NB+C Engineering Services

Proposed Wood Pole Antenna Installation

Prepared for Crown Castle Fiber, LLC

SITE INFORMATION

Address	244 Main Street Malden, MA 02148 Middlesex County Latitude: 42.423182º Longitude: -71.067480º
Crown Castle Node Number	ODAS_2F-26
NB+C Project Number	100723
Date	November 10, 2023

100 Apollo Drive | Suite 303 | Chelmsford, MA| 01824| 978.856.8308

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1.0 INTRODUCTION

The structure is a proposed class 2-40 ft. wood pole located in Malden, MA. As per your request **NB+C ES** performed a structural analysis and design for the proposed wood pole to verify that the structure can support the new loads and are in compliance with the applicable codes and standards. Information we have received and used for this analysis includes:

- Final Construction Drawings prepared by **NB+C ES**, dated November 7, 2023
- Field Notes and Photos by **NB+C ES** personnel dated October 02, 2023

2.0 APPURTENANCES LOADING

As per the information provided to us, the final antenna configuration is shown in Table 1 below.

Table 1 – Final Antenna and Cable Information

Center Line Elevation (ft)	Antenna Model	Carrier	Feed Lines
37.25	**(1) Amphenol 6U4MT360X12Fxys4 antenna**	T-Mobile	(4) 1/2" Coax Cable
13.92	**(1) Charles Industries Curved Shroud SH60-702322 w/ (1) Ericsson Radio 4455 B2/B25, (1) Radio 8863 B41**		
10.25	**(1) PTS90526 AC Load Center**		
8.83	(1) Existing Meter		

Note: Proposed Equipment marked in bold

3.0 ASSUMPTIONS

This report is based on the theoretical capacity of the existing/proposed structural elements and is not an assessment of the overall suitability of the existing structure or its components for any particular use other than specified here in this report:

- This report makes no warranties, expressed and/or implied, and disclaims any liability arising from material, fabrication and erection of the existing structure and any other existing or proposed components or appurtenances.
- All proposed and existing antennas, mounts, coaxial cables, and appurtenances are assumed to be properly installed and configured according to manufacturer requirements.
- All existing structural elements are assumed to be in place and in good condition and were previously designed and constructed in accordance with applicable codes and standards.
- All antennas and equipment are conservatively assumed to be normal to the wind for all load combinations considered.
- Contractor to verify existing site condition including the existing soil type. In the event the existing site conditions are different than the assumptions made in this report, this has to

be brought to the structural engineer's attention before proceeding any further with bidding, fabrication and/or erection.

- The proposed wood pole is embedded minimum 6'-0" into the ground.

4.0 ANALYSIS

Calculations for this analysis are provided in Appendix A of this report.

5.0 CONCLUSIONS & RECOMMENDATIONS

Based on the performed analysis of this structure for applied gravity and lateral loads, the proposed wood pole structure was calculated to have ***adequate*** structural capacity to support the propsed T-Mobile telecommunication equipment and is in compliance with building codes and standards listed here in this report. **The pole will be stressed to a maximum 95.3% of its design capacity.** Refer to the construction drawings prepared by **NB+C ES** for the proposed location of the appurtenances.

The results in Appendix A of the report show that the additional forces imparted to the proposed wood pole due to the proposed telecommunications antenna and mount are within acceptable limits considering the overall configuration of the support structure.

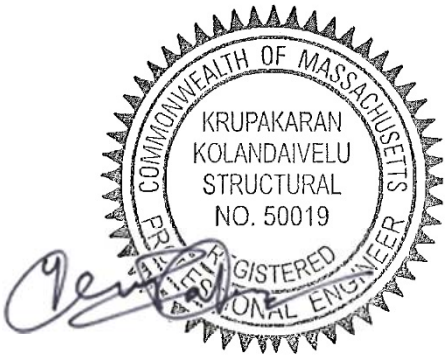
The conclusions reached by **NB+C ES** in this report are only applicable for the previously mentioned existing and proposed structural members supporting the T-Mobile telecommunication antennas. Further, no structural qualification is made or implied by this report for existing structural members not supporting the T-Mobile equipment.

NB+C ENGINEERING SERVICES, LLC

Prepared by: Hitesh Pandey, P.E.

Respectfully Submitted by:

Krupakaran Kolandaivelu, P.E.
Vice President of Engineering
MA PE License # 50019



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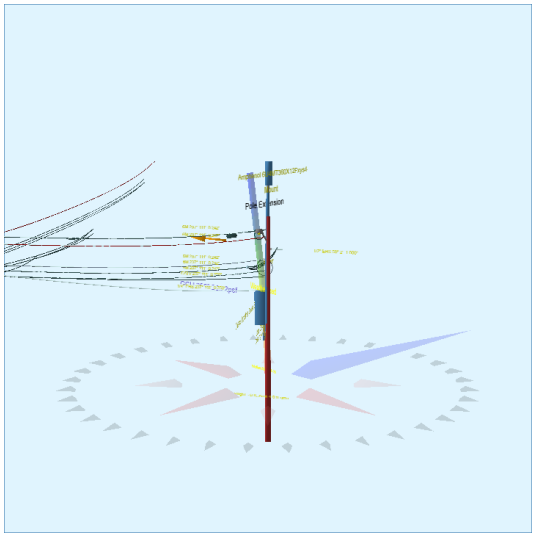
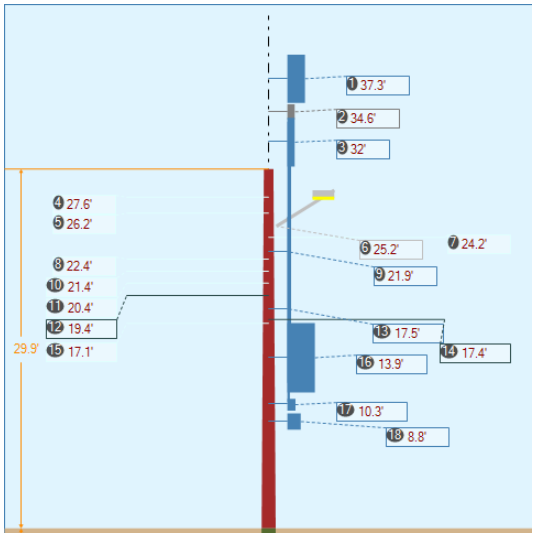
APPENDIX A

CALCULATIONS

Pole Num:	**ODAS-2F-26**	Pole Length / Class:	**40 / 2**	Code:	**NESC**	Structure Type:	**Unguyed Tangent**
Aux Data 1	**Unset**	Species:	**SOUTHERN PINE**	NESC Rule:	**Rule 250C**	Status	**Unguyed**
Aux Data 2	**Unset**	Setting Depth (ft):	**10.08**	Construction Grade:	**C**	Pole Strength Factor:	**0.75**
Aux Data 3	**Unset**	G/L Circumference (in):	**36.88**	Loading District:	**Special**	Transverse Wind LF:	**0.75**
Aux Data 4	**Unset**	G/L Fiber Stress (psi):	**8,000**	Ice Thickness (in):	**0.00**	Wire Tension LF:	**1.00**
Aux Data 5	**Unset**	Allowable Stress (psi):	**6,000**	Wind Speed (mph):	**105.00**	Vertical LF:	**1.00**
Aux Data 6	**Unset**	Fiber Stress Ht. Reduc:	**No**	Wind Pressure (psf):	**28.22**	Max 250C Wind (mph)	**121.27**
Latitude:	**0.000000 Deg**	Longitude:	**0.000000 Deg**			Elevation:	**0 Feet**





Pole Capacity Utilization (%)		Height (ft)	Wind Angle (deg)
Maximum	95.3	0.0	254.8
Groundline	95.3	0.0	254.8
Vertical	4.4	17.9	254.8

Pole Moments (ft-lb)		Load Angle (deg)	Wind Angle (deg)
Max Cap Util	**75,405**	251.2	254.8
Groundline	**75,405**	251.2	254.8
GL Allowable	**79,413**		

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 251.2°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
Powers	344	10.2	**9,453**	12.5	**11.9**	**679**	52	0	**679**	**11.3**
Comms	1,866	55.5	**43,775**	58.1	**55.1**	**3,142**	273	3	**3,145**	**52.4**
GenericEquipments	654	19.5	**14,339**	19.0	**18.1**	**1,029**	591	5	**1,035**	**17.2**
Pole	453	13.5	**6,676**	8.9	**8.4**	**479**	961	9	**488**	**8.1**
SpanAdditions	5	0.2	**139**	0.2	**0.2**	**10**	26	0	**10**	**0.2**
Streetlights	39	1.2	**1,006**	1.3	**1.3**	**72**	60	1	**73**	**1.2**
Insulators	0	0.0	**18**	0.0	**0.0**	**1**	40	0	**2**	**0.0**
Pole Load	3,362	100.0	**75,405**	100.0	**95.0**	**5,412**	2,003	19	**5,431**	**90.5**
Pole Reserve Capacity			**4,008**		**5.0**	**588**			**569**	**9.5**

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 251.2°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
<Undefined>	2,855	84.9	**66,876**	88.7	**84.2**	**4,800**	993	9	**4,809**	**80.2**
Crown Castle	13	0.4	**464**	0.6	**0.6**	**33**	30	0	**34**	**0.6**
SPRINT BOSTON	41	1.2	**1,389**	1.8	**1.8**	**100**	19	0	**100**	**1.7**
Pole	453	13.5	**6,676**	8.9	**8.4**	**479**	961	9	**488**	**8.1**
Totals:	3,362	100.0	**75,405**	100.0	**95.0**	**5,412**	2,003	19	**5,431**	**90.5**

Detailed Load Components:

Power		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Cable Diameter (in)**	**Sag at Max Temp (ft)**	**Cable Weight (lbs/ft)**	**Lead/Span Length (ft)**	**Span Angle (deg)**	**Wire Length (ft)**	**Tension (lbs)**	**Tension Moment* (ft-lb)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Secondary	TRIPLEX 1/0		26.23	6.84	0.2500		0.263	111.0	237.0	111.3			8	30	39
Secondary	TRIPLEX 1/0		23.22	726.96	0.2500	3.81	0.263	128.0	328.0	128.3	156	383	3	236	621
Secondary	TRIPLEX 1/0		26.23	6.59	0.2500		0.263	111.0	237.0	111.3			8	30	38
Overlashed Bundle	6M		26.25	6.71	0.2420	3.28	0.104	111.0	237.0	111.3	324	8,249	3	30	8,283
											Totals:	**8,632**	**22**	**327**	**8,981**

Comm	**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Cable Diameter (in)**	**Sag at Max Temp (ft)**	**Cable Weight (lbs/ft)**	**Lead/Span Length (ft)**	**Span Angle (deg)**	**Wire Length (ft)**	**Tension (lbs)**	**Tension Moment* (ft-lb)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**

Overlashed Bundle	6M	27.58	6.63	0.2420	3.27	0.104	111.0	237.0	111.3	432	11,560	3	41	11,604
CATV	CATV .35	27.56	6.81	0.3500		0.368	111.0	237.0	111.3			11	83	94
CATV	CATV .35	27.56	6.47	0.3500		0.368	111.0	237.0	111.3			11	41	52
Overlashed Bundle	1/2" EHS	24.25	6.84	1.0000	0.03	0.430	2.0	59.0	2.0	26	-620	0	2	-618
Overlashed Bundle	6M	22.42	6.95	0.2420	3.28	0.104	111.0	237.0	111.3	324	7,046	3	53	7,102
Telco	TELE 0.5	22.39	6.95	0.5000		0.526	111.0	237.0	111.3			16	53	69
Overlashed Bundle	6M	21.42	7.02	0.2420	3.27	0.104	111.0	237.0	111.3	459	9,537	3	23	9,564
CATV	CATV .25	21.41	7.24	0.2500		0.263	111.0	237.0	111.3			9	23	32
CATV	CATV .25	20.89	43.01	0.2500	1.01	0.263	20.0	330.0	20.2	14	54	1	75	130
CATV	CATV .25	18.41	727.01	0.2500	3.04	0.263	49.0	342.0	49.7	27	-3	1	78	76
CATV	CATV .25	21.41	6.80	0.2500		0.263	111.0	237.0	111.3			8	23	31
CATV	CATV .25	20.89	42.57	0.2500	1.27	0.263	20.0	330.0	20.3	11	43	1	75	119
CATV	CATV .25	18.42	762.57	0.2500	3.39	0.263	128.0	328.0	128.3	182	333	3	171	506
CATV	CATV .25	18.41	726.57	0.2500	3.04	0.263	49.0	342.0	49.7	27	-3	1	78	76
CATV	CATV .25	21.40	7.03	0.2500		0.263	111.0	237.0	111.3			8	23	31
CATV	CATV .25	20.88	42.80	0.2500	1.50	0.263	20.0	330.0	20.4	9	36	1	74	111
CATV	CATV .25	18.40	726.80	0.2500	2.55	0.263	49.0	342.0	49.5	32	-4	1	78	76
Overlashed Bundle	6M	20.42	7.08	0.2420	3.28	0.104	111.0	237.0	111.3	324	6,417	3	23	6,444
CATV	CATV .25	20.40	6.94	0.2500		0.263	111.0	237.0	111.3			8	23	32
CATV	CATV .25	17.42	762.71	0.2500	2.94	0.263	128.0	328.0	128.2	218	377	3	160	540
CATV	CATV .25	20.40	7.21	0.2500		0.263	111.0	237.0	111.3			9	23	32
CATV	CATV .25	17.42	762.98	0.2500	3.39	0.263	128.0	328.0	128.3	182	315	3	160	478
CATV	CATV .25	19.40	7.01	0.2500	2.40	0.263	111.0	237.0	111.1	203	3,812	8	29	3,850
CATV	CATV .25	17.40	726.78	0.2500	2.08	0.263	49.0	342.0	49.3	40	-4	1	73	70
CATV	CATV .25	17.40	726.78	0.2500	1.99	0.263	23.0	354.0	23.6	9	-16	1	34	18
Overlashed Bundle	1/4" EHS	17.08	7.29	0.2500	3.14	0.121	111.0	237.0	111.3	63	1,038	4	28	1,071
										Totals:	**39,918**	**121**	**1,548**	**41,587**

GenericEquipment		Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Cylinder	Amphenol 6U4MT360X12Fxys4		37.25	1.82	90.0	0.0	42.00	48.20	--	14.60	--	-6	3,756	3,750
Cylinder	Mount	Crown Castle	34.63	0.68	90.0	0.0	30.00	15.00	--	6.00	--	-2	443	441
Cylinder	Pole Extension	SPRINT BOSTON	31.96	0.15	270.0	0.0	19.00	48.96	--	6.00	--	0	1,319	1,320
Cylinder	Riser		21.90	5.99	291.0	0.0	100.00	261.00	--	3.00	--	38	2,237	2,275
Cylinder	Weatherhead		17.48	5.77	187.0	0.0	100.00	185.00	--	2.00	--	21	805	825
Box	Charles Industries Curved Shroud: SH60-702322		13.92	15.71	235.0	0.0	250.00	69.50	21.45	--	22.73	314	4,223	4,537
Box	Load Center		10.25	7.89	235.0	0.0	40.00	12.00	5.33	--	6.70	25	156	181

Box	Existing Meter	8.83	7.74	235.0	0.0	10.00	16.08	4.86	--	11.00	6	286	292
										Totals:	**398**	**13,225**	**13,622**

SpanAddition		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Maintenance Loop	Span Addition		27.38	12.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	20	20
Maintenance Loop	Span Addition		27.38	12.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	40	40
Maintenance Loop	Span Addition		24.77	420.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	27	27
Maintenance Loop	Span Addition		22.39	0.00	237.0	237.0	7.00	30.00	30.00	30.00	30.00	0	45	45
											Totals:	**0**	**132**	**132**

Streetlight		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
General	Streetlight - 6 ft. Arm		25.17	4.28	152.0	152.0	60.00	36.00	18.00	3.00	48.00	-33	988	955
											Totals:	**-33**	**988**	**955**

Insulator		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Bolt	Single Bolt		27.58	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt		26.25	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		24.25	0.00	57.0	57.0	5.00	3.00	0.00	-3	0	-3
Bolt	Single Bolt (Relocated)		22.42	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		21.42	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		20.42	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		19.42	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
Bolt	Single Bolt (Relocated)		17.08	0.00	237.0	237.0	5.00	3.00	0.00	3	0	3
									Totals:	**17**	**0**	**17**

Pole Buckling

Buckling Constant	**Buckling Column Height* (ft)**	**Buckling Section Height (% Buckling Col. Hgt.)**	**Buckling Section Diameter (in)**	**Minimum Buckling Diameter at GL (in)**	**Diameter at Tip (in)**	**Diameter at GL (in)**	**Modulus of Elasticity (psi)**	**Pole Density (pcf)**	**Ice Density (pcf)**	**Pole Tip Height (ft)**	**Buckling Load Capacity at Height (lbs)**	**Buckling Load Applied at Height (lbs)**	**Buckling Load Factor of Safety**
2.00	17.95	32.90	10.99	9.96	7.96	11.75	1.60e+6	60.00	57.00	29.92	45,755	**455.20**	**22.73**

Notes

Date	Author	Description
12/7/2015	bmesfin	Assumptions

ASSUMPTIONS :

The analysis contained within this report is based on the pole capacity as prescriberd in the governing codes. The validitiy and accuracy of the analysis within is limited by the accuracy of the infromation it is based on. The structural analysis is based on the following assumptions.

1. The pole was built and maintained in accordance with the manufacturer's specifications. The structure is assumed to be plumb, in good condition and essentially as erected.
2. The member size dimensions and sections are accurate as supplied.
3. The wood pole evaluated is Southern pine with capacity of 8000psi.
4. The soil at this locations have normal (average) soil properties.
5. All wire types, sizes, heights and wind spans were determined from photos obtained during a site visit.

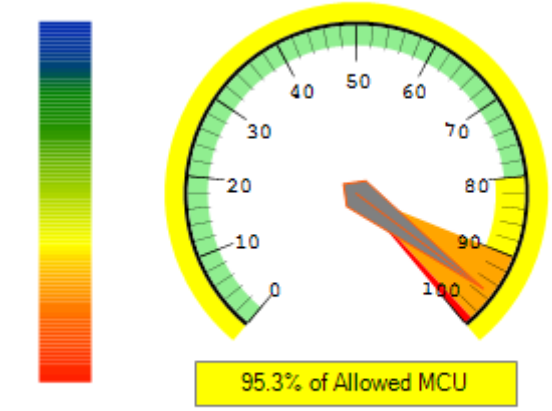
If any of these assumptions is not valid or has been made in error, this analysis may be affected, and NB+C ES sould be allowed to review any new information to determine its effect on the structural integrity of the tower.

O-Calc® Pro Capacity Summary Info

Pole Identification: ODAS-2F-26

Report Created: 11/10/2023

File: ODAS_2F-26.pplx



O-Calc® Pro Heat Map View

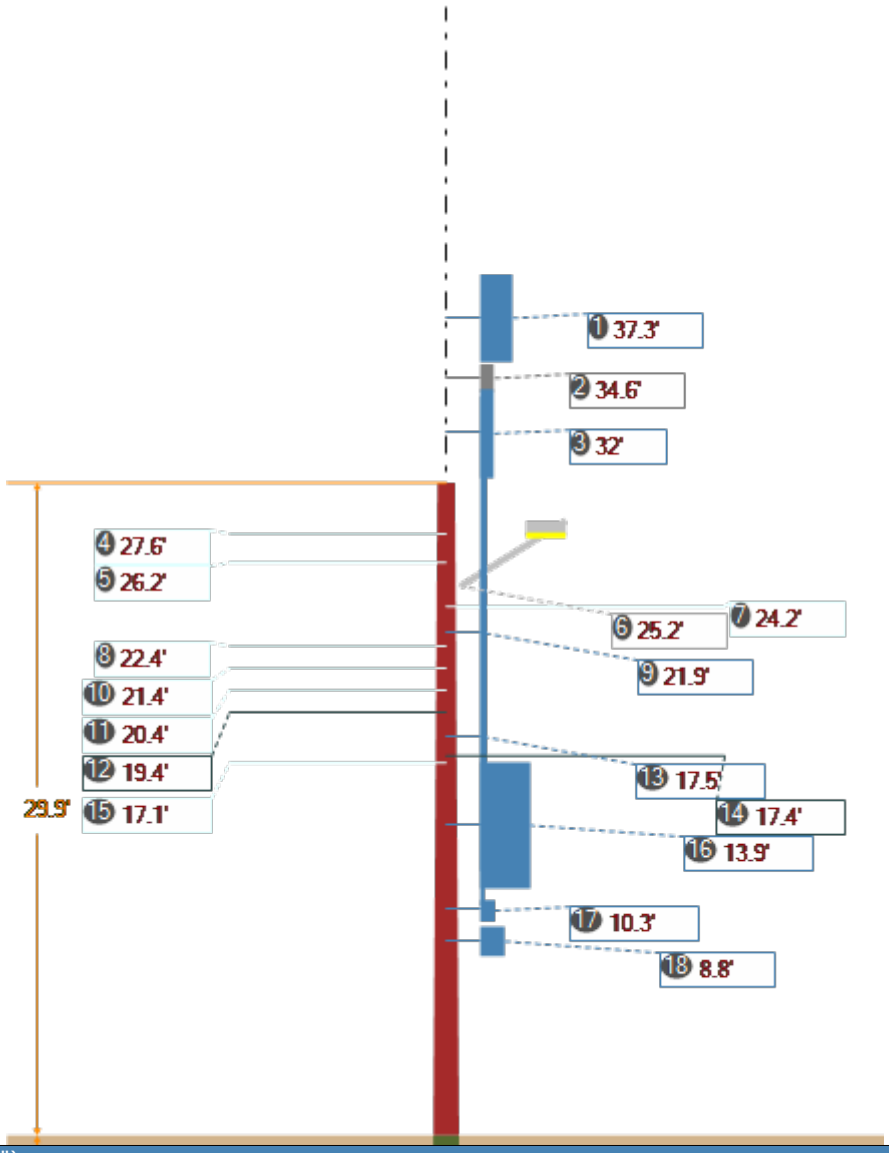
Report Created: 11/10/2023

O-Calc® Pro Schematic View

Pole Identification: ODAS-2F-26

Report Created: 11/10/2023

File: ODAS_2F-26.pplx



1 - 37.3' (447")
Amphenol 6U4MT360X12Fxys4

2 - 34.6' (415.6")
Mount

3 - 32' (383.5")
Bracket

4 - 27.6' (331")
6M 237° 111' Msgr:0.242"

5 - 26.2' (315")
6M 237° 111' Msgr:0.242"

6 - 25.2' (302")
Streetlight - 6 ft. Arm 4.0 ft arm

7 - 24.2' (291")
1/2" EHS 59° 2' Msgr:1.000"

8 - 22.4' (269")
6M 237° 111' Msgr:0.242"

9 - 21.9' (262.7")
Riser

10 - 21.4' (257")
6M 237° 111' Msgr:0.242"

11 - 20.4' (245")
6M 237° 111' Msgr:0.242"

12 - 19.4' (232.8")
CATV 237° 111' 0.250" Hoff=-0.1 Voff=-0.2 (CATV .25)

13 - 17.5' (209.7")
Weatherhead

14 - 17.4' (208.8")
CATV 342° 49' 0.250" Hoff=-0.2 Voff=-0.1 (CATV .25)
CATV 354° 23' 0.250" Hoff=-0.2 Voff=-0.1 (CATV .25)

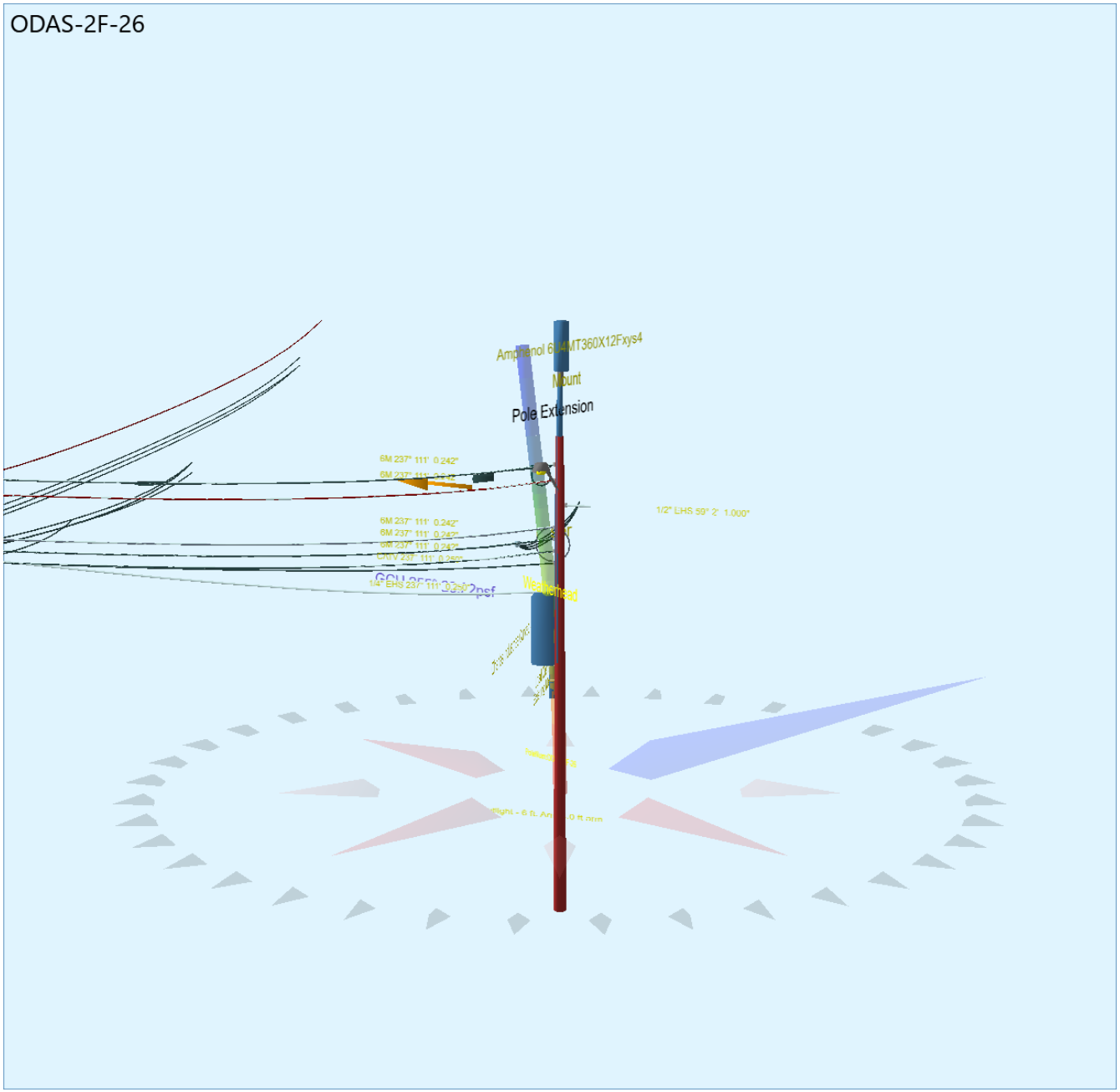
15 - 17.1' (205")
1/4" EHS 237° 111' Msgr:0.250"

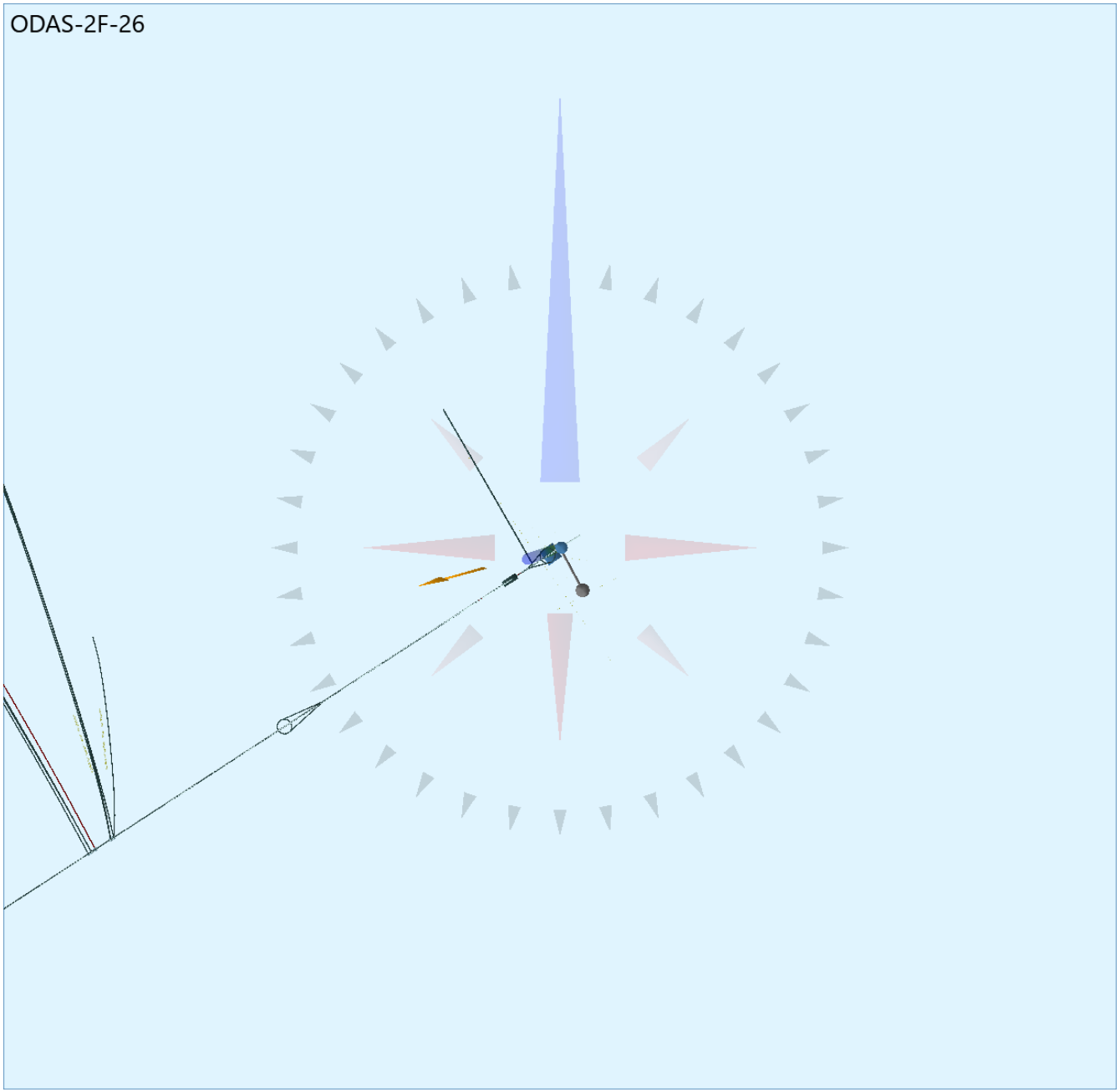
16 - 13.9' (167")
CHARLES SH60-702322 Shroud

17 - 10.3' (123")
Load Center PTS90526

18 - 8.8' (106")
Meter

ODAS-2F-26


Mount
Pole Extension
6M 237° 111° 0.242"
6M 237° 111° 0.242"
6M 237° 111° 0.242"
6M 237° 111° 0.242"
1/2" LHS 59° 2° 1.000"
Weatherhead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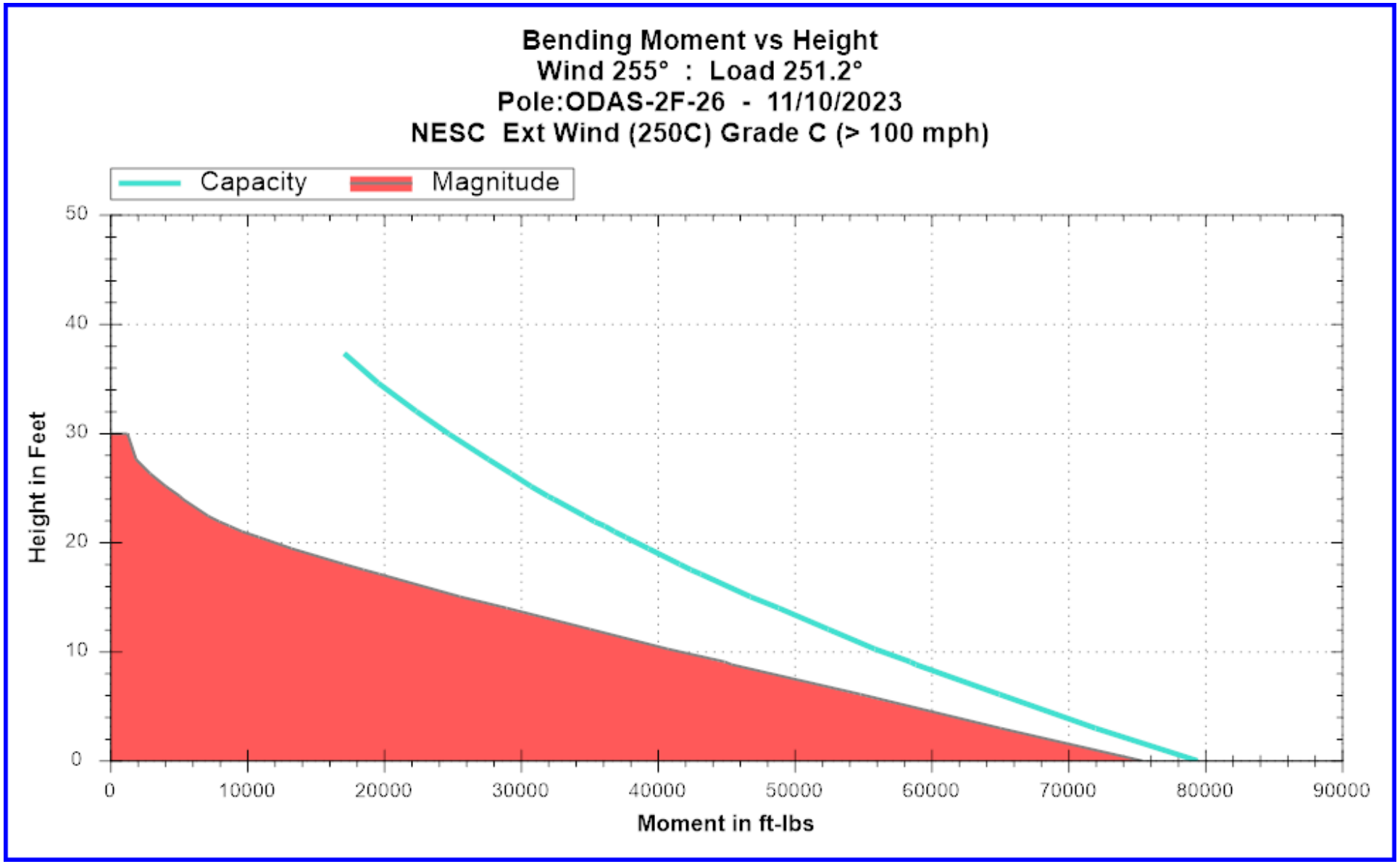
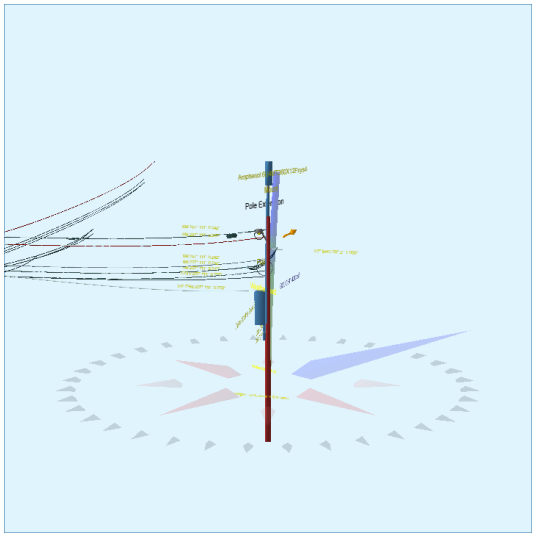
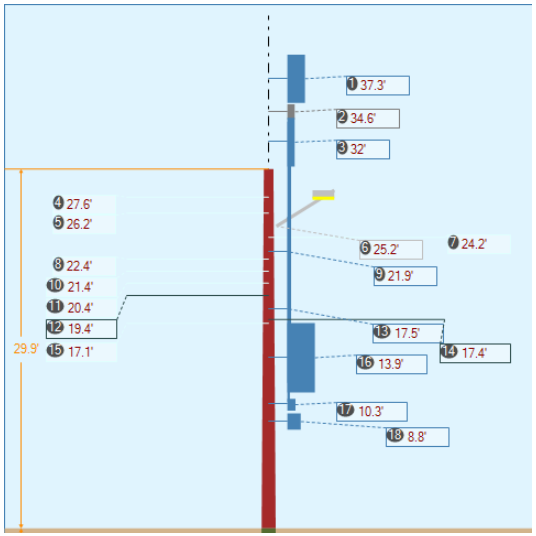

Bending Moment vs Height
Wind 255° : Load 251.2°
Pole:ODAS-2F-26 - 11/10/2023
NESC Ext Wind (250C) Grade C (> 100 mph)
Capacity
Magnitude
Height in Feet
0
10
20
30
40
50
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
Moment in ft-lbs

Pole Num:	**ODAS-2F-26**	Pole Length / Class:	**40 / 2**	Code:	**NESC**	Structure Type:	**Unguyed Tangent**
Aux Data 1	**Unset**	Species:	**SOUTHERN PINE**	NESC Rule:	**Rule 250B**	Status	**Unguyed**
Aux Data 2	**Unset**	Setting Depth (ft):	**10.08**	Construction Grade:	**C**	Pole Strength Factor:	**0.85**
Aux Data 3	**Unset**	G/L Circumference (in):	**36.88**	Loading District:	**Heavy**	Transverse Wind LF:	**1.75**
Aux Data 4	**Unset**	G/L Fiber Stress (psi):	**8,000**	Ice Thickness (in):	**0.50**	Wire Tension LF:	**1.00**
Aux Data 5	**Unset**	Allowable Stress (psi):	**6,800**	Wind Speed (mph):	**39.53**	Vertical LF:	**1.90**
Aux Data 6	**Unset**	Fiber Stress Ht. Reduc:	**No**	Wind Pressure (psf):	**4.00**		
Latitude:	**0.000000 Deg**	Longitude:	**0.000000 Deg**			Elevation:	**0 Feet**





Pole Capacity Utilization (%)		Height (ft)	Wind Angle (deg)
Maximum	**39.5**	0.0	334.1
Groundline	**39.5**	0.0	334.1
Vertical	**9.7**	18.6	334.1

Pole Moments (ft-lb)		Load Angle (deg)	Wind Angle (deg)
Max Cap Util	**34,951**	337.9	334.1
Groundline	**34,951**	337.9	334.1
GL Allowable	**90,002**		

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 337.9°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
Powers	109	6.8	**2,603**	7.5	**2.9**	**176**	225	2	**178**	**2.6**
Comms	1,076	66.9	**24,226**	69.3	**26.9**	**1,638**	1,217	11	**1,649**	**24.2**
GenericEquipments	236	14.7	**5,109**	14.6	**5.7**	**345**	1,123	10	**356**	**5.2**
Pole	172	10.7	**3,005**	8.6	**3.3**	**203**	1,827	17	**220**	**3.2**
SpanAdditions	2	0.1	**52**	0.2	**0.1**	**4**	49	0	**4**	**0.1**
Streetlights	14	0.9	**-39**	-0.1	**0.0**	**-3**	114	1	**-2**	**0.0**
Insulators	0	0.0	**-7**	0.0	**0.0**	**-1**	76	1	**0**	**0.0**
Pole Load	1,608	100.0	**34,951**	100.0	**38.8**	**2,363**	4,630	43	**2,406**	**35.4**
Pole Reserve Capacity			**55,051**		**61.2**	**4,437**			**4,394**	**64.6**

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 337.9°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
<Undefined>	1,418	88.2	**31,269**	89.5	**34.7**	**2,114**	2,711	25	**2,139**	**31.5**
Crown Castle	4	0.3	**168**	0.5	**0.2**	**11**	57	1	**12**	**0.2**
SPRINT BOSTON	14	0.9	**509**	1.5	**0.6**	**34**	36	0	**35**	**0.5**
Pole	172	10.7	**3,005**	8.6	**3.3**	**203**	1,827	17	**220**	**3.2**
Totals:	1,608	100.0	**34,951**	100.0	**38.8**	**2,363**	4,630	43	**2,406**	**35.4**

Detailed Load Components:

Power		Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)
Secondary	TRIPLEX 1/0		26.23	6.84	0.2500		0.263	111.0	237.0	111.3			-5	154	149
Secondary	TRIPLEX 1/0		23.22	726.96	0.2500	3.81	0.263	128.0	328.0	128.3	372	3,909	-3	9	3,915
Secondary	TRIPLEX 1/0		26.23	6.59	0.2500		0.263	111.0	237.0	111.3			-5	154	149
Overlashed Bundle	6M		26.25	6.71	0.2420	3.28	0.104	111.0	237.0	111.3	579	-2,863	-4	983	-1,884
											Totals:	**1,046**	**-17**	**1,300**	**2,329**

Comm	Owner	Height (ft)	Horiz. Offset (in)	Cable Diameter (in)	Sag at Max Temp (ft)	Cable Weight (lbs/ft)	Lead/Span Length (ft)	Span Angle (deg)	Wire Length (ft)	Tension (lbs)	Tension Moment* (ft-lb)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)

Overlashed Bundle	6M	27.58	6.63	0.2420	3.27	0.104	111.0	237.0	111.3	715	-3,716	-4	1,077	-2,643
CATV	CATV .35	27.56	6.81	0.3500		0.368	111.0	237.0	111.3			-7	415	409
CATV	CATV .35	27.56	6.47	0.3500		0.368	111.0	237.0	111.3			-7	206	200
Overlashed Bundle	1/2" EHS	24.25	6.84	1.0000	0.03	0.430	2.0	59.0	2.0	3,956	14,775	0	28	14,804
Overlashed Bundle	6M	22.42	6.95	0.2420	3.28	0.104	111.0	237.0	111.3	620	-2,617	-6	981	-1,641
Telco	TELE 0.5	22.39	6.95	0.5000		0.526	111.0	237.0	111.3			-11	273	263
Overlashed Bundle	6M	21.42	7.02	0.2420	3.27	0.104	111.0	237.0	111.3	742	-2,993	-3	796	-2,201
CATV	CATV .25	21.41	7.24	0.2500		0.263	111.0	237.0	111.3			-5	120	115
CATV	CATV .25	20.89	43.01	0.2500	1.02	0.263	20.0	330.0	20.2	32	637	-1	1	638
CATV	CATV .25	18.41	727.01	0.2500	3.03	0.263	49.0	342.0	49.7	63	531	-1	2	531
CATV	CATV .25	21.41	6.80	0.2500		0.263	111.0	237.0	111.3			-5	120	115
CATV	CATV .25	20.89	42.57	0.2500	1.25	0.263	20.0	330.0	20.3	25	511	-1	1	512
CATV	CATV .25	18.42	762.57	0.2500	3.38	0.263	128.0	328.0	128.3	429	3,367	-3	7	3,370
CATV	CATV .25	18.41	726.57	0.2500	3.03	0.263	49.0	342.0	49.7	63	530	-1	2	531
CATV	CATV .25	21.40	7.03	0.2500		0.263	111.0	237.0	111.3			-5	120	115
CATV	CATV .25	20.88	42.80	0.2500	1.48	0.263	20.0	330.0	20.4	21	424	-1	1	425
CATV	CATV .25	18.40	726.80	0.2500	2.57	0.263	49.0	342.0	49.5	76	642	-1	2	643
Overlashed Bundle	6M	20.42	7.08	0.2420	3.28	0.104	111.0	237.0	111.3	581	-2,236	-4	767	-1,473
CATV	CATV .25	20.40	6.94	0.2500		0.263	111.0	237.0	111.3			-6	123	117
CATV	CATV .25	17.42	762.71	0.2500	2.94	0.263	128.0	328.0	128.2	505	3,748	-3	6	3,752
CATV	CATV .25	20.40	7.21	0.2500		0.263	111.0	237.0	111.3			-6	123	117
CATV	CATV .25	17.42	762.98	0.2500	3.38	0.263	128.0	328.0	128.3	429	3,183	-3	6	3,186
CATV	CATV .25	19.40	7.01	0.2500	2.40	0.263	111.0	237.0	111.1	481	-1,758	-8	765	-1,001
CATV	CATV .25	17.40	726.78	0.2500	2.09	0.263	49.0	342.0	49.3	96	766	-1	1	766
CATV	CATV .25	17.40	726.78	0.2500	1.96	0.263	23.0	354.0	23.6	21	159	-1	6	165
Overlashed Bundle	1/4" EHS	17.08	7.29	0.2500	3.12	0.121	111.0	237.0	111.3	255	-817	-8	690	-135
										Totals:	**15,136**	**-101**	**6,641**	**21,676**

GenericEquipment		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Cylinder	Amphenol 6U4MT360X12Fxys4		37.25	1.82	90.0	0.0	42.00	48.20	--	14.60	--	-5	1,271	1,267
Cylinder	Mount	Crown Castle	34.63	0.68	90.0	0.0	30.00	15.00	--	6.00	--	-1	151	150
Cylinder	Pole Extension	SPRINT BOSTON	31.96	0.15	270.0	0.0	19.00	48.96	--	6.00	--	0	455	456
Cylinder	Riser		21.90	5.99	291.0	0.0	100.00	261.00	--	3.00	--	65	832	896
Cylinder	Weatherhead		17.48	5.77	187.0	0.0	100.00	185.00	--	2.00	--	-80	314	234
Box	Charles Industries Curved Shroud: SH60-702322		13.92	15.71	235.0	0.0	250.00	69.50	21.45	--	22.73	-138	1,614	1,475
Box	Load Center		10.25	7.89	235.0	0.0	40.00	12.00	5.33	--	6.70	-11	51	40

Box	Existing Meter	8.83	7.74	235.0	0.0	10.00	16.08	4.86	--	11.00	-3	56	53
										Totals:	**-173**	**4,744**	**4,572**

SpanAddition		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Maintenance Loop	Span Addition		27.38	12.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	7	7
Maintenance Loop	Span Addition		27.38	12.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	14	14
Maintenance Loop	Span Addition		24.77	420.00	237.0	237.0	7.00	15.00	15.00	15.00	15.00	0	10	10
Maintenance Loop	Span Addition		22.39	0.00	237.0	237.0	7.00	30.00	30.00	30.00	30.00	0	16	16
											Totals:	**0**	**47**	**47**

Streetlight		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Height (in)**	**Unit Depth (in)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
General	Streetlight - 6 ft. Arm		25.17	4.28	152.0	152.0	60.00	36.00	18.00	3.00	48.00	-386	352	-34
											Totals:	**-386**	**352**	**-34**

Insulator		**Owner**	**Height (ft)**	**Horiz. Offset (in)**	**Offset Angle (deg)**	**Rotate Angle (deg)**	**Unit Weight (lbs)**	**Unit Diameter (in)**	**Unit Length (in)**	**Offset Moment* (ft-lb)**	**Wind Moment* (ft-lb)**	**Moment at GL* (ft-lb)**
Bolt	Single Bolt		27.58	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt		26.25	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		24.25	0.00	57.0	57.0	5.00	3.00	0.00	1	0	1
Bolt	Single Bolt (Relocated)		22.42	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		21.42	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		20.42	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		19.42	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
Bolt	Single Bolt (Relocated)		17.08	0.00	237.0	237.0	5.00	3.00	0.00	-1	0	-1
									Totals:	**-6**	**0**	**-6**

Pole Buckling

Buckling Constant	**Buckling Column Height* (ft)**	**Buckling Section Height (% Buckling Col. Hgt.)**	**Buckling Section Diameter (in)**	**Minimum Buckling Diameter at GL (in)**	**Diameter at Tip (in)**	**Diameter at GL (in)**	**Modulus of Elasticity (psi)**	**Pole Density (pcf)**	**Ice Density (pcf)**	**Pole Tip Height (ft)**	**Buckling Load Capacity at Height (lbs)**	**Buckling Load Applied at Height (lbs)**	**Buckling Load Factor of Safety**
2.00	18.59	33.00	10.96	15.03	7.96	11.75	1.60e+6	60.00	57.00	29.92	47,804	**477.34**	**10.31**

Notes

Date	Author	Description
12/7/2015	bmesfin	Assumptions

ASSUMPTIONS :

The analysis contained within this report is based on the pole capacity as prescriberd in the governing codes. The validitiy and accuracy of the analysis within is limited by the accuracy of the infromation it is based on. The structural analysis is based on the following assumptions.

1. The pole was built and maintained in accordance with the manufacturer's specifications. The structure is assumed to be plumb, in good condition and essentially as erected.
2. The member size dimensions and sections are accurate as supplied.
3. The wood pole evaluated is Southern pine with capacity of 8000psi.
4. The soil at this locations have normal (average) soil properties.
5. All wire types, sizes, heights and wind spans were determined from photos obtained during a site visit.

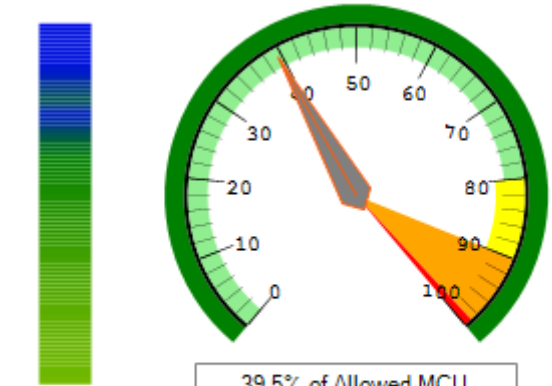
If any of these assumptions is not valid or has been made in error, this analysis may be affected, and NB+C ES sould be allowed to review any new information to determine its effect on the structural integrity of the tower.

O-Calc® Pro Capacity Summary Info

Pole Identification: ODAS-2F-26

Report Created: 11/10/2023

File: ODAS_2F-26.pplx



O-Calc® Pro Heat Map View

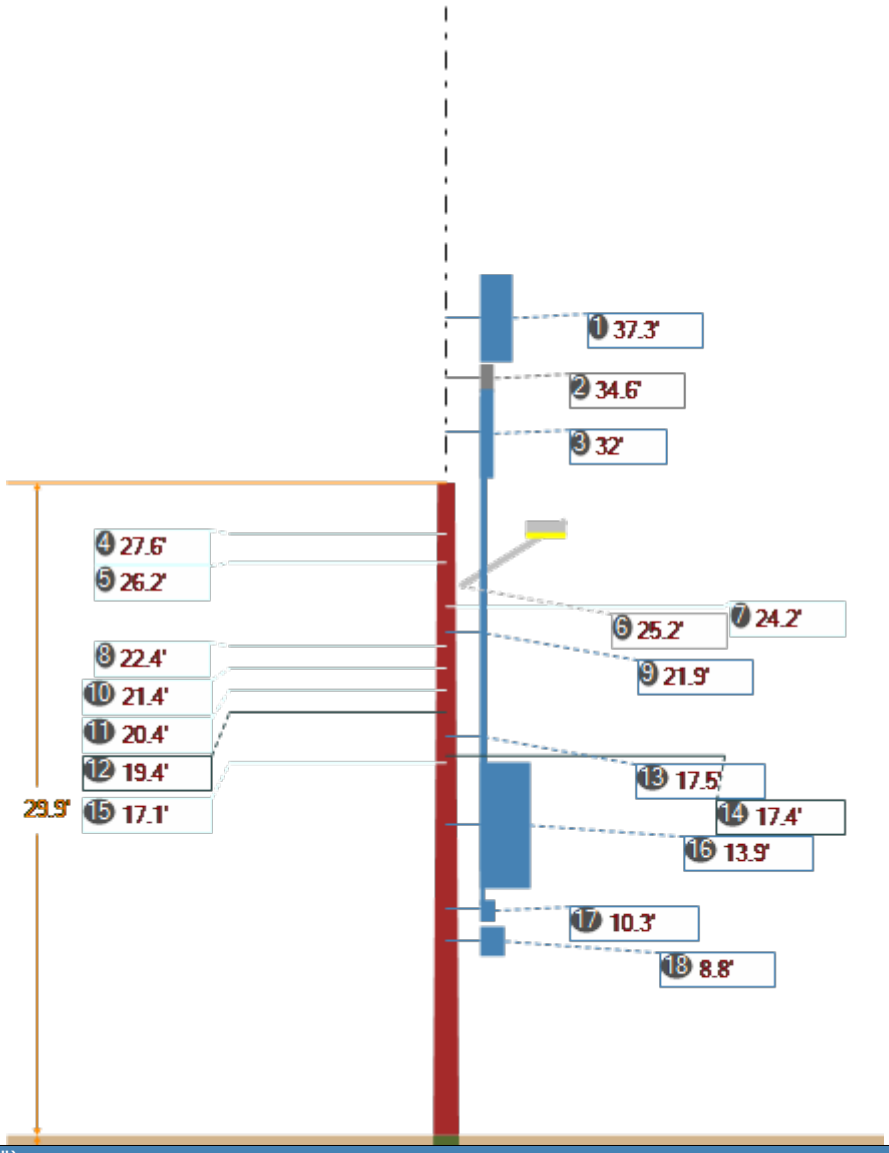
Report Created: 11/10/2023

O-Calc® Pro Schematic View

Pole Identification: ODAS-2F-26

Report Created: 11/10/2023

File: ODAS_2F-26.pplx



1 - 37.3' (447")
Amphenol 6U4MT360X12Fxys4

2 - 34.6' (415.6")
Mount

3 - 32' (383.5")
Bracket

4 - 27.6' (331")
6M 237° 111' Msgr:0.242"

5 - 26.2' (315")
6M 237° 111' Msgr:0.242"

6 - 25.2' (302")
Streetlight - 6 ft. Arm 4.0 ft arm

7 - 24.2' (291")
1/2" EHS 59° 2' Msgr:1.000"

8 - 22.4' (269")
6M 237° 111' Msgr:0.242"

9 - 21.9' (262.7")
Riser

10 - 21.4' (257")
6M 237° 111' Msgr:0.242"

11 - 20.4' (245")
6M 237° 111' Msgr:0.242"

12 - 19.4' (232.8")
CATV 237° 111' 0.250" Hoff=-0.1 Voff=-0.2 (CATV .25)

13 - 17.5' (209.7")
Weatherhead

14 - 17.4' (208.8")
CATV 342° 49' 0.250" Hoff=-0.2 Voff=-0.1 (CATV .25)
CATV 354° 23' 0.250" Hoff=-0.2 Voff=-0.1 (CATV .25)

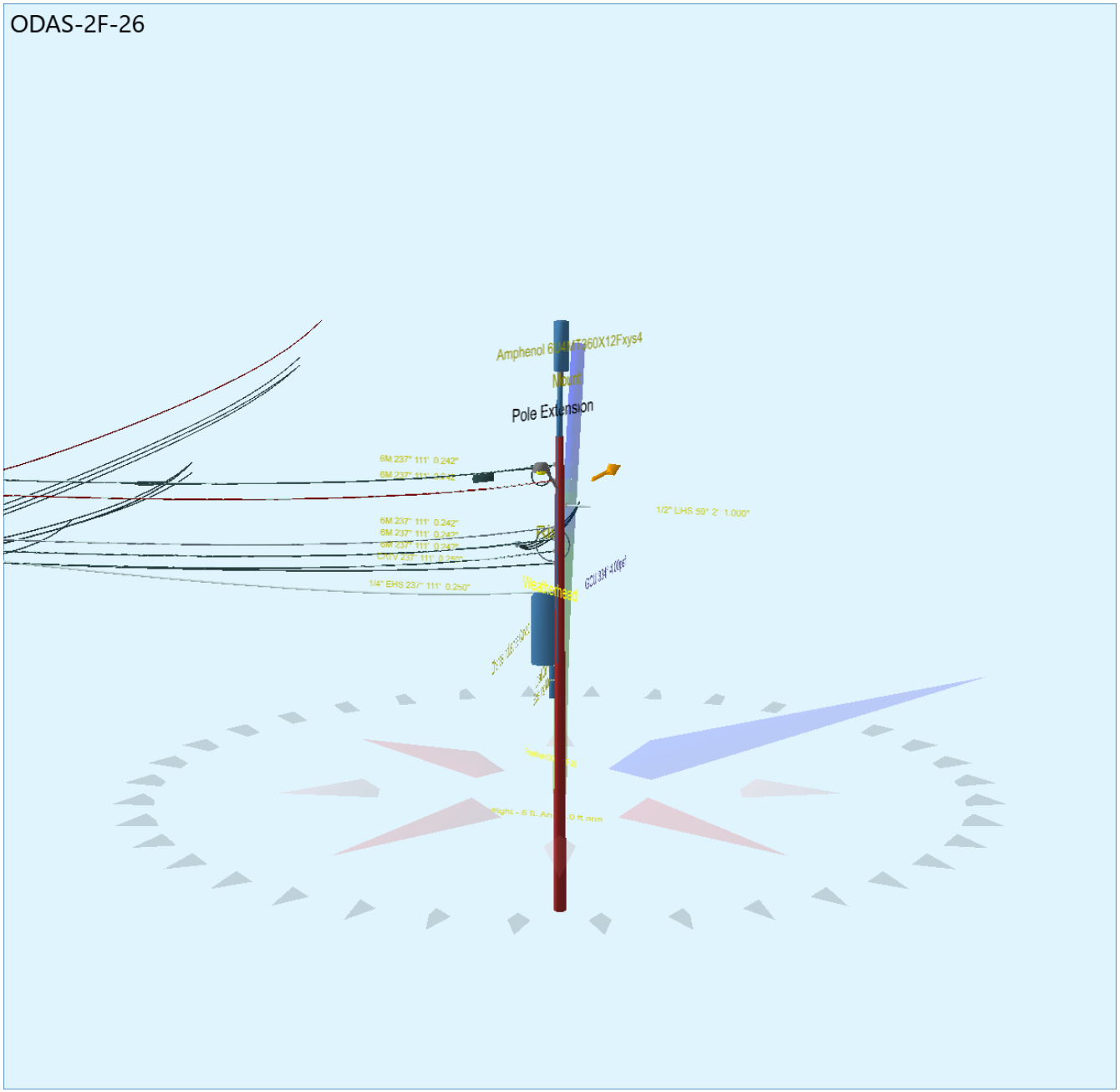
15 - 17.1' (205")
1/4" EHS 237° 111' Msgr:0.250"

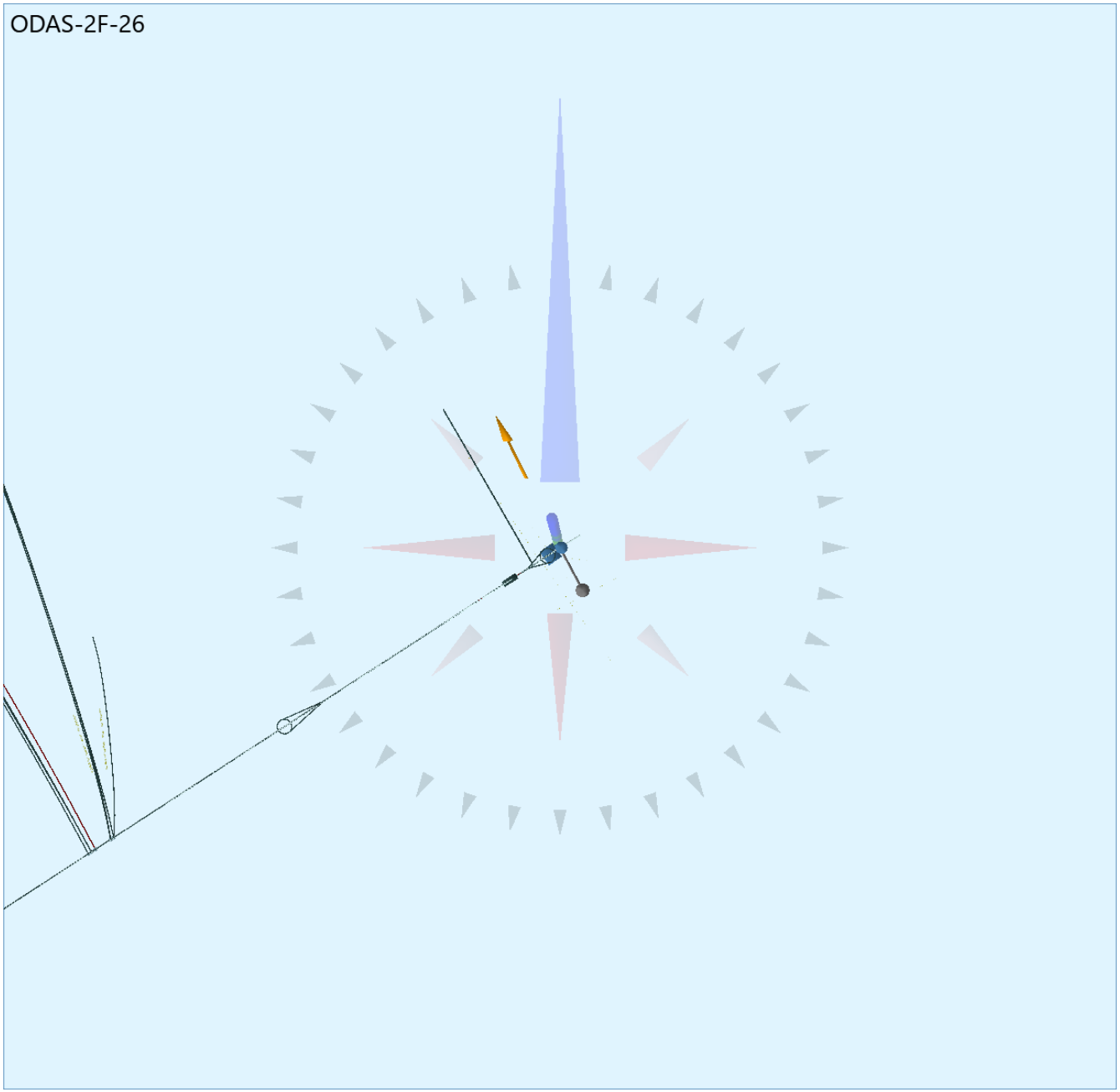
16 - 13.9' (167")
CHARLES SH60-702322 Shroud

17 - 10.3' (123")
Load Center PTS90526

18 - 8.8' (106")
Meter

ODAS-2F-26


Amphenol 6
Mount
Pole Extension
6M 237° 111° 0.242"
6M 237° 111° 0.242"
6M 237° 111° 0.242"
6M 237° 111° 0.242"
1/4" EHS 237° 111° 0.250"
1/2" LHS 59° 2° 1.000"
Weatherhead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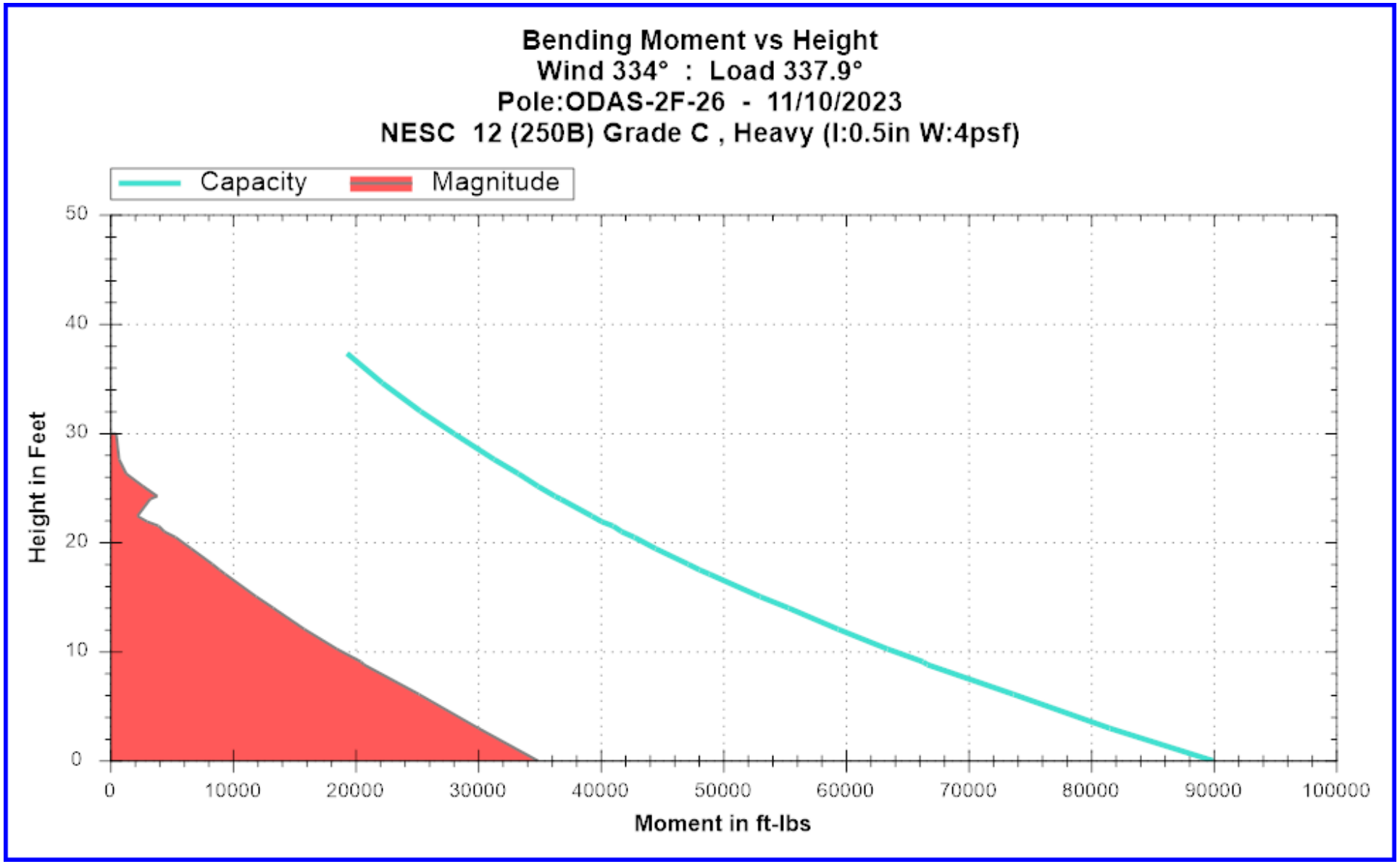

Bending Moment vs Height
Wind 334° : Load 337.9°
Pole:ODAS-2F-26 - 11/10/2023
NESC 12 (250B) Grade C , Heavy (I:0.5in W:4psf)
Capacity
Magnitude
Height in Feet
0
10
20
30
40
50
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
Moment in ft-lbs

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

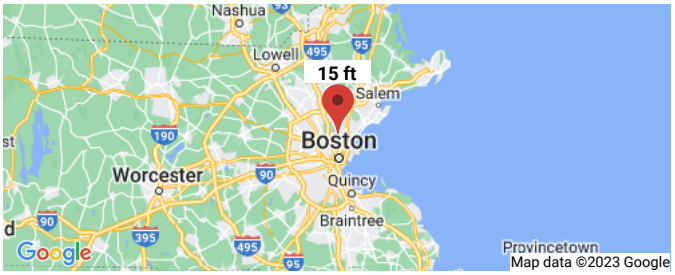
Search Information

Coordinates: 42.423182, -71.06748

Elevation: 15 ft

Timestamp: 2023-11-08T06:40:18.932Z

Hazard Type: Wind



ASCE 7-16

MRI 10-Year	75 mph
MRI 25-Year	84 mph
MRI 50-Year	91 mph
MRI 100-Year	98 mph
Risk Category I	109 mph
Risk Category II	119 mph
Risk Category III	128 mph
Risk Category IV	⚠ 132 mph

You are in a wind-borne debris region if you are also within 1 mile of the coastal mean high water line.

ASCE 7-10

MRI 10-Year	78 mph
MRI 25-Year	88 mph
MRI 50-Year	96 mph
MRI 100-Year	103 mph
Risk Category I	117 mph
Risk Category II	127 mph
Risk Category III-IV	⚠ 138 mph

If the structure under consideration is a healthcare facility and you are also within 1 mile of the coastal mean high water line, you are in a wind-borne debris region. If other occupancy, use the Risk Category II basic wind speed contours to determine if you are in a wind-borne debris region.

ASCE 7-05

ASCE 7-05 Wind Speed	105 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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