

Date: **May 02, 2021**



B+T Group
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Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 470988
Site Name: Killingworth 2 CT

Crown Castle Designation: **BU Number:** 807134
Site Name: NHV 031B 943108
JDE Job Number: 644619
Work Order Number: 1957241
Order Number: 552653 Rev. 0

Engineering Firm Designation: **B+T Group Project Number:** 150161.001.01

Site Data: **197 North Chestnut Hill Road, Killingworth, Middlesex County, CT**
Latitude 41° 23' 9.93", Longitude -72° 36' 14.39"
170 Foot - Self Support Tower

B+T Group is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

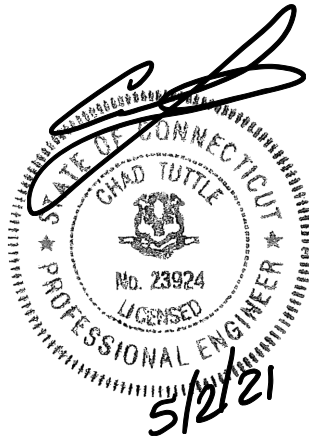
LC7: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: John Landon

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: N/A



Chad E. Tuttle, P.E.

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1) INTRODUCTION

This tower is a 170 ft. Self-Support tower designed by Rohn.

This tower was modified by GPD associates in August of 2008, modification includes replacing existing diagonal bolts from 0'-20'.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
170.0	170.0	6	Antel	LPA-80063/6CF	18	1-5/8
		3	Commscope	CBC78T-DS-43-2X		
		6	Commscope	JAHH-65B-R3B		
		1	Raycap	RVZDC-6627-PF-48		
		3	Samsung Telecomm.	RFV01U-D1A		
		3	Samsung Telecomm.	RFV01U-D2A		
		1	--	Sector Mount [SM 510-3]		
		3	Vzw	Sub6 Antenna - VZS01		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148.0	148.0	3	Fujitsu	TA08025-B604	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	JMA Wireless	MX08FRO665-20		
		1	Raycap	RDIDC-9181-PF-48		
		3	Commscope	MTC3975083		
135.0	136.0	2	KMW Comm.	AM-X-CD-16-65-00T-RET	12 2 1	1-1/4 7/16 3/8
		6	Powerwave Tech.	7770.00		
		1	Powerwave Tech.	P65-16-XLH-RR		
	135.0	3	Ericsson	RRUS-11		
		6	Powerwave Tech.	LGP21401		
		6	Powerwave Tech.	LGP21901		
		1	Raycap	DC6-48-60-18-8F		
		1	--	Sector Mount [SM 402-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	258477	CCI Sites
Tower Modification Drawing	2303423	CCI Sites
Post Modification Inspection	2354059	CCI Sites
Foundation Drawing	301178	CCI Sites
Geotech Report	258466	CCI Sites
Crown CAD Package	Date: 04/19/2021	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

- 1) The tower and structures were maintained in accordance with the - TIA-222 standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	170 - 160	Leg	ROHN 2.5 STD	2	-7.829	60.052	13.0	Pass
T2	160 - 140	Leg	ROHN 2.5 EH	21	-27.030	61.437	44.0	Pass
T3	140 - 120	Leg	ROHN 3 EH	45	-53.841	99.054	54.4	Pass
T4	120 - 100	Leg	ROHN 4 EH	66	-81.847	167.909	48.7	Pass
T5	100 - 80	Leg	ROHN 5 EH	87	-107.884	211.295	51.1	Pass
T6	80 - 60	Leg	ROHN 6 EHS	102	-136.930	256.266	53.4	Pass
T7	60 - 40	Leg	ROHN 6 EH	117	-165.948	318.900	52.0	Pass
T8	40 - 20	Leg	ROHN 8 EHS	132	-195.059	405.717	48.1	Pass
T9	20 - 0	Leg	ROHN 8 EHS	147	-224.423	405.717	55.3	Pass
T1	170 - 160	Diagonal	L2x2x3/16	9	-2.555	10.352	24.7	Pass
T2	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	28	-4.270	16.198	26.4	Pass
T3	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	49	-5.678	12.425	45.7	Pass
T4	120 - 100	Diagonal	L3x3x1/4	70	-6.764	17.340	39.0	Pass
T5	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	91	-8.197	18.922	43.3	Pass
T6	80 - 60	Diagonal	L4x4x5/16	106	-9.274	29.616	31.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T7	60 - 40	Diagonal	L4x4x5/16	121	-9.720	24.783	39.2	Pass
T8	40 - 20	Diagonal	L4x4x5/16	136	-10.877	21.559	50.5	Pass
T9	20 - 0	Diagonal	L4x4x3/8	151	-12.035	22.004	54.7	Pass
T1	170 - 160	Top Girt	L2 1/2x2 1/2x3/16	4	-0.958	6.934	13.8	Pass
T2	160 - 140	Top Girt	L2 1/2x2 1/2x3/16	23	-0.469	6.934	6.8	Pass
							Summary	
						Leg (T9)	55.3	Pass
						Diagonal (T9)	54.7	Pass
						Top Girt (T1)	13.8	Pass
						Bolt Checks	80.9	Pass
						Rating =	80.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft.)	% Capacity	Pass / Fail
1,2	Anchor Rods	Base	39.4	Pass
1,2	Concrete Breakout	Base	34.3	Pass
1,2	Anchor Rod Pullout	Base	58.3	Pass
1,2	Base Foundation (Structural)	Base	19.0	Pass
1,2	Base Foundation (Soil Interaction)	Base	43.3	Pass

Structure Rating (max from all components) =	80.9%
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Notes:

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

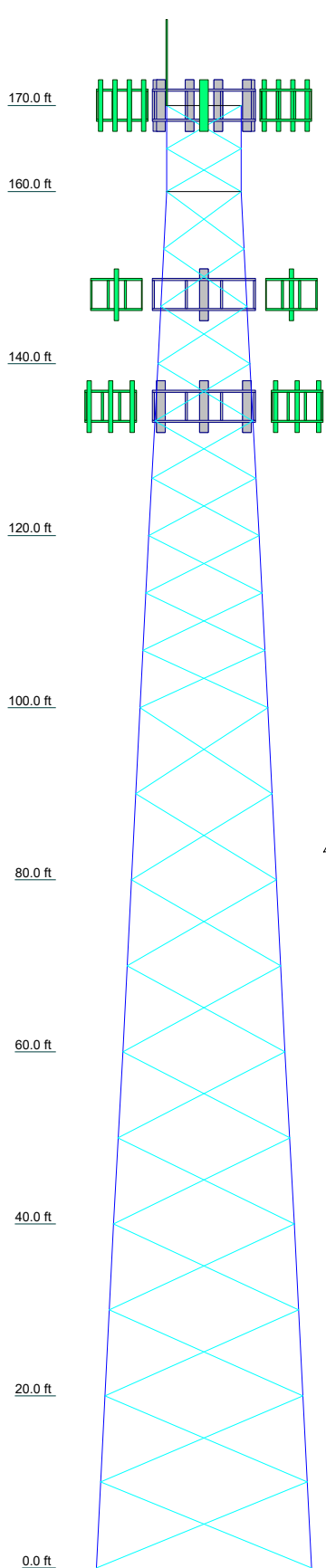
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Legs	A	ROHN 2.5 EH	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS		
Leg Grade										
Diagonals	L2x2x3/16									
Diagonal Grade										
Top Girts										
Face Width (ft)	8.64583									
# Panels @ (ft)	2 @ 5									
Weight (K)	0.6									



SYMBOL LIST			
MARK	SIZE	MARK	SIZE
A	ROHN 2.5 STD		

MATERIAL STRENGTH					
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TIA-222-H Annex S
9. TOWER RATING: 80.9%

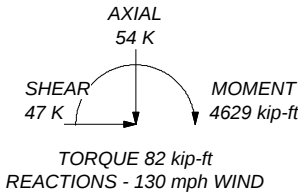
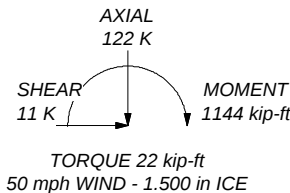
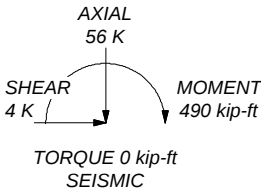


ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 232 K
SHEAR: 29 K

UPLIFT: -188 K
SHEAR: 25 K

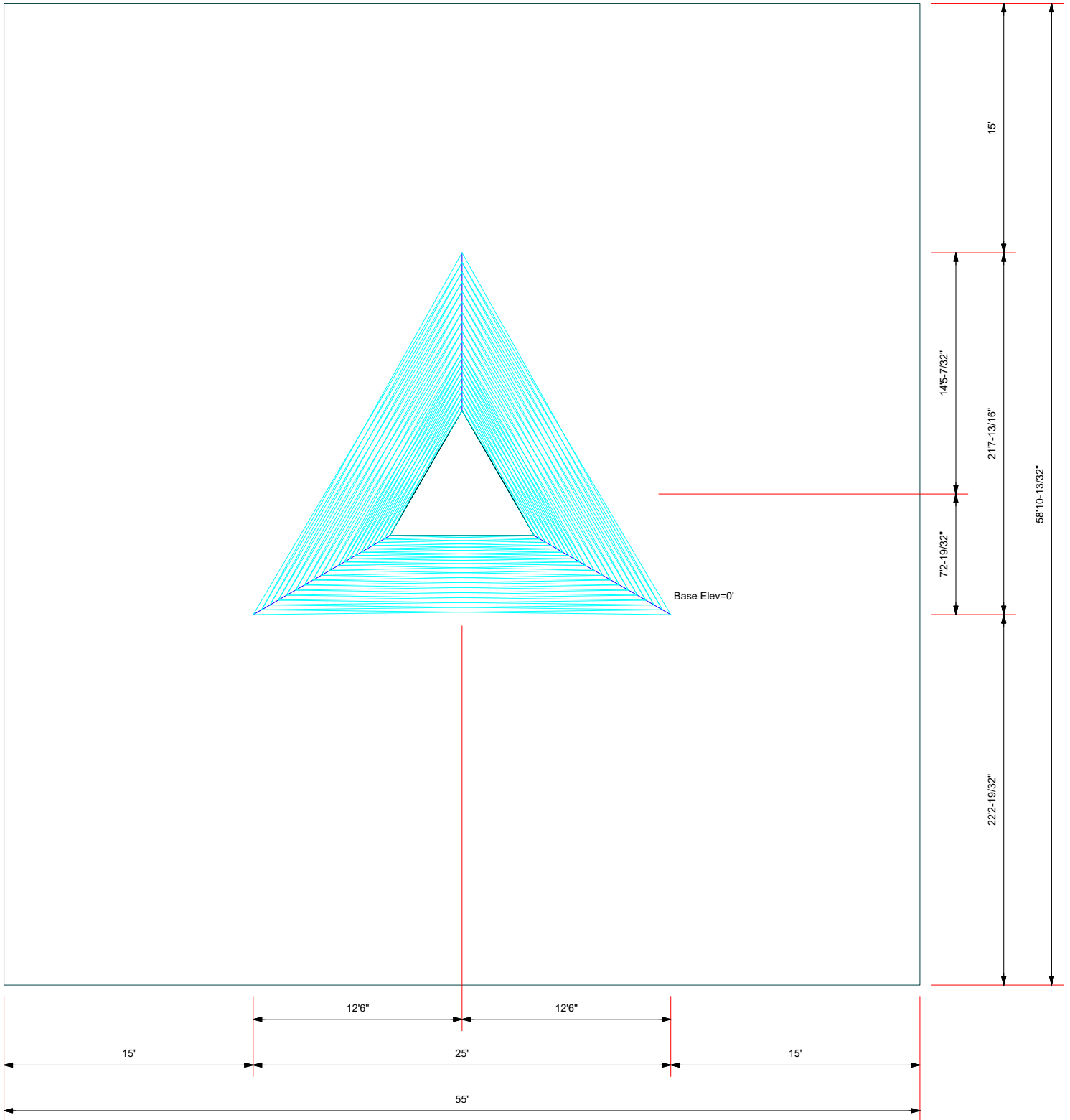




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Job:	150161.001.01 - NHV 031B 943108, CT (BU# 807134)		
Project:			
Client:	Crown Castle	Drawn by:	Chinmaya
Code:	TIA-222-H	Date:	04/29/21
Path:			
		Scale:	NTS
		Dwg No.	E-1

Plot Plan
Total Area - 0.07 Acres



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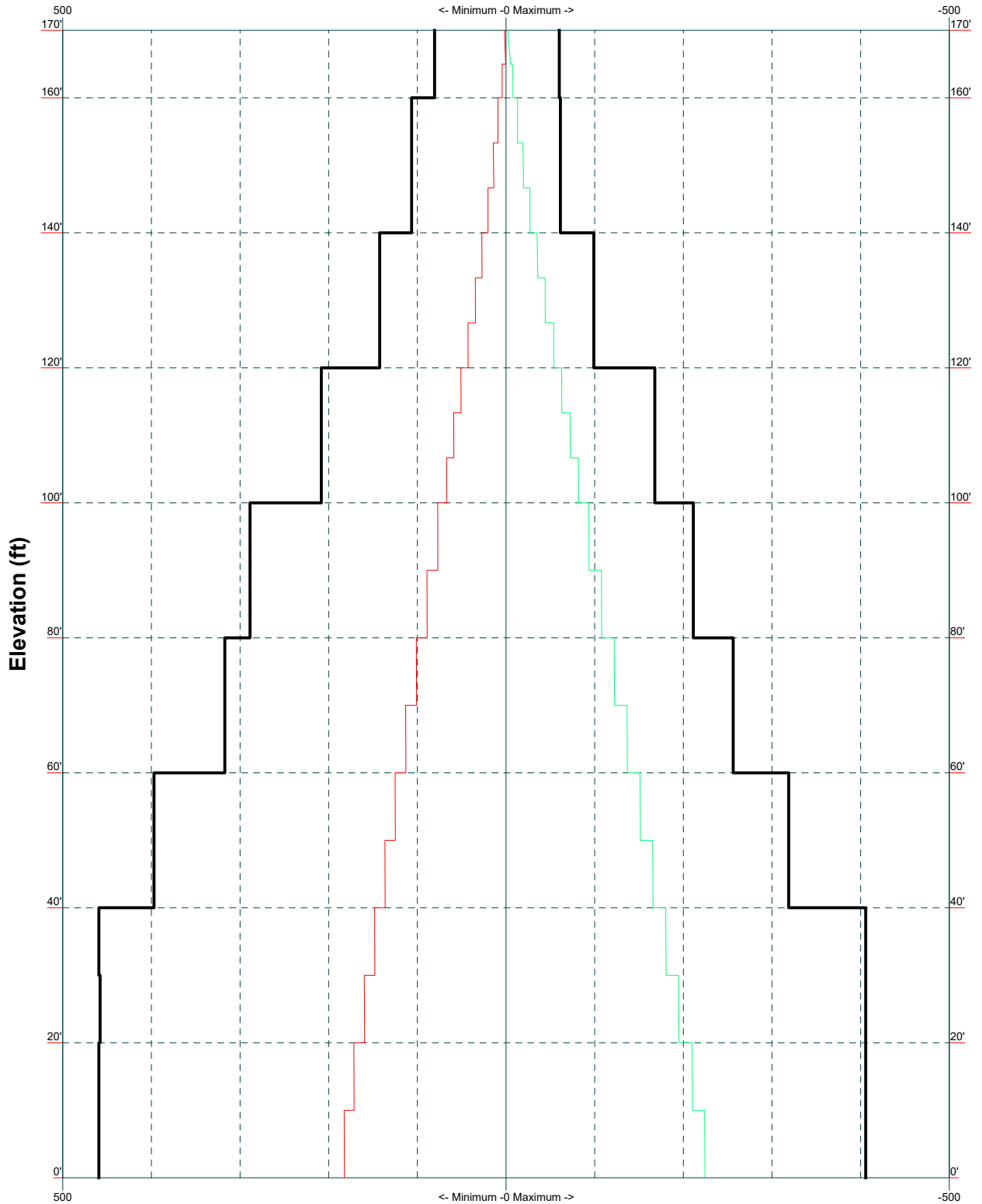
Job: **150161.001.01 - NHV 031B 943108, CT (BU# 807134)**

Project:	Client: Crown Castle	Drawn by: Chinmaya	App'd:
Code: TIA-222-H	Date: 04/29/21	Scale: NTS	
Path:		Dwg No. E-2	

TIA-222-H - 130 mph/50 mph 1.500 in Ice Exposure B

Leg Capacity ———

Leg Compression (K)



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Project:		
Client: Crown Castle	Drawn by: Chinmaya	App'd:
Code: TIA-222-H	Date: 04/29/21	Scale: NTS
Path:	Dwg No. E-3	

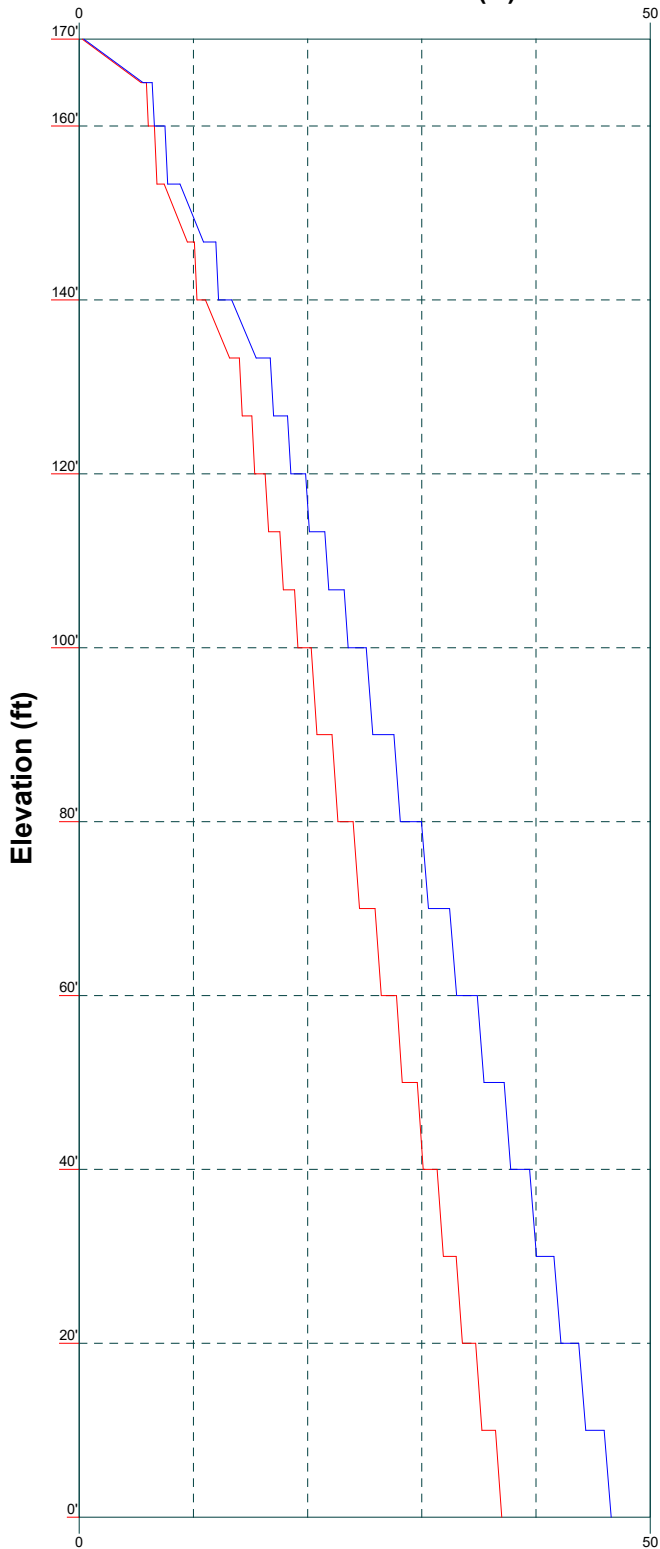
Vx

Vz

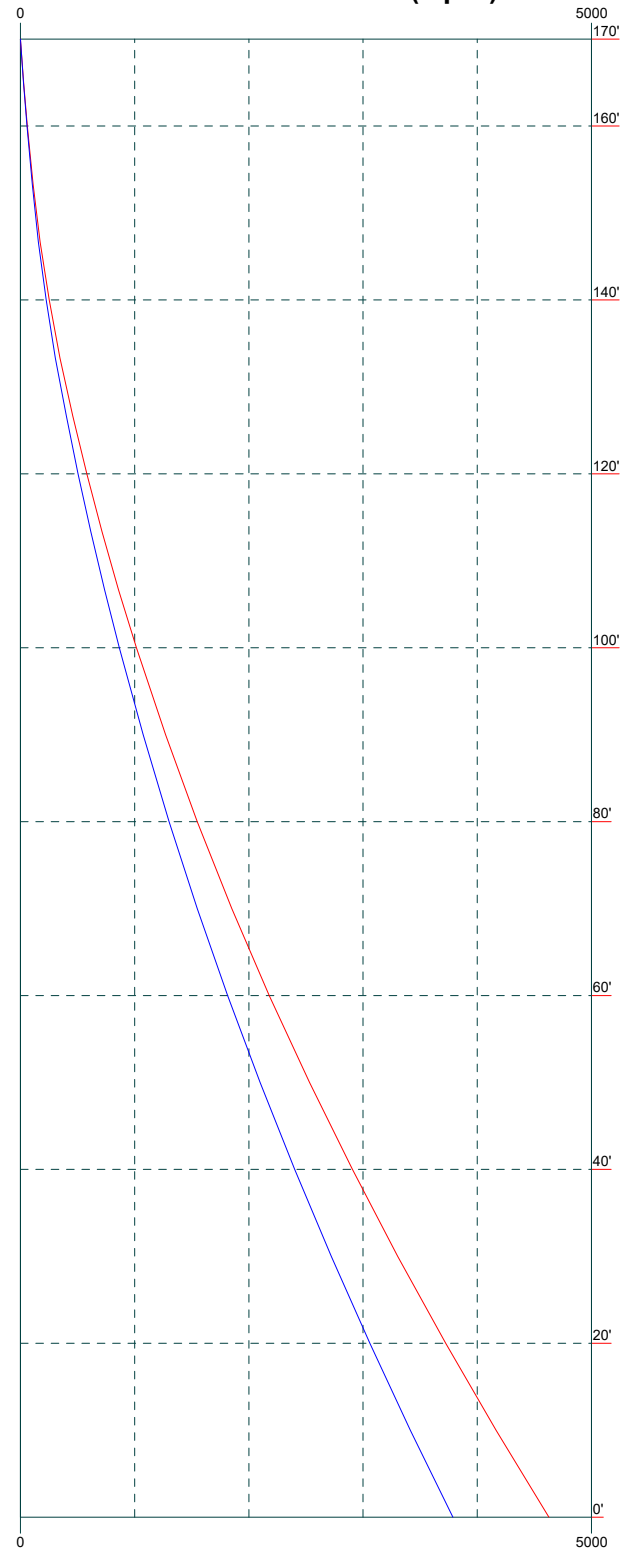
Mx

Mz

Global Mast Shear (K)

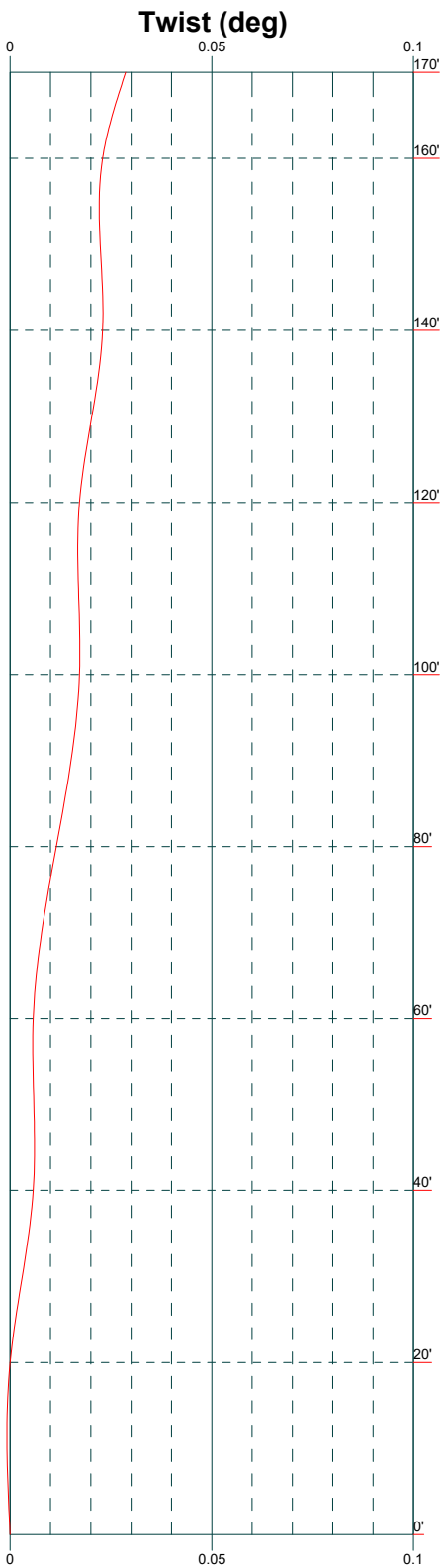
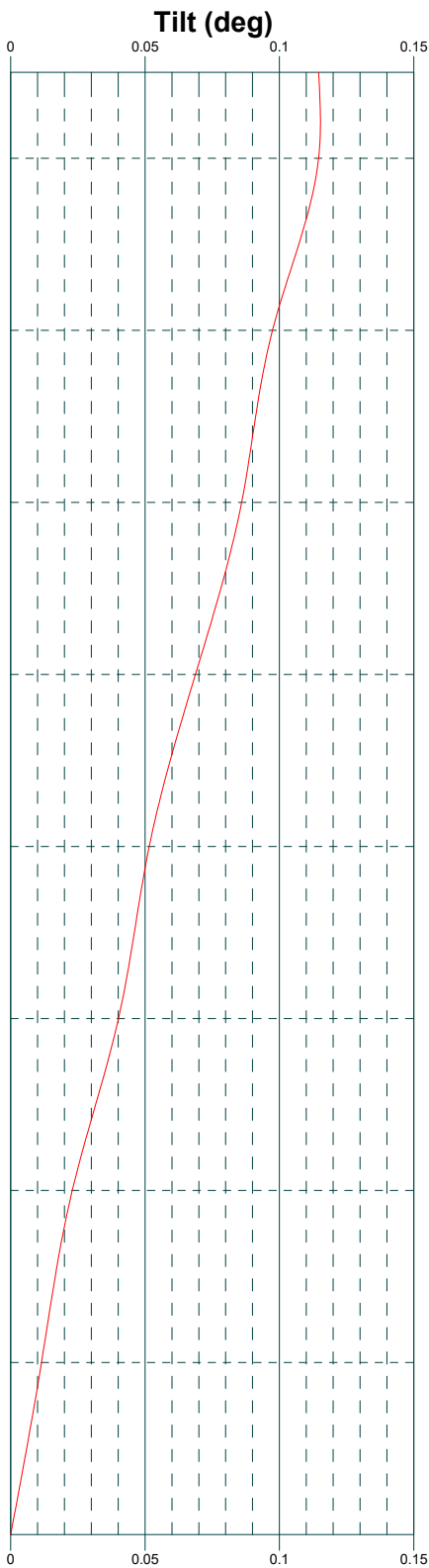
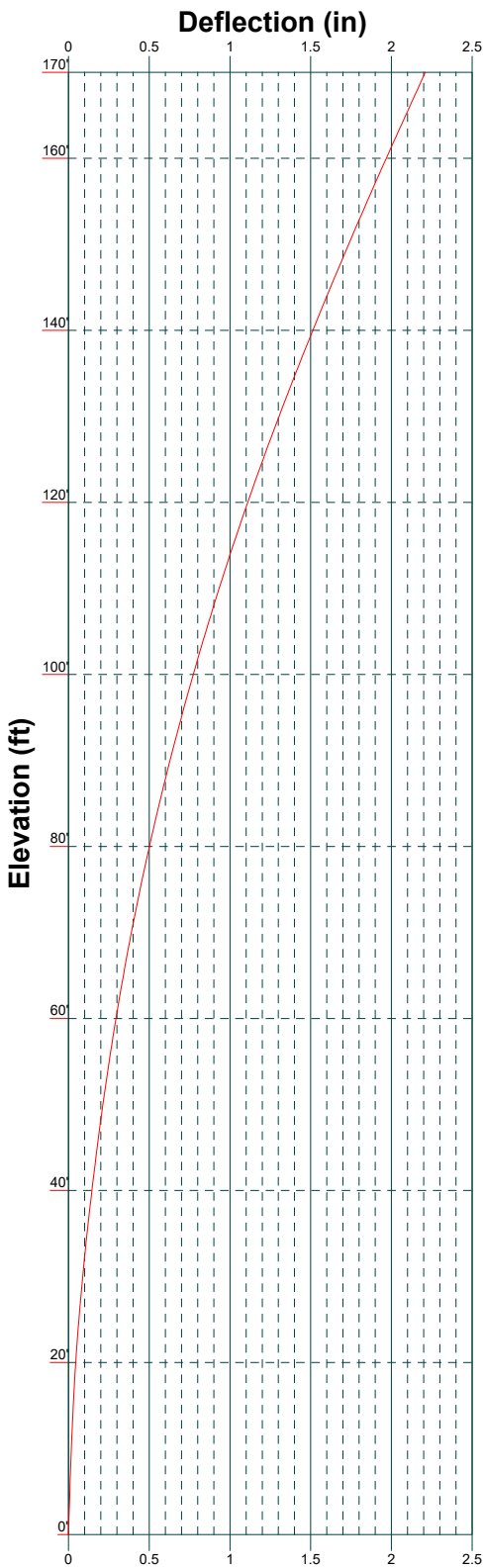


Global Mast Moment (kip-ft)



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Project:		
Client: Crown Castle	Drawn by: Chinmaya	App'd:
Code: TIA-222-H	Date: 04/29/21	Scale: NTS
Path:	Dwg No. E-4	



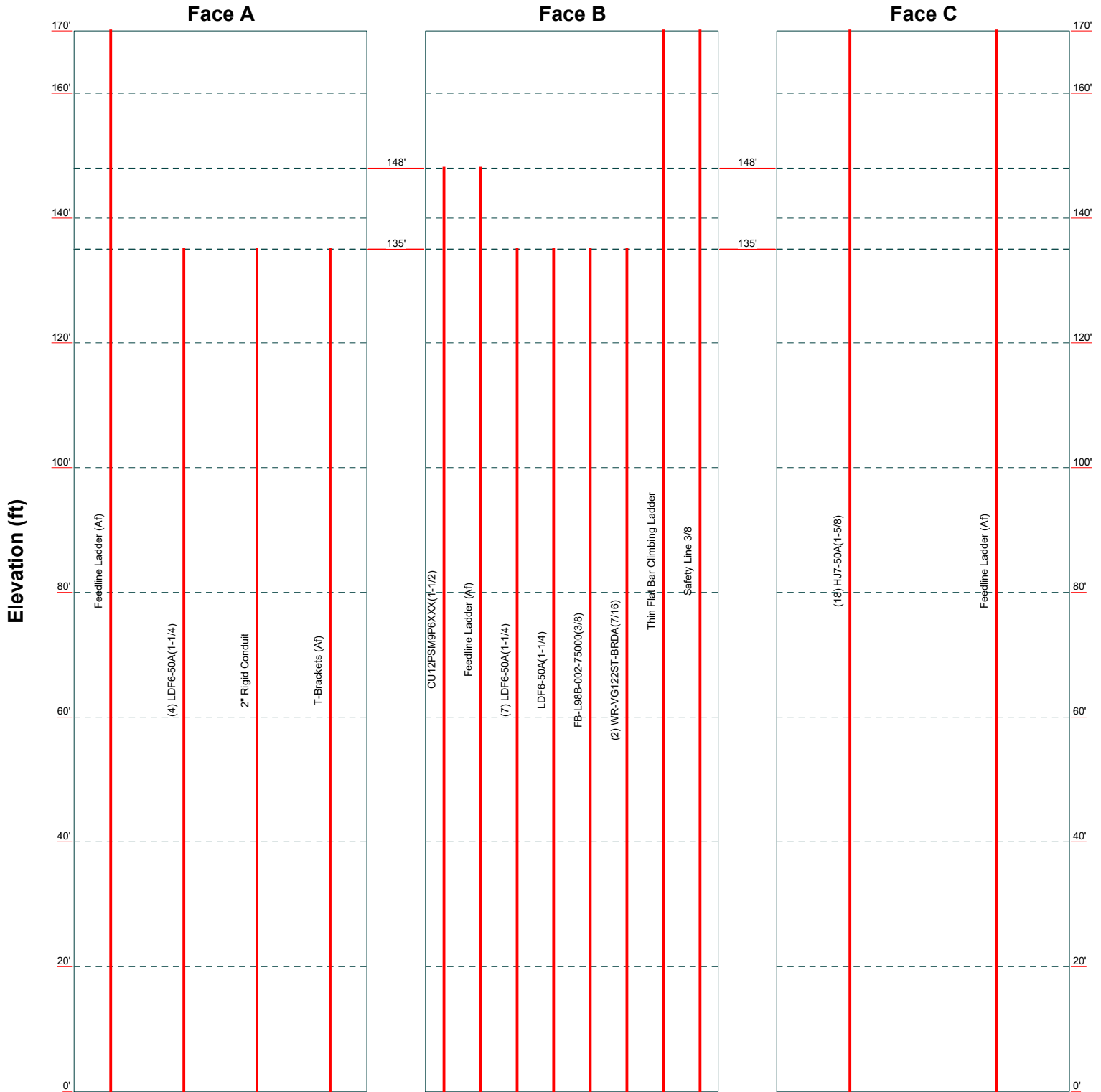


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Job: 150161.001.01 - NHV 031B 943108, CT (BU# 807134)		
Project:		
Client: Crown Castle	Drawn by: Chinmaya	App'd:
Code: TIA-222-H	Date: 04/29/21	Scale: NTS
Path:	Dwg No. E-5	

Feed Line Distribution Chart 0' - 170'

Round Flat App In Face App Out Face Truss Leg



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	Project:		
	Client: Crown Castle	Drawn by: Chinmaya	App'd:
	Code: TIA-222-H	Date: 04/29/21	Scale: NTS
	Path:	Dwg No. E-7	

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	Client Crown Castle	Designed by Chinmaya

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 170' above the ground line.

The base of the tower is set at an elevation of 0' above the ground line.

The face width of the tower is 8'7-3/4" at the top and 25' at the base.

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

The following design criteria apply:

Tower is located in Middlesex County, Connecticut.

Tower base elevation above sea level: 382'.

Basic wind speed of 130 mph.

Risk Category II.

Exposure Category B.

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

Topographic Category: 1.

Crest Height: 0'.

Nominal ice thickness of 1.500 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

TIA-222-H Annex S.

Pressures are calculated at each section.

Stress ratio used in tower member design is 1.

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

Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$, $K_{es}(E_v \text{ and } E_h) = 1.0$.

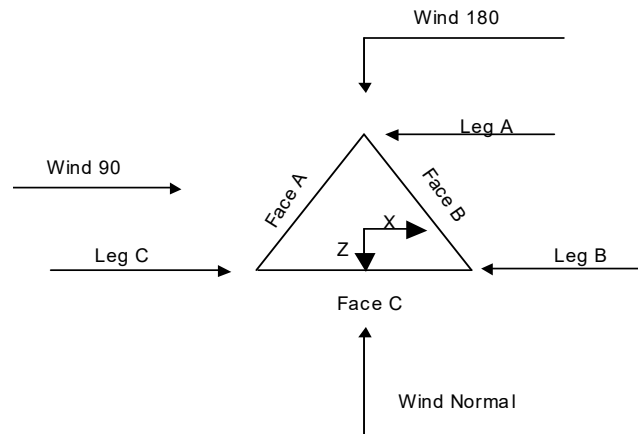
Maximum demand-capacity ratio is: 1.05.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	Client Crown Castle	Designed by Chinmaya



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	170'-160'			8'7-3/4"	1	10'
T2	160'-140'			8'7-3/4"	1	20'
T3	140'-120'			10'8-1/4"	1	20'
T4	120'-100'			12'9-1/8"	1	20'
T5	100'-80'			14'9-1/4"	1	20'
T6	80'-60'			16'10-1/4"	1	20'
T7	60'-40'			18'10-1/4"	1	20'
T8	40'-20'			21'	1	20'
T9	20'-0'			23'	1	20'

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	170'-160'	5'	X Brace	No	Yes	0.000	0.000
T2	160'-140'	6'8"	X Brace	No	Yes	0.000	0.000
T3	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T4	120'-100'	6'8"	X Brace	No	No	0.000	0.000

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	Project	Date
	Client	Designed by
	Crown Castle	Chinmaya

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T5	100'-80'	10'	X Brace	No	No	0.000	0.000
T6	80'-60'	10'	X Brace	No	No	0.000	0.000
T7	60'-40'	10'	X Brace	No	No	0.000	0.000
T8	40'-20'	10'	X Brace	No	No	0.000	0.000
T9	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 170'-160'	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-140'	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 140'-120'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 120'-100'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T5 100'-80'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T6 80'-60'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T7 60'-40'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T8 40'-20'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T9 20'-0'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
ft						
T1 170'-160'	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 160'-140'	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in

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	Project	Date
	Client	Designed by
	Crown Castle	Chinmaya

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft ²	in							
T1 170'-160'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 160'-140'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 140'-120'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 120'-100'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 100'-80'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 80'-60'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 60'-40'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 40'-20'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 20'-0'	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹						
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
T1 170'-160'	Yes	No	1	1	1	1	1	1	1	1
T2 160'-140'	Yes	No	1	1	1	1	1	1	1	1
T3 140'-120'	Yes	No	1	1	1	1	1	1	1	1
T4 120'-100'	Yes	No	1	1	1	1	1	1	1	1
T5 100'-80'	Yes	No	1	1	1	1	1	1	1	1
T6 80'-60'	Yes	No	1	1	1	1	1	1	1	1
T7 60'-40'	Yes	No	1	1	1	1	1	1	1	1
T8 40'-20'	Yes	No	1	1	1	1	1	1	1	1
T9 20'-0'	Yes	No	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

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Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T9 20'-0"	Flange	1.000 A354-BC	0	0.750 A490N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
HJ7-50A(1-5/8)	C	No	No	Ar (CaAa)	170' - 0'	0.000	-0.4	18	15	0.850 0.750	1.980		0.001
Feedline Ladder (Af) *	C	No	No	Af (CaAa)	170' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
CU12PSM9P6 XXX(1-1/2)	B	No	No	Ar (CaAa)	148' - 0'	0.000	0.475	1	1	0.850 0.750	1.600		0.002
Feedline Ladder (Af) *	B	No	No	Af (CaAa)	148' - 0'	0.000	0.475	1	1	3.000	3.000		0.008
Feedline Ladder (Af) *	A	No	No	Af (CaAa)	170' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
LDF6-50A(1-1/4)	B	No	No	Ar (CaAa)	135' - 0'	-2.500	-0.47	7	4	0.500	1.550		0.001
LDF6-50A(1-1/4)	A	No	No	Ar (CaAa)	135' - 0'	-2.000	0.465	4	3	0.500	1.550		0.001
LDF6-50A(1-1/4)	B	No	No	Ar (CaAa)	135' - 0'	-2.500	-0.45	1	1	0.500	1.550		0.001
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	135' - 0'	0.000	0	1	1	0.394	0.394		0.000
WR-VG122S T-BRDA(7/16)	B	No	No	Ar (CaAa)	135' - 0'	0.000	0	2	2	0.460	0.460		0.000
2" Rigid Conduit	A	No	No	Ar (CaAa)	135' - 0'	-6.000	0.463	1	1	2.000	2.000		0.003
T-Brackets (Af) *	A	No	No	Af (CaAa)	135' - 0'	-2.000	0.48	1	1	1.000	1.000		0.008
Thin Flat Bar Climbing Ladder	B	No	No	Af (CaAa)	170' - 0'	-2.500	0.48	1	1	2.000	2.000		0.004
Safety Line 3/8 *	B	No	No	Ar (CaAa)	170' - 0'	0.200	0.48	1	1	0.375	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight klf
*								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	170'-160'	A	0.000	0.000	5.000	0.000	0.084
		B	0.000	0.000	3.708	0.000	0.042
		C	0.000	0.000	40.640	0.000	0.271
T2	160'-140'	A	0.000	0.000	10.000	0.000	0.168
		B	0.000	0.000	12.697	0.000	0.170
		C	0.000	0.000	81.280	0.000	0.542
T3	140'-120'	A	0.000	0.000	24.800	0.000	0.372
		B	0.000	0.000	41.187	0.000	0.377
		C	0.000	0.000	81.280	0.000	0.542
T4	120'-100'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542
T5	100'-80'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542
T6	80'-60'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542
T7	60'-40'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542
T8	40'-20'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542
T9	20'-0'	A	0.000	0.000	29.733	0.000	0.440
		B	0.000	0.000	48.044	0.000	0.402
		C	0.000	0.000	81.280	0.000	0.542

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	170'-160'	A	1.498	0.000	0.000	7.995	0.000	0.187
		B		0.000	0.000	9.699	0.000	0.156
		C		0.000	0.000	64.565	0.000	1.106
T2	160'-140'	A	1.483	0.000	0.000	15.934	0.000	0.371
		B		0.000	0.000	29.311	0.000	0.521
		C		0.000	0.000	128.992	0.000	2.199
T3	140'-120'	A	1.462	0.000	0.000	50.326	0.000	0.948
		B		0.000	0.000	89.349	0.000	1.376
		C		0.000	0.000	128.786	0.000	2.179
T4	120'-100'	A	1.438	0.000	0.000	61.358	0.000	1.126
		B		0.000	0.000	103.543	0.000	1.533

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T5	100'-80'	C	1.410	0.000	0.000	128.549	0.000	2.156
		A		0.000	0.000	60.815	0.000	1.109
		B		0.000	0.000	102.460	0.000	1.504
T6	80'-60'	C	1.375	0.000	0.000	128.270	0.000	2.129
		A		0.000	0.000	60.150	0.000	1.088
		B		0.000	0.000	101.135	0.000	1.469
T7	60'-40'	C	1.329	0.000	0.000	127.928	0.000	2.096
		A		0.000	0.000	59.286	0.000	1.061
		B		0.000	0.000	99.412	0.000	1.424
T8	40'-20'	C	1.263	0.000	0.000	127.485	0.000	2.054
		A		0.000	0.000	58.029	0.000	1.023
		B		0.000	0.000	96.905	0.000	1.360
T9	20'-0'	C	1.132	0.000	0.000	126.839	0.000	1.992
		A		0.000	0.000	55.532	0.000	0.949
		B		0.000	0.000	91.931	0.000	1.238
		C		0.000	0.000	125.561	0.000	1.871

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	170'-160'	17.737	3.293	18.895	4.130
T2	160'-140'	20.668	4.568	22.582	5.844
T3	140'-120'	22.902	-7.656	25.024	-7.515
T4	120'-100'	23.072	-11.221	26.102	-11.812
T5	100'-80'	26.346	-12.813	29.859	-13.550
T6	80'-60'	27.029	-13.020	31.360	-14.129
T7	60'-40'	28.782	-13.828	33.751	-15.159
T8	40'-20'	30.221	-14.428	35.207	-15.640
T9	20'-0'	31.731	-15.128	37.112	-16.352

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	2	HJ7-50A(1-5/8)	160.00 - 170.00	0.6000	0.6000
T1	4	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	10	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	20	Thin Flat Bar Climbing Ladder	160.00 - 170.00	0.6000	0.6000
T1	21	Safety Line 3/8	160.00 - 170.00	0.6000	0.6000
T2	2	HJ7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T2	4	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T2	6	CU12PSM9P6XXX(1-1/2)	140.00 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _o No Ice	K _o Ice
T2	7	Feedline Ladder (Af)	148.00 140.00 - 148.00	0.6000	0.6000
T2	10	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T2	20	Thin Flat Bar Climbing Ladder	140.00 - 160.00	0.6000	0.6000
T2	21	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T3	2	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.6000
T3	4	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	6	CU12PSM9P6XXX(1-1/2)	120.00 - 140.00	0.6000	0.6000
T3	7	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	10	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	12	LDF6-50A(1-1/4)	120.00 - 135.00	0.6000	0.6000
T3	13	LDF6-50A(1-1/4)	120.00 - 135.00	0.6000	0.6000
T3	14	LDF6-50A(1-1/4)	120.00 - 135.00	0.6000	0.6000
T3	15	FB-L98B-002-75000(3/8)	120.00 - 135.00	0.6000	0.6000
T3	16	WR-VG122ST-BRDA(7/16)	120.00 - 135.00	0.6000	0.6000
T3	17	2" Rigid Conduit	120.00 - 135.00	0.6000	0.6000
T3	18	T-Brackets (Af)	120.00 - 135.00	0.6000	0.6000
T3	20	Thin Flat Bar Climbing Ladder	120.00 - 140.00	0.6000	0.6000
T3	21	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	2	HJ7-50A(1-5/8)	100.00 - 120.00	0.6000	0.6000
T4	4	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	6	CU12PSM9P6XXX(1-1/2)	100.00 - 120.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	10	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	12	LDF6-50A(1-1/4)	100.00 - 120.00	0.6000	0.6000
T4	13	LDF6-50A(1-1/4)	100.00 - 120.00	0.6000	0.6000
T4	14	LDF6-50A(1-1/4)	100.00 - 120.00	0.6000	0.6000
T4	15	FB-L98B-002-75000(3/8)	100.00 - 120.00	0.6000	0.6000
T4	16	WR-VG122ST-BRDA(7/16)	100.00 - 120.00	0.6000	0.6000
T4	17	2" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T4	18	T-Brackets (Af)	100.00 - 120.00	0.6000	0.6000
T4	20	Thin Flat Bar Climbing	100.00 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _o No Ice	K _o Ice
		Ladder	120.00		
T4	21	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T5	2	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T5	4	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	6	CU12PSM9P6XXX(1-1/2)	80.00 - 100.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	10	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	12	LDF6-50A(1-1/4)	80.00 - 100.00	0.6000	0.6000
T5	13	LDF6-50A(1-1/4)	80.00 - 100.00	0.6000	0.6000
T5	14	LDF6-50A(1-1/4)	80.00 - 100.00	0.6000	0.6000
T5	15	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.6000	0.6000
T5	16	WR-VG122ST-BRDA(7/16)	80.00 - 100.00	0.6000	0.6000
T5	17	2" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T5	18	T-Brackets (Af)	80.00 - 100.00	0.6000	0.6000
T5	20	Thin Flat Bar Climbing	80.00 - 100.00	0.6000	0.6000
		Ladder			
T5	21	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	2	HJ7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T6	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	6	CU12PSM9P6XXX(1-1/2)	60.00 - 80.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	10	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	12	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.6000
T6	13	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.6000
T6	14	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.6000
T6	15	FB-L98B-002-75000(3/8)	60.00 - 80.00	0.6000	0.6000
T6	16	WR-VG122ST-BRDA(7/16)	60.00 - 80.00	0.6000	0.6000
T6	17	2" Rigid Conduit	60.00 - 80.00	0.6000	0.6000
T6	18	T-Brackets (Af)	60.00 - 80.00	0.6000	0.6000
T6	20	Thin Flat Bar Climbing	60.00 - 80.00	0.6000	0.6000
		Ladder			
T6	21	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	2	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T7	4	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	6	CU12PSM9P6XXX(1-1/2)	40.00 - 60.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	10	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	12	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.6000
T7	13	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.6000
T7	14	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.6000
T7	15	FB-L98B-002-75000(3/8)	40.00 - 60.00	0.6000	0.6000
T7	16	WR-VG122ST-BRDA(7/16)	40.00 - 60.00	0.6000	0.6000
T7	17	2" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T7	18	T-Brackets (Af)	40.00 - 60.00	0.6000	0.6000
T7	20	Thin Flat Bar Climbing	40.00 - 60.00	0.6000	0.6000
		Ladder			
T7	21	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	2	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T8	4	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	6	CU12PSM9P6XXX(1-1/2)	20.00 - 40.00	0.6000	0.6000
T8	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	10	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	12	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T8	13	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T8	14	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T8	15	FB-L98B-002-75000(3/8)	20.00 - 40.00	0.6000	0.6000
T8	16	WR-VG122ST-BRDA(7/16)	20.00 - 40.00	0.6000	0.6000
T8	17	2" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T8	18	T-Brackets (Af)	20.00 - 40.00	0.6000	0.6000
T8	20	Thin Flat Bar Climbing	20.00 - 40.00	0.6000	0.6000
		Ladder			

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		Chinmaya

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _o No Ice	K _o Ice
T8	21	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T9	2	HJ7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T9	4	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	6	CU12PSM9P6XXX(1-1/2)	0.00 - 20.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	10	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	12	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T9	13	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T9	14	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T9	15	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.6000	0.6000
T9	16	WR-VG122ST-BRDA(7/16)	0.00 - 20.00	0.6000	0.6000
T9	17	2" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T9	18	T-Brackets (Af)	0.00 - 20.00	0.6000	0.6000
T9	20	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T9	21	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

User Defined Loads - Seismic

Description	Elevation	Offset From Centroid	Azimuth Angle	E _v	E _{hx}	E _{hz}	E _h
	ft	ft	°	K	K	K	K
CCISeismic Tower Section 1	145'	0'	0.000	0.055	0.000	0.000	0.170
CCISeismic Tower Section 2	130'	0'	0.000	0.105	0.000	0.000	0.287
CCISeismic Tower Section 3	117'6"	0'	0.000	0.030	0.000	0.000	0.072
CCISeismic Tower Section 4	112'6"	0'	0.000	0.025	0.000	0.000	0.058
CCISeismic Tower Section 5	107'6"	0'	0.000	0.025	0.000	0.000	0.055
CCISeismic Tower Section 6	102'6"	0'	0.000	0.032	0.000	0.000	0.066
CCISeismic Tower Section 7	97'6"	0'	0.000	0.039	0.000	0.000	0.075
CCISeismic Tower Section 8	92'6"	0'	0.000	0.034	0.000	0.000	0.063
CCISeismic Tower Section 9	87'6"	0'	0.000	0.034	0.000	0.000	0.059
CCISeismic Tower Section 10	82'6"	0'	0.000	0.041	0.000	0.000	0.066
CCISeismic Tower Section 11	77'6"	0'	0.000	0.040	0.000	0.000	0.059
CCISeismic Tower Section 12	72'6"	0'	0.000	0.044	0.000	0.000	0.060
CCISeismic Tower Section 13	67'6"	0'	0.000	0.045	0.000	0.000	0.057
CCISeismic Tower Section 14	62'6"	0'	0.000	0.046	0.000	0.000	0.053
CCISeismic Tower Section 15	50'	0'	0.000	0.278	0.000	0.000	0.247
CCISeismic Tower Section 16	30'	0'	0.000	0.208	0.000	0.000	0.101
CCISeismic Tower Section 17	10'	0'	0.000	0.233	0.000	0.000	0.031
CCISeismic (2) misc Side Lighting	150'	0'	0.000	0.001	0.000	0.000	0.004
CCISeismic ericsson AIR 32 B2a/B66Aa w/ Mount Pipe	148'	0'	0.000	0.020	0.000	0.000	0.065
CCISeismic ericsson AIR 32 B2a/B66Aa w/ Mount Pipe	148'	0'	0.000	0.020	0.000	0.000	0.065
CCISeismic ericsson AIR 32 B2a/B66Aa w/ Mount Pipe	148'	0'	0.000	0.020	0.000	0.000	0.065
CCISeismic commscope ETW190VS12UB	148'	0'	0.000	0.001	0.000	0.000	0.004
CCISeismic commscope ETW190VS12UB	148'	0'	0.000	0.001	0.000	0.000	0.004
CCISeismic commscope ETW190VS12UB	148'	0'	0.000	0.001	0.000	0.000	0.004
CCISeismic tower mounts Sector	148'	0'	0.000	0.209	0.000	0.000	0.664

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Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
Mount [SM 602-3]							
CCISeismic ericsson AIR6449	148'	0'	0.000	0.018	0.000	0.000	0.056
B41_T-MOBILE w/ Mount Pipe							
CCISeismic ericsson AIR6449	148'	0'	0.000	0.018	0.000	0.000	0.056
B41_T-MOBILE w/ Mount Pipe							
CCISeismic ericsson AIR6449	148'	0'	0.000	0.018	0.000	0.000	0.056
B41_T-MOBILE w/ Mount Pipe							
CCISeismic rfs celwave	148'	0'	0.000	0.025	0.000	0.000	0.080
APXVAARR24_43-U-NA20 w/ Mount Pipe							
CCISeismic rfs celwave	148'	0'	0.000	0.025	0.000	0.000	0.080
APXVAARR24_43-U-NA20 w/ Mount Pipe							
CCISeismic rfs celwave	148'	0'	0.000	0.025	0.000	0.000	0.080
APXVAARR24_43-U-NA20 w/ Mount Pipe							
CCISeismic ericsson RADIO	148'	0'	0.000	0.009	0.000	0.000	0.030
4449 B71 B85A_T-MOBILE							
CCISeismic ericsson RADIO	148'	0'	0.000	0.009	0.000	0.000	0.030
4449 B71 B85A_T-MOBILE							
CCISeismic ericsson RADIO	148'	0'	0.000	0.009	0.000	0.000	0.030
4449 B71 B85A_T-MOBILE							
CCISeismic ericsson RRUS	148'	0'	0.000	0.007	0.000	0.000	0.022
4415 B25_CCIV2							
CCISeismic ericsson RRUS	148'	0'	0.000	0.007	0.000	0.000	0.022
4415 B25_CCIV2							
CCISeismic ericsson RRUS	148'	0'	0.000	0.007	0.000	0.000	0.022
4415 B25_CCIV2							
CCISeismic microdata telecom	148'	0'	0.000	0.001	0.000	0.000	0.003
MI-54131							
CCISeismic microdata telecom	148'	0'	0.000	0.001	0.000	0.000	0.003
MI-54131							
CCISeismic microdata telecom	148'	0'	0.000	0.001	0.000	0.000	0.003
MI-54131							
CCISeismic miscl Safety Line	145'	0'	0.000	0.000	0.000	0.000	0.001
3/8 From 0 to 150 (140ft to150ft)							
CCISeismic miscl Safety Line	130'	0'	0.000	0.001	0.000	0.000	0.002
3/8 From 0 to 150 (120ft to140ft)							
CCISeismic miscl Safety Line	117'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (115ft to120ft)							
CCISeismic miscl Safety Line	112'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (110ft to115ft)							
CCISeismic miscl Safety Line	107'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (105ft to110ft)							
CCISeismic miscl Safety Line	102'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (100ft to105ft)							
CCISeismic miscl Safety Line	97'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (95ft to100ft)							
CCISeismic miscl Safety Line	92'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (90ft to95ft)							
CCISeismic miscl Safety Line	87'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (85ft to90ft)							
CCISeismic miscl Safety Line	82'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (80ft to85ft)							
CCISeismic miscl Safety Line	77'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (75ft to80ft)							
CCISeismic miscl Safety Line	72'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (70ft to75ft)							
CCISeismic miscl Safety Line	67'6"	0'	0.000	0.000	0.000	0.000	0.000
3/8 From 0 to 150 (65ft to70ft)							

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Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
CCISeismic miscel Safety Line 3/8 From 0 to 150 (60ft to65ft)	62'6"	0'	0.000	0.000	0.000	0.000	0.000
CCISeismic miscel Safety Line 3/8 From 0 to 150 (40ft to60ft)	50'	0'	0.000	0.001	0.000	0.000	0.001
CCISeismic miscel Safety Line 3/8 From 0 to 150 (20ft to40ft)	30'	0'	0.000	0.001	0.000	0.000	0.000
CCISeismic miscel Safety Line 3/8 From 0 to 150 (0ft to20ft)	10'	0'	0.000	0.001	0.000	0.000	0.000
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (140ft to150ft)	145'	0'	0.000	0.011	0.000	0.000	0.035
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (120ft to140ft)	130'	0'	0.000	0.023	0.000	0.000	0.062
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (115ft to120ft)	117'6"	0'	0.000	0.006	0.000	0.000	0.014
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (110ft to115ft)	112'6"	0'	0.000	0.006	0.000	0.000	0.013
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (105ft to110ft)	107'6"	0'	0.000	0.006	0.000	0.000	0.012
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (100ft to105ft)	102'6"	0'	0.000	0.006	0.000	0.000	0.012
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (95ft to100ft)	97'6"	0'	0.000	0.006	0.000	0.000	0.011
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (90ft to95ft)	92'6"	0'	0.000	0.006	0.000	0.000	0.010
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (85ft to90ft)	87'6"	0'	0.000	0.006	0.000	0.000	0.010
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (80ft to85ft)	82'6"	0'	0.000	0.006	0.000	0.000	0.009
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (75ft to80ft)	77'6"	0'	0.000	0.006	0.000	0.000	0.008
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (70ft to75ft)	72'6"	0'	0.000	0.006	0.000	0.000	0.008
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (65ft to70ft)	67'6"	0'	0.000	0.006	0.000	0.000	0.007
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (60ft to65ft)	62'6"	0'	0.000	0.006	0.000	0.000	0.007
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (40ft to60ft)	50'	0'	0.000	0.023	0.000	0.000	0.020
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (20ft to40ft)	30'	0'	0.000	0.023	0.000	0.000	0.011
CCISeismic miscel Feedline Ladder (Af) From 0 to 150 (0ft to20ft)	10'	0'	0.000	0.023	0.000	0.000	0.003
CCISeismic (10) andrew	145'	0'	0.000	0.011	0.000	0.000	0.035

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Description	Elevation	Offset From Centroid	Azimuth Angle	E _v	E _{hx}	E _{hz}	E _h
	ft	ft	°	K	K	K	K
LDF7-50A(1-5/8) From 0 to 150 (140ft to150ft)							
CCISeismic (10) andrew	130'	0'	0.000	0.022	0.000	0.000	0.061
LDF7-50A(1-5/8) From 0 to 150 (120ft to140ft)							
CCISeismic (10) andrew	117'6"	0'	0.000	0.006	0.000	0.000	0.013
LDF7-50A(1-5/8) From 0 to 150 (115ft to120ft)							
CCISeismic (10) andrew	112'6"	0'	0.000	0.006	0.000	0.000	0.013
LDF7-50A(1-5/8) From 0 to 150 (110ft to115ft)							
CCISeismic (10) andrew	107'6"	0'	0.000	0.006	0.000	0.000	0.012
LDF7-50A(1-5/8) From 0 to 150 (105ft to110ft)							
CCISeismic (10) andrew	102'6"	0'	0.000	0.006	0.000	0.000	0.011
LDF7-50A(1-5/8) From 0 to 150 (100ft to105ft)							
CCISeismic (10) andrew	97'6"	0'	0.000	0.006	0.000	0.000	0.011
LDF7-50A(1-5/8) From 0 to 150 (95ft to100ft)							
CCISeismic (10) andrew	92'6"	0'	0.000	0.006	0.000	0.000	0.010
LDF7-50A(1-5/8) From 0 to 150 (90ft to95ft)							
CCISeismic (10) andrew	87'6"	0'	0.000	0.006	0.000	0.000	0.010
LDF7-50A(1-5/8) From 0 to 150 (85ft to90ft)							
CCISeismic (10) andrew	82'6"	0'	0.000	0.006	0.000	0.000	0.009
LDF7-50A(1-5/8) From 0 to 150 (80ft to85ft)							
CCISeismic (10) andrew	77'6"	0'	0.000	0.006	0.000	0.000	0.008
LDF7-50A(1-5/8) From 0 to 150 (75ft to80ft)							
CCISeismic (10) andrew	72'6"	0'	0.000	0.006	0.000	0.000	0.008
LDF7-50A(1-5/8) From 0 to 150 (70ft to75ft)							
CCISeismic (10) andrew	67'6"	0'	0.000	0.006	0.000	0.000	0.007
LDF7-50A(1-5/8) From 0 to 150 (65ft to70ft)							
CCISeismic (10) andrew	62'6"	0'	0.000	0.006	0.000	0.000	0.006
LDF7-50A(1-5/8) From 0 to 150 (60ft to65ft)							
CCISeismic (10) andrew	50'	0'	0.000	0.022	0.000	0.000	0.020
LDF7-50A(1-5/8) From 0 to 150 (40ft to60ft)							
CCISeismic (10) andrew	30'	0'	0.000	0.022	0.000	0.000	0.011
LDF7-50A(1-5/8) From 0 to 150 (20ft to40ft)							
CCISeismic (10) andrew	10'	0'	0.000	0.022	0.000	0.000	0.003
LDF7-50A(1-5/8) From 0 to 150 (0ft to20ft)							
CCISeismic (2) andrew	144'	0'	0.000	0.002	0.000	0.000	0.005
LDF7-50A(1-5/8) From 8 to 148 (140ft to148ft)							
CCISeismic (2) andrew	130'	0'	0.000	0.004	0.000	0.000	0.012
LDF7-50A(1-5/8) From 8 to 148 (120ft to140ft)							
CCISeismic (2) andrew	117'6"	0'	0.000	0.001	0.000	0.000	0.003
LDF7-50A(1-5/8) From 8 to 148 (115ft to120ft)							
CCISeismic (2) andrew	112'6"	0'	0.000	0.001	0.000	0.000	0.003

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Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
LDF7-50A(1-5/8) From 8 to 148 (110ft to115ft)							
CCISeismic (2) andrew	107'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (105ft to110ft)							
CCISeismic (2) andrew	102'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (100ft to105ft)							
CCISeismic (2) andrew	97'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (95ft to100ft)							
CCISeismic (2) andrew	92'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (90ft to95ft)							
CCISeismic (2) andrew	87'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (85ft to90ft)							
CCISeismic (2) andrew	82'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (80ft to85ft)							
CCISeismic (2) andrew	77'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (75ft to80ft)							
CCISeismic (2) andrew	72'6"	0'	0.000	0.001	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (70ft to75ft)							
CCISeismic (2) andrew	67'6"	0'	0.000	0.001	0.000	0.000	0.001
LDF7-50A(1-5/8) From 8 to 148 (65ft to70ft)							
CCISeismic (2) andrew	62'6"	0'	0.000	0.001	0.000	0.000	0.001
LDF7-50A(1-5/8) From 8 to 148 (60ft to65ft)							
CCISeismic (2) andrew	50'	0'	0.000	0.004	0.000	0.000	0.004
LDF7-50A(1-5/8) From 8 to 148 (40ft to60ft)							
CCISeismic (2) andrew	30'	0'	0.000	0.004	0.000	0.000	0.002
LDF7-50A(1-5/8) From 8 to 148 (20ft to40ft)							
CCISeismic (2) andrew	14'	0'	0.000	0.003	0.000	0.000	0.001
LDF7-50A(1-5/8) From 8 to 148 (8ft to20ft)							
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (140ft to148ft)	144'	0'	0.000	0.002	0.000	0.000	0.005
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (120ft to140ft)	130'	0'	0.000	0.004	0.000	0.000	0.012
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (115ft to120ft)	117'6"	0'	0.000	0.001	0.000	0.000	0.003
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (110ft to115ft)	112'6"	0'	0.000	0.001	0.000	0.000	0.003
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (105ft to110ft)	107'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (100ft to105ft)	102'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS	97'6"	0'	0.000	0.001	0.000	0.000	0.002

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Description	Elevation	Offset From Centroid	Azimuth Angle	E _v	E _{hx}	E _{hz}	E _h
	ft	ft	°	K	K	K	K
6X12 6AWG(1-3/8) From 8 to 148 (95ft to100ft)							
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (90ft to95ft)	92'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (85ft to90ft)	87'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (80ft to85ft)	82'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (75ft to80ft)	77'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (70ft to75ft)	72'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (65ft to70ft)	67'6"	0'	0.000	0.001	0.000	0.000	0.001
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (60ft to65ft)	62'6"	0'	0.000	0.001	0.000	0.000	0.001
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (40ft to60ft)	50'	0'	0.000	0.004	0.000	0.000	0.004
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (20ft to40ft)	30'	0'	0.000	0.004	0.000	0.000	0.002
CCISeismic (2) ericsson HCS 6X12 6AWG(1-3/8) From 8 to 148 (8ft to20ft)	14'	0'	0.000	0.003	0.000	0.000	0.001
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (140ft to148ft)	144'	0'	0.000	0.002	0.000	0.000	0.006
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (120ft to140ft)	130'	0'	0.000	0.005	0.000	0.000	0.013
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (115ft to120ft)	117'6"	0'	0.000	0.001	0.000	0.000	0.003
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (110ft to115ft)	112'6"	0'	0.000	0.001	0.000	0.000	0.003
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (105ft to110ft)	107'6"	0'	0.000	0.001	0.000	0.000	0.003
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (100ft to105ft)	102'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (95ft to100ft)	97'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (90ft to95ft)	92'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (85ft to90ft)	87'6"	0'	0.000	0.001	0.000	0.000	0.002
CCISeismic ericsson HCS 6X12 4AWG(1-5/8) From 8 to 148 (80ft to85ft)	82'6"	0'	0.000	0.001	0.000	0.000	0.002

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Description	Elevation	Offset From Centroid	Azimuth Angle	E _v	E _{hx}	E _{hz}	E _h
	ft	ft	°	K	K	K	K
4AWG(1-5/8) From 8 to 148 (80ft to85ft)							
CCISeismic ericsson HCS 6X12	77'6"	0'	0.000	0.001	0.000	0.000	0.002
4AWG(1-5/8) From 8 to 148 (75ft to80ft)							
CCISeismic ericsson HCS 6X12	72'6"	0'	0.000	0.001	0.000	0.000	0.002
4AWG(1-5/8) From 8 to 148 (70ft to75ft)							
CCISeismic ericsson HCS 6X12	67'6"	0'	0.000	0.001	0.000	0.000	0.001
4AWG(1-5/8) From 8 to 148 (65ft to70ft)							
CCISeismic ericsson HCS 6X12	62'6"	0'	0.000	0.001	0.000	0.000	0.001
4AWG(1-5/8) From 8 to 148 (60ft to65ft)							
CCISeismic ericsson HCS 6X12	50'	0'	0.000	0.005	0.000	0.000	0.004
4AWG(1-5/8) From 8 to 148 (40ft to60ft)							
CCISeismic ericsson HCS 6X12	30'	0'	0.000	0.005	0.000	0.000	0.002
4AWG(1-5/8) From 8 to 148 (20ft to40ft)							
CCISeismic ericsson HCS 6X12	14'	0'	0.000	0.003	0.000	0.000	0.001
4AWG(1-5/8) From 8 to 148 (8ft to20ft)							
CCISeismic *** From 8 to 148 (140ft to148ft)	144'	0'	0.000	0.003	0.000	0.000	0.008
CCISeismic *** From 8 to 148 (120ft to140ft)	130'	0'	0.000	0.007	0.000	0.000	0.018
CCISeismic *** From 8 to 148 (115ft to120ft)	117'6"	0'	0.000	0.002	0.000	0.000	0.004
CCISeismic *** From 8 to 148 (110ft to115ft)	112'6"	0'	0.000	0.002	0.000	0.000	0.004
CCISeismic *** From 8 to 148 (105ft to110ft)	107'6"	0'	0.000	0.002	0.000	0.000	0.004
CCISeismic *** From 8 to 148 (100ft to105ft)	102'6"	0'	0.000	0.002	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (95ft to100ft)	97'6"	0'	0.000	0.002	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (90ft to95ft)	92'6"	0'	0.000	0.002	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (85ft to90ft)	87'6"	0'	0.000	0.002	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (80ft to85ft)	82'6"	0'	0.000	0.002	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (75ft to80ft)	77'6"	0'	0.000	0.002	0.000	0.000	0.002
CCISeismic *** From 8 to 148 (70ft to75ft)	72'6"	0'	0.000	0.002	0.000	0.000	0.002
CCISeismic *** From 8 to 148 (65ft to70ft)	67'6"	0'	0.000	0.002	0.000	0.000	0.002
CCISeismic *** From 8 to 148 (60ft to65ft)	62'6"	0'	0.000	0.002	0.000	0.000	0.002
CCISeismic *** From 8 to 148 (40ft to60ft)	50'	0'	0.000	0.007	0.000	0.000	0.006
CCISeismic *** From 8 to 148 (20ft to40ft)	30'	0'	0.000	0.007	0.000	0.000	0.003
CCISeismic *** From 8 to 148 (8ft to20ft)	14'	0'	0.000	0.004	0.000	0.000	0.001

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Lightning Rod 1" x 5' on 5' Pole	C	From Leg	0.000 0' 5'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	1.942 2.956 3.684 4.988	1.942 2.956 3.684 4.988	0.076 0.102 0.135 0.214
*									
(2) LPA-80063/6CF w/ Mount Pipe	A	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	9.831 10.400 10.933 12.026	10.215 11.384 12.269 14.086	0.052 0.145 0.246 0.476
(2) LPA-80063/6CF w/ Mount Pipe	B	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	9.831 10.400 10.933 12.026	10.215 11.384 12.269 14.086	0.052 0.145 0.246 0.476
(2) LPA-80063/6CF w/ Mount Pipe	C	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	9.831 10.400 10.933 12.026	10.215 11.384 12.269 14.086	0.052 0.145 0.246 0.476
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	5.500 5.970 6.450 7.440	4.380 4.840 5.300 6.260	0.096 0.169 0.254 0.457
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	5.500 5.970 6.450 7.440	4.380 4.840 5.300 6.260	0.096 0.169 0.254 0.457
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	5.500 5.970 6.450 7.440	4.380 4.840 5.300 6.260	0.096 0.169 0.254 0.457
Sub6 Antenna - VZS01	A	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	4.700 4.988 5.284 5.897	1.844 2.067 2.297 2.777	0.087 0.116 0.150 0.228
Sub6 Antenna - VZS01	B	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	4.700 4.988 5.284 5.897	1.844 2.067 2.297 2.777	0.087 0.116 0.150 0.228
Sub6 Antenna - VZS01	C	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	4.700 4.988 5.284 5.897	1.844 2.067 2.297 2.777	0.087 0.116 0.150 0.228
CBC78T-DS-43-2X	A	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	0.368 0.446 0.531 0.723	0.512 0.605 0.705 0.927	0.021 0.027 0.035 0.057
CBC78T-DS-43-2X	B	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	0.368 0.446 0.531 0.723	0.512 0.605 0.705 0.927	0.021 0.027 0.035 0.057
CBC78T-DS-43-2X	C	From Face	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice	0.368 0.446 0.531	0.512 0.605 0.705	0.021 0.027 0.035

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
RFV01U-D2A	A	From Face	4.000 0' 0'	0.000	170'	2" Ice	0.723	0.927	0.057
						No Ice	1.875	1.013	0.070
						1/2" Ice	2.045	1.145	0.087
						1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
RFV01U-D2A	B	From Face	4.000 0' 0'	0.000	170'	No Ice	1.875	1.013	0.070
						1/2" Ice	2.045	1.145	0.087
						1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
						No Ice	1.875	1.013	0.070
RFV01U-D2A	C	From Face	4.000 0' 0'	0.000	170'	1/2" Ice	2.045	1.145	0.087
						1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
						No Ice	1.875	1.013	0.070
						1/2" Ice	2.045	1.145	0.087
RFV01U-D1A	A	From Face	4.000 0' 0'	0.000	170'	1" Ice	2.223	1.284	0.106
						2" Ice	2.601	1.585	0.153
						No Ice	1.875	1.250	0.084
						1/2" Ice	2.045	1.393	0.103
						1" Ice	2.223	1.543	0.124
RFV01U-D1A	B	From Face	4.000 0' 0'	0.000	170'	2" Ice	2.601	1.865	0.175
						No Ice	1.875	1.250	0.084
						1/2" Ice	2.045	1.393	0.103
						1" Ice	2.223	1.543	0.124
						2" Ice	2.601	1.865	0.175
RFV01U-D1A	C	From Face	4.000 0' 0'	0.000	170'	No Ice	1.875	1.250	0.084
						1/2" Ice	2.045	1.393	0.103
						1" Ice	2.223	1.543	0.124
						2" Ice	2.601	1.865	0.175
						No Ice	3.792	2.514	0.032
RVZDC-6627-PF-48	A	From Face	4.000 0' 0'	0.000	170'	1/2" Ice	4.044	2.727	0.063
						1" Ice	4.303	2.947	0.099
						2" Ice	4.844	3.417	0.181
						No Ice	39.970	39.970	2.396
						1/2" Ice	56.450	56.450	3.077
Sector Mount [SM 510-3]	C	None		0.000	170'	1" Ice	72.590	72.590	3.960
						2" Ice	104.060	104.060	6.296
						No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
8' x 2" Mount Pipe	A	From Face	4.000 0' 0'	0.000	170'	2" Ice	4.396	4.396	0.119
						No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
8' x 2" Mount Pipe	B	From Face	4.000 0' 0'	0.000	170'	No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
						No Ice	1.900	1.900	0.029
8' x 2" Mount Pipe	C	From Face	4.000 0' 0'	0.000	170'	1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
						No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
* MX08FRO665-20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
						No Ice	8.010	4.230	0.098
						1/2" Ice	8.520	4.690	0.184
						1" Ice	9.040	5.160	0.281
MX08FRO665-20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	2" Ice	10.110	6.120	0.512
						No Ice	8.010	4.230	0.098
						1/2" Ice	8.520	4.690	0.184
						1" Ice	9.040	5.160	0.281
						2" Ice	10.110	6.120	0.512
MX08FRO665-20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	8.010	4.230	0.098
						1/2" Ice	8.520	4.690	0.184
						1" Ice	9.040	5.160	0.281
						2" Ice	10.110	6.120	0.512
						No Ice	8.010	4.230	0.098

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
TA08025-B604	A	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	10.110 1.964 2.138 2.320 2.705	6.120 0.981 1.112 1.250 1.548	0.512 0.064 0.081 0.100 0.148
TA08025-B604	B	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.964 1.964 2.138 2.320 2.705	0.981 0.981 1.112 1.250 1.548	0.064 0.064 0.081 0.100 0.148
TA08025-B604	C	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.705 1.964 2.138 2.320 2.705	1.548 0.981 1.112 1.250 1.548	0.148 0.064 0.081 0.100 0.148
TA08025-B605	A	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.705 1.964 2.138 2.320 2.705	1.548 1.129 1.267 1.411 1.723	0.148 0.075 0.093 0.114 0.164
TA08025-B605	B	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	1.723 1.964 2.138 2.320 2.705	1.129 1.129 1.267 1.411 1.723	0.164 0.075 0.093 0.114 0.164
TA08025-B605	C	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.705 1.964 2.138 2.320 2.705	1.723 1.129 1.267 1.411 1.723	0.164 0.075 0.093 0.114 0.164
RDIDC-9181-PF-48	A	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.705 2.012 2.189 2.373 2.763	1.723 1.168 1.311 1.461 1.784	0.164 0.022 0.040 0.060 0.110
Commscope MTC3975083	C	None		0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	2.763 23.850 34.120 44.390 64.930	1.784 23.850 34.120 44.390 64.930	0.110 1.260 1.800 2.340 3.420
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	64.930 1.900 2.728 3.401 4.396	64.930 1.900 2.728 3.401 4.396	3.420 0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	4.396 1.900 2.728 3.401 4.396	4.396 1.900 2.728 3.401 4.396	0.119 0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	4.396 1.900 2.728 3.401 4.396	4.396 1.900 2.728 3.401 4.396	0.119 0.029 0.044 0.063 0.119
*									
*									
(2) 7770.00	A	From Leg	4.000 0' 1'	0.000	135'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	4.396 5.508 5.867 6.233 6.986	4.396 2.928 3.273 3.625 4.352	0.119 0.035 0.068 0.105 0.195
(2) 7770.00	B	From Leg	4.000 0' 1'	0.000	135'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	6.986 5.508 5.867 6.233 6.986	4.352 2.928 3.273 3.625 4.352	0.195 0.035 0.068 0.105 0.195
(2) 7770.00	C	From Leg	4.000 0'	0.000	135'	2" Ice No Ice 1/2" Ice	6.986 5.508 5.867	4.352 2.928 3.273	0.195 0.035 0.068

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			Chinmaya

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
			1'			1" Ice 6.233	3.625	0.105
						2" Ice 6.986	4.352	0.195
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0'	0.000	135'	No Ice 4.630	3.270	0.074
			1'			1/2" Ice 5.060	3.690	0.133
						1" Ice 5.510	4.120	0.203
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000 0'	0.000	135'	2" Ice 6.430	5.000	0.376
			1'			No Ice 4.630	3.270	0.074
						1/2" Ice 5.060	3.690	0.133
						1" Ice 5.510	4.120	0.203
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0'	0.000	135'	2" Ice 6.430	5.000	0.376
			1'			No Ice 5.660	4.010	0.076
						1/2" Ice 6.210	4.530	0.135
						1" Ice 6.760	5.060	0.206
(2) LGP21401	A	From Leg	4.000 0'	0.000	135'	2" Ice 7.900	6.150	0.380
			0'			No Ice 1.104	0.207	0.014
						1/2" Ice 1.239	0.274	0.021
						1" Ice 1.381	0.348	0.030
(2) LGP21401	B	From Leg	4.000 0'	0.000	135'	2" Ice 1.688	0.521	0.055
			0'			No Ice 1.104	0.207	0.014
						1/2" Ice 1.239	0.274	0.021
						1" Ice 1.381	0.348	0.030
(2) LGP21401	C	From Leg	4.000 0'	0.000	135'	2" Ice 1.688	0.521	0.055
			0'			No Ice 1.104	0.207	0.014
						1/2" Ice 1.239	0.274	0.021
						1" Ice 1.381	0.348	0.030
(2) LGP21901	A	From Leg	4.000 0'	0.000	135'	2" Ice 1.688	0.521	0.055
			0'			No Ice 0.231	0.158	0.006
						1/2" Ice 0.294	0.213	0.008
						1" Ice 0.365	0.276	0.011
(2) LGP21901	B	From Leg	4.000 0'	0.000	135'	2" Ice 0.528	0.423	0.022
			0'			No Ice 0.231	0.158	0.006
						1/2" Ice 0.294	0.213	0.008
						1" Ice 0.365	0.276	0.011
(2) LGP21901	C	From Leg	4.000 0'	0.000	135'	2" Ice 0.528	0.423	0.022
			0'			No Ice 0.231	0.158	0.006
						1/2" Ice 0.294	0.213	0.008
						1" Ice 0.365	0.276	0.011
RRUS-11	A	From Leg	4.000 0'	0.000	135'	2" Ice 0.528	0.423	0.022
			0'			No Ice 2.784	1.187	0.048
						1/2" Ice 2.992	1.334	0.068
						1" Ice 3.207	1.490	0.092
RRUS-11	B	From Leg	4.000 0'	0.000	135'	2" Ice 3.658	1.833	0.150
			0'			No Ice 2.784	1.187	0.048
						1/2" Ice 2.992	1.334	0.068
						1" Ice 3.207	1.490	0.092
RRUS-11	C	From Leg	4.000 0'	0.000	135'	2" Ice 3.658	1.833	0.150
			0'			No Ice 2.784	1.187	0.048
						1/2" Ice 2.992	1.334	0.068
						1" Ice 3.207	1.490	0.092
DC6-48-60-18-8F	C	From Leg	4.000 0'	0.000	135'	2" Ice 3.658	1.833	0.150
			0'			No Ice 1.212	1.212	0.033
						1/2" Ice 1.892	1.892	0.055
						1" Ice 2.105	2.105	0.080
Sector Mount [SM 402-3]	C	None		0.000	135'	2" Ice 2.570	2.570	0.138
						No Ice 18.870	18.870	0.851
						1/2" Ice 26.470	26.470	1.210
						1" Ice 33.990	33.990	1.696

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
					2" Ice	48.840	48.840	3.044
*								

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service

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Comb. No.	Description
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service
51	1.2 Dead+1.0 Ev+1.0 Eh 0 deg
52	0.9 Dead-1.0 Ev+1.0 Eh 0 deg
53	1.2 Dead+1.0 Ev+1.0 Eh 30 deg
54	0.9 Dead-1.0 Ev+1.0 Eh 30 deg
55	1.2 Dead+1.0 Ev+1.0 Eh 60 deg
56	0.9 Dead-1.0 Ev+1.0 Eh 60 deg
57	1.2 Dead+1.0 Ev+1.0 Eh 90 deg
58	0.9 Dead-1.0 Ev+1.0 Eh 90 deg
59	1.2 Dead+1.0 Ev+1.0 Eh 120 deg
60	0.9 Dead-1.0 Ev+1.0 Eh 120 deg
61	1.2 Dead+1.0 Ev+1.0 Eh 150 deg
62	0.9 Dead-1.0 Ev+1.0 Eh 150 deg
63	1.2 Dead+1.0 Ev+1.0 Eh 180 deg
64	0.9 Dead-1.0 Ev+1.0 Eh 180 deg
65	1.2 Dead+1.0 Ev+1.0 Eh 210 deg
66	0.9 Dead-1.0 Ev+1.0 Eh 210 deg
67	1.2 Dead+1.0 Ev+1.0 Eh 240 deg
68	0.9 Dead-1.0 Ev+1.0 Eh 240 deg
69	1.2 Dead+1.0 Ev+1.0 Eh 270 deg
70	0.9 Dead-1.0 Ev+1.0 Eh 270 deg
71	1.2 Dead+1.0 Ev+1.0 Eh 300 deg
72	0.9 Dead-1.0 Ev+1.0 Eh 300 deg
73	1.2 Dead+1.0 Ev+1.0 Eh 330 deg
74	0.9 Dead-1.0 Ev+1.0 Eh 330 deg

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	170 - 160	Leg	Max Tension	15	4.308	-0.064	-0.016
			Max. Compression	10	-7.829	-0.034	-0.021
			Max. Mx	16	3.062	-0.083	-0.010
			Max. My	4	-2.003	-0.047	0.097
			Max. Vy	20	1.696	0.000	0.000
			Max. Vx	2	1.695	0.000	0.000
		Diagonal	Max Tension	12	2.529	0.000	0.000
			Max. Compression	12	-2.555	0.000	0.000
			Max. Mx	32	0.273	0.034	0.000
			Max. My	16	-2.316	0.008	0.001
			Max. Vy	32	-0.031	0.034	0.000
			Max. Vx	16	-0.000	0.012	0.001
		Top Girt	Max Tension	11	0.923	0.000	0.000
			Max. Compression	14	-0.958	0.000	0.000
			Max. Mx	26	-0.078	-0.122	0.000
			Max. Vy	26	-0.057	0.000	0.000
T2	160 - 140	Leg	Max Tension	15	20.266	-0.064	0.071
			Max. Compression	2	-27.030	0.048	-0.070
			Max. Mx	14	12.920	0.433	0.074
			Max. My	20	-3.358	-0.012	0.456
			Max. Vy	14	0.585	-0.340	0.074
			Max. Vx	4	0.597	-0.019	-0.330
		Diagonal	Max Tension	24	4.161	0.000	0.000

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	140 - 120	Top Girt	Max. Compression	24	-4.270	0.000	0.000
			Max. Mx	32	0.278	0.061	0.008
			Max. My	33	-0.925	0.051	0.009
			Max. Vy	32	0.047	0.055	0.008
			Max. Vx	33	-0.003	0.000	0.000
			Max Tension	3	0.157	0.000	0.000
			Max. Compression	14	-0.212	0.000	0.000
			Max. Mx	26	-0.077	-0.121	0.000
			Max. My	26	-0.077	0.000	0.004
			Max. Vy	26	0.056	0.000	0.000
			Max. Vx	26	0.002	0.000	0.000
			Max Tension	15	42.904	0.038	0.080
		Leg	Max. Compression	2	-53.841	0.229	-0.078
			Max. Mx	3	-34.714	0.494	-0.065
			Max. My	24	-4.488	-0.002	-0.567
			Max. Vy	22	0.599	-0.492	-0.018
			Max. Vx	4	0.588	-0.008	-0.377
			Max Tension	24	5.718	0.000	0.000
			Max. Compression	24	-5.678	0.000	0.000
			Max. Mx	32	0.558	0.088	0.011
			Max. My	34	0.976	0.084	0.012
			Max. Vy	28	0.056	0.084	-0.012
			Max. Vx	34	-0.003	0.000	0.000
			Max Tension	15	67.081	-0.153	0.057
T4	120 - 100	Leg	Max. Compression	2	-81.847	0.322	-0.125
			Max. Mx	3	-80.127	0.324	-0.125
			Max. My	4	-8.065	-0.011	-0.422
			Max. Vy	22	0.079	-0.296	-0.050
			Max. Vx	3	0.158	-0.174	-0.402
			Max Tension	24	6.708	0.000	0.000
			Max. Compression	24	-6.764	0.000	0.000
			Max. Mx	31	1.031	0.118	0.014
			Max. My	33	-1.303	0.105	0.016
			Max. Vy	29	0.074	0.116	-0.015
			Max. Vx	33	-0.004	0.000	0.000
			Max Tension	15	89.127	-0.321	0.156
		Diagonal	Max. Compression	2	-107.884	0.586	-0.177
			Max. Mx	2	-107.884	0.586	-0.177
			Max. My	4	-8.939	-0.042	-0.576
			Max. Vy	18	-0.121	0.558	0.029
			Max. Vx	2	0.194	-0.204	-0.552
			Max Tension	24	8.106	0.000	0.000
			Max. Compression	24	-8.197	0.000	0.000
			Max. Mx	29	1.155	0.187	0.025
			Max. My	27	0.952	0.184	-0.027
			Max. Vy	29	0.096	0.187	0.025
			Max. Vx	27	0.005	0.000	0.000
			T5	100 - 80	Leg	Max Tension	15
Max. Compression	2	-136.930				0.627	-0.133
Max. Mx	2	-136.930				0.627	-0.133
Max. My	4	-10.886				-0.057	-0.789
Max. Vy	18	-0.118				0.596	0.018
Max. Vx	2	0.201				-0.307	-0.740
Max Tension	24	9.176				0.000	0.000
Max. Compression	24	-9.274				0.000	0.000
Max. Mx	31	1.885				0.275	-0.034
Max. My	27	1.066				0.265	-0.038
Max. Vy	29	0.129				0.270	0.035
Max. Vx	27	0.007				0.000	0.000
Diagonal	Max Tension	15			136.579	-0.521	0.127
	Max. Compression	2			-165.948	0.683	-0.107
T6	80 - 60	Leg					
		Diagonal					
T7	60 - 40	Leg					
		Diagonal					

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T8	40 - 20	Diagonal	Max. Mx	33	5.787	-1.446	0.053
			Max. My	4	-14.384	0.019	-0.693
			Max. Vy	37	0.251	-1.442	-0.026
			Max. Vx	2	0.174	-0.319	-0.626
			Max Tension	24	9.639	0.000	0.000
			Max. Compression	24	-9.720	0.000	0.000
			Max. Mx	29	0.714	0.321	0.039
			Max. My	33	-1.885	0.285	0.046
			Max. Vy	29	0.140	0.308	0.043
			Max. Vx	33	-0.008	0.000	0.000
		Leg	Max Tension	15	159.763	-0.897	0.086
			Max. Compression	2	-195.059	1.357	-0.153
			Max. Mx	33	6.481	-4.075	0.049
			Max. My	4	-16.306	-0.102	-1.178
			Max. Vy	37	0.697	-4.039	-0.023
			Max. Vx	4	-0.216	-0.102	-1.178
			Max Tension	24	10.603	0.000	0.000
			Max. Compression	2	-10.877	0.000	0.000
			Max. Mx	29	0.336	0.386	0.042
			Max. My	33	2.598	0.326	0.048
T9	20 - 0	Leg	Max. Vy	29	0.147	0.386	0.042
			Max. Vx	33	-0.008	0.000	0.000
			Max Tension	15	182.601	-0.944	0.123
			Max. Compression	2	-224.423	0.000	0.000
			Max. Mx	27	-82.034	4.218	0.048
			Max. My	4	-19.113	-0.163	-2.069
			Max. Vy	37	-0.835	-4.039	-0.023
			Max. Vx	4	-0.363	-0.163	-2.069
		Diagonal	Max Tension	24	11.461	0.000	0.000
			Max. Compression	2	-12.035	0.000	0.000
			Max. Mx	28	-1.505	0.516	0.048
			Max. My	27	4.593	0.320	-0.059
			Max. Vy	28	0.169	0.516	0.048
			Max. Vx	27	0.009	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	210.458	23.362	-13.027
	Max. H _x	18	210.458	23.362	-13.027
	Max. H _z	5	-166.715	-18.792	10.932
	Min. Vert	7	-171.252	-19.380	10.772
	Min. H _x	7	-171.252	-19.380	10.772
	Min. H _z	18	210.458	23.362	-13.027
Leg B	Max. Vert	10	213.201	-22.603	-13.885
	Max. H _x	23	-166.039	18.534	11.481
	Max. H _z	25	-162.014	16.947	13.535
	Min. Vert	23	-166.039	18.534	11.481
	Min. H _x	10	213.201	-22.603	-13.885
	Min. H _z	12	197.462	-19.468	-15.045
Leg A	Max. Vert	2	231.822	1.952	29.245
	Max. H _x	20	18.312	3.735	1.649
	Max. H _z	2	231.822	1.952	29.245
	Min. Vert	15	-188.257	-1.866	-24.587
	Min. H _x	11	-82.861	-3.742	-11.192

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H _z	15	-188.257	-1.866	-24.587

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	45.138	0.000	0.000	-2.622	-47.362	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	54.166	-0.014	-47.376	-4628.192	-54.414	82.398
0.9 Dead+1.0 Wind 0 deg - No Ice	40.624	-0.014	-47.376	-4627.405	-40.205	82.398
1.2 Dead+1.0 Wind 30 deg - No Ice	54.166	22.702	-39.333	-3868.685	-2287.486	79.705
0.9 Dead+1.0 Wind 30 deg - No Ice	40.624	22.702	-39.333	-3867.898	-2273.277	79.705
1.2 Dead+1.0 Wind 60 deg - No Ice	54.166	34.657	-20.001	-1983.288	-3489.445	16.347
0.9 Dead+1.0 Wind 60 deg - No Ice	40.624	34.657	-20.001	-1982.501	-3475.236	16.347
1.2 Dead+1.0 Wind 90 deg - No Ice	54.166	37.598	0.014	-0.725	-3786.941	-25.180
0.9 Dead+1.0 Wind 90 deg - No Ice	40.624	37.598	0.014	0.061	-3772.732	-25.180
1.2 Dead+1.0 Wind 120 deg - No Ice	54.166	36.887	21.304	2086.385	-3674.073	-30.143
0.9 Dead+1.0 Wind 120 deg - No Ice	40.624	36.887	21.304	2087.172	-3659.865	-30.143
1.2 Dead+1.0 Wind 150 deg - No Ice	54.166	22.468	38.901	3832.022	-2272.748	-60.622
0.9 Dead+1.0 Wind 150 deg - No Ice	40.624	22.468	38.901	3832.809	-2258.539	-60.622
1.2 Dead+1.0 Wind 180 deg - No Ice	54.166	0.014	44.230	4368.269	-59.256	-82.398
0.9 Dead+1.0 Wind 180 deg - No Ice	40.624	0.014	44.230	4369.055	-45.047	-82.398
1.2 Dead+1.0 Wind 210 deg - No Ice	54.166	-22.702	39.333	3862.392	2173.816	-79.705
0.9 Dead+1.0 Wind 210 deg - No Ice	40.624	-22.702	39.333	3863.178	2188.025	-79.705
1.2 Dead+1.0 Wind 240 deg - No Ice	54.166	-37.382	21.574	2103.810	3595.426	-16.347
0.9 Dead+1.0 Wind 240 deg - No Ice	40.624	-37.382	21.574	2104.597	3609.635	-16.347
1.2 Dead+1.0 Wind 270 deg - No Ice	54.166	-37.598	-0.014	-5.568	3673.271	25.180
0.9 Dead+1.0 Wind 270 deg - No Ice	40.624	-37.598	-0.014	-4.781	3687.480	25.180
1.2 Dead+1.0 Wind 300 deg - No Ice	54.166	-34.162	-19.731	-1965.863	3340.753	30.143
0.9 Dead+1.0 Wind 300 deg - No Ice	40.624	-34.162	-19.731	-1965.077	3354.962	30.143
1.2 Dead+1.0 Wind 330 deg - No Ice	54.166	-22.468	-38.901	-3838.315	2159.078	60.622
0.9 Dead+1.0 Wind 330 deg - No Ice	40.624	-22.468	-38.901	-3837.528	2173.287	60.622
1.2 Dead+1.0 Ice+1.0 Temp	121.983	0.000	0.000	5.307	-172.392	0.000

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	121.983	-0.002	-11.246	-1106.875	-172.001	22.177
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	121.983	5.269	-9.128	-903.521	-696.916	17.138
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	121.983	8.285	-4.782	-473.946	-1002.938	3.130
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	121.983	9.194	0.002	5.697	-1095.542	-6.386
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	121.983	8.573	4.951	498.449	-1026.214	-9.814
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	121.983	5.230	9.057	909.099	-694.459	-15.943
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	121.983	0.002	10.830	1084.798	-172.782	-22.177
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	121.983	-5.269	9.128	914.136	352.133	-17.138
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	121.983	-8.644	4.989	500.907	686.467	-3.130
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	121.983	-9.194	-0.002	4.917	750.759	6.386
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	121.983	-8.213	-4.743	-471.489	653.118	9.814
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	121.983	-5.230	-9.057	-898.485	349.676	15.943
Dead+Wind 0 deg - Service	45.138	-0.003	-10.855	-1050.617	-46.820	18.460
Dead+Wind 30 deg - Service	45.138	5.206	-9.020	-878.850	-553.002	17.863
Dead+Wind 60 deg - Service	45.138	7.972	-4.601	-452.090	-826.515	3.666
Dead+Wind 90 deg - Service	45.138	8.662	0.003	-2.079	-894.686	-5.637
Dead+Wind 120 deg - Service	45.138	8.472	4.893	471.374	-867.914	-6.742
Dead+Wind 150 deg - Service	45.138	5.154	8.924	866.796	-549.697	-13.574
Dead+Wind 180 deg - Service	45.138	0.003	10.150	988.502	-47.905	-18.460
Dead+Wind 210 deg - Service	45.138	-5.206	9.020	873.606	458.277	-17.863
Dead+Wind 240 deg - Service	45.138	-8.583	4.953	475.282	781.042	-3.666
Dead+Wind 270 deg - Service	45.138	-8.662	-0.003	-3.165	799.961	5.637
Dead+Wind 300 deg - Service	45.138	-7.861	-4.540	-448.183	723.937	6.742
Dead+Wind 330 deg - Service	45.138	-5.154	-8.924	-872.040	454.972	13.574
1.2 Dead+1.0 Ev+1.0 Eh 0 deg	56.416	0.000	-3.751	-436.711	-56.835	0.000
0.9 Dead-1.0 Ev+1.0 Eh 0 deg	38.374	0.000	-3.751	-435.924	-42.626	0.000
1.2 Dead+1.0 Ev+1.0 Eh 30 deg	56.416	1.875	-3.248	-378.624	-273.617	0.000
0.9 Dead-1.0 Ev+1.0 Eh 30 deg	38.374	1.875	-3.248	-377.838	-259.408	0.000
1.2 Dead+1.0 Ev+1.0 Eh 60 deg	56.416	3.248	-1.875	-219.929	-432.313	0.000
0.9 Dead-1.0 Ev+1.0 Eh 60 deg	38.374	3.248	-1.875	-219.142	-418.104	0.000
1.2 Dead+1.0 Ev+1.0 Eh 90 deg	56.416	3.751	0.000	-3.147	-490.399	0.000
0.9 Dead-1.0 Ev+1.0 Eh 90 deg	38.374	3.751	0.000	-2.360	-476.190	0.000
1.2 Dead+1.0 Ev+1.0 Eh 120 deg	56.416	3.248	1.875	213.636	-432.313	0.000
0.9 Dead-1.0 Ev+1.0 Eh 120 deg	38.374	3.248	1.875	214.422	-418.104	0.000
1.2 Dead+1.0 Ev+1.0 Eh 150 deg	56.416	1.875	3.248	372.331	-273.617	0.000
0.9 Dead-1.0 Ev+1.0 Eh 150 deg	38.374	1.875	3.248	373.118	-259.408	0.000
1.2 Dead+1.0 Ev+1.0 Eh 180 deg	56.416	0.000	3.751	430.418	-56.835	0.000
0.9 Dead-1.0 Ev+1.0 Eh 180 deg	38.374	0.000	3.751	431.204	-42.626	0.000
1.2 Dead+1.0 Ev+1.0 Eh 210 deg	56.416	-1.875	3.248	372.331	159.947	-0.000
0.9 Dead-1.0 Ev+1.0 Eh 210 deg	38.374	-1.875	3.248	373.118	174.156	-0.000
1.2 Dead+1.0 Ev+1.0 Eh 240	56.416	-3.248	1.875	213.636	318.643	-0.000

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
deg						
0.9 Dead-1.0 Ev+1.0 Eh 240	38.374	-3.248	1.875	214.422	332.852	-0.000
deg						
1.2 Dead+1.0 Ev+1.0 Eh 270	56.416	-3.751	0.000	-3.147	376.729	-0.000
deg						
0.9 Dead-1.0 Ev+1.0 Eh 270	38.374	-3.751	0.000	-2.360	390.938	-0.000
deg						
1.2 Dead+1.0 Ev+1.0 Eh 300	56.416	-3.248	-1.875	-219.929	318.643	-0.000
deg						
0.9 Dead-1.0 Ev+1.0 Eh 300	38.374	-3.248	-1.875	-219.142	332.852	-0.000
deg						
1.2 Dead+1.0 Ev+1.0 Eh 330	56.416	-1.875	-3.248	-378.624	159.947	-0.000
deg						
0.9 Dead-1.0 Ev+1.0 Eh 330	38.374	-1.875	-3.248	-377.838	174.156	-0.000
deg						

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-45.138	0.000	-0.000	45.138	-0.000	0.000%
2	-0.014	-54.166	-47.376	0.014	54.166	47.376	0.000%
3	-0.014	-40.624	-47.376	0.014	40.624	47.376	0.000%
4	22.702	-54.166	-39.333	-22.702	54.166	39.333	0.000%
5	22.702	-40.624	-39.333	-22.702	40.624	39.333	0.000%
6	34.657	-54.166	-20.001	-34.657	54.166	20.001	0.000%
7	34.657	-40.624	-20.001	-34.657	40.624	20.001	0.000%
8	37.598	-54.166	0.014	-37.598	54.166	-0.014	0.000%
9	37.598	-40.624	0.014	-37.598	40.624	-0.014	0.000%
10	36.887	-54.166	21.304	-36.887	54.166	-21.304	0.000%
11	36.887	-40.624	21.304	-36.887	40.624	-21.304	0.000%
12	22.468	-54.166	38.901	-22.468	54.166	-38.901	0.000%
13	22.468	-40.624	38.901	-22.468	40.624	-38.901	0.000%
14	0.014	-54.166	44.230	-0.014	54.166	-44.230	0.000%
15	0.014	-40.624	44.230	-0.014	40.624	-44.230	0.000%
16	-22.702	-54.166	39.333	22.702	54.166	-39.333	0.000%
17	-22.702	-40.624	39.333	22.702	40.624	-39.333	0.000%
18	-37.382	-54.166	21.574	37.382	54.166	-21.574	0.000%
19	-37.382	-40.624	21.574	37.382	40.624	-21.574	0.000%
20	-37.598	-54.166	-0.014	37.598	54.166	0.014	0.000%
21	-37.598	-40.624	-0.014	37.598	40.624	0.014	0.000%
22	-34.162	-54.166	-19.731	34.162	54.166	19.731	0.000%
23	-34.162	-40.624	-19.731	34.162	40.624	19.731	0.000%
24	-22.468	-54.166	-38.901	22.468	54.166	38.901	0.000%
25	-22.468	-40.624	-38.901	22.468	40.624	38.901	0.000%
26	0.000	-121.983	0.000	-0.000	121.983	-0.000	0.000%
27	-0.002	-121.983	-11.246	0.002	121.983	11.246	0.000%
28	5.269	-121.983	-9.128	-5.269	121.983	9.128	0.000%
29	8.285	-121.983	-4.782	-8.285	121.983	4.782	0.000%
30	9.194	-121.983	0.002	-9.194	121.983	-0.002	0.000%
31	8.573	-121.983	4.951	-8.573	121.983	-4.951	0.000%
32	5.230	-121.983	9.057	-5.230	121.983	-9.057	0.000%
33	0.002	-121.983	10.830	-0.002	121.983	-10.830	0.000%
34	-5.269	-121.983	9.128	5.269	121.983	-9.128	0.000%
35	-8.644	-121.983	4.989	8.644	121.983	-4.989	0.000%
36	-9.194	-121.983	-0.002	9.194	121.983	0.002	0.000%
37	-8.213	-121.983	-4.743	8.213	121.983	4.743	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
38	-5.230	-121.983	-9.057	5.230	121.983	9.057	0.000%
39	-0.003	-45.138	-10.855	0.003	45.138	10.855	0.000%
40	5.206	-45.138	-9.020	-5.206	45.138	9.020	0.000%
41	7.972	-45.138	-4.601	-7.972	45.138	4.601	0.000%
42	8.662	-45.138	0.003	-8.662	45.138	-0.003	0.000%
43	8.472	-45.138	4.893	-8.472	45.138	-4.893	0.000%
44	5.154	-45.138	8.924	-5.154	45.138	-8.924	0.000%
45	0.003	-45.138	10.150	-0.003	45.138	-10.150	0.000%
46	-5.206	-45.138	9.020	5.206	45.138	-9.020	0.000%
47	-8.583	-45.138	4.953	8.583	45.138	-4.953	0.000%
48	-8.662	-45.138	-0.003	8.662	45.138	0.003	0.000%
49	-7.861	-45.138	-4.540	7.861	45.138	4.540	0.000%
50	-5.154	-45.138	-8.924	5.154	45.138	8.924	0.000%
51	0.000	-56.416	-3.751	-0.000	56.416	3.751	0.000%
52	0.000	-38.374	-3.751	-0.000	38.374	3.751	0.000%
53	1.875	-56.416	-3.248	-1.875	56.416	3.248	0.000%
54	1.875	-38.374	-3.248	-1.875	38.374	3.248	0.000%
55	3.248	-56.416	-1.875	-3.248	56.416	1.875	0.000%
56	3.248	-38.374	-1.875	-3.248	38.374	1.875	0.000%
57	3.751	-56.416	0.000	-3.751	56.416	-0.000	0.000%
58	3.751	-38.374	0.000	-3.751	38.374	0.000	0.000%
59	3.248	-56.416	1.875	-3.248	56.416	-1.875	0.000%
60	3.248	-38.374	1.875	-3.248	38.374	-1.875	0.000%
61	1.875	-56.416	3.248	-1.875	56.416	-3.248	0.000%
62	1.875	-38.374	3.248	-1.875	38.374	-3.248	0.000%
63	0.000	-56.416	3.751	-0.000	56.416	-3.751	0.000%
64	0.000	-38.374	3.751	-0.000	38.374	-3.751	0.000%
65	-1.875	-56.416	3.248	1.875	56.416	-3.248	0.000%
66	-1.875	-38.374	3.248	1.875	38.374	-3.248	0.000%
67	-3.248	-56.416	1.875	3.248	56.416	-1.875	0.000%
68	-3.248	-38.374	1.875	3.248	38.374	-1.875	0.000%
69	-3.751	-56.416	0.000	3.751	56.416	-0.000	0.000%
70	-3.751	-38.374	0.000	3.751	38.374	0.000	0.000%
71	-3.248	-56.416	-1.875	3.248	56.416	1.875	0.000%
72	-3.248	-38.374	-1.875	3.248	38.374	1.875	0.000%
73	-1.875	-56.416	-3.248	1.875	56.416	3.248	0.000%
74	-1.875	-38.374	-3.248	1.875	38.374	3.248	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 160	2.210	39	0.114	0.026
T2	160 - 140	1.968	39	0.112	0.026
T3	140 - 120	1.513	39	0.100	0.023
T4	120 - 100	1.110	39	0.083	0.019
T5	100 - 80	0.773	39	0.068	0.014
T6	80 - 60	0.501	39	0.053	0.011
T7	60 - 40	0.294	39	0.038	0.008
T8	40 - 20	0.145	39	0.025	0.005
T9	20 - 0	0.045	39	0.013	0.003

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Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
170'	Lightning Rod 1" x 5' on 5' Pole	39	2.210	0.114	0.026	241284
150'	CCISeismic (2) misc Side Lighting	39	1.735	0.107	0.025	98628
148'	MX08FRO665-20 w/ Mount Pipe	39	1.690	0.106	0.024	95156
145'	CCISeismic Tower Section 1	39	1.623	0.104	0.024	90382
144'	CCISeismic (2) andrew	39	1.600	0.103	0.024	88898
	LDF7-50A(1-5/8) From 8 to 148 (140ft to 148ft)					
135'	(2) 7770.00	39	1.407	0.096	0.022	78837
130'	CCISeismic Tower Section 2	39	1.304	0.092	0.021	74741
117'6"	CCISeismic Tower Section 3	39	1.064	0.081	0.018	68325
112'6"	CCISeismic Tower Section 4	39	0.976	0.077	0.017	69322
107'6"	CCISeismic Tower Section 5	39	0.891	0.073	0.016	70443
102'6"	CCISeismic Tower Section 6	39	0.811	0.069	0.015	71584
97'6"	CCISeismic Tower Section 7	39	0.735	0.066	0.014	72373
92'6"	CCISeismic Tower Section 8	39	0.663	0.062	0.013	72785
87'6"	CCISeismic Tower Section 9	39	0.595	0.059	0.012	73184
82'6"	CCISeismic Tower Section 10	39	0.532	0.055	0.011	73372
77'6"	CCISeismic Tower Section 11	39	0.472	0.052	0.011	74347
72'6"	CCISeismic Tower Section 12	39	0.416	0.048	0.010	76231
67'6"	CCISeismic Tower Section 13	39	0.365	0.044	0.009	78254
62'6"	CCISeismic Tower Section 14	39	0.317	0.040	0.009	80452
50'	CCISeismic Tower Section 15	39	0.213	0.031	0.007	94131
30'	CCISeismic Tower Section 16	39	0.088	0.019	0.004	84595
14'	CCISeismic (2) andrew	39	0.027	0.009	0.002	97411
	LDF7-50A(1-5/8) From 8 to 148 (8ft to 20ft)					
10'	CCISeismic Tower Section 17	39	0.018	0.007	0.001	136375

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	°	°
T1	170 - 160	9.817	3	0.503	0.116
T2	160 - 140	8.739	3	0.494	0.114
T3	140 - 120	6.706	3	0.444	0.102
T4	120 - 100	4.913	2	0.371	0.083
T5	100 - 80	3.415	2	0.300	0.064
T6	80 - 60	2.212	2	0.236	0.049
T7	60 - 40	1.297	2	0.169	0.037
T8	40 - 20	0.636	2	0.111	0.024
T9	20 - 0	0.198	2	0.057	0.011

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
170'	Lightning Rod 1" x 5' on 5' Pole	3	9.817	0.503	0.116	56299

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
150'	CCISeismic (2) miscel Side Lighting	3	7.697	0.474	0.110	23193
148'	MX08FRO665-20 w/ Mount Pipe	3	7.495	0.468	0.108	22404
145'	CCISeismic Tower Section 1	3	7.195	0.460	0.106	21317
144'	CCISeismic (2) andrew	3	7.096	0.457	0.105	20978
	LDF7-50A(1-5/8) From 8 to 148 (140ft to148ft)					
135'	(2) 7770.00	2	6.233	0.427	0.098	18528
130'	CCISeismic Tower Section 2	2	5.775	0.408	0.093	17471
117'6"	CCISeismic Tower Section 3	2	4.709	0.362	0.081	15676
112'6"	CCISeismic Tower Section 4	2	4.316	0.343	0.076	15838
107'6"	CCISeismic Tower Section 5	2	3.941	0.325	0.071	16026
102'6"	CCISeismic Tower Section 6	2	3.586	0.308	0.067	16215
97'6"	CCISeismic Tower Section 7	2	3.248	0.291	0.062	16332
92'6"	CCISeismic Tower Section 8	2	2.929	0.276	0.058	16373
87'6"	CCISeismic Tower Section 9	2	2.629	0.260	0.054	16411
82'6"	CCISeismic Tower Section 10	2	2.347	0.244	0.050	16458
77'6"	CCISeismic Tower Section 11	2	2.082	0.228	0.047	16690
72'6"	CCISeismic Tower Section 12	2	1.836	0.211	0.044	17126
67'6"	CCISeismic Tower Section 13	2	1.608	0.194	0.041	17593
62'6"	CCISeismic Tower Section 14	2	1.396	0.178	0.038	18101
50'	CCISeismic Tower Section 15	2	0.938	0.139	0.031	21196
30'	CCISeismic Tower Section 16	2	0.386	0.084	0.018	19108
14'	CCISeismic (2) andrew	2	0.120	0.040	0.008	22036
	LDF7-50A(1-5/8) From 8 to 148 (8ft to20ft)					
10'	CCISeismic Tower Section 17	2	0.080	0.029	0.005	30851

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	170	Leg	A325N	0.625	4	1.077	20.340	0.053	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	2.529	8.135	0.311	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.923	8.482	0.109	1.05	Member Bearing
T2	160	Leg	A325N	0.750	4	5.067	30.101	0.168	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	4.161	12.615	0.330	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.469	8.482	0.055	1.05	Member Bearing
T3	140	Leg	A325N	0.875	4	10.726	41.556	0.258	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	5.718	12.615	0.453	1.05	Member Bearing
T4	120	Leg	A325N	1.000	4	16.770	54.517	0.308	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	6.708	13.485	0.497	1.05	Gusset Bearing
T5	100	Leg	A325N	1.000	6	14.855	54.517	0.272	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	8.106	13.485	0.601	1.05	Gusset Bearing
T6	80	Leg	A325N	1.000	6	18.860	54.517	0.346	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.176	13.485	0.680	1.05	Gusset Bearing
T7	60	Leg	A325N	1.000	8	17.072	54.517	0.313	1.05	Bolt Tension

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T8	40	Diagonal	A325N	0.750	1	9.639	13.485	0.715 ✓	1.05	Gusset Bearing
		Leg	A325N	1.000	8	19.970	54.517	0.366 ✓	1.05	Bolt Tension
T9	20	Diagonal	A325N	0.750	1	10.603	13.485	0.786 ✓	1.05	Gusset Bearing
		Diagonal	A490N	0.750	1	11.461	13.485	0.850 ✓	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	ROHN 2.5 STD	10'	5'	63.3 K=1.00	1.704	-7.829	57.192	0.137 ¹ ✓
T2	160 - 140	ROHN 2.5 EH	20'13/32"	6'8-1/8"	86.7 K=1.00	2.254	-27.030	58.512	0.462 ¹ ✓
T3	140 - 120	ROHN 3 EH	20'7/16"	6'8-5/32"	70.5 K=1.00	3.016	-53.841	94.337	0.571 ¹ ✓
T4	120 - 100	ROHN 4 EH	20'13/32"	6'8-1/8"	54.3 K=1.00	4.407	-81.847	159.913	0.512 ¹ ✓
T5	100 - 80	ROHN 5 EH	20'7/16"	10'7/32"	65.4 K=1.00	6.112	-107.884	201.233	0.536 ¹ ✓
T6	80 - 60	ROHN 6 EHS	20'13/32"	10'7/32"	54.0 K=1.00	6.713	-136.930	244.063	0.561 ¹ ✓
T7	60 - 40	ROHN 6 EH	20'15/32"	10'7/32"	54.8 K=1.00	8.405	-165.948	303.714	0.546 ¹ ✓
T8	40 - 20	ROHN 8 EHS	20'13/32"	10'7/32"	41.2 K=1.00	9.719	-195.059	386.397	0.505 ¹ ✓
T9	20 - 0	ROHN 8 EHS	20'13/32"	10'7/32"	41.2 K=1.00	9.719	-224.423	386.397	0.581 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	L2x2x3/16	9'11-27/32"	4'8-3/4"	144.1 K=1.00	0.715	-2.555	9.859	0.259 ¹ ✓
T2	160 - 140	L2 1/2x2 1/2x1/4	12'3-23/32"	6'31/32"	148.6 K=1.00	1.190	-4.270	15.427	0.277 ¹ ✓

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	Client	Designed by
	Crown Castle	Chinmaya

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T3	140 - 120	L2 1/2x2 1/2x1/4	14'1-1/8' ,	6'11-5/16"	169.7 K=1.00	1.190	-5.678	11.834	0.480 ¹ ✓
T4	120 - 100	L3x3x1/4	15'10-13/16"	7'9-17/32"	158.0 K=1.00	1.440	-6.764	16.515	0.410 ¹ ✓
T5	100 - 80	L3 1/2x3 1/2x1/4	19'1-27/32"	9'5-11/16"	163.8 K=1.00	1.690	-8.197	18.021	0.455 ¹ ✓
T6	80 - 60	L4x4x5/16	20'10-27/32"	10'3-7/16"	156.1 K=1.00	2.400	-9.274	28.206	0.329 ¹ ✓
T7	60 - 40	L4x4x5/16	22'9-11/32"	11'2-15/16"	170.6 K=1.00	2.400	-9.720	23.603	0.412 ¹ ✓
T8	40 - 20	L4x4x5/16	24'7-1/2' ,	12'11/16"	182.9 K=1.00	2.400	-10.877	20.532	0.530 ¹ ✓
T9	20 - 0	L4x4x3/8	26'5-9/16"	12'11-3/4"	197.6 K=1.00	2.860	-12.035	20.956	0.574 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	L2 1/2x2 1/2x3/16	8'7-3/4"	8'1-7/8"	197.7 K=1.00	0.902	-0.958	6.603	0.145 ¹ ✓
T2	160 - 140	L2 1/2x2 1/2x3/16	8'7-3/4"	8'1-7/8"	197.7 K=1.00	0.902	-0.469	6.603	0.071 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	ROHN 2.5 STD	10'	5'	63.3	1.704	4.308	76.682	0.056 ¹ ✓
T2	160 - 140	ROHN 2.5 EH	20'13/32"	6'8-1/8"	86.7	2.254	20.266	101.409	0.200 ¹ ✓
T3	140 - 120	ROHN 3 EH	20'7/16"	6'8-5/32"	70.5	3.016	42.904	135.717	0.316 ¹ ✓
T4	120 - 100	ROHN 4 EH	20'13/32"	6'8-1/8"	54.3	4.407	67.081	198.335	0.338 ¹ ✓
T5	100 - 80	ROHN 5 EH	20'7/16"	10'7/32"	65.4	6.112	89.127	275.039	0.324 ¹ ✓

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	Crown Castle	Chinmaya

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T6	80 - 60	ROHN 6 EHS	20'13/32"	10'7/32"	54.0	6.713	113.158	302.097	0.375 ¹ ✓
T7	60 - 40	ROHN 6 EH	20'15/32"	10'7/32"	54.8	8.405	136.579	378.222	0.361 ¹ ✓
T8	40 - 20	ROHN 8 EHS	20'13/32"	10'7/32"	41.2	9.719	159.763	437.369	0.365 ¹ ✓
T9	20 - 0	ROHN 8 EHS	20'13/32"	10'7/32"	41.2	9.719	182.601	437.369	0.417 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	L2x2x3/16	9'11-27/32"	4'8-3/4"	94.4	0.431	2.529	18.739	0.135 ¹ ✓
T2	160 - 140	L2 1/2x2 1/2x1/4	12'3-23/32"	6'31/32"	97.0	0.728	4.161	31.687	0.131 ¹ ✓
T3	140 - 120	L2 1/2x2 1/2x1/4	14'1-1/8"	6'11-5/16"	110.4	0.728	5.718	31.687	0.180 ¹ ✓
T4	120 - 100	L3x3x1/4	15'10-13/16"	7'9-17/32"	102.3	0.916	6.708	44.652	0.150 ¹ ✓
T5	100 - 80	L3 1/2x3 1/2x1/4	19'1-27/32"	9'5-11/16"	105.8	1.103	8.106	53.793	0.151 ¹ ✓
T6	80 - 60	L4x4x5/16	20'10-27/32"	10'3-7/16"	100.9	1.595	9.176	77.752	0.118 ¹ ✓
T7	60 - 40	L4x4x5/16	22'9-11/32"	11'2-15/16"	110.1	1.595	9.639	77.752	0.124 ¹ ✓
T8	40 - 20	L4x4x5/16	24'7-1/2"	12'11/16"	118.0	1.595	10.603	77.752	0.136 ¹ ✓
T9	20 - 0	L4x4x3/8	26'5-9/16"	12'11-3/4"	127.9	1.899	11.461	92.572	0.124 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	170 - 160	L2 1/2x2 1/2x3/16	8'7-3/4"	8'1-7/8"	129.7	0.571	0.923	24.840	0.037 ¹ ✓
T2	160 - 140	L2 1/2x2 1/2x3/16	8'7-3/4"	8'1-7/8"	129.7	0.571	0.469	24.840	0.019 ¹ ✓

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	Crown Castle	Designed by
		Chinmaya

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
									✓

¹ P_u / φP_n controls

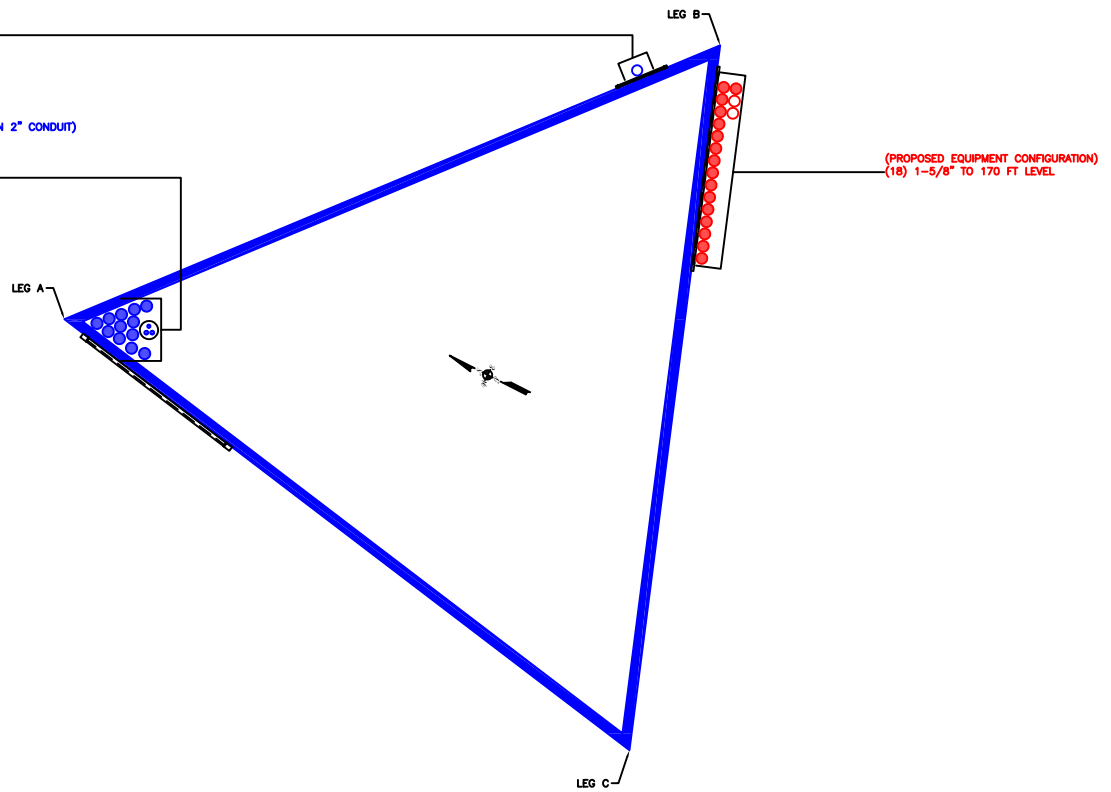
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail
T1	170 - 160	Leg	ROHN 2.5 STD	2	-7.829	60.052	13.0	Pass
T2	160 - 140	Leg	ROHN 2.5 EH	21	-27.030	61.437	44.0	Pass
T3	140 - 120	Leg	ROHN 3 EH	45	-53.841	99.054	54.4	Pass
T4	120 - 100	Leg	ROHN 4 EH	66	-81.847	167.909	48.7	Pass
T5	100 - 80	Leg	ROHN 5 EH	87	-107.884	211.295	51.1	Pass
T6	80 - 60	Leg	ROHN 6 EHS	102	-136.930	256.266	53.4	Pass
T7	60 - 40	Leg	ROHN 6 EH	117	-165.948	318.900	52.0	Pass
T8	40 - 20	Leg	ROHN 8 EHS	132	-195.059	405.717	48.1	Pass
T9	20 - 0	Leg	ROHN 8 EHS	147	-224.423	405.717	55.3	Pass
T1	170 - 160	Diagonal	L2x2x3/16	9	-2.555	10.352	24.7	Pass
T2	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	28	-4.270	16.198	26.4	Pass
T3	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	49	-5.678	12.425	45.7	Pass
T4	120 - 100	Diagonal	L3x3x1/4	70	-6.764	17.340	39.0	Pass
T5	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	91	-8.197	18.922	43.3	Pass
T6	80 - 60	Diagonal	L4x4x5/16	106	-9.274	29.616	31.3	Pass
T7	60 - 40	Diagonal	L4x4x5/16	121	-9.720	24.783	39.2	Pass
T8	40 - 20	Diagonal	L4x4x5/16	136	-10.877	21.559	50.5	Pass
T9	20 - 0	Diagonal	L4x4x3/8	151	-12.035	22.004	54.7	Pass
T1	170 - 160	Top Girt	L2 1/2x2 1/2x3/16	4	-0.958	6.934	13.8	Pass
T2	160 - 140	Top Girt	L2 1/2x2 1/2x3/16	23	-0.469	6.934	6.8	Pass
Summary								
Leg (T9)							55.3	Pass
Diagonal (T9)							54.7	Pass
Top Girt (T1)							13.8	Pass
Bolt Checks							80.9	Pass
RATING =							80.9	Pass

APPENDIX B
BASE LEVEL DRAWING

(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/2" TO 148 FT LEVEL

(OTHER CONSIDERED EQUIPMENT--IN 2" CONDUIT)
(1) 3/8" TO 135 FT LEVEL
(2) 7/16" TO 135 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-1/4" TO 135 FT LEVEL



BUSINESS UNIT: 807134

APPENDIX C
ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity



Site Info	
BU #	807134
Site Name	NHV 031B 943108, CT
Order #	552653, Rev 0

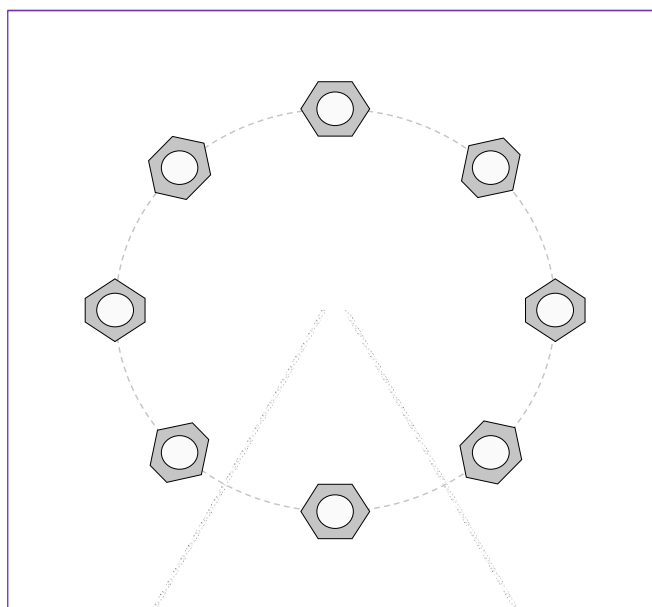
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	0

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	231.82	188.26
Shear Force (kips)	29.31	24.66

*TIA-222-H Section 15.5 Applied

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

*Anchor Rod Eccentricity Applied



Connection Properties

Analysis Results

Anchor Rod Data

(8) 1" ϕ bolts (A354-BC N; $F_y=109$ ksi, $F_u=125$ ksi)
 l_{ar} (in): 0

Anchor Rod Summary

(units of kips, kip-in)

$P_{u,t} = 23.53$	$\phi P_{n,t} = 56.81$	Stress Rating
$V_u = 3.08$	$\phi V_n = 36.82$	39.4%
$M_u = n/a$	$\phi M_n = n/a$	Pass

SST Unit Base Foundation



BU # : 807134
 Site Name: NHV 031B
 App. Number: 552653, Rev 0.

TIA-222 Revision: H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☐
Block Foundation?:	☒
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Global Moment, M :	4629	ft-kips
Global Axial, P :	54	kips
Global Shear, V :	47	kips
Leg Compression, P_{comp} :	232	kips
Leg Comp. Shear, V_{u,comp} :	29	kips
Leg Uplift, P_{uplift} :	188	kips
Leg Uplift. Shear, V_{u,uplift} :	25	kips
Tower Height, H :	170	ft
Base Face Width, BW :	25	ft
BP Dist. Above Fdn, bp_{dist} :	4	in
Anchor Bolt Circle, BC :	14	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	327.01	47.00	13.7%	Pass
<i>Bearing Pressure (ksf)</i>	60.00	1.83	2.9%	Pass
<i>Overturning (kip*ft)</i>	11156.47	4832.67	43.3%	Pass
<i>Pad Flexure (kip*ft)</i>	4757.68	947.45	19.0%	Pass
<i>Pad Shear - 1-way (kips)</i>	1464.43	127.02	8.3%	Pass
<i>Pad Shear - Comp 2-way (ksi)</i>	0.164	0.029	16.7%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	2499.77	0.00	0.0%	Pass
<i>Pad Shear - Tension 2-way (ksi)</i>	0.164	0.023	13.5%	Pass
<i>Flexural 2-way (Tension) (kip*ft)</i>	2499.77	0.00	0.0%	Pass

*Rating per TIA-222-H Section 15.5

Soil Rating*:	43.3%
Structural Rating*:	19.0%

Pad Properties		
Depth, D :	3.50	ft
Pad Width, W₁ :	34.00	ft
Pad Thickness, T :	4.00	ft
Pad Rebar Size (Bottom dir. 2), Sp₂ :	7	
Pad Rebar Quantity (Bottom dir. 2), mp₂ :	41	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, Fy :	60	ksi
Concrete Compressive Strength, F'c :	3	ksi
Dry Concrete Density, δc :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	170	pcf
Ultimate Gross Bearing, Qult :	80.000	ksf
Cohesion, Cu :		ksf
Friction Angle, φ :		degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.65	
Neglected Depth, N :	3.3	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw :	N/A	ft

<-- Toggle between Gross and Net

SST Unit Base Foundation



BU #: 807134
 Site Name: NHV 031B
 App. Number: 552653, Rev 0.

TIA-222 Revision: H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☐
Block Foundation?:	☒
Rectangular Pad?:	☐

***Service Wind Reactions

Superstructure Analysis Reactions		
Global Moment, M :	1052	ft-kips
Global Axial, P :	45	kips
Global Shear, V :	11	kips
Leg Compression, P_{comp} :	64	kips
Leg Comp. Shear, V_{u,comp} :	8	kips
Leg Uplift, P_{uplift} :	31	kips
Leg Uplift. Shear, V_{u,uplift} :	5	kips
Tower Height, H :	170	ft
Base Face Width, BW :	25	ft
BP Dist. Above Fdn, bp_{dist} :	4	in
Anchor Bolt Circle, BC :	14	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	323.72	11.00	3.2%	Pass
<i>Bearing Pressure (ksf)</i>	60.00	1.00	1.6%	Pass
<i>Overtuning (kip*ft)</i>	11044.63	1099.67	10.0%	Pass
<i>Pad Flexure (kip*ft)</i>	4757.68	253.83	5.1%	Pass
<i>Pad Shear - 1-way (kips)</i>	1464.43	33.90	2.2%	Pass
<i>Pad Shear - Comp 2-way (ksi)</i>	0.164	0.008	4.6%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	2499.77	0.00	0.0%	Pass
<i>Pad Shear - Tension 2-way (ksi)</i>	0.164	0.004	2.2%	Pass
<i>Flexural 2-way (Tension) (kip*ft)</i>	2499.77	0.00	0.0%	Pass

*Rating per TIA-222-H Section 15.5

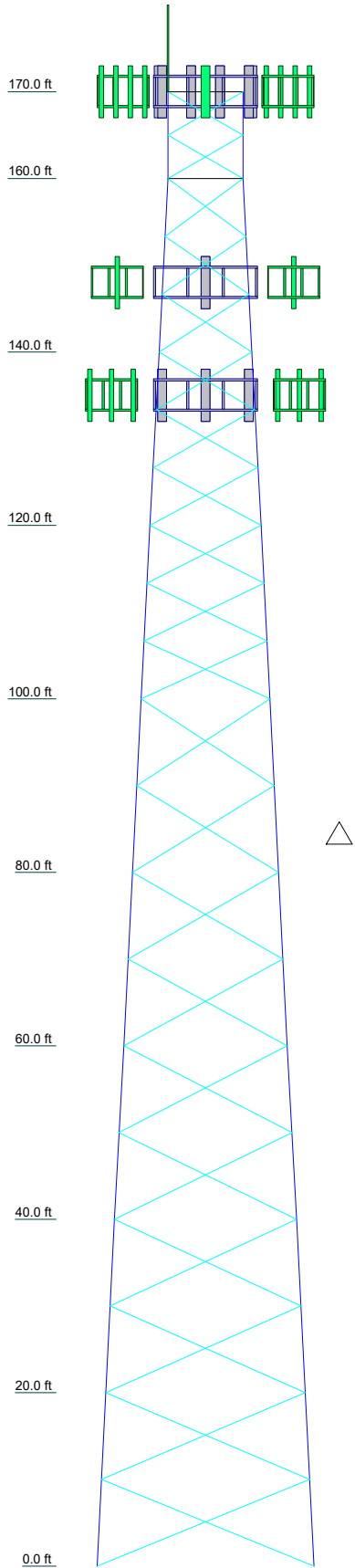
Pad Properties		
Depth, D :	3.50	ft
Pad Width, W₁ :	34.00	ft
Pad Thickness, T :	4.00	ft
Pad Rebar Size (Bottom dir. 2), Sp₂ :	7	
Pad Rebar Quantity (Bottom dir. 2), mp₂ :	41	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, Fy :	60	ksi
Concrete Compressive Strength, F'c :	3	ksi
Dry Concrete Density, δc :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	170	pcf
Ultimate Gross Bearing, Qult :	80.000	ksf
Cohesion, Cu :		ksf
Friction Angle, φ :		degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.65	
Neglected Depth, N :	3.3	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw :	N/A	ft

<-- Toggle between Gross and Net

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Legs	A	ROHN 2.5 EH	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS		
Leg Grade										
Diagonals	L2x2x3/16			L2 1/2x2 1/2x1/4	L3 1/2x3 1/2x1/4		L4x4x5/16		L4x4x3/8	
Diagonal Grade										
Top Girts										
Face Width (ft)	8.64583		10.6875	12.7604	14.7708	16.8542	18.8542	21	23	25
# Panels @ (ft)	2 @ 5		9 @ 6.66667				10 @ 10			
Weight (K)	0.6	1.5	1.7	2.4	2.7	3.5	4.1	4.6	5.3	26.2



SYMBOL LIST			
MARK	SIZE	MARK	SIZE
A	ROHN 2.5 STD		

MATERIAL STRENGTH					
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed in accordance with the TIA-222-H Standard.
3. Deflections are based upon a 60 mph wind.
4. Tower Risk Category II.
5. Topographic Category 1 with Crest Height of 0'
6. TIA-222-H Annex S
7. TOWER RATING: 10.9%

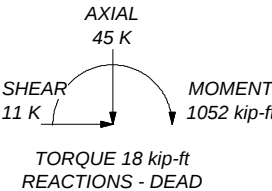
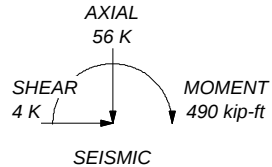
***Service Wind Reactions

ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 64 K
SHEAR: 8 K

UPLIFT: -31 K
SHEAR: 5 K



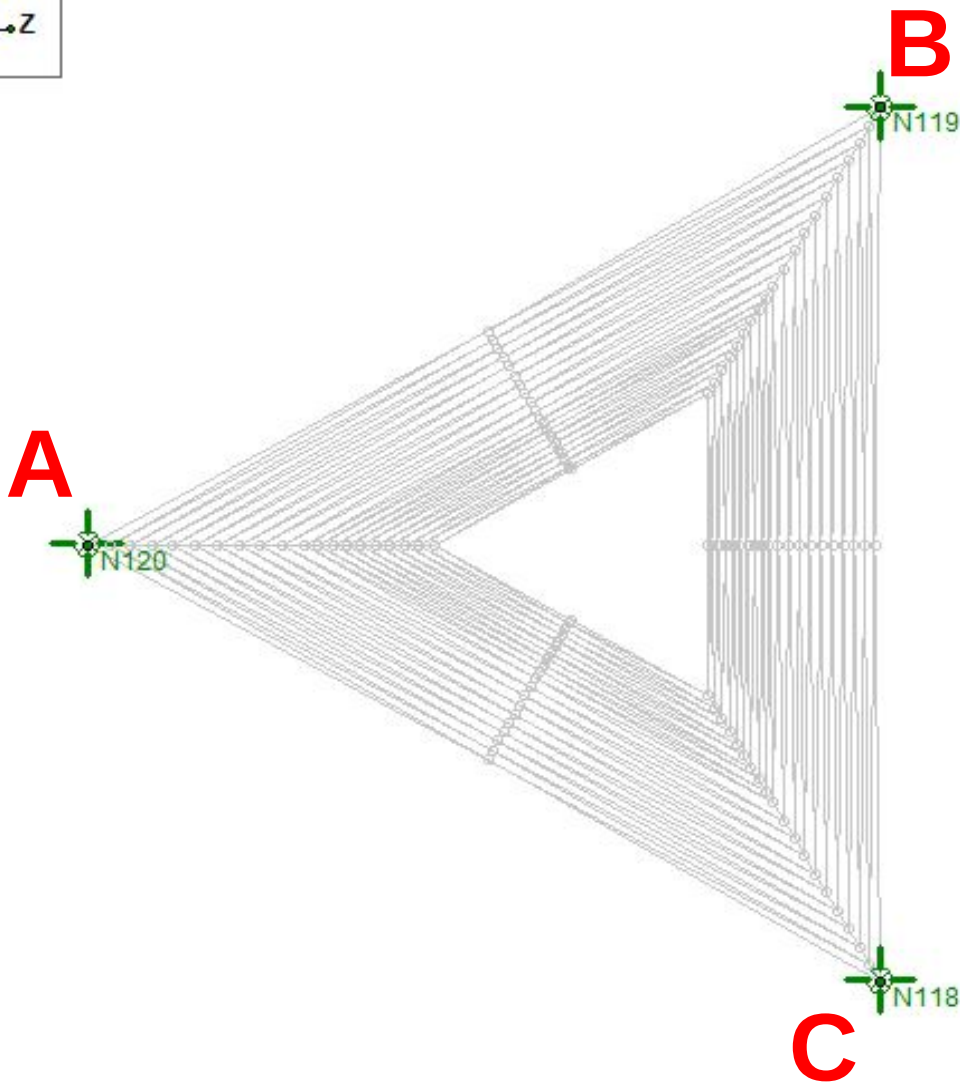
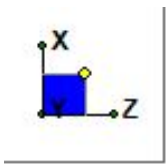


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Job: 150161.001.01 - NHV 031B 943108, CT (BU# 807134)			
Project:			
Client: Crown Castle		Drawn by: Chinmaya	App'd:
Code: TIA-222-H		Date: 04/29/21	Scale: NTS
Path:		Dwg No. E-1	

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N118	max	23.312	18	211.103	18	10.948	5	0	74	.005	16	0	74
2		min	-19.428	7	-171.719	7	-12.999	18	0	1	-.005	5	0	1
3	N119	max	18.575	23	213.857	10	13.592	25	0	74	.003	16	0	74
4		min	-22.556	10	-166.495	23	-14.991	12	0	1	-.003	5	0	1
5	N120	max	3.732	20	232.538	2	29.179	2	0	74	.005	17	0	74
6		min	-3.758	11	-188.766	15	-24.654	15	0	1	-.005	4	0	1
7	Totals:	max	37.598	21	121.982	35	47.376	3						
8		min	-37.598	8	38.376	52	-44.23	14						



CONCRETE BREAKOUT CHECK

BU#: 807134

Site Name: NHV 031B 943108, CT

Project Number: 552653, Rev 0.



LEG A

Inputs	
Anchor Rod diameter (db)	1 in
Bolt Circle of Anchor rods (B.C)	14 in
Anchor rod embedment (hef)	68 in
Number of Anchor rods	8
Uplift Reaction (LC-7)	188.766 Kips
Service Wind Moment (Demand pad flexure)	253.83 K-ft
Compressive Strength of Concrete (fc')	3000 Psi
Pad Width (B)	408 in
Pad thickness (D)	48 in

Foundation Breakout

(Per ACI 318-14)

Asumption Bolt template plate edge distance, $1.5 \times d_b = 1.5$ in

There are 2 edges, total edge distance is, $1.5 \times d_b \times 2 = 3$ in

ACI 318-14 Breakout-----

$S_1 = S_2 = \text{Bolt circle of anchor} + \text{total edge dist} = 17$ in

Anchor Pull out Strength

Nut distance across flats 1.625 in

Nut Bearing Area: $A_{brg} = 1.61$ in²

Number of Anchor rods 8

Tension Pullout Strength (N_p) $8 \times A_{brg} \times f'_c$
38.56 K

ACI 318-14 Section 17.4.3.4

Applied Tension load per Bolt:
(N_u) 23.59575

Anchor rod Pullout rating **58.28%**

Since, $H_{ef} > 25$ inch and Anchor rod pullout is passing, using ACI 318-14 Eq. 17.4.2.2 b as per commentary

Basic Concrete Breakout,

$$N_b = 16 \times \lambda \times \sqrt{f'_c} \times (h_{ef})^{5/3}$$

$K_c = 24$ (For cast in place) (Note: K_c is 17 for post installed anchors)

$\lambda = 1$ (Normal wt. conc)

$N_b = 992800.829$ lbs

$N_b = 992.80$ Kips

Anchor Factors,

$$N_{cbg} = \frac{A_{NC}}{A_{NCO}} \times \psi_{ec,N} \times \psi_{ed,N} \times \psi_{c,N} \times \psi_{cp,N} \times N_b$$

$$A_{NC} = (C_{a1} + S_1 + 1.5h_{ef}) \times (C_{a2} + S_2 + 1.5h_{ef}) \quad \text{--for 4 no of anchors}$$

$$C_{a1} < C_{a2} < 1.5h_{ef} \quad \text{-----} \quad \text{(limited by edge distance)}$$

$$S_1 = S_2 = 17$$

$$A_{NC} = 30475.3 \text{ sq.in} = 211.634 \text{ sqft} \quad \text{From CAD}$$

$$A_{NCO} = 9 \times h_{ef}^2$$

$$A_{NCO} = 41616 \text{ sq.in} = 289 \text{ sqft}$$

$$C_{a_Min} = 23.7949$$

$$\psi_{ec,N} = 1 \quad \text{-----}$$

$$\psi_{ed,N} = 0.77 \quad \text{-----} \quad \text{(For } C_{a1} < 1.5h_{ef} \text{)}$$

$$\psi_{c,N} = 1 \quad \text{-----} \quad \text{(Conservative assume for cracked)}$$

$$\psi_{cp,N} = 1 \quad \text{-----} \quad \text{Cast in anchors}$$

$$N_{cbg} = 559.80 \text{ Kips}$$

$$\text{Strength Reduction, } \phi = 0.75 \quad \text{-----}$$

$$\phi N_{cbg} = 419.85 \text{ Kips} \quad \text{-----}$$

$$\underline{\underline{\mu_u \cdot M_{cr} \text{ --Uncracked Concrete Breakout}}} \quad \text{-----} \quad \text{ACI 318-14}$$

Flexural M_{cr} Considering Uncracked,

$$M_{cr} = \frac{f_r \times I_g}{Y_t}$$

$$f_r = 7.5 \times \lambda \times \sqrt{f_c'}$$

$$f_r = 410.79 \text{ Psi} = 0.411 \text{ Ksi}$$

$$I_g = \frac{B \times D^3}{12}$$

$$I_g = 3760128 \text{ in}^4$$

$$Y_t = 24 \text{ in}$$

$$M_{cr} = 64359.59 \text{ K-in} = 5363.30 \text{ K-ft}$$

Strength Reduction, $\phi=0.65$ ----- ACI 14 th

$$\phi M_{cr} = 3486.14 \text{ K-ft}$$

Service Wind Moment (Demand pad flexure)= 253.83 K-ft

$$3486.14 \text{ K-ft} > 253.83 \text{ K-ft} \text{ .Therefore its Uncracked.}$$

Uncracked Concrete -Cast in Place Anchors

$$N_{cbg} = \frac{A_{NC}}{A_{NCO}} \times \psi_{ec} \times N\psi_{ed} \times N\psi_c \times N\psi_{CN} \times N\psi_b$$

, $N\psi_{CN}=1.25$ for Cast in Anchors

$$N_{cbg} = 699.75 \text{ K}$$

Strength Reduction, $\phi=0.75$ ----- ACI 14th

$$\phi N_{cbg} = 524.81 \text{ Kips}$$

----- ACI 14th

Uplift (LC 7)= 188.766 K

Concrete Breakout = Uplift (LC 7)/(ϕN_{cbg}) = 0.359683

Concrete Breakout Rating = 34.26 % ----- (Rev H TIA)

Foundation is sufficient for concrete breakout

CONCRETE BREAKOUT CHECK

BU#: 807134

Site Name: NHV 031B 943108, CT

Project Number: 552653, Rev 0.



LEG B & C

Inputs	
Anchor Rod diameter (db)	1 in
Bolt Circle of Anchor rods (B.C)	14 in
Anchor rod embedment (hef)	68 in
Number of Anchor rods	8
Uplift Reaction (LC-7)	171.719 Kips
Service Wind Moment (Demand pad flexure)	253.83 K-ft
Compressive Strength of Concrete (fc')	3000 Psi
Pad Width (B)	408 in
Pad thickness (D)	48 in

Foundation Breakout

(Per ACI 318-14)

Asumption Bolt template plate edge distance, $1.5 \times d_b = 1.5$ in

There are 2 edges, total edge distance is, $1.5 \times d_b \times 2 = 3$ in

ACI 318-14 Breakout-----

$S_1 = S_2 = \text{Bolt circle of anchor} + \text{total edge dist} = 17$ in

Anchor Pull out Strength

Nut distance across flats 1.625 in

Nut Bearing Area: $A_{brg} = 1.61$ in²

Number of Anchor rods 8

Tension Pullout Strength (N_p) $8 \times A_{brg} \times f'_c$
38.56 K

ACI 318-14 Section 17.4.3.4

Applied Tension load per Bolt:
(N_u) 21.464875

Anchor rod Pullout rating **53.02%**

Since, $H_{ef} > 25$ inch and Anchor rod pullout is passing, using ACI 318-14 Eq. 17.4.2.2 b as per commentary

Basic Concrete Breakout,

$$N_b = 16 \times \lambda \times \sqrt{f'_c} \times (h_{ef})^{5/3}$$

$K_c = 24$ (For cast in place) (Note: K_c is 17 for post installed anchors)

$\lambda = 1$ (Normal wt. conc)

$N_b = 992800.829$ lbs

$N_b = 992.80$ Kips

Anchor Factors,

$$N_{cbg} = \frac{A_{NC}}{A_{NCO}} \times \psi_{ec,N} \times \psi_{ed,N} \times \psi_{c,N} \times \psi_{cp,N} \times N_b$$

$$A_{NC} = (C_{a1} + S_1 + 1.5h_{ef}) \times (C_{a2} + S_2 + 1.5h_{ef}) \quad \text{--for 4 no of anchors}$$

$$C_{a1} < C_{a2} < 1.5h_{ef} \quad \text{-----} \quad \text{(limited by edge distance)}$$

$$S_1 = S_2 = 17$$

$$A_{NC} = 35534.02 \text{ sq.in} = 246.764 \text{ sqft} \quad \text{From CAD}$$

$$A_{NCO} = 9 \times h_{ef}^2$$

$$A_{NCO} = 41616 \text{ sq.in} = 289 \text{ sqft}$$

$$C_{a_Min} = 47$$

$$\psi_{ec,N} = 1 \quad \text{-----}$$

$$\psi_{ed,N} = 0.84 \quad \text{-----} \quad \text{(For } C_a < 1.5h_{ef} \text{)}$$

$$\psi_{c,N} = 1 \quad \text{-----} \quad \text{(Conservative assume for cracked)}$$

$$\psi_{cp,N} = 1 \quad \text{-----} \quad \text{Cast in anchors}$$

$$N_{cbg} = 710.58 \text{ Kips}$$

$$\text{Strength Reduction, } \phi = 0.75 \quad \text{-----}$$

$$\phi N_{cbg} = 532.93 \text{ Kips} \quad \text{-----}$$

$$\underline{\underline{\mu_u \cdot M_{cr} \text{ --Uncracked Concrete Breakout}}} \quad \text{-----} \quad \text{ACI 318-14}$$

Flexural M_{cr} Considering Uncracked,

$$M_{cr} = \frac{f_r \times I_g}{Y_t}$$

$$f_r = 7.5 \times \lambda \times \sqrt{f_c'}$$

$$f_r = 410.79 \text{ Psi} = 0.411 \text{ Ksi}$$

$$I_g = \frac{B \times D^3}{12}$$

$$I_g = 3760128 \text{ in}^4$$

$$Y_t = 24 \text{ in}$$

$$M_{cr} = 64359.59 \text{ K-in} = 5363.30 \text{ K-ft}$$

Strength Reduction, $\phi=0.65$ ----- ACI 14 th

$$\phi M_{cr} = 3486.14 \text{ K-ft}$$

Service Wind Moment (Demand pad flexure)= 253.83 K-ft

$$3486.14 \text{ K-ft} > 253.83 \text{ K-ft} \text{ .Therefore its Uncracked.}$$

Uncracked Concrete -Cast in Place Anchors

$$N_{cbg} = \frac{A_{NC}}{A_{NCO}} \times \psi_{ec} \times N\psi_{ed} \times N\psi_c \times N\psi_{CN} \times N\psi_b$$

, $N\psi_{CN}=1.25$ for Cast in Anchors

$$N_{cbg} = 888.22 \text{ K}$$

Strength Reduction, $\phi=0.75$ ----- ACI 14th

$$\phi N_{cbg} = 666.17 \text{ Kips}$$

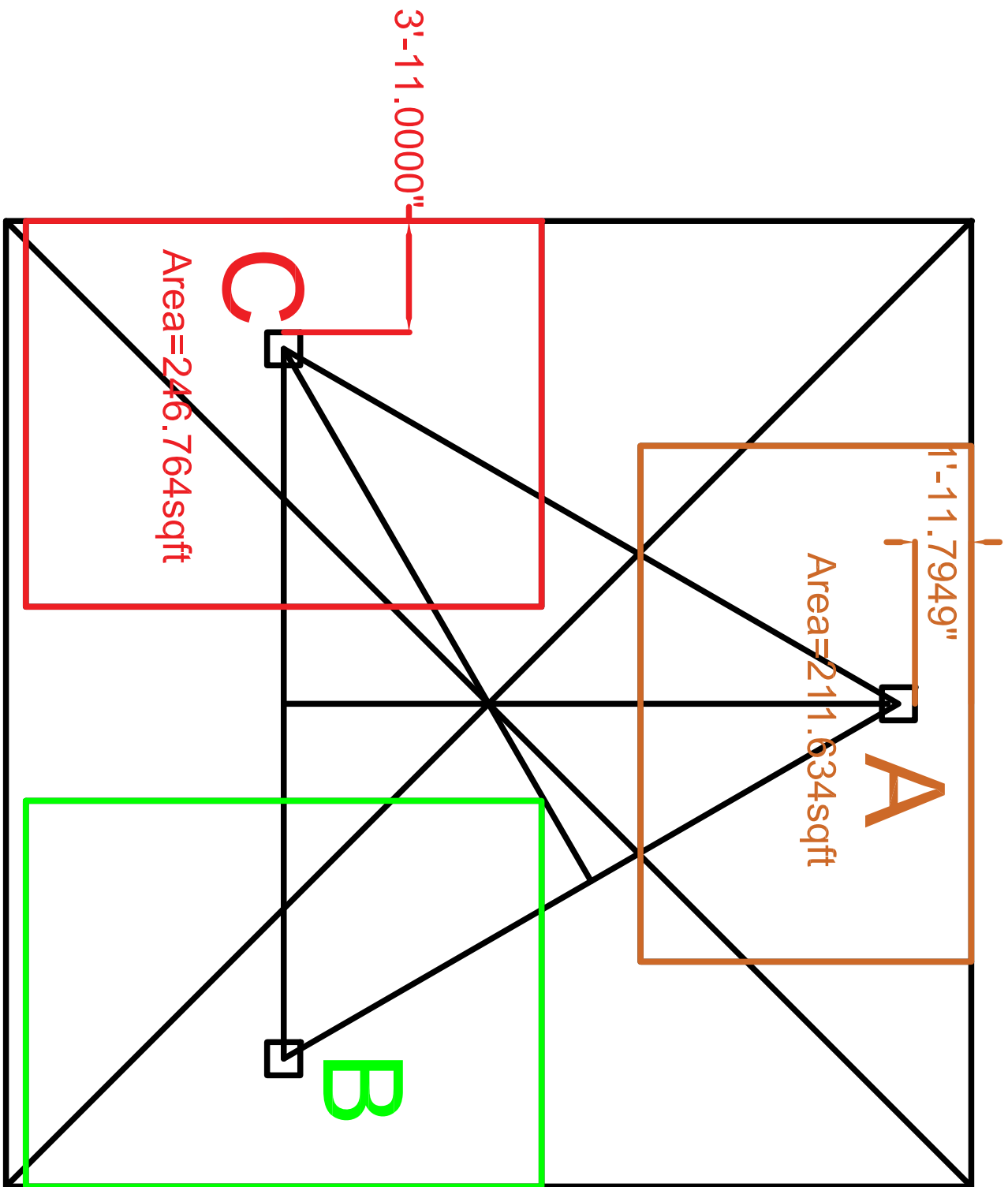
----- ACI 14th

Uplift (LC 7)= 171.719 K

Concrete Breakout = Uplift (LC 7)/(ϕN_{cbg}) = 0.257772

Concrete Breakout Rating = 24.55 % ----- (Rev H TIA)

Foundation is sufficient for concrete breakout

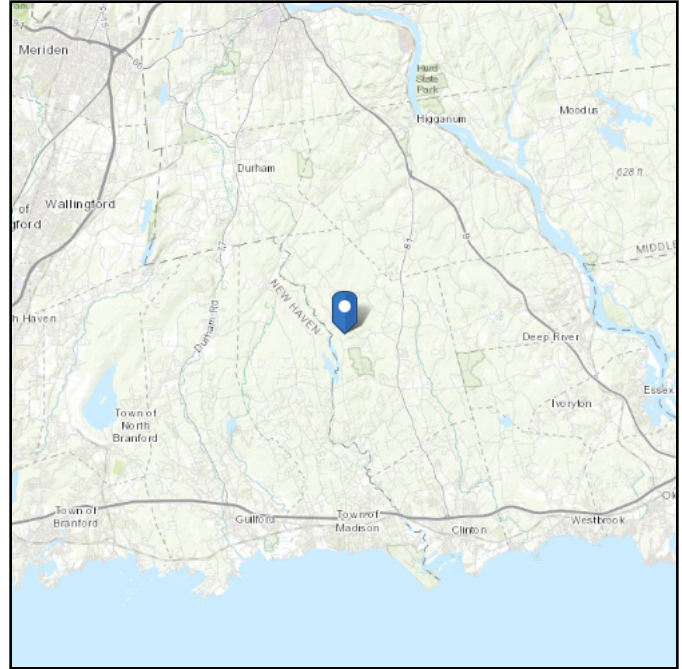


ASCE 7 Hazards Report

Address:
No Address at This
Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 381.75 ft (NAVD 88)
Latitude: 41.386092
Longitude: -72.603997

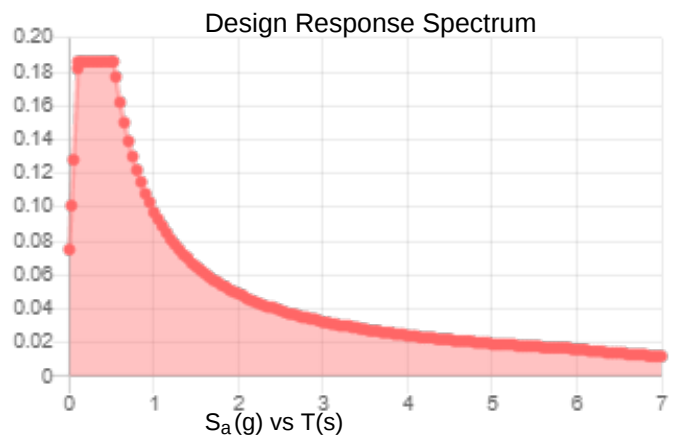
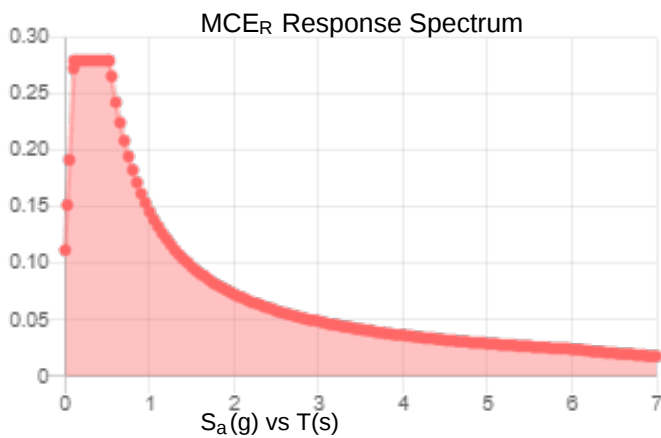


Site Soil Class: D - Stiff Soil

Results:

S_S :	0.175	S_{DS} :	0.186
S_1 :	0.061	S_{D1} :	0.097
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.089
S_{MS} :	0.28	PGA_M :	0.142
S_{M1} :	0.146	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Sat Apr 24 2021

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Results:

Ice Thickness: 0.75 in.
Concurrent Temperature: 15 F
Gust Speed: 50 mph

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

Date Accessed: Sat Apr 24 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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