Sabre Industries™
Towers and Poles

Structural Design Report

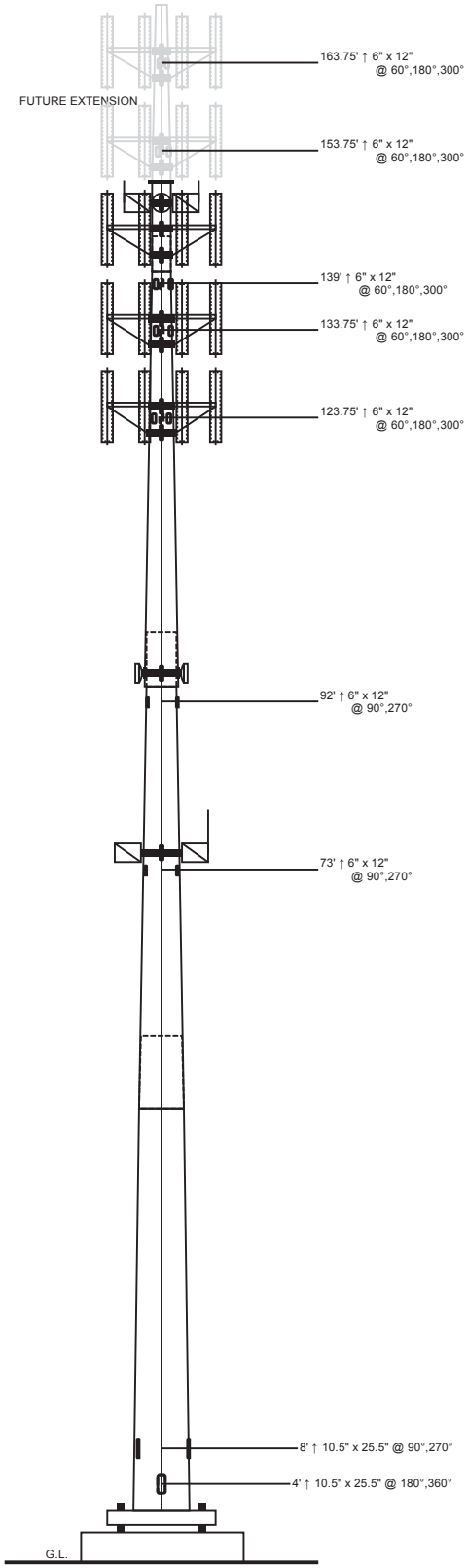
150' Extendible to 170' Monopole
Site: Easton, CT
Site Number: CT254

Prepared for: INSITE TOWERS LLC
by: Sabre Towers & Poles ™

Job Number: 172085
Revision B

October 19, 2017

Length (ft)	20'-0"	10'-0"	50'-6"	53'-6"	53'-3"								
Number Of Sides				18									
Thickness (in)	1/4"		7/16"		1/2"		9/16"						
Lap Splice (ft)		A			6' - 0"		8' - 3"						
Top Diameter (in)	17"	24.06"		25.68"		40.53"		55.51"					
Bottom Diameter (in)	24.06"	27.6"		43.52"		59.42"		74.32"					
Taper (in/ft)	0.3532												
Grade	A572-65												
Weight (lbs)	1561	961		8886		15254		24813					
Overall Steel Height (ft)	20 (Extension)					149							



Load Case Reactions

Description	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
3s Gusted Wind	97.01	97.57	12043.39	13.71	9.68
3s Gusted Wind 0.9 Dead	72.89	97.5	11904.15	13.49	9.5
3s Gusted Wind&Ice	141.58	26.07	3242.44	3.79	2.65
Service Loads	80.83	19.41	2399.27	2.79	1.95

Base Plate Dimensions

Shape	Diameter	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Round	87.75"	2.75"	82"	30	2.25"

Anchor Bolt Dimensions

Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	3633	A615-75	Galv

Material List

Display	Value
A	4' - 0"

Notes

1) Antenna Feed Lines Run Inside Pole
2) All dimensions are above ground level, unless otherwise specified.
3) Weights shown are estimates. Final weights may vary.
4) The Monopole was designed for a basic wind speed of 101 mph with 0" of radial ice, and 50 mph with 3/4" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 2, with a Crest Height of 115'.
5) The tower design meets the requirements for an Ultimate Wind Speed of 130 mph (Risk Category II), in accordance with the 2012 International Building Code.
6) Full Height Step Bolts
7) Tower Rating: 98.7%

** These Appurtenances cannot be installed at the higher elevation until the Monopole has been extended.

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Sabre Industries™ Towers and Poles

Sabre Communications Corporation
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Job:	**172085B**
Customer:	INSITE TOWERS LLC
Site Name:	Easton, CT CT254
Description:	150' ext. 170' Monopole
Date:	10/19/2017 By: REB

Designed Appurtenance Loading

Elev	Description	Tx-Line
165***	Platform - 12' w/ Enhanced Support Rail	
165***	(12) 8' x 16" x 9" Panel	(12) 1 5/8"
165***	(3) DC6-48-60-18-8F	
165***	(6) FD9R6004	
165***	(24) RRUS 11	
165***	(1) SC412-HF2LDF	(1) 7/16"
155***	Platform - 12' w/ Enhanced Support Rail	
155***	(1) SC412-HF2LDF	(1) 7/16"
155***	(6) FD9R6004	
155***	(24) RRUS 11	
155***	(3) DC6-48-60-18-8F	
155***	(12) 8' x 16" x 9" Panel	(12) 1 5/8"
150.5	(3) ANT150D3	(3) 7/16"
148	(3) 3ft Sidearms	
148	(2) Dish Mount (Monopole Only) - Pipe Mount (up to 6' Dish)	
148	(2) 2' H.P. Dish	(2) 7/16"
145	Platform - 12' w/ Enhanced Support Rail	
145	(1) SC412-HF2LDF	(1) 7/16"
145	(3) DC6-48-60-18-8F	
145	(24) RRUS 11	

Elev	Description	Tx-Line
145	(6) FD9R6004	
145	(12) 8' x 16" x 9" Panel	(12) 1 5/8"
135	Platform - 12' w/ Enhanced Support Rail	
135	(12) 8' x 16" x 9" Panel	(12) 1 5/8"
135	(3) DC6-48-60-18-8F	
135	(24) RRUS 11	
135	(6) FD9R6004	
135	(1) SC412-HF2LDF	(1) 7/16"
125	Platform - 12' w/ Enhanced Support Rail	
125	(6) FD9R6004	
125	(24) RRUS 11	
125	(12) 8' x 16" x 9" Panel	(12) 1 5/8"
125	(3) DC6-48-60-18-8F	
125	(1) SC412-HF2LDF	(1) 7/16"
95	(2) Dish Mount (Monopole Only) - Pipe Mount (up to 6' Dish)	
95	(2) 2' H.P. Dish	(2) 7/16"
79.75	(1) DB201-L	(1) 7/16"
75.5	(1) ANT150D3	(1) 7/16"
75	3ft Sidearm	
75	3ft Sidearm	

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Job:	**172085B**
Customer:	INSITE TOWERS LLC
Site Name:	Easton, CT CT254
Description:	150' ext. 170' Monopole
Date:	10/19/2017 By: REB

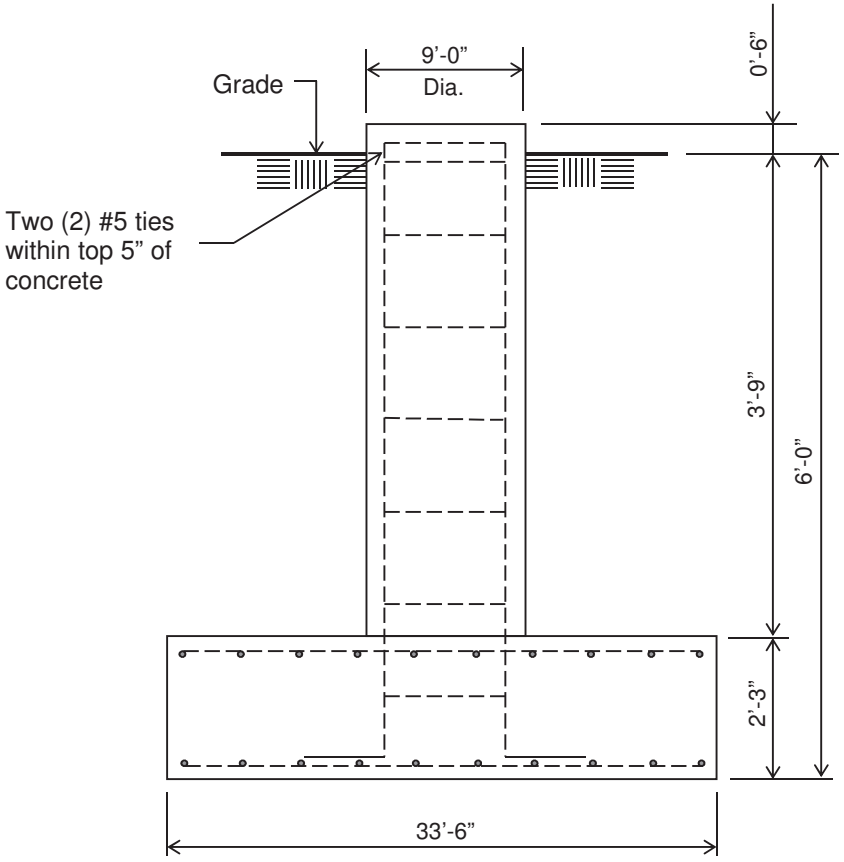
Sabre Industries™
Towers and Poles

No.: 172085

Date: 10/19/17
By: REB
Revision B

Customer: INSITE TOWERS LLC
Site: Easton, CT CT254

150' Extendible to 170' Monopole at
101 mph Wind with no ice and 50 mph Wind with 0.75 in. Ice per ANSI/TIA-222-G.
Antenna Loading per Page 1



ELEVATION VIEW
(103.53 Cu. Yds.)
(1 REQUIRED; NOT TO SCALE)

Notes:

1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.

2) Rebar to conform to ASTM specification A615 Grade 60.

3) All rebar to have a minimum of 3" concrete cover.

4) All exposed concrete corners to be chamfered 3/4".

5) The foundation design is based on the geotechnical report by Terracon project no. J2175120, dated: 9/29/17

6) See the geotechnical report for compaction requirements, if specified.

7) 3.75 ft of soil cover is required over the entire area of the foundation slab.

8) The foundation is based on the following factored loads:
   Moment (kip-ft) = 12043.39
   Axial (kips) = 97.01
   Shear (kips) = 97.57

Rebar Schedule for Pad and Pier	
Pier	(60) #9 vertical rebar w/ hooks at bottom w/ #5 ties, two within top 5" of pier, then 12" C/C
Pad	(79) #9 horizontal rebar evenly spaced each way top and bottom (316 total)

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7101 Southbridge Drive - P.O. Box 658 - Sioux City, IA 51102-0658 - Phone 712.258.6690 - Fax 712.279.0814

(USA 222-G) - Monopole Spatial Analysis (c)2015 Guymast Inc.

Tel:(416)736-7453 Fax:(416)736-4372 Web:www.guymast.com

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150' ext. 170' Monopole / Easton, CT

* All pole diameters shown on the following pages are across corners.
See profile drawing for widths across flats.

POLE GEOMETRY

ELEV ft	SECTION NAME	No. SIDE	OUTSIDE DIAM in	THICK -NESS in	RESISTANCES ϕ*Pn kip	RESISTANCES ϕ*Mn ft-kip	SPLICE TYPE	...OVERLAP... LENGTH ft	...OVERLAP... RATIO	w/t
169.0										
			17.26	0.250	987.5	337.9				
	A	18								10.2
			24.44	0.250	1403.9	685.9				
149.0										
			24.44	0.250	1403.9	685.9				
	B	18								15.2
			26.58	0.250	1513.7	805.8				
143.0										
			26.58	0.250	1513.7	805.8				
	B/C	18					SLIP	4.00	1.77	
			27.52	0.438	2751.1	1496.6				
139.0										
			27.52	0.438	2751.1	1496.6				
	C	18								9.2
			42.03	0.438	4224.7	3548.7				
98.5										
			42.03	0.438	4224.7	3548.7				
	C/D	18					SLIP	6.00	1.69	
			43.32	0.500	4970.7	4293.6				
92.5										
			43.32	0.500	4970.7	4293.6				
	D	18								13.3
			57.36	0.500	6401.2	7364.7				
53.2										
			57.36	0.500	6401.2	7364.7				
	D/E	18					SLIP	8.25	1.69	
			59.34	0.562	7618.9	9053.3				
45.0										
			59.34	0.562	7618.9	9053.3				
	E	18								16.6
			75.46	0.562	9015.4	13679.8				
0.0										

POLE ASSEMBLY

SECTION NAME	BASE ELEV ft	BOLTS AT BASE OF SECTION... NUMBER	TYPE	DIAM in	STRENGTH ksi	THREADS IN SHEAR PLANE	CALC BASE ELEV ft
A	149.000	0	A325	0.00	92.0	0	149.000
B	139.000	0	A325	0.00	92.0	0	139.000
C	92.500	0	A325	0.00	92.0	0	92.500
D	45.000	0	A325	0.00	92.0	0	45.000
E	0.000	0	A325	0.00	92.0	0	0.000

POLE SECTIONS

SECTION NAME	No.of SIDES	LENGTH ft	OUTSIDE.DIAMETER BOT * in	OUTSIDE.DIAMETER TOP * in	THICK-NESS in	MAT-ERIAL ID	FLANGE.ID BOT	FLANGE.ID TOP	FLANGE.WELD ..GROUP.ID.. BOT	FLANGE.WELD ..GROUP.ID.. TOP

A	18	20.00	24.44	17.26	0.250	1	0	0	0	0
B	18	10.00	28.02	24.44	0.250	2	0	0	0	0
C	18	50.50	44.19	26.08	0.438	3	0	0	0	0
D	18	53.50	60.34	41.15	0.500	4	0	0	0	0
E	18	53.25	75.46	56.36	0.562	5	0	0	0	0

* - Diameter of circumscribed circle

MATERIAL TYPES

TYPE OF SHAPE	TYPE NO	NO OF ELEM.	ORIENT & deg	HEIGHT in	WIDTH in	.THICKNESS. WEB in	FLANGE in	IRREGULARITY .PROJECTION. % OF AREA	ORIENT deg
PL	1	1	0.0	24.44	0.25	0.250	0.250	0.00	0.0
PL	2	1	0.0	28.02	0.25	0.250	0.250	0.00	0.0
PL	3	1	0.0	44.19	0.44	0.438	0.438	0.00	0.0
PL	4	1	0.0	60.34	0.50	0.500	0.500	0.00	0.0
PL	5	1	0.0	75.46	0.56	0.562	0.562	0.00	0.0

& - With respect to vertical

MATERIAL PROPERTIES

MATERIAL TYPE NO.	ELASTIC MODULUS ksi	UNIT WEIGHT pcf	.. STRENGTH .. Fu ksi	Fy ksi	THERMAL COEFFICIENT /deg
1	29000.0	490.0	80.0	65.0	0.00001170
2	29000.0	490.0	80.0	65.0	0.00001170
3	29000.0	490.0	80.0	65.0	0.00001170
4	29000.0	490.0	80.0	65.0	0.00001170
5	29000.0	490.0	80.0	65.0	0.00001170

* Only 3 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

101 mph wind with no ice. Wind Azimuth: 0◆

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	164.000	0.00	0.0	0.0	0.0000	2.5092	0.0000	0.0000
C	164.000	0.00	0.0	0.0	14.2023	5.8004	0.0000	0.0000
C	154.000	0.00	0.0	0.0	0.0000	2.3562	0.0000	0.0000
C	154.000	0.00	0.0	0.0	11.8425	5.8004	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.0000	0.1453	0.0000	0.0000
C	149.500	0.00	0.0	0.0	1.5222	0.1868	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	0.0953	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.6061	0.7896	0.0000	0.0000
C	144.000	0.00	0.0	0.0	0.0000	2.2032	0.0000	0.0000
C	144.000	0.00	0.0	0.0	11.8756	5.8004	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	2.0502	0.0000	0.0000
C	134.000	0.00	0.0	0.0	11.9179	5.8004	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	1.8972	0.0000	0.0000
C	124.000	0.00	0.0	0.0	11.9695	5.8004	0.0000	0.0000
C	94.000	0.00	0.0	0.0	0.0000	0.0609	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0000	0.0255	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.2239	0.0674	0.0000	0.0000

C	74.500	0.00	0.0	0.0	0.0000	0.0241	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.5348	0.0623	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.3969	0.6192	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.3969	0.6192	0.0000	0.0000
D	169.000	0.00	180.0	0.0	0.0690	0.0570	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0988	0.0814	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.1049	0.2341	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.1049	0.2341	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.1154	0.1651	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.1154	0.1651	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.1349	0.1918	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.1349	0.1918	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.1549	0.2185	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.1549	0.2185	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.1696	0.5046	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.1696	0.5046	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.1807	0.2884	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.1807	0.2884	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.2011	0.3181	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.2011	0.3181	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.2215	0.3477	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.2215	0.3477	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.2378	0.7836	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.2378	0.7836	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.2475	0.4366	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.2475	0.4366	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.2603	0.4653	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.2603	0.4653	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.2651	0.4941	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.2651	0.4941	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.2894	0.5228	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.2894	0.5228	0.0000	0.0000

ANTENNA LOADING
==========

.....ANTENNA.....			ATTACHMENT		..........ANTENNA FORCES..........			
TYPE	ELEV	AZI	RAD	AZI	AXIAL	SHEAR	GRAVITY	TORSION
	ft		ft		kip	kip	kip	ft-kip
HP	94.0	270.0	2.5	270.0	-0.03	0.14	0.05	0.05
HP	94.0	90.0	2.5	90.0	-0.03	-0.14	0.05	-0.05
HP	147.0	270.0	1.7	270.0	-0.02	0.14	0.05	0.04
HP	147.0	90.0	1.7	90.0	-0.02	-0.14	0.05	-0.04

==========

LOADING CONDITION M ==========

101 mph wind with no ice. Wind Azimuth: 0

LOADS ON POLE
==========

LOAD	ELEV	APPLY..LOAD..AT		LOAD	......FORCES......		......MOMENTS.....	
TYPE		RADIUS	AZI	AZI	HORIZ	DOWN	VERTICAL	TORSNAL
	ft	ft			kip	kip	ft-kip	ft-kip
C	164.000	0.00	0.0	0.0	0.0000	1.8819	0.0000	0.0000
C	164.000	0.00	0.0	0.0	14.2023	4.3503	0.0000	0.0000
C	154.000	0.00	0.0	0.0	0.0000	1.7671	0.0000	0.0000
C	154.000	0.00	0.0	0.0	11.8425	4.3503	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.0000	0.1090	0.0000	0.0000
C	149.500	0.00	0.0	0.0	1.5222	0.1401	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	0.0714	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.6061	0.5922	0.0000	0.0000
C	144.000	0.00	0.0	0.0	0.0000	1.6524	0.0000	0.0000
C	144.000	0.00	0.0	0.0	11.8756	4.3503	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	1.5376	0.0000	0.0000
C	134.000	0.00	0.0	0.0	11.9179	4.3503	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	1.4229	0.0000	0.0000
C	124.000	0.00	0.0	0.0	11.9695	4.3503	0.0000	0.0000
C	94.000	0.00	0.0	0.0	0.0000	0.0457	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0000	0.0191	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.2239	0.0506	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.0000	0.0181	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.5348	0.0467	0.0000	0.0000

C	74.000	0.00	0.0	0.0	0.3969	0.4644	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.3969	0.4644	0.0000	0.0000
D	169.000	0.00	180.0	0.0	0.0690	0.0427	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0988	0.0610	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.1049	0.1755	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.1049	0.1755	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.1154	0.1238	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.1154	0.1238	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.1349	0.1438	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.1349	0.1438	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.1549	0.1639	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.1549	0.1639	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.1696	0.3784	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.1696	0.3784	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.1807	0.2163	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.1807	0.2163	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.2011	0.2386	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.2011	0.2386	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.2215	0.2608	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.2215	0.2608	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.2378	0.5877	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.2378	0.5877	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.2475	0.3275	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.2475	0.3275	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.2603	0.3490	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.2603	0.3490	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.2651	0.3705	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.2651	0.3705	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.2894	0.3921	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.2894	0.3921	0.0000	0.0000

ANTENNA LOADING
==========

.....ANTENNA.....			ATTACHMENT		.....ANTENNA FORCES.....			
TYPE	ELEV	AZI	RAD	AZI	AXIAL	SHEAR	GRAVITY	TORSION
	ft		ft		kip	kip	kip	ft-kip
HP	94.0	270.0	2.5	270.0	-0.03	0.14	0.04	0.05
HP	94.0	90.0	2.5	90.0	-0.03	-0.14	0.04	-0.05
HP	147.0	270.0	1.7	270.0	-0.02	0.14	0.04	0.04
HP	147.0	90.0	1.7	90.0	-0.02	-0.14	0.04	-0.04

==========

LOADING CONDITION Y ==========

50 mph wind with 0.75 ice. Wind Azimuth: 0◆

LOADS ON POLE
==========

LOAD	ELEV	APPLY..LOAD..AT		LOAD	......FORCES......		......MOMENTS.....	
TYPE		RADIUS	AZI	AZI	HORIZ	DOWN	VERTICAL	TORSNAL
	ft	ft			kip	kip	ft-kip	ft-kip
C	164.000	0.00	0.0	0.0	0.0000	2.5092	0.0000	0.0000
C	164.000	0.00	0.0	0.0	3.4615	10.7953	0.0000	0.0000
C	154.000	0.00	0.0	0.0	0.0000	2.3562	0.0000	0.0000
C	154.000	0.00	0.0	0.0	2.8790	10.7907	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.0000	0.1453	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.6625	0.3198	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	0.0953	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.1727	1.3437	0.0000	0.0000
C	144.000	0.00	0.0	0.0	0.0000	2.2032	0.0000	0.0000
C	144.000	0.00	0.0	0.0	2.8865	10.7870	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	2.0502	0.0000	0.0000
C	134.000	0.00	0.0	0.0	2.8963	10.7839	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	1.8972	0.0000	0.0000
C	124.000	0.00	0.0	0.0	2.9086	10.7815	0.0000	0.0000
C	94.000	0.00	0.0	0.0	0.0000	0.0609	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0000	0.0255	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0947	0.1135	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.0000	0.0241	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.2321	0.1064	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.1127	0.8032	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.1127	0.8032	0.0000	0.0000

D	169.000	0.00	180.0	0.0	0.0236	0.1025	0.0000	0.0000
D	154.000	0.00	180.0	0.0	0.0275	0.1218	0.0000	0.0000
D	154.000	0.00	180.0	0.0	0.0299	0.1335	0.0000	0.0000
D	147.000	0.00	180.0	0.0	0.0299	0.1335	0.0000	0.0000
D	147.000	0.00	180.0	0.0	0.0321	0.1443	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0321	0.1443	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0337	0.2998	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0337	0.2998	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0367	0.2367	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.0367	0.2367	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.0422	0.2743	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.0422	0.2743	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.0479	0.3118	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.0479	0.3118	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.0521	0.6058	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.0521	0.6058	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.0552	0.3953	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.0552	0.3953	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.0610	0.4353	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.0610	0.4353	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.0668	0.4752	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0668	0.4752	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0714	0.9192	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.0714	0.9192	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.0741	0.5768	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.0741	0.5768	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.0777	0.6125	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.0777	0.6125	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.0787	0.6457	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0855	0.6711	0.0000	0.0000

ANTENNA LOADING
===============

.....ANTENNA.....			ATTACHMENT		.....ANTENNA FORCES.....			
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	94.0	270.0	2.5	270.0	0.00	0.03	0.20	0.01
HP	94.0	90.0	2.5	90.0	0.00	-0.03	0.20	-0.01
HP	147.0	270.0	1.7	270.0	0.00	0.03	0.20	0.01
HP	147.0	90.0	1.7	90.0	0.00	-0.03	0.20	-0.01

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150' ext. 170' Monopole / Easton, CT

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)
==========

MAST ELEV ft	.....DEFLECTIONS (ft)..... ..... HORIZONTAL ..... ALONG	ACROSS	DOWN	.....ROTATIONS (deg)..... ..... TILT ..... ALONG	ACROSS	TWIST
169.0	13.71I	-0.08H	1.62D	9.68I	-0.05H	0.00K
164.0	12.89I	-0.07H	1.48D	9.68I	-0.05H	0.00K
159.0	12.07I	-0.07H	1.34D	9.60I	-0.05H	0.00K
154.0	11.26I	-0.06H	1.21D	9.43I	-0.05H	0.00K
147.0	10.16I	-0.06H	1.03D	9.02I	-0.05H	0.00K
143.0	9.55I	-0.06H	0.94D	8.72I	-0.05H	0.00K

139.0	8.97I	-0.05H	0.85D	8.51I	-0.05H	0.00K
125.5	7.10I	-0.04H	0.59D	7.59I	-0.04H	0.00K
112.0	5.46I	-0.03H	0.39I	6.52I	-0.04H	0.00K
98.5	4.07I	-0.03H	0.24I	5.41I	-0.03H	0.00K
92.5	3.53I	-0.02H	0.19I	4.98I	-0.03H	0.00K
79.4	2.51I	-0.02H	0.11I	4.05I	-0.02H	0.00I
66.3	1.69I	-0.01H	0.06I	3.19I	-0.02H	0.00I
53.2	1.05I	-0.01H	0.03I	2.40I	-0.02H	0.00I
45.0	0.74I	0.00H	0.02I	1.98I	-0.01H	0.00I
33.7	0.41I	0.00H	0.01I	1.43I	-0.01H	0.00I
22.5	0.18I	0.00H	0.00I	0.92I	-0.01H	0.00I
11.2	0.04I	0.00H	0.00I	0.44I	0.00H	0.00I
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS

ELEV ft	ANT AZI deg	ANT TYPE	.... BEAM DEFLECTIONS (deg) ..... ROLL	YAW	PITCH	TOTAL
147.0	90.0	HP	-8.992 A	0.003 K	9.011 D	9.011 D
147.0	270.0	HP	8.992 A	0.003 K	-9.011 D	9.011 D
94.0	90.0	HP	-5.065 A	0.002 K	5.077 D	5.077 D
94.0	270.0	HP	5.065 A	0.002 K	-5.077 D	5.077 D

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	ACROSS ft-kip	TORSION ft-kip
169.0	0.02 C	0.03 K	-0.01 L	-0.08 U	0.02 K	0.00 K
	0.53 AB	0.39 K	-0.01 L	-1.03 F	0.03 L	-0.01 L
164.0	13.84 AB	14.59 W	-0.03 O	-1.01 K	0.04 L	-0.01 L
	14.40 AB	14.97 W	-0.03 O	-79.88 H	0.15 O	-0.06 X
159.0	14.40 AG	15.00 B	-0.06 Q	-79.91 H	0.15 E	-0.07 X
	14.99 AG	15.41 B	-0.06 Q	-161.00 B	0.32 O	-0.12 X
154.0	28.14 AG	27.26 O	-0.07 C	-161.07 B	0.31 O	0.12 N
	29.54 AG	29.40 O	-0.07 C	-371.95 D	0.81 O	0.30 N
147.0	31.38 AG	30.54 P	0.31 X	-372.07 A	0.89 O	0.37 N
	44.95 AG	42.79 P	0.31 X	-516.29 D	1.58 C	0.37 N
143.0	44.95 AC	42.96 J	-0.32 T	-516.39 D	1.74 C	0.36 N
	46.15 AC	43.38 J	-0.32 T	-701.14 D	2.48 O	0.37 N
139.0	46.15 AB	43.34 V	-0.31 H	-701.19 D	2.41 O	0.39 N

	62.18 AB	56.81 V	-0.31 H	-1446.56 I	6.46 H	-0.54 K
125.5	62.18 AB	56.80 V	-0.36 H	-1446.62 I	6.48 H	-0.55 K
	78.56 AB	70.58 V	-0.36 H	-2431.57 I	11.46 H	-0.94 K
112.0	78.55 AB	70.66 V	-0.36 H	-2431.57 I	11.46 H	-0.94 K
	82.76 AB	72.74 V	-0.36 H	-3457.55 I	16.41 H	-1.28 K
98.5	82.76 AB	72.76 V	-0.40 H	-3457.87 I	16.37 H	-1.28 K
	86.85 AB	74.29 V	-0.63 H	-3922.03 I	19.15 H	-1.45 K
92.5	86.85 AC	74.27 V	-0.63 H	-3922.16 I	19.17 H	-1.44 K
	92.02 AC	76.63 V	-0.63 H	-4959.74 I	27.50 H	-1.57 K
79.4	92.02 AC	76.53 I	-0.62 H	-4959.76 I	27.53 H	-1.56 K
	99.59 AC	80.71 I	-0.62 H	-6037.79 I	35.78 H	-1.70 K
66.3	99.59 AC	80.72 I	-0.63 H	-6037.82 I	35.78 H	-1.70 K
	105.81 AC	83.62 I	-0.63 H	-7152.46 I	44.11 H	-1.88 I
53.2	105.81 AC	83.60 I	-0.60 H	-7152.45 I	44.11 H	-1.88 I
	113.39 AC	85.56 I	-0.60 H	-7871.86 I	49.14 H	-1.99 I
45.0	113.39 AC	85.56 I	-0.62 H	-7871.85 I	49.11 H	-1.99 I
	119.88 AC	88.34 I	-0.62 H	-8875.05 I	56.19 H	-2.10 I
33.7	119.88 AC	88.40 I	-0.61 H	-8875.02 I	56.19 H	-2.10 I
	126.77 AC	91.32 I	-0.61 H	-9904.47 I	63.16 H	-2.18 I
22.5	126.77 AC	91.32 I	-0.62 H	-9904.48 I	63.16 H	-2.18 I
	134.11 AC	94.30 I	-0.62 H	-10960.10 I	70.13 H	-2.22 I
11.2	134.11 AC	94.31 I	-0.62 H	-10960.10 I	70.12 H	-2.22 I
	141.58 AC	97.57 I	-0.62 H	-12043.39 I	77.16 H	-2.24 I
base reaction	141.58 AC	-97.57 I	0.62 H	12043.39 I	-77.16 H	2.24 I

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
169.00	0.00C	0.00U	0.00K	0.00U	YES	10.23A	45.2
	0.00AB	0.00F	0.00K	0.00F	YES	11.47A	45.2
164.00	0.01AB	0.00K	0.03W	0.01Z	YES	11.47A	45.2
	0.01AB	0.16H	0.03W	0.17D	YES	12.72A	45.2
159.00	0.01AG	0.16H	0.03B	0.17H	YES	12.72A	45.2
	0.01AG	0.27B	0.02B	0.28B	YES	13.96A	45.2
154.00	0.02AG	0.27B	0.04O	0.29B	YES	13.96A	45.2
	0.02AG	0.51D	0.04O	0.53A	YES	15.71A	45.2
147.00	0.02AG	0.51A	0.04P	0.53A	YES	15.71A	45.2
	0.03AG	0.64D	0.06P	0.66D	YES	16.70A	45.2
143.00	0.02AC	0.37D	0.03J	0.38D	YES	8.79A	45.2

	0.02AC	0.45D	0.03J	0.46D	YES	9.36A	45.2
139.00							
	0.02AB	0.47D	0.03V	0.48D	YES	9.16A	45.2
	0.02AB	0.69I	0.04V	0.71I	YES	11.08A	45.2
125.50							
	0.02AB	0.69I	0.04V	0.71I	YES	11.08A	45.2
	0.02AB	0.88I	0.04V	0.89I	YES	13.00A	45.2
112.00							
	0.02AB	0.88I	0.04V	0.89I	YES	13.00A	45.2
	0.02AB	0.97I	0.03V	0.99I	YES	14.92A	45.2
98.50							
	0.02AB	0.86I	0.03V	0.87I	YES	12.84A	45.2
	0.02AB	0.88I	0.03V	0.89I	YES	13.58A	45.2
92.50							
	0.02AC	0.91I	0.03V	0.93I	YES	13.28A	45.2
	0.02AC	0.94I	0.03V	0.95I	YES	14.91A	45.2
79.42							
	0.02AC	0.94I	0.03I	0.95I	YES	14.91A	45.2
	0.02AC	0.95I	0.03I	0.96I	YES	16.54A	45.2
66.33							
	0.02AC	0.95I	0.03I	0.96I	YES	16.54A	45.2
	0.02AC	0.97I	0.03I	0.98I	YES	18.17A	45.2
53.25							
	0.01AC	0.84I	0.02I	0.85I	YES	15.95A	45.2
	0.01AC	0.84I	0.02I	0.85I	YES	16.86A	45.2
45.00							
	0.01AC	0.87I	0.02I	0.88I	YES	16.55A	45.2
	0.01AC	0.87I	0.02I	0.88I	YES	17.80A	45.2
33.75							
	0.01AC	0.87I	0.02I	0.88I	YES	17.80A	45.2
	0.02AC	0.88I	0.02I	0.89I	YES	19.04A	45.2
22.50							
	0.02AC	0.88I	0.02I	0.89I	YES	19.04A	45.2
	0.02AC	0.88I	0.02I	0.89I	YES	20.29A	45.2
11.25							
	0.02AC	0.88I	0.02I	0.89I	YES	20.29A	45.2
	0.02AC	0.88I	0.02I	0.89I	YES	21.53A	45.2
0.00							

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)
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DOWN	SHEAR.w.r.t.WIND.DIR ALONG	ACROSS	MOMENT.w.r.t.WIND.DIR ALONG	ACROSS	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
141.58	97.57	-0.62	-12043.39	77.16	-2.24
AC	I	H	I	H	I

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150' ext. 170' Monopole / Easton, CT

********** Service Load Condition **********

* Only 1 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

60 mph wind with no ice. Wind Azimuth: 0

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	164.000	0.00	0.0	0.0	0.0000	2.0910	0.0000	0.0000
C	164.000	0.00	0.0	0.0	2.8620	4.8337	0.0000	0.0000
C	154.000	0.00	0.0	0.0	0.0000	1.9635	0.0000	0.0000
C	154.000	0.00	0.0	0.0	2.3673	4.8337	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.0000	0.1211	0.0000	0.0000
C	149.500	0.00	0.0	0.0	0.3004	0.1557	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	0.0794	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.1196	0.6580	0.0000	0.0000
C	144.000	0.00	0.0	0.0	0.0000	1.8360	0.0000	0.0000
C	144.000	0.00	0.0	0.0	2.3740	4.8337	0.0000	0.0000
C	134.000	0.00	0.0	0.0	0.0000	1.7085	0.0000	0.0000
C	134.000	0.00	0.0	0.0	2.3826	4.8337	0.0000	0.0000
C	124.000	0.00	0.0	0.0	0.0000	1.5810	0.0000	0.0000
C	124.000	0.00	0.0	0.0	2.3931	4.8337	0.0000	0.0000
C	94.000	0.00	0.0	0.0	0.0000	0.0508	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0000	0.0213	0.0000	0.0000
C	78.750	0.00	0.0	0.0	0.0442	0.0562	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.0000	0.0201	0.0000	0.0000
C	74.500	0.00	0.0	0.0	0.1055	0.0519	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.0783	0.5160	0.0000	0.0000
C	74.000	0.00	0.0	0.0	0.0783	0.5160	0.0000	0.0000
D	169.000	0.00	180.0	0.0	0.0136	0.0475	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0195	0.0678	0.0000	0.0000
D	143.000	0.00	180.0	0.0	0.0207	0.1950	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0207	0.1950	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0228	0.1376	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.0228	0.1376	0.0000	0.0000
D	125.500	0.00	180.0	0.0	0.0266	0.1598	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.0266	0.1598	0.0000	0.0000
D	112.000	0.00	180.0	0.0	0.0306	0.1821	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.0306	0.1821	0.0000	0.0000
D	98.500	0.00	180.0	0.0	0.0335	0.4205	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.0335	0.4205	0.0000	0.0000
D	92.500	0.00	180.0	0.0	0.0357	0.2404	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.0357	0.2404	0.0000	0.0000
D	79.417	0.00	180.0	0.0	0.0397	0.2651	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.0397	0.2651	0.0000	0.0000
D	66.333	0.00	180.0	0.0	0.0437	0.2898	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0437	0.2898	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0469	0.6530	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.0469	0.6530	0.0000	0.0000
D	45.000	0.00	180.0	0.0	0.0488	0.3639	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.0488	0.3639	0.0000	0.0000
D	33.750	0.00	180.0	0.0	0.0514	0.3878	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.0514	0.3878	0.0000	0.0000
D	22.500	0.00	180.0	0.0	0.0523	0.4117	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.0523	0.4117	0.0000	0.0000
D	11.250	0.00	180.0	0.0	0.0571	0.4357	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0571	0.4357	0.0000	0.0000

ANTENNA LOADING

.....ANTENNA..... TYPE	ELEV	AZI	ATTACHMENT RAD	AZI	.....ANTENNA FORCES..... AXIAL	SHEAR	GRAVITY	TORSION

	ft		ft		kip	kip	kip	ft-kip
HP	94.0	270.0	2.5	270.0	0.00	0.03	0.04	0.01
HP	94.0	90.0	2.5	90.0	0.00	-0.03	0.04	-0.01
HP	147.0	270.0	1.7	270.0	0.00	0.03	0.04	0.01
HP	147.0	90.0	1.7	90.0	0.00	-0.03	0.04	-0.01

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

MAST ELEV ft	DEFLECTIONS (ft) HORIZONTAL ALONG	HORIZONTAL ACROSS	DOWN	ROTATIONS (deg) TILT ALONG	TILT ACROSS	TWIST
169.0	2.79D	0.01L	0.07D	1.95D	0.01L	0.00F
164.0	2.62D	0.01L	0.06D	1.95D	0.01L	0.00F
159.0	2.45D	0.01L	0.06D	1.94D	0.01L	0.00F
154.0	2.28D	0.01L	0.05D	1.90D	0.01L	0.00F
147.0	2.06D	0.01L	0.05D	1.82D	0.01L	0.00F
143.0	1.93D	0.01L	0.04D	1.75D	0.01L	0.00F
139.0	1.81D	0.01L	0.04D	1.71D	0.01L	0.00F
125.5	1.43D	0.01L	0.03D	1.52D	0.01L	0.00F
112.0	1.10D	0.00L	0.02D	1.31D	0.00L	0.00F
98.5	0.82D	0.00L	0.01D	1.08D	0.00L	0.00F
92.5	0.71D	0.00L	0.01D	1.00D	0.00L	0.00F
79.4	0.50D	0.00L	0.01D	0.81D	0.00L	0.00F
66.3	0.34D	0.00L	0.00D	0.64D	0.00L	0.00F
53.2	0.21D	0.00L	0.00D	0.48D	0.00L	0.00F
45.0	0.15D	0.00L	0.00D	0.40D	0.00L	0.00F
33.7	0.08D	0.00L	0.00D	0.28D	0.00L	0.00F
22.5	0.03D	0.00L	0.00D	0.18D	0.00L	0.00F
11.2	0.01D	0.00L	0.00D	0.09D	0.00L	0.00F
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS

ELEV ft	ANT AZI deg	ANT TYPE	BEAM DEFLECTIONS (deg) ROLL	YAW	PITCH	TOTAL
147.0	90.0	HP	-1.807 A	0.000 F	1.817 D	1.817 D
147.0	270.0	HP	1.807 A	0.000 F	-1.817 D	1.817 D
94.0	90.0	HP	-1.011 A	0.000 F	1.017 D	1.017 D
94.0	270.0	HP	1.011 A	0.000 F	-1.017 D	1.017 D

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	SHEAR.w.r.t.WIND.DIR ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	MOMENT.w.r.t.WIND.DIR ACROSS ft-kip	TORSION ft-kip

169.0						
	0.00 A	0.00 J	0.00 E	0.01 J	0.00 I	0.00 I
	0.25 F	0.07 J	0.00 E	-0.21 L	0.01 L	0.00 L
164.0						
	7.18 F	2.94 J	-0.01 K	-0.21 B	0.01 L	0.00 L
	7.44 F	3.01 J	-0.01 K	-16.30 J	0.03 B	0.00 F
159.0						
	7.45 F	3.02 I	-0.01 B	-16.31 J	0.03 K	0.00 F
	7.73 F	3.10 I	-0.01 B	-32.84 I	0.06 B	0.00 F
154.0						
	14.53 F	5.48 D	-0.01 I	-32.84 J	0.05 B	0.00 F
	15.24 F	5.91 D	-0.01 I	-75.69 D	-0.06 L	-0.01 F
147.0						
	16.06 F	6.13 D	-0.05 B	-75.67 D	-0.06 L	-0.03 F
	23.00 F	8.58 D	-0.05 B	-104.90 D	0.24 B	-0.03 F
143.0						
	23.00 K	8.57 I	-0.06 I	-104.90 D	0.23 B	-0.03 F
	23.78 K	8.65 I	-0.06 I	-142.09 D	-0.42 L	-0.03 F
139.0						
	23.78 H	8.65 D	0.04 L	-142.07 D	-0.42 L	-0.03 F
	32.18 H	11.34 D	0.04 L	-292.05 D	-0.96 L	-0.03 F
125.5						
	32.18 H	11.33 D	0.04 F	-292.05 D	-0.96 L	-0.03 F
	40.75 H	14.08 D	0.04 F	-488.99 D	-1.39 L	-0.04 F
112.0						
	40.75 H	14.07 J	0.04 F	-489.01 D	-1.39 L	-0.04 F
	43.21 H	14.49 J	0.04 F	-693.52 D	-1.97 F	-0.05 F
98.5						
	43.21 H	14.49 D	0.05 L	-693.52 D	-1.98 F	-0.05 F
	45.87 H	14.79 D	0.09 L	-786.07 D	-2.26 F	-0.07 F
92.5						
	45.87 H	14.80 D	0.08 L	-786.05 D	-2.25 F	-0.07 F
	49.02 H	15.26 D	0.08 L	-992.39 D	-3.35 L	-0.07 F
79.4						
	49.02 H	15.25 D	0.09 L	-992.39 D	-3.36 L	-0.07 F
	53.66 H	16.08 D	0.09 L	-1206.44 D	-4.52 L	-0.07 F
66.3						
	53.67 H	16.08 D	0.09 L	-1206.44 D	-4.52 L	-0.07 F
	57.46 H	16.65 D	0.09 L	-1427.60 D	-5.69 L	-0.07 F
53.2						
	57.46 H	16.65 D	0.09 L	-1427.62 D	-5.69 L	-0.07 F
	62.84 H	17.04 D	0.09 L	-1570.37 D	-6.41 L	-0.07 F
45.0						
	62.84 H	17.05 D	0.09 L	-1570.36 D	-6.42 L	-0.07 F
	66.94 H	17.60 D	0.09 L	-1769.58 D	-7.39 L	-0.07 F
33.7						
	66.94 H	17.60 D	0.09 F	-1769.58 D	-7.39 L	-0.07 F
	71.30 H	18.18 D	0.09 F	-1974.03 D	-8.36 L	-0.07 F
22.5						
	71.30 H	18.18 D	0.09 F	-1974.03 D	-8.36 L	-0.07 F
	75.93 H	18.77 D	0.09 F	-2183.82 D	-9.33 L	-0.07 F
11.2						
	75.93 H	18.77 D	0.09 F	-2183.82 D	-9.33 L	-0.07 F
	80.83 H	19.41 D	0.09 F	-2399.27 D	-10.26 L	-0.07 F
base reaction	80.83 H	-19.41 D	-0.09 F	2399.27 D	10.26 L	0.07 F

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
169.00	0.00A	0.00C	0.00J	0.00C	YES	10.23A	45.2
	0.00F	0.00L	0.00J	0.00L	YES	11.47A	45.2
164.00	0.01F	0.00B	0.01J	0.01B	YES	11.47A	45.2
	0.01F	0.03J	0.01J	0.04J	YES	12.72A	45.2
159.00	0.01F	0.03J	0.01I	0.04J	YES	12.72A	45.2
	0.01F	0.06I	0.00I	0.06I	YES	13.96A	45.2
154.00	0.01F	0.06J	0.01D	0.07J	YES	13.96A	45.2
	0.01F	0.10D	0.01D	0.11D	YES	15.71A	45.2
147.00	0.01F	0.10D	0.01D	0.12D	YES	15.71A	45.2
	0.02F	0.13D	0.01D	0.15D	YES	16.70A	45.2
143.00	0.01K	0.08D	0.01I	0.08D	YES	8.79A	45.2
	0.01K	0.09D	0.01I	0.10D	YES	9.36A	45.2
139.00	0.01H	0.09D	0.01D	0.10D	YES	9.16A	45.2
	0.01H	0.14D	0.01D	0.15D	YES	11.08A	45.2
125.50	0.01H	0.14D	0.01D	0.15D	YES	11.08A	45.2
	0.01H	0.18D	0.01D	0.19D	YES	13.00A	45.2
112.00	0.01H	0.18D	0.01J	0.19D	YES	13.00A	45.2
	0.01H	0.20D	0.01J	0.21D	YES	14.92A	45.2
98.50	0.01H	0.17D	0.01D	0.18D	YES	12.84A	45.2
	0.01H	0.18D	0.01D	0.18D	YES	13.58A	45.2
92.50	0.01H	0.18D	0.01D	0.19D	YES	13.28A	45.2
	0.01H	0.19D	0.01D	0.20D	YES	14.91A	45.2
79.42	0.01H	0.19D	0.01D	0.20D	YES	14.91A	45.2
	0.01H	0.19D	0.01D	0.20D	YES	16.54A	45.2
66.33	0.01H	0.19D	0.01D	0.20D	YES	16.54A	45.2
	0.01H	0.19D	0.01D	0.20D	YES	18.17A	45.2
53.25	0.01H	0.17D	0.00D	0.18D	YES	15.95A	45.2
	0.01H	0.17D	0.00D	0.18D	YES	16.86A	45.2
45.00	0.01H	0.17D	0.00D	0.18D	YES	16.55A	45.2
	0.01H	0.17D	0.00D	0.18D	YES	17.80A	45.2
33.75	0.01H	0.17D	0.00D	0.18D	YES	17.80A	45.2
	0.01H	0.17D	0.00D	0.18D	YES	19.04A	45.2
22.50	0.01H	0.17D	0.00D	0.18D	YES	19.04A	45.2
	0.01H	0.18D	0.00D	0.18D	YES	20.29A	45.2
11.25	0.01H	0.18D	0.00D	0.18D	YES	20.29A	45.2
	0.01H	0.18D	0.00D	0.18D	YES	21.53A	45.2
0.00							

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR ALONG	ACROSS	MOMENT.w.r.t.WIND.DIR ALONG	ACROSS	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
80.83	19.41	0.09	-2399.27	-10.26	-0.07
H	D	F	D	L	F

Sabre Industries™
Towers and Poles

SO#: 172085B
Site Name: Easton, CT
Date: 10/19/2017

Round Flange Plate and Bolts per ANSI/TIA 222-G
Elevation = 149 feet

Pole Data

Diameter:	24.06	in
Thickness:	0.25	in
Yield (Fy):	65	ksi
# of Sides:	18	"0" IF Round
Strength (Fu):	80	ksi

Reactions

Moment, Mu:	311.7	ft-kips
Axial, Pu:	18.07	kips
Shear, Vu:	28.78	kips

Bolt Data

Quantity:	10		
Diameter:	1	in	
Bolt Material:	A325		
Strength (Fu):	120	ksi	
Yield (Fy):	92	ksi	
BC Diam. (in):	27.5	BC Override:	

Flange Bolt Results

Allowable Φ*Rnt:	54.54	kips
Adjusted Φ*Rnt (due to shear):	54.39	kips
Maximum Bolt Tension:	52.60	kips
Bolt Interaction Ratio:	**96.7%**	**Pass**

Plate Data

Diameter (in):	30	Dia. Override:	
Thickness:	1.5	in	
Center Hole Diam.:	16	in	
Yield (Fy):	50	ksi	
Single-Rod B-eff:	7.64	in	
Drain Hole:	1	in. diameter	
Drain Location:	11	in. center of pole to center of drain hole	

Flange Plate Results

Compression Side Plate (Mu/Z):	15.0	ksi
Allowable Φ*Fy:	45.0	ksi
Compr. Plate Interaction Ratio:	**33.3%**	**Pass**

Sabre Industries™
Towers and Poles

SO#: 172085B
Site Name: Easton, CT
Date: 10/19/2017

Round Base Plate and Anchor Rods, per ANSI/TIA 222-G

Pole Data

Diameter:	74.320	in (flat to flat)
Thickness:	0.5625	in
Yield (Fy):	65	ksi
# of Sides:	18	"0" IF Round
Strength (Fu):	80	ksi

Reactions

Moment, Mu:	12043.39	ft-kips
Axial, Pu:	97.01	kips
Shear, Vu:	97.57	kips

Anchor Rod Data

Quantity:	30		
Diameter:	2.25	in	
Rod Material:	A615		
Strength (Fu):	100	ksi	
Yield (Fy):	75	ksi	
BC Diam. (in):	82	BC Override:	

Anchor Rod Results

Maximum Rod (Pu+ Vu/η):	244.7 Kips	
Allowable Φ*Rnt:	260.0 Kips	(per 4.9.9)
Anchor Rod Interaction Ratio:	**94.1%** **Pass**	

Plate Data

Diameter (in):	87.75	Dia. Override:	
Thickness:	2.75	in	
Yield (Fy):	50	ksi	
Eff Width/Rod:	7.86	in	
Drain Hole:	2.625	in. diameter	
Drain Location:	35	in. center of pole to center of drain hole	
Center Hole:	62	in. diameter	

Base Plate Results

Base Plate (Mu/Z):	38.8 ksi	
Allowable Φ*Fy:	45.0 ksi	(per AISC)
Base Plate Interaction Ratio:	**86.3%** **Pass**	

MAT FOUNDATION DESIGN BY SABRE TOWERS & POLES

170' Monopole INSITE TOWERS LLC Easton, CT (172085) 10-19-17 REB

Overall Loads:			
Factored Moment (ft-kips)	12043.39		
Factored Axial (kips)	97.01		
Factored Shear (kips)	97.57		
Bearing Design Strength (ksf)	18	Max. Net Bearing Press. (ksf)	12.59
Water Table Below Grade (ft)	**999**		
Width of Mat (ft)	33.5	Allowable Bearing Pressure (ksf)	**12.00**
Thickness of Mat (ft)	2.25	Safety Factor	**2.00**
Depth to Bottom of Slab (ft)	6	Ultimate Bearing Pressure (ksf)	24.00
Quantity of Bolts in Bolt Circle	30	Bearing Φs	0.75
Bolt Circle Diameter (in)	82		
Top of Concrete to Top of Bottom Threads (in)	60		
Diameter of Pier (ft)	9	Minimum Pier Diameter (ft)	8.17
Ht. of Pier Above Ground (ft)	0.5	Equivalent Square b (ft)	7.98
Ht. of Pier Below Ground (ft)	3.75	Square Pier? (Y/N)	**N**
Quantity of Bars in Mat	79		
Bar Diameter in Mat (in)	1.128		
Area of Bars in Mat (in^2)	78.95		
Spacing of Bars in Mat (in)	5.06	Recommended Spacing (in)	5 to 12
Quantity of Bars Pier	60		
Bar Diameter in Pier (in)	1.128		
Tie Bar Diameter in Pier (in)	0.625		
Spacing of Ties (in)	12		
Area of Bars in Pier (in^2)	59.96	Minimum Pier A_s (in^2)	45.80
Spacing of Bars in Pier (in)	5.22	Recommended Spacing (in)	5 to 12
f'c (ksi)	4.5		
fy (ksi)	60		
Unit Wt. of Soil (kcf)	**0.1**		
Unit Wt. of Concrete (kcf)	0.15		
Volume of Concrete (yd^3)	103.53		
Two-Way Shear Action:			
Average d (in)	22.872		
ϕv_c (ksi)	0.228	v_u (ksi)	0.202
$\phi v_c = \phi(2 + 4/\beta_c)f'_c{}^{1/2}$	0.342		
$\phi v_c = \phi(\alpha_s d/b_o+2)f'_c{}^{1/2}$	0.241		
$\phi v_c = \phi 4f'_c{}^{1/2}$	0.228		
Shear perimeter, b_o (in)	411.15		
β_c	1		
One-Way Shear:			
ϕV_c (kips)	1048.5	V_u (kips)	679.2
Stability:			
Overturning Design Strength (ft-k)	13524.5	Total Applied M (ft-k)	12677.6

Pier Design:

ϕV_n (kips)	1069.8	V_u (kips)	97.6
$\phi V_c=\phi 2(1+N_u/(2000A_g))f'_c{}^{1/2}b_w d$	1069.8		
V_s (kips)	0.0	*** V_s max = 4 $f'_c{}^{1/2}b_w d$ (kips)	2503.8
Maximum Spacing (in)	6.78	(Only if Shear Ties are Required)	
Actual Hook Development (in)	21.74	Req'd Hook Development l_{dh} (in)	13.54
		*** Ref. To Spacing Requirements ACI 11.5.4.3	

Flexure in Slab:

ϕM_n (ft-kips)	7578.3	M_u (ft-kips)	7531.4
a (in)	3.08		
Steel Ratio	0.00859		
β_1	0.825		
Maximum Steel Ratio (ρ_t)	0.0197		
Minimum Steel Ratio	0.0018		
Rebar Development in Pad (in)	150.14	Required Development in Pad (in)	33.45

Condition	1 is OK, 0 Fails
Maximum Soil Bearing Pressure	1
Pier Area of Steel	1
Pier Shear	1
Interaction Diagram Visual Check	1
Two-Way Shear Action	1
One-Way Shear Action	1
Overturning	1
Flexure	1
Steel Ratio	1
Length of Development in Pad	1
Hook Development	1