6/30/2016

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

Notice of Exempt Modification
142 Baldwin Drive, New Haven, CT 06519
N 41.34544
W -72.97071

Dear Ms. Bachman:

T-Mobile currently maintains 9 antennas at the 95-foot level of the existing 120-foot lattice tower at 142 Baldwin Drive, New Haven, CT 06519. The tower is owned by SBA Properties, LLC. The property is owned by Department of Emergency Services and Public Protection —Division of State Police. T-Mobile now intends to replace the 6 existing antennas with 6 new antennas, for a total of 9 antennas. These antennas would be installed at the 95-foot level of the tower. The Structural Analysis is passing with all components between an 8% - 96.2% ratio.

This facility was approved by the City of New Haven in Docket No. EM-VOICESTREAM-093-010719. This approval included the condition(s) that will be followed per the proposed modification. This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ~ 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. g 16-50j-73, a copy of this letter is being sent to City of New Haven, Mayor Toni Harp – as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided fox its R.C.S:A. ~ 16-50j-72(b)(2}.

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels ox more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard,

5. The proposed modifications wall not cause a change or alteration in the physical ox environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. ~ 16-SOj-72(b}(2).

Sincerely,

Gregg Shappy
10 Industrial Ave.
Suite 3
Mahwah, NJ 07430
(845) 553-2045
gshappy@transcendwireless.com

Attachments
cc: City of New Haven, Mayor Toni Harp
Michael Villa - SBA
Department of Emergency Services and Public Protection —Division of State Police

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11086B

New Haven/ WC X59
240 Baldwin Drive (West Rock State Park)
New Haven, CT 06514

June 22, 2016

EBI Project Number: 6216002938

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	41.19 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

June 22, 2016

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11086B – New Haven/ WC X59**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **240 Baldwin Drive (West Rock State Park), New Haven, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **240 Baldwin Drive (West Rock State Park), New Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each 2100 MHz UMTS RF path 1.66 dB of additional cable loss was factored into the calculations. This is based on manufacturers Specifications for 157 feet of 1-5/8" coax cable on each path.

8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **Ericsson AIR32 B66Aa/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66Aa/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **95 feet** above ground level (AGL).

12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

13) All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	95	Height (AGL):	95	Height (AGL):	95
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	4.24	Antenna B1 MPE%	4.24	Antenna C1 MPE%	4.24
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	95	Height (AGL):	95	Height (AGL):	95
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,261.31	ERP (W):	6,261.31	ERP (W):	6,261.31
Antenna A2 MPE%	2.84	Antenna B2 MPE%	2.84	Antenna C2 MPE%	2.84
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	95	Height (AGL):	95	Height (AGL):	95
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.84	Antenna B3 MPE%	0.84	Antenna C3 MPE%	0.84

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**7.92 %**
AT&T	9.36 %
CTT	1.73 %
Sprint	2.86 %
DOT	1.40 %
FBI	8.50 %
IRS	3.35 %
OEM	2.90 %
CSP	3.17 %
Site Total MPE %:	**41.19 %**

T-Mobile Sector A Total:	7.92 %
T-Mobile Sector B Total:	7.92 %
T-Mobile Sector C Total:	7.92 %
Site Total:	41.19 %

T-Mobile _Max per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	95	21.19	AWS - 2100 MHz	1000	2.12 %
T-Mobile 1900 MHz (PCS) LTE	2	2,334.27	95	21.19	PCS - 1900 MHz	1000	2.12 %
T-Mobile 2100 MHz (AWS) UMTS	2	796.38	95	7.23	AWS - 2100 MHz	1000	0.72 %
T-Mobile 1900 MHz (PCS) UMTS	2	1,167.14	95	10.59	PCS - 1950 MHz	1000	1.06 %
T-Mobile 1900 MHz (PCS) GSM	2	1,167.14	95	10.59	PCS - 1950 MHz	1000	1.06 %
T-Mobile 700 MHz LTE	1	865.21	95	3.93	700 MHz	467	0.84 %
						Total:	**7.92 %**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	7.92 %
Sector B:	7.92 %
Sector C:	7.92 %
T-Mobile Per Sector Maximum:	7.92 %
Site Total:	41.19 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.19%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

AECOM

Submitted to
AT&T
500 Enterprise Drive
Suite 3A
Rocky Hill, CT 06067

T-Mobile
35 Griffin Road South
Bloomfield, CT 06002

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
June 6, 2016

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 120' SELF SUPPORT LATTICE AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

at&t

T-Mobile

AT&T Site I.D. #: CT2013
T-Mobile Site I.D.# : CT11086B
Site Name : New Haven – State Police Tower #27
Site Address: 142 Baldwin Drive, New Haven, CT

SAI-089
TWM-006

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the existing 120' self-supporting lattice tower structure located at 142 Baldwin Drive, New Haven; (aka 1065 Wintergreen Avenue, Hamden), Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard, and the Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction of this report.

The proposed AT&T and T-Mobile antenna upgrades are listed below:

Proposed Antenna	Carrier	Antenna Center Elevation
Remove: **(2) SBNH-1D6565C Panel Antennas (Alpha & Beta Sectors, 1 panel each sector)** **(1) AM-X-CD-16-65-00T-RET Panel Antenna (Gamma Sector)** **(2) TMA2217F00V1-1 TMA Units (Alpha & Beta Sectors)** **(24) 1-1/4" Coax Cables**	**AT&T (Existing)**	**@ 75'**
(3) Ericsson AIR21 B4A/B2P Panel Antennas (1 per Sector)	**T-Mobile (Existing)**	**@ 95'**
Install: **(2) CCI TPA-65R-LCUUUU-H8 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector)** **(1) Quintel QS66512-3 Panel Antenna (Gamma Sector)** **(6) RRUS-11 RRH Units** **(3) RRUS-32 RRH Units** **(2) DC6-48-60-18-8F Surge Suppressor Units** **(4) 3/4" Diameter DC Cables** **(2) 1/2" Diameter Fiber Optic Cables**	**AT&T (Proposed)**	**@ 75'**
(3) Ericsson AIR 32 B66A/B2A Panel Antennas (1 per sector)	**T-Mobile (Proposed)**	**@ 95'**

The results of an initial analysis indicated the existing tower structure did not have enough capacity for the proposed loading conditions stated above. The tower structure requires modifications shown on SK-1 and SK-2. **Once the modifications indicated on sheets SK-1 and SK-2 are performed, the modified structure and existing foundation are considered structurally adequate with the wind classification specified above with the existing and proposed antenna loading.**

The tower deflection (sway) is 0.35 degrees, and the tower rotation (twist) is 0.08 degrees. **These figures are within the Connecticut State Police specification of 0.75 degrees for combined deflection (sway) and rotation (twist).**

1. EXECUTIVE SUMMARY - *continued*

This analysis is based on:

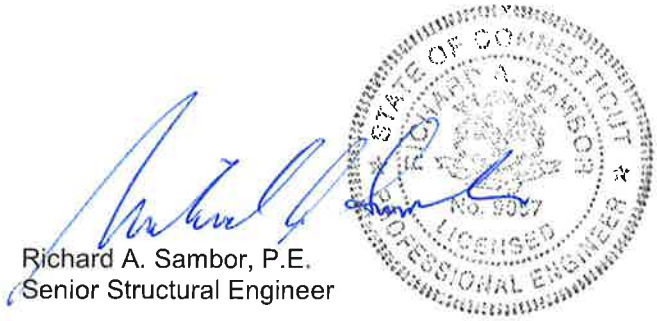
1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes utilized in the preparation of this report were obtained from manufacturer's original design documents prepared by Stainless, Inc. report number 358810, noted as revision B, dated March 3, 1995.
3) Geotechnical engineering report prepared by Dr. Clarence Welti, P.E., P.C., dated December 29, 1993.
4) Tower Mapping and Existing Inventory via tower climb, performed by D&K Nationwide Communications, Inc. on March 30, 2016.
5) Proposed inventory taken from AT&T Radio Frequency Data Sheet (RFDS), dated September 17, 2015 and obtained via e-mail on April 5, 2016.
6) Antenna inventory provided by Connecticut State Police via e-mail on April 7, 2016.
7) Proposed antennas via T-Mobile RFDS, dated April 6, 2016, obtained via e-mail dated May 16, 2016.
8) Antenna and mount configuration as specified within Section 2 and 6 of this report.
9) Coax cable orientation as specified in section 6 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 antenna, cabling, and mount configuration used, as well as the physical condition of the tower members, connections and foundation. 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,

AECOM, *contracting as URS Corporation AES,*



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

RAS/mcd

cc: IA, CF/Book - AECOM

2. INTRODUCTION

The subject tower is located at 142 Baldwin Drive, New Haven; (aka 1065 Wintergreen Avenue, Hamden), Connecticut. The structure is an existing 120' self supporting steel tapered lattice tower, designed and manufactured by Stainless, Inc.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 4' Lightning Rod	#27 Tower (existing)	18' Pipe Mast on Top of Tower	138'	---
(3) (Windload) PA6-65 Dishes	CSP-25, 26, 27 (reserve)	Leg Mounted	120'	(3) WEP65
(1) UHF3 Dipole Antenna	#26 CSP-15 (existing)	2' Flange Mount	120'	(1) LDF6-50A
(1) UHF-6 Whip Antenna	CSP-1 (existing)	*Share with below mount*	120'	(1) LDF5-50A
(1) OGT9-806 Whip Antenna	#25-B CSP-7 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	#24-C CSP-21 (existing)	*Share with below Mount*	120'	(1) AVA7-50A
(1) OGT9-806 Whip Antenna	#24-D CSP-8 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	#25-A CSP-17 (existing)	(2) 5' Sidearm Mounts w/ 8' Pipe	114'	(1) AVA7-50A
(1) Junction Box	#24-A (existing)	(2) 4' Sidearm mounts w/ 8' Pipe	113.5'	(2) 3/8"
(1) (Inverted) Whip Antenna	#24-B (existing)	*Share with above Mount*	113.5'	(1) 1/2"
(1) (Inverted) Dipole Antenna	#24-E (existing)	*Share with above Mount*	113.5	(1) 1-1/4" Cable
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-A CSP-22 (existing)	*Share with above mount*	112.75'	(1) AVA7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-B CSP-23 (existing)	*Share with above mount*	112.75'	(1) AVA7-50A
(1) Sinclair Whip Antenna	#22 (existing)	(1) 4'x8' Gate-boom 3' Standoff w/ 2-1/2" Pipe	112'	(3) 1 5/8"
(1) Junction Box	#23-C (existing)	(1) Unistrut mount attached to Waveguide ladder	112'	(1) 1/2"
(1) PA6-65 Dish Antenna	#21 CSP-5 (existing)	2-1/2" Pipe Mounted to leg	110'	(1) WEP65
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-9 (existing)	*See above mount @ 113'*	110'	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	CSP-18 (existing)	*See above mount @ 113'*	110'	(1) AVA7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-19 (existing)	*See above mount @ 113'*	110'	(1) AVA7-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 432E-83I-01T TTA Unit	CSP-20 (existing)	*See above mount @ 113'*	110'	(1) LDF4-50A
(1) WPA-70040-4CF-EDIN Panel Antenna	CSP-28 (existing)	Leg Mounted	110'	(1) AVA7-50A
(1) PA6-65 Dish Antenna	#20 CSP-3 (existing)	2-1/2" Pipe Mounted to leg	109'	(1) WEP65
(1) PA6-65 Dish Antenna	#19 CSP-6 (existing)	2-1/2" Pipe Mounted to leg	107'	(1) WEP65
(1) SE419-SWBPALDF Panel Antenna	CSP-29 (existing)	Leg Mounted	105'	(1) AVA7-50A
(1) 432E-83I-01T TTA Unit	CSP-30 (existing)	Face Mounted	105'	(1) LDF4-50A
(1) 422-86A-99116 TTA Unit	CSP-31 (existing)	Face Mounted	105'	(1) LDF3-50A
(1) 422-86A-99116 TTA Unit	CSP-32 (existing)	Face Mounted	105'	(1) LDF3-50A
(1) AP13-850 Panel Antenna	#18A CSP-12 (existing)	2-1/2" Pipe Mounted to Face	101'	(1) LDF7-50A
(1) SE419-SWBPALDF Panel Antenna	#18B CSP-13 (existing)	2-1/2" Pipe Mounted to Face	101'	(1) LDF7-50A
(3) AIR B66A/B2A Panel Antennas	**T-Mobile (Proposed)**	*See Below Mount*	**95'**	*See Below Cables*
(3) Commscope LNX-6515DS-VTM Panel Antennas (3) RRUS-11 RRH Units (3) AIR21 B2A|B4P Panel Antennas (3) Antenna Pipe Mounts (3) TMA Units	T-Mobile (existing)	(3) EUSF10-U T-Arm Mounts attached to Leg	95'	(6) 1-5/8" (2) 1-1/4" Fiber Optic Cables
(1) (Inverted) OGT9-806 Whip Antenna	#16A CSP-10 (existing)	(2) 5' Standoff Mounts w/ 4-1/2" Pipe Mount	92'	(1) LDF7-50A
(1) PD-458 Whip Antenna	#16B CSP-2 (existing)	*Share with above mount*	92'	(1) LDF5-50A
(1) Dipole Antenna	#15 (existing)	3' Sidearm w/ 2" Pipe Mount	86'	(1) 7/8"
(1) 3' Yagi Antenna	#12 (existing)	*Share with above mount*	81'	(1) 1/2"
(1) DB-230 Yagi Antenna	#13 CSP-11 (existing)	*Share with above mount*	81'	(1) LDF5-50A
(1) 22' Dipole Antenna	#14 (existing)	4' Sidearm	77'	(1) 1/2"
(2) CCI TPA-65R-LCUUUU-H8 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector) (1) Quintel QS66512-3 Panel Antenna (Gamma Sector) (6) RRUS-11 RRH Units (3) RRUS-32 RRH Units (2) DC6-48-60-18-8F Surge Suppressor Units	**AT&T (Proposed)**	*See below Mount*	**75'**	**(2) 1/2" Fiber Cables (4) 3/4" DC Cables**

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(2) CCI HPA-65R-BUU-H8 Panels (Alpha & Beta Sectors,1 per sector) (1) CCI HPA-65R-BUU-H6 (Gamma) Panel (2) Andrew SBNH-1D6565C Panels (Alpha & Beta Sectors, 1 per sector) (2) DTMABP7819VG12A TMA Units	AT&T (existing)	(3) Antenna Face Mounts	75'	(4) 1-1/4"
(3) RFS APXVTM14-C-1-20 Panel Antennnas (3) TD-RRH8x20-25 RRH Units (27) Jumper Cables (3) RFS APXVSPP18-C-A20 (6) RRH 4x45 65 MHz (3) ALU RRH 800 MHz 2x50W (3) 800 MHz Notch Filter (3) 1900 RRH Combiner	Sprint (existing)	Pipe Mounts on Existing Frame	68'	(4) 1-1/4" Hybriflex Cables
(1) 6' Dual Yagi Antenna	#9 (existing)	2' Sidearm	65'	(1) 1/2"
(1) GPS Antenna	#8 (existing)	3' Sidearm	63'	(1) 7/8"
(1) DB-264 20' Dipole Antenna	#7 CSP-4 (existing)	2' Sidearm	55'	(1) LDF5-50A
(1) DB-803 Whip Antenna	#6 CSP-16 (existing)	2' Sidearm	53'	(1) LDF4-50A
(1) 10' Dipole Antenna	#4A (existing)	3' Sidearm	48'	(1) 1/2"
(1) 3' Yagi Antenna	#4B (existing)	*Shared with above mount*	48'	(1) 1/2"
(1) 5' Whip Antenna	#3 (existing)	Leg Mounted	47'	(1) 1/2"
(1) 3' Whip Antenna	#2 (existing)	Leg Mounted	43'	(1) 7/8"
(1) 4' Dish with Shroud Cover	#1A (existing)	4' Sidearm	41'	(2) 1/2"
(1) 1'x1' Panel Antenna	#1B (existing)	*Shared with above mount*	41'	(1) 3/8"
(1) 6' Whip Antenna	#5 CSP-14 (existing)	1' Sidearm Mount	39'	(1) LDF4-50A

Notes: Refer to TNX Tower feed-line plan within Section 6 of this report for coax locations. Antenna elevations and ID numbering obtained from Tower Mapping and Existing Inventory via tower climb, performed by D&K Nationwide Communications, Inc. on March 30, 2016.

This structural analysis and evaluation of the communications tower was performed by AECOM for AT&T and T-Mobile. The purpose of this analysis was to investigate the structural integrity of the modified tower with its existing, future and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection), stress and forces on the tower.

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 TNX Tower 7.0.5.1. 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

Stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of an initial analysis indicated that the existing tower structure did not have enough capacity to support the proposed loading conditions. The tower structure requires modifications shown on SK-1 and SK-2. Once the modifications indicated on Sheets SK-1 and SK-2 are performed, the modified structure is considered structurally adequate with the wind load classification specified with the existing, proposed and future antenna loading noted herein. See The below tower capacity and tower deflection (sway) and rotation (twist) figures:

TABLE 1: Tower Deflection (Sway) and Rotation (Twist) at the top of the tower (degrees):

Description	Current	Allowable
Tower Sway (degrees)	0.3487	N/A
Tower Twist (degrees)	0.0777	
Total (degrees)	0.4264	0.750

TABLE 2: Tower Base Reactions:

Base Reactions	Proposed Tower Reactions
Axial Load (kips)	54
Shear per Leg (kips)	34
Total Shear (kips)	61
Uplift per Leg (kips)	218
Comp.per Leg (kips)	268
O.T. Moment (ft-kips)	4542

For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

TABLE 3: Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Stress (% capacity)	Pass/Fail
Tower Leg (T8)	P5x0.4	Compression/25'-50'	92.0 %	**Pass**
Diagonal (T5)	2L 2-1/2x2-1/2x3/16	Compression/83.3'-91.7'	96.2 %	**Pass**
Horizontal (T7)	L3x3x1/4	Compression/50'-75'	95.2 %	**Pass**
Top Girt (T8)	L3x3x1/4	Compression/25'-50'	87.1 %	**Pass**
Inner Bracing (T8)	L2-1/2x2x3/16	Compression/25'-50'	8.0 %	**Pass**
Bolt Checks	3/4"	Member Bearing/25'-50'	86.3 %	**Pass**
Anchor Bolts	1 1/2" dia. A36	Tension & Shear	95%	**Pass**
Foundation	Rock Anchors	Tension	77%	**Pass**

5. CONCLUSIONS AND RECOMMENDATIONS

The results of an initial analysis indicated the existing tower structure did not have enough capacity for the proposed loading conditions stated above. The tower structure require modifications shown on SK-1 and SK-2. **Once the modifications indicated on sheets SK-1 and SK-2 are performed, the modified structure and existing foundation are considered structurally adequate with the wind classification specified herein with the existing and proposed antenna loading.**

The tower deflection (sway) is 0.35 degrees, and the tower rotation (twist) is 0.08 degrees. **These figures are within the Connecticut State Police specification of 0.75 degrees for combined 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 are in good condition without defect and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM 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

AECOM 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 AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

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

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

6. DRAWINGS AND DATA

TOWER REINFORCEMENT DRAWINGS SK-1 AND SK-2

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.
8. NO MOVEMENT, ALTERATION, OR DISCONNECTION OF CONNECTICUT STATE POLICE ANTENNAS MAY OCCUR WITHOUT THE NOTIFICATION AND APPROVAL OF THE CONNECTICUT STATE POLICE. CONTACT THE NETWORK CONTROL CENTER AT 860-865-8008.
9. TOWER REINFORCING WORK AFFECTING CRITICAL CONNECTICUT STATE POLICE ANTENNAS MAY BE REQUIRED TO BE CONDUCTED AT TIMES AS DETERMINED BY THE REQUIREMENTS OF THE CONNECTICUT STATE POLICE.
10. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
12. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.
13. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT ANY DISCREPANCIES FROM THE DRAWINGS TO THE ARCHITECT.
14. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
15. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.
16. DIMENSIONS OF EXISTING TOWER ARE BASED ON MANUFACTURER'S DRAWINGS PREPARED BY STAINLESS, INC., DATED MARCH 3, 1995, AND 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.
17. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED FROM D&K NATIONWIDE COMMUNICATIONS, INC., MARCH 30, 2016 AND BY CONNECTICUT STATE POLICE DATED APRIL 7, 2016.
18. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK.
19. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND.

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL LEG:
LEG PIPES 0.400 THICK AND THICKER.....A572-60 (60 KSI)
LEG PIPES 3/8" THICK AND THINNER.....A572-50 (50 KSI)
BEAMS, CHANNELS, PLATES, ANGLES..... A36

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

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.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW.

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

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8" DIA. A325-X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

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

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

OWNER WILL SUPPLY THE SERVICES OF A SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO THE OWNER, BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

STATE OF CONNECTICUT
RICHARD A. SALOMON
No. 9057
LICENSED PROFESSIONAL ENGINEER

PROJECT NO. SAI-089
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

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

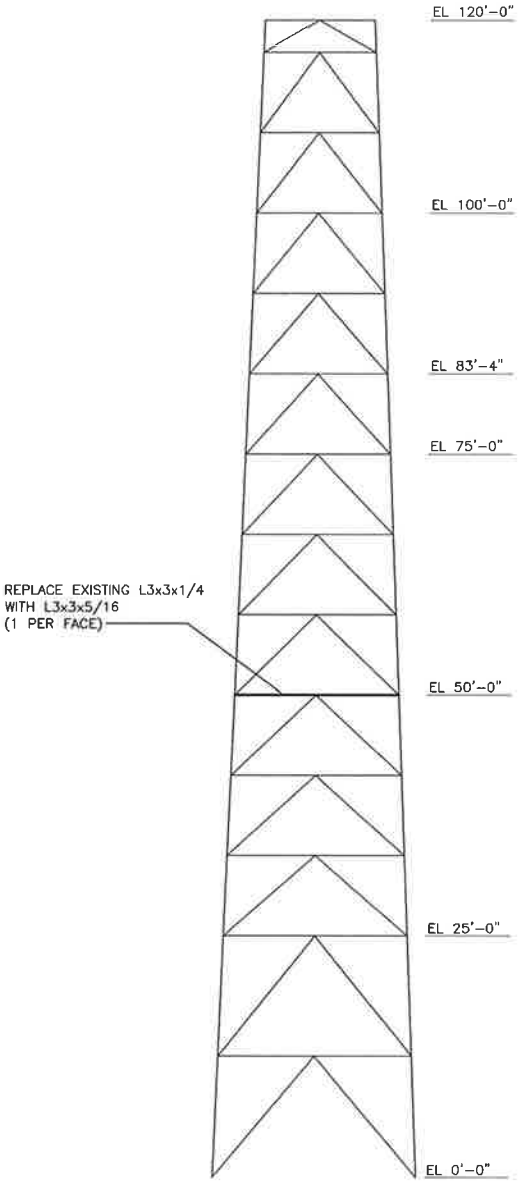
T-Mobile at&t

SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

REV.	DATE:	DESCRIPTION
1	06/06/16	REISSUE

Scale: AS NOTED | Date: 05/26/16
Job No. SAI-089 | File No.

Dwg. No. SK-1



1 / SK-2 TOWER ELEVATION
SCALE: 1" = 30'-0"

NOTES:
REFER TO SK-1 STRUCTURAL NOTES FOR MORE INFORMATION

STATE OF CONNECTICUT
RICHARD A. SAMBOR
No. 30671
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO.	SAI-089
Designed by:	MCD
Drawn by:	KAP
Checked by:	KAB
Approved by:	RAS

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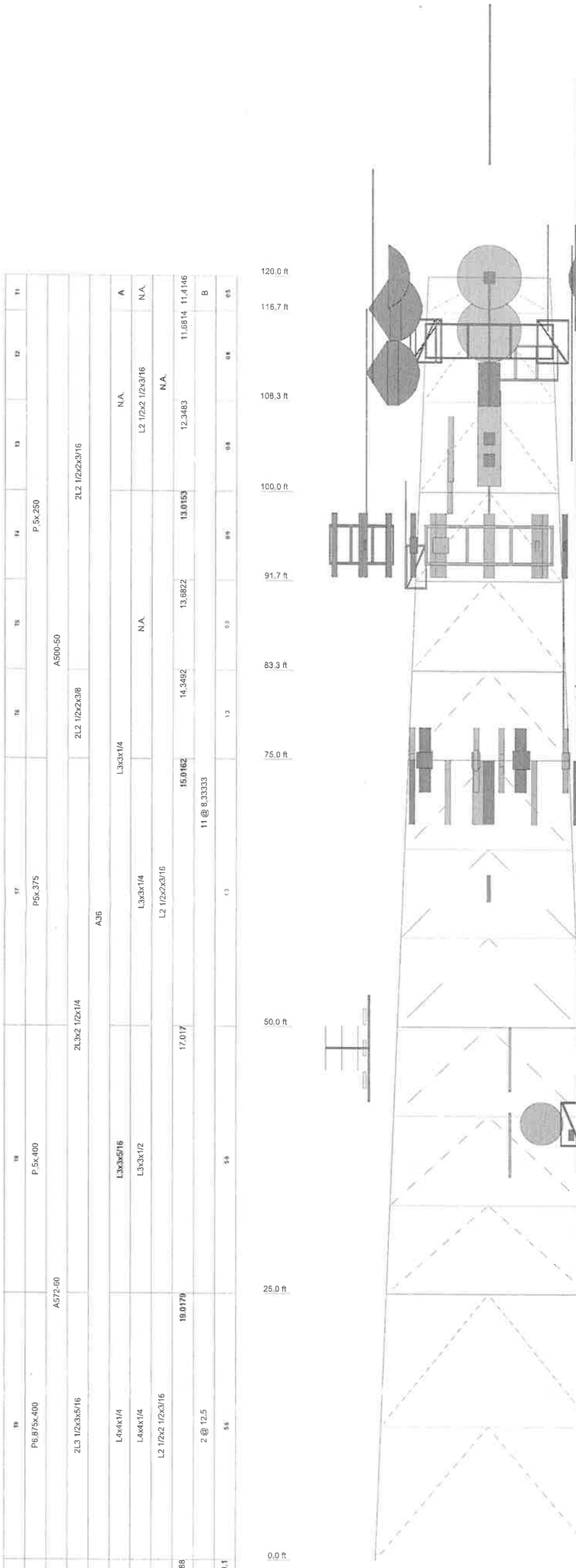
REV.	DATE:	DESCRIPTION
1	06/06/16	REISSUE

Scale: AS NOTED | Date: 05/26/16
Job No. SAI-089 | File No.

Dwg. No. SK-2
Dwg. 2 of 2

TNX TOWER INPUT / OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (#27)	138	4'6"x3" Pipe Mount (horizontal) ((Top Mount) #14)	87
16'x2.5" Pipe Mount (#27 Mount)	138	20' 4-Bay Dipole (#15)	86
16'x3" Omni (inverted) (#23-A - CSP-22)	120 - 106	3' Yagi (#13 - CSP-11)	82
16'x3" Omni (inverted) (#23-B - CSP-23)	120 - 106	3' Yagi (#12)	81
SC479-HF1LDF (inverted) (#24-B)	120 - 106	20' 4-Bay Dipole (#14)	77
SC479-HF1LDF (#24-C - CSP#21)	120	3'4"x4" Pipe Mount (horizontal) ((Bottom mount) #15)	76
OGT9-840 (#24-D - CSP#8)	120	Face Mount ((#11) ATT)	75
OGT9-840 (#25-B - CSP#7)	120	Face Mount ((#11) ATT)	75
10'x2" Dipole Antenna (#26 - CSP-15)	120	Face Mount ((#11) ATT)	75
TMA 432-83H-01T (CSP-24)	120	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	75
SC479-HF1LDF (inverted) (CSP - 9 (P))	120 - 106	RRUS-11 (ATT)	75
TMA 432-83H-01T (CSP-24)	120	RRUS-11 (ATT)	75
PA6-65AC (CSP - 69)	120	DC6-48-60-18-8F (Squid) Suppressor (ATT)	75
PA6-65AC (CSP - 70)	120	HPA-65R-BUU-H8 Panel (ATT)	75
PA6-65AC (CSP - 71)	120	RRUS-32 (ATT)	75
6' DISH (SOLID) (#19 - CSP-3)	117	DC6-48-60-18-8F (Squid) Suppressor (ATT)	75
6' DISH (SOLID) (#21 - CSP-5)	115	SBNH-1D6565C (ATT)	75
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	DTMABP7819VG12A TMA (ATT)	75
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	75
Junction Box (#24-A)	114	RRUS-11 (ATT)	75
10'x2" Dipole Antenna (inverted) (#24-E)	114 - 104	RRUS-11 (ATT)	75
Rohn 6' Side-Arm(1) (#25 Antennas Mount)	114	HPA-65R-BUU-H8 Panel (ATT)	75
SC479-HF1LDF (inverted) (#25-A - CSP-17)	114 - 100	RRUS-32 (ATT)	75
Pirod 4' Side Mount Standoff (1) (#22, 23-A, 23-B Mount)	113	SBNH-1D6565C (ATT)	75
16'x3" Omni (#22)	113	DTMABP7819VG12A TMA (ATT)	75
Junction Box (#23-C)	112	QS66415-3 Panel (ATT)	75
6' DISH (SOLID) (#20 - CSP-6)	111	RRUS-11 (ATT)	75
6'8"x4" Pipe Mount (#21 - Dish Mount)	110	RRUS-11 (ATT)	75
SC479-HF1LDF (CSP-18 (New Install))	110	HPA-65R-BUU-H8 Panel (ATT)	75
SC479-HF1LDF (inverted) (CSP-19 (New Install))	110 - 96	RRUS-32 (ATT)	75
TMA 432-83H-01T (CSP-20)	110	APXVTM14-C-1 20 ((#10) Sprint)	72
WPA-70040-4CF-EDIN Panel (CSP-28)	110	APXVTM14-C-1 20 ((#10) Sprint)	72
6'8"x4" Pipe Mount (#19 - Dish Mount)	107	(2) ALU RRH 1900 4X45 65MHz ((#10) Sprint)	72
6'8"x4" Pipe Mount (#20 - Dish Mount)	107	1900 RRH COMBINER ((#10) Sprint)	72
SE419-SWBPALDF Panel Antenna (CSP-29)	105	1900 RRH COMBINER ((#10) Sprint)	72
TMA 432-83H-01T (CSP-30)	105	1900 RRH COMBINER ((#10) Sprint)	72
AP13-850/065D w/Mount Pipe (#18-B - CSP-12(E))	104	TD-RRH8x20-25 ((#10) Sprint)	72
		ALU RRH 800 MHz 2x50W ((#10) Sprint)	72
TMA 432-83H-01T (CSP-32)	103	(2) ALU RRH 1900 4X45 65MHz ((#10) Sprint)	72
SE419-SWBPALDF Panel Antenna (#18-A - CSP 13(P))	101	APXVSPP18-C-A20 ((#10) Sprint)	72
		(2) ALU RRH 1900 4X45 65MHz ((#10) Sprint)	72
PD458-406 (# 16-B - CSP-2)	100 - 92	TD-RRH8x20-25 ((#10) Sprint)	72
3'4"x4" Pipe Mount (horizontal) ((Top Mount) #15)	96	TD-RRH8x20-25 ((#10) Sprint)	72
SC479-HF1LDF (inverted) (# 16-A - CSP-10)	95 - 81	APXVTM14-C-1 20 ((#10) Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	800 MHz NOTCH FILTER ((#10) Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU RRH 800 MHz 2x50W ((#10) Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU RRH 800 MHz 2x50W ((#10) Sprint)	72
AIR B2A/B4P w/ 6' Sch 40 Pipe Mount ((#17) T-Mobile)	95	800 MHz NOTCH FILTER ((#10) Sprint)	72
AIR B2A/B4P w/ 6' Sch 40 Pipe Mount ((#17) T-Mobile)	95	APXVSPP18-C-A20 ((#10) Sprint)	72
		Face Mount ((#10) Sprint)	72
AIR B2A/B4P w/ 6' Sch 40 Pipe Mount ((#17) T-Mobile)	95	Face Mount ((#10) Sprint)	72
		Face Mount ((#10) Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	APXVSPP18-C-A20 ((#10) Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	800 MHz NOTCH FILTER ((#10) Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	4'6"x3" Pipe Mount (horizontal) ((Bottom mount) #14)	67
LNX-6515DS-VTM w/ 6' 2" sch 40 Pipe Mount ((#17) T-Mobile)	95	6' Yagi w/ Mount (#9)	65
LNX-6515DS-VTM w/ 6' 2" sch 40 Pipe Mount ((#17) T-Mobile)	95	2'6"x4" Pipe Mount (For #8)	63
		GPS (#8)	63
LNX-6515DS-VTM w/ 6' 2" sch 40 Pipe Mount ((#17) T-Mobile)	95	20' 4-Bay Dipole w/ 2' Sidearm Mount (#7 - CSP-4)	55
		1.0" Dia 4' Omni w/Pipe Mount (#6 - CSP#16)	53
RRUS-11 ((#17) T-Mobile)	95	10'x6" Dipole Antenna (#4-A)	48
RRUS-11 ((#17) T-Mobile)	95	3' Yagi (#4-B)	48
RRUS-11 ((#17) T-Mobile)	95	Pirod 4' Side Mount Standoff (1) (#4-AB)	48
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	5'x1.5in dia Whip Antenna /w mount (#3)	47
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	3' Whip (3in diameter) /w mount (#2)	43
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	Pirod 6' Side Mount Standoff (1) (#1-A Dish Mount)	41
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Upright # 16-B) (# 16-AB)	92	4 FT DISH (#1-A)	41
		1'x1' Panel Antenna (#1-B (mount Share #1-A))	40
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Invert #16-A) (# 16-AB)	92	6'x1" Whip Antenna w/ Mount (#5 - CSP#14)	39

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	B	1 @ 3.33333

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016).
5. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
6. TOWER RATING: 96.2%

MAX. CORNER REACTIONS AT BASE:

AXIAL 67 K
SHEAR: 34 K

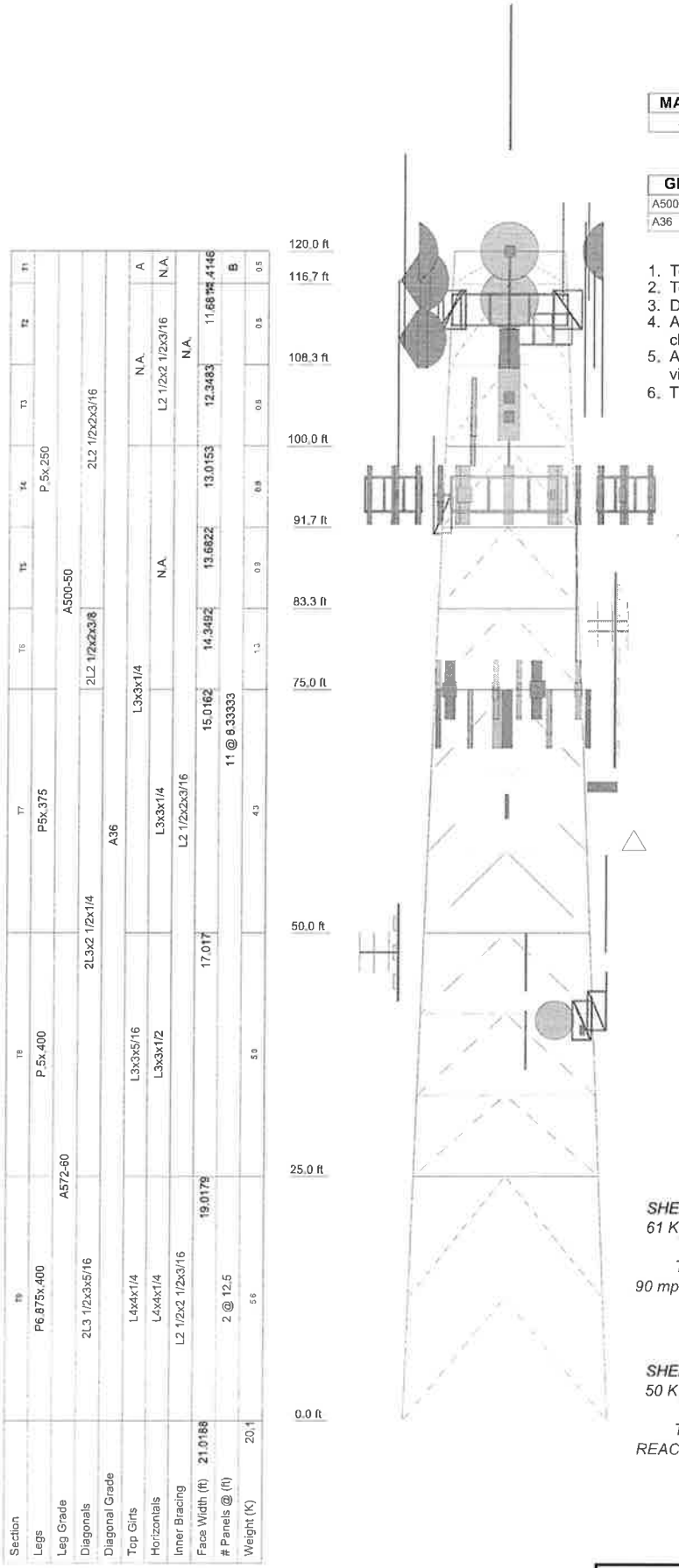
UPLIFT: -217 K
SHEAR: 31 K

AXIAL 54 K
SHEAR 61 K
MOMENT 4531 kip-ft
TORQUE 72 kip-ft
90 mph WIND - 0.5000 in ICE

AXIAL 34 K
SHEAR 50 K
MOMENT 3737 kip-ft
TORQUE 51 kip-ft
REACTIONS - 90 mph WIND

AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: **120' Self-Supporting Lattice Tower**
Project: **Connecticut State Police Tower - West Rock**
Client: Site Aquisitions / SAI-085 - Analysis
Drawn by: MCD
App'd:
Code: TIA/EIA-222-F
Date: 06/06/16
Scale: NTS
Path:
Dwg No. E-1



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	B	1 @ 3.33333

MATERIAL STRENGTH

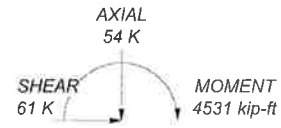
GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

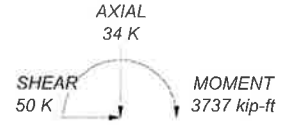
1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016).
5. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
6. TOWER RATING: 96.2%

MAX. CORNER REACTIONS AT BASE:
DOWN: 267 K
SHEAR: 34 K

UPLIFT: -217 K
SHEAR: 31 K



TORQUE 72 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 51 kip-ft
REACTIONS - 90 mph WIND

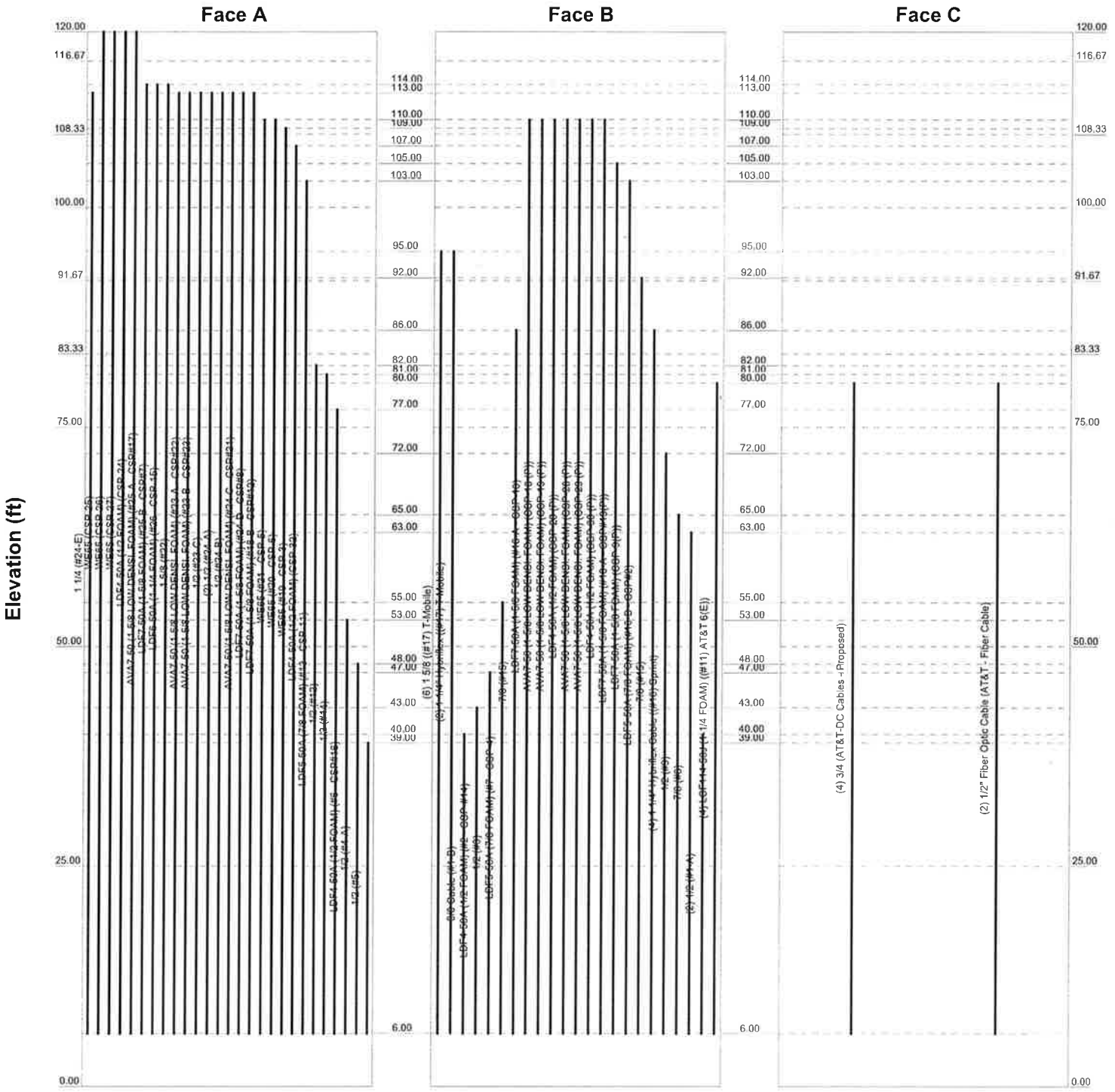
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job:	***120' Self-Supporting Lattice Tower***		
Project:	***Connecticut State Police Tower - West Rock***		
Client:	Site Aquisitions / SAI-085 - Analysis	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 06/06/16	Scale: NTS
Path:			Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 120'

Round Flat App In Face App Out Face Truss Leg

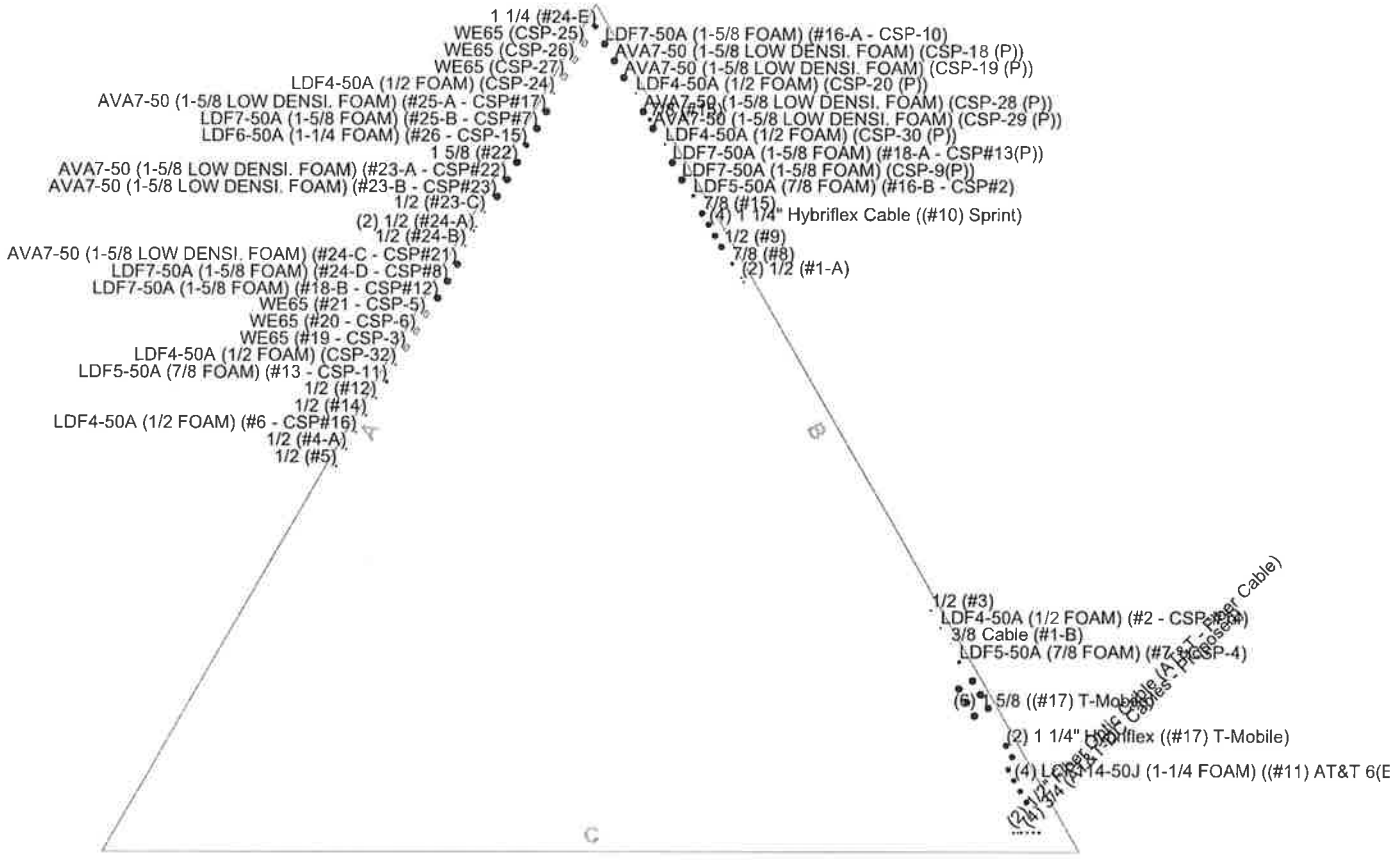


AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: ***120' Self-Supporting Lattice Tower*** Project: ***Connecticut State Police Tower - West Rock*** Client: Site Aquisitions / SAI-085 - Analysis Drawn by: MCD App'd: Code: TIA/EIA-222-F Date: 06/06/16 Scale: NTS Path: Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face

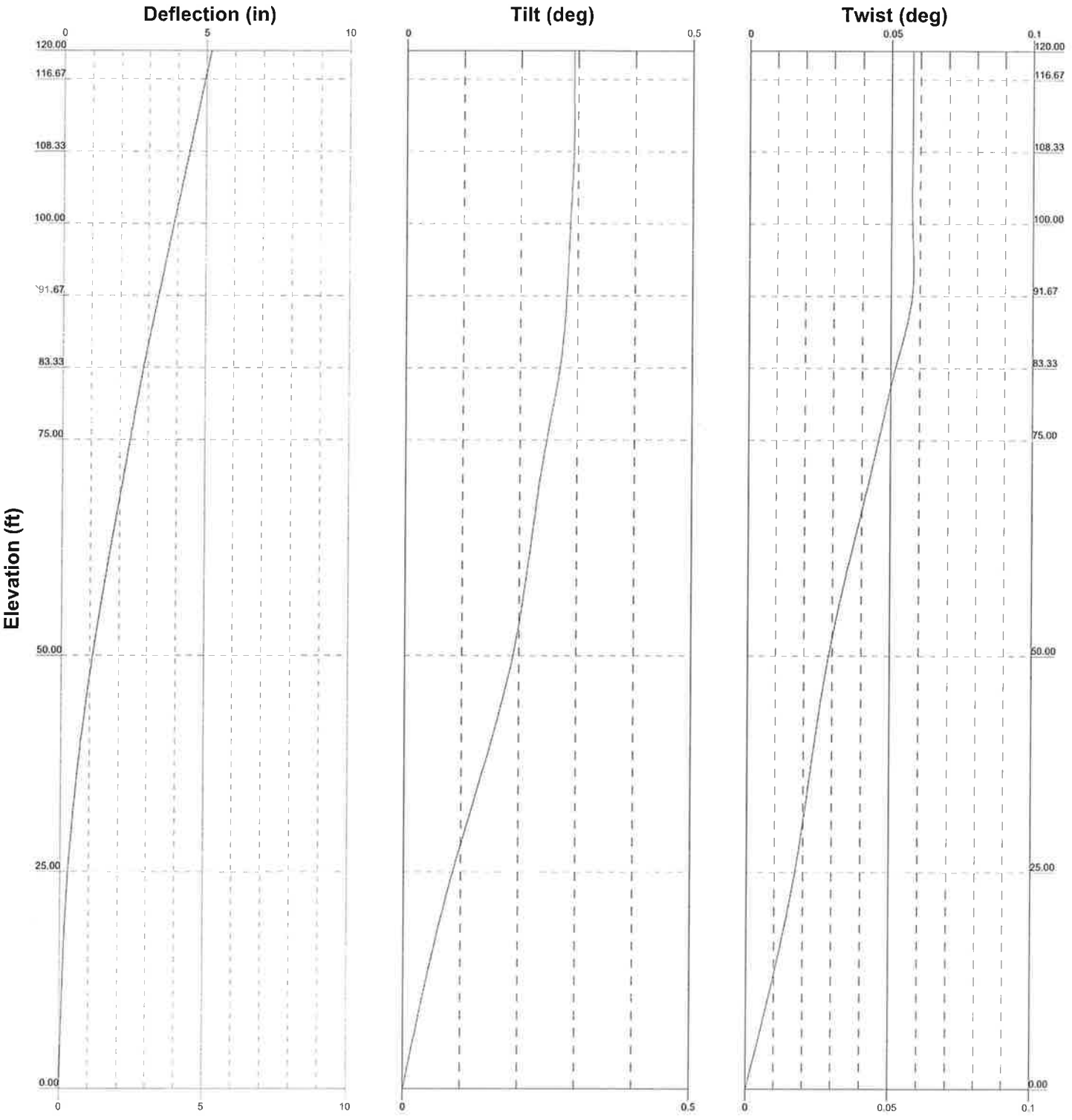


AECOM 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-529-8882 FAX: 860-529-3991	Job: ***120' Self-Supporting Lattice Tower*** Project: ***Connecticut State Police Tower - West Rock*** Client: Site Aquisitions / SAI-085 - Analysis Drawn by: MCD App'd: Code: TIA/EIA-222-F Date: 06/06/16 Scale: NTS Path: Dwg No. E-7

TNX DEFLECTION, TILT AND TWIST

TIA/EIA-222-F - Service - 90 mph

Maximum Values



AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job:	***120' Self-Supporting Lattice Tower***
Project:	***Connecticut State Police Tower - West Rock***
Client: Site Aquisitions / SAI-085 - Analysis	Drawn by: MCD / App'd:
Code: TIA/EIA-222-F	Date: 06/06/16 / Scale: NTS
Path:	Dwg No. E-5

TNX TOWER DETAILED OUTPUT

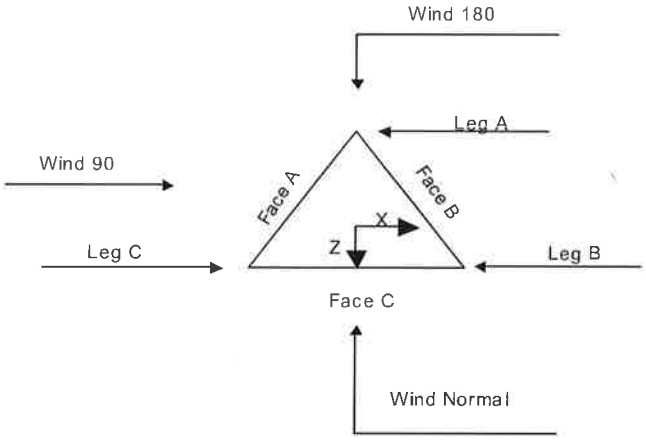
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 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 11.41 ft at the top and 21.02 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.
Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016)..
Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016..
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, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
√ Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	120.00-116.67			11.41	1	3.33
T2	116.67-108.33			11.68	1	8.33
T3	108.33-100.00			12.35	1	8.33
T4	100.00-91.67			13.02	1	8.33
T5	91.67-83.33			13.68	1	8.33
T6	83.33-75.00			14.35	1	8.33
T7	75.00-50.00			15.02	1	25.00
T8	50.00-25.00			17.02	1	25.00
T9	25.00-0.00			19.02	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	120.00-116.67	3.33	K Brace Down	No	Yes	0.0000	0.0000
T2	116.67-108.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	108.33-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-91.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	91.67-83.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T6	83.33-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	75.00-50.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	50.00-25.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T9	25.00-0.00	12.50	K Brace 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 120.00-116.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 116.67-108.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 108.33-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-91.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T6 83.33-75.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/8	A36 (36 ksi)
T7 75.00-50.00	Pipe	P5x.375	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T8 50.00-25.00	Pipe	P.5x.400	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T9 25.00-0.00	Pipe	P6.875x.400	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x5/16	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 120.00-116.67	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 100.00-91.67	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 91.67-83.33	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 83.33-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T7 75.00-50.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T8 50.00-25.00	Single Angle	L3x3x5/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T9 25.00-0.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Solid Round		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 120.00-116.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 116.67-108.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 108.33-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T6 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T7 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T8 50.00-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T9 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 100.00-91.67	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 83.33-75.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 75.00-50.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-25.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T9 25.00-0.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 120.00-116.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T2	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
116.67-108.33			(36 ksi)						
T3	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
108.33-100.00			(36 ksi)						
T4	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
100.00-91.67			(36 ksi)						
T5 91.67-83.33	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T6 83.33-75.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T7 75.00-50.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T8 50.00-25.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T9 25.00-0.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-116.67				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
116.67-108.33				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
108.33-100.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
100.00-91.67				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
91.67-83.33				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
83.33-75.00				1	1	1	1	1	1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
50.00-25.00				1	1	1	1	1	1	1	1	1	1	1	1
T9 25.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	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 120.00-116.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 116.67-108.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 108.33-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-91.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 83.33-75.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 75.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-25.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 25.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower 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 120.00-116.67	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 116.67-108.33	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 108.33-100.00	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-91.67	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 91.67-83.33	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 83.33-75.00	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 75.00-50.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-25.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 ((#17) T-Mobile)	B	Yes	Ar (CfAe)	95.00 - 6.00	-5.0000	0.31	6	3	1.9800	1.9800		1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 1/4" Hybriflex ((#17) T-Mobile)	B	Yes	Ar (CfAe)	95.00 - 6.00	-2.0000	0.375	2	2	1.6250	1.6250		0.66
3/8 Cable (#1-B)	B	Yes	Ar (CfAe)	40.00 - 6.00	-2.0000	0.25	1	1	0.3750	0.3750		0.20
LDF4-50A (1/2 FOAM) (#2 - CSP-#14)	B	Yes	Ar (CfAe)	43.00 - 6.00	-2.0000	0.23	1	1	0.6300	0.6300		0.15
1/2 (#3)	B	Yes	Ar (CfAe)	47.00 - 6.00	-2.0000	0.21	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (#7 - CSP-4)	B	Yes	Ar (CfAe)	55.00 - 6.00	-2.0000	0.27	1	1	1.0900	1.0900		0.33
7/8 (#15)	B	Yes	Ar (CfAe)	86.00 - 6.00	-2.0000	-0.37	1	1	1.1100	1.1100		0.54
1 1/4 (#24-E)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.48	1	1	1.5500	1.5500		0.66
WE65 (CSP-25)	A	Yes	Af (CfAe)	120.00 - 6.00	-2.0000	0.46	1	1	1.5836	1.5836	5.1284	0.53
WE65 (CSP-26)	A	Yes	Af (CfAe)	120.00 - 6.00	-2.0000	0.44	1	1	1.5836	1.5836	5.1284	0.53
WE65 (CSP-27)	A	Yes	Af (CfAe)	120.00 - 6.00	-2.0000	0.42	1	1	1.5836	1.5836	5.1284	0.53
LDF4-50A (1/2 FOAM) (CSP-24)	A	Yes	Ar (CfAe)	120.00 - 6.00	-2.0000	0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#25-A - CSP#17)	A	Yes	Ar (CfAe)	114.00 - 6.00	-2.0000	0.38	1	1	1.9800	1.9800		0.72
LDF7-50A (1-5/8 FOAM) (#25-B - CSP#7)	A	Yes	Ar (CfAe)	114.00 - 6.00	-2.0000	0.36	1	1	1.9800	1.9800		0.82
LDF6-50A (1-1/4 FOAM) (#26 - CSP-15)	A	Yes	Ar (CfAe)	114.00 - 6.00	-2.0000	0.34	1	1	1.5500	1.5500		0.66
1 5/8 (#22)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.32	1	1	1.9800	1.9800		1.04
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-A - CSP#22)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.3	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-B - CSP#23)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.28	1	1	1.9800	1.9800		0.72
1/2 (#23-C)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.26	1	1	0.5800	0.5800		0.25
1/2 (#24-A)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.24	2	2	0.5800	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.22	1	1	0.5800	0.5800		0.25

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
(#24-B)												
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#24-C - CSP#21)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.2	1	1	1.9800	1.9800		0.72
LDF7-50A (1-5/8 FOAM) (#24-D - CSP#8)	A	Yes	Ar (CfAe)	113.00 - 6.00	-2.0000	0.18	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (#18-B - CSP#12)	A	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	0.16	1	1	1.9800	1.9800		0.82
WE65 (#21 - CSP-5)	A	Yes	Af (CfAe)	110.00 - 6.00	-2.0000	0.14	1	1	1.5836	1.5836	5.1284	0.53
WE65 (#20 - CSP-6)	A	Yes	Af (CfAe)	109.00 - 6.00	-2.0000	0.12	1	1	1.5836	1.5836	5.1284	0.53
WE65 (#19 - CSP-3)	A	Yes	Af (CfAe)	107.00 - 6.00	-2.0000	0.1	1	1	1.5836	1.5836	5.1284	0.53
LDF4-50A (1/2 FOAM) (CSP-32)	A	Yes	Ar (CfAe)	103.00 - 6.00	-2.0000	0.08	1	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM) (#13 - CSP-11)	A	Yes	Ar (CfAe)	82.00 - 6.00	-2.0000	0.06	1	1	1.0900	1.0900		0.33
1/2 (#12)	A	Yes	Ar (CfAe)	81.00 - 6.00	-2.0000	0.04	1	1	0.5800	0.5800		0.25
1/2 (#14)	A	Yes	Ar (CfAe)	77.00 - 6.00	-2.0000	0.02	1	1	0.5800	0.5800		0.25
LDF4-50A (1/2 FOAM) (#6 - CSP#16)	A	Yes	Ar (CfAe)	53.00 - 6.00	-2.0000	0	1	1	0.6300	0.6300		0.15
1/2 (#4-A)	A	Yes	Ar (CfAe)	48.00 - 6.00	-2.0000	-0.02	1	1	0.5800	0.5800		0.25
1/2 (#5)	A	Yes	Ar (CfAe)	39.00 - 6.00	-2.0000	-0.04	1	1	0.5800	0.5800		0.25
LDF7-50A (1-5/8 FOAM) (#16-A - CSP-10)	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.46	1	1	1.9800	1.9800		0.82
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-18 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.44	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-19 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.42	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP-20 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-28 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.38	1	1	1.9800	1.9800		0.72

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
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-29 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.36	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP-30 (P))	B	Yes	Ar (CfAe)	110.00 - 6.00	-2.0000	-0.34	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (#18-A - CSP#13(P))	B	Yes	Ar (CfAe)	105.00 - 6.00	-2.0000	-0.32	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (CSP-9(P))	B	Yes	Ar (CfAe)	103.00 - 6.00	-2.0000	-0.3	1	1	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (#16-B - CSP#2)	B	Yes	Ar (CfAe)	92.00 - 6.00	-2.0000	-0.28	1	1	1.0900	1.0900		0.33
7/8 (#15)	B	Yes	Ar (CfAe)	86.00 - 6.00	-2.0000	-0.26	1	1	1.1100	1.1100		0.54
1 1/4" Hybriflex Cable ((#10) Sprint)	B	Yes	Ar (CfAe)	72.00 - 6.00	-2.0000	-0.24	4	4	1.6250	1.6250		1.60
1/2 (#9)	B	Yes	Ar (CfAe)	65.00 - 6.00	-2.0000	-0.22	1	1	0.5800	0.5800		0.25
7/8 (#8)	B	Yes	Ar (CfAe)	63.00 - 6.00	-2.0000	-0.2	1	1	1.1100	1.1100		0.54
1/2 (#1-A)	B	Yes	Ar (CfAe)	40.00 - 6.00	-2.0000	-0.18	2	2	0.5800	0.5800		0.25
LCF114-50J (1-1/4 FOAM) ((#11) AT&T 6(E))	B	Yes	Ar (CfAe)	80.00 - 6.00	-4.5000	0.41	4	4	1.5800	1.5800		0.70
3/4 (AT&T-DC Cables - Proposed)	C	Yes	Ar (CfAe)	80.00 - 6.00	-4.5000	-0.45	4	4	0.7500	0.7500		0.54
1/2" Fiber Optic Cable (AT&T - Fiber Cable)	C	Yes	Ar (CfAe)	80.00 - 6.00	-4.5000	-0.435	2	2	0.5800	0.5800		0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	0.175	1.320	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	8.669	3.607	0.000	0.000	0.06
		B	1.550	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	15.359	6.422	0.000	0.000	0.10
		B	9.070	0.000	0.000	0.000	0.04

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	15.639	6.598	0.000	0.000	0.10
		B	13.083	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	15.639	6.598	0.000	0.000	0.10
		B	18.132	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	16.661	6.598	0.000	0.000	0.11
		B	21.814	0.000	0.000	0.000	0.14
		C	1.733	0.000	0.000	0.000	0.01
T7	75.00-50.00	A	51.762	19.795	0.000	0.000	0.33
		B	85.007	0.000	0.000	0.000	0.59
		C	8.667	0.000	0.000	0.000	0.07
T8	50.00-25.00	A	54.705	19.795	0.000	0.000	0.34
		B	93.969	0.000	0.000	0.000	0.64
		C	8.667	0.000	0.000	0.000	0.07
T9	25.00-0.00	A	42.053	15.044	0.000	0.000	0.26
		B	72.778	0.000	0.000	0.000	0.49
		C	6.587	0.000	0.000	0.000	0.05

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	0.500	0.453	1.875	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
T2	116.67-108.33	A	0.500	14.194	5.577	0.000	0.000	0.18
		B		2.522	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	0.500	24.928	9.932	0.000	0.000	0.32
		B		14.598	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	0.500	25.653	10.182	0.000	0.000	0.32
		B		20.750	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	0.500	25.653	10.182	0.000	0.000	0.32
		B		28.993	0.000	0.000	0.000	0.33
		C		0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	0.500	27.925	10.182	0.000	0.000	0.34
		B		35.286	0.000	0.000	0.000	0.38
		C		1.387	2.358	0.000	0.000	0.04
T7	75.00-50.00	A	0.500	88.303	30.545	0.000	0.000	1.05
		B		138.840	0.000	0.000	0.000	1.52
		C		6.938	11.792	0.000	0.000	0.18
T8	50.00-25.00	A	0.500	96.163	30.545	0.000	0.000	1.11
		B		157.410	1.450	0.000	0.000	1.68
		C		6.938	11.792	0.000	0.000	0.18
T9	25.00-0.00	A	0.500	74.385	23.214	0.000	0.000	0.85
		B		122.526	1.837	0.000	0.000	1.30
		C		5.273	8.962	0.000	0.000	0.14

Feed Line Shielding

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T1	120.00-116.67	A	0.000	0.140	0.201	0.350
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	116.67-108.33	A	0.000	0.550	0.822	1.375
		B	0.000	0.068	0.104	0.169
		C	0.000	0.000	0.000	0.000
T3	108.33-100.00	A	0.000	0.950	1.429	2.376
		B	0.000	0.383	0.595	0.958
		C	0.000	0.000	0.000	0.000
T4	100.00-91.67	A	0.000	0.959	1.543	2.583
		B	0.000	0.534	0.908	1.440
		C	0.000	0.000	0.000	0.000
T5	91.67-83.33	A	0.000	0.943	1.519	2.543
		B	0.000	0.734	1.239	1.981
		C	0.000	0.000	0.000	0.000
T6	83.33-75.00	A	0.000	0.985	1.566	2.660
		B	0.000	0.880	1.469	2.376
		C	0.000	0.093	0.117	0.252
T7	75.00-50.00	A	0.000	2.988	5.214	8.963
		B	0.000	3.372	6.194	10.116
		C	0.000	0.455	0.631	1.365
T8	50.00-25.00	A	0.000	3.077	5.255	9.232
		B	0.000	3.735	6.629	11.206
		C	0.000	0.440	0.611	1.321
T9	25.00-0.00	A	0.000	1.731	3.623	6.394
		B	0.000	2.136	4.618	7.891
		C	0.000	0.244	0.418	0.903

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	120.00-116.67	-0.1231	-3.7318	-0.1447	-3.9535
T2	116.67-108.33	-1.9160	-15.2753	-2.1175	-16.9696
T3	108.33-100.00	-3.3136	-25.8436	-3.4563	-27.9809
T4	100.00-91.67	-1.1351	-25.4122	-1.2014	-27.5667
T5	91.67-83.33	1.9786	-24.7341	2.1726	-26.8736
T6	83.33-75.00	5.2234	-23.1446	5.2227	-25.0810
T7	75.00-50.00	7.9127	-23.4025	7.9329	-25.7335
T8	50.00-25.00	9.5089	-26.3899	9.5800	-28.3507
T9	25.00-0.00	8.5174	-23.3783	9.1318	-26.4427

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 6' Side Mount Standoff	B	From Leg	1.00	0.0000	41.00	No Ice	4.97	4.97	0.07
(1)			4.00			1/2" Ice	6.12	6.12	0.13
(#1-A Dish Mount)			0.00						
1'x1' Panel Antenna	B	From Leg	1.00	0.0000	40.00	No Ice	1.40	0.13	0.01
(#1-B (mount Share #1-A))			4.00			1/2" Ice	1.56	0.21	0.02
			0.00						
3' Whip (3in diameter) /w	B	From Leg	0.50	0.0000	43.00	No Ice	1.27	1.27	0.02
mount			0.00			1/2" Ice	1.64	1.64	0.03
(#2)			0.00						
5'x1.5in dia Whip Antenna /w	A	From Leg	0.50	0.0000	47.00	No Ice	1.81	1.81	0.03
mount			0.00			1/2" Ice	2.64	2.64	0.05
(#3)			0.00						
10'x6" Dipole Antenna	C	From Leg	3.00	0.0000	48.00	No Ice	9.17	1.67	0.05
(#4-A)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00						
3' Yagi	C	From Leg	3.00	0.0000	48.00	No Ice	2.08	2.08	0.03
(#4-B)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00						
Pirod 4' Side Mount Standoff	C	None		0.0000	48.00	No Ice	2.72	2.72	0.05
(1)						1/2" Ice	4.91	4.91	0.09
(#4-A&B)									
6'x1" Whip Antenna w/	A	From Leg	1.00	0.0000	39.00	No Ice	2.02	2.02	0.05
Mount			0.00			1/2" Ice	3.14	3.14	0.07
(#5 - CSP#14)			0.00						
1.0" Dia 4' Omni w/Pipe	B	From Leg	2.00	0.0000	53.00	No Ice	0.94	0.94	0.02
Mount			0.00			1/2" Ice	1.39	1.39	0.03
(#6 - CSP#16)			0.00						
20' 4-Bay Dipole w/ 2'	A	From Leg	2.00	0.0000	55.00	No Ice	4.00	4.00	0.06
Sidearm Mount			0.00			1/2" Ice	6.00	6.00	0.10
(#7 - CSP-4)			0.00						
GPS	B	From Leg	3.00	0.0000	63.00	No Ice	1.00	1.00	0.01
(#8)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
2'6"x4" Pipe Mount	B	None		0.0000	63.00	No Ice	0.75	0.75	0.03
(For #8)						1/2" Ice	0.95	0.95	0.04
6' Yagi w/ Mount	B	From Leg	2.00	0.0000	65.00	No Ice	8.79	0.71	0.05
(#9)			0.00			1/2" Ice	9.46	0.98	0.09
			0.00						
Face Mount	A	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
((#10) Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
Face Mount	B	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
((#10) Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
Face Mount	C	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
((#10) Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
APXVSPP18-C-A20	A	From Leg	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06
((#10) Sprint)			-1.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	B	From Leg	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06
((#10) Sprint)			-1.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	C	From Leg	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06
((#10) Sprint)			-1.00			1/2" Ice	8.81	5.74	0.11
			0.00						
(2) ALU RRH 1900 4X45	A	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
((#10) Sprint)			0.50						
(2) ALU RRH 1900 4X45	B	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
((#10) Sprint)			0.00						
(2) ALU RRH 1900 4X45	C	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
((#10) Sprint)			0.00						
ALU RRH 800 MHz 2x50W	A	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
((#10) Sprint)			0.00			1/2" Ice	2.19	2.17	0.09
			0.00						
ALU RRH 800 MHz 2x50W	B	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
((#10) Sprint)			0.00			1/2" Ice	2.19	2.17	0.09
			0.00						
ALU RRH 800 MHz 2x50W	C	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
((#10) Sprint)			0.00			1/2" Ice	2.19	2.17	0.09
			0.00						
800 MHz NOTCH FILTER	A	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
((#10) Sprint)			0.00			1/2" Ice	0.99	0.65	0.02
			0.00						
800 MHz NOTCH FILTER	B	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
((#10) Sprint)			0.00			1/2" Ice	0.99	0.65	0.02
			0.00						
800 MHz NOTCH FILTER	C	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
((#10) Sprint)			0.00			1/2" Ice	0.99	0.65	0.02
			0.00						
1900 RRH COMBINER	A	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
((#10) Sprint)			0.00			1/2" Ice	1.48	0.56	0.05
			0.00						
1900 RRH COMBINER	B	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
((#10) Sprint)			0.00			1/2" Ice	1.48	0.56	0.05
			0.00						
1900 RRH COMBINER	C	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
((#10) Sprint)			0.00			1/2" Ice	1.48	0.56	0.05
			0.00						
APXVTM14-C-1 20	A	From Face	0.00	0.0000	72.00	No Ice	6.90	4.34	0.07
((#10) Sprint)			0.00			1/2" Ice	7.35	4.74	0.11
			0.00						
TD-RRH8x20-25	A	From Face	0.00	0.0000	72.00	No Ice	4.32	1.41	0.07
((#10) Sprint)			0.00			1/2" Ice	4.60	1.61	0.09
			0.00						
APXVTM14-C-1 20	B	From Face	0.50	0.0000	72.00	No Ice	6.90	4.34	0.07
((#10) Sprint)			0.00			1/2" Ice	7.35	4.74	0.11
			0.00						
TD-RRH8x20-25	B	From Face	0.00	0.0000	72.00	No Ice	4.32	1.41	0.07
((#10) Sprint)			0.00			1/2" Ice	4.60	1.61	0.09
			0.00						
APXVTM14-C-1 20	C	From Face	0.50	0.0000	72.00	No Ice	6.90	4.34	0.07
((#10) Sprint)			0.00			1/2" Ice	7.35	4.74	0.11
			0.00						
TD-RRH8x20-25	C	From Face	0.00	0.0000	72.00	No Ice	4.32	1.41	0.07
((#10) Sprint)			0.00			1/2" Ice	4.60	1.61	0.09
			0.00						
3' Yagi	B	From Leg	1.00	40.0000	81.00	No Ice	2.08	2.08	0.03
(#12)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00						
3' Yagi	B	From Leg	1.00	-40.0000	82.00	No Ice	2.08	2.08	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(#13 - CSP-11)			0.00 0.00			1/2" Ice	3.79	3.79	0.05
20' 4-Bay Dipole	B	From Leg	4.00	0.0000	77.00	No Ice	4.00	4.00	0.06
(#14)			0.00 0.00			1/2" Ice	6.00	6.00	0.10
4'6"x3" Pipe Mount (horizontal)	B	None		0.0000	67.00	No Ice	1.30	1.30	0.03
((Bottom mount) #14)						1/2" Ice	1.57	1.57	0.08
4'6"x3" Pipe Mount (horizontal)	B	None		0.0000	87.00	No Ice	1.30	1.30	0.03
((Top Mount) #14)						1/2" Ice	1.57	1.57	0.08
20' 4-Bay Dipole	A	From Leg	4.00	0.0000	86.00	No Ice	4.00	4.00	0.06
(#15)			0.00 0.00			1/2" Ice	6.00	6.00	0.10
3'4"x4" Pipe Mount (horizontal)	A	None		0.0000	76.00	No Ice	1.05	1.05	0.04
((Bottom mount) #15)						1/2" Ice	1.27	1.27	0.09
3'4"x4" Pipe Mount (horizontal)	A	None		0.0000	96.00	No Ice	1.05	1.05	0.04
((Top Mount) #15)						1/2" Ice	1.27	1.27	0.09
SC479-HF1LDF (inverted)	B	From Face	4.00	0.0000	81.00 - 95.00	No Ice	1.74	1.74	0.04
(# 16-A - CSP-10)			0.00 0.00			1/2" Ice	2.60	2.60	0.05
PD458-406	A	From Face	4.00	0.0000	100.00 - 92.00	No Ice	4.59	4.59	0.02
(# 16-B - CSP-2)			0.00 0.00			1/2" Ice	6.89	6.89	0.04
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Upright # 16-B)	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
(# 16-A&B)						1/2" Ice	3.13	3.13	0.15
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Invert #16-A)	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
(# 16-A&B)						1/2" Ice	3.13	3.13	0.15
SE419-SWBPALDF Panel Antenna	A	From Face	0.50	0.0000	101.00	No Ice	25.76	9.90	0.05
(#18-A - CSP 13(P))			0.00 0.00			1/2" Ice	26.62	10.56	0.18
AP13-850/065D w/Mount Pipe	A	From Face	0.50	0.0000	104.00	No Ice	5.61	3.92	0.04
(#18-B - CSP-12(E))			0.00 0.00			1/2" Ice	6.30	4.96	0.08
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	2.60	2.60	0.07
(#19 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	2.60	2.60	0.07
(#20 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
6'8"x4" Pipe Mount	A	None		0.0000	110.00	No Ice	2.60	2.60	0.07
(#21 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
Pirod 4' Side Mount Standoff (1)	B	None		0.0000	113.00	No Ice	2.72	2.72	0.05
(#22, 23-A, 23-B Mount)						1/2" Ice	4.91	4.91	0.09
16'x3" Omni	B	From Leg	4.00	0.0000	113.00	No Ice	5.06	5.06	0.03
(#22)			0.00 0.00			1/2" Ice	6.54	6.54	0.07
16'x3" Omni (inverted)	B	From Leg	4.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#23-A - CSP-22)			0.00 0.00			1/2" Ice	6.54	6.54	0.07
16'x3" Omni (inverted)	B	From Leg	2.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#23-B - CSP-23)			0.00 0.00			1/2" Ice	6.54	6.54	0.07
Junction Box	B	From Face	0.50	0.0000	112.00	No Ice	3.15	1.05	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(#23-C)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00						
Rohn 6' Side-Arm(1)	B	From Leg	0.00	20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00						
Rohn 6' Side-Arm(1)	C	From Leg	0.00	-20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00						
Junction Box	C	From Face	3.00	0.0000	114.00	No Ice	3.15	1.05	0.02
(#24-A)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00						
SC479-HF1LDF (inverted)	C	From Face	6.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#24-B)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF	B	From Face	6.00	0.0000	120.00	No Ice	5.06	5.06	0.03
(#24-C - CSP#21)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
OGT9-840	B	From Face	3.00	0.0000	120.00	No Ice	2.27	2.27	0.02
(#24-D - CSP#8)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00						
10'x2" Dipole Antenna	C	From Face	3.00	0.0000	104.00 - 114.00	No Ice	9.17	1.67	0.05
(inverted)			0.00			1/2" Ice	9.89	2.79	0.08
(#24-E)			0.00						
Rohn 6' Side-Arm(1)	C	From Leg	0.00	60.0000	114.00	No Ice	10.60	10.60	0.14
(#25 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00						
SC479-HF1LDF (inverted)	C	From Leg	6.00	60.0000	100.00 - 114.00	No Ice	5.06	5.06	0.03
(#25-A - CSP-17)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
OGT9-840	C	From Leg	6.00	60.0000	120.00	No Ice	2.27	2.27	0.02
(#25-B - CSP#7)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00						
10'x2" Dipole Antenna	A	From Leg	0.50	0.0000	120.00	No Ice	9.17	1.67	0.05
(#26 - CSP-15)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00						
Lightning Rod 5/8x4'	C	None		0.0000	138.00	No Ice	0.25	0.25	0.03
(#27)						1/2" Ice	0.66	0.66	0.03
16'x2.5" Pipe Mount	C	None		0.0000	138.00	No Ice	4.00	4.00	0.09
(#27 Mount)						1/2" Ice	4.80	4.80	0.09
TMA 432-83H-01T	C	None		0.0000	103.00	No Ice	1.63	0.95	0.03
(CSP-32)						1/2" Ice	1.81	1.09	0.04
TMA 432-83H-01T	B	None		0.0000	120.00	No Ice	1.63	0.95	0.03
(CSP-24)						1/2" Ice	1.81	1.09	0.04
SC479-HF1LDF (inverted)	B	From Leg	3.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(CSP - 9 (P))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF	A	From Leg	3.00	0.0000	110.00	No Ice	5.06	5.06	0.03
(CSP-18 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF (inverted)	A	From Leg	3.00	0.0000	96.00 - 110.00	No Ice	5.06	5.06	0.03
(CSP-19 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
TMA 432-83H-01T	A	None		0.0000	110.00	No Ice	1.63	0.95	0.03
(CSP-20)						1/2" Ice	1.81	1.09	0.04
SE419-SWBPALDF Panel	A	From Leg	0.50	0.0000	105.00	No Ice	25.76	9.90	0.05
Antenna			0.00			1/2" Ice	26.62	10.56	0.18
(CSP-29)			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TMA 432-83H-01T	A	None		0.0000	105.00	No Ice	1.63	0.95	0.03
(CSP-30)						1/2" Ice	1.81	1.09	0.04
WPA-70040-4CF-EDIN Panel	A	None		0.0000	110.00	No Ice	11.04	3.65	0.02
(CSP-28)						1/2" Ice	11.50	4.01	0.08
Face Mount	A	From Face	0.00	0.0000	75.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
Face Mount	B	From Face	0.00	0.0000	75.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
Face Mount	C	From Face	0.00	0.0000	75.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
TPA-65R-LCUUUU-H8	A	From Face	0.50	0.0000	75.00	No Ice	13.44	8.82	0.08
Panel w/ RET			6.00			1/2" Ice	14.16	9.42	0.16
(ATT)			0.00						
RRUS-11	A	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	A	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
DC6-48-60-18-8F (Squid)	A	From Face	0.50	0.0000	75.00	No Ice	1.27	1.27	0.02
Suppressor			6.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00						
HPA-65R-BUU-H8 Panel	A	From Face	0.50	0.0000	75.00	No Ice	12.99	7.48	0.05
(ATT)			-3.00			1/2" Ice	13.69	8.06	0.13
			0.00						
RRUS-32	A	From Face	0.50	0.0000	75.00	No Ice	3.88	2.76	0.08
(ATT)			-3.00			1/2" Ice	4.14	2.98	0.11
			0.00						
DC6-48-60-18-8F (Squid)	A	From Face	0.50	0.0000	75.00	No Ice	1.27	1.27	0.02
Suppressor			-3.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00						
SBNH-1D6565C	A	From Face	0.50	0.0000	75.00	No Ice	11.45	7.70	0.06
(ATT)			-6.00			1/2" Ice	12.06	8.29	0.13
			0.00						
DTMABP7819VG12A TMA	A	From Face	0.50	0.0000	75.00	No Ice	1.59	0.58	0.02
(ATT)			-6.00			1/2" Ice	1.76	0.70	0.03
			0.00						
TPA-65R-LCUUUU-H8	B	From Face	0.50	0.0000	75.00	No Ice	13.44	8.82	0.08
Panel w/ RET			6.00			1/2" Ice	14.16	9.42	0.16
(ATT)			0.00						
RRUS-11	B	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	B	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
HPA-65R-BUU-H8 Panel	B	From Face	0.50	0.0000	75.00	No Ice	12.99	7.48	0.05
(ATT)			-3.00			1/2" Ice	13.69	8.06	0.13
			0.00						
RRUS-32	B	From Face	0.50	0.0000	75.00	No Ice	3.88	2.76	0.08
(ATT)			-3.00			1/2" Ice	4.14	2.98	0.11
			0.00						
SBNH-1D6565C	B	From Face	0.50	0.0000	75.00	No Ice	11.45	7.70	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(ATT)			-6.00 0.00			1/2" Ice	12.06	8.29	0.13
DTMABP7819VG12A TMA	B	From Face	0.50	0.0000	75.00	No Ice	1.59	0.58	0.02
(ATT)			-6.00 0.00			1/2" Ice	1.76	0.70	0.03
QS66415-3 Panel	C	From Face	0.50	0.0000	75.00	No Ice	10.36	5.52	0.15
(ATT)			6.00 0.00			1/2" Ice	10.93	5.97	0.21
RRUS-11	C	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00 0.00			1/2" Ice	3.23	1.41	0.07
RRUS-11	C	From Face	0.50	0.0000	75.00	No Ice	2.99	1.25	0.05
(ATT)			6.00 0.00			1/2" Ice	3.23	1.41	0.07
HPA-65R-BUU-H8 Panel	C	From Face	0.50	0.0000	75.00	No Ice	12.99	7.48	0.05
(ATT)			-3.00 0.00			1/2" Ice	13.69	8.06	0.13
RRUS-32	C	From Face	0.50	0.0000	75.00	No Ice	3.88	2.76	0.08
(ATT)			-3.00 0.00			1/2" Ice	4.14	2.98	0.11
TMA 432-83H-01T	A	None		0.0000	120.00	No Ice	1.63	0.95	0.03
(CSP-24)						1/2" Ice	1.81	1.09	0.04
EUSF10-U	A	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00 0.00			1/2" Ice	12.66	5.24	0.51
EUSF10-U	C	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00 0.00			1/2" Ice	12.66	5.24	0.51
EUSF10-U	B	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00 0.00			1/2" Ice	12.66	5.24	0.51
AIR B2A/B4P w/ 6' Sch 40	A	From Leg	3.00	0.0000	95.00	No Ice	6.75	5.65	0.10
Pipe Mount			4.50			1/2" Ice	7.31	6.56	0.16
((#17) T-Mobile)			0.00						
AIR B2A/B4P w/ 6' Sch 40	B	From Leg	3.00	0.0000	95.00	No Ice	6.75	5.65	0.10
Pipe Mount			4.50			1/2" Ice	7.31	6.56	0.16
((#17) T-Mobile)			0.00						
AIR B2A/B4P w/ 6' Sch 40	C	From Leg	3.00	0.0000	95.00	No Ice	6.75	5.65	0.10
Pipe Mount			4.50			1/2" Ice	7.31	6.56	0.16
((#17) T-Mobile)			0.00						
TMA2093F00V1-1 Twin	A	From Leg	3.00	0.0000	95.00	No Ice	0.42	1.12	0.03
TMA			4.50			1/2" Ice	0.53	1.27	0.03
((#17) T-Mobile)			0.00						
TMA2093F00V1-1 Twin	B	From Leg	3.00	0.0000	95.00	No Ice	0.42	1.12	0.03
TMA			4.50			1/2" Ice	0.53	1.27	0.03
((#17) T-Mobile)			0.00						
TMA2093F00V1-1 Twin	C	From Leg	3.00	0.0000	95.00	No Ice	0.42	1.12	0.03
TMA			4.50			1/2" Ice	0.53	1.27	0.03
((#17) T-Mobile)			0.00						
LNX-6515DS-VTM w/ 6' 2"	A	From Leg	3.00	0.0000	95.00	No Ice	11.45	9.12	0.07
sch 40 Piipe Mount			-4.50			1/2" Ice	12.06	10.21	0.15
((#17) T-Mobile)			0.00						
LNX-6515DS-VTM w/ 6' 2"	B	From Leg	3.00	0.0000	95.00	No Ice	11.45	9.12	0.07
sch 40 Piipe Mount			-4.50			1/2" Ice	12.06	10.21	0.15
((#17) T-Mobile)			0.00						
LNX-6515DS-VTM w/ 6' 2"	C	From Leg	3.00	0.0000	95.00	No Ice	11.45	9.12	0.07
sch 40 Piipe Mount			-4.50			1/2" Ice	12.06	10.21	0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
((#17) T-Mobile)			0.00						
RRUS-11	A	From Leg	3.00	0.0000	95.00	No Ice	2.99	1.25	0.05
((#17) T-Mobile)			-4.50			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	B	From Leg	3.00	0.0000	95.00	No Ice	2.99	1.25	0.05
((#17) T-Mobile)			-4.50			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	C	From Leg	3.00	0.0000	95.00	No Ice	2.99	1.25	0.05
((#17) T-Mobile)			-4.50			1/2" Ice	3.23	1.41	0.07
			0.00						
AIR32 B66Aa/B2a Antenna	A	From Leg	3.00	0.0000	95.00	No Ice	5.84	3.94	0.13
Panel			0.00			1/2" Ice	6.23	4.30	0.17
((#17) T-Mobile)			0.00						
AIR32 B66Aa/B2a Antenna	B	From Leg	3.00	0.0000	95.00	No Ice	5.84	3.94	0.13
Panel			0.00			1/2" Ice	6.23	4.30	0.17
((#17) T-Mobile)			0.00						
AIR32 B66Aa/B2a Antenna	C	From Leg	3.00	0.0000	95.00	No Ice	5.84	3.94	0.13
Panel			0.00			1/2" Ice	6.23	4.30	0.17
((#17) T-Mobile)			0.00						

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
4 FT DISH	A	Paraboloid	From	1.50	0.0000		41.00	4.00	No Ice	12.57	0.14
(#1-A)		w/Shroud (HP)	Leg	5.00					1/2" Ice	13.10	0.28
				0.00							
PA6-65AC	A	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.27	0.09
(CSP - 69)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	B	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.27	0.09
(CSP - 70)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	C	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.27	0.09
(CSP - 71)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
6' DISH (SOLID)	C	Paraboloid	From	0.50	10.0000		117.00	6.00	No Ice	28.27	0.09
(#19 - CSP-3)		w/Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
6' DISH (SOLID)	A	Paraboloid	From	0.50	10.0000		115.00	6.00	No Ice	28.27	0.09
(#21 - CSP-5)		w/Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
6' DISH (SOLID)	C	Paraboloid	From	0.50	-60.0000		111.00	6.00	No Ice	28.27	0.09
(#20 - CSP-6)		w/Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							

Tower Pressures - No Ice

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 120.00-116.67	118.33	1.44	30	39.883	A	6.112	2.956	2.781	30.67	0.000	0.000
					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2 116.67-108.33	112.50	1.42	29	103.599	A	9.308	15.621	6.952	27.89	0.000	0.000
					B	6.419	8.502		46.59	0.000	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3 108.33-100.00	104.17	1.389	29	109.157	A	11.744	22.311	6.952	20.41	0.000	0.000
					B	6.156	16.022		31.35	0.000	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4 100.00-91.67	95.83	1.356	28	114.715	A	12.561	22.591	6.952	19.78	0.000	0.000
					B	6.598	20.035		26.10	0.000	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	120.273	A	12.845	22.591	6.952	19.62	0.000	0.000
					B	6.527	25.084		21.99	0.000	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.284	27	125.831	A	13.060	23.613	6.952	18.96	0.000	0.000
					B	6.559	28.766		19.68	0.000	0.000
					C	7.911	8.685		41.89	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	412.014	A	43.026	74.966	23.204	19.67	0.000	0.000
					B	22.251	108.211		17.79	0.000	0.000
					C	27.814	31.871		38.88	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	460.861	A	45.652	75.561	20.856	17.21	0.000	0.000
					B	24.484	114.824		14.97	0.000	0.000
					C	30.502	29.522		34.75	0.000	0.000
T9 25.00-0.00	12.50	1	21	514.792	A	42.447	70.730	28.676	25.34	0.000	0.000
					B	26.408	101.454		22.43	0.000	0.000
					C	30.608	35.263		43.53	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 120.00-116.67	118.33	1.44	30	0.5000	40.161	A	6.518	5.647	3.337	27.43	0.000	0.000
						B	4.994	5.334		32.31	0.000	0.000
						C	4.994	5.334		32.31	0.000	0.000
T2 116.67-108.33	112.50	1.42	29	0.5000	104.294	A	10.725	24.595	8.342	23.62	0.000	0.000
						B	6.354	13.406		42.22	0.000	0.000
						C	6.523	10.951		47.74	0.000	0.000
T3 108.33-100.00	104.17	1.389	29	0.5000	109.852	A	14.307	35.021	8.342	16.91	0.000	0.000
						B	5.793	25.257		26.87	0.000	0.000
						C	6.751	11.043		46.88	0.000	0.000
T4 100.00-91.67	95.83	1.356	28	0.5000	115.410	A	15.105	35.829	8.342	16.38	0.000	0.000
						B	6.066	31.350		22.30	0.000	0.000
						C	7.506	11.135		44.75	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	0.5000	120.968	A	15.405	35.938	8.342	16.25	0.000	0.000
						B	5.785	39.487		18.43	0.000	0.000
						C	7.766	11.227		43.92	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T6 83.33-75.00	79.17	1.284	27	0.5000	126.526	A	15.550	38.262	8.342	15.50	0.000	0.000
						B	5.652	45.727		16.24	0.000	0.000
						C	10.134	12.615		36.67	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	0.5000	414.099	A	50.026	122.172	27.375	15.90	0.000	0.000
						B	18.329	172.325		14.36	0.000	0.000
						C	38.872	43.339		33.30	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	0.5000	462.946	A	52.425	128.484	25.027	13.83	0.000	0.000
						B	21.357	189.073		11.89	0.000	0.000
						C	41.584	41.895		29.98	0.000	0.000
T9 25.00-0.00	12.50	1	21	0.5000	516.877	A	47.846	113.913	32.848	20.31	0.000	0.000
						B	24.971	161.649		17.60	0.000	0.000
						C	39.084	46.287		38.48	0.000	0.000

Tower Pressure - Service

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.44	30	39.883	A	6.112	2.956	2.781	30.67	0.000	0.000
120.00-116.67					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.42	29	103.599	A	9.308	15.621	6.952	27.89	0.000	0.000
116.67-108.33					B	6.419	8.502		46.59	0.000	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.389	29	109.157	A	11.744	22.311	6.952	20.41	0.000	0.000
108.33-100.00					B	6.156	16.022		31.35	0.000	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.356	28	114.715	A	12.561	22.591	6.952	19.78	0.000	0.000
100.00-91.67					B	6.598	20.035		26.10	0.000	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	120.273	A	12.845	22.591	6.952	19.62	0.000	0.000
					B	6.527	25.084		21.99	0.000	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.284	27	125.831	A	13.060	23.613	6.952	18.96	0.000	0.000
					B	6.559	28.766		19.68	0.000	0.000
					C	7.911	8.685		41.89	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	412.014	A	43.026	74.966	23.204	19.67	0.000	0.000
					B	22.251	108.211		17.79	0.000	0.000
					C	27.814	31.871		38.88	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	460.861	A	45.652	75.561	20.856	17.21	0.000	0.000
					B	24.484	114.824		14.97	0.000	0.000
					C	30.502	29.522		34.75	0.000	0.000
T9 25.00-0.00	12.50	1	21	514.792	A	42.447	70.730	28.676	25.34	0.000	0.000
					B	26.408	101.454		22.43	0.000	0.000
					C	30.608	35.263		43.53	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	1	1	7.875	0.68	203.25	A
120.00-116.67			B	0.195	2.613	0.589	1	1	6.632			
			C	0.195	2.613	0.589	1	1	6.632			
T2	0.06	0.77	A	0.241	2.466	0.6	1	1	18.673	1.56	186.89	A
116.67-108.33			B	0.144	2.794	0.581	1	1	11.355			
			C	0.13	2.846	0.579	1	1	10.546			
T3	0.14	0.78	A	0.312	2.265	0.62	1	1	25.569	1.92	229.90	A
108.33-100.00			B	0.203	2.585	0.591	1	1	15.626			
			C	0.126	2.864	0.578	1	1	10.769			
T4	0.17	0.92	A	0.306	2.279	0.618	1	1	26.520	1.95	234.32	A
100.00-91.67			B	0.232	2.492	0.597	1	1	18.569			
			C	0.126	2.862	0.578	1	1	11.525			
T5	0.22	0.94	A	0.295	2.31	0.614	1	1	26.722	1.94	233.22	A
91.67-83.33			B	0.263	2.4	0.605	1	1	21.709			
			C	0.122	2.876	0.578	1	1	11.782			
T6	0.25	1.30	A	0.291	2.319	0.613	1	1	27.542	1.95	234.47	A
83.33-75.00			B	0.281	2.349	0.61	1	1	24.111			
			C	0.132	2.839	0.579	1	1	12.939			
T7	0.98	4.33	A	0.286	2.333	0.612	1	1	88.892	5.93	237.18	A
75.00-50.00			B	0.317	2.253	0.621	1	1	89.464			
			C	0.145	2.791	0.581	1	1	46.321			
T8	1.05	5.01	A	0.263	2.399	0.605	1	1	91.388	5.42	216.71	A
50.00-25.00			B	0.302	2.29	0.617	1	1	95.285			
			C	0.13	2.846	0.579	1	1	47.585			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	1	1	84.506	5.10	203.83	A
			B	0.248	2.442	0.601	1	1	87.429			
			C	0.128	2.854	0.578	1	1	51.002			
Sum Weight:	3.69	20.09						OTM	1604.28 kip-ft	26.44		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.825	1	6.805	0.59	175.64	A
120.00-116.67			B	0.195	2.613	0.589	0.825	1	5.759			
			C	0.195	2.613	0.589	0.825	1	5.759			
T2	0.06	0.77	A	0.241	2.466	0.6	0.825	1	17.044	1.42	170.59	A
116.67-108.33			B	0.144	2.794	0.581	0.825	1	10.232			
			C	0.13	2.846	0.579	0.825	1	9.404			
T3	0.14	0.78	A	0.312	2.265	0.62	0.825	1	23.514	1.76	211.42	A
108.33-100.00			B	0.203	2.585	0.591	0.825	1	14.548			
			C	0.126	2.864	0.578	0.825	1	9.588			
T4	0.17	0.92	A	0.306	2.279	0.618	0.825	1	24.321	1.79	214.90	A
100.00-91.67			B	0.232	2.492	0.597	0.825	1	17.414			
			C	0.126	2.862	0.578	0.825	1	10.211			
T5	0.22	0.94	A	0.295	2.31	0.614	0.825	1	24.474	1.78	213.60	A
91.67-83.33			B	0.263	2.4	0.605	0.825	1	20.567			
			C	0.122	2.876	0.578	0.825	1	10.423			
T6	0.25	1.30	A	0.291	2.319	0.613	0.825	1	25.257	1.79	215.01	A
83.33-75.00			B	0.281	2.349	0.61	0.825	1	22.964			
			C	0.132	2.839	0.579	0.825	1	11.554			
T7	0.98	4.33	A	0.286	2.333	0.612	0.825	1	81.362	5.51	220.47	B
75.00-50.00			B	0.317	2.253	0.621	0.825	1	85.570			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.145	2.791	0.581	0.825	1	41.453			
T8	1.05	5.01	A	0.263	2.399	0.605	0.825	1	83.398	5.15	205.98	B
50.00-25.00			B	0.302	2.29	0.617	0.825	1	91.000			
			C	0.13	2.846	0.579	0.825	1	42.247			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.825	1	77.078	4.82	192.74	B
			B	0.248	2.442	0.601	0.825	1	82.808			
			C	0.128	2.854	0.578	0.825	1	45.646			
Sum Weight:	3.69	20.09						OTM	1479.77 kip-ft	24.61		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.8	1	6.652	0.57	171.70	A
120.00-116.67			B	0.195	2.613	0.589	0.8	1	5.634			
			C	0.195	2.613	0.589	0.8	1	5.634			
T2	0.06	0.77	A	0.241	2.466	0.6	0.8	1	16.812	1.40	168.26	A
116.67-108.33			B	0.144	2.794	0.581	0.8	1	10.071			
			C	0.13	2.846	0.579	0.8	1	9.241			
T3	0.14	0.78	A	0.312	2.265	0.62	0.8	1	23.220	1.74	208.78	A
108.33-100.00			B	0.203	2.585	0.591	0.8	1	14.395			
			C	0.126	2.864	0.578	0.8	1	9.419			
T4	0.17	0.92	A	0.306	2.279	0.618	0.8	1	24.007	1.77	212.12	A
100.00-91.67			B	0.232	2.492	0.597	0.8	1	17.249			
			C	0.126	2.862	0.578	0.8	1	10.024			
T5	0.22	0.94	A	0.295	2.31	0.614	0.8	1	24.153	1.76	210.79	A
91.67-83.33			B	0.263	2.4	0.605	0.8	1	20.403			
			C	0.122	2.876	0.578	0.8	1	10.228			
T6	0.25	1.30	A	0.291	2.319	0.613	0.8	1	24.930	1.77	212.23	A
83.33-75.00			B	0.281	2.349	0.61	0.8	1	22.800			
			C	0.132	2.839	0.579	0.8	1	11.356			
T7	0.98	4.33	A	0.286	2.333	0.612	0.8	1	80.287	5.48	219.04	B
75.00-50.00			B	0.317	2.253	0.621	0.8	1	85.014			
			C	0.145	2.791	0.581	0.8	1	40.758			
T8	1.05	5.01	A	0.263	2.399	0.605	0.8	1	82.257	5.11	204.59	B
50.00-25.00			B	0.302	2.29	0.617	0.8	1	90.388			
			C	0.13	2.846	0.579	0.8	1	41.484			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.8	1	76.017	4.78	191.20	B
			B	0.248	2.442	0.601	0.8	1	82.147			
			C	0.128	2.854	0.578	0.8	1	44.881			
Sum Weight:	3.69	20.09						OTM	1463.63 kip-ft	24.38		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.85	1	6.958	0.60	179.59	A
120.00-116.67			B	0.195	2.613	0.589	0.85	1	5.883			
			C	0.195	2.613	0.589	0.85	1	5.883			
T2	0.06	0.77	A	0.241	2.466	0.6	0.85	1	17.277	1.44	172.92	A
116.67-108.33			B	0.144	2.794	0.581	0.85	1	10.392			
			C	0.13	2.846	0.579	0.85	1	9.567			
T3	0.14	0.78	A	0.312	2.265	0.62	0.85	1	23.807	1.78	214.06	A
108.33-100.00			B	0.203	2.585	0.591	0.85	1	14.702			
			C	0.126	2.864	0.578	0.85	1	9.757			
T4	0.17	0.92	A	0.306	2.279	0.618	0.85	1	24.636	1.81	217.67	A
100.00-91.67			B	0.232	2.492	0.597	0.85	1	17.579			
			C	0.126	2.862	0.578	0.85	1	10.399			
T5	0.22	0.94	A	0.295	2.31	0.614	0.85	1	24.795	1.80	216.40	A
91.67-83.33			B	0.263	2.4	0.605	0.85	1	20.730			
			C	0.122	2.876	0.578	0.85	1	10.617			
T6	0.25	1.30	A	0.291	2.319	0.613	0.85	1	25.583	1.81	217.79	A
83.33-75.00			B	0.281	2.349	0.61	0.85	1	23.128			
			C	0.132	2.839	0.579	0.85	1	11.752			
T7	0.98	4.33	A	0.286	2.333	0.612	0.85	1	82.438	5.55	221.91	B
75.00-50.00			B	0.317	2.253	0.621	0.85	1	86.127			
			C	0.145	2.791	0.581	0.85	1	42.149			
T8	1.05	5.01	A	0.263	2.399	0.605	0.85	1	84.540	5.18	207.36	B
50.00-25.00			B	0.302	2.29	0.617	0.85	1	91.612			
			C	0.13	2.846	0.579	0.85	1	43.010			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.85	1	78.139	4.86	194.28	B
			B	0.248	2.442	0.601	0.85	1	83.468			
			C	0.128	2.854	0.578	0.85	1	46.411			
Sum Weight:	3.69	20.09						OTM	1495.92 kip-ft	24.84		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.69	A	0.303	2.288	0.617	1	1	10.001	0.79	235.60	A
120.00-116.67			B	0.257	2.416	0.604	1	1	8.214			
			C	0.257	2.416	0.604	1	1	8.214			
T2	0.20	1.12	A	0.339	2.198	0.628	1	1	26.183	1.95	233.60	A
116.67-108.33			B	0.189	2.632	0.588	1	1	14.241			
			C	0.168	2.708	0.584	1	1	12.922			
T3	0.44	1.14	A	0.449	1.975	0.673	1	1	37.870	2.47	296.97	A
108.33-100.00			B	0.283	2.343	0.611	1	1	21.219			
			C	0.162	2.728	0.583	1	1	13.193			
T4	0.54	1.34	A	0.441	1.988	0.669	1	1	39.086	2.51	301.25	A
100.00-91.67			B	0.324	2.234	0.624	1	1	25.616			
			C	0.162	2.73	0.583	1	1	14.001			
T5	0.65	1.38	A	0.424	2.018	0.662	1	1	39.191	2.49	298.70	A
91.67-83.33			B	0.374	2.117	0.641	1	1	31.113			
			C	0.157	2.746	0.583	1	1	14.307			
T6	0.76	1.74	A	0.425	2.016	0.662	1	1	40.888	2.52	302.62	A
83.33-75.00			B	0.406	2.052	0.654	1	1	35.562			
			C	0.18	2.665	0.586	1	1	17.533			
T7	2.76	5.89	A	0.416	2.033	0.658	1	1	130.439	7.58	303.38	A
75.00-50.00			B	0.46	1.957	0.678	1	1	135.183			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.199	2.601	0.59	1	1	64.447			
T8	2.97	6.66	A	0.391	2.083	0.648	1	1	135.667	7.24	289.66	B
50.00-25.00			B	0.455	1.966	0.675	1	1	149.051			
			C	0.18	2.663	0.587	1	1	66.158			
T9 25.00-0.00	2.29	7.28	A	0.313	2.262	0.62	1	1	118.467	6.54	261.52	B
			B	0.361	2.146	0.636	1	1	127.859			
			C	0.165	2.716	0.584	1	1	66.112			
Sum Weight:	10.64	27.24						OTM	2055.06 kip-ft	34.09		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.69	A	0.303	2.288	0.617	0.825	1	8.861	0.70	208.73	A
120.00-116.67			B	0.257	2.416	0.604	0.825	1	7.340			
			C	0.257	2.416	0.604	0.825	1	7.340			
T2	0.20	1.12	A	0.339	2.198	0.628	0.825	1	24.306	1.81	216.86	A
116.67-108.33			B	0.189	2.632	0.588	0.825	1	13.129			
			C	0.168	2.708	0.584	0.825	1	11.781			
T3	0.44	1.14	A	0.449	1.975	0.673	0.825	1	35.366	2.31	277.34	A
108.33-100.00			B	0.283	2.343	0.611	0.825	1	20.205			
			C	0.162	2.728	0.583	0.825	1	12.012			
T4	0.54	1.34	A	0.441	1.988	0.669	0.825	1	36.443	2.34	280.88	A
100.00-91.67			B	0.324	2.234	0.624	0.825	1	24.555			
			C	0.162	2.73	0.583	0.825	1	12.687			
T5	0.65	1.38	A	0.424	2.018	0.662	0.825	1	36.495	2.32	278.15	A
91.67-83.33			B	0.374	2.117	0.641	0.825	1	30.101			
			C	0.157	2.746	0.583	0.825	1	12.948			
T6	0.76	1.74	A	0.425	2.016	0.662	0.825	1	38.167	2.35	282.48	A
83.33-75.00			B	0.406	2.052	0.654	0.825	1	34.573			
			C	0.18	2.665	0.586	0.825	1	15.759			
T7	2.76	5.89	A	0.416	2.033	0.658	0.825	1	121.684	7.38	295.37	B
75.00-50.00			B	0.46	1.957	0.678	0.825	1	131.976			
			C	0.199	2.601	0.59	0.825	1	57.644			
T8	2.97	6.66	A	0.391	2.083	0.648	0.825	1	126.493	7.06	282.40	B
50.00-25.00			B	0.455	1.966	0.675	0.825	1	145.313			
			C	0.18	2.663	0.587	0.825	1	58.881			
T9 25.00-0.00	2.29	7.28	A	0.313	2.262	0.62	0.825	1	110.093	6.31	252.58	B
			B	0.361	2.146	0.636	0.825	1	123.489			
			C	0.165	2.716	0.584	0.825	1	59.272			
Sum Weight:	10.64	27.24						OTM	1945.07 kip-ft	32.59		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.69	A	0.303	2.288	0.617	0.8	1	8.698	0.68	204.89	A
120.00-116.67			B	0.257	2.416	0.604	0.8	1	7.215			
			C	0.257	2.416	0.604	0.8	1	7.215			
T2	0.20	1.12	A	0.339	2.198	0.628	0.8	1	24.038	1.79	214.47	A
116.67-108.33			B	0.189	2.632	0.588	0.8	1	12.970			
			C	0.168	2.708	0.584	0.8	1	11.618			
T3	0.44	1.14	A	0.449	1.975	0.673	0.8	1	35.008	2.29	274.54	A
108.33-100.00			B	0.283	2.343	0.611	0.8	1	20.060			
			C	0.162	2.728	0.583	0.8	1	11.843			
T4	0.54	1.34	A	0.441	1.988	0.669	0.8	1	36.065	2.32	277.97	A
100.00-91.67			B	0.324	2.234	0.624	0.8	1	24.403			
			C	0.162	2.73	0.583	0.8	1	12.500			
T5	0.65	1.38	A	0.424	2.018	0.662	0.8	1	36.110	2.29	275.22	A
91.67-83.33			B	0.374	2.117	0.641	0.8	1	29.956			
			C	0.157	2.746	0.583	0.8	1	12.754			
T6	0.76	1.74	A	0.425	2.016	0.662	0.8	1	37.778	2.33	279.60	A
83.33-75.00			B	0.406	2.052	0.654	0.8	1	34.431			
			C	0.18	2.665	0.586	0.8	1	15.506			
T7	2.76	5.89	A	0.416	2.033	0.658	0.8	1	120.434	7.36	294.35	B
75.00-50.00			B	0.46	1.957	0.678	0.8	1	131.517			
			C	0.199	2.601	0.59	0.8	1	56.672			
T8	2.97	6.66	A	0.391	2.083	0.648	0.8	1	125.182	7.03	281.36	B
50.00-25.00			B	0.455	1.966	0.675	0.8	1	144.779			
			C	0.18	2.663	0.587	0.8	1	57.842			
T9 25.00-0.00	2.29	7.28	A	0.313	2.262	0.62	0.8	1	108.897	6.28	251.30	B
			B	0.361	2.146	0.636	0.8	1	122.864			
			C	0.165	2.716	0.584	0.8	1	58.295			
Sum Weight:	10.64	27.24						OTM	1929.55 kip-ft	32.37		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.69	A	0.303	2.288	0.617	0.85	1	9.024	0.71	212.57	A
120.00-116.67			B	0.257	2.416	0.604	0.85	1	7.465			
			C	0.257	2.416	0.604	0.85	1	7.465			
T2	0.20	1.12	A	0.339	2.198	0.628	0.85	1	24.574	1.83	219.25	A
116.67-108.33			B	0.189	2.632	0.588	0.85	1	13.288			
			C	0.168	2.708	0.584	0.85	1	11.944			
T3	0.44	1.14	A	0.449	1.975	0.673	0.85	1	35.724	2.33	280.15	A
108.33-100.00			B	0.283	2.343	0.611	0.85	1	20.350			
			C	0.162	2.728	0.583	0.85	1	12.180			
T4	0.54	1.34	A	0.441	1.988	0.669	0.85	1	36.820	2.36	283.79	A
100.00-91.67			B	0.324	2.234	0.624	0.85	1	24.706			
			C	0.162	2.73	0.583	0.85	1	12.875			
T5	0.65	1.38	A	0.424	2.018	0.662	0.85	1	36.880	2.34	281.09	A
91.67-83.33			B	0.374	2.117	0.641	0.85	1	30.246			
			C	0.157	2.746	0.583	0.85	1	13.142			
T6	0.76	1.74	A	0.425	2.016	0.662	0.85	1	38.556	2.38	285.35	A
83.33-75.00			B	0.406	2.052	0.654	0.85	1	34.714			
			C	0.18	2.665	0.586	0.85	1	16.012			
T7	2.76	5.89	A	0.416	2.033	0.658	0.85	1	122.935	7.41	296.40	B
75.00-50.00			B	0.46	1.957	0.678	0.85	1	132.434			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.199	2.601	0.59	0.85	1	58.616			
T8	2.97	6.66	A	0.391	2.083	0.648	0.85	1	127.804	7.09	283.44	B
50.00-25.00			B	0.455	1.966	0.675	0.85	1	145.847			
			C	0.18	2.663	0.587	0.85	1	59.921			
T9 25.00-0.00	2.29	7.28	A	0.313	2.262	0.62	0.85	1	111.290	6.35	253.86	B
			B	0.361	2.146	0.636	0.85	1	124.113			
			C	0.165	2.716	0.584	0.85	1	60.249			
Sum Weight:	10.64	27.24						OTM	1960.60 kip-ft	32.80		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	1	1	7.875	0.68	203.25	A
120.00-116.67			B	0.195	2.613	0.589	1	1	6.632			
			C	0.195	2.613	0.589	1	1	6.632			
T2	0.06	0.77	A	0.241	2.466	0.6	1	1	18.673	1.56	186.89	A
116.67-108.33			B	0.144	2.794	0.581	1	1	11.355			
			C	0.13	2.846	0.579	1	1	10.546			
T3	0.14	0.78	A	0.312	2.265	0.62	1	1	25.569	1.92	229.90	A
108.33-100.00			B	0.203	2.585	0.591	1	1	15.626			
			C	0.126	2.864	0.578	1	1	10.769			
T4	0.17	0.92	A	0.306	2.279	0.618	1	1	26.520	1.95	234.32	A
100.00-91.67			B	0.232	2.492	0.597	1	1	18.569			
			C	0.126	2.862	0.578	1	1	11.525			
T5	0.22	0.94	A	0.295	2.31	0.614	1	1	26.722	1.94	233.22	A
91.67-83.33			B	0.263	2.4	0.605	1	1	21.709			
			C	0.122	2.876	0.578	1	1	11.782			
T6	0.25	1.30	A	0.291	2.319	0.613	1	1	27.542	1.95	234.47	A
83.33-75.00			B	0.281	2.349	0.61	1	1	24.111			
			C	0.132	2.839	0.579	1	1	12.939			
T7	0.98	4.33	A	0.286	2.333	0.612	1	1	88.892	5.93	237.18	A
75.00-50.00			B	0.317	2.253	0.621	1	1	89.464			
			C	0.145	2.791	0.581	1	1	46.321			
T8	1.05	5.01	A	0.263	2.399	0.605	1	1	91.388	5.42	216.71	A
50.00-25.00			B	0.302	2.29	0.617	1	1	95.285			
			C	0.13	2.846	0.579	1	1	47.585			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	1	1	84.506	5.10	203.83	A
			B	0.248	2.442	0.601	1	1	87.429			
			C	0.128	2.854	0.578	1	1	51.002			
Sum Weight:	3.69	20.09						OTM	1604.28 kip-ft	26.44		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.825	1	6.805	0.59	175.64	A
120.00-116.67			B	0.195	2.613	0.589	0.825	1	5.759			
			C	0.195	2.613	0.589	0.825	1	5.759			
T2	0.06	0.77	A	0.241	2.466	0.6	0.825	1	17.044	1.42	170.59	A
116.67-108.33			B	0.144	2.794	0.581	0.825	1	10.232			
			C	0.13	2.846	0.579	0.825	1	9.404			
T3	0.14	0.78	A	0.312	2.265	0.62	0.825	1	23.514	1.76	211.42	A
108.33-100.00			B	0.203	2.585	0.591	0.825	1	14.548			
			C	0.126	2.864	0.578	0.825	1	9.588			
T4	0.17	0.92	A	0.306	2.279	0.618	0.825	1	24.321	1.79	214.90	A
100.00-91.67			B	0.232	2.492	0.597	0.825	1	17.414			
			C	0.126	2.862	0.578	0.825	1	10.211			
T5	0.22	0.94	A	0.295	2.31	0.614	0.825	1	24.474	1.78	213.60	A
91.67-83.33			B	0.263	2.4	0.605	0.825	1	20.567			
			C	0.122	2.876	0.578	0.825	1	10.423			
T6	0.25	1.30	A	0.291	2.319	0.613	0.825	1	25.257	1.79	215.01	A
83.33-75.00			B	0.281	2.349	0.61	0.825	1	22.964			
			C	0.132	2.839	0.579	0.825	1	11.554			
T7	0.98	4.33	A	0.286	2.333	0.612	0.825	1	81.362	5.51	220.47	B
75.00-50.00			B	0.317	2.253	0.621	0.825	1	85.570			
			C	0.145	2.791	0.581	0.825	1	41.453			
T8	1.05	5.01	A	0.263	2.399	0.605	0.825	1	83.398	5.15	205.98	B
50.00-25.00			B	0.302	2.29	0.617	0.825	1	91.000			
			C	0.13	2.846	0.579	0.825	1	42.247			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.825	1	77.078	4.82	192.74	B
			B	0.248	2.442	0.601	0.825	1	82.808			
			C	0.128	2.854	0.578	0.825	1	45.646			
Sum Weight:	3.69	20.09						OTM	1479.77 kip-ft	24.61		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.8	1	6.652	0.57	171.70	A
120.00-116.67			B	0.195	2.613	0.589	0.8	1	5.634			
			C	0.195	2.613	0.589	0.8	1	5.634			
T2	0.06	0.77	A	0.241	2.466	0.6	0.8	1	16.812	1.40	168.26	A
116.67-108.33			B	0.144	2.794	0.581	0.8	1	10.071			
			C	0.13	2.846	0.579	0.8	1	9.241			
T3	0.14	0.78	A	0.312	2.265	0.62	0.8	1	23.220	1.74	208.78	A
108.33-100.00			B	0.203	2.585	0.591	0.8	1	14.395			
			C	0.126	2.864	0.578	0.8	1	9.419			
T4	0.17	0.92	A	0.306	2.279	0.618	0.8	1	24.007	1.77	212.12	A
100.00-91.67			B	0.232	2.492	0.597	0.8	1	17.249			
			C	0.126	2.862	0.578	0.8	1	10.024			
T5	0.22	0.94	A	0.295	2.31	0.614	0.8	1	24.153	1.76	210.79	A
91.67-83.33			B	0.263	2.4	0.605	0.8	1	20.403			
			C	0.122	2.876	0.578	0.8	1	10.228			
T6	0.25	1.30	A	0.291	2.319	0.613	0.8	1	24.930	1.77	212.23	A
83.33-75.00			B	0.281	2.349	0.61	0.8	1	22.800			
			C	0.132	2.839	0.579	0.8	1	11.356			
T7	0.98	4.33	A	0.286	2.333	0.612	0.8	1	80.287	5.48	219.04	B
75.00-50.00			B	0.317	2.253	0.621	0.8	1	85.014			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.145	2.791	0.581	0.8	1	40.758			
T8	1.05	5.01	A	0.263	2.399	0.605	0.8	1	82.257	5.11	204.59	B
50.00-25.00			B	0.302	2.29	0.617	0.8	1	90.388			
			C	0.13	2.846	0.579	0.8	1	41.484			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.8	1	76.017	4.78	191.20	B
			B	0.248	2.442	0.601	0.8	1	82.147			
			C	0.128	2.854	0.578	0.8	1	44.881			
Sum Weight:	3.69	20.09						OTM	1463.63 kip-ft	24.38		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.01	0.45	A	0.227	2.507	0.596	0.85	1	6.958	0.60	179.59	A
120.00-116.67			B	0.195	2.613	0.589	0.85	1	5.883			
			C	0.195	2.613	0.589	0.85	1	5.883			
T2	0.06	0.77	A	0.241	2.466	0.6	0.85	1	17.277	1.44	172.92	A
116.67-108.33			B	0.144	2.794	0.581	0.85	1	10.392			
			C	0.13	2.846	0.579	0.85	1	9.567			
T3	0.14	0.78	A	0.312	2.265	0.62	0.85	1	23.807	1.78	214.06	A
108.33-100.00			B	0.203	2.585	0.591	0.85	1	14.702			
			C	0.126	2.864	0.578	0.85	1	9.757			
T4	0.17	0.92	A	0.306	2.279	0.618	0.85	1	24.636	1.81	217.67	A
100.00-91.67			B	0.232	2.492	0.597	0.85	1	17.579			
			C	0.126	2.862	0.578	0.85	1	10.399			
T5	0.22	0.94	A	0.295	2.31	0.614	0.85	1	24.795	1.80	216.40	A
91.67-83.33			B	0.263	2.4	0.605	0.85	1	20.730			
			C	0.122	2.876	0.578	0.85	1	10.617			
T6	0.25	1.30	A	0.291	2.319	0.613	0.85	1	25.583	1.81	217.79	A
83.33-75.00			B	0.281	2.349	0.61	0.85	1	23.128			
			C	0.132	2.839	0.579	0.85	1	11.752			
T7	0.98	4.33	A	0.286	2.333	0.612	0.85	1	82.438	5.55	221.91	B
75.00-50.00			B	0.317	2.253	0.621	0.85	1	86.127			
			C	0.145	2.791	0.581	0.85	1	42.149			
T8	1.05	5.01	A	0.263	2.399	0.605	0.85	1	84.540	5.18	207.36	B
50.00-25.00			B	0.302	2.29	0.617	0.85	1	91.612			
			C	0.13	2.846	0.579	0.85	1	43.010			
T9 25.00-0.00	0.80	5.59	A	0.22	2.531	0.595	0.85	1	78.139	4.86	194.28	B
			B	0.248	2.442	0.601	0.85	1	83.468			
			C	0.128	2.854	0.578	0.85	1	46.411			
Sum Weight:	3.69	20.09						OTM	1495.92 kip-ft	24.84		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.83					
Bracing Weight	13.26					
Total Member Self-Weight	20.09			-13.75	-7.42	
Total Weight	33.62			-13.75	-7.42	
Wind 0 deg - No Ice		-0.15	-49.61	-3825.07	5.58	7.51
Wind 30 deg - No Ice		24.00	-40.81	-3128.32	-1861.96	-20.14
Wind 45 deg - No Ice		33.39	-33.01	-2525.70	-2570.55	-30.49
Wind 60 deg - No Ice		40.12	-23.51	-1816.98	-3061.46	-39.21
Wind 90 deg - No Ice		46.51	-0.57	-83.39	-3528.65	-51.08
Wind 120 deg - No Ice		42.23	25.00	1901.34	-3220.54	-50.66
Wind 135 deg - No Ice		32.98	33.77	2579.84	-2515.97	-39.97
Wind 150 deg - No Ice		22.96	41.50	3173.78	-1729.37	-32.24
Wind 180 deg - No Ice		0.31	47.18	3607.26	-39.20	-7.08
Wind 210 deg - No Ice		-22.52	41.36	3161.41	1670.01	17.89
Wind 225 deg - No Ice		-32.70	33.58	2562.63	2474.26	27.63
Wind 240 deg - No Ice		-42.07	24.67	1870.67	3190.39	40.96
Wind 270 deg - No Ice		-46.38	-1.02	-128.29	3497.90	50.02
Wind 300 deg - No Ice		-39.99	-23.62	-1822.26	3028.00	46.73
Wind 315 deg - No Ice		-33.28	-32.94	-2512.58	2538.13	40.24
Wind 330 deg - No Ice		-23.99	-40.67	-3107.63	1839.29	30.97
Member Ice	7.16					
Total Weight Ice	54.11			-42.70	-17.77	
Wind 0 deg - Ice		-0.15	-61.04	-4651.20	-4.88	12.45
Wind 30 deg - Ice		29.87	-50.95	-3857.40	-2280.38	-25.94
Wind 45 deg - Ice		41.70	-41.29	-3126.35	-3156.85	-41.32
Wind 60 deg - Ice		50.31	-29.39	-2251.66	-3775.62	-54.36
Wind 90 deg - Ice		58.23	-0.58	-114.76	-4349.17	-71.62
Wind 120 deg - Ice		52.13	30.72	2270.90	-3922.14	-70.59
Wind 135 deg - Ice		41.29	42.08	3124.20	-3100.10	-58.15
Wind 150 deg - Ice		28.81	51.65	3846.53	-2143.32	-47.01
Wind 180 deg - Ice		0.32	58.94	4389.29	-49.96	-12.30
Wind 210 deg - Ice		-28.36	51.51	3834.29	2062.84	23.62
Wind 225 deg - Ice		-41.00	41.88	3107.19	3037.61	38.37
Wind 240 deg - Ice		-51.96	30.38	2240.21	3871.32	55.86
Wind 270 deg - Ice		-58.09	-1.05	-159.96	4297.28	70.53
Wind 300 deg - Ice		-50.18	-29.50	-2256.26	3720.46	67.13
Wind 315 deg - Ice		-41.60	-41.23	-3112.21	3102.58	58.42
Wind 330 deg - Ice		-29.87	-50.80	-3835.66	2235.96	45.70
Total Weight	33.62			-13.75	-7.42	
Wind 0 deg - Service		-0.15	-49.61	-3811.82	12.80	7.51
Wind 30 deg - Service		24.00	-40.81	-3115.08	-1854.74	-20.14
Wind 45 deg - Service		33.39	-33.01	-2512.45	-2563.33	-30.49
Wind 60 deg - Service		40.12	-23.51	-1803.74	-3054.24	-39.21
Wind 90 deg - Service		46.51	-0.57	-70.14	-3521.43	-51.08
Wind 120 deg - Service		42.23	25.00	1914.58	-3213.32	-50.66
Wind 135 deg - Service		32.98	33.77	2593.08	-2508.75	-39.97
Wind 150 deg - Service		22.96	41.50	3187.02	-1722.15	-32.24
Wind 180 deg - Service		0.31	47.18	3620.51	-31.98	-7.08
Wind 210 deg - Service		-22.52	41.36	3174.66	1677.22	17.89
Wind 225 deg - Service		-32.70	33.58	2575.87	2481.48	27.63
Wind 240 deg - Service		-42.07	24.67	1883.92	3197.60	40.96
Wind 270 deg - Service		-46.38	-1.02	-115.05	3505.12	50.02
Wind 300 deg - Service		-39.99	-23.62	-1809.01	3035.22	46.73
Wind 315 deg - Service		-33.28	-32.94	-2499.33	2545.35	40.24
Wind 330 deg - Service		-23.99	-40.67	-3094.38	1846.51	30.97

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	120 - 116.667	Leg	Max Tension	5	0.12	0.00	0.00
			Max. Compression	30	-1.01	1.14	0.18
			Max. Mx	27	-0.13	-1.26	-0.11
			Max. My	34	-0.63	-0.06	1.37
			Max. Vy	22	0.70	-1.19	-0.14
			Max. Vx	24	0.80	-0.58	-1.19
		Diagonal	Max Tension	24	1.21	0.00	0.00
			Max. Compression	24	-1.40	0.00	0.00
			Max. Mx	20	0.91	0.04	0.00
			Max. My	30	-0.05	0.00	-0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	32	1.29	0.02	0.01
			Max. Compression	24	-1.45	0.02	0.01
			Max. Mx	27	-0.51	0.03	0.00
			Max. My	19	0.55	0.02	0.01
			Max. Vy	27	0.02	0.03	0.00
			Max. Vx	19	-0.00	0.00	0.00
T2	116.667 - 108.333	Leg	Max Tension	10	0.82	-1.01	-0.10
			Max. Compression	30	-3.23	0.87	-0.13
			Max. Mx	27	0.61	-1.26	-0.11
			Max. My	34	-1.04	-0.06	1.37
			Max. Vy	27	-1.04	-1.26	-0.11
			Max. Vx	26	-1.09	-0.02	-1.36
		Diagonal	Max Tension	23	4.66	0.00	0.00
			Max. Compression	23	-4.82	0.00	0.00
			Max. Mx	20	4.59	0.07	0.00
			Max. My	30	-0.35	0.00	-0.00
			Max. Vy	20	0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	22	3.05	0.00	0.00
			Max. Compression	24	-3.13	0.00	0.00
			Max. Mx	27	0.04	0.03	0.01
			Max. My	25	0.00	0.02	0.01
			Max. Vy	27	0.02	0.03	0.01
			Max. Vx	25	-0.00	0.00	0.00
T3	108.333 - 100	Leg	Max Tension	27	6.12	-1.08	-0.13
			Max. Compression	19	-10.65	0.94	0.04
			Max. Mx	27	6.12	-1.08	-0.13
			Max. My	31	-3.16	-0.01	-1.27
			Max. Vy	24	-0.52	0.96	0.28
			Max. Vx	31	0.71	-0.01	-1.27
		Diagonal	Max Tension	20	7.50	0.00	0.00
			Max. Compression	20	-7.66	0.00	0.00
			Max. Mx	20	7.50	0.07	0.00
			Max. My	30	-0.27	0.00	-0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	27	4.62	0.00	0.00
			Max. Compression	19	-4.84	0.03	0.01
			Max. Mx	27	0.11	0.03	0.01
			Max. My	27	-3.51	0.03	0.01
			Max. Vy	27	0.02	0.03	0.01
			Max. Vx	27	-0.00	0.00	0.00
T4	100 - 91.6667	Leg	Max Tension	27	14.72	-1.03	-0.04
			Max. Compression	19	-23.12	0.94	0.03
			Max. Mx	22	12.91	1.68	0.17
			Max. My	23	-4.19	-0.08	-1.69
			Max. Vy	22	0.99	-1.04	0.17
			Max. Vx	23	-1.07	-0.04	1.15

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	20	9.91	0.00	0.00
			Max. Compression	20	-10.15	0.00	0.00
			Max. Mx	20	9.91	0.08	0.00
			Max. My	24	-0.16	0.00	0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	20	6.33	0.04	-0.00
			Max. Compression	20	-6.34	0.04	-0.00
			Max. Mx	27	-1.43	0.06	0.02
			Max. My	19	0.60	0.03	-0.02
			Max. Vy	27	0.03	0.06	0.02
			Max. Vx	19	0.00	0.03	-0.02
		Inner Bracing	Max Tension	20	0.11	0.00	0.00
			Max. Compression	20	-0.11	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.11	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T5	91.6667 - 83.3333	Leg	Max Tension	27	24.89	-1.04	-0.03
			Max. Compression	19	-37.03	0.09	-0.09
			Max. Mx	22	24.20	-1.04	0.17
			Max. My	23	-6.75	-0.04	1.15
			Max. Vy	27	-0.23	-1.04	-0.03
			Max. Vx	31	-0.34	-0.06	-1.15
		Diagonal	Max Tension	20	12.16	0.00	0.00
			Max. Compression	20	-12.41	0.00	0.00
			Max. Mx	20	12.16	0.08	0.00
			Max. My	24	0.21	0.00	0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	20	8.02	0.05	-0.00
			Max. Compression	20	-7.95	0.05	-0.00
			Max. Mx	27	-1.46	0.07	0.02
			Max. My	19	0.66	0.03	-0.02
			Max. Vy	27	0.04	0.07	0.02
			Max. Vx	19	0.00	0.03	-0.02
		Inner Bracing	Max Tension	20	0.14	0.00	0.00
			Max. Compression	20	-0.14	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.13	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T6	83.3333 - 75	Leg	Max Tension	27	38.66	-0.07	0.09
			Max. Compression	19	-53.38	0.71	-0.13
			Max. Mx	27	38.33	-0.77	0.13
			Max. My	20	-6.59	-0.04	-0.75
			Max. Vy	32	0.23	-0.77	-0.10
			Max. Vx	19	0.28	-0.41	-0.71
		Diagonal	Max Tension	20	12.40	0.00	0.00
			Max. Compression	20	-12.75	0.00	0.00
			Max. Mx	20	12.40	0.14	0.00
			Max. My	24	0.58	0.00	0.01
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Top Girt	Max Tension	20	8.42	0.05	-0.00
			Max. Compression	20	-8.32	0.05	-0.00
			Max. Mx	27	-0.69	0.08	0.02
			Max. My	19	0.27	0.02	-0.02
			Max. Vy	27	0.04	0.08	0.02
			Max. Vx	19	0.00	0.02	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	20	0.14	0.00	0.00
			Max. Compression	20	-0.14	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.13	0.00	-0.00
			Max. Vy	18	-0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T7	75 - 50	Leg	Max Tension	27	87.77	-0.19	0.09
			Max. Compression	19	-115.93	0.49	0.02
			Max. Mx	27	49.98	1.67	0.04
			Max. My	31	-12.71	-0.01	1.75
			Max. Vy	22	-2.37	-0.76	-0.03
			Max. Vx	31	-2.45	-0.04	-0.68
		Diagonal	Max Tension	26	17.35	0.00	0.00
			Max. Compression	26	-17.74	0.00	0.00
			Max. Mx	20	17.27	0.16	0.00
			Max. My	24	1.31	0.00	0.01
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	26	12.56	0.07	-0.00
			Max. Compression	26	-12.42	0.07	-0.00
			Max. Mx	27	1.01	0.10	0.02
			Max. My	19	0.76	0.04	-0.03
			Max. Vy	27	0.04	0.10	0.02
			Max. Vx	19	0.00	0.04	-0.03
		Top Girt	Max Tension	21	11.38	0.05	-0.01
			Max. Compression	29	-11.24	0.06	0.01
			Max. Mx	27	-1.98	0.08	0.03
			Max. My	19	1.65	0.04	-0.03
			Max. Vy	27	0.04	0.08	0.03
			Max. Vx	19	0.01	0.04	-0.03
		Inner Bracing	Max Tension	29	0.19	0.00	0.00
			Max. Compression	29	-0.19	0.00	0.00
			Max. Mx	18	-0.00	-0.04	0.00
			Max. My	19	0.01	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T8	50 - 25	Leg	Max Tension	22	144.11	-0.59	0.11
			Max. Compression	19	-182.46	0.46	-0.04
			Max. Mx	27	143.45	-0.60	0.05
			Max. My	23	-19.51	-0.07	0.68
			Max. Vy	27	-0.29	-0.48	0.05
			Max. Vx	27	0.35	0.21	0.44
		Diagonal	Max Tension	26	18.77	0.00	0.00
			Max. Compression	26	-19.32	0.00	0.00
			Max. Mx	20	18.15	0.19	0.00
			Max. My	24	1.76	0.00	0.01
			Max. Vy	20	-0.06	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	26	14.36	0.14	-0.00
			Max. Compression	26	-14.20	0.14	-0.00
			Max. Mx	22	1.57	0.20	0.02
			Max. My	19	0.83	0.06	-0.03
			Max. Vy	22	0.08	0.20	0.02
			Max. Vx	19	0.00	0.06	-0.03
		Top Girt	Max Tension	26	13.13	0.08	-0.00
			Max. Compression	26	-13.02	0.08	-0.00
			Max. Mx	27	-0.51	0.12	0.02
			Max. My	19	0.64	0.05	-0.03
			Max. Vy	27	0.05	0.12	0.02
			Max. Vx	19	0.00	0.05	-0.03
		Inner Bracing	Max Tension	26	0.23	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-0.23	0.00	0.00
			Max. Mx	18	-0.00	-0.05	0.00
			Max. My	19	0.19	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T9	25 - 0	Leg	Max Tension	22	190.29	-0.78	0.19
			Max. Compression	19	-236.53	-0.00	0.00
			Max. Mx	19	-204.61	1.47	-0.09
			Max. My	23	-21.19	0.32	1.32
			Max. Vy	30	0.21	1.46	-0.18
			Max. Vx	23	0.30	0.32	1.32
		Diagonal	Max Tension	26	23.62	0.00	0.00
			Max. Compression	26	-24.24	0.00	0.00
			Max. Mx	26	23.62	0.37	0.00
			Max. My	19	-0.59	0.00	0.01
			Max. Vy	26	-0.09	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Horizontal	Max Tension	26	15.35	0.09	-0.00
			Max. Compression	26	-15.30	0.09	-0.00
			Max. Mx	22	2.04	0.19	0.04
			Max. My	19	0.66	-0.02	-0.05
			Max. Vy	22	0.07	0.19	0.04
			Max. Vx	19	0.01	-0.02	-0.05
		Top Girt	Max Tension	26	14.74	0.13	-0.00
			Max. Compression	26	-14.71	0.13	-0.00
			Max. Mx	22	1.14	0.23	0.04
			Max. My	19	0.86	0.02	-0.05
			Max. Vy	22	0.07	0.23	0.04
			Max. Vx	19	0.01	0.02	-0.05
		Inner Bracing	Max Tension	26	0.25	0.00	0.00
			Max. Compression	26	-0.25	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	24	0.24	0.00	-0.00
			Max. Vy	18	-0.03	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	257.15	28.15	-18.06
	Max. H_x	30	257.15	28.15	-18.06
	Max. H_z	21	-211.91	-24.15	17.50
	Min. Vert	22	-217.14	-25.62	16.56
	Min. H_x	22	-217.14	-25.62	16.56
	Min. H_z	29	241.78	25.68	-18.31
Leg B	Max. Vert	24	260.42	-28.10	-18.53
	Max. H_x	32	-214.64	25.39	16.84
	Max. H_z	33	-208.93	23.84	17.85
	Min. Vert	32	-214.64	25.39	16.84
	Min. H_x	24	260.42	-28.10	-18.53
	Min. H_z	25	245.23	-25.59	-18.90
Leg A	Max. Vert	19	266.98	0.37	33.94
	Max. H_x	31	26.85	9.38	1.70
	Max. H_z	19	266.98	0.37	33.94
	Min. Vert	27	-216.80	-0.36	-30.80

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_x	23	24.36	-9.40	1.44
	Min. H_z	27	-216.80	-0.36	-30.80

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	33.62	0.00	0.00	-13.75	-7.42	0.00
Dead+Wind 0 deg - No Ice	33.62	-0.15	-49.61	-3736.58	5.59	7.52
Dead+Wind 30 deg - No Ice	33.62	24.00	-40.81	-3054.62	-1819.46	-20.15
Dead+Wind 45 deg - No Ice	33.62	33.39	-33.01	-2466.07	-2510.93	-30.50
Dead+Wind 60 deg - No Ice	33.62	40.12	-23.51	-1775.31	-2989.02	-39.22
Dead+Wind 90 deg - No Ice	33.62	46.51	-0.57	-83.59	-3443.39	-51.12
Dead+Wind 120 deg - No Ice	33.62	42.23	25.00	1857.01	-3143.79	-50.70
Dead+Wind 135 deg - No Ice	33.62	32.98	33.77	2520.23	-2456.33	-40.01
Dead+Wind 150 deg - No Ice	33.62	22.96	41.50	3100.12	-1686.72	-32.27
Dead+Wind 180 deg - No Ice	33.62	0.31	47.18	3523.77	-39.26	-7.09
Dead+Wind 210 deg - No Ice	33.62	-22.52	41.36	3087.74	1627.26	17.90
Dead+Wind 225 deg - No Ice	33.62	-32.70	33.58	2503.00	2414.56	27.64
Dead+Wind 240 deg - No Ice	33.62	-42.07	24.67	1826.30	3113.59	40.98
Dead+Wind 270 deg - No Ice	33.62	-46.38	-1.02	-128.57	3412.60	50.05
Dead+Wind 300 deg - No Ice	33.62	-39.99	-23.62	-1780.59	2955.51	46.77
Dead+Wind 315 deg - No Ice	33.62	-33.28	-32.94	-2452.93	2478.47	40.28
Dead+Wind 330 deg - No Ice	33.62	-23.99	-40.67	-3033.89	1796.76	31.00
Dead+Ice+Temp	54.11	0.00	0.00	-42.69	-17.77	0.00
Dead+Wind 0 deg+Ice+Temp	54.11	-0.15	-61.04	-4531.41	-4.89	12.49
Dead+Wind 30 deg+Ice+Temp	54.11	29.87	-50.95	-3756.91	-2222.44	-25.97
Dead+Wind 45 deg+Ice+Temp	54.11	41.70	-41.29	-3044.82	-3075.31	-41.37
Dead+Wind 60 deg+Ice+Temp	54.11	50.31	-29.39	-2194.53	-3676.22	-54.44
Dead+Wind 90 deg+Ice+Temp	54.11	58.23	-0.58	-115.14	-4232.88	-71.74
Dead+Wind 120 deg+Ice+Temp	54.11	52.13	30.72	2210.79	-3818.20	-70.72
Dead+Wind 135 deg+Ice+Temp	54.11	41.29	42.08	3042.58	-3018.55	-58.28
Dead+Wind 150 deg+Ice+Temp	54.11	28.81	51.65	3745.98	-2085.15	-47.11
Dead+Wind 180 deg+Ice+Temp	54.11	0.32	58.94	4274.65	-50.07	-12.34
Dead+Wind 210 deg+Ice+Temp	54.11	-28.36	51.51	3733.72	2004.49	23.65
Dead+Wind 225 deg+Ice+Temp	54.11	-41.00	41.88	3025.54	2955.94	38.44
Dead+Wind 240 deg+Ice+Temp	54.11	-51.96	30.38	2180.04	3767.29	55.93
Dead+Wind 270 deg+Ice+Temp	54.11	-58.09	-1.05	-160.45	4180.88	70.65
Dead+Wind 300 deg+Ice+Temp	54.11	-50.18	-29.50	-2199.15	3620.95	67.25
Dead+Wind 315 deg+Ice+Temp	54.11	-41.60	-41.23	-3030.65	3020.93	58.53
Dead+Wind 330 deg+Ice+Temp	54.11	-29.87	-50.80	-3735.13	2177.92	45.79
Dead+Wind 0 deg - Service	33.62	-0.15	-49.61	-3736.58	5.59	7.52
Dead+Wind 30 deg - Service	33.62	24.00	-40.81	-3054.62	-1819.46	-20.15
Dead+Wind 45 deg - Service	33.62	33.39	-33.01	-2466.07	-2510.93	-30.50
Dead+Wind 60 deg - Service	33.62	40.12	-23.51	-1775.31	-2989.02	-39.22
Dead+Wind 90 deg - Service	33.62	46.51	-0.57	-83.59	-3443.39	-51.12
Dead+Wind 120 deg - Service	33.62	42.23	25.00	1857.01	-3143.79	-50.70
Dead+Wind 135 deg - Service	33.62	32.98	33.77	2520.23	-2456.33	-40.01
Dead+Wind 150 deg - Service	33.62	22.96	41.50	3100.12	-1686.72	-32.27
Dead+Wind 180 deg - Service	33.62	0.31	47.18	3523.77	-39.26	-7.09
Dead+Wind 210 deg - Service	33.62	-22.52	41.36	3087.74	1627.26	17.90
Dead+Wind 225 deg - Service	33.62	-32.70	33.58	2503.00	2414.56	27.64
Dead+Wind 240 deg - Service	33.62	-42.07	24.67	1826.30	3113.59	40.98
Dead+Wind 270 deg - Service	33.62	-46.38	-1.02	-128.57	3412.60	50.05
Dead+Wind 300 deg - Service	33.62	-39.99	-23.62	-1780.59	2955.51	46.77
Dead+Wind 315 deg - Service	33.62	-33.28	-32.94	-2452.93	2478.47	40.28

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 330 deg - Service	33.62	-23.99	-40.67	-3033.89	1796.76	31.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-33.62	0.00	0.00	33.62	0.00	0.000%
2	-0.15	-33.62	-49.61	0.15	33.62	49.61	0.000%
3	24.00	-33.62	-40.81	-24.00	33.62	40.81	0.000%
4	33.39	-33.62	-33.01	-33.39	33.62	33.01	0.000%
5	40.12	-33.62	-23.51	-40.12	33.62	23.51	0.000%
6	46.51	-33.62	-0.57	-46.51	33.62	0.57	0.000%
7	42.23	-33.62	25.00	-42.23	33.62	-25.00	0.000%
8	32.98	-33.62	33.77	-32.98	33.62	-33.77	0.000%
9	22.96	-33.62	41.50	-22.96	33.62	-41.50	0.000%
10	0.31	-33.62	47.18	-0.31	33.62	-47.18	0.000%
11	-22.52	-33.62	41.36	22.52	33.62	-41.36	0.000%
12	-32.70	-33.62	33.58	32.70	33.62	-33.58	0.000%
13	-42.07	-33.62	24.67	42.07	33.62	-24.67	0.000%
14	-46.38	-33.62	-1.02	46.38	33.62	1.02	0.000%
15	-39.99	-33.62	-23.62	39.99	33.62	23.62	0.000%
16	-33.28	-33.62	-32.94	33.28	33.62	32.94	0.000%
17	-23.99	-33.62	-40.67	23.99	33.62	40.67	0.000%
18	0.00	-54.11	0.00	0.00	54.11	0.00	0.000%
19	-0.15	-54.11	-61.04	0.15	54.11	61.04	0.000%
20	29.87	-54.11	-50.95	-29.87	54.11	50.95	0.000%
21	41.70	-54.11	-41.29	-41.70	54.11	41.29	0.000%
22	50.31	-54.11	-29.39	-50.31	54.11	29.39	0.000%
23	58.23	-54.11	-0.58	-58.23	54.11	0.58	0.000%
24	52.13	-54.11	30.72	-52.13	54.11	-30.72	0.000%
25	41.29	-54.11	42.08	-41.29	54.11	-42.08	0.000%
26	28.81	-54.11	51.65	-28.81	54.11	-51.65	0.000%
27	0.32	-54.11	58.94	-0.32	54.11	-58.94	0.000%
28	-28.36	-54.11	51.51	28.36	54.11	-51.51	0.000%
29	-41.00	-54.11	41.88	41.00	54.11	-41.88	0.000%
30	-51.96	-54.11	30.38	51.96	54.11	-30.38	0.000%
31	-58.09	-54.11	-1.05	58.09	54.11	1.05	0.000%
32	-50.18	-54.11	-29.50	50.18	54.11	29.50	0.000%
33	-41.60	-54.11	-41.23	41.60	54.11	41.23	0.000%
34	-29.87	-54.11	-50.80	29.87	54.11	50.80	0.000%
35	-0.15	-33.62	-49.61	0.15	33.62	49.61	0.000%
36	24.00	-33.62	-40.81	-24.00	33.62	40.81	0.000%
37	33.39	-33.62	-33.01	-33.39	33.62	33.01	0.000%
38	40.12	-33.62	-23.51	-40.12	33.62	23.51	0.000%
39	46.51	-33.62	-0.57	-46.51	33.62	0.57	0.000%
40	42.23	-33.62	25.00	-42.23	33.62	-25.00	0.000%
41	32.98	-33.62	33.77	-32.98	33.62	-33.77	0.000%
42	22.96	-33.62	41.50	-22.96	33.62	-41.50	0.000%
43	0.31	-33.62	47.18	-0.31	33.62	-47.18	0.000%
44	-22.52	-33.62	41.36	22.52	33.62	-41.36	0.000%
45	-32.70	-33.62	33.58	32.70	33.62	-33.58	0.000%
46	-42.07	-33.62	24.67	42.07	33.62	-24.67	0.000%
47	-46.38	-33.62	-1.02	46.38	33.62	1.02	0.000%
48	-39.99	-33.62	-23.62	39.99	33.62	23.62	0.000%
49	-33.28	-33.62	-32.94	33.28	33.62	32.94	0.000%
50	-23.99	-33.62	-40.67	23.99	33.62	40.67	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	5.165	35	0.2918	0.0560
T2	116.667 - 108.333	4.956	35	0.2919	0.0558
T3	108.333 - 100	4.421	35	0.2919	0.0571
T4	100 - 91.6667	3.877	35	0.2887	0.0580
T5	91.6667 - 83.3333	3.342	35	0.2804	0.0552
T6	83.3333 - 75	2.820	35	0.2666	0.0508
T7	75 - 50	2.356	35	0.2460	0.0471
T8	50 - 25	1.082	35	0.1873	0.0313
T9	25 - 0	0.268	35	0.0883	0.0149

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	35	5.165	0.2918	0.0560	37555
120.00	PA6-65AC	35	5.165	0.2918	0.0560	37555
117.00	6' DISH (SOLID)	35	4.977	0.2919	0.0558	37555
115.00	6' DISH (SOLID)	35	4.851	0.2920	0.0559	37555
114.00	Rohn 6' Side-Arm(1)	35	4.787	0.2921	0.0560	38226
113.00	Pirod 4' Side Mount Standoff (1)	35	4.723	0.2921	0.0561	40810
112.00	Junction Box	35	4.659	0.2921	0.0562	45159
111.00	6' DISH (SOLID)	35	4.594	0.2921	0.0563	51272
110.00	6'8"x4" Pipe Mount	35	4.530	0.2921	0.0565	58243
109.00	10'x2" Dipole Antenna (inverted)	35	4.465	0.2920	0.0569	68035
107.00	6'8"x4" Pipe Mount	35	4.334	0.2917	0.0575	113378
106.00	16'x3" Omni (inverted)	35	4.269	0.2915	0.0578	184222
105.00	SE419-SWBPALDF Panel Antenna	35	4.203	0.2912	0.0579	335301
104.00	AP13-850/065D w/Mount Pipe	35	4.138	0.2908	0.0581	160003
103.00	TMA 432-83H-01T	35	4.072	0.2904	0.0581	107938
101.00	SE419-SWBPALDF Panel Antenna	35	3.942	0.2893	0.0581	68701
100.00	PD458-406	35	3.877	0.2887	0.0580	63309
96.00	3'4"x4" Pipe Mount (horizontal)	35	3.619	0.2853	0.0570	120849
95.00	SC479-HF1LDF (inverted)	35	3.555	0.2843	0.0567	190091
92.00	PD458-406	35	3.363	0.2809	0.0554	178445
88.00	SC479-HF1LDF (inverted)	35	3.108	0.2753	0.0532	23481
87.00	4'6"x3" Pipe Mount (horizontal)	35	3.045	0.2736	0.0527	18051
86.00	20' 4-Bay Dipole	35	2.982	0.2719	0.0521	14914
82.00	3' Yagi	35	2.743	0.2636	0.0501	12648
81.00	3' Yagi	35	2.686	0.2612	0.0497	14018
77.00	20' 4-Bay Dipole	35	2.464	0.2510	0.0480	39714
76.00	3'4"x4" Pipe Mount (horizontal)	35	2.410	0.2485	0.0475	62339
75.00	Face Mount	35	2.356	0.2460	0.0471	105551
72.00	Face Mount	35	2.194	0.2389	0.0456	171145
67.00	4'6"x3" Pipe Mount (horizontal)	35	1.925	0.2281	0.0428	50438
65.00	6' Yagi w/ Mount	35	1.819	0.2239	0.0415	38816
63.00	GPS	35	1.714	0.2197	0.0403	31547
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	35	1.312	0.2014	0.0348	18036
53.00	1.0" Dia 4' Omni w/Pipe Mount	35	1.218	0.1961	0.0334	16322
48.00	10'x6" Dipole Antenna	35	0.995	0.1808	0.0300	13967
47.00	5'x1.5in dia Whip Antenna /w mount	35	0.953	0.1774	0.0293	13753
43.00	3' Whip (3in diameter) /w mount	35	0.794	0.1627	0.0265	13122
41.00	4 FT DISH	35	0.720	0.1549	0.0252	12837

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
40.00	1'x1' Panel Antenna	35	0.684	0.1509	0.0245	12699
39.00	6'x1" Whip Antenna w/ Mount	35	0.650	0.1468	0.0239	12564

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	6.199	19	0.3489	0.0750
T2	116.667 - 108.333	5.950	19	0.3490	0.0741
T3	108.333 - 100	5.312	19	0.3490	0.0775
T4	100 - 91.6667	4.663	19	0.3453	0.0790
T5	91.6667 - 83.3333	4.023	19	0.3358	0.0756
T6	83.3333 - 75	3.399	19	0.3196	0.0697
T7	75 - 50	2.842	19	0.2953	0.0647
T8	50 - 25	1.310	19	0.2255	0.0435
T9	25 - 0	0.327	19	0.1067	0.0208

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	19	6.199	0.3489	0.0750	29905
120.00	PA6-65AC	19	6.199	0.3489	0.0750	29905
117.00	6' DISH (SOLID)	19	5.975	0.3489	0.0742	29905
115.00	6' DISH (SOLID)	19	5.824	0.3490	0.0743	29905
114.00	Rohn 6' Side-Arm(1)	19	5.748	0.3491	0.0746	30542
113.00	Pirod 4' Side Mount Standoff (1)	19	5.672	0.3492	0.0750	32756
112.00	Junction Box	19	5.596	0.3492	0.0755	36459
111.00	6' DISH (SOLID)	19	5.519	0.3492	0.0761	41661
110.00	6'8"x4" Pipe Mount	19	5.441	0.3492	0.0766	48131
109.00	10'x2" Dipole Antenna (inverted)	19	5.364	0.3491	0.0771	56921
107.00	6'8"x4" Pipe Mount	19	5.208	0.3488	0.0781	97733
106.00	16'x3" Omni (inverted)	19	5.130	0.3485	0.0784	161879
105.00	SE419-SWBPALDF Panel Antenna	19	5.052	0.3482	0.0787	335301
104.00	AP13-850/065D w/Mount Pipe	19	4.974	0.3478	0.0789	153746
103.00	TMA 432-83H-01T	19	4.896	0.3473	0.0790	99663
101.00	SE419-SWBPALDF Panel Antenna	19	4.740	0.3461	0.0791	61121
100.00	PD458-406	19	4.663	0.3453	0.0790	56540
96.00	3'4"x4" Pipe Mount (horizontal)	19	4.355	0.3415	0.0779	118612
95.00	SC479-HF1LDF (inverted)	19	4.278	0.3403	0.0774	190091
92.00	PD458-406	19	4.049	0.3363	0.0758	178445
88.00	SC479-HF1LDF (inverted)	19	3.743	0.3298	0.0730	20412
87.00	4'6"x3" Pipe Mount (horizontal)	19	3.668	0.3279	0.0723	15574
86.00	20' 4-Bay Dipole	19	3.593	0.3258	0.0715	12810
82.00	3' Yagi	19	3.306	0.3161	0.0688	10791
81.00	3' Yagi	19	3.238	0.3133	0.0682	11952
77.00	20' 4-Bay Dipole	19	2.972	0.3013	0.0659	33746
76.00	3'4"x4" Pipe Mount (horizontal)	19	2.907	0.2983	0.0653	52810
75.00	Face Mount	19	2.842	0.2953	0.0647	88849
72.00	Face Mount	19	2.647	0.2870	0.0628	141465

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
67.00	4'6"x3" Pipe Mount (horizontal)	19	2.324	0.2742	0.0590	42375
65.00	6' Yagi w/ Mount	19	2.197	0.2692	0.0573	32665
63.00	GPS	19	2.071	0.2642	0.0556	26576
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	19	1.588	0.2424	0.0482	15224
53.00	1.0" Dia 4' Omni w/Pipe Mount	19	1.474	0.2360	0.0463	13780
48.00	10'x6" Dipole Antenna	19	1.206	0.2178	0.0416	11771
47.00	5'x1.5in dia Whip Antenna /w mount	19	1.156	0.2137	0.0407	11581
43.00	3' Whip (3in diameter) /w mount	19	0.964	0.1961	0.0369	11011
41.00	4 FT DISH	19	0.874	0.1867	0.0351	10754
40.00	1'x1' Panel Antenna	19	0.831	0.1819	0.0342	10630
39.00	6'x1" Whip Antenna w/ Mount	19	0.789	0.1770	0.0332	10509

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	120	Diagonal	A325X	0.7500	1	1.21	12.23	0.099 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	0.72	8.16	0.089 ✓	1.333	Member Bearing
T2	116.667	Diagonal	A325X	0.7500	1	4.66	12.23	0.381 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	1.56	8.16	0.192 ✓	1.333	Member Bearing
T3	108.333	Diagonal	A325X	0.7500	1	7.50	12.23	0.613 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	2.42	8.16	0.296 ✓	1.333	Member Bearing
T4	100	Leg	A325X	0.7500	6	2.45	19.44	0.126 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	9.91	12.23	0.810 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	3.17	9.20	0.344 ✓	1.333	Bolt Shear
T5	91.6667	Diagonal	A325X	0.7500	1	12.16	12.23	0.994 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	4.01	9.20	0.436 ✓	1.333	Bolt Shear
T6	83.3333	Diagonal	A325X	0.7500	1	12.40	24.47	0.507 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	4.21	9.20	0.458 ✓	1.333	Bolt Shear
T7	75	Leg	A325X	0.7500	6	8.74	19.42	0.450 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	17.35	16.31	1.064 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	6.28	9.20	0.682 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	5.69	9.20	0.618 ✓	1.333	Bolt Shear
T8	50	Leg	A325X	0.7500	6	17.74	19.44	0.913 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	18.77	16.31	1.151 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	7.18	9.20	0.780 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	6.57	9.20	0.713 ✓	1.333	Bolt Shear
T9	25	Leg	A325X	1.0000	8	20.36	34.56	0.589 ✓	1.333	Bolt Tension
		Diagonal	A325X	1.0000	1	23.62	27.19	0.869 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	7.68	9.20	0.834 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	7.37	9.20	0.801 ✓	1.333	Bolt Shear

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

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8 K=1.00	27.884	3.7306	-1.01	104.03	0.010 ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-3.23	85.05	0.038 ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-10.65	85.05	0.125 ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-23.12	85.05	0.272 ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-37.03	85.05	0.435 ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-53.38	85.05	0.628 ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4 K=1.00	23.645	6.1120	-115.93	144.52	0.802 ✔
T8	50 - 25	P.5x.400	25.03	8.34	61.3 K=1.00	25.746	5.7805	-182.46	148.83	1.226 ✔
T9	25 - 0	P6.875x.400	25.03	12.51	65.5 K=1.00	24.741	8.1367	-236.53	201.31	1.175 ✔

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	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	94.4 K=1.00	13.674	1.6200	-1.40	22.15	0.063 ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	148.1 K=1.00	6.805	1.6200	-4.82	11.02	0.437 ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	151.4 K=1.00	6.517	1.6200	-7.66	10.56	0.726 ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	154.7 K=1.00	6.240	1.6200	-10.15	10.11	1.004 ✔
T5	91.6667 - 83.3333	2L2 1/2x2x3/16	11.00	10.41	158.1 K=1.00	5.975	1.6200	-12.41	9.68	1.283 ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	166.2 K=1.00	5.407	3.0900	-12.75	16.71	0.763

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	75 - 50	2L3x2 1/2x1/4	11.91	11.32	143.7 K=1.00	7.232	2.6300	-17.74	19.02	0.933
T8	50 - 25	2L3x2 1/2x1/4	12.65	12.10	153.6 K=1.00	6.328	2.6300	-19.32	16.64	1.161
T9	25 - 0	2L3 1/2x3x5/16	16.33	15.56	169.7 K=1.00	5.186	3.8700	-24.24	20.07	1.208

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
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	10.87	149.3 K=0.89	6.699	0.9020	-3.13	6.04	0.517
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	11.54	155.6 K=0.87	6.166	0.9020	-4.84	5.56	0.869
T7	75 - 50	L3x3x1/4	16.35	7.75	148.2 K=0.94	6.796	1.4400	-12.42	9.79	1.270
T8	50 - 25	L3x3x1/2	18.35	8.77	165.9 K=0.92	5.425	2.7500	-14.20	14.92	0.952
T9	25 - 0	L4x4x1/4	20.02	9.52	138.2 K=0.96	7.824	1.9400	-15.30	15.18	1.008

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	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	10.60	146.8 K=0.90	6.932	0.9020	-1.45	6.25	0.231
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	122.8 K=0.99	9.872	1.4400	-6.34	14.22	0.446
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	128.0 K=0.98	9.116	1.4400	-7.95	13.13	0.606
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	133.1 K=0.97	8.424	1.4400	-8.32	12.13	0.686
T7	75 - 50	L3x3x1/4	15.02	7.10	138.3 K=0.96	7.808	1.4400	-11.24	11.24	1.000
T8	50 - 25	L3x3x5/16	17.02	8.08	154.0 K=0.94	6.295	1.7800	-13.02	11.21	1.162
T9	25 - 0	L4x4x1/4	19.02	9.10	133.3 K=0.97	8.404	1.9400	-14.71	16.30	0.902

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 $\frac{P}{P_a}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	182.9 K=1.00	4.465	0.8090	-0.11	3.61	0.030 ✓
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	192.3 K=1.00	4.040	0.8090	-0.14	3.27	0.042 ✓
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	201.6 K=1.00	3.673	0.8090	-0.14	2.97	0.049 ✓
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	211.0 K=1.00	3.354	0.8090	-0.19	2.71	0.072 ✓
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	239.1 K=1.00	2.612	0.8090	-0.23	2.11	0.107 ✓
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	230.5 K=1.00	2.810	0.9020	-0.25	2.53	0.101 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8	30.000	3.7306	0.12	111.92	0.001 ✓
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5	30.000	3.7306	0.82	111.92	0.007 ✓
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5	30.000	3.7306	6.12	111.92	0.055 ✓
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5	30.000	3.7306	14.72	111.92	0.132 ✓
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5	30.000	3.7306	24.89	111.92	0.222 ✓
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5	30.000	3.7306	38.66	111.92	0.345 ✓
T7	75 - 50	P5x.375	25.03	8.34	54.4	30.000	6.1120	87.77	183.36	0.479 ✓
T8	50 - 25	P.5x.400	25.03	8.34	61.3	36.000	5.7805	144.11	208.10	0.692 ✓
T9	25 - 0	P6.875x.400	25.03	12.51	65.5	36.000	8.1367	190.29	292.92	0.650 ✓

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	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	98.5	29.000	0.9689	1.21	28.10	0.043 ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	152.3	29.000	0.9689	4.66	28.10	0.166 ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	155.5	29.000	0.9689	7.50	28.10	0.267 ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	158.8	29.000	0.9689	9.91	28.10	0.353 ✔
T5	91.6667 - 83.3333	2L2 1/2x2x3/16	11.00	10.41	162.2	29.000	0.9689	12.16	28.10	0.433 ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	170.4	29.000	1.8253	12.40	52.93	0.234 ✔
T7	75 - 50	2L3x2 1/2x1/4	11.91	11.32	147.1	29.000	1.6444	17.35	47.69	0.364 ✔
T8	50 - 25	2L3x2 1/2x1/4	12.65	12.10	157.1	29.000	1.6444	18.77	47.69	0.394 ✔
T9	25 - 0	2L3 1/2x3x5/16	16.33	15.56	173.3	29.000	2.3752	23.62	68.88	0.343 ✔

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 $\frac{P}{P_a}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	10.87	173.7	29.000	0.5710	3.05	16.56	0.184 ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	11.54	184.0	29.000	0.5710	4.62	16.56	0.279 ✔
T7	75 - 50	L3x3x1/4	16.35	7.75	102.5	29.000	0.9394	12.56	27.24	0.461 ✔
T8	50 - 25	L3x3x1/2	18.35	8.77	119.8	29.000	1.7813	14.36	51.66	0.278 ✔
T9	25 - 0	L4x4x1/4	20.02	9.52	93.3	29.000	1.3144	15.35	38.12	0.403 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	10.60	169.6	29.000	0.5710	1.29	16.56	0.078 ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	81.3	29.000	0.9394	6.33	27.24	0.232 ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	85.6	29.000	0.9394	8.02	27.24	0.295 ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	89.9	29.000	0.9394	8.42	27.24	0.309

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	75 - 50	L3x3x1/4	15.02	7.10	94.2	29.000	0.9394	11.38	27.24	0.418
T8	50 - 25	L3x3x5/16	17.02	8.08	107.7	29.000	1.1592	13.13	33.62	0.391
T9	25 - 0	L4x4x1/4	19.02	9.10	89.3	29.000	1.3144	14.74	38.12	0.387

Inner Bracing 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
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	130.2	21.600	0.8090	0.11	17.47	0.006
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	136.9	21.600	0.8090	0.14	17.47	0.008
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	143.6	21.600	0.8090	0.14	17.47	0.008
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	150.2	21.600	0.8090	0.19	17.47	0.011
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	170.2	21.600	0.8090	0.23	17.47	0.013
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	146.7	21.600	0.9020	0.25	19.48	0.013

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	120 - 116.667	Leg	P.5x.250	1	-1.01	138.67	1.8	Pass
T2	116.667 - 108.333	Leg	P.5x.250	13	-3.23	113.37	2.8	Pass
T3	108.333 - 100	Leg	P.5x.250	27	-10.65	113.37	9.4	Pass
T4	100 - 91.6667	Leg	P.5x.250	39	-23.12	113.37	20.4	Pass
T5	91.6667 - 83.3333	Leg	P.5x.250	54	-37.03	113.37	32.7	Pass
T6	83.3333 - 75	Leg	P.5x.250	69	-53.38	113.37	47.1	Pass
T7	75 - 50	Leg	P5x.375	84	-115.93	192.64	60.2	Pass
T8	50 - 25	Leg	P.5x.400	123	-182.46	198.39	92.0	Pass
T9	25 - 0	Leg	P6.875x.400	162	-236.53	268.35	88.1	Pass
T1	120 - 116.667	Diagonal	2L2 1/2x2x3/16	9	-1.40	29.53	4.7 7.4 (b)	Pass
T2	116.667 - 108.333	Diagonal	2L2 1/2x2x3/16	18	-4.82	14.69	32.8	Pass
T3	108.333 - 100	Diagonal	2L2 1/2x2x3/16	35	-7.66	14.07	54.4	Pass
T4	100 - 91.6667	Diagonal	2L2 1/2x2x3/16	47	-10.15	13.47	75.3	Pass
T5	91.6667 - 83.3333	Diagonal	2L2 1/2x2x3/16	62	-12.41	12.90	96.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T6	83.3333 - 75	Diagonal	2L2 1/2x2x3/8	77	-12.75	22.27	57.2	Pass
T7	75 - 50	Diagonal	2L3x2 1/2x1/4	92	-17.74	25.35	70.0 79.8 (b)	Pass
T8	50 - 25	Diagonal	2L3x2 1/2x1/4	131	-19.32	22.18	87.1	Pass
T9	25 - 0	Diagonal	2L3 1/2x3x5/16	170	-24.24	26.75	90.6	Pass
T2	116.667 - 108.333	Horizontal	L2 1/2x2 1/2x3/16	16	-3.13	8.05	38.8	Pass
T3	108.333 - 100	Horizontal	L2 1/2x2 1/2x3/16	34	-4.84	7.41	65.2	Pass
T7	75 - 50	Horizontal	L3x3x1/4	91	-12.42	13.05	95.2	Pass
T8	50 - 25	Horizontal	L3x3x1/2	130	-14.20	19.89	71.4	Pass
T9	25 - 0	Horizontal	L4x4x1/4	169	-15.30	20.23	75.6	Pass
T1	120 - 116.667	Top Girt	L2 1/2x2 1/2x3/16	5	-1.45	8.34	17.3	Pass
T4	100 - 91.6667	Top Girt	L3x3x1/4	42	-6.34	18.95	33.5	Pass
T5	91.6667 - 83.3333	Top Girt	L3x3x1/4	57	-7.95	17.50	45.4	Pass
T6	83.3333 - 75	Top Girt	L3x3x1/4	72	-8.32	16.17	51.5	Pass
T7	75 - 50	Top Girt	L3x3x1/4	87	-11.24	14.99	75.0	Pass
T8	50 - 25	Top Girt	L3x3x5/16	125	-13.02	14.94	87.1	Pass
T9	25 - 0	Top Girt	L4x4x1/4	164	-14.71	21.73	67.7	Pass
T4	100 - 91.6667	Inner Bracing	L2 1/2x2x3/16	50	-0.11	4.81	2.3	Pass
T5	91.6667 - 83.3333	Inner Bracing	L2 1/2x2x3/16	66	-0.14	4.36	3.2	Pass
T6	83.3333 - 75	Inner Bracing	L2 1/2x2x3/16	80	-0.14	3.96	3.6	Pass
T7	75 - 50	Inner Bracing	L2 1/2x2x3/16	119	-0.19	3.62	5.4	Pass
T8	50 - 25	Inner Bracing	L2 1/2x2x3/16	157	-0.23	2.82	8.0	Pass
T9	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	184	-0.25	3.38	7.5	Pass
							Summary	
						Leg (T8)	92.0	Pass
						Diagonal (T5)	96.2	Pass
						Horizontal (T7)	95.2	Pass
						Top Girt (T8)	87.1	Pass
						Inner Bracing (T8)	8.0	Pass
						Bolt Checks	86.3	Pass
						RATING =	**96.2**	**Pass**

ANCHOR BOLT ANALYSIS

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Job	120' Stainless Lattice Tower - New Haven, CT	Project No.	SAI-089 / TWM-006	Sheet 1	of 3
Description	Anchor Bolt Analysis	Computed by	MCD	Date	06/06/16
	MODification Analysis	Checked by		Date	

ANCHOR BOLT ANALYSIS

Input Data

Max Corner Reactions:

Uplift:	Uplift := 217·kips	*user input*
Shear:	Shear := 34·kips	*user input*
Compression:	Compression := 267·kips	*user input*

Anchor Bolt Data:

Use ASTM A36 (actual material strength unknown therefore assume min design values)

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 58·ksi	*user input*	
Bolt Yield Strength:	Fy := 36·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.5in	*user input*	
Threads per Inch:	n := 6.0	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 1.767 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 1.405 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u \right) \qquad AllowableTension = 45.1 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333 \cdot \left(0.60 \cdot A_n \cdot Fy \right) \qquad F_{net.area} = 40.5 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 36.2 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.89$$

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

Condition1 = "OK"

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Check Anchor Bolt Area:

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

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 8.0 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 2.7 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 8.4 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.95$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.32$$

Condition3 = "OK"

FOUNDATION ANALYSIS

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FOUNDATION CHECK

INPUT DATA

Max Pier Reactions:

Uplift:	$Uplift := 217 \cdot kips$	*user input*
Shear:	$Shear := 34 \cdot kips$	*user input*
Compression:	$Compression := 267 \cdot kips$	*user input*

Structure

Footing Width:	$B_{ftg} := 6ft$	*user input*
Footing Length:	$L_{ftg} := 6ft$	*user input*
Footing Thickness:	$TH_{ftg} := 2.5ft$	*user input*

Depths:

Depth to Bottom of Footing: (from grade line)	$D_{ftg} := 4.0ft$	*user input*
Depth to Suitable Rock: (from grade line)	$D_{rock} := 2.0ft$	*user input*
Depth to Suitable Earth: (from grade line)	$D_{earth} := 0ft$	*user input*
Anchor Depth:	$D_{anchor} := 24.0ft$	*user input*

Soil Properties:

Internal Friction Angle:	$\phi := 45deg$	*user input*
Unit Weight of Earth:	$\gamma_{earth} := 100\frac{lb}{ft^3}$	*user input*
Unit Weight of Rock:	$\gamma_{rock} := 178\frac{lb}{ft^3}$	*user input*
Allowable Bearing:	$Bearing := 50000 \cdot psf$	*user input*
Pier Projection Above Grade:	$P_p := 0.5 \cdot ft$	*user input*

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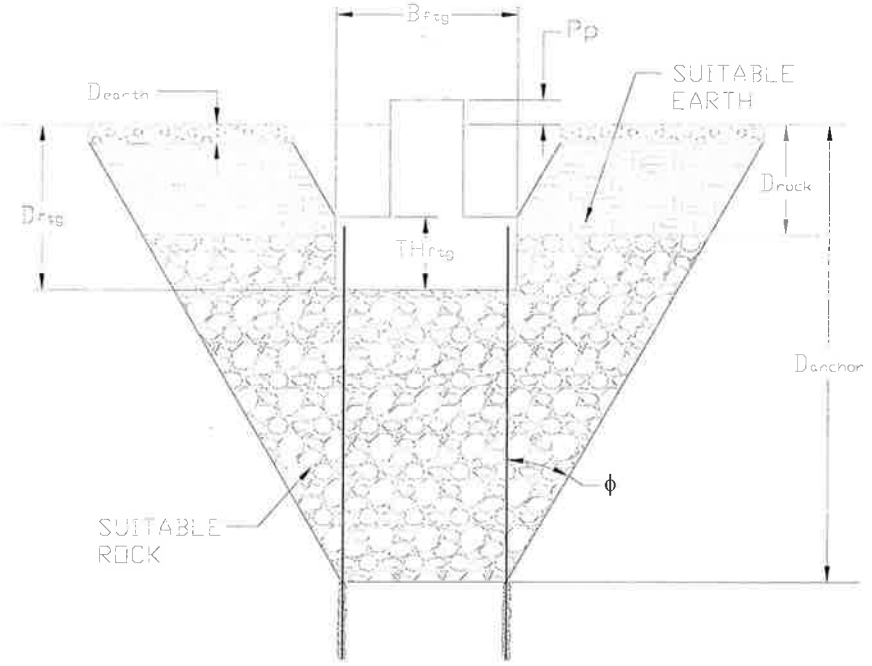

ROCK ANCHOR DATA

Anchors:

Number of Anchors (along width):	$NW_{anchor} := 2$	*user input*
Number of Anchors (along length):	$NL_{anchor} := 2$	*user input*
Hole Diameter:	$hole_d := 2.5in$	*user input*
Allowable Bond Stress:	$\sigma_{bond} := 100 \cdot psi$	*user input*
Anchor Spacing* (along length):	$SL_{anchor} := 3ft$	*user input*
Anchor Spacing* (along width):	$SW_{anchor} := 3ft$	*user input*
Rock Anchor Yield Strength:	$Fy_{anchor} := 150ksi$	*user input*
Rock Anchor Diameter:	$Anchor_{Dia} := 1.00in$	*user input*

Check Tensile Forces:

Force (per anchor):

$$P_{design} := \frac{Uplift}{NW_{anchor} + NL_{anchor}} \qquad P_{design} = 54.25 \cdot kips$$

Rock Anchor Allowble Tension:

$$T_{allowable} := \frac{0.6 \cdot Fy_{anchor} \cdot Anchor_{Dia}^{2} \cdot \pi}{4} \qquad T_{allowable} = 70.69 \cdot kips$$

$$TensionCheck := if\left(\frac{P_{design}}{T_{allowable}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{P_{design}}{T_{allowable}} = 0.77$$

TensionCheck = "OK"

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CALCULATE RESISTANCE

Intermediate Dimensions:

Suitable Earth Height: $H := D_{rock} - D_{earth}$ $H = 2.00\ ft$

Suitable Rock Height: $Z := D_{anchor} - D_{earth} - D_{rock}$ $Z = 22.00\ ft$

Total Anchor Width: $W := (NW_{anchor} - 1) \cdot SW_{anchor}$ $W = 3.00\ ft$

Total Anchor Length: $L := (NL_{anchor} - 1) \cdot SL_{anchor}$ $L = 3.00\ ft$

Earth Above Footing: $PD := D_{ftg} - D_{earth} - TH_{ftg}$ $PD = 1.50\ ft$

Volumes:

Gross Volume:

$GV_1 := W \cdot L \cdot (Z + H)$ $GV_1 = 216.00 \cdot ft^3$

$GV_2 := \left[\frac{1}{2} \cdot (Z + H) \cdot \tan(\phi) \cdot (Z + H)\right] \cdot (W + L) \cdot 2$ $GV_2 = 3456.00 \cdot ft^3$

$GV_3 := \frac{1}{3} \cdot \pi \cdot [(Z + H) \cdot \tan(\phi)]^2 \cdot (Z + H)$ $GV_3 = 14476.46 \cdot ft^3$

$GV := GV_1 + GV_2 + GV_3$ $GV = 18148.46 \cdot ft^3$

Rock Volume:

$RV_1 := W \cdot L \cdot (H)$ $RV_1 = 18.00 \cdot ft^3$

$RV_2 := \left[\frac{1}{2} \cdot (Z) \cdot \tan(\phi) \cdot (Z)\right] \cdot (W + L) \cdot 2$ $RV_2 = 2904.00 \cdot ft^3$

$RV_3 := \frac{1}{3} \cdot \pi \cdot [(Z) \cdot \tan(\phi)]^2 \cdot (Z)$ $RV_3 = 11150.56 \cdot ft^3$

$RV := RV_1 + RV_2 + RV_3$ $RV = 14072.56 \cdot ft^3$

Volume of Neglect Above Footing:

$NV_1 := B_{ftg} \cdot L_{ftg} \cdot H$ $NV_1 = 72.00 \cdot ft^3$

$NV_2 := \left[\frac{1}{2} \cdot (PD) \cdot \tan(\phi) \cdot (PD)\right] \cdot (B_{ftg} + L_{ftg}) \cdot 2$ $NV_2 = 27.00 \cdot ft^3$

$NV_3 := \frac{1}{3} \cdot \pi \cdot [(PD) \cdot \tan(\phi)]^2 \cdot (PD)$ $NV_3 = 3.53 \cdot ft^3$

$NV := NV_1 + NV_2 + NV_3$ $NV = 102.53 \cdot ft^3$

Total Suitable Earth Volume: $EV := GV - RV - NV$ $EV = 3973.37 \cdot ft^3$

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Resisting Forces:

Resisting Rock Force: $F_{rock} := RV \cdot \gamma_{rock}$ $F_{rock} = 2504.92 \cdot kips$

Resisting Earth Force: $F_{earth} := EV \cdot \gamma_{earth}$ $F_{earth} = 397.34 \cdot kips$

Total Resisting Force: $F_{total} := F_{rock} + F_{earth}$ $F_{total} = 2902.25 \cdot kips$

Check Uplift:

$$Condition1 := if\left(\frac{F_{total}}{Uplift} \geq 2.00, "OK", "Overstressed"\right) \qquad \frac{F_{total}}{Uplift} = 13.37$$

Condition1 = "OK"

Embedment Length:

$$L_b := \frac{P_{design}}{\pi \cdot hole_d \cdot \sigma_{bond}} \qquad L_b = 5.76\,ft$$

$$Condition2 := if\left(\frac{Z}{L_b} \geq 2.00, "OK", "Overstressed"\right) \qquad \frac{Z}{L_b} = 3.82$$

Condition2 = "OK"

Check Bearing (with Post tension Force included):

$$MaxBearing := \left[\frac{Compression + \left(NW_{anchor} + NL_{anchor}\right)\left(P_{design}\right)}{B_{ftg} \cdot L_{ftg}}\right] + \frac{Shear \cdot \left(D_{ftg} + P_p\right)}{\left(\frac{B_{ftg} \cdot L_{ftg}^{\,2}}{6}\right)} \qquad MaxBearing = 17694.44 \cdot psf$$

$$Condition3 := if\left(\frac{MaxBearing}{Bearing} \leq 1.00, "OK", "Overstressed"\right) \qquad \frac{MaxBearing}{Bearing} = 0.35$$

Condition3 = "OK"

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

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