Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 30, 2018

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

Notice of Exempt Modification
1021 Straits Turnpike, Middlebury, CT 06762
Latitude- 41.53576300
Longitude- -73.08921000

Dear Ms. Bachman,

T-Mobile currently maintains nine (9) existing antennas at the 195' level of the existing 195' lattice tower at 1021 Straits Turnpike, Middlebury, CT. The tower is owned by Phoenix Tower International. The property is owned by the Town of Middlebury. T-Mobile now intends to replace three (3) antennas with three (3) new 600/700 MHz antennas. These antennas would be installed at the same 195' level of the tower. T-Mobile also intends to install two (2) new hybrid cable.

This facility was approved by the Town of Middlebury on August 24, 1999. The approval did not come with conditions that could be violated by this modification.

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. 16-50j-73, a copy of this letter is being sent to Edward B. St. John, First Selectman of the Town of Middlebury, as well as the property owner and tower owner.

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

1. The proposed modification will not 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 or 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 modification will not cause a change or alteration in the physical or 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. 16-50j-72(b)(2).

Sincerely,

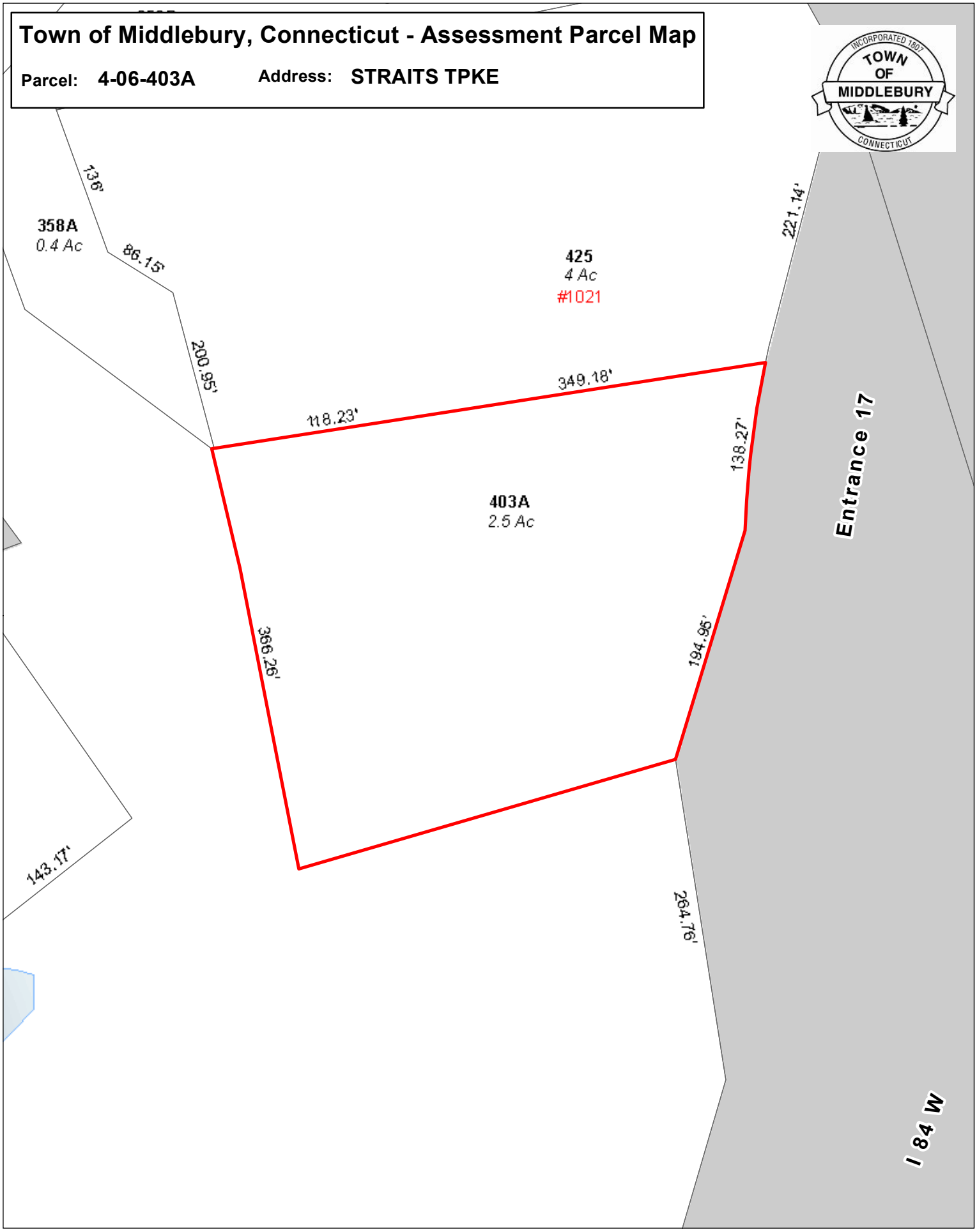
Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Edward B. St. John- as elected official
Curt Bosco- as zoning official
Phoenix Tower International- as tower owner
Town of Middlebury- as property owner

Town of Middlebury, Connecticut - Assessment Parcel Map

Parcel: 4-06-403A **Address:** STRAITS TPKE



Map Produced December 2014

Approximate Scale: 1 inch = 100 feet

STRAITS TPKE

Location	STRAITS TPKE	**Mblu**	4-06/ / 403A/ /
Acct#	Z9500330	**Owner**	MIDDLEBURY TOWN OF
Assessment	$293,300	**Appraisal**	$419,000
PID	3624	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$419,000	$419,000
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$293,300	$293,300

Owner of Record

Owner	MIDDLEBURY TOWN OF
Co-Owner	
Address	1212 WHITTEMORE RD MIDDLEBURY, CT 06762-0392

Sale Price	$0
Certificate	1990
Book & Page	119/ 942
Sale Date	08/15/1990
Instrument	XX

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MIDDLEBURY TOWN OF	$0	1990	119/ 942	XX	08/15/1990

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	
Replacement Cost Less Depreciation:	$0

Building Attributes	
Field	**Description**

Style	Vacant Land
Model	
Grade	
Stories	
Occupancy	
Exterior Wall A	
Exterior Wall B	
Roof Structure	
Roof Cover	
Interior Wall A	
Interior Wall B	
Interior Flr A	
Interior Flr B	
Heat Fuel	
Heat Type	
AC Type	
Total Bedrooms	
Full Bathrooms	
Half Bathrooms	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Fireplaces	
Whirlpool	
Fin Basement	
Fin Bsmt Quality	
Bsmt Garages	

Building Photo

(http://images.vgsi.com/photos/MiddleburyCTPhotos//default.jp

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	920
Description	Mun Land Com
Zone	CA40
Neighborhood	C275

Land Line Valuation

Size (Acres)	2.5
Frontage	0
Depth	0
Assessed Value	$293,300

Alt Land Appr Category No

Appraised Value $419,000

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$420,500	$420,500
2013	$0	$420,500	$420,500
2012	$0	$420,500	$420,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$294,400	$294,400
2013	$0	$294,400	$294,400
2012	$0	$294,400	$294,400

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: CT11128E

Middlebury I84/X17
1021 Straits Turnpike
Middlebury, CT 06762

July 10, 2018

EBI Project Number: 6218004845

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	5.66 %

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

EBI Consulting
environmental | engineering | due diligence

July 10, 2018

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

Emissions Analysis for Site: **CT11128E – Middlebury I84/X17**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1021 Straits Turnpike, Middlebury, 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 population 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 population 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 limits for the 600 MHz and 700 MHz Band are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. 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 **1021 Straits Turnpike, Middlebury, 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 for directional panel antennas, 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) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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 for directional panel antennas, 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 B66A/B2A** & **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 centerlines of the proposed antennas are **198 feet** and **200 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 population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	200	Height (AGL):	200	Height (AGL):	200
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%	**0.89**	Antenna B1 MPE%	**0.89**	Antenna C1 MPE%	**0.89**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	200	Height (AGL):	200	Height (AGL):	200
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):	7,678.43	ERP (W):	7,678.43	ERP (W):	7,678.43
Antenna A2 MPE%	**0.73**	Antenna B2 MPE%	**0.73**	Antenna C2 MPE%	**0.73**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95/ 13.35 dBd	Gain:	12.95/ 13.35 dBd	Gain:	12.95/ 13.35 dBd
Height (AGL):	198	Height (AGL):	198	Height (AGL):	198
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A3 MPE%	**0.56**	Antenna B3 MPE%	**0.56**	Antenna C3 MPE%	**0.56**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.18 %**
AT&T	0.55 %
MetroPCS	0.35 %
Verizon Wireless	1.74 %
Sprint	0.84 %
Site Total MPE %:	**5.66 %**

T-Mobile Sector A Total:	2.18 %
T-Mobile Sector B Total:	2.18 %
T-Mobile Sector C Total:	2.18 %
Site Total:	5.66 %

T-Mobile Max Power Values (Per Sector)

T-Mobile _Max Power Values (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 AWS - 2100 MHz LTE	2	2,334.27	200	4.46	AWS - 2100 MHz	1000	0.45%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	200	4.46	PCS - 1900 MHz	1000	0.45%
T-Mobile AWS - 2100 MHz UMTS	2	1,279.74	200	2.44	AWS - 2100 MHz	1000	0.24%
T-Mobile PCS - 1900 MHz UMTS	2	1,279.74	200	2.44	PCS - 1900 MHz	1000	0.24%
T-Mobile PCS - 1900 MHz GSM	2	1,279.74	200	2.44	PCS - 1900 MHz	1000	0.24%
T-Mobile 600 MHz LTE	2	591.73	198	1.15	600 MHz	1000	0.29%
T-Mobile 700 MHz LTE	2	648.82	198	1.27	700 MHz	467	0.27%
						Total:	**2.18%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population 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 population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.18 %
Sector B:	2.18 %
Sector C:	2.18 %
T-Mobile Per Sector Maximum (Per Sector):	2.18 %
Site Total:	5.66 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.66%** of the allowable FCC established general population 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.

July 12, 2018

David C. Rodriguez
Phoenix Tower International
999 Yamato Road, Suite 100
Boca Raton, FL 33431
(561) 257-0557

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
Structures@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Reconfiguration**	
	Carrier Site Number:	CT11128E
	Carrier Project Name:	Middlebury/I84 X17
Phoenix Tower Designation:	**PTI Site Number:**	US-CT-1003
	PTI Site Name:	Straits Turnpike
Engineering Firm Designation:	**TEP Project Number:**	25628.165387
Site Data:	**1021 Straits Turnpike, Middlebury, New Haven County, CT 06762** **Latitude *41° 32' 8.78"*, Longitude *-73° 05' 21.27"*** **195 ± Foot - Self Supporting Tower**	

Dear David C. Rodriguez,

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

LC1: Existing + Proposed + Future Loading **Sufficient Capacity**
Note: See Table 1 for the existing, proposed, and future loading

Structure Capacity	Foundation Capacity
91.1%	54.1%

This analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 and the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II was/were used in this analysis.

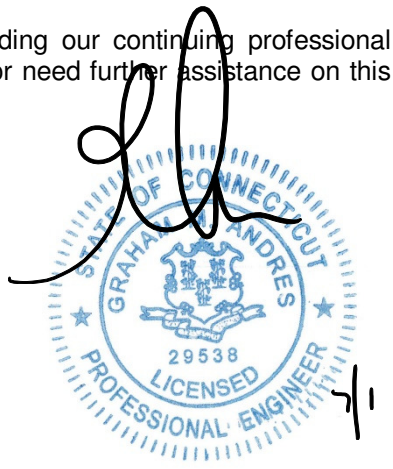
All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *Phoenix Tower International.* If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: James H. Joyce, E.I.

Respectfully submitted by:

Graham M. Andres, P.E.



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1) INTRODUCTION

This tower is a 195-ft Self Supporting tower designed by Fred A. Nudd Corporation in May of 1998. The tower was originally designed for a wind speed of 85 mph per ANSI/EIA/TIA-222-F. TEP visited the site in June of 2010 to gather existing steel and appurtenance information. This tower has been modified multiple times in the past to accommodate additional loading. All other information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 and the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph with no ice per section 1609.3.1 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1, 50 mph with 0.75 inch ice thickness, and 60 mph under service loads. Risk Category II was used in this analysis with the following design criteria:

Type of Analysis: **Rigorous**
Classification of Structure: **Class II**
Exposure Category: **Exposure B**
Topographic Category: **Category 1**
Earthquake Category: **Not Considered**
Earthquake effects may be ignored per this standard for site locations where Ss does not exceed 1.0. (Site Location Ss = 0.195).

Table 1 - Existing, Proposed, and Future Antenna and Cable Information

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
Future	***195.0***	***195.0***	***-***	***T-Mobile Future Loading[1]***	(3) 12.5' Sector Frames	***3***	***1 5/8***	***AB Face***	***T-Mobile***
Proposed	***195.0***	***195.0***	***3***	***RFS APXVAAR24-43-U-NA20***		***2***	***Fiber***	***AB Face***	***T-Mobile***
			3	***Ericsson Radio 4449 B71/B12***					
Existing	195.0	195.0	3	Ericsson KRD-901146-1		1	Fiber	AB Face	T-Mobile
			6	Ericsson KRY-112-71		18	1-5/8	AB Face	T-Mobile
			3	RFS APX16DWV-16DWV-S-E-A20					
To Be Removed	*195.0*	*193.0*	*3*	*Commscope LNX-6515DS-A1M*	-	-	-	-	*T-Mobile*
Existing	185.0	185.0	3	Powerwave 7770	(3) 15.0' T-Frames with Catwalk and MT195-14 Handrail Kit	12 1 2	1-5/8 7/16"Ø Fiber 3/8"Ø Power	CA Face	AT&T
			4	Powerwave P65-17-XLH-RR					
			6	Powerwave LGP 21401 TMA					
			3	Ericsson RRUS-11					
			2	Raycap DC6-48-60-18-8F					
			6	Ericsson RRUS-12					
			3	Ericsson RRUS-32					
			6	CCI TPX-070621					
			2	KMW AM-X-CD-16-65-00T-RET					

Table 1 - Existing, Proposed, and Future Antenna and Cable Information (Continued)

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
Existing	169.0	169.0	2	Antel BXA-70063-6CF	(3) 15.0' T-Frames with Catwalk	12 1	1-5/8 Fiber	AB Face	Verizon
			4	Decibel DB844G65ZAXY					
			1	Antel BXA 70080/6CF					
			2	Decibel DB846F65ZAXY					
			6	RFS FD9R6004/2C-3L					
			3	Alcatel Lucent RRH2x60-AWS					
			3	Alcatel Lucent RRH2x60-PCS					
			1	RFS DB-T1-6Z-8AB-0Z					
			6	HBXX-6517DS-A2M					
Existing	153.0	153.0	3	Commscope DT465B-2XR	(3) 12.0' Sector Frames	4	1-1/4" Hybrilflex	BC Face	Sprint
			3	ALU TD-RRH8x20-25 w/Solar Shield					
			3	ALU RRH2x50-08					
			3	RFS APXVSPP18-C-A20					
			3	ALU RRH 1900 4x45 65MHz					
			3	ALU 2x50W 800MHz RRH					
Existing	75.5	75.5	1	GPS Antenna	4.5' Standoff	1	5/8"Ø	BC Face	Unknown

Notes:
1) T-Mobile Future Loading consists of 0.0 in^2 wind area and (3) feed lines at 193-ft elevation.

Table 2 - Detailed Future Loading Information[2]

Existing/ Proposed	Elevation (ft)	Wind Area (in^2) (includes Ca factors)	Weight (lb)	Qty Coax	Coax Size	% Capacity	Owner/ Tenant
Existing/ Proposed	***195/193***	***20,475.85***	***2,645.32***	***18 3***	***1 5/8 Fiber***	***87.5***	***T-Mobile***
Future	***195***	***1,524.15***	***196.91***	***3***	***1 5/8***	***-***	***T-Mobile***
Total	195	22,000.00	2,842.23	21 3	1 5/8 Fiber	91.1	T-Mobile

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Source
Tower and Foundation Drawings	Fred A. Nudd Corporation, dated May 5, 1998 Project No. 5974.	TEP
Structural Modification Drawings	Fred A. Nudd Corporation, dated April 30, 1999 Drawing No. 99-6726-1	TEP
Steel and Appurtenance Mapping	Tower Engineering Professionals, Inc., dated June 3, 2010 TEP No. 102056	TEP
Post-Modification Inspection	Tower Engineering Professionals, Inc., dated April 21, 2011 TEP No. 102056	TEP
Geotechnical Report	Dr. Clarence Welti, P.E., P.C., dated April 17, 1998 Project No. 25628	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated August 29, 2011 TEP No. 102056	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated July 26, 2012 TEP No. 102056	TEP
Structural Modification Analysis	Tower Engineering Professionals, Inc., dated August 1, 2013 TEP No. 25628.4865	TEP
Previous Structural Analysis	Tower Engineering Professionals, Inc., dated December 12, 2017 TEP No. 25628.147080	TEP
Structural Modification Analysis	Tower Engineering Professionals, Inc., dated August 24, 2016 TEP No. 25628.93911	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated April 19, 2016 TEP No. 25628.47301	TEP
Post Modification Inspection	Tower Engineering Professionals, Inc., dated October 26, 2016 TEP No. 25628. 58752	TEP
Correspondence	Correspondence with Phoenix Tower International with regards to the existing, proposed, and future loading.	PTI

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation have been maintained in accordance with the manufacturer's specification.
3) The configuration of existing antennas, transmission cables, mounts and other appurtenances are as specified in the tower mapping report by TEP.
4) Unless specified by the client or tower mapping, the location of the existing and proposed coax is assumed by TEP and listed in Table 1.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 6.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not analyze antennas supporting mounts as part of this structural analysis report.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
T1	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	3	-34692.80	70532.50	49.2	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	45	-38704.30	77102.10	50.2	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	57	-49111.10	77205.80	63.6	Pass
T4	170 - 160	Leg	2.5SCH40 w/ 3SCH80 Half Sleeve	Note 2	Note 2	Note 2	68.3	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	90	-93942.50	126932.00	74.0	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	Note 2	Note 2	Note 2	62.0	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T10	120 - 113.333	Leg	Pipe 6.625" x 0.280" (6 STD)	159	-169677.00	268817.00	63.1	Pass
T11	113.333 - 106.667	Leg	Pipe 6.625" x 0.280" (6 STD)	171	-182476.00	268848.00	67.9	Pass
T12	106.667 - 100	Leg	Pipe 6.625" x 0.280" (6 STD)	183	-194456.00	268875.00	72.3	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	Note 2	Note 2	Note 2	52.2	Pass
T14	80 - 60	Leg	Pipe 8.625" x 0.322" (8 STD)	225	-267054.00	391613.00	68.2	Pass
T15	60 - 50	Leg	Pipe 8.625" x 0.322" (8 STD)	246	-279437.00	401143.00	69.7	Pass
T16	50 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	258	-296682.00	401194.00	73.9	Pass
T17	40 - 20	Leg	Pipe 8.75" x 0.500" (8 EH)	270	-330692.00	559858.00	59.1	Pass
T18	20 - 0	Leg	Pipe 8.75" x 0.500" (8 EH)	285	-361692.00	560492.00	64.5 65.0 (b)	Pass
T1	195 - 180	Diagonal	5/8	12	9052.81	9940.20	91.1	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	48	-4196.57	7609.55	55.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
							73.8 (b)	
T3	175 - 170	Diagonal	L2x2x3/16	60	-3381.34	13320.20	25.4 49.9 (b)	Pass
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	84	-5337.84	22761.40	23.5 59.5 (b)	Pass
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	93	-6144.02	34011.90	18.1 71.5 (b)	Pass
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	115	-5862.88	31842.70	18.4 69.9 (b)	Pass
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	135	-6077.85	17991.90	33.8 47.1 (b)	Pass
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	144	-6286.79	16560.40	38.0 48.3 (b)	Pass
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	153	-6111.95	11588.10	52.7 77.2 (b)	Pass
T10	120 - 113.333	Diagonal	L3x3x1/4	163	-7199.18	22905.00	31.4 51.4 (b)	Pass
T11	113.333 - 106.667	Diagonal	L3x3x1/4	175	-7307.60	21667.80	33.7 53.4 (b)	Pass
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	187	-7417.97	11556.70	64.2	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	199	-7560.14	25335.60	29.8 31.5 (b)	Pass
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	229	-8018.62	21768.60	36.8	Pass
T15	60 - 50	Diagonal	L3x3x5/16	250	-9945.70	13914.00	71.5	Pass
T16	50 - 40	Diagonal	L3x3x5/16	262	-9728.57	12883.30	75.5	Pass
T17	40 - 20	Diagonal	L4x4x3/8	274	-9635.43	28952.00	33.3 38.8 (b)	Pass
T18	20 - 0	Diagonal	L5x5x5/16	289	-10301.90	38842.60	26.5 41.5 (b)	Pass
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	17	-5082.87	7191.11	70.7	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	53	-671.22	15868.60	4.2 9.8 (b)	Pass
T3	175 - 170	Secondary Horizontal	L2x2x3/16	65	-851.69	15324.60	5.6 12.5 (b)	Pass
T4	170 - 160	Secondary Horizontal	L2x2x3/16	77	-1247.58	14254.80	8.8 18.3 (b)	Pass
T5	160 - 150	Secondary Horizontal	L2x2x3/16	98	-1630.88	13230.80	12.3 23.9 (b)	Pass
T6	150 - 140	Secondary Horizontal	L2x2x3/16	119	-2047.33	12187.10	16.8 30.0 (b)	Pass
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	167	-2943.28	19380.60	15.2 37.6 (b)	Pass
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	179	-3166.26	18683.90	16.9 40.4 (b)	Pass
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	191	-3373.60	17991.70	18.8 43.1 (b)	Pass
T13	100 - 80	Secondary Horizontal	L3x3x1/4	203	-4017.41	20777.30	19.3 28.9 (b)	Pass
T15	60 - 50	Secondary Horizontal	L4x4x3/8	254	-4846.03	44960.90	10.8 39.0 (b)	Pass
T16	50 - 40	Secondary Horizontal	L4x4x1/4	266	-5145.09	28993.60	17.7 35.8 (b)	Pass
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	5	-1572.22	7191.11	21.9	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	8	-3025.86	7191.11	42.1	Pass
							Summary	
						Leg (T4)	68.3	Pass
						Diagonal (T1)	91.1	Pass
						Horizontal (T1)	70.7	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
						Secondary Horizontal (T12)	43.1	Pass
						Top Girt (T1)	21.9	Pass
						Bottom Girt (T1)	42.1	Pass
						Bolt Checks	77.2	Pass
						RATING =	**91.1**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
2	Anchor Rods	-	71.8	Pass
2	Base Foundation - Soil Interaction	-	36.9	Pass
2	Base Foundation - Structural	-	54.1	Pass

Structure Rating (max from all components) =	**91.1%**

Notes:
2) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

Table 6 - Dish Twist/Sway Results for 60 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
-	-	-	-	-

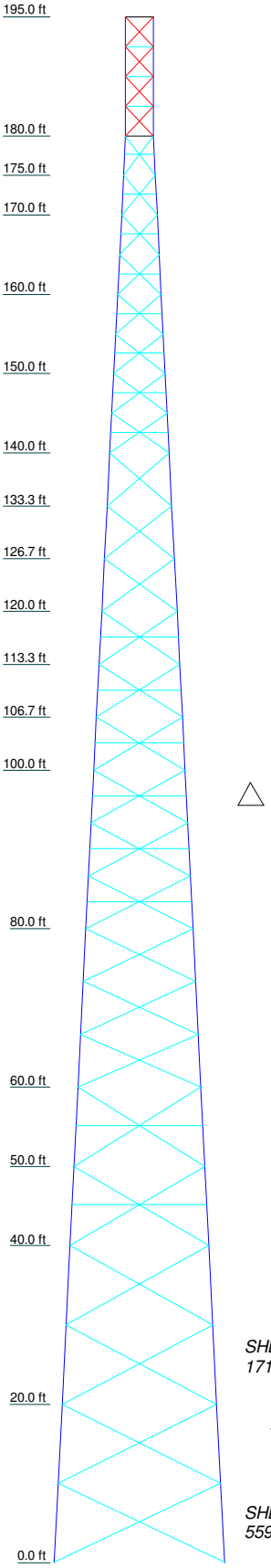
4.1) Recommendations

1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, proposed, and future loading. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T18	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pipe 8.75" x 0.500" (8 EH)			Pipe 8.625" x 0.322" (8 STD)		F		E		D		C	B	A		PIPE 2.5 STD (SCH 40)	
Leg Grade		A572-55				A53-B-42		A572-55		A500-46		A500-50	A572-55	A53-B-35		A572-55	
Diagonals	L5x5x5/16	L4x4x3/8	L3x3x5/16		L3 1/2x3 1/2x1/4		K	L3x3x1/4		J	L2 1/2x2 1/2x1/4		2L2x2x3/16x1/4	I	H	G	SR 5/8	
Diagonal Grade						A36												
Top Girts						N.A.							L2x2x3/16					L1 1/2x1 1/2x3/16
Bottom Girts						N.A.												L1 1/2x1 1/2x3/16
Horizontals						N.A.												L1 1/2x1 1/2x3/16
Sec. Horizontals	N.A.		L4x4x1/4	L4x4x3/8	N.A.	L3x3x1/4		L3x3x3/16		N.A.								N.A.
Face Width (ft) 21.5	19.5	17.5	16.5	15.5	13.5	11.5	10.8333	10.1667	9.5	8.83333	8.16667	7.5	6.5	5.5	4.5	4		3.5
# Panels @ (ft)	2 @ 9.95833		4 @ 10				12 @ 6.66667							8 @ 5			4 @ 3.75	
Weight (lb) 30602.5	5469.9	5106.5	1912.1	2011.3	3370.0	4304.0	820.6	862.9	839.1	788.4	842.1	829.5	1040.7	817.6	707.8	214.0	181.8	494.2



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2.5SCH40 w/ 3SCH80 Half Sleeve	G	L1 1/2x1 1/2x3/16
B	Pipe 3.5 Std (SCH40)	H	L2x2x3/16
C	3.5SCH40 w/ 4SCH40 Half Sleeve	I	2L1 1/2x1 1/2x3/16x1/4
D	5 STD w/ 6 XH Half Sleeve	J	L2 1/2x2 1/2x1/4
E	Pipe 6.625" x 0.280" (6 STD)	K	L2 1/2x2 1/2x1/4
F	6 STD w/ 7 XH Half Sleeve		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A500-50	50 ksi	62 ksi
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi
A53-B-35	35 ksi	60 ksi	A53-B-42	42 ksi	63 ksi

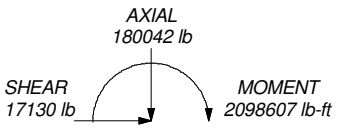
TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft

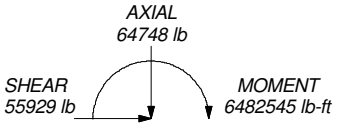
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 369737 lb
SHEAR: 36026 lb

UPLIFT: -318663 lb
SHEAR: 31474 lb



TORQUE 4290 lb-ft
50 mph WIND - 0.7500 in ICE



TORQUE 13855 lb-ft
REACTIONS - 93 mph WIND

Tower Engineering Professionals

Tower Engineering Professionals, Inc.
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: ***US-CT-1003 - Straits Turnpike***			
Project: ***TEP #25628.165387***			
Client: Phoenix Tower International	Drawn by: jhjoyce	App'd:	
Code: TIA-222-G	Date: 07/12/18	Scale: NTS	
Path: \\tep-netapp-01\Towers\25628\P-149187_L-165387_US-CT-1003_Straits Turnpike_Structural Analysis\tnx\US-CT-1003.eri		Dwg No. E-1	

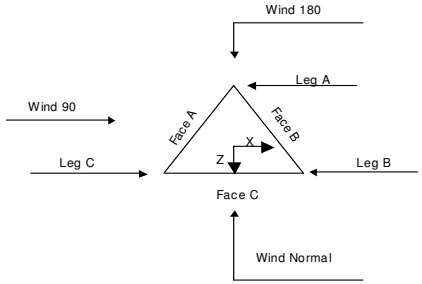
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 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 3.50 ft at the top and 21.50 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-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	195.00-180.00			3.50	1	15.00
T2	180.00-175.00			3.50	1	5.00
T3	175.00-170.00			4.00	1	5.00
T4	170.00-160.00			4.50	1	10.00
T5	160.00-150.00			5.50	1	10.00
T6	150.00-140.00			6.50	1	10.00
T7	140.00-133.33			7.50	1	6.67
T8	133.33-126.67			8.17	1	6.67
T9	126.67-120.00			8.83	1	6.67
T10	120.00-113.33			9.50	1	6.67
T11	113.33-106.67			10.17	1	6.67
T12	106.67-100.00			10.83	1	6.67
T13	100.00-80.00			11.50	1	20.00
T14	80.00-60.00			13.50	1	20.00
T15	60.00-50.00			15.50	1	10.00
T16	50.00-40.00			16.50	1	10.00
T17	40.00-20.00			17.50	1	20.00
T18	20.00-0.00			19.50	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	195.00-180.00	3.75	TX Brace	No	Yes	0.0000	0.0000
T2	180.00-175.00	5.00	X Brace	No	Yes	0.0000	0.0000
T3	175.00-170.00	5.00	X Brace	No	Yes	0.0000	0.0000
T4	170.00-160.00	5.00	X Brace	No	Yes	0.0000	0.0000
T5	160.00-150.00	5.00	X Brace	No	Yes	0.0000	0.0000
T6	150.00-140.00	5.00	X Brace	No	Yes	0.0000	0.0000
T7	140.00-133.33	6.67	X Brace	No	No	0.0000	0.0000
T8	133.33-126.67	6.67	X Brace	No	No	0.0000	0.0000
T9	126.67-120.00	6.67	X Brace	No	No	0.0000	0.0000
T10	120.00-113.33	6.67	X Brace	No	Yes	0.0000	0.0000
T11	113.33-106.67	6.67	X Brace	No	Yes	0.0000	0.0000
T12	106.67-100.00	6.67	X Brace	No	Yes	0.0000	0.0000
T13	100.00-80.00	6.67	X Brace	No	Yes	0.0000	0.0000
T14	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T15	60.00-50.00	10.00	X Brace	No	Yes	0.0000	0.0000
T16	50.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T17	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T18	20.00-0.00	9.96	X Brace	No	No	0.0000	1.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 195.00-180.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 180.00-175.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 175.00-170.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 170.00-160.00	Arbitrary Shape	2.5SCH40 w/ 3SCH80 Half Sleeve	A53-B-35 (35 ksi)	Double Equal Angle	2L1 1/2x1 1/2x3/16x1/4	A36 (36 ksi)
T5 160.00-150.00	Pipe	Pipe 3.5 Std (SCH40)	A572-55 (55 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T6 150.00-140.00	Arbitrary Shape	3.5SCH40 w/ 4SCH40 Half Sleeve	A500-50 (50 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T7 140.00-133.33	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 133.33-126.67	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T9 126.67-120.00	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 120.00-113.33	Pipe	Pipe 6.625" x 0.280" (6 STD)	A572-55 (55 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 113.33-106.67	Pipe	Pipe 6.625" x 0.280" (6 STD)	A572-55 (55 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T12 106.67-100.00	Pipe	Pipe 6.625" x 0.280" (6 STD)	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T13 100.00-80.00	Arbitrary Shape	6 STD w/ 7 XH Half Sleeve	A53-B-42 (42 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T14 80.00-60.00	Pipe	Pipe 8.625" x 0.322" (8 STD)	A572-55 (55 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T15 60.00-50.00	Pipe	Pipe 8.625" x 0.322" (8 STD)	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T16 50.00-40.00	Pipe	Pipe 8.625" x 0.322" (8 STD)	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T17 40.00-20.00	Pipe	Pipe 8.75" x 0.500" (8 EH)	A572-55	Equal Angle	L4x4x3/8	A36

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T18 20.00-0.00	Pipe	Pipe 8.75" x 0.500" (8 EH)	(55 ksi) A572-55 (55 ksi)	Equal Angle	L5x5x5/16	(36 ksi) 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 195.00-180.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	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 195.00-180.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	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
T2 180.00-175.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 175.00-170.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 170.00-160.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 160.00-150.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 150.00-140.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T10 120.00-113.33	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T11 113.33-106.67	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T12 106.67-100.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T13 100.00-80.00	Equal Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T15 60.00-50.00	Equal Angle	L4x4x3/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T16 50.00-40.00	Equal Angle	L4x4x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 195.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T2 180.00-175.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T3 175.00-170.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T4 170.00-160.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T5 160.00-150.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T6 150.00-140.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T7 140.00-133.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T8 133.33-126.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T9 126.67-120.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T10 120.00-113.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T11 113.33-106.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T12 106.67-100.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T13 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T14 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T15 60.00-50.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T16 50.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T17 40.00-20.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T18 20.00-0.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000

Tower Section Geometry *(cont'd)*

K Factors[1]

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 195.00-180.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.00-175.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 175.00-170.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T4 170.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 160.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T6 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 140.00-133.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T8 133.33-126.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 126.67-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 120.00-113.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 113.33-106.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T12 106.67-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T14 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T15 60.00-50.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T16 50.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T17 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T18 20.00-0.00	Yes	Yes	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 Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 195.00-180.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-175.00	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
T3 175.00-170.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T4	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
170.00-160.00														
T5	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
160.00-150.00														
T6	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
150.00-140.00														
T7	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
140.00-133.33														
T8	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
133.33-126.67														
T9	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
126.67-120.00														
T10	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
120.00-113.33														
T11	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
113.33-106.67														
T12	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
106.67-100.00														
T13	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
100.00-80.00														
T14	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
80.00-60.00														
T15	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
60.00-50.00														
T16	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
50.00-40.00														
T17	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
40.00-20.00														
T18 20.00-0.00	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	Flange	0.7500	4	0.0000	0	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
195.00-180.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2	Flange	0.7500	0	0.5000	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
180.00-175.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3	Flange	0.7500	0	0.5000	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
175.00-170.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T4	Flange	0.7500	6	0.5000	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
170.00-160.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5	Flange	1.0000	0	0.5000	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
160.00-150.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T6	Flange	1.0000	6	0.5000	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
150.00-140.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7	Flange	1.0000	0	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
140.00-133.33		A325N		A325X		A325N		A325N		A325N		A325N		A325N	

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.
T8	Flange	1.0000	0	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
133.33-126.67		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T9	Flange	1.0000	8	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
126.67-120.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10	Flange	1.0000	0	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
120.00-113.33		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T11	Flange	1.0000	0	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
113.33-106.67		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T12	Flange	1.0000	8	0.6250	1	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
106.67-100.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T13	Flange	1.2500	8	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.7500	1
100.00-80.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T14	Flange	1.2500	8	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.7500	0
80.00-60.00		A325N		A325N		A325N		A325N		A325N		A325N		A325X	
T15	Flange	1.2500	0	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	1
60.00-50.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T16	Flange	1.2500	8	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.7500	1
50.00-40.00		A325N		A325N		A325N		A325N		A325N		A325N		A325X	
T17	Flange	1.2500	8	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
40.00-20.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T18 20.00-0.00	Flange	1.5000	8	0.6250	2	0.0000	0	0.0000	0	0.6250	0	0.0000	0	0.6250	0
		A36		A325N		A325N		A325N		A325N		A325N		A325N	

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
LDF7-50A (1-5/8 FOAM)	B	No	Ar (CaAa)	169.00 - 8.00	-2.0000	0.35	12	12	0.5000	1.9800		0.82
HB158-1-08U8-S8J18(1-5/8)	B	No	Ar (CaAa)	169.00 - 8.00	-4.0000	0.29	1	1	0.5000	0.0001		1.30
WG Rail 1.5x1.5x1/4 ****	B	No	Af (CaAa)	170.00 - 8.00	-2.0000	0.35	2	2	36.5000	1.5000		2.40
1 5/8" Hybrid	B	No	Ar (CaAa)	195.00 - 8.00	0.0000	0	3	3	0.5000	1.6250		0.75
LDF7-50A (1-5/8 FOAM)	B	No	Ar (CaAa)	195.00 - 8.00	0.0000	0	21	9	0.5000	1.9800		0.82
WG Rail 1.5x1.5x3/16 ****	B	No	Af (CaAa)	195.00 - 0.00	0.0000	0	2	2	36.0000	1.5000		1.81
5/8" dia. coax	C	No	Ar (CaAa)	75.50 - 10.00	0.0000	0	1	1	0.5000	0.6250		0.15
1 1/4 Hybriflex Cable	C	No	Ar (CaAa)	153.00 - 10.00	0.0000	0.04	4	4	0.5000	1.2500		1.44
WG Rail 1.5x1.5x3/16 ****	C	No	Af (CaAa)	160.00 - 0.00	0.0000	0.1	2	2	35.0000	1.5000		1.81
LDF7-50A (1-5/8 FOAM)	A	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.3	12	6	0.5000	1.9800		0.82
7/16" Fiber Cable (24 fibers Max)	A	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.375	1	1	0.5000	0.4375		0.03

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
8AWG7	A	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.35	2	2	0.5000	0.3750		0.15
WG Rail 1.5x1.5x1/8 ***	A	No	Af (CaAa)	185.00 - 2.00	0.0000	0.3	2	2	34.0000	1.5000		1.23
Safety Line 3/8	A	No	Ar (CaAa)	195.00 - 0.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
Step Pegs (5/8" SR) 7-in. w/30" step	A	No	Ar (CaAa)	195.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step	B	No	Ar (CaAa)	60.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step *****	C	No	Ar (CaAa)	60.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
Rung L1.5x1.5x1/8 (36.25"w, 34"s)	B	No	Af (CaAa)	170.00 - 8.00	-2.0000	0.35	1	1	0.5000	0.0001		1.31
Rung L1.5x1.5x1/8 (36"w, 34"s)	B	No	Af (CaAa)	181.00 - 0.00	0.0000	0	1	1	0.5000	0.0001		1.29
Rung L2x1.5x1/8 (35"w, 48"s)	C	No	Af (CaAa)	160.00 - 0.00	0.0000	0.1	1	1	0.5000	0.0001		1.05
Rung L1.5x1.5x1/8 (36"w, 34"s) ****	A	No	Af (CaAa)	180.00 - 2.00	0.0000	0.3	1	1	0.5000	0.0001		1.29

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft²/ft	Weight plf
****							
****							
****							
****							
***							
****							

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	195.00-180.00	A	0.000	0.000	16.061	0.000	73.75
		B	0.000	0.000	77.183	0.000	347.64
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	0.000	0.000	15.336	0.000	73.16
		B	0.000	0.000	25.728	0.000	121.93
		C	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T3	175.00-170.00	A	0.000	0.000	15.336	0.000	73.16
		B	0.000	0.000	25.728	0.000	121.93
		C	0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	0.000	0.000	30.673	0.000	146.32
		B	0.000	0.000	77.839	0.000	405.24
		C	0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	0.000	0.000	30.673	0.000	146.32
		B	0.000	0.000	80.215	0.000	416.38
		C	0.000	0.000	6.500	0.000	63.90
T6	150.00-140.00	A	0.000	0.000	30.673	0.000	146.32
		B	0.000	0.000	80.215	0.000	416.38
		C	0.000	0.000	10.000	0.000	104.11
T7	140.00-133.33	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T8	133.33-126.67	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T9	126.67-120.00	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T10	120.00-113.33	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T11	113.33-106.67	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T12	106.67-100.00	A	0.000	0.000	20.448	0.000	97.55
		B	0.000	0.000	53.477	0.000	277.59
		C	0.000	0.000	6.667	0.000	69.41
T13	100.00-80.00	A	0.000	0.000	61.345	0.000	292.64
		B	0.000	0.000	160.431	0.000	832.76
		C	0.000	0.000	20.000	0.000	208.22
T14	80.00-60.00	A	0.000	0.000	61.345	0.000	292.64
		B	0.000	0.000	160.431	0.000	832.76
		C	0.000	0.000	20.969	0.000	210.54
T15	60.00-50.00	A	0.000	0.000	30.673	0.000	146.32
		B	0.000	0.000	80.565	0.000	421.25
		C	0.000	0.000	10.975	0.000	110.48
T16	50.00-40.00	A	0.000	0.000	30.673	0.000	146.32
		B	0.000	0.000	80.565	0.000	421.25
		C	0.000	0.000	10.975	0.000	110.48
T17	40.00-20.00	A	0.000	0.000	61.345	0.000	292.64
		B	0.000	0.000	161.131	0.000	842.50
		C	0.000	0.000	21.950	0.000	220.96
T18	20.00-0.00	A	0.000	0.000	40.387	0.000	203.77
		B	0.000	0.000	100.959	0.000	548.72
		C	0.000	0.000	16.325	0.000	162.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	195.00-180.00	A	1.785	0.000	0.000	36.049	0.000	552.51
		B		0.000	0.000	90.296	0.000	1753.28
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	1.775	0.000	0.000	29.879	0.000	496.13

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
		B		0.000	0.000	31.702	0.000	625.74
		C		0.000	0.000	0.000	0.000	0.00
T3	175.00-170.00	A	1.770	0.000	0.000	29.831	0.000	494.60
		B		0.000	0.000	31.670	0.000	624.28
		C		0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	1.762	0.000	0.000	59.515	0.000	984.46
		B		0.000	0.000	119.383	0.000	2173.03
		C		0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	1.751	0.000	0.000	59.308	0.000	977.86
		B		0.000	0.000	123.632	0.000	2228.98
		C		0.000	0.000	19.658	0.000	356.40
T6	150.00-140.00	A	1.739	0.000	0.000	59.089	0.000	970.88
		B		0.000	0.000	123.358	0.000	2216.03
		C		0.000	0.000	29.239	0.000	495.74
T7	140.00-133.33	A	1.729	0.000	0.000	39.264	0.000	643.17
		B		0.000	0.000	82.078	0.000	1469.75
		C		0.000	0.000	19.429	0.000	328.33
T8	133.33-126.67	A	1.720	0.000	0.000	39.156	0.000	639.75
		B		0.000	0.000	81.942	0.000	1463.39
		C		0.000	0.000	19.375	0.000	326.52
T9	126.67-120.00	A	1.711	0.000	0.000	39.042	0.000	636.18
		B		0.000	0.000	81.801	0.000	1456.73
		C		0.000	0.000	19.319	0.000	324.63
T10	120.00-113.33	A	1.702	0.000	0.000	38.923	0.000	632.45
		B		0.000	0.000	81.652	0.000	1449.76
		C		0.000	0.000	19.260	0.000	322.65
T11	113.33-106.67	A	1.692	0.000	0.000	38.798	0.000	628.53
		B		0.000	0.000	81.495	0.000	1442.44
		C		0.000	0.000	19.198	0.000	320.57
T12	106.67-100.00	A	1.681	0.000	0.000	38.666	0.000	624.40
		B		0.000	0.000	81.330	0.000	1434.72
		C		0.000	0.000	19.132	0.000	318.38
T13	100.00-80.00	A	1.658	0.000	0.000	115.130	0.000	1846.31
		B		0.000	0.000	242.905	0.000	4253.76
		C		0.000	0.000	56.967	0.000	940.90
T14	80.00-60.00	A	1.617	0.000	0.000	113.582	0.000	1798.87
		B		0.000	0.000	240.970	0.000	4164.55
		C		0.000	0.000	62.182	0.000	986.75
T15	60.00-50.00	A	1.579	0.000	0.000	56.066	0.000	877.55
		B		0.000	0.000	123.087	0.000	2083.00
		C		0.000	0.000	35.031	0.000	532.36
T16	50.00-40.00	A	1.547	0.000	0.000	55.476	0.000	859.97
		B		0.000	0.000	122.287	0.000	2048.32
		C		0.000	0.000	34.613	0.000	520.28
T17	40.00-20.00	A	1.486	0.000	0.000	108.642	0.000	1652.20
		B		0.000	0.000	241.442	0.000	3962.35
		C		0.000	0.000	67.590	0.000	994.11
T18	20.00-0.00	A	1.331	0.000	0.000	74.332	0.000	1065.37
		B		0.000	0.000	152.944	0.000	2378.89
		C		0.000	0.000	47.740	0.000	684.45

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	195.00-180.00	1.9689	-1.9890	1.3253	-1.8575

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T2	180.00-175.00	1.2463	-2.6532	0.8749	-2.8194
T3	175.00-170.00	1.3578	-2.9062	0.9549	-3.0799
T4	170.00-160.00	2.6395	-1.7803	2.5285	-1.7080
T5	160.00-150.00	2.8786	-1.5245	2.5457	-1.0339
T6	150.00-140.00	3.1871	-1.5111	2.7999	-1.0376
T7	140.00-133.33	3.4997	-1.6507	3.1472	-1.1808
T8	133.33-126.67	3.7897	-1.7814	3.4151	-1.2785
T9	126.67-120.00	4.0763	-1.9104	3.6796	-1.3747
T10	120.00-113.33	4.1580	-1.9438	3.7722	-1.4063
T11	113.33-106.67	4.4158	-2.0597	4.0121	-1.4926
T12	106.67-100.00	4.7375	-2.2054	4.2797	-1.5887
T13	100.00-80.00	5.0101	-2.3246	4.6385	-1.7142
T14	80.00-60.00	5.8652	-2.6656	5.4765	-1.8587
T15	60.00-50.00	6.3895	-2.8140	5.8270	-1.5558
T16	50.00-40.00	6.7446	-2.9665	6.1727	-1.6432
T17	40.00-20.00	7.4219	-3.2588	6.9175	-1.8306
T18	20.00-0.00	6.2649	-3.0294	6.0571	-2.2895

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	6	1 5/8" Hybrid	180.00 - 195.00	0.6000	0.3995
T1	7	LDF7-50A (1-5/8 FOAM)	180.00 - 195.00	0.6000	0.3995
T1	8	WG Rail 1.5x1.5x3/16	180.00 - 195.00	0.6000	0.3995
T1	18	LDF7-50A (1-5/8 FOAM)	180.00 - 185.00	0.6000	0.3995
T1	19	7/16" Fiber Cable (24 fibers Max)	180.00 - 185.00	0.6000	0.3995
T1	20	8AWG7	180.00 - 185.00	0.6000	0.3995
T1	21	WG Rail 1.5x1.5x1/8	180.00 - 185.00	0.6000	0.3995
T1	29	Safety Line 3/8	180.00 - 195.00	0.6000	0.3995
T1	30	Step Pegs (5/8" SR) 7-in. w/30" step	180.00 - 195.00	0.6000	0.3995
T1	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	180.00 - 181.00	0.6000	0.3995
T2	6	1 5/8" Hybrid	175.00 - 180.00	0.6000	0.4444
T2	7	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.4444
T2	8	WG Rail 1.5x1.5x3/16	175.00 - 180.00	0.6000	0.4444
T2	18	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.4444
T2	19	7/16" Fiber Cable (24 fibers Max)	175.00 - 180.00	0.6000	0.4444
T2	20	8AWG7	175.00 - 180.00	0.6000	0.4444
T2	21	WG Rail 1.5x1.5x1/8	175.00 -	0.6000	0.4444

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	29	Safety Line 3/8	180.00 175.00 - 180.00	0.6000	0.4444
T2	30	Step Pegs (5/8" SR) 7-in. w/30" step	175.00 - 180.00	0.6000	0.4444
T2	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	175.00 - 180.00	0.6000	0.4444
T2	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	175.00 - 180.00	0.6000	0.4444
T3	6	1 5/8" Hybrid	170.00 - 175.00	0.6000	0.4600
T3	7	LDF7-50A (1-5/8 FOAM)	170.00 - 175.00	0.6000	0.4600
T3	8	WG Rail 1.5x1.5x3/16	170.00 - 175.00	0.6000	0.4600
T3	18	LDF7-50A (1-5/8 FOAM)	170.00 - 175.00	0.6000	0.4600
T3	19	7/16" Fiber Cable (24 fibers Max)	170.00 - 175.00	0.6000	0.4600
T3	20	8AWG7	170.00 - 175.00	0.6000	0.4600
T3	21	WG Rail 1.5x1.5x1/8	170.00 - 175.00	0.6000	0.4600
T3	29	Safety Line 3/8	170.00 - 175.00	0.6000	0.4600
T3	30	Step Pegs (5/8" SR) 7-in. w/30" step	170.00 - 175.00	0.6000	0.4600
T3	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	170.00 - 175.00	0.6000	0.4600
T3	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	170.00 - 175.00	0.6000	0.4600
T4	1	LDF7-50A (1-5/8 FOAM)	160.00 - 169.00	0.6000	0.5462
T4	2	HB158-1-08U8-S8J18(1-5/8)	160.00 - 169.00	0.6000	0.5462
T4	3	WG Rail 1.5x1.5x1/4	160.00 - 170.00	0.6000	0.5462
T4	6	1 5/8" Hybrid	160.00 - 170.00	0.6000	0.5462
T4	7	LDF7-50A (1-5/8 FOAM)	160.00 - 170.00	0.6000	0.5462
T4	8	WG Rail 1.5x1.5x3/16	160.00 - 170.00	0.6000	0.5462
T4	18	LDF7-50A (1-5/8 FOAM)	160.00 - 170.00	0.6000	0.5462
T4	19	7/16" Fiber Cable (24 fibers Max)	160.00 - 170.00	0.6000	0.5462
T4	20	8AWG7	160.00 - 170.00	0.6000	0.5462
T4	21	WG Rail 1.5x1.5x1/8	160.00 - 170.00	0.6000	0.5462
T4	29	Safety Line 3/8	160.00 - 170.00	0.6000	0.5462
T4	30	Step Pegs (5/8" SR) 7-in. w/30" step	160.00 - 170.00	0.6000	0.5462
T4	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	160.00 - 170.00	0.6000	0.5462
T4	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	160.00 - 170.00	0.6000	0.5462
T4	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	160.00 - 170.00	0.6000	0.5462
T5	1	LDF7-50A (1-5/8 FOAM)	150.00 -	0.6000	0.5278

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	2	HB158-1-08U8-S8J18(1-5/8)	160.00 150.00 - 160.00	0.6000	0.5278
T5	3	WG Rail 1.5x1.5x1/4	150.00 - 160.00	0.6000	0.5278
T5	6	1 5/8" Hybrid	150.00 - 160.00	0.6000	0.5278
T5	7	LDF7-50A (1-5/8 FOAM)	150.00 - 160.00	0.6000	0.5278
T5	8	WG Rail 1.5x1.5x3/16	150.00 - 160.00	0.6000	0.5278
T5	11	1 1/4 Hybriflex Cable	150.00 - 153.00	0.6000	0.5278
T5	12	WG Rail 1.5x1.5x3/16	150.00 - 160.00	0.6000	0.5278
T5	18	LDF7-50A (1-5/8 FOAM)	150.00 - 160.00	0.6000	0.5278
T5	19	7/16" Fiber Cable (24 fibers Max)	150.00 - 160.00	0.6000	0.5278
T5	20	8AWG7	150.00 - 160.00	0.6000	0.5278
T5	21	WG Rail 1.5x1.5x1/8	150.00 - 160.00	0.6000	0.5278
T5	29	Safety Line 3/8	150.00 - 160.00	0.6000	0.5278
T5	30	Step Pegs (5/8" SR) 7-in. w/30" step	150.00 - 160.00	0.6000	0.5278
T5	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	150.00 - 160.00	0.6000	0.5278
T5	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	150.00 - 160.00	0.6000	0.5278
T5	42	Rung L2x1.5x1/8 (35"w, 48"s)	150.00 - 160.00	0.6000	0.5278
T5	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	150.00 - 160.00	0.6000	0.5278
T6	1	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5518
T6	2	HB158-1-08U8-S8J18(1-5/8)	140.00 - 150.00	0.6000	0.5518
T6	3	WG Rail 1.5x1.5x1/4	140.00 - 150.00	0.6000	0.5518
T6	6	1 5/8" Hybrid	140.00 - 150.00	0.6000	0.5518
T6	7	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5518
T6	8	WG Rail 1.5x1.5x3/16	140.00 - 150.00	0.6000	0.5518
T6	11	1 1/4 Hybriflex Cable	140.00 - 150.00	0.6000	0.5518
T6	12	WG Rail 1.5x1.5x3/16	140.00 - 150.00	0.6000	0.5518
T6	18	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5518
T6	19	7/16" Fiber Cable (24 fibers Max)	140.00 - 150.00	0.6000	0.5518
T6	20	8AWG7	140.00 - 150.00	0.6000	0.5518
T6	21	WG Rail 1.5x1.5x1/8	140.00 - 150.00	0.6000	0.5518
T6	29	Safety Line 3/8	140.00 - 150.00	0.6000	0.5518
T6	30	Step Pegs (5/8" SR) 7-in.	140.00 -	0.6000	0.5518

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		w/30" step	150.00		
T6	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	140.00 - 150.00	0.6000	0.5518
T6	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	140.00 - 150.00	0.6000	0.5518
T6	42	Rung L2x1.5x1/8 (35"w, 48"s)	140.00 - 150.00	0.6000	0.5518
T6	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	140.00 - 150.00	0.6000	0.5518
T7	1	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	2	HB158-1-08U8-S8J18(1-5/8)	133.33 - 140.00	0.6000	0.6000
T7	3	WG Rail 1.5x1.5x1/4	133.33 - 140.00	0.6000	0.6000
T7	6	1 5/8" Hybrid	133.33 - 140.00	0.6000	0.6000
T7	7	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	8	WG Rail 1.5x1.5x3/16	133.33 - 140.00	0.6000	0.6000
T7	11	1 1/4 Hybriflex Cable	133.33 - 140.00	0.6000	0.6000
T7	12	WG Rail 1.5x1.5x3/16	133.33 - 140.00	0.6000	0.6000
T7	18	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	19	7/16" Fiber Cable (24 fibers Max)	133.33 - 140.00	0.6000	0.6000
T7	20	8AWG7	133.33 - 140.00	0.6000	0.6000
T7	21	WG Rail 1.5x1.5x1/8	133.33 - 140.00	0.6000	0.6000
T7	29	Safety Line 3/8	133.33 - 140.00	0.6000	0.6000
T7	30	Step Pegs (5/8" SR) 7-in. w/30" step	133.33 - 140.00	0.6000	0.6000
T7	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T7	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T7	42	Rung L2x1.5x1/8 (35"w, 48"s)	133.33 - 140.00	0.6000	0.6000
T7	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T8	1	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	2	HB158-1-08U8-S8J18(1-5/8)	126.67 - 133.33	0.6000	0.6000
T8	3	WG Rail 1.5x1.5x1/4	126.67 - 133.33	0.6000	0.6000
T8	6	1 5/8" Hybrid	126.67 - 133.33	0.6000	0.6000
T8	7	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	8	WG Rail 1.5x1.5x3/16	126.67 - 133.33	0.6000	0.6000
T8	11	1 1/4 Hybriflex Cable	126.67 - 133.33	0.6000	0.6000
T8	12	WG Rail 1.5x1.5x3/16	126.67 - 133.33	0.6000	0.6000
T8	18	LDF7-50A (1-5/8 FOAM)	126.67 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			133.33		
T8	19	7/16" Fiber Cable (24 fibers Max)	126.67 - 133.33	0.6000	0.6000
T8	20	8AWG7	126.67 - 133.33	0.6000	0.6000
T8	21	WG Rail 1.5x1.5x1/8	126.67 - 133.33	0.6000	0.6000
T8	29	Safety Line 3/8	126.67 - 133.33	0.6000	0.6000
T8	30	Step Pegs (5/8" SR) 7-in. w/30" step	126.67 - 133.33	0.6000	0.6000
T8	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T8	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T8	42	Rung L2x1.5x1/8 (35"w, 48"s)	126.67 - 133.33	0.6000	0.6000
T8	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T9	1	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	2	HB158-1-08U8-S8J18(1-5/8)	120.00 - 126.67	0.6000	0.6000
T9	3	WG Rail 1.5x1.5x1/4	120.00 - 126.67	0.6000	0.6000
T9	6	1 5/8" Hybrid	120.00 - 126.67	0.6000	0.6000
T9	7	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	8	WG Rail 1.5x1.5x3/16	120.00 - 126.67	0.6000	0.6000
T9	11	1 1/4 Hybriflex Cable	120.00 - 126.67	0.6000	0.6000
T9	12	WG Rail 1.5x1.5x3/16	120.00 - 126.67	0.6000	0.6000
T9	18	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	19	7/16" Fiber Cable (24 fibers Max)	120.00 - 126.67	0.6000	0.6000
T9	20	8AWG7	120.00 - 126.67	0.6000	0.6000
T9	21	WG Rail 1.5x1.5x1/8	120.00 - 126.67	0.6000	0.6000
T9	29	Safety Line 3/8	120.00 - 126.67	0.6000	0.6000
T9	30	Step Pegs (5/8" SR) 7-in. w/30" step	120.00 - 126.67	0.6000	0.6000
T9	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T9	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T9	42	Rung L2x1.5x1/8 (35"w, 48"s)	120.00 - 126.67	0.6000	0.6000
T9	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T10	1	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	2	HB158-1-08U8-S8J18(1-5/8)	113.33 - 120.00	0.6000	0.6000
T10	3	WG Rail 1.5x1.5x1/4	113.33 - 120.00	0.6000	0.6000
T10	6	1 5/8" Hybrid	113.33 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			120.00		
T10	7	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	8	WG Rail 1.5x1.5x3/16	113.33 - 120.00	0.6000	0.6000
T10	11	1 1/4 Hybriflex Cable	113.33 - 120.00	0.6000	0.6000
T10	12	WG Rail 1.5x1.5x3/16	113.33 - 120.00	0.6000	0.6000
T10	18	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	19	7/16" Fiber Cable (24 fibers Max)	113.33 - 120.00	0.6000	0.6000
T10	20	8AWG7	113.33 - 120.00	0.6000	0.6000
T10	21	WG Rail 1.5x1.5x1/8	113.33 - 120.00	0.6000	0.6000
T10	29	Safety Line 3/8	113.33 - 120.00	0.6000	0.6000
T10	30	Step Pegs (5/8" SR) 7-in. w/30" step	113.33 - 120.00	0.6000	0.6000
T10	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T10	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T10	42	Rung L2x1.5x1/8 (35"w, 48"s)	113.33 - 120.00	0.6000	0.6000
T10	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T11	1	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	2	HB158-1-08U8-S8J18(1-5/8)	106.67 - 113.33	0.6000	0.6000
T11	3	WG Rail 1.5x1.5x1/4	106.67 - 113.33	0.6000	0.6000
T11	6	1 5/8" Hybrid	106.67 - 113.33	0.6000	0.6000
T11	7	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	8	WG Rail 1.5x1.5x3/16	106.67 - 113.33	0.6000	0.6000
T11	11	1 1/4 Hybriflex Cable	106.67 - 113.33	0.6000	0.6000
T11	12	WG Rail 1.5x1.5x3/16	106.67 - 113.33	0.6000	0.6000
T11	18	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	19	7/16" Fiber Cable (24 fibers Max)	106.67 - 113.33	0.6000	0.6000
T11	20	8AWG7	106.67 - 113.33	0.6000	0.6000
T11	21	WG Rail 1.5x1.5x1/8	106.67 - 113.33	0.6000	0.6000
T11	29	Safety Line 3/8	106.67 - 113.33	0.6000	0.6000
T11	30	Step Pegs (5/8" SR) 7-in. w/30" step	106.67 - 113.33	0.6000	0.6000
T11	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	106.67 - 113.33	0.6000	0.6000
T11	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	106.67 - 113.33	0.6000	0.6000
T11	42	Rung L2x1.5x1/8 (35"w,	106.67 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		48"s)	113.33		
T11	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	106.67 - 113.33	0.6000	0.6000
T12	1	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	2	HB158-1-08U8-S8J18(1-5/8)	100.00 - 106.67	0.6000	0.6000
T12	3	WG Rail 1.5x1.5x1/4	100.00 - 106.67	0.6000	0.6000
T12	6	1 5/8" Hybrid	100.00 - 106.67	0.6000	0.6000
T12	7	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	8	WG Rail 1.5x1.5x3/16	100.00 - 106.67	0.6000	0.6000
T12	11	1 1/4 Hybriflex Cable	100.00 - 106.67	0.6000	0.6000
T12	12	WG Rail 1.5x1.5x3/16	100.00 - 106.67	0.6000	0.6000
T12	18	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	19	7/16" Fiber Cable (24 fibers Max)	100.00 - 106.67	0.6000	0.6000
T12	20	8AWG7	100.00 - 106.67	0.6000	0.6000
T12	21	WG Rail 1.5x1.5x1/8	100.00 - 106.67	0.6000	0.6000
T12	29	Safety Line 3/8	100.00 - 106.67	0.6000	0.6000
T12	30	Step Pegs (5/8" SR) 7-in. w/30" step	100.00 - 106.67	0.6000	0.6000
T12	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T12	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T12	42	Rung L2x1.5x1/8 (35"w, 48"s)	100.00 - 106.67	0.6000	0.6000
T12	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T13	1	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	2	HB158-1-08U8-S8J18(1-5/8)	80.00 - 100.00	0.6000	0.6000
T13	3	WG Rail 1.5x1.5x1/4	80.00 - 100.00	0.6000	0.6000
T13	6	1 5/8" Hybrid	80.00 - 100.00	0.6000	0.6000
T13	7	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	8	WG Rail 1.5x1.5x3/16	80.00 - 100.00	0.6000	0.6000
T13	11	1 1/4 Hybriflex Cable	80.00 - 100.00	0.6000	0.6000
T13	12	WG Rail 1.5x1.5x3/16	80.00 - 100.00	0.6000	0.6000
T13	18	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	19	7/16" Fiber Cable (24 fibers Max)	80.00 - 100.00	0.6000	0.6000
T13	20	8AWG7	80.00 - 100.00	0.6000	0.6000
T13	21	WG Rail 1.5x1.5x1/8	80.00 - 100.00	0.6000	0.6000
T13	29	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T13	30	Step Pegs (5/8" SR) 7-in. w/30" step	80.00 - 100.00	0.6000	0.6000
T13	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	80.00 - 100.00	0.6000	0.6000
T13	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	80.00 - 100.00	0.6000	0.6000
T13	42	Rung L2x1.5x1/8 (35"w, 48"s)	80.00 - 100.00	0.6000	0.6000
T13	44	Rung L1.5x1.5x1/8 (36"w,	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		34"s)			
T14	1	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	2	HB158-1-08U8-S8J18(1-5/8)	60.00 - 80.00	0.6000	0.6000
T14	3	WG Rail 1.5x1.5x1/4	60.00 - 80.00	0.6000	0.6000
T14	6	1 5/8" Hybrid	60.00 - 80.00	0.6000	0.6000
T14	7	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	8	WG Rail 1.5x1.5x3/16	60.00 - 80.00	0.6000	0.6000
T14	10	5/8" dia. coax	60.00 - 75.50	0.6000	0.6000
T14	11	1 1/4 Hybriflex Cable	60.00 - 80.00	0.6000	0.6000
T14	12	WG Rail 1.5x1.5x3/16	60.00 - 80.00	0.6000	0.6000
T14	18	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	19	7/16" Fiber Cable (24 fibers Max)	60.00 - 80.00	0.6000	0.6000
T14	20	8AWG7	60.00 - 80.00	0.6000	0.6000
T14	21	WG Rail 1.5x1.5x1/8	60.00 - 80.00	0.6000	0.6000
T14	29	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T14	30	Step Pegs (5/8" SR) 7-in. w/30" step	60.00 - 80.00	0.6000	0.6000
T14	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T14	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T14	42	Rung L2x1.5x1/8 (35"w, 48"s)	60.00 - 80.00	0.6000	0.6000
T14	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T15	1	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	2	HB158-1-08U8-S8J18(1-5/8)	50.00 - 60.00	0.6000	0.6000
T15	3	WG Rail 1.5x1.5x1/4	50.00 - 60.00	0.6000	0.6000
T15	6	1 5/8" Hybrid	50.00 - 60.00	0.6000	0.6000
T15	7	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	8	WG Rail 1.5x1.5x3/16	50.00 - 60.00	0.6000	0.6000
T15	10	5/8" dia. coax	50.00 - 60.00	0.6000	0.6000
T15	11	1 1/4 Hybriflex Cable	50.00 - 60.00	0.6000	0.6000
T15	12	WG Rail 1.5x1.5x3/16	50.00 - 60.00	0.6000	0.6000
T15	18	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	19	7/16" Fiber Cable (24 fibers Max)	50.00 - 60.00	0.6000	0.6000
T15	20	8AWG7	50.00 - 60.00	0.6000	0.6000
T15	21	WG Rail 1.5x1.5x1/8	50.00 - 60.00	0.6000	0.6000
T15	29	Safety Line 3/8	50.00 - 60.00	0.6000	0.6000
T15	30	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	31	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	32	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T15	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T15	42	Rung L2x1.5x1/8 (35"w, 48"s)	50.00 - 60.00	0.6000	0.6000
T15	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T16	1	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	2	HB158-1-08U8-S8J18(1-5/8)	40.00 - 50.00	0.6000	0.6000
T16	3	WG Rail 1.5x1.5x1/4	40.00 - 50.00	0.6000	0.6000
T16	6	1 5/8" Hybrid	40.00 - 50.00	0.6000	0.6000
T16	7	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	8	WG Rail 1.5x1.5x3/16	40.00 - 50.00	0.6000	0.6000
T16	10	5/8" dia. coax	40.00 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T16	11	1 1/4 Hybriflex Cable	40.00 - 50.00	0.6000	0.6000
T16	12	WG Rail 1.5x1.5x3/16	40.00 - 50.00	0.6000	0.6000
T16	18	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	19	7/16" Fiber Cable (24 fibers Max)	40.00 - 50.00	0.6000	0.6000
T16	20	8AWG7	40.00 - 50.00	0.6000	0.6000
T16	21	WG Rail 1.5x1.5x1/8	40.00 - 50.00	0.6000	0.6000
T16	29	Safety Line 3/8	40.00 - 50.00	0.6000	0.6000
T16	30	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	31	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	32	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T16	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T16	42	Rung L2x1.5x1/8 (35"w, 48"s)	40.00 - 50.00	0.6000	0.6000
T16	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T17	1	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	2	HB158-1-08U8-S8J18(1-5/8)	20.00 - 40.00	0.6000	0.6000
T17	3	WG Rail 1.5x1.5x1/4	20.00 - 40.00	0.6000	0.6000
T17	6	1 5/8" Hybrid	20.00 - 40.00	0.6000	0.6000
T17	7	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	8	WG Rail 1.5x1.5x3/16	20.00 - 40.00	0.6000	0.6000
T17	10	5/8" dia. coax	20.00 - 40.00	0.6000	0.6000
T17	11	1 1/4 Hybriflex Cable	20.00 - 40.00	0.6000	0.6000
T17	12	WG Rail 1.5x1.5x3/16	20.00 - 40.00	0.6000	0.6000
T17	18	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	19	7/16" Fiber Cable (24 fibers Max)	20.00 - 40.00	0.6000	0.6000
T17	20	8AWG7	20.00 - 40.00	0.6000	0.6000
T17	21	WG Rail 1.5x1.5x1/8	20.00 - 40.00	0.6000	0.6000
T17	29	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T17	30	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	31	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	32	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T17	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T17	42	Rung L2x1.5x1/8 (35"w, 48"s)	20.00 - 40.00	0.6000	0.6000
T17	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T18	1	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	2	HB158-1-08U8-S8J18(1-5/8)	8.00 - 20.00	0.6000	0.6000
T18	3	WG Rail 1.5x1.5x1/4	8.00 - 20.00	0.6000	0.6000
T18	6	1 5/8" Hybrid	8.00 - 20.00	0.6000	0.6000
T18	7	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	8	WG Rail 1.5x1.5x3/16	0.00 - 20.00	0.6000	0.6000
T18	10	5/8" dia. coax	10.00 - 20.00	0.6000	0.6000
T18	11	1 1/4 Hybriflex Cable	10.00 - 20.00	0.6000	0.6000
T18	12	WG Rail 1.5x1.5x3/16	0.00 - 20.00	0.6000	0.6000
T18	18	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	19	7/16" Fiber Cable (24 fibers	8.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		Max)			
T18	20	8AWG7	8.00 - 20.00	0.6000	0.6000
T18	21	WG Rail 1.5x1.5x1/8	2.00 - 20.00	0.6000	0.6000
T18	29	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T18	30	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	31	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	32	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	39	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	8.00 - 20.00	0.6000	0.6000
T18	41	Rung L1.5x1.5x1/8 (36"w, 34"s)	0.00 - 20.00	0.6000	0.6000
T18	42	Rung L2x1.5x1/8 (35"w, 48"s)	0.00 - 20.00	0.6000	0.6000
T18	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	2.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
1.75" Dia x 5-ft Pipe	C	From Leg	2.25		0.0000	75.50	No Ice	0.88	0.88	12.00
			0.00				1/2" Ice	1.32	1.32	19.06
			0.00				1" Ice	1.63	1.63	29.51
GPS0015	C	From Leg	4.50		0.0000	75.50	No Ice	0.09	0.09	0.50
			0.00				1/2" Ice	0.13	0.13	2.29
			0.75				1" Ice	0.19	0.19	4.89
****										
****										
Sector Mount [SM 502-3]	C	None			0.0000	153.00	No Ice	33.02	33.02	1673.10
							1/2" Ice	47.36	47.36	2223.90
							1" Ice	61.70	61.70	2774.70
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	5.00		0.0000	153.00	No Ice	8.02	6.71	78.90
			0.00				1/2" Ice	8.48	7.66	144.31
			0.00				1" Ice	8.94	8.49	217.47
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	5.00		0.0000	153.00	No Ice	8.02	6.71	78.90
			0.00				1/2" Ice	8.48	7.66	144.31
			0.00				1" Ice	8.94	8.49	217.47
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	5.00		0.0000	153.00	No Ice	8.02	6.71	78.90
			0.00				1/2" Ice	8.48	7.66	144.31
			0.00				1" Ice	8.94	8.49	217.47
DT465B-2XR w/ Mount Pipe	A	From Leg	5.00		0.0000	153.00	No Ice	9.34	7.63	83.52
			0.00				1/2" Ice	9.91	8.82	160.00
			0.00				1" Ice	10.44	9.72	244.63
DT465B-2XR w/ Mount Pipe	B	From Leg	5.00		0.0000	153.00	No Ice	9.34	7.63	83.52
			0.00				1/2" Ice	9.91	8.82	160.00
			0.00				1" Ice	10.44	9.72	244.63
DT465B-2XR w/ Mount Pipe	C	From Leg	5.00		0.0000	153.00	No Ice	9.34	7.63	83.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1/2" Ice	9.91	8.82	160.00
			0.00				1" Ice	10.44	9.72	244.63
RRH2x50-08	A	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
RRH2x50-08	B	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
RRH2x50-08	C	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
800MHZ 2X50W RRH	A	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
800MHZ 2X50W RRH	B	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
800MHZ 2X50W RRH	C	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
PCS 1900MHz 4x45W-65MHz	A	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
PCS 1900MHz 4x45W-65MHz	B	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
PCS 1900MHz 4x45W-65MHz	C	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
TD-RRH8x20-25	A	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
TD-RRH8x20-25	B	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
TD-RRH8x20-25	C	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
****										
(3) Sector Mounts 169-ft	C	None			0.0000	169.00	No Ice	21.56	21.56	1395.40
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
(2) BXA-70063/6CF w/ Mount Pipe	A	From Leg	5.00		0.0000	169.00	No Ice	7.59	5.18	38.90
			0.00				1/2" Ice	8.04	6.11	95.39
			0.00				1" Ice	8.50	6.92	159.37
(2) DB844G65ZAXY w/Mount Pipe	B	From Leg	5.00		0.0000	169.00	No Ice	5.05	5.28	41.55
			0.00				1/2" Ice	5.68	6.31	92.81
			0.00				1" Ice	6.19	7.06	150.42
(2) DB844G65ZAXY w/Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	5.05	5.28	41.55
			0.00				1/2" Ice	5.68	6.31	92.81
			0.00				1" Ice	6.19	7.06	150.42
DB-B1/T1 w/ Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	4.88	4.18	57.55
			0.00				1/2" Ice	5.61	5.12	107.53
			0.00				1" Ice	6.16	5.77	163.14
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64
RRH2x60-AWS	A	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
RRH2x60-AWS	B	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
RRH2x60-AWS	C	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
RRH2X60-PCS	A	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
RRH2X60-PCS	B	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
RRH2X60-PCS	C	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
BXA-70080/6CF w/ Mount Pipe	A	From Leg	5.00		0.0000	169.00	No Ice	7.59	5.54	42.90
			0.00				1/2" Ice	8.04	6.48	100.79
			0.00				1" Ice	8.50	7.30	166.25
DB846F65ZAXY w/Mount Pipe	B	From Leg	5.00		0.0000	169.00	No Ice	7.27	7.82	46.55
			0.00				1/2" Ice	7.83	9.01	113.93
			0.00				1" Ice	8.35	9.91	189.25
DB846F65ZAXY w/Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	7.27	7.82	46.55
			0.00				1/2" Ice	7.83	9.01	113.93
			0.00				1" Ice	8.35	9.91	189.25
(2) FD9R6004	A	From Leg	5.00		0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
(2) FD9R6004	B	From Leg	5.00		0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
(2) FD9R6004	C	From Leg	5.00		0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
****										
(3) Sector Mounts 185-ft	C	None			0.0000	185.00	No Ice	21.56	21.56	1395.40
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
Miscellaneous [NA 510-1]	C	None			0.0000	185.00	No Ice	6.00	6.00	255.70
							1/2" Ice	8.50	8.50	339.50
							1" Ice	11.00	11.00	409.12
7770.00 w/ Mount Pipe	A	From Leg	5.00		0.0000	185.00	No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42
			3.00				1" Ice	6.77	5.92	160.42
7770.00 w/ Mount Pipe	B	From Leg	5.00		0.0000	185.00	No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42
			3.00				1" Ice	6.77	5.92	160.42
7770.00 w/ Mount Pipe	C	From Leg	5.00		0.0000	185.00	No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
				3.00			1" Ice	6.77	5.92	160.42
P65-17-XLH-RR w/Mount Pipe	A	From Leg	5.00		0.0000	185.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	5.00		0.0000	185.00	No Ice	8.26	6.30	74.05
			0.00				1/2" Ice	8.82	7.48	139.04
			3.00				1" Ice	9.35	8.37	211.91
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	5.00		0.0000	185.00	No Ice	8.26	6.30	74.05
			0.00				1/2" Ice	8.82	7.48	139.04
			3.00				1" Ice	9.35	8.37	211.91
P65-17-XLH-RR w/Mount Pipe	A	From Leg	5.00		0.0000	185.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
P65-17-XLH-RR w/Mount Pipe	B	From Leg	5.00		0.0000	185.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
P65-17-XLH-RR w/Mount Pipe	C	From Leg	5.00		0.0000	185.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
(2) TPX - 070621	A	From Leg	5.00		0.0000	185.00	No Ice	0.47	0.18	7.50
			0.00				1/2" Ice	0.56	0.24	10.95
			3.00				1" Ice	0.66	0.32	15.73
(2) TPX - 070621	B	From Leg	5.00		0.0000	185.00	No Ice	0.47	0.18	7.50
			0.00				1/2" Ice	0.56	0.24	10.95
			3.00				1" Ice	0.66	0.32	15.73
(2) TPX - 070621	C	From Leg	5.00		0.0000	185.00	No Ice	0.47	0.18	7.50
			0.00				1/2" Ice	0.56	0.24	10.95
			3.00				1" Ice	0.66	0.32	15.73
RRUS-12	A	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
RRUS-12	B	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
RRUS-12	C	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
RRUS-12	A	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
RRUS-12	B	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
RRUS-12	C	From Leg	5.00		0.0000	185.00	No Ice	2.70	1.21	60.00
			0.00				1/2" Ice	2.90	1.36	81.29
			3.00				1" Ice	3.11	1.52	105.63
(2) LGP21401	A	From Leg	5.00		0.0000	185.00	No Ice	1.10	0.35	14.10
			0.00				1/2" Ice	1.24	0.44	21.26
			3.00				1" Ice	1.38	0.54	30.32
(2) LGP21401	B	From Leg	5.00		0.0000	185.00	No Ice	1.10	0.35	14.10
			0.00				1/2" Ice	1.24	0.44	21.26
			3.00				1" Ice	1.38	0.54	30.32
(2) LGP21401	C	From Leg	5.00		0.0000	185.00	No Ice	1.10	0.35	14.10
			0.00				1/2" Ice	1.24	0.44	21.26
			3.00				1" Ice	1.38	0.54	30.32
(2) RRUS-11	A	From Leg	5.00		0.0000	185.00	No Ice	2.79	1.19	50.00
			0.00				1/2" Ice	3.00	1.34	70.87

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 lb
			3.00			1" Ice	3.21	1.50	94.78
(2) RRUS-11	B	From Leg	5.00	0.0000	185.00	No Ice	2.79	1.19	50.00
			0.00			1/2" Ice	3.00	1.34	70.87
			3.00			1" Ice	3.21	1.50	94.78
(2) RRUS-11	C	From Leg	5.00	0.0000	185.00	No Ice	2.79	1.19	50.00
			0.00			1/2" Ice	3.00	1.34	70.87
			3.00			1" Ice	3.21	1.50	94.78
RRUS-32 B30	A	From Leg	5.00	0.0000	185.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			3.00			1" Ice	3.81	2.86	136.47
RRUS-32 B30	B	From Leg	5.00	0.0000	185.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			3.00			1" Ice	3.81	2.86	136.47
RRUS-32 B30	C	From Leg	5.00	0.0000	185.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			3.00			1" Ice	3.81	2.86	136.47
DC6-48-60-18-8F	A	From Leg	0.50	0.0000	185.00	No Ice	1.21	1.21	32.80
			0.00			1/2" Ice	1.89	1.89	54.76
			3.00			1" Ice	2.11	2.11	79.58
DC6-48-60-18-8F	B	From Leg	0.50	0.0000	185.00	No Ice	1.21	1.21	32.80
			0.00			1/2" Ice	1.89	1.89	54.76
			3.00			1" Ice	2.11	2.11	79.58
****									
Sector Mount [SM 802-3]	C	None		0.0000	195.00	No Ice	24.41	24.41	930.00
						1/2" Ice	31.39	31.39	1362.00
						1" Ice	38.37	38.37	1794.00
HSS Top Mount	C	None		0.0000	195.00	No Ice	8.08	8.08	328.90
						1/2" Ice	9.70	9.70	415.20
						1" Ice	11.32	11.32	501.50
APXVAARR24_43-U-NA20 w/ MP	A	From Leg	3.00	0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
APXVAARR24_43-U-NA20 w/ MP	B	From Leg	3.00	0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
APXVAARR24_43-U-NA20 w/ MP	C	From Leg	3.00	0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00			1/2" Ice	20.89	12.21	290.89
			0.00			1" Ice	21.55	13.49	435.20
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	3.00	0.0000	195.00	No Ice	6.91	3.57	62.60
			0.00			1/2" Ice	7.39	4.41	112.02
			0.00			1" Ice	7.86	5.13	168.01
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	3.00	0.0000	195.00	No Ice	6.91	3.57	62.60
			0.00			1/2" Ice	7.39	4.41	112.02
			0.00			1" Ice	7.86	5.13	168.01
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	3.00	0.0000	195.00	No Ice	6.91	3.57	62.60
			0.00			1/2" Ice	7.39	4.41	112.02
			0.00			1" Ice	7.86	5.13	168.01
AIR -32 B2A/B66AA	A	From Leg	3.00	0.0000	195.00	No Ice	6.51	4.71	132.20
			0.00			1/2" Ice	6.89	5.07	178.02
			0.00			1" Ice	7.27	5.43	229.11
AIR -32 B2A/B66AA	B	From Leg	3.00	0.0000	195.00	No Ice	6.51	4.71	132.20
			0.00			1/2" Ice	6.89	5.07	178.02
			0.00			1" Ice	7.27	5.43	229.11
AIR -32 B2A/B66AA	C	From Leg	3.00	0.0000	195.00	No Ice	6.51	4.71	132.20
			0.00			1/2" Ice	6.89	5.07	178.02
			0.00			1" Ice	7.27	5.43	229.11
(2) KRY 112 71	A	From Leg	3.00	0.0000	195.00	No Ice	0.63	0.61	18.07

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 lb
			0.00			1/2" Ice	0.75	0.79	26.97
			0.00			1" Ice	0.89	0.99	38.22
(2) KRY 112 71	B	From Leg	3.00	0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00			1/2" Ice	0.75	0.79	26.97
			0.00			1" Ice	0.89	0.99	38.22
(2) KRY 112 71	C	From Leg	3.00	0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00			1/2" Ice	0.75	0.79	26.97
			0.00			1" Ice	0.89	0.99	38.22
RADIO 4449 B12/B71	A	From Leg	3.00	0.0000	195.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95
RADIO 4449 B12/B71	B	From Leg	3.00	0.0000	195.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95
RADIO 4449 B12/B71	C	From Leg	3.00	0.0000	195.00	No Ice	1.65	1.16	74.00
			0.00			1/2" Ice	1.81	1.30	90.16
			0.00			1" Ice	1.98	1.45	108.95
****									
TMO Future Loading	C	None		0.0000	195.00	No Ice	10.58	10.58	196.91
						1/2" Ice	11.65	11.65	294.20
						1" Ice	12.72	12.72	391.49
*****									
***									
**									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice

Comb. No.	Description
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	7.000	39	0.4186	0.0437
T2	180 - 175	5.633	39	0.3868	0.0119
T3	175 - 170	5.230	39	0.3617	0.0098
T4	170 - 160	4.865	39	0.3340	0.0085
T5	160 - 150	4.190	39	0.3008	0.0080
T6	150 - 140	3.600	39	0.2553	0.0076
T7	140 - 133.333	3.089	39	0.2242	0.0071
T8	133.333 - 126.667	2.777	39	0.2135	0.0067
T9	126.667 - 120	2.479	39	0.2026	0.0062
T10	120 - 113.333	2.194	39	0.1915	0.0057
T11	113.333 - 106.667	1.932	39	0.1743	0.0053
T12	106.667 - 100	1.694	39	0.1570	0.0049
T13	100 - 80	1.479	39	0.1397	0.0044
T14	80 - 60	0.927	39	0.1138	0.0033
T15	60 - 50	0.498	39	0.0790	0.0022
T16	50 - 40	0.338	39	0.0617	0.0017
T17	40 - 20	0.216	39	0.0445	0.0012
T18	20 - 0	0.061	39	0.0221	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	39	7.000	0.4186	0.0437	26451
185.00	(3) Sector Mounts 185-ft	39	6.070	0.4031	0.0185	13225
169.00	(3) Sector Mounts 169-ft	39	4.794	0.3296	0.0083	17303
153.00	Sector Mount [SM 502-3]	39	3.768	0.2692	0.0078	13821
75.50	1.75" Dia x 5-ft Pipe	39	0.819	0.1073	0.0031	39840

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	26.806	2	1.6005	0.1442
T2	180 - 175	21.593	2	1.4803	0.0461
T3	175 - 170	20.051	2	1.3849	0.0379
T4	170 - 160	18.650	2	1.2795	0.0328
T5	160 - 150	16.064	2	1.1528	0.0309
T6	150 - 140	13.804	2	0.9785	0.0293
T7	140 - 133.333	11.846	2	0.8593	0.0275
T8	133.333 - 126.667	10.649	2	0.8184	0.0258
T9	126.667 - 120	9.506	2	0.7765	0.0241
T10	120 - 113.333	8.413	2	0.7343	0.0219
T11	113.333 - 106.667	7.408	2	0.6684	0.0204
T12	106.667 - 100	6.495	2	0.6018	0.0189
T13	100 - 80	5.671	2	0.5355	0.0171
T14	80 - 60	3.556	2	0.4363	0.0129
T15	60 - 50	1.910	2	0.3030	0.0085
T16	50 - 40	1.296	2	0.2365	0.0066
T17	40 - 20	0.829	2	0.1704	0.0047
T18	20 - 0	0.236	2	0.0847	0.0023

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	2	26.806	1.6005	0.1442	7175
185.00	(3) Sector Mounts 185-ft	2	23.261	1.5421	0.0665	3587
169.00	(3) Sector Mounts 169-ft	2	18.380	1.2627	0.0322	4559
153.00	Sector Mount [SM 502-3]	2	14.446	1.0319	0.0299	3614
75.50	1.75" Dia x 5-ft Pipe	2	3.142	0.4115	0.0119	10399

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	0.7500	4	4617.64	29820.60	0.155	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T2	180	Diagonal	A325N	0.5000	1	3463.30	4689.84	0.738	1	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	671.22	6830.86	0.098	1	Member Block Shear
T3	175	Diagonal	A325X	0.5000	1	3616.17	7245.70	0.499	1	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	851.69	6830.86	0.125	1	Member Block Shear
T4	170	Leg	A325N	0.7500	6	10461.80	29820.60	0.351	1	Bolt Tension
		Diagonal	A325N	0.5000	1	4915.95	8265.00	0.595	1	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1247.58	6830.86	0.183	1	Member Block Shear
T5	160	Diagonal	A325X	0.5000	1	5911.14	8265.00	0.715	1	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1630.88	6830.86	0.239	1	Member Block Shear
T6	150	Leg	A325N	1.0000	6	17283.60	53014.40	0.326	1	Bolt Tension
		Diagonal	A325N	0.5000	1	5777.80	8265.00	0.699	1	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	2047.33	6830.86	0.300	1	Member Block Shear
T7	140	Diagonal	A325X	0.6250	1	5983.73	12712.50	0.471	1	Member Block Shear
T8	133.333	Diagonal	A325X	0.6250	1	6136.54	12712.50	0.483	1	Member Block Shear
T9	126.667	Leg	A325N	1.0000	8	17572.60	53014.40	0.331	1	Bolt Tension
		Diagonal	A325N	0.6250	1	6045.04	7830.00	0.772	1	Member Bearing
T10	120	Diagonal	A325X	0.6250	1	6710.13	13050.00	0.514	1	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	2943.28	7830.00	0.376	1	Member Bearing
T11	113.333	Diagonal	A325X	0.6250	1	6964.19	13050.00	0.534	1	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	3166.26	7830.00	0.404	1	Member Bearing
T12	106.667	Leg	A325N	1.0000	8	21572.30	53014.40	0.407	1	Bolt Tension
		Diagonal	A325X	0.6250	1	6919.33	12712.50	0.544	1	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	3373.60	7830.00	0.431	1	Member Bearing
T13	100	Leg	A325N	1.2500	8	25523.80	82835.00	0.308	1	Bolt Tension
		Diagonal	A325N	0.6250	2	3659.89	11622.70	0.315	1	Member Block Shear
		Secondary Horizontal	A325N	0.7500	1	4017.41	13898.40	0.289	1	Member Block Shear
T14	80	Leg	A325N	1.2500	8	29326.20	82835.00	0.354	1	Bolt Tension
		Diagonal	A325N	0.6250	2	3923.79	11622.70	0.338	1	Member Block Shear
T15	60	Diagonal	A325N	0.6250	2	4972.85	12425.20	0.400	1	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	4846.03	12425.20	0.390	1	Bolt Shear
T16	50	Leg	A325N	1.2500	8	32430.30	82835.00	0.392	1	Bolt Tension
		Diagonal	A325N	0.6250	2	4864.28	12425.20	0.391	1	Bolt Shear
		Secondary Horizontal	A325X	0.7500	1	5145.09	14355.00	0.358	1	Member Bearing
T17	40	Leg	A325N	1.2500	8	35935.30	82835.00	0.434	1	Bolt Tension
		Diagonal	A325N	0.6250	2	4817.71	12425.20	0.388	1	Bolt Shear
T18	20	Leg	A36	1.5000	8	39994.90	61496.70	0.650	1	Bolt Tension
		Diagonal	A325N	0.6250	2	5150.94	12425.20	0.415	1	Bolt Shear

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	Client: Phoenix Tower International	Designed by: jhjoyce

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4 K=1.00	1.7072	-34692.80	70532.50	0.492 [1]
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.67	33.8 K=1.00	1.7072	-38704.30	77102.10	0.502 [1]
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.65	33.5 K=1.00	1.7072	-49111.10	77205.80	0.636 [1]
T4	170 - 160	2.5SCH40 w/ 3SCH80 Half Sleeve	10.02	2.62	34.2 K=1.00	3.2300	-71939.20	72967.00	0.986 [1]
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.60	23.4 K=1.00	2.6795	-93942.50	126932.00	0.740 [1]
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.59	23.8 K=1.00	4.2666	-118036.00	184209.00	0.641 [1]
T7	140 - 133.333	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-131440.00	306442.00	0.429 [1]
T8	133.333 - 126.667	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-145132.00	306442.00	0.474 [1]
T9	126.667 - 120	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-158660.00	306442.00	0.518 [1]
T10	120 - 113.333	Pipe 6.625" x 0.280" (6 STD)	6.68	3.45	18.4 K=1.00	5.5813	-169677.00	268817.00	0.631 [1]
T11	113.333 - 106.667	Pipe 6.625" x 0.280" (6 STD)	6.68	3.44	18.4 K=1.00	5.5813	-182476.00	268848.00	0.679 [1]
T12	106.667 - 100	Pipe 6.625" x 0.280" (6 STD)	6.68	3.44	18.4 K=1.00	5.5813	-194456.00	268875.00	0.723 [1]
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.42	19.5 K=1.00	11.1800	-231656.00	412800.00	0.561 [1]
T14	80 - 60	Pipe 8.625" x 0.322" (8 STD)	20.03	6.68	27.3 K=1.00	8.3993	-267054.00	391613.00	0.682 [1]
T15	60 - 50	Pipe 8.625" x 0.322" (8 STD)	10.02	5.16	21.1 K=1.00	8.3993	-279437.00	401143.00	0.697 [1]
T16	50 - 40	Pipe 8.625" x 0.322" (8 STD)	10.02	5.16	21.1 K=1.00	8.3993	-296682.00	401194.00	0.739 [1]
T17	40 - 20	Pipe 8.75" x 0.500" (8 EH)	20.03	10.02	41.1 K=1.00	12.9591	-330692.00	559858.00	0.591 [1]
T18	20 - 0	Pipe 8.75" x 0.500" (8 EH)	20.03	9.97	41.0 K=1.00	12.9591	-361692.00	560492.00	0.645 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.03	124.0 K=1.00	0.5273	-4196.57	7609.55	0.551 [1]
T3	175 - 170	L2x2x3/16	6.56	3.18	102.5 K=1.06	0.7150	-3381.34	13320.20	0.254 [1]
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4	6.90	3.34	87.9	1.0547	-5337.84	22761.40	0.235 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				
		2L 'a' > 19.3293 in - 84							
T5	160 - 150	2L2x2x3/16x1/4	8.01	3.83	76.6	1.4297	-6144.02	34011.90	0.181 [1]
					K=1.00				
		2L 'a' > 22.0154 in - 93							
T6	150 - 140	2L2x2x3/16x1/4	8.81	4.22	84.4	1.4297	-5862.88	31842.70	0.184 [1]
					K=1.00				
		2L 'a' > 24.2504 in - 115							
T7	140 - 133.333	L2 1/2x2 1/2x1/4	10.29	4.92	120.3	1.1900	-6077.85	17991.90	0.338 [1]
					K=1.00				
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.18	126.7	1.1900	-6286.79	16560.40	0.380 [1]
					K=1.00				
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.47	132.6	0.9020	-6111.95	11588.10	0.527 [1]
					K=1.00				
T10	120 - 113.333	L3x3x1/4	11.88	5.67	116.3	1.4400	-7199.18	22905.00	0.314 [1]
					K=1.01				
T11	113.333 - 106.667	L3x3x1/4	12.44	5.95	120.7	1.4400	-7307.60	21667.80	0.337 [1]
					K=1.00				
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	152.5	1.1900	-7417.97	11556.70	0.642 [1]
					K=1.00				
T13	100 - 80	L3 1/2x3 1/2x1/4	14.76	7.01	121.0	1.6900	-7560.14	25335.60	0.298 [1]
					K=1.00				
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	7.88	132.4	1.6900	-8018.62	21768.60	0.368 [1]
					K=0.97				
T15	60 - 50	L3x3x5/16	18.87	9.11	170.0	1.7800	-9945.70	13914.00	0.715 [1]
					K=0.92				
T16	50 - 40	L3x3x5/16	19.73	9.54	176.7	1.7800	-9728.57	12883.30	0.755 [1]
					K=0.91				
T17	40 - 20	L4x4x3/8	21.47	10.41	149.4	2.8600	-9635.43	28952.00	0.333 [1]
					K=0.94				
T18	20 - 0	L5x5x5/16	23.24	11.29	132.5	3.0300	-10301.90	38842.60	0.265 [1]
					K=0.97				

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2	0.5273	-5082.87	7191.11	0.707 [1]
					K=0.96				

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	L2x2x3/16	3.73	1.63	84.8	0.7150	-671.22	15868.60	0.042 [1]

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	Client: Phoenix Tower International	Designed by: jhjoyce

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.71				
T3	175 - 170	L2x2x3/16	4.24	1.88	88.6	0.7150	-851.69	15324.60	0.056 [1]
					K=1.55				
T4	170 - 160	L2x2x3/16	5.24	2.37	96.0	0.7150	-1247.58	14254.80	0.088 [1]
					K=1.33				
T5	160 - 150	L2x2x3/16	6.24	2.83	103.2	0.7150	-1630.88	13230.80	0.123 [1]
					K=1.20				
T6	150 - 140	L2x2x3/16	7.24	3.31	110.5	0.7150	-2047.33	12187.10	0.168 [1]
					K=1.09				
T10	120 - 113.333	L3x3x3/16	9.82	4.52	105.5	1.0900	-2943.28	19380.60	0.152 [1]
					K=1.16				
T11	113.333 - 106.667	L3x3x3/16	10.49	4.85	108.8	1.0900	-3166.26	18683.90	0.169 [1]
					K=1.11				
T12	106.667 - 100	L3x3x3/16	11.16	5.18	112.2	1.0900	-3373.60	17991.70	0.188 [1]
					K=1.08				
T13	100 - 80	L3x3x1/4	13.16	6.12	124.0	1.4400	-4017.41	20777.30	0.193 [1]
					K=1.00				
T15	60 - 50	L4x4x3/8	15.98	7.51	117.2	2.8600	-4846.03	44960.90	0.108 [1]
					K=1.02				
T16	50 - 40	L4x4x1/4	16.99	7.99	120.6	1.9400	-5145.09	28993.60	0.177 [1]
					K=1.00				

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2	0.5273	-1572.22	7191.11	0.219 [1]
					K=0.96				

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2	0.5273	-3025.86	7191.11	0.421 [1]
					K=0.96				

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4	1.7072	18470.60	84508.30	0.219 [1]
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.34	29.5	1.7072	34233.90	84508.30	0.405 [1]
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.36	29.8	1.7072	42903.30	84508.30	0.508 [1]
T4	170 - 160	2.5SCH40 w/ 3SCH80 Half Sleeve	10.02	2.38	31.1	3.2300	62815.20	101745.00	0.617 [1]
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.40	21.6	2.6795	82377.50	132637.00	0.621 [1]
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.42	22.2	4.2666	103832.00	191997.00	0.541 [1]
T7	140 - 133.333	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	115974.00	351995.00	0.329 [1]
T8	133.333 - 126.667	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	128427.00	351995.00	0.365 [1]
T9	126.667 - 120	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	140581.00	351995.00	0.399 [1]
T10	120 - 113.333	Pipe 6.625" x 0.280" (6 STD)	6.68	3.23	17.2	5.5813	150796.00	276277.00	0.546 [1]
T11	113.333 - 106.667	Pipe 6.625" x 0.280" (6 STD)	6.68	3.23	17.3	5.5813	162130.00	276277.00	0.587 [1]
T12	106.667 - 100	Pipe 6.625" x 0.280" (6 STD)	6.68	3.24	17.3	5.5813	172840.00	276277.00	0.626 [1]
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.25	18.6	11.1800	204441.00	422604.00	0.484 [1]
T14	80 - 60	Pipe 8.625" x 0.322" (8 STD)	20.03	6.68	27.3	8.3993	234610.00	415763.00	0.564 [1]
T15	60 - 50	Pipe 8.625" x 0.322" (8 STD)	10.02	4.85	19.8	8.3993	245261.00	415763.00	0.590 [1]
T16	50 - 40	Pipe 8.625" x 0.322" (8 STD)	10.02	4.86	19.9	8.3993	259744.00	415763.00	0.625 [1]
T17	40 - 20	Pipe 8.75" x 0.500" (8 EH)	20.03	10.02	41.1	12.9591	287482.00	641474.00	0.448 [1]
T18	20 - 0	Pipe 8.75" x 0.500" (8 EH)	20.03	0.08	0.3	12.9591	319959.00	641474.00	0.499 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	195 - 180	5/8	5.13	4.78	366.9	0.3068	9052.81	9940.20	0.911 [1]
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.03	82.4	0.3076	3463.30	13381.30	0.259 [1]
T3	175 - 170	L2x2x3/16	6.56	3.18	64.0	0.4484	3616.17	19503.60	0.185 [1]
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4 2L 'a' > 19.3293 in - 83	6.90	3.34	90.6	0.6152	4915.95	26762.70	0.184 [1]
T5	160 - 150	2L2x2x3/16x1/4 2L 'a' > 22.0154 in - 94	8.01	3.83	76.8	0.8965	5911.14	38997.10	0.152 [1]
T6	150 - 140	2L2x2x3/16x1/4 2L 'a' > 23.1042 in - 124	8.40	4.02	80.3	0.8965	5777.80	38997.10	0.148 [1]
T7	140 - 133.333	L2 1/2x2 1/2x1/4	10.29	4.92	78.9	0.7519	5983.73	32706.60	0.183 [1]
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.18	83.0	0.7519	6136.54	32706.60	0.188 [1]
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.47	86.2	0.5710	6045.04	24839.90	0.243 [1]
T10	120 - 113.333	L3x3x1/4	11.88	5.67	75.0	0.9394	6710.13	40862.80	0.164 [1]
T11	113.333 - 106.667	L3x3x1/4	12.44	5.95	78.6	0.9394	6964.19	40862.80	0.170 [1]
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	99.5	0.7519	6919.33	32706.60	0.212 [1]
T13	100 - 80	L3 1/2x3 1/2x1/4	14.17	6.72	76.1	1.1269	7319.78	49019.10	0.149 [1]

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	7.88	88.9	1.1269	7847.57	49019.10	0.160 [1]
T15	60 - 50	L3x3x5/16	18.87	9.11	121.1	1.1592	9140.99	50426.00	0.181 [1]
T16	50 - 40	L3x3x5/16	19.73	9.54	126.7	1.1592	9091.96	50426.00	0.180 [1]
T17	40 - 20	L4x4x3/8	21.47	10.41	103.5	1.9341	9284.58	84131.70	0.110 [1]
T18	20 - 0	L5x5x5/16	23.24	11.29	87.8	2.0967	9772.96	91207.30	0.107 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	0.5273	600.90	17085.90	0.035 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T2	180 - 175	L2x2x3/16	3.73	1.63	67.9	0.4308	671.22	18739.00	0.036 [1]
T3	175 - 170	L2x2x3/16	4.24	1.88	77.7	0.4308	851.69	18739.00	0.045 [1]
T4	170 - 160	L2x2x3/16	5.24	2.37	96.7	0.4308	1247.58	18739.00	0.067 [1]
T5	160 - 150	L2x2x3/16	6.24	2.83	114.9	0.4308	1630.88	18739.00	0.087 [1]
T6	150 - 140	L2x2x3/16	7.24	3.31	133.5	0.4308	2047.33	18739.00	0.109 [1]
T10	120 - 113.333	L3x3x3/16	9.82	4.52	118.5	0.7120	2943.28	30973.40	0.095 [1]
T11	113.333 - 106.667	L3x3x3/16	10.49	4.85	127.0	0.7120	3166.26	30973.40	0.102 [1]
T12	106.667 - 100	L3x3x3/16	11.16	5.18	135.5	0.7120	3373.60	30973.40	0.109 [1]
T13	100 - 80	L3x3x1/4	13.16	6.12	161.6	0.9159	4017.41	39843.30	0.101 [1]
T15	60 - 50	L4x4x3/8	15.98	7.51	148.9	1.9341	4846.03	84131.70	0.058 [1]
T16	50 - 40	L4x4x1/4	16.99	7.99	156.2	1.2909	5145.09	56155.80	0.092 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	0.5273	782.15	17085.90	0.046 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

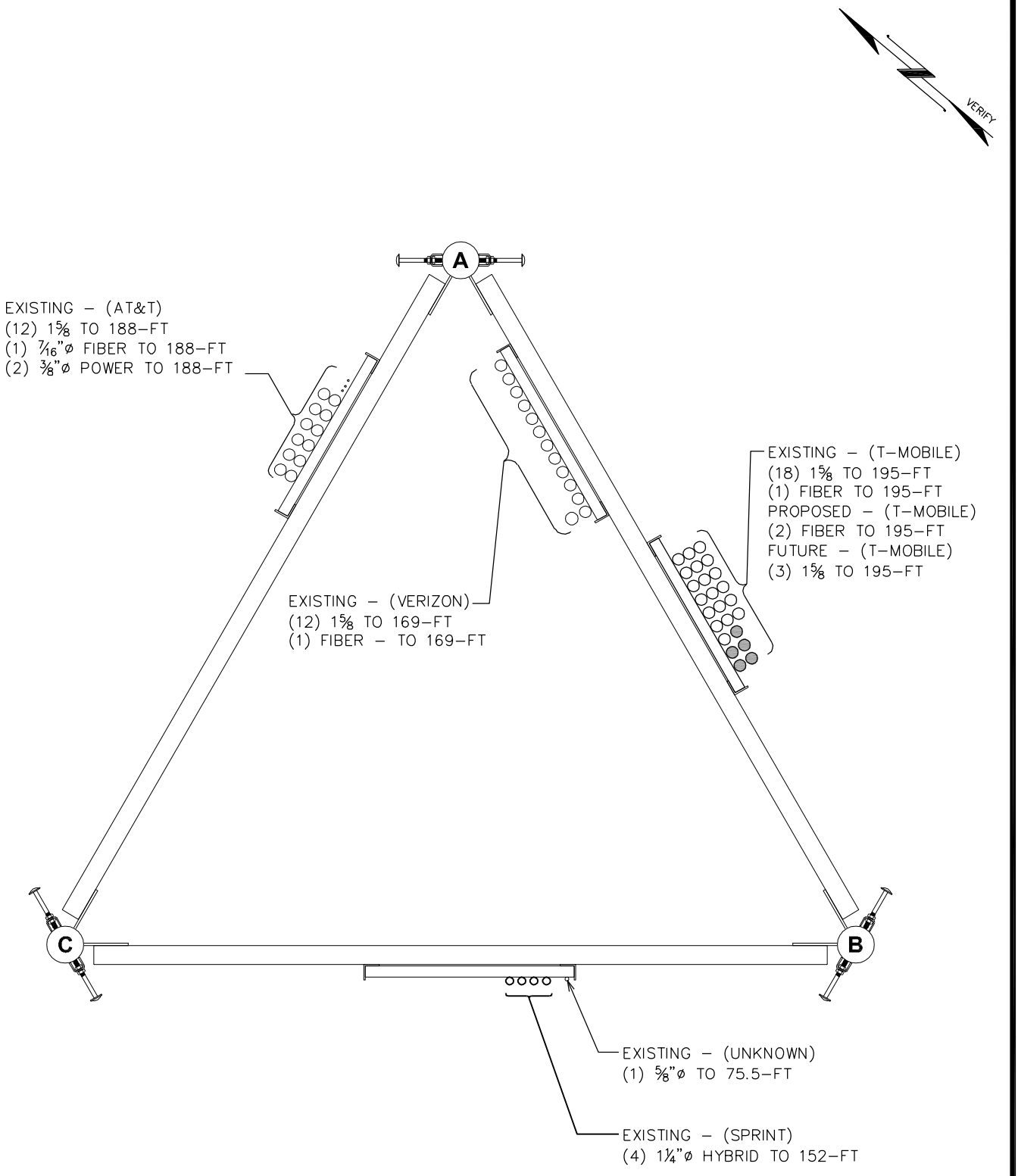
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	3	-34692.80	70532.50	49.2	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	45	-38704.30	77102.10	50.2	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	57	-49111.10	77205.80	63.6	Pass
T4	170 - 160	Leg	2.5SCH40 w/ 3SCH80 Half Sleeve	Note 2	Note 2	Note 2	68.3	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	90	-93942.50	126932.00	74.0	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	Note 2	Note 2	Note 2	62.0	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	Note 2	Note 2	Note 2	48.7	Pass
T10	120 - 113.333	Leg	Pipe 6.625" x 0.280" (6 STD)	159	-169677.00	268817.00	63.1	Pass
T11	113.333 - 106.667	Leg	Pipe 6.625" x 0.280" (6 STD)	171	-182476.00	268848.00	67.9	Pass
T12	106.667 - 100	Leg	Pipe 6.625" x 0.280" (6 STD)	183	-194456.00	268875.00	72.3	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	Note 2	Note 2	Note 2	52.2	Pass
T14	80 - 60	Leg	Pipe 8.625" x 0.322" (8 STD)	225	-267054.00	391613.00	68.2	Pass
T15	60 - 50	Leg	Pipe 8.625" x 0.322" (8 STD)	246	-279437.00	401143.00	69.7	Pass
T16	50 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	258	-296682.00	401194.00	73.9	Pass
T17	40 - 20	Leg	Pipe 8.75" x 0.500" (8 EH)	270	-330692.00	559858.00	59.1	Pass
T18	20 - 0	Leg	Pipe 8.75" x 0.500" (8 EH)	285	-361692.00	560492.00	64.5	Pass
							65.0 (b)	
T1	195 - 180	Diagonal	5/8	12	9052.81	9940.20	91.1	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	48	-4196.57	7609.55	55.1	Pass
							73.8 (b)	
T3	175 - 170	Diagonal	L2x2x3/16	60	-3381.34	13320.20	25.4	Pass
							49.9 (b)	
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	84	-5337.84	22761.40	23.5	Pass
							59.5 (b)	
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	93	-6144.02	34011.90	18.1	Pass
							71.5 (b)	
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	115	-5862.88	31842.70	18.4	Pass
							69.9 (b)	
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	135	-6077.85	17991.90	33.8	Pass
							47.1 (b)	
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	144	-6286.79	16560.40	38.0	Pass
							48.3 (b)	
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	153	-6111.95	11588.10	52.7	Pass
							77.2 (b)	
T10	120 - 113.333	Diagonal	L3x3x1/4	163	-7199.18	22905.00	31.4	Pass
							51.4 (b)	
T11	113.333 - 106.667	Diagonal	L3x3x1/4	175	-7307.60	21667.80	33.7	Pass
							53.4 (b)	
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	187	-7417.97	11556.70	64.2	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	199	-7560.14	25335.60	29.8	Pass
							31.5 (b)	
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	229	-8018.62	21768.60	36.8	Pass
T15	60 - 50	Diagonal	L3x3x5/16	250	-9945.70	13914.00	71.5	Pass
T16	50 - 40	Diagonal	L3x3x5/16	262	-9728.57	12883.30	75.5	Pass
T17	40 - 20	Diagonal	L4x4x3/8	274	-9635.43	28952.00	33.3	Pass
							38.8 (b)	
T18	20 - 0	Diagonal	L5x5x5/16	289	-10301.90	38842.60	26.5	Pass
							41.5 (b)	
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	17	-5082.87	7191.11	70.7	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	53	-671.22	15868.60	4.2	Pass

tnxTower	Job: US-CT-1003 - Straits Turnpike	Page: 36 of 36
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Project: TEP #25628.165387	Date: 16:47:45 07/12/18
	Client: Phoenix Tower International	Designed by: jhjoyce

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
							9.8 (b)	
T3	175 - 170	Secondary Horizontal	L2x2x3/16	65	-851.69	15324.60	5.6	Pass
							12.5 (b)	
T4	170 - 160	Secondary Horizontal	L2x2x3/16	77	-1247.58	14254.80	8.8	Pass
							18.3 (b)	
T5	160 - 150	Secondary Horizontal	L2x2x3/16	98	-1630.88	13230.80	12.3	Pass
							23.9 (b)	
T6	150 - 140	Secondary Horizontal	L2x2x3/16	119	-2047.33	12187.10	16.8	Pass
							30.0 (b)	
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	167	-2943.28	19380.60	15.2	Pass
							37.6 (b)	
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	179	-3166.26	18683.90	16.9	Pass
							40.4 (b)	
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	191	-3373.60	17991.70	18.8	Pass
							43.1 (b)	
T13	100 - 80	Secondary Horizontal	L3x3x1/4	203	-4017.41	20777.30	19.3	Pass
							28.9 (b)	
T15	60 - 50	Secondary Horizontal	L4x4x3/8	254	-4846.03	44960.90	10.8	Pass
							39.0 (b)	
T16	50 - 40	Secondary Horizontal	L4x4x1/4	266	-5145.09	28993.60	17.7	Pass
							35.8 (b)	
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	5	-1572.22	7191.11	21.9	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	8	-3025.86	7191.11	42.1	Pass
							Summary	
							Leg (T4) 68.3	Pass
							Diagonal (T1) 91.1	Pass
							Horizontal (T1) 70.7	Pass
							Secondary Horizontal (T12) 43.1	Pass
							Top Girt (T1) 21.9	Pass
							Bottom Girt (T1) 42.1	Pass
							Bolt Checks 77.2	Pass
							RATING = **91.1**	**Pass**

APPENDIX B

COAX CONFIGURATION



COAX CONFIGURATION - N.T.S.

PREPARED BY:
TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
www.tepgroup.net

PREPARED FOR:
PHOENIX TOWER INTERNATIONAL
999 YAMATO ROAD, SUITE 100
BOCA RATON, FL 33431

PROJECT INFORMATION:
STRAITS TURNPIKE
SITE #: US-CT-1003
1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762
(NEW HAVEN COUNTY)

REVISION: 0
TEP JOB #:25628.165387
SHEET NUMBER:
C-1

APPENDIX C

ADDITIONAL CALCULATIONS

Project Name:	Straits Turnpike	**Engineer:**	JHJ
Project Number:	TEP #25628.1656387	**Check:**	RPS
Client Site Number:	US-CT-1003	**Date:**	7/12/2018

Anchor Bolt Reinforcement:

Result Summary 71.8%

Input - Loads

Tu:	318.66	kip - maximum leg uplift
Pu:	369.74	kip - maximum leg download
Vu:	31.47	kips - maximum leg shear (uplift)
Vu:	36.03	kips - maximum leg shear (download)
η:	0.55	Eta factor (Existing)
η:	0.55	Eta factor (Proposed)

Geometry

n_1:	8	quantity of existing anchor bolts
Ex. Bolt Grade:	A36	
Ex. Bolt Size:	1.50	in
n_2:	0	quantity of reinforcing bolts
Pr. Bolt Grade:	A36	
Pr. Bolt Size:	1.50	in

Case I - Max T/C in Reinforcement

T_u:	0.00	kips - maximum tension force in bolt
C_u:	0.00	kips - maximum compression force in bolt
V_u:	0.00	kips - maximum shear force in bolt (uplift)
V_u:	0.00	kips - maximum shear force in bolt (download)

Case II - Max T/C in Existing Bolts

T_u:	39.83	kips - maximum tension force in bolt
C_u:	46.22	kips - maximum compression force in bolt
V_u:	3.93	kips - maximum shear force in bolt (uplift)
V_u:	4.50	kips - maximum shear force in bolt (download)

Anchor Rods (TIA-G 4.9.9) ϕ: 0.80

No are the reinforcing bolts Williams Form?

A_{nt}:	1.410	in^2 - tensile area of reinforcing bolt
R_y:	36.00	ksi - minimum yeild strength of reinforcing bolt
R_u:	58.00	ksi - minimum tensile strength of reinforcing bolt
A_{nt}:	1.410	in^2 - tensile area of existing anchor bolt
F_y:	36.00	ksi - minimum yeild strength of existing bolt
F_u:	58.00	ksi - minimum tensile strength of existing bolt
ϕR_n:	65.42	kips - design capacity of reinforcement anchor bolts steel failure
ϕR_n:	65.42	kips - design capacity of existing anchor bolts

Interaction:	0.000	interaction for reinforcement anchor bolt
Interaction:	0.718	interaction for existing anchor bolt

Anchor Bolts are Adequate	71.8%

		PASS	PASS	Straits Turnpike (US-CT-1003)
	Results Summary:	LC1	LC2	TEP #: 25628.165387
	Soil Interaction:	N/A	N/A	Analysis: JHJ 7/12/2018
Drilled Caisson Tool - Pier Check	Foundation Structural:	26.8%	54.1%	Check: RPS 7/12/2018

Code Revisions: TIA-222-G ACI 318-11

Tower Type: Self Support

	LC1	LC2	
Moment:	0.00	0.00	kip-ft
Axial (download):	369.74	0.00	kip
Shear:	36.03	31.47	kip
Axial (uplift):	0.00	318.66	kip

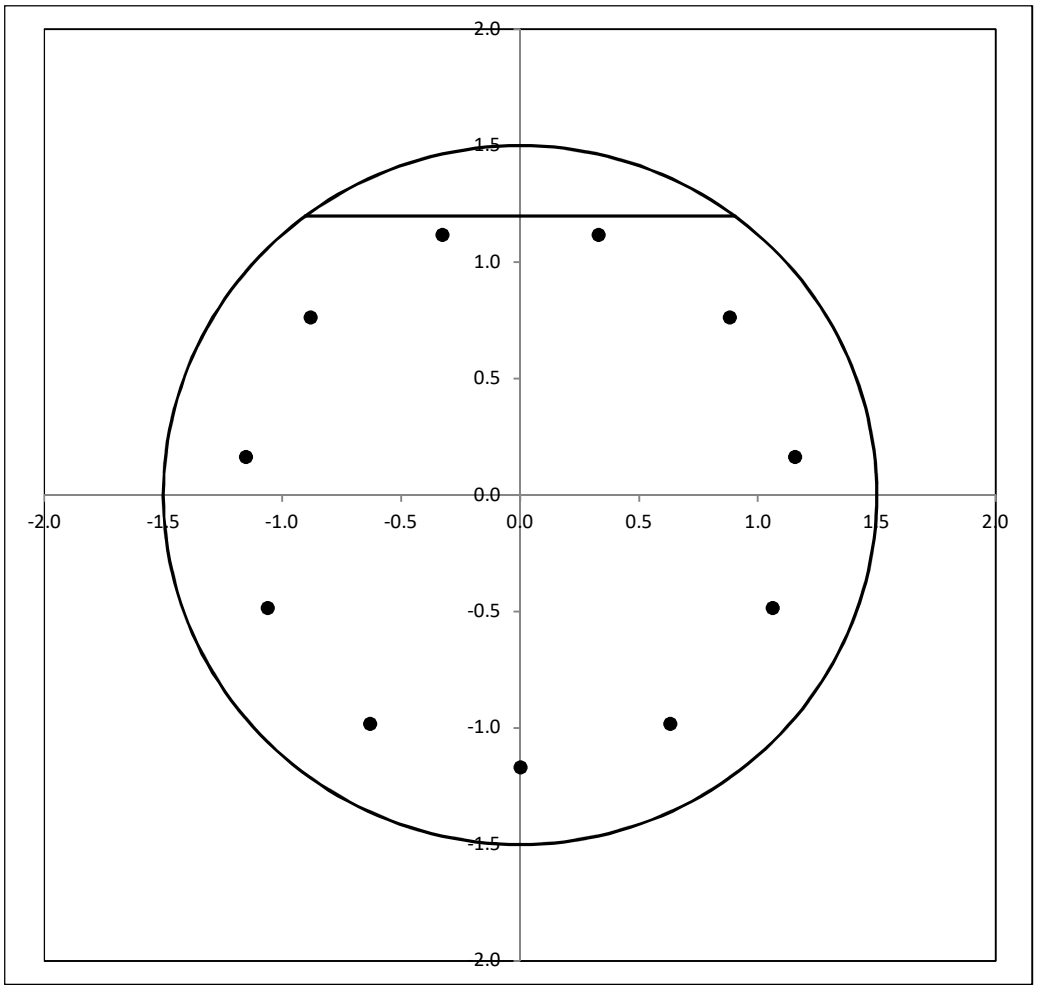
Shaft Information

Diameter:	3.00	ft
Projection:	0.25	ft
Caisson Length:	5.67	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 28.00in)*
Tie Bar Spacing:	16.00	in
Vertical Bar Size:	8	
Vertical Bar Quantity:	11	*(ρ =0.854%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	36.0	36.0	kip
	Vc =	131.8	41.7	kip
fy,tie = 60.0	Vs =	47.1	47.1	kip
	ϕVn =	134.2	66.6	kip
	Capacity =	26.8%	54.1%	
		PASS	PASS	

	LC1	LC2	
Mu =	0.0	0.0	kip-ft
ϕMn =	802.7	190.6	kip-ft
Capacity =	0.0%	0.0%	
	PASS	PASS	

TOWER ENGINEERING PROFESSIONALS

JOB:	Straits Turnpike (US-CT-1003)		
SHEET #:	1	OF	2
CALCULATED BY:	JHJ	DATE	7/12/2018
CHECKED BY:	RPS	DATE	7/12/2018

Mat Foundation Design for Self Supporting Tower - TIA-222-G

q_a, ALLOWABLE SOIL PRESS. (ksf)	6
NET OR GROSS BEARING?	NET
SAFETY FACTOR IN q_a	2
SOIL DENSITY (pcf)	125
TOWER FACE WIDTH (ft.)	21.5
Tower Eccentricity (ft)	0.00

φ^*q_n = 9.0 ksf

Distance between tower centroid and the foundation centroid

F'c (ksi)	3
F'y (ksi)	60

Base Reactions LC1: 1.2D + 1.6W

M_u, MOMENT (k-ft)	6482.5
P_t, AXIAL (k)	64.7
H, SHEAR (k)	55.9

Base Reactions LC2: 0.9D + 1.6W

M, MOMENT (k-ft)	6482.5
P_t, AXIAL (k)	48.6
H, SHEAR (k)	55.9

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (ft.)	Pier Shape
	33	33	4	5.416	9.416	4.00	5.67	Square

W_f, WEIGHT OF FOUNDATION (k) =	694.2
W_s, WEIGHT OF SOIL (k) =	704.8

Concrete Volume (cu yd) 171.4

CHECK BEARING CAPACITY FOR LC1: 1.2D + 1.6W

$P = P_t + 1.2*W_f + 1.2*W_s$ =	1743.5 k
$e = (M_{ot} + P_t*e_t)/P$ =	4.03 ft
L/6 =	5.50 ft
90 Axis: q_{max} =	1.60 ksf
Diag. Axis: q_{max} =	2.08 ksf

Capacity: **23.1%**

CHECK BEARING FAILURE[1] FOR LC2: 0.9D +1.6W

$P = P_t + 0.9*W_f + 0.9*W_s$ =		1307.6 k
90° Axis	$M_{\varphi Qn}$[2] =	19030.4 k-ft
	$M_{ot}/M_{\varphi Qn}$ =	0.369
Diag. Axis	$M_{\varphi Qn}$ =	20032.1 k-ft
	$M_{ot}/M_{\varphi Qn}$ =	0.351

Capacity: **36.9%**

[1] Per effective bearing area (AASHTO LRFD Bridge Design Specifications, 4th Ed.)

[2] $M_{\varphi Qn}$ is the applied moment for which qmax = φQ_n

CHECK OVERTURNING: LC2 CONTROLS

$M_{ot} = M+H*(t+h)$ =	7023.4 k-ft
$M_{st}=P*(L/2-e_t)+(W_{f+s}*L/2)$ =	21576.1 k-ft
M_{ot}/M_{st} =	0.326

Capacity: **32.6%**

TOWER ENGINEERING PROFESSIONALS

JOB:	Straits Turnpike (US-CT-1003)		
SHEET NUMBER:	2	OF	2
CALCULATED BY:	JHJ	DATE	7/12/2018

Stress and capacity calculations of reinforced concrete mat assume a fully rigid foundation and a linear (triangular or trapeziodal) contact stress distribution based on factored loads.

CHECK BEAM SHEAR

Vu =	146.6 k
φVc =	1415.3 k

Vc > Vu **O.K**

Capacity: **10.4%**

CHECK PUNCHING SHEAR

Vu =	295.5 k
φVc =	2009.1 k

Vc > Vu **O.K**

Capacity: **14.7%**

CALCULATE REINFORCING REQUIRED

F'c = 3.0 ksi F'y = 60.0 ksi

Temp & Shrinkage Reinforcement, As, temp = 0.39 in^2/ft (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Bar Size= 8
Bar Spacing = 11.8 in.
d = 43.5 in.

Mu= -547.4 in-k/ft

φMn=0.9*As*Fy*(d-1/2*As*Fy/(0.85*b*F'c))

Solution: As,req = 0.23 in^2/ft As,temp controls
Check, As= 0.80 in^2/ft

Capacity: **48.5%**

TOP REINFORCING

Bar Size= 8
Bar Spacing = 11.8 in.
d= 43.5 in.

Mu= 508.0 in-k/ft

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.22 in^2/ft As,temp controls
Check, As= 0.80 in^2/ft

Capacity: **48.5%**

Project Name:	Straits Turnpike	**Engineer:**	JHJ
Project Number:	TEP#25628.16563 87	**Check:**	RPS
Client Site Number:	US-CT-1003	**Date:**	7/12/2018
Elevation:	80 - 100ft	**CODE:**	TIA-G

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc =	0.90	- LRFD strength reduction factor (compression)	Mast St.: 1.00 - from tnxTower
ΦT =	0.90	- LRFD strength reduction factor (tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	12.864	kips - force from initial load (no wind)
P_{wind}:	231.656	kips - force due to final loading including reinforcement
T_u:	205.757	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	37.5%
Crushing Check:	44.2%
Leg Comp. Check:	44.3%
Sleeve Check:	52.2%
Built-up Check:	49.2%
Slenderness Check:	OK
Leg Tension Check:	42.2%

Input - Tower Leg 6 STD

K:	1.00	- effective length factor for leg
L_u:	3.43	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	2.25	in - minimum radius of gyration of tower leg
A_{leg}:	5.58	in^2 - area of tower leg
DI:	6.07	in - inside diameter of tower leg
t_{leg}:	0.28	in - thickness of tower leg
f`c:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 7 XH Gap Check: OK

F_{y_sleeve}:	42.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	63.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	1.10	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	2.53	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	5.60	in^2 - area of sleeve r/f
t_{sleeve}:	0.50	in - thickness of tower leg

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	5.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	11.98	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	7.63	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section 6 STD w/7 XH Half Sleeve

r_{x_bu}:	2.10	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	2.39	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Project Name:	Straits Turnpike	**Engineer:**	JHJ
Project Number:	TEP#25628.16563 87	**Check:**	RPS
Client Site Number:	US-CT-1003	**Date:**	7/12/2018
Elevation:	120 - 140ft	**CODE:**	TIA-G

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc =	0.90	- LRFD strength reduction factor (compression)	Mast St.: 1.00 - from tnxTower
ΦT =	0.90	- LRFD strength reduction factor (tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	8.947	kips - force from initial load (no wind)
P_{wind}:	158.66	kips - force due to final loading including reinforcement
T_u:	141.714	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	26.8%
Crushing Check:	39.8%
Leg Comp. Check:	40.0%
Sleeve Check:	43.3%
Built-up Check:	48.7%
Slenderness Check:	OK
Leg Tension Check:	36.6%

Input - Tower Leg 5 STD

K:	1.00	- effective length factor for leg
L_u:	6.68	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	1.88	in - minimum radius of gyration of tower leg
A_{leg}:	4.30	in^2 - area of tower leg
DI:	5.05	in - inside diameter of tower leg
t_{leg}:	0.26	in - thickness of tower leg
f`c:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 6 XH Gap Check: OK

F_{y_sleeve}:	46.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	62.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.96	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	2.19	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	4.20	in^2 - area of sleeve r/f
t_{sleeve}:	0.43	in - thickness of tower leg

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	15.50	in - spacing of connectors connecting the sleeve to the leg
D:	5.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	10.41	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	6.63	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section 5 STD w/6 XH Half Sleeve

r_{x_bu}:	1.77	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	2.04	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Project Name:	Straits Turnpike	**Engineer:**	JHJ
Project Number:	TEP#25628.165387	**Check:**	RPS
Client Site Number:	US-CT-1003	**Date:**	7/12/2018
Elevation:	140 - 150ft	**CODE:**	TIA-G

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc =	0.90	- LRFD strength reduction factor (compression)	Mast St.: 1.00 - from tnxTower
ΦT =	0.90	- LRFD strength reduction factor (tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	7.248	kips - force from initial load (no wind)
P_{wind}:	118.036	kips - force due to final loading including reinforcement
T_u:	104.796	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	28.5%
Crushing Check:	57.9%
Leg Comp. Check:	58.3%
Sleeve Check:	59.1%
Built-up Check:	62.0%
Slenderness Check:	OK
Leg Tension Check:	51.4%

Input - Tower Leg 3.5 STD

K:	1.00	- effective length factor for leg
L_u:	2.60	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	1.34	in - minimum radius of gyration of tower leg
A_{leg}:	2.68	in^2 - area of tower leg
DI:	3.55	in - inside diameter of tower leg
t_{leg}:	0.23	in - thickness of tower leg
f`c:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 4 STD Gap Check: OK

F_{y_sleeve}:	50.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	62.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.66	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	1.51	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	1.59	in^2 - area of sleeve r/f
t_{sleeve}:	0.24	in - thickness of tower leg

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	3.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	7.07	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	4.50	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section 3.5 STD w/4 STD Half Sleeve

r_{x_bu}:	1.31	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	1.40	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Project Name:	Straits Turnpike	**Engineer:**	JHJ
Project Number:	TEP#25628.165387	**Check:**	RPS
Client Site Number:	US-CT-1003	**Date:**	7/12/2018
Elevation:	160 - 170ft	**CODE:**	TIA-G

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc =	0.90	- LRFD strength reduction factor (compression)	Mast St.: 1.00 - from tnxTower
ΦT =	0.90	- LRFD strength reduction factor (tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	4.901	kips - force from initial load (no wind)
P_{wind}:	71.939	kips - force due to final loading including reinforcement
T_u:	63.484	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	23.4%
Crushing Check:	48.0%
Leg Comp. Check:	48.6%
Sleeve Check:	68.3%
Built-up Check:	61.4%
Slenderness Check:	OK
Leg Tension Check:	48.1%

Input - Tower Leg 2.5 STD

K:	1.00	- effective length factor for leg
L_u:	2.64	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	0.95	in - minimum radius of gyration of tower leg
A_{leg}:	1.70	in^2 - area of tower leg
DI:	2.47	in - inside diameter of tower leg
t_{leg}:	0.20	in - thickness of tower leg
f`c:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 3 XS Gap Check: OK

F_{y_sleeve}:	35.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	60.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.50	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	1.14	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	1.51	in^2 - area of sleeve r/f
t_{sleeve}:	0.30	in - thickness of tower leg

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	3.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	5.50	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	3.50	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section 2.5 STD w/3 XS Half Sleeve

r_{x_bu}:	0.92	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	1.04	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY I84/X17

SITE ID: CT11128E

1021 STRAITS TURNPIKE

MIDDLEBURY, CT 06762

T-MOBILE RF CONFIGURATION
67D94DB_1xAIR+1QP+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS 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 SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS 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 THE DRAWINGS OR IN THE WRITTEN 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, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. 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.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. 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.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

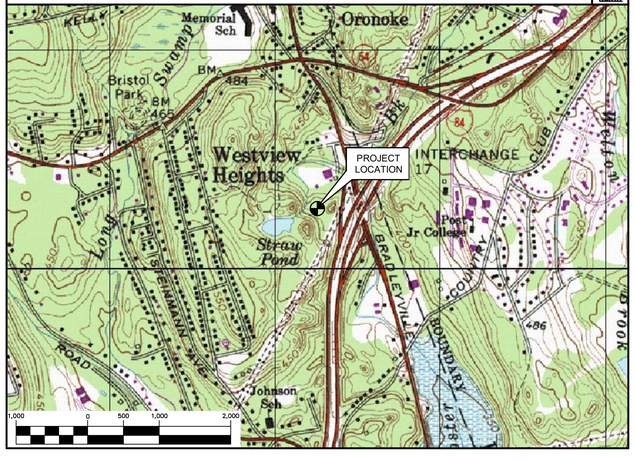
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

1.	HEAD NORTH ON GRIFFIN RD S TOWARD HARTMAN RD.	0.19 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	3.64 MI.
3.	MERGE ONTO I-91 S TOWARD HARTFORD.	7.27 MI.
4.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY.	13.29 MI.
5.	KEEP LEFT TO TAKE I-84 W TOWARD WATERBURY	19.03 MI.
6.	TAKE THE CT-64 EXIT VIA EXIT 17 TOWARD CT-63/MIDDLEBURY/WATERTOWN	0.24 MI.
7.	STAY STRAIGHT TO TAKE CT-64/CHASE PKWY.CONTINUE TO FOLLOW CT-64	0.31 MI.
8.	TURN LEFT ONTO BRADLEYVILLE RD/CT-63	0.24 MI.
9.	TURN RIGHT ONTO WOODSIDE AVE	0.02 MI.
10.	TURN LEFT ONTO SERVICE RD.	0.05 MI.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE THREE (3) EXISTING PANEL ANTENNAS AT POSITION 1.
   B. RELOCATE THREE (3) EXISTING PANEL ANTENNAS FROM POSITION 2 TO POSITION 1.
   C. INSTALL THREE (3) NEW RFS ANTENNAS AT EXISTING POSITION 2.
   D. REMOVE THREE (3) EXISTING RRUS11-B12 MOUNTED ON RACK AT GRADE.
   E. INSTALL THREE (3) ERICSSON RADIO 4449 B71+B12 ON TOWER.
   F. INSTALL TWO (2) 6X12 HYBRID CABLES.

PROJECT INFORMATION

SITE NAME:	MIDDLEBURY I84/X17
SITE ID:	CT11128E
SITE ADDRESS:	1021 STRAITS TURNPIKE MIDDLEBURY, CT 06762
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-32'-08.74" N LONGITUDE: 73°-05'-21.15" W GROUND ELEVATION: 448'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND AND EQUIPMENT LAYOUT PLAN	0
C-3	ELEVATION AND ANTENNA MOUNTING CONFIGURATION	0
E-1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/30/18	LGL	TJL	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — THOMAS J. LYNCH — LICENSED PROFESSIONAL ENGINEER

T-Mobile — Transcend Wireless

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T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
MIDDLEBURY I84/X17
SITE ID: CT11128E
1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

DATE: 06/05/18
SCALE: AS NOTED
JOB NO. 18058.46

TITLE SHEET

T-1

Sheet No. 1 of 6

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS):
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE C/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — TIMOTHY J. LYNCH — 25839 — LICENSED PROFESSIONAL ENGINEER

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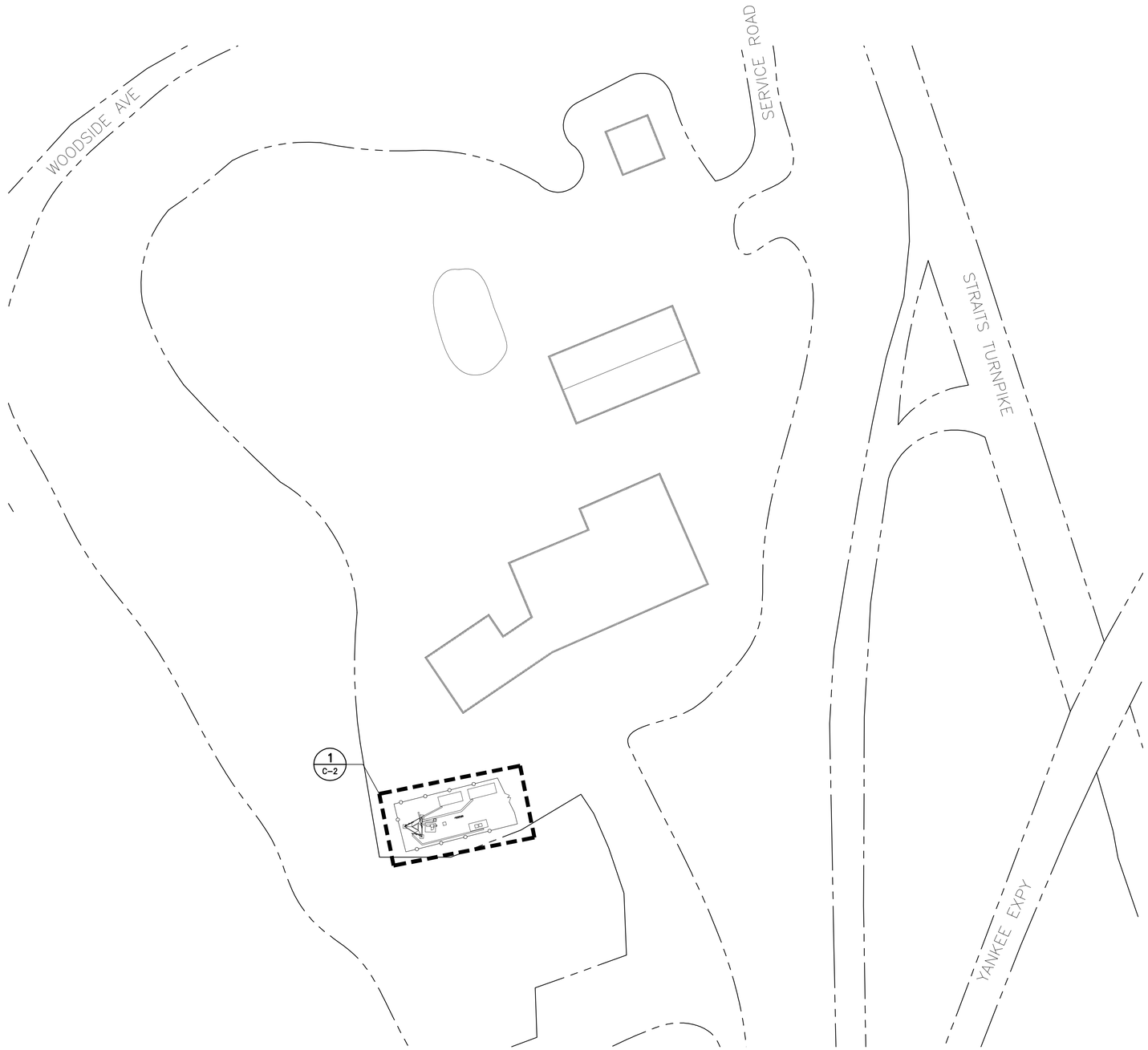
MIDDLEBURY, CT 06762

DATE: 06/05/18
SCALE: AS NOTED
JOB NO. 18058.46

DESIGN BASIS AND SITE NOTES

N-1



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 50'

APPROX. NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — TIMOTHY J. LYNCH — 29826 — REGISTERED PROFESSIONAL ENGINEER

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/30/18	LGL	TJL	ISSUED FOR CONSTRUCTION

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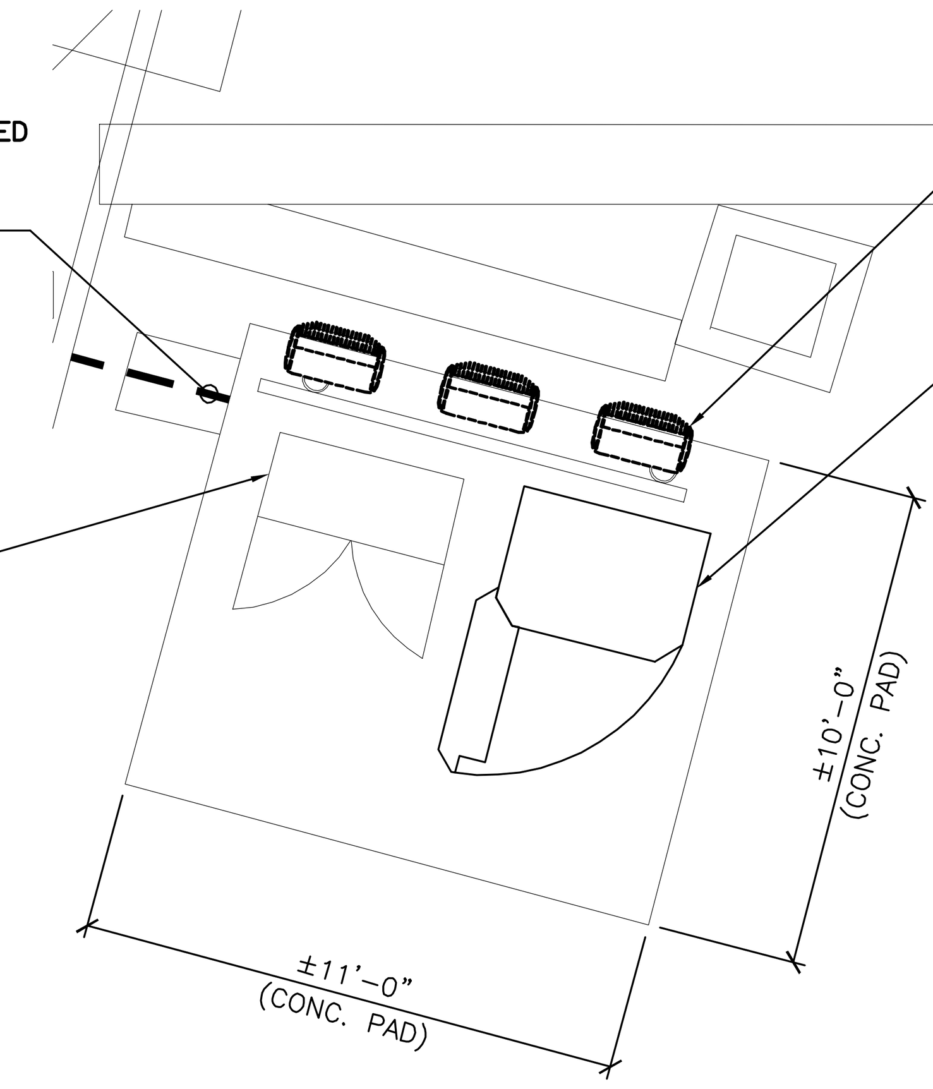
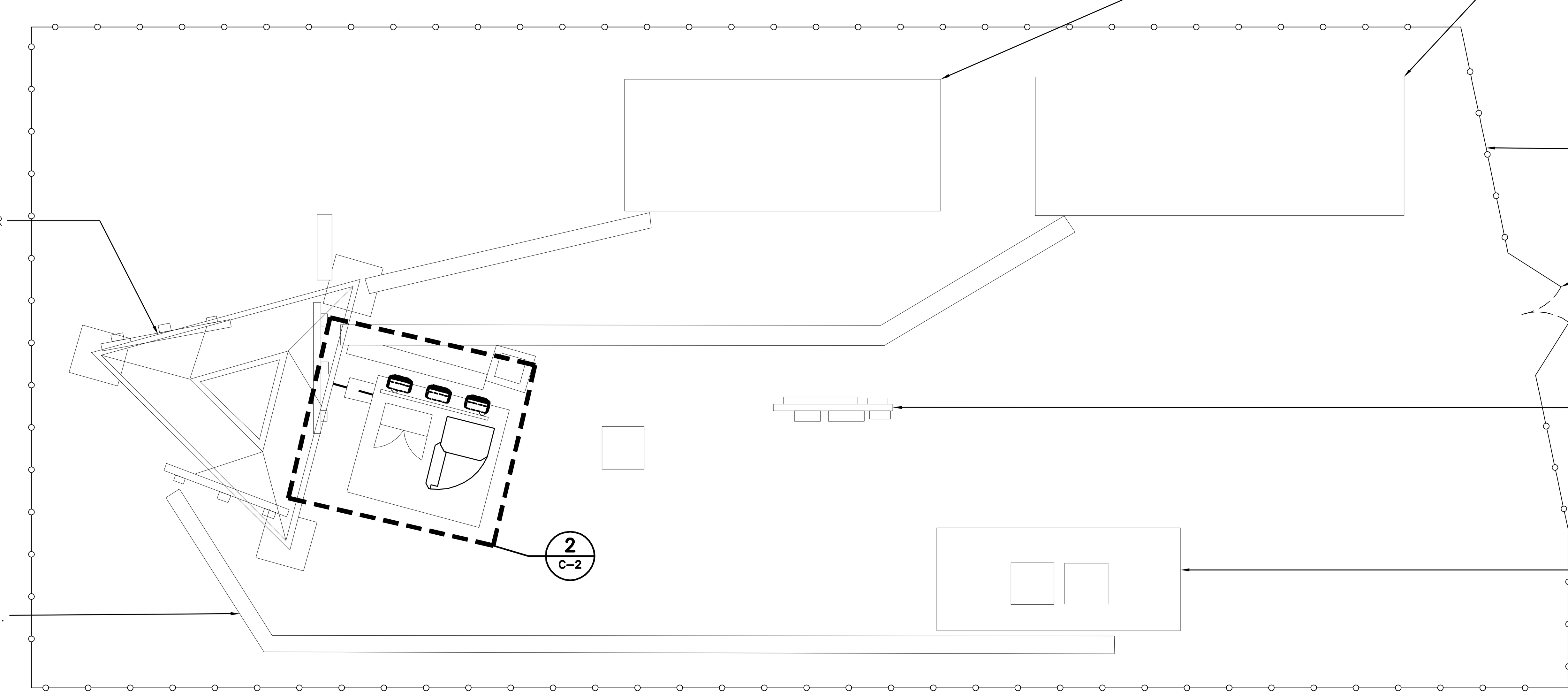
SITE LOCATION PLAN

C-1

Sheet No. 3 of 6



2 C-2 **EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH



1 C-2 **COMPOUND PLAN**
SCALE: 1" = 4'
TRUE NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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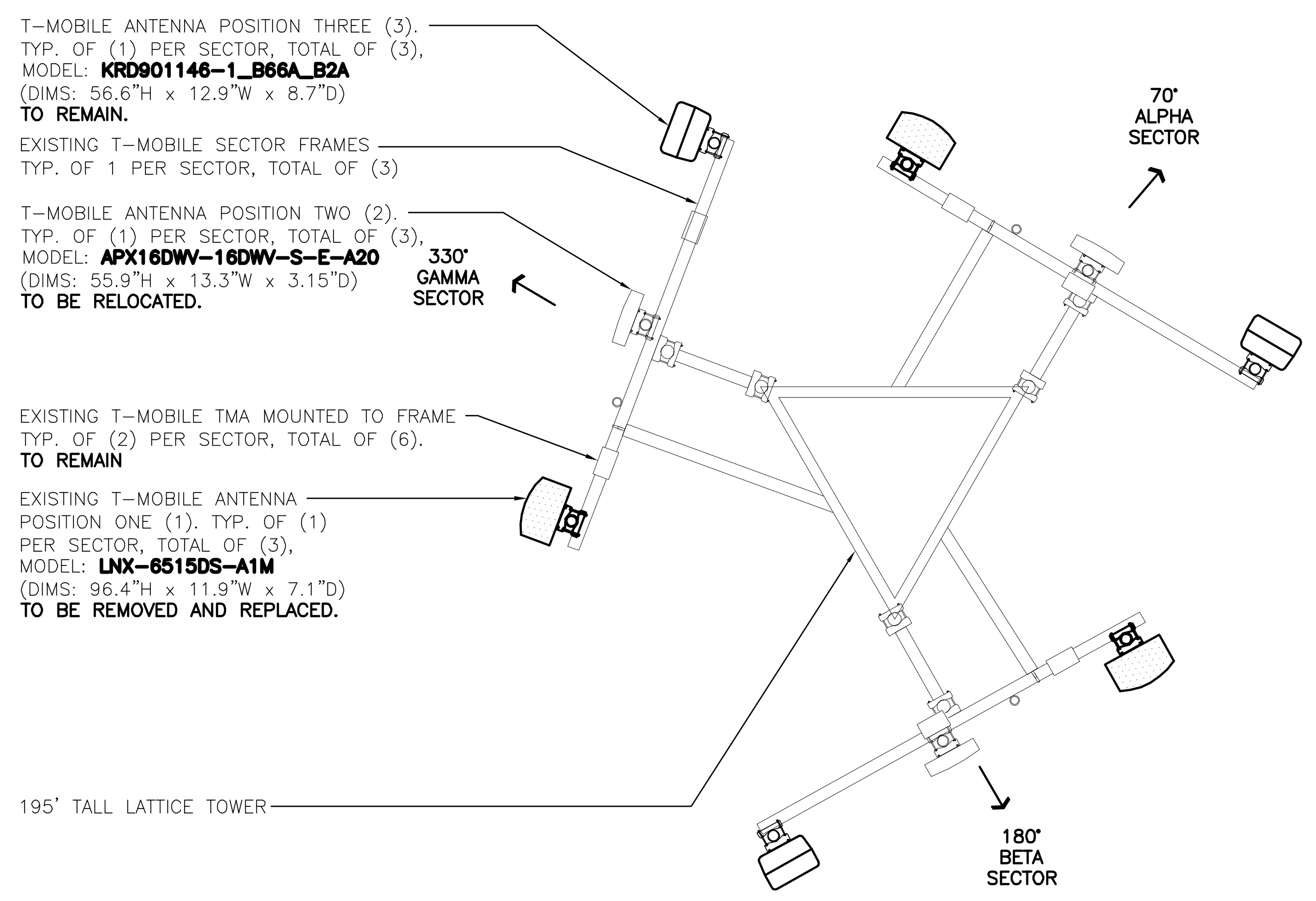
DATE: 06/05/18
SCALE: AS NOTED
JOB NO. 18058.46

COMPOUND AND EQUIPMENT PLAN

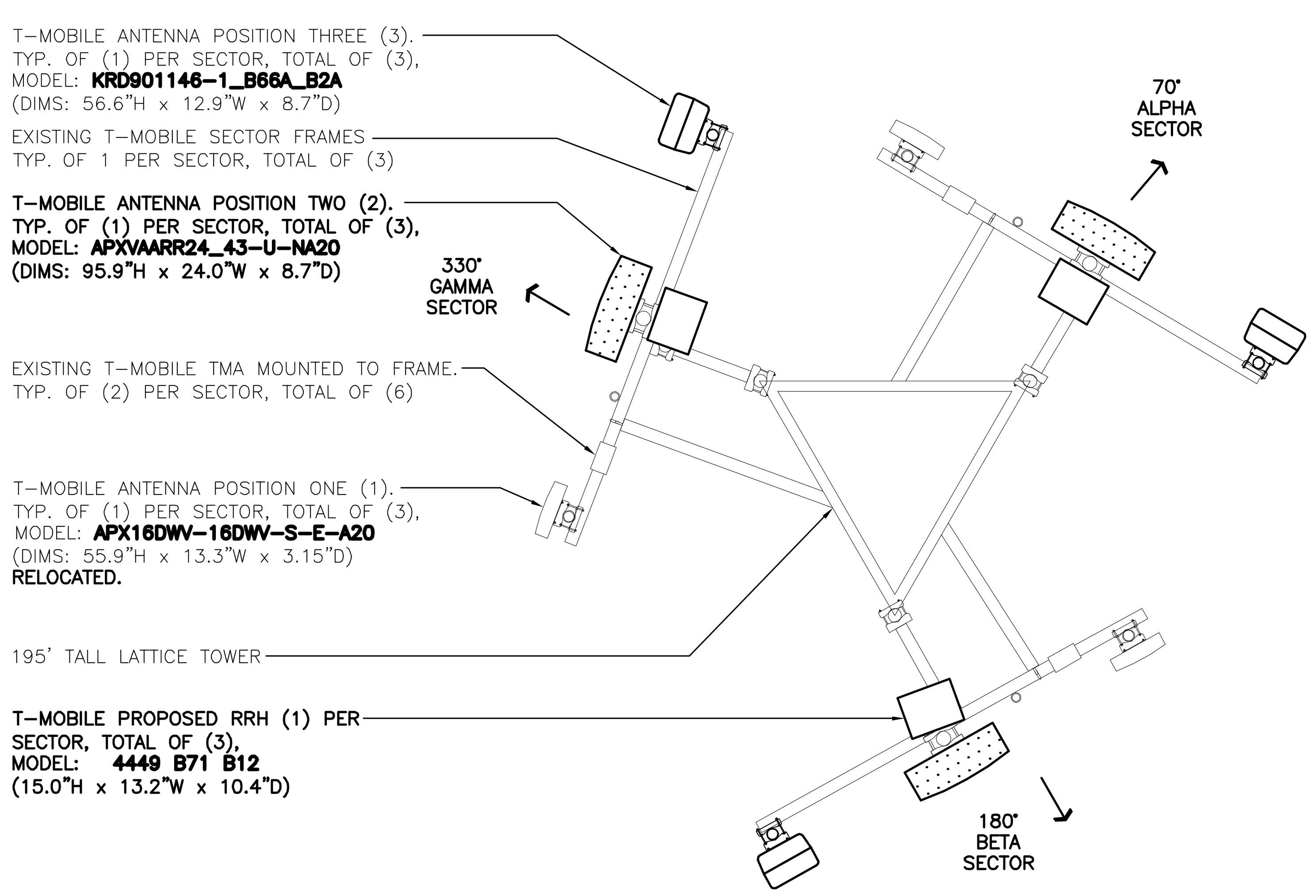
C-2

Sheet No. 4 of 6



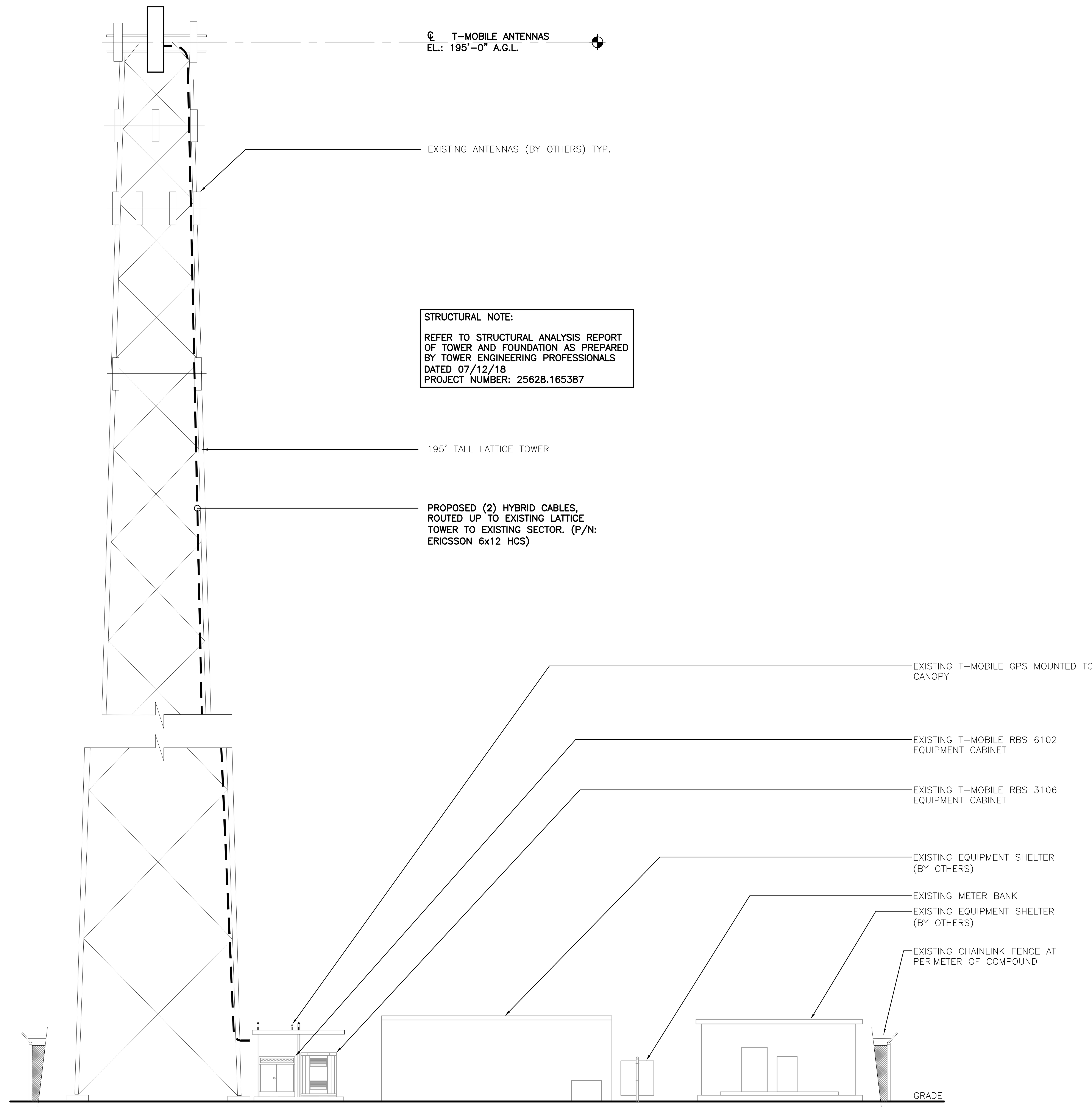
1 / C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**

SCALE: 3/8" = 1'



2 / C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**

SCALE: 3/8" = 1'



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY TOWER ENGINEERING PROFESSIONALS DATED 07/12/18 PROJECT NUMBER: 25628.165387

3 / C-3 **TOWER ELEVATION**

SCALE: 1" = 8'

GRAPHIC SCALE 8 0 4 8 16 32 (IN FEET) 1 inch = 8 ft.

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MIDDLEBURY I84/X17

SITE ID: CT11128E

1021 STRAITS TURNPIKE

MIDDLEBURY, CT 06762

DATE: 06/05/18

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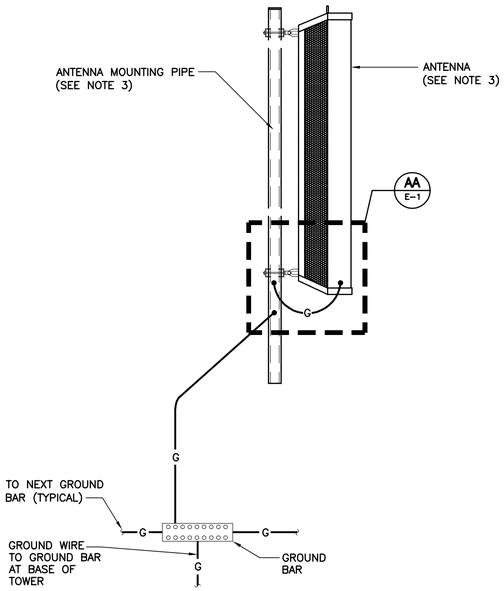
JOB NO. 18058.46

ELEVATION AND ANTENNA MOUNTING CONFIG.

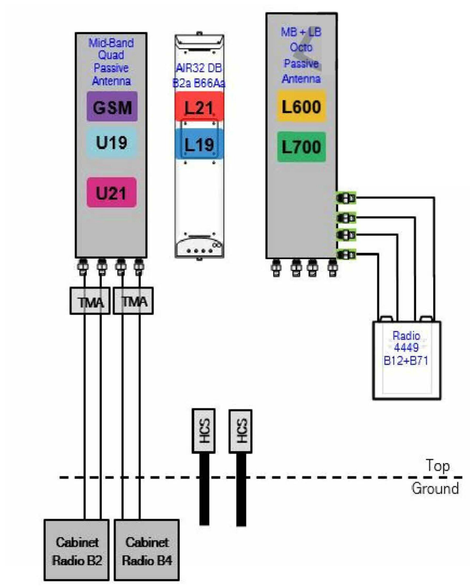
C-3



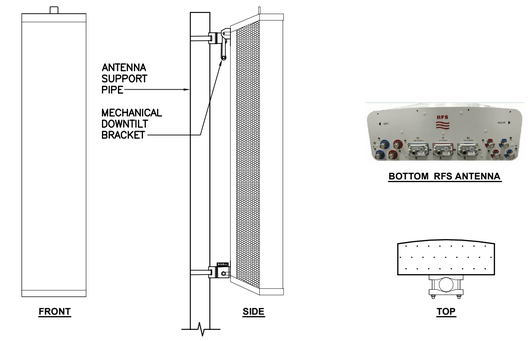
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE

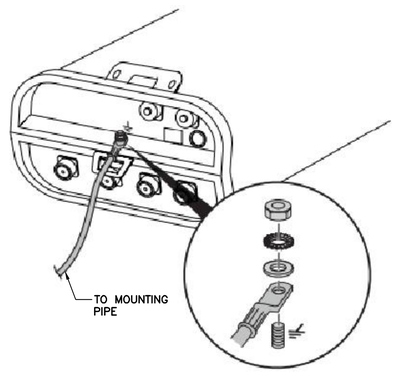


2 / E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NONE

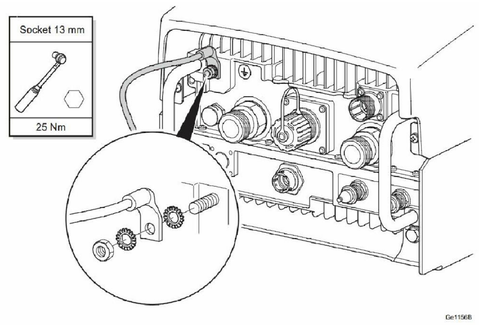


ALPHA/BETA/GAMMA ANTENNA			
EQUIPMENT		DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20		95.9"L x 24.0"W x 8.7"D	153 LBS.

3 / E-1 **PROPOSED ANTENNA DETAIL**
SCALE: NONE



AA / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE



4 / E-1 **TYPICAL RRU GROUNDING DETAIL**
NOT TO SCALE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

5 / E-1 **PROPOSED RRU DETAIL**
SCALE: NONE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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DATE: 06/05/18
SCALE: AS NOTED
JOB NO. 18058.46

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 6

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, August 1, 2018 9:53 AM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CT11128E FS CSC

Your package has been delivered.

Delivery Date: Wednesday, 08/01/2018
Delivery Time: 09:47 AM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424292753069
Ship To:	Edward B. St. John Town of Middlebury 1212 WHITTEMORE RD MIDDLEBURY, CT 06762 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	INSIDE DELIVERY BISSETTE
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11128E FS CSC

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, August 1, 2018 9:53 AM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CT11128E zoning CSC

Your package has been delivered.

Delivery Date: Wednesday, 08/01/2018
Delivery Time: 09:47 AM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424293983078
Ship To:	Curt Bosco Town of Middlebury 1212 WHITTEMORE RD MIDDLEBURY, CT 06762 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	INSIDE DELIVERY BISSETTE
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11128E zoning CSC

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, August 3, 2018 12:23 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CT11128E CSC tower owner

Your package has been delivered.

Delivery Date: Friday, 08/03/2018
Delivery Time: 12:19 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424292217086
Ship To:	Phoenix Tower International 999 W YAMATO RD ROOM 100 BOCA RATON, FL 33431 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	FRONT DESK BARERA
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11128E CSC tower owner

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