	NHH-65C-HG-R2B w/ Mount Pipe		
		1	Raycap	RHSDC-6627-PF-48		
		3	Ericsson	RADIO 4490HP 44B5 44B13 C		
		3	Ericsson	RADIO 4890HP B2/B25 B66		
	133.0	3	VZWSmart	SFK-4		
		3	VZWSmart	P40-312x150		
		1	VZWSmart	P40-238x048		
		1	Tower Mounts	T-Arm Mount [TA 602-3]		
128.0	129.0	1	Andrew	PAR6-59	1	EW52
	128.0	1	Tower Mounts	Pipe Mount [PM 601-1]		
112.0	113.0	1	Andrew	VHLPX4-6W	1	EW52
	112.0	2	Tower Mounts	Pipe Mount [PM 601-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
145.0	146.0	1	Commscope	VHLP3-11W/A	1 9 1	2-1/8 1-5/8 1/2
		2	Ceragon	FIBEAIR IP-20A_RFU-D		
	145.0	3	Commscope	FFVV-65C-R3-V1_TMO w/ Mount Pipe		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	RADIO 4480 B71_TMO		
		1	Kenwood Telecom	T1507KTHD-996C9-M-H		
109.0	109.0	1	Cellmax Technologies	CMA-B/3324 w/ Mount Pipe	2	1-5/8
		1	Andrew	TMBX-6517-R2M w/ Mount Pipe		
		1	Tower Mounts	Side Arm Mount [SO 104-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	3481778	CCISites
Foundation Mapping Report	3481777	CCISites
Tower Manufacturer Drawings	3481780	CCISites
Tower Manufacturer Drawings	3773245	CCISites

3.1) Analysis Method

tnxTower (version 8.2.4.3), 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) The 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.
- 3) The foundation steel reinforcement was assumed to be the minimum required per ACI 318.
- 4) The following material grades were assumed:
 - a) Concrete compressive strength: $f'_c = 4$ ksi
 - b) Foundation flexural reinforcement: $f_y = 60$ ksi

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	ϕP_{allow} (k)	% Capacity	Pass / Fail
L1	150 - 109.75	Pole	TP31.111x24x0.1875	1	-9.11	1104.59	31.0	Pass
L2	109.75 - 70.75	Pole	TP37.626x30.0293x0.25	2	-15.36	1780.83	46.2	Pass
L3	70.75 - 37.5	Pole	TP43x36.2868x0.3125	3	-22.11	2541.58	46.1	Pass
L4	37.5 - 0	Pole	TP49x41.4034x0.375	4	-33.91	3555.03	45.4	Pass
							Summary	
						Pole (L2)	46.2	Pass
						RATING =	46.2	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	42.6	Pass
1,2	Base Plate	-	26.5	Pass
1,2	Base Foundation Structural	-	22.6	Pass
1,2	Base Foundation Soil Interaction	-	55.1	Pass

Structure Rating (max from all components) =	55.1%
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Notes:

- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

Table 6 - Dish Twist/Sway Results for 60 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
129.0	Andrew PAR6-59	12.733	0.8918	0.0064
113.0	Andrew VHLPX4-6W	9.811	0.8255	0.0051

4.1) Recommendations

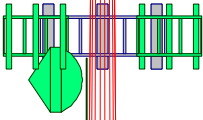
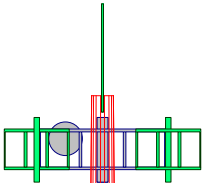
- 1) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

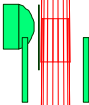
TNXTOWER OUTPUT

Section	1	2	3	4	
Length (ft)	40.25	43.00	38.00	43.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.2500	0.3125	0.3750	
Socket Length (ft)	4.00	4.75	5.50		
Top Dia (in)	24.0000	30.0293	36.2868	41.4034	
Bot Dia (in)	31.1110	37.6260	43.0000	49.0000	
Grade	A572-65				
Weight (K)	2.2	3.9	5.0	7.8	19.0

150.0 ft



109.8 ft



70.8 ft

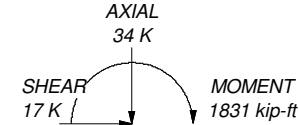


37.5 ft



0.0 ft

ALL REACTIONS
ARE FACTORED



TORQUE 3 kip-ft
REACTIONS - 119 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Columbia County, Florida.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 46.2%



TEP

326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
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Job: Little Gum Swamp (BU 825403)

Project: TEP No. 26551.1070995

Client: Crown Castle

Code: TIA-222-H

Path: C:\Users\jdwil\Desktop\26551\1P 466066 1-1070995 825403 Little Gum Swamp Structural Analysis\Tower\825403 2268048 1CS.dwg

Drawn by: SDD

Date: 02/28/25

App'd:

Scale: NTS

Dwg No. E-1

tnxTower TEP 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Little Gum Swamp (BU 825403)	Page 1 of 13
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	Client Crown Castle	Designed by SDD

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower is located in Columbia County, Florida.

Tower base elevation above sea level: 154.00 ft.

Basic wind speed of 119 mph.

Risk Category II.

Exposure Category B.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used: $K_{es}(F_w) = 0.95$.

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-109.75	40.25	4.00	18	24.0000	31.1110	0.1875	0.7500	A572-65 (65 ksi)
L2	109.75-70.75	43.00	4.75	18	30.0293	37.6260	0.2500	1.0000	A572-65 (65 ksi)
L3	70.75-37.50	38.00	5.50	18	36.2868	43.0000	0.3125	1.2500	A572-65 (65 ksi)

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	Client	Crown Castle	Designed by	SDD

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L4	37.50-0.00	43.00		18	41.4034	49.0000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in ²	in ⁴	in	in	in ³	in ⁴	in ²	in	
L1	24.3413	14.1714	1015.2211	8.4534	12.1920	83.2694	2031.7780	7.0871	3.8940	20.768
	31.5620	18.4033	2223.3691	10.9778	15.8044	140.6805	4449.6638	9.2034	5.1455	27.443
L2	31.1716	23.6299	2647.4549	10.5717	15.2549	173.5479	5298.3934	11.8172	4.8452	19.381
	38.1679	29.6579	5234.3510	13.2685	19.1140	273.8490	10475.5896	14.8317	6.1822	24.729
L3	37.6505	35.6820	5834.0828	12.7709	18.4337	316.4899	11675.8423	17.8444	5.8365	18.677
	43.6151	42.3407	9747.5744	15.1541	21.8440	446.2358	19507.9749	21.1744	7.0180	22.458
L4	42.9709	48.8340	10385.5147	14.5651	21.0329	493.7746	20784.6949	24.4216	6.6270	17.672
	49.6981	57.8759	17288.3873	17.2619	24.8920	694.5359	34599.5231	28.9435	7.9640	21.237

Tower Elevation	Gusset Area	Gusset Thickness	Gusset Grade	Adjust. Factor	Adjust. Factor	Weight Mult.	Double Angle	Double Angle	Double Angle
	(per face)			A _f	A _r		Stitch Bolt	Stitch Bolt	Stitch Bolt
ft	ft ²	in					Spacing	Spacing	Spacing
							Diagonals	Horizontals	Redundants
							in	in	in
L1				1	1	1			
150.00-109.75									
L2				1	1	1			
109.75-70.75									
L3 70.75-37.50				1	1	1			
L4 37.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement	Total Number		C _A A _A	Weight
					ft			ft ² /ft	plf
Safety Line 3/8	A	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.04	0.22
Step Pegs (5/8" SR) 7-in. w/30" step **145**	A	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.03	0.49
NTM 201 3929/2 56.9MM(2-1/8)	C	No	No	Inside Pole	145.00 - 0.00	1	No Ice	0.00	1.90

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	Client	Crown Castle	Designed by	SDD

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
LDF7-50A(1-5/8)	C	No	No	Inside Pole	145.00 - 0.00	7	No Ice	0.00	0.82
HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	145.00 - 0.00	2	No Ice	0.00	2.50
LDF4-50A(1/2) **133**	C	No	No	Inside Pole	145.00 - 0.00	1	No Ice	0.00	0.15
HFT2406-48SV3-X XX(2) **128**	B	No	No	Inside Pole	133.00 - 0.00	2	No Ice	0.00	3.10
EW52(ELLIPTICA L) **112**	B	No	No	Inside Pole	128.00 - 0.00	1	No Ice	0.00	0.59
EW52(ELLIPTICA L) **109**	B	No	No	Inside Pole	112.00 - 0.00	1	No Ice	0.00	0.59
LDF7-50A(1-5/8") ***	C	No	No	Inside Pole	109.00 - 0.00	2	No Ice	0.00	0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.00-109.75	A	0.000	0.000	0.000	2.918	0.03
		B	0.000	0.000	0.000	0.000	0.16
		C	0.000	0.000	0.000	0.000	0.45
L2	109.75-70.75	A	0.000	0.000	0.000	2.828	0.03
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	0.000	0.000	0.56
L3	70.75-37.50	A	0.000	0.000	0.000	2.411	0.02
		B	0.000	0.000	0.000	0.000	0.25
		C	0.000	0.000	0.000	0.000	0.48
L4	37.50-0.00	A	0.000	0.000	0.000	2.719	0.03
		B	0.000	0.000	0.000	0.000	0.28
		C	0.000	0.000	0.000	0.000	0.54

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	150.00-109.75	0.0000	-0.6486	0.0000	-0.3791
L2	109.75-70.75	0.0000	-0.6547	0.0000	-0.3812
L3	70.75-37.50	0.0000	-0.6584	0.0000	-0.3825
L4	37.50-0.00	0.0000	-0.6611	0.0000	-0.3834

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

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Lightning rod (5/8"x7") **145**	C	None		0.0000	153.50	No Ice	0.44	0.44	0.01
FFVV-65C-R3-V1_TMO w/ Mount Pipe	A	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	12.97	6.20	0.16
FFVV-65C-R3-V1_TMO w/ Mount Pipe	B	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	12.97	6.20	0.16
FFVV-65C-R3-V1_TMO w/ Mount Pipe	C	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	12.97	6.20	0.16
RADIO 4460 B2/B25 B66_TMO	A	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	B	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	C	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.14	1.69	0.11
RADIO 4480 B71_TMO	A	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.85	1.38	0.09
RADIO 4480 B71_TMO	B	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.85	1.38	0.09
RADIO 4480 B71_TMO	C	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	2.85	1.38	0.09
(2) FIBEAIR IP-20A_RFU-D	A	From Centroid-Fa ce	4.00 0.00 1.00	0.0000	145.00	No Ice	0.69	0.29	0.01
2.4" x 8' Pipe	A	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	1.90	1.90	0.03
(2) 2.4" x 8' Pipe	B	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	1.90	1.90	0.03
(2) 2.4" x 8' Pipe	C	From Centroid-Fa ce	4.00 0.00 0.00	0.0000	145.00	No Ice	1.90	1.90	0.03
Miscellaneous [NA 507-1]	C	None		0.0000	145.00	No Ice	4.56	4.56	0.24
T1507KTHD-996C9-M-H **133**	C	None		0.0000	145.00	No Ice	23.03	23.03	0.93
AIR 6419 w/ Mount Pipe	A	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	3.79	2.15	0.07
AIR 6419 w/ Mount Pipe	B	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	3.79	2.15	0.07
AIR 6419 w/ Mount Pipe	C	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	3.79	2.15	0.07
(2) NHH-65C-HG-R2B w/	A	From Face	4.00	0.0000	133.00	No Ice	5.35	4.30	0.10

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_AA_A Front ft²</i>	<i>C_AA_A Side ft²</i>	<i>Weight K</i>
Mount Pipe			0.00 3.00						
(2) NHH-65C-HG-R2B w/ Mount Pipe	B	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	5.35	4.30	0.10
(2) NHH-65C-HG-R2B w/ Mount Pipe	C	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	5.35	4.30	0.10
RHSDC-6627-PF-48	B	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	4.06	3.10	0.03
RADIO 4490HP 44B5 44B13 C	A	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.22	0.99	0.07
RADIO 4490HP 44B5 44B13 C	B	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.22	0.99	0.07
RADIO 4490HP 44B5 44B13 C	C	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.22	0.99	0.07
RADIO 4890HP B2/B25 B66	A	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.20	1.01	0.07
RADIO 4890HP B2/B25 B66	B	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.20	1.01	0.07
RADIO 4890HP B2/B25 B66	C	From Face	4.00 0.00 3.00	0.0000	133.00	No Ice	2.20	1.01	0.07
2.4" Dia x 4-ft Mount Pipe	B	From Face	2.00 0.00 0.00	0.0000	133.00	No Ice	0.87	0.87	0.01
(2) T-Arm Mount [TA 602-3] **128**	C	None		0.0000	133.00	No Ice	13.40	13.40	0.77
1.9" Dia. x 6-ft	C	From Leg	1.00 0.00 0.00	0.0000	128.00	No Ice	0.00	1.14	0.02
Pipe Mount [PM 601-1]	C	From Leg	0.50 0.00 0.00	0.0000	128.00	No Ice	1.32	1.32	0.07
112									
1.9" Dia. x 4-ft	C	From Leg	1.00 0.00 0.00	0.0000	112.00	No Ice	0.00	0.76	0.01
(2) Pipe Mount [PM 601-1]	C	From Leg	0.50 0.00 0.00	0.0000	112.00	No Ice	1.32	1.32	0.07
109									
CMA-B/3324 w/ Mount Pipe	B	From Leg	2.00 0.00 0.00	0.0000	109.00	No Ice	7.76	5.17	0.08
TMBX-6517-R2M w/ Mount Pipe	C	From Leg	2.00 0.00 0.00	0.0000	109.00	No Ice	3.22	2.80	0.04
2.4" Dia. x 6-ft	A	From Leg	2.00 0.00 0.00	0.0000	109.00	No Ice	1.43	1.43	0.02

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Side Arm Mount [SO 104-3] *****	A	None		0.0000	109.00	No Ice	2.62	2.62	0.29

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	No Ice	Aperture Area ft ²	Weight K
VHLP3-11W/A	A	Paraboloid w/Shroud (HP)	From Centroid -Face	4.00 0.00 1.00	-55.0000		145.00	3.27	No Ice	8.42	0.04
128 PAR6-59	C	Paraboloid w/Radome	From Leg	1.00 0.00 1.00	30.0000		128.00	6.00	No Ice	28.27	0.14
112 VHLPX4-6W	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 1.00	30.0000		112.00	4.23	No Ice	14.08	0.10

Load Combinations

Comb. No.	Description
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

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Comb. No.	Description
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	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 109.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	24	-9.19	104.31	176.12
			Max. Mx	8	-9.11	-219.09	3.26
			Max. My	2	-9.19	-7.77	205.42
			Max. Vy	8	9.43	-219.09	3.26
			Max. Vx	2	-8.73	-7.77	205.42
			Max. Torque	14			-2.64
L2	109.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.44	1.39	-618.02
			Max. Mx	8	-15.36	-671.49	5.32
			Max. My	14	-15.44	1.39	-618.02
			Max. Vy	8	13.13	-671.49	5.32
			Max. Vx	2	-12.07	-16.33	617.57
			Max. Torque	14			-3.62
L3	70.75 - 37.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.16	0.70	-1043.57
			Max. Mx	8	-22.11	-1131.69	7.26
			Max. My	14	-22.16	0.70	-1043.57
			Max. Vy	8	15.12	-1131.69	7.26
			Max. Vx	2	-14.07	-23.66	1043.43
			Max. Torque	14			-3.42
L4	37.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.91	-0.27	-1698.23
			Max. Mx	8	-33.91	-1831.28	9.76
			Max. My	2	-33.91	-33.12	1698.53
			Max. Vy	8	17.36	-1831.28	9.76
			Max. Vx	2	-16.34	-33.12	1698.53
			Max. Torque	14			-3.42

Maximum Reactions

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	8	33.91	-17.34	0.05
	Max. H _x	20	33.91	16.94	-0.03
	Max. H _z	2	33.91	-0.21	16.33
	Max. M _x	2	1698.53	-0.21	16.33
	Max. M _z	8	1831.28	-17.34	0.05
	Max. Torsion	2	3.28	-0.21	16.33
	Min. Vert	25	25.44	8.43	14.06
	Min. H _x	8	33.91	-17.34	0.05
	Min. H _z	14	33.91	-0.02	-16.32
	Min. M _x	14	-1698.23	-0.02	-16.32
	Min. M _z	20	-1780.09	16.94	-0.03
	Min. Torsion	14	-3.42	-0.02	-16.32

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	28.26	0.00	0.00	0.29	0.64	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	33.91	0.21	-16.33	-1698.53	-33.12	-3.28
0.9 Dead+1.0 Wind 0 deg - No Ice	25.44	0.21	-16.33	-1681.27	-32.92	-3.28
1.2 Dead+1.0 Wind 30 deg - No Ice	33.91	8.89	-14.22	-1483.76	-944.85	-1.48
0.9 Dead+1.0 Wind 30 deg - No Ice	25.44	8.89	-14.22	-1468.67	-935.34	-1.48
1.2 Dead+1.0 Wind 60 deg - No Ice	33.91	15.09	-8.37	-879.24	-1595.79	-0.06
0.9 Dead+1.0 Wind 60 deg - No Ice	25.44	15.09	-8.37	-870.31	-1579.62	-0.06
1.2 Dead+1.0 Wind 90 deg - No Ice	33.91	17.34	-0.05	-9.76	-1831.28	0.23
0.9 Dead+1.0 Wind 90 deg - No Ice	25.44	17.34	-0.05	-9.72	-1812.71	0.23
1.2 Dead+1.0 Wind 120 deg - No Ice	33.91	15.13	8.23	856.19	-1599.56	0.51
0.9 Dead+1.0 Wind 120 deg - No Ice	25.44	15.13	8.23	847.37	-1583.36	0.51
1.2 Dead+1.0 Wind 150 deg - No Ice	33.91	8.78	14.20	1480.12	-924.50	2.31
0.9 Dead+1.0 Wind 150 deg - No Ice	25.44	8.78	14.20	1464.89	-915.25	2.31
1.2 Dead+1.0 Wind 180 deg - No Ice	33.91	0.02	16.32	1698.23	-0.27	3.42
0.9 Dead+1.0 Wind 180 deg - No Ice	25.44	0.02	16.32	1680.78	-0.48	3.41
1.2 Dead+1.0 Wind 210 deg - No Ice	33.91	-8.43	14.04	1459.18	885.79	2.75
0.9 Dead+1.0 Wind 210 deg - No Ice	25.44	-8.43	14.04	1444.17	876.51	2.74
1.2 Dead+1.0 Wind 240 deg - No Ice	33.91	-14.63	8.16	851.24	1535.33	1.17
0.9 Dead+1.0 Wind 240 deg - No Ice	25.44	-14.63	8.16	842.42	1519.40	1.16
1.2 Dead+1.0 Wind 270 deg - No Ice	33.91	-16.94	0.03	6.79	1780.09	-0.25

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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
0.9 Dead+1.0 Wind 270 deg - No Ice	25.44	-16.94	0.03	6.60	1761.66	-0.25
1.2 Dead+1.0 Wind 300 deg - No Ice	33.91	-14.67	-8.10	-838.89	1541.10	-1.41
0.9 Dead+1.0 Wind 300 deg - No Ice	25.44	-14.67	-8.10	-830.44	1525.12	-1.41
1.2 Dead+1.0 Wind 330 deg - No Ice	33.91	-8.43	-14.06	-1458.98	882.07	-2.76
0.9 Dead+1.0 Wind 330 deg - No Ice	25.44	-8.43	-14.06	-1444.18	872.85	-2.76
Dead+Wind 0 deg - Service	28.26	0.05	-3.91	-403.92	-7.39	-0.79
Dead+Wind 30 deg - Service	28.26	2.13	-3.40	-352.83	-224.33	-0.35
Dead+Wind 60 deg - Service	28.26	3.61	-2.00	-208.99	-379.24	-0.01
Dead+Wind 90 deg - Service	28.26	4.15	-0.01	-2.09	-435.28	0.06
Dead+Wind 120 deg - Service	28.26	3.62	1.97	203.96	-380.13	0.12
Dead+Wind 150 deg - Service	28.26	2.10	3.40	352.40	-219.49	0.55
Dead+Wind 180 deg - Service	28.26	0.01	3.91	404.29	0.42	0.82
Dead+Wind 210 deg - Service	28.26	-2.02	3.36	347.41	211.24	0.66
Dead+Wind 240 deg - Service	28.26	-3.50	1.95	202.77	365.80	0.28
Dead+Wind 270 deg - Service	28.26	-4.06	0.01	1.84	424.05	-0.06
Dead+Wind 300 deg - Service	28.26	-3.51	-1.94	-199.39	367.17	-0.34
Dead+Wind 330 deg - Service	28.26	-2.02	-3.37	-346.92	210.36	-0.67

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-28.26	0.00	0.00	28.26	0.00	0.000%
2	0.21	-33.91	-16.33	-0.21	33.91	16.33	0.000%
3	0.21	-25.44	-16.33	-0.21	25.44	16.33	0.000%
4	8.89	-33.91	-14.22	-8.89	33.91	14.22	0.000%
5	8.89	-25.44	-14.22	-8.89	25.44	14.22	0.000%
6	15.09	-33.91	-8.37	-15.09	33.91	8.37	0.000%
7	15.09	-25.44	-8.37	-15.09	25.44	8.37	0.000%
8	17.34	-33.91	-0.05	-17.34	33.91	0.05	0.000%
9	17.34	-25.44	-0.05	-17.34	25.44	0.05	0.000%
10	15.13	-33.91	8.23	-15.13	33.91	-8.23	0.000%
11	15.13	-25.44	8.23	-15.13	25.44	-8.23	0.000%
12	8.78	-33.91	14.20	-8.78	33.91	-14.20	0.000%
13	8.78	-25.44	14.20	-8.78	25.44	-14.20	0.000%
14	0.02	-33.91	16.32	-0.02	33.91	-16.32	0.000%
15	0.02	-25.44	16.32	-0.02	25.44	-16.32	0.000%
16	-8.43	-33.91	14.04	8.43	33.91	-14.04	0.000%
17	-8.43	-25.44	14.04	8.43	25.44	-14.04	0.000%
18	-14.63	-33.91	8.16	14.63	33.91	-8.16	0.000%
19	-14.63	-25.44	8.16	14.63	25.44	-8.16	0.000%
20	-16.94	-33.91	0.03	16.94	33.91	-0.03	0.000%
21	-16.94	-25.44	0.03	16.94	25.44	-0.03	0.000%
22	-14.67	-33.91	-8.10	14.67	33.91	8.10	0.000%
23	-14.67	-25.44	-8.10	14.67	25.44	8.10	0.000%
24	-8.43	-33.91	-14.06	8.43	33.91	14.06	0.000%
25	-8.43	-25.44	-14.06	8.43	25.44	14.06	0.000%
26	0.05	-28.26	-3.91	-0.05	28.26	3.91	0.000%
27	2.13	-28.26	-3.40	-2.13	28.26	3.40	0.000%
28	3.61	-28.26	-2.00	-3.61	28.26	2.00	0.000%
29	4.15	-28.26	-0.01	-4.15	28.26	0.01	0.000%
30	3.62	-28.26	1.97	-3.62	28.26	-1.97	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
31	2.10	-28.26	3.40	-2.10	28.26	-3.40	0.000%
32	0.01	-28.26	3.91	-0.01	28.26	-3.91	0.000%
33	-2.02	-28.26	3.36	2.02	28.26	-3.36	0.000%
34	-3.50	-28.26	1.95	3.50	28.26	-1.95	0.000%
35	-4.06	-28.26	0.01	4.06	28.26	-0.01	0.000%
36	-3.51	-28.26	-1.94	3.51	28.26	1.94	0.000%
37	-2.02	-28.26	-3.37	2.02	28.26	3.37	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00010129
3	Yes	5	0.00000001	0.00005128
4	Yes	5	0.00000001	0.00049069
5	Yes	5	0.00000001	0.00023463
6	Yes	5	0.00000001	0.00052536
7	Yes	5	0.00000001	0.00025045
8	Yes	4	0.00000001	0.00033322
9	Yes	4	0.00000001	0.00017827
10	Yes	5	0.00000001	0.00051967
11	Yes	5	0.00000001	0.00024852
12	Yes	5	0.00000001	0.00046095
13	Yes	5	0.00000001	0.00022063
14	Yes	5	0.00000001	0.00013112
15	Yes	5	0.00000001	0.00006601
16	Yes	5	0.00000001	0.00052294
17	Yes	5	0.00000001	0.00025421
18	Yes	5	0.00000001	0.00045751
19	Yes	5	0.00000001	0.00021901
20	Yes	4	0.00000001	0.00046647
21	Yes	4	0.00000001	0.00028401
22	Yes	5	0.00000001	0.00044173
23	Yes	5	0.00000001	0.00021153
24	Yes	5	0.00000001	0.00051891
25	Yes	5	0.00000001	0.00025262
26	Yes	4	0.00000001	0.00014104
27	Yes	4	0.00000001	0.00015802
28	Yes	4	0.00000001	0.00017458
29	Yes	4	0.00000001	0.00004139
30	Yes	4	0.00000001	0.00018113
31	Yes	4	0.00000001	0.00015644
32	Yes	4	0.00000001	0.00015420
33	Yes	4	0.00000001	0.00022885
34	Yes	4	0.00000001	0.00014464
35	Yes	4	0.00000001	0.00004176
36	Yes	4	0.00000001	0.00013778
37	Yes	4	0.00000001	0.00022751

Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 109.75	16.841	29	0.9396	0.0082
L2	113.75 - 70.75	9.942	29	0.8295	0.0052
L3	75.5 - 37.5	4.312	29	0.5433	0.0021
L4	43 - 0	1.397	29	0.2952	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
153.50	Lightning rod (5/8"x7")	29	16.841	0.9396	0.0082	66122
146.00	VHLP3-11W/A	29	16.048	0.9320	0.0078	66122
145.00	FFVV-65C-R3-V1_TMO w/ Mount Pipe	29	15.850	0.9300	0.0078	66122
133.00	AIR 6419 w/ Mount Pipe	29	13.500	0.9031	0.0068	19447
129.00	PAR6-59	29	12.733	0.8918	0.0064	15743
128.00	1.9" Dia. x 6-ft	29	12.543	0.8887	0.0064	15027
113.00	VHLPX4-6W	29	9.811	0.8255	0.0051	9176
112.00	1.9" Dia. x 4-ft	29	9.638	0.8199	0.0050	9064
109.00	CMA-B/3324 w/ Mount Pipe	29	9.128	0.8022	0.0048	8851

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 109.75	71.039	8	3.9704	0.0335
L2	113.75 - 70.75	41.914	8	3.5030	0.0214
L3	75.5 - 37.5	18.168	8	2.2909	0.0089
L4	43 - 0	5.884	8	1.2435	0.0037

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
153.50	Lightning rod (5/8"x7")	8	71.039	3.9704	0.0335	15724
146.00	VHLP3-11W/A	8	67.692	3.9380	0.0322	15724
145.00	FFVV-65C-R3-V1_TMO w/ Mount Pipe	8	66.857	3.9297	0.0319	15724
133.00	AIR 6419 w/ Mount Pipe	8	56.934	3.8154	0.0279	4623
129.00	PAR6-59	8	53.697	3.7672	0.0266	3742
128.00	1.9" Dia. x 6-ft	8	52.896	3.7540	0.0263	3572
113.00	VHLPX4-6W	8	41.364	3.4859	0.0211	2178
112.00	1.9" Dia. x 4-ft	8	40.635	3.4623	0.0207	2151
109.00	CMA-B/3324 w/ Mount Pipe	8	38.482	3.3872	0.0197	2101

tnxTower TEP 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Little Gum Swamp (BU 825403)	Page	12 of 13
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	Client	Crown Castle	Designed by	SDD

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
L1	150 - 109.75	TP31.111x24x0.1875	40.25	0.00	0.0	17.9828	-9.11	1051.99	0.009
	(1)								
L2	109.75 - 70.75	TP37.626x30.0293x0.25	43.00	0.00	0.0	28.9920	-15.36	1696.03	0.009
	(2)								
L3	70.75 - 37.5 (3)	TP43x36.2868x0.3125	38.00	0.00	0.0	41.3769	-22.11	2420.55	0.009
L4	37.5 - 0 (4)	TP49x41.4034x0.375	43.00	0.00	0.0	57.8759	-33.91	3385.74	0.010

Pole Bending Design Data

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	
L1	150 - 109.75	TP31.111x24x0.1875	219.33	693.70	0.316	0.00	693.70	0.000
	(1)							
L2	109.75 - 70.75	TP37.626x30.0293x0.25	671.51	1412.42	0.475	0.00	1412.42	0.000
	(2)							
L3	70.75 - 37.5 (3)	TP43x36.2868x0.3125	1131.72	2383.77	0.475	0.00	2383.77	0.000
L4	37.5 - 0 (4)	TP49x41.4034x0.375	1831.30	3926.91	0.466	0.00	3926.91	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	150 - 109.75	TP31.111x24x0.1875	9.44	315.60	0.030	0.60	835.15	0.001
	(1)							
L2	109.75 - 70.75	TP37.626x30.0293x0.25	13.13	508.81	0.026	0.50	1628.04	0.000
	(2)							
L3	70.75 - 37.5 (3)	TP43x36.2868x0.3125	15.12	726.16	0.021	0.38	2652.88	0.000
L4	37.5 - 0 (4)	TP49x41.4034x0.375	17.36	1015.72	0.017	0.24	4325.28	0.000

Pole Interaction Design Data

Section No.	Elevation	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
	ft								
L1	150 - 109.75	0.009	0.316	0.000	0.030	0.001	0.326	1.050	
	(1)								

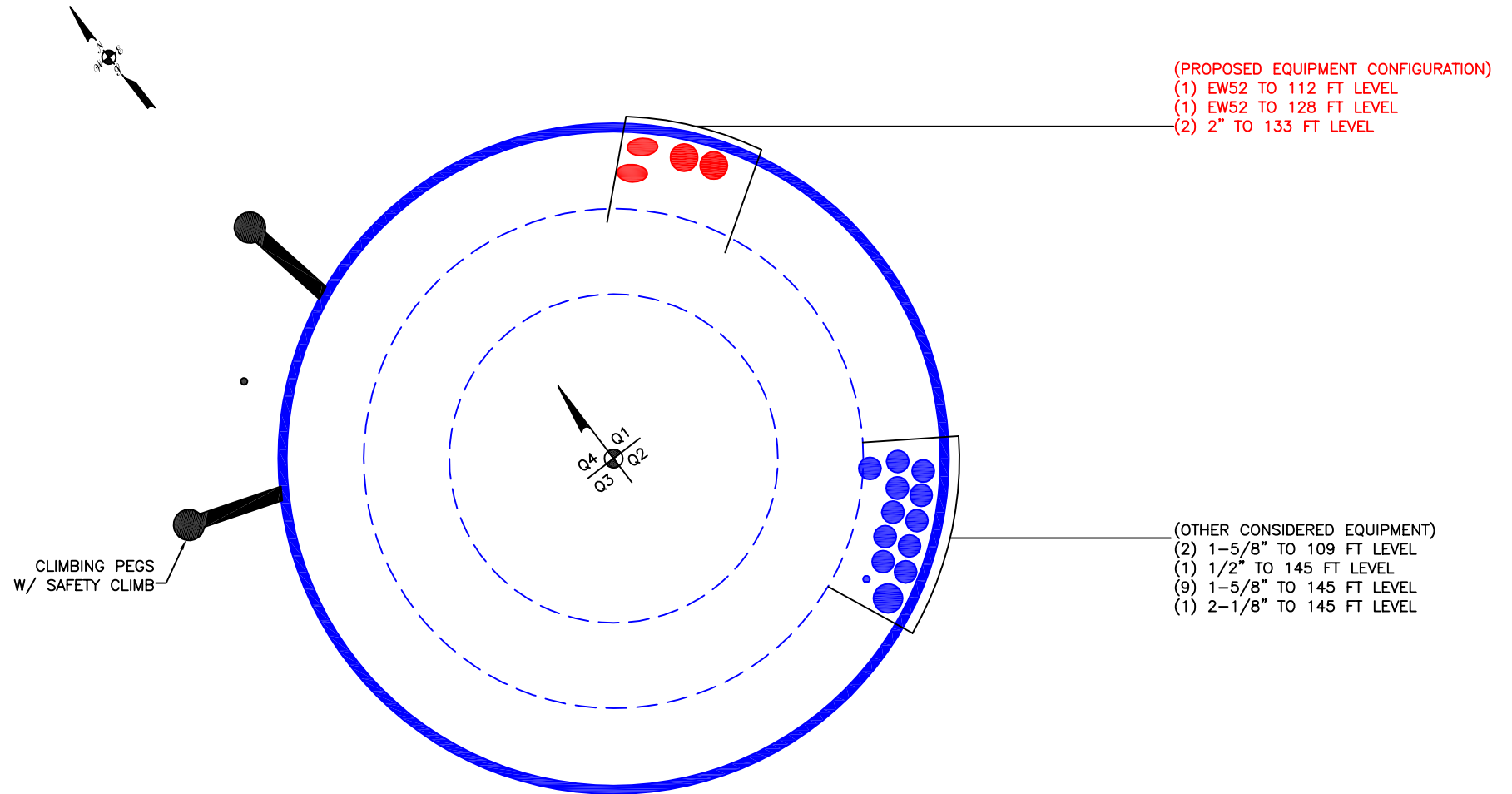
tnxTower TEP 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Little Gum Swamp (BU 825403)	Page	13 of 13
	Project	TEP No. 26551.1070995	Date	16:30:16 02/28/25
	Client	Crown Castle	Designed by	SDD

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	109.75 - 70.75 (2)	0.009	0.475	0.000	0.026	0.000	0.485	1.050	
L3	70.75 - 37.5 (3)	0.009	0.475	0.000	0.021	0.000	0.484	1.050	
L4	37.5 - 0 (4)	0.010	0.466	0.000	0.017	0.000	0.477	1.050	

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 109.75	Pole	TP31.111x24x0.1875	1	-9.11	1104.59	31.0	Pass
L2	109.75 - 70.75	Pole	TP37.626x30.0293x0.25	2	-15.36	1780.83	46.2	Pass
L3	70.75 - 37.5	Pole	TP43x36.2868x0.3125	3	-22.11	2541.58	46.1	Pass
L4	37.5 - 0	Pole	TP49x41.4034x0.375	4	-33.91	3555.03	45.4	Pass
							Summary	
							Pole (L2)	Pass
							RATING = 46.2	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C

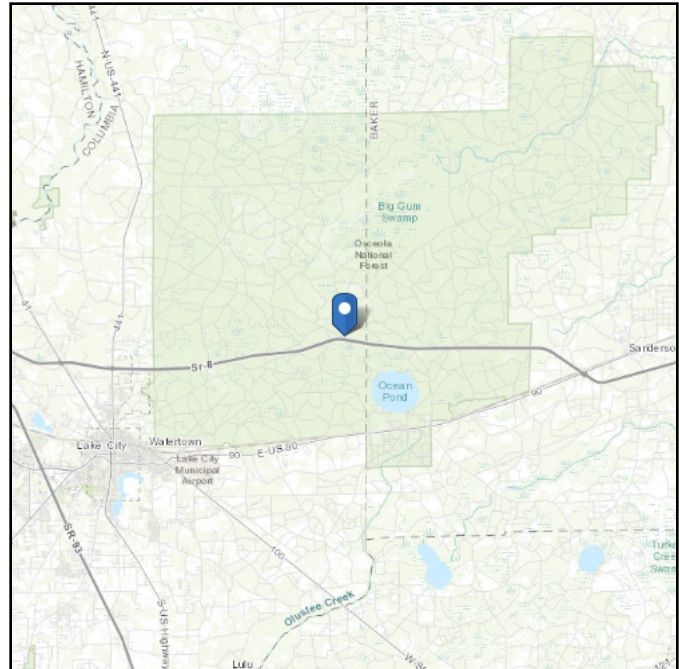
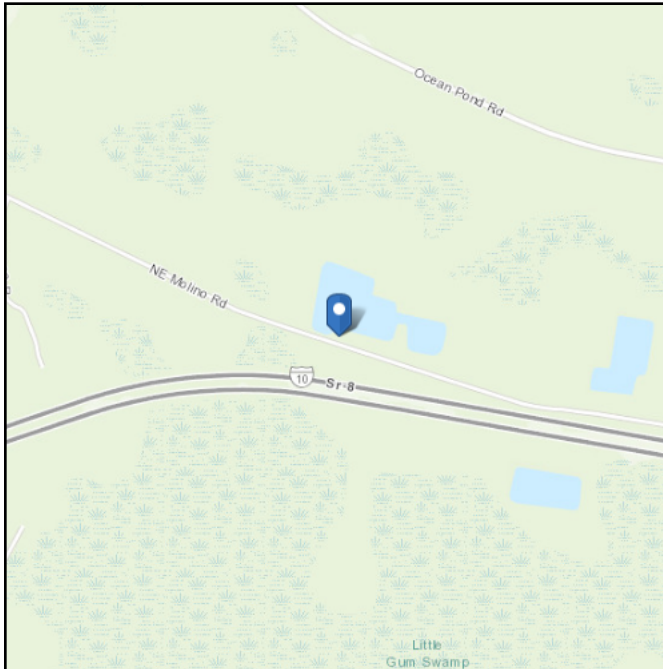
ADDITIONAL CALCULATIONS

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: Default

Latitude: 30.261106
Longitude: -82.473631
Elevation: 153.7353084234667 ft
(NAVD 88)



Wind

Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	83 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph
300-year MRI	109 Vmph
700-year MRI	119 Vmph
1,700-year MRI	128 Vmph
3,000-year MRI	134 Vmph
10,000-year MRI	144 Vmph
100,000-year MRI	155 Vmph
1,000,000-year MRI	169 Vmph

Data Source: ASCE/SEI 7-22, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Fri Feb 28 2025



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 7-22 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years). Values for 10-year MRI, 25-year MRI, 50-year MRI and 100-year MRI are Service Level wind speeds, all other wind speeds are Ultimate wind speeds.

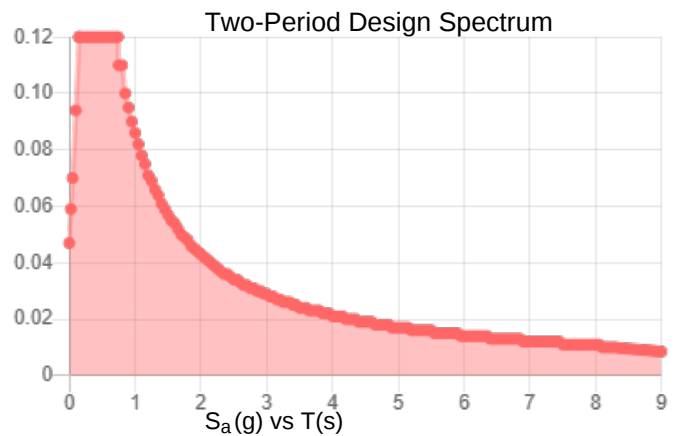
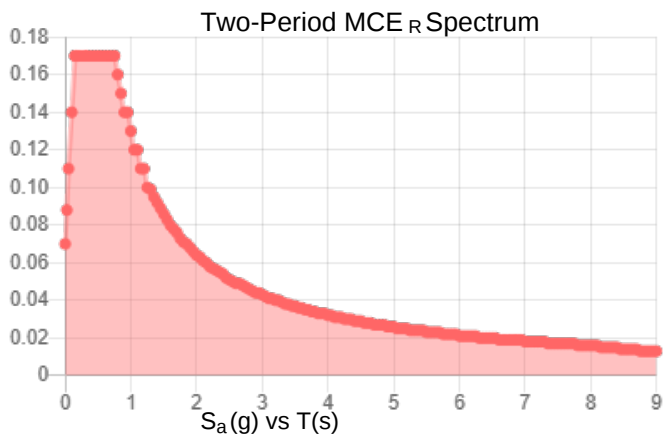
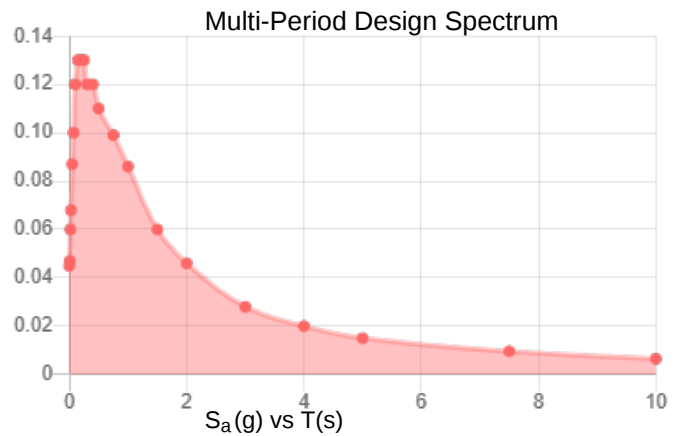
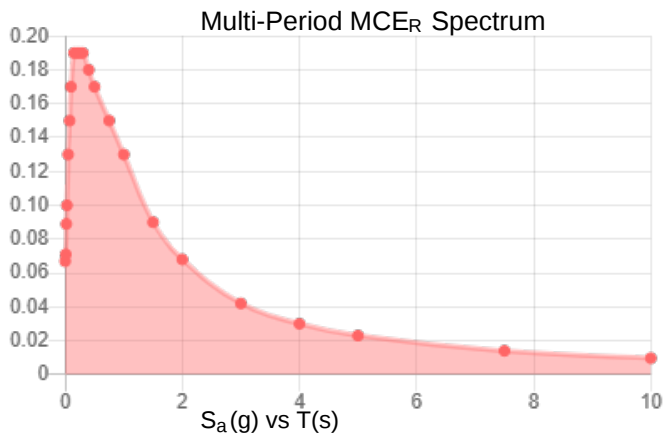
Site is in a hurricane-prone region as defined in ASCE/SEI 7-22 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: Default

Results:

PGA _M :	0.063	T _L :	8
S _{MS} :	0.17	S _S :	0.14
S _{M1} :	0.13	S ₁ :	0.06
S _{DS} :	0.12	V _{S30} :	260
S _{D1} :	0.086		

Seismic Design Category: B



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Fri Feb 28 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

Results:

Ice Thickness: N/A
Concurrent Temperature: N/A
3-s Gust Speed N/A

Data Source: Standard ASCE/SEI 7-22, Figs. 10-2 through 10-8

Date Accessed: Fri Feb 28 2025

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 for 250, 500, 1,000, and 1,400-year mean recurrence intervals along with concurrent 3-s gust speeds and concurrent air temperatures. The shading indicates special icing regions, with elevations above 2,100 ft (640 m) in the east, 6,000 ft (1829 m) in the west, and 1,600 ft (488 m) in Alaska, with sparse weather station data for determining design ice loads. In these regions, as well as in regions with complex terrain causing unusual icing conditions and regions where snow or in-cloud icing results in larger loads, the mapped values should be adjusted based on a combination of local historical records and experience, reanalysis data, and numerical weather prediction systems.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Monopole Base Plate Connection

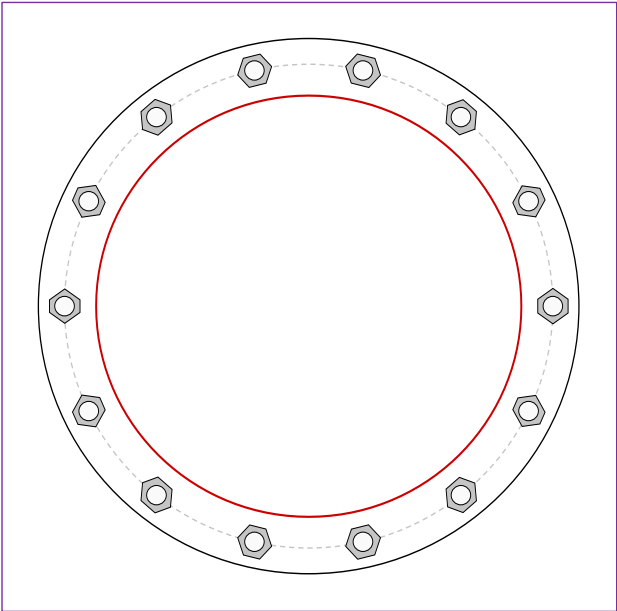


Site Info	
BU #	825403
Site Name	Little Gum Swamp
Order #	689230 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	1831.00
Axial Force (kips)	34.00
Shear Force (kips)	17.00

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary <i>(units of kips, kip-in)</i>	
(14) 2-1/4" $\varnothing$ bolts (A615-75 N; F_y =75 ksi, F_u =100 ksi) on 56.25" BC		Pu_t = 109.1	ϕPn_t = 243.75 Stress Rating
Base Plate Data		Vu = 1.21	ϕVn = 149.1 42.6%
62.25" OD x 2.5" Plate (A572-60; F_y =60 ksi, F_u =75 ksi)		Mu = n/a	ϕMn = n/a Pass
Stiffener Data		Base Plate Summary	
N/A		Max Stress (ksi):	15.04 (Flexural)
Pole Data		Allowable Stress (ksi):	54
49" x 0.375" 18-sided pole (A572-65; F_y =65 ksi, F_u =80 ksi)		Stress Rating:	26.5% Pass

Drilled Pier Foundation

BU # :	825403
Site Name:	Little Gum Swamp
Order Number:	689230 Rev. 0
TIA-222 Revision:	H
Tower Type:	Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	1831	
Axial Force (kips)	34	
Shear Force (kips)	17	

Material Properties		
Concrete Strength, f _c :	4	ksi
Rebar Strength, F _y :	60	ksi
Tie Yield Strength, F _y :	40	ksi

Pier Design Data		
Depth	22.83	ft
Ext. Above Grade	1.67	ft
Pier Section 1		
<i>From 1.67' above grade to 22.83' below grade</i>		
Pier Diameter	9.5	ft
Rebar Quantity	44	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	3	
Tie Spacing	12.5	in

[Rebar & Pier Options](#)

[Embedded Pole Inputs](#)

[Belled Pier Inputs](#)

Analysis Results		
Soil Lateral Check		
	Compression	Uplift
D _{v=0} (ft from TOC)	8.58	-
Soil Safety Factor	2.70	-
Max Moment (kip-ft)	1969.56	-
Rating*	47.0%	-
Soil Vertical Check		
	Compression	Uplift
Skin Friction (kips)	88.77	-
End Bearing (kips)	333.05	-
Weight of Concrete (kips)	209.99	-
Total Capacity (kips)	421.83	-
Axial (kips)	243.99	-
Rating*	55.1%	-
Reinforced Concrete Flexure		
	Compression	Uplift
Critical Depth (ft from TOC)	8.50	-
Critical Moment (kip-ft)	1969.51	-
Critical Moment Capacity	8291.15	-
Rating*	22.6%	-
Reinforced Concrete Shear		
	Compression	Uplift
Critical Depth (ft from TOC)	17.60	-
Critical Shear (kip)	240.53	-
Critical Shear Capacity	1070.28	-
Rating*	21.4%	-
Structural Foundation Rating*	22.6%	
Soil Interaction Rating*	55.1%	

*Rating per TIA-222-H Section 15.5



Check Limitation	
Apply TIA-222-H Section 15.5:	☒
N/A	☐
Design Options	
Input Effective Depths (else Actual):	☐
Consider non-tapered moment capacity:	☐
Check Shear along Depth of Pier:	☒
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

[Go to Soil Calculations](#)

Soil Profile														
Groundwater Depth	3.5	# of Layers		4										
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	Y _{soil} (pcf)	Y _{concrete} (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. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	117	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	6	2.5	54.6	87.6	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	6	12	6	54.6	87.6	0	31	0.000	0.000	0.30	0.23			Cohesionless
4	12	22.83	10.83	54.6	87.6	0	29	0.000	0.000	0.20	0.15	4.8		Cohesionless