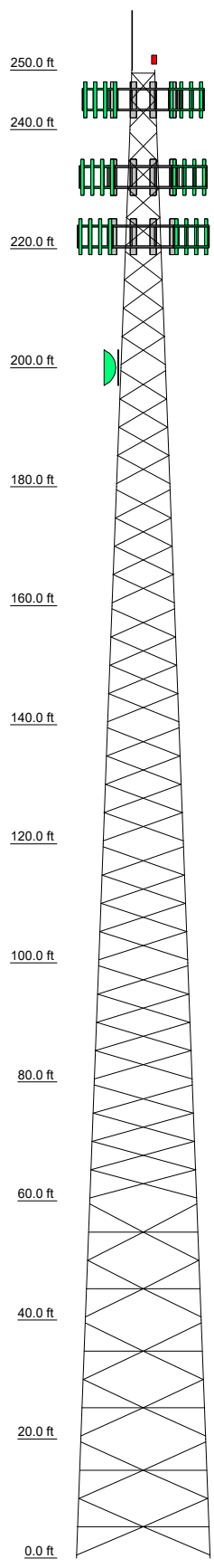


Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	
Legs	SR 1 3/4	SR 2 1/4	SR 2 3/4	SR 3 1/4	SR 3 1/2	SR 3 3/4	SR 4	SR 4 1/4	SR 4 1/2	SR 4 3/4	SR 4 1/2	SR 4 3/4	SR 4 3/4	
Leg Grade	L1 3/4x1 3/4x3/16													
Diagonals	L2x2x3/16													
Diagonal Grade	A529-50													
Top Girts	A36M-50													
Horizontals	N.A.													
Inner Bracing	N.A.													
Face Width (ft)	22.5	21	19.5	18	16.5	15	13.5	12	10.5	9	7.5	6	4.5	3.75
# Panels @ (ft)	2 @ 4.5	48 @ 4.75												
Weight (K)	46.7	6.7	6.1	5.5	5.0	4.8	3.9	3.5	2.9	2.8	2.3	1.7	1.2	0.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10"	250	Sector3(CaAa=10000 Sq.in)No Ice (Carrier 2)	232
Top Beacon	250	Sector1(CaAa=10000 Sq.in)No Ice (Carrier 1)	222
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 1)	245	Sector2(CaAa=10000 Sq.in)No Ice (Carrier 3)	222
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 1)	245	Sector3(CaAa=10000 Sq.in)No Ice (Carrier 3)	222
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 1)	245	4 1/2" OD Dish Mount (Carrier 4)	200
Sector1(CaAa=10000 Sq.in)No Ice (Carrier 2)	232	6" MW Dish (Carrier 4)	200
Sector2(CaAa=10000 Sq.in)No Ice (Carrier 2)	232		

SYMBOL LIST

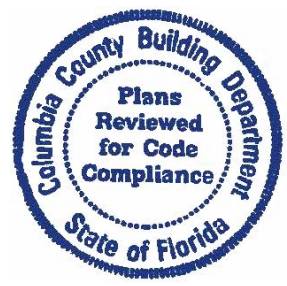
MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A529-50	50 ksi	65 ksi	A36M-50	50 ksi	65 ksi

TOWER DESIGN NOTES

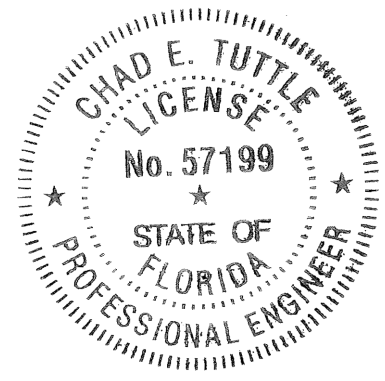
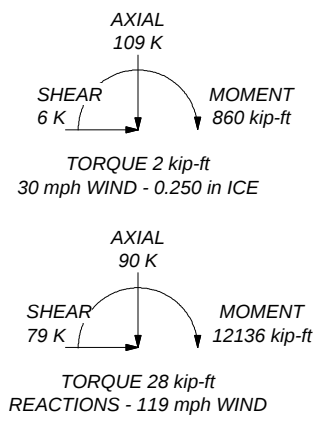
1. Tower is located in Columbia County, Florida.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 30 mph basic wind with 0.25 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity.



ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 653 K
SHEAR: 47 K

UPLIFT: -567 K
SHEAR: 43 K

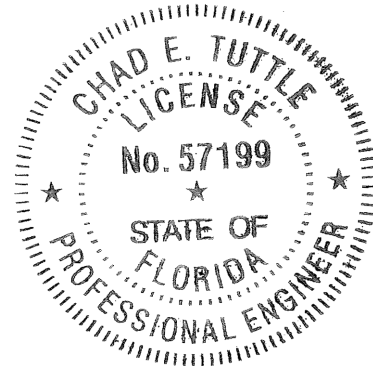
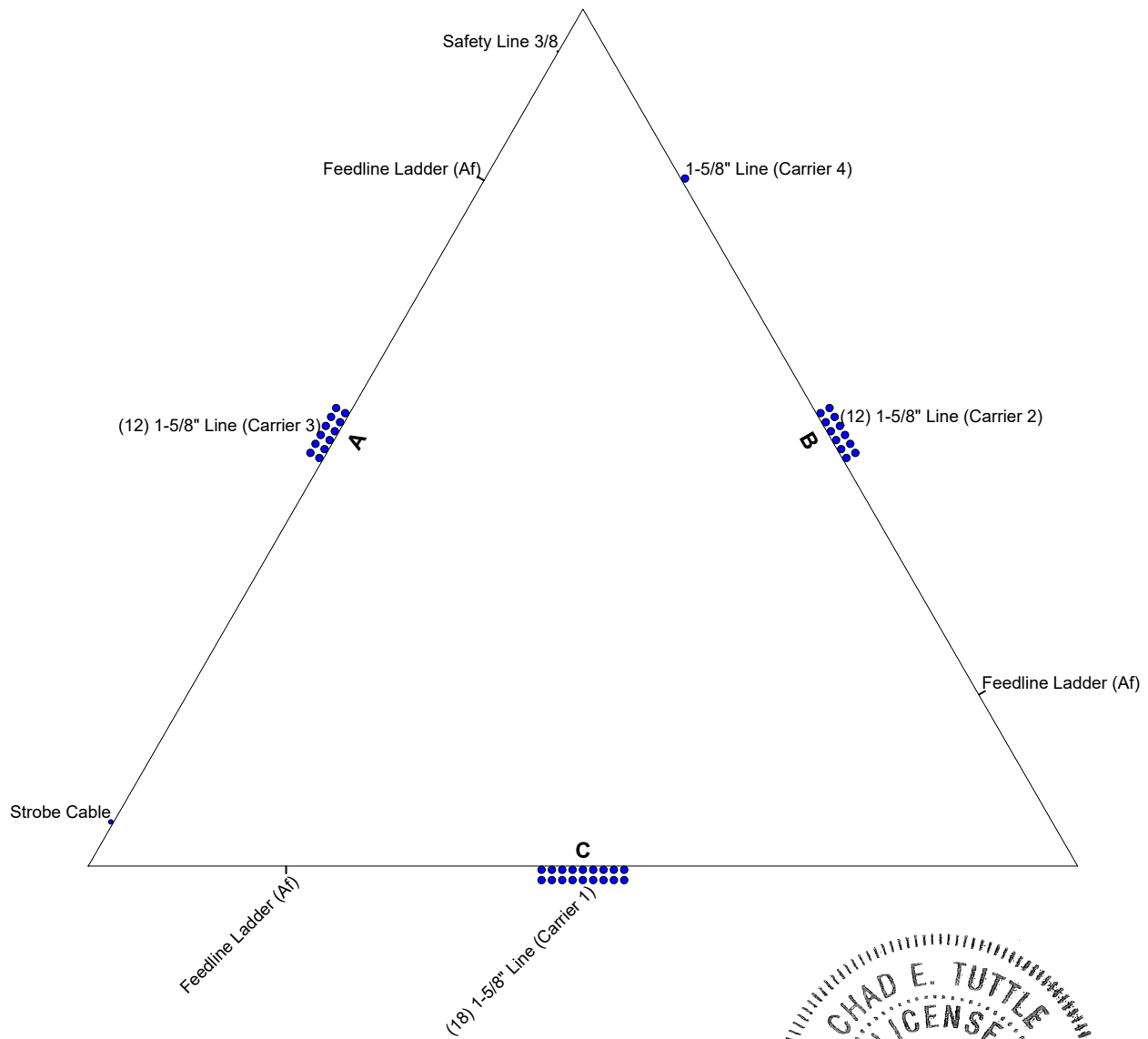




B+T Group
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ATS#9749 - Ebenezer (Site# US-FL-5391)		
Project: 250' SST/30.10299722, -82.5741528		
Client: Vertical Bridge	Drawn by: andrew.fisher	App'd:
Code: TIA-222-H	Date: 09/21/22	Scale: NTS
Path:		Dwg No. E-1

Feed Line Plan

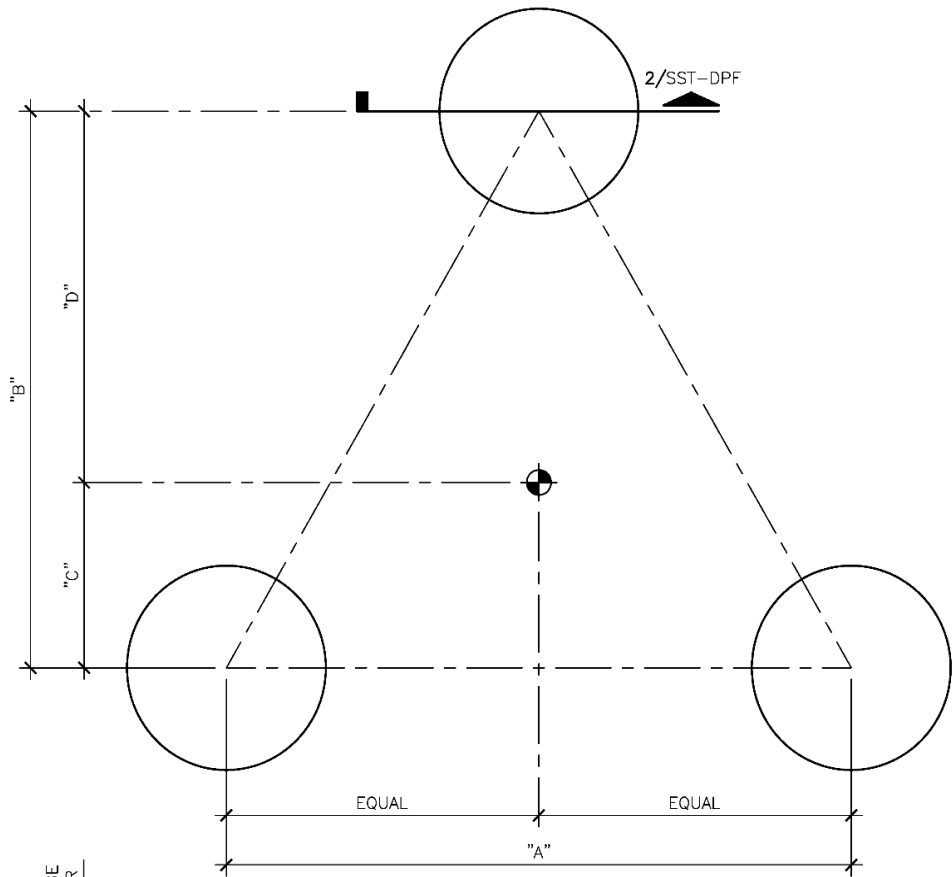


ARCOSA
TELECOM STRUCTURES

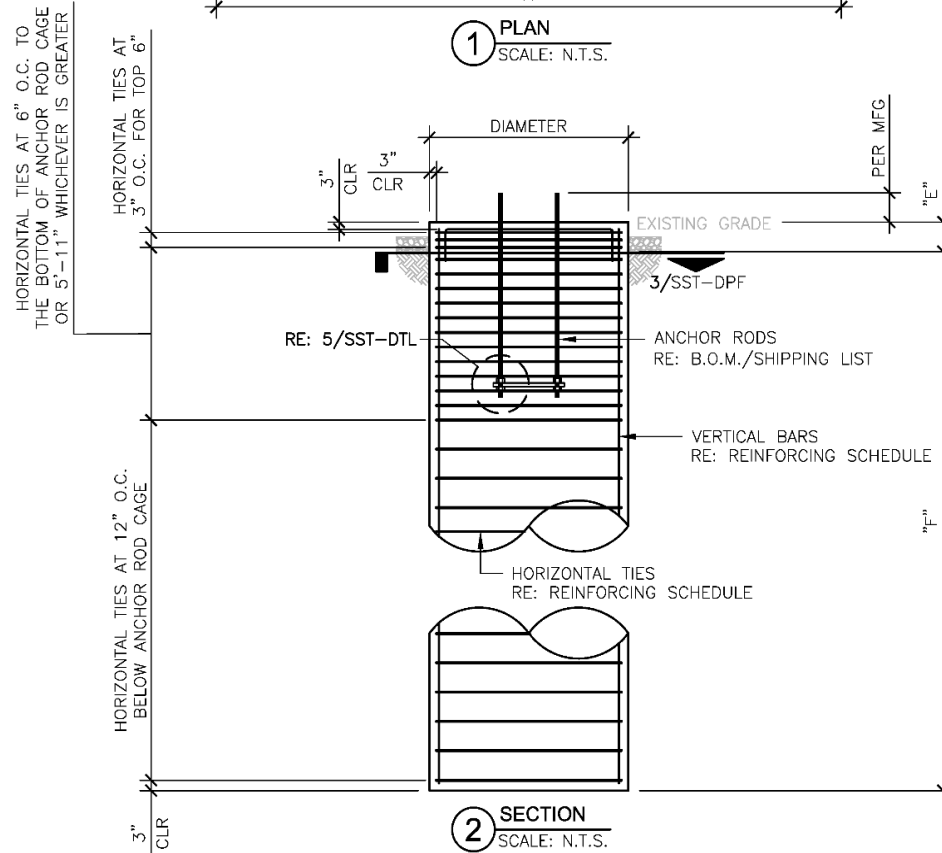
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Client: Vertical Bridge	Drawn by: andrew.fisher	App'd:
Code: TIA-222-H	Date: 09/21/22	Scale: NTS
Path:	Dwg No. E-7	

S:\Projects\Arcosa Telecom Structures\105590_9749_Ebenezer\Engineer\Tuttle\Tower\0922-091_250SST_Ebenezer.dwg



1 PLAN
SCALE: N.T.S.



2 SECTION
SCALE: N.T.S.

NOTES:

- REINFORCEMENT STEEL SHALL CONFIRM TO THE REQUIREMENT OF ASTM A-615 (GRADE 60) EXCEPT THAT TIES MAY BE ASTM-615 (GRADE 40) WITH MINIMUM CLEAR COVER.
- REINFORCEMENT STEEL SHALL BE DETAILED, FABRICATED, BENT, AND PLACED IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE AND THE ACI 315 (LATEST EDITION).
- THE CONTRACTOR SHALL THOROUGHLY REVIEW THE GEOTECH REPORT FOR THIS PROJECT AND FOLLOW THE RECOMMENDATIONS IN THAT REPORT WHEN CONSTRUCTING THE FOUNDATION.
GEOTECHNICAL PROPERTIES BY: EGSCI CONSULTING INC
PROJECT NUMBER: 20-US-FL-5391
DATE: JAN 22, 2020
- THIS FOUNDATION HAS BEEN DESIGNED, IN ACCORDANCE WITH THE TIA 222-H STANDARD, SPECIFICALLY FOR THE TOWER AND SOIL CONDITION REFERENCED ABOVE. IF ANYTHING DIFFERS THIS DESIGN SHALL BE CONSIDERED INVALID AND MUST BE REDESIGNED PRIOR TO CONSTRUCTION.
- TOTAL CONCRETE VOLUME FOR ALL (3) PIERS IN CUBIC YARDS: 85.71
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
- CONCRETE MIXTURES SHALL MEET DURABILITY REQUIREMENTS OF CHAPTER 19 OF THE ACI 318-14
- ALL CONCRETE TESTING SHALL BE IN ACCORDANCE WITH ASTM C494 STANDARD TYPES A, B, C, D OR E. THE ENGINEER SHALL PRE-APPROVE SUPER PLASTICIZER USE. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260.
- SLUMP TEST SHALL BE MADE IN ACCORDANCE WITH ASTM C143. THE ALLOWABLE CONCRETE SLUMP SHALL BE 4 INCHES (±1") UNLESS ADMIXTURES ARE USED. ADMIXTURE SHALL BE IN ACCORDANCE WITH ASTM C494 STANDARD TYPES A, B, C, D OR E. THE ENGINEER SHALL PRE-APPROVE SUPER PLASTICIZER USE. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260.
- BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM UNIT WEIGHT SPECIFIED IN GEOTECH REPORT. THE SOIL SHALL BE INSTALLED IN 6" TO 8" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE APPROPRIATE UNIT WEIGHT UNLESS GEOTECH SPECIFIES OTHER COMPACTION REQUIREMENTS.
- VERIFY ALL DIMENSIONS AGAINST MANUFACTURER'S DRAWINGS.

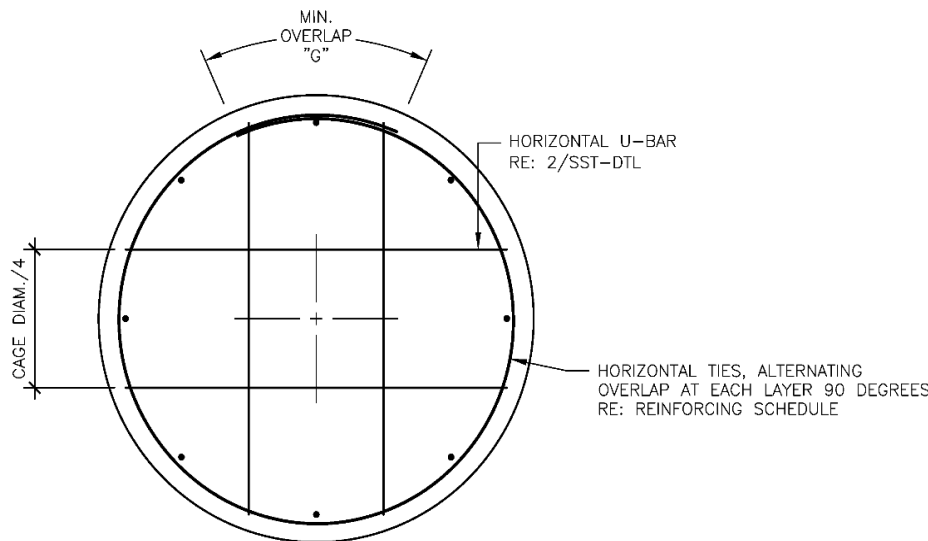
STIPULATION FOR REUSE:

- THIS DRAWING WAS SPECIFICALLY DESIGNED FOR USE BY THE CUSTOMER ON THIS DRAWING AT THE SPECIFIED LOCATION. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF A PROPERLY LICENSED ENGINEER.

DIMENSIONING SCHEDULE	
A	22' 6"
B	19' 5-13/16"
C	6' 5-15/16"
D	12' 11-7/8"
E	0' 6"
F	48' 0"
MIN. OVERLAP "G"	2' 3"
DIAMETER	4' 6"

REINFORCING SCHEDULE	SIZE	TOTAL QTY
VERTICAL BARS	# 9	36
HORIZONTAL TIES	# 4	168
U-BAR HORIZONTAL	# 4	12

BASE REACTIONS: (FACTORED LOADS)		
GLOBAL REACTIONS		
MOMENT	12136	KIP-FT
AXIAL	90	KIPS
SHEAR	79	KIPS
REACTIONS PER LEG		
COMPRESSION AXIAL	653	KIPS
COMPRESSION SHEAR	47	KIPS
UPLIFT AXIAL	567	KIPS
UPLIFT SHEAR	43	KIPS



3 SECTION
SCALE: N.T.S.



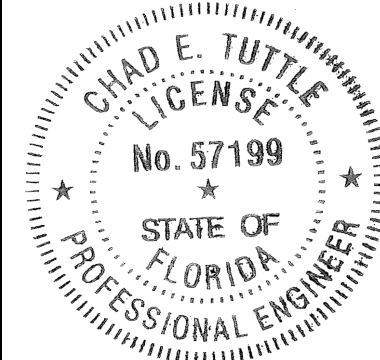
1717 S BOULDER AVE #300, TULSA, OK 74119
(918) 587-4630

ARCOSA
TELECOM STRUCTURES

4020 TULL AVE. MUSKOGEE, OK 74403

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/21/22	ISSUED FOR CONSTRUCTION



IT IS A VIOLATION OF LAW FOR ANY PERSON UNLESS THEY ARE ACTING UNDER THE DIRECTIONS OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT

PROJECT INFORMATION:

PROJECT NO: 165690.001.01
SITE NAME: EBENEZER
SITE NO: US-FL-5391
CLIENT NAME: ARCOSA TELECOM STRUCTURES

DRAWN BY: ANDREW FISHER
CHECKED BY:

SHEET TITLE:

DRILLED PIER FOUNDATION

SHEET NUMBER:

SST-DPF

REVISION:

0



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(918) 587-4630

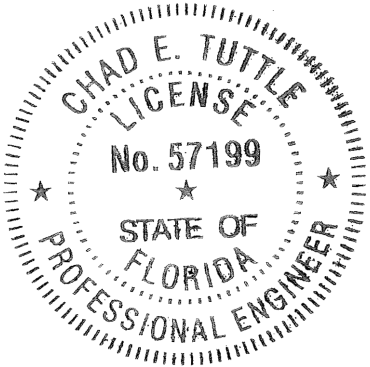


TELECOM STRUCTURES

4020 TULL AVE. MUSKOGEE, OK 74403

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/21/22	ISSUED FOR CONSTRUCTION



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SITE NAME: EBENEZER
SITE NO: US-FL-5391
CLIENT NAME: ARCOSA TELECOM STRUCTURES

DRAWN BY: ANDREW FISHER
CHECKED BY:

SHEET TITLE:

DIMENSIONING DETAIL

SHEET NUMBER:

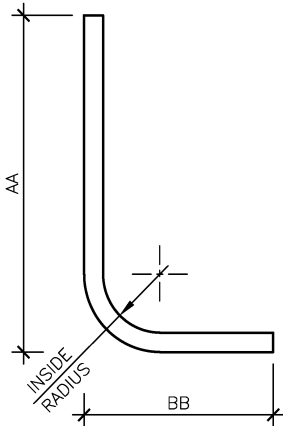
SST-DTL

REVISION:

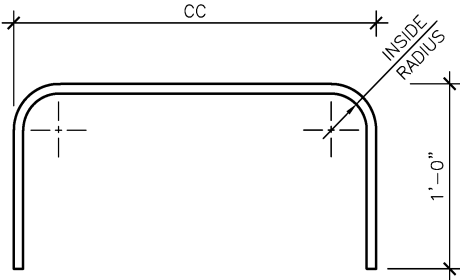
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DIMENSIONING SCHEDULE	
CC*	3' 9-1/4"

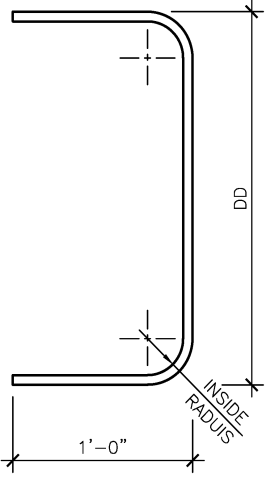
*NOTE: CONTRACTOR TO VERIFY DIMENSIONS PRIOR TO FABRICATION



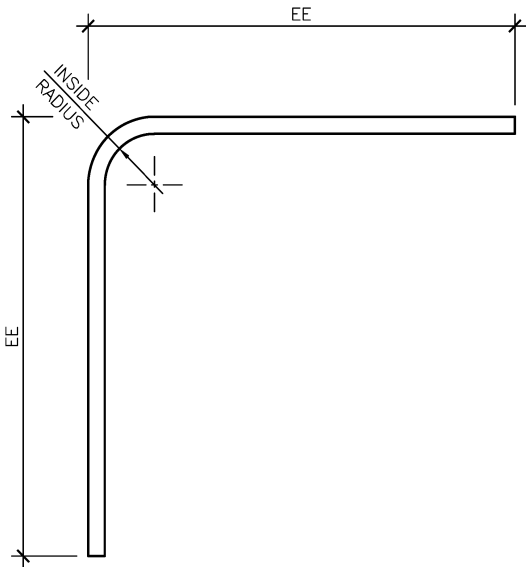
1 L-BAR
SCALE: N.T.S.



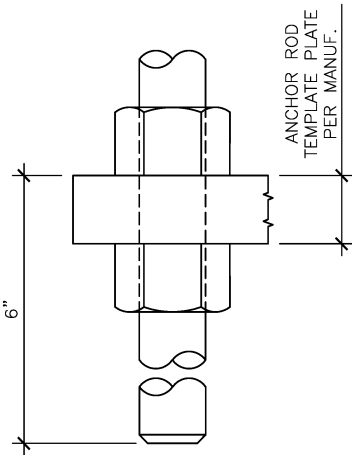
2 HORIZONTAL U-BAR
SCALE: N.T.S.



3 VERTICAL U-BAR
SCALE: N.T.S.



4 CORNER BAR
SCALE: N.T.S.



5 ANCHOR ROD DETAIL
SCALE: N.T.S.

Drilled Pier Foundation

Project #	165690.001.01
Site Name	Ebenezer
Site Number	US-FL-5391
TIA-222 Revision	H
Tower Type	Self Support

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)		
Axial Force (kips)	653	567
Shear Force (kips)	47	43

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	41	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 41' below grade		
Pier Diameter	5	ft
Rebar Quantity	18	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	4	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results

Soil Lateral Check	Compression	Uplift
D _{v=0} (ft from TOC)	17.62	17.62
Soil Safety Factor	20.20	22.08
Max Moment (kip-ft)	583.75	534.07
Rating	6.6%	6.0%

Soil Vertical Check	Compression	Uplift
Skin Friction (kips)	513.19	513.19
End Bearing (kips)	300.90	-
Weight of Concrete (kips)	91.51	68.64
Total Capacity (kips)	814.09	581.83
Axial (kips)	744.51	567.00
Rating	91.5%	97.5%

Reinforced Concrete Flexure	Compression	Uplift
Critical Depth (ft from TOC)	19.01	13.30
Critical Moment (kip-ft)	579.34	488.73
Critical Moment Capacity	2323.38	909.61
Rating	24.9%	53.7%

Reinforced Concrete Shear	Compression	Uplift
Critical Depth (ft from TOC)	31.52	0.00
Critical Shear (kip)	44.08	43.00
Critical Shear Capacity	498.77	185.78
Rating	8.8%	23.1%

Structural Foundation Rating	53.7%
Soil Interaction Rating	97.5%

Check Limitation	
Apply TIA-222-H Section 15.5:	☐
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☒
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

[Go to Soil Calculations](#)

Soil Profile															
Groundwater Depth	3.5														

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	Y _{soil} (pcf)	Y _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3	3	110	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3	3.5	0.5	120	150		34	0.000	0.000	0.50	0.50			Cohesionless
3	3.5	6.3	2.8	57.6	87.6		34	0.000	0.000	0.50	0.50			Cohesionless
4	6.3	7.3	1	57.6	87.6	2		1.100	1.100	1.10	1.10			Cohesive
5	7.3	9	1.7	62.6	87.6		36	0.000	0.000	1.50	1.50			Cohesionless
6	9	11.5	2.5	67.6	87.6		40	0.000	0.000	2.00	2.00			Cohesionless
7	11.5	12.8	1.3	67.6	87.6		37	0.00	0.00	1.75	1.75			Cohesionless
8	12.8	14.8	2	67.6	87.6	3.75		1.96	1.96	1.90	1.90			Cohesive
9	14.8	16.3	1.5	67.6	87.6		39	0.00	0.00	2.00	2.00			Cohesionless
10	16.3	17.2	0.9	62.6	87.6	3		1.65	1.65	1.65	1.65			Cohesive
11	17.2	18.5	1.3	67.6	87.6		40	0.00	0.00	2.25	2.25			Cohesionless
12	18.5	20	1.5	57.6	87.6		34	0.00	0.00	1.10	1.10			Cohesionless
13	20	22	2	47.6	87.6		32	0.00	0.00	0.85	0.85			Cohesionless
14	22	23.3	1.3	32.6	87.6		27	0.00	0.00	0.41	0.41			Cohesionless
15	23.3	24	0.7	37.6	87.6	0.75		0.41	0.41	0.41	0.41			Cohesive
16	24	26.2	2.2	27.6	87.6		25	0.00	0.00	0.41	0.41			Cohesionless
17	26.2	28	1.8	37.6	87.6	0.5		0.28	0.28	0.28	0.28			Cohesive
18	28	29.5	1.5	57.6	87.6		35	0.00	0.00	1.10	1.10			Cohesionless
19	29.5	35.2	5.7	47.6	87.6	1.5		0.83	0.83	0.83	0.83			Cohesive
20	35.2	35.8	0.6	57.6	87.6		35	0.00	0.00	1.24	1.24			Cohesionless
21	35.8	39.1	3.3	57.6	87.6	2.25		1.24	1.24	1.24	1.24			Cohesive
22	39.1	41	1.9	62.6	87.6		37	0.00	0.00	1.60	1.60	18		Cohesionless

tnxTower B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job ATS#9749 - Ebenezer (Site# US-FL-5391)	Page 1 of 32
	Project 250' SST/30.10299722, -82.5741528	Date 14:37:13 09/21/22
	Client Vertical Bridge	Designed by andrew.fisher

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 250.000 ft above the ground line.

The base of the tower is set at an elevation of 0.000 ft above the ground line.

The face width of the tower is 3.750 ft at the top and 22.500 ft at the base.

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

The following design criteria apply:

Tower is located in Columbia County, Florida.

Tower base elevation above sea level: 148.000 ft.

Basic wind speed of 119 mph.

Risk Category II.

Exposure Category C.

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

Topographic Category: 1.

Crest Height: 0.000 ft.

Nominal ice thickness of 0.250 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 30 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity..

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

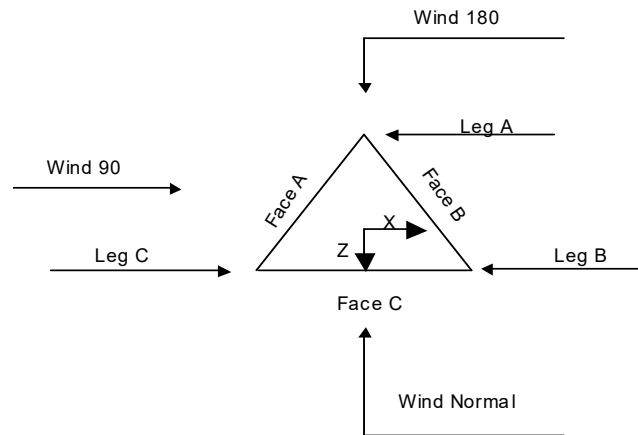
Stress ratio used in tower member design is 1.

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

tnxTower B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job ATS#9749 - Ebenezer (Site# US-FL-5391)	Page 2 of 32
	Project 250' SST/30.10299722, -82.5741528	Date 14:37:13 09/21/22
	Client Vertical Bridge	Designed by andrew.fisher



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	250.000-240.000			3.750	1	10.000
T2	240.000-220.000			4.500	1	20.000
T3	220.000-200.000			6.000	1	20.000
T4	200.000-180.000			7.500	1	20.000
T5	180.000-160.000			9.000	1	20.000
T6	160.000-140.000			10.500	1	20.000
T7	140.000-120.000			12.000	1	20.000
T8	120.000-100.000			13.500	1	20.000
T9	100.000-80.000			15.000	1	20.000
T10	80.000-60.000			16.500	1	20.000
T11	60.000-40.000			18.000	1	20.000
T12	40.000-20.000			19.500	1	20.000
T13	20.000-0.000			21.000	1	20.000

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	250.000-240.000	4.500	X Brace	No	No	6.000	6.000
T2	240.000-220.000	4.750	X Brace	No	No	6.000	6.000

tnxTower B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job	Page
	ATS#9749 - Ebenezer (Site# US-FL-5391)	3 of 32
	Project	Date
	250' SST/30.10299722, -82.5741528	14:37:13 09/21/22
	Client	Designed by
	Vertical Bridge	andrew.fisher

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
T3	220.000-200.000	4.750	X Brace	No	No	6.000	6.000
T4	200.000-180.000	4.750	X Brace	No	No	6.000	6.000
T5	180.000-160.000	4.750	X Brace	No	No	6.000	6.000
T6	160.000-140.000	4.750	X Brace	No	No	6.000	6.000
T7	140.000-120.000	4.750	X Brace	No	No	6.000	6.000
T8	120.000-100.000	4.750	X Brace	No	No	6.000	6.000
T9	100.000-80.000	4.750	X Brace	No	No	6.000	6.000
T10	80.000-60.000	4.750	X Brace	No	No	6.000	6.000
T11	60.000-40.000	4.750	Double K	No	Yes	6.000	6.000
T12	40.000-20.000	4.750	Double K	No	Yes	6.000	6.000
T13	20.000-0.000	4.750	Double K	No	Yes	6.000	6.000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1	Solid Round	1 3/4	A529-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
250.000-240.000						
T2	Solid Round	2 1/4	A529-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
240.000-220.000						
T3	Solid Round	2 3/4	A529-50 (50 ksi)	Equal Angle	L2x2x3/16	A36M-50 (50 ksi)
220.000-200.000						
T4	Solid Round	3 1/4	A529-50 (50 ksi)	Equal Angle	L2x2x3/16	A36M-50 (50 ksi)
200.000-180.000						
T5	Solid Round	3 1/2	A529-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36M-50 (50 ksi)
180.000-160.000						
T6	Solid Round	3 1/2	A529-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36M-50 (50 ksi)
160.000-140.000						
T7	Solid Round	3 3/4	A529-50 (50 ksi)	Equal Angle	L3x3x3/16	A36M-50 (50 ksi)
140.000-120.000						
T8	Solid Round	4	A529-50 (50 ksi)	Equal Angle	L3x3x3/16	A36M-50 (50 ksi)
120.000-100.000						
T9	Solid Round	4 1/4	A529-50 (50 ksi)	Equal Angle	L3x3x1/4	A36M-50 (50 ksi)
100.000-80.000						
T10	Solid Round	4 1/4	A529-50 (50 ksi)	Equal Angle	L3x3x1/4	A36M-50 (50 ksi)
80.000-60.000						
T11	Solid Round	4 1/2	A529-50 (50 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
60.000-40.000						
T12	Solid Round	4 3/4	A529-50 (50 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
40.000-20.000						
T13	Solid Round	4 3/4	A529-50 (50 ksi)	Double Angle	2L3x3x3/16x3/8	A36M-50 (50 ksi)
20.000-0.000						

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	Equal Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)	Solid Round		A529-50 (50 ksi)
250.000-240.000						

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	Vertical Bridge	andrew.fisher

Tower Section Geometry (cont'd)

Tower Elevation	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
ft							
T11 60.000-40.000	None	Flat Bar		A36 (36 ksi)	Double Angle	2L2x2x3/16x3/8	A36M-50 (50 ksi)
T12 40.000-20.000	None	Flat Bar		A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)
T13 20.000-0.000	None	Flat Bar		A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x3/16x3/8	A36M-50 (50 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
ft						
T11 60.000-40.000	Solid Round		A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T12 40.000-20.000	Solid Round		A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 ksi)
T13 20.000-0.000	Solid Round		A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36M-50 (50 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 in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft ²	in							
T1 250.000-240.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T2 240.000-220.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T3 220.000-200.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T4 200.000-180.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T5 180.000-160.000	0.000	0.375	A36M-50 (50 ksi)	1	1	1	36.000	36.000	36.000
T6	0.000	0.375	A36M-50	1	1	1	36.000	36.000	36.000

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Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T13 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 250.000-240.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 240.000-220.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 220.000-200.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 200.000-180.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 180.000-160.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 160.000-140.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 140.000-120.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 120.000-100.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 100.000-80.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 80.000-60.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 60.000-40.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 40.000-20.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 20.000-0.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

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.
T1 250.000-240.0 00	Flange	0.000 A325N	0	0.625 A325X	1	0.625 A325X	1	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T2 240.000-220.0 00	Flange	0.750 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T3 220.000-200.0 00	Flange	0.750 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T4 200.000-180.0 00	Flange	1.000 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T5 180.000-160.0 00	Flange	1.000 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T6 160.000-140.0 00	Flange	1.000 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T7 140.000-120.0 00	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T8 120.000-100.0 00	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T9 100.000-80.00 0	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T10 80.000-60.000	Flange	1.250 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.000 A325X	0	0.625 A325N	0
T11 60.000-40.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T12 40.000-20.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.625 A325X	1	0.625 A325N	0
T13 20.000-0.000	Flange	1.500 A325N	6	0.625 A325X	1	0.000 A325X	0	0.000 A325N	0	0.625 A325N	0	0.625 A325X	1	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
1-5/8" Line (Carrier 1) **	C	No	No	Ar (CaAa)	245.000 - 10.000	0.000	0	18	9	0.750	1.980		0.001
1-5/8" Line (Carrier 2) **	B	No	No	Ar (CaAa)	232.000 - 10.000	0.000	0	12	6	0.750	1.980		0.001
1-5/8" Line (Carrier 3) **	A	No	No	Ar (CaAa)	222.000 - 10.000	0.000	0	12	6	0.750	1.980		0.001
1-5/8" Line (Carrier 4) **	B	No	No	Ar (CaAa)	200.000 - 10.000	0.000	-0.3	1	1	0.750	1.980		0.001

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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
Safety Line 3/8	A	No	No	Ar (CaAa)	250.000 - 10.000	0.000	0.45	1	1	0.375	0.375		0.000
Strobe Cable	A	No	No	Ar (CaAa)	250.000 - 10.000	0.000	-0.45	1	1	1.250	1.250		0.001
**													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	245.000 - 10.000	0.000	0.3	1	1	3.000	0.250		0.008
Feedline Ladder (Af)	B	No	No	Af (CaAa)	232.000 - 10.000	0.000	0.3	1	1	3.000	0.250		0.008
Feedline Ladder (Af)	A	No	No	Af (CaAa)	222.000 - 10.000	0.000	0.3	1	1	3.000	0.250		0.008
**													

Feed Line/Linear Appurtenances - Entered As Area

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	250.000-240.000	A	0.000	0.000	1.625	0.000	0.009
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	18.028	0.000	0.116
T2	240.000-220.000	A	0.000	0.000	8.085	0.000	0.055
		B	0.000	0.000	29.012	0.000	0.219
		C	0.000	0.000	72.113	0.000	0.463
T3	220.000-200.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	48.353	0.000	0.365
		C	0.000	0.000	72.113	0.000	0.463
T4	200.000-180.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T5	180.000-160.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T6	160.000-140.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T7	140.000-120.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T8	120.000-100.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463

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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
T9	100.000-80.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T10	80.000-60.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T11	60.000-40.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T12	40.000-20.000	A	0.000	0.000	51.603	0.000	0.383
		B	0.000	0.000	52.313	0.000	0.381
		C	0.000	0.000	72.113	0.000	0.463
T13	20.000-0.000	A	0.000	0.000	25.802	0.000	0.192
		B	0.000	0.000	26.157	0.000	0.191
		C	0.000	0.000	36.057	0.000	0.232

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	250.000-240.000	A	0.305	0.000	0.000	2.847	0.000	0.018
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	23.833	0.000	0.196
T2	240.000-220.000	A	0.304	0.000	0.000	12.092	0.000	0.093
		B		0.000	0.000	38.483	0.000	0.349
		C		0.000	0.000	95.185	0.000	0.781
T3	220.000-200.000	A	0.301	0.000	0.000	69.653	0.000	0.614
		B		0.000	0.000	63.996	0.000	0.579
		C		0.000	0.000	94.976	0.000	0.778
T4	200.000-180.000	A	0.298	0.000	0.000	69.473	0.000	0.611
		B		0.000	0.000	68.992	0.000	0.610
		C		0.000	0.000	94.748	0.000	0.775
T5	180.000-160.000	A	0.295	0.000	0.000	69.275	0.000	0.608
		B		0.000	0.000	68.807	0.000	0.607
		C		0.000	0.000	94.498	0.000	0.771
T6	160.000-140.000	A	0.291	0.000	0.000	69.055	0.000	0.605
		B		0.000	0.000	68.602	0.000	0.604
		C		0.000	0.000	94.219	0.000	0.766
T7	140.000-120.000	A	0.287	0.000	0.000	68.808	0.000	0.602
		B		0.000	0.000	68.371	0.000	0.600
		C		0.000	0.000	93.905	0.000	0.762
T8	120.000-100.000	A	0.282	0.000	0.000	68.523	0.000	0.598
		B		0.000	0.000	68.105	0.000	0.596
		C		0.000	0.000	93.544	0.000	0.756
T9	100.000-80.000	A	0.276	0.000	0.000	68.186	0.000	0.593
		B		0.000	0.000	67.791	0.000	0.591
		C		0.000	0.000	93.119	0.000	0.749
T10	80.000-60.000	A	0.270	0.000	0.000	67.775	0.000	0.587
		B		0.000	0.000	67.407	0.000	0.585
		C		0.000	0.000	92.597	0.000	0.741
T11	60.000-40.000	A	0.261	0.000	0.000	67.240	0.000	0.579
		B		0.000	0.000	66.907	0.000	0.578
		C		0.000	0.000	91.919	0.000	0.731
T12	40.000-20.000	A	0.248	0.000	0.000	66.461	0.000	0.568
		B		0.000	0.000	66.181	0.000	0.567
		C		0.000	0.000	90.933	0.000	0.716
T13	20.000-0.000	A	0.222	0.000	0.000	32.458	0.000	0.273

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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
		B		0.000	0.000	32.369	0.000	0.273
		C		0.000	0.000	44.488	0.000	0.344

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	250.000-240.000	-0.781	2.134	-1.116	1.808
T2	240.000-220.000	0.712	0.286	0.416	0.448
T3	220.000-200.000	-0.534	-3.438	-0.755	-3.184
T4	200.000-180.000	-0.374	-4.716	-0.580	-4.578
T5	180.000-160.000	-0.392	-4.876	-0.612	-4.782
T6	160.000-140.000	-0.430	-5.287	-0.668	-5.192
T7	140.000-120.000	-0.431	-5.254	-0.672	-5.210
T8	120.000-100.000	-0.456	-5.517	-0.706	-5.469
T9	100.000-80.000	-0.478	-5.750	-0.736	-5.699
T10	80.000-60.000	-0.499	-5.975	-0.764	-5.933
T11	60.000-40.000	-0.638	-7.586	-0.949	-7.386
T12	40.000-20.000	-0.646	-7.648	-0.952	-7.484
T13	20.000-0.000	-0.376	-4.392	-0.545	-4.356

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	1-5/8" Line	240.00 - 245.00	0.6000	0.6000
T1	9	Safety Line 3/8	240.00 - 250.00	0.6000	0.6000
T1	10	Strobe Cable	240.00 - 250.00	0.6000	0.6000
T1	12	Feedline Ladder (Af)	240.00 - 245.00	0.6000	0.6000
T2	1	1-5/8" Line	220.00 - 240.00	0.6000	0.6000
T2	3	1-5/8" Line	220.00 - 232.00	0.6000	0.6000
T2	5	1-5/8" Line	220.00 - 222.00	0.6000	0.6000
T2	9	Safety Line 3/8	220.00 - 240.00	0.6000	0.6000
T2	10	Strobe Cable	220.00 - 240.00	0.6000	0.6000
T2	12	Feedline Ladder (Af)	220.00 - 240.00	0.6000	0.6000
T2	13	Feedline Ladder (Af)	220.00 - 232.00	0.6000	0.6000
T2	14	Feedline Ladder (Af)	220.00 - 222.00	0.6000	0.6000
T3	1	1-5/8" Line	200.00 -	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T3	3	1-5/8" Line	220.00 - 200.00	0.6000	0.6000
T3	5	1-5/8" Line	220.00 - 200.00	0.6000	0.6000
T3	9	Safety Line 3/8	220.00 - 200.00	0.6000	0.6000
T3	10	Strobe Cable	220.00 - 200.00	0.6000	0.6000
T3	12	Feedline Ladder (Af)	220.00 - 200.00	0.6000	0.6000
T3	13	Feedline Ladder (Af)	220.00 - 200.00	0.6000	0.6000
T3	14	Feedline Ladder (Af)	220.00 - 200.00	0.6000	0.6000
T4	1	1-5/8" Line	200.00 - 180.00	0.6000	0.6000
T4	3	1-5/8" Line	200.00 - 180.00	0.6000	0.6000
T4	5	1-5/8" Line	200.00 - 180.00	0.6000	0.6000
T4	7	1-5/8" Line	200.00 - 180.00	0.6000	0.6000
T4	9	Safety Line 3/8	200.00 - 180.00	0.6000	0.6000
T4	10	Strobe Cable	200.00 - 180.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	200.00 - 180.00	0.6000	0.6000
T4	13	Feedline Ladder (Af)	200.00 - 180.00	0.6000	0.6000
T4	14	Feedline Ladder (Af)	200.00 - 180.00	0.6000	0.6000
T5	1	1-5/8" Line	180.00 - 160.00	0.6000	0.6000
T5	3	1-5/8" Line	180.00 - 160.00	0.6000	0.6000
T5	5	1-5/8" Line	180.00 - 160.00	0.6000	0.6000
T5	7	1-5/8" Line	180.00 - 160.00	0.6000	0.6000
T5	9	Safety Line 3/8	180.00 - 160.00	0.6000	0.6000
T5	10	Strobe Cable	180.00 - 160.00	0.6000	0.6000
T5	12	Feedline Ladder (Af)	180.00 - 160.00	0.6000	0.6000
T5	13	Feedline Ladder (Af)	180.00 - 160.00	0.6000	0.6000
T5	14	Feedline Ladder (Af)	180.00 - 160.00	0.6000	0.6000
T6	1	1-5/8" Line	160.00 - 140.00	0.6000	0.6000
T6	3	1-5/8" Line	160.00 - 140.00	0.6000	0.6000
T6	5	1-5/8" Line	160.00 - 140.00	0.6000	0.6000
T6	7	1-5/8" Line	160.00 - 140.00	0.6000	0.6000
T6	9	Safety Line 3/8	160.00 - 140.00	0.6000	0.6000
T6	10	Strobe Cable	160.00 - 140.00	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T6	12	Feedline Ladder (Af)	160.00 - 140.00	0.6000	0.6000
T6	13	Feedline Ladder (Af)	160.00 - 140.00	0.6000	0.6000
T6	14	Feedline Ladder (Af)	160.00 - 140.00	0.6000	0.6000
T7	1	1-5/8" Line	120.00 - 140.00	0.6000	0.6000
T7	3	1-5/8" Line	120.00 - 140.00	0.6000	0.6000
T7	5	1-5/8" Line	120.00 - 140.00	0.6000	0.6000
T7	7	1-5/8" Line	120.00 - 140.00	0.6000	0.6000
T7	9	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T7	10	Strobe Cable	120.00 - 140.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	13	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	14	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T8	1	1-5/8" Line	100.00 - 120.00	0.6000	0.6000
T8	3	1-5/8" Line	100.00 - 120.00	0.6000	0.6000
T8	5	1-5/8" Line	100.00 - 120.00	0.6000	0.6000
T8	7	1-5/8" Line	100.00 - 120.00	0.6000	0.6000
T8	9	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T8	10	Strobe Cable	100.00 - 120.00	0.6000	0.6000
T8	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	14	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T9	1	1-5/8" Line	80.00 - 100.00	0.6000	0.6000
T9	3	1-5/8" Line	80.00 - 100.00	0.6000	0.6000
T9	5	1-5/8" Line	80.00 - 100.00	0.6000	0.6000
T9	7	1-5/8" Line	80.00 - 100.00	0.6000	0.6000
T9	9	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T9	10	Strobe Cable	80.00 - 100.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	14	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T10	1	1-5/8" Line	60.00 - 80.00	0.6000	0.6000
T10	3	1-5/8" Line	60.00 - 80.00	0.6000	0.6000
T10	5	1-5/8" Line	60.00 - 80.00	0.6000	0.6000
T10	7	1-5/8" Line	60.00 - 80.00	0.6000	0.6000
T10	9	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T10	10	Strobe Cable	60.00 - 80.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	14	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T11	1	1-5/8" Line	40.00 - 60.00	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
T11	3	1-5/8" Line	40.00 - 60.00	0.6000	0.6000
T11	5	1-5/8" Line	40.00 - 60.00	0.6000	0.6000
T11	7	1-5/8" Line	40.00 - 60.00	0.6000	0.6000
T11	9	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	10	Strobe Cable	40.00 - 60.00	0.6000	0.6000
T11	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	13	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	14	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T12	1	1-5/8" Line	20.00 - 40.00	0.6000	0.6000
T12	3	1-5/8" Line	20.00 - 40.00	0.6000	0.6000
T12	5	1-5/8" Line	20.00 - 40.00	0.6000	0.6000
T12	7	1-5/8" Line	20.00 - 40.00	0.6000	0.6000
T12	9	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	10	Strobe Cable	20.00 - 40.00	0.6000	0.6000
T12	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	13	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	14	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T13	1	1-5/8" Line	10.00 - 20.00	0.6000	0.6000
T13	3	1-5/8" Line	10.00 - 20.00	0.6000	0.6000
T13	5	1-5/8" Line	10.00 - 20.00	0.6000	0.6000
T13	7	1-5/8" Line	10.00 - 20.00	0.6000	0.6000
T13	9	Safety Line 3/8	10.00 - 20.00	0.6000	0.6000
T13	10	Strobe Cable	10.00 - 20.00	0.6000	0.6000
T13	12	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000
T13	13	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000
T13	14	Feedline Ladder (Af)	10.00 - 20.00	0.6000	0.6000

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"x10'	C	From Leg	0.000	0.000	250.000	No Ice	1.000	1.000	0.040
			0.000			1/2" Ice	2.017	2.017	0.049
			5.000						
Top Beacon	B	From Leg	0.000	0.000	250.000	No Ice	2.700	2.700	0.050
			0.000			1/2" Ice	3.100	3.100	0.070
			1.000						
**									
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 1)	A	From Leg	4.000	0.000	245.000	No Ice	97.222	65.139	3.333
			0.000			1/2" Ice	121.527	81.424	4.167
			0.000						
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 1)	B	From Leg	4.000	0.000	245.000	No Ice	97.222	65.139	3.333
			0.000			1/2" Ice	121.527	81.424	4.167
			0.000						
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 1)	C	From Leg	4.000	0.000	245.000	No Ice	97.222	65.139	3.333
			0.000			1/2" Ice	121.527	81.424	4.167
			0.000						
**									
Sector1(CaAa=10000 Sq.in)No Ice	A	From Leg	4.000	0.000	232.000	No Ice	69.444	46.527	0.700
			0.000			1/2" Ice	86.805	58.159	1.400

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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
(Carrier 2)			0.000						
Sector2(CaAa=10000 Sq.in)No Ice	B	From Leg	4.000	0.000	232.000	No Ice	69.444	46.527	0.700
(Carrier 2)			0.000			1/2" Ice	86.805	58.159	1.400
Sector3(CaAa=10000 Sq.in)No Ice	C	From Leg	4.000	0.000	232.000	No Ice	69.444	46.527	0.700
(Carrier 2)			0.000			1/2" Ice	86.805	58.159	1.400
**									
Sector1(CaAa=10000 Sq.in)No Ice	A	From Leg	4.000	0.000	222.000	No Ice	69.444	46.527	0.700
(Carrier 3)			0.000			1/2" Ice	86.805	58.159	1.400
Sector2(CaAa=10000 Sq.in)No Ice	B	From Leg	4.000	0.000	222.000	No Ice	69.444	46.527	0.700
(Carrier 3)			0.000			1/2" Ice	86.805	58.159	1.400
Sector3(CaAa=10000 Sq.in)No Ice	C	From Leg	4.000	0.000	222.000	No Ice	69.444	46.527	0.700
(Carrier 3)			0.000			1/2" Ice	86.805	58.159	1.400
**									
4 1/2" OD Dish Mount (Carrier 4)	C	From Leg	0.500	0.000	200.000	No Ice	1.873	1.850	0.057
			0.000			1/2" Ice	2.207	2.207	0.074
**			0.000						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
6' MW Dish (Carrier 4)	C	Paraboloid w/o Radome	From Leg	1.000	0.000		200.000	6.000	No Ice	28.270
				0.000					1/2" Ice	29.050
**				0.000						0.292

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

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Comb. No.	Description
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
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

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	250 - 240	Leg	Max Tension	15	11.274	1.461	-0.003
			Max. Compression	2	-18.355	0.828	-0.002
			Max. Mx	2	-18.353	-1.601	0.001
			Max. My	4	-4.207	-0.011	0.666
			Max. Vy	2	-4.855	0.828	-0.002
			Max. Vx	12	-3.539	0.008	-0.066
		Diagonal	Max Tension	24	5.622	0.000	0.000
			Max. Compression	8	-5.212	0.000	0.000
			Max. Mx	3	-0.889	0.054	-0.002
			Max. My	24	-5.196	-0.010	-0.049
			Max. Vy	14	0.020	0.000	0.000
			Max. Vx	24	0.017	0.000	0.000

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	Client	Designed by
	Vertical Bridge	andrew.fisher

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	240 - 220	Top Girt	Max Tension	14	2.755	0.000	0.000
			Max. Compression	2	-2.631	0.000	0.000
		Leg	Max. Mx	26	0.066	-0.006	0.000
			Max. My	32	0.068	0.000	0.000
			Max. Vy	26	0.007	0.000	0.000
			Max. Vx	32	-0.000	0.000	0.000
			Max Tension	15	69.335	1.929	-0.008
			Max. Compression	2	-81.052	2.620	-0.013
		Diagonal	Max. Mx	2	-72.721	-3.418	0.003
			Max. My	4	-6.740	-0.021	2.321
			Max. Vy	2	-10.832	2.620	-0.013
			Max. Vx	4	4.670	-0.036	-1.507
			Max Tension	4	8.208	0.000	0.000
			Max. Compression	4	-7.322	0.000	0.000
T3	220 - 200	Leg	Max. Mx	2	-0.680	0.025	-0.001
			Max. My	2	-6.460	-0.023	-0.016
			Max. Vy	2	0.010	0.025	0.002
			Max. Vx	2	0.005	0.000	0.000
			Max Tension	15	138.202	2.937	0.058
			Max. Compression	2	-153.594	1.598	-0.170
		Diagonal	Max. Mx	2	-81.092	7.931	-0.028
			Max. My	16	-6.671	-0.060	3.842
			Max. Vy	2	-10.739	1.598	-0.170
			Max. Vx	4	4.668	-0.051	-3.840
			Max Tension	4	9.637	0.000	0.000
			Max. Compression	4	-10.542	0.000	0.000
T4	200 - 180	Leg	Max. Mx	2	1.820	0.046	-0.002
			Max. My	8	-10.342	-0.008	-0.038
			Max. Vy	2	0.016	0.046	0.001
			Max. Vx	8	0.010	0.000	0.000
			Max Tension	15	195.626	3.773	0.104
			Max. Compression	2	-216.197	0.993	0.021
		Diagonal	Max. Mx	2	-153.605	7.119	0.088
			Max. My	24	-8.498	-0.050	2.795
			Max. Vy	2	-11.611	0.993	0.021
			Max. Vx	4	4.693	0.093	-2.782
			Max Tension	4	9.186	0.000	0.000
			Max. Compression	16	-9.762	0.000	0.000
T5	180 - 160	Leg	Max. Mx	16	5.653	0.030	0.000
			Max. My	20	-9.494	-0.006	0.018
			Max. Vy	16	0.012	0.030	0.000
			Max. Vx	20	-0.004	0.000	0.000
			Max Tension	15	245.715	4.639	0.108
			Max. Compression	2	-271.761	0.216	0.004
		Diagonal	Max. Mx	2	-216.219	6.776	0.199
			Max. My	24	-9.974	-0.040	2.757
			Max. Vy	2	-12.481	0.216	0.004
			Max. Vx	24	-4.644	-0.005	0.220
			Max Tension	16	9.196	0.000	0.000
			Max. Compression	16	-9.370	0.000	0.000
T6	160 - 140	Leg	Max. Mx	4	4.883	0.045	0.001
			Max. My	22	-7.763	0.004	0.012
			Max. Vy	4	0.017	0.045	0.001
			Max. Vx	22	-0.003	0.000	0.000
			Max Tension	15	291.354	4.272	0.083
			Max. Compression	2	-322.991	1.122	0.027
		Diagonal	Max. Mx	2	-271.781	6.454	0.159
			Max. My	24	-11.597	-0.030	2.547
			Max. Vy	2	-13.570	1.122	0.027
			Max. Vx	24	-4.920	-0.008	0.618
			Max Tension	16	9.344	0.000	0.000

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	Project	Date
	250' SST/30.10299722, -82.5741528	14:37:13 09/21/22
	Client	Designed by
	Vertical Bridge	andrew.fisher

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	140 - 120	Leg	Max. Compression	16	-9.407	0.000	0.000
			Max. Mx	4	5.036	0.044	0.002
			Max. My	22	-7.797	0.007	0.011
			Max. Vy	34	0.019	0.025	-0.002
			Max. Vx	22	-0.002	0.000	0.000
			Max Tension	15	334.664	4.813	0.081
			Max. Compression	2	-372.529	1.084	0.020
			Max. Mx	2	-323.016	7.876	0.165
			Max. My	24	-13.237	-0.031	3.082
			Max. Vy	2	-14.779	1.084	0.020
			Max. Vx	24	-5.264	-0.005	0.543
			Max Tension	16	9.948	0.000	0.000
			Max. Compression	2	-9.991	0.000	0.000
			Max. Mx	4	5.405	0.063	0.002
T8	120 - 100	Leg	Max. My	14	-8.718	0.010	-0.013
			Max. Vy	34	0.025	0.037	-0.003
			Max. Vx	14	0.002	0.000	0.000
			Max Tension	15	376.488	5.119	0.071
			Max. Compression	2	-421.117	1.388	0.030
			Max. Mx	2	-372.557	8.450	0.144
			Max. My	24	-15.097	-0.015	3.180
			Max. Vy	2	-16.036	1.388	0.030
			Max. Vx	24	-5.662	0.002	0.823
			Max Tension	16	10.529	0.000	0.000
			Max. Compression	2	-10.558	0.000	0.000
			Max. Mx	4	5.774	0.061	0.003
			Max. My	24	-6.334	0.040	0.012
			Max. Vy	34	0.028	0.044	-0.004
T9	100 - 80	Leg	Max. Vx	24	0.002	0.000	0.000
			Max Tension	15	417.367	6.442	0.083
			Max. Compression	2	-469.623	0.359	0.010
			Max. Mx	2	-421.149	9.376	0.143
			Max. My	24	-17.103	0.010	3.658
			Max. Vy	2	-17.459	0.359	0.010
			Max. Vx	24	-6.111	0.004	0.325
			Max Tension	2	11.585	0.000	0.000
			Max. Compression	2	-11.427	0.000	0.000
			Max. Mx	4	6.225	0.082	0.006
			Max. My	24	-6.952	0.059	0.014
			Max. Vy	34	0.038	0.064	-0.006
			Max. Vx	24	-0.002	0.000	0.000
			Max Tension	15	457.212	6.142	0.060
T10	80 - 60	Leg	Max. Compression	2	-517.364	1.144	0.045
			Max. Mx	2	-469.652	9.085	0.116
			Max. My	24	-19.480	0.029	3.386
			Max. Vy	2	-18.581	1.144	0.045
			Max. Vx	24	-6.939	-0.009	1.439
			Max Tension	2	12.279	0.000	0.000
			Max. Compression	2	-12.050	0.000	0.000
			Max. Mx	4	6.187	0.094	0.007
			Max. My	14	-11.305	0.055	-0.017
			Max. Vy	33	0.041	0.078	0.007
			Max. Vx	14	0.002	0.000	0.000
			Max Tension	15	496.044	7.551	0.068
			Max. Compression	2	-564.496	0.018	0.028
			Max. Mx	2	-517.398	10.417	0.150
T11	60 - 40	Leg	Max. My	24	-21.929	0.051	4.912
			Max. Vy	2	-19.310	0.018	0.028
			Max. Vx	24	-6.945	0.051	4.912
			Max Tension	17	13.577	0.000	0.000
			Max. Compression	3	-14.456	0.000	0.000
			Max. Compression	3	-14.456	0.000	0.000

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	Client	Designed by
	Vertical Bridge	andrew.fisher

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T12	40 - 20	Horizontal	Max. Mx	34	1.289	0.120	0.000
			Max. My	27	0.308	0.000	0.003
			Max. Vy	34	-0.044	0.000	0.000
			Max. Vx	27	-0.001	0.000	0.000
			Max Tension	2	2.101	-0.068	0.001
			Max. Compression	15	-2.123	-0.049	0.002
			Max. Mx	27	-0.018	-0.081	0.001
			Max. My	14	0.966	-0.055	0.007
			Max. Vy	33	0.043	-0.078	0.001
			Max. Vx	14	0.001	-0.055	0.007
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	2	-0.006	0.000	0.000
			Max. Mx	26	-0.004	-0.039	0.000
			Max. My	2	-0.006	0.000	-0.000
			Max. Vy	26	-0.016	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
			Max Tension	15	533.080	8.479	0.069
			Max. Compression	2	-610.205	-0.715	0.019
			Max. Mx	2	-610.170	-10.925	-0.070
			Max. My	24	-24.603	0.028	4.473
		Diagonal	Max. Vy	2	-20.403	-0.715	0.019
			Max. Vx	24	-6.941	0.028	4.473
			Max Tension	17	13.909	0.000	0.000
			Max. Compression	3	-14.311	0.000	0.000
			Max. Mx	34	1.648	0.136	0.000
			Max. My	27	0.679	0.000	0.003
			Max. Vy	34	0.047	0.000	0.000
			Max. Vx	27	-0.001	0.000	0.000
		Horizontal	Max Tension	2	2.399	-0.099	0.001
			Max. Compression	15	-2.297	-0.072	0.003
			Max. Mx	27	-0.065	-0.127	0.003
			Max. My	14	0.933	-0.081	0.009
			Max. Vy	27	0.058	-0.127	0.003
			Max. Vx	14	0.002	-0.081	0.009
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	2	-0.006	0.000	0.000
			Max. Mx	30	-0.004	-0.045	0.000
			Max. My	2	-0.006	0.000	-0.000
			Max. Vy	30	0.017	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000
T13	20 - 0	Leg	Max Tension	15	568.220	8.290	0.070
			Max. Compression	2	-653.970	0.000	-0.000
			Max. Mx	2	-653.934	-10.736	-0.081
			Max. My	25	-20.679	0.022	4.261
			Max. Vy	2	-21.455	0.000	-0.000
			Max. Vx	24	-6.907	0.037	4.260
		Diagonal	Max Tension	17	13.970	0.000	0.000
			Max. Compression	2	-14.506	0.000	0.000
			Max. Mx	27	2.387	0.183	0.000
			Max. My	27	1.509	0.000	0.004
			Max. Vy	27	-0.060	0.000	0.000
			Max. Vx	27	-0.001	0.000	0.000
		Horizontal	Max Tension	2	2.367	-0.117	0.001
			Max. Compression	15	-2.283	-0.080	0.003
			Max. Mx	27	-0.107	-0.154	0.004
			Max. My	14	1.039	-0.092	0.009
			Max. Vy	27	0.062	-0.154	0.004
			Max. Vx	14	0.002	-0.092	0.009
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	2	-0.008	0.000	0.000
			Max. Mx	35	-0.005	-0.050	0.000

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	Client	Vertical Bridge	Designed by	andrew.fisher

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-0.008	0.000	-0.000
			Max. Vy	35	0.018	0.000	0.000
			Max. Vx	2	0.000	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	623.848	39.029	-22.519
	Max. H _x	18	623.848	39.029	-22.519
	Max. H _z	5	-497.414	-31.381	20.921
	Min. Vert	7	-547.244	-35.627	20.559
	Min. H _x	7	-547.244	-35.627	20.559
Leg B	Min. H _z	18	623.848	39.029	-22.519
	Max. Vert	10	620.580	-38.959	-22.312
	Max. H _x	23	-534.193	35.028	20.008
	Max. H _z	25	-481.098	30.598	20.274
	Min. Vert	23	-534.193	35.028	20.008
Leg A	Min. H _x	10	620.580	-38.959	-22.312
	Min. H _z	10	620.580	-38.959	-22.312
	Max. Vert	2	652.614	-0.131	47.254
	Max. H _x	21	21.680	5.801	0.897
	Max. H _z	2	652.614	-0.131	47.254
	Min. Vert	15	-566.815	0.164	-42.875
	Min. H _x	9	31.202	-5.909	1.457
	Min. H _z	15	-566.815	0.164	-42.875

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	74.881	0.000	-0.000	5.021	1.631	-0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	89.857	1.409	-78.987	-12132.908	-282.760	-3.001
0.9 Dead+1.0 Wind 0 deg - No Ice	67.393	1.409	-78.984	-12103.633	-282.516	-2.993
1.2 Dead+1.0 Wind 30 deg - No Ice	89.857	37.947	-63.990	-9978.355	-5964.882	21.531
0.9 Dead+1.0 Wind 30 deg - No Ice	67.393	37.946	-63.988	-9954.312	-5950.126	21.528
1.2 Dead+1.0 Wind 60 deg - No Ice	89.857	61.161	-35.311	-5560.543	-9639.739	0.411
0.9 Dead+1.0 Wind 60 deg - No Ice	67.393	61.159	-35.310	-5547.764	-9615.437	0.396
1.2 Dead+1.0 Wind 90 deg - No Ice	89.857	70.196	-0.868	-169.140	-10995.266	-20.522
0.9 Dead+1.0 Wind 90 deg - No Ice	67.393	70.194	-0.868	-170.257	-10967.520	-20.544
1.2 Dead+1.0 Wind 120 deg - No Ice	89.857	65.482	36.179	5513.201	-10106.082	3.943
0.9 Dead+1.0 Wind 120 deg - No Ice	67.393	65.480	36.177	5497.667	-10080.852	3.920

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	Project	Date
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	Vertical Bridge	andrew.fisher

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
No Ice						
1.2 Dead+1.0 Wind 150 deg - No Ice	89.857	36.531	63.299	9844.428	-5675.331	27.977
0.9 Dead+1.0 Wind 150 deg - No Ice	67.393	36.529	63.297	9817.746	-5661.277	27.960
1.2 Dead+1.0 Wind 180 deg - No Ice	89.857	-0.181	73.573	11513.464	38.571	5.722
0.9 Dead+1.0 Wind 180 deg - No Ice	67.393	-0.181	73.570	11482.454	37.974	5.714
1.2 Dead+1.0 Wind 210 deg - No Ice	89.857	-36.990	63.963	9984.904	5775.744	-18.131
0.9 Dead+1.0 Wind 210 deg - No Ice	67.393	-36.988	63.961	9957.834	5760.421	-18.129
1.2 Dead+1.0 Wind 240 deg - No Ice	89.857	-65.004	37.530	5789.916	10019.843	-0.411
0.9 Dead+1.0 Wind 240 deg - No Ice	67.393	-65.002	37.529	5773.643	9993.824	-0.396
1.2 Dead+1.0 Wind 270 deg - No Ice	89.857	-69.694	0.053	16.899	10897.785	17.123
0.9 Dead+1.0 Wind 270 deg - No Ice	67.393	-69.692	0.052	15.292	10869.300	17.146
1.2 Dead+1.0 Wind 300 deg - No Ice	89.857	-60.179	-34.536	-5400.073	9438.939	-6.661
0.9 Dead+1.0 Wind 300 deg - No Ice	67.393	-60.177	-34.534	-5387.726	9414.190	-6.639
1.2 Dead+1.0 Wind 330 deg - No Ice	89.857	-36.553	-63.286	-9829.752	5683.581	-27.977
0.9 Dead+1.0 Wind 330 deg - No Ice	67.393	-36.552	-63.284	-9806.120	5668.581	-27.961
1.2 Dead+1.0 Ice+1.0 Temp	109.039	0.000	-0.000	9.990	2.797	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	109.039	0.091	-5.596	-859.739	-15.588	-0.292
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	109.039	2.703	-4.570	-710.006	-426.043	1.235
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	109.039	4.395	-2.538	-393.471	-696.232	-0.109
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	109.039	5.042	-0.056	-1.212	-794.945	-1.424
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	109.039	4.661	2.586	408.962	-724.800	0.183
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	109.039	2.612	4.525	720.885	-407.311	1.802
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	109.039	-0.012	5.262	841.030	5.208	0.468
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	109.039	-2.641	4.568	729.934	419.209	-1.016
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	109.039	-4.630	2.673	426.861	724.629	0.109
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	109.039	-5.010	0.003	10.826	794.066	1.205
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	109.039	-4.332	-2.488	-383.097	688.680	-0.358
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	109.039	-2.613	-4.524	-700.436	413.291	-1.802
Dead+Wind 0 deg - Service	74.881	0.358	-20.140	-3080.529	-70.625	-0.761
Dead+Wind 30 deg - Service	74.881	9.677	-16.319	-2532.986	-1515.100	5.484
Dead+Wind 60 deg - Service	74.881	15.600	-9.007	-1410.040	-2449.403	0.102
Dead+Wind 90 deg - Service	74.881	17.905	-0.221	-39.436	-2794.057	-5.231
Dead+Wind 120 deg - Service	74.881	16.698	9.227	1405.109	-2567.828	0.998
Dead+Wind 150 deg - Service	74.881	9.317	16.143	2506.076	-1441.548	7.120
Dead+Wind 180 deg - Service	74.881	-0.046	18.763	2930.284	10.925	1.453

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	Project	Date
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	Client	Designed by
	Vertical Bridge	andrew.fisher

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+Wind 210 deg - Service	74.881	-9.433	16.312	2541.746	1469.313	-4.621
Dead+Wind 240 deg - Service	74.881	-16.577	9.571	1475.346	2548.231	-0.102
Dead+Wind 270 deg - Service	74.881	-17.777	0.013	7.774	2771.606	4.367
Dead+Wind 300 deg - Service	74.881	-15.350	-8.809	-1369.317	2400.723	-1.690
Dead+Wind 330 deg - Service	74.881	-9.322	-16.140	-2495.270	1445.984	-7.120

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	-74.881	0.000	-0.000	74.881	0.000	0.000%
2	1.410	-89.857	-78.991	-1.409	89.857	78.987	0.003%
3	1.410	-67.393	-78.991	-1.409	67.393	78.984	0.006%
4	37.948	-89.857	-63.993	-37.947	89.857	63.990	0.003%
5	37.948	-67.393	-63.993	-37.946	67.393	63.988	0.006%
6	61.164	-89.857	-35.313	-61.161	89.857	35.311	0.003%
7	61.164	-67.393	-35.313	-61.159	67.393	35.310	0.006%
8	70.199	-89.857	-0.868	-70.196	89.857	0.868	0.003%
9	70.199	-67.393	-0.868	-70.194	67.393	0.868	0.006%
10	65.485	-89.857	36.180	-65.482	89.857	-36.179	0.003%
11	65.485	-67.393	36.180	-65.480	67.393	-36.177	0.006%
12	36.533	-89.857	63.301	-36.531	89.857	-63.299	0.003%
13	36.533	-67.393	63.301	-36.529	67.393	-63.297	0.006%
14	-0.181	-89.857	73.576	0.181	89.857	-73.573	0.003%
15	-0.181	-67.393	73.576	0.181	67.393	-73.570	0.006%
16	-36.991	-89.857	63.965	36.990	89.857	-63.963	0.003%
17	-36.991	-67.393	63.965	36.988	67.393	-63.961	0.006%
18	-65.007	-89.857	37.532	65.004	89.857	-37.530	0.003%
19	-65.007	-67.393	37.532	65.002	67.393	-37.529	0.006%
20	-69.697	-89.857	0.053	69.694	89.857	-0.053	0.003%
21	-69.697	-67.393	0.053	69.692	67.393	-0.052	0.006%
22	-60.181	-89.857	-34.537	60.179	89.857	34.536	0.003%
23	-60.181	-67.393	-34.537	60.177	67.393	34.534	0.005%
24	-36.554	-89.857	-63.289	36.553	89.857	63.286	0.003%
25	-36.554	-67.393	-63.289	36.552	67.393	63.284	0.006%
26	0.000	-109.039	0.000	-0.000	109.039	0.000	0.000%
27	0.091	-109.039	-5.596	-0.091	109.039	5.596	0.000%
28	2.703	-109.039	-4.570	-2.703	109.039	4.570	0.000%
29	4.395	-109.039	-2.538	-4.395	109.039	2.538	0.000%
30	5.043	-109.039	-0.056	-5.042	109.039	0.056	0.000%
31	4.661	-109.039	2.586	-4.661	109.039	-2.586	0.000%
32	2.612	-109.039	4.525	-2.612	109.039	-4.525	0.000%
33	-0.012	-109.039	5.262	0.012	109.039	-5.262	0.000%
34	-2.641	-109.039	4.568	2.641	109.039	-4.568	0.000%
35	-4.630	-109.039	2.673	4.630	109.039	-2.673	0.000%
36	-5.010	-109.039	0.003	5.010	109.039	-0.003	0.000%
37	-4.332	-109.039	-2.488	4.332	109.039	2.488	0.000%
38	-2.613	-109.039	-4.525	2.613	109.039	4.524	0.000%
39	0.358	-74.881	-20.140	-0.358	74.881	20.140	0.001%
40	9.677	-74.881	-16.320	-9.677	74.881	16.319	0.001%
41	15.600	-74.881	-9.007	-15.600	74.881	9.007	0.001%
42	17.905	-74.881	-0.221	-17.905	74.881	0.221	0.001%
43	16.699	-74.881	9.227	-16.698	74.881	-9.227	0.001%
44	9.317	-74.881	16.144	-9.317	74.881	-16.143	0.001%
45	-0.046	-74.881	18.764	0.046	74.881	-18.763	0.001%
46	-9.434	-74.881	16.313	9.433	74.881	-16.312	0.001%
47	-16.578	-74.881	9.571	16.577	74.881	-9.571	0.001%

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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	
48	-17.778	-74.881	0.013	17.777	74.881	-0.013	0.001%
49	-15.351	-74.881	-8.810	15.350	74.881	8.809	0.001%
50	-9.323	-74.881	-16.141	9.322	74.881	16.140	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00003586	0.00008610
3	Yes	12	0.00006434	0.00014785
4	Yes	13	0.00003498	0.00008420
5	Yes	12	0.00006232	0.00014356
6	Yes	13	0.00003418	0.00008244
7	Yes	12	0.00006048	0.00013959
8	Yes	13	0.00003501	0.00008432
9	Yes	12	0.00006237	0.00014375
10	Yes	13	0.00003584	0.00008610
11	Yes	12	0.00006428	0.00014779
12	Yes	13	0.00003503	0.00008432
13	Yes	12	0.00006242	0.00014378
14	Yes	13	0.00003413	0.00008229
15	Yes	12	0.00006038	0.00013929
16	Yes	13	0.00003503	0.00008433
17	Yes	12	0.00006243	0.00014381
18	Yes	13	0.00003586	0.00008616
19	Yes	12	0.00006432	0.00014789
20	Yes	13	0.00003506	0.00008445
21	Yes	12	0.00006248	0.00014400
22	Yes	13	0.00003421	0.00008250
23	Yes	12	0.00006053	0.00013970
24	Yes	13	0.00003502	0.00008431
25	Yes	12	0.00006241	0.00014377
26	Yes	6	0.00000001	0.00000381
27	Yes	13	0.00000001	0.00007157
28	Yes	13	0.00000001	0.00007062
29	Yes	13	0.00000001	0.00006955
30	Yes	13	0.00000001	0.00006938
31	Yes	13	0.00000001	0.00007083
32	Yes	13	0.00000001	0.00007108
33	Yes	13	0.00000001	0.00007179
34	Yes	13	0.00000001	0.00007187
35	Yes	13	0.00000001	0.00007149
36	Yes	13	0.00000001	0.00006959
37	Yes	13	0.00000001	0.00006913
38	Yes	13	0.00000001	0.00006999
39	Yes	13	0.00000001	0.00006792
40	Yes	13	0.00000001	0.00006758
41	Yes	13	0.00000001	0.00006719
42	Yes	13	0.00000001	0.00006756
43	Yes	13	0.00000001	0.00006789
44	Yes	13	0.00000001	0.00006761
45	Yes	13	0.00000001	0.00006721
46	Yes	13	0.00000001	0.00006766
47	Yes	13	0.00000001	0.00006796
48	Yes	13	0.00000001	0.00006760

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49	Yes	13	0.00000001	0.00006717
50	Yes	13	0.00000001	0.00006757

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	11.562	39	0.413	0.055
T2	240 - 220	10.650	39	0.414	0.055
T3	220 - 200	8.854	39	0.388	0.052
T4	200 - 180	7.215	39	0.345	0.048
T5	180 - 160	5.773	39	0.304	0.039
T6	160 - 140	4.517	39	0.263	0.032
T7	140 - 120	3.430	39	0.220	0.026
T8	120 - 100	2.521	39	0.180	0.020
T9	100 - 80	1.759	39	0.145	0.015
T10	80 - 60	1.144	39	0.114	0.011
T11	60 - 40	0.653	39	0.082	0.006
T12	40 - 20	0.319	39	0.053	0.004
T13	20 - 0	0.101	39	0.026	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.000	Lightning Rod 1"x10'	39	11.562	0.413	0.055	Inf
245.000	Sector1(CaAa=14000 Sq.in)No Ice	39	11.106	0.414	0.055	Inf
232.000	Sector1(CaAa=10000 Sq.in)No Ice	39	9.921	0.408	0.054	64655
222.000	Sector1(CaAa=10000 Sq.in)No Ice	39	9.028	0.391	0.052	28833
200.000	6' MW Dish	39	7.215	0.345	0.048	23597

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	45.675	2	1.635	0.218
T2	240 - 220	42.060	2	1.640	0.217
T3	220 - 200	34.953	2	1.532	0.205
T4	200 - 180	28.474	2	1.362	0.188
T5	180 - 160	22.777	2	1.199	0.154
T6	160 - 140	17.814	2	1.038	0.127
T7	140 - 120	13.526	2	0.867	0.102
T8	120 - 100	9.936	2	0.712	0.080
T9	100 - 80	6.930	2	0.574	0.059
T10	80 - 60	4.506	2	0.449	0.042
T11	60 - 40	2.572	2	0.323	0.026
T12	40 - 20	1.257	2	0.208	0.016
T13	20 - 0	0.398	2	0.104	0.007

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.000	Lightning Rod 1"x10'	2	45.675	1.635	0.218	689110
245.000	Sector1(CaAa=14000 Sq.in)No Ice	2	43.868	1.641	0.218	689110
232.000	Sector1(CaAa=10000 Sq.in)No Ice	2	39.176	1.613	0.213	16323
222.000	Sector1(CaAa=10000 Sq.in)No Ice	2	35.642	1.548	0.206	7249
200.000	6' MW Dish	2	28.474	1.362	0.188	6017

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	250	Diagonal	A325X	0.625	1	5.622	9.598	0.586 ✓	1	Member Block Shear
		Top Girt	A325X	0.625	1	2.755	9.598	0.287 ✓	1	Member Block Shear
T2	240	Leg	A325N	0.750	6	1.878	30.101	0.062 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	8.208	9.598	0.855 ✓	1	Member Block Shear
T3	220	Leg	A325N	0.750	6	11.552	30.101	0.384 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	9.637	10.740	0.897 ✓	1	Member Block Shear
T4	200	Leg	A325N	1.000	6	23.035	54.517	0.423 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	9.186	10.740	0.855 ✓	1	Member Block Shear
T5	180	Leg	A325N	1.000	6	32.602	54.517	0.598 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	9.196	13.025	0.706 ✓	1	Member Block Shear
T6	160	Leg	A325N	1.000	6	40.950	54.517	0.751 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	9.344	13.025	0.717 ✓	1	Member Block Shear
T7	140	Leg	A325N	1.250	6	48.556	87.220	0.557 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	9.948	14.168	0.702 ✓	1	Member Block Shear
T8	120	Leg	A325N	1.250	6	55.774	87.220	0.639 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	10.529	14.168	0.743 ✓	1	Member Block Shear
T9	100	Leg	A325N	1.250	6	62.745	87.220	0.719 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	11.585	17.257	0.671 ✓	1	Bolt Shear
T10	80	Leg	A325N	1.250	6	69.558	87.220	0.797 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	12.279	17.257	0.712 ✓	1	Bolt Shear

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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
T11	60	Leg	A325N	1.500	6	76.198	126.472	0.602 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	13.576	26.051	0.521 ✓	1	Member Block Shear
		Horizontal	A325X	0.625	1	9.784	21.480	0.455 ✓	1	Member Block Shear
T12	40	Leg	A325N	1.500	6	82.670	126.472	0.654 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	13.909	26.051	0.534 ✓	1	Member Block Shear
		Horizontal	A325X	0.625	1	10.576	26.051	0.406 ✓	1	Member Block Shear
T13	20	Leg	A325N	1.500	6	88.843	126.472	0.702 ✓	1	Bolt Tension
		Diagonal	A325X	0.625	1	14.506	29.250	0.496 ✓	1	Gusset Bearing
		Horizontal	A325X	0.625	1	11.335	26.051	0.435 ✓	1	Member Block Shear

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	250 - 240	1 3/4	10.009	4.504	123.5 K=1.00	2.405	-12.186	35.601	0.342 ¹ ✓
T2	240 - 220	2 1/4	20.019	4.754	101.4 K=1.00	3.976	-72.721	84.331	0.862 ¹ ✓
T3	220 - 200	2 3/4	20.019	4.754	83.0 K=1.00	5.940	-145.431	161.540	0.900 ¹ ✓
T4	200 - 180	3 1/4	20.019	4.754	70.2 K=1.00	8.296	-208.474	260.312	0.801 ¹ ✓
T5	180 - 160	3 1/2	20.019	4.754	65.2 K=1.00	9.621	-264.543	317.273	0.834 ¹ ✓
T6	160 - 140	3 1/2	20.019	4.754	65.2 K=1.00	9.621	-316.220	317.273	0.997 ¹ ✓
T7	140 - 120	3 3/4	20.019	4.754	60.9 K=1.00	11.045	-365.799	379.106	0.965 ¹ ✓
T8	120 - 100	4	20.019	4.754	57.1 K=1.00	12.566	-414.381	445.717	0.930 ¹ ✓
T9	100 - 80	4 1/4	20.019	4.754	53.7 K=1.00	14.186	-462.781	517.034	0.895 ¹ ✓
T10	80 - 60	4 1/4	20.019	4.754	53.7 K=1.00	14.186	-510.701	517.034	0.988 ¹ ✓
T11	60 - 40	4 1/2	20.019	4.754	50.7 K=1.00	15.904	-551.963	593.004	0.931 ¹ ✓
T12	40 - 20	4 3/4	20.019	4.754	48.0 K=1.00	17.721	-597.659	673.582	0.887 ¹ ✓

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Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	$\frac{\phi P_n}{\phi P_n}$
T13	20 - 0	4 3/4	20.019	4.754	48.0 K=1.00	17.721	-641.705	673.582	0.953 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	$\frac{\phi P_n}{\phi P_n}$
T1	250 - 240	L1 3/4x1 3/4x3/16	6.221	3.127	109.3 K=1.00	0.621	-5.212	14.893	0.350 ¹ ✓
T2	240 - 220	L1 3/4x1 3/4x3/16	7.485	3.737	130.6 K=1.00	0.621	-7.322	10.429	0.702 ¹ ✓
T3	220 - 200	L2x2x3/16	7.823	3.887	118.4 K=1.00	0.715	-10.542	14.601	0.722 ¹ ✓
T4	200 - 180	L2x2x3/16	9.987	4.941	150.5 K=1.00	0.715	-8.685	9.037	0.961 ¹ ✓
T5	180 - 160	L2 1/2x2 1/2x3/16	11.329	5.602	135.8 K=1.00	0.902	-8.870	13.999	0.634 ¹ ✓
T6	160 - 140	L2 1/2x2 1/2x3/16	12.706	6.292	152.5 K=1.00	0.902	-9.066	11.097	0.817 ¹ ✓
T7	140 - 120	L3x3x3/16	14.108	6.983	140.6 K=1.00	1.090	-9.698	15.783	0.614 ¹ ✓
T8	120 - 100	L3x3x3/16	15.529	7.683	154.7 K=1.00	1.090	-10.414	13.037	0.799 ¹ ✓
T9	100 - 80	L3x3x1/4	16.963	8.390	170.1 K=1.00	1.440	-11.334	14.250	0.795 ¹ ✓
T10	80 - 60	L3x3x1/4	18.408	9.113	184.7 K=1.00	1.440	-11.988	12.079	0.992 ¹ ✓
T11	60 - 40	2L2 1/2x2 1/2x3/16x3/8	10.829	10.620	168.0 K=1.00	1.800	-13.587	17.672	0.769 ¹ ✓
T12	40 - 20	2L 'a' > 60.815 in - 273 2L2 1/2x2 1/2x3/16x3/8	11.508	11.290	178.6 K=1.00	1.800	-14.116	15.702	0.899 ¹ ✓
T13	20 - 0	2L 'a' > 64.652 in - 312 2L3x3x3/16x3/8 2L 'a' > 68.435 in - 350	12.195	11.980	159.4 K=1.00	2.180	-14.506	23.211	0.625 ¹ ✓

¹ P_u / φP_n controls

Horizontal Design Data (Compression)

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

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T11	60 - 40	2L2x2x3/16x3/8	19.106	9.366	183.2 K=1.00	1.430	-9.784	11.998	0.816 ¹ ✓
T12	40 - 20	2L 'a' > 53.826 in - 268 2L2 1/2x2 1/2x3/16x3/8	20.606	10.105	159.9 K=1.00	1.800	-10.576	19.445	0.544 ¹ ✓
T13	20 - 0	2L 'a' > 57.865 in - 307 2L2 1/2x2 1/2x3/16x3/8 2L 'a' > 62.159 in - 346	22.106	10.855	171.8 K=1.00	1.800	-11.335	16.943	0.669 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	250 - 240	L1 3/4x1 3/4x3/16	3.788	3.642	127.2 K=1.00	0.621	-2.631	10.980	0.240 ¹ ✓

¹ P_u / φP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	L1 3/4x1 3/4x3/16	9.197	9.197	321.3 K=1.00	0.621	-0.006	1.722	0.004 ¹ ✓
T12	40 - 20	KL/R > 250 (C) - 293 L1 3/4x1 3/4x3/16	10.303	10.303	360.0 K=1.00	0.621	-0.006	1.372	0.004 ¹ ✓
T13	20 - 0	KL/R > 250 (C) - 315 L1 3/4x1 3/4x3/16 KL/R > 250 (C) - 371	10.697	10.697	373.7 K=1.00	0.621	-0.008	1.273	0.006 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

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	Vertical Bridge	andrew.fisher

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	250 - 240	1 3/4	10.009	0.500	13.7	2.405	11.274	108.238	0.104 ¹
T2	240 - 220	2 1/4	20.019	0.500	10.7	3.976	69.335	178.924	0.388 ¹
T3	220 - 200	2 3/4	20.019	0.500	8.7	5.940	138.202	267.281	0.517 ¹
T4	200 - 180	3 1/4	20.019	0.500	7.4	8.296	195.626	373.310	0.524 ¹
T5	180 - 160	3 1/2	20.019	0.500	6.9	9.621	245.715	432.951	0.568 ¹
T6	160 - 140	3 1/2	20.019	0.500	6.9	9.621	291.354	432.951	0.673 ¹
T7	140 - 120	3 3/4	20.019	0.500	6.4	11.045	334.664	497.010	0.673 ¹
T8	120 - 100	4	20.019	0.500	6.0	12.566	376.488	565.487	0.666 ¹
T9	100 - 80	4 1/4	20.019	0.500	5.7	14.186	417.367	638.381	0.654 ¹
T10	80 - 60	4 1/4	20.019	0.500	5.7	14.186	457.212	638.381	0.716 ¹
T11	60 - 40	4 1/2	20.019	0.500	5.3	15.904	496.044	715.694	0.693 ¹
T12	40 - 20	4 3/4	20.019	0.500	5.1	17.721	533.080	797.425	0.669 ¹
T13	20 - 0	4 3/4	20.019	0.500	5.1	17.721	568.220	797.425	0.713 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	250 - 240	L1 3/4x1 3/4x3/16	6.221	3.127	69.9	0.360	5.622	17.567	0.320 ¹
T2	240 - 220	L1 3/4x1 3/4x3/16	7.485	3.737	83.5	0.360	8.208	17.567	0.467 ¹
T3	220 - 200	L2x2x3/16	7.823	3.887	75.6	0.431	9.637	21.001	0.459 ¹
T4	200 - 180	L2x2x3/16	9.061	4.481	87.2	0.431	9.186	21.001	0.437 ¹
T5	180 - 160	L2 1/2x2 1/2x3/16	11.329	5.602	86.4	0.571	9.196	27.838	0.330 ¹
T6	160 - 140	L2 1/2x2 1/2x3/16	12.706	6.292	97.0	0.571	9.344	27.838	0.336 ¹
T7	140 - 120	L3x3x3/16	14.108	6.983	89.2	0.712	9.948	34.712	0.287 ¹
T8	120 - 100	L3x3x3/16	15.529	7.683	98.2	0.712	10.529	34.712	0.303 ¹

tnxTower B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job	ATS#9749 - Ebenezer (Site# US-FL-5391)	Page	30 of 32
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	Client	Vertical Bridge	Designed by	andrew.fisher

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T9	100 - 80	L3x3x1/4	16.963	8.390	108.3	0.939	11.585	45.794	0.253 ¹ ✓
T10	80 - 60	L3x3x1/4	18.408	9.113	117.6	0.939	12.279	45.794	0.268 ¹ ✓
T11	60 - 40	2L2 1/2x2 1/2x3/16x3/8	10.829	10.620	163.8	1.139	13.576	55.529	0.244 ¹ ✓
T12	40 - 20	2L 'a' > 60.815 in - 272 2L2 1/2x2 1/2x3/16x3/8	11.508	11.290	174.1	1.139	13.909	55.529	0.250 ¹ ✓
T13	20 - 0	2L 'a' > 64.652 in - 311 2L3x3x3/16x3/8	12.195	11.980	153.1	1.424	13.970	69.423	0.201 ¹ ✓
		2L 'a' > 68.435 in - 350							✓

¹ P_u / φP_n controls

Horizontal 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 $\frac{P_u}{\phi P_n}$
T11	60 - 40	2L2x2x3/16x3/8	18.394	9.009	175.2	0.862	9.784	42.001	0.233 ¹ ✓
T12	40 - 20	2L 'a' > 51.778 in - 286 2L2 1/2x2 1/2x3/16x3/8	20.606	10.105	155.9	1.139	10.576	55.529	0.190 ¹ ✓
T13	20 - 0	2L 'a' > 57.865 in - 307 2L2 1/2x2 1/2x3/16x3/8	21.394	10.499	161.9	1.139	11.335	55.529	0.204 ¹ ✓
		2L 'a' > 60.119 in - 364							✓

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	250 - 240	L1 3/4x1 3/4x3/16	3.788	3.642	81.4	0.360	2.755	17.567	0.157 ¹ ✓

¹ P_u / φP_n controls

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	Vertical Bridge	andrew.fisher

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	250 - 240	Leg	1 3/4	3	-12.186	35.601	34.2	Pass
T2	240 - 220	Leg	2 1/4	21	-72.721	84.331	86.2	Pass
T3	220 - 200	Leg	2 3/4	48	-145.431	161.540	90.0	Pass
T4	200 - 180	Leg	3 1/4	75	-208.474	260.312	80.1	Pass
T5	180 - 160	Leg	3 1/2	102	-264.543	317.273	83.4	Pass
T6	160 - 140	Leg	3 1/2	129	-316.220	317.273	99.7	Pass
T7	140 - 120	Leg	3 3/4	156	-365.799	379.106	96.5	Pass
T8	120 - 100	Leg	4	183	-414.381	445.717	93.0	Pass
T9	100 - 80	Leg	4 1/4	210	-462.781	517.034	89.5	Pass
T10	80 - 60	Leg	4 1/4	237	-510.701	517.034	98.8	Pass
T11	60 - 40	Leg	4 1/2	264	-551.963	593.004	93.1	Pass
T12	40 - 20	Leg	4 3/4	303	-597.659	673.582	88.7	Pass
T13	20 - 0	Leg	4 3/4	342	-641.705	673.582	95.3	Pass
T1	250 - 240	Diagonal	L1 3/4x1 3/4x3/16	8	-5.212	14.893	35.0	Pass
							58.6 (b)	
T2	240 - 220	Diagonal	L1 3/4x1 3/4x3/16	26	-7.322	10.429	70.2	Pass
							85.5 (b)	
T3	220 - 200	Diagonal	L2x2x3/16	71	-10.542	14.601	72.2	Pass
							89.7 (b)	
T4	200 - 180	Diagonal	L2x2x3/16	81	-8.685	9.037	96.1	Pass
T5	180 - 160	Diagonal	L2 1/2x2 1/2x3/16	108	-8.870	13.999	63.4	Pass
							70.6 (b)	
T6	160 - 140	Diagonal	L2 1/2x2 1/2x3/16	135	-9.066	11.097	81.7	Pass
T7	140 - 120	Diagonal	L3x3x3/16	162	-9.698	15.783	61.4	Pass
							70.2 (b)	
T8	120 - 100	Diagonal	L3x3x3/16	189	-10.414	13.037	79.9	Pass
T9	100 - 80	Diagonal	L3x3x1/4	216	-11.334	14.250	79.5	Pass
T10	80 - 60	Diagonal	L3x3x1/4	243	-11.988	12.079	99.2	Pass
T11	60 - 40	Diagonal	2L2 1/2x2 1/2x3/16x3/8	273	-13.587	17.672	76.9	Pass
T12	40 - 20	Diagonal	2L2 1/2x2 1/2x3/16x3/8	312	-14.116	15.702	89.9	Pass
T13	20 - 0	Diagonal	2L3x3x3/16x3/8	350	-14.506	23.211	62.5	Pass
T11	60 - 40	Horizontal	2L2x2x3/16x3/8	268	-9.784	11.998	81.6	Pass
T12	40 - 20	Horizontal	2L2 1/2x2 1/2x3/16x3/8	307	-10.576	19.445	54.4	Pass
T13	20 - 0	Horizontal	2L2 1/2x2 1/2x3/16x3/8	346	-11.335	16.943	66.9	Pass
T1	250 - 240	Top Girt	L1 3/4x1 3/4x3/16	4	-2.631	10.980	24.0	Pass
							28.7 (b)	
T11	60 - 40	Inner Bracing	L1 3/4x1 3/4x3/16	293	-0.006	1.722	0.4	Pass
T12	40 - 20	Inner Bracing	L1 3/4x1 3/4x3/16	315	-0.006	1.372	0.4	Pass
T13	20 - 0	Inner Bracing	L1 3/4x1 3/4x3/16	371	-0.008	1.273	0.6	Pass
							Summary	
							Leg (T6)	Pass
							Diagonal (T10)	Pass
							Horizontal (T11)	Pass
							Top Girt (T1)	Pass
							Inner Bracing (T13)	Pass
							Bolt Checks	Pass
							RATING =	Pass

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Client Arcosa Telecom Structures/165690 9749 Ebenezer/Engineering/tnxTower/0922	Designed By Ebenezer.eri andrew.fisher	