



January 29, 2015

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Street
New Britain, CT 06051

Regarding: Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address: 26 Fenwood Lane, Wilton, CT (the "Property")
Applicant: AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 180 foot self-supporting lattice tower ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 163 feet. The tower is controlled by the Connecticut State Police. The Council approved the previous application on September 16th 2011 reference number EM-CING-161-110830. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-CING-161-110830.

Please accept this application 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 the First Selectman and the Town Planner for the Town of Wilton. A copy of this letter is also being sent to AT&T Towers, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 163 foot level of the 180 foot tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.



4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the September 16, 2011 Decision.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by GPD Group dated August 23, 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

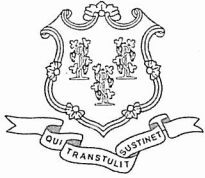
Sincerely,

A handwritten signature in black ink that reads "David P. Cooper". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: William Brennan, First Selectman, Town of Wilton
Robert Nerney, Town Planner, Town of Wilton
Connecticut State Police

CT 2143



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

September 16, 2011

Douglas L. Culp, Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-161-110830** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 46 Fenwood Lane, Wilton, Connecticut.

Dear Mr. Culp:

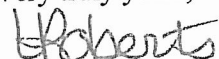
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 30, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

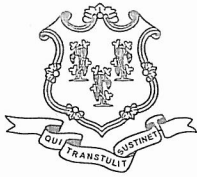
Very truly yours,


Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable William Francis Brennan, First Selectman, Town of Wilton
Robert Nerney, Town Planner, Town of Wilton
Brian Benito, Bureau of Police Support Telecommunications





STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

September 1, 2011

The Honorable William Francis Brennan
First Selectman
Town of Wilton
Town Hall
238 Danbury Road
Wilton, CT 06897

RE: **EM-CING-161-110830** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 46 Fenwood Lane, Wilton, Connecticut.

Dear First Selectman Brennan:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by September 16, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Robert Nerney, Town Planner, Town of Wilton



New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant



HAND DELIVERED

November 15, 2011

CONNECTICUT
SITING COUNCIL

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

ORIGINAL

Re: EM-CING 161-110830 – Addition of Tower Modifications for Wilton State Police Tower per Sprint Structural by URS Corp. dated June 29, 2011 for the existing telecommunications facility located at 46 Fenwood Lane Wilton, CT (owner CT State Police)

Dear Ms. Roberts:

Please let this letter serve as notice that after the above referenced exempt modification approval, it was discovered that Sprint was supposed to do modifications to the State Police Tower to upgrade their facility on the same tower. Sprint has never implemented those modifications. AT&T's will therefore include Sprints modifications along with its own when it implements its upgrade.

Please feel free to call me at (860) 463-5511 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Attachments



November 10, 2011

Mr. Tim Burks
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

**Reference: State Building Code Plan Review of Construction Drawings
Wilton State Police Tower – New Antenna Arrangement
AT&T Site ID #: CT2143
Engineer's Response to Review Comment 4**

Dear Mr. Burks:

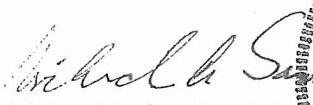
In response to State Building Code Plan Review dated October 27, 2011, Review Item 4, we have conferred with representatives of Sprint in order to verify the assumption made in the Executive Summary of URS' Structural Analysis / Modification Design for AT&T dated October 17, 2011. Representatives for Sprint have confirmed that reinforcing of the tower included in URS' June 29, 2011 Structural Analysis /Modification Design for Sprint has not been installed.

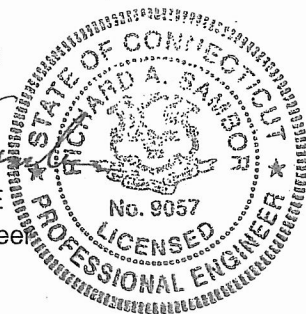
URS has made AT&T aware of the lack of Sprint modification on the tower. AT&T has agreed to include Sprint's modification as part of the work for their installation. URS has provided AT&T with the requirements for Sprint's modification. No installation of antennas, mounting devices, or cables shall occur until the Sprint modification and the AT&T modification are complete. Additionally, URS will provide the Special Inspector for AT&T with a copy of Sprint's reinforcement design for inclusion with AT&T's Special Inspections.

Should you have any questions please contact me.

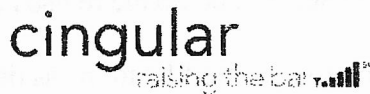
Sincerely,

URS Corporation AES


Richard A. Sambor, P.E.
Senior Structural Engineer

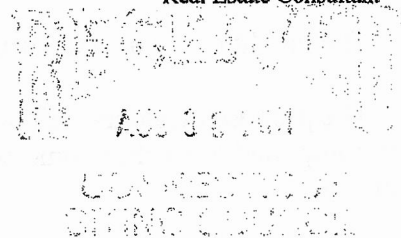


cc: Ignacio C. Artaiz - URS
Project File



New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant



HAND DELIVERED

August 30, 2011

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing tele-communications facility located at 46 Fenwood Lane Wilton, CT (owner State of Connecticut State Police)

Dear Ms. Roberts:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a new high-performance air interface for cellular mobile communications. It is the last step toward the 4th generation (4G) of radio technologies, designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the

structural sufficiency of the tower to accommodate the revised antenna configuration.

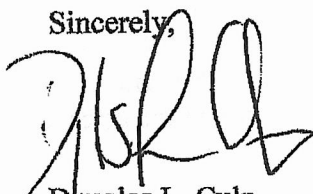
The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.
4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly-licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 463-5511 with questions concerning this matter. Thank you for your consideration.

Sincerely,



Douglas L. Culp
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

46 Fernwood Lane Wilton, CT
 Site Number CT2143
 Exempt Mod

Tower Owner/Manager: State of Connecticut – State Police

Equipment configuration: SSLT

Current and/or approved: Six PowerWave antennas @ 163 ft
 Six PowerWave TMA's and Six PowerWave Diplexers @ 163 ft
 Twelve runs 7/8" inch coax to 163 ft
 Equipment Shelter

Planned Modifications: Retain existing PowerWave Antenna's and TMA's at 163 ft
 Retain all Coax Cabling
 Remove Diplexers
 Install three PowerWave P65-16 antennas or equivalent @ 163 ft
 Install three PowerWave Twin BP TMA's or equivalent @ 163 ft
 Install six remote radio heads and surge arrestor @ 163 ft
 Install one fiber and two DC power cables to 163 ft

Power Density:

Worst-case calculations for existing wireless operations at the site, using standard parameters for other carriers, indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the Tower, of approximately 86.7% of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 88.1% of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm ²)	Standard Limits (mW/cm ²)	Percent of Limit
Other Users							81.57
AT&T UMTS	163	1900 Band	1	500	0.0068	1.0000	0.68
AT&T UMTS	163	800 Band	1	500	0.0068	0.5867	1.15
AT&T GSM	163	800Band	4	296	0.0160	0.5867	2.73
AT&T GSM	163	1900 Band	1	427	0.0058	1.0000	0.58
Total							86.7%

* Data for other users are from Siting Council records.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm ²)	Standard Limits (mW/cm ²)	Percent of Limit
Other Users							81.57
AT&T UMTS	163	800 Band	1	500	0.0068	0.5867	1.15
AT&T UMTS	163	1900 Band	1	500	0.0068	1.0000	0.68
AT&T GSM	163	1900 Band	1	427	0.0058	1.0000	0.58
AT&T GSM	163	880 - 894	4	296	0.0160	0.5867	2.73
AT&T LTE	163	740 - 746	1	500	0.0068	0.4933	1.37
Total							88.1%

* Data for other users are from Siting Council records.

Structural information:

The attached structural analysis demonstrates that the monopole and foundation have adequate structural capacity to accommodate the proposed modifications. URS Corporation dated 8-23-11).

WILTON
46 FENWOOD LANE
WILTON, CONNECTICUT



NEW CINGULAR WIRELESS PCS, LLC
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067

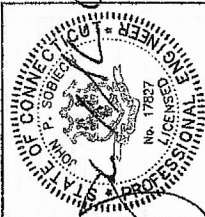


Executive Summary

26100 Eads Drive Highway, Suite 212 • Rocky Hill, CT 06067-2660
 Mobile 860.267.1887 • info@barnardsgroup.com

CHA PROJECT NO:
2702 - 1009 - 43000

		SUBMITTAL
NO.		
9	03/16/11 BY: JMW	ISSUED FOR REVIEW CHK: PHL ADP/O: JPS
1	04/28/11 BY: TUD	SUBMIT FOR CONSTRUCTION CHK: PHL ADP/O: JPS



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

SITE ID: CT2143
 SITE NAME: WILTON
 SITE ADDRESS: 46 FENWOOD LANE
 WILTON, CT 06897
 FAIRFIELD COUNTY

SHEET TITLE

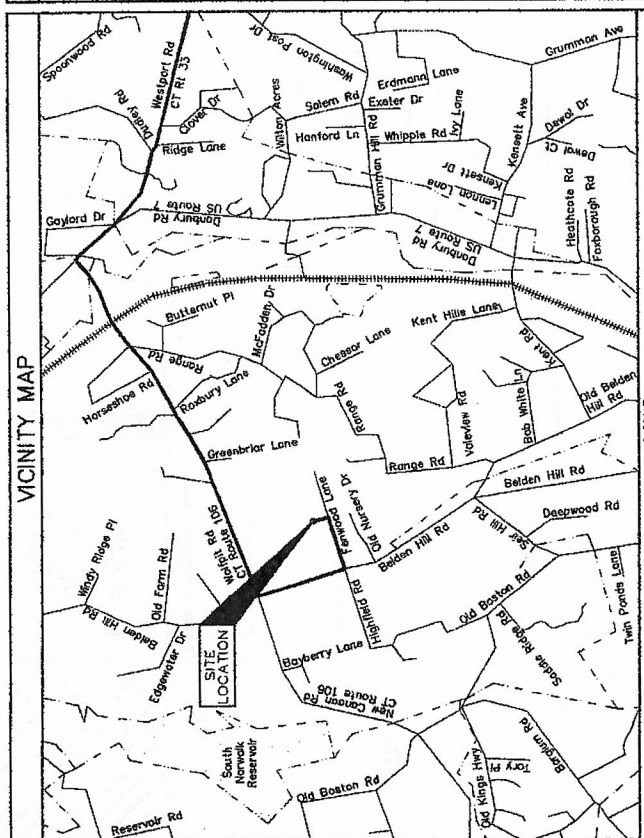
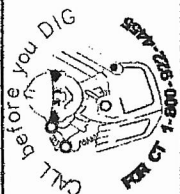
SHEET NUMBER

LOT

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**DO NOT SCALE
DRAWINGS**

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME



NO SCALE

APRIL 20, 2011



PROJECT SUMMARY

DATE NUMBER:	027443	WILSON	NEW COUNCIL WARELESS PWS, LLC
DATE NAME:	48 FERNWOOD LANE	WILSON, CT 06897	500 ENTERPRISE DRIVE
DATE ADDRESS:	CT STATE POLICE	ROCKY HILL, CT 06867	MOORE, D. FOLEY
STRUCTURE OWNER:			(203) 414-1184
APPLICANT:			41° 10' 21.2"N
CONTACT:			73° 26' 2.1"W
COORDINATES:			HD 83
HORIZONTAL DATUM:			GDA 83
ENGINEER:			375B MAIN ST
			ROCKY HILL, CT 06867
CONTACT:			PAUL LUSTIN
			(860) 257-4657

DRIVING DIRECTIONS

FROM HARTFORD:

1. TAKE I-91 S.
2. TAKE EXIT 17 AND MERGE ONTO CT-155/W. CROSS PARKWAY.
3. TAKE EXIT 41 TOWARD CT-33 N/WILTON RD.
4. TURN LEFT ONTO CT-33 N/WILTON RD
5. CONTINUE TO FOLLOW CT-33 N
6. TURN LEFT ONTO CT-106 S/WOLFRT RD.
7. TURN LEFT AT BELDEN HALL RD.
8. TAKE THE 1ST LEFT ONTO FENWOOD LN.
9. LATTICE TOWER WILL BE ON THE LEFT.

PROJECT DESCRIPTION

THIS PROJECT ADDS THREE ANTENNAS, SIX RRM, SURGE ARRESTORS, AND A RADIO CABINET TO AN EXISTING TELECOMMUNICATIONS SITE.



Your world. Delivered.

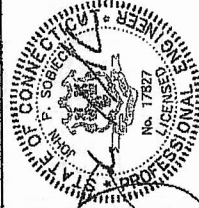
NEW CABLECARD WIRELESS PCS, LLC
2000 WEST 10TH AVENUE
ROCKY HILL, CT 06867



2110 Blue Court Highway, Suite 210 - Rocky Hill, CT 06867-0285
Phone: (860) 271-4247 • Fax: (860) 271-4248

CIA PROJECT NO:
22702 - 1002 - 43000

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1	03/13/07	ISSUED FOR PERMIT	JPM/PS
2	03/13/07	ISSUED FOR CONSTRUCTION	JPM/PS

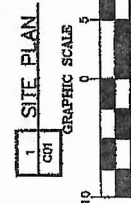
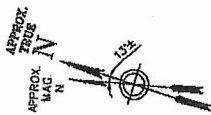
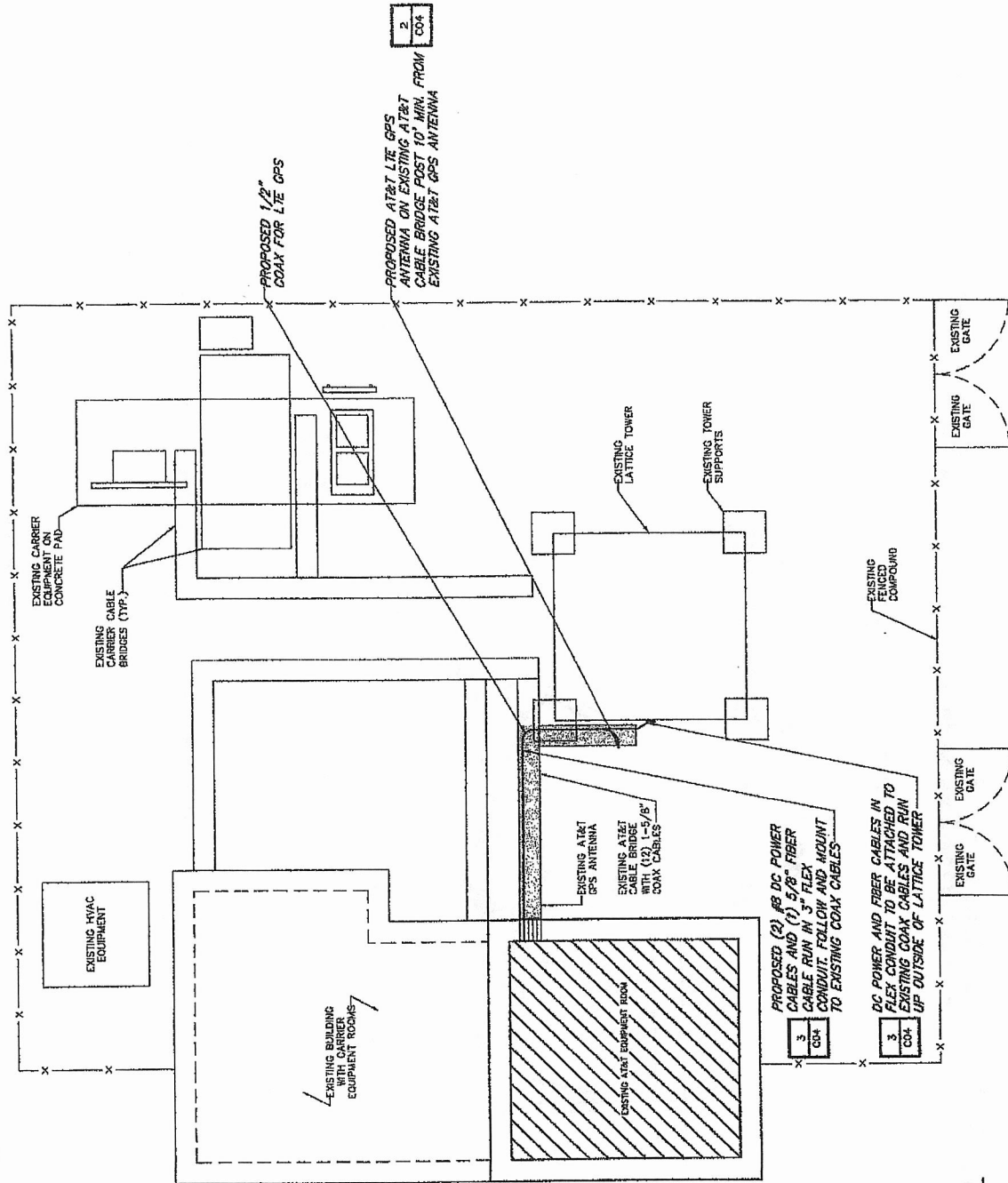


I, JOHN P. SOBIEAJ, A PROFESSIONAL ENGINEER, DO HEREBY CERTIFY THAT I AM THE DESIGNER OF THIS PROJECT AND THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF CONNECTICUT.

SITE ID:
C12143
SITE NAME:
WILTON
SITE ADDRESS:
46 FENWOOD LANE
WILTON, CT 06897
FAIRFIELD COUNTY

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
C01





Your World. Delivered.

NEW CIRCULAR WIRELESS PCS, LLC
1000 BROADWAY, SUITE 200
ROCKY HILL, CT 06867

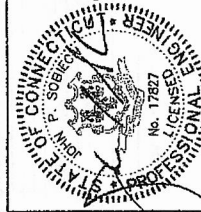
Drawn: CHA/10/01/01

CHA

1000 BROADWAY, SUITE 200, ROCKY HILL, CT 06867
TEL: (860) 514-1111 FAX: (860) 514-1112

CHA PROJECT NO. 22702 - 1009 - 03/00

NO.	DATE	DESCRIPTION
1	10/17/01	ISSUED FOR PERMIT
2	10/17/01	ISSUED FOR PERMIT
3	10/17/01	ISSUED FOR PERMIT
4	10/17/01	ISSUED FOR PERMIT
5	10/17/01	ISSUED FOR PERMIT
6	10/17/01	ISSUED FOR PERMIT
7	10/17/01	ISSUED FOR PERMIT
8	10/17/01	ISSUED FOR PERMIT
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15	10/17/01	ISSUED FOR PERMIT
16	10/17/01	ISSUED FOR PERMIT
17	10/17/01	ISSUED FOR PERMIT
18	10/17/01	ISSUED FOR PERMIT
19	10/17/01	ISSUED FOR PERMIT
20	10/17/01	ISSUED FOR PERMIT

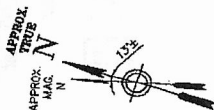
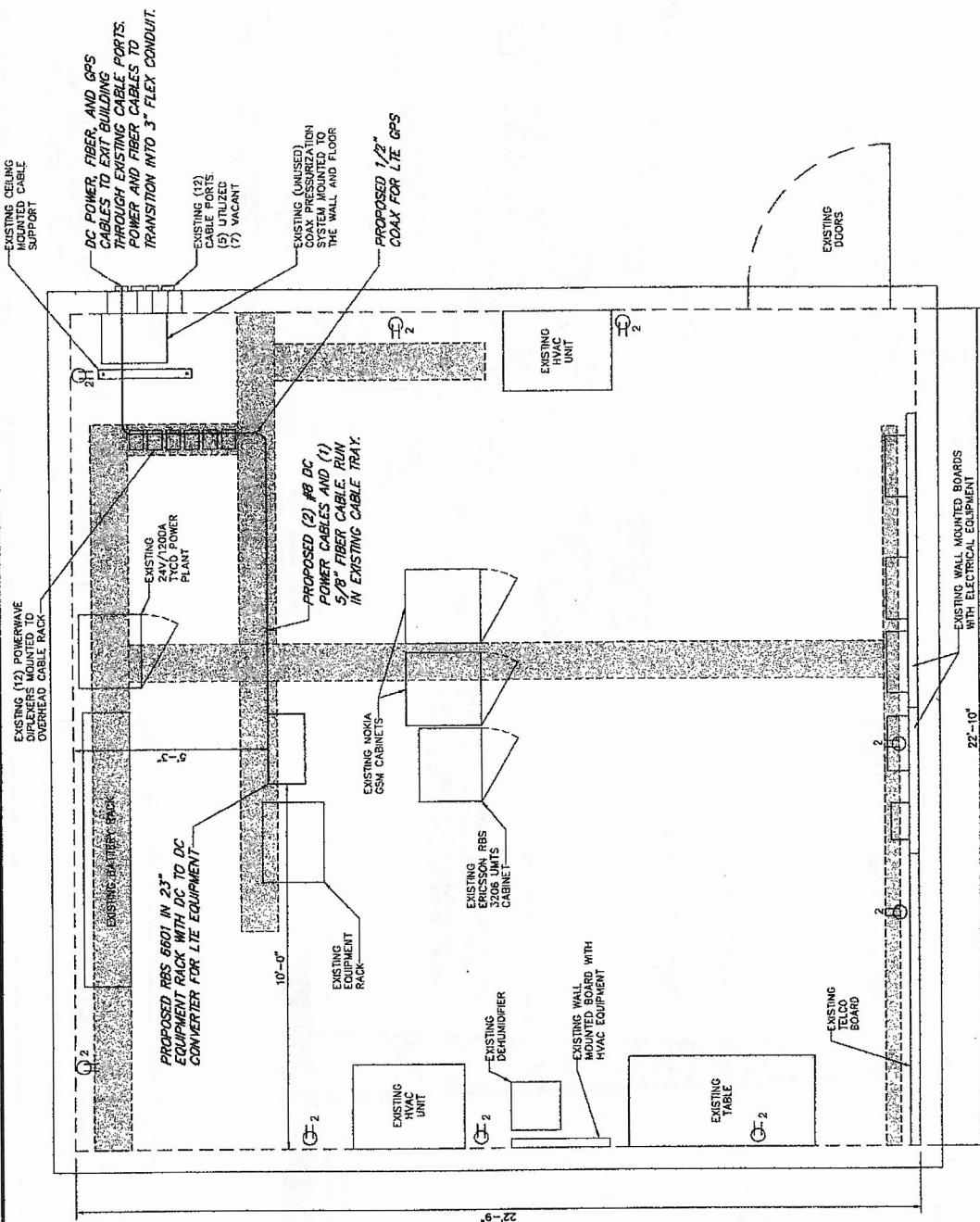


IT IS A VIOLATION OF ANY FOR ANY FORFEITURE
UNLESS THEY ARE AGING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER
TO ALTER THIS DOCUMENT.

SITE NO.
CT2143
SITE NAME:
WILTON
SITE ADDRESS:
46 FENWOOD LANE
WILTON, CT
06897
FAIRFIELD COUNTY

SHEET TITLE
SHELTER PLAN

SHEET NUMBER
C02



1 SHELTER PLAN

GRAPHIC SCALE



LEGEND	
2	EXISTING DUPLEX OUTLET
4	EXISTING FOURPLEX OUTLET
	EXISTING OVERHEAD RACK



Your world. Delivered.

NEW CINGULAR WIRELESS PCS, LLC
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067

Copyright © 1991

Donation Certificate 000115

[illegible]

DATA PROJECT NO:
22702 - 1038 - 43000

	SUBMITTAL
DJ/12/11 WFC JMS	ISSUED FOR REVIEW ENR: PAL APP'D JPS
09/28/11	ISSUED FOR CONSTRUCTION BIC: WAC CIVIL: PAL APP'D JPS



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ATTEMPT THIS EXPERIMENT.

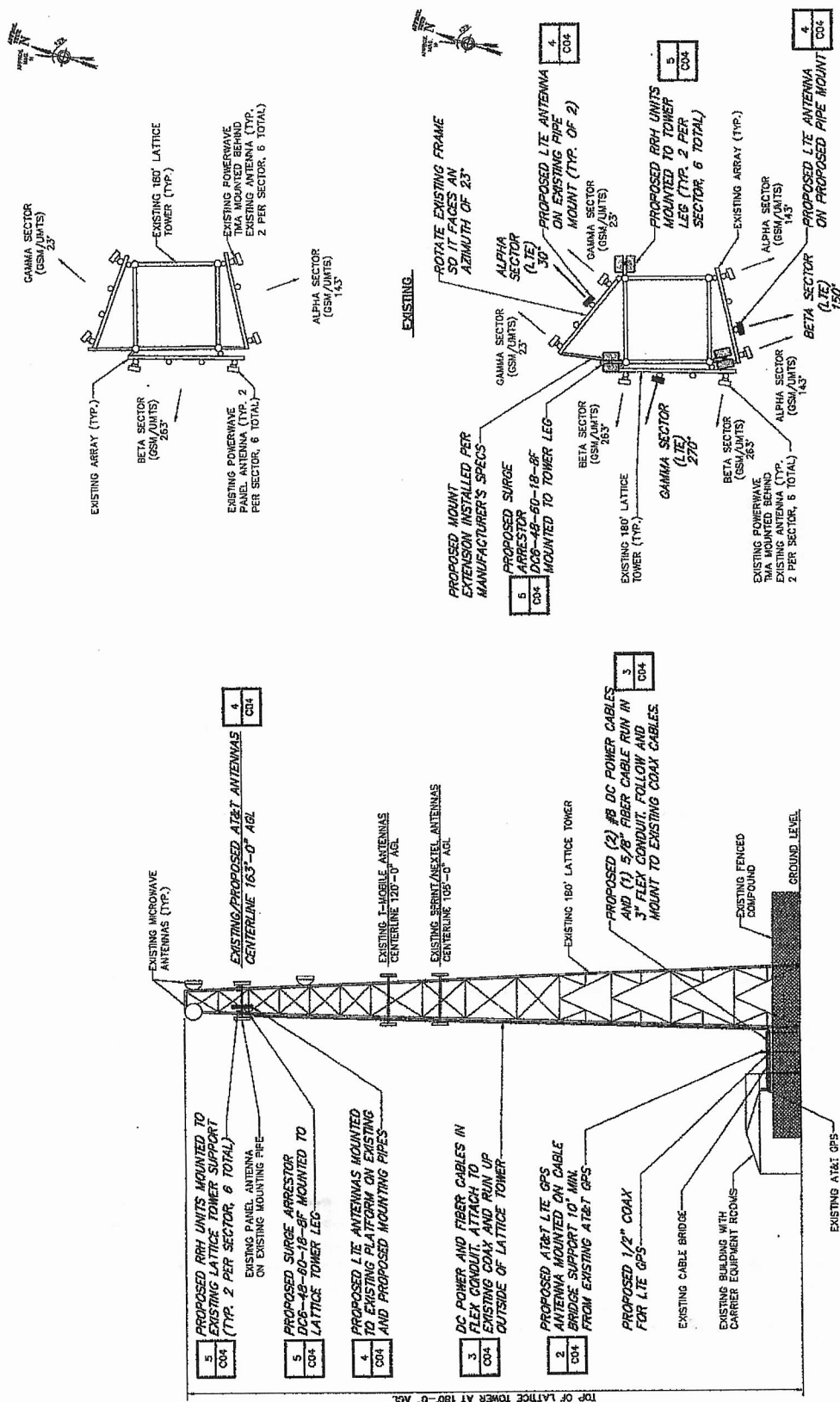
SITE ID:
CT2143
SITE NAME:
WILTON
SITE ADDRESS:
46 FENWOOD LANE
WILTON, CT
06897
FAIRFIELD COUNTY

SUBJECT TITLE

ELEVATION AND
ANTENNA PLAN

THE UNIVERSITY OF CHICAGO

CO3



PROPOSED

ANTENNA PLANS

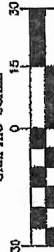
ANTENNA
SCALE: N.T.S.

NOTE: REFER TO FINAL RFDS FOR FINAL SECTOR CONFIGURATIONS.

TOWER EVALUATION

SCALE: 1" = 15' FULL SIZE
1" = 30' 11 V 17

GRAPHIC SCALE



11

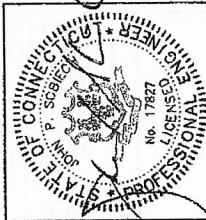


NEW CINGULAR WIRELESS PCS, LLC
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06857



CWA PROJECT NO:
23702 - 000 - 43000

NO.	DATE	DESCRIPTION
0	03/14/01	ISSUED FOR REVIEW
1	03/14/01	ISSUED FOR REVIEW
2	03/14/01	ISSUED FOR REVIEW
3	03/14/01	ISSUED FOR REVIEW
4	03/14/01	ISSUED FOR REVIEW
5	03/14/01	ISSUED FOR REVIEW
6	03/14/01	ISSUED FOR REVIEW
7	03/14/01	ISSUED FOR REVIEW
8	03/14/01	ISSUED FOR REVIEW
9	03/14/01	ISSUED FOR REVIEW

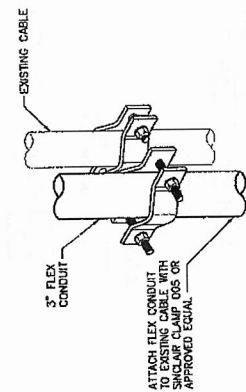


IT IS A VIOLATION OF LAW FOR ANY PERSON
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER
TO SEAL AND SIGN DOCUMENTS.

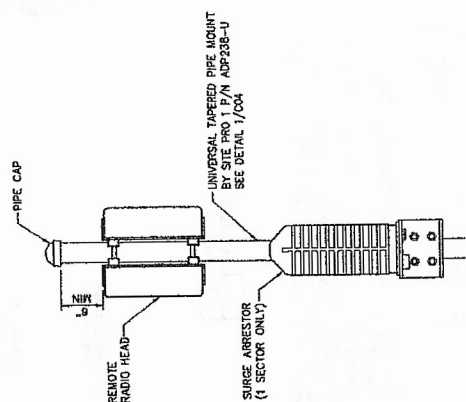
SHEET NO.
C12143
SITE NAME
WILTON
SITE ADDRESS
46 FENWOOD LAKE
WILTON, CT
06897
FAIRFIELD COUNTY

SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
C04

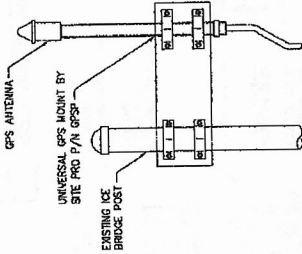


3 FLEX CONDUIT DETAIL
SCALE: NTS



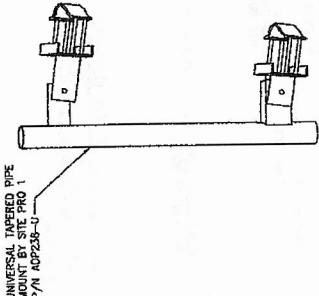
5 RRH/SURGE ARRESTOR MOUNTING DETAIL
SCALE: NTS

NOTE:
REMOTE RADIO HEAD/SURGE ARRESTOR MOUNTING BRACKET AND
HARDWARE TO BE PROVIDED BY MANUFACTURER.

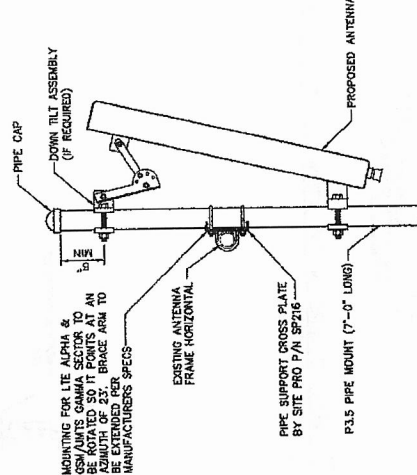


2 GPS MOUNTING DETAIL
SCALE: NTS

NOTE:
1. THE WEIGHT OF THE ANTENNA MOUNT IS 6.5 LBS.



1 PIPE MOUNT TO TOWER LEG
SCALE: NTS



NOTE:
1. MOUNT ANTENNA IN ACCORDANCE WITH MANUFACTURER'S
RECOMMENDED PROCEDURE.
2. USE EXISTING PIPE MOUNT IF AVAILABLE.

4 TYPICAL ANTENNA MOUNTING DETAIL
SCALE: NTS

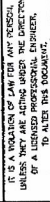


NEW CINGULAR WIRELESS PCS, LLC
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067



CHA PROJECT NO:
22702 - 1009 - 43000

NO.	SUBMITTA.	ISSUED FOR REVIEW			
		BY: JCA	CHK: PAL	APP'D: JPS	DATE
0		03/16/11			
		04/29/11			
1		BY: TAO	CHK: PAL	APP'D: JPS	DATE



SITE ID:
CT2143
SITE NAME:
WILTON
SITE ADDRESS:
46 FENWOOD LANE
WILTON, CT
06897
FAIRFIELD COUNTY

SHEET TITLE
GENERAL
NOTES

SHEET NUMBER
GN01

- EARTHQUAKE DESIGN DATA:
SEISMIC IMPORTANCE FACTOR, I : 1.0
MAPPED SPECTRAL RESPONSE ACCELERATIONS: $SS=0.302$ $SI=0.067$
SITE CLASS: D
SEISMIC DESIGN CATEGORY: B

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 180' SELF- SUPPORTING LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

Site I.D #: CT2143
Site Name: Wilton State Police Tower
Address: 46 Fenwood Lane
Wilton, Connecticut

prepared for



AT&T Mobility

500 Enterprise
Drive, Suite 3A
Rocky Hill, CT 06067

prepared by



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

36924439.00000
SAI-066 (Rev 1)

August 23, 2011

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 - **RISA TOWER INPUT / OUTPUT SUMMARY**
 - **RISA TOWER FEEDLINE DISTRIBUTION CHART**
 - **RISA TOWER FEEDLINE PLAN**
 - **RISA TOWER DEFLECTION, TILT, AND TWIST**
 - **RISA TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT EVALUATION**
 - **FOUNDATION ANALYSIS**

1. **EXECUTIVE SUMMARY**

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 46 Fenwood Lane in Wilton, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard and additional requirements of the Connecticut State Police for wind velocity of 90 mph concurrent with ½" ice design wind load. 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 AT&T installation is as follows:

Antenna and Mount	Carrier	Antenna Center Elevation
<u>Remove:</u> (6) Powerwave LGP13519 Diplexers		
<u>Install:</u> (3) Powerwave P-65-16-XLH-RR Antennas (6) Ericsson RRU (3) Powerwave TT19-08BP111-001 TMAs (1) RAYCAP Surge Protector (1) Fiber Cable (10mm) (2) DC Cables (0.645")		
<u>Relocate:</u> (12) 7/8" diameter coaxial cables (See drawing SK-1 in Section 6 for details)		
	AT&T	@ 163'

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

The tower deflection (sway) is 0.68 degrees, and the tower rotation (twist) is 0.07 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).**

1. EXECUTIVE SUMMARY - continued

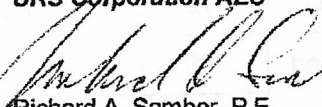
This analysis is based on:

- 1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes utilized in the preparation of this report obtained from the manufacturers original design documents prepared by Bayar and Associates dated July 1990.
- 3) URS Corporation has previously produced a Reinforcement Design with Passing Analysis dated 6/29/11 for Sprint. The analysis contained herein is based upon the reinforcement design for Sprint having been installed.
- 4) Antenna inventory from Tower Climb Report by CSB Communications, LLC dated April 6, 2011.
- 5) Antenna and mount configuration as specified on the following page of this report.

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. 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 AES


Richard A. Sambor, P.E.
Senior Structural Engineer
RAS/kab



2. INTRODUCTION

The subject tower is located at 46 Fenwood Lane in Wilton, Connecticut. The structure is a 180' four sided self-supporting lattice tower designed by Bayar and Associates.

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Mount Elevation (Note 1)	Cable
(3) 6' Dishes (Wind Load)	CSP (reserved)	Leg Mounted	180'	N/A
(2) Scala OGT9-806 (See Note 2) (2) Scala OGT9-806 (Inverted) (See Note 2) (1) 4' Omni (See Note 2)	CSP (existing)	(3) 4' Stand-Off	180'	(4) 1-5/8" (1) 7/8"
(1) 10' Dipole (See Note 2)	CSP (existing)	Pipe Mounted	180'	(1) 7/8"
(3) 6' Dishes	CSP (existing)	(3) Pipe Mounts	177'	(3) WEP65
(1) 8-Bay Dipole (See Note 2)	CSP (existing)	6' Standoff	172'	(1) 7/8"
(1) 3' Omni (See Note 2)	CSP (existing)	6' Standoff	172'	(1) 7/8"
(1) 4' Omni (See Note 2)	CSP (existing)	Leg Mounted	168'	(1) 7/8"
(6) Powerwave 7770 (6) LGP21401 TMAs	AT&T (existing)	(3) T-Frames	163'	(12) 7/8" (See Note 3)
(3) Powerwave P-65-16-XLH-RR (6) Ericsson RRU (12) LGP21901 Diplexers (3) Powerwave TT19-08BP111-001 TMAs (1) RAYCAP Surge Protector	AT&T (proposed)	Shared with Above	163'	(1) Fiber Cable (10mm) (2) DC Cables (0.645")
(1) 3' Yagi	CSP (existing)	6' Standoff	145'	(1) 7/8"
(1) 10' Omni (See Note 2)	CSP (existing)	6' Standoff	145'	(1) 7/8"
(1) 10' 2-Bay Dipole (See Note 2)	CSP (existing)	4' Standoff	143'	(1) 7/8"
(1) 6' Dish	CSP (existing)	Pipe Mounted	133'	(1) WEP65
(1) 30" Omni (See Note 2)	CSP (existing)	2' Standoff	132'	(1) 7/8"
(3) EMS RR65-18-04DP (6) TMAs	T-Mobile (existing)	Pipe Mounted	127'	(6) 1-1/4"
(1) Ground Plane	CSP (existing)	10' Standoff	126'	(1) 7/8"
(1) 12' Omni (See Note 2)	CSP (existing)	6' Standoff	115'	(1) 7/8"
(1) Ground Plane	CSP (existing)	See Standoff Above	115'	(1) 1/2"
(1) 4' Omni (See Note 2)	CSP (existing)	2' Standoff	115'	(1) 1/2"

Antenna Type	Carrier	Mount	Mount Elevation (Note 1)	Cable
(1) 4' Grid Dish	CSP (existing)	Pipe Mounted	112'	(1) 1/2"
(1) 12' Omni (See Note 2)	CSP (existing)	4' Standoff	112'	(1) 7/8"
(3) Andrew DB980F65E-M antenna (3) Andrew HBX-9014DS-VTM antenna	Sprint (existing)	(3) 10' Frame	106'	(6) 1-5/8"
(1) 10' Omni (Inverted) (See Note 2)	CSP (existing)	10' Standoff	101'	(1) 1-5/8"
(1) 20' 4-Bay Dipole (See Note 2)	CSP (existing)	3' Standoff	85'	(1) 1/2"
(1) 20' 4-Bay Dipole (See Note 2)	CSP (existing)	2' Standoff	88'	(1) 1-5/8"
(1) Ice Shield for 6' Grid Dish Below	CSP (existing)	4' Standoff	80'	N/A
(1) 6' Grid Dish	CSP (existing)	Pipe Mounted	76'	(1) 7/8"
(1) GPS	Sprint (existing)	3' Standoff	56'	(1) 1/2"
(1) DB-803 Omni (See Note 2)	CSP (existing)	3' Stand-Off	47'	(1) 3/8"

Note 1: In the RISA Tower analysis the mount elevations are entered at the "Mount Elevation". and the antenna elevations are entered at the antenna centerline elevation.

Note 2: Antenna centerline elevation and mount elevation are not equal. See "RISA Tower Input / Output Summary" in Section 6 for antenna centerline elevation.

Note 3: Coaxial cables shall be relocated as indicated in SK-1 in Section 6 of this report.

This structural analysis of the communications tower was performed by URS Corporation, AES (URS) for AT&T. The purpose of this analysis was to analyze the existing tower for its existing and proposed antenna loads. This analysis was conducted to evaluate rotation (twist), deflection (sway) and 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 5.3.1.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load

Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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.

5. CONCLUSIONS

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

The tower deflection (sway) is 0.68 degrees, and the tower rotation (twist) is 0.07 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).**

Limitations/Assumptions:

This report is based on the following:

1. URS Corporation has previously produced a Reinforcement Design with Passing Analysis dated 6/29/11 for Sprint. The analysis contained herein is based upon the reinforcement design for Sprint having been installed.
2. Tower inventory as listed in this report.
3. Tower is properly installed and maintained.
4. All members are as specified in the original design documents and are in good condition.
5. All required members are in place.
6. All bolts are in place and are properly tightened.
7. Tower is in plumb condition.
8. All member protective coatings are in good condition.
9. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
10. Foundations were properly constructed to support original design loads as specified in the original design documents.

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

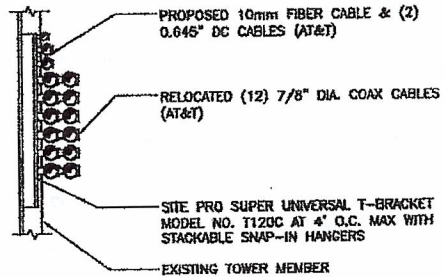
URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of 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.

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.

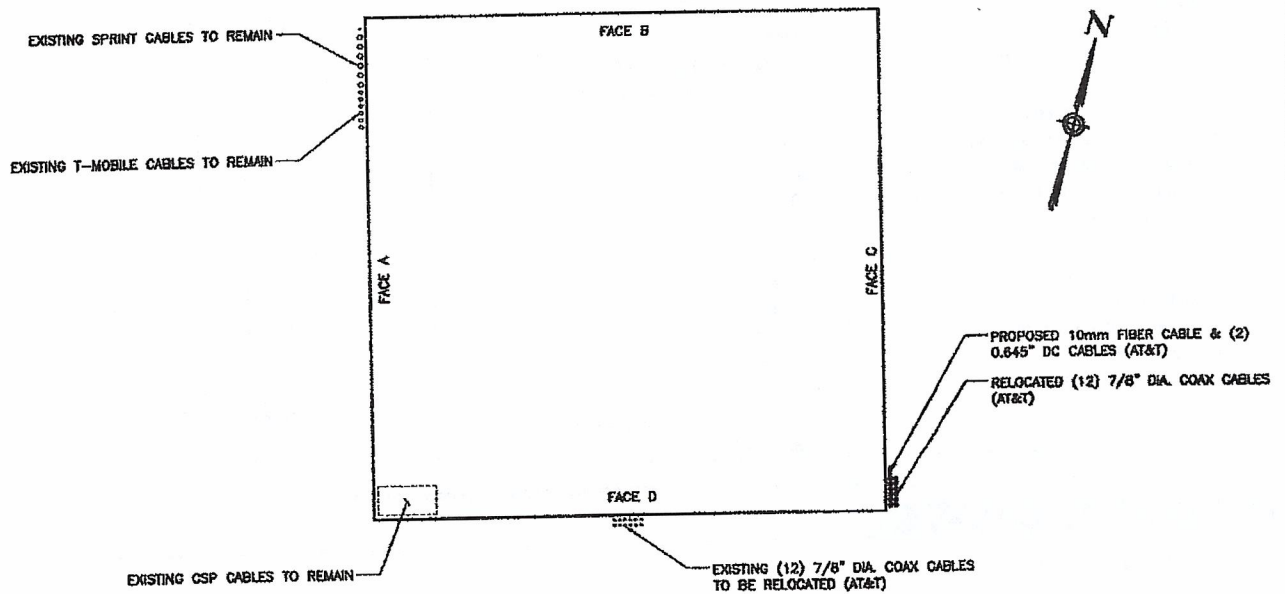
The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire 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 condition.

6.) DRAWINGS AND DATA

FEEDLINE MODIFICATION DRAWING SK-1



2 COAXIAL CABLE PLAN
 SK-1 SCALE: 1/2" = 1'-0"



1 COAXIAL CABLE LAYOUT
 SK-1 SCALE: N.T.S.

OW NO:
38924439
 Designed by:
KAB
 Drawn by:
PD
 Checked by:
HJK
 Approved by:
ICA

URS CORPORATION AES
 500 ENTERPRISE DRIVE
 ROCKY HILL, CONNECTICUT
 1-(860)-629-8882



SITE ADDRESS:
 180' State Police Tower
 48 Fenwood Lane
 WILTON, CONNECTICUT

REV.	DATE	DESCRIPTION

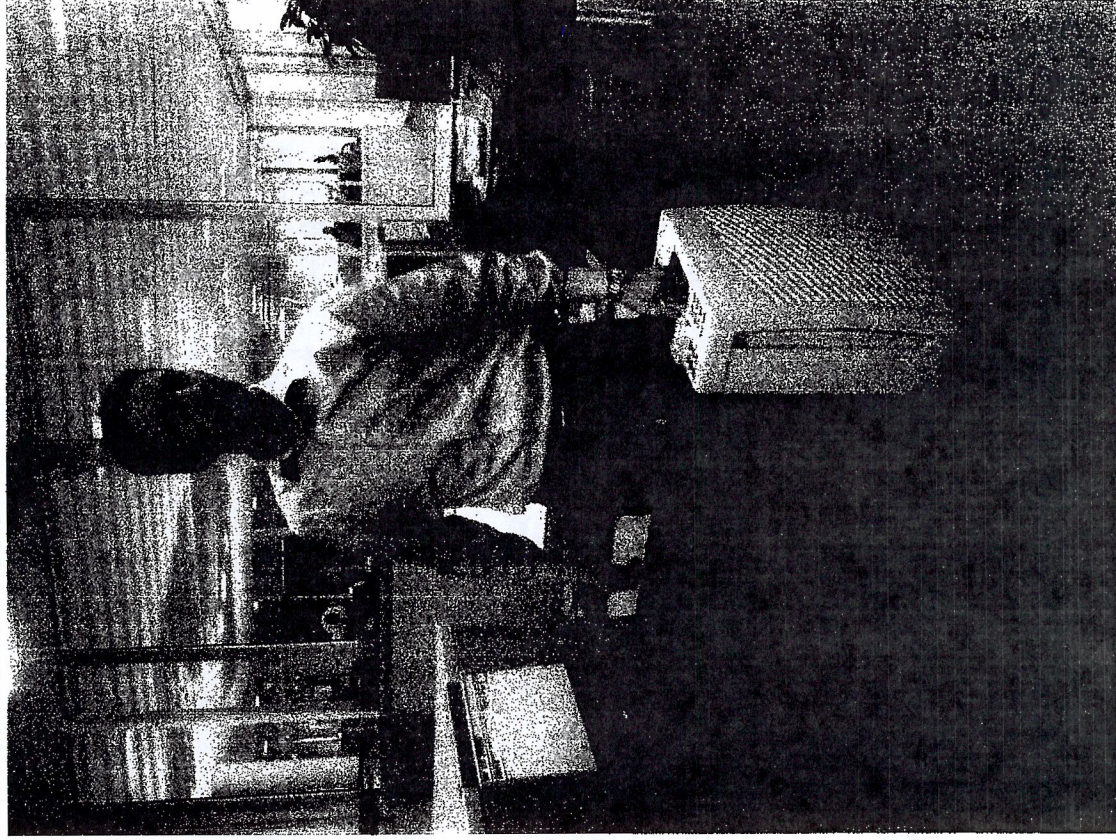
Scale: AS NOTED Date: 08/23/11
 Job No. SA1-066 File No. Dwg. 1 of 1

Dwg. No.
SK-1

RRUS 11 – Dual PA RRU.

Technical Data

- > Multi standard
- > RF: 2x30 Watts
- > Carrier BW: 1.4 – 20 MHz
- > Alarms: 2
- > Dimensions (with sunshield):
 - Width: 17.0 in
 - Height: 17.8 in
 - Depth: 7.2 in
 - Weight: 55 lbs (Band 12)
 - Weight: 50 lbs (Band 4)
- > Temperature: -40 to +131 F
- > Cooling: Self convection
- > Power: -48 VDC
- > Rec. fuse size 20 Amp
 - Rec. DC cable:
 - 6 mm² up to 60 meters
 - 10 mm² over 60 meters
- > Power Cons: 200 Watts typ.



RBS6000

TT19-08BP111-001

TMA Twin 1900 with 850 Bypass 12 dB AISG 1.1

ELECTRICAL SPECIFICATIONS

UL Frequency Range (MHz)	1850-1910 with 824-894 bypass
UL Rejection	>77 dB
UL Gain(dB)	12
UL Return Loss	>18
UL Noise Figure	<1.7 dB, Typical
UL Output 3rd Order Intercept Point(dBm)	>+23
UL Bypass Loss(dB)	2.5, Typical
UL Max Input Power (dBm)	+14 dBm
DL Frequency Range (MHz)	1930-1990 with 824-894 bypass
DL Return Loss	>18
DL Insertion Loss (dB)	850 MHz, <0.3; 1900 MHz, <0.5
Intermodulation	@ 2 x +43 dBm TX carriers, in receive band, <160 dBc, referred to antenna port
Input Voltage (V)	AISG Mode: 10-30; Current alarm mode: 8-17
Alarm Functionality	AISG compatible or in case of no AISG command received, current alarm mode 170-190 mA
Power Consumption	<1.1W @12V
Power Handling, RMS	850: >57 dBm; 1900: >55 dBm
AISG Compatibility	AISG 1.1 fully upgradable to AISG 2.0 (AISG version only dependent on loaded SW version) TT19-08BP112-001 has AISG 2.0 loaded from factory

MECHANICAL SPECIFICATIONS

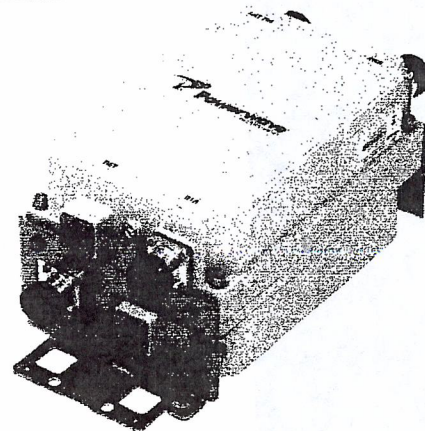
Dimension HxWxD mm(ft)	250x169x137 mm (9.8"x6.7"x5.4")
Weight(lbs)	<16
Colors	Off white (NCS 1502-R)
RF Connectors	DIN 7/16 female, long neck
Mounting Kit	Mounting kit for pole and wall is included

ENVIRONMENTAL SPECIFICATIONS

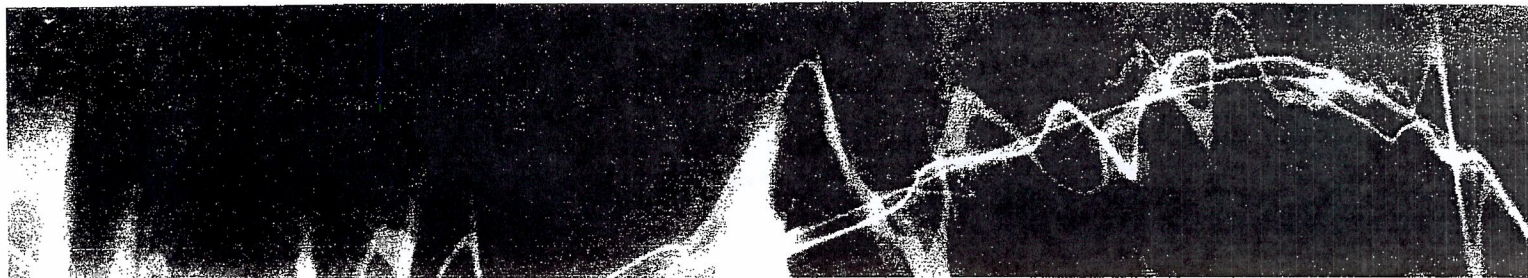
Temperature Range	-40° C to +65° C (-40° F to +149° F)
Operational	ETS 300 019-1-4
Transportation	ETS 300 019-1-2
Storage	ETS 300 019-1-1
Lightning Protection	3 kA 10/350 µs; 20 kA (Shield)
Housing	Aluminum
MTBF	>1 million hours per TMA
Ingress Protection	IP65 and IP68

APPROVAL AND TESTS

Safety	EN60950
EMC	3GPP: TS 25.113



*All specifications subject to change without notice. Contact your Powerwave representative for complete performance data.



DC6-48-60-18-8F

DC Power Surge Protection

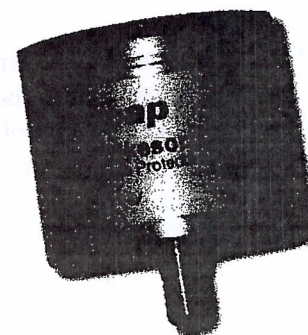
Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 μ s
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 μ s
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 - 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)



Raycap

G02-00-068 REV 050610



GS-07F-0435V

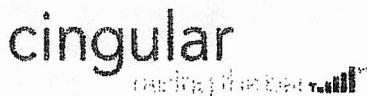


Certified to
ISO 9001:2000



TUV Rheinland
of North America

Raycap, Inc. 806 W. Clearwater Loop • Post Falls • Idaho • 83854 • USA
Phone 208.777.1166 • Toll Free 800.890.2569 • Fax 208.777.4466 • www.raycapsurgeprotection.com



New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

August 30, 2011

Honorable William F. Brennan
1st Selectman, Town of Wilton
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Re: Telecommunications Facility – 46 Fernwood Lane, CT

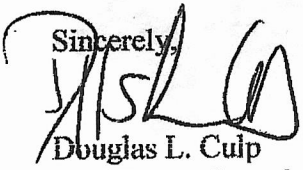
Dear Selectman Brennan:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes Cingular's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures; please call me at (860) 463-5511 or Ms. Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,


Douglas L. Culp
Real Estate Consultant

Enclosure

DETAILED STRUCTURAL ANALYSIS AND REINFORCEMENT OF AN EXISTING 180' SELF- SUPPORTING LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

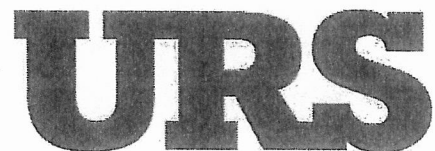
Site I.D #: CT03XC360
Site Name: Wilton State Police Tower
Address: 46 Fenwood Lane
Wilton, Connecticut

prepared for



1 International Blvd.
Suite 800
Mahwah, NJ. 07495

prepared by



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

36924431.00000
SER-001

June 29, 2011

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 - **RISA TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT EVALUATION**
 - **FOUNDATION ANALYSIS**

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 180' self-supporting lattice tower located at 46 Fenwood Lane in Wilton, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard and additional requirements of the Connecticut State Police for wind velocity of 90 mph concurrent with 1/2" ice design wind load. 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 Sprint modification is as follows:

Antenna and Mount	Carrier	Antenna Center Elevation
Remove: (3) Andrew DB980H90 Panel Antennas		
Install: (3) Andrew HBX-9014DS-VTM Panel Antennas	Sprint	@ 106'

URS has analyzed this tower and foundation for the proposed antenna modifications listed above. The existing foundation and anchor bolts are considered structurally adequate. The existing tower requires modifications which are summarized in SK-1 located in Section 6. **Once these modifications are performed the tower is considered structurally adequate for the proposed loading.**

The tower deflection (sway) is 0.68 degrees, and the tower rotation (twist) is 0.06 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees combined for deflection (sway) and rotation (twist).**

This analysis is based on:

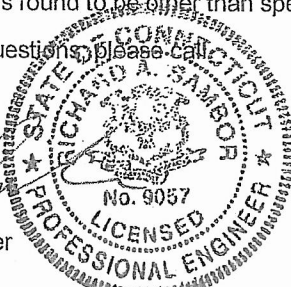
- 1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- 2) Tower geometry and structural member sizes utilized in the preparation of this report obtained from the manufacturers original design documents prepared by Bayar and Associates dated July 1990.
- 3) Previous structural analysis and tower reinforcement designed by URS Corporation, project number SAI-015 / 36915475, signed and sealed February 8, 2008.
- 4) Antenna inventory from Tower Climb Report by CSB Communications, LLC on April 6, 2011.
- 5) Antenna and mount configuration as specified on the following page of this report.

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. 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 AES

Richard A. Sambor
Richard A. Sambor, P.E.
Senior Structural Engineer
RAS/mjk



2. INTRODUCTION

The subject tower is located at 46 Fenwood Lane in Wilton, Connecticut. The structure is a 180' four sided self-supporting lattice tower designed by Bayar and Associates.

The inventory is summarized in the table below:

<i>Antenna Type</i>	<i>Carrier</i>	<i>Mount</i>	<i>Antenna Mount Elevation</i>	<i>Cable</i>
(3) 6' Dishes (Wind Load)	CSP (reserved)	Leg Mounted	180'	N/A
(2) Scala OGT9-806 (2) Scala OGT9-806 (Inverted) (1) 4' Omni	CSP (existing)	(3) 4' Stand-Off	180'	(4) 1-5/8" (1) 7/8"
(1) 10' Dipole	CSP (existing)	Pipe Mounted	180'	(1) 7/8"
(3) 6' Dishes	CSP (existing)	(3) Pipe Mounts	177'	(3) WEP65
(1) 8-Bay Dipole	CSP (existing)	6' Standoff	172'	(1) 7/8"
(1) 3' Omni	CSP (existing)	6' Standoff	172'	(1) 7/8"
(1) 4' Omni	CSP (existing)	Leg Mounted	168'	(1) 7/8"
(6) Powerwave 7770 (6) LPG13519 Diplexers (6) LPG214 TMAs	AT&T (existing)	(3) T-Frames	166'	(12) 1-5/8"
(1) 3' Yagi	CSP (existing)	6' Standoff	145'	(1) 7/8"
(1) 10' Omni	CSP (existing)	6' Standoff	145'	(1) 7/8"
(1) 10' 2-Bay Dipole	CSP (existing)	4' Standoff	143'	(1) 7/8"
(1) 6' Dish	CSP (existing)	Pipe Mounted	133'	(1) WEP65
(1) 30" Omni	CSP (existing)	2' Standoff	132'	(1) 7/8"
(3) EMS RR65-18-04DP (6) TMAs	T-Mobile (existing)	Pipe Mounted	127'	(6) 1-1/4"
(1) Ground Plane	CSP (existing)	10' Standoff	126'	(1) 7/8"
(1) 12' Omni	CSP (existing)	6' Standoff	115'	(1) 7/8"
(1) Ground Plane	CSP (existing)	See Standoff Above	115'	(1) 1/2"
(1) 4' Omni	CSP (existing)	2' Standoff	115'	(1) 1/2"
(1) 4' Grid Dish	CSP (existing)	Pipe Mounted	112'	(1) 1/2"
(1) 12' Omni	CSP (existing)	4' Standoff	112'	(1) 7/8"
(3) Andrew DB980F65E-M antenna	Sprint (existing)	(3) 10' Frame	106'	(6) 1-5/8"

<i>Antenna Type</i>	<i>Carrier</i>	<i>Mount</i>	<i>Antenna Mount Elevation</i>	<i>Cable</i>
(3) Andrew HBX-9014DS-VTM antenna	Sprint (proposed)	Shared with Above	106'	Included In Above
(1) 10' Omni (Inverted)	CSP (existing)	10' Standoff	101'	(1) 1-5/8"
(1) 20' 4-Bay Dipole	CSP (existing)	3' Standoff	85'	(1) 1/2"
(1) 20' 4-Bay Dipole	CSP (existing)	2' Standoff	88'	(1) 1-5/8"
(1) Ice Shield for 6' Grid Dish Below	CSP (existing)	4' Standoff	80'	N/A
(1) 6' Grid Dish	CSP (existing)	Pipe Mounted	76'	(1) 7/8"
(1) GPS	Sprint (existing)	3' Standoff	56'	(1) 1/2"
(1) DB-803 Omni	CSP (existing)	3' Stand-Off	47'	(1) 3/8"

Note: Elevations indicated are the mounting height of the antennas. In the RISA Tower analysis the mount elevations are entered at the mounting height and the antenna elevations are entered at the antenna centerline elevation.

This structural analysis and reinforcement of the communications tower was performed by URS Corporation, AES (URS) for Sprint. The purpose of this analysis was to analyze the existing tower for its existing and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection) and 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 5.3.1.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load

Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

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

The combined axial and bending stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of the analysis indicate that the calculated stresses under the proposed loading are above the allowable stresses for the tower structure. The calculated stresses for the foundation and anchor bolts under the proposed loading were found to be within the allowable limits. The tower deflection does not exceed the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).

Tower Base Reactions:

Description	Current
Pier Compression (kips)	404
Pier Uplift (kips)	362
Overall Overturning (kip-ft)	9623
Overall Shear (kips)	91
Shear per Leg (kips)	39

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Critical Component Size	Controlling Elevation	Stress (% capacity)	Pass/Fail
Leg (T7)	L6x6x1/2	130'-140'	90.6	PASS
Diagonal (T18)	2L2 1/2x2x1/4	10'-20'	85.9	PASS
Horizontal (T19)	2L2 1/2x2 1/2x1/4	0'-10'	49.9	PASS
Secondary Horizontal (T18)	L3 1/2x3 1/2x1/4	10'-20'	77.4	PASS
Top Girt (T3)	L2x2x3/16	159.049'-163.573'	12.2	PASS
Redund Horz 1 Bracing (T19)	L2 1/2x2 1/2x3/16	0'-10'	39.5	PASS
Redund Diag 1 Bracing (T19)	L2 1/2x2 1/2x3/16	0'-10'	66.5	PASS
Redund Hip 1 Bracing (T19)	L2 1/2x2 1/2x3/16	0'-10'	0.3	PASS
Redund Sub Horz Bracing (T19)	L3x3x5/16	0'-10'	62.3	PASS
Inner Bracing (T19)	2L2x2 1/2x3/16	0'-10'	7.9	PASS
Anchor Bolts	(4) 2-1/2" dia. A36 bolts	N/A	79.0	PASS

Foundation Summary:

Component	Required	Computed	% Capacity	Pass/Fail
Overturning Moment Factor of Safety	2.0 min	2.19	91.3	PASS

Tower Twist & Sway at Top:

Description	Current	Total Allowable
Tower Twist (degrees)	0.0634	0.75
Tower Sway (degrees)	0.6779	
Total Deflection (degrees)	0.7413	

5. CONCLUSIONS

URS has analyzed this tower and foundation for the proposed antenna modifications listed above. The existing foundation and anchor bolts are considered structurally adequate. The existing tower requires modifications which are summarized in SK-1 located in Section 6. **Once these modifications are performed the tower is considered structurally adequate for the proposed loading.**

The tower deflection (sway) is 0.68 degrees, and the tower rotation (twist) is 0.06 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees combined for deflection (sway) and rotation (twist).**

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.

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

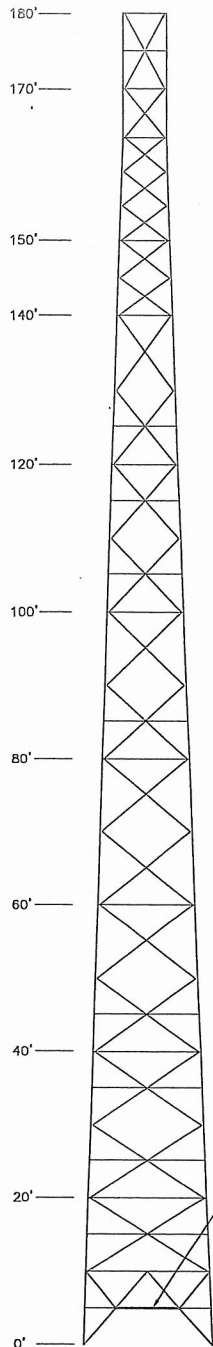
URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of 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.

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 condition.

6.) DRAWINGS AND DATA

REINFORCEMENT DRAWING SK-1



STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL BEAMS, CHANNELS, PLATES & ANGLES ASTM A36

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE DOCUMENTS ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONSTRUCTION", NINTH EDITION.

IF WELDING GALVANIZED MATERIALS, USE PRECAUTIONS & PROCEDURES PER AWS D1.1.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

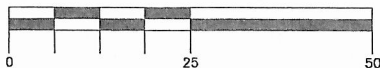
CONNECTIONS / FIELD ASSEMBLY:

COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

ALL BOLTS REMOVED FROM THE TOWER SHALL BE REPLACED WITH 3/4" DIA A-325X BOLTS.

REPLACE EXISTING L2-1/2x2-1/2x5/16
REDUNDANT SUB HORIZONTAL BRACING
WITH L3x3x5/16 REDUNDANT SUB
HORIZONTAL BRACING (TYP OF 4 FACES)

1 TOWER ELEVATION
SK-1 SCALE: 1" = 25'-0"



OW NO:
36924431

Designed by:
MJK

Drawn by:
KAP

Checked by:
KAB

Approved by:
ICA

URS CORPORATION AES

500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

Sprint

SITE
ADDRESS:

180' State Police Tower
46 Fenwood Lane
WILTON, CONNECTICUT

REV.	DATE:	DESCRIPTION

Scale: AS NOTED

Date: 06-29-11

Job No. SER-001

File No.

Dwg. No.

SK-1

Dwg. 1 of 1

RISA TOWER INPUT / OUPUT SUMMARY

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220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RISA TOWER FEEDLINE DISTRIBUTION

Needline Distribution Chart

0' - 180'

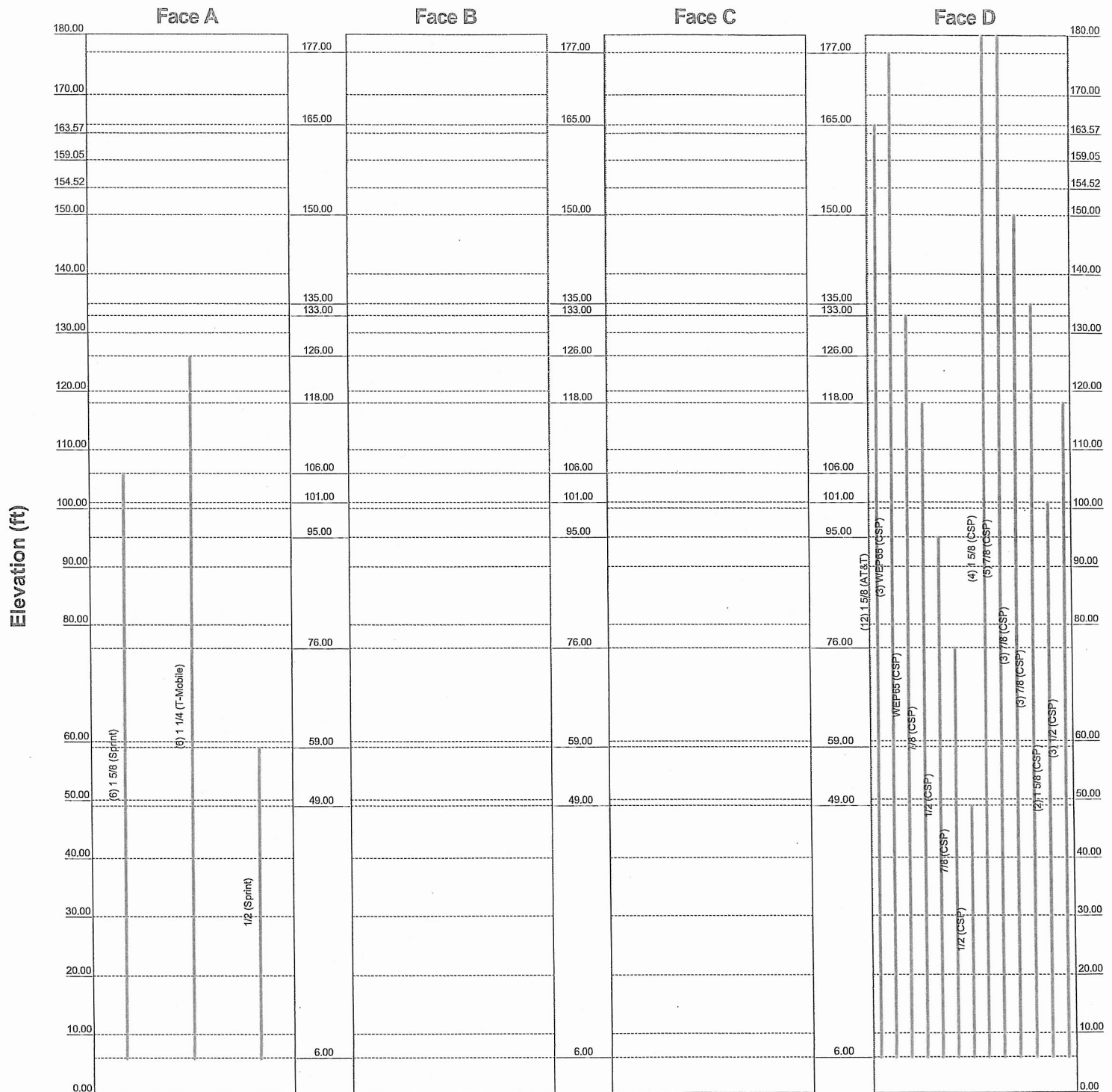
Round

Flat

App In Face

App Out Face

Truss Leg



URS Corporation

500 Enterprise Drive, Suite 3B

Rocky Hill, CT

Phone: (860) 529-8882

FAX: (860) 529-3991

Job: 180' Lattice Tower - CSP

Project: Wilton, Connecticut

Client: Sprint

Drawn by: Matthew Kapinos

App'd:

Code: TIA/EIA-222-F

Date: 06/29/11

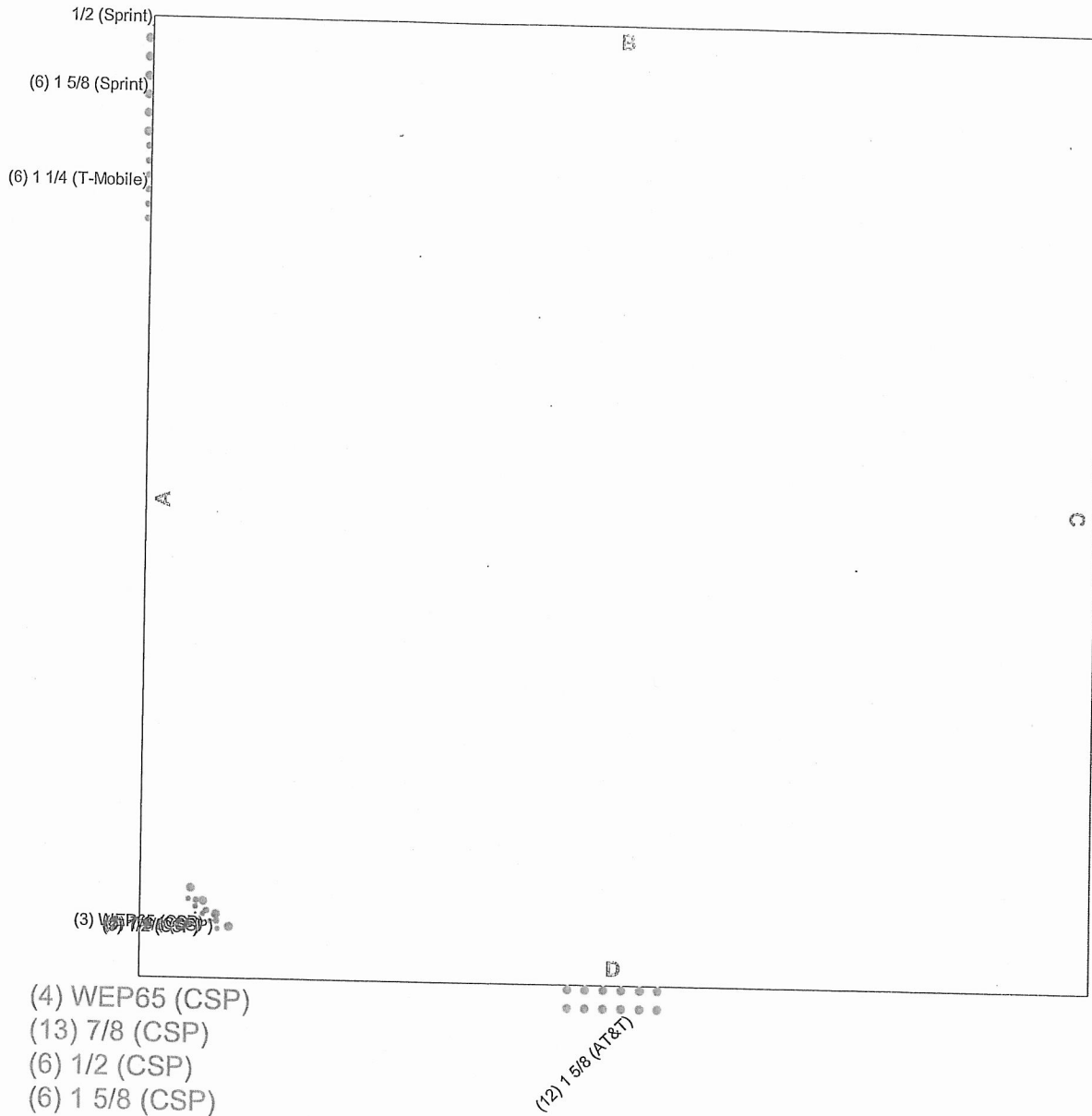
Scale: NT

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Dwg No. E-

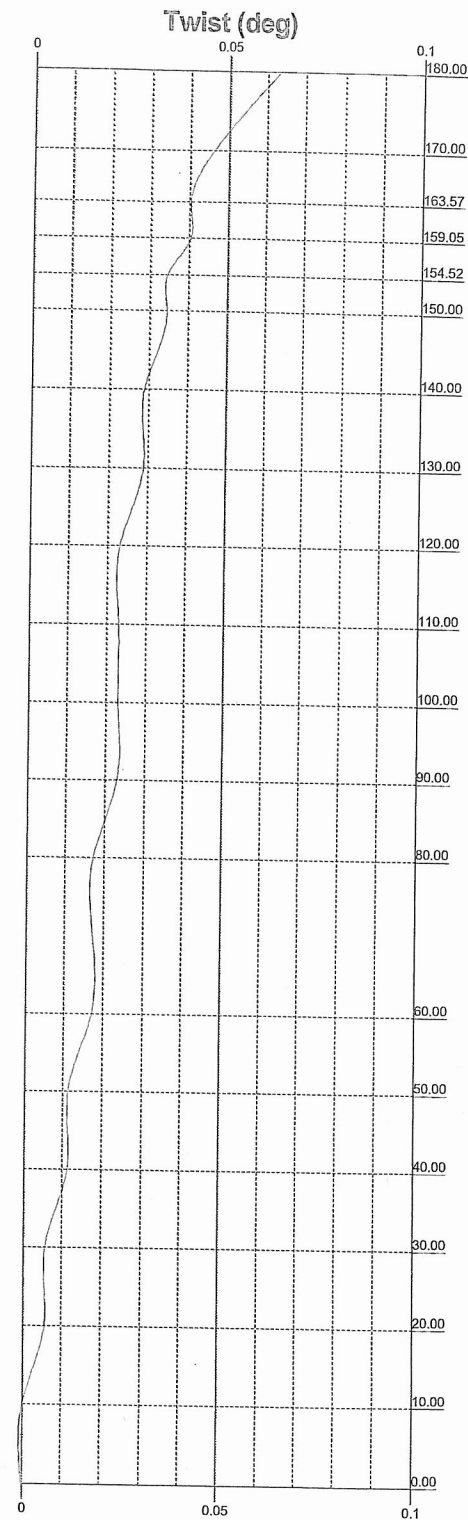
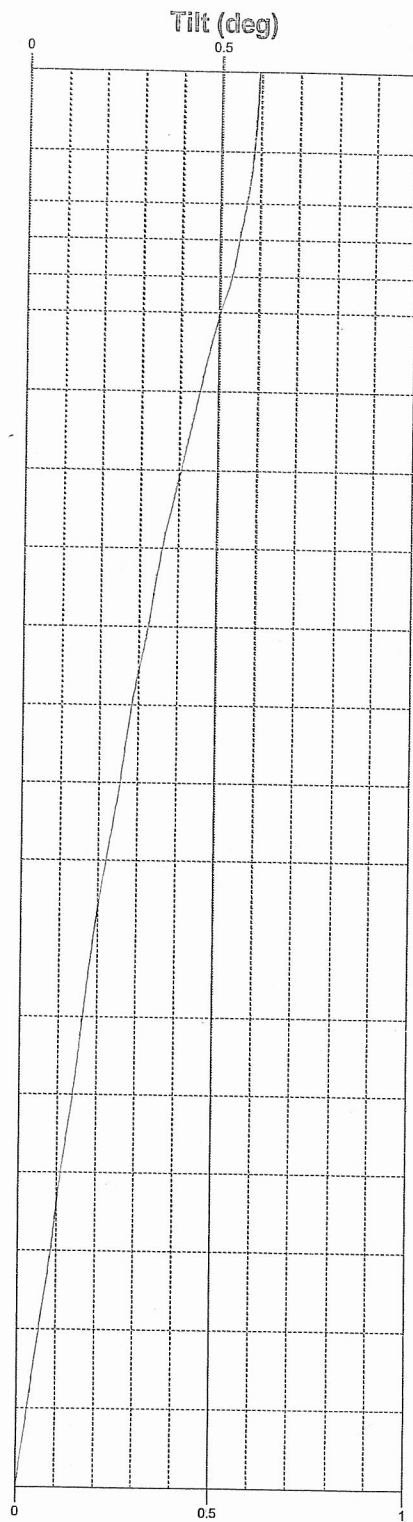
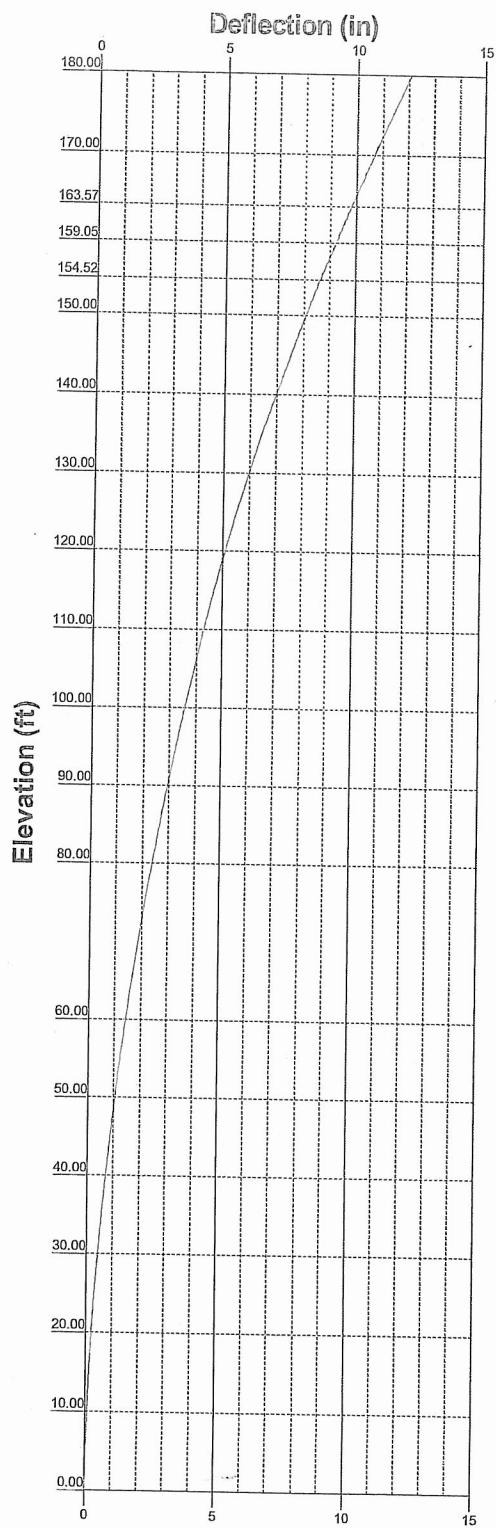
RISA TOWER FEEDLINE PLAN

Round Flat App In Face App Out Face



URS Corporation		Job: 180' Lattice Tower - CSP	
500 Enterprise Drive, Suite 3B		Project: Wilton, Connecticut	
Rocky Hill, CT		Client: Sprint	Drawn by: Matthew Kapinos
Phone: (860) 529-8882		Code: TIA/EIA-222-F	Date: 06/29/11
FAX: (860) 529-3991		Path: P:\08\Analysis with Reinforcement\ERI\Fig1180' Lattice Wilton CSP.en	Scale: NTS
			Dwg No. E-7

RISA TOWER DEFLECTION, TILT, AND TWIST



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

Job: 180' Lattice Tower - CSP
Project: Wilton, Connecticut
 Client: Sprint Drawn by: Matthew Kapinos App'd:
 Code: TIA/EIA-222-F Date: 06/29/11 Scale: NT:
 Path: P:\08\Analysis with Reinforcement\ERI Files\180' Lattice Wilton CSP.dwg Dwg No. E-

DETAILED OUTPUT

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	1 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 180.00 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 6.00 ft at the top and 17.73 ft at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 90 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 90 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 90 mph.

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

Pressures are calculated at each section.

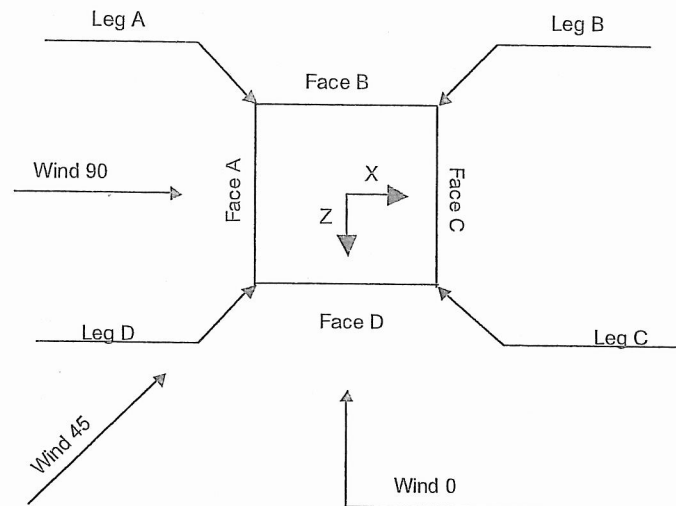
Stress ratio used in tower member design is 1.333.

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		

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Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-170.00			6.00	1	10.00
T2	170.00-163.57			6.00	1	6.43
T3	163.57-159.05			6.00	1	4.52
T4	159.05-154.52			6.32	1	4.52
T5	154.52-150.00			6.65	1	4.52
T6	150.00-140.00			6.97	1	10.00
T7	140.00-130.00			7.69	1	10.00
T8	130.00-120.00			8.41	1	10.00
T9	120.00-110.00			9.12	1	10.00
T10	110.00-100.00			9.84	1	10.00
T11	100.00-90.00			10.56	1	10.00
T12	90.00-80.00			11.28	1	10.00
T13	80.00-60.00			11.99	1	20.00
T14	60.00-50.00			13.43	1	10.00
T15	50.00-40.00			14.14	1	10.00
T16	40.00-30.00			14.86	1	10.00
T17	30.00-20.00			15.58	1	10.00
T18	20.00-10.00			16.29	1	10.00
T19	10.00-0.00			17.01	1	10.00

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

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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
T1	180.00-170.00	10.00	X Brace	No	Yes	0.0000	0.0000
T2	170.00-163.57	6.43	X Brace	No	No	0.0000	0.0000
T3	163.57-159.05	4.52	X Brace	No	No	0.0000	0.0000
T4	159.05-154.52	4.52	X Brace	No	No	0.0000	0.0000
T5	154.52-150.00	4.52	X Brace	No	No	0.0000	0.0000
T6	150.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T7	140.00-130.00	10.00	X Brace	No	No	0.0000	0.0000
T8	130.00-120.00	10.00	X Brace	No	Yes	0.0000	0.0000
T9	120.00-110.00	10.00	X Brace	No	Yes	0.0000	0.0000
T10	110.00-100.00	10.00	X Brace	No	Yes	0.0000	0.0000
T11	100.00-90.00	10.00	X Brace	No	Yes	0.0000	0.0000
T12	90.00-80.00	10.00	X Brace	No	Yes	0.0000	0.0000
T13	80.00-60.00	10.00	X Brace	No	Yes	0.0000	0.0000
T14	60.00-50.00	10.00	X Brace	No	Yes	0.0000	0.0000
T15	50.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T16	40.00-30.00	10.00	X Brace	No	Yes	0.0000	0.0000
T17	30.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T18	20.00-10.00	10.00	X Brace	No	Yes	0.0000	0.0000
T19	10.00-0.00	10.00	K1 Down	No	Yes	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 180.00-170.00	Single Angle	L3 1/2x3 1/2x3/8	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 170.00-163.57	Single Angle	L5x5x5/16	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 163.57-159.05	Single Angle	L5x5x5/16	A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T4 159.05-154.52	Single Angle	L5x5x5/16	A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 154.52-150.00	Single Angle	L5x5x5/16	A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 150.00-140.00	Single Angle	L5x5x3/8	A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 140.00-130.00	Single Angle	L6x6x1/2	A36 (36 ksi)	Single Angle	L3x2 1/2x1/4	A36 (36 ksi)
T8 130.00-120.00	Single Angle	L6x6x1/2	A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T9 120.00-110.00	Single Angle	L6x6x3/4	A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T10 110.00-100.00	Single Angle	L6x6x3/4	A36 (36 ksi)	Single Angle	L3 1/2x3x1/4	A36 (36 ksi)
T11 100.00-90.00	Single Angle	L8x8x3/4	A36 (36 ksi)	Single Angle	L3 1/2x3x1/4	A36 (36 ksi)
T12 90.00-80.00	Single Angle	L8x8x3/4	A36 (36 ksi)	Single Angle	L3 1/2x3x1/4	A36 (36 ksi)
T13 80.00-60.00	Single Angle	L8x8x1	A36 (36 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T14 60.00-50.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T15 50.00-40.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T16 40.00-30.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)

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Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T17 30.00-20.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T18 20.00-10.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2x1/4	A36 (36 ksi)
T19 10.00-0.00	Single Angle	L8x8x1 1/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4	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 180.00-170.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 170.00-163.57	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 163.57-159.05	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 150.00-140.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 140.00-130.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T13 80.00-60.00	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 40.00-30.00	Double Angle	2L2x2x3/16	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
T1 180.00-170.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Double Angle		A36 (36 ksi)
T9 120.00-110.00	1	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T11 100.00-90.00	None	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T14 60.00-50.00	None	Single Angle		A36 (36 ksi)	Double Angle	2L2x2x3/16	A36 (36 ksi)
T18 20.00-10.00	None	Single Angle		A36 (36 ksi)	Double Angle	2L2x2x3/16	A36 (36 ksi)
T19 10.00-0.00	None	Single Angle		A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

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Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
<i>ft</i>						
T1 180.00-170.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 140.00-130.00	Single Angle		A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T8 130.00-120.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 120.00-110.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T10 110.00-100.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T11 100.00-90.00	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T12 90.00-80.00	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T13 80.00-60.00	Single Angle		A36 (36 ksi)	Double Angle	2L2x2x3/16	A36 (36 ksi)
T14 60.00-50.00	Single Angle		A36 (36 ksi)	Double Angle	2L2x2x3/16	A36 (36 ksi)
T15 50.00-40.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 40.00-30.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Double Angle	2L2x2x3/16	A36 (36 ksi)
T17 30.00-20.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T18 20.00-10.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Double Angle	2L2x2 1/2x3/16	A36 (36 ksi)
T19 10.00-0.00	Single Angle		A36 (36 ksi)	Double Angle	2L2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Redundant Bracing Grade	Redundant Type	Redundant Size	K Factor
<i>ft</i>				
T19 10.00-0.00	A36 (36 ksi)	Horizontal (1) Diagonal (1) Sub-Horizontal Hip (1)	Single Angle Single Angle Single Angle Single Angle	L2 1/2x2 1/2x3/16 L2 1/2x2 1/2x3/16 L3x3x5/16 L2 1/2x2 1/2x3/16
				1 1 1 1

Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
<i>ft</i>	<i>ft²</i>	<i>in</i>					<i>in</i>	<i>in</i>
T1 180.00-170.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	24.0000	24.0000
T2 170.00-163.57	0.00	0.0000	A36 (36 ksi)	1	1	1.02	24.0000	24.0000

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontal
ft	ft ²	in					in	in
T3	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
163.57-159.05			(36 ksi)					
T4	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
159.05-154.52			(36 ksi)					
T5	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
154.52-150.00			(36 ksi)					
T6	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
150.00-140.00			(36 ksi)					
T7	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
140.00-130.00			(36 ksi)					
T8	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
130.00-120.00			(36 ksi)					
T9	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
120.00-110.00			(36 ksi)					
T10	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
110.00-100.00			(36 ksi)					
T11	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
100.00-90.00			(36 ksi)					
T12	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
90.00-80.00			(36 ksi)					
T13	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
80.00-60.00			(36 ksi)					
T14	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
60.00-50.00			(36 ksi)					
T15	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
50.00-40.00			(36 ksi)					
T16	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
40.00-30.00			(36 ksi)					
T17	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
30.00-20.00			(36 ksi)					
T18	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
20.00-10.00			(36 ksi)					
T19 10.00-0.00	0.00	0.0000	A36	1	1	1.02	24.0000	24.0000
			(36 ksi)					

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
				X Y	X Y	X Y	X Y	X Y	X Y	X Y
ft										
T1	Yes	No	1	1	1	1	1	1	1	1
180.00-170.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
170.00-163.57				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
163.57-159.05				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
159.05-154.52				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
154.52-150.00				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
150.00-140.00				1	1	1	1	1	1	1

Designed by
Matthew Kapinos

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 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
T1 180.00-170.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T2 170.00-163.57	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T3 163.57-159.05	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T4 159.05-154.52	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T5 154.52-150.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T6 150.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T7 140.00-130.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
T8 130.00-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75

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Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T9	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
120.00-110.00														
T10	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
110.00-100.00														
T11	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
100.00-90.00														
T12	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
90.00-80.00														
T13	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
80.00-60.00														
T14	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
60.00-50.00														
T15	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
50.00-40.00														
T16	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
40.00-30.00														
T17	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
30.00-20.00														
T18	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
20.00-10.00														
T19	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.6250	0.75	0.0000	0.75	0.0000	0.75
10.00-0.00														

Tower Section Geometry (cont'd)

Tower Elevation ft	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
	in	in	in	in	in	in	in	in
T1	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
180.00-170.00								
T2	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
170.00-163.57								
T3	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
163.57-159.05								
T4	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
159.05-154.52								
T5	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
154.52-150.00								
T6	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
150.00-140.00								
T7	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
140.00-130.00								
T8	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
130.00-120.00								
T9	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
120.00-110.00								
T10	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
110.00-100.00								

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Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T11	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
100.00-90.00								
T12	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
90.00-80.00								
T13	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
80.00-60.00								
T14	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
60.00-50.00								
T15	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
50.00-40.00								
T16	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
40.00-30.00								
T17	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
30.00-20.00								
T18	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
20.00-10.00								
T19 10.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	2	0.6250	0	0.6250	2
180.00-170.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T2	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0
170.00-163.57		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T3	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0
163.57-159.05		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T4	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
159.05-154.52		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T5	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
154.52-150.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T6	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0
150.00-140.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T7	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0
140.00-130.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T8	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	2
130.00-120.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T9	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	2	0.6250	2
120.00-110.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T10	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	2
110.00-100.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T11	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	2	0.6250	2	0.6250	0
100.00-90.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T12	Flange	0.7500	0	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	2
90.00-80.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	
T13	Flange	0.7500	0	0.6250	2	0.6250	2	0.6250	0	0.6250	0	0.6250	0	0.6250	0
80.00-60.00		A325X		A325X		A325X		A325N		A325X		A325X		A325X	

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Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T14 60.00-50.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325X	2	0.6250 A325X	0
T15 50.00-40.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	2
T16 40.00-30.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	2
T17 30.00-20.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	2
T18 20.00-10.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325X	2	0.6250 A325X	2
T19 10.00-0.00	Flange	0.7500 A325X	0	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325X	2	0.6250 A325X	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 5/8 (AT&T)	D	Yes	Ar (CfAe)	165.00 - 6.00	0.0000	0	12	6	1.9800	1.9800		1.04
1 5/8 (Sprint)	A	Yes	Ar (CfAe)	106.00 - 6.00	0.0000	0.43	6	6	1.9800	1.9800		1.04
1 1/4 (T-Mobile)	A	Yes	Ar (CfAe)	126.00 - 6.00	0.0000	0.33	6	6	1.5500	1.5500		0.66
WEP65 (CSP)	D	No	Ar (Leg)	177.00 - 6.00	0.0000	0.1	3	1	1.5836	1.5836		0.53
WEP65 (CSP)	D	No	Ar (Leg)	133.00 - 6.00	0.0000	0.1	1	1	1.5836	1.5836		0.53
7/8 (CSP)	D	No	Ar (Leg)	118.00 - 6.00	0.0000	0.095	1	1	1.1100	1.1100		0.54
1/2 (CSP)	D	No	Ar (Leg)	95.00 - 6.00	0.0000	0.09	1	1	0.5800	0.5800		0.25
7/8 (CSP)	D	No	Ar (Leg)	76.00 - 6.00	0.0000	0.095	1	1	1.1100	1.1100		0.54
1/2 (CSP)	D	No	Ar (Leg)	49.00 - 6.00	0.0000	0.09	1	1	0.5800	0.5800		0.25
1/2 (Sprint)	A	No	Ar (CfAe)	59.00 - 6.00	0.0000	0.49	1	1	0.5800	0.5800		0.25
1 5/8 (CSP)	D	No	Ar (Leg)	180.00 - 6.00	0.0000	0.105	4	1	1.9800	1.9800		1.04
7/8 (CSP)	D	No	Ar (Leg)	180.00 - 6.00	0.0000	0.095	5	1	1.1100	1.1100		0.54
7/8 (CSP)	D	No	Ar (Leg)	150.00 - 6.00	0.0000	0.095	3	1	1.1100	1.1100		0.54
7/8 (CSP)	D	No	Ar (Leg)	135.00 - 6.00	0.0000	0.095	3	1	1.1100	1.1100		0.54
1 5/8 (CSP)	D	No	Ar (Leg)	101.00 - 6.00	0.0000	0.105	2	1	1.9800	1.9800		1.04
1/2 (CSP)	D	No	Ar (Leg)	118.00 - 6.00	0.0000	0.09	3	1	0.5800	0.5800		0.25

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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_{AA} In Face ft^2	C_{AA} Out Face ft^2	Weight K
T1	180.00-170.00	A	3.499	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	3.499	0.000	0.000	0.000	0.08
T2	170.00-163.57	A	2.503	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	3.916	0.000	0.000	0.000	0.07
T3	163.57-159.05	A	1.762	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	6.241	0.000	0.000	0.000	0.09
T4	159.05-154.52	A	1.762	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	6.241	0.000	0.000	0.000	0.09
T5	154.52-150.00	A	1.762	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	6.241	0.000	0.000	0.000	0.09
T6	150.00-140.00	A	4.820	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	14.720	0.000	0.000	0.000	0.23
T7	140.00-130.00	A	5.678	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	15.578	0.000	0.000	0.000	0.24
T8	130.00-120.00	A	11.714	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	16.964	0.000	0.000	0.000	0.25
T9	120.00-110.00	A	15.941	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	18.091	0.000	0.000	0.000	0.26
T10	110.00-100.00	A	22.328	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	18.538	0.000	0.000	0.000	0.26
T11	100.00-90.00	A	28.014	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	20.264	0.000	0.000	0.000	0.28
T12	90.00-80.00	A	28.256	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	20.506	0.000	0.000	0.000	0.28
T13	80.00-60.00	A	57.992	0.000	0.000	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	42.492	0.000	0.000	0.000	0.58
T14	60.00-50.00	A	29.616	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	21.431	0.000	0.000	0.000	0.29
T15	50.00-40.00	A	30.099	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T16	40.00-30.00	C	0.000	0.000	0.000	0.000	0.00
		D	21.866	0.000	0.000	0.000	0.29
		A	30.148	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
T17	30.00-20.00	C	0.000	0.000	0.000	0.000	0.00
		D	21.914	0.000	0.000	0.000	0.29
		A	30.148	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
T18	20.00-10.00	C	0.000	0.000	0.000	0.000	0.00
		D	21.914	0.000	0.000	0.000	0.29
		A	30.148	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
T19	10.00-0.00	C	0.000	0.000	0.000	0.000	0.00
		D	21.914	0.000	0.000	0.000	0.29
		A	12.059	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	8.766	0.000	0.000	0.000	0.12

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T1	180.00-170.00	A	0.500	5.749	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		5.749	0.000	0.000	0.000	0.22
T2	170.00-163.57	A	0.500	4.110	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		6.236	0.000	0.000	0.000	0.19
T3	163.57-159.05	A	0.500	2.893	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		9.634	0.000	0.000	0.000	0.24
T4	159.05-154.52	A	0.500	2.893	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		9.634	0.000	0.000	0.000	0.24
T5	154.52-150.00	A	0.500	2.893	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		9.634	0.000	0.000	0.000	0.24
T6	150.00-140.00	A	0.500	8.153	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		23.053	0.000	0.000	0.000	0.58
T7	140.00-130.00	A	0.500	9.678	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		24.578	0.000	0.000	0.000	0.61
T8	130.00-120.00	A	0.500	19.714	0.000	0.000	0.000	0.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		26.964	0.000	0.000	0.000	0.65
T9	120.00-110.00	A	0.500	27.274	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
		C		0.000	0.000	0.000	0.000	0.00
		D		29.424	0.000	0.000	0.000	0.68
T10	110.00-100.00	A	0.500	37.078	0.000	0.000	0.000	0.21
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		30.288	0.000	0.000	0.000	0.70
T11	100.00-90.00	A	0.500	45.931	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		33.181	0.000	0.000	0.000	0.75
T12	90.00-80.00	A	0.500	46.589	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		33.839	0.000	0.000	0.000	0.75
T13	80.00-60.00	A	0.500	95.992	0.000	0.000	0.000	0.54
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		70.492	0.000	0.000	0.000	1.53
T14	60.00-50.00	A	0.500	49.533	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		35.598	0.000	0.000	0.000	0.77
T15	50.00-40.00	A	0.500	50.849	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		36.783	0.000	0.000	0.000	0.77
T16	40.00-30.00	A	0.500	50.981	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		36.914	0.000	0.000	0.000	0.78
T17	30.00-20.00	A	0.500	50.981	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		36.914	0.000	0.000	0.000	0.78
T18	20.00-10.00	A	0.500	50.981	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		36.914	0.000	0.000	0.000	0.78
T19	10.00-0.00	A	0.500	20.392	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		14.766	0.000	0.000	0.000	0.31

Feed Line Shielding

Section	Elevation ft	Face	A_R ft ²	A_R Ice ft ²	A_F ft ²	A_F Ice ft ²
T1	180.00-170.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.000	0.000	0.000
T2	170.00-163.57	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.108	0.171	0.257
T3	163.57-159.05	A	0.000	0.000	0.000	0.000

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Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T4	159.05-154.52	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.432	0.574	0.864
		A	0.000	0.000	0.000	0.000
T5	154.52-150.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.303	0.503	0.757
		A	0.000	0.000	0.000	0.000
T6	150.00-140.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.298	0.495	0.745
		A	0.000	0.000	0.000	0.000
T7	140.00-130.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.725	1.205	1.814
		A	0.000	0.000	0.000	0.000
T8	130.00-120.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.520	0.995	1.498
		A	0.000	0.257	0.430	0.707
T9	120.00-110.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.501	0.916	1.378
		A	0.000	0.521	0.854	1.404
T10	110.00-100.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.609	1.090	1.641
		A	0.000	0.687	1.346	2.133
T11	100.00-90.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.472	0.973	1.465
		A	0.000	0.855	1.764	2.763
T12	90.00-80.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.461	0.989	1.489
		A	0.000	0.838	1.725	2.702
T13	80.00-60.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.452	0.968	1.456
		A	0.000	1.403	2.240	3.509
T14	60.00-50.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.756	1.256	1.891
		A	0.000	0.800	1.203	1.884
T15	50.00-40.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.431	0.675	1.015
		A	0.000	0.790	1.408	2.206
T16	40.00-30.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.426	0.790	1.189
		A	0.000	1.012	1.689	2.646
T17	30.00-20.00	B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.545	0.947	1.426
		A	0.000	0.774	1.383	2.166
T18	20.00-10.00	B	0.000	0.000	0.000	0.000
		A	0.000	0.998	1.667	2.611

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Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T19	10.00-0.00	C	0.000	0.000	0.000	0.000
		D	0.000	0.538	0.935	1.407
		A	0.000	0.469	0.749	1.173
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
		D	0.000	0.253	0.420	0.632

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_{X_{Ice}}$	$CP_{Z_{Ice}}$
	ft	in	in	in	in
T1	180.00-170.00	-1.8952	1.8952	-2.2315	2.2315
T2	170.00-163.57	-1.6950	2.7569	-2.0759	3.1983
T3	163.57-159.05	-1.5549	5.8973	-1.8561	6.2555
T4	159.05-154.52	-1.6745	6.4184	-2.0506	7.1036
T5	154.52-150.00	-1.7363	6.6484	-2.1249	7.3583
T6	150.00-140.00	-2.1322	6.9134	-2.6600	7.6690
T7	140.00-130.00	-2.5874	7.5794	-3.3389	8.8021
T8	130.00-120.00	-5.5469	6.7760	-6.8083	7.7459
T9	120.00-110.00	-7.1244	5.9720	-8.6757	6.9016
T10	110.00-100.00	-10.4287	3.9131	-12.3720	4.8537
T11	100.00-90.00	-11.6214	2.7698	-13.9226	3.7609
T12	90.00-80.00	-12.2809	2.9852	-14.7504	4.1093
T13	80.00-60.00	-15.1994	3.8087	-17.9336	5.1285
T14	60.00-50.00	-16.0815	3.7853	-19.0038	4.9112
T15	50.00-40.00	-15.9922	3.9452	-19.2369	5.2855
T16	40.00-30.00	-15.4839	3.9017	-18.4933	5.2420
T17	30.00-20.00	-17.1676	4.2325	-20.6732	5.6894
T18	20.00-10.00	-16.4648	4.1296	-19.6705	5.5515
T19	10.00-0.00	-7.9565	2.0209	-9.8792	2.8413

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	$C_A A_A$ Front ft ²	$C_A A_A$ Side ft ²	Weight K
T-Frame (AT&T)	A	From Leg	1.50	0.0000	165.00	No Ice	10.20	0.40
			0.00			1/2" Ice	16.20	0.60
			0.00					
T-Frame (AT&T)	B	From Leg	1.50	0.0000	165.00	No Ice	10.20	0.40
			0.00			1/2" Ice	16.20	0.60
			0.00					
T-Frame (AT&T)	C	From Leg	1.50	0.0000	165.00	No Ice	10.20	0.40
			0.00			1/2" Ice	16.20	0.60
			0.00					
(2) 7770.00 (AT&T)	A	From Leg	2.00	0.0000	165.00	No Ice	5.88	0.04
			0.00			1/2" Ice	6.31	0.07

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) LPG13519 Diplexer (AT&T)	A	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
(2) LPG21401 TMA (AT&T)	A	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
(2) 7770.00 (AT&T)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(2) LPG13519 Diplexer (AT&T)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
(2) LPG21401 TMA (AT&T)	B	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
(2) 7770.00 (AT&T)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
(2) LPG13519 Diplexer (AT&T)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
(2) LPG21401 TMA (AT&T)	C	From Leg	0.00 2.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
5'3"x4" Pipe Mount (T-Mobile)	A	From Leg	0.00 0.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
5'3"x4" Pipe Mount (T-Mobile)	B	From Leg	0.00 0.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
5'3"x4" Pipe Mount (T-Mobile)	D	From Leg	0.00 0.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
RR65-18-04DP (T-Mobile)	A	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
RR65-18-04DP (T-Mobile)	B	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
RR65-18-04DP (T-Mobile)	D	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	4.36 4.77	1.97 2.31	0.02 0.04
(2) TMA (T-Mobile)	A	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
(2) TMA (T-Mobile)	B	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
(2) TMA (T-Mobile)	D	From Leg	0.00 1.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
12' Wireless Frame (Sprint)	A	From Leg	0.00 1.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	11.07 15.53	11.07 15.53	0.24 0.35
12' Wireless Frame (Sprint)	B	From Leg	0.00 1.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	11.07 15.53	11.07 15.53	0.24 0.35

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
12' Wireless Frame (Sprint)	C	From Leg	0.00 1.00 0.00	0.0000	106.00	No Ice 1/2" Ice	11.07 15.53	11.07 15.53	0.24 0.35
DB980F65E-M (Sprint)	A	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.90 4.28	2.29 2.65	0.01 0.03
DB980F65E-M (Sprint)	B	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.90 4.28	2.29 2.65	0.01 0.03
DB980F65E-M (Sprint)	C	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.90 4.28	2.29 2.65	0.01 0.03
HBX-9014DS-VTM (Sprint)	A	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.42 3.76	2.18 2.49	0.02 0.04
HBX-9014DS-VTM (Sprint)	B	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.42 3.76	2.18 2.49	0.02 0.04
HBX-9014DS-VTM (Sprint)	C	From Leg	0.00 1.50 0.00	0.0000	106.00	No Ice 1/2" Ice	3.42 3.76	2.18 2.49	0.02 0.04
6' Standoff (CSP)	A	From Leg	0.00 3.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
OGT9-806 (CSP)	A	From Leg	0.00 6.00 0.00	0.0000	185.00	No Ice 1/2" Ice	2.15 3.25	2.15 3.25	0.02 0.03
OGT9-806 (CSP)	A	From Leg	0.00 6.00 0.00	0.0000	175.00	No Ice 1/2" Ice	2.15 3.25	2.15 3.25	0.02 0.03
6' Standoff (CSP)	D	From Leg	0.00 3.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
OGT9-806 (CSP)	D	From Leg	0.00 6.00 0.00	0.0000	185.00	No Ice 1/2" Ice	2.15 3.25	2.15 3.25	0.02 0.03
OGT9-806 (CSP)	D	From Leg	0.00 6.00 0.00	0.0000	175.00	No Ice 1/2" Ice	2.15 3.25	2.15 3.25	0.02 0.03
6' Standoff (CSP)	C	From Leg	0.00 3.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
3' Omni (CSP)	C	From Leg	0.00 3.00 0.00	0.0000	182.00	No Ice 1/2" Ice	0.53 0.80	0.53 0.80	0.03 0.10
6' Standoff (CSP)	D	From Leg	0.00 3.00 0.00	0.0000	172.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
20' 8 Bay Di-Pole (CSP)	D	From Leg	0.00 6.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
10'6"x4" Pipe Mount (CSP)	A	From Leg	0.00 0.50 0.00	0.0000	180.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10' Dipole (CSP)	A	From Leg	0.00 6.00 0.00	0.0000	185.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.05 0.07

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
6' Standoff (CSP)	C	From Leg	0.00 3.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
4' Omni (CSP)	C	From Leg	6.00 0.00 3.00	0.0000	176.00	No Ice 1/2" Ice	0.53 0.80	0.53 0.80	0.03 0.10
4' Omni (CSP)	C	From Leg	0.50 0.00 3.00	0.0000	173.00	No Ice 1/2" Ice	0.53 0.80	0.53 0.80	0.03 0.10
6' Standoff (CSP)	A	From Leg	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
3' Yagi (CSP)	A	From Leg	6.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	2.08 3.79	2.08 3.79	0.03 0.05
2" Dia 10' Omni (CSP)	D	From Leg	6.00 0.00 5.00	0.0000	150.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.03
6' Standoff (CSP)	C	From Leg	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
6' Standoff (CSP)	D	From Leg	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
6' Standoff (CSP)	A	From Leg	3.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
10' Dipole (CSP)	A	From Leg	6.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.05 0.07
3' Stand-off (CSP)	C	From Leg	1.50 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
4' Omni (CSP)	C	From Leg	3.00 0.00 3.00	0.0000	134.00	No Ice 1/2" Ice	0.53 0.80	0.53 0.80	0.03 0.10
LeBlanc 10' Standoff (1) (CSP)	C	From Leg	5.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	17.00 22.00	17.00 22.00	0.55 0.75
Ground Plane (CSP)	C	From Leg	10.00 0.00 0.00	0.0000	126.00	No Ice 1/2" Ice	1.10 1.60	1.10 1.60	0.03 0.04
6' Standoff (CSP)	D	From Leg	3.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	0.07 0.13
3" Dia x 15' Omni (CSP)	D	From Leg	6.00 0.00 6.00	0.0000	121.00	No Ice 1/2" Ice	4.50 6.00	4.50 6.00	0.04 0.07
Ground Plane (CSP)	D	From Leg	6.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice	1.10 1.60	1.10 1.60	0.03 0.04
3' Stand-off (CSP)	C	From Leg	1.50 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
4' Omni (CSP)	C	From Leg	3.00 0.00	0.0000	118.00	No Ice 1/2" Ice	0.53 0.80	0.53 0.80	0.03 0.10

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
6' Stand-off (CSP)	B	From Leg	3.00 3.00 0.00	0.0000	112.00	No Ice 1/2" Ice	1.20 1.40	4.50 5.50	0.07 0.13
3" Dia x 15' Omni (CSP)	B	From Leg	6.00 0.00 6.00	0.0000	118.00	No Ice 1/2" Ice	4.50 6.00	4.50 6.00	0.04 0.07
LeBlanc 10' Standoff (1) (CSP)	A	From Leg	5.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	17.00 22.00	17.00 22.00	0.55 0.75
2" Dia 10' Omni (CSP)	A	From Leg	6.00 0.00 5.00	0.0000	96.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.03
3' Stand-off (CSP)	D	From Leg	1.50 0.00 0.00	0.0000	85.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
20' 4-Bay Dipole (CSP)	D	From Leg	3.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
3' Stand-off (CSP)	D	From Leg	1.50 0.00 0.00	0.0000	88.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
20' 4-Bay Dipole (CSP)	D	From Leg	3.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
6' Ice Shield (CSP)	A	From Leg	4.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice	2.60 3.00	2.60 3.00	0.13 0.15
3' Stand-off (CSP)	B	From Leg	1.50 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
GPS (CSP)	B	From Leg	3.00 0.00 0.00	0.0000	59.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01
3' Stand-off (CSP)	B	From Leg	1.50 0.00 0.00	0.0000	47.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
DB803M-Y (CSP)	B	From Leg	3.00 0.00 0.00	0.0000	49.00	No Ice 1/2" Ice	0.50 0.68	0.50 0.68	0.00 0.01
10'6"x4" Pipe Mount (CSP)	A	From Leg	0.50 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10'6"x4" Pipe Mount (CSP)	B	From Leg	0.50 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10'6"x4" Pipe Mount (CSP)	C	From Leg	0.50 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10'6"x4" Pipe Mount (CSP)	D	From Leg	0.50 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10'6"x4" Pipe Mount (CSP)	A	From Leg	0.50 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15
10'6"x4" Pipe Mount (CSP)	C	From Leg	0.50 0.00	0.0000	112.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	20 of 61
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	Client	Sprint	Designed by	Matthew Kapinos

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
10'6"x4" Pipe Mount (CSP)	A	From Leg	0.00 0.50 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice	4.72 5.62	4.72 5.62	0.11 0.15

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
PA6-65AC (CSP)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		180.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
PA6-65AC (CSP)	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		180.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
PA6-65AC (CSP)	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		180.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
4' Grid Dish (CSP)	C	Grid	From Leg	1.00 0.00 0.00	Worst		112.00	4.00	No Ice 1/2" Ice	12.57 13.10 0.08 0.15
6' Grid Dish (CSP)	A	Grid	From Leg	1.00 0.00 0.00	Worst		76.00	6.00	No Ice 1/2" Ice	28.27 29.07 0.13 0.28
PA6-65AC (CSP)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		177.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
PA6-65AC (CSP)	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		177.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
PA6-65AC (CSP)	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		177.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24
PA6-65AC (CSP)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		133.00	6.00	No Ice 1/2" Ice	28.27 29.05 0.09 0.24

Tower Pressures - No Ice

$$G_H = 1.121$$

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	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
T1 180.00-170.00	175.00	1.611	33	61.674	A	12.491	3.499	5.833	36.48	0.000	0.000
					B	12.491	0.000		46.70	0.000	0.000
					C	12.491	0.000		46.70	0.000	0.000
					D	12.491	3.499		36.48	0.000	0.000
T2 170.00-163.57	166.79	1.589	33	40.022	A	9.832	2.503	5.356	43.42	0.000	0.000
					B	9.832	0.000		54.47	0.000	0.000
					C	9.832	0.000		54.47	0.000	0.000
					D	9.661	3.916		39.45	0.000	0.000
T3 163.57-159.05	161.31	1.574	33	28.908	A	7.122	1.762	3.775	42.49	0.000	0.000
					B	7.122	0.000		53.00	0.000	0.000
					C	7.122	0.000		53.00	0.000	0.000
					D	6.548	6.241		29.52	0.000	0.000
T4 159.05-154.52	156.79	1.561	32	30.376	A	6.903	1.762	3.775	43.57	0.000	0.000
					B	6.903	0.000		54.69	0.000	0.000
					C	6.903	0.000		54.69	0.000	0.000
					D	6.400	6.241		29.86	0.000	0.000
T5 154.52-150.00	152.26	1.548	32	31.844	A	7.011	1.762	3.775	43.03	0.000	0.000
					B	7.011	0.000		53.84	0.000	0.000
					C	7.011	0.000		53.84	0.000	0.000
					D	6.516	6.241		29.59	0.000	0.000
T6 150.00-140.00	145.00	1.526	32	75.634	A	16.767	4.820	8.344	38.65	0.000	0.000
					B	16.767	0.000		49.76	0.000	0.000
					C	16.767	0.000		49.76	0.000	0.000
					D	15.562	14.720		27.55	0.000	0.000
T7 140.00-130.00	135.00	1.496	31	83.296	A	17.795	5.678	10.013	42.66	0.000	0.000
					B	17.795	0.000		56.27	0.000	0.000
					C	17.795	0.000		56.27	0.000	0.000
					D	16.800	15.578		30.92	0.000	0.000
T8 130.00-120.00	125.00	1.463	30	90.466	A	17.447	11.714	10.013	34.34	0.000	0.000
					B	17.878	0.000		56.01	0.000	0.000
					C	17.878	0.000		56.01	0.000	0.000
					D	16.962	16.964		29.51	0.000	0.000
T9 120.00-110.00	115.00	1.429	30	97.774	A	19.174	15.941	10.013	28.51	0.000	0.000
					B	20.028	0.000		49.99	0.000	0.000
					C	20.028	0.000		49.99	0.000	0.000
					D	18.938	18.091		27.04	0.000	0.000
T10 110.00-100.00	105.00	1.392	29	104.945	A	18.411	22.328	10.013	24.58	0.000	0.000
					B	19.757	0.000		50.68	0.000	0.000
					C	19.757	0.000		50.68	0.000	0.000
					D	18.783	18.538		26.83	0.000	0.000
T11 100.00-90.00	95.00	1.353	28	112.984	A	22.108	28.014	13.350	26.64	0.000	0.000
					B	23.872	0.000		55.93	0.000	0.000
					C	23.872	0.000		55.93	0.000	0.000
					D	22.883	20.264		30.94	0.000	0.000
T12 90.00-80.00	85.00	1.31	27	120.155	A	22.640	28.256	13.350	26.23	0.000	0.000
					B	24.365	0.000		54.79	0.000	0.000
					C	24.365	0.000		54.79	0.000	0.000
					D	23.398	20.506		30.41	0.000	0.000
T13 80.00-60.00	70.00	1.24	26	262.088	A	39.977	57.992	26.701	27.25	0.000	0.000
					B	42.217	0.000		63.25	0.000	0.000
					C	42.217	0.000		63.25	0.000	0.000
					D	40.961	42.492		32.00	0.000	0.000
T14 60.00-50.00	55.00	1.157	24	141.855	A	21.205	29.616	13.350	26.27	0.000	0.000
					B	22.407	0.000		59.58	0.000	0.000
					C	22.407	0.000		59.58	0.000	0.000
					D	21.733	21.431		30.93	0.000	0.000
T15 50.00-40.00	45.00	1.093	23	149.025	A	23.146	30.099	13.350	25.07	0.000	0.000
					B	24.554	0.000		54.37	0.000	0.000
					C	24.554	0.000		54.37	0.000	0.000
					D	23.764	21.866		29.26	0.000	0.000

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	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T16 40.00-30.00	35.00	1.017	21	156.196	A	25.685	30.148	13.350	23.91	0.000	0.000
					B	27.374	0.000		48.77	0.000	0.000
					C	27.374	0.000		48.77	0.000	0.000
					D	26.427	21.914		27.62	0.000	0.000
T17 30.00-20.00	25.00	1	21	163.366	A	24.084	30.148	13.350	24.62	0.000	0.000
					B	25.467	0.000		52.42	0.000	0.000
					C	25.467	0.000		52.42	0.000	0.000
					D	24.691	21.914		28.65	0.000	0.000
T18 20.00-10.00	15.00	1	21	170.539	A	26.867	30.148	13.350	23.42	0.000	0.000
					B	28.533	0.000		46.79	0.000	0.000
					C	28.533	0.000		46.79	0.000	0.000
					D	27.598	21.914		26.96	0.000	0.000
T19 10.00-0.00	5.00	1	21	177.715	A	28.939	12.059	13.350	32.56	0.000	0.000
					B	29.688	0.000		44.97	0.000	0.000
					C	29.688	0.000		44.97	0.000	0.000
					D	29.268	8.766		35.10	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.121$$

Section Elevation	z	K _z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 180.00-170.00	175.00	1.611	33	0.5000	62.507	A	12.491	10.269	7.500	32.95	0.000	0.000
						B	12.491	4.520		44.09	0.000	0.000
						C	12.491	4.520		44.09	0.000	0.000
						D	12.491	10.269		32.95	0.000	0.000
T2 170.00-163.57	166.79	1.589	33	0.5000	40.557	A	9.832	7.067	6.427	38.03	0.000	0.000
						B	9.832	2.957		50.26	0.000	0.000
						C	9.832	2.957		50.26	0.000	0.000
						D	9.575	9.084		34.44	0.000	0.000
T3 163.57-159.05	161.31	1.574	33	0.5000	29.285	A	7.122	5.322	4.530	36.40	0.000	0.000
						B	7.122	2.429		47.43	0.000	0.000
						C	7.122	2.429		47.43	0.000	0.000
						D	6.258	11.631		25.32	0.000	0.000
T4 159.05-154.52	156.79	1.561	32	0.5000	30.753	A	6.903	4.899	4.530	38.39	0.000	0.000
						B	6.903	2.006		50.85	0.000	0.000
						C	6.903	2.006		50.85	0.000	0.000
						D	6.146	11.338		25.91	0.000	0.000
T5 154.52-150.00	152.26	1.548	32	0.5000	32.221	A	7.011	4.943	4.530	37.90	0.000	0.000
						B	7.011	2.050		50.00	0.000	0.000
						C	7.011	2.050		50.00	0.000	0.000
						D	6.266	11.386		25.66	0.000	0.000
T6 150.00-140.00	145.00	1.526	32	0.5000	76.467	A	16.767	13.191	10.013	33.42	0.000	0.000
						B	16.767	5.038		45.92	0.000	0.000
						C	16.767	5.038		45.92	0.000	0.000
						D	14.954	27.366		23.66	0.000	0.000
T7 140.00-130.00	135.00	1.496	31	0.5000	84.129	A	17.795	14.042	11.682	36.69	0.000	0.000
						B	17.795	4.364		52.72	0.000	0.000
						C	17.795	4.364		52.72	0.000	0.000
						D	16.298	28.422		26.12	0.000	0.000
T8 130.00-120.00	125.00	1.463	30	0.5000	91.300	A	17.170	23.977	11.682	28.39	0.000	0.000
						B	17.878	4.520		52.16	0.000	0.000
						C	17.878	4.520		52.16	0.000	0.000

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	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	z	K _z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
T9 120.00-110.00	115.00	1.429	30	0.5000	98.608	D	16.500	30.983		24.60	0.000	0.000
						A	18.624	32.129	11.682	23.02	0.000	0.000
						B	20.028	5.376		45.98	0.000	0.000
						C	20.028	5.376		45.98	0.000	0.000
						D	18.387	34.191		22.22	0.000	0.000
T10 110.00-100.00	105.00	1.392	29	0.5000	105.778	A	17.624	41.190	11.682	19.86	0.000	0.000
						B	19.757	4.799		47.57	0.000	0.000
						C	19.757	4.799		47.57	0.000	0.000
						D	18.292	34.615		22.08	0.000	0.000
T11 100.00-90.00	95.00	1.353	28	0.5000	113.818	A	21.109	49.990	15.019	21.12	0.000	0.000
						B	23.872	4.914		52.17	0.000	0.000
						C	23.872	4.914		52.17	0.000	0.000
						D	22.383	37.635		25.02	0.000	0.000
T12 90.00-80.00	85.00	1.31	27	0.5000	120.989	A	21.663	50.828	15.019	20.72	0.000	0.000
						B	24.365	5.077		51.01	0.000	0.000
						C	24.365	5.077		51.01	0.000	0.000
						D	22.909	38.465		24.47	0.000	0.000
T13 80.00-60.00	70.00	1.24	26	0.5000	263.756	A	38.708	104.133	30.039	21.03	0.000	0.000
						B	42.217	9.544		58.03	0.000	0.000
						C	42.217	9.544		58.03	0.000	0.000
						D	40.326	79.280		25.11	0.000	0.000
T14 60.00-50.00	55.00	1.157	24	0.5000	142.689	A	20.523	54.237	15.019	20.09	0.000	0.000
						B	22.407	5.504		53.81	0.000	0.000
						C	22.407	5.504		53.81	0.000	0.000
						D	21.392	40.671		24.20	0.000	0.000
T15 50.00-40.00	45.00	1.093	23	0.5000	149.859	A	22.348	55.749	15.019	19.23	0.000	0.000
						B	24.554	5.689		49.66	0.000	0.000
						C	24.554	5.689		49.66	0.000	0.000
						D	23.366	42.046		22.96	0.000	0.000
T16 40.00-30.00	35.00	1.017	21	0.5000	157.030	A	24.729	56.999	15.019	18.38	0.000	0.000
						B	27.374	7.030		43.66	0.000	0.000
						C	27.374	7.030		43.66	0.000	0.000
						D	25.949	43.399		21.66	0.000	0.000
T17 30.00-20.00	25.00	1	21	0.5000	164.200	A	23.300	56.213	15.019	18.89	0.000	0.000
						B	25.467	6.007		47.72	0.000	0.000
						C	25.467	6.007		47.72	0.000	0.000
						D	24.299	42.504		22.48	0.000	0.000
T18 20.00-10.00	15.00	1	21	0.5000	171.373	A	25.922	57.452	15.019	18.01	0.000	0.000
						B	28.533	7.470		41.72	0.000	0.000
						C	28.533	7.470		41.72	0.000	0.000
						D	27.126	43.846		21.16	0.000	0.000
T19 10.00-0.00	5.00	1	21	0.5000	178.549	A	28.515	27.979	15.019	26.59	0.000	0.000
						B	29.688	8.056		39.79	0.000	0.000
						C	29.688	8.056		39.79	0.000	0.000
						D	29.056	22.569		29.09	0.000	0.000

Tower Pressure - Service

$$G_H = 1.121$$

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1	175.00	1.611	33	61.674	A	12.491	3.499	5.833	36.48	0.000	0.000

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	24 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
180.00-170.00					B	12.491	0.000		46.70	0.000	0.000
					C	12.491	0.000		46.70	0.000	0.000
					D	12.491	3.499		36.48	0.000	0.000
T2	166.79	1.589	33	40.022	A	9.832	2.503	5.356	43.42	0.000	0.000
170.00-163.57					B	9.832	0.000		54.47	0.000	0.000
					C	9.832	0.000		54.47	0.000	0.000
					D	9.661	3.916		39.45	0.000	0.000
T3	161.31	1.574	33	28.908	A	7.122	1.762	3.775	42.49	0.000	0.000
163.57-159.05					B	7.122	0.000		53.00	0.000	0.000
					C	7.122	0.000		53.00	0.000	0.000
					D	6.548	6.241		29.52	0.000	0.000
T4	156.79	1.561	32	30.376	A	6.903	1.762	3.775	43.57	0.000	0.000
159.05-154.52					B	6.903	0.000		54.69	0.000	0.000
					C	6.903	0.000		54.69	0.000	0.000
					D	6.400	6.241		29.86	0.000	0.000
T5	152.26	1.548	32	31.844	A	7.011	1.762	3.775	43.03	0.000	0.000
154.52-150.00					B	7.011	0.000		53.84	0.000	0.000
					C	7.011	0.000		53.84	0.000	0.000
					D	6.516	6.241		29.59	0.000	0.000
T6	145.00	1.526	32	75.634	A	16.767	4.820	8.344	38.65	0.000	0.000
150.00-140.00					B	16.767	0.000		49.76	0.000	0.000
					C	16.767	0.000		49.76	0.000	0.000
					D	15.562	14.720		27.55	0.000	0.000
T7	135.00	1.496	31	83.296	A	17.795	5.678	10.013	42.66	0.000	0.000
140.00-130.00					B	17.795	0.000		56.27	0.000	0.000
					C	17.795	0.000		56.27	0.000	0.000
					D	16.800	15.578		30.92	0.000	0.000
T8	125.00	1.463	30	90.466	A	17.447	11.714	10.013	34.34	0.000	0.000
130.00-120.00					B	17.878	0.000		56.01	0.000	0.000
					C	17.878	0.000		56.01	0.000	0.000
					D	16.962	16.964		29.51	0.000	0.000
T9	115.00	1.429	30	97.774	A	19.174	15.941	10.013	28.51	0.000	0.000
120.00-110.00					B	20.028	0.000		49.99	0.000	0.000
					C	20.028	0.000		49.99	0.000	0.000
					D	18.938	18.091		27.04	0.000	0.000
T10	105.00	1.392	29	104.945	A	18.411	22.328	10.013	24.58	0.000	0.000
110.00-100.00					B	19.757	0.000		50.68	0.000	0.000
					C	19.757	0.000		50.68	0.000	0.000
					D	18.783	18.538		26.83	0.000	0.000
T11	95.00	1.353	28	112.984	A	22.108	28.014	13.350	26.64	0.000	0.000
100.00-90.00					B	23.872	0.000		55.93	0.000	0.000
					C	23.872	0.000		55.93	0.000	0.000
					D	22.883	20.264		30.94	0.000	0.000
T12	85.00	1.31	27	120.155	A	22.640	28.256	13.350	26.23	0.000	0.000
90.00-80.00					B	24.365	0.000		54.79	0.000	0.000
					C	24.365	0.000		54.79	0.000	0.000
					D	23.398	20.506		30.41	0.000	0.000
T13	70.00	1.24	26	262.088	A	39.977	57.992	26.701	27.25	0.000	0.000
80.00-60.00					B	42.217	0.000		63.25	0.000	0.000
					C	42.217	0.000		63.25	0.000	0.000
					D	40.961	42.492		32.00	0.000	0.000
T14	55.00	1.157	24	141.855	A	21.205	29.616	13.350	26.27	0.000	0.000
60.00-50.00					B	22.407	0.000		59.58	0.000	0.000
					C	22.407	0.000		59.58	0.000	0.000
					D	21.733	21.431		30.93	0.000	0.000
T15	45.00	1.093	23	149.025	A	23.146	30.099	13.350	25.07	0.000	0.000
50.00-40.00					B	24.554	0.000		54.37	0.000	0.000
					C	24.554	0.000		54.37	0.000	0.000
					D	23.764	21.866		29.26	0.000	0.000
T16	35.00	1.017	21	156.196	A	25.685	30.148	13.350	23.91	0.000	0.000

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	25 of 61
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	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
40.00-30.00					B	27.374	0.000		48.77	0.000	0.000
					C	27.374	0.000		48.77	0.000	0.000
					D	26.427	21.914		27.62	0.000	0.000
T17	25.00	1	21	163.366	A	24.084	30.148	13.350	24.62	0.000	0.000
30.00-20.00					B	25.467	0.000		52.42	0.000	0.000
					C	25.467	0.000		52.42	0.000	0.000
					D	24.691	21.914		28.65	0.000	0.000
T18	15.00	1	21	170.539	A	26.867	30.148	13.350	23.42	0.000	0.000
20.00-10.00					B	28.533	0.000		46.79	0.000	0.000
					C	28.533	0.000		46.79	0.000	0.000
					D	27.598	21.914		26.96	0.000	0.000
T19	10.00-0.00	1	21	177.715	A	28.939	12.059	13.350	32.56	0.000	0.000
	5.00				B	29.688	0.000		44.97	0.000	0.000
					C	29.688	0.000		44.97	0.000	0.000
					D	29.268	8.766		35.10	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.08	0.75	A	0.259	2.739	0.604	1	1	14.606	1.50	149.77	D
180.00-170.00			B	0.203	2.969	0.591	1	1	12.491			
			C	0.203	2.969	0.591	1	1	12.491			
			D	0.259	2.739	0.604	1	1	14.606			
T2	0.07	0.54	A	0.308	2.562	0.618	1	1	11.380	1.10	171.26	D
170.00-163.57			B	0.246	2.792	0.601	1	1	9.832			
			C	0.246	2.792	0.601	1	1	9.832			
			D	0.339	2.459	0.629	1	1	12.123			
T3	0.09	0.39	A	0.307	2.565	0.618	1	1	8.211	0.85	188.43	D
163.57-159.05			B	0.246	2.789	0.601	1	1	7.122			
			C	0.246	2.789	0.601	1	1	7.122			
			D	0.442	2.173	0.67	1	1	10.728			
T4	0.09	0.36	A	0.285	2.643	0.611	1	1	7.980	0.85	188.53	D
159.05-154.52			B	0.227	2.866	0.596	1	1	6.903			
			C	0.227	2.866	0.596	1	1	6.903			
			D	0.416	2.237	0.658	1	1	10.508			
T5	0.09	0.37	A	0.276	2.678	0.609	1	1	8.084	0.87	191.76	D
154.52-150.00			B	0.22	2.895	0.595	1	1	7.011			
			C	0.22	2.895	0.595	1	1	7.011			
			D	0.401	2.278	0.652	1	1	10.585			
T6	0.23	0.97	A	0.285	2.642	0.612	1	1	19.715	2.03	203.39	D
150.00-140.00			B	0.222	2.889	0.595	1	1	16.767			
			C	0.222	2.889	0.595	1	1	16.767			
			D	0.4	2.279	0.652	1	1	25.156			
T7	0.24	1.42	A	0.282	2.655	0.611	1	1	21.262	2.16	215.93	D
140.00-130.00			B	0.214	2.922	0.593	1	1	17.795			
			C	0.214	2.922	0.593	1	1	17.795			
			D	0.389	2.311	0.647	1	1	26.880			
T8	0.27	1.43	A	0.322	2.514	0.623	1	1	24.745	2.23	222.53	D
130.00-120.00			B	0.198	2.99	0.59	1	1	17.878			
			C	0.198	2.99	0.59	1	1	17.878			
			D	0.375	2.35	0.642	1	1	27.848			
T9	0.30	2.05	A	0.359	2.397	0.636	1	1	29.309	2.37	237.47	D
120.00-110.00			B	0.205	2.959	0.591	1	1	20.028			
			C	0.205	2.959	0.591	1	1	20.028			

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	26 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T10	0.34	1.91	D	0.379	2.339	0.643	1	1	30.573			
110.00-100.00			A	0.388	2.312	0.647	1	1	32.853	2.46	245.78	A
			B	0.188	3.031	0.588	1	1	19.757			
			C	0.188	3.031	0.588	1	1	19.757			
			D	0.356	2.408	0.634	1	1	30.545			
T11	0.38	2.50	A	0.444	2.17	0.67	1	1	40.888	2.79	278.94	A
100.00-90.00			B	0.211	2.932	0.593	1	1	23.872			
			C	0.211	2.932	0.593	1	1	23.872			
			D	0.382	2.33	0.644	1	1	35.941			
T12	0.39	2.43	A	0.424	2.219	0.662	1	1	41.332	2.79	279.28	A
90.00-80.00			B	0.203	2.968	0.591	1	1	24.365			
			C	0.203	2.968	0.591	1	1	24.365			
			D	0.365	2.378	0.638	1	1	36.483			
T13	0.78	6.02	A	0.374	2.353	0.641	1	1	77.165	5.23	261.63	A
80.00-60.00			B	0.161	3.153	0.583	1	1	42.217			
			C	0.161	3.153	0.583	1	1	42.217			
			D	0.318	2.527	0.622	1	1	67.378			
T14	0.39	3.59	A	0.358	2.4	0.635	1	1	40.024	2.58	258.31	A
60.00-50.00			B	0.158	3.168	0.583	1	1	22.407			
			C	0.158	3.168	0.583	1	1	22.407			
			D	0.304	2.575	0.617	1	1	34.960			
T15	0.40	3.44	A	0.357	2.403	0.635	1	1	42.262	2.58	257.87	A
50.00-40.00			B	0.165	3.136	0.584	1	1	24.554			
			C	0.165	3.136	0.584	1	1	24.554			
			D	0.306	2.568	0.618	1	1	37.274			
T16	0.40	4.06	A	0.357	2.402	0.635	1	1	44.834	2.55	254.56	A
40.00-30.00			B	0.175	3.089	0.586	1	1	27.374			
			C	0.175	3.089	0.586	1	1	27.374			
			D	0.309	2.557	0.619	1	1	39.989			
T17	0.40	3.52	A	0.332	2.482	0.626	1	1	42.962	2.48	247.86	A
30.00-20.00			B	0.156	3.177	0.582	1	1	25.467			
			C	0.156	3.177	0.582	1	1	25.467			
			D	0.285	2.642	0.612	1	1	38.092			
T18	0.40	4.51	A	0.334	2.475	0.627	1	1	45.769	2.63	263.24	A
20.00-10.00			B	0.167	3.125	0.584	1	1	28.533			
			C	0.167	3.125	0.584	1	1	28.533			
			D	0.29	2.624	0.613	1	1	41.032			
T19	0.16	4.70	A	0.231	2.852	0.597	1	1	36.140	2.40	239.54	A
10.00-0.00			B	0.167	3.126	0.584	1	1	29.688			
			C	0.167	3.126	0.584	1	1	29.688			
			D	0.214	2.921	0.593	1	1	34.469			
Sum Weight:	5.48	44.95						OTM	3574.08 kip-ft	42.45		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.08	0.75	A	0.259	2.739	0.604	1.194	1.194	17.446	1.79	178.90	D
180.00-170.00			B	0.203	2.969	0.591	1.152	1.152	14.389			
			C	0.203	2.969	0.591	1.152	1.152	14.389			
			D	0.259	2.739	0.604	1.194	1.194	17.446			
T2	0.07	0.54	A	0.308	2.562	0.618	1.2	1.2	13.656	1.32	205.51	D
170.00-163.57			B	0.246	2.792	0.601	1.184	1.184	11.643			

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	27 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T3 163.57-159.05	0.09	0.39	C	0.246	2.792	0.601	1.184	1.184	11.643	1.02	226.12	D
			D	0.339	2.459	0.629	1.2	1.2	14.547			
			A	0.307	2.565	0.618	1.2	1.2	9.854			
			B	0.246	2.789	0.601	1.185	1.185	8.438			
T4 159.05-154.52	0.09	0.36	C	0.246	2.789	0.601	1.185	1.185	8.438	1.02	226.24	D
			D	0.442	2.173	0.67	1.2	1.2	12.874			
			A	0.285	2.643	0.611	1.2	1.2	9.576			
			B	0.227	2.866	0.596	1.17	1.17	8.079			
T5 154.52-150.00	0.09	0.37	C	0.227	2.866	0.596	1.17	1.17	8.079	1.04	230.11	D
			D	0.416	2.237	0.658	1.2	1.2	12.610			
			A	0.276	2.678	0.609	1.2	1.2	9.701			
			B	0.22	2.895	0.595	1.165	1.165	8.169			
T6 150.00-140.00	0.23	0.97	C	0.22	2.895	0.595	1.165	1.165	8.169	2.44	244.07	D
			D	0.401	2.278	0.652	1.2	1.2	12.701			
			A	0.285	2.642	0.612	1.2	1.2	23.657			
			B	0.222	2.889	0.595	1.166	1.166	19.555			
T7 140.00-130.00	0.24	1.42	C	0.222	2.889	0.595	1.166	1.166	19.555	2.59	259.12	D
			D	0.4	2.279	0.652	1.2	1.2	30.187			
			A	0.282	2.655	0.611	1.2	1.2	25.514			
			B	0.214	2.922	0.593	1.16	1.16	20.647			
T8 130.00-120.00	0.27	1.43	C	0.214	2.922	0.593	1.16	1.16	20.647	2.67	267.04	D
			D	0.389	2.311	0.647	1.2	1.2	32.256			
			A	0.322	2.514	0.623	1.2	1.2	29.694			
			B	0.198	2.99	0.59	1.148	1.148	20.527			
T9 120.00-110.00	0.30	2.05	C	0.198	2.99	0.59	1.148	1.148	20.527	2.85	284.96	D
			D	0.375	2.35	0.642	1.2	1.2	33.418			
			A	0.359	2.397	0.636	1.2	1.2	35.171			
			B	0.205	2.959	0.591	1.154	1.154	23.105			
T10 110.00-100.00	0.34	1.91	C	0.205	2.959	0.591	1.154	1.154	23.105	2.95	294.94	A
			D	0.379	2.339	0.643	1.2	1.2	36.687			
			A	0.388	2.312	0.647	1.2	1.2	39.424			
			B	0.188	3.031	0.588	1.141	1.141	22.546			
T11 100.00-90.00	0.38	2.50	C	0.188	3.031	0.588	1.141	1.141	22.546	3.35	334.72	A
			D	0.356	2.408	0.634	1.2	1.2	36.655			
			A	0.444	2.17	0.67	1.2	1.2	49.066			
			B	0.211	2.932	0.593	1.158	1.158	27.655			
T12 90.00-80.00	0.39	2.43	C	0.211	2.932	0.593	1.158	1.158	27.655	3.35	335.13	A
			D	0.382	2.33	0.644	1.2	1.2	43.129			
			A	0.424	2.219	0.662	1.2	1.2	49.598			
			B	0.203	2.968	0.591	1.152	1.152	28.071			
T13 80.00-60.00	0.78	6.02	C	0.203	2.968	0.591	1.152	1.152	28.071	6.28	313.96	A
			D	0.365	2.378	0.638	1.2	1.2	43.779			
			A	0.374	2.353	0.641	1.2	1.2	92.598			
			B	0.161	3.153	0.583	1.121	1.121	47.317			
T14 60.00-50.00	0.39	3.59	C	0.161	3.153	0.583	1.121	1.121	47.317	3.10	309.97	A
			D	0.318	2.527	0.622	1.2	1.2	80.854			
			A	0.358	2.4	0.635	1.2	1.2	48.029			
			B	0.158	3.168	0.583	1.118	1.118	25.062			
T15 50.00-40.00	0.40	3.44	C	0.158	3.168	0.583	1.118	1.118	25.062	3.09	309.45	A
			D	0.304	2.575	0.617	1.2	1.2	41.952			
			A	0.357	2.403	0.635	1.2	1.2	50.715			
			B	0.165	3.136	0.584	1.124	1.124	27.588			
T16 40.00-30.00	0.40	4.06	C	0.165	3.136	0.584	1.124	1.124	27.588	3.05	305.47	A
			D	0.306	2.568	0.618	1.2	1.2	44.728			
			A	0.357	2.402	0.635	1.2	1.2	53.801			
			B	0.175	3.089	0.586	1.131	1.131	30.972			
T17 30.00-20.00	0.40	3.52	C	0.175	3.089	0.586	1.131	1.131	30.972	2.97	297.43	A
			D	0.309	2.557	0.619	1.2	1.2	47.986			
			A	0.332	2.482	0.626	1.2	1.2	51.555			
			B	0.156	3.177	0.582	1.117	1.117	28.444			

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	28 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T18 20.00-10.00	0.40	4.51	C	0.156	3.177	0.582	1.117	1.117	28.444	3.16	315.89	A
			D	0.285	2.642	0.612	1.2	1.2	45.710			
			A	0.334	2.475	0.627	1.2	1.2	54.923			
			B	0.167	3.125	0.584	1.125	1.125	32.114			
			C	0.167	3.125	0.584	1.125	1.125	32.114			
T19 10.00-0.00	0.16	4.70	D	0.29	2.624	0.613	1.2	1.2	49.238	2.81	280.99	A
			A	0.231	2.852	0.597	1.173	1.173	42.394			
			B	0.167	3.126	0.584	1.125	1.125	33.408			
			C	0.167	3.126	0.584	1.125	1.125	33.408			
			D	0.214	2.921	0.593	1.161	1.161	40.002			
Sum Weight:	5.48	44.95						OTM	4287.12 kip-ft	50.87		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 180.00-170.00	0.22	1.18	A	0.364	2.382	0.638	1	1	19.039	1.70	169.78	D
			B	0.272	2.691	0.608	1	1	15.239			
			C	0.272	2.691	0.608	1	1	15.239			
			D	0.364	2.382	0.638	1	1	19.039			
T2 170.00-163.57	0.19	0.86	A	0.417	2.236	0.659	1	1	14.485	1.24	192.74	D
			B	0.315	2.537	0.621	1	1	11.667			
			C	0.315	2.537	0.621	1	1	11.667			
			D	0.46	2.132	0.678	1	1	15.733			
T3 163.57-159.05	0.24	0.63	A	0.425	2.215	0.662	1	1	10.646	1.04	230.54	D
			B	0.326	2.501	0.624	1	1	8.638			
			C	0.326	2.501	0.624	1	1	8.638			
			D	0.611	1.889	0.76	1	1	15.101			
T4 159.05-154.52	0.24	0.56	A	0.384	2.325	0.645	1	1	10.063	1.02	225.04	D
			B	0.29	2.627	0.613	1	1	8.132			
			C	0.29	2.627	0.613	1	1	8.132			
			D	0.569	1.939	0.735	1	1	14.477			
T5 154.52-150.00	0.24	0.57	A	0.371	2.362	0.64	1	1	10.176	1.03	226.92	D
			B	0.281	2.657	0.61	1	1	8.262			
			C	0.281	2.657	0.61	1	1	8.262			
			D	0.548	1.968	0.723	1	1	14.499			
T6 150.00-140.00	0.58	1.49	A	0.392	2.302	0.648	1	1	25.319	2.42	242.16	D
			B	0.285	2.643	0.611	1	1	19.848			
			C	0.285	2.643	0.611	1	1	19.848			
			D	0.553	1.96	0.726	1	1	34.827			
T7 140.00-130.00	0.61	2.01	A	0.378	2.34	0.643	1	1	26.825	2.54	253.64	D
			B	0.263	2.723	0.605	1	1	20.437			
			C	0.263	2.723	0.605	1	1	20.437			
			D	0.532	1.994	0.714	1	1	36.594			
T8 130.00-120.00	0.72	1.98	A	0.451	2.153	0.674	1	1	33.320	2.63	263.14	D
			B	0.245	2.793	0.601	1	1	20.592			
			C	0.245	2.793	0.601	1	1	20.592			
			D	0.52	2.013	0.708	1	1	38.434			
T9 120.00-110.00	0.80	2.78	A	0.515	2.023	0.705	1	1	41.278	2.83	283.21	D
			B	0.258	2.745	0.604	1	1	23.274			
			C	0.258	2.745	0.604	1	1	23.274			
			D	0.533	1.991	0.715	1	1	42.834			
T10	0.90	2.52	A	0.556	1.956	0.728	1	1	47.596	3.01	301.21	A

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	29 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
110.00-100.00			B	0.232	2.846	0.597	1	1	22.624			
			C	0.232	2.846	0.597	1	1	22.624			
			D	0.5	2.05	0.698	1	1	42.438			
T11	1.01	3.28	A	0.625	1.875	0.769	1	1	59.552	3.51	351.11	A
100.00-90.00			B	0.253	2.764	0.603	1	1	26.833			
			C	0.253	2.764	0.603	1	1	26.833			
			D	0.527	2.001	0.712	1	1	49.172			
T12	1.02	3.15	A	0.599	1.901	0.753	1	1	59.941	3.47	347.03	A
90.00-80.00			B	0.243	2.801	0.6	1	1	27.413			
			C	0.243	2.801	0.6	1	1	27.413			
			D	0.507	2.036	0.701	1	1	49.882			
T13	2.06	7.54	A	0.542	1.978	0.72	1	1	113.640	6.48	323.82	A
80.00-60.00			B	0.196	2.996	0.59	1	1	47.845			
			C	0.196	2.996	0.59	1	1	47.845			
			D	0.453	2.147	0.675	1	1	93.830			
T14	1.04	4.55	A	0.524	2.007	0.71	1	1	59.032	3.19	318.61	A
60.00-50.00			B	0.196	2.999	0.59	1	1	25.652			
			C	0.196	2.999	0.59	1	1	25.652			
			D	0.435	2.191	0.666	1	1	48.498			
T15	1.05	4.29	A	0.521	2.012	0.709	1	1	61.847	3.16	315.96	A
50.00-40.00			B	0.202	2.972	0.591	1	1	27.915			
			C	0.202	2.972	0.591	1	1	27.915			
			D	0.436	2.187	0.667	1	1	51.417			
T16	1.05	5.26	A	0.52	2.013	0.708	1	1	65.092	3.10	309.68	A
40.00-30.00			B	0.219	2.899	0.594	1	1	31.554			
			C	0.219	2.899	0.594	1	1	31.554			
			D	0.442	2.175	0.669	1	1	55.003			
T17	1.05	4.42	A	0.484	2.081	0.69	1	1	62.064	3.00	300.18	A
30.00-20.00			B	0.192	3.016	0.589	1	1	29.003			
			C	0.192	3.016	0.589	1	1	29.003			
			D	0.407	2.262	0.654	1	1	52.114			
T18	1.05	5.82	A	0.487	2.076	0.691	1	1	65.605	3.17	316.61	A
20.00-10.00			B	0.21	2.937	0.593	1	1	32.959			
			C	0.21	2.937	0.593	1	1	32.959			
			D	0.414	2.243	0.657	1	1	55.954			
T19	0.42	6.11	A	0.316	2.534	0.621	1	1	45.892	2.70	270.25	A
10.00-0.00			B	0.211	2.932	0.593	1	1	34.463			
			C	0.211	2.932	0.593	1	1	34.463			
			D	0.289	2.628	0.613	1	1	42.883			
Sum Weight:	14.53	59.00						OTM	4296.11 kip-ft	51.23		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.22	1.18	A	0.364	2.382	0.638	1.2	1.2	22.847	2.04	203.73	D
180.00-170.00			B	0.272	2.691	0.608	1.2	1.2	18.286			
			C	0.272	2.691	0.608	1.2	1.2	18.286			
			D	0.364	2.382	0.638	1.2	1.2	22.847			
T2	0.19	0.86	A	0.417	2.236	0.659	1.2	1.2	17.383	1.49	231.29	D
170.00-163.57			B	0.315	2.537	0.621	1.2	1.2	14.001			
			C	0.315	2.537	0.621	1.2	1.2	14.001			
			D	0.46	2.132	0.678	1.2	1.2	18.880			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	30 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T3 163.57-159.05	0.24	0.63	A	0.425	2.215	0.662	1.2	1.2	12.775	1.25	276.65	D
			B	0.326	2.501	0.624	1.2	1.2	10.366			
			C	0.326	2.501	0.624	1.2	1.2	10.366			
			D	0.611	1.889	0.76	1.2	1.2	18.121			
T4 159.05-154.52	0.24	0.56	A	0.384	2.325	0.645	1.2	1.2	12.076	1.22	270.05	D
			B	0.29	2.627	0.613	1.2	1.2	9.758			
			C	0.29	2.627	0.613	1.2	1.2	9.758			
			D	0.569	1.939	0.735	1.2	1.2	17.372			
T5 154.52-150.00	0.24	0.57	A	0.371	2.362	0.64	1.2	1.2	12.211	1.23	272.31	D
			B	0.281	2.657	0.61	1.2	1.2	9.915			
			C	0.281	2.657	0.61	1.2	1.2	9.915			
			D	0.548	1.968	0.723	1.2	1.2	17.399			
T6 150.00-140.00	0.58	1.49	A	0.392	2.302	0.648	1.2	1.2	30.382	2.91	290.59	D
			B	0.285	2.643	0.611	1.2	1.2	23.817			
			C	0.285	2.643	0.611	1.2	1.2	23.817			
			D	0.553	1.96	0.726	1.2	1.2	41.792			
T7 140.00-130.00	0.61	2.01	A	0.378	2.34	0.643	1.2	1.2	32.190	3.04	304.37	D
			B	0.263	2.723	0.605	1.198	1.198	24.475			
			C	0.263	2.723	0.605	1.198	1.198	24.475			
			D	0.532	1.994	0.714	1.2	1.2	43.913			
T8 130.00-120.00	0.72	1.98	A	0.451	2.153	0.674	1.2	1.2	39.985	3.16	315.77	D
			B	0.245	2.793	0.601	1.184	1.184	24.381			
			C	0.245	2.793	0.601	1.184	1.184	24.381			
			D	0.52	2.013	0.708	1.2	1.2	46.121			
T9 120.00-110.00	0.80	2.78	A	0.515	2.023	0.705	1.2	1.2	49.534	3.40	339.86	D
			B	0.258	2.745	0.604	1.193	1.193	27.771			
			C	0.258	2.745	0.604	1.193	1.193	27.771			
			D	0.533	1.991	0.715	1.2	1.2	51.400			
T10 110.00-100.00	0.90	2.52	A	0.556	1.956	0.728	1.2	1.2	57.115	3.61	361.45	A
			B	0.232	2.846	0.597	1.174	1.174	26.563			
			C	0.232	2.846	0.597	1.174	1.174	26.563			
			D	0.5	2.05	0.698	1.2	1.2	50.926			
T11 100.00-90.00	1.01	3.28	A	0.625	1.875	0.769	1.2	1.2	71.463	4.21	421.34	A
			B	0.253	2.764	0.603	1.19	1.19	31.923			
			C	0.253	2.764	0.603	1.19	1.19	31.923			
			D	0.527	2.001	0.712	1.2	1.2	59.006			
T12 90.00-80.00	1.02	3.15	A	0.599	1.901	0.753	1.2	1.2	71.929	4.16	416.44	A
			B	0.243	2.801	0.6	1.183	1.183	32.416			
			C	0.243	2.801	0.6	1.183	1.183	32.416			
			D	0.507	2.036	0.701	1.2	1.2	59.858			
T13 80.00-60.00	2.06	7.54	A	0.542	1.978	0.72	1.2	1.2	136.368	7.77	388.58	A
			B	0.196	2.996	0.59	1.147	1.147	54.887			
			C	0.196	2.996	0.59	1.147	1.147	54.887			
			D	0.453	2.147	0.675	1.2	1.2	112.596			
T14 60.00-50.00	1.04	4.55	A	0.524	2.007	0.71	1.2	1.2	70.838	3.82	382.33	A
			B	0.196	2.999	0.59	1.147	1.147	29.415			
			C	0.196	2.999	0.59	1.147	1.147	29.415			
			D	0.435	2.191	0.666	1.2	1.2	58.198			
T15 50.00-40.00	1.05	4.29	A	0.521	2.012	0.709	1.2	1.2	74.216	3.79	379.15	A
			B	0.202	2.972	0.591	1.151	1.151	32.141			
			C	0.202	2.972	0.591	1.151	1.151	32.141			
			D	0.436	2.187	0.667	1.2	1.2	61.701			
T16 40.00-30.00	1.05	5.26	A	0.52	2.013	0.708	1.2	1.2	78.111	3.72	371.61	A
			B	0.219	2.899	0.594	1.164	1.164	36.738			
			C	0.219	2.899	0.594	1.164	1.164	36.738			
			D	0.442	2.175	0.669	1.2	1.2	66.003			
T17 30.00-20.00	1.05	4.42	A	0.484	2.081	0.69	1.2	1.2	74.477	3.60	360.21	A
			B	0.192	3.016	0.589	1.144	1.144	33.172			
			C	0.192	3.016	0.589	1.144	1.144	33.172			
			D	0.407	2.262	0.654	1.2	1.2	62.537			

RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	31 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T18 20.00-10.00	1.05	5.82	A	0.487	2.076	0.691	1.2	1.2	78.726	3.80	379.93	A
			B	0.21	2.937	0.593	1.158	1.158	38.152			
			C	0.21	2.937	0.593	1.158	1.158	38.152			
			D	0.414	2.243	0.657	1.2	1.2	67.144			
T19 10.00-0.00	0.42	6.11	A	0.316	2.534	0.621	1.2	1.2	55.071	3.24	324.30	A
			B	0.211	2.932	0.593	1.159	1.159	39.927			
			C	0.211	2.932	0.593	1.159	1.159	39.927			
			D	0.289	2.628	0.613	1.2	1.2	51.459			
Sum Weight:	14.53	59.00						OTM	5155.33 kip-ft	61.47		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 180.00-170.00	0.08	0.75	A	0.259	2.739	0.604	1	1	14.606	1.50	149.77	D
			B	0.203	2.969	0.591	1	1	12.491			
			C	0.203	2.969	0.591	1	1	12.491			
			D	0.259	2.739	0.604	1	1	14.606			
T2 170.00-163.57	0.07	0.54	A	0.308	2.562	0.618	1	1	11.380	1.10	171.26	D
			B	0.246	2.792	0.601	1	1	9.832			
			C	0.246	2.792	0.601	1	1	9.832			
			D	0.339	2.459	0.629	1	1	12.123			
T3 163.57-159.05	0.09	0.39	A	0.307	2.565	0.618	1	1	8.211	0.85	188.43	D
			B	0.246	2.789	0.601	1	1	7.122			
			C	0.246	2.789	0.601	1	1	7.122			
			D	0.442	2.173	0.67	1	1	10.728			
T4 159.05-154.52	0.09	0.36	A	0.285	2.643	0.611	1	1	7.980	0.85	188.53	D
			B	0.227	2.866	0.596	1	1	6.903			
			C	0.227	2.866	0.596	1	1	6.903			
			D	0.416	2.237	0.658	1	1	10.508			
T5 154.52-150.00	0.09	0.37	A	0.276	2.678	0.609	1	1	8.084	0.87	191.76	D
			B	0.22	2.895	0.595	1	1	7.011			
			C	0.22	2.895	0.595	1	1	7.011			
			D	0.401	2.278	0.652	1	1	10.585			
T6 150.00-140.00	0.23	0.97	A	0.285	2.642	0.612	1	1	19.715	2.03	203.39	D
			B	0.222	2.889	0.595	1	1	16.767			
			C	0.222	2.889	0.595	1	1	16.767			
			D	0.4	2.279	0.652	1	1	25.156			
T7 140.00-130.00	0.24	1.42	A	0.282	2.655	0.611	1	1	21.262	2.16	215.93	D
			B	0.214	2.922	0.593	1	1	17.795			
			C	0.214	2.922	0.593	1	1	17.795			
			D	0.389	2.311	0.647	1	1	26.880			
T8 130.00-120.00	0.27	1.43	A	0.322	2.514	0.623	1	1	24.745	2.23	222.53	D
			B	0.198	2.99	0.59	1	1	17.878			
			C	0.198	2.99	0.59	1	1	17.878			
			D	0.375	2.35	0.642	1	1	27.848			
T9 120.00-110.00	0.30	2.05	A	0.359	2.397	0.636	1	1	29.309	2.37	237.47	D
			B	0.205	2.959	0.591	1	1	20.028			
			C	0.205	2.959	0.591	1	1	20.028			
			D	0.379	2.339	0.643	1	1	30.573			
T10 110.00-100.00	0.34	1.91	A	0.388	2.312	0.647	1	1	32.853	2.46	245.78	A
			B	0.188	3.031	0.588	1	1	19.757			
			C	0.188	3.031	0.588	1	1	19.757			

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	32 of 61
	Project	Wilton, Connecticut	Date	14:16:44 06/29/11
	Client	Sprint	Designed by	Matthew Kapinos

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T11	0.38	2.50	D	0.356	2.408	0.634	1	1	30.545			
100.00-90.00			A	0.444	2.17	0.67	1	1	40.888	2.79	278.94	A
			B	0.211	2.932	0.593	1	1	23.872			
			C	0.211	2.932	0.593	1	1	23.872			
			D	0.382	2.33	0.644	1	1	35.941			
T12	0.39	2.43	A	0.424	2.219	0.662	1	1	41.332	2.79	279.28	A
90.00-80.00			B	0.203	2.968	0.591	1	1	24.365			
			C	0.203	2.968	0.591	1	1	24.365			
			D	0.365	2.378	0.638	1	1	36.483			
T13	0.78	6.02	A	0.374	2.353	0.641	1	1	77.165	5.23	261.63	A
80.00-60.00			B	0.161	3.153	0.583	1	1	42.217			
			C	0.161	3.153	0.583	1	1	42.217			
			D	0.318	2.527	0.622	1	1	67.378			
T14	0.39	3.59	A	0.358	2.4	0.635	1	1	40.024	2.58	258.31	A
60.00-50.00			B	0.158	3.168	0.583	1	1	22.407			
			C	0.158	3.168	0.583	1	1	22.407			
			D	0.304	2.575	0.617	1	1	34.960			
T15	0.40	3.44	A	0.357	2.403	0.635	1	1	42.262	2.58	257.87	A
50.00-40.00			B	0.165	3.136	0.584	1	1	24.554			
			C	0.165	3.136	0.584	1	1	24.554			
			D	0.306	2.568	0.618	1	1	37.274			
T16	0.40	4.06	A	0.357	2.402	0.635	1	1	44.834	2.55	254.56	A
40.00-30.00			B	0.175	3.089	0.586	1	1	27.374			
			C	0.175	3.089	0.586	1	1	27.374			
			D	0.309	2.557	0.619	1	1	39.989			
T17	0.40	3.52	A	0.332	2.482	0.626	1	1	42.962	2.48	247.86	A
30.00-20.00			B	0.156	3.177	0.582	1	1	25.467			
			C	0.156	3.177	0.582	1	1	25.467			
			D	0.285	2.642	0.612	1	1	38.092			
T18	0.40	4.51	A	0.334	2.475	0.627	1	1	45.769	2.63	263.24	A
20.00-10.00			B	0.167	3.125	0.584	1	1	28.533			
			C	0.167	3.125	0.584	1	1	28.533			
			D	0.29	2.624	0.613	1	1	41.032			
T19	0.16	4.70	A	0.231	2.852	0.597	1	1	36.140	2.40	239.54	A
10.00-0.00			B	0.167	3.126	0.584	1	1	29.688			
			C	0.167	3.126	0.584	1	1	29.688			
			D	0.214	2.921	0.593	1	1	34.469			
Sum Weight:	5.48	44.95						OTM	3574.08 kip-ft	42.45		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.08	0.75	A	0.259	2.739	0.604	1.194	1.194	17.446	1.79	178.90	D
180.00-170.00			B	0.203	2.969	0.591	1.152	1.152	14.389			
			C	0.203	2.969	0.591	1.152	1.152	14.389			
			D	0.259	2.739	0.604	1.194	1.194	17.446			
T2	0.07	0.54	A	0.308	2.562	0.618	1.2	1.2	13.656	1.32	205.51	D
170.00-163.57			B	0.246	2.792	0.601	1.184	1.184	11.643			
			C	0.246	2.792	0.601	1.184	1.184	11.643			
			D	0.339	2.459	0.629	1.2	1.2	14.547			
T3	0.09	0.39	A	0.307	2.565	0.618	1.2	1.2	9.854	1.02	226.12	D
163.57-159.05			B	0.246	2.789	0.601	1.185	1.185	8.438			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T4 159.05-154.52	0.09	0.36	C	0.246	2.789	0.601	1.185	1.185	8.438	1.02	226.24	D
			D	0.442	2.173	0.67	1.2	1.2	12.874			
			A	0.285	2.643	0.611	1.2	1.2	9.576			
			B	0.227	2.866	0.596	1.17	1.17	8.079			
			C	0.227	2.866	0.596	1.17	1.17	8.079			
T5 154.52-150.00	0.09	0.37	D	0.416	2.237	0.658	1.2	1.2	12.610	1.04	230.11	D
			A	0.276	2.678	0.609	1.2	1.2	9.701			
			B	0.22	2.895	0.595	1.165	1.165	8.169			
			C	0.22	2.895	0.595	1.165	1.165	8.169			
			D	0.401	2.278	0.652	1.2	1.2	12.701			
T6 150.00-140.00	0.23	0.97	A	0.285	2.642	0.612	1.2	1.2	23.657	2.44	244.07	D
			B	0.222	2.889	0.595	1.166	1.166	19.555			
			C	0.222	2.889	0.595	1.166	1.166	19.555			
			D	0.4	2.279	0.652	1.2	1.2	30.187			
			A	0.282	2.655	0.611	1.2	1.2	25.514			
T7 140.00-130.00	0.24	1.42	B	0.214	2.922	0.593	1.16	1.16	20.647	2.59	259.12	D
			C	0.214	2.922	0.593	1.16	1.16	20.647			
			D	0.389	2.311	0.647	1.2	1.2	32.256			
			A	0.322	2.514	0.623	1.2	1.2	29.694			
			B	0.198	2.99	0.59	1.148	1.148	20.527			
T8 130.00-120.00	0.27	1.43	C	0.198	2.99	0.59	1.148	1.148	20.527	2.67	267.04	D
			D	0.375	2.35	0.642	1.2	1.2	33.418			
			A	0.359	2.397	0.636	1.2	1.2	35.171			
			B	0.205	2.959	0.591	1.154	1.154	23.105			
			C	0.205	2.959	0.591	1.154	1.154	23.105			
T9 120.00-110.00	0.30	2.05	D	0.379	2.339	0.643	1.2	1.2	36.687	2.85	284.96	D
			A	0.388	2.312	0.647	1.2	1.2	39.424			
			B	0.188	3.031	0.588	1.141	1.141	22.546			
			C	0.188	3.031	0.588	1.141	1.141	22.546			
			D	0.356	2.408	0.634	1.2	1.2	36.655			
T10 110.00-100.00	0.34	1.91	A	0.444	2.17	0.67	1.2	1.2	49.066	2.95	294.94	A
			B	0.211	2.932	0.593	1.158	1.158	27.655			
			C	0.211	2.932	0.593	1.158	1.158	27.655			
			D	0.382	2.33	0.644	1.2	1.2	43.129			
			A	0.424	2.219	0.662	1.2	1.2	49.598			
T11 100.00-90.00	0.38	2.50	B	0.203	2.968	0.591	1.152	1.152	28.071	3.35	334.72	A
			C	0.203	2.968	0.591	1.152	1.152	28.071			
			D	0.365	2.378	0.638	1.2	1.2	43.779			
			A	0.374	2.353	0.641	1.2	1.2	92.598			
			B	0.161	3.153	0.583	1.121	1.121	47.317			
T12 90.00-80.00	0.39	2.43	C	0.161	3.153	0.583	1.121	1.121	47.317	6.28	313.96	A
			D	0.318	2.527	0.622	1.2	1.2	80.854			
			A	0.358	2.4	0.635	1.2	1.2	48.029			
			B	0.158	3.168	0.583	1.118	1.118	25.062			
			C	0.158	3.168	0.583	1.118	1.118	25.062			
T13 80.00-60.00	0.39	3.59	D	0.304	2.575	0.617	1.2	1.2	41.952	3.10	309.97	A
			A	0.357	2.403	0.635	1.2	1.2	50.715			
			B	0.165	3.136	0.584	1.124	1.124	27.588			
			C	0.165	3.136	0.584	1.124	1.124	27.588			
			D	0.306	2.568	0.618	1.2	1.2	44.728			
T14 60.00-50.00	0.40	3.44	A	0.357	2.402	0.635	1.2	1.2	53.801	3.09	309.45	A
			B	0.175	3.089	0.586	1.131	1.131	30.972			
			C	0.175	3.089	0.586	1.131	1.131	30.972			
			D	0.309	2.557	0.619	1.2	1.2	47.986			
			A	0.332	2.482	0.626	1.2	1.2	51.555			
T15 50.00-40.00	0.40	4.06	B	0.156	3.177	0.582	1.117	1.117	28.444	2.97	297.43	A
			C	0.156	3.177	0.582	1.117	1.117	28.444			
			D	0.285	2.642	0.612	1.2	1.2	45.710			
			A	0.334	2.475	0.627	1.2	1.2	54.923			
			B	0.167	3.125	0.584	1.125	1.125	32.114			
T16 40.00-30.00	0.40	4.51								3.16	315.89	A
T17 30.00-20.00	0.40	3.52								2.97	297.43	A
T18 20.00-10.00	0.40	4.51								3.16	315.89	A

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T19	0.16	4.70	C	0.167	3.125	0.584	1.125	1.125	32.114			
10.00-0.00			D	0.29	2.624	0.613	1.2	1.2	49.238			
			A	0.231	2.852	0.597	1.173	1.173	42.394	2.81	280.99	A
			B	0.167	3.126	0.584	1.125	1.125	33.408			
			C	0.167	3.126	0.584	1.125	1.125	33.408			
			D	0.214	2.921	0.593	1.161	1.161	40.002			
Sum Weight:	5.48	44.95						OTM	4287.12 kip-ft	50.87		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	26.90					
Bracing Weight	18.05					
Total Member Self-Weight	44.95			12.73	21.75	
Total Weight	57.82			12.73	21.75	
Wind 0 deg - No Ice		-0.22	-66.58	-7298.03	49.46	-42.28
Wind 30 deg - No Ice		37.31	-64.84	-6922.23	-3966.15	-47.44
Wind 45 deg - No Ice		52.88	-52.88	-5641.36	-5632.33	-41.37
Wind 60 deg - No Ice		64.84	-37.31	-3975.18	-6913.20	-32.48
Wind 90 deg - No Ice		66.58	0.22	40.43	-7289.00	-11.87
Wind 120 deg - No Ice		65.06	37.69	4048.62	-6940.91	17.21
Wind 135 deg - No Ice		53.18	53.18	5705.99	-5671.51	28.90
Wind 150 deg - No Ice		37.69	65.06	6975.39	-4014.14	38.62
Wind 180 deg - No Ice		0.22	66.58	7323.48	-5.95	42.28
Wind 210 deg - No Ice		-37.31	64.84	6947.68	4009.65	47.44
Wind 225 deg - No Ice		-52.88	52.88	5666.81	5675.84	41.37
Wind 240 deg - No Ice		-64.84	37.31	4000.63	6956.71	32.48
Wind 270 deg - No Ice		-66.58	-0.22	-14.98	7332.51	11.87
Wind 300 deg - No Ice		-65.06	-37.69	-4023.16	6984.41	-17.21
Wind 315 deg - No Ice		-53.18	-53.18	-5680.54	5715.02	-28.90
Wind 330 deg - No Ice		-37.69	-65.06	-6949.93	4057.64	-38.62
Member Ice	14.05					
Total Weight Ice	85.86			41.27	56.17	
Wind 0 deg - Ice		-0.25	-80.53	-8655.93	85.92	-66.58
Wind 30 deg - Ice		45.18	-78.49	-8219.96	-4696.28	-69.77
Wind 45 deg - Ice		64.02	-64.02	-6695.11	-6680.21	-58.57
Wind 60 deg - Ice		78.49	-45.18	-4711.18	-8205.06	-43.38
Wind 90 deg - Ice		80.53	0.25	71.02	-8641.03	-9.97
Wind 120 deg - Ice		78.74	45.60	4845.25	-8234.81	34.08
Wind 135 deg - Ice		64.36	64.36	6819.72	-6722.27	50.98
Wind 150 deg - Ice		45.60	78.74	8332.25	-4747.80	64.40
Wind 180 deg - Ice		0.25	80.53	8738.48	26.43	66.58
Wind 210 deg - Ice		-45.18	78.49	8302.51	4808.63	69.77
Wind 225 deg - Ice		-64.02	64.02	6777.66	6792.56	58.57
Wind 240 deg - Ice		-78.49	45.18	4793.73	8317.41	43.38
Wind 270 deg - Ice		-80.53	-0.25	11.53	8753.38	9.97
Wind 300 deg - Ice		-78.74	-45.60	-4762.70	8347.15	-34.08
Wind 315 deg - Ice		-64.36	-64.36	-6737.17	6834.62	-50.98
Wind 330 deg - Ice		-45.60	-78.74	-8249.70	4860.14	-64.40
Total Weight	57.82			12.73	21.75	
Wind 0 deg - Service		-0.22	-66.58	-7316.40	29.72	-42.28
Wind 30 deg - Service		37.31	-64.84	-6940.60	-3985.89	-47.44

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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
Wind 45 deg - Service		52.88	-52.88	-5659.73	-5652.07	-41.37
Wind 60 deg - Service		64.84	-37.31	-3993.55	-6932.94	-32.48
Wind 90 deg - Service		66.58	0.22	22.06	-7308.74	-11.87
Wind 120 deg - Service		65.06	37.69	4030.24	-6960.65	17.21
Wind 135 deg - Service		53.18	53.18	5687.62	-5691.26	28.90
Wind 150 deg - Service		37.69	65.06	6957.01	-4033.88	38.62
Wind 180 deg - Service		0.22	66.58	7305.11	-25.69	42.28
Wind 210 deg - Service		-37.31	64.84	6929.31	3989.91	47.44
Wind 225 deg - Service		-52.88	52.88	5648.44	5656.10	41.37
Wind 240 deg - Service		-64.84	37.31	3982.26	6936.97	32.48
Wind 270 deg - Service		-66.58	-0.22	-33.35	7312.76	11.87
Wind 300 deg - Service		-65.06	-37.69	-4041.53	6964.67	-17.21
Wind 315 deg - Service		-53.18	-53.18	-5698.91	5695.28	-28.90
Wind 330 deg - Service		-37.69	-65.06	-6968.30	4037.90	-38.62

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

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Comb. No.	Description
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	180 - 170	Leg	Max Tension	25	6.32	-1.01	-0.59
			Max. Compression	25	-6.23	-0.80	-1.63
			Max. Mx	26	1.48	-4.41	2.57
			Max. My	32	1.52	2.60	-4.45
			Max. Vy	31	-3.01	1.30	-0.47
			Max. Vx	23	-3.01	-0.47	1.30
		Diagonal	Max Tension	24	5.89	0.00	0.00
			Max. Compression	32	-7.02	0.01	-0.00
			Max. Mx	24	5.79	0.02	-0.00
			Max. My	26	4.50	0.02	0.02
			Max. Vy	24	0.01	0.02	-0.00
			Max. Vx	26	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	23	0.94	0.00	0.00
			Max. Compression	27	-0.96	0.00	0.00
			Max. Mx	18	0.01	-0.02	0.00
			Max. My	31	0.07	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Top Girt	Max Tension	19	0.48	0.00	0.00
			Max. Compression	17	-0.04	0.00	0.00
			Max. Mx	18	0.11	-0.02	0.00
			Max. My	31	0.21	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T2	170 - 163.573	Leg	Max Tension	25	18.67	-0.49	-0.63
			Max. Compression	21	-21.09	-1.08	-1.16
			Max. Mx	28	-5.90	1.87	-1.48
			Max. My	34	-5.70	-1.48	1.89
			Max. Vy	24	-1.00	1.55	0.62
			Max. Vx	34	-0.99	0.64	1.53
		Diagonal	Max Tension	24	7.17	0.00	0.00
			Max. Compression	32	-7.72	0.00	0.00
			Max. Mx	25	6.42	0.03	0.00
			Max. My	34	7.05	0.02	-0.01
			Max. Vy	25	0.01	0.03	0.00
			Max. Vx	34	0.00	0.02	-0.01
		Top Girt	Max Tension	27	1.06	0.00	0.00
			Max. Compression	14	-0.54	0.00	0.00
			Max. Mx	18	0.33	-0.02	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T3	163.573 - 159.049	Leg	Max. My	22	0.07	0.00	0.00	
			Max. Vy	18	0.01	0.00	0.00	
			Max. Vx	22	-0.00	0.00	0.00	
			Max Tension	21	30.94	-0.53	-0.50	
		Diagonal	Max. Compression	25	-34.91	-0.68	-0.88	
			Max. Mx	31	-24.44	1.31	-0.54	
			Max. My	23	-24.74	-0.53	1.32	
			Max. Vy	31	0.57	-1.18	0.09	
			Max. Vx	23	0.58	0.10	-1.18	
			Max Tension	31	5.68	0.00	0.00	
			Max. Compression	31	-5.82	0.00	0.00	
			Max. Mx	24	2.26	0.02	0.00	
		Top Girt	Max. My	34	-4.00	0.00	-0.01	
			Max. Vy	24	0.01	0.02	0.00	
			Max. Vx	34	0.00	0.00	0.00	
			Max Tension	27	1.62	0.00	0.00	
			Max. Compression	14	-0.85	0.00	0.00	
			Max. Mx	31	1.61	-0.02	0.00	
			Max. My	22	-0.46	0.00	0.00	
			Max. Vy	31	0.01	0.00	0.00	
T4	159.049 - 154.524	Leg	Max. Vx	22	-0.00	0.00	0.00	
			Max Tension	25	40.71	-0.62	-0.42	
			Diagonal	Max. Compression	25	-45.65	-0.39	-0.56
				Max. Mx	26	8.48	1.27	-0.94
		Max. My		32	8.45	-0.95	1.28	
		Max. Vy		23	-0.43	1.15	-0.40	
		Max. Vx		31	-0.43	-0.42	1.16	
		Max Tension		31	5.86	0.00	0.00	
		Max. Compression		31	-5.49	0.00	0.00	
		Max. Mx		24	1.63	0.04	0.00	
		Leg	Max. My	34	-2.66	0.01	-0.01	
			Max. Vy	24	0.02	0.04	0.00	
			Max. Vx	34	0.00	0.00	0.00	
			Max Tension	25	48.86	-0.59	-0.40	
			Max. Compression	25	-53.51	-0.74	-0.89	
			Max. Mx	32	-51.31	-0.95	-0.63	
			Max. My	26	-51.78	-0.64	-0.94	
			Max. Vy	32	0.36	-0.95	-0.63	
T5	154.524 - 150	Diagonal	Max. Vx	34	-0.36	0.55	0.89	
			Max Tension	24	5.52	0.00	0.00	
			Max. Compression	31	-5.90	0.00	0.00	
			Max. Mx	26	1.46	0.05	0.00	
		Leg	Max. My	26	-4.03	-0.00	0.01	
			Max. Vy	26	-0.02	0.05	0.00	
			Max. Vx	26	0.00	-0.00	0.01	
			Max Tension	25	67.77	-0.78	-0.66	
			Max. Compression	25	-73.37	-1.37	-1.42	
			Max. Mx	28	-70.71	-1.65	-1.01	
			Max. My	22	-70.05	-1.00	-1.68	
			Max. Vy	29	0.55	-1.63	-1.12	
		Diagonal	Max. Vx	22	0.56	-1.00	-1.68	
			Max Tension	23	6.04	0.00	0.00	
			Max. Compression	23	-6.14	0.00	0.00	
			Max. Mx	26	2.39	0.06	0.00	
T6	150 - 140		Top Girt	Max. My	31	-5.73	-0.01	-0.01
				Max. Vy	26	-0.02	0.06	0.00
				Max. Vx	23	-0.00	0.00	0.00
				Max Tension	23	1.08	0.00	0.00
		Max. Compression	6	-0.94	0.00	0.00		

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	Client	Sprint	Designed by	Matthew Kapinos

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	140 - 130	Leg	Max. Mx	27	-0.93	-0.03	0.00
			Max. My	28	-0.38	0.00	0.00
			Max. Vy	27	0.02	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	25	81.44	-0.58	-0.39
			Max. Compression	25	-88.47	-1.12	-1.13
		Diagonal	Max. Mx	22	17.87	4.35	-3.59
			Max. My	28	17.86	-3.60	4.36
			Max. Vy	22	-1.20	4.35	-3.59
			Max. Vx	28	-1.21	-3.60	4.36
			Max Tension	23	8.48	0.00	0.00
			Max. Compression	23	-8.65	0.00	0.00
		Top Girt	Max. Mx	26	4.81	0.12	0.00
			Max. My	31	-8.54	-0.03	-0.05
			Max. Vy	26	0.03	0.12	0.00
			Max. Vx	31	0.01	0.00	0.00
			Max Tension	31	1.05	0.00	0.00
			Max. Compression	31	-1.06	-0.09	0.00
		Inner Bracing	Max. Mx	19	-1.05	-0.13	0.00
			Max. My	19	-1.05	-0.13	0.01
			Max. Vy	19	-0.04	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	33	0.15	0.00	0.00
			Max. Compression	33	-0.15	0.00	0.00
			Max. Mx	18	0.00	-0.03	0.00
			Max. My	31	-0.00	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T8	130 - 120	Leg	Max Tension	25	100.63	0.66	0.59
			Max. Compression	25	-109.98	-0.73	-0.55
			Max. Mx	22	-32.64	-2.28	1.86
			Max. My	28	-32.62	1.80	-2.22
			Max. Vy	22	0.85	-0.73	-1.01
			Max. Vx	28	0.86	-1.01	-0.75
		Diagonal	Max Tension	23	9.75	0.00	0.00
			Max. Compression	23	-9.95	0.00	0.00
			Max. Mx	26	4.05	0.16	0.02
			Max. My	31	-8.56	-0.02	-0.06
			Max. Vy	26	-0.04	0.16	0.02
			Max. Vx	31	0.01	-0.02	-0.06
		Secondary Horizontal	Max Tension	25	1.65	0.00	0.00
			Max. Compression	25	-1.65	0.00	0.00
			Max. Mx	27	-0.97	-0.05	0.00
			Max. My	28	0.49	0.00	0.00
			Max. Vy	27	-0.02	0.00	0.00
			Max. Vx	28	0.00	0.00	0.00
T9	120 - 110	Leg	Max Tension	25	120.67	-1.81	-1.58
			Max. Compression	25	-132.30	-0.28	-0.39
			Max. Mx	25	-4.97	5.15	-4.98
			Max. My	33	-4.97	-4.96	5.14
			Max. Vy	29	-1.39	5.07	-4.85
			Max. Vx	21	-1.39	-4.82	5.04
		Diagonal	Max Tension	20	9.38	0.00	0.00
			Max. Compression	22	-9.49	0.00	0.00
			Max. Mx	26	5.92	0.11	0.00
			Max. My	31	-9.24	-0.01	-0.05
			Max. Vy	26	0.03	0.11	0.00
			Max. Vx	31	0.01	0.00	0.00
		Horizontal	Max Tension	26	0.66	0.00	0.00
			Max. Compression	27	-0.79	-0.20	0.01

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	Client	Sprint	Designed by	Matthew Kapinos

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	110 - 100	Secondary Horizontal	Max. Mx	27	-0.78	-0.20	0.01
			Max. My	27	-0.79	-0.20	0.01
			Max. Vy	27	-0.06	0.00	0.00
			Max. Vx	27	-0.00	0.00	0.00
			Max Tension	25	1.99	0.00	0.00
			Max. Compression	25	-1.99	0.00	0.00
			Max. Mx	27	-1.14	-0.05	0.00
			Max. My	28	0.59	0.00	0.00
			Max. Vy	27	0.02	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
		Inner Bracing	Max Tension	33	0.09	0.00	0.00
			Max. Compression	33	-0.09	0.00	0.00
			Max. Mx	18	0.00	-0.05	0.00
			Max. My	31	-0.00	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
			Max Tension	25	141.81	-1.88	-1.91
			Max. Compression	25	-154.97	-1.10	-0.82
			Max. Mx	27	-105.30	3.24	-0.08
			Max. My	19	-102.83	-0.08	3.22
		Diagonal	Max. Vy	34	1.15	-1.14	-0.66
			Max. Vx	24	1.16	-0.71	-1.13
			Max Tension	20	10.51	0.00	0.00
			Max. Compression	22	-10.70	0.00	0.00
			Max. Mx	26	4.45	0.19	0.01
			Max. My	31	-10.24	-0.02	-0.03
			Max. Vy	26	-0.05	0.19	0.01
			Max. Vx	31	0.01	-0.02	-0.03
			Max Tension	25	2.33	0.00	0.00
			Max. Compression	25	-2.33	0.00	0.00
		Secondary Horizontal	Max. Mx	18	0.12	-0.07	0.00
			Max. My	28	0.69	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	25	162.75	-1.35	-1.35
			Max. Compression	25	-179.22	-0.75	-0.49
			Max. Mx	34	34.08	5.69	-4.86
			Max. My	24	34.13	-4.89	5.71
			Max. Vy	34	-0.97	5.69	-4.86
			Max. Vx	24	-0.96	-4.89	5.71
T11	100 - 90	Leg	Max Tension	25	162.75	-1.35	-1.35
			Max. Compression	25	-179.22	-0.75	-0.49
			Max. Mx	34	34.08	5.69	-4.86
			Max. My	24	34.13	-4.89	5.71
			Max. Vy	34	-0.97	5.69	-4.86
			Max. Vx	24	-0.96	-4.89	5.71
		Diagonal	Max Tension	20	10.84	0.00	0.00
			Max. Compression	19	-10.91	0.00	0.00
			Max. Mx	30	5.92	0.14	-0.00
			Max. My	31	-10.70	-0.02	-0.04
			Max. Vy	30	0.04	0.14	-0.00
			Max. Vx	31	0.01	0.00	0.00
		Horizontal	Max Tension	27	1.43	0.00	0.00
			Max. Compression	27	-1.53	-0.29	0.01
			Max. Mx	27	-1.53	-0.29	0.01
			Max. My	27	-1.53	-0.29	0.01
			Max. Vy	27	-0.07	0.00	0.00
			Max. Vx	27	-0.00	0.00	0.00
		Inner Bracing	Max Tension	25	0.10	0.00	0.00
			Max. Compression	25	-0.10	0.00	0.00
			Max. Mx	18	0.00	-0.07	0.00
			Max. My	31	-0.00	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T12	90 - 80	Leg	Max Tension	25	184.95	-1.83	-1.62

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T13	80 - 60	Diagonal	Max. Compression	29	-203.22	-2.25	-1.79
			Max. Mx	31	-137.03	3.32	-0.29
			Max. My	23	-136.90	-0.25	3.27
			Max. Vy	30	1.04	-2.00	-1.64
			Max. Vx	20	1.03	-1.70	-1.89
			Max Tension	20	11.68	0.00	0.00
			Max. Compression	19	-11.94	0.00	0.00
			Max. Mx	28	4.77	0.17	-0.01
			Max. My	27	-10.81	0.00	-0.03
			Max. Vy	28	-0.05	0.17	-0.01
			Max. Vx	27	0.00	0.00	-0.03
			Max Tension	29	3.05	0.00	0.00
		Secondary Horizontal	Max. Compression	29	-3.05	0.00	0.00
			Max. Mx	18	0.16	-0.11	0.00
			Max. My	28	0.89	0.00	0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	33	229.74	-0.82	-1.24
			Max. Compression	29	-252.55	-2.99	-3.04
			Max. Mx	22	44.71	6.09	-4.44
		Diagonal	Max. My	28	44.65	-4.18	5.88
			Max. Vy	22	-1.20	6.09	-4.44
			Max. Vx	28	-1.19	-4.18	5.88
			Max Tension	19	12.78	0.00	0.00
			Max. Compression	19	-13.37	0.00	0.00
			Max. Mx	28	5.02	-0.11	0.01
			Max. My	27	-11.76	-0.03	0.04
			Max. Vy	28	0.04	-0.11	0.01
		Top Girt	Max. Vx	27	-0.01	0.00	0.00
			Max Tension	26	1.23	0.00	0.00
			Max. Compression	31	-1.33	-0.36	0.01
			Max. Mx	27	-1.22	-0.51	0.02
			Max. My	27	-1.22	-0.51	0.02
			Max. Vy	27	-0.10	0.00	0.00
			Max. Vx	27	-0.00	0.00	0.00
		Inner Bracing	Max Tension	25	0.14	0.00	0.00
			Max. Compression	25	-0.14	0.00	0.00
			Max. Mx	18	0.00	0.14	0.00
			Max. My	31	0.00	0.00	-0.00
			Max. Vy	18	-0.05	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
			Max Tension	33	250.33	-0.97	-0.41
			Max. Compression	29	-276.88	-0.15	0.63
T14	60 - 50	Leg	Max. Mx	21	-13.87	6.39	-5.24
			Max. My	25	-15.63	-5.22	6.41
			Max. Vy	21	-1.08	6.39	-5.24
			Max. Vx	25	-1.09	-5.22	6.41
			Max Tension	20	12.93	0.00	0.00
		Diagonal	Max. Compression	28	-12.84	0.00	0.00
			Max. Mx	30	6.49	-0.09	0.01
			Max. My	28	-12.79	-0.02	0.03
			Max. Vy	30	-0.04	-0.09	0.01
			Max. Vx	27	-0.01	0.00	0.00
		Horizontal	Max Tension	27	2.11	0.00	0.00
			Max. Compression	14	-1.55	0.35	-0.02
			Max. Mx	27	-1.02	0.70	-0.04
			Max. My	27	-1.02	0.70	-0.04
			Max. Vy	27	0.13	0.00	0.00
			Max. Vx	27	0.01	0.00	0.00
		Inner Bracing	Max Tension	25	0.13	0.00	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T15	50 - 40	Leg	Max. Compression	25	-0.13	0.00	0.00
			Max. Mx	18	0.00	0.17	0.00
			Max. My	31	0.00	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
			Max Tension	33	272.06	-1.33	-1.92
			Max. Compression	29	-300.31	-0.67	-1.00
			Max. Mx	27	-199.38	4.25	-0.08
			Max. My	19	-196.39	-0.08	4.23
			Max. Vy	26	1.32	-2.30	-2.24
		Diagonal	Max. Vx	20	1.31	-2.19	-2.29
			Max Tension	20	13.38	0.00	0.00
			Max. Compression	28	-13.88	0.00	0.00
			Max. Mx	28	4.54	-0.11	0.01
			Max. My	19	-2.34	-0.07	-0.01
		Secondary Horizontal	Max. Vy	28	0.04	-0.11	0.01
			Max. Vx	19	0.00	0.00	0.00
			Max Tension	29	4.51	0.00	0.00
			Max. Compression	29	-4.51	0.00	0.00
			Max. Mx	18	0.25	-0.24	0.00
T16	40 - 30	Leg	Max. My	28	1.32	0.00	0.01
			Max. Vy	18	0.06	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	33	292.05	-3.08	-2.14
			Max. Compression	29	-323.34	1.14	1.91
			Max. Mx	20	-95.75	6.71	-4.91
			Max. My	26	-97.28	-4.93	6.77
			Max. Vy	20	-1.63	6.71	-4.91
			Max. Vx	26	-1.66	-4.93	6.77
		Diagonal	Max Tension	20	13.69	0.00	0.00
			Max. Compression	28	-14.41	0.00	0.00
			Max. Mx	29	9.69	-0.10	0.01
			Max. My	28	-14.37	-0.03	0.03
			Max. Vy	29	-0.04	-0.10	0.01
		Secondary Horizontal	Max. Vx	28	-0.01	0.00	0.00
			Max Tension	29	4.85	0.00	0.00
			Max. Compression	29	-4.85	0.00	0.00
			Max. Mx	18	0.28	-0.26	0.00
			Max. My	28	1.42	0.00	0.01
T17	30 - 20	Top Girt	Max. Vy	18	0.07	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	26	2.03	0.00	0.00
			Max. Compression	15	-0.93	0.39	-0.02
			Max. Mx	27	0.08	0.72	-0.04
			Max. My	27	0.08	0.72	-0.04
			Max. Vy	27	0.13	0.00	0.00
			Max. Vx	27	0.01	0.00	0.00
			Max Tension	33	0.17	0.00	0.00
			Max. Compression	33	-0.17	0.00	0.00
		Inner Bracing	Max. Mx	18	0.00	0.21	0.00
			Max. My	31	0.00	0.00	-0.00
			Max. Vy	18	-0.06	0.00	0.00
			Max. Vx	33	-0.00	0.00	0.00
			Max Tension	33	313.08	-1.97	-2.61
		Leg	Max. Compression	29	-347.87	-0.21	-0.41
			Max. Mx	29	-18.06	-6.06	5.03
			Max. My	33	-20.27	5.06	-6.05
			Max. Vy	26	1.75	-2.94	-2.84
			Max. Vx	20	1.74	-2.79	-2.92

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T18	20 - 10	Diagonal	Max Tension	20	13.83	0.00	0.00
			Max. Compression	28	-13.88	0.00	0.00
			Max. Mx	28	4.97	-0.12	0.01
			Max. My	27	-2.22	-0.08	0.02
			Max. Vy	33	-0.05	-0.11	0.01
			Max. Vx	27	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	29	5.22	0.00	0.00
			Max. Compression	29	-5.22	0.00	0.00
			Max. Mx	18	0.31	-0.28	0.00
			Max. My	28	1.54	0.00	0.01
			Max. Vy	18	0.07	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
		Leg	Max Tension	33	333.45	-3.23	-2.38
			Max. Compression	29	-366.51	0.07	0.40
			Max. Mx	25	-19.81	-4.60	4.16
			Max. My	21	-17.46	4.10	-4.58
			Max. Vy	34	-1.28	2.26	1.78
			Max. Vx	28	-1.28	1.76	2.28
		Diagonal	Max Tension	20	13.57	0.00	0.00
			Max. Compression	22	-17.92	0.00	0.00
			Max. Mx	29	9.71	-0.13	0.02
			Max. My	27	-7.61	-0.08	0.05
			Max. Vy	29	-0.06	-0.13	0.02
			Max. Vx	27	-0.01	0.00	0.00
		Horizontal	Max Tension	27	4.95	0.00	0.00
			Max. Compression	14	-0.87	0.53	-0.03
			Max. Mx	27	1.12	0.77	-0.05
			Max. My	27	1.12	0.77	-0.05
			Max. Vy	27	-0.13	0.00	0.00
			Max. Vx	27	-0.01	0.00	0.00
		Secondary Horizontal	Max Tension	29	5.50	0.00	0.00
			Max. Compression	29	-5.50	0.00	0.00
			Max. Mx	18	0.30	-0.31	0.00
			Max. My	28	1.60	0.00	0.01
			Max. Vy	18	0.07	0.00	0.00
			Max. Vx	28	0.00	0.00	0.00
		Inner Bracing	Max Tension	32	0.09	0.00	0.00
			Max. Compression	24	-0.08	0.00	0.00
			Max. Mx	18	0.00	0.29	0.00
			Max. My	33	0.09	0.00	0.00
			Max. Vy	18	-0.07	0.00	0.00
			Max. Vx	33	-0.00	0.00	0.00
T19	10 - 0	Leg	Max Tension	29	330.07	-1.89	-1.68
			Max. Compression	29	-380.17	-0.00	0.00
			Max. Mx	28	-115.96	3.84	-2.56
			Max. My	26	-118.54	-2.56	3.87
			Max. Vy	34	1.31	-3.40	-2.94
			Max. Vx	28	1.31	-2.96	-3.40
		Diagonal	Max Tension	20	25.16	-0.04	0.00
			Max. Compression	34	-19.64	0.00	0.00
			Max. Mx	3	12.28	-0.06	0.03
			Max. My	28	-19.48	0.01	0.08
			Max. Vy	26	0.03	-0.05	0.01
			Max. Vx	28	0.01	0.00	0.00
		Horizontal	Max Tension	34	14.91	-0.11	-0.01
			Max. Compression	20	-15.54	-0.06	0.02
			Max. Mx	31	5.52	-0.13	-0.02
			Max. My	19	-6.22	-0.04	0.03
			Max. Vy	31	-0.06	-0.13	-0.02

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Redund Horiz 1 Bracing	Max. Vx	19	-0.01	-0.04	0.03
			Max Tension	29	5.71	0.00	0.00
			Max. Compression	29	-5.71	0.00	0.00
			Max. Mx	28	5.53	-0.01	0.00
			Max. My	28	-0.94	0.00	0.00
		Redund Diag 1 Bracing	Max. Vy	28	0.01	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
			Max Tension	27	9.83	0.00	0.00
			Max. Compression	14	-5.79	0.00	0.00
			Max. Mx	34	4.19	-0.02	0.00
		Redund Hip 1 Bracing	Max. My	20	9.69	0.00	-0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
			Max Tension	27	0.01	0.00	0.00
			Max. Compression	16	-0.03	0.00	0.00
		Redund Sub Horiz Bracing	Max. Mx	18	0.01	-0.02	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max Tension	27	12.08	0.00	0.00
			Max. Compression	14	-6.77	0.00	0.00
			Max. Mx	18	4.26	-0.09	0.00
		Inner Bracing	Max. My	18	4.26	0.00	0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	18	-0.00	0.00	0.00
			Max Tension	20	0.33	0.00	0.00
			Max. Compression	20	-0.33	0.00	0.00
			Max. Mx	18	-0.00	0.32	0.00
			Max. My	31	0.17	0.00	-0.00
			Max. Vy	18	-0.07	0.00	0.00
			Max. Vx	29	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	29	404.45	24.03	-25.69
	Max. H _x	30	391.52	24.86	-23.11
	Max. H _z	20	-343.41	-23.96	29.03
	Min. Vert	21	-356.40	-26.59	28.22
	Min. H _x	22	-343.40	-27.46	25.52
Leg C	Min. H _z	28	391.52	21.51	-26.47
	Max. Vert	25	403.66	-25.71	-24.14
	Max. H _x	32	-348.88	28.71	24.75
	Max. H _z	34	-348.89	26.03	27.43
	Min. Vert	33	-361.95	28.31	26.98
Leg B	Min. H _x	24	390.65	-26.08	-22.00
	Min. H _z	26	390.64	-23.54	-24.56
	Max. Vert	21	398.95	-25.53	23.89
	Max. H _x	30	-348.91	28.82	-24.47
	Max. H _z	20	386.01	-23.33	24.35
	Min. Vert	29	-361.91	28.39	-26.72
	Min. H _x	22	386.02	-25.94	21.72
	Min. H _z	28	-348.92	26.07	-27.21

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Max. Vert	33	404.50	24.15	25.74
	Max. H _x	32	391.49	25.00	23.13
	Max. H _z	34	391.48	21.60	26.53
	Min. Vert	25	-361.11	-26.97	-28.26
	Min. H _x	24	-348.04	-27.85	-25.55
	Min. H _z	26	-348.04	-24.32	-29.10

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	57.82	0.00	0.00	12.73	21.76	0.00
Dead+Wind 0 deg - No Ice	57.82	-0.22	-66.58	-7303.07	49.63	-42.34
Dead+Wind 30 deg - No Ice	57.82	37.31	-64.84	-6926.38	-3968.33	-47.48
Dead+Wind 45 deg - No Ice	57.82	52.88	-52.88	-5644.77	-5635.53	-41.38
Dead+Wind 60 deg - No Ice	57.82	64.84	-37.31	-3977.61	-6917.20	-32.46
Dead+Wind 90 deg - No Ice	57.82	66.58	0.22	40.42	-7294.03	-11.82
Dead+Wind 120 deg - No Ice	57.82	65.06	37.69	4051.04	-6945.04	17.28
Dead+Wind 135 deg - No Ice	57.82	53.18	53.18	5709.42	-5674.88	28.98
Dead+Wind 150 deg - No Ice	57.82	37.69	65.06	6979.58	-4016.49	38.71
Dead+Wind 180 deg - No Ice	57.82	0.22	66.58	7328.56	-5.90	42.34
Dead+Wind 210 deg - No Ice	57.82	-37.31	64.84	6951.73	4012.14	47.46
Dead+Wind 225 deg - No Ice	57.82	-52.88	52.88	5670.07	5679.29	41.38
Dead+Wind 240 deg - No Ice	57.82	-64.84	37.31	4002.87	6960.91	32.48
Dead+Wind 270 deg - No Ice	57.82	-66.58	-0.22	-15.10	7337.59	11.82
Dead+Wind 300 deg - No Ice	57.82	-65.06	-37.69	-4025.60	6988.58	-17.28
Dead+Wind 315 deg - No Ice	57.82	-53.18	-53.18	-5683.92	5718.46	-28.98
Dead+Wind 330 deg - No Ice	57.82	-37.69	-65.06	-6954.04	4060.14	-38.69
Dead+Ice+Temp	85.86	0.00	-0.00	41.35	56.26	0.00
Dead+Wind 0 deg+Ice+Temp	85.86	-0.25	-80.53	-8668.23	86.27	-66.74
Dead+Wind 30 deg+Ice+Temp	85.86	45.18	-78.49	-8230.55	-4702.05	-69.83
Dead+Wind 45 deg+Ice+Temp	85.86	64.02	-64.02	-6703.76	-6688.56	-58.55
Dead+Wind 60 deg+Ice+Temp	85.86	78.49	-45.17	-4717.30	-8215.43	-43.28
Dead+Wind 90 deg+Ice+Temp	85.86	80.53	0.25	71.11	-8653.30	-9.78
Dead+Wind 120 deg+Ice+Temp	85.86	78.74	45.60	4851.56	-8245.34	34.35
Dead+Wind 135 deg+Ice+Temp	85.86	64.36	64.36	6828.59	-6730.84	51.25
Dead+Wind 150 deg+Ice+Temp	85.86	45.60	78.74	8343.06	-4753.81	64.67
Dead+Wind 180 deg+Ice+Temp	85.86	0.25	80.53	8750.98	26.59	66.74
Dead+Wind 210 deg+Ice+Temp	85.86	-45.18	78.49	8313.09	4814.95	69.82
Dead+Wind 225 deg+Ice+Temp	85.86	-64.02	64.02	6786.24	6801.39	58.55
Dead+Wind 240 deg+Ice+Temp	85.86	-78.49	45.18	4799.75	8328.15	43.29
Dead+Wind 270 deg+Ice+Temp	85.86	-80.53	-0.25	11.46	8765.85	9.78
Dead+Wind 300 deg+Ice+Temp	85.86	-78.74	-45.60	-4768.79	8357.91	-34.35
Dead+Wind 315 deg+Ice+Temp	85.86	-64.36	-64.36	-6745.75	6843.48	-51.24
Dead+Wind 330 deg+Ice+Temp	85.86	-45.60	-78.74	-8260.20	4866.55	-64.65
Dead+Wind 0 deg - Service	57.82	-0.22	-66.58	-7303.07	49.63	-42.34
Dead+Wind 30 deg - Service	57.82	37.31	-64.84	-6926.38	-3968.33	-47.48
Dead+Wind 45 deg - Service	57.82	52.88	-52.88	-5644.77	-5635.53	-41.38
Dead+Wind 60 deg - Service	57.82	64.84	-37.31	-3977.61	-6917.20	-32.46
Dead+Wind 90 deg - Service	57.82	66.58	0.22	40.42	-7294.03	-11.82
Dead+Wind 120 deg - Service	57.82	65.06	37.69	4051.04	-6945.04	17.28
Dead+Wind 135 deg - Service	57.82	53.18	53.18	5709.42	-5674.88	28.98
Dead+Wind 150 deg - Service	57.82	37.69	65.06	6979.58	-4016.49	38.71
Dead+Wind 180 deg - Service	57.82	0.22	66.58	7328.56	-5.90	42.34
Dead+Wind 210 deg - Service	57.82	-37.31	64.84	6951.73	4012.14	47.46
Dead+Wind 225 deg - Service	57.82	-52.88	52.88	5670.07	5679.29	41.38

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Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 240 deg - Service	57.82	-64.84	37.31	4002.87	6960.91	32.48
Dead+Wind 270 deg - Service	57.82	-66.58	-0.22	-15.10	7337.59	11.82
Dead+Wind 300 deg - Service	57.82	-65.06	-37.69	-4025.60	6988.58	-17.28
Dead+Wind 315 deg - Service	57.82	-53.18	-53.18	-5683.92	5718.46	-28.98
Dead+Wind 330 deg - Service	57.82	-37.69	-65.06	-6954.04	4060.14	-38.69

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-57.82	0.00	-0.00	57.82	0.00	0.000%
2	-0.22	-57.82	-66.58	0.22	57.82	66.58	0.000%
3	37.31	-57.82	-64.84	-37.31	57.82	64.84	0.000%
4	52.88	-57.82	-52.88	-52.88	57.82	52.88	0.000%
5	64.84	-57.82	-37.31	-64.84	57.82	37.31	0.000%
6	66.58	-57.82	0.22	-66.58	57.82	-0.22	0.000%
7	65.06	-57.82	37.69	-65.06	57.82	-37.69	0.000%
8	53.18	-57.82	53.18	-53.18	57.82	-53.18	0.000%
9	37.69	-57.82	65.06	-37.69	57.82	-65.06	0.002%
10	0.22	-57.82	66.58	-0.22	57.82	-66.58	0.000%
11	-37.31	-57.82	64.84	37.31	57.82	-64.84	0.000%
12	-52.88	-57.82	52.88	52.88	57.82	-52.88	0.000%
13	-64.84	-57.82	37.31	64.84	57.82	-37.31	0.000%
14	-66.58	-57.82	-0.22	66.58	57.82	0.22	0.000%
15	-65.06	-57.82	-37.69	65.06	57.82	37.69	0.000%
16	-53.18	-57.82	53.18	53.18	57.82	53.18	0.000%
17	-37.69	-57.82	-65.06	37.69	57.82	65.06	0.000%
18	0.00	-85.86	0.00	-0.00	85.86	0.00	0.000%
19	-0.25	-85.86	-80.53	0.25	85.86	80.53	0.000%
20	45.18	-85.86	-78.49	-45.18	85.86	78.49	0.001%
21	64.02	-85.86	-64.02	-64.02	85.86	64.02	0.001%
22	78.49	-85.86	-45.18	-78.49	85.86	45.17	0.001%
23	80.53	-85.86	0.25	-80.53	85.86	-0.25	0.000%
24	78.74	-85.86	45.60	-78.74	85.86	-45.60	0.000%
25	64.36	-85.86	64.36	-64.36	85.86	-64.36	0.001%
26	45.60	-85.86	78.74	-45.60	85.86	-78.74	0.001%
27	0.25	-85.86	80.53	-0.25	85.86	-80.53	0.000%
28	-45.18	-85.86	78.49	45.18	85.86	-78.49	0.001%
29	-64.02	-85.86	64.02	64.02	85.86	-64.02	0.001%
30	-78.49	-85.86	45.18	78.49	85.86	-45.18	0.000%
31	-80.53	-85.86	-0.25	80.53	85.86	0.25	0.000%
32	-78.74	-85.86	-45.60	78.74	85.86	45.60	0.000%
33	-64.36	-85.86	-64.36	64.36	85.86	64.36	0.001%
34	-45.60	-85.86	-78.74	45.60	85.86	78.74	0.001%
35	-0.22	-57.82	-66.58	0.22	57.82	66.58	0.000%
36	37.31	-57.82	-64.84	-37.31	57.82	64.84	0.000%
37	52.88	-57.82	-52.88	-52.88	57.82	52.88	0.000%
38	64.84	-57.82	-37.31	-64.84	57.82	37.31	0.000%
39	66.58	-57.82	0.22	-66.58	57.82	-0.22	0.000%
40	65.06	-57.82	37.69	-65.06	57.82	-37.69	0.000%
41	53.18	-57.82	53.18	-53.18	57.82	-53.18	0.000%
42	37.69	-57.82	65.06	-37.69	57.82	-65.06	0.002%
43	0.22	-57.82	66.58	-0.22	57.82	-66.58	0.000%
44	-37.31	-57.82	64.84	37.31	57.82	-64.84	0.000%
45	-52.88	-57.82	52.88	52.88	57.82	-52.88	0.000%
46	-64.84	-57.82	37.31	64.84	57.82	-37.31	0.000%
47	-66.58	-57.82	-0.22	66.58	57.82	0.22	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
48	-65.06	-57.82	-37.69	65.06	57.82	37.69	0.000%
49	-53.18	-57.82	-53.18	53.18	57.82	53.18	0.000%
50	-37.69	-57.82	-65.06	37.69	57.82	65.06	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00067461
2	Yes	5	0.00040329	0.00025751
3	Yes	4	0.00064004	0.00072389
4	Yes	4	0.00045355	0.00039148
5	Yes	4	0.00056859	0.00068470
6	Yes	5	0.00035243	0.00021863
7	Yes	4	0.00058611	0.00082668
8	Yes	4	0.00046092	0.00040849
9	Yes	4	0.00064923	0.00072677
10	Yes	5	0.00040709	0.00025835
11	Yes	4	0.00064625	0.00074880
12	Yes	4	0.00045849	0.00039257
13	Yes	4	0.00058052	0.00072777
14	Yes	5	0.00036005	0.00021842
15	Yes	4	0.00058248	0.00069041
16	Yes	4	0.00046165	0.00040866
17	Yes	4	0.00065442	0.00084861
18	Yes	5	0.00000001	0.00045491
19	Yes	5	0.00064686	0.00036314
20	Yes	4	0.00092868	0.00083978
21	Yes	4	0.00092415	0.00060649
22	Yes	5	0.00077815	0.00037455
23	Yes	6	0.00061982	0.00028370
24	Yes	5	0.00078063	0.00039328
25	Yes	4	0.00093241	0.00061400
26	Yes	4	0.00094502	0.00082775
27	Yes	5	0.00066111	0.00036606
28	Yes	4	0.00094409	0.00084853
29	Yes	4	0.00094436	0.00060960
30	Yes	5	0.00080502	0.00038446
31	Yes	6	0.00064914	0.00028996
32	Yes	5	0.00081301	0.00037610
33	Yes	4	0.00094984	0.00061549
34	Yes	4	0.00094178	0.00091977
35	Yes	5	0.00040329	0.00025751
36	Yes	4	0.00064004	0.00072389
37	Yes	4	0.00045355	0.00039148
38	Yes	4	0.00056859	0.00068470
39	Yes	5	0.00035243	0.00021863
40	Yes	4	0.00058611	0.00082668
41	Yes	4	0.00046092	0.00040849
42	Yes	4	0.00064923	0.00072677
43	Yes	5	0.00040709	0.00025835
44	Yes	4	0.00064625	0.00074880
45	Yes	4	0.00045849	0.00039257
46	Yes	4	0.00058052	0.00072777
47	Yes	5	0.00036005	0.00021842
48	Yes	4	0.00058248	0.00069041

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49	Yes	4	0.00046165	0.00040866
50	Yes	4	0.00065442	0.00084861

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	12.053	48	0.5920	0.0634
T2	170 - 163.573	10.657	48	0.5813	0.0485
T3	163.573 - 159.049	9.780	48	0.5637	0.0422
T4	159.049 - 154.524	9.182	48	0.5472	0.0374
T5	154.524 - 150	8.608	48	0.5254	0.0342
T6	150 - 140	8.060	48	0.5007	0.0328
T7	140 - 130	6.943	48	0.4447	0.0309
T8	130 - 120	5.950	48	0.4017	0.0282
T9	120 - 110	5.058	48	0.3560	0.0255
T10	110 - 100	4.264	48	0.3193	0.0243
T11	100 - 90	3.552	48	0.2814	0.0236
T12	90 - 80	2.919	48	0.2495	0.0217
T13	80 - 60	2.353	48	0.2173	0.0197
T14	60 - 50	1.414	48	0.1633	0.0146
T15	50 - 40	1.031	49	0.1373	0.0120
T16	40 - 30	0.701	49	0.1113	0.0095
T17	30 - 20	0.429	49	0.0839	0.0070
T18	20 - 10	0.214	49	0.0562	0.0045
T19	10 - 0	0.072	40	0.0278	0.0026

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	OGT9-806	48	12.053	0.5920	0.0634	55693
182.00	3' Omni	48	12.053	0.5920	0.0634	55693
180.00	PA6-65AC	48	12.053	0.5920	0.0634	55693
177.00	PA6-65AC	48	11.632	0.5901	0.0584	55693
176.00	4' Omni	48	11.492	0.5893	0.0568	55693
175.00	OGT9-806	48	11.352	0.5884	0.0553	55693
173.00	4' Omni	48	11.073	0.5862	0.0523	39695
172.00	6' Standoff	48	10.934	0.5848	0.0509	34588
170.00	20' 8 Bay Di-Pole	48	10.657	0.5813	0.0485	27206
165.00	T-Frame	48	9.972	0.5682	0.0436	16246
150.00	2" Dia 10' Omni	48	8.060	0.5007	0.0328	9398
145.00	6' Standoff	48	7.485	0.4717	0.0317	9224
143.00	6' Standoff	48	7.264	0.4604	0.0314	9203
134.00	4' Omni	48	6.334	0.4184	0.0294	10993
133.00	PA6-65AC	48	6.236	0.4144	0.0291	11349
132.00	3' Stand-off	48	6.140	0.4102	0.0288	11687
127.00	5'3"x4" Pipe Mount	48	5.672	0.3881	0.0274	12346
126.00	RR65-18-04DP	48	5.581	0.3833	0.0271	12275
121.00	3" Dia x 15' Omni	48	5.143	0.3603	0.0257	11969
118.00	4' Omni	48	4.892	0.3480	0.0251	12354
115.00	6' Standoff	48	4.650	0.3370	0.0247	13228
112.00	4' Grid Dish	48	4.416	0.3265	0.0244	14248
106.00	12' Wireless Frame	48	3.969	0.3040	0.0241	14919

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Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
101.00	LeBlanc 10' Standoff (1)	48	3.619	0.2850	0.0237	14791
96.00	2" Dia 10' Omni	48	3.290	0.2681	0.0229	16019
95.00	20' 4-Bay Dipole	48	3.226	0.2650	0.0227	16425
88.00	3' Stand-off	48	2.800	0.2431	0.0213	18547
85.00	3' Stand-off	48	2.628	0.2333	0.0207	18393
80.00	6' Ice Shield	48	2.353	0.2173	0.0197	18142
76.00	6' Grid Dish	48	2.145	0.2054	0.0188	18525
59.00	GPS	48	1.373	0.1607	0.0144	21559
56.00	3' Stand-off	49	1.254	0.1529	0.0136	22451
49.00	DB803M-Y	49	0.996	0.1347	0.0118	23450
47.00	3' Stand-off	49	0.926	0.1295	0.0113	22579

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	°	°
T1	180 - 170	14.032	26	0.6779	0.0634
T2	170 - 163.573	12.436	26	0.6665	0.0485
T3	163.573 - 159.049	11.432	26	0.6473	0.0442
T4	159.049 - 154.524	10.745	26	0.6293	0.0429
T5	154.524 - 150	10.086	26	0.6052	0.0421
T6	150 - 140	9.454	26	0.5778	0.0423
T7	140 - 130	8.165	32	0.5152	0.0415
T8	130 - 120	7.015	32	0.4669	0.0387
T9	120 - 110	5.980	32	0.4151	0.0353
T10	110 - 100	5.053	32	0.3731	0.0339
T11	100 - 90	4.219	32	0.3298	0.0336
T12	90 - 80	3.475	32	0.2933	0.0314
T13	80 - 60	2.808	32	0.2560	0.0292
T14	60 - 50	1.693	32	0.1933	0.0217
T15	50 - 40	1.237	32	0.1628	0.0179
T16	40 - 30	0.843	32	0.1321	0.0140
T17	30 - 20	0.517	32	0.0997	0.0103
T18	20 - 10	0.258	33	0.0669	0.0066
T19	10 - 0	0.088	24	0.0331	0.0038

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
185.00	OGT9-806	26	14.032	0.6779	0.0634	52415
182.00	3' Omni	26	14.032	0.6779	0.0634	52415
180.00	PA6-65AC	26	14.032	0.6779	0.0634	52415
177.00	PA6-65AC	26	13.551	0.6759	0.0584	52415
176.00	4' Omni	26	13.391	0.6751	0.0568	52415
175.00	OGT9-806	26	13.231	0.6742	0.0553	52415
173.00	4' Omni	26	12.912	0.6718	0.0523	37398
172.00	6' Standoff	26	12.753	0.6703	0.0509	32654
170.00	20' 8 Bay Di-Pole	26	12.436	0.6665	0.0485	25860
165.00	T-Frame	26	11.652	0.6522	0.0449	15791

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
150.00	2" Dia 10' Omni	26	9.454	0.5778	0.0423	8517
145.00	6' Standoff	32	8.791	0.5455	0.0422	8297
143.00	6' Standoff	32	8.536	0.5329	0.0420	8249
134.00	4' Omni	32	7.460	0.4857	0.0400	9736
133.00	PA6-65AC	32	7.347	0.4811	0.0397	10045
132.00	3' Stand-off	32	7.235	0.4765	0.0393	10339
127.00	5'3"x4" Pipe Mount	32	6.693	0.4514	0.0376	10912
126.00	RR65-18-04DP	32	6.588	0.4461	0.0372	10850
121.00	3" Dia x 15' Omni	32	6.078	0.4199	0.0356	10588
118.00	4' Omni	32	5.786	0.4060	0.0348	10940
115.00	6' Standoff	32	5.504	0.3934	0.0343	11734
112.00	4' Grid Dish	32	5.231	0.3813	0.0340	12662
106.00	12' Wireless Frame	32	4.709	0.3556	0.0339	13215
101.00	LeBlanc 10' Standoff (1)	32	4.299	0.3339	0.0337	13019
96.00	2" Dia 10' Omni	32	3.912	0.3146	0.0328	14001
95.00	20' 4-Bay Dipole	32	3.837	0.3110	0.0326	14333
88.00	3' Stand-off	32	3.336	0.2859	0.0310	16095
85.00	3' Stand-off	32	3.132	0.2746	0.0303	16057
80.00	6' Ice Shield	32	2.808	0.2560	0.0292	15962
76.00	6' Grid Dish	32	2.562	0.2423	0.0280	16242
59.00	GPS	32	1.645	0.1902	0.0213	18389
56.00	3' Stand-off	32	1.503	0.1811	0.0201	19148
49.00	DB803M-Y	32	1.195	0.1597	0.0175	19966
47.00	3' Stand-off	32	1.112	0.1537	0.0167	19216

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
T1	180	Diagonal	A325X	0.6250	2	3.51	8.16	0.430 ✓	1.333	Member Bearing
		Secondary Horizontal	A325X	0.6250	2	0.48	8.16	0.059 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	0.24	8.16	0.030 ✓	1.333	Member Bearing
T2	170	Diagonal	A325X	0.6250	2	3.86	8.16	0.473 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	0.53	8.16	0.065 ✓	1.333	Member Bearing
T3	163.573	Diagonal	A325X	0.6250	2	2.91	8.16	0.357 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	0.81	8.16	0.099 ✓	1.333	Member Bearing
T4	159.049	Diagonal	A325X	0.6250	2	2.93	8.16	0.359 ✓	1.333	Member Bearing
T5	154.524	Diagonal	A325X	0.6250	2	2.95	8.16	0.361 ✓	1.333	Member Bearing
T6	150	Diagonal	A325X	0.6250	2	3.07	8.16	0.376 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	0.54	8.16	0.066 ✓	1.333	Member Bearing
T7	140	Diagonal	A325X	0.6250	2	4.32	9.20	0.470 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	0.53	8.16	0.065 ✓	1.333	Member Bearing
T8	130	Diagonal	A325X	0.6250	2	4.97	9.20	0.540 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325X	0.6250	2	0.83	9.20	0.090 ✓	1.333	Bolt Shear
T9	120	Diagonal	A325X	0.6250	2	4.74	9.20	0.515 ✓	1.333	Bolt Shear

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load Allowable	Allowable Ratio	Criteria
T10	110	Horizontal	A325X	0.6250	2	0.39	9.20	0.043 ✓	1.333	Bolt Shear
		Secondary	A325X	0.6250	2	0.99	8.16	0.122 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	5.35	9.20	0.581 ✓	1.333	Bolt Shear
		Diagonal	A325X	0.6250	2	1.16	9.20	0.126 ✓	1.333	Bolt Shear
T11	100	Horizontal	A325X	0.6250	2	5.45	9.20	0.593 ✓	1.333	Bolt Shear
		Diagonal	A325X	0.6250	2	0.76	9.20	0.083 ✓	1.333	Bolt Shear
T12	90	Horizontal	A325X	0.6250	2	5.97	9.20	0.649 ✓	1.333	Bolt Shear
		Diagonal	A325X	0.6250	2	1.53	9.20	0.166 ✓	1.333	Bolt Shear
T13	80	Horizontal	A325X	0.6250	2	6.69	16.31	0.410 ✓	1.333	Member Bearing
		Diagonal	A325X	0.6250	2	0.66	9.20	0.072 ✓	1.333	Bolt Shear
T14	60	Horizontal	A325X	0.6250	2	6.47	16.31	0.396 ✓	1.333	Member Bearing
		Diagonal	A325X	0.6250	2	1.06	16.31	0.065 ✓	1.333	Member Bearing
T15	50	Horizontal	A325X	0.6250	2	6.94	16.31	0.426 ✓	1.333	Member Bearing
		Diagonal	A325X	0.6250	2	2.25	9.20	0.245 ✓	1.333	Bolt Shear
T16	40	Horizontal	A325X	0.6250	2	7.21	16.31	0.442 ✓	1.333	Member Bearing
		Diagonal	A325X	0.6250	2	2.43	9.20	0.264 ✓	1.333	Bolt Shear
T17	30	Horizontal	A325X	0.6250	2	1.02	16.31	0.062 ✓	1.333	Member Bearing
		Diagonal	A325X	0.6250	2	6.94	16.31	0.425 ✓	1.333	Member Bearing
T18	20	Horizontal	A325X	0.6250	2	2.61	9.20	0.284 ✓	1.333	Bolt Shear
		Diagonal	A325X	0.6250	2	8.96	18.41	0.487 ✓	1.333	Bolt Shear
T19	10	Horizontal	A325X	0.6250	2	2.48	16.31	0.152 ✓	1.333	Member Bearing
		Secondary	A325X	0.6250	2	2.75	9.20	0.299 ✓	1.333	Bolt Shear
		Horizontal	A325X	0.6250	2	12.58	18.41	0.683 ✓	1.333	Bolt Shear
		Diagonal	A325X	0.6250	2	7.77	18.41	0.422 ✓	1.333	Bolt Shear

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	180 - 170	L3 1/2x3 1/2x3/8	10.00	5.00	87.3 K=1.00	14.519	2.4800	-6.23	36.01	0.173 ✓
T2	170 - 163.573	L5x5x5/16	6.43	6.43	77.6 K=1.00	15.232	3.0300	-21.09	46.15	0.457 ✓

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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
T3	163.573 - 159.049	L5x5x5/16	4.53	4.53	54.7 K=1.00	17.404	3.0300	-34.91	52.74	0.662
T4	159.049 - 154.524	L5x5x5/16	4.53	4.53	54.7 K=1.00	17.404	3.0300	-45.65	52.74	0.866
T5	154.524 - 150	L5x5x5/16	4.53	4.53	54.7 K=1.00	17.404	3.0300	-53.51	52.74	1.015
T6	150 - 140	L5x5x3/8	10.01	5.01	60.7 K=1.00	17.364	3.6100	-73.37	62.68	1.170
T7	140 - 130	L6x6x1/2	10.01	10.01	101.8 K=1.00	12.745	5.7500	-88.47	73.29	1.207
T8	130 - 120	L6x6x1/2	10.01	5.21	53.0 K=1.00	18.083	5.7500	-109.98	103.98	1.058
T9	120 - 110	L6x6x3/4	10.01	5.20	53.3 K=1.00	18.057	8.4400	-132.30	152.40	0.868
T10	110 - 100	L6x6x3/4	10.01	5.18	53.2 K=1.00	18.069	8.4400	-154.97	152.50	1.016
T11	100 - 90	L8x8x3/4	10.01	10.01	76.0 K=1.00	15.789	11.4000	-179.22	180.00	0.996
T12	90 - 80	L8x8x3/4	10.01	5.16	39.2 K=1.00	19.253	11.4000	-203.22	219.49	0.926
T13	80 - 60	L8x8x1	20.03	10.01	77.0 K=1.00	15.683	15.0000	-252.55	235.25	1.074
T14	60 - 50	L8x8x1 1/8	10.01	10.01	77.0 K=1.00	15.683	16.7000	-276.88	261.91	1.057
T15	50 - 40	L8x8x1 1/8	10.01	5.13	39.5 K=1.00	19.232	16.7000	-300.32	321.18	0.935
T16	40 - 30	L8x8x1 1/8	10.01	5.12	39.4 K=1.00	19.236	16.7000	-323.34	321.24	1.007
T17	30 - 20	L8x8x1 1/8	10.01	5.12	39.4 K=1.00	19.239	16.7000	-347.87	321.29	1.083
T18	20 - 10	L8x8x1 1/8	10.01	5.11	39.3 K=1.00	19.242	16.7000	-366.51	321.34	1.141
T19	10 - 0	L8x8x1 1/8	10.01	5.01	38.5 K=1.00	19.307	16.7000	-380.17	322.43	1.179

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 P P _a
T1	180 - 170	L2 1/2x2 1/2x3/16	11.41	5.49	130.1 K=0.98	8.827	0.9020	-7.02	7.96	0.882
T2	170 - 163.573	L2 1/2x2 1/2x3/16	8.46	4.02	103.0 K=1.06	12.592	0.9020	-7.72	11.36	0.680
T3	163.573 - 159.049	L2x2x3/16	7.25	3.51	110.1 K=1.03	11.658	0.7150	-5.82	8.34	0.698
T4	159.049 - 154.524	L2 1/2x2x3/16	7.51	3.63	106.6 K=1.04	12.128	0.8090	-5.49	9.81	0.560
T5	154.524 - 150	L2 1/2x2x3/16	7.77	3.76	109.3 K=1.03	11.766	0.8090	-5.90	9.52	0.619

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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
T6	150 - 140	L2 1/2x2x3/16	8.61	4.20	118.4 K=1.00	10.505	0.8090	-6.14	8.50	0.722 ✓
T7	140 - 130	L3x2 1/2x1/4	12.53	6.33	138.3 K=0.96	7.810	1.3100	-8.65	10.23	0.845 ✓
T8	130 - 120	L3x3x1/4	12.98	6.54	129.6 K=0.98	8.886	1.4400	-9.95	12.80	0.777 ✓
T9	120 - 110	L3x3x1/4	13.45	6.76	133.1 K=0.97	8.432	1.4400	-9.49	12.14	0.781 ✓
T10	110 - 100	L3 1/2x3x1/4	13.94	7.00	130.0 K=0.98	8.832	1.5600	-10.70	13.78	0.777 ✓
T11	100 - 90	L3 1/2x3x1/4	14.44	7.25	133.6 K=0.97	8.366	1.5600	-10.91	13.05	0.836 ✓
T12	90 - 80	L3 1/2x3x1/4	14.97	7.50	137.3 K=0.96	7.920	1.5600	-11.94	12.36	0.966 ✓
T13	80 - 60	2L2 1/2x2x3/16	16.07	8.04	122.1 K=1.00	9.977	1.6200	-13.37	16.16	0.827 ✓
T14	60 - 50	2L2 1/2x2x3/16	16.63	8.32	126.4 K=1.00	9.352	1.6200	-12.84	15.15	0.847 ✓
T15	50 - 40	2L2 1/2x2x3/16	17.21	8.60	130.7 K=1.00	8.742	1.6200	-13.88	14.16	0.980 ✓
T16	40 - 30	2L2 1/2x2x3/16	17.80	8.90	135.1 K=1.00	8.179	1.6200	-14.41	13.25	1.088 ✓
T17	30 - 20	2L2 1/2x2x3/16	18.40	9.19	139.6 K=1.00	7.661	1.6200	-13.88	12.41	1.118 ✓
T18	20 - 10	2L2 1/2x2x1/4	19.00	9.49	142.6 K=1.00	7.348	2.1300	-17.92	15.65	1.145 ✓
T19	10 - 0	2L2 1/2x2 1/2x1/4	13.37	6.47	110.5 K=1.09	11.606	2.3800	-19.64	27.62	0.711 ✓

Horizontal 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
T9	120 - 110	L2 1/2x2 1/2x1/4	9.12	4.10	110.1 K=1.10	11.660	1.1900	-0.79	13.88	0.057 ✓
T11	100 - 90	L2 1/2x2 1/2x1/4	10.56	4.82	118.8 K=1.01	10.447	1.1900	-1.53	12.43	0.123 ✓
T14	60 - 50	2L2x2x3/16	13.43	6.17	120.0 K=1.00	10.287	1.4300	-1.55	14.71	0.105 ✓
T18	20 - 10	2L2x2x3/16	16.29	7.60	141.2 K=0.96	7.486	1.4300	-0.87	10.70	0.082 ✓
T19	10 - 0	2L2 1/2x2 1/2x1/4	17.01	7.96	123.2 K=0.99	9.813	2.3800	-15.54	23.35	0.665 ✓

Secondary Horizontal Design Data (Compression)

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T1	180 - 170	L2x2x3/16	6.00	5.28	141.5 K=0.88	7.454	0.7150	-0.96	5.33	0.179
T8	130 - 120	L2x2x1/4	8.75	7.82	198.2 K=0.83	3.802	0.9380	-1.65	3.57	0.463
T9	120 - 110	L2x2x3/16	9.47	8.54	211.7 K=0.81	3.331	0.7150	-1.99	2.38	0.834
T10	110 - 100	L2x2x1/4	10.19	9.26	228.0 K=0.80	2.873	0.9380	-2.33	2.69	0.863
T12	90 - 80	L2 1/2x2 1/2x1/4	11.62	10.53	209.8 K=0.82	3.392	1.1900	-3.05	4.04	0.756
T15	50 - 40	L3 1/2x3 1/2x1/4	14.49	13.40	192.3 K=0.83	4.040	1.6900	-4.51	6.83	0.660
T16	40 - 30	L3 1/2x3 1/2x1/4	15.21	14.12	200.8 K=0.82	3.705	1.6900	-4.85	6.26	0.775
T17	30 - 20	L3 1/2x3 1/2x1/4	15.93	14.83	209.2 K=0.82	3.412	1.6900	-5.22	5.77	0.906
T18	20 - 10	L3 1/2x3 1/2x1/4	16.65	15.55	217.6 K=0.81	3.154	1.6900	-5.50	5.33	1.032

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 P P _a
T1	180 - 170	L2x2x3/16	6.00	5.28	145.1 K=0.90	7.091	0.7150	-0.04	5.07	0.007
T2	170 - 163.573	L2x2x3/16	6.00	5.28	145.1 K=0.90	7.091	0.7150	-0.54	5.07	0.107
T3	163.573 - 159.049	L2x2x3/16	6.00	5.16	142.8 K=0.91	7.325	0.7150	-0.85	5.24	0.163
T6	150 - 140	L2 1/2x2 1/2x3/16	6.97	6.13	137.6 K=0.93	7.889	0.9020	-0.94	7.12	0.133
T7	140 - 130	L2 1/2x2 1/2x3/16	7.69	3.42	101.5 K=1.22	12.788	0.9020	-1.06	11.53	0.092
T13	80 - 60	L2 1/2x2 1/2x1/4	11.99	5.45	130.1 K=0.98	8.825	1.1900	-1.33	10.50	0.127
T16	40 - 30	2L2x2x3/16	14.86	6.88	130.6 K=0.98	8.753	1.4300	-0.93	12.52	0.074

Redundant Horizontal (1) 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
T19	10 - 0	L2 1/2x2 1/2x3/16	4.25	3.92	107.5 K=1.13	12.004	0.9020	-5.71	10.83	0.527

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Redundant Diagonal (1) 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
T19	10 - 0	L2 1/2x2 1/2x3/16	6.45	5.92	143.6 K=1.00	7.239	0.9020	-5.79	6.53	0.887 ✓

Redundant Hip (1) 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
T19	10 - 0	L2 1/2x2 1/2x3/16	6.01	6.01	145.8 K=1.00	7.024	0.9020	-0.03	6.34	0.004 ✓

Redundant Sub-Horizontal 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
T19	10 - 0	L3x3x5/16	8.86	8.86	180.6 K=1.00	4.578	1.7800	-6.77	8.15	0.831 ✓

Inner Bracing 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
T7	140 - 130	L2x2x3/16	5.44	5.44	165.6 K=1.00	5.444	0.7150	-0.15	3.89	0.037 ✓
T9	120 - 110	L2 1/2x2x3/16	6.45	6.45	181.3 K=1.00	4.542	0.8090	-0.09	3.67	0.025 ✓
T11	100 - 90	L2 1/2x2x3/16	7.47	7.47	209.8 K=1.00	3.392	0.8090	-0.10	2.74	0.037 ✓
T13	80 - 60	2L2x2x3/16	8.48	8.48	164.9 K=1.00	5.490	1.4300	-0.14	7.85	0.018 ✓
T14	60 - 50	2L2x2x3/16	9.49	9.49	184.6 K=1.00	4.380	1.4300	-0.13	6.26	0.020 ✓
T16	40 - 30	2L2x2x3/16	10.51	10.51	204.4 K=1.00	3.575	1.4300	-0.17	5.11	0.033 ✓
T18	20 - 10	2L2x2 1/2x3/16	11.52	11.52	230.4 K=1.00	2.812	1.6200	-0.08	4.56	0.017 ✓
T19	10 - 0	2L2x2 1/2x3/16	17.01	17.01	340.2 K=1.00	1.290	1.6200	-0.22	2.09	0.106 ✓

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Section No.	Elevation	Size	L	L _u	KL/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a

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Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L _u	KL/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a
T1	180 - 170	L3 1/2x3 1/2x3/8	10.00	5.00	56.1	21.600	2.4800	6.32	53.57	0.118
T2	170 - 163.573	L5x5x5/16	6.43	6.43	49.1	21.600	3.0300	18.67	65.45	0.285
T3	163.573 - 159.049	L5x5x5/16	4.53	4.53	34.6	21.600	3.0300	30.94	65.45	0.473
T4	159.049 - 154.524	L5x5x5/16	4.53	4.53	34.6	21.600	3.0300	40.71	65.45	0.622
T5	154.524 - 150	L5x5x5/16	4.53	4.53	34.6	21.600	3.0300	48.86	65.45	0.747
T6	150 - 140	L5x5x3/8	10.01	5.01	38.5	21.600	3.6100	67.61	77.98	0.867
T7	140 - 130	L6x6x1/2	10.01	10.01	64.6	21.600	5.7500	81.44	124.20	0.656
T8	130 - 120	L6x6x1/2	10.01	5.21	33.6	21.600	5.7500	100.63	124.20	0.810
T9	120 - 110	L6x6x3/4	10.01	5.20	34.1	21.600	8.4400	120.67	182.30	0.662
T10	110 - 100	L6x6x3/4	10.01	5.18	34.0	21.600	8.4400	141.81	182.30	0.778
T11	100 - 90	L8x8x3/4	10.01	10.01	48.6	21.600	11.4000	162.76	246.24	0.661
T12	90 - 80	L8x8x3/4	10.01	5.16	25.1	21.600	11.4000	184.95	246.24	0.751
T13	80 - 60	L8x8x1	20.03	10.01	49.2	21.600	15.0000	229.74	324.00	0.709
T14	60 - 50	L8x8x1 1/8	10.01	10.01	49.7	21.600	16.7000	250.33	360.72	0.694
T15	50 - 40	L8x8x1 1/8	10.01	5.13	25.4	21.600	16.7000	272.06	360.72	0.754
T16	40 - 30	L8x8x1 1/8	10.01	5.12	25.4	21.600	16.7000	292.05	360.72	0.810
T17	30 - 20	L8x8x1 1/8	10.01	5.12	25.4	21.600	16.7000	313.08	360.72	0.868
T18	20 - 10	L8x8x1 1/8	10.01	5.11	25.4	21.600	16.7000	333.45	360.72	0.924
T19	10 - 0	L8x8x1 1/8	10.01	5.01	24.8	21.600	16.7000	330.07	360.72	0.915

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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 $\frac{P}{P_a}$
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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	180 - 170	L2 1/2x2 1/2x3/16	11.41	5.49	88.0	29.000	0.5710	5.89	16.56	0.355
T2	170 - 163.573	L2 1/2x2 1/2x3/16	8.46	4.02	65.2	29.000	0.5710	7.17	16.56	0.433
T3	163.573 - 159.049	L2x2x3/16	7.25	3.51	72.4	29.000	0.4308	5.68	12.49	0.454
T4	159.049 - 154.524	L2 1/2x2x3/16	7.51	3.63	77.0	29.000	0.5013	5.86	14.54	0.403
T5	154.524 - 150	L2 1/2x2x3/16	7.77	3.76	79.6	29.000	0.5013	5.52	14.54	0.380
T6	150 - 140	L2 1/2x2x3/16	8.61	4.20	88.2	29.000	0.5013	6.04	14.54	0.416
T7	140 - 130	L3x2 1/2x1/4	12.53	6.33	104.5	29.000	0.8419	8.48	24.41	0.347
T8	130 - 120	L3x3x1/4	12.98	6.54	87.2	29.000	0.9394	9.75	27.24	0.358
T9	120 - 110	L3x3x1/4	13.45	6.76	90.0	29.000	0.9394	9.38	27.24	0.344
T10	110 - 100	L3 1/2x3x1/4	13.94	7.00	94.8	29.000	1.0294	10.51	29.85	0.352
T11	100 - 90	L3 1/2x3x1/4	14.44	7.25	98.1	29.000	1.0294	10.84	29.85	0.363
T12	90 - 80	L3 1/2x3x1/4	14.97	7.50	101.4	29.000	1.0294	11.68	29.85	0.391
T13	80 - 60	2L2 1/2x2x3/16	16.07	8.04	125.4	29.000	1.0041	12.78	29.12	0.439
T14	60 - 50	2L2 1/2x2x3/16	16.63	8.32	129.6	29.000	1.0041	12.93	29.12	0.444
T15	50 - 40	2L2 1/2x2x3/16	17.21	8.60	133.9	29.000	1.0041	13.38	29.12	0.459
T16	40 - 30	2L2 1/2x2x3/16	17.80	8.90	138.4	29.000	1.0041	13.69	29.12	0.470
T17	30 - 20	2L2 1/2x2x3/16	18.40	9.19	142.9	29.000	1.0041	13.83	29.12	0.475
T18	20 - 10	2L2 1/2x2x1/4	19.00	9.49	148.6	29.000	1.3162	13.57	38.17	0.356
T19	10 - 0	2L2 1/2x2 1/2x1/4	13.37	6.47	104.3	29.000	1.5037	25.16	43.61	0.577

Horizontal Design Data (Tension)

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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
T9	120 - 110	L2 1/2x2 1/2x1/4	9.12	4.10	67.3	29.000	0.7519	0.66	21.80	0.030
T11	100 - 90	L2 1/2x2 1/2x1/4	10.56	4.82	78.5	29.000	0.7519	1.43	21.80	0.066
T14	60 - 50	2L2x2x3/16	13.43	6.17	124.1	29.000	0.8616	2.11	24.99	0.084
T18	20 - 10	2L2x2x3/16	16.29	7.60	152.0	29.000	0.8616	4.95	24.99	0.198
T19	10 - 0	2L2 1/2x2 1/2x1/4	17.01	7.96	127.5	29.000	1.5037	14.91	43.61	0.342

Secondary Horizontal 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 P P _a
T1	180 - 170	L2x2x3/16	6.00	5.28	111.0	29.000	0.4308	0.94	12.49	0.075
T8	130 - 120	L2x2x1/4	8.75	7.82	162.6	29.000	0.5629	1.65	16.32	0.101
T9	120 - 110	L2x2x3/16	9.47	8.54	174.4	29.000	0.4308	1.99	12.49	0.159
T10	110 - 100	L2x2x1/4	10.19	9.26	190.9	29.000	0.5629	2.33	16.32	0.142
T12	90 - 80	L2 1/2x2 1/2x1/4	11.62	10.53	171.0	29.000	0.7519	3.05	21.80	0.140
T15	50 - 40	L3 1/2x3 1/2x1/4	14.49	13.40	152.2	29.000	1.1269	4.51	32.68	0.138
T16	40 - 30	L3 1/2x3 1/2x1/4	15.21	14.12	160.1	29.000	1.1269	4.85	32.68	0.149
T17	30 - 20	L3 1/2x3 1/2x1/4	15.93	14.83	168.0	29.000	1.1269	5.22	32.68	0.160
T18	20 - 10	L3 1/2x3 1/2x1/4	16.65	15.55	175.9	29.000	1.1269	5.50	32.68	0.168

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 P P _a
T1	180 - 170	L2x2x3/16	6.00	5.28	111.0	29.000	0.4308	0.48	12.49	0.039
T2	170 - 163.573	L2x2x3/16	6.00	5.28	111.0	29.000	0.4308	1.06	12.49	0.085
T3	163.573 - 159.049	L2x2x3/16	6.00	5.16	108.6	29.000	0.4308	1.62	12.49	0.129
T6	150 - 140	L2 1/2x2 1/2x3/16	6.97	6.13	101.1	29.000	0.5710	1.08	16.56	0.065

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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
T7	140 - 130	L2 1/2x2 1/2x3/16	7.69	3.42	56.1	29.000	0.5710	1.05	16.56	0.064 ✓
T13	80 - 60	L2 1/2x2 1/2x1/4	11.99	5.45	88.4	29.000	0.7519	1.23	21.80	0.057 ✓
T16	40 - 30	2L2x2x3/16	14.86	6.88	138.0	29.000	0.8616	2.03	24.99	0.081 ✓

Redundant Horizontal (1) 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 P P _a
T19	10 - 0	L2 1/2x2 1/2x3/16	4.25	3.92	60.5	21.600	0.9020	5.71	19.48	0.293 ✓

Redundant Diagonal (1) 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 P P _a
T19	10 - 0	L2 1/2x2 1/2x3/16	6.45	5.92	91.4	21.600	0.9020	9.83	19.48	0.504 ✓

Redundant Hip (1) 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 P P _a
T19	10 - 0	L2 1/2x2 1/2x3/16	6.01	6.01	92.8	21.600	0.9020	0.01	19.48	0.000 ✓

* DL controls

Redundant Sub-Horizontal 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 P P _a
T19	10 - 0	L3x3x5/16	8.86	8.86	115.4	21.600	1.7800	12.08	38.45	0.314 ✓

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Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a

Inner Bracing Design Data (Tension)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a
T7	140 - 130	L2x2x3/16	5.44	5.44	105.8	21.600	0.7150	0.15	15.44	0.009
T9	120 - 110	L2 1/2x2x3/16	6.45	6.45	129.1	21.600	0.8090	0.09	17.47	0.005
T11	100 - 90	L2 1/2x2x3/16	7.47	7.47	149.4	21.600	0.8090	0.10	17.47	0.006
T13	80 - 60	2L2x2x3/16	8.48	8.48	164.9	21.600	1.4300	0.14	30.89	0.005
T14	60 - 50	2L2x2x3/16	9.49	9.49	184.6	21.600	1.4300	0.13	30.89	0.004
T16	40 - 30	2L2x2x3/16	10.51	10.51	204.4	21.600	1.4300	0.17	30.89	0.006
T18	20 - 10	2L2x2 1/2x3/16	11.52	11.52	230.4	21.600	1.6200	0.09	34.99	0.003
T19	10 - 0	2L2x2 1/2x3/16	12.03	12.03	240.6	21.600	1.6200	0.33	34.99	0.009

Section Capacity Table

Section No.	Elevation	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T1	180 - 170	Leg	L3 1/2x3 1/2x3/8	2	-6.23	48.00	13.0	Pass
T2	170 - 163.573	Leg	L5x5x5/16	23	-21.09	61.52	34.3	Pass
T3	163.573 - 159.049	Leg	L5x5x5/16	38	-34.91	70.30	49.7	Pass
T4	159.049 - 154.524	Leg	L5x5x5/16	54	-45.65	70.30	64.9	Pass
T5	154.524 - 150	Leg	L5x5x5/16	66	-53.51	70.30	76.1	Pass
T6	150 - 140	Leg	L5x5x3/8	78	-73.37	83.56	87.8	Pass
T7	140 - 130	Leg	L6x6x1/2	102	-88.47	97.69	90.6	Pass
T8	130 - 120	Leg	L6x6x1/2	123	-109.98	138.60	79.3	Pass
T9	120 - 110	Leg	L6x6x3/4	139	-132.30	203.15	65.1	Pass
T10	110 - 100	Leg	L6x6x3/4	164	-154.97	203.29	76.2	Pass
T11	100 - 90	Leg	L8x8x3/4	180	-179.22	239.94	74.7	Pass
T12	90 - 80	Leg	L8x8x3/4	200	-203.22	292.58	69.5	Pass
T13	80 - 60	Leg	L8x8x1	216	-252.55	313.59	80.5	Pass
T14	60 - 50	Leg	L8x8x1 1/8	245	-276.88	349.13	79.3	Pass
T15	50 - 40	Leg	L8x8x1 1/8	266	-300.32	428.13	70.1	Pass
T16	40 - 30	Leg	L8x8x1 1/8	282	-323.34	428.21	75.5	Pass
T17	30 - 20	Leg	L8x8x1 1/8	307	-347.87	428.28	81.2	Pass
T18	20 - 10	Leg	L8x8x1 1/8	323	-366.51	428.35	85.6	Pass
T19	10 - 0	Leg	L8x8x1 1/8	348	-380.17	429.80	88.5	Pass
T1	180 - 170	Diagonal	L2 1/2x2 1/2x3/16	14	-7.02	10.61	66.1	Pass
T2	170 - 163.573	Diagonal	L2 1/2x2 1/2x3/16	34	-7.72	15.14	51.0	Pass

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Matthew Kapinos

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
T3	163.573 - 159.049	Diagonal	L2x2x3/16	50	-5.82	11.11	52.4	Pass	
T4	159.049 - 154.524	Diagonal	L2 1/2x2x3/16	62	-5.49	13.08	42.0	Pass	
T5	154.524 - 150	Diagonal	L2 1/2x2x3/16	74	-5.90	12.69	46.5	Pass	
T6	150 - 140	Diagonal	L2 1/2x2x3/16	89	-6.14	11.33	54.2	Pass	
T7	140 - 130	Diagonal	L3x2 1/2x1/4	118	-8.65	13.64	63.4	Pass	
T8	130 - 120	Diagonal	L3x3x1/4	130	-9.95	17.06	58.3	Pass	
T9	120 - 110	Diagonal	L3x3x1/4	155	-9.49	16.19	58.6	Pass	
T10	110 - 100	Diagonal	L3 1/2x3x1/4	171	-10.70	18.37	58.3	Pass	
T11	100 - 90	Diagonal	L3 1/2x3x1/4	198	-10.91	17.40	62.7	Pass	
T12	90 - 80	Diagonal	L3 1/2x3x1/4	210	-11.94	16.47	72.5	Pass	
T13	80 - 60	Diagonal	2L2 1/2x2x3/16	235	-13.37	21.54	62.1	Pass	
T14	60 - 50	Diagonal	2L2 1/2x2x3/16	265	-12.84	20.20	63.6	Pass	
T15	50 - 40	Diagonal	2L2 1/2x2x3/16	277	-13.88	18.88	73.5	Pass	
T16	40 - 30	Diagonal	2L2 1/2x2x3/16	302	-14.41	17.66	81.6	Pass	
T17	30 - 20	Diagonal	2L2 1/2x2x3/16	318	-13.88	16.54	83.9	Pass	
T18	20 - 10	Diagonal	2L2 1/2x2x1/4	340	-17.92	20.86	85.9	Pass	
T19	10 - 0	Diagonal	2L2 1/2x2 1/2x1/4	379	-19.64	36.82	53.3	Pass	
T9	120 - 110	Horizontal	L2 1/2x2 1/2x1/4	144	-0.79	18.50	4.2	Pass	
T11	100 - 90	Horizontal	L2 1/2x2 1/2x1/4	185	-1.53	16.57	9.2	Pass	
T14	60 - 50	Horizontal	2L2x2x3/16	250	-1.55	19.61	7.9	Pass	
T18	20 - 10	Horizontal	2L2x2x3/16	327	4.95	33.31	14.9	Pass	
T19	10 - 0	Horizontal	2L2 1/2x2 1/2x1/4	378	-15.54	31.13	49.9	Pass	
T1	180 - 170	Secondary Horizontal	L2x2x3/16	19	-0.96	7.10	13.4	Pass	
T8	130 - 120	Secondary Horizontal	L2x2x1/4	135	-1.65	4.75	34.7	Pass	
T9	120 - 110	Secondary Horizontal	L2x2x3/16	159	-1.99	3.17	62.6	Pass	
T10	110 - 100	Secondary Horizontal	L2x2x1/4	175	-2.33	3.59	64.8	Pass	
T12	90 - 80	Secondary Horizontal	L2 1/2x2 1/2x1/4	212	-3.05	5.38	56.7	Pass	
T15	50 - 40	Secondary Horizontal	L3 1/2x3 1/2x1/4	278	-4.51	9.10	49.5	Pass	
T16	40 - 30	Secondary Horizontal	L3 1/2x3 1/2x1/4	303	-4.85	8.35	58.1	Pass	
T17	30 - 20	Secondary Horizontal	L3 1/2x3 1/2x1/4	322	-5.22	7.69	67.9	Pass	
T18	20 - 10	Secondary Horizontal	L3 1/2x3 1/2x1/4	344	-5.50	7.11	77.4	Pass	
T1	180 - 170	Top Girt	L2x2x3/16	7	0.48	16.65	2.9	Pass	
T2	170 - 163.573	Top Girt	L2x2x3/16	26	-0.54	6.76	8.1	Pass	
T3	163.573 - 159.049	Top Girt	L2x2x3/16	42	-0.85	6.98	12.2	Pass	
T6	150 - 140	Top Girt	L2 1/2x2 1/2x3/16	84	-0.94	9.49	9.9	Pass	
T7	140 - 130	Top Girt	L2 1/2x2 1/2x3/16	106	-1.06	15.38	6.9	Pass	
T13	80 - 60	Top Girt	L2 1/2x2 1/2x1/4	221	-1.33	14.00	9.5	Pass	
T16	40 - 30	Top Girt	2L2x2x3/16	286	2.03	33.31	6.1	Pass	
T19	10 - 0	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	383	-5.71	14.43	39.5	Pass	
T19	10 - 0	Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	355	-5.79	8.70	66.5	Pass	
T19	10 - 0	Redund Hip 1 Bracing	L2 1/2x2 1/2x3/16	368	-0.03	8.44	0.3	Pass	
T19	10 - 0	Redund Sub Horz Bracing	L3x3x5/16	385	-6.77	10.86	62.3	Pass	
T7	140 - 130	Inner Bracing	L2x2x3/16	112	-0.15	5.19	2.8	Pass	
T9	120 - 110	Inner Bracing	L2 1/2x2x3/16	149	-0.09	4.90	1.8	Pass	
T11	100 - 90	Inner Bracing	L2 1/2x2x3/16	188	-0.10	3.66	2.8	Pass	
T13	80 - 60	Inner Bracing	2L2x2x3/16	225	-0.14	10.46	1.3	Pass	
T14	60 - 50	Inner Bracing	2L2x2x3/16	254	-0.13	8.35	1.5	Pass	
T16	40 - 30	Inner Bracing	2L2x2x3/16	293	-0.17	6.82	2.5	Pass	
T18	20 - 10	Inner Bracing	2L2x2 1/2x3/16	334	-0.08	6.07	1.3	Pass	
T19	10 - 0	Inner Bracing	2L2x2 1/2x3/16	392	-0.22	2.79	7.9	Pass	
							Summary		
							Leg (T7) Diagonal (T18)	90.6	Pass
								85.9	Pass

RISA Tower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: (860) 529-8882 FAX: (860) 529-3991	Job	180' Lattice Tower - CSP	Page	61 of 61
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	Client	Sprint	Designed by	Matthew Kapinos

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF \times P_{allow}$ K	% Capacity	Pass Fail
						Horizontal (T19)	49.9	Pass
						Secondary Horizontal (T18)	77.4	Pass
						Top Girt (T3)	12.2	Pass
						Redund Horz 1 Bracing (T19)	39.5	Pass
						Redund Diag 1 Bracing (T19)	66.5	Pass
						Redund Hip 1 Bracing (T19)	0.3	Pass
						Redund Sub Horz Bracing (T19)	62.3	Pass
						Inner Bracing (T19)	7.9	Pass
						Bolt Checks	51.3	Pass
						RATING =	90.6	Pass

ANCHOR BOLT EVALUATION



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ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 362 kips	user input
Shear:	Shear := 39 kips	user input
Compression:	Compression := 404 kips	user input

Anchor Bolt Data:

Use ASTM A36

Number of Anchor Bolts = N	$N_{\text{min}} := 4$	user input
Bolt Ultimate Strength:	$F_u := 58 \text{ ksi}$	user input
Bolt Yield Strength:	$F_y := 36 \text{ ksi}$	user input
Bolt Modulus:	$E := 29000 \text{ ksi}$	user input
Thickness of Anchor Bolts	$D := 2.5 \text{ in}$	user input
Threads per Inch:	$n := 4$	user input
Coefficient of Friction:	$\mu := 0.55$	user input (for baseplate with grout ASCE 10-97)

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Description Anchor Bolt Evaluation

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Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi \cdot D^2}{4} \quad A_g = 4.909 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \quad A_n = 3.999 \cdot \text{in}^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.33 \cdot (0.33 \cdot A_g \cdot F_u)$$

$$\text{AllowableTension} = 125.0 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.33 \cdot (0.60 \cdot A_n \cdot F_y)$$

$$F_{\text{net.area}} = 114.9 \cdot \text{kips}$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{\text{Uplift}}{N}$$

$$\text{MaxTension} = 90.5 \cdot \text{kips}$$

Check Stresses:

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.79$$

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

$$\text{Condition1} = \text{"OK"}$$



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Check Anchor Bolt Area:

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

Required Area:

$$A_{s1} := \frac{\text{Uplift}}{F_y} + \frac{\text{Shear}}{\mu \cdot 0.85 \cdot F_y} \quad A_{s1} = 12.4 \cdot \text{in}^2$$

$$A_{s2} := \left| \frac{\text{Shear} - (0.3 \cdot \text{Compression})}{\mu \cdot 0.85 \cdot F_y} \right| \quad A_{s2} = 4.9 \cdot \text{in}^2$$

Provided Area:

$$A_{\text{provided}} := A_n \cdot N \quad A_{\text{provided}} = 16.0 \cdot \text{in}^2$$

$$\text{Condition2} := \text{if} \left(\frac{A_{s1}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s1}}{A_{\text{provided}}} = 0.77$$

Condition2 = "OK"

$$\text{Condition3} := \text{if} \left(\frac{A_{s2}}{A_{\text{provided}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \frac{A_{s2}}{A_{\text{provided}}} = 0.31$$

Condition3 = "OK"

FOUNDATION ANALYSIS

FOOTING WITH FOUR CONCRETE PIERS

INPUT DATA

TOWER FORCES:

Moment Caused by Tower	$M_t := 9623 \cdot \text{kip} \cdot \text{ft}$
Shear at Base of Tower	$S_t := 91 \cdot \text{kip}$
Max Compressive Force	$C_t := 404 \cdot \text{kip}$
Max Uplift	$U_t := 362 \cdot \text{kip}$
Max Pier Shear	$S_p := 39 \cdot \text{kip}$
Height of Tower	$H_t := 180 \cdot \text{ft}$
Width of Tower at Base	$W_t := 17.729 \cdot \text{ft}$
Weight of Tower	$W_{T_t} := 1 \cdot \text{kip}$

FOOTING DIMENSIONS:

Width of Footing	$W_f := 35 \cdot \text{ft}$
Overall Depth of Footing	$D_f := 9.5 \cdot \text{ft}$
Length of Pier	$L_p := 6.5 \cdot \text{ft}$
Extension of Pier Above Grade	$L_{pag} := 1.0 \cdot \text{ft}$
Square Dimension of Pier	$d_p := 4.0 \cdot \text{ft}$
Thickness of Footing	$T_f := 3.0 \cdot \text{ft}$
Reinforcement Cover:	$C_{vr} := 3 \cdot \text{in}$
Ftg. Edge To Pier CL:	$X_t := 8.635 \cdot \text{ft}$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

MATERIAL PROPERTIES:

Compressive Strength of Concrete	$f_c := 3000 \cdot \text{psi}$	Unit Weight of Soil	$\gamma_s := 100 \cdot \text{pcf}$
Yield Strength of Steel Reinforcement	$f_y := 60000 \cdot \text{psi}$	Unit Weight of Concrete	$\gamma_c := 150 \cdot \text{pcf}$
Internal Friction Angle of Soil	$\phi_s := 30 \cdot \text{deg}$	Depth to Neglect	$n := 1.5 \cdot \text{ft}$
Allowable Bearing Capacity	$q_s := 3400 \cdot \text{psf}$	Cohesion of Clay Type Soil	$c_{\text{max}} := 0 \cdot \text{ksf}$
Stability Factor of Safety	$FS_{\text{req}} := 2.0$	Note: Use 0 for Sandy Soil	
Coefficient of Lateral Soil Pressure	$K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$	$K_p = 3$	

What is Position of Center of Tower with respect to Center of Pad?

1=Offset

2=Not Offset

$Pos_{\text{tower}} := 2$

PIER REINFORCEMENT:

Bar Size	$BS_{\text{pier}} := 9$	Bar Diameter	$d_{\text{bpier}} := 1.128 \cdot \text{in}$
Number of Bars	$NB_{\text{pier}} := 24$	Bar Area	$A_{\text{bpier}} := 1.00 \cdot \text{in}^2$

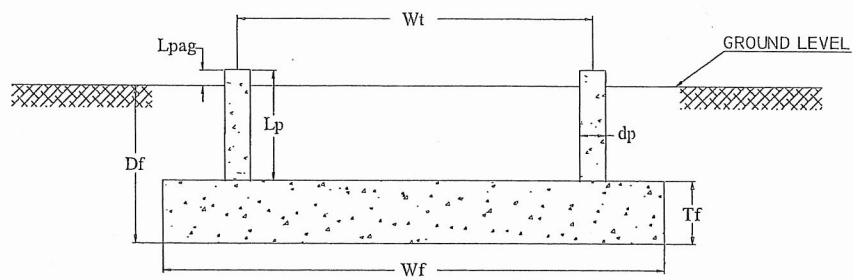
PAD REINFORCEMENT:

Bar Size	$BS_{\text{pad}} := 9$	Bar Diameter	$d_{\text{bpad}} := 1.128 \cdot \text{in}$
Number of Bars	$NB_{\text{pad}} := 42$	Bar Area	$A_{\text{bpad}} := 1.00 \cdot \text{in}^2$

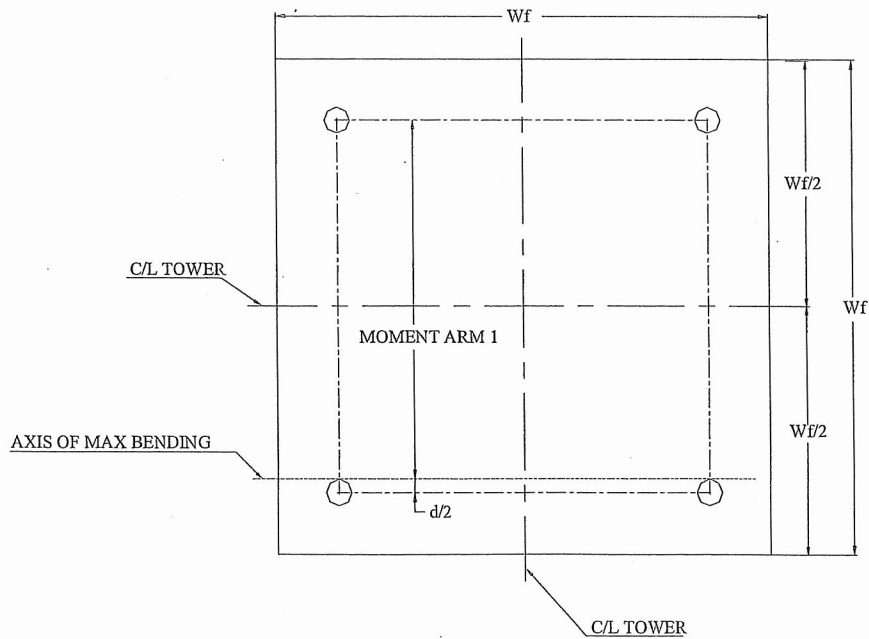


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Typical Footing Plan and Elevation:



ELEVATION



PLAN

STABILITY OF FOOTING

Passive Pressure:

Pressure at Neglect:	$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$	$P_{pn} = 0.45 \cdot \text{ksf}$
Pressure at Footing Top:	$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$	$P_{pt} = 1.95 \cdot \text{ksf}$
Pressure at Top:	$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}]$	$P_{top} = 1.95 \cdot \text{ksf}$
Pressure at Bottom:	$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$	$P_{bot} = 2.85 \cdot \text{ksf}$
Average Pressure:	$P_{ave} := \frac{P_{top} + P_{bot}}{2}$	$P_{ave} = 2.4 \cdot \text{ksf}$

Soil Shear:

Effective Soil Depth:	$T_{pp} := \text{if}[n < (D_f - T_f), T_f, (D_f - n)]$	$T_{pp} = 3 \cdot \text{ft}$
Area of Resistance:	$A_{pp} := W_f \cdot T_{pp}$	$A_{pp} = 105 \cdot \text{ft}^2$
Shear Resistance:	$S_u := P_{ave} \cdot A_{pp}$	$S_u = 252 \cdot \text{kip}$

Stabilizing Dead Load:

Weight of Concrete Pad:	$WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$	$WT_c = 551.25 \cdot \text{kip}$
Weight of Soil above Footing:	$\text{Depth} := \begin{cases} D_f - n - T_f & \text{if } n < (D_f - T_f) \\ 0 & \text{otherwise} \end{cases}$	Depth = 5 · ft
	$WT_{s1} := W_f^2 \cdot \text{Depth} \cdot \gamma_s$	$WT_{s1} = 612.5 \cdot \text{kip}$
Weight of Soil Wedge at Back Face:	$WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$	$WT_{s2} = 64.6632 \cdot \text{kip}$

Stability Analysis:

Resisting Moment:	$M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + WT_t \cdot \left(\frac{W_f}{2} \right) + S_u \cdot \frac{T_{pp}}{3} + WT_{s2} \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$	
	$M_r = 22935.6714 \cdot \text{kip} \cdot \text{ft}$	
Overturning Moment:	$M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t$	$M_{ot} = 10488.5 \cdot \text{kip} \cdot \text{ft}$
Factor of Safety:	$FS := \frac{M_r}{M_{ot}}$	FS = 2.19
	$\text{SafetyCheck} := \text{if}(FS > FS_{req}, \text{"Okay"}, \text{"No Good"})$	SafetyCheck = "Okay"



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BEARING PRESSURES

Loading Eccentricity:

Total Axial Load:	$LOAD_{tot} := WT_c + WT_{s1} + WT_t$	$LOAD_{tot} = 1164.75 \cdot \text{kip}$
Total Moment:	$M_{tot} := M_t + S_t(L_p + T_f) + WT_t$	$M_{ot} = 10488.5 \cdot \text{kip} \cdot \text{ft}$
Eccentricity:	$e := \frac{M_{ot}}{LOAD_{tot}}$	$e = 9.0049 \cdot \text{ft}$
Dist. From Ftg. CL to Kern Edge:	$X_k := \frac{W_f}{6}$	$X_k = 5.8333 \cdot \text{ft}$

Calculate Soil Pressures:

Maximum Contact Pressure:

$$P_{max} := \begin{cases} \frac{LOAD_{tot}}{W_f^2} \cdot \left(1 + \frac{6 \cdot e}{W_f}\right) & \text{if } e \leq X_k \\ \frac{2 \cdot LOAD_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e\right)} & \text{otherwise} \end{cases}$$

$P_{max} = 2.6116 \cdot \text{ksf}$

Minimum Contact Pressure:

$$P_{min} := \begin{cases} \frac{LOAD_{tot}}{W_f^2} \cdot \left(1 - \frac{6 \cdot e}{W_f}\right) & \text{if } e \leq X_k \\ 0 \text{ksf} & \text{otherwise} \end{cases}$$

$P_{min} = 0 \cdot \text{ksf}$

Length of Applied Pressure:

$$X_p := \begin{cases} W_f & \text{if } e \leq X_k \\ 3 \cdot \left(\frac{W_f}{2} - e\right) & \text{otherwise} \end{cases}$$

$X_p = 25.4852 \cdot \text{ft}$

Pressure Slope:

$$m_p := \frac{P_{max} - P_{min}}{X_p}$$

$m_p = 0.1025 \cdot \text{ksf}$

Soil Bearing Pressure Check:

$$\text{BearingStatus} := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

BearingStatus = "Okay"



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Concrete Bearing Capacity (ACI 10.17):

$$(ACI 9.3.2.2) \quad \phi_c := 0.75$$

$$P_b := \phi_c \cdot 0.85 \cdot f_c \cdot \frac{d_p^2 \cdot \pi}{4}$$

$$P_b = 3460.7785 \cdot \text{kip}$$

$$\text{BearingCheck} := \text{if}(P_b > C_t, \text{"Okay"}, \text{"No Good"})$$

$$\text{BearingCheck} = \text{"Okay"}$$

SHEAR STRENGTH OF CONCRETE

Beam (One-Way) Shear Action (ACI 11.3.1.1):

$$\text{Load Factor: (EIA 3.1.1)} \quad LF := \text{if} \left[H_t \leq 700 \cdot \text{ft}, 1.3, \text{if} \left[H_t \geq 1200, 1.7, 1.3 + \left(\frac{H_t - 700}{1200 - 700} \right) \cdot 0.4 \right] \right] \quad LF = 1.3$$

$$\text{"d" Distance:} \quad d := T_f - C_{vr} - .5 \cdot \text{in} \quad d = 32.5 \cdot \text{in}$$

$$\text{Factored Pressure at "d" Distance:} \quad P_d := LF \cdot \left[P_{\max} - \left(X_t - \frac{d_p}{2} - d \right) \cdot m_p \right] \quad P_d = 2.872 \cdot \text{ksf}$$

$$\text{Factored Pressure at Edge:} \quad P_{\text{edge}} := LF \cdot P_{\max} \quad P_{\text{edge}} = 3.3951 \cdot \text{ksf}$$

$$\text{Average Pressure:} \quad P_{\text{ave}} := \frac{P_d + P_{\text{edge}}}{2} \quad P_{\text{ave}} = 3.1335 \cdot \text{ksf}$$

$$\text{Capacity Reduction Factor: (ACI 9.3.2.3)} \quad \phi_{\text{shear}} := .85$$

$$\text{Applied Shear Force:} \quad V_{\text{req}} := \frac{P_{\text{ave}} \cdot (X_t - 0.5 \cdot d_p - d) \cdot W_f}{\phi_c} \quad V_{\text{req}} = 506.6488 \cdot \text{kip}$$

$$\text{Available Shear: (ACI 11.3.1.1)} \quad V_{\text{Avail}} := 2 \cdot \sqrt{f_c \cdot \text{psi}} \cdot W_f \cdot d \quad V_{\text{Avail}} = 1495.2826 \cdot \text{kip}$$

$$\text{Check Capacity:} \quad \text{BeamShearCheck} := \text{if}(V_{\text{req}} < V_{\text{Avail}}, \text{"Okay"}, \text{"No Good"})$$

$$\text{BeamShearCheck} = \text{"Okay"}$$



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Punching (Two-Way) Shear Action (ACI 11.12.2.1):

Critical Perimeter:	$b_o := 4(d_p + d)$	$b_o = 26.8333 \cdot \text{ft}$
Capacity Reduction Factor: (ACI 9.3.2.3)	$\phi_{\text{shear}} := .85$	$C_t = 404 \cdot \text{kip}$
Factored Maximum Punching Shear Force	$FL := \frac{LF \cdot C_t}{\phi_c}$	$FL = 617.8824 \cdot \text{kip}$
Available Shear:	$V_{\text{avail}} := 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_o \cdot d$	$V_{\text{avail}} = 2292.7666 \cdot \text{kip}$
Check Capacity:	PunchingShearCheck := if($V_{\text{req}} < V_{\text{avail}}$, "Okay", "No Good")	
	PunchingShearCheck = "Okay"	

BENDING

Maximim Bending Moment:

Distance From Edge of FTG To Face of Pier:	$X_b := \frac{W_f}{2} - e - \frac{d_p}{2}$	$X_b = 6.4951 \cdot \text{ft}$
<u>Moment Due To Overturning:</u>		
Factored Pressure at "d" Distance:	$P_{\text{face}} := LF \cdot (P_{\text{max}} - X_b \cdot m_p)$	$P_{\text{face}} = 2.5298 \cdot \text{ksf}$
Factored Pressure at Edge:	$P_{\text{edge}} := LF \cdot P_{\text{max}}$	$P_{\text{edge}} = 3.3951 \cdot \text{ksf}$
Moment Due To Rectangular Loading:	$M_1 := (P_{\text{face}} \cdot X_b \cdot W_f) \cdot \left(\frac{1}{2} \cdot X_b\right)$	$M_1 = 1867.6477 \cdot \text{kip} \cdot \text{ft}$
Moment Due to Triangular Loading:	$M_2 := \left[\frac{1}{2} \cdot X_b \cdot (P_{\text{edge}} - P_{\text{face}})\right] \cdot \left(\frac{2}{3} \cdot X_b\right)$	$M_2 = 12.1672 \cdot \text{kip} \cdot \text{ft}$
Sum Moments:	$M_{\text{ot}} := M_1 + M_2$	$M_{\text{ot}} = 1879.8149 \cdot \text{kip} \cdot \text{ft}$



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Moment Due To Uplift:

Pier Forces: $M_{nT} := LF \left[U_t \left(W_f - 2 \cdot X_b - \frac{d}{2} - d \right) + S_t \cdot (D_f + L_{pag}) \right]$ $M_{nT} = 9688.1839 \cdot \text{kip} \cdot \text{ft}$

Concrete Resistance: $M_{nS} := \frac{1}{2} \cdot (W_f - X_b - d_p)^2 \cdot (T_f W_f) \cdot \gamma_s$ $M_{nS} = 3152.5826 \cdot \text{kip} \cdot \text{ft}$

Soil Resistance: $M_{nC} := \frac{1}{2} \cdot (W_f - X_b - d_p)^2 \cdot (T_f W_f) \cdot \gamma_c$ $M_{nC} = 4728.8739 \cdot \text{kip} \cdot \text{ft}$

Sum Moments $M_{uplift} := M_{nT} - M_{nS} - M_{nC}$ $M_{uplift} = 1806.7274 \cdot \text{kips} \cdot \text{ft}$

Select Controlling Moment:

$$M_u := \begin{cases} M_{ot} & \text{if } M_{ot} \geq M_{uplift} \\ M_{uplift} & \text{otherwise} \end{cases}$$
 $M_u = 1879.8149 \cdot \text{kips} \cdot \text{ft}$

Strength Reduction Factor:
(ACI 9.3.2.2)

$$\phi_m := .90$$

Design Moment:

$$M_n := \frac{M_u}{\phi_m}$$
 $M_n = 2088.6833 \cdot \text{kips} \cdot \text{ft}$

Size Reinforcing Steel:

Effective Width: $b_{eff} := W_f$ $b_{eff} = 420 \cdot \text{in}$

Stress Block: $a := d \cdot \left(1 - \sqrt{1 - 2.3529 \cdot \frac{M_n}{f_c \cdot b_{eff} \cdot d^2}} \right)$ $a = 0.7282 \cdot \text{in}$

Steel Req'd For Bending: $A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2} \right)}$ $A_s = 12.9991 \cdot \text{in}^2$

Reinforcement Ratio: $\rho := \frac{A_s}{b_{eff} \cdot d}$ $\rho = 0.001$

Steel Req'd For Temperature and Shrinkage:
(ACI 7.12.2.1b) $\rho_{sh} := \text{if}(f_y \geq 60000 \cdot \text{psi}, 0.0018, 0.0020)$ $\rho_{sh} = 0.0018$

$A_s := \text{if}(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot b_{eff} \cdot d)$ $A_s = 24.57 \cdot \text{in}^2$

$A_{sprov} := A_{bpad} \cdot NB_{pad}$ $A_{sprov} = 42 \cdot \text{in}^2$

Check Provided Steel: $PadReinforcement := \text{if}(A_{sprov} > A_s, \text{"Okay"}, \text{"No Good"})$

$PadReinforcement = \text{"Okay"}$



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DEVELOPMENT LENGTH OF PAD REINFORCEMENT

TENSION (ACI 12.2.3)

Bar Spacing: $B_{sPad} := \frac{W_f - 2 \cdot C_{vr} - N B_{pad} \cdot d_{bpad}}{N B_{pad} - 1}$ $B_{sPad} = 8.942 \cdot \text{in}$

Development Length Factors:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := \text{if} \left(C_{vr} < \frac{B_{sPad}}{2}, C_{vr}, \frac{B_{sPad}}{2} \right)$ $c = 3 \cdot \text{in}$

Transverse Reinforcement Index: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpad}$$

$L_{dbt} = 34.8457 \cdot \text{in}$

$L_{dbmin} := 12 \cdot \text{in}$

Minimum Development Length: (ACI 12.2.1) $L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use } L_{dbt}\text{"}, \text{"Use } L_{dbmin}\text{"})$ $L_{dbtCheck} = \text{"Use } L_{dbt}\text{"}$

Available Length in Pad: $L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - C_{vr}$ $L_{Pad} = 100.626 \cdot \text{in}$

$L_{padTension} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$ $L_{padTension} = \text{"Okay"}$

REINFORCEMENT IN PIER

Pier Area: $A_p := \frac{\pi \cdot d_p^2}{4}$ $A_p = 1809.5574 \cdot \text{in}^2$

(ACI 10.8.4 and 10.9.1) $A_{smin} := 0.01 \cdot 0.5 \cdot A_p$ $A_{smin} = 9.0478 \cdot \text{in}^2$

$A_{sprov} := N B_{pier} \cdot A_{b_{pier}}$ $A_{sprov} = 24 \cdot \text{in}^2$

$\text{SteelAreaCheck} := \text{if}(A_{sprov} > A_{smin}, \text{"Okay"}, \text{"No Good"})$ $\text{SteelAreaCheck} = \text{"Okay"}$

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.



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Bar Spacing In Pier: $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier}$ $B_{sPier} = 5.1552 \cdot \text{in}$

Diameter of Reinforcement Cage: $Diam_{cage} := d_p - 2 \cdot C_{vr}$ $Diam_{cage} = 42 \cdot \text{in}$

Maximum Moment in Pier: $M_p := (S_p \cdot L_p) \cdot LF$ $M_p = 3955 \cdot \text{kips} \cdot \text{in}$

Pier Check evaluated from outside program and results are listed below;

(defined variables) $(f_c \ f_y \ c1 \ Spiral) = (3 \ 60 \ 4 \ 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches: $(D \ N \ n \ P_u \ M_{xu}) := (48 \ 24 \ 9 \ 144 \ 16045)$

Clears any previous output: $(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := (0 \ 0 \ 0 \ 0)$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P'_n (D, N, n, P_u, M_{xu})^T$$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio: $(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (208.5987 \ 23242.8205 \ -60 \ 0.0133)$

Column size and reinforcement may be changed to match capacity to the applied load.

AxialLoadCheck := if($\phi P_n \geq P_u$, "Okay", "No Good") AxialLoadCheck = "Okay"

BendingCheck := if($\phi M_{xn} \geq M_{xu}$, "Okay", "No Good") BendingCheck = "Okay"



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DEVELOPMENT LENGTH OF PIER REINFORCEMENT

TENSION (ACI 12.2.3)

Spacing and Cover: $C_{vr} = 3 \cdot \text{in}$ $B_{sPier} = 5.1552 \cdot \text{in}$

Factors for development:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := \text{if} \left(C_{vr} < \frac{B_{sPier}}{2}, C_{vr}, \frac{B_{sPier}}{2} \right) c = 2.5776 \cdot \text{in}$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpier}$$

$$L_{dbt} = 40.5561 \cdot \text{in}$$

Minimum Development Length: (ACI 12.2.1)

$$L_{dbmin} := 12 \cdot \text{in}$$

$$L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$$

$$L_{dbtCheck} = "Use L.dbt"$$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot \text{psi}}}$$

$$L_{dbc1} = 24.7132 \cdot \text{in}$$

$$L_{dbmin} := 0.0003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{bpier} \cdot f_y)$$

$$L_{dbmin} = 20.304 \cdot \text{in}$$

$$L_{dbc} := \text{if}(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin})$$

$$L_{dbc} = 24.7132 \cdot \text{in}$$

Available Length in Pier: $L_{pier} := L_p - 3 \cdot \text{in}$

$$L_{pier} = 75 \cdot \text{in}$$

Available Length in Pad: $L_{pad} := T_f - 3 \cdot \text{in}$

$$L_{pad} = 33 \cdot \text{in}$$

Available Length: $L_{total} := L_{pad} + L_{pier}$

$$L_{total} = 108 \cdot \text{in}$$

$$L_{tension} := \text{if}(L_{total} > L_{dbt}, "Okay", "No Good")$$

$$L_{tension} = "Okay"$$

$$L_{compression} := \text{if}(L_{total} > L_{dbc}, "Okay", "No Good")$$

$$L_{compression} = "Okay"$$