



NB+C Engineering Services

Existing Wood Pole Antenna Installation

Prepared for Crown Castle Fiber, LLC

SITE INFORMATION

Address	10 Mills Street
	Malden, MA 02148
	Middlesex County
	Latitude: 42.420460°
	Longitude: -71.055183°
Crown Castle Node Number	ODAS_2F-23
NB+C Project Number	100723
Date	November 9, 2023

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1.0 INTRODUCTION

The structure is an existing class 3-40 ft. wood pole located in Malden, MA. As per your request **NB+C ES** performed a structural analysis and design for the existing 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 06, 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
37.83	(1) Amphenol 6U4MT360X12F20s0BR antenna	T-Mobile	(4) 1/2" Coax Cable
15.50	(1) Charles Industries Curved Shroud SH60-702322 w/ (1) Ericsson Radio 4455 B2/B25, (1) Radio 8863 B41		
11.50	(1) PTS90526 AC Load Center		
9.71	(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.

- Based on the photos taken by **NB+C ES** personnel dated October 6, 2023, the existing pole was assumed to be a class 3-40 ft Southern Pine wood pole with an embedment of 5.5 ft 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 existing wood pole structure **with proposed modification** was calculated to have adequate structural capacity to support the proposed 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 58.2% of its design capacity. NB+C ES recommends installation of a 12" Bust Expanding Anchor (Hubbell part #1283 or approved equivalent) with a lead length of 12'-0" along 140° West of True North along with 7/16" – Φ EHS down guy at 28'-0". The proposed down guy and the anchor were calculated to be stressed to a maximum of 48.6% and 34.3%, respectively, of their theoretical design capacity. NB+C ES recommends that the pole owner perform a condition assessment and evaluate the need for a pole replacement due to condition, maintenance, and serviceability.** 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 existing 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.

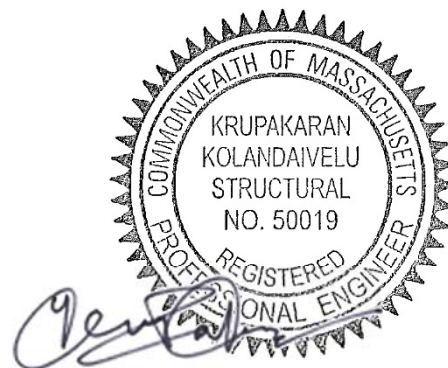
NB+C ENGINEERING SERVICES, LLC

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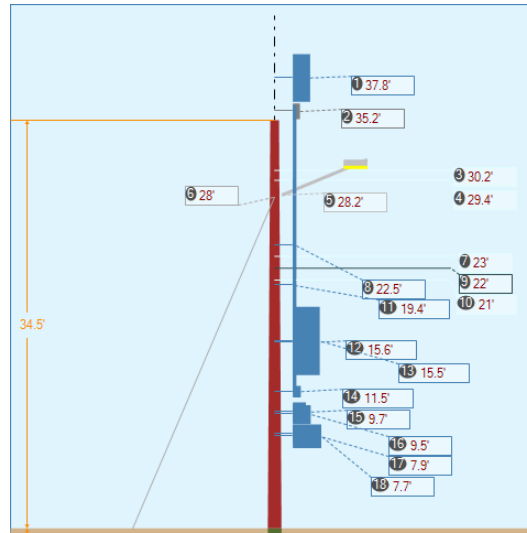
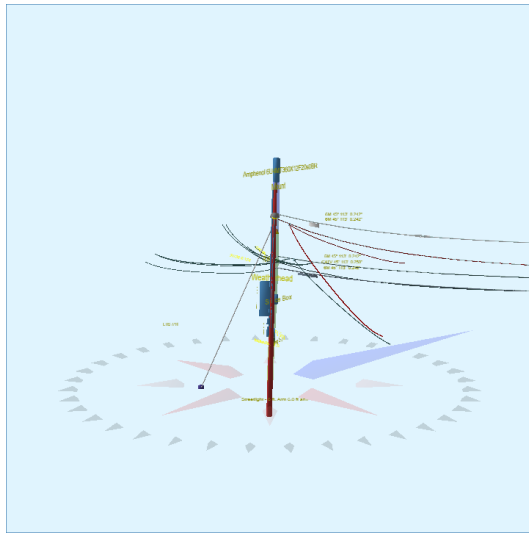


11/9/23

APPENDIX A

CALCULATIONS

Pole Num:	ODAS-2F-23	Pole Length / Class:	40 / 3	Code:	NESC	Structure Type:	Guyed Tangent
Aux Data 1	Unset	Species:	SOUTHERN PINE	NESC Rule:	Rule 250B	Status	Guy Wires Adequate
Aux Data 2	Unset	Setting Depth (ft):	5.50	Construction Grade:	C	Pole Strength Factor:	0.85
Aux Data 3	Unset	G/L Circumference (in):	36.19	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:	1.30
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	48.4	0.0
Groundline	48.4	0.0
Vertical	9.4	25.8

Pole Moments (ft-lb)	Load Angle (deg)	Wind Angle (deg)
Max Cap Util	39,316	22.7
Groundline	39,316	22.7
GL Allowable	85,052	

Guy System Component Summary				Load From Worst Wind Angle on Pole		Individual Maximum Load	
Description	Lead Length (ft)	Lead Angle (deg)	Height (ft)	Nominal Capacity (%)	Wind Angle (deg)	Max Load Capacity (%)	Wind Angle (deg)
Expanding - 12" - Soil Class 5	12.0	220.0		28.6	320.0	34.3	30.0
EHS 7/16 (Down)			28.0	40.4	320.0	48.6	30.0
System Capacity Summary:				Adequate		Adequate	

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 22.7°

	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	478	25.5	16,985	43.2	20.0	1,123	301	3	1,126	16.6
Comms	3,878	206.7	110,653	281.4	130.1	7,316	1,364	13	7,329	107.8
GuyBraces	-2,774	-147.8	-93,940	-238.9	-110.5	-6,211	10,506	101	-6,110	-89.9
GenericEquipments	149	7.9	2,631	6.7	3.1	174	1,162	11	185	2.7
Pole	134	7.1	2,773	7.1	3.3	183	1,935	19	202	3.0
SpanAdditions	1	0.0	21	0.1	0.0	1	10	0	1	0.0
Streetlights	11	0.6	130	0.3	0.2	9	114	1	10	0.1
Insulators	1	0.1	64	0.2	0.1	4	47	0	5	0.1
Pole Load	1,877	100.0	39,316	100.0	46.2	2,599	15,440	148	2,747	40.4
Pole Reserve Capacity			45,736		53.8	4,201			4,053	59.6

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 22.7°

	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>	1,739	92.7	36,392	92.6	42.8	2,406	13,448	129	2,535	37.3
Crown Castle	4	0.2	151	0.4	0.2	10	57	1	11	0.2
Pole	134	7.1	2,773	7.1	3.3	183	1,935	19	202	3.0
Totals:	1,877	100.0	39,316	100.0	46.2	2,599	15,440	148	2,747	40.4

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	29.41	6.31	0.2500		0.263	113.0	45.0	114.5			25	71	132
Secondary	TRIPLEX 1/0	29.40	6.62	0.2500		0.263	113.0	45.0	114.5			26	71	133
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	0.99	0.263	28.0	6.0	28.1	68	2,247	11	-59	2,208
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	0.99	0.263	28.0	6.0	28.1	68	2,247	11	-59	2,208
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	2.12	0.263	49.0	120.0	49.3	91	-417	13	170	-214
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	2.06	0.263	49.0	120.0	49.3	93	-429	13	170	-227
Overlashed Bundle	6M	29.42	6.47	0.2420	7.14	0.104	113.0	45.0	114.5	264	9,324	17	438	9,804
										Totals:	12,972	116	803	14,045

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	30.25	6.42	0.2420	4.07	0.104	113.0	45.0	113.5	485	17,625	25	519	18,208
Fiber	Fiber 0.45	30.23	6.17	0.4500		0.474	113.0	45.0	113.5			43	231	340
Overlashed Bundle	6M	23.00	6.86	0.2420	2.85	0.104	113.0	45.0	113.2	1,428	39,469	15	325	39,825
CATV	CATV .20	22.99	6.69	0.2000		0.600	113.0	45.0	113.2			41	38	124
CATV	CATV .25	22.46	42.69	0.2500	1.07	0.600	49.0	120.0	49.1	300	-1,089	21	132	-909
CATV	CATV .20	22.99	6.99	0.2000		0.600	113.0	45.0	113.2			43	38	125
CATV	CATV .25	22.63	30.99	0.2500	1.52	0.600	45.0	280.0	45.2	166	-1,042	20	229	-771
CATV	CATV .25	22.63	30.99	0.2500	1.78	0.600	45.0	280.0	45.2	142	-892	19	229	-622
CATV	CATV .25	22.63	30.99	0.2500	1.58	0.600	45.0	280.0	45.2	161	-1,007	20	229	-737
CATV	CATV .25	22.01	78.99	0.2500	1.23	0.600	45.0	300.0	45.1	207	714	20	116	872
CATV	CATV .25	22.01	78.99	0.2500	1.38	0.600	45.0	300.0	45.1	184	635	20	116	792
CATV	CATV .25	22.01	78.99	0.2500	1.33	0.600	45.0	302.0	45.1	191	837	20	104	983
CATV	CATV .20	22.98	6.86	0.2000		0.600	113.0	45.0	113.2			42	38	125
CATV	CATV .25	22.00	6.42	0.2500	5.44	0.600	113.0	45.0	113.9	297	7,853	57	343	8,314
CATV	CATV .25	22.00	6.42	0.2500	1.59	0.600	41.0	300.0	41.2	141	514	21	112	669
CATV	CATV .25	22.00	6.42	0.2500	1.59	0.600	41.0	301.0	41.2	141	584	21	106	732
Overlashed Bundle	6M	21.00	6.98	0.2420	3.23	0.104	113.0	45.0	113.3	926	23,377	17	316	23,727
Telco	TELE 0.35	20.98	7.19	0.3500		0.350	113.0	45.0	113.3			32	54	115
Telco	TELE 0.35	20.98	6.78	0.3500		0.350	113.0	45.0	113.3			30	131	191
Telco	TELE 0.35	20.96	6.99	0.3500		0.350	113.0	45.0	113.3			31	54	115
CATV	CATV .35	21.00	6.98	0.2500	1.52	0.600	45.0	280.0	45.2	166	-984	33	216	-715
Totals:											86,596	593	3,677	91,502

Generic Equipment	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 6U4MT360X12F20s0BR	37.83	1.76	90.0	0.0	42.00	48.20	--	14.60	--	5	594	672
Cylinder	Mount	35.17	0.62	90.0	0.0	30.00	15.96	--	6.00	--	1	75	125
Cylinder	Riser	22.49	5.89	255.0	0.0	100.00	285.24	--	3.00	--	-57	430	476
Cylinder	Weatherhead	19.45	5.83	145.0	0.0	100.00	217.00	--	2.50	--	-49	236	276
Box	Splice Box	15.59	9.94	90.0	0.0	10.00	20.04	5.13	--	9.50	6	31	44
Box	Charles Industries Curved Shroud: SH60-702322	15.50	15.54	225.0	0.0	250.00	69.50	21.45	--	22.73	-569	834	444
Box	Load Center	11.50	7.73	225.0	0.0	40.00	11.88	5.33	--	6.70	-45	27	3
Box	Existing Meter	9.71	7.60	225.0	0.0	10.00	20.04	4.86	--	11.00	-11	41	35
Box	Existing Sign	9.54	5.30	27.0	0.0	10.00	18.96	0.25	--	15.00	8	82	95

Box	Existing Sign	7.92	5.40	64.0	0.0	10.00	18.00	0.25	--	15.00	6	-28	-18
Box	Existing Sign	7.67	5.42	225.0	0.0	10.00	24.00	0.25	--	24.00	-8	29	25
										Totals:	-713	2,352	2,176

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		26.43	300.00	45.0	45.0	7.00	20.00	20.00	20.00	20.00	0	9	17
										Totals:	0	9	17	

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		28.17	4.05	135.0	135.0	60.00	36.00	20.00	3.00	72.00	-207	237	107
										Totals:	-207	237	107	

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		30.25	0.00	45.0	45.0	5.00	3.00	0.00	5	0	12
Bolt	Single Bolt		29.42	0.00	45.0	45.0	5.00	3.00	0.00	5	0	12
Bolt	Single Bolt (Relocated)		23.00	0.00	45.0	45.0	5.00	3.00	0.00	5	0	10
J-Hook	J-Hook (Relocated)		22.00	0.00	45.0	45.0	5.00	2.00	0.00	5	0	10
Bolt	Single Bolt (Relocated)		21.00	0.00	45.0	45.0	5.00	3.00	0.00	5	0	10
									Totals:	24	0	53

Guy Wire and Brace		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Diameter (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
EHS 7/16	Down		28.00	0.00	12.00	0.438	75.00	220.0	66.6	0.399	35.47	1.24

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Loaded Tension*2 (lbs)	Maximum Tension² (lbs)	Applied Tension³ (lbs)	Vertical Load (lbs)	Shear Load In Guy Dir (lbs)	Shear Load At Report Angle (lbs)	Moment at GL³ (ft-lb)
EHS 7/16	Down	2.30e+7	20,800	0.90	18,720	700	9,099	8,272	7,570	6,945	3,012	-2,875	-77,682
									Totals:	6,945	3,012	-2,875	-77,682

Anchor/Rod Load Summary		Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load ² (lbs)	Load at Pole MCU ³ (lbs)	Max Required Capacity ² (%)
Expanding - 12" - Soil Class 5			0.00	12.00	220.0	26,500	1.00	26,500	9,099	7,570	34.3

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
0.71	25.78	34.09	10.45	18.74	7.32	11.53	1.60e+6	60.00	57.00	34.50	164,269	1642.50	10.64

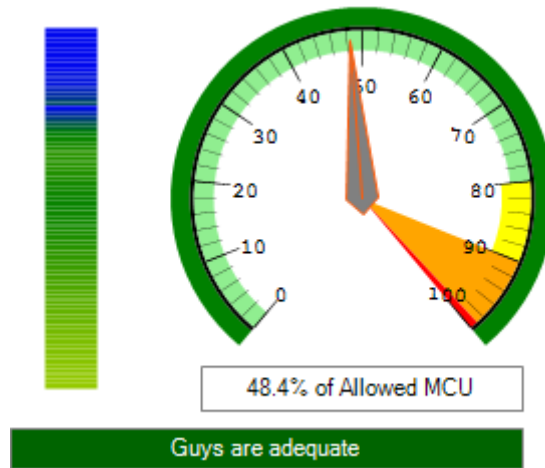
Notes		
Date	Author	Description
12/7/2015	bmesfin	Assumptions
ASSUMPTIONS :		
The analysis contained within this report is based on the pole capacity as prescriberd in the governing codes. The validity and accuracy of the analysis within is limited by the accuracy of the infromation it is based on. The 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 could 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-23

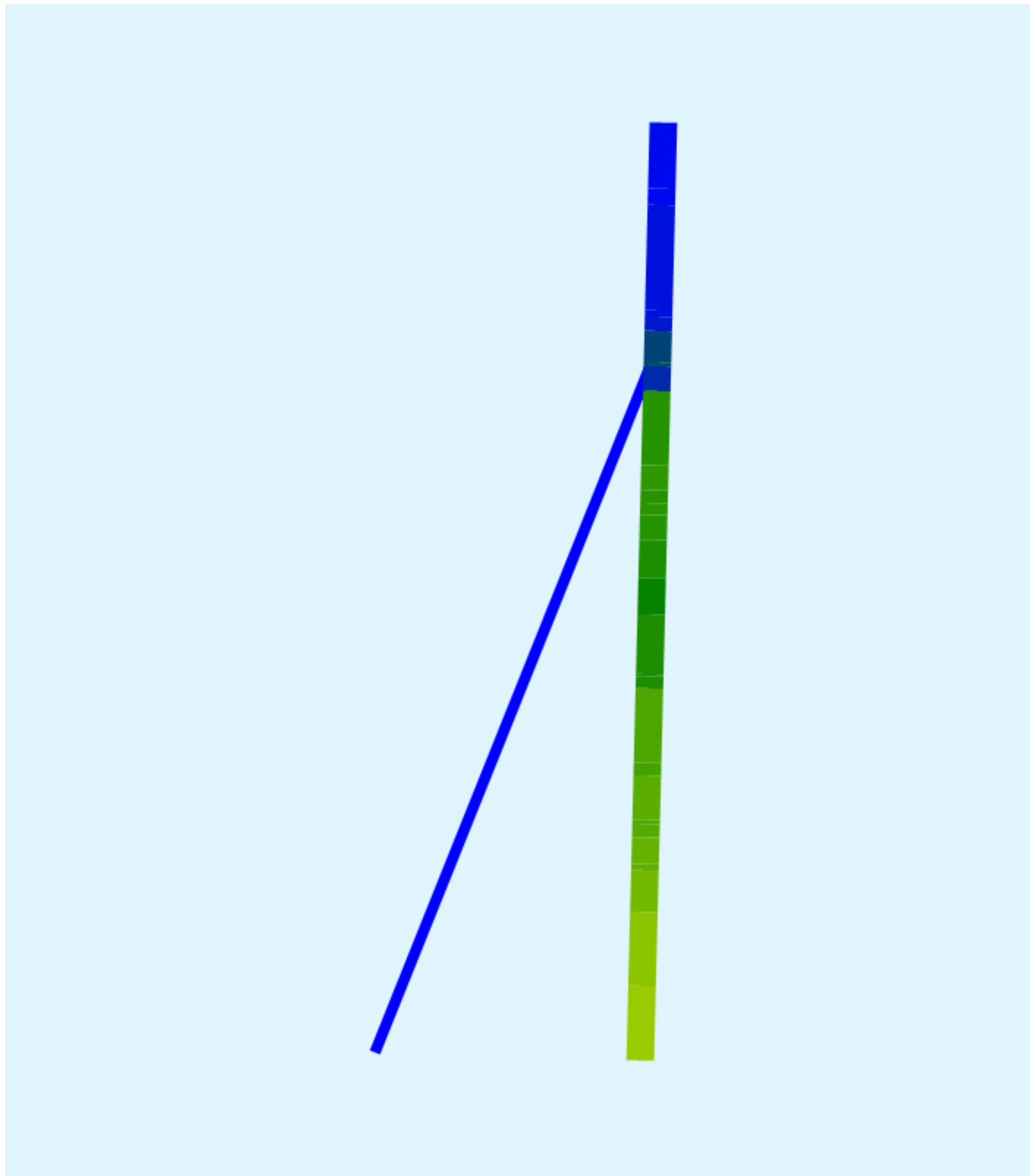
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O-Calc® Pro Heat Map View

Report Created: 11/9/2023

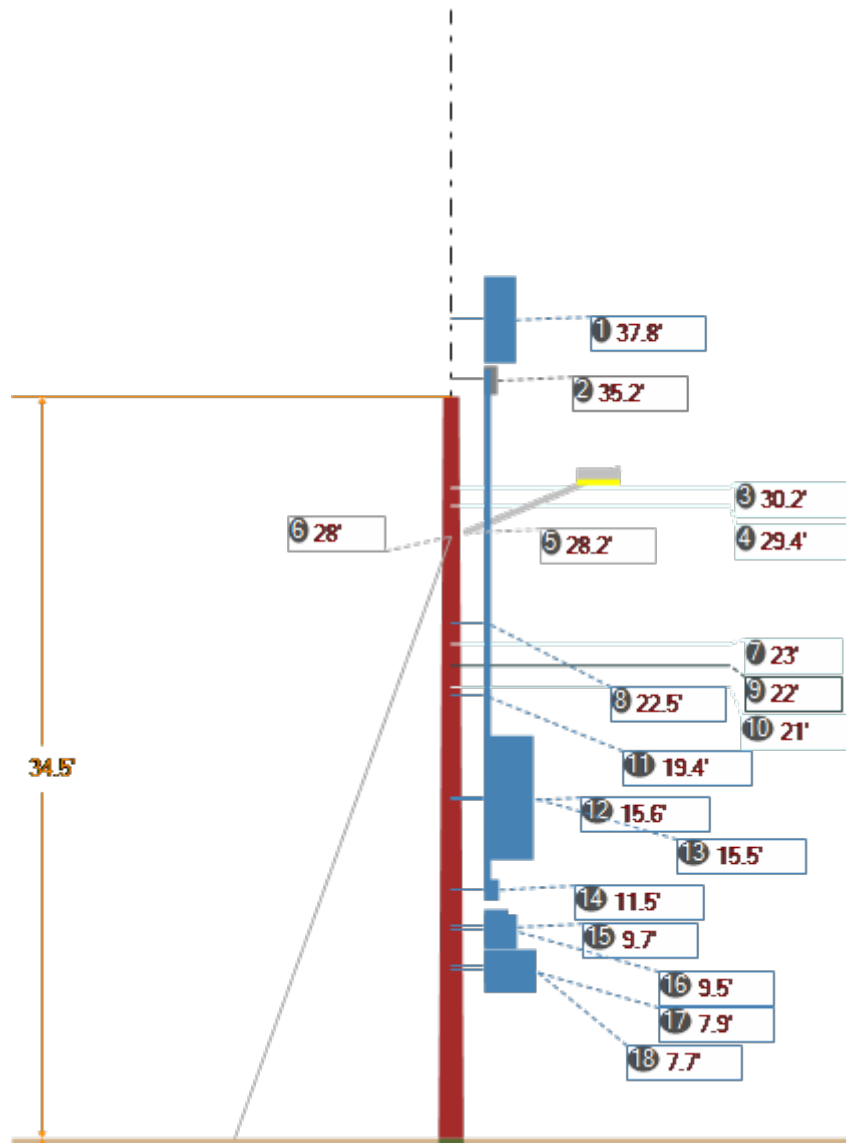


O-Calc® Pro Schematic View

Pole Identification: ODAS-2F-23

Report Created: 11/9/2023

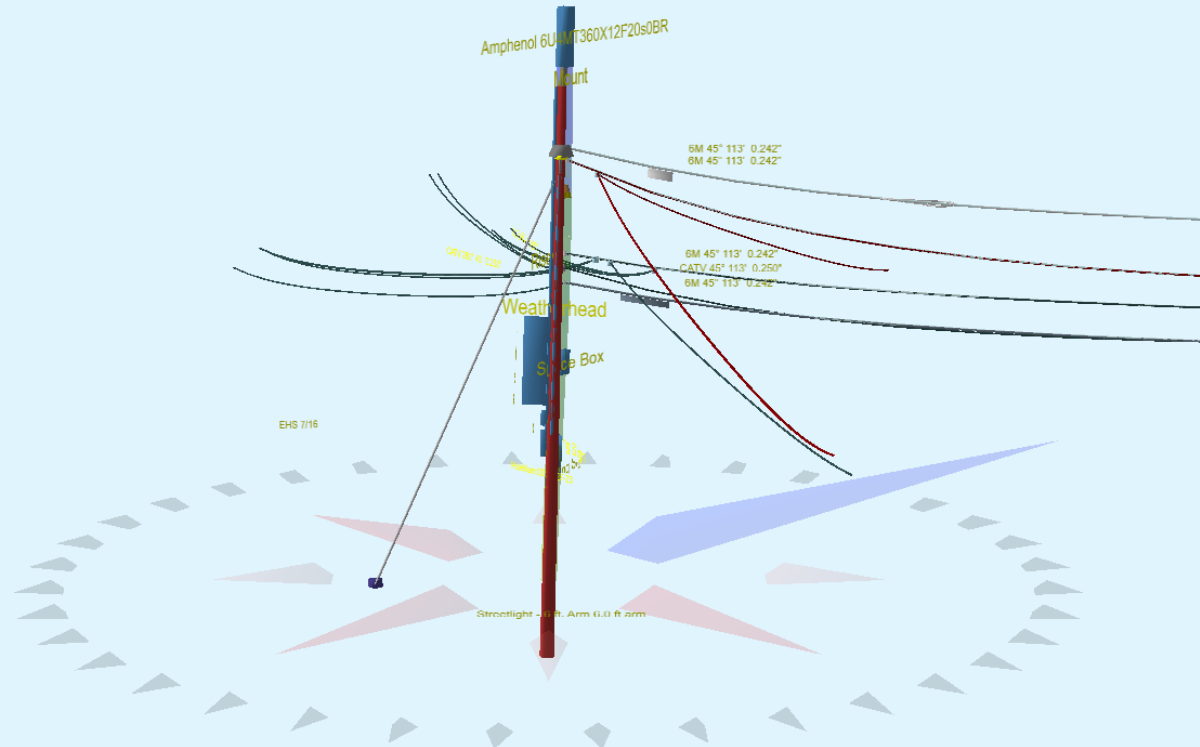
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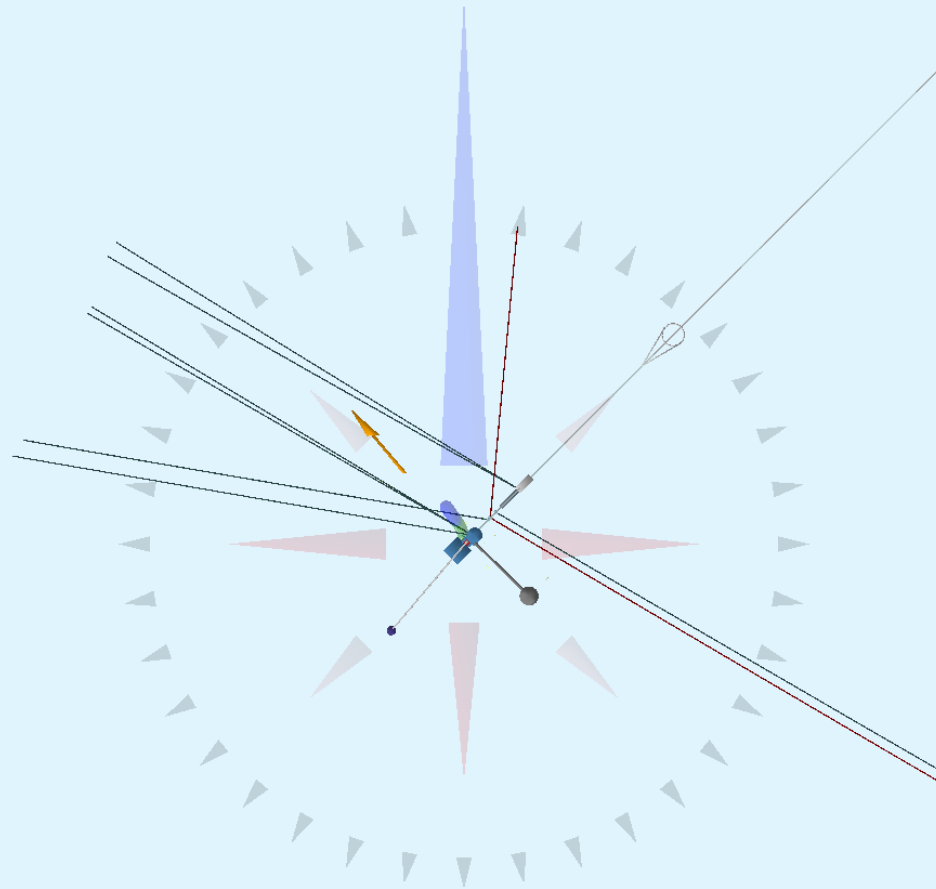
1 - 37.8' (454")
Amphenol 6U4MT360X12F20s0BR
2 - 35.2' (422")
Mount
3 - 30.2' (363")
6M 45° 113' Msgr:0.242"
4 - 29.4' (353")
6M 45° 113' Msgr:0.242"
5 - 28.2' (338")
Streetlight - 6 ft. Arm 6.0 ft arm
6 - 28' (336")
EHS 7/16 Down Guy 28.0 ft hgt, 66.8° angle
7 - 23' (276")
6M 45° 113' Msgr:0.242"

8 - 22.5' (269.8")	Riser
9 - 22' (264")	CATV 45° 113' 0.250" (CATV .25) CATV 300° 41' 0.250" (CATV .25) CATV 301° 41' 0.250" (CATV .25)
10 - 21' (252")	6M 45° 113' Msgr:0.242" CATV 280° 45' 0.250" (CATV .35)
11 - 19.4' (233.4")	Weatherhead
12 - 15.6' (187")	Splice Box
13 - 15.5' (186")	CHARLES SH60-702322 Shroud
14 - 11.5' (138")	Load Center PTS90526
15 - 9.7' (116.5")	Meter
16 - 9.5' (114.5")	Existing Sign
17 - 7.9' (95")	Existing Sign
18 - 7.7' (92")	Existing Sign

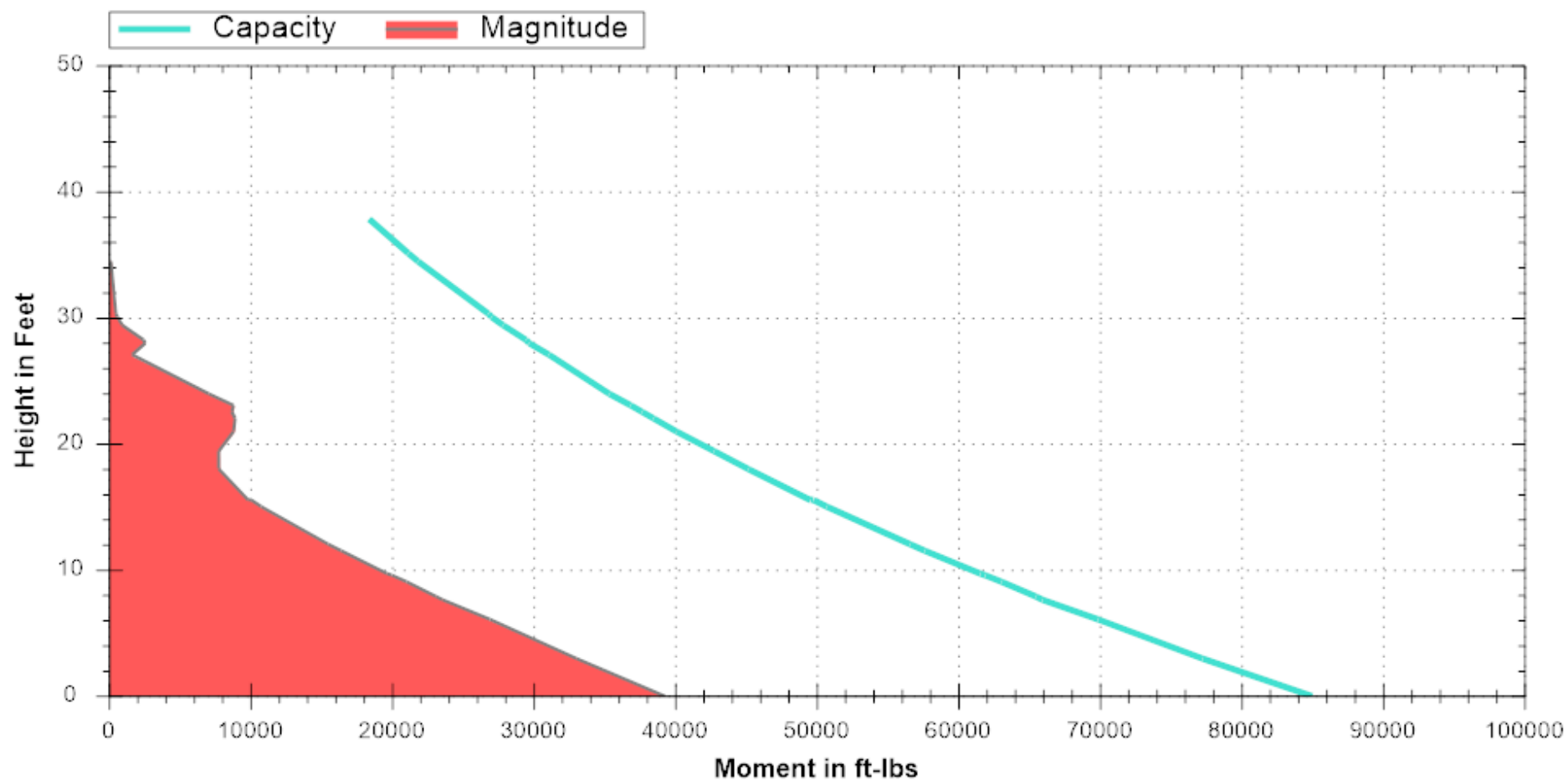
ODAS-2F-23



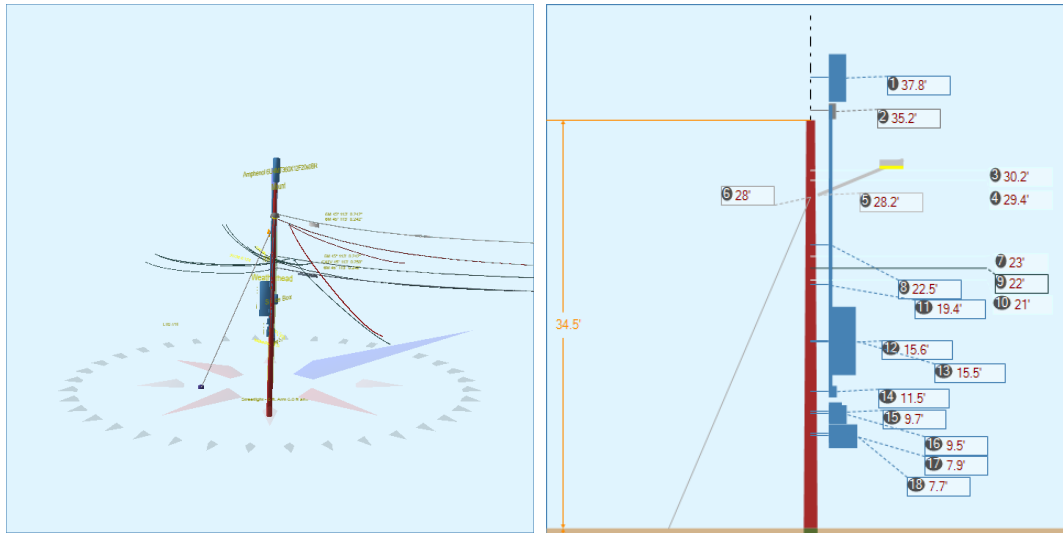
ODAS-2F-23



Bending Moment vs Height
Wind 320° : Load 22.7°
Pole: ODAS-2F-23 - 11/9/2023
NESC 12 (250B) Grade C , Heavy (I:0.5in W:4psf)



Pole Num:	ODAS-2F-23	Pole Length / Class:	40 / 3	Code:	NESC	Structure Type:	Guyed Tangent
Aux Data 1	Unset	Species:	SOUTHERN PINE	NESC Rule:	Rule 250C	Status	Guy Wires Adequate
Aux Data 2	Unset	Setting Depth (ft):	5.50	Construction Grade:	C	Pole Strength Factor:	0.75
Aux Data 3	Unset	G/L Circumference (in):	36.19	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)	126.22
Latitude:	0.000000 Deg	Longitude:	0.000000 Deg	Elevation:	0 Feet		



Pole Capacity Utilization (%)	Height (ft)	Wind Angle (deg)
Maximum	58.2	0.0
Groundline	58.2	0.0
Vertical	3.8	25.0

Pole Moments (ft-lb)	Load Angle (deg)	Wind Angle (deg)
Max Cap Util	42,962	9.1
Groundline	42,962	9.1
GL Allowable	75,046	

Guy System Component Summary				Load From Worst Wind Angle on Pole		Individual Maximum Load	
Description	Lead Length (ft)	Lead Angle (deg)	Height (ft)	Nominal Capacity (%)	Wind Angle (deg)	Max Load Capacity (%)	Wind Angle (deg)
Expanding - 12" - Soil Class 5	12.0	220.0		14.8	314.1	21.2	40.0
EHS 7/16 (Down)			28.0	20.9	314.1	30.0	40.0
System Capacity Summary:				Adequate		Adequate	

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 9.1°

	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	181	10.6	7,313	17.0	9.8	425	87	1	426	7.1
Comms	2,091	122.2	66,855	155.6	89.1	3,888	502	5	3,892	64.9
GuyBraces	-1,285	-75.0	-49,451	-115.1	-65.9	-2,876	3,621	35	-2,841	-47.3
GenericEquipments	378	22.1	10,331	24.1	13.8	601	612	6	607	10.1
Pole	314	18.3	6,854	16.0	9.1	399	1,018	10	408	6.8
SpanAdditions	1	0.1	52	0.1	0.1	3	5	0	3	0.1
Streetlights	31	1.8	975	2.3	1.3	57	60	1	57	1.0
Insulators	1	0.0	34	0.1	0.0	2	25	0	2	0.0
Pole Load	1,712	100.0	42,962	100.0	57.3	2,498	5,931	57	2,555	42.6
Pole Reserve Capacity			32,084		42.8	3,502			3,445	57.4

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 9.1°

	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>	1,389	81.2	35,699	83.1	47.6	2,076	4,883	47	2,123	35.4
Crown Castle	9	0.5	409	1.0	0.6	24	30	0	24	0.4
Pole	314	18.3	6,854	16.0	9.1	399	1,018	10	408	6.8
Totals:	1,712	100.0	42,962	100.0	57.3	2,498	5,931	57	2,555	42.6

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	29.41	6.31	0.2500		0.263	113.0	45.0	114.5			6	287	303
Secondary	TRIPLEX 1/0	29.40	6.62	0.2500		0.263	113.0	45.0	114.5			6	287	303
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	1.00	0.263	28.0	6.0	28.1	30	782	3	-7	781
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	1.00	0.263	28.0	6.0	28.1	30	782	3	-7	781
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	2.12	0.263	49.0	120.0	49.3	39	-382	3	62	-314
Secondary	TRIPLEX 1/0	28.53	30.41	0.2500	2.06	0.263	49.0	120.0	49.3	40	-394	3	62	-326
Overlashed Bundle	6M	29.42	6.47	0.2420	7.14	0.104	113.0	45.0	114.5	147	3,498	2	288	3,792
										Totals:	4,287	28	972	5,319

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	30.25	6.42	0.2420	4.08	0.104	113.0	45.0	113.5	248	6,055	2	574	6,635
Fiber	Fiber 0.45	30.23	6.17	0.4500		0.474	113.0	45.0	113.5			11	934	961
Overlashed Bundle	6M	23.00	6.86	0.2420	2.86	0.104	113.0	45.0	113.2	1,150	21,420	3	150	21,575
CATV	CATV .20	22.99	6.69	0.2000		0.600	113.0	45.0	113.2			15	149	181
CATV	CATV .25	22.46	42.69	0.2500	1.07	0.600	49.0	120.0	49.1	181	-1,410	7	46	-1,349
CATV	CATV .20	22.99	6.99	0.2000		0.600	113.0	45.0	113.2			15	149	181
CATV	CATV .25	22.63	30.99	0.2500	1.52	0.600	45.0	280.0	45.2	104	37	7	107	157
CATV	CATV .25	22.63	30.99	0.2500	1.78	0.600	45.0	280.0	45.2	89	31	7	107	151
CATV	CATV .25	22.63	30.99	0.2500	1.57	0.600	45.0	280.0	45.2	100	35	7	107	156
CATV	CATV .25	22.01	78.99	0.2500	1.23	0.600	45.0	300.0	45.1	129	951	7	41	1,004
CATV	CATV .25	22.01	78.99	0.2500	1.38	0.600	45.0	300.0	45.1	114	844	7	41	897
CATV	CATV .25	22.01	78.99	0.2500	1.33	0.600	45.0	302.0	45.1	118	955	7	35	1,002
CATV	CATV .20	22.98	6.86	0.2000		0.600	113.0	45.0	113.2			15	149	181
CATV	CATV .25	22.00	6.42	0.2500	5.43	0.600	113.0	45.0	113.9	184	3,271	15	265	3,567
CATV	CATV .25	22.00	6.42	0.2500	1.59	0.600	41.0	300.0	41.2	84	663	5	39	713
CATV	CATV .25	22.00	6.42	0.2500	1.59	0.600	41.0	301.0	41.2	84	693	5	36	740
Overlashed Bundle	6M	21.00	6.98	0.2420	3.24	0.104	113.0	45.0	113.3	620	10,539	3	207	10,751
Telco	TELE 0.35	20.98	7.19	0.3500		0.350	113.0	45.0	113.3			9	207	225
Telco	TELE 0.35	20.98	6.78	0.3500		0.350	113.0	45.0	113.3			9	503	521
Telco	TELE 0.35	20.96	6.99	0.3500		0.350	113.0	45.0	113.3			9	207	224
CATV	CATV .35	21.00	6.98	0.2500	1.52	0.600	45.0	280.0	45.2	104	35	12	100	152
										Totals:	44,118	179	4,155	48,624

Generic Equipment	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 6U4MT360X12F20s0BR	37.83	1.76	90.0	0.0	42.00	48.20	--	14.60	--	1	2,196	2,230
Cylinder	Mount	35.17	0.62	90.0	0.0	30.00	15.96	--	6.00	--	0	275	298
Cylinder	Riser	22.49	5.89	255.0	0.0	100.00	285.24	--	3.00	--	-20	1,433	1,461
Cylinder	Weatherhead	19.45	5.83	145.0	0.0	100.00	217.00	--	2.50	--	-35	762	769
Box	Splice Box	15.59	9.94	90.0	0.0	10.00	20.04	5.13	--	9.50	1	147	152
Box	Charles Industries Curved Shroud: SH60-702322	15.50	15.54	225.0	0.0	250.00	69.50	21.45	--	22.73	-262	2,543	2,363
Box	Load Center	11.50	7.73	225.0	0.0	40.00	11.88	5.33	--	6.70	-21	79	68
Box	Existing Meter	9.71	7.60	225.0	0.0	10.00	20.04	4.86	--	11.00	-5	101	98
Box	Existing Sign	9.54	5.30	27.0	0.0	10.00	18.96	0.25	--	15.00	4	147	154

Box	Existing Sign	7.92	5.40	64.0	0.0	10.00	18.00	0.25	--	15.00	3	-75	-71
Box	Existing Sign	7.67	5.42	225.0	0.0	10.00	24.00	0.25	--	24.00	-4	-6	-8
Totals:										-337	7,603	7,513	

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		26.43	300.00	45.0	45.0	7.00	20.00	20.00	20.00	20.00	0	34	37
Totals:											0	34	37	

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		28.17	4.05	135.0	135.0	60.00	36.00	20.00	3.00	72.00	-168	841	709
Totals:											-168	841	709	

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		30.25	0.00	45.0	45.0	5.00	3.00	0.00	2	0	5
Bolt	Single Bolt		29.42	0.00	45.0	45.0	5.00	3.00	0.00	2	0	5
Bolt	Single Bolt (Relocated)		23.00	0.00	45.0	45.0	5.00	3.00	0.00	2	0	5
J-Hook	J-Hook (Relocated)		22.00	0.00	45.0	45.0	5.00	2.00	0.00	2	0	4
Bolt	Single Bolt (Relocated)		21.00	0.00	45.0	45.0	5.00	3.00	0.00	2	0	5
Totals:										11	0	25

Guy Wire and Brace		Owner	Attach Height (ft)	End Height (ft)	Lead/Span Length (ft)	Wire Diameter (in)	Percent Solid (%)	Lead Angle (deg)	Incline Angle (deg)	Wire Weight (lbs/ft)	Rest Length (ft)	Stretch Length (in)
EHS 7/16	Down		28.00	0.00	12.00	0.438	75.00	220.0	66.6	0.399	35.47	0.64

Guy Wire and Brace (Loads and Reactions)		Elastic Modulus (psi)	Rated Tensile Strength (lbs)	Guy Strength Factor	Allowable Tension (lbs)	Initial Tension (lbs)	Loaded Tension*2 (lbs)	Maximum Tension² (lbs)	Applied Tension³ (lbs)	Vertical Load (lbs)	Shear Load In Guy Dir (lbs)	Shear Load At Report Angle (lbs)	Moment at GL³ (ft-lb)
EHS 7/16	Down	2.30e+7	20,800	0.90	18,720	700	5,617	5,617	3,912	3,589	1,557	-1,335	-35,966
Totals:										3,589	1,557	-1,335	-35,966

Anchor/Rod Load Summary		Owner	Rod Length AGL (in)	Lead Length (ft)	Lead Angle (deg)	Strength of Assembly (lbs)	Anchor/Rod Strength Factor	Allowable Load (lbs)	Max Load² (lbs)	Load at Pole MCU³ (lbs)	Max Required Capacity² (%)
Expanding - 12" - Soil Class 5			0.00	12.00	220.0	26,500	1.00	26,500	5,617	3,912	21.2

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
0.71	25.05	33.97	10.48	11.81	7.32	11.53	1.60e+6	60.00	57.00	34.50	155,498	1560.71	26.32

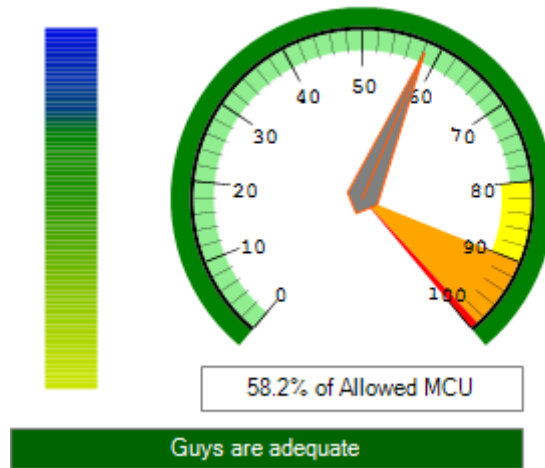
Notes		
Date	Author	Description
12/7/2015	bmesfin	Assumptions
ASSUMPTIONS :		
The analysis contained within this report is based on the pole capacity as prescriberd in the governing codes. The validity and accuracy of the analysis within is limited by the accuracy of the infromation it is based on. The 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 could 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-23

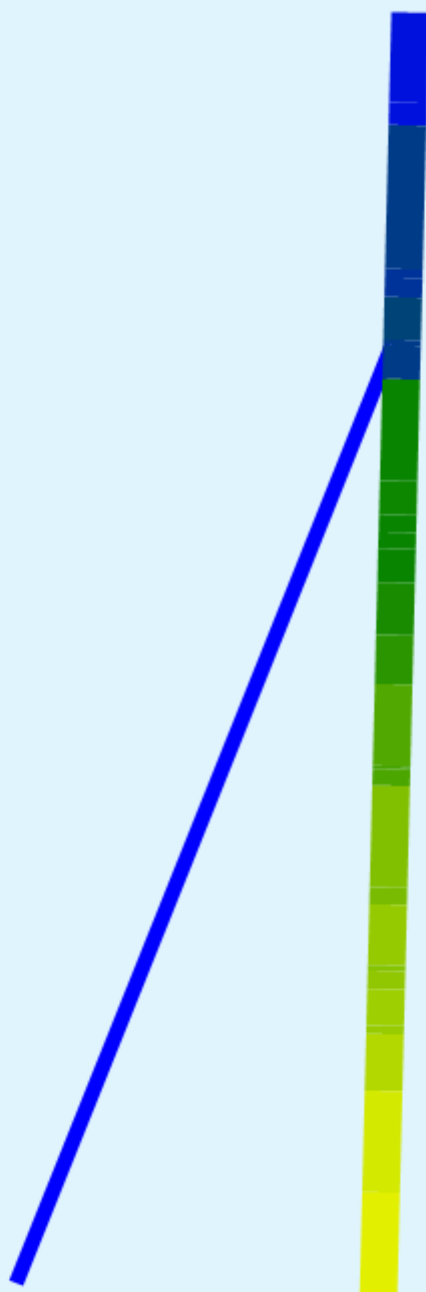
Report Created: 11/9/2023

File: ODAS_2F-23.pplx



O-Calc® Pro Heat Map View

Report Created: 11/9/2023

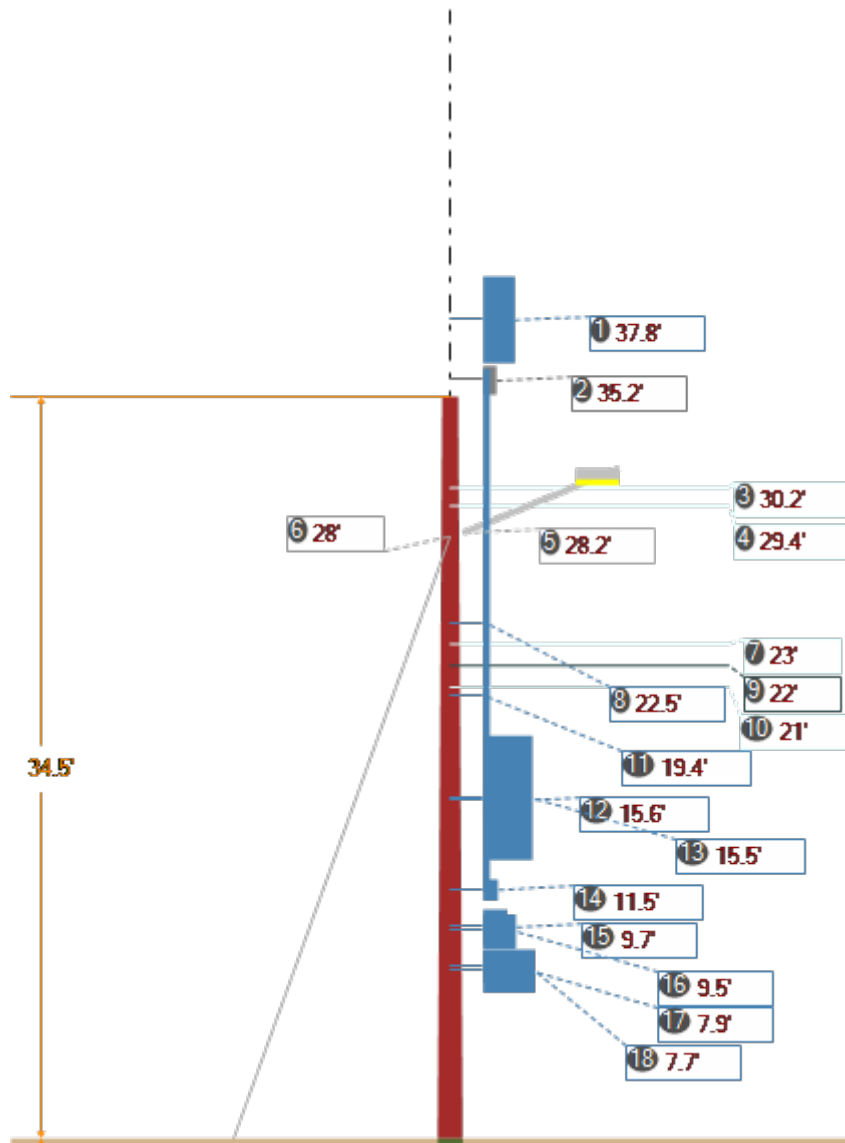


O-Calc® Pro Schematic View

Pole Identification: ODAS-2F-23

Report Created: 11/9/2023

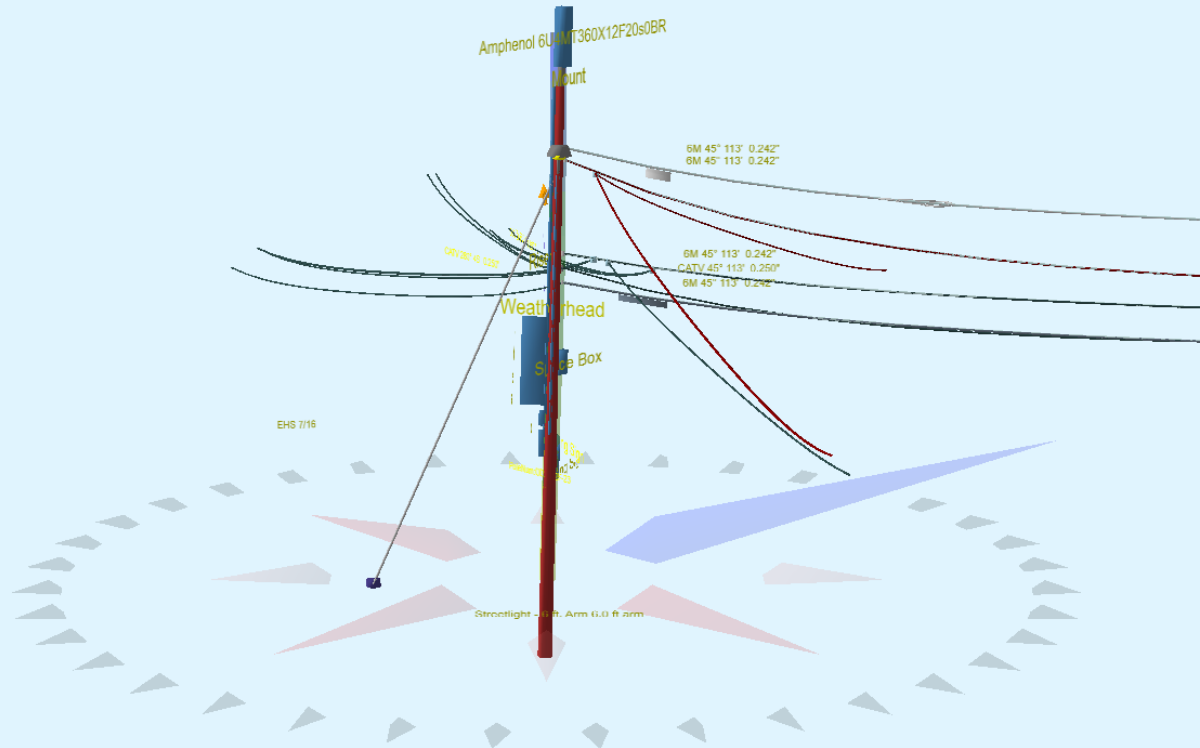
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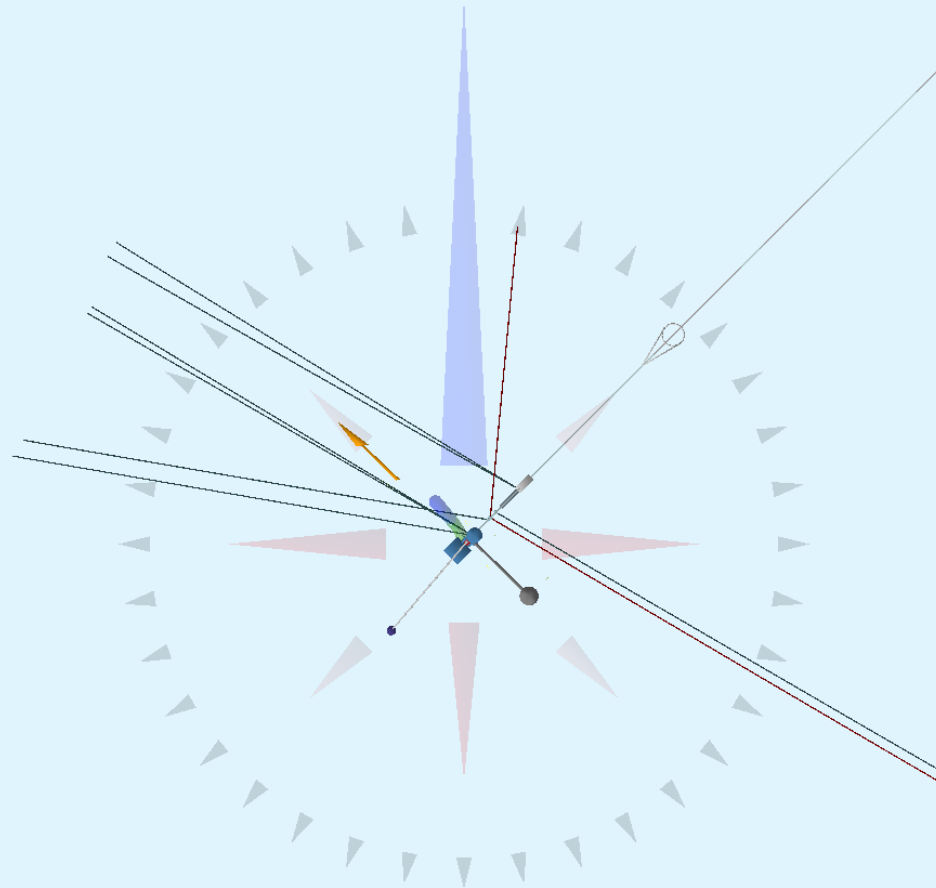
1 - 37.8' (454")
Amphenol 6U4MT360X12F20s0BR
2 - 35.2' (422")
Mount
3 - 30.2' (363")
6M 45° 113' Msgr:0.242"
4 - 29.4' (353")
6M 45° 113' Msgr:0.242"
5 - 28.2' (338")
Streetlight - 6 ft. Arm 6.0 ft arm
6 - 28' (336")
EHS 7/16 Down Guy 28.0 ft hgt, 66.8° angle
7 - 23' (276")
6M 45° 113' Msgr:0.242"

8 - 22.5' (269.8")	Riser
9 - 22' (264")	CATV 45° 113' 0.250" (CATV .25) CATV 300° 41' 0.250" (CATV .25) CATV 301° 41' 0.250" (CATV .25)
10 - 21' (252")	6M 45° 113' Msgr:0.242" CATV 280° 45' 0.250" (CATV .35)
11 - 19.4' (233.4")	Weatherhead
12 - 15.6' (187")	Splice Box
13 - 15.5' (186")	CHARLES SH60-702322 Shroud
14 - 11.5' (138")	Load Center PTS90526
15 - 9.7' (116.5")	Meter
16 - 9.5' (114.5")	Existing Sign
17 - 7.9' (95")	Existing Sign
18 - 7.7' (92")	Existing Sign

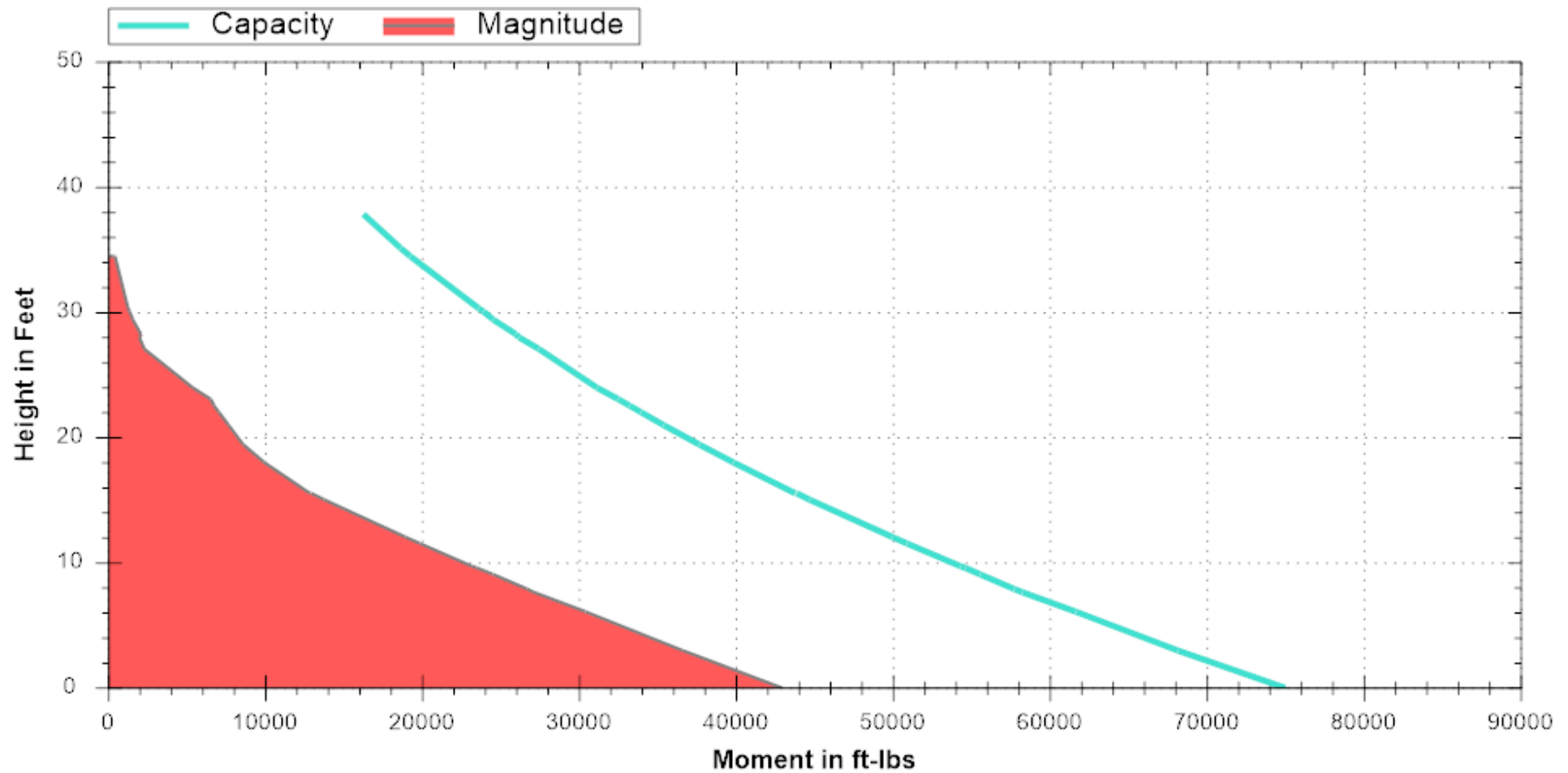
ODAS-2F-23



ODAS-2F-23



Bending Moment vs Height
Wind 314° : Load 9.1°
Pole: ODAS-2F-23 - 11/9/2023
NESC Ext Wind (250C) Grade C (> 100 mph)



⚠ This is a beta release of the new ATC Hazards by Location website. Please [contact us](#) with feedback.

ℹ The ATC Hazards by Location website will not be updated to support ASCE 7-22. [Find out why.](#)



Hazards by Location

Search Information

Coordinates: 42.42046, -71.055183
Elevation: 43 ft
Timestamp: 2023-11-07T08:43:55.105Z
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 ... ⚠ 139 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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