



AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure : 150 ft Monopole
ATC Site Name : Woods Chapel, MO
ATC Asset Number : 306042
Engineering Number : 13681558_C3_02
Proposed Carrier : VERIZON WIRELESS
Carrier Site Name : WOODS CHAPEL
Carrier Site Number : 140737
Site Location : 1204 N.e. Woods Chapel Road
Lees Summit, MO 64064-1989
38.983200,-94.350100
County : Jackson
Date : May 24, 2021
Max Usage : 103%
Result : Pass



Prepared By:
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Structural Engineer III

Reviewed By:

COA: 2006031326



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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 150 ft monopole to reflect the change in loading by VERIZON WIRELESS.

Supporting Documents

Tower Drawings	Valmont Drawing #DC2215Z, dated March 3, 1995
Foundation Drawing	Valmont Drawing #2721, dated March 8, 1995
Geotechnical Report	Terracon Project #02955036, dated February 24, 1995

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	90 mph (3-Second Gust, V_{asd}) / 115 mph (3-Second Gust, V_{ult})
Basic Wind Speed w/ Ice:	40 mph (3-Second Gust) w/ 1" radial ice concurrent
Code:	ANSI/TIA-222-G / 2012 IBC
Structure Class:	II
Exposure Category:	C
Topographic Category:	1
Crest Height:	0 ft
Spectral Response:	$S_s = 0.11$, $S_1 = 0.11$
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
152.0	3	Nokia AHLBBA	Platform with Handrails	(2) 0.39" (10mm) Fiber Trunk (6) 0.78" (19.7mm) 8 AWG 6 (9) 1 5/8" Coax (2) 2" conduit (1) 3/8" (0.38"- 9.5mm) RET Control Cable	AT&T MOBILITY
	1	Raycap DC6-48-60-0-8C			
	1	Raycap DC6-48-60-18-8C			
	1	Raycap DC6-48-60-18-8F(32.8 lbs)			
	3	Nokia AirScale RRH 4T4R B5 160W AHCA			
	3	Powerwave Allgon TT08-19DB111-001			
	3	Alcatel-Lucent RRH4X25-WCS			
	3	Nokia AirScale Dual RRH 4T4R B25/66 320W AHFIB			
	3	Nokia AEQK AirScale MAA 64T64R 192AE n77 200W			
	3	Commscope JAH4-65C-R4			
	6	CCI TPA65R-BU8D			
140.0	-	-	-	(2) 1 1/4" Hybriflex Cable (12) 1 5/8" Coax	VERIZON WIRELESS
126.0	3	Commscope FFHH-65C-R3	Platform with Handrails	(6) 1 5/8" Coax (1) 1.46" (37.1mm) Hybrid (6) 7/8" Coax	T-MOBILE
	6	Andrew TMBXX-6516-A2M with actuator			
	1	Raycap ASU9338TYP01			
	3	Nokia FHFB			
	3	Nokia FRIG w/o Solar Shield			
	3	Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA			
	3	Andrew ETW190VS12UB			
122.0	9	Generic 48" x 12" Panel	Platform with Handrails	(9) 1 1/4" Coax	SPRINT NEXTEL
115.0	2	DragonWave Horizon DUO (Radio)	Flush	(2) 1/2" Coax (1) 2" conduit	CLEARWIRE CORPORATION
	3	Samsung 2.5GHz nRRHv2			
	3	Argus LLPX310R			
	2	Andrew Microwaves VHLP2.5			

Equipment to be Removed

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
140.0	3	Commscope CBC78-DF-2X	-	-	VERIZON WIRELESS
	3	Commscope TMA-T-DB78-DD-A			
	2	RFS DB-B1-6C-12AB-0Z			
	6	Andrew LNX-6515DS-A1M			
	3	Ericsson AIR 32 (57" Height)			
	3	Kathrein Scala 800 10510V01			
	3	Ericsson RRUS B13 w/ RRUS A2			

Proposed Equipment

Elev. ¹ (ft)	Qty	Equipment	Mount Type	Lines	Carrier
140.0	6	Powerwave Allgon LGP 13901	Low Profile Platform	-	VERIZON WIRELESS
	3	Ericsson Radio 4449 - B13&B5			
	3	Ericsson 8843 Rev 2			
	2	Raycap RRFDC-3315-PF-48			
	3	Ericsson AIR 6449 B77D/ C-Band			
	3	Antel BXA-80063/8CF			
	6	Commscope NHH-65C-R2B			

¹ Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed coax inside the pole shaft.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	103%	Pass
Shaft	59%	Pass
Base Plate	29%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	4,310.1	70%
Axial (Kips)	105.8	5%
Shear (Kips)	40.5	56%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
140.0	Powerwave Allgon LGP 13901	VERIZON WIRELESS	1.279	1.010
	Ericsson Radio 4449 - B13&B5			
	Ericsson 8843 Rev 2			
	Raycap RRFDC-3315-PF-48			
	Ericsson AIR 6449 B77D/ C-Band			
	Antel BXA-80063/8CF			
	Commscope NHH-65C-R2B			
115.0	Andrew Microwaves VHLP2.5	CLEARWIRE CORPORATION	0.860	0.888

*Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G



Standard Conditions

All engineering services performed by ATC Tower Services are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

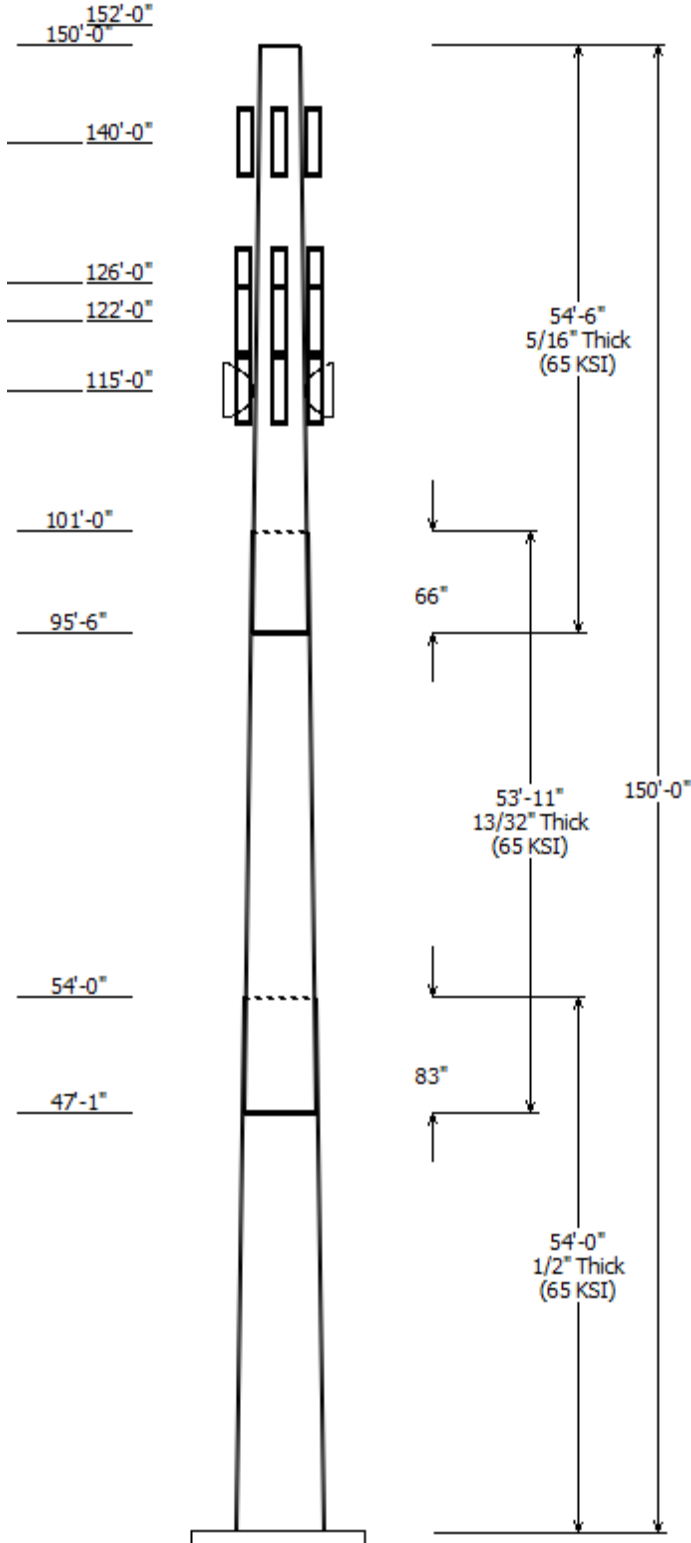
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services

It is the responsibility of the client to ensure that the information provided to ATC Tower Services and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and ATC Tower Services, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. ATC Tower Services is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.



Job Information

Client : VERIZON WIRELESS
Pole : 306042 Code: ANSI/TIA-222-G
Location : Woods Chapel, MO
Description : 150 ft Valmont Monopole
Shape : 12 Sides
Height : 150.00 (ft)
Base Elev (ft): 0.00
Taper: 0.24798(in/ft)

Sections Properties

Section	Length (ft)	Diameter (in) Across Flats	Thick (in)	Joint Type	Overlap Length (in)	Steel Grade
1	54.000	47.10	60.50	0.500	0.000	12 Sides 65
2	53.917	36.26	49.63	0.406	83.000	12 Sides 65
3	54.500	24.74	38.25	0.313	66.000	12 Sides 65

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
152.000	152.000	6	CCI TPA65R-BU8D
152.000	152.000	3	Commscope JAH4-65C-R4
152.000	152.000	3	Nokia AEQK AirScale MAA
152.000	152.000	3	Nokia AirScale Dual RRH 4T4R B
152.000	152.000	3	Alcatel-Lucent RRH4X25-WCS
152.000	152.000	3	Nokia AHLBBA
152.000	152.000	1	Raycap DC6-48-60-0-8C
152.000	152.000	1	Raycap DC6-48-60-18-8C
152.000	152.000	1	Raycap DC6-48-60-18-8F(32.8 lb
152.000	152.000	3	Nokia AirScale RRH 4T4R B5 160
152.000	152.000	3	Powerwave Allgon TT08-
150.000	150.000	1	Flat Platform with Handrails
140.000	140.000	1	Generic Round Low Profile
140.000	140.000	6	Commscope NHH-65C-R2B
140.000	140.000	3	Antel BXA-80063/8CF
140.000	140.000	3	Ericsson AIR 6449 B77D/ C-
140.000	140.000	2	Raycap RRFDC-3315-PF-48
140.000	140.000	3	Ericsson 8843 Rev 2
140.000	140.000	3	Ericsson Radio 4449 - B13&B5
140.000	140.000	6	Powerwave Allgon LGP 13901
126.000	126.000	1	Generic Round Platform with
126.000	126.000	3	Commscope FFHH-65C-R3
126.000	126.000	6	Andrew TMBXX-6516-A2M
126.000	126.000	1	Raycap ASU9338TYP01
126.000	126.000	3	Nokia FHFB
126.000	126.000	3	Nokia FRIG w/o Solar Shield
126.000	126.000	3	Nokia AirScale Dual RRH 4T4R B
126.000	126.000	3	Andrew ETW190VS12UB
122.000	122.000	1	Flat Platform with Handrails
122.000	122.000	9	Generic 48" x 12" Panel
115.000	115.000	1	Side Arms
115.000	115.000	2	Andrew Microwaves VHLP2.5
115.000	115.000	3	Argus LLPX310R
115.000	115.000	3	Samsung 2.5GHz nRRHv2
115.000	115.000	2	DragonWave Horizon DUO

Linear Appurtenance

Elev (ft)	From	To	Description	Exposed To Wind
5.000	115.0		2" conduit	Yes
5.000	140.0		1 1/4" Hybriflex	No
5.000	140.0		1 5/8" Coax	No
5.000	152.0		0.39" (10mm)	No

152'-0"
150'-0"

140'-0"

126'-0"

122'-0"

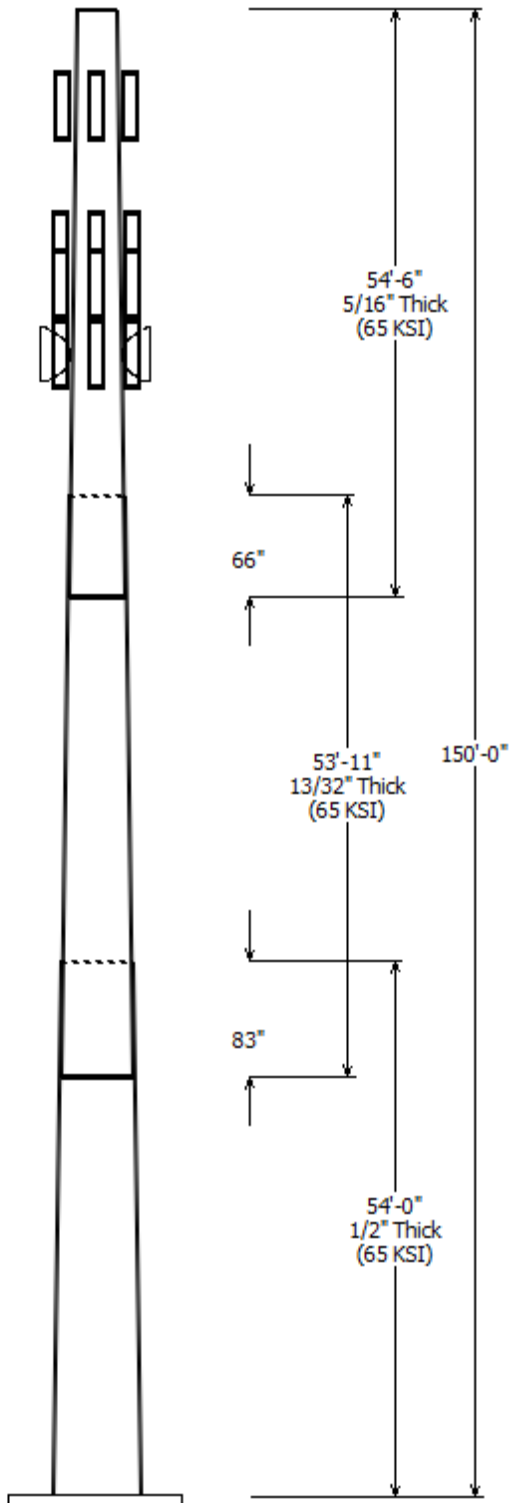
115'-0"

101'-0"

95'-6"

54'-0"

47'-1"



5.000	152.0	0.78" (19.7mm) 8	No
5.000	152.0	0.78" (19.7mm) 8	No
5.000	152.0	1 5/8" Coax	No
5.000	152.0	2" conduit	No
5.000	152.0	2" conduit	No
0.000	115.0	1/2" Coax	No
0.000	152.0	0.39" (10mm)	No
0.000	152.0	3/8" (0.38"-	No
0.000	122.0	1 1/4" Coax	No
0.000	126.0	1 5/8" Coax	Yes
0.000	126.0	1.46" (37.1mm)	Yes
0.000	126.0	7/8" Coax	Yes

Load Cases

1.2D + 1.6W	90 mph with No Ice
0.9D + 1.6W	90 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph with 1.00 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph

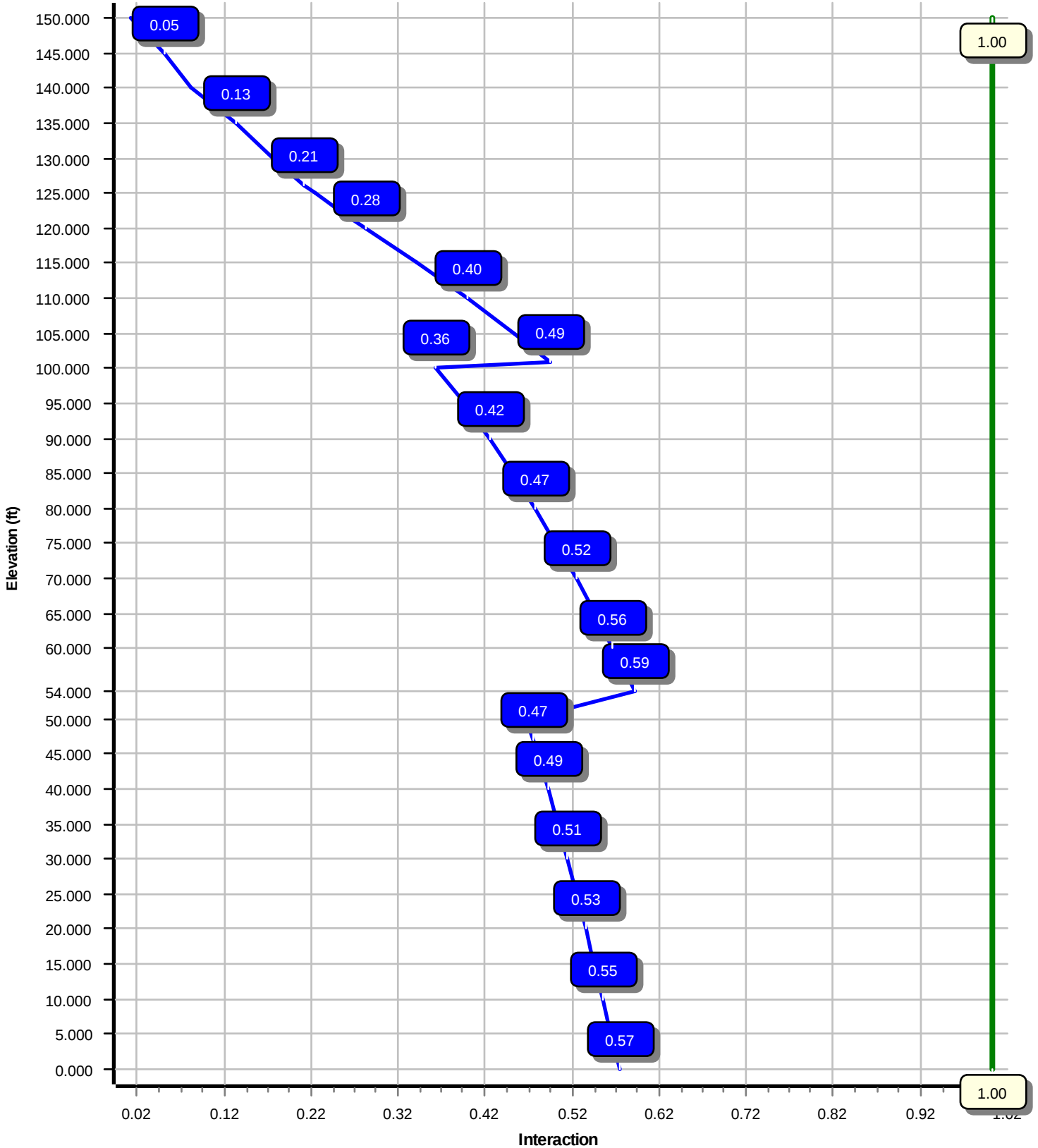
Reactions

Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	4310.12	40.54	62.67
0.9D + 1.6W	4272.44	40.52	46.99
1.2D + 1.0Di + 1.0Wi	1114.05	11.49	105.79
(1.2 + 0.2Sds) * DL + E ELFM	354.28	2.90	61.90
(1.2 + 0.2Sds) * DL + E EMAM	325.72	2.59	61.90
(0.9 - 0.2Sds) * DL + E ELFM	350.73	2.90	44.29
(0.9 - 0.2Sds) * DL + E EMAM	322.34	2.59	44.29
1.0D + 1.0W	1065.67	10.07	52.27

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	115.00	10.320	0.888

Load Case : 1.2D + 1.6W
Max Ratio 58.83% at 54.0 ft



Site Number: 306042**Code: ANSI/TIA-222-G**

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Site Name: Woods Chapel, MO**Engineering Number:13681558_C3_02****5/24/2021 10:17:41 AM****Customer: VERIZON WIRELESS**

Analysis Parameters

Location :	Jackson County, MO	Height (ft) :	150
Code :	ANSI/TIA-222-G	Base Diameter (in) :	60.50
Shape :	12 Sides	Top Diameter (in) :	24.74
Pole Type :	Taper	Taper (in/ft) :	0.248
Pole Manufacturer :	Valmont	Rotation (deg) :	0.00

Ice & Wind Parameters

Structure Class:	II	Design Wind Speed Without Ice:	90 mph
Exposure Category:	C	Design Wind Speed With Ice:	40 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0 ft	Design Ice Thickness:	1.00 in

Seismic Parameters

Analysis Method: Equivalent Modal Analysis & Equivalent Lateral Force Methods

Site Class: D - Stiff Soil

Period Based on Rayleigh Method (sec): 2.09

T_L (sec):	12	p :	1	C_s :	0.055
S_s :	0.113	S_1 :	0.110	C_s Max:	0.055
F_a :	1.600	F_v :	2.360	C_s Min:	0.030
S_{ds} :	0.121	S_{d1} :	0.173		

Load Cases

1.2D + 1.6W	90 mph with No Ice
0.9D + 1.6W	90 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	40 mph with 1.00 in Radial Ice
(1.2 + 0.2S _{ds}) * DL + E ELFM	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2S _{ds}) * DL + E EMAM	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2S _{ds}) * DL + E ELFM	Seismic (Reduced DL) Equivalent Lateral Forces Method
(0.9 - 0.2S _{ds}) * DL + E EMAM	Seismic (Reduced DL) Equivalent Modal Analysis Method
1.0D + 1.0W	Serviceability 60 mph

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:41 AM

Customer: VERIZON WIRELESS

Shaft Section Properties

Slip							Bottom						Top						
Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	54.000	0.5000	65		0.00	15,769	60.50	0.00	96.60	44388.0	29.74	121.00	47.10	54.00	75.04	20807.7	22.57	94.22	0.247980
2-12	53.917	0.4060	65	Slip	83.00	10,204	49.63	47.08	64.36	19909.7	30.08	122.26	36.26	101.00	46.88	7694.8	21.26	89.33	0.247980
3-12	54.500	0.3125	65	Slip	66.00	5,819	38.25	95.50	38.18	7015.6	30.12	122.42	24.74	150.00	24.58	1872.1	18.53	79.17	0.247980
Shaft Weight						31,793													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	Weight (lb)	No Ice EPAa (sf)	Orientation Factor	Weight (lb)	Ice EPAa (sf)	Orientation Factor
152.00	Powerwave Allgon TT08-	3	0.75	0.000	22.00	0.793	0.50	57.43	1.641	0.50
152.00	Nokia AirScale RRH 4T4R B5	3	0.75	0.000	36.80	1.286	0.50	89.19	1.334	0.50
152.00	Raycap DC6-48-60-18-8F(32.8	1	0.75	0.000	32.80	1.470	1.00	115.09	2.402	1.00
152.00	Raycap DC6-48-60-18-8C	1	0.75	0.000	16.00	2.030	1.00	93.65	3.043	1.00
152.00	Raycap DC6-48-60-0-8C	1	0.75	0.000	16.00	2.030	1.00	81.39	3.043	1.00
152.00	Nokia AHLBBA	3	0.75	0.000	94.80	2.820	0.50	197.78	4.335	0.50
152.00	Alcatel-Lucent RRH4X25-WCS	3	0.75	0.000	70.00	3.165	0.50	191.89	4.897	0.50
152.00	Nokia AirScale Dual RRH 4T4R	3	0.75	0.000	88.20	3.683	0.50	225.64	5.432	0.50
152.00	Nokia AEQK AirScale MAA	3	0.75	0.000	99.20	4.351	0.67	254.06	6.219	0.67
152.00	Commscope JAH4-65C-R4	3	0.75	0.000	87.30	12.862	0.67	440.26	17.858	0.67
152.00	CCI TPA65R-BU8D	6	0.75	0.000	82.50	18.089	0.63	542.39	23.014	0.63
150.00	Flat Platform with Handrails	1	1.00	0.000	2,000.00	42.400	1.00	3,895.61	70.373	1.00
140.00	Powerwave Allgon LGP 13901	6	0.80	0.000	9.90	0.503	0.50	29.40	1.146	0.50
140.00	Ericsson Radio 4449 - B13&B5	3	0.80	0.000	70.00	1.650	0.50	144.60	2.772	0.50
140.00	Ericsson 8843 Rev 2	3	0.80	0.000	75.00	1.650	0.50	157.21	2.775	0.50
140.00	Raycap RRFDC-3315-PF-48	2	0.80	0.000	26.90	2.512	0.67	132.41	3.891	0.67
140.00	Ericsson AIR 6449 B77D/ C-Band	3	0.80	0.000	81.60	4.028	0.70	235.88	5.845	0.70
140.00	Antel BXA-80063/8CF	3	0.80	0.000	24.00	10.660	0.65	270.50	14.860	0.65
140.00	Commscope NHH-65C-R2B	6	0.80	0.000	51.60	11.389	0.70	354.27	15.666	0.70
140.00	Generic Round Low Profile	1	1.00	0.000	1,875.00	21.700	1.00	2,947.66	47.129	1.00
126.00	Andrew ETW190VS12UB	3	0.75	0.000	11.00	0.654	0.50	35.24	1.373	0.50
126.00	Nokia AirScale Dual RRH 4T4R	3	0.75	0.000	83.80	2.218	0.67	167.39	3.552	0.67
126.00	Nokia FRIG w/o Solar Shield	3	0.75	0.000	54.00	2.293	0.50	130.33	3.599	0.50
126.00	Nokia FHFB	3	0.75	0.000	48.50	2.415	0.50	139.14	3.808	0.50
126.00	Raycap ASU9338TYP01	1	0.75	0.000	14.90	3.213	1.00	112.89	4.749	1.00
126.00	Andrew TMBXX-6516-A2M with	6	0.75	0.000	34.60	6.160	0.67	209.70	9.607	0.67
126.00	Commscope FFHH-65C-R3	3	0.75	0.000	125.70	21.138	0.63	670.59	26.028	0.63
126.00	Generic Round Platform with	1	1.00	0.000	2,500.00	27.200	1.00	4,625.82	59.282	1.00
122.00	Generic 48" x 12" Panel	9	0.75	0.000	30.00	5.067	0.66	178.05	7.513	0.66
122.00	Flat Platform with Handrails	1	1.00	0.000	2,000.00	42.400	1.00	3,858.43	69.825	1.00
115.00	DragonWave Horizon DUO	2	0.80	0.000	7.00	0.200	1.00	23.97	0.539	1.00
115.00	Samsung 2.5GHz nRRHv2	3	0.80	0.000	50.70	2.496	0.67	143.37	3.875	0.67
115.00	Argus LLPX310R	3	0.80	0.000	28.60	4.292	0.63	145.59	6.439	0.63
115.00	Andrew Microwaves VHLP2.5	2	1.00	0.000	47.60	8.430	1.00	271.32	10.641	1.00
115.00	Side Arms	1	1.00	0.000	560.00	8.500	1.00	1,066.46	16.187	1.00
Totals	Num Loadings:35	102			13,972.90			37,157.69		

Linear Appurtenance Properties

Load Case Azimuth (deg) : 0

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Dia (in)	Coax Wt (lb/ft)	Max Coax / Flat	Dist Between Rows (in)	Dist Between Cols (in)	Dist Azimuth (deg)	Dist From Face (in)	Exposed To Wind	Carrier
0.00	152.00	1	0.39" (10mm) Fiber	0.39	0.06	N	0	0.00	0.00	0	N	AT&T MOBILITY
0.00	152.00	1	3/8" (0.38"- 9.5mm)	0.38	0.23	N	0	0.00	0.00	0	N	AT&T MOBILITY
5.00	152.00	1	0.39" (10mm) Fiber	0.39	0.06	N	0	0.00	0.00	0	N	AT&T MOBILITY

Site Number: 306042**Code: ANSI/TIA-222-G**

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Site Name: Woods Chapel, MO**Engineering Number:13681558_C3_02****5/24/2021 10:17:42 AM****Customer: VERIZON WIRELESS**

5.00	152.00	2	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0.00	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	4	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0.00	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	9	1 5/8" Coax	1.98	0.82	N	0	0.00	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	1	2" conduit	2.38	3.65	N	0	0.00	0.00	0	0.00	N	AT&T MOBILITY
5.00	152.00	1	2" conduit	2.38	3.65	N	0	0.00	0.00	0	0.00	N	AT&T MOBILITY
5.00	140.00	2	1 1/4" Hybriflex Cable	1.54	1.00	N	0	0.00	0.00	90	0.00	N	VERIZON WIRELESS
5.00	140.00	12	1 5/8" Coax	1.98	0.82	N	0	0.00	0.00	90	0.00	N	VERIZON WIRELESS
0.00	126.00	6	1 5/8" Coax	1.98	0.82	N	6	0.00	0.00	180	0.50	Y	T-MOBILE
0.00	126.00	1	1.46" (37.1mm) Hybrid	1.46	1.70	N	1	0.00	0.00	90	0.50	Y	T-MOBILE
0.00	126.00	6	7/8" Coax	1.09	0.33	N	6	0.00	0.00	90	0.50	Y	T-MOBILE
0.00	122.00	9	1 1/4" Coax	1.55	0.63	N	0	0.00	0.00	0	0.00	N	SPRINT NEXTEL
0.00	115.00	2	1/2" Coax	0.63	0.15	N	0	0.00	0.00	0	0.00	N	CLEARWIRE
5.00	115.00	1	2" conduit	2.38	3.65	N	1	0.00	0.00	90	0.50	Y	CLEARWIRE

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:42 AM

Customer: VERIZON WIRELESS

Segment Properties (Max Len : 5. ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	F'y (ksi)	S (in ³)	Z (in ³)	Weight (lb)
0.00		0.5000	60.500	96.600	44,388.0	29.74	121.00	72.3	1417.	0.0	0.0
5.00		0.5000	59.260	94.604	41,692.6	29.08	118.52	73.0	1359.	0.0	1,626.6
10.00		0.5000	58.020	92.608	39,108.7	28.41	116.04	73.7	1302.	0.0	1,592.6
15.00		0.5000	56.780	90.611	36,633.7	27.75	113.56	74.5	1246.	0.0	1,558.6
20.00		0.5000	55.540	88.615	34,265.5	27.08	111.08	75.2	1191.	0.0	1,524.7
25.00		0.5000	54.300	86.619	32,001.5	26.42	108.60	75.9	1138.	0.0	1,490.7
30.00		0.5000	53.061	84.623	29,839.6	25.76	106.12	76.6	1086.	0.0	1,456.7
35.00		0.5000	51.821	82.626	27,777.3	25.09	103.64	77.3	1035.	0.0	1,422.8
40.00		0.5000	50.581	80.630	25,812.2	24.43	101.16	78.1	985.9	0.0	1,388.8
45.00		0.5000	49.341	78.634	23,942.1	23.76	98.68	78.8	937.4	0.0	1,354.8
47.08	Bot - Section 2	0.5000	48.824	77.802	23,190.4	23.49	97.65	79.1	917.6	0.0	554.5
50.00		0.5000	48.101	76.638	22,164.6	23.10	96.20	79.5	890.2	0.0	1,400.5
54.00	Top - Section 1	0.4060	47.921	62.117	17,900.4	28.95	118.03	73.1	721.6	0.0	1,886.6
55.00		0.4060	47.673	61.793	17,621.6	28.78	117.42	73.3	714.1	0.0	210.8
60.00		0.4060	46.433	60.172	16,270.9	27.97	114.37	74.2	676.9	0.0	1,037.6
65.00		0.4060	45.193	58.551	14,991.1	27.15	111.31	75.1	640.8	0.0	1,010.0
70.00		0.4060	43.953	56.930	13,780.2	26.33	108.26	76.0	605.7	0.0	982.4
75.00		0.4060	42.713	55.309	12,636.3	25.51	105.21	76.9	571.5	0.0	954.8
80.00		0.4060	41.474	53.688	11,557.5	24.69	102.15	77.8	538.4	0.0	927.2
85.00		0.4060	40.234	52.068	10,542.0	23.87	99.10	78.7	506.2	0.0	899.7
90.00		0.4060	38.994	50.447	9,587.8	23.06	96.04	79.6	475.0	0.0	872.1
95.00		0.4060	37.754	48.826	8,692.9	22.24	92.99	80.5	444.8	0.0	844.5
95.50	Bot - Section 3	0.4060	37.630	48.664	8,606.6	22.16	92.68	80.6	441.8	0.0	82.9
100.0		0.4060	36.514	47.205	7,855.6	21.42	89.94	81.4	415.6	0.0	1,310.0
101.0	Top - Section 2	0.3125	36.891	36.807	6,285.9	28.95	118.05	73.1	329.2	0.0	285.7
105.0		0.3125	35.899	35.809	5,788.3	28.10	114.88	74.1	311.5	0.0	494.2
110.0		0.3125	34.659	34.561	5,204.1	27.04	110.91	75.2	290.1	0.0	598.6
115.0		0.3125	33.419	33.314	4,660.6	25.98	106.94	76.4	269.4	0.0	577.4
120.0		0.3125	32.179	32.066	4,156.3	24.91	102.97	77.5	249.5	0.0	556.2
122.0		0.3125	31.683	31.567	3,965.3	24.49	101.39	78.0	241.8	0.0	216.5
125.0		0.3125	30.939	30.818	3,689.8	23.85	99.01	78.7	230.4	0.0	318.4
126.0		0.3125	30.692	30.569	3,600.9	23.64	98.21	78.9	226.7	0.0	104.4
130.0		0.3125	29.700	29.571	3,259.6	22.79	95.04	79.9	212.0	0.0	409.3
135.0		0.3125	28.460	28.323	2,864.2	21.72	91.07	81.0	194.4	0.0	492.5
140.0		0.3125	27.220	27.075	2,502.1	20.66	87.10	81.9	177.6	0.0	471.3
145.0		0.3125	25.980	25.828	2,171.9	19.60	83.14	81.9	161.5	0.0	450.0
150.0		0.3125	24.740	24.580	1,872.1	18.53	79.17	81.9	146.2	0.0	428.8
											31,793.3

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:42 AM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W

90 mph with No Ice

21 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion		Moment	
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		380.6	0.0					0.0	0.0	380.6	0.0	0.0	0.0
5.00		753.3	1,951.9					0.0	89.2	753.3	2,041.0	0.0	0.0
10.00		737.6	1,911.1					0.0	291.8	737.6	2,202.9	0.0	0.0
15.00		733.1	1,870.4					0.0	291.8	733.1	2,162.1	0.0	0.0
20.00		747.9	1,829.6					0.0	291.8	747.9	2,121.4	0.0	0.0
25.00		766.8	1,788.8					0.0	291.8	766.8	2,080.6	0.0	0.0
30.00		778.9	1,748.1					0.0	291.8	778.9	2,039.9	0.0	0.0
35.00		785.9	1,707.3					0.0	291.8	785.9	1,999.1	0.0	0.0
40.00		789.1	1,666.6					0.0	291.8	789.1	1,958.4	0.0	0.0
45.00		559.3	1,625.8					0.0	291.8	559.3	1,917.6	0.0	0.0
47.08	Bot - Section 2	398.0	665.4					0.0	121.6	398.0	787.0	0.0	0.0
50.00		553.1	1,680.5					0.0	170.2	553.1	1,850.7	0.0	0.0
54.00	Top - Section 1	399.1	2,263.9					0.0	233.4	399.1	2,497.3	0.0	0.0
55.00		476.0	253.0					0.0	58.4	476.0	311.3	0.0	0.0
60.00		789.1	1,245.1					0.0	291.8	789.1	1,536.8	0.0	0.0
65.00		781.1	1,212.0					0.0	291.8	781.1	1,503.7	0.0	0.0
70.00		771.6	1,178.9					0.0	291.8	771.6	1,470.7	0.0	0.0
75.00		760.8	1,145.8					0.0	291.8	760.8	1,437.6	0.0	0.0
80.00		748.9	1,112.7					0.0	291.8	748.9	1,404.5	0.0	0.0
85.00		735.8	1,079.6					0.0	291.8	735.8	1,371.4	0.0	0.0
90.00		721.8	1,046.5					0.0	291.8	721.8	1,338.3	0.0	0.0
95.00		392.6	1,013.4					0.0	291.8	392.6	1,305.2	0.0	0.0
95.50	Bot - Section 3	354.9	99.5					0.0	29.2	354.9	128.7	0.0	0.0
100.00		389.7	1,572.0					0.0	262.6	389.7	1,834.7	0.0	0.0
101.00	Top - Section 2	347.4	342.9					0.0	58.4	347.4	401.2	0.0	0.0
105.00		616.3	593.0					0.0	233.4	616.3	826.5	0.0	0.0
110.00		669.2	718.4					0.0	291.8	669.2	1,010.1	0.0	0.0
115.00	Appurtenance(s)	651.4	692.9	1,635.1	0.0	0.0	1,088.5	0.0	291.8	2,286.5	2,073.2	0.0	0.0
120.00		447.0	667.4					0.0	268.1	447.0	935.5	0.0	0.0
122.00	Appurtenance(s)	311.7	259.8	2,972.9	0.0	0.0	2,724.0	0.0	107.2	3,284.6	3,091.1	0.0	0.0
125.00		247.1	382.1					0.0	140.4	247.1	522.5	0.0	0.0
126.00	Appurtenance(s)	302.0	125.3	4,031.9	0.0	0.0	4,429.8	0.0	46.8	4,333.9	4,601.9	0.0	0.0
130.00		532.8	491.1					0.0	146.0	532.8	637.1	0.0	0.0
135.00		573.8	591.0					0.0	182.5	573.8	773.5	0.0	0.0
140.00	Appurtenance(s)	553.0	565.5	4,296.7	0.0	0.0	3,659.5	0.0	182.5	4,849.7	4,407.5	0.0	0.0
145.00		531.7	540.1					0.0	111.4	531.7	651.5	0.0	0.0
150.00	Appurtenance(s)	260.5	514.6	2,026.3	0.0	0.0	2,400.0	0.0	111.4	2,286.8	3,026.0	0.0	0.0
Totals:										36,311.4	60,258.4	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:45 AM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W

90 mph with No Ice

21 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-62.67	-40.54	0.00	-4,310.12	0.00	4,310.12	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.571
5.00	-60.54	-39.93	0.00	-4,107.42	0.00	4,107.42	6,215.54	3,107.77	15,067.9	7,441.50	0.07	-0.13	0.562
10.00	-58.25	-39.32	0.00	-3,907.79	0.00	3,907.79	6,144.79	3,072.40	14,579.4	7,200.24	0.29	-0.27	0.552
15.00	-55.99	-38.71	0.00	-3,711.18	0.00	3,711.18	6,071.43	3,035.72	14,092.2	6,959.61	0.65	-0.41	0.543
20.00	-53.79	-38.08	0.00	-3,517.62	0.00	3,517.62	5,995.47	2,997.74	13,606.6	6,719.80	1.15	-0.55	0.533
25.00	-51.62	-37.42	0.00	-3,327.23	0.00	3,327.23	5,916.91	2,958.45	13,123.0	6,481.00	1.81	-0.69	0.522
30.00	-49.50	-36.74	0.00	-3,140.14	0.00	3,140.14	5,835.74	2,917.87	12,642.0	6,243.42	2.61	-0.84	0.512
35.00	-47.42	-36.04	0.00	-2,956.45	0.00	2,956.45	5,751.96	2,875.98	12,163.8	6,007.26	3.56	-0.98	0.501
40.00	-45.39	-35.33	0.00	-2,776.24	0.00	2,776.24	5,665.59	2,832.79	11,688.9	5,772.72	4.67	-1.13	0.489
45.00	-43.42	-34.81	0.00	-2,599.58	0.00	2,599.58	5,576.61	2,788.30	11,217.6	5,539.99	5.93	-1.28	0.477
47.08	-42.59	-34.45	0.00	-2,527.05	0.00	2,527.05	5,538.76	2,769.38	11,022.5	5,443.60	6.50	-1.34	0.472
50.00	-40.69	-33.93	0.00	-2,426.56	0.00	2,426.56	5,485.02	2,742.51	10,750.5	5,309.27	7.35	-1.43	0.465
54.00	-38.16	-33.52	0.00	-2,290.84	0.00	2,290.84	4,089.14	2,044.57	8,015.68	3,958.64	8.60	-1.55	0.588
55.00	-37.81	-33.10	0.00	-2,257.32	0.00	2,257.32	4,077.72	2,038.86	7,951.24	3,926.82	8.93	-1.58	0.584
60.00	-36.19	-32.38	0.00	-2,091.81	0.00	2,091.81	4,019.09	2,009.54	7,629.58	3,767.96	10.68	-1.76	0.564
65.00	-34.62	-31.66	0.00	-1,929.91	0.00	1,929.91	3,957.85	1,978.93	7,309.16	3,609.72	12.61	-1.93	0.544
70.00	-33.08	-30.94	0.00	-1,771.63	0.00	1,771.63	3,894.01	1,947.01	6,990.39	3,452.29	14.73	-2.11	0.522
75.00	-31.58	-30.22	0.00	-1,616.95	0.00	1,616.95	3,827.57	1,913.78	6,673.67	3,295.87	17.03	-2.28	0.499
80.00	-30.12	-29.50	0.00	-1,465.87	0.00	1,465.87	3,758.52	1,879.26	6,359.40	3,140.67	19.52	-2.46	0.475
85.00	-28.70	-28.79	0.00	-1,318.37	0.00	1,318.37	3,686.86	1,843.43	6,047.97	2,986.87	22.18	-2.63	0.449
90.00	-27.31	-28.09	0.00	-1,174.42	0.00	1,174.42	3,612.61	1,806.30	5,739.81	2,834.68	25.03	-2.80	0.422
95.00	-25.99	-27.67	0.00	-1,033.99	0.00	1,033.99	3,535.74	1,767.87	5,435.30	2,684.29	28.04	-2.96	0.393
95.50	-25.84	-27.34	0.00	-1,020.16	0.00	1,020.16	3,527.92	1,763.96	5,405.07	2,669.36	28.35	-2.98	0.390
100.00	-23.99	-26.89	0.00	-897.11	0.00	897.11	3,456.28	1,728.14	5,134.86	2,535.91	31.23	-3.12	0.361
101.00	-23.57	-26.56	0.00	-870.22	0.00	870.22	2,422.80	1,211.40	3,656.13	1,805.62	31.88	-3.15	0.492
105.00	-22.71	-25.95	0.00	-764.00	0.00	764.00	2,386.99	1,193.50	3,503.59	1,730.29	34.58	-3.27	0.452
110.00	-21.67	-25.29	0.00	-634.24	0.00	634.24	2,339.89	1,169.95	3,313.75	1,636.54	38.10	-3.44	0.397
115.00	-19.68	-22.93	0.00	-507.80	0.00	507.80	2,290.19	1,145.09	3,125.22	1,543.43	41.79	-3.60	0.338
120.00	-18.74	-22.45	0.00	-393.16	0.00	393.16	2,237.88	1,118.94	2,938.40	1,451.17	45.63	-3.74	0.280
122.00	-15.85	-18.99	0.00	-348.25	0.00	348.25	2,216.23	1,108.11	2,864.24	1,414.54	47.21	-3.79	0.254
125.00	-15.33	-18.72	0.00	-291.29	0.00	291.29	2,182.97	1,091.48	2,753.69	1,359.95	49.61	-3.86	0.222
126.00	-11.02	-14.09	0.00	-272.57	0.00	272.57	2,171.67	1,085.84	2,717.04	1,341.84	50.42	-3.88	0.208
130.00	-10.41	-13.53	0.00	-216.19	0.00	216.19	2,125.45	1,062.73	2,571.50	1,269.97	53.70	-3.96	0.175
135.00	-9.66	-12.92	0.00	-148.52	0.00	148.52	2,065.33	1,032.67	2,392.23	1,181.43	57.89	-4.04	0.131
140.00	-5.60	-7.77	0.00	-83.93	0.00	83.93	1,995.73	997.87	2,208.66	1,090.78	62.15	-4.09	0.080
145.00	-4.98	-7.20	0.00	-45.06	0.00	45.06	1,903.77	951.88	2,008.69	992.02	66.45	-4.13	0.048
150.00	0.00	-6.82	0.00	-9.07	0.00	9.07	1,811.80	905.90	1,818.20	897.94	70.78	-4.15	0.010

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:45 AM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W

90 mph with No Ice (Reduced DL)

21 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :0.90

Wind Load Factor :1.60

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead		Torsion	Moment	
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		380.6	0.0					0.0	0.0	380.6	0.0	0.0	0.0
5.00		753.3	1,463.9					0.0	66.9	753.3	1,530.8	0.0	0.0
10.00		737.6	1,433.3					0.0	218.8	737.6	1,652.2	0.0	0.0
15.00		733.1	1,402.8					0.0	218.8	733.1	1,621.6	0.0	0.0
20.00		747.9	1,372.2					0.0	218.8	747.9	1,591.0	0.0	0.0
25.00		766.8	1,341.6					0.0	218.8	766.8	1,560.5	0.0	0.0
30.00		778.9	1,311.1					0.0	218.8	778.9	1,529.9	0.0	0.0
35.00		785.9	1,280.5					0.0	218.8	785.9	1,499.3	0.0	0.0
40.00		789.1	1,249.9					0.0	218.8	789.1	1,468.8	0.0	0.0
45.00		559.3	1,219.4					0.0	218.8	559.3	1,438.2	0.0	0.0
47.08	Bot - Section 2	398.0	499.0					0.0	91.2	398.0	590.2	0.0	0.0
50.00		553.1	1,260.4					0.0	127.7	553.1	1,388.1	0.0	0.0
54.00	Top - Section 1	399.1	1,697.9					0.0	175.1	399.1	1,873.0	0.0	0.0
55.00		476.0	189.7					0.0	43.8	476.0	233.5	0.0	0.0
60.00		789.1	933.8					0.0	218.8	789.1	1,152.6	0.0	0.0
65.00		781.1	909.0					0.0	218.8	781.1	1,127.8	0.0	0.0
70.00		771.6	884.2					0.0	218.8	771.6	1,103.0	0.0	0.0
75.00		760.8	859.3					0.0	218.8	760.8	1,078.2	0.0	0.0
80.00		748.9	834.5					0.0	218.8	748.9	1,053.4	0.0	0.0
85.00		735.8	809.7					0.0	218.8	735.8	1,028.5	0.0	0.0
90.00		721.8	784.9					0.0	218.8	721.8	1,003.7	0.0	0.0
95.00		392.6	760.1					0.0	218.8	392.6	978.9	0.0	0.0
95.50	Bot - Section 3	354.9	74.6					0.0	21.9	354.9	96.5	0.0	0.0
100.00		389.7	1,179.0					0.0	197.0	389.7	1,376.0	0.0	0.0
101.00	Top - Section 2	347.4	257.2					0.0	43.8	347.4	300.9	0.0	0.0
105.00		616.3	444.8					0.0	175.1	616.3	619.9	0.0	0.0
110.00		669.2	538.8					0.0	218.8	669.2	757.6	0.0	0.0
115.00	Appurtenance(s)	651.4	519.7	1,635.1	0.0	0.0	816.4	0.0	218.8	2,286.5	1,554.9	0.0	0.0
120.00		447.0	500.6					0.0	201.1	447.0	701.6	0.0	0.0
122.00	Appurtenance(s)	311.7	194.9	2,972.9	0.0	0.0	2,043.0	0.0	80.4	3,284.6	2,318.3	0.0	0.0
125.00		247.1	286.6					0.0	105.3	247.1	391.9	0.0	0.0
126.00	Appurtenance(s)	302.0	94.0	4,031.9	0.0	0.0	3,322.3	0.0	35.1	4,333.9	3,451.5	0.0	0.0
130.00		532.8	368.4					0.0	109.5	532.8	477.8	0.0	0.0
135.00		573.8	443.2					0.0	136.8	573.8	580.1	0.0	0.0
140.00	Appurtenance(s)	553.0	424.1	4,296.7	0.0	0.0	2,744.6	0.0	136.8	4,849.7	3,305.6	0.0	0.0
145.00		531.7	405.0					0.0	83.6	531.7	488.6	0.0	0.0
150.00	Appurtenance(s)	260.5	385.9	2,026.3	0.0	0.0	1,800.0	0.0	83.6	2,286.8	2,269.5	0.0	0.0
Totals:										36,311.4	45,193.8	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:49 AM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W

90 mph with No Ice (Reduced DL)

21 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :0.90

Wind Load Factor :1.60

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-46.99	-40.52	0.00	-4,272.44	0.00	4,272.44	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.564
5.00	-45.37	-39.87	0.00	-4,069.84	0.00	4,069.84	6,215.54	3,107.77	15,067.9	7,441.50	0.07	-0.13	0.554
10.00	-43.63	-39.23	0.00	-3,870.48	0.00	3,870.48	6,144.79	3,072.40	14,579.4	7,200.24	0.29	-0.27	0.545
15.00	-41.92	-38.59	0.00	-3,674.32	0.00	3,674.32	6,071.43	3,035.72	14,092.2	6,959.61	0.64	-0.41	0.535
20.00	-40.24	-37.93	0.00	-3,481.37	0.00	3,481.37	5,995.47	2,997.74	13,606.6	6,719.80	1.14	-0.55	0.525
25.00	-38.60	-37.24	0.00	-3,291.73	0.00	3,291.73	5,916.91	2,958.45	13,123.0	6,481.00	1.79	-0.69	0.515
30.00	-36.99	-36.53	0.00	-3,105.54	0.00	3,105.54	5,835.74	2,917.87	12,642.0	6,243.42	2.58	-0.83	0.504
35.00	-35.41	-35.81	0.00	-2,922.87	0.00	2,922.87	5,751.96	2,875.98	12,163.8	6,007.26	3.53	-0.97	0.493
40.00	-33.87	-35.08	0.00	-2,743.81	0.00	2,743.81	5,665.59	2,832.79	11,688.9	5,772.72	4.63	-1.12	0.481
45.00	-32.38	-34.55	0.00	-2,568.40	0.00	2,568.40	5,576.61	2,788.30	11,217.6	5,539.99	5.87	-1.26	0.470
47.08	-31.75	-34.18	0.00	-2,496.41	0.00	2,496.41	5,538.76	2,769.38	11,022.5	5,443.60	6.44	-1.33	0.464
50.00	-30.32	-33.65	0.00	-2,396.71	0.00	2,396.71	5,485.02	2,742.51	10,750.5	5,309.27	7.28	-1.41	0.457
54.00	-28.41	-33.24	0.00	-2,262.10	0.00	2,262.10	4,089.14	2,044.57	8,015.68	3,958.64	8.51	-1.53	0.579
55.00	-28.13	-32.81	0.00	-2,228.86	0.00	2,228.86	4,077.72	2,038.86	7,951.24	3,926.82	8.84	-1.56	0.575
60.00	-26.90	-32.07	0.00	-2,064.81	0.00	2,064.81	4,019.09	2,009.54	7,629.58	3,767.96	10.57	-1.74	0.555
65.00	-25.71	-31.33	0.00	-1,904.45	0.00	1,904.45	3,957.85	1,978.93	7,309.16	3,609.72	12.48	-1.91	0.534
70.00	-24.54	-30.60	0.00	-1,747.80	0.00	1,747.80	3,894.01	1,947.01	6,990.39	3,452.29	14.58	-2.08	0.513
75.00	-23.40	-29.87	0.00	-1,594.81	0.00	1,594.81	3,827.57	1,913.78	6,673.67	3,295.87	16.85	-2.26	0.490
80.00	-22.29	-29.14	0.00	-1,445.49	0.00	1,445.49	3,758.52	1,879.26	6,359.40	3,140.67	19.31	-2.43	0.466
85.00	-21.22	-28.42	0.00	-1,299.78	0.00	1,299.78	3,686.86	1,843.43	6,047.97	2,986.87	21.94	-2.60	0.441
90.00	-20.17	-27.71	0.00	-1,157.67	0.00	1,157.67	3,612.61	1,806.30	5,739.81	2,834.68	24.75	-2.76	0.414
95.00	-19.17	-27.30	0.00	-1,019.11	0.00	1,019.11	3,535.74	1,767.87	5,435.30	2,684.29	27.73	-2.92	0.385
95.50	-19.05	-26.97	0.00	-1,005.46	0.00	1,005.46	3,527.92	1,763.96	5,405.07	2,669.36	28.04	-2.94	0.382
100.00	-17.66	-26.53	0.00	-884.10	0.00	884.10	3,456.28	1,728.14	5,134.86	2,535.91	30.88	-3.08	0.354
101.00	-17.34	-26.19	0.00	-857.57	0.00	857.57	2,422.80	1,211.40	3,656.13	1,805.62	31.53	-3.11	0.483
105.00	-16.69	-25.59	0.00	-752.80	0.00	752.80	2,386.99	1,193.50	3,503.59	1,730.29	34.18	-3.23	0.443
110.00	-15.90	-24.92	0.00	-624.87	0.00	624.87	2,339.89	1,169.95	3,313.75	1,636.54	37.66	-3.40	0.389
115.00	-14.43	-22.58	0.00	-500.28	0.00	500.28	2,290.19	1,145.09	3,125.22	1,543.43	41.31	-3.55	0.331
120.00	-13.73	-22.11	0.00	-387.38	0.00	387.38	2,237.88	1,118.94	2,938.40	1,451.17	45.10	-3.69	0.273
122.00	-11.61	-18.69	0.00	-343.16	0.00	343.16	2,216.23	1,108.11	2,864.24	1,414.54	46.66	-3.74	0.248
125.00	-11.22	-18.43	0.00	-287.08	0.00	287.08	2,182.97	1,091.48	2,753.69	1,359.95	49.03	-3.81	0.217
126.00	-8.05	-13.88	0.00	-268.65	0.00	268.65	2,171.67	1,085.84	2,717.04	1,341.84	49.83	-3.83	0.204
130.00	-7.59	-13.33	0.00	-213.12	0.00	213.12	2,125.45	1,062.73	2,571.50	1,269.97	53.07	-3.91	0.172
135.00	-7.04	-12.73	0.00	-146.47	0.00	146.47	2,065.33	1,032.67	2,392.23	1,181.43	57.20	-3.98	0.128
140.00	-4.08	-7.66	0.00	-82.85	0.00	82.85	1,995.73	997.87	2,208.66	1,090.78	61.41	-4.04	0.078
145.00	-3.62	-7.10	0.00	-44.55	0.00	44.55	1,903.77	951.88	2,008.69	992.02	65.66	-4.08	0.047
150.00	0.00	-6.82	0.00	-9.07	0.00	9.07	1,811.80	905.90	1,818.20	897.94	69.93	-4.09	0.010

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:49 AM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi

40 mph with 1.00 in Radial Ice

20 Iterations

Gust Response Factor :1.10

Ice Dead Load Factor 1.00

Wind Importance Factor 1.00

Dead Load Factor :1.20

Ice Importance Factor 1.00

Wind Load Factor :1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion			Moment
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		59.2	0.0					0.0	0.0	59.2	0.0	0.0	0.0
5.00		117.6	2,560.4					142.0	204.8	259.5	2,765.2	0.0	0.0
10.00		115.7	2,578.3					150.1	439.4	265.8	3,017.7	0.0	0.0
15.00		115.4	2,559.0					149.2	448.2	264.6	3,007.2	0.0	0.0
20.00		118.1	2,527.4					152.6	454.4	270.7	2,981.8	0.0	0.0
25.00		121.5	2,489.5					159.3	459.2	280.8	2,948.7	0.0	0.0
30.00		123.7	2,447.7					164.4	463.2	288.1	2,910.9	0.0	0.0
35.00		125.2	2,403.1					168.4	466.6	293.6	2,869.6	0.0	0.0
40.00		126.0	2,356.4					171.5	469.5	297.5	2,826.0	0.0	0.0
45.00		89.5	2,308.2					174.0	472.2	263.5	2,780.4	0.0	0.0
47.08	Bot - Section 2	63.8	949.2					73.1	197.4	136.9	1,146.7	0.0	0.0
50.00		88.7	2,080.8					102.8	277.1	191.5	2,357.9	0.0	0.0
54.00	Top - Section 1	64.1	2,805.9					141.8	381.2	205.9	3,187.2	0.0	0.0
55.00		76.6	388.5					35.9	95.5	112.5	484.0	0.0	0.0
60.00		127.2	1,909.4					180.2	478.7	307.4	2,388.1	0.0	0.0
65.00		126.3	1,864.9					181.0	480.6	307.3	2,345.6	0.0	0.0
70.00		125.1	1,819.9					181.5	482.4	306.6	2,302.2	0.0	0.0
75.00		123.8	1,774.2					181.7	484.0	305.5	2,258.2	0.0	0.0
80.00		122.2	1,728.0					181.7	485.5	304.0	2,213.5	0.0	0.0
85.00		120.5	1,681.3					181.5	487.0	302.0	2,168.3	0.0	0.0
90.00		118.6	1,634.2					181.1	488.4	299.8	2,122.6	0.0	0.0
95.00		64.7	1,586.8					180.6	489.7	245.2	2,076.5	0.0	0.0
95.50	Bot - Section 3	58.6	156.8					18.0	49.0	76.6	205.9	0.0	0.0
100.00		64.4	2,083.1					161.8	441.9	226.2	2,525.0	0.0	0.0
101.00	Top - Section 2	57.6	456.0					35.9	98.3	93.4	554.4	0.0	0.0
105.00		102.4	1,035.4					144.3	393.8	246.7	1,429.2	0.0	0.0
110.00		111.6	1,255.7					179.5	493.3	291.2	1,749.0	0.0	0.0
115.00	Appurtenance(s)	109.1	1,214.7	302.9	0.0	0.0	2,526.6	178.5	494.4	590.5	4,235.7	0.0	0.0
120.00		75.1	1,173.4					162.8	447.4	238.0	1,620.8	0.0	0.0
122.00	Appurtenance(s)	52.6	459.9	583.5	0.0	0.0	5,564.6	64.7	179.2	700.9	6,203.7	0.0	0.0
125.00		41.8	676.3					96.6	248.7	138.4	925.0	0.0	0.0
126.00	Appurtenance(s)	51.3	222.8	818.6	0.0	0.0	9,536.2	32.1	83.0	902.0	9,842.0	0.0	0.0
130.00		90.8	870.1					0.0	146.0	90.8	1,016.1	0.0	0.0
135.00		98.3	1,048.0					0.0	182.5	98.3	1,230.5	0.0	0.0
140.00	Appurtenance(s)	95.4	1,005.9	851.0	0.0	0.0	8,019.1	0.0	182.5	946.4	9,207.4	0.0	0.0
145.00		92.4	963.5					0.0	111.4	92.4	1,074.9	0.0	0.0
150.00	Appurtenance(s)	45.4	920.9	415.2	0.0	0.0	4,091.6	0.0	111.4	460.6	5,123.9	0.0	0.0
Totals:										10,760.2	98,101.7	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:53 AM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi

40 mph with 1.00 in Radial Ice

20 Iterations

Gust Response Factor :1.10

Ice Dead Load Factor 1.00

Wind Importance Factor 1.00

Dead Load Factor :1.20

Ice Importance Factor :1.00

Wind Load Factor :1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-105.79	-11.49	0.00	-1,114.05	0.00	1,114.05	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.162
5.00	-103.02	-11.29	0.00	-1,056.61	0.00	1,056.61	6,215.54	3,107.77	15,067.9	7,441.50	0.02	-0.03	0.159
10.00	-100.00	-11.08	0.00	-1,000.15	0.00	1,000.15	6,144.79	3,072.40	14,579.4	7,200.24	0.07	-0.07	0.155
15.00	-96.98	-10.88	0.00	-944.73	0.00	944.73	6,071.43	3,035.72	14,092.2	6,959.61	0.17	-0.11	0.152
20.00	-93.99	-10.66	0.00	-890.35	0.00	890.35	5,995.47	2,997.74	13,606.6	6,719.80	0.30	-0.14	0.148
25.00	-91.04	-10.43	0.00	-837.07	0.00	837.07	5,916.91	2,958.45	13,123.0	6,481.00	0.46	-0.18	0.145
30.00	-88.12	-10.18	0.00	-784.94	0.00	784.94	5,835.74	2,917.87	12,642.0	6,243.42	0.67	-0.21	0.141
35.00	-85.25	-9.93	0.00	-734.03	0.00	734.03	5,751.96	2,875.98	12,163.8	6,007.26	0.91	-0.25	0.137
40.00	-82.42	-9.67	0.00	-684.37	0.00	684.37	5,665.59	2,832.79	11,688.9	5,772.72	1.19	-0.29	0.133
45.00	-79.63	-9.43	0.00	-636.00	0.00	636.00	5,576.61	2,788.30	11,217.6	5,539.99	1.51	-0.32	0.129
47.08	-78.49	-9.31	0.00	-616.36	0.00	616.36	5,538.76	2,769.38	11,022.5	5,443.60	1.65	-0.34	0.127
50.00	-76.13	-9.14	0.00	-589.20	0.00	589.20	5,485.02	2,742.51	10,750.5	5,309.27	1.87	-0.36	0.125
54.00	-72.94	-8.94	0.00	-552.63	0.00	552.63	4,089.14	2,044.57	8,015.68	3,958.64	2.18	-0.39	0.157
55.00	-72.45	-8.85	0.00	-543.70	0.00	543.70	4,077.72	2,038.86	7,951.24	3,926.82	2.26	-0.40	0.156
60.00	-70.06	-8.58	0.00	-499.43	0.00	499.43	4,019.09	2,009.54	7,629.58	3,767.96	2.70	-0.44	0.150
65.00	-67.71	-8.30	0.00	-456.53	0.00	456.53	3,957.85	1,978.93	7,309.16	3,609.72	3.18	-0.48	0.144
70.00	-65.40	-8.02	0.00	-415.02	0.00	415.02	3,894.01	1,947.01	6,990.39	3,452.29	3.70	-0.52	0.137
75.00	-63.14	-7.74	0.00	-374.90	0.00	374.90	3,827.57	1,913.78	6,673.67	3,295.87	4.27	-0.56	0.130
80.00	-60.93	-7.46	0.00	-336.20	0.00	336.20	3,758.52	1,879.26	6,359.40	3,140.67	4.88	-0.60	0.123
85.00	-58.76	-7.17	0.00	-298.92	0.00	298.92	3,686.86	1,843.43	6,047.97	2,986.87	5.53	-0.64	0.116
90.00	-56.63	-6.88	0.00	-263.07	0.00	263.07	3,612.61	1,806.30	5,739.81	2,834.68	6.23	-0.68	0.108
95.00	-54.56	-6.63	0.00	-228.65	0.00	228.65	3,535.74	1,767.87	5,435.30	2,684.29	6.96	-0.72	0.101
95.50	-54.35	-6.57	0.00	-225.34	0.00	225.34	3,527.92	1,763.96	5,405.07	2,669.36	7.03	-0.72	0.100
100.00	-51.83	-6.33	0.00	-195.78	0.00	195.78	3,456.28	1,728.14	5,134.86	2,535.91	7.72	-0.75	0.092
101.00	-51.27	-6.24	0.00	-189.45	0.00	189.45	2,422.80	1,211.40	3,656.13	1,805.62	7.88	-0.76	0.126
105.00	-49.84	-6.00	0.00	-164.48	0.00	164.48	2,386.99	1,193.50	3,503.59	1,730.29	8.53	-0.78	0.116
110.00	-48.10	-5.72	0.00	-134.46	0.00	134.46	2,339.89	1,169.95	3,313.75	1,636.54	9.37	-0.82	0.103
115.00	-43.87	-5.09	0.00	-105.88	0.00	105.88	2,290.19	1,145.09	3,125.22	1,543.43	10.25	-0.85	0.088
120.00	-42.25	-4.84	0.00	-80.44	0.00	80.44	2,237.88	1,118.94	2,938.40	1,451.17	11.16	-0.88	0.074
122.00	-36.05	-4.05	0.00	-70.76	0.00	70.76	2,216.23	1,108.11	2,864.24	1,414.54	11.53	-0.89	0.066
125.00	-35.13	-3.90	0.00	-58.61	0.00	58.61	2,182.97	1,091.48	2,753.69	1,359.95	12.09	-0.91	0.059
126.00	-25.30	-2.85	0.00	-54.70	0.00	54.70	2,171.67	1,085.84	2,717.04	1,341.84	12.28	-0.91	0.052
130.00	-24.29	-2.75	0.00	-43.30	0.00	43.30	2,125.45	1,062.73	2,571.50	1,269.97	13.05	-0.93	0.046
135.00	-23.06	-2.64	0.00	-29.56	0.00	29.56	2,065.33	1,032.67	2,392.23	1,181.43	14.03	-0.94	0.036
140.00	-13.87	-1.54	0.00	-16.37	0.00	16.37	1,995.73	997.87	2,208.66	1,090.78	15.02	-0.95	0.022
145.00	-12.80	-1.43	0.00	-8.67	0.00	8.67	1,903.77	951.88	2,008.69	992.02	16.02	-0.96	0.015
150.00	0.00	-1.22	0.00	-1.51	0.00	1.51	1,811.80	905.90	1,818.20	897.94	17.03	-0.96	0.002

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:53 AM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W

Serviceability 60 mph

20 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :1.00

Wind Load Factor :1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
Seg			Dead	Torsion		Moment	Dead		Dead	Torsion		Moment	
Elev		Wind FX	Load	Wind FX	MY	MZ	Load	Wind FX	Load	Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		94.6	0.0					0.0	0.0	94.6	0.0	0.0	0.0
5.00		187.2	1,626.6					0.0	74.3	187.2	1,700.9	0.0	0.0
10.00		183.3	1,592.6					0.0	243.2	183.3	1,835.7	0.0	0.0
15.00		182.2	1,558.6					0.0	243.2	182.2	1,801.8	0.0	0.0
20.00		185.9	1,524.7					0.0	243.2	185.9	1,767.8	0.0	0.0
25.00		190.6	1,490.7					0.0	243.2	190.6	1,733.9	0.0	0.0
30.00		193.6	1,456.7					0.0	243.2	193.6	1,699.9	0.0	0.0
35.00		195.3	1,422.8					0.0	243.2	195.3	1,665.9	0.0	0.0
40.00		196.1	1,388.8					0.0	243.2	196.1	1,632.0	0.0	0.0
45.00		139.0	1,354.8					0.0	243.2	139.0	1,598.0	0.0	0.0
47.08	Bot - Section 2	98.9	554.5					0.0	101.3	98.9	655.8	0.0	0.0
50.00		137.5	1,400.5					0.0	141.8	137.5	1,542.3	0.0	0.0
54.00	Top - Section 1	99.2	1,886.6					0.0	194.5	99.2	2,081.1	0.0	0.0
55.00		118.3	210.8					0.0	48.6	118.3	259.5	0.0	0.0
60.00		196.1	1,037.6					0.0	243.2	196.1	1,280.7	0.0	0.0
65.00		194.1	1,010.0					0.0	243.2	194.1	1,253.1	0.0	0.0
70.00		191.8	982.4					0.0	243.2	191.8	1,225.5	0.0	0.0
75.00		189.1	954.8					0.0	243.2	189.1	1,198.0	0.0	0.0
80.00		186.1	927.2					0.0	243.2	186.1	1,170.4	0.0	0.0
85.00		182.9	899.7					0.0	243.2	182.9	1,142.8	0.0	0.0
90.00		179.4	872.1					0.0	243.2	179.4	1,115.2	0.0	0.0
95.00		97.6	844.5					0.0	243.2	97.6	1,087.7	0.0	0.0
95.50	Bot - Section 3	88.2	82.9					0.0	24.3	88.2	107.2	0.0	0.0
100.00		96.9	1,310.0					0.0	218.8	96.9	1,528.9	0.0	0.0
101.00	Top - Section 2	86.3	285.7					0.0	48.6	86.3	334.4	0.0	0.0
105.00		153.2	494.2					0.0	194.5	153.2	688.7	0.0	0.0
110.00		166.3	598.6					0.0	243.2	166.3	841.8	0.0	0.0
115.00	Appurtenance(s)	161.9	577.4	406.4	0.0	0.0	907.1	0.0	243.2	568.3	1,727.7	0.0	0.0
120.00		111.1	556.2					0.0	223.4	111.1	779.6	0.0	0.0
122.00	Appurtenance(s)	77.5	216.5	738.9	0.0	0.0	2,270.0	0.0	89.4	816.4	2,575.9	0.0	0.0
125.00		61.4	318.4					0.0	117.0	61.4	435.5	0.0	0.0
126.00	Appurtenance(s)	75.1	104.4	1,002.1	0.0	0.0	3,691.5	0.0	39.0	1,077.1	3,835.0	0.0	0.0
130.00		132.4	409.3					0.0	121.6	132.4	530.9	0.0	0.0
135.00		142.6	492.5					0.0	152.1	142.6	644.5	0.0	0.0
140.00	Appurtenance(s)	137.4	471.3	1,067.9	0.0	0.0	3,049.6	0.0	152.1	1,205.3	3,672.9	0.0	0.0
145.00		132.1	450.0					0.0	92.9	132.1	542.9	0.0	0.0
150.00	Appurtenance(s)	64.7	428.8	503.6	0.0	0.0	2,000.0	0.0	92.9	568.3	2,521.7	0.0	0.0
Totals:										9,024.78	50,215.3	0.00	0.00

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W

Serviceability 60 mph

20 Iterations

Gust Response Factor :1.10

Wind Importance Factor 1.00

Dead Load Factor :1.00

Wind Load Factor :1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-52.27	-10.07	0.00	-1,065.67	0.00	1,065.67	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.147
5.00	-50.56	-9.91	0.00	-1,015.31	0.00	1,015.31	6,215.54	3,107.77	15,067.9	7,441.50	0.02	-0.03	0.145
10.00	-48.72	-9.76	0.00	-965.74	0.00	965.74	6,144.79	3,072.40	14,579.4	7,200.24	0.07	-0.07	0.142
15.00	-46.91	-9.60	0.00	-916.95	0.00	916.95	6,071.43	3,035.72	14,092.2	6,959.61	0.16	-0.10	0.139
20.00	-45.14	-9.44	0.00	-868.95	0.00	868.95	5,995.47	2,997.74	13,606.6	6,719.80	0.28	-0.14	0.137
25.00	-43.40	-9.27	0.00	-821.75	0.00	821.75	5,916.91	2,958.45	13,123.0	6,481.00	0.45	-0.17	0.134
30.00	-41.69	-9.10	0.00	-775.40	0.00	775.40	5,835.74	2,917.87	12,642.0	6,243.42	0.64	-0.21	0.131
35.00	-40.02	-8.92	0.00	-729.91	0.00	729.91	5,751.96	2,875.98	12,163.8	6,007.26	0.88	-0.24	0.128
40.00	-38.39	-8.74	0.00	-685.31	0.00	685.31	5,665.59	2,832.79	11,688.9	5,772.72	1.15	-0.28	0.126
45.00	-36.79	-8.61	0.00	-641.60	0.00	641.60	5,576.61	2,788.30	11,217.6	5,539.99	1.47	-0.32	0.122
47.08	-36.13	-8.52	0.00	-623.66	0.00	623.66	5,538.76	2,769.38	11,022.5	5,443.60	1.61	-0.33	0.121
50.00	-34.58	-8.39	0.00	-598.81	0.00	598.81	5,485.02	2,742.51	10,750.5	5,309.27	1.82	-0.35	0.119
54.00	-32.50	-8.29	0.00	-565.25	0.00	565.25	4,089.14	2,044.57	8,015.68	3,958.64	2.12	-0.38	0.151
55.00	-32.24	-8.18	0.00	-556.97	0.00	556.97	4,077.72	2,038.86	7,951.24	3,926.82	2.21	-0.39	0.150
60.00	-30.95	-8.00	0.00	-516.06	0.00	516.06	4,019.09	2,009.54	7,629.58	3,767.96	2.64	-0.43	0.145
65.00	-29.69	-7.82	0.00	-476.06	0.00	476.06	3,957.85	1,978.93	7,309.16	3,609.72	3.12	-0.48	0.139
70.00	-28.47	-7.64	0.00	-436.97	0.00	436.97	3,894.01	1,947.01	6,990.39	3,452.29	3.64	-0.52	0.134
75.00	-27.26	-7.46	0.00	-398.78	0.00	398.78	3,827.57	1,913.78	6,673.67	3,295.87	4.21	-0.56	0.128
80.00	-26.09	-7.28	0.00	-361.49	0.00	361.49	3,758.52	1,879.26	6,359.40	3,140.67	4.82	-0.61	0.122
85.00	-24.94	-7.10	0.00	-325.10	0.00	325.10	3,686.86	1,843.43	6,047.97	2,986.87	5.48	-0.65	0.116
90.00	-23.83	-6.93	0.00	-289.59	0.00	289.59	3,612.61	1,806.30	5,739.81	2,834.68	6.18	-0.69	0.109
95.00	-22.74	-6.82	0.00	-254.96	0.00	254.96	3,535.74	1,767.87	5,435.30	2,684.29	6.93	-0.73	0.101
95.50	-22.63	-6.74	0.00	-251.55	0.00	251.55	3,527.92	1,763.96	5,405.07	2,669.36	7.00	-0.73	0.101
100.00	-21.10	-6.63	0.00	-221.21	0.00	221.21	3,456.28	1,728.14	5,134.86	2,535.91	7.71	-0.77	0.093
101.00	-20.76	-6.55	0.00	-214.58	0.00	214.58	2,422.80	1,211.40	3,656.13	1,805.62	7.87	-0.78	0.127
105.00	-20.07	-6.40	0.00	-188.38	0.00	188.38	2,386.99	1,193.50	3,503.59	1,730.29	8.54	-0.81	0.117
110.00	-19.23	-6.23	0.00	-156.39	0.00	156.39	2,339.89	1,169.95	3,313.75	1,636.54	9.41	-0.85	0.104
115.00	-17.51	-5.65	0.00	-125.21	0.00	125.21	2,290.19	1,145.09	3,125.22	1,543.43	10.32	-0.89	0.089
120.00	-16.73	-5.53	0.00	-96.96	0.00	96.96	2,237.88	1,118.94	2,938.40	1,451.17	11.27	-0.92	0.074
122.00	-14.16	-4.68	0.00	-85.89	0.00	85.89	2,216.23	1,108.11	2,864.24	1,414.54	11.66	-0.93	0.067
125.00	-13.73	-4.61	0.00	-71.85	0.00	71.85	2,182.97	1,091.48	2,753.69	1,359.95	12.25	-0.95	0.059
126.00	-9.91	-3.48	0.00	-67.24	0.00	67.24	2,171.67	1,085.84	2,717.04	1,341.84	12.45	-0.96	0.055
130.00	-9.38	-3.34	0.00	-53.34	0.00	53.34	2,125.45	1,062.73	2,571.50	1,269.97	13.26	-0.98	0.046
135.00	-8.74	-3.19	0.00	-36.65	0.00	36.65	2,065.33	1,032.67	2,392.23	1,181.43	14.30	-1.00	0.035
140.00	-5.09	-1.92	0.00	-20.72	0.00	20.72	1,995.73	997.87	2,208.66	1,090.78	15.35	-1.01	0.022
145.00	-4.55	-1.78	0.00	-11.14	0.00	11.14	1,903.77	951.88	2,008.69	992.02	16.41	-1.02	0.014
150.00	0.00	-1.70	0.00	-2.25	0.00	2.25	1,811.80	905.90	1,818.20	897.94	17.48	-1.02	0.003

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period (S_s):	0.11
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.11
Long-Period Transition Period (T_L):	12
Importance Factor (I_E):	1.00
Site Coefficient F_a :	1.60
Site Coefficient F_v :	2.36
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.12
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.17
Seismic Response Coefficient (C_s):	0.06
Upper Limit C_s	0.06
Lower Limit C_s	0.03
Period based on Rayleigh Method (sec):	2.09
Redundancy Factor (p):	1.00
Seismic Force Distribution Exponent (k):	1.79
Total Unfactored Dead Load:	52.27 k
Seismic Base Shear (E):	2.89 k

Load Case (1.2 + 0.2Sds) * DL + E ELFM**Seismic Equivalent Lateral Forces Method**

Segment	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	C_{vx}	Horizontal Force (lb)	Vertical Force (lb)
36	147.50	522	4,027	0.024	69	639
35	142.50	543	3,940	0.023	67	665
34	137.50	623	4,243	0.025	72	763
33	132.50	645	4,106	0.024	70	789
32	128.00	531	3,179	0.019	54	650
31	125.50	143	829	0.005	14	176
30	123.50	435	2,445	0.014	42	533
29	121.00	306	1,656	0.010	28	374
28	117.50	780	4,004	0.024	68	954
27	112.50	821	3,898	0.023	66	1,004
26	107.50	842	3,686	0.022	63	1,030
25	103.00	689	2,793	0.016	48	843
24	100.50	334	1,298	0.008	22	409
23	97.75	1,529	5,646	0.033	96	1,872
22	95.25	107	378	0.002	6	131
21	92.50	1,088	3,638	0.021	62	1,331
20	87.50	1,115	3,377	0.020	57	1,365
19	82.50	1,143	3,114	0.018	53	1,399
18	77.50	1,170	2,851	0.017	48	1,433
17	72.50	1,198	2,589	0.015	44	1,466
16	67.50	1,226	2,330	0.014	40	1,500
15	62.50	1,253	2,076	0.012	35	1,534
14	57.50	1,281	1,827	0.011	31	1,568

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

13	54.50	259	336	0.002	6	318
12	52.00	2,081	2,479	0.015	42	2,547
11	48.54	1,542	1,624	0.010	28	1,888
10	46.04	656	628	0.004	11	803
9	42.50	1,598	1,326	0.008	23	1,956
8	37.50	1,632	1,082	0.006	18	1,998
7	32.50	1,666	855	0.005	15	2,039
6	27.50	1,700	646	0.004	11	2,081
5	22.50	1,734	460	0.003	8	2,122
4	17.50	1,768	299	0.002	5	2,164
3	12.50	1,802	167	0.001	3	2,206
2	7.50	1,836	68	0.000	1	2,247
1	2.50	1,701	9	0.000	0	2,082
Powerwave Allgon TT0	150.00	66	525	0.003	9	81
Nokia AirScale RRH 4	150.00	110	878	0.005	15	135
Raycap DC6-48-60-18-	150.00	33	261	0.002	4	40
Raycap DC6-48-60-18-	150.00	16	127	0.001	2	20
Raycap DC6-48-60-0-8	150.00	16	127	0.001	2	20
Nokia AHLBBA	150.00	284	2,263	0.013	38	348
Alcatel-Lucent RRH4X	150.00	210	1,671	0.010	28	257
Nokia AirScale Dual	150.00	265	2,105	0.012	36	324
Nokia AEQK AirScale	150.00	298	2,368	0.014	40	364
Commscope JAH4-65C-R	150.00	262	2,084	0.012	35	321
CCI TPA65R-BU8D	150.00	495	3,938	0.023	67	606
Flat Platform with H	150.00	2,000	15,912	0.094	271	2,448
Powerwave Allgon LGP	140.00	59	418	0.002	7	73
Ericsson Radio 4449	140.00	210	1,476	0.009	25	257
Ericsson 8843 Rev 2	140.00	225	1,582	0.009	27	275
Raycap RRFDC-3315-PF	140.00	54	378	0.002	6	66
Ericsson AIR 6449 B7	140.00	245	1,721	0.010	29	300
Antel BXA-80063/8CF	140.00	72	506	0.003	9	88
Commscope NHH-65C-R2	140.00	310	2,177	0.013	37	379
Generic Round Low Pr	140.00	1,875	13,182	0.078	224	2,295
Andrew ETW190VS12UB	126.00	33	192	0.001	3	40
Nokia AirScale Dual	126.00	251	1,463	0.009	25	308
Nokia FRIG w/o Solar	126.00	162	943	0.006	16	198
Nokia FHFB	126.00	146	847	0.005	14	178
Raycap ASU9338TYP01	126.00	15	87	0.001	1	18
Andrew TMBXX-6516-A2	126.00	208	1,208	0.007	21	254
Commscope FFHH-65C-R	126.00	377	2,195	0.013	37	462
Generic Round Platfo	126.00	2,500	14,552	0.086	248	3,060
Generic 48" x 12" Pa	122.00	270	1,483	0.009	25	331
Flat Platform with H	122.00	2,000	10,987	0.065	187	2,448
DragonWave Horizon D	115.00	14	69	0.000	1	17
Samsung 2.5GHz nRRHv	115.00	152	752	0.004	13	186
Argus LLPX310R	115.00	86	424	0.002	7	105
Andrew Microwaves VH	115.00	95	470	0.003	8	117
Side Arms	115.00	560	2,767	0.016	47	685
		52,270	170,046	1.000	2,892	63,984

Load Case (0.9 - 0.2Sds) * DL + E ELFM

Seismic (Reduced DL) Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	W _z (lb-ft)	C _{vx}	Horizontal Force (lb)	Vertical Force (lb)
36	147.50	522	4,027	0.024	69	457
35	142.50	543	3,940	0.023	67	476
34	137.50	623	4,243	0.025	72	546
33	132.50	645	4,106	0.024	70	565
32	128.00	531	3,179	0.019	54	465
31	125.50	143	829	0.005	14	126

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

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Customer: VERIZON WIRELESS

30	123.50	435	2,445	0.014	42	381
29	121.00	306	1,656	0.010	28	268
28	117.50	780	4,004	0.024	68	683
27	112.50	821	3,898	0.023	66	719
26	107.50	842	3,686	0.022	63	737
25	103.00	689	2,793	0.016	48	603
24	100.50	334	1,298	0.008	22	293
23	97.75	1,529	5,646	0.033	96	1,339
22	95.25	107	378	0.002	6	94
21	92.50	1,088	3,638	0.021	62	953
20	87.50	1,115	3,377	0.020	57	977
19	82.50	1,143	3,114	0.018	53	1,001
18	77.50	1,170	2,851	0.017	48	1,025
17	72.50	1,198	2,589	0.015	44	1,049
16	67.50	1,226	2,330	0.014	40	1,073
15	62.50	1,253	2,076	0.012	35	1,098
14	57.50	1,281	1,827	0.011	31	1,122
13	54.50	259	336	0.002	6	227
12	52.00	2,081	2,479	0.015	42	1,823
11	48.54	1,542	1,624	0.010	28	1,351
10	46.04	656	628	0.004	11	574
9	42.50	1,598	1,326	0.008	23	1,400
8	37.50	1,632	1,082	0.006	18	1,429
7	32.50	1,666	855	0.005	15	1,459
6	27.50	1,700	646	0.004	11	1,489
5	22.50	1,734	460	0.003	8	1,519
4	17.50	1,768	299	0.002	5	1,548
3	12.50	1,802	167	0.001	3	1,578
2	7.50	1,836	68	0.000	1	1,608
1	2.50	1,701	9	0.000	0	1,490
Powerwave Allgon TT0	150.00	66	525	0.003	9	58
Nokia AirScale RRH 4	150.00	110	878	0.005	15	97
Raycap DC6-48-60-18-	150.00	33	261	0.002	4	29
Raycap DC6-48-60-18-	150.00	16	127	0.001	2	14
Raycap DC6-48-60-0-8	150.00	16	127	0.001	2	14
Nokia AHLBBA	150.00	284	2,263	0.013	38	249
Alcatel-Lucent RRH4X	150.00	210	1,671	0.010	28	184
Nokia AirScale Dual	150.00	265	2,105	0.012	36	232
Nokia AEQK AirScale	150.00	298	2,368	0.014	40	261
Commscope JAH4-65C-R	150.00	262	2,084	0.012	35	229
CCI TPA65R-BU8D	150.00	495	3,938	0.023	67	434
Flat Platform with H	150.00	2,000	15,912	0.094	271	1,752
Powerwave Allgon LGP	140.00	59	418	0.002	7	52
Ericsson Radio 4449	140.00	210	1,476	0.009	25	184
Ericsson 8843 Rev 2	140.00	225	1,582	0.009	27	197
Raycap RRFDC-3315-PF	140.00	54	378	0.002	6	47
Ericsson AIR 6449 B7	140.00	245	1,721	0.010	29	214
Antel BXA-80063/8CF	140.00	72	506	0.003	9	63
Commscope NHH-65C-R2	140.00	310	2,177	0.013	37	271
Generic Round Low Pr	140.00	1,875	13,182	0.078	224	1,642
Andrew ETW190VS12UB	126.00	33	192	0.001	3	29
Nokia AirScale Dual	126.00	251	1,463	0.009	25	220
Nokia FRIG w/o Solar	126.00	162	943	0.006	16	142
Nokia FHFB	126.00	146	847	0.005	14	127
Raycap ASU9338TYP01	126.00	15	87	0.001	1	13
Andrew TMBXX-6516-A2	126.00	208	1,208	0.007	21	182
Commscope FFHH-65C-R	126.00	377	2,195	0.013	37	330
Generic Round Platfo	126.00	2,500	14,552	0.086	248	2,190
Generic 48" x 12" Pa	122.00	270	1,483	0.009	25	236
Flat Platform with H	122.00	2,000	10,987	0.065	187	1,752
DragonWave Horizon D	115.00	14	69	0.000	1	12
Samsung 2.5GHz nRRHv	115.00	152	752	0.004	13	133
Argus LLPX310R	115.00	86	424	0.002	7	75
Andrew Microwaves VH	115.00	95	470	0.003	8	83

Side Arms	115.00	560	2,767	0.016	47	491
		52,270	170,046	1.000	2,892	45,783

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Load Case (1.2 + 0.2Sds) * DL + E ELFM

Seismic Equivalent Lateral Forces Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-61.90	-2.90	0.00	-354.28	0.00	354.28	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.056
5.00	-59.65	-2.91	0.00	-339.79	0.00	339.79	6,215.54	3,107.77	15,067.9	7,441.50	0.01	-0.01	0.055
10.00	-57.45	-2.92	0.00	-325.25	0.00	325.25	6,144.79	3,072.40	14,579.4	7,200.24	0.02	-0.02	0.055
15.00	-55.28	-2.92	0.00	-310.67	0.00	310.67	6,071.43	3,035.72	14,092.2	6,959.61	0.05	-0.03	0.054
20.00	-53.16	-2.92	0.00	-296.06	0.00	296.06	5,995.47	2,997.74	13,606.6	6,719.80	0.10	-0.05	0.053
25.00	-51.08	-2.92	0.00	-281.45	0.00	281.45	5,916.91	2,958.45	13,123.0	6,481.00	0.15	-0.06	0.052
30.00	-49.04	-2.91	0.00	-266.85	0.00	266.85	5,835.74	2,917.87	12,642.0	6,243.42	0.22	-0.07	0.051
35.00	-47.04	-2.90	0.00	-252.27	0.00	252.27	5,751.96	2,875.98	12,163.8	6,007.26	0.30	-0.08	0.050
40.00	-45.08	-2.89	0.00	-237.76	0.00	237.76	5,665.59	2,832.79	11,688.9	5,772.72	0.39	-0.09	0.049
45.00	-44.28	-2.88	0.00	-223.31	0.00	223.31	5,576.61	2,788.30	11,217.6	5,539.99	0.50	-0.11	0.048
47.08	-42.39	-2.86	0.00	-217.31	0.00	217.31	5,538.76	2,769.38	11,022.5	5,443.60	0.54	-0.11	0.048
50.00	-39.84	-2.82	0.00	-208.98	0.00	208.98	5,485.02	2,742.51	10,750.5	5,309.27	0.62	-0.12	0.047
54.00	-39.53	-2.81	0.00	-197.72	0.00	197.72	4,089.14	2,044.57	8,015.68	3,958.64	0.72	-0.13	0.060
55.00	-37.96	-2.78	0.00	-194.90	0.00	194.90	4,077.72	2,038.86	7,951.24	3,926.82	0.75	-0.13	0.059
60.00	-36.42	-2.76	0.00	-180.98	0.00	180.98	4,019.09	2,009.54	7,629.58	3,767.96	0.90	-0.15	0.057
65.00	-34.92	-2.72	0.00	-167.20	0.00	167.20	3,957.85	1,978.93	7,309.16	3,609.72	1.06	-0.16	0.055
70.00	-33.46	-2.68	0.00	-153.60	0.00	153.60	3,894.01	1,947.01	6,990.39	3,452.29	1.24	-0.18	0.053
75.00	-32.02	-2.64	0.00	-140.19	0.00	140.19	3,827.57	1,913.78	6,673.67	3,295.87	1.44	-0.19	0.051
80.00	-30.62	-2.59	0.00	-127.01	0.00	127.01	3,758.52	1,879.26	6,359.40	3,140.67	1.65	-0.21	0.049
85.00	-29.26	-2.53	0.00	-114.07	0.00	114.07	3,686.86	1,843.43	6,047.97	2,986.87	1.88	-0.22	0.046
90.00	-27.93	-2.47	0.00	-101.41	0.00	101.41	3,612.61	1,806.30	5,739.81	2,834.68	2.12	-0.24	0.044
95.00	-27.79	-2.47	0.00	-89.06	0.00	89.06	3,535.74	1,767.87	5,435.30	2,684.29	2.38	-0.25	0.041
95.50	-25.92	-2.37	0.00	-87.82	0.00	87.82	3,527.92	1,763.96	5,405.07	2,669.36	2.41	-0.25	0.040
100.00	-25.51	-2.35	0.00	-77.17	0.00	77.17	3,456.28	1,728.14	5,134.86	2,535.91	2.65	-0.27	0.038
101.00	-24.67	-2.30	0.00	-74.82	0.00	74.82	2,422.80	1,211.40	3,656.13	1,805.62	2.71	-0.27	0.052
105.00	-23.64	-2.24	0.00	-65.63	0.00	65.63	2,386.99	1,193.50	3,503.59	1,730.29	2.94	-0.28	0.048
110.00	-22.64	-2.17	0.00	-54.45	0.00	54.45	2,339.89	1,169.95	3,313.75	1,636.54	3.24	-0.29	0.043
115.00	-20.57	-2.02	0.00	-43.61	0.00	43.61	2,290.19	1,145.09	3,125.22	1,543.43	3.56	-0.31	0.037
120.00	-20.20	-1.99	0.00	-33.51	0.00	33.51	2,237.88	1,118.94	2,938.40	1,451.17	3.89	-0.32	0.032
122.00	-16.89	-1.72	0.00	-29.53	0.00	29.53	2,216.23	1,108.11	2,864.24	1,414.54	4.02	-0.32	0.028
125.00	-16.71	-1.71	0.00	-24.37	0.00	24.37	2,182.97	1,091.48	2,753.69	1,359.95	4.23	-0.33	0.026
126.00	-11.54	-1.26	0.00	-22.66	0.00	22.66	2,171.67	1,085.84	2,717.04	1,341.84	4.30	-0.33	0.022
130.00	-10.76	-1.19	0.00	-17.63	0.00	17.63	2,125.45	1,062.73	2,571.50	1,269.97	4.58	-0.34	0.019
135.00	-9.99	-1.11	0.00	-11.70	0.00	11.70	2,065.33	1,032.67	2,392.23	1,181.43	4.93	-0.34	0.015
140.00	-5.60	-0.65	0.00	-6.15	0.00	6.15	1,995.73	997.87	2,208.66	1,090.78	5.30	-0.35	0.008
145.00	-4.96	-0.58	0.00	-2.90	0.00	2.90	1,903.77	951.88	2,008.69	992.02	5.67	-0.35	0.006
150.00	0.00	-0.55	0.00	0.00	0.00	0.00	1,811.80	905.90	1,818.20	897.94	6.03	-0.35	0.000

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Load Case (0.9 - 0.2Sds) * DL + E ELFMSeismic (Reduced DL) Equivalent Lateral Forces MethodCalculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-44.29	-2.90	0.00	-350.73	0.00	350.73	6,283.69	3,141.85	15,557.3	7,683.17	0.00	0.00	0.053
5.00	-42.68	-2.90	0.00	-336.25	0.00	336.25	6,215.54	3,107.77	15,067.9	7,441.50	0.01	-0.01	0.052
10.00	-41.11	-2.91	0.00	-321.74	0.00	321.74	6,144.79	3,072.40	14,579.4	7,200.24	0.02	-0.02	0.051
15.00	-39.56	-2.91	0.00	-307.20	0.00	307.20	6,071.43	3,035.72	14,092.2	6,959.61	0.05	-0.03	0.051
20.00	-38.04	-2.91	0.00	-292.65	0.00	292.65	5,995.47	2,997.74	13,606.6	6,719.80	0.09	-0.05	0.050
25.00	-36.55	-2.90	0.00	-278.11	0.00	278.11	5,916.91	2,958.45	13,123.0	6,481.00	0.15	-0.06	0.049
30.00	-35.09	-2.90	0.00	-263.58	0.00	263.58	5,835.74	2,917.87	12,642.0	6,243.42	0.21	-0.07	0.048
35.00	-33.66	-2.88	0.00	-249.11	0.00	249.11	5,751.96	2,875.98	12,163.8	6,007.26	0.29	-0.08	0.047
40.00	-32.26	-2.86	0.00	-234.70	0.00	234.70	5,665.59	2,832.79	11,688.9	5,772.72	0.39	-0.09	0.046
45.00	-31.68	-2.86	0.00	-220.37	0.00	220.37	5,576.61	2,788.30	11,217.6	5,539.99	0.49	-0.11	0.045
47.08	-30.33	-2.83	0.00	-214.42	0.00	214.42	5,538.76	2,769.38	11,022.5	5,443.60	0.54	-0.11	0.045
50.00	-28.51	-2.79	0.00	-206.16	0.00	206.16	5,485.02	2,742.51	10,750.5	5,309.27	0.61	-0.12	0.044
54.00	-28.28	-2.79	0.00	-195.00	0.00	195.00	4,089.14	2,044.57	8,015.68	3,958.64	0.71	-0.13	0.056
55.00	-27.16	-2.76	0.00	-192.21	0.00	192.21	4,077.72	2,038.86	7,951.24	3,926.82	0.74	-0.13	0.056
60.00	-26.06	-2.73	0.00	-178.43	0.00	178.43	4,019.09	2,009.54	7,629.58	3,767.96	0.89	-0.15	0.054
65.00	-24.99	-2.69	0.00	-164.80	0.00	164.80	3,957.85	1,978.93	7,309.16	3,609.72	1.05	-0.16	0.052
70.00	-23.94	-2.65	0.00	-151.34	0.00	151.34	3,894.01	1,947.01	6,990.39	3,452.29	1.23	-0.18	0.050
75.00	-22.91	-2.60	0.00	-138.10	0.00	138.10	3,827.57	1,913.78	6,673.67	3,295.87	1.42	-0.19	0.048
80.00	-21.91	-2.55	0.00	-125.08	0.00	125.08	3,758.52	1,879.26	6,359.40	3,140.67	1.63	-0.21	0.046
85.00	-20.93	-2.50	0.00	-112.32	0.00	112.32	3,686.86	1,843.43	6,047.97	2,986.87	1.86	-0.22	0.043
90.00	-19.98	-2.44	0.00	-99.83	0.00	99.83	3,612.61	1,806.30	5,739.81	2,834.68	2.10	-0.24	0.041
95.00	-19.89	-2.43	0.00	-87.65	0.00	87.65	3,535.74	1,767.87	5,435.30	2,684.29	2.35	-0.25	0.038
95.50	-18.55	-2.33	0.00	-86.44	0.00	86.44	3,527.92	1,763.96	5,405.07	2,669.36	2.38	-0.25	0.038
100.00	-18.25	-2.31	0.00	-75.94	0.00	75.94	3,456.28	1,728.14	5,134.86	2,535.91	2.62	-0.26	0.035
101.00	-17.65	-2.26	0.00	-73.63	0.00	73.63	2,422.80	1,211.40	3,656.13	1,805.62	2.67	-0.27	0.048
105.00	-16.91	-2.20	0.00	-64.58	0.00	64.58	2,386.99	1,193.50	3,503.59	1,730.29	2.90	-0.28	0.044
110.00	-16.19	-2.13	0.00	-53.57	0.00	53.57	2,339.89	1,169.95	3,313.75	1,636.54	3.20	-0.29	0.040
115.00	-14.72	-1.99	0.00	-42.90	0.00	42.90	2,290.19	1,145.09	3,125.22	1,543.43	3.51	-0.30	0.034
120.00	-14.45	-1.96	0.00	-32.97	0.00	32.97	2,237.88	1,118.94	2,938.40	1,451.17	3.84	-0.32	0.029
122.00	-12.08	-1.69	0.00	-29.06	0.00	29.06	2,216.23	1,108.11	2,864.24	1,414.54	3.97	-0.32	0.026
125.00	-11.95	-1.68	0.00	-23.98	0.00	23.98	2,182.97	1,091.48	2,753.69	1,359.95	4.17	-0.33	0.023
126.00	-8.26	-1.24	0.00	-22.30	0.00	22.30	2,171.67	1,085.84	2,717.04	1,341.84	4.24	-0.33	0.020
130.00	-7.69	-1.17	0.00	-17.35	0.00	17.35	2,125.45	1,062.73	2,571.50	1,269.97	4.52	-0.33	0.017
135.00	-7.15	-1.09	0.00	-11.52	0.00	11.52	2,065.33	1,032.67	2,392.23	1,181.43	4.87	-0.34	0.013
140.00	-4.00	-0.64	0.00	-6.06	0.00	6.06	1,995.73	997.87	2,208.66	1,090.78	5.23	-0.34	0.008
145.00	-3.55	-0.57	0.00	-2.85	0.00	2.85	1,903.77	951.88	2,008.69	992.02	5.59	-0.35	0.005
150.00	0.00	-0.55	0.00	0.00	0.00	0.00	1,811.80	905.90	1,818.20	897.94	5.95	-0.35	0.000

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Equivalent Modal Analysis Method

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period (S_s):	0.11
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.11
Importance Factor (I_E):	1.00
Site Coefficient F_a :	1.60
Site Coefficient F_v :	2.36
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.12
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.17
Period Based on Rayleigh Method (sec):	2.09
Redundancy Factor (p):	1.00

Load Case (1.2 + 0.2Sds) * DL + E EMAM **Seismic Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
36	147.50	522	1.828	1.667	1.025	0.249	87	639
35	142.50	543	1.706	1.144	0.823	0.207	75	665
34	137.50	623	1.588	0.742	0.654	0.170	71	763
33	132.50	645	1.475	0.441	0.513	0.138	59	789
32	128.00	531	1.376	0.240	0.408	0.115	41	650
31	125.50	143	1.323	0.154	0.357	0.103	10	176
30	123.50	435	1.281	0.095	0.320	0.095	28	533
29	121.00	306	1.230	0.035	0.278	0.086	18	374
28	117.50	780	1.160	-0.030	0.226	0.075	39	954
27	112.50	821	1.063	-0.088	0.165	0.063	34	1,004
26	107.50	842	0.971	-0.116	0.117	0.054	30	1,030
25	103.00	689	0.891	-0.122	0.084	0.049	22	843
24	100.50	334	0.848	-0.119	0.069	0.046	10	409
23	97.75	1,529	0.803	-0.112	0.055	0.044	45	1,872
22	95.25	107	0.762	-0.104	0.044	0.043	3	131
21	92.50	1,088	0.719	-0.092	0.034	0.042	30	1,331
20	87.50	1,115	0.643	-0.068	0.020	0.041	30	1,365
19	82.50	1,143	0.572	-0.043	0.012	0.040	30	1,399
18	77.50	1,170	0.505	-0.018	0.007	0.038	30	1,433
17	72.50	1,198	0.442	0.005	0.006	0.037	30	1,466
16	67.50	1,226	0.383	0.023	0.007	0.036	29	1,500
15	62.50	1,253	0.328	0.039	0.010	0.034	28	1,534
14	57.50	1,281	0.278	0.050	0.014	0.031	27	1,568
13	54.50	259	0.250	0.055	0.017	0.030	5	318
12	52.00	2,081	0.227	0.059	0.020	0.029	40	2,547
11	48.54	1,542	0.198	0.063	0.023	0.027	28	1,888
10	46.04	656	0.178	0.065	0.026	0.026	11	803
9	42.50	1,598	0.152	0.068	0.030	0.024	25	1,956
8	37.50	1,632	0.118	0.070	0.035	0.021	23	1,998
7	32.50	1,666	0.089	0.071	0.039	0.019	21	2,039
6	27.50	1,700	0.064	0.072	0.041	0.017	19	2,081
5	22.50	1,734	0.043	0.070	0.042	0.015	18	2,122
4	17.50	1,768	0.026	0.067	0.040	0.013	16	2,164
3	12.50	1,802	0.013	0.059	0.034	0.011	13	2,206

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

2	7.50	1,836	0.005	0.044	0.025	0.008	10	2,247
1	2.50	1,701	0.001	0.018	0.010	0.003	4	2,082
Powerwave Allgon T10	150.00	66	1.890	1.980	1.140	0.273	12	81
Nokia AirScale RRH 4	150.00	110	1.890	1.980	1.140	0.273	20	135
Raycap DC6-48-60-18-	150.00	33	1.890	1.980	1.140	0.273	6	40
Raycap DC6-48-60-18-	150.00	16	1.890	1.980	1.140	0.273	3	20
Raycap DC6-48-60-0-8	150.00	16	1.890	1.980	1.140	0.273	3	20
Nokia AHLBBA	150.00	284	1.890	1.980	1.140	0.273	52	348
Alcatel-Lucent RRH4X	150.00	210	1.890	1.980	1.140	0.273	38	257
Nokia AirScale Dual	150.00	265	1.890	1.980	1.140	0.273	48	324
Nokia AEQK AirScale	150.00	298	1.890	1.980	1.140	0.273	54	364
Commscope JAH4-65C-	150.00	262	1.890	1.980	1.140	0.273	48	321
CCI TPA65R-BU8D	150.00	495	1.890	1.980	1.140	0.273	90	606
Flat Platform with H	150.00	2,000	1.890	1.980	1.140	0.273	364	2,448
Powerwave Allgon LGP	140.00	59	1.646	0.929	0.735	0.187	7	73
Ericsson Radio 4449	140.00	210	1.646	0.929	0.735	0.187	26	257
Ericsson 8843 Rev 2	140.00	225	1.646	0.929	0.735	0.187	28	275
Raycap RRFDC-3315-PF	140.00	54	1.646	0.929	0.735	0.187	7	66
Ericsson AIR 6449 B7	140.00	245	1.646	0.929	0.735	0.187	31	300
Antel BXA-80063/8CF	140.00	72	1.646	0.929	0.735	0.187	9	88
Commscope NHH-65C-	140.00	310	1.646	0.929	0.735	0.187	39	379
Generic Round Low Pr	140.00	1,875	1.646	0.929	0.735	0.187	234	2,295
Andrew ETW190VS12UB	126.00	33	1.334	0.170	0.367	0.105	2	40
Nokia AirScale Dual	126.00	251	1.334	0.170	0.367	0.105	18	308
Nokia FRIG w/o Solar	126.00	162	1.334	0.170	0.367	0.105	11	198
Nokia FHFB	126.00	146	1.334	0.170	0.367	0.105	10	178
Raycap ASU9338TYP01	126.00	15	1.334	0.170	0.367	0.105	1	18
Andrew TMBXX-6516-	126.00	208	1.334	0.170	0.367	0.105	15	254
Commscope FFHH-65C-	126.00	377	1.334	0.170	0.367	0.105	27	462
Generic Round Platfo	126.00	2,500	1.334	0.170	0.367	0.105	176	3,060
Generic 48" x 12" Pa	122.00	270	1.250	0.057	0.294	0.089	16	331
Flat Platform with H	122.00	2,000	1.250	0.057	0.294	0.089	119	2,448
DragonWave Horizon D	115.00	14	1.111	-0.064	0.194	0.068	1	17
Samsung 2.5GHz nRRHv	115.00	152	1.111	-0.064	0.194	0.068	7	186
Argus LLPX310R	115.00	86	1.111	-0.064	0.194	0.068	4	105
Andrew Microwaves	115.00	95	1.111	-0.064	0.194	0.068	4	117
Side Arms	115.00	560	1.111	-0.064	0.194	0.068	26	685
		52,270	78.109	36.853	29.676	8.216	2,593	63,984

Load Case (0.9 - 0.2Sds) * DL + E EMAM**Seismic (Reduced DL) Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
36	147.50	522	1.828	1.667	1.025	0.249	87	457
35	142.50	543	1.706	1.144	0.823	0.207	75	476
34	137.50	623	1.588	0.742	0.654	0.170	71	546
33	132.50	645	1.475	0.441	0.513	0.138	59	565
32	128.00	531	1.376	0.240	0.408	0.115	41	465
31	125.50	143	1.323	0.154	0.357	0.103	10	126
30	123.50	435	1.281	0.095	0.320	0.095	28	381
29	121.00	306	1.230	0.035	0.278	0.086	18	268
28	117.50	780	1.160	-0.030	0.226	0.075	39	683
27	112.50	821	1.063	-0.088	0.165	0.063	34	719
26	107.50	842	0.971	-0.116	0.117	0.054	30	737
25	103.00	689	0.891	-0.122	0.084	0.049	22	603
24	100.50	334	0.848	-0.119	0.069	0.046	10	293
23	97.75	1,529	0.803	-0.112	0.055	0.044	45	1,339
22	95.25	107	0.762	-0.104	0.044	0.043	3	94
21	92.50	1,088	0.719	-0.092	0.034	0.042	30	953

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

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Customer: VERIZON WIRELESS

20	87.50	1,115	0.643	-0.068	0.020	0.041	30	977
19	82.50	1,143	0.572	-0.043	0.012	0.040	30	1,001
18	77.50	1,170	0.505	-0.018	0.007	0.038	30	1,025
17	72.50	1,198	0.442	0.005	0.006	0.037	30	1,049
16	67.50	1,226	0.383	0.023	0.007	0.036	29	1,073
15	62.50	1,253	0.328	0.039	0.010	0.034	28	1,098
14	57.50	1,281	0.278	0.050	0.014	0.031	27	1,122
13	54.50	259	0.250	0.055	0.017	0.030	5	227
12	52.00	2,081	0.227	0.059	0.020	0.029	40	1,823
11	48.54	1,542	0.198	0.063	0.023	0.027	28	1,351
10	46.04	656	0.178	0.065	0.026	0.026	11	574
9	42.50	1,598	0.152	0.068	0.030	0.024	25	1,400
8	37.50	1,632	0.118	0.070	0.035	0.021	23	1,429
7	32.50	1,666	0.089	0.071	0.039	0.019	21	1,459
6	27.50	1,700	0.064	0.072	0.041	0.017	19	1,489
5	22.50	1,734	0.043	0.070	0.042	0.015	18	1,519
4	17.50	1,768	0.026	0.067	0.040	0.013	16	1,548
3	12.50	1,802	0.013	0.059	0.034	0.011	13	1,578
2	7.50	1,836	0.005	0.044	0.025	0.008	10	1,608
1	2.50	1,701	0.001	0.018	0.010	0.003	4	1,490
Powerwave Allgon TT0	150.00	66	1.890	1.980	1.140	0.273	12	58
Nokia AirScale RRH 4	150.00	110	1.890	1.980	1.140	0.273	20	97
Raycap DC6-48-60-18-	150.00	33	1.890	1.980	1.140	0.273	6	29
Raycap DC6-48-60-18-	150.00	16	1.890	1.980	1.140	0.273	3	14
Raycap DC6-48-60-0-8	150.00	16	1.890	1.980	1.140	0.273	3	14
Nokia AHLBBA	150.00	284	1.890	1.980	1.140	0.273	52	249
Alcatel-Lucent RRH4X	150.00	210	1.890	1.980	1.140	0.273	38	184
Nokia AirScale Dual	150.00	265	1.890	1.980	1.140	0.273	48	232
Nokia AEQK AirScale	150.00	298	1.890	1.980	1.140	0.273	54	261
Commscope JAH4-65C-	150.00	262	1.890	1.980	1.140	0.273	48	229
CCI TPA65R-BU8D	150.00	495	1.890	1.980	1.140	0.273	90	434
Flat Platform with H	150.00	2,000	1.890	1.980	1.140	0.273	364	1,752
Powerwave Allgon LGP	140.00	59	1.646	0.929	0.735	0.187	7	52
Ericsson Radio 4449	140.00	210	1.646	0.929	0.735	0.187	26	184
Ericsson 8843 Rev 2	140.00	225	1.646	0.929	0.735	0.187	28	197
Raycap RRFDC-3315-PF	140.00	54	1.646	0.929	0.735	0.187	7	47
Ericsson AIR 6449 B7	140.00	245	1.646	0.929	0.735	0.187	31	214
Antel BXA-80063/8CF	140.00	72	1.646	0.929	0.735	0.187	9	63
Commscope NHH-65C-	140.00	310	1.646	0.929	0.735	0.187	39	271
Generic Round Low Pr	140.00	1,875	1.646	0.929	0.735	0.187	234	1,642
Andrew ETW190VS12UB	126.00	33	1.334	0.170	0.367	0.105	2	29
Nokia AirScale Dual	126.00	251	1.334	0.170	0.367	0.105	18	220
Nokia FRIG w/o Solar	126.00	162	1.334	0.170	0.367	0.105	11	142
Nokia FHFB	126.00	146	1.334	0.170	0.367	0.105	10	127
Raycap ASU9338TYP01	126.00	15	1.334	0.170	0.367	0.105	1	13
Andrew TMBXX-6516-	126.00	208	1.334	0.170	0.367	0.105	15	182
Commscope FFHH-65C-	126.00	377	1.334	0.170	0.367	0.105	27	330
Generic Round Platfo	126.00	2,500	1.334	0.170	0.367	0.105	176	2,190
Generic 48" x 12" Pa	122.00	270	1.250	0.057	0.294	0.089	16	236
Flat Platform with H	122.00	2,000	1.250	0.057	0.294	0.089	119	1,752
DragonWave Horizon D	115.00	14	1.111	-0.064	0.194	0.068	1	12
Samsung 2.5GHz nRRHv	115.00	152	1.111	-0.064	0.194	0.068	7	133
Argus LLPX310R	115.00	86	1.111	-0.064	0.194	0.068	4	75
Andrew Microwaves	115.00	95	1.111	-0.064	0.194	0.068	4	83
Side Arms	115.00	560	1.111	-0.064	0.194	0.068	26	491
		52,270	78.109	36.853	29.676	8.216	2,593	45,783

Site Number: 306042

Code: ANSI/TIA-222-G

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-61.90	-2.59	0.00	-325.72	0.00	325.72	6,283.69	3,141.85	15,557.31	7,683.17	0.00	0.00	0.052
5.00	-59.65	-2.60	0.00	-312.75	0.00	312.75	6,215.54	3,107.77	15,067.96	7,441.50	0.01	-0.01	0.052
10.00	-57.45	-2.59	0.00	-299.77	0.00	299.77	6,144.79	3,072.40	14,579.45	7,200.24	0.02	-0.02	0.051
15.00	-55.28	-2.59	0.00	-286.81	0.00	286.81	6,071.43	3,035.72	14,092.20	6,959.61	0.05	-0.03	0.050
20.00	-53.16	-2.58	0.00	-273.88	0.00	273.88	5,995.47	2,997.74	13,606.61	6,719.80	0.09	-0.04	0.050
25.00	-51.08	-2.57	0.00	-260.99	0.00	260.99	5,916.91	2,958.45	13,123.09	6,481.00	0.14	-0.05	0.049
30.00	-49.04	-2.55	0.00	-248.16	0.00	248.16	5,835.74	2,917.87	12,642.03	6,243.42	0.20	-0.06	0.048
35.00	-47.04	-2.54	0.00	-235.40	0.00	235.40	5,751.96	2,875.98	12,163.84	6,007.26	0.27	-0.08	0.047
40.00	-45.08	-2.52	0.00	-222.72	0.00	222.72	5,665.59	2,832.79	11,688.92	5,772.72	0.36	-0.09	0.047
45.00	-44.28	-2.51	0.00	-210.13	0.00	210.13	5,576.61	2,788.30	11,217.67	5,539.99	0.46	-0.10	0.046
47.08	-42.39	-2.49	0.00	-204.89	0.00	204.89	5,538.76	2,769.38	11,022.50	5,443.60	0.50	-0.10	0.045
50.00	-39.85	-2.45	0.00	-197.64	0.00	197.64	5,485.02	2,742.51	10,750.50	5,309.27	0.57	-0.11	0.044
54.00	-39.53	-2.45	0.00	-187.86	0.00	187.86	4,089.14	2,044.57	8,015.68	3,958.64	0.67	-0.12	0.057
55.00	-37.96	-2.42	0.00	-185.41	0.00	185.41	4,077.72	2,038.86	7,951.24	3,926.82	0.69	-0.12	0.057
60.00	-36.43	-2.40	0.00	-173.31	0.00	173.31	4,019.09	2,009.54	7,629.58	3,767.96	0.83	-0.14	0.055
65.00	-34.92	-2.37	0.00	-161.31	0.00	161.31	3,957.85	1,978.93	7,309.16	3,609.72	0.99	-0.15	0.054
70.00	-33.46	-2.35	0.00	-149.44	0.00	149.44	3,894.01	1,947.01	6,990.39	3,452.29	1.15	-0.17	0.052
75.00	-32.02	-2.32	0.00	-137.69	0.00	137.69	3,827.57	1,913.78	6,673.67	3,295.87	1.34	-0.18	0.050
80.00	-30.63	-2.30	0.00	-126.08	0.00	126.08	3,758.52	1,879.26	6,359.40	3,140.67	1.54	-0.20	0.048
85.00	-29.26	-2.27	0.00	-114.59	0.00	114.59	3,686.86	1,843.43	6,047.97	2,986.87	1.75	-0.21	0.046
90.00	-27.93	-2.24	0.00	-103.25	0.00	103.25	3,612.61	1,806.30	5,739.81	2,834.68	1.99	-0.23	0.044
95.00	-27.80	-2.24	0.00	-92.05	0.00	92.05	3,535.74	1,767.87	5,435.30	2,684.29	2.23	-0.24	0.042
95.50	-25.92	-2.19	0.00	-90.93	0.00	90.93	3,527.92	1,763.96	5,405.07	2,669.36	2.26	-0.24	0.041
100.00	-25.52	-2.18	0.00	-81.07	0.00	81.07	3,456.28	1,728.14	5,134.86	2,535.91	2.49	-0.26	0.039
101.00	-24.67	-2.16	0.00	-78.88	0.00	78.88	2,422.80	1,211.40	3,656.13	1,805.62	2.55	-0.26	0.054
105.00	-23.64	-2.13	0.00	-70.25	0.00	70.25	2,386.99	1,193.50	3,503.59	1,730.29	2.77	-0.27	0.051
110.00	-22.64	-2.10	0.00	-59.60	0.00	59.60	2,339.89	1,169.95	3,313.75	1,636.54	3.06	-0.29	0.046
115.00	-20.57	-2.01	0.00	-49.12	0.00	49.12	2,290.19	1,145.09	3,125.22	1,543.43	3.37	-0.30	0.041
120.00	-20.20	-1.99	0.00	-39.06	0.00	39.06	2,237.88	1,118.94	2,938.40	1,451.17	3.69	-0.31	0.036
122.00	-16.89	-1.82	0.00	-35.07	0.00	35.07	2,216.23	1,108.11	2,864.24	1,414.54	3.83	-0.32	0.032
125.00	-16.71	-1.81	0.00	-29.63	0.00	29.63	2,182.97	1,091.48	2,753.69	1,359.95	4.03	-0.33	0.029
126.00	-11.54	-1.48	0.00	-27.82	0.00	27.82	2,171.67	1,085.84	2,717.04	1,341.84	4.10	-0.33	0.026
130.00	-10.75	-1.41	0.00	-21.91	0.00	21.91	2,125.45	1,062.73	2,571.50	1,269.97	4.38	-0.34	0.022
135.00	-9.99	-1.34	0.00	-14.84	0.00	14.84	2,065.33	1,032.67	2,392.23	1,181.43	4.73	-0.34	0.017
140.00	-5.60	-0.86	0.00	-8.13	0.00	8.13	1,995.73	997.87	2,208.66	1,090.78	5.10	-0.35	0.010
145.00	-4.96	-0.77	0.00	-3.84	0.00	3.84	1,903.77	951.88	2,008.69	992.02	5.47	-0.35	0.006
150.00	0.00	-0.74	0.00	0.00	0.00	0.00	1,811.80	905.90	1,818.20	897.94	5.84	-0.36	0.000

Site Number: 306042

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Site Name: Woods Chapel, MO

Engineering Number:13681558_C3_02

5/24/2021 10:17:57 AM

Customer: VERIZON WIRELESS

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-44.29	-2.59	0.00	-322.34	0.00	322.34	6,283.69	3,141.85	15,557.31	7,683.17	0.00	0.00	0.049
5.00	-42.68	-2.59	0.00	-309.37	0.00	309.37	6,215.54	3,107.77	15,067.96	7,441.50	0.01	-0.01	0.048
10.00	-41.11	-2.58	0.00	-296.42	0.00	296.42	6,144.79	3,072.40	14,579.45	7,200.24	0.02	-0.02	0.048
15.00	-39.56	-2.58	0.00	-283.50	0.00	283.50	6,071.43	3,035.72	14,092.20	6,959.61	0.05	-0.03	0.047
20.00	-38.04	-2.56	0.00	-270.62	0.00	270.62	5,995.47	2,997.74	13,606.61	6,719.80	0.09	-0.04	0.047
25.00	-36.55	-2.55	0.00	-257.80	0.00	257.80	5,916.91	2,958.45	13,123.09	6,481.00	0.14	-0.05	0.046
30.00	-35.09	-2.54	0.00	-245.04	0.00	245.04	5,835.74	2,917.87	12,642.03	6,243.42	0.20	-0.06	0.045
35.00	-33.66	-2.52	0.00	-232.37	0.00	232.37	5,751.96	2,875.98	12,163.84	6,007.26	0.27	-0.08	0.045
40.00	-32.26	-2.50	0.00	-219.78	0.00	219.78	5,665.59	2,832.79	11,688.92	5,772.72	0.36	-0.09	0.044
45.00	-31.68	-2.49	0.00	-207.30	0.00	207.30	5,576.61	2,788.30	11,217.67	5,539.99	0.45	-0.10	0.043
47.08	-30.33	-2.46	0.00	-202.12	0.00	202.12	5,538.76	2,769.38	11,022.50	5,443.60	0.50	-0.10	0.043
50.00	-28.51	-2.42	0.00	-194.94	0.00	194.94	5,485.02	2,742.51	10,750.50	5,309.27	0.56	-0.11	0.042
54.00	-28.28	-2.42	0.00	-185.25	0.00	185.25	4,089.14	2,044.57	8,015.68	3,958.64	0.66	-0.12	0.054
55.00	-27.16	-2.40	0.00	-182.83	0.00	182.83	4,077.72	2,038.86	7,951.24	3,926.82	0.69	-0.12	0.053
60.00	-26.06	-2.37	0.00	-170.85	0.00	170.85	4,019.09	2,009.54	7,629.58	3,767.96	0.82	-0.14	0.052
65.00	-24.99	-2.35	0.00	-158.99	0.00	158.99	3,957.85	1,978.93	7,309.16	3,609.72	0.97	-0.15	0.050
70.00	-23.94	-2.32	0.00	-147.26	0.00	147.26	3,894.01	1,947.01	6,990.39	3,452.29	1.14	-0.17	0.049
75.00	-22.91	-2.29	0.00	-135.67	0.00	135.67	3,827.57	1,913.78	6,673.67	3,295.87	1.32	-0.18	0.047
80.00	-21.91	-2.26	0.00	-124.21	0.00	124.21	3,758.52	1,879.26	6,359.40	3,140.67	1.52	-0.20	0.045
85.00	-20.93	-2.24	0.00	-112.88	0.00	112.88	3,686.86	1,843.43	6,047.97	2,986.87	1.73	-0.21	0.043
90.00	-19.98	-2.21	0.00	-101.71	0.00	101.71	3,612.61	1,806.30	5,739.81	2,834.68	1.96	-0.22	0.041
95.00	-19.89	-2.21	0.00	-90.67	0.00	90.67	3,535.74	1,767.87	5,435.30	2,684.29	2.20	-0.24	0.039
95.50	-18.55	-2.16	0.00	-89.57	0.00	89.57	3,527.92	1,763.96	5,405.07	2,669.36	2.23	-0.24	0.039
100.00	-18.25	-2.15	0.00	-79.86	0.00	79.86	3,456.28	1,728.14	5,134.86	2,535.91	2.46	-0.25	0.037
101.00	-17.65	-2.13	0.00	-77.71	0.00	77.71	2,422.80	1,211.40	3,656.13	1,805.62	2.51	-0.26	0.050
105.00	-16.91	-2.10	0.00	-69.21	0.00	69.21	2,386.99	1,193.50	3,503.59	1,730.29	2.73	-0.27	0.047
110.00	-16.19	-2.06	0.00	-58.73	0.00	58.73	2,339.89	1,169.95	3,313.75	1,636.54	3.02	-0.28	0.043
115.00	-14.72	-1.98	0.00	-48.42	0.00	48.42	2,290.19	1,145.09	3,125.22	1,543.43	3.33	-0.30	0.038
120.00	-14.45	-1.96	0.00	-38.52	0.00	38.52	2,237.88	1,118.94	2,938.40	1,451.17	3.64	-0.31	0.033
122.00	-12.08	-1.79	0.00	-34.60	0.00	34.60	2,216.23	1,108.11	2,864.24	1,414.54	3.78	-0.32	0.030
125.00	-11.95	-1.78	0.00	-29.24	0.00	29.24	2,182.97	1,091.48	2,753.69	1,359.95	3.98	-0.32	0.027
126.00	-8.26	-1.46	0.00	-27.46	0.00	27.46	2,171.67	1,085.84	2,717.04	1,341.84	4.04	-0.32	0.024
130.00	-7.69	-1.40	0.00	-21.63	0.00	21.63	2,125.45	1,062.73	2,571.50	1,269.97	4.32	-0.33	0.021
135.00	-7.15	-1.32	0.00	-14.65	0.00	14.65	2,065.33	1,032.67	2,392.23	1,181.43	4.67	-0.34	0.016
140.00	-4.00	-0.85	0.00	-8.04	0.00	8.04	1,995.73	997.87	2,208.66	1,090.78	5.03	-0.35	0.009
145.00	-3.55	-0.76	0.00	-3.80	0.00	3.80	1,903.77	951.88	2,008.69	992.02	5.40	-0.35	0.006
150.00	0.00	-0.74	0.00	0.00	0.00	0.00	1,811.80	905.90	1,818.20	897.94	5.76	-0.35	0.000

Site Number: 306042**Code: ANSI/TIA-222-G**

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Site Name: Woods Chapel, MO**Engineering Number:13681558_C3_02****5/24/2021 10:17:57 AM****Customer: VERIZON WIRELESS**

Analysis Summary

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	40.54	0.00	62.67	0.00	0.00	4310.12	54.00	0.59
0.9D + 1.6W	40.52	0.00	46.99	0.00	0.00	4272.44	54.00	0.58
1.2D + 1.0Di + 1.0Wi	11.49	0.00	105.79	0.00	0.00	1114.05	0.00	0.16
(1.2 + 0.2Sds) * DL + E ELFM	2.90	0.00	61.90	0.00	0.00	354.28	54.00	0.06
(1.2 + 0.2Sds) * DL + E EMAM	2.59	0.00	61.90	0.00	0.00	325.72	54.00	0.06
(0.9 - 0.2Sds) * DL + E ELFM	2.90	0.00	44.29	0.00	0.00	350.73	54.00	0.06
(0.9 - 0.2Sds) * DL + E EMAM	2.59	0.00	44.29	0.00	0.00	322.34	54.00	0.05
1.0D + 1.0W	10.07	0.00	52.27	0.00	0.00	1065.67	54.00	0.15



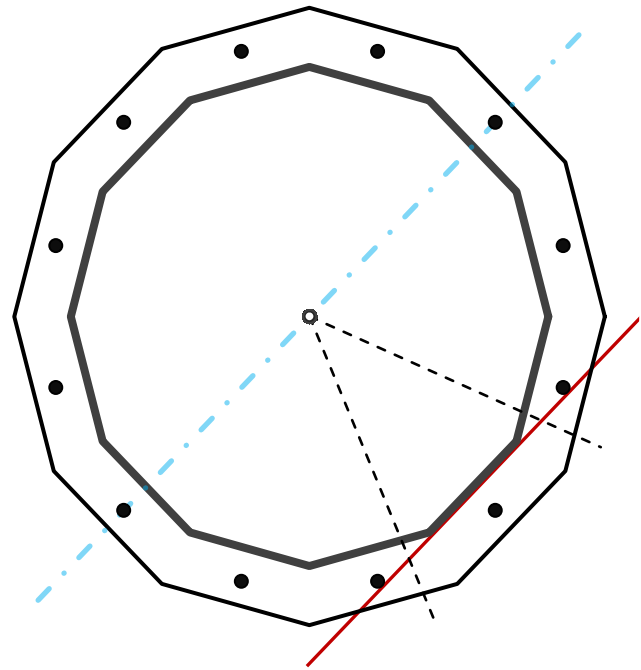
Base Plate & Anchor Rod Analysis

Pole Dimensions		
Number of Sides	12	-
Diameter	60.5	in
Thickness	1/2	in
Orientation Offset	0	°

Base Reactions		
Moment, Mu	4,310.1	k-ft
Axial, Pu	62.7	k
Shear, Vu	40.5	k
Neutral Axis	225	°

Report Capacities		
Component	Capacity	Result
Base Plate	29%	Pass
Anchor Rods	103%	Pass
Dwyidag	-	-

Base Plate		
Number of Sides	12	-
Diameter, ϕ	75.14	in
Thickness	2 5/8	in
Grade	A871-60	
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	75	ksi
Clip	N/A	in
Orientation Offset		°
Anchor Rod Detail	c	$\eta=0.55$
Clear Distance	N/A	in
Applied Moment, Mu	792.0	k
Bending Stress, ϕMn	2765.2	k



Original Anchor Rods		
Arrangement	Radial	-
Quantity	12	-
Diameter, ϕ	2 1/4	in
Bolt Circle	69.14	in
Grade	A615-75	
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Spacing	18.1	in
Orientation Offset	15	°
Applied Force, Pu	263.3	k
Anchor Rods, ϕPn	259.8	k

Calculations for Monopole Base Plate & Anchor Rod Analysis

Reaction Distribution

Reaction	Shear Vu	Moment Mu	Factor
-	k	k-ft	-
Base Forces	40.5	4310.1	1.00
Anchor Rod Forces	40.5	4310.1	1.00
Additional Bolt (Grp1) Forces	0.0	0.0	0.00
Additional Bolt (Grp2) Forces	0.0	0.0	0.00
Dywidag Forces	0.0	0.0	0.00
Stiffener Forces	0.0	0.0	0.00

Geometric Properties

Section	Gross Area	Net Area	Individual Inertia	Threads per Inch	Moment of Inertia
-	in ²	in ²	in ⁴	#	in ⁴
Pole	93.1749	7.7646	0.6497		41936.48
Bolt	3.9761	3.2477	0.8393	4.5	21725.25
Bolt1	0.0000	0.0000	0.0000	0	0.00
Bolt2	0.0000	0.0000	0.0000	0	0.00
Dywidag	0.0000	0.0000	0.0000		0.00
Stiffener	0.0000	0.0000	0.0000		0.00

Base Plate			
Shape	12	-	
Width, W	75.14	in	
Thickness, t	2.625	in	
Yield Strength, Fy	60	ksi	
Tensile Strength, Fu	75	ksi	
Base Plate Chord	44.562	in	
Detail Type	c	-	
Detail Factor	0.55	-	
Clear Distance	N/A	-	

Anchor Rods			
Anchor Rod Quantity, N	12	-	
Rod Diameter, d	2.25	in	
Bolt Circle, BC	69.14	in	
Yield Strength, Fy	75	ksi	
Tensile Strength, Fu	100	ksi	
Applied Axial, Pu	263.3	k	
Applied Shear, Vu	2.7	k	
Compressive Capacity, ϕP_n	259.8	k	
Tensile Capacity, ϕR_n	1.014	OK	
Interaction Capacity	1.033	OK	

External Base Plate			
Chord Length AA	45.514	in	
Additional AA	5.250	in	
Section Modulus, Z	87.449	in ³	
Applied Moment, Mu	792.0	k-ft	
Bending Capacity, ϕM_n	4722.2	k-ft	
Capacity, Mu/ ϕM_n	0.168	OK	

Chord Length AB	43.371	in	
Additional AB	5.250	in	
Section Modulus, Z	83.757	in ³	
Applied Moment, Mu	509.8	k-ft	
Bending Capacity, ϕM_n	4522.9	k-ft	
Capacity, Mu/ ϕM_n	0.113	OK	

Bend Line Length	29.726	in	
Additional Bend Line	0.000	in	
Section Modulus, Z	51.207	in ³	
Applied Moment, Mu	792.0	k-ft	
Bending Capacity, ϕM_n	2765.2	k-ft	
Capacity, Mu/ ϕM_n	0.286	OK	

Internal Base Plate			
Arc Length	0.000	in	
Section Modulus, Z	0.000	in ³	
Moment Arm	0.000	in	
Applied Moment, Mu	0.0	k-ft	
Bending Capacity, ϕM_n	0.0	k-ft	
Capacity, Mu/ ϕM_n			

Pier Foundation Analysis (ANSI/TIA-222-G)

Foundation Analysis Parameters

Pier Diameter	D	8.00	ft
Pier Embedment	$L-h$	33.0	ft
Pier Height above Ground	H	0.50	ft
Water Table Depth [BGL]	GW	18	ft
Pullout Angle	Θ	30	°
Unit Weight of Concrete		150	pcf
Uplift Skin Friction Factor		1.000	

Reactions

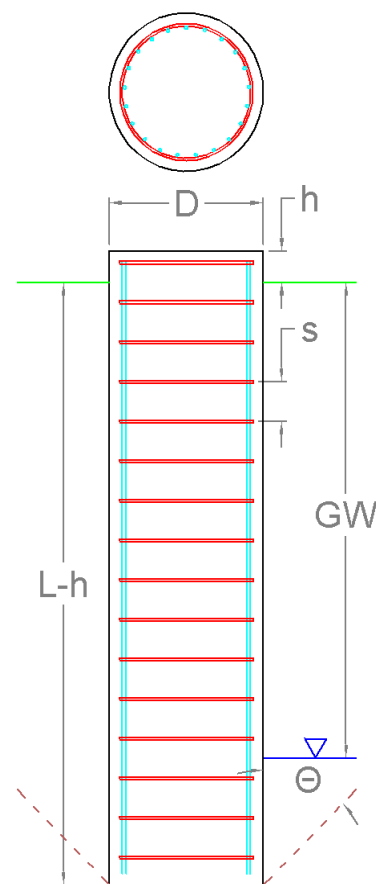
Moment, M_u	4,310.1	k-ft
Shear, V_u	40.5	k
Axial, P_u	62.7	k
Uplift, T_u	0.0	k

Soil Properties

Layer Depth (ft)		Unit Weight	Cohesion	Friction Angle	Ultimate Skin Friction	Ultimate Bearing Pressure
TOP	BTM	pcf	psf	°	psf	psf
0.0	1.0	105	0	0	0	0
1.0	7.0	100	250	0	0	0
7.0	10.5	100	250	0	134	0
10.5	12.0	136	5,916	0	2,662	0
12.0	18.0	136	6,125	0	2,768	0
18.0	18.5	100	9,017	0	4,058	0
18.5	34.0	100	9,845	0	4,430	36,226

Soil Strength Capacities

Volume of Concrete	1,683.9	ft ³
Weight of Concrete [Buoyancy Considered]	205.5	k
Average Soil Unit Weight	80.0	pcf
Skin Friction Resistance	2,194.9	k
Compressive Bearing Resistance	1,820.9	k
Pullout Weight [Minus Concrete Weight]	1,635.0	k
Compressive Force, P_u	145.6	k
Nominal Compressive Capacity, $\phi_s P_n$	3,011.9	k
$P_u / \phi_s P_n$	4.8%	
Total Lateral Resistance	11,556.2	k
Inflection Point [BGL]	23.2	ft
Moment at Inflection Point, M_D	5,269.5	k-ft
Nominal Moment Capacity, $\phi_s M_n$	46,789.3	k-ft
$M_D / \phi_s M_n$	11.3%	



Pier Strength Capacities		
Concrete Compressive Strength, f'_c	3,000	psi
Rebar Size #	9	
Rebar Area (Single)	1.00	in ²
Rebar Quantity	32	
Rebar Yield Strength, F_y	60	ksi
Vertical Rebar Clear Cover	3	in
Tie Rebar Size #	4	
Tie Rebar Area (Single)	0.20	in ²
Tie Rebar Spacing	12.0	in
Tie Rebar Yield Strength, F_y	60	ksi
Rebar Cage Diameter	87.87	in
Strength Bending/Tension Reduction Factor, ϕ_B	0.90	
Strength Shear Reduction Factor, ϕ_V	0.75	
Strength Compression Reduction Factor, ϕ_C	0.65	
Steel Elastic Modulus	29,000	ksi
Design Moment, M_u	4,331.8	k-ft
Moment Capacity, $\phi_B M_n$	6,190.9	k-ft
$M_u / \phi_B M_n$	70.0%	
Design Shear, V_u	399.8	k
Shear Capacity, $\phi_V V_n$	712.5	k
$V_u / \phi_V V_n$	56.1%	
Design Compression, P_u	145.6	k
Compression Capacity, $\phi_P P_n$	10,553.9	k
$P_u / \phi_P P_n$	1.4%	
Bending Reinforcement Ratio	0.004	

