ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Hartford, CT 06103-3597
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Direct (860) 275-8345

EM-VER-033-071005

October 5, 2007

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification**
179 Shunpike Road
Cromwell, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") intends to install antennas on the existing 170-foot self-supporting lattice tower owned by the Cromwell Fire District at 179 Shunpike Road in Cromwell, Connecticut. Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Paul Beaulieu, Cromwell First Selectman. Pursuant to Siting Council directive a copy of the letter is also being sent to the Cromwell Fire District, owners of the property on which the tower is located.

The facility consists of a 170-foot self-supporting lattice tower capable of supporting multiple carriers within a fenced compound at 179 Shunpike Road in Cromwell. The tower is currently shared by Sprint Nextel with antennas located at the 170-foot level; the Town with whip antennas at various levels; T-Mobile with antennas at the 127-foot level; and AT&T at the 114-foot level on the tower. Cellco intends to install twelve (12) panel-type antennas (six cellular and six PCS) at the 100-foot level on the tower and place a 12' x 30' equipment shelter on the ground near the base of the tower within the existing fenced compound. Attached behind Tab 1 are Project Plans for the proposed Cellco facility.

The planned modifications to the Cromwell facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the overall height of the existing tower. Cellco's antennas will be mounted with their centerline at the 100-foot level on the 170-foot tower.

2. The proposed installation of a 12' x 30' equipment shelter will not require an extension of the fenced compound or lease area.

3. The proposed installation will not increase the noise levels at the facility by six decibels or more.

4. The operation of the antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. The worst-case RF power density calculations for existing and Cellco antennas would be 42.29% of the FCC standard. A copy of the power density calculations table is attached behind Tab 2.

Also attached, behind Tab 3, is a Structural Analysis confirming that the tower can support the existing and Cellco antennas and associated equipment.

For the foregoing reasons, Cellco respectfully submits that the proposed antenna installation at the facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

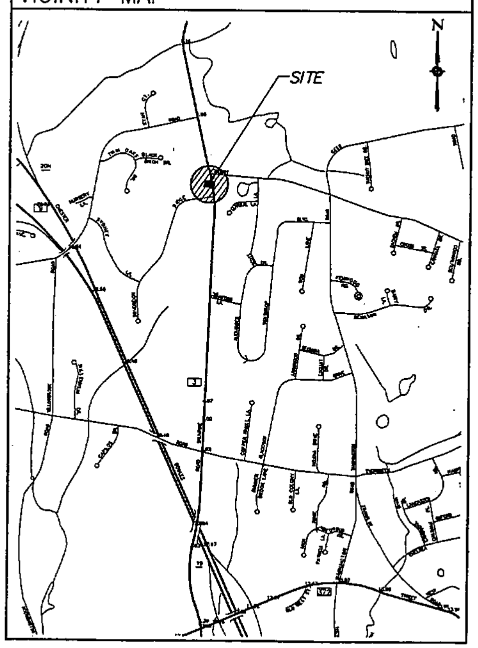
Attachments
Copy to:
Paul Beaulieu, Cromwell First Selectman
Cromwell Fire District
Sandy M. Carter
Michelle Kababik

CELLCO PARTNERSHIP
DBA
verizon wireless

CROMWELL NORTH

179 SHUNPIKE ROAD
CROMWELL, CT 06416

VICINITY MAP



PROJECT SUMMARY

SITE NAME:	CROMWELL NORTH
SITE ADDRESS:	179 SHUNPIKE ROAD CROMWELL, CT 06416
CONTACT PERSON	CELLCO PARTNERSHIP DBA VERIZON WIRELESS BRIAN RAGOZZINE (860) 803-8207
TOWER OWNER:	CROMWELL FIRE DISTRICT
JURISDICTION:	CONNECTICUT SITING COUNCIL
ARCHITECT:	URS CORPORATION A.E.S. 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067
M/E/P ENGINEER:	URS CORPORATION A.E.S. 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067

LEGEND

SYMBOL	DESCRIPTION
	SECTION OR DETAIL NUMBER SHEET WHERE DETAIL/SECTION OCCURS
	ELEVATION NUMBER
	SHEET WHERE ELEVATION OCCURS

ABBREVIATIONS

MIN.	MINIMUM
V.I.F.	VERIFY IN FIELD
O.C.	ON CENTER
PSF	POUND/SQUARE FOOT
TYP.	TYPICAL
TOC	TOP OF CONCRETE
TOW	TOP OF WALL
FT.	FEET
SQ.FT.	SQUARE FEET
N/A	NOT APPLICABLE

SHEET INDEX

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET - GENERAL NOTES AND LEGENDS
SC-1	PARTIAL SITE PLAN, EQUIPMENT ROOM PLAN AND ELEVATION

CELLCO PARTNERSHIP
DBA
verizon wireless

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE
SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

STATE OF CONNECTICUT · DOUGLAS J. ... · No. 4310 · LICENSED ARCHITECT

PROJECT NO:	36931088
JOB NO:	VZ4-010
DRAWN BY:	KAP
CHECKED BY:	

ISSUED FOR

A	10-01-07	REVIEW
0	10-02-07	ZONING

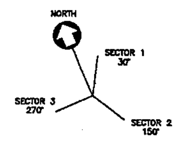
THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO VERIZON WIRELESS IS STRICTLY PROHIBITED.

CROMWELL NORTH
179 SHUNPIKE ROAD
CROMWELL, CT 06416

SCALE: AS NOTED

TITLE SHEET - PROJECT SUMMARY AND LEGENDS

T-1

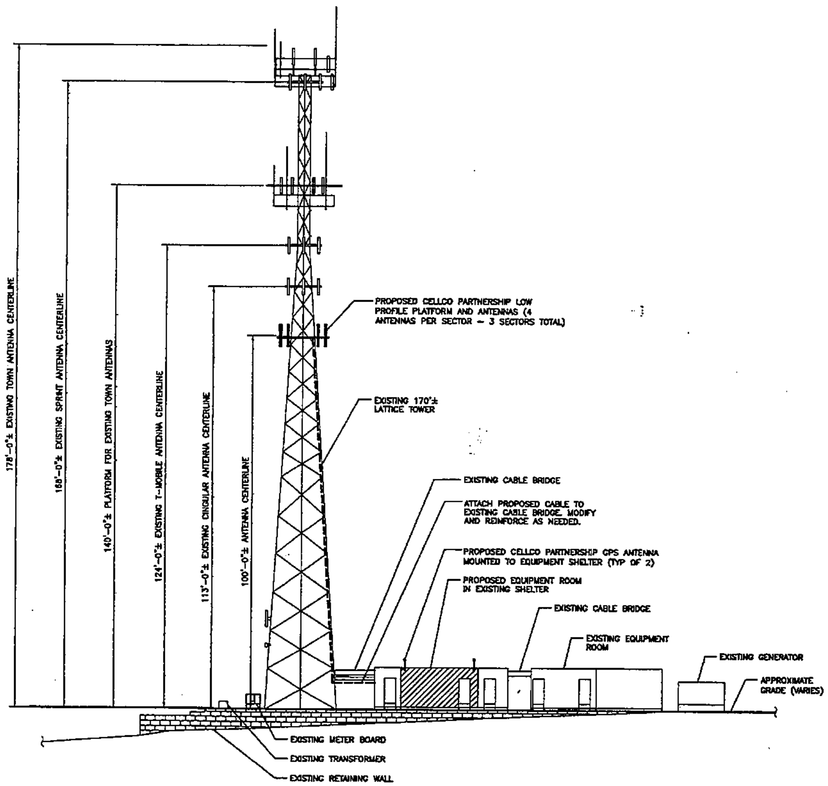


ANTENNA ORIENTATION KEY

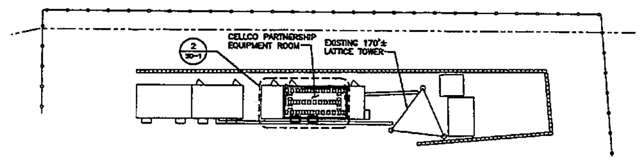
LEGEND		
DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
LEASE LINE		
CHAIN LINK FENCE		
CONTOUR LINES		
UNDERGROUND UTILITIES		E/T
UTILITY POLE		
TREE LINE		
SEDIMENTATION FENCE		
SPOT ELEVATION	x XXX.X	
WOOD FENCE		

SITE PLAN INFORMATION

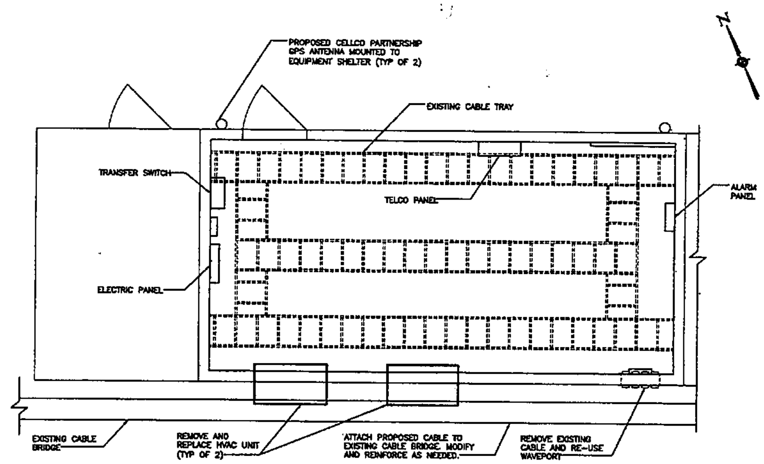
THIS SITE PLAN DRAWING WAS COMPILED FROM DATA COLLECTED IN THE FIELD AND FROM AVAILABLE EXISTING DRAWINGS OF THE SUBJECT AREA.



3 SC-1 MONOPOLE ELEVATION
SCALE: 1"=10'-0"



1 SC-1 PARTIAL SITE PLAN
SCALE: 1"=5'-0"



2 SC-1 EQUIPMENT ROOM PLAN
SCALE: 3/8"=1'-0"

CELLCO PARTNERSHIP
DBA
verizon wireless

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE
SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

PROJECT NO: 36931086
JOB NO: VZ4-010
DRAWN BY: KAP
CHECKED BY:

ISSUED FOR		
A	10-01-07	REVIEW
0	10-02-07	ZONING

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO VERIZON WIRELESS IS STRICTLY PROHIBITED.

CROMWELL NORTH

179 SHUNPIKE ROAD
CROMWELL, CT 06416

SCALE: AS NOTED

PARTIAL SITE PLAN, EQUIPMENT ROOM PLAN AND ELEVATION

SC-1

	General	Power	Density					
Site Name: Cromwell N								
Tower Height: Verizon @ 100Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Cingular UMTS	1	500	114	0.0138	1935	1.0000	1.38%	
*Cingular - GSM	2	296	114	0.0164	880	0.5867	2.79%	
*Cingular - GSM	2	497	114	0.0275	1930	1.0000	2.75%	
*VoiceStream	4	268	125	0.0247	1930	1.0000	2.47%	
*CR Police Dept	1	635	159	0.0090	635	0.4233	2.13%	
*CR Fire Dept	1	100	128	0.0022	46	0.2000	1.10%	
*CR Fire Dept	1	110	135	0.0022	154	0.2000	1.09%	
*CR Fire Alarm	1	500	127	0.0111	460	0.3067	3.63%	
*Sprint	11	359	170	0.0491	1962.5	1.0000	4.91%	
Verizon	**9**	**285**	**100**	**0.0922**	**880**	**0.5866**	**15.72%**	
Verizon PCS	**3**	**400**	**100**	**0.0431**	**1900**	**1.0000**	**4.31%**	
								42.29%
* Source: Siting Council								

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 170' SELF SUPPORTING LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

Cromwell North - Revision 2
179 Shunpike Road
Cromwell, Connecticut

prepared for

Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

prepared by

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36931086.00000
VZ4-010

REV 2 October 3, 2007

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 170' self supporting lattice tower located at 179 Shunpike Road in Cromwell, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 85 mph (fastest mile) and 74 mph (fastest mile) concurrent with ½" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Verizon Wireless installation is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(9) Allgon 7184.14 antennas,** **(9) 1 5/8" coaxial cables and** **(3) PiROD T –Frames.**	**AT&T (existing)**	**@ 161'-6"**
Install: **(6) Antel RWA 80014 antennas and** **(6) Antel LPA 185063/12CF-2 antennas** **on (3) T-frames** **(PiROD part #800093)** **(12) 1 5/8" dia coax cables** **(located at Tower leg C, on existing** **T – bracket previously occupied by AT&T).** **See Section 6 Tower Feed Line Plan**	**Verizon (Proposed)**	**@ 100'**

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **With the modifications outlined above, the tower and foundation are considered structurally adequate for the proposed antenna loading with the wind load classification specified above.**

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.

2) Tower geometry, structural member sizes, and Foundation information taken from a tower report prepared by PiROD Inc., ENG. File No. A-116398, dated November 19, 1999.

3) Tower reinforcement information taken from report prepared by Maguire Group Inc., dated July 15, 2002.

4) Antenna and mount configuration as specified on the following page of this report.

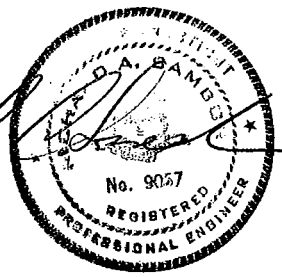
1. EXECUTIVE SUMMARY – continued

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower and connections. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation



Richard A. Sambor, P.E.
Manager Facilities Design

RAS/jrm

cc: AA, DR, IA, CF/Book – URS

2. INTRODUCTION

The subject tower is located at 179 Shunpike Road in Cromwell, Connecticut. The structure is a 170' self supporting lattice tower designed and manufactured by PiROD Inc.

The inventory is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) 9' Whip antenna	Town (existing)	Pipe to Pipe Kit	178	(1) 1 5/8" coax cable
(2) 21' Whip antennas	Town (existing)	9 Arm Halo Mount	178'	(1) 7/8" coax cable (1) 1 1/4" coax cable
(1) Mobile Mark OD12-2400 antenna (1) Breezecom TMA	Town (existing)	Pipe to Pipe Kit	175'	(1) 3/8" coax cable
(1) PD458-2 antenna	Town (existing)	9 Arm Halo Mount	175'	(1) 7/8" coax cable
(2) 10' Whip antennas	Town (existing)	9 Arm Halo Mount	174'	(2) 7/8" coax cables
(1) Tx Rx 101-90-08 antenna	Town (existing)	9 Arm Halo Mount	173'	(1) 1 1/4" coax cable
(6) Decibel 950G65VTZE-M antennas	Sprint (existing)	9 Arm Halo Mount	168'	(6) 1 5/8" coax cables
(1) Breezecom SU-RA-HP-2.4 antenna	Town (existing)	9 Arm Halo Mount	168'	(1) 3/8" coax cable
(1) 21' Whip antenna	Town (existing)	20' Platform	144'	(1) 1/2" coax cable
(1) 17' Whip antenna	Town (existing)	20' Platform	142	(1) 1/2" coax cable
(1) PD620-3 antenna	Town (existing)	20' Platform	140'	(1) 7/8" coax cable
(1) 11' Whip Antenna	Town (existing)	20' Platform	140'	(1) 1/2" coax cable
(3) PD458-2 antennas	Town (existing)	20' Platform	140'	(1) 1 1/4" coax cable (2) 7/8" coax cables (1) 1/2" coax cable (dead end)
(6) EMS RR90-17-DP antennas (6) LGP TMAs	T-Mobile (existing)	(3) T-Frames	124'	(12) 1 5/8" coax cables
(6) Powerwave 7770.00 antennas and (12) Powerwave LGP21401 TMA's	Cingular (existing)	(3) T-Frames	113'	(12) 1 5/8" coax cables
(1) Cushcraft PC9013 antenna	(existing)	18" Bar	24'	(1) 1/2" coax cable
(6) Antel RWA 80014 and (6) Antel LPA 185063/12CF-2 antennas	**Verizon (proposed)**	**(3) T-Frames (PiROD part #800093)**	**100'**	**(12) 1 5/8" coax cables (existing T-Bracket, leg C)**
(2) Silent Witness V60BB6036 cameras	(existing)	10" Bar	17'	(2) 2/18 AWG cables

This structural analysis of the communications tower was performed by URS Corporation (URS) for Verizon Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 85 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 74 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were within the allowable stresses. The anchor bolts and foundation were also within allowable limits. Detailed analysis and calculations for the proposed load conditions are provided in section 6 of this report.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **With the modifications outlined in Section 1 of this report, the tower and foundation are considered structurally adequate for the proposed antenna loading with the wind load classification specified above.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed as specified in Section 6 of this report.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

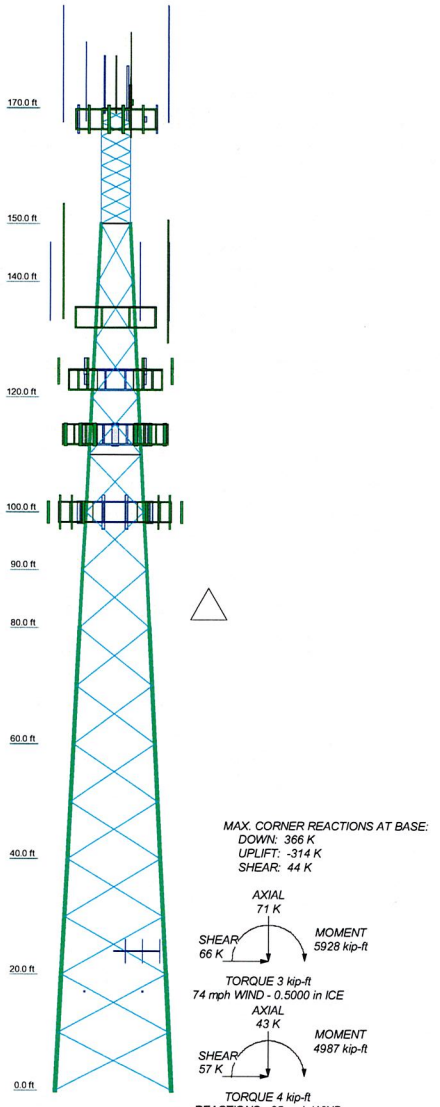
After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Prod 105220	Prod 105219		Prod 105218			Prod 105217	Prod 105216	Prod 105244	SR 1 3/4
Leg Grade	A572-50									
Diagonals	L4x4x1/4	L3 1/2x3 1/2x5/16		L3x3x5/16			L3x3x3/16		A	SR 7/8
Diagonal Grade	A572-50						A36			
Top Girts	L3x3x3/16									SR 7/8
Mid Girts	N.A.						L3x3x3/16		N.A.	
Bottom Girts	SR 7/8			N.A.						
Face Width (ft)	20	18	16	14	12	11	10	8	6	5
# Panels @ (ft)	8 @ 2.46958			15 @ 10						
Weight (K)	27.6	5.2	4.5	4.6	3.5	1.5	1.5	2.8	2.1	1.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
2" Dia 10' Omni (Municipal)	178	PIROD 10' Lightweight T-Frame (T-Mobile)	123
3" Dia 20' Omni (Municipal)	177.5	PIROD 10' Lightweight T-Frame (T-Mobile)	123
3" Dia 20' Omni (Municipal)	177.5	PIROD 10' Lightweight T-Frame (T-Mobile)	123
OD12-2400 (Municipal)	175.25	(2) TMA 10"x8"x3" (Cingular)	113.5
PD458-2 (Municipal)	174.5	(2) TMA 10"x8"x3" (Cingular)	113.5
2" Dia 10' Omni (Municipal)	174	(2) TMA 10"x8"x3" (Cingular)	113.5
2" Dia 10' Omni (Municipal)	174	(3) DUO1417-8686 (Cingular)	113.5
101-90-08-0-01 (Municipal)	172.5	(3) DUO1417-8686 (Cingular)	113.5
4'x4" Pipe Mount (Municipal)	172	Diplexer (Cingular)	113.5
Generic TMA (Municipal)	171	(3) DUO1417-8686 (Cingular)	113.5
10'6"x4" Pipe Mount (Municipal)	170	Diplexer (Cingular)	113.5
9 Arm Halo Mount (Municipal)	168	Diplexer (Cingular)	113.5
950G65VTZE-M (Sprint)	168	PIROD 12' Lightweight T-Frame (Cingular)	113.5
SU-RA-HP-2.4 Antenna (Municipal)	168	PIROD 12' Lightweight T-Frame (Cingular)	113.5
950G65VTZE-M (Sprint)	168	PIROD 12' Lightweight T-Frame (Cingular)	113.5
950G65VTZE-M (Sprint)	168	LPA-185063/12CF_2 (Verizon -proposed)	100
950G65VTZE-M (Sprint)	168	RWA80014 (Verizon -proposed)	100
950G65VTZE-M (Sprint)	168	RWA80014 (Verizon -proposed)	100
950G65VTZE-M (Sprint)	168	LPA-185063/12CF_2 (Verizon -proposed)	100
3" Dia 20' Omni (Municipal)	143.5	PIROD 12' Lightweight T-Frame (Verizon -proposed)	100
17' 3" Dia Whip (Municipal)	142	RWA80014 (Verizon -proposed)	100
PD458-2 (Municipal)	140	RWA80014 (Verizon -proposed)	100
PD458-2 (Municipal)	140	LPA-185063/12CF_2 (Verizon -proposed)	100
PD458-2 (Municipal)	140	LPA-185063/12CF_2 (Verizon -proposed)	100
620-3 (Municipal)	140	RWA80014 (Verizon -proposed)	100
11' 6" Whip (Municipal)	139.5	RWA80014 (Verizon -proposed)	100
PIROD 20' Universal Platform (Municipal)	133.75	PIROD 12' Lightweight T-Frame (Verizon -proposed)	100
(2) RR90-17-DP (T-Mobile)	124.5	LPA-185063/12CF_2 (Verizon -proposed)	100
(2) RR90-17-DP (T-Mobile)	124.5	PIROD 12' Lightweight T-Frame (Verizon -proposed)	100
(2) RR90-17-DP (T-Mobile)	124.5	LPA-185063/12CF_2 (Verizon -proposed)	100
(2) Generic TMA (T-Mobile)	124.5	PC9013N	24
(2) Generic TMA (T-Mobile)	124.5	(2) V60BB6036	17
(2) Generic TMA (T-Mobile)	124.5		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 96.8%

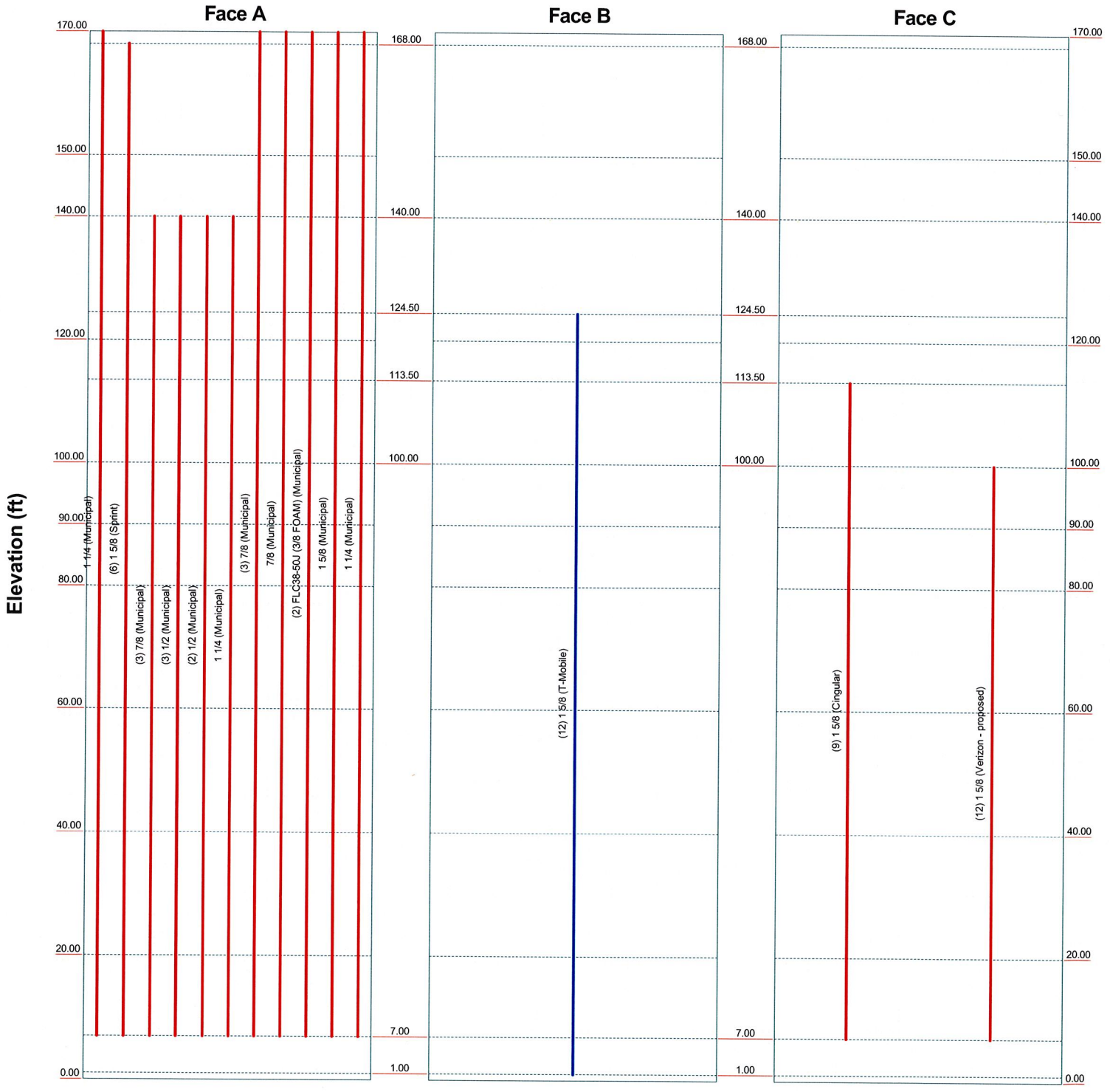
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: *170' Self-Supporting Lattice Tower - Cromwell*			
Project: *Cromwell North - REV 2*			
Client: Verizon Wireless	Drawn by: Staff	App'd:	
Code: TIA/EIA-222-F	Date: 10/03/07	Scale: NTS	
Path: P:\08\Rev-2\ERI Files\170' Self-Supporting Lattice Tower_Rev_1.prj		Dwg No. E-1	

RISA TOWER FEEDLINE DISTRIBUTION CHART

Feedline Distribution Chart
0' - 170'

Round | Flat | App In Face | App Out Face | Truss Leg



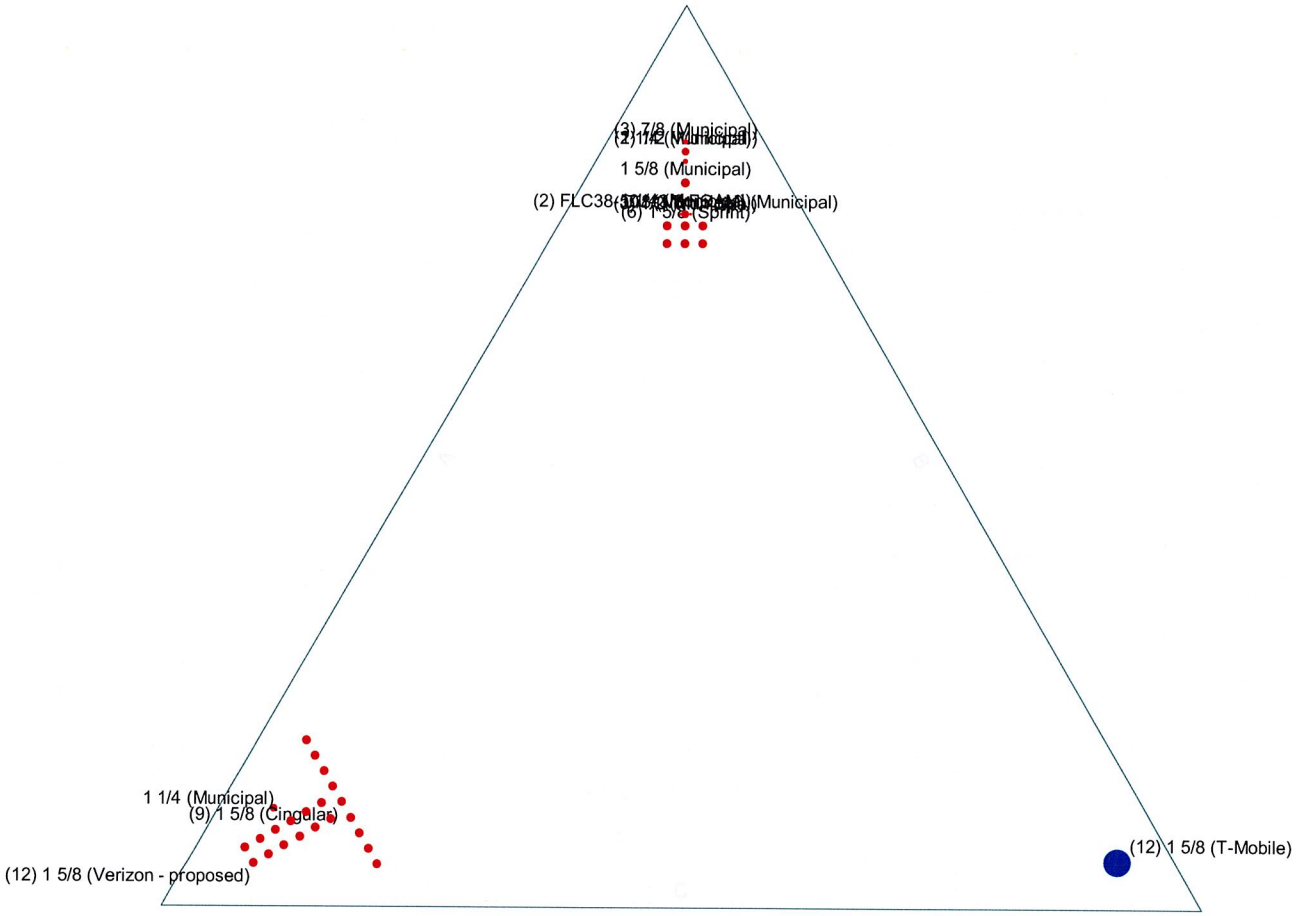
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***170' Self-Supporting Lattice Tower - Cromwell***			
Project: ***Cromwell North - REV 2***			
Client: Verizon Wireless	Drawn by: Staff	App'd:	
Code: TIA/EIA-222-F	Date: 10/03/07	Scale: NTS	
Path: P:\08\Rev-2\ERI Files\170' Self-Supporting Lattice Tower_Rev_1.er		Dwg No. E-7	

RISA TOWER FEEDLINE PLAN

Feedline Plan

Round Flat App In Face App Out Face Truss-Leg



URS Corporation
500 Enterprise Drive, Suite 3B
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Phone: (860) 529-8882
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Job: ***170' Self-Supporting Lattice Tower - Cromwell***			
Project: ***Cromwell North - REV 2***			
Client: Verizon Wireless	Drawn by: Staff	App'd:	
Code: TIA/EIA-222-F	Date: 10/03/07	Scale: NTS	
Path: P:\08\Rev-2\ER\Files\170' Self-Supporting Lattice Tower_Rev_1.er		Dwg No. E-7	

RISA TOWER DETAILED OUTPUT

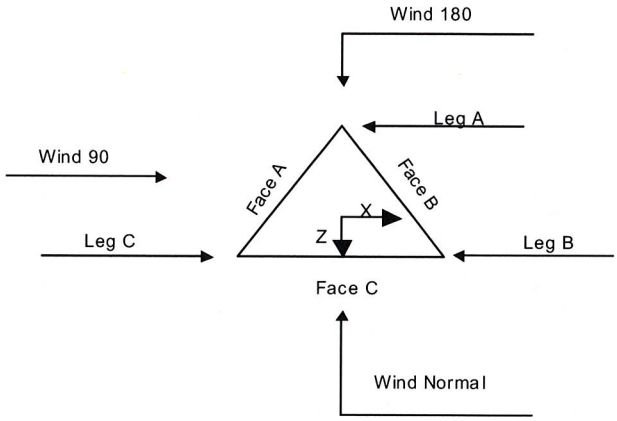
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 170.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	√ Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	170.00-150.00			5.00	1	20.00
T2	150.00-140.00		U6.0 105244	5.00	1	10.00
T3	140.00-120.00		U8.0 105216	6.00	1	20.00
T4	120.00-100.00		U10.0 105217 L3x3/16	8.00	1	20.00
T5	100.00-90.00		U12.0 105216	10.00	1	10.00
T6	90.00-80.00		U12.0 105216	11.00	1	10.00
T7	80.00-60.00		U14.0 105218	12.00	1	20.00
T8	60.00-40.00		U16.0 105219	14.00	1	20.00
T9	40.00-20.00		U18.0 105219	16.00	1	20.00
T10	20.00-0.00		U20.0 105219 L4x1/4	18.00	1	20.00

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	170.00-150.00	2.49	X Brace	No	No	0.0000	1.0000
T2	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T5	100.00-90.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	90.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 170.00-150.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 140.00-120.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T4 120.00-100.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T5 100.00-90.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T6 90.00-80.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 80.00-60.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T8 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 40.00-20.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 20.00-0.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 170.00-150.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 150.00-140.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 120.00-100.00	1	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	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
T1 170.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T5 100.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T6 90.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X / Y	K Brace Diags X / Y	Single Diags X / Y	Girts X / Y	Horiz. X / Y	Sec. Horiz. X / Y	Inner Brace X / Y
T1 170.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-90.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 90.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: 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)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals
T2 150.00-140.00	1	0.5	0.85	1	0.5	0.85
T3 140.00-120.00	1	0.5	0.85	1	0.5	0.85
T4 120.00-100.00	1	0.5	0.85	1	0.5	0.85
T5 100.00-90.00	1	0.5	0.85	1	0.5	0.85
T6 90.00-80.00	1	0.5	0.85	1	0.5	0.85
T7 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T8 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T9 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T10 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 170.00-150.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

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
T2 150.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 100.00-90.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 90.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

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 170.00-150.00	Flange	0.7500 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-90.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 90.00-80.00	Flange	1.0000 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	1.0000 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 1/4	A	No	Ar (CfAe)	170.00 - 7.00	-10.0000	-0.365	1	1	1.5500	1.5500		0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(Municipal)												
1 5/8 (Cingular)	C	No	Ar (Leg)	113.50 - 7.00	0.0000	0.2	9	1	1.9800	1.9800		1.04
1 5/8 (Sprint)	A	No	Ar (Leg)	168.00 - 7.00	0.0000	0.22	6	2	1.9800	1.9800		1.04
7/8 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.14	3	3	1.1100	1.1100		0.54
1/2 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.2	3	1	0.5800	0.5800		0.25
1/2 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.14	2	2	0.5800	0.5800		0.25
1 1/4 (Municipal)	A	No	Ar (Leg)	140.00 - 7.00	0.0000	0.14	1	1	1.5500	1.5500		0.66
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.14	3	3	1.1100	1.1100		0.54
7/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.2	1	1	1.1100	1.1100		0.54
FLC38-50J (3/8 FOAM) (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.2	2	2	0.4400	0.4400		0.08
1 5/8 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.17	1	1	1.9800	1.9800		1.04
1 1/4 (Municipal)	A	No	Ar (Leg)	170.00 - 7.00	0.0000	0.2	1	1	1.5500	1.5500		0.66
1 5/8 (Verizon - proposed)	C	No	Ar (Leg)	100.00 - 7.00	0.0000	0.14	12	6	1.9800	1.9800		1.04

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	B	No	CaAa (In Face)	124.50 - 1.00	-8.0000	0.42	12	No Ice	0.20	1.04
								1/2" Ice	0.30	2.55

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	170.00-150.00	A	33.586	0.000	0.000	0.000	0.21
		B	31.002	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	150.00-140.00	A	17.696	0.000	0.000	0.000	0.11
		B	16.404	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	48.358	0.000	0.000	0.000	0.29
		B	45.775	0.000	10.692	0.000	0.06
		C	0.000	0.000	0.000	0.000	0.00
T4	120.00-100.00	A	68.406	0.000	0.000	0.000	0.29
		B	45.775	0.000	47.520	0.000	0.25
		C	20.047	0.000	0.000	0.000	0.13
T5	100.00-90.00	A	57.506	0.000	0.000	0.000	0.14

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	22.887	0.000	23.760	0.000	0.12
		C	33.327	0.000	0.000	0.000	0.22
T6	90.00-80.00	A	57.506	0.000	0.000	0.000	0.14
		B	22.887	0.000	23.760	0.000	0.12
		C	33.327	0.000	0.000	0.000	0.22
T7	80.00-60.00	A	115.012	0.000	0.000	0.000	0.29
		B	45.775	0.000	47.520	0.000	0.25
		C	66.654	0.000	0.000	0.000	0.44
T8	60.00-40.00	A	115.012	0.000	0.000	0.000	0.29
		B	45.775	0.000	47.520	0.000	0.25
		C	66.654	0.000	0.000	0.000	0.44
T9	40.00-20.00	A	115.012	0.000	0.000	0.000	0.29
		B	45.775	0.000	47.520	0.000	0.25
		C	66.654	0.000	0.000	0.000	0.44
T10	20.00-0.00	A	74.758	0.000	0.000	0.000	0.19
		B	29.754	0.000	45.144	0.000	0.24
		C	43.325	0.000	0.000	0.000	0.28

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	170.00-150.00	A	0.500	47.686	1.467	0.000	0.000	0.55
		B		43.436	1.467	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	150.00-140.00	A	0.500	24.829	0.733	0.000	0.000	0.29
		B		22.704	0.733	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	0.500	73.591	3.400	0.000	0.000	0.80
		B		69.341	3.400	16.092	0.000	0.14
		C		0.000	0.000	0.000	0.000	0.00
T4	120.00-100.00	A	0.500	103.764	3.400	0.000	0.000	0.80
		B		69.341	3.400	71.519	0.000	0.61
		C		30.172	0.000	0.000	0.000	0.31
T5	100.00-90.00	A	0.500	78.456	1.700	0.000	0.000	0.40
		B		34.671	1.700	35.760	0.000	0.31
		C		41.660	0.000	0.000	0.000	0.54
T6	90.00-80.00	A	0.500	78.456	1.700	0.000	0.000	0.40
		B		34.671	1.700	35.760	0.000	0.31
		C		41.660	0.000	0.000	0.000	0.54
T7	80.00-60.00	A	0.500	156.912	3.400	0.000	0.000	0.80
		B		69.341	3.400	71.519	0.000	0.61
		C		83.320	0.000	0.000	0.000	1.07
T8	60.00-40.00	A	0.500	156.912	3.400	0.000	0.000	0.80
		B		69.341	3.400	71.519	0.000	0.61
		C		83.320	0.000	0.000	0.000	1.07
T9	40.00-20.00	A	0.500	156.912	3.400	0.000	0.000	0.80
		B		69.341	3.400	71.519	0.000	0.61
		C		83.320	0.000	0.000	0.000	1.07
T10	20.00-0.00	A	0.500	101.993	2.210	0.000	0.000	0.52
		B		45.072	2.210	67.943	0.000	0.58
		C		54.158	0.000	0.000	0.000	0.70

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	170.00-150.00	-0.4160	-6.4715	-0.4235	-5.5237
T2	150.00-140.00	-0.2878	-4.5139	-0.3097	-4.0278
T3	140.00-120.00	1.3249	-5.0245	1.2459	-4.7891
T4	120.00-100.00	2.7297	-0.3117	2.6619	-0.2820
T5	100.00-90.00	-1.2771	1.9517	-0.2905	1.4281
T6	90.00-80.00	-1.3380	2.0916	-0.2613	1.5200
T7	80.00-60.00	-1.4158	2.2790	-0.2162	1.6438
T8	60.00-40.00	-1.4928	2.4816	-0.1561	1.7828
T9	40.00-20.00	-1.6020	2.7344	-0.1014	1.9513
T10	20.00-0.00	1.6310	3.7763	2.9631	3.2078

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) V60BB6036	A	From Leg	0.83 0.00 0.00	0.0000	17.00	No Ice 1/2" Ice	0.11 0.16	0.12 0.17	0.00 0.00
PC9013N	A	From Leg	1.00 0.00 0.00	0.0000	24.00	No Ice 1/2" Ice	0.46 0.52	0.46 0.52	0.00 0.00
PiROD 12' Lightweight T-Frame (Verizon -proposed)	A	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Verizon -proposed)	B	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Verizon -proposed)	C	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
RWA80014 (Verizon -proposed)	A	From Leg	4.00 -6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
LPA-185063/12CF_2 (Verizon -proposed)	A	From Leg	4.00 -2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
LPA-185063/12CF_2 (Verizon -proposed)	A	From Leg	4.00 2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
RWA80014 (Verizon -proposed)	A	From Leg	4.00 6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
RWA80014 (Verizon -proposed)	B	From Leg	4.00 -6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
LPA-185063/12CF_2 (Verizon -proposed)	B	From Leg	4.00 -2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05

RISA Tower
URS Corporation
500 Enterprise Drive, Suite 3B
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Phone: (860) 529-8882
FAX: (860) 529-3991

Job	170' Self-Supporting Lattice Tower - Cromwell
Project	Cromwell North - REV 2
Client	Verizon Wireless
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Date	15:51:16 10/03/07
Designed by	Staff

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LPA-185063/12CF_2 (Verizon -proposed)	B	From Leg	4.00 2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
RWA80014 (Verizon -proposed)	B	From Leg	4.00 6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
RWA80014 (Verizon -proposed)	C	From Leg	4.00 -6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
LPA-185063/12CF_2 (Verizon -proposed)	C	From Leg	4.00 -2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
LPA-185063/12CF_2 (Verizon -proposed)	C	From Leg	4.00 2.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 5.42	4.51 4.95	0.01 0.05
RWA80014 (Verizon -proposed)	C	From Leg	4.00 6.00 0.00	0.0000	100.00	No Ice 1/2" Ice	5.44 5.83	3.00 3.31	0.01 0.05
PiROD 12' Lightweight T-Frame (Cingular)	A	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Cingular)	B	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
PiROD 12' Lightweight T-Frame (Cingular)	C	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	10.20 16.20	10.20 16.20	0.25 0.35
(3) DUO1417-8686 (Cingular)	A	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	6.53 6.94	4.20 4.57	0.02 0.06
(3) DUO1417-8686 (Cingular)	B	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	6.53 6.94	4.20 4.57	0.02 0.06
(3) DUO1417-8686 (Cingular)	C	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	6.53 6.94	4.20 4.57	0.02 0.06
Diplexer (Cingular)	A	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
Diplexer (Cingular)	B	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
Diplexer (Cingular)	C	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.35 0.43	0.12 0.17	0.01 0.01
(2) TMA 10"x8"x3" (Cingular)	A	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (Cingular)	B	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (Cingular)	C	From Leg	2.00 0.00 0.00	0.0000	113.50	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
PiROD 10' Lightweight T-Frame (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	0.25 0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PiROD 10' Lightweight T-Frame (T-Mobile)	B	From Leg	2.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	0.25 0.34
PiROD 10' Lightweight T-Frame (T-Mobile)	C	From Leg	2.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	9.30 14.50	9.30 14.50	0.25 0.34
(2) RR90-17-DP (T-Mobile)	A	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) RR90-17-DP (T-Mobile)	B	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) RR90-17-DP (T-Mobile)	C	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) Generic TMA (T-Mobile)	A	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	1.05 1.19	0.35 0.45	0.02 0.02
(2) Generic TMA (T-Mobile)	B	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	1.05 1.19	0.35 0.45	0.02 0.02
(2) Generic TMA (T-Mobile)	C	From Leg	4.00 0.00 0.00	0.0000	124.50	No Ice 1/2" Ice	1.05 1.19	0.35 0.45	0.02 0.02
PiROD 20' Universal Platform (Municipal)	C	None		0.0000	133.75	No Ice 1/2" Ice	33.10 47.10	33.10 47.10	2.27 2.70
PD458-2 (Municipal)	A	From Face	6.00 -9.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.40 4.79	3.40 4.79	0.02 0.05
17' 3" Dia Whip (Municipal)	A	From Face	6.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice	5.10 6.83	5.10 6.83	0.05 0.08
11' 6" Whip (Municipal)	A	From Face	6.00 9.00 0.00	0.0000	139.50	No Ice 1/2" Ice	2.30 3.48	2.30 3.48	0.02 0.04
PD458-2 (Municipal)	B	From Face	6.00 -5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.40 4.79	3.40 4.79	0.02 0.05
PD458-2 (Municipal)	B	From Face	6.00 5.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.40 4.79	3.40 4.79	0.02 0.05
620-3 (Municipal)	C	From Face	6.00 -9.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.83 5.99	3.83 5.99	0.05 0.08
3" Dia 20' Omni (Municipal)	C	From Face	6.00 9.00 0.00	0.0000	143.50	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
2" Dia 10' Omni (Municipal)	A	From Leg	2.50 -2.00 0.00	0.0000	174.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.03
101-90-08-0-01 (Municipal)	A	From Leg	2.50 2.00 0.00	0.0000	172.50	No Ice 1/2" Ice	3.33 4.31	3.33 4.31	0.04 0.06
3" Dia 20' Omni (Municipal)	B	From Face	9.00 0.00 0.00	0.0000	177.50	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
9 Arm Halo Mount (Municipal)	C	None		0.0000	168.00	No Ice	62.60	62.60	3.60
						1/2" Ice	80.40	80.40	4.80
950G65VTZE-M (Sprint)	B	From Face	6.00 1.25 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
SU-RA-HP-2.4 Antenna (Municipal)	B	From Face	3.00 2.50 0.00	0.0000	168.00	No Ice 1/2" Ice	0.80 0.93	0.37 0.47	0.00 0.01
950G65VTZE-M (Sprint)	B	From Leg	2.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
OD12-2400 (Municipal)	C	From Face	3.00 -2.50 0.00	0.0000	175.25	No Ice 1/2" Ice	0.34 0.65	0.34 0.65	0.00 0.01
Generic TMA (Municipal)	C	From Face	3.00 -2.50 0.00	0.0000	171.00	No Ice 1/2" Ice	1.05 1.19	0.35 0.45	0.02 0.02
4'x4" Pipe Mount (Municipal)	C	From Face	3.00 -2.50 0.00	0.0000	172.00	No Ice 1/2" Ice	1.32 1.58	1.32 1.58	0.04 0.06
950G65VTZE-M (Sprint)	C	From Face	6.00 -1.25 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
2" Dia 10' Omni (Municipal)	C	From Face	9.00 0.00 0.00	0.0000	174.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.03
950G65VTZE-M (Sprint)	C	From Face	6.00 1.25 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
950G65VTZE-M (Sprint)	C	From Leg	2.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
PD458-2 (Municipal)	A	From Face	3.00 -2.50 0.00	0.0000	174.50	No Ice 1/2" Ice	3.40 4.79	3.40 4.79	0.02 0.05
950G65VTZE-M (Sprint)	A	From Face	6.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice	3.99 4.37	2.78 3.15	0.01 0.03
3" Dia 20' Omni (Municipal)	A	From Face	9.00 0.00 0.00	0.0000	177.50	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
10'6"x4" Pipe Mount (Municipal)	B	From Leg	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
2" Dia 10' Omni (Municipal)	B	From Leg	0.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.03

Truss-Leg Properties

Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in^2	in^2	K	K	in	in	in^2
Pirod 105244	1026.8606	1727.9786	0.56	0.21	7.1310	11.9999	3.6816
Pirod 105216	1998.0891	3357.4497	0.51	0.43	6.9378	11.6578	3.6816
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105217	2130.7479	3520.4599	0.62	0.44	7.3984	12.2238	5.3014
Pirod 105218	2263.4687	3690.8612	0.75	0.46	7.8593	12.8155	7.2158
Pirod 105219	2441.8688	3942.2854	0.94	0.49	8.4787	13.6885	9.4248
Pirod 105219	2441.8688	3942.2854	0.94	0.49	8.4787	13.6885	9.4248
Pirod 105220	2578.8005	4132.5504	1.12	0.50	8.9542	14.3491	11.9282

Tower Pressures - No Ice

$G_H = 1.125$

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1 170.00-150.00	160.00	1.57	29	102.917	A	0.000	46.453	5.833	12.56	0.000	0.000
					B	0.000	43.870		13.30		
					C	0.000	12.868		45.33		
T2 150.00-140.00	145.00	1.526	28	66.055	A	5.476	29.600	11.905	33.94	0.000	0.000
					B	5.476	28.309		35.24		
					C	5.476	11.905		68.50		
T3 140.00-120.00	130.00	1.48	27	162.111	A	10.467	71.523	23.165	28.25	10.692	0.000
					B	10.467	68.939		29.17		
					C	10.467	23.165		68.88		
T4 120.00-100.00	110.00	1.411	26	202.528	A	13.964	93.108	24.703	23.07	47.520	0.000
					B	13.964	70.477		29.25		
					C	13.964	44.750		42.07		
T5 100.00-90.00	95.00	1.353	25	116.264	A	6.561	69.857	12.351	16.16	23.760	0.000
					B	6.561	35.239		29.55		
					C	6.561	45.678		23.64		
T6 90.00-80.00	85.00	1.31	24	126.264	A	6.959	69.857	12.351	16.08	23.760	0.000
					B	6.959	35.239		29.27		
					C	6.959	45.678		23.47		
T7 80.00-60.00	70.00	1.24	23	282.945	A	15.144	141.253	26.241	16.78	47.520	0.000
					B	15.144	72.016		30.11		
					C	15.144	92.895		24.29		
T8 60.00-40.00	50.00	1.126	21	323.362	A	19.635	143.321	28.309	17.37	47.520	0.000
					B	19.635	74.084		30.21		
					C	19.635	94.963		24.70		
T9 40.00-20.00	30.00	1	18	363.362	A	21.661	143.321	28.309	17.16	47.520	0.000
					B	21.661	74.084		29.57		
					C	21.661	94.963		24.27		
T10 20.00-0.00	10.00	1	18	403.780	A	27.125	104.654	29.897	22.69	45.144	0.000
					B	27.125	59.650		34.45		
					C	27.125	73.222		29.79		

Tower Pressure - With Ice

$G_H = 1.125$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 170.00-150.00	160.00	1.57	22	0.5000	104.583	A	1.467	71.926	9.167	12.49	0.000	0.000
						B	1.467	67.676		13.26		
						C	0.000	24.240		37.82		
T2 150.00-140.00	145.00	1.526	21	0.5000	66.890	A	6.209	46.971	20.033	37.67	0.000	0.000
						B	6.209	44.846		39.24		
						C	5.476	22.142		72.54		
T3 140.00-120.00	130.00	1.48	21	0.5000	163.780	A	13.867	116.004	38.924	29.97	16.092	0.000
						B	13.867	111.754		30.99		
						C	10.467	42.413		73.61		
T4 120.00-100.00	110.00	1.411	20	0.5000	204.197	A	17.364	149.233	40.814	24.50	71.519	0.000
						B	17.364	114.810		30.88		
						C	13.964	75.641		45.55		
T5 100.00-90.00	95.00	1.353	19	0.5000	117.098	A	8.261	101.050	20.407	18.67	35.760	0.000
						B	8.261	57.265		31.14		
						C	6.561	64.254		28.82		
T6 90.00-80.00	85.00	1.31	18	0.5000	127.098	A	8.659	101.182	20.407	18.58	35.760	0.000
						B	8.659	57.397		30.89		
						C	6.959	64.387		28.60		
T7 80.00-60.00	70.00	1.24	17	0.5000	284.614	A	18.544	204.749	42.789	19.16	71.519	0.000
						B	18.544	117.179		31.53		
						C	15.144	131.158		29.25		
T8 60.00-40.00	50.00	1.126	16	0.5000	325.031	A	23.035	208.226	45.704	19.76	71.519	0.000
						B	23.035	120.656		31.81		
						C	19.635	134.634		29.63		
T9 40.00-20.00	30.00	1	14	0.5000	365.031	A	25.061	208.805	45.704	19.54	71.519	0.000
						B	25.061	121.234		31.24		
						C	21.661	135.213		29.13		
T10 20.00-0.00	10.00	1	14	0.5000	405.448	A	29.335	156.684	47.910	25.76	67.943	0.000
						B	29.335	99.763		37.11		
						C	27.125	108.850		35.23		

Tower Pressure - Service

$G_H = 1.125$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 170.00-150.00	160.00	1.57	10	102.917	A	0.000	46.453	5.833	12.56	0.000	0.000
					B	0.000	43.870		13.30		
					C	0.000	12.868		45.33		
T2 150.00-140.00	145.00	1.526	10	66.055	A	5.476	29.600	11.905	33.94	0.000	0.000
					B	5.476	28.309		35.24		
					C	5.476	11.905		68.50		
T3 140.00-120.00	130.00	1.48	9	162.111	A	10.467	71.523	23.165	28.25	10.692	0.000
					B	10.467	68.939		29.17		
					C	10.467	23.165		68.88		
T4 120.00-100.00	110.00	1.411	9	202.528	A	13.964	93.108	24.703	23.07	47.520	0.000
					B	13.964	70.477		29.25		
					C	13.964	44.750		42.07		
T5 100.00-90.00	95.00	1.353	9	116.264	A	6.561	69.857	12.351	16.16	23.760	0.000
					B	6.561	35.239		29.55		
					C	6.561	45.678		23.64		
T6 90.00-80.00	85.00	1.31	8	126.264	A	6.959	69.857	12.351	16.08	23.760	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	6.959	35.239		29.27		
					C	6.959	45.678		23.47		
T7 80.00-60.00	70.00	1.24	8	282.945	A	15.144	141.253	26.241	16.78	47.520	0.000
					B	15.144	72.016		30.11		
					C	15.144	92.895		24.29		
T8 60.00-40.00	50.00	1.126	7	323.362	A	19.635	143.321	28.309	17.37	47.520	0.000
					B	19.635	74.084		30.21		
					C	19.635	94.963		24.70		
T9 40.00-20.00	30.00	1	6	363.362	A	21.661	143.321	28.309	17.16	47.520	0.000
					B	21.661	74.084		29.57		
					C	21.661	94.963		24.27		
T10 20.00-0.00	10.00	1	6	403.780	A	27.125	104.654	29.897	22.69	45.144	0.000
					B	27.125	59.650		34.45		
					C	27.125	73.222		29.79		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	1	1	31.305	2.02	100.77	A
			B	0.426	2.014	0.663	1	1	29.071			
			C	0.125	2.866	0.578	1	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	1	1	26.604	1.57	157.38	A
			B	0.511	1.886	0.703	1	1	25.388			
			C	0.263	2.399	0.605	1	1	12.682			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	1	1	60.566	3.86	192.86	A
			B	0.49	1.914	0.692	1	1	58.198			
			C	0.207	2.571	0.592	1	1	24.179			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	1	1	80.308	5.79	289.53	A
			B	0.417	2.031	0.659	1	1	60.385			
			C	0.29	2.323	0.613	1	1	41.390			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	1	1	61.771	3.76	376.21	A
			B	0.36	2.15	0.636	1	1	28.970			
			C	0.449	1.975	0.673	1	1	37.301			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	1	1	59.964	3.59	358.84	A
			B	0.334	2.209	0.627	1	1	29.052			
			C	0.417	2.032	0.659	1	1	37.044			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	1	1	117.668	6.81	340.59	A
			B	0.308	2.275	0.618	1	1	59.678			
			C	0.382	2.101	0.644	1	1	75.002			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	1	1	119.891	6.44	321.75	A
			B	0.29	2.323	0.613	1	1	65.037			
			C	0.354	2.161	0.634	1	1	79.846			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	1	1	118.422	5.83	291.71	A
			B	0.263	2.398	0.605	1	1	66.512			
			C	0.321	2.242	0.623	1	1	80.779			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	1	1	92.463	5.23	261.26	A
			B	0.215	2.547	0.594	1	1	62.531			
			C	0.249	2.442	0.601	1	1	71.168			
Sum Weight:	5.94	27.64						OTM	3377.34 kip-ft	44.89		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.825	1	31.305	2.02	100.77	A
			B	0.426	2.014	0.663	0.825	1	29.071			
			C	0.125	2.866	0.578	0.825	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.825	1	25.646	1.52	151.71	A
			B	0.511	1.886	0.703	0.825	1	24.430			
			C	0.263	2.399	0.605	0.825	1	11.723			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.825	1	58.734	3.75	187.52	A
			B	0.49	1.914	0.692	0.825	1	56.366			
			C	0.207	2.571	0.592	0.825	1	22.348			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.825	1	77.864	5.66	282.84	A
			B	0.417	2.031	0.659	0.825	1	57.941			
			C	0.29	2.323	0.613	0.825	1	38.946			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.825	1	60.623	3.70	370.46	A
			B	0.36	2.15	0.636	0.825	1	27.822			
			C	0.449	1.975	0.673	0.825	1	36.152			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.825	1	58.746	3.53	352.87	A
			B	0.334	2.209	0.627	0.825	1	27.834			
			C	0.417	2.032	0.659	0.825	1	35.826			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.825	1	115.018	6.69	334.30	A
			B	0.308	2.275	0.618	0.825	1	57.028			
			C	0.382	2.101	0.644	0.825	1	72.351			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.825	1	116.454	6.28	314.12	A
			B	0.29	2.323	0.613	0.825	1	61.600			
			C	0.354	2.161	0.634	0.825	1	76.410			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.825	1	114.632	5.68	283.95	A
			B	0.263	2.398	0.605	0.825	1	62.721			
			C	0.321	2.242	0.623	0.825	1	76.988			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.825	1	87.716	5.01	250.26	A
			B	0.215	2.547	0.594	0.825	1	57.784			
			C	0.249	2.442	0.601	0.825	1	66.421			
Sum Weight:	5.94	27.64						OTM	3306.71 kip-ft	43.83		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.8	1	31.305	2.02	100.77	A
			B	0.426	2.014	0.663	0.8	1	29.071			
			C	0.125	2.866	0.578	0.8	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.8	1	25.509	1.51	150.90	A
			B	0.511	1.886	0.703	0.8	1	24.293			
			C	0.263	2.399	0.605	0.8	1	11.586			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.8	1	58.472	3.74	186.76	A
			B	0.49	1.914	0.692	0.8	1	56.105			
			C	0.207	2.571	0.592	0.8	1	22.086			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.8	1	77.515	5.64	281.89	A
			B	0.417	2.031	0.659	0.8	1	57.592			
			C	0.29	2.323	0.613	0.8	1	38.597			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.8	1	60.459	3.70	369.64	A
			B	0.36	2.15	0.636	0.8	1	27.658			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.449	1.975	0.673	0.8	1	35.988			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.8	1	58.572	3.52	352.02	A
			B	0.334	2.209	0.627	0.8	1	27.660			
			C	0.417	2.032	0.659	0.8	1	35.652			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.8	1	114.639	6.67	333.40	A
			B	0.308	2.275	0.618	0.8	1	56.650			
			C	0.382	2.101	0.644	0.8	1	71.973			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.8	1	115.964	6.26	313.04	A
			B	0.29	2.323	0.613	0.8	1	61.110			
			C	0.354	2.161	0.634	0.8	1	75.919			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.8	1	114.090	5.66	282.84	A
			B	0.263	2.398	0.605	0.8	1	62.180			
			C	0.321	2.242	0.623	0.8	1	76.447			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.8	1	87.038	4.97	248.68	A
			B	0.215	2.547	0.594	0.8	1	57.106			
			C	0.249	2.442	0.601	0.8	1	65.743			
Sum Weight:	5.94	27.64						OTM	3296.62 kip-ft	43.67		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.85	1	31.305	2.02	100.77	A
			B	0.426	2.014	0.663	0.85	1	29.071			
			C	0.125	2.866	0.578	0.85	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.85	1	25.783	1.53	152.52	A
			B	0.511	1.886	0.703	0.85	1	24.567			
			C	0.263	2.399	0.605	0.85	1	11.860			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.85	1	58.995	3.77	188.28	A
			B	0.49	1.914	0.692	0.85	1	56.628			
			C	0.207	2.571	0.592	0.85	1	22.609			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.85	1	78.213	5.68	283.80	A
			B	0.417	2.031	0.659	0.85	1	58.290			
			C	0.29	2.323	0.613	0.85	1	39.295			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.85	1	60.787	3.71	371.28	A
			B	0.36	2.15	0.636	0.85	1	27.986			
			C	0.449	1.975	0.673	0.85	1	36.316			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.85	1	58.920	3.54	353.73	A
			B	0.334	2.209	0.627	0.85	1	28.008			
			C	0.417	2.032	0.659	0.85	1	36.000			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.85	1	115.397	6.70	335.20	A
			B	0.308	2.275	0.618	0.85	1	57.407			
			C	0.382	2.101	0.644	0.85	1	72.730			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.85	1	116.945	6.30	315.21	A
			B	0.29	2.323	0.613	0.85	1	62.091			
			C	0.354	2.161	0.634	0.85	1	76.901			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.85	1	115.173	5.70	285.06	A
			B	0.263	2.398	0.605	0.85	1	63.263			
			C	0.321	2.242	0.623	0.85	1	77.530			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.85	1	88.394	5.04	251.83	A
			B	0.215	2.547	0.594	0.85	1	58.462			
			C	0.249	2.442	0.601	0.85	1	67.099			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.94	27.64						OTM	3316.80 kip-ft	43.98		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.55	1.43	A	0.702	1.776	0.821	1	1	60.529	2.63	131.67	A
			B	0.661	1.779	0.793	1	1	55.128			
			C	0.232	2.493	0.597	1	1	14.481			
T2 150.00-140.00	0.29	1.64	A	0.795	1.812	0.892	1	1	48.125	2.08	207.72	A
			B	0.763	1.793	0.867	1	1	45.096			
			C	0.413	2.039	0.657	1	1	20.022			
T3 140.00-120.00	0.94	3.77	A	0.793	1.811	0.891	1	1	117.191	5.27	263.53	A
			B	0.767	1.795	0.87	1	1	111.098			
			C	0.323	2.237	0.623	1	1	36.898			
T4 120.00-100.00	1.72	4.44	A	0.816	1.829	0.909	1	1	153.087	7.73	386.74	A
			B	0.647	1.782	0.784	1	1	107.339			
			C	0.439	1.992	0.668	1	1	64.508			
T5 100.00-90.00	1.24	2.39	A	0.933	1.975	1	1	1	109.311	4.94*	494.28	A
			B	0.56	1.835	0.73	1	1	50.047			
			C	0.605	1.801	0.757	1	1	55.170			
T6 90.00-80.00	1.24	2.43	A	0.864	1.878	0.951	1	1	104.874	4.76	475.69	A
			B	0.52	1.876	0.708	1	1	49.282			
			C	0.561	1.833	0.731	1	1	54.006			
T7 80.00-60.00	2.48	5.43	A	0.785	1.805	0.884	1	1	199.524	8.35	417.53	A
			B	0.477	1.932	0.686	1	1	98.926			
			C	0.514	1.882	0.705	1	1	107.579			
T8 60.00-40.00	2.48	6.58	A	0.712	1.777	0.828	1	1	195.483	7.36	368.00	A
			B	0.442	1.987	0.67	1	1	103.835			
			C	0.475	1.935	0.685	1	1	111.845			
T9 40.00-20.00	2.48	6.80	A	0.641	1.784	0.779	1	1	187.789	6.34	317.20	A
			B	0.401	2.062	0.652	1	1	104.095			
			C	0.43	2.008	0.664	1	1	111.468			
T10 20.00-0.00	1.80	7.56	A	0.459	1.959	0.677	1	1	135.465	5.20	260.06	A
			B	0.318	2.248	0.622	1	1	91.359			
			C	0.335	2.206	0.627	1	1	95.413			
Sum Weight:	15.23	42.48			*$2A_g$ limit			OTM	4327.30 kip-ft	54.67		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.55	1.43	A	0.702	1.776	0.821	0.825	1	60.272	2.62	131.11	A
			B	0.661	1.779	0.793	0.825	1	54.871			
			C	0.232	2.493	0.597	0.825	1	14.481			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2 150.00-140.00	0.29	1.64	A	0.795	1.812	0.892	0.825	1	47.038	2.03	203.03	A
			B	0.763	1.793	0.867	0.825	1	44.009			
			C	0.413	2.039	0.657	0.825	1	19.064			
T3 140.00-120.00	0.94	3.77	A	0.793	1.811	0.891	0.825	1	114.764	5.17	258.45	A
			B	0.767	1.795	0.87	0.825	1	108.671			
			C	0.323	2.237	0.623	0.825	1	35.066			
T4 120.00-100.00	1.72	4.44	A	0.816	1.829	0.909	0.825	1	150.049	7.61	380.63	A
			B	0.647	1.782	0.784	0.825	1	104.300			
			C	0.439	1.992	0.668	0.825	1	62.065			
T5 100.00-90.00	1.24	2.39	A	0.933	1.975	1	0.825	1	107.865	4.94*	494.28	A
			B	0.56	1.835	0.73	0.825	1	48.601			
			C	0.605	1.801	0.757	0.825	1	54.022			
T6 90.00-80.00	1.24	2.43	A	0.864	1.878	0.951	0.825	1	103.358	4.70	469.87	A
			B	0.52	1.876	0.708	0.825	1	47.767			
			C	0.561	1.833	0.731	0.825	1	52.788			
T7 80.00-60.00	2.48	5.43	A	0.785	1.805	0.884	0.825	1	196.279	8.24	411.86	A
			B	0.477	1.932	0.686	0.825	1	95.681			
			C	0.514	1.882	0.705	0.825	1	104.928			
T8 60.00-40.00	2.48	6.58	A	0.712	1.777	0.828	0.825	1	191.452	7.23	361.71	A
			B	0.442	1.987	0.67	0.825	1	99.804			
			C	0.475	1.935	0.685	0.825	1	108.408			
T9 40.00-20.00	2.48	6.80	A	0.641	1.784	0.779	0.825	1	183.404	6.22	311.10	A
			B	0.401	2.062	0.652	0.825	1	99.710			
			C	0.43	2.008	0.664	0.825	1	107.678			
T10 20.00-0.00	1.80	7.56	A	0.459	1.959	0.677	0.825	1	130.332	5.04	252.22	A
			B	0.318	2.248	0.622	0.825	1	86.225			
			C	0.335	2.206	0.627	0.825	1	90.666			
Sum Weight:	15.23	42.48			*2A_g limit			OTM	4267.67 kip-ft	53.81		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.55	1.43	A	0.702	1.776	0.821	0.8	1	60.236	2.62	131.03	A
			B	0.661	1.779	0.793	0.8	1	54.834			
			C	0.232	2.493	0.597	0.8	1	14.481			
T2 150.00-140.00	0.29	1.64	A	0.795	1.812	0.892	0.8	1	46.883	2.02	202.36	A
			B	0.763	1.793	0.867	0.8	1	43.854			
			C	0.413	2.039	0.657	0.8	1	18.927			
T3 140.00-120.00	0.94	3.77	A	0.793	1.811	0.891	0.8	1	114.417	5.15	257.73	A
			B	0.767	1.795	0.87	0.8	1	108.325			
			C	0.323	2.237	0.623	0.8	1	34.804			
T4 120.00-100.00	1.72	4.44	A	0.816	1.829	0.909	0.8	1	149.615	7.60	379.75	A
			B	0.647	1.782	0.784	0.8	1	103.866			
			C	0.439	1.992	0.668	0.8	1	61.715			
T5 100.00-90.00	1.24	2.39	A	0.933	1.975	1	0.8	1	107.659	4.94*	494.28	A
			B	0.56	1.835	0.73	0.8	1	48.395			
			C	0.605	1.801	0.757	0.8	1	53.858			
T6 90.00-80.00	1.24	2.43	A	0.864	1.878	0.951	0.8	1	103.142	4.69	469.04	A
			B	0.52	1.876	0.708	0.8	1	47.550			
			C	0.561	1.833	0.731	0.8	1	52.614			
T7 80.00-60.00	2.48	5.43	A	0.785	1.805	0.884	0.8	1	195.816	8.22	411.05	A
			B	0.477	1.932	0.686	0.8	1	95.217			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.514	1.882	0.705	0.8	1	104.550			
T8 60.00-40.00	2.48	6.58	A	0.712	1.777	0.828	0.8	1	190.876	7.22	360.81	A
			B	0.442	1.987	0.67	0.8	1	99.228			
			C	0.475	1.935	0.685	0.8	1	107.918			
T9 40.00-20.00	2.48	6.80	A	0.641	1.784	0.779	0.8	1	182.777	6.20	310.23	A
			B	0.401	2.062	0.652	0.8	1	99.083			
			C	0.43	2.008	0.664	0.8	1	107.136			
T10 20.00-0.00	1.80	7.56	A	0.459	1.959	0.677	0.8	1	129.598	5.02	251.09	A
			B	0.318	2.248	0.622	0.8	1	85.492			
			C	0.335	2.206	0.627	0.8	1	89.988			
Sum Weight:	15.23	42.48			*2Ag limit			OTM	4259.16 kip-ft	53.69		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.55	1.43	A	0.702	1.776	0.821	0.85	1	60.309	2.62	131.19	A
			B	0.661	1.779	0.793	0.85	1	54.908			
			C	0.232	2.493	0.597	0.85	1	14.481			
T2 150.00-140.00	0.29	1.64	A	0.795	1.812	0.892	0.85	1	47.193	2.04	203.70	A
			B	0.763	1.793	0.867	0.85	1	44.165			
			C	0.413	2.039	0.657	0.85	1	19.200			
T3 140.00-120.00	0.94	3.77	A	0.793	1.811	0.891	0.85	1	115.110	5.18	259.18	A
			B	0.767	1.795	0.87	0.85	1	109.018			
			C	0.323	2.237	0.623	0.85	1	35.327			
T4 120.00-100.00	1.72	4.44	A	0.816	1.829	0.909	0.85	1	150.483	7.63	381.50	A
			B	0.647	1.782	0.784	0.85	1	104.734			
			C	0.439	1.992	0.668	0.85	1	62.414			
T5 100.00-90.00	1.24	2.39	A	0.933	1.975	1	0.85	1	108.072	4.94*	494.28	A
			B	0.56	1.835	0.73	0.85	1	48.808			
			C	0.605	1.801	0.757	0.85	1	54.186			
T6 90.00-80.00	1.24	2.43	A	0.864	1.878	0.951	0.85	1	103.575	4.71	470.70	A
			B	0.52	1.876	0.708	0.85	1	47.983			
			C	0.561	1.833	0.731	0.85	1	52.962			
T7 80.00-60.00	2.48	5.43	A	0.785	1.805	0.884	0.85	1	196.743	8.25	412.67	A
			B	0.477	1.932	0.686	0.85	1	96.144			
			C	0.514	1.882	0.705	0.85	1	105.307			
T8 60.00-40.00	2.48	6.58	A	0.712	1.777	0.828	0.85	1	192.028	7.25	362.61	A
			B	0.442	1.987	0.67	0.85	1	100.379			
			C	0.475	1.935	0.685	0.85	1	108.899			
T9 40.00-20.00	2.48	6.80	A	0.641	1.784	0.779	0.85	1	184.030	6.24	311.97	A
			B	0.401	2.062	0.652	0.85	1	100.336			
			C	0.43	2.008	0.664	0.85	1	108.219			
T10 20.00-0.00	1.80	7.56	A	0.459	1.959	0.677	0.85	1	131.065	5.07	253.34	A
			B	0.318	2.248	0.622	0.85	1	86.958			
			C	0.335	2.206	0.627	0.85	1	91.344			
Sum Weight:	15.23	42.48			*2Ag limit			OTM	4276.19 kip-ft	53.94		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	1	1	31.305	0.70	34.87	A
			B	0.426	2.014	0.663	1	1	29.071			
			C	0.125	2.866	0.578	1	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	1	1	26.604	0.54	54.46	A
			B	0.511	1.886	0.703	1	1	25.388			
			C	0.263	2.399	0.605	1	1	12.682			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	1	1	60.566	1.33	66.73	A
			B	0.49	1.914	0.692	1	1	58.198			
			C	0.207	2.571	0.592	1	1	24.179			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	1	1	80.308	2.00	100.18	A
			B	0.417	2.031	0.659	1	1	60.385			
			C	0.29	2.323	0.613	1	1	41.390			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	1	1	61.771	1.30	130.18	A
			B	0.36	2.15	0.636	1	1	28.970			
			C	0.449	1.975	0.673	1	1	37.301			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	1	1	59.964	1.24	124.17	A
			B	0.334	2.209	0.627	1	1	29.052			
			C	0.417	2.032	0.659	1	1	37.044			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	1	1	117.668	2.36	117.85	A
			B	0.308	2.275	0.618	1	1	59.678			
			C	0.382	2.101	0.644	1	1	75.002			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	1	1	119.891	2.23	111.33	A
			B	0.29	2.323	0.613	1	1	65.037			
			C	0.354	2.161	0.634	1	1	79.846			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	1	1	118.422	2.02	100.94	A
			B	0.263	2.398	0.605	1	1	66.512			
			C	0.321	2.242	0.623	1	1	80.779			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	1	1	92.463	1.81	90.40	A
			B	0.215	2.547	0.594	1	1	62.531			
			C	0.249	2.442	0.601	1	1	71.168			
Sum Weight:	5.94	27.64						OTM	1168.63 kip-ft	15.53		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.825	1	31.305	0.70	34.87	A
			B	0.426	2.014	0.663	0.825	1	29.071			
			C	0.125	2.866	0.578	0.825	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.825	1	25.646	0.52	52.50	A
			B	0.511	1.886	0.703	0.825	1	24.430			
			C	0.263	2.399	0.605	0.825	1	11.723			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.825	1	58.734	1.30	64.89	A
			B	0.49	1.914	0.692	0.825	1	56.366			
			C	0.207	2.571	0.592	0.825	1	22.348			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.825	1	77.864	1.96	97.87	A
			B	0.417	2.031	0.659	0.825	1	57.941			
			C	0.29	2.323	0.613	0.825	1	38.946			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.825	1	60.623	1.28	128.19	A
			B	0.36	2.15	0.636	0.825	1	27.822			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.449	1.975	0.673	0.825	1	36.152			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.825	1	58.746	1.22	122.10	A
			B	0.334	2.209	0.627	0.825	1	27.834			
			C	0.417	2.032	0.659	0.825	1	35.826			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.825	1	115.018	2.31	115.67	A
			B	0.308	2.275	0.618	0.825	1	57.028			
			C	0.382	2.101	0.644	0.825	1	72.351			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.825	1	116.454	2.17	108.69	A
			B	0.29	2.323	0.613	0.825	1	61.600			
			C	0.354	2.161	0.634	0.825	1	76.410			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.825	1	114.632	1.97	98.25	A
			B	0.263	2.398	0.605	0.825	1	62.721			
			C	0.321	2.242	0.623	0.825	1	76.988			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.825	1	87.716	1.73	86.59	A
			B	0.215	2.547	0.594	0.825	1	57.784			
			C	0.249	2.442	0.601	0.825	1	66.421			
Sum Weight:	5.94	27.64						OTM	1144.19 kip-ft	15.16		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.8	1	31.305	0.70	34.87	A
			B	0.426	2.014	0.663	0.8	1	29.071			
			C	0.125	2.866	0.578	0.8	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.8	1	25.509	0.52	52.22	A
			B	0.511	1.886	0.703	0.8	1	24.293			
			C	0.263	2.399	0.605	0.8	1	11.586			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.8	1	58.472	1.29	64.62	A
			B	0.49	1.914	0.692	0.8	1	56.105			
			C	0.207	2.571	0.592	0.8	1	22.086			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.8	1	77.515	1.95	97.54	A
			B	0.417	2.031	0.659	0.8	1	57.592			
			C	0.29	2.323	0.613	0.8	1	38.597			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.8	1	60.459	1.28	127.90	A
			B	0.36	2.15	0.636	0.8	1	27.658			
			C	0.449	1.975	0.673	0.8	1	35.988			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.8	1	58.572	1.22	121.81	A
			B	0.334	2.209	0.627	0.8	1	27.660			
			C	0.417	2.032	0.659	0.8	1	35.652			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.8	1	114.639	2.31	115.36	A
			B	0.308	2.275	0.618	0.8	1	56.650			
			C	0.382	2.101	0.644	0.8	1	71.973			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.8	1	115.964	2.17	108.32	A
			B	0.29	2.323	0.613	0.8	1	61.110			
			C	0.354	2.161	0.634	0.8	1	75.919			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.8	1	114.090	1.96	97.87	A
			B	0.263	2.398	0.605	0.8	1	62.180			
			C	0.321	2.242	0.623	0.8	1	76.447			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.8	1	87.038	1.72	86.05	A
			B	0.215	2.547	0.594	0.8	1	57.106			
			C	0.249	2.442	0.601	0.8	1	65.743			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.94	27.64						OTM	1140.70 kip-ft	15.11		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 170.00-150.00	0.21	1.10	A	0.451	1.971	0.674	0.85	1	31.305	0.70	34.87	A
			B	0.426	2.014	0.663	0.85	1	29.071			
			C	0.125	2.866	0.578	0.85	1	7.437			
T2 150.00-140.00	0.11	1.12	A	0.531	1.863	0.714	0.85	1	25.783	0.53	52.78	A
			B	0.511	1.886	0.703	0.85	1	24.567			
			C	0.263	2.399	0.605	0.85	1	11.860			
T3 140.00-120.00	0.35	2.09	A	0.506	1.893	0.7	0.85	1	58.995	1.30	65.15	A
			B	0.49	1.914	0.692	0.85	1	56.628			
			C	0.207	2.571	0.592	0.85	1	22.609			
T4 120.00-100.00	0.66	2.60	A	0.529	1.866	0.713	0.85	1	78.213	1.96	98.20	A
			B	0.417	2.031	0.659	0.85	1	58.290			
			C	0.29	2.323	0.613	0.85	1	39.295			
T5 100.00-90.00	0.49	1.48	A	0.657	1.78	0.79	0.85	1	60.787	1.28	128.47	A
			B	0.36	2.15	0.636	0.85	1	27.986			
			C	0.449	1.975	0.673	0.85	1	36.316			
T6 90.00-80.00	0.49	1.51	A	0.608	1.799	0.759	0.85	1	58.920	1.22	122.40	A
			B	0.334	2.209	0.627	0.85	1	28.008			
			C	0.417	2.032	0.659	0.85	1	36.000			
T7 80.00-60.00	0.98	3.52	A	0.553	1.841	0.726	0.85	1	115.397	2.32	115.98	A
			B	0.308	2.275	0.618	0.85	1	57.407			
			C	0.382	2.101	0.644	0.85	1	72.730			
T8 60.00-40.00	0.98	4.45	A	0.504	1.895	0.7	0.85	1	116.945	2.18	109.07	A
			B	0.29	2.323	0.613	0.85	1	62.091			
			C	0.354	2.161	0.634	0.85	1	76.901			
T9 40.00-20.00	0.98	4.61	A	0.454	1.967	0.675	0.85	1	115.173	1.97	98.64	A
			B	0.263	2.398	0.605	0.85	1	63.263			
			C	0.321	2.242	0.623	0.85	1	77.530			
T10 20.00-0.00	0.71	5.16	A	0.326	2.228	0.624	0.85	1	88.394	1.74	87.14	A
			B	0.215	2.547	0.594	0.85	1	58.462			
			C	0.249	2.442	0.601	0.85	1	67.099			
Sum Weight:	5.94	27.64						OTM	1147.68 kip-ft	15.22		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	17.89					
Bracing Weight	9.75					
Total Member Self-Weight	27.64			2.17	2.53	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Total Weight	43.08			2.17	2.53	
Wind 0 deg - No Ice		0.01	-56.85	-4964.90	1.50	-1.43
Wind 30 deg - No Ice		27.97	-48.44	-4247.52	-2450.23	0.49
Wind 45 deg - No Ice		39.44	-39.45	-3460.86	-3458.53	1.43
Wind 60 deg - No Ice		48.17	-27.82	-2441.89	-4227.27	2.26
Wind 90 deg - No Ice		55.92	-0.01	1.14	-4901.21	3.47
Wind 120 deg - No Ice		49.22	28.42	2484.81	-4296.15	3.80
Wind 135 deg - No Ice		39.43	39.44	3463.75	-3457.08	3.45
Wind 150 deg - No Ice		27.95	48.44	4250.83	-2448.45	2.97
Wind 180 deg - No Ice		-0.01	55.63	4888.52	3.56	1.43
Wind 210 deg - No Ice		-27.97	48.44	4251.86	2455.29	-0.49
Wind 225 deg - No Ice		-39.44	39.45	3465.20	3463.59	-1.43
Wind 240 deg - No Ice		-49.22	28.43	2486.60	4302.24	-2.37
Wind 270 deg - No Ice		-55.92	0.01	3.20	4906.27	-3.47
Wind 300 deg - No Ice		-48.16	-27.81	-2440.11	4231.30	-3.69
Wind 315 deg - No Ice		-39.43	-39.44	-3459.40	3462.13	-3.45
Wind 330 deg - No Ice		-27.95	-48.44	-4246.49	2453.51	-2.97
Member Ice	14.84					
Total Weight Ice	71.30			2.51	6.77	
Wind 0 deg - Ice		0.00	-66.42	-5888.08	5.95	2.21
Wind 30 deg - Ice		32.84	-56.89	-5055.04	-2912.58	2.67
Wind 45 deg - Ice		46.35	-46.36	-4121.18	-4115.37	2.65
Wind 60 deg - Ice		56.66	-32.72	-2909.42	-5034.12	2.45
Wind 90 deg - Ice		65.67	-0.00	1.69	-5830.51	1.61
Wind 120 deg - Ice		57.51	33.20	2947.10	-5092.32	0.32
Wind 135 deg - Ice		46.35	46.35	4125.05	-4114.21	-0.37
Wind 150 deg - Ice		32.83	56.88	5059.24	-2911.16	-1.05
Wind 180 deg - Ice		-0.00	65.44	5824.96	7.59	-2.13
Wind 210 deg - Ice		-32.84	56.89	5060.06	2926.12	-2.67
Wind 225 deg - Ice		-46.35	46.36	4126.21	4128.91	-2.65
Wind 240 deg - Ice		-57.51	33.21	2948.52	5106.68	-2.53
Wind 270 deg - Ice		-65.67	0.00	3.33	5844.05	-1.61
Wind 300 deg - Ice		-56.66	-32.71	-2908.00	5046.84	-0.32
Wind 315 deg - Ice		-46.35	-46.35	-4120.02	4127.75	0.37
Wind 330 deg - Ice		-32.83	-56.88	-5054.22	2924.70	1.05
Total Weight	43.08			2.17	2.53	
Wind 0 deg - Service		0.00	-19.67	-1718.67	-0.42	-0.49
Wind 30 deg - Service		9.68	-16.76	-1470.45	-848.77	0.17
Wind 45 deg - Service		13.65	-13.65	-1198.25	-1197.66	0.49
Wind 60 deg - Service		16.67	-9.63	-845.66	-1463.66	0.78
Wind 90 deg - Service		19.35	-0.00	-0.32	-1696.86	1.20
Wind 120 deg - Service		17.03	9.83	859.08	-1487.50	1.32
Wind 135 deg - Service		13.64	13.65	1197.81	-1197.16	1.20
Wind 150 deg - Service		9.67	16.76	1470.16	-848.15	1.03
Wind 180 deg - Service		-0.00	19.25	1690.81	0.29	0.50
Wind 210 deg - Service		-9.68	16.76	1470.52	848.64	-0.17
Wind 225 deg - Service		-13.65	13.65	1198.32	1197.53	-0.49
Wind 240 deg - Service		-17.03	9.84	859.70	1487.72	-0.82
Wind 270 deg - Service		-19.35	0.00	0.39	1696.73	-1.20
Wind 300 deg - Service		-16.66	-9.62	-845.05	1463.18	-1.28
Wind 315 deg - Service		-13.64	-13.65	-1197.74	1197.03	-1.20
Wind 330 deg - Service		-9.67	-16.76	-1470.09	848.02	-1.03

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	170 - 150	Leg	Max Tension	22	20.34	-0.03	0.02
			Max. Compression	19	-25.44	-0.00	0.32
			Max. Mx	24	-25.09	-0.27	-0.17

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	19	-25.44	-0.00	0.32
			Max. Vy	30	-2.69	0.27	-0.17
			Max. Vx	19	-3.18	-0.00	0.32
		Diagonal	Max Tension	26	2.37	0.00	0.00
			Max. Compression	34	-2.41	0.00	0.00
			Max. Mx	19	1.93	-0.00	0.00
			Max. My	9	-1.66	-0.00	-0.00
			Max. Vy	19	0.00	-0.00	0.00
			Max. Vx	9	0.00	-0.00	-0.00
		Top Girt	Max Tension	5	0.11	0.00	0.00
			Max. Compression	13	-0.14	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
			Max. My	23	-0.00	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
		Bottom Girt	Max Tension	32	0.11	0.00	0.00
			Max. Compression	19	-0.12	0.00	0.00
			Max. Mx	18	-0.00	0.01	0.00
			Max. My	31	-0.00	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T2	150 - 140	Leg	Max Tension	22	23.94	-0.29	0.01
			Max. Compression	19	-29.18	1.88	0.16
			Max. Mx	22	23.27	-2.24	0.13
			Max. My	34	-2.79	-0.20	2.57
			Max. Vy	22	0.43	-2.24	0.13
			Max. Vx	34	-0.60	-0.20	2.57
		Diagonal	Max Tension	22	3.45	0.00	0.00
			Max. Compression	30	-3.89	0.00	0.00
			Max. Mx	22	2.91	0.03	0.00
			Max. My	21	-3.02	-0.01	0.01
			Max. Vy	22	0.01	0.03	0.00
			Max. Vx	21	-0.00	0.00	0.00
		Top Girt	Max Tension	22	0.30	0.00	0.00
			Max. Compression	2	-0.25	0.00	0.00
			Max. Mx	18	0.03	-0.02	0.00
			Max. My	23	0.02	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	22	47.63	-2.38	0.05
			Max. Compression	19	-59.27	2.24	-0.00
			Max. Mx	32	46.78	-2.86	-0.06
			Max. My	23	-6.49	-0.31	3.83
			Max. Vy	27	0.56	-2.85	0.01
			Max. Vx	23	-0.66	-0.31	3.83
		Diagonal	Max Tension	21	5.81	0.00	0.00
			Max. Compression	29	-6.03	0.00	0.00
			Max. Mx	19	4.51	0.08	-0.00
			Max. My	22	-4.18	-0.01	0.01
			Max. Vy	19	-0.03	0.08	-0.00
			Max. Vx	22	-0.00	0.00	0.00
T4	120 - 100	Leg	Max Tension	22	81.25	-3.27	-0.01
			Max. Compression	19	-98.00	3.07	-0.02
			Max. Mx	19	-77.53	3.97	-0.02
			Max. My	23	-8.67	-0.25	4.41
			Max. Vy	30	-0.81	3.94	0.01
			Max. Vx	20	-0.74	-0.32	-3.81
		Diagonal	Max Tension	33	8.51	0.00	0.00
			Max. Compression	25	-9.19	0.00	0.00
			Max. Mx	19	5.45	0.08	0.01
			Max. My	33	-8.03	-0.01	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	22	0.03	0.08	0.00
			Max. Vx	33	0.00	0.00	0.00
		Mid Girt	Max Tension	22	2.31	0.00	0.00
			Max. Compression	19	-1.72	0.00	0.00
			Max. Mx	18	0.32	-0.07	0.00
			Max. My	25	-1.62	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	25	-0.00	0.00	0.00
T5	100 - 90	Leg	Max Tension	22	103.61	-3.52	0.05
			Max. Compression	19	-124.19	3.16	0.01
			Max. Mx	22	103.61	-3.52	0.05
			Max. My	23	-9.78	-0.25	4.41
			Max. Vy	22	-1.01	-3.52	0.05
			Max. Vx	20	-0.99	-0.25	-4.37
		Diagonal	Max Tension	26	10.58	0.00	0.00
			Max. Compression	26	-10.64	0.00	0.00
			Max. Mx	19	8.72	0.13	-0.00
			Max. My	33	-10.16	-0.02	-0.02
			Max. Vy	19	-0.04	0.13	-0.00
			Max. Vx	33	0.00	0.00	0.00
T6	90 - 80	Leg	Max Tension	22	126.37	-3.15	-0.01
			Max. Compression	19	-149.65	3.83	-0.00
			Max. Mx	19	-149.65	3.83	-0.00
			Max. My	34	-10.55	-0.01	3.78
			Max. Vy	22	0.23	-3.80	-0.00
			Max. Vx	34	0.21	-0.01	3.78
		Diagonal	Max Tension	26	11.04	0.00	0.00
			Max. Compression	26	-11.47	0.00	0.00
			Max. Mx	19	9.05	0.15	0.01
			Max. My	25	3.42	0.11	0.01
			Max. Vy	19	-0.05	0.15	0.01
			Max. Vx	25	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	32	173.50	-3.85	0.01
			Max. Compression	19	-202.50	4.47	-0.01
			Max. Mx	22	172.69	-4.53	0.00
			Max. My	28	-13.81	-0.06	4.62
			Max. Vy	22	0.22	-4.53	0.00
			Max. Vx	26	0.22	-0.05	-4.01
		Diagonal	Max Tension	26	11.99	0.00	0.00
			Max. Compression	26	-12.42	0.00	0.00
			Max. Mx	19	9.81	0.14	-0.01
			Max. My	31	-5.87	0.06	-0.01
			Max. Vy	32	0.05	0.13	-0.01
			Max. Vx	24	0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	32	219.70	-4.24	0.01
			Max. Compression	30	-255.47	3.75	0.01
			Max. Mx	32	219.05	-5.18	0.01
			Max. My	28	-14.71	-0.06	4.62
			Max. Vy	22	0.24	-5.18	-0.00
			Max. Vx	34	0.20	-0.06	4.62
		Diagonal	Max Tension	26	12.87	0.00	0.00
			Max. Compression	26	-13.07	0.00	0.00
			Max. Mx	30	10.89	0.18	-0.01
			Max. My	33	-12.41	0.03	-0.02
			Max. Vy	32	0.06	0.18	-0.01
			Max. Vx	33	0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	32	262.71	-2.62	0.01
			Max. Compression	30	-306.98	-0.27	0.01
			Max. Mx	32	262.05	-9.26	0.01
			Max. My	28	-20.06	1.96	5.11
			Max. Vy	22	0.79	-9.25	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	34	0.29	1.97	5.11
		Diagonal	Max Tension	26	14.31	0.00	0.00
			Max. Compression	26	-13.71	0.00	0.00
			Max. Mx	30	12.23	0.20	0.01
			Max. My	27	-11.69	0.06	0.02
			Max. Vy	32	0.07	0.19	-0.01
			Max. Vx	27	-0.00	0.00	0.00
T10	20 - 0	Leg	Max Tension	32	301.06	2.94	0.01
			Max. Compression	30	-356.63	-0.00	0.00
			Max. Mx	30	-329.21	12.92	0.01
			Max. My	28	-25.25	7.86	8.24
			Max. Vy	19	-1.41	12.92	-0.02
			Max. Vx	28	0.94	7.86	8.24
		Diagonal	Max Tension	33	17.53	0.00	0.00
			Max. Compression	23	-15.64	0.00	0.00
			Max. Mx	32	8.73	0.25	-0.02
			Max. My	27	-14.06	0.13	0.02
			Max. Vy	32	0.07	0.25	-0.02
			Max. Vx	27	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	366.05	31.18	-17.92
	Max. H_x	30	366.05	31.18	-17.92
	Max. H_z	21	-302.72	-36.41	22.17
	Min. Vert	22	-313.74	-38.07	21.89
	Min. H_x	22	-313.74	-38.07	21.89
	Min. H_z	30	366.05	31.18	-17.92
Leg B	Max. Vert	24	365.28	-31.13	-17.96
	Max. H_x	32	-314.34	38.04	21.96
	Max. H_z	33	-303.31	36.37	22.26
	Min. Vert	32	-314.34	38.04	21.96
	Min. H_x	24	365.28	-31.13	-17.96
	Min. H_z	24	365.28	-31.13	-17.96
Leg A	Max. Vert	19	365.54	0.05	35.95
	Max. H_x	31	23.58	3.93	-4.09
	Max. H_z	19	365.54	0.05	35.95
	Min. Vert	27	-314.35	-0.07	-43.93
	Min. H_x	23	23.67	-3.95	-4.08
	Min. H_z	27	-314.35	-0.07	-43.93

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	43.08	0.00	0.00	2.17	2.53	0.00
Dead+Wind 0 deg - No Ice	43.08	0.01	-56.85	-4982.81	1.50	-1.44
Dead+Wind 30 deg - No Ice	43.08	27.97	-48.44	-4262.88	-2459.10	0.50
Dead+Wind 45 deg - No Ice	43.08	39.44	-39.45	-3473.39	-3471.05	1.43

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 60 deg - No Ice	43.08	48.17	-27.82	-2450.75	-4242.57	2.25
Dead+Wind 90 deg - No Ice	43.08	55.92	-0.01	1.12	-4918.93	3.46
Dead+Wind 120 deg - No Ice	43.08	49.22	28.42	2493.76	-4311.64	3.80
Dead+Wind 135 deg - No Ice	43.08	39.43	39.44	3476.25	-3469.56	3.47
Dead+Wind 150 deg - No Ice	43.08	27.95	48.44	4266.19	-2457.29	2.99
Dead+Wind 180 deg - No Ice	43.08	-0.01	55.63	4906.20	3.57	1.44
Dead+Wind 210 deg - No Ice	43.08	-27.97	48.44	4267.23	2464.16	-0.50
Dead+Wind 225 deg - No Ice	43.08	-39.44	39.45	3477.71	3476.10	-1.43
Dead+Wind 240 deg - No Ice	43.08	-49.22	28.43	2495.55	4317.75	-2.37
Dead+Wind 270 deg - No Ice	43.08	-55.92	0.01	3.19	4924.00	-3.46
Dead+Wind 300 deg - No Ice	43.08	-48.16	-27.81	-2448.95	4246.60	-3.69
Dead+Wind 315 deg - No Ice	43.08	-39.43	-39.44	-3471.92	3474.65	-3.47
Dead+Wind 330 deg - No Ice	43.08	-27.95	-48.44	-4261.84	2462.38	-2.99
Dead+Ice+Temp	71.30	0.00	-0.00	2.51	6.77	-0.00
Dead+Wind 0 deg+Ice+Temp	71.30	0.00	-66.42	-5919.78	5.96	2.17
Dead+Wind 30 deg+Ice+Temp	71.30	32.84	-56.89	-5082.29	-2928.29	2.65
Dead+Wind 45 deg+Ice+Temp	71.30	46.35	-46.36	-4143.42	-4137.56	2.62
Dead+Wind 60 deg+Ice+Temp	71.30	56.66	-32.72	-2925.15	-5061.26	2.42
Dead+Wind 90 deg+Ice+Temp	71.30	65.67	-0.00	1.63	-5861.92	1.57
Dead+Wind 120 deg+Ice+Temp	71.30	57.51	33.20	2962.89	-5119.71	0.32
Dead+Wind 135 deg+Ice+Temp	71.30	46.35	46.35	4147.22	-4136.36	-0.36
Dead+Wind 150 deg+Ice+Temp	71.30	32.83	56.88	5086.45	-2926.83	-1.02
Dead+Wind 180 deg+Ice+Temp	71.30	-0.00	65.44	5856.32	7.62	-2.10
Dead+Wind 210 deg+Ice+Temp	71.30	-32.84	56.89	5087.28	2941.85	-2.65
Dead+Wind 225 deg+Ice+Temp	71.30	-46.35	46.36	4148.39	4151.12	-2.62
Dead+Wind 240 deg+Ice+Temp	71.30	-57.51	33.21	2964.33	5134.12	-2.49
Dead+Wind 270 deg+Ice+Temp	71.30	-65.67	0.00	3.29	5875.51	-1.57
Dead+Wind 300 deg+Ice+Temp	71.30	-56.66	-32.71	-2923.72	5074.02	-0.32
Dead+Wind 315 deg+Ice+Temp	71.30	-46.35	-46.35	-4142.26	4149.98	0.36
Dead+Wind 330 deg+Ice+Temp	71.30	-32.83	-56.88	-5081.47	2940.44	1.02
Dead+Wind 0 deg - Service	43.08	0.00	-19.67	-1722.77	2.17	-0.50
Dead+Wind 30 deg - Service	43.08	9.68	-16.76	-1473.65	-849.26	0.16
Dead+Wind 45 deg - Service	43.08	13.65	-13.65	-1200.46	-1199.41	0.49
Dead+Wind 60 deg - Service	43.08	16.67	-9.63	-846.60	-1466.38	0.78
Dead+Wind 90 deg - Service	43.08	19.35	-0.00	1.81	-1700.42	1.21
Dead+Wind 120 deg - Service	43.08	17.03	9.83	864.33	-1490.29	1.32
Dead+Wind 135 deg - Service	43.08	13.64	13.65	1204.30	-1198.91	1.19
Dead+Wind 150 deg - Service	43.08	9.67	16.76	1477.63	-848.63	1.02
Dead+Wind 180 deg - Service	43.08	-0.00	19.25	1699.09	2.89	0.50
Dead+Wind 210 deg - Service	43.08	-9.68	16.76	1477.99	854.32	-0.16
Dead+Wind 225 deg - Service	43.08	-13.65	13.65	1204.80	1204.48	-0.49
Dead+Wind 240 deg - Service	43.08	-17.03	9.84	864.95	1495.71	-0.82
Dead+Wind 270 deg - Service	43.08	-19.35	0.00	2.53	1705.49	-1.21
Dead+Wind 300 deg - Service	43.08	-16.66	-9.62	-845.98	1471.09	-1.28
Dead+Wind 315 deg - Service	43.08	-13.64	-13.65	-1199.96	1203.97	-1.20
Dead+Wind 330 deg - Service	43.08	-9.67	-16.76	-1473.29	853.70	-1.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-43.08	0.00	0.00	43.08	0.00	0.000%
2	0.01	-43.08	-56.85	-0.01	43.08	56.85	0.000%
3	27.97	-43.08	-48.44	-27.97	43.08	48.44	0.000%
4	39.44	-43.08	-39.45	-39.44	43.08	39.45	0.000%
5	48.17	-43.08	-27.82	-48.17	43.08	27.82	0.000%
6	55.92	-43.08	-0.01	-55.92	43.08	0.01	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
7	49.22	-43.08	28.42	-49.22	43.08	-28.42	0.000%
8	39.43	-43.08	39.44	-39.43	43.08	-39.44	0.000%
9	27.95	-43.08	48.44	-27.95	43.08	-48.44	0.000%
10	-0.01	-43.08	55.63	0.01	43.08	-55.63	0.000%
11	-27.97	-43.08	48.44	27.97	43.08	-48.44	0.000%
12	-39.44	-43.08	39.45	39.44	43.08	-39.45	0.000%
13	-49.22	-43.08	28.43	49.22	43.08	-28.43	0.000%
14	-55.92	-43.08	0.01	55.92	43.08	-0.01	0.000%
15	-48.16	-43.08	-27.81	48.16	43.08	27.81	0.000%
16	-39.43	-43.08	-39.44	39.43	43.08	39.44	0.000%
17	-27.95	-43.08	-48.44	27.95	43.08	48.44	0.000%
18	0.00	-71.30	0.00	-0.00	71.30	0.00	0.000%
19	0.00	-71.30	-66.42	-0.00	71.30	66.42	0.000%
20	32.84	-71.30	-56.89	-32.84	71.30	56.89	0.000%
21	46.35	-71.30	-46.36	-46.35	71.30	46.36	0.000%
22	56.66	-71.30	-32.72	-56.66	71.30	32.72	0.000%
23	65.67	-71.30	-0.00	-65.67	71.30	0.00	0.000%
24	57.51	-71.30	33.20	-57.51	71.30	-33.20	0.000%
25	46.35	-71.30	46.35	-46.35	71.30	-46.35	0.000%
26	32.83	-71.30	56.88	-32.83	71.30	-56.88	0.000%
27	-0.00	-71.30	65.44	0.00	71.30	-65.44	0.000%
28	-32.84	-71.30	56.89	32.84	71.30	-56.89	0.000%
29	-46.35	-71.30	46.36	46.35	71.30	-46.36	0.000%
30	-57.51	-71.30	33.21	57.51	71.30	-33.21	0.000%
31	-65.67	-71.30	0.00	65.67	71.30	-0.00	0.000%
32	-56.66	-71.30	-32.71	56.66	71.30	32.71	0.000%
33	-46.35	-71.30	-46.35	46.35	71.30	46.35	0.000%
34	-32.83	-71.30	-56.88	32.83	71.30	56.88	0.000%
35	0.00	-43.08	-19.67	-0.00	43.08	19.67	0.000%
36	9.68	-43.08	-16.76	-9.68	43.08	16.76	0.000%
37	13.65	-43.08	-13.65	-13.65	43.08	13.65	0.000%
38	16.67	-43.08	-9.63	-16.67	43.08	9.63	0.000%
39	19.35	-43.08	-0.00	-19.35	43.08	0.00	0.000%
40	17.03	-43.08	9.83	-17.03	43.08	-9.83	0.000%
41	13.64	-43.08	13.65	-13.64	43.08	-13.65	0.000%
42	9.67	-43.08	16.76	-9.67	43.08	-16.76	0.000%
43	-0.00	-43.08	19.25	0.00	43.08	-19.25	0.000%
44	-9.68	-43.08	16.76	9.68	43.08	-16.76	0.000%
45	-13.65	-43.08	13.65	13.65	43.08	-13.65	0.000%
46	-17.03	-43.08	9.84	17.03	43.08	-9.84	0.000%
47	-19.35	-43.08	0.00	19.35	43.08	-0.00	0.000%
48	-16.66	-43.08	-9.62	16.66	43.08	9.62	0.000%
49	-13.64	-43.08	-13.65	13.64	43.08	13.65	0.000%
50	-9.67	-43.08	-16.76	9.67	43.08	16.76	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001

8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000094
21	Yes	4	0.00000001	0.00000098
22	Yes	4	0.00000001	0.00000096
23	Yes	4	0.00000001	0.00000094
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000080
26	Yes	4	0.00000001	0.00000094
27	Yes	4	0.00000001	0.00000095
28	Yes	4	0.00000001	0.00000094
29	Yes	4	0.00000001	0.00000080
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000094
32	Yes	4	0.00000001	0.00000096
33	Yes	4	0.00000001	0.00000097
34	Yes	4	0.00000001	0.00000094
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 150	5.248	35	0.2741	0.0115
T2	150 - 140	4.107	35	0.2541	0.0095
T3	140 - 120	3.578	35	0.2401	0.0074
T4	120 - 100	2.626	46	0.2034	0.0036
T5	100 - 90	1.808	46	0.1706	0.0008
T6	90 - 80	1.458	46	0.1502	0.0005
T7	80 - 60	1.153	46	0.1279	0.0006
T8	60 - 40	0.662	46	0.0913	0.0007
T9	40 - 20	0.314	46	0.0603	0.0006
T10	20 - 0	0.096	46	0.0271	0.0004

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

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	2" Dia 10' Omni	35	5.248	0.2741	0.0115	132635
177.50	3" Dia 20' Omni	35	5.248	0.2741	0.0115	132635
175.25	OD12-2400	35	5.248	0.2741	0.0115	132635
174.50	PD458-2	35	5.248	0.2741	0.0115	132635
174.00	2" Dia 10' Omni	35	5.248	0.2741	0.0115	132635
172.50	101-90-08-0-01	35	5.248	0.2741	0.0115	132635
172.00	4'x4" Pipe Mount	35	5.248	0.2741	0.0115	132635
171.00	Generic TMA	35	5.248	0.2741	0.0115	132635
170.00	10'6"x4" Pipe Mount	35	5.248	0.2741	0.0115	132635
168.00	9 Arm Halo Mount	35	5.131	0.2723	0.0114	132635
143.50	3" Dia 20' Omni	35	3.759	0.2454	0.0082	33968
142.00	17' 3" Dia Whip	35	3.681	0.2432	0.0079	34163
140.00	PD458-2	35	3.578	0.2401	0.0074	34433
139.50	11' 6" Whip	35	3.553	0.2392	0.0073	34495
133.75	PiROD 20' Universal Platform	35	3.266	0.2291	0.0061	35300
124.50	(2) RR90-17-DP	46	2.828	0.2116	0.0044	36718
123.00	PiROD 10' Lightweight T-Frame	46	2.760	0.2088	0.0041	36926
113.50	PiROD 12' Lightweight T-Frame	46	2.344	0.1927	0.0025	34530
100.00	PiROD 12' Lightweight T-Frame	46	1.808	0.1706	0.0008	29443
24.00	PC9013N	46	0.129	0.0334	0.0004	32977
17.00	(2) V60BB6036	46	0.076	0.0226	0.0003	37426

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	170 - 150	17.781	19	0.9100	0.0519
T2	150 - 140	13.991	19	0.8503	0.0408
T3	140 - 120	12.218	19	0.8076	0.0312
T4	120 - 100	8.991	19	0.6909	0.0167
T5	100 - 90	6.204	30	0.5823	0.0066
T6	90 - 80	5.008	30	0.5140	0.0042
T7	80 - 60	3.965	30	0.4383	0.0027
T8	60 - 40	2.277	30	0.3137	0.0021
T9	40 - 20	1.077	30	0.2073	0.0017
T10	20 - 0	0.328	30	0.0931	0.0010

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	2" Dia 10' Omni	19	17.781	0.9100	0.0519	45661
177.50	3" Dia 20' Omni	19	17.781	0.9100	0.0519	45661
175.25	OD12-2400	19	17.781	0.9100	0.0519	45661
174.50	PD458-2	19	17.781	0.9100	0.0519	45661
174.00	2" Dia 10' Omni	19	17.781	0.9100	0.0519	45661
172.50	101-90-08-0-01	19	17.781	0.9100	0.0519	45661
172.00	4'x4" Pipe Mount	19	17.781	0.9100	0.0519	45661
171.00	Generic TMA	19	17.781	0.9100	0.0519	45661
170.00	10'6"x4" Pipe Mount	19	17.781	0.9100	0.0519	45661
168.00	9 Arm Halo Mount	19	17.395	0.9047	0.0511	45661
143.50	3" Dia 20' Omni	19	12.827	0.8241	0.0346	11303
142.00	17' 3" Dia Whip	19	12.564	0.8173	0.0331	11280
140.00	PD458-2	19	12.218	0.8076	0.0312	11267
139.50	11' 6" Whip	19	12.133	0.8050	0.0308	11268
133.75	PiROD 20' Universal Platform	19	11.165	0.7732	0.0259	11352
124.50	(2) RR90-17-DP	19	9.681	0.7173	0.0193	11527
123.00	PiROD 10' Lightweight T-Frame	19	9.449	0.7083	0.0183	11545
113.50	PiROD 12' Lightweight T-Frame	30	8.033	0.6559	0.0131	10523
100.00	PiROD 12' Lightweight T-Frame	30	6.204	0.5823	0.0066	8750
24.00	PC9013N	30	0.439	0.1150	0.0012	9509
17.00	(2) V60BB6036	30	0.258	0.0777	0.0009	10779

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T2	150	Leg	A325N	1.0000	6	3.99	34.56	0.115 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	3.45	8.16	0.423 ✔	1.333	Member Bearing
		Top Girt	A325N	1.0000	1	0.30	8.16	0.037 ✔	1.333	Member Bearing
T3	140	Leg	A325N	1.0000	6	5.82	34.56	0.168 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	5.81	8.16	0.713 ✔	1.333	Member Bearing
T4	120	Leg	A325N	1.0000	6	10.53	34.56	0.305 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	8.51	8.16	1.043 ✔	1.333	Member Bearing
		Mid Girt	A325N	1.0000	1	2.31	8.16	0.284 ✔	1.333	Member Bearing
T5	100	Leg	A325N	1.0000	6	17.27	34.56	0.500 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	10.58	13.59	0.778 ✔	1.333	Member Bearing
T6	90	Diagonal	A325N	1.0000	1	11.04	13.59	0.812 ✔	1.333	Member Bearing
T7	80	Leg	A325N	1.0000	6	25.06	34.56	0.725 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	11.99	13.59	0.882 ✔	1.333	Member Bearing
T8	60	Leg	A325N	1.0000	6	32.86	34.56	0.951 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	12.87	16.99	0.758 ✔	1.333	Member Bearing
T9	40	Leg	A325N	1.2500	6	40.39	54.00	0.748 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	14.31	16.99	0.842 ✔	1.333	Member Bearing
T10	20	Leg	A325N	1.2500	6	47.81	53.99	0.886 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	17.53	13.59	1.290 ✔	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P/P_a
T1	170 - 150	1 3/4	20.00	2.49	68.3 K=1.00	21.253	2.4053	-25.44	51.12	0.498 ✓
T2	150 - 140	Pirod 105244	10.02	10.02	45.4 K=1.00	25.051	3.6816	-29.18	92.23	0.316 ✓
T3	140 - 120	Pirod 105216	20.03	10.02	45.4 K=1.00	25.051	3.6816	-59.27	92.23	0.643 ✓
T4	120 - 100	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.3014	-98.00	138.54	0.707 ✓
T5	100 - 90	Pirod 105217	10.02	10.02	37.8 K=1.00	26.132	5.3014	-124.19	138.54	0.896 ✓
T6	90 - 80	Pirod 105217	10.02	10.02	37.8 K=1.00	26.132	5.3014	-149.65	138.54	1.080 ✓
T7	80 - 60	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-202.50	193.73	1.045 ✓
T8	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-255.47	257.78	0.991 ✓
T9	40 - 20	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-306.99	257.78	1.191 ✓
T10	20 - 0	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-356.63	330.69	1.078 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	14.073	0.1963	0.62	3.09	0.201 ✓
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.66	2.23	0.298 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	0.81	2.26	0.357 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	1.02	2.26	0.450 ✓
T6	90 - 80	0.5	1.47	120.0	10.279	0.1963	0.23	2.26	0.104 ✓

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T7	80 - 60	0.5	1.46	119.0	10.423	0.1963	0.22	2.29	0.097
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.25	4.69	0.054
T9	40 - 20	0.625	1.45	94.4	13.671	0.3068	0.79	4.69	0.168
T10	20 - 0	0.625	1.43	93.6	13.766	0.3068	1.43	4.73	0.302

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	111.6 K=0.75	12.001	0.6013	-2.41	7.22	0.334
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	121.3 K=1.00	10.097	0.9020	-3.89	9.11	0.427
T3	140 - 120	L3x3x3/16	12.50	5.65	115.3 K=1.01	10.840	1.0900	-6.03	11.82	0.510
T4	120 - 100	L3x3x3/16	13.80	6.35	127.8 K=1.00	9.141	1.0900	-9.19	9.96	0.922
T5	100 - 90	L3x3x5/16	14.50	6.72	136.9 K=1.00	7.969	1.7800	-10.64	14.19	0.750
T6	90 - 80	L3x3x5/16	15.24	7.10	144.7 K=1.00	7.132	1.7800	-11.47	12.69	0.903
T7	80 - 60	L3x3x5/16	16.80	7.90	161.0 K=1.00	5.760	1.7800	-12.42	10.25	1.211
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	151.3 K=1.00	6.527	2.0900	-13.07	13.64	0.958
T9	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.56	166.3 K=1.00	5.400	2.0900	-12.89	11.29	1.142
T10	20 - 0	L4x4x1/4	21.03	10.01	151.1 K=1.00	6.542	1.9400	-15.64	12.69	1.232

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.14	2.58	0.054
T2	150 - 140	L3x3x3/16	5.00	4.48	105.1 K=1.17	12.131	1.0900	-0.25	13.22	0.019

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.12	2.58	0.046 ✔

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	120 - 100	L3x3x3/16	9.00	7.63	153.5 K=1.00	6.336	1.0900	-1.72	6.91	0.249 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	1 3/4	20.00	2.49	68.3	30.000	2.4053	20.34	72.16	0.282 ✔
T2	150 - 140	Pirod 105244	10.02	10.02	45.4	30.000	3.6816	23.94	110.45	0.217 ✔
T3	140 - 120	Pirod 105216	20.03	10.02	45.4	30.000	3.6816	47.63	110.45	0.431 ✔
T4	120 - 100	Pirod 105217	20.03	10.02	37.8	30.000	5.3014	81.25	159.04	0.511 ✔
T5	100 - 90	Pirod 105217	10.02	10.02	37.8	30.000	5.3014	103.61	159.04	0.651 ✔
T6	90 - 80	Pirod 105217	10.02	10.02	37.8	30.000	5.3014	126.37	159.04	0.795 ✔
T7	80 - 60	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	173.50	216.47	0.801 ✔
T8	60 - 40	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	219.70	282.74	0.777 ✔
T9	40 - 20	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	262.71	282.74	0.929 ✔
T10	20 - 0	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	301.06	357.85	0.841 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T2	150 - 140	0.5	1.48	121.0	14.073	0.1963	0.62	3.09	0.201 ✓
T3	140 - 120	0.5	1.48	121.0	10.133	0.1963	0.66	2.23	0.298 ✓
T4	120 - 100	0.5	1.47	120.0	10.279	0.1963	0.81	2.26	0.357 ✓
T5	100 - 90	0.5	1.47	120.0	10.279	0.1963	1.02	2.26	0.450 ✓
T6	90 - 80	0.5	1.47	120.0	10.279	0.1963	0.23	2.26	0.104 ✓
T7	80 - 60	0.5	1.46	119.0	10.423	0.1963	0.22	2.29	0.097 ✓
T8	60 - 40	0.625	1.45	94.4	13.671	0.3068	0.25	4.69	0.054 ✓
T9	40 - 20	0.625	1.45	94.4	13.671	0.3068	0.79	4.69	0.168 ✓
T10	20 - 0	0.625	1.43	93.6	13.766	0.3068	1.43	4.73	0.302 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.59	2.71	148.7	30.000	0.6013	2.37	18.04	0.131 ✓
T2	150 - 140	L2 1/2x2 1/2x3/16	11.42	5.00	80.1	21.600	0.9020	3.45	19.48	0.177 ✓
T3	140 - 120	L3x3x3/16	12.50	5.65	74.6	21.600	1.0900	5.81	23.54	0.247 ✓
T4	120 - 100	L3x3x3/16	13.80	6.35	83.5	21.600	1.0900	8.51	23.54	0.361 ✓
T5	100 - 90	L3x3x5/16	14.50	6.72	89.9	21.600	1.7800	10.58	38.45	0.275 ✓
T6	90 - 80	L3x3x5/16	15.24	7.10	94.9	21.600	1.7800	11.04	38.45	0.287 ✓
T7	80 - 60	L3x3x5/16	16.80	7.90	105.3	21.600	1.7800	11.99	38.45	0.312 ✓
T8	60 - 40	L3 1/2x3 1/2x5/16	18.45	8.70	99.2	21.600	2.0900	12.87	45.14	0.285 ✓
T9	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.56	108.8	21.600	2.0900	14.31	45.14	0.317 ✓
T10	20 - 0	L4x4x1/4	21.92	10.45	102.5	21.600	1.9400	17.53	41.90	0.418 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.11	18.04	0.006 ✔
T2	150 - 140	L3x3x3/16	5.00	4.48	62.0	21.600	1.0900	0.30	23.54	0.013 ✔

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	170 - 150	7/8	5.00	4.85	266.3	30.000	0.6013	0.11	18.04	0.006 ✔

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	120 - 100	L3x3x3/16	9.00	7.63	102.2	21.600	1.0900	2.31	23.54	0.098 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	170 - 150	Leg	1 3/4	3	-25.44	68.14	37.3	Pass
T2	150 - 140	Leg	Pirod 105244	60	-29.18	122.94	23.7	Pass
T3	140 - 120	Leg	Pirod 105216	72	-59.27	122.94	48.2	Pass
T4	120 - 100	Leg	Pirod 105217	87	-98.00	184.67	53.1	Pass
T5	100 - 90	Leg	Pirod 105217	105	-124.19	184.67	67.3	Pass
T6	90 - 80	Leg	Pirod 105217	114	-149.65	184.67	81.0	Pass
T7	80 - 60	Leg	Pirod 105218	123	-202.50	258.24	78.4	Pass
T8	60 - 40	Leg	Pirod 105219	136	-255.47	343.62	74.3	Pass
T9	40 - 20	Leg	Pirod 105219	151	-306.99	343.62	89.3	Pass
T10	20 - 0	Leg	Pirod 105220	166	-356.63	440.81	80.9	Pass
T1	170 - 150	Diagonal	7/8	13	-2.41	9.62	25.1	Pass
T2	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	69	-3.89	12.14	32.0	Pass
T3	140 - 120	Diagonal	L3x3x3/16	78	-6.03	15.75	38.3	Pass
T4	120 - 100	Diagonal	L3x3x3/16	93	-9.19	13.28	53.5 (b) 69.2	Pass
T5	100 - 90	Diagonal	L3x3x5/16	108	-10.64	18.91	78.3 (b) 56.3	Pass
T6	90 - 80	Diagonal	L3x3x5/16	117	-11.47	16.92	58.4 (b) 67.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	80 - 60	Diagonal	L3x3x5/16	126	-12.42	13.67	90.8	Pass
T8	60 - 40	Diagonal	L3 1/2x3 1/2x5/16	141	-13.07	18.18	71.9	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	156	-12.89	15.04	85.7	Pass
T10	20 - 0	Diagonal	L4x4x1/4	176	-15.64	16.92	92.4	Pass
							96.8 (b)	
T1	170 - 150	Top Girt	7/8	5	-0.14	3.45	4.0	Pass
T2	150 - 140	Top Girt	L3x3x3/16	61	-0.25	17.63	1.4	Pass
							2.8 (b)	
T1	170 - 150	Bottom Girt	7/8	7	-0.12	3.45	3.4	Pass
T4	120 - 100	Mid Girt	L3x3x3/16	88	-1.72	9.21	18.7	Pass
							21.3 (b)	
							Summary	
						Leg (T9)	89.3	Pass
						Diagonal (T10)	96.8	Pass
						Top Girt (T1)	4.0	Pass
						Bottom Girt (T1)	3.4	Pass
						Mid Girt (T4)	21.3	Pass
						Bolt Checks	96.8	Pass
						RATING =	**96.8**	**Pass**

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 314·kips	*user input*
Shear:	Shear := 44·kips	*user input*
Compression:	Compression := 366·kips	*user input*

Anchor Bolt Data:

Use ASTM A354 Grade BC

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 150·ksi	*user input*	
Bolt Yield Strength:	Fy := 105·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.25in	*user input*	
Threads per Inch:	n := 7	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 1.227\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 0.969\cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.33\cdot\left(0.33\cdot A_g\cdot F_u\right) \qquad AllowableTension = 80.8\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.33\cdot\left(0.60\cdot A_n\cdot Fy\right) \qquad F_{net.area} = 81.2\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 52.3\cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.64$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Stell Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 3.9 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 1.3 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 5.8 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.67$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.23$$

Condition3 = "OK"

FOUNDATION EVALUATION

FOUNDATION ANALYSIS

Input Data

Maximum Pier Reactions:

Compression: $C_t := 366 \cdot kips$ *user input*

Uplift: $U_t := 314 \cdot kips$ *user input*

Foundation Dimensions:

Drilled Caisson Length: $C_{Length} := 41.5 \cdot ft$ *user input*

Diameter of Pier: $d_p := 5.5ft$ *user input*

Extension of Pier Above Grade: $L_{pag} := 0.5ft$ *user input*

Material Properties:

Unit Weight of Concrete: $\mu c := 150pcf$ *user input*

Unit Weight of Water: $\mu w := 62.4pcf$ *user input*

Unit Weight of Soil: $\mu s := 100pcf$ *user input*

Allowable Soil Bearing Capacity (Allowable Bearing Pressure at Depth 41'): $q_s := 6 \cdot ksi$ *user input*

Water Table Below Grade: $Wd := 41 \cdot ft$ *user input*

Average Allowable Shear: $fl := 859 \cdot psf$ *user input*

Depth Neglected for Skin Friction at Top: $Depthunbond := 4 \cdot ft$ *user input*

Loading:

$$TotalDownLoad := C_t + \pi \cdot \frac{d_p^2}{4} \cdot \left[L_{pag} \cdot \mu c + \left[\mu c \cdot \left(C_{Length} - L_{pag} \right) \right] \right]$$

$$TotalDownLoad = 513.9 \cdot kips$$

$$PierWeight := \pi \cdot \frac{d_p^2}{4} \cdot \left[\left(Wd + L_{pag} \right) \cdot \mu c + \left(C_{Length} - Wd - L_{pag} \right) \cdot \left(\mu c - \mu w \right) \right]$$

$$PierWeight = 147.9 \cdot kips$$

$$SoilShear := \pi \, d_p \cdot \left[fl \cdot \left(C_{Length} - Depthunbond \right) \right]$$

$$SoilShear = 556.6 \cdot kips$$

Compression Capacity:

$$TotalDownLoadCapacity := SoilShear + q_s \cdot \left(\pi \cdot \frac{d_p^{\,2}}{4} \right)$$

$TotalDownLoadCapacity = 21083.8 \cdot kips$

$CheckDownLoadCapacity := if(TotalDownLoad < TotalDownLoadCapacity, "Okay", "No Good")$

$CheckDownLoadCapacity = "Okay"$

Tension Capacity:

$TotalUpLiftCapacity := SoilShear + PierWeight$

$TotalUpLiftCapacity = 704.5 \cdot kips$

$CheckUpLiftCapacity := if\left(U_t < TotalUpLiftCapacity, "Okay", "No Good"\right)$

$CheckUpLiftCapacity = "Okay"$

$$SafetyFactor_{provided} := \frac{TotalUpLiftCapacity}{U_t}$$

$SafetyFactor_{provided} = 2.24$

Check Cone Failure:

$$ConeFailureCapacity := \frac{\left[\left(C_{Length} - L_{pag}\right) \cdot \tan(30deg) \cdot 2 + d_p\right]^2 \cdot \pi}{4} \cdot \frac{C_{Length} - L_{pag}}{3} \cdot \mu s$$

$ConeFailureCapacity = 2997.25 \cdot kips$

$CheckConeFailureCapacity := if\left(U_t < ConeFailureCapacity, "Okay", "No Good"\right)$

$CheckConeFailureCapacity = "Okay"$

$$ConeSafetyFactor_{provided} := \frac{ConeFailureCapacity}{U_t}$$

$ConeSafetyFactor_{provided} = 9.55$