AIROSMITH DEVELOPMENT
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October 2nd, 2018

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

RE: Notice of Exempt Modification – Antenna Swap for wireless facility located at 1065 WINTERGREEN AVE, HAMDEN, CONNECTICUT – CT03XC003 (lat. 41° 20' 43.56" N, long. -72° 58' 14.57" W)

Dear Ms. Bachman:

Sprint Spectrum, LP ("Sprint") currently maintains wireless telecommunications antennas at the (71-foot level) on an existing (120-foot self-support tower) at the above-referenced address. The property is owned by the STATE OF CONNECTICUT and the tower is owned by STATE OF CONNECTICUT DEPARTMENT OF PUBLIC SAFETY DIVISION OF STATE POLICE

Sprint's proposed work involves antenna replacement and tower work. Sprint intends to replace three (3) antennas, add three (3) new antennas, and add three (3) new RRHs onto the tower. All the proposed work is contained within the existing fenced area. Please refer to the attached drawings for site plans prepared by Infinigy Engineering.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to CURT B. LENG, MAYOR and DANIEL KOPS, TOWN PLANNER of the Town of HAMDEN. A copy of this letter is also being sent to Brian Benito the tower manager for STATE OF CONNECTICUT DEPARTMENT OF PUBLIC SAFETY DIVISION OF STATE POLICE, and STATE OF CONNECTICUT who owns the land.

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

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The antennas work is a one-for-one replacement of facility components.

32 Clinton Street, Saratoga Springs, NY 12866
Office 518-306-1733 – Fax 518-306-1711
www.airosmithdevelopment.com

AIROSMITH DEVELOPMENT
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3. The proposed modifications will include the addition of ground base equipment as depicted on the attached drawings; however, the proposed equipment will not require an extension of the site boundaries.

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

5. The additional ground based equipment will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b).

If you have any questions or require any additional information regarding this request, please do not hesitate to give me a call at (518) 350-4222 or email me to aperkowski@airosmithdevelopment.com

Kind Regards,

Arthur Perkowski
Airosmith Development Inc.
32 Clinton Street
Saratoga Springs, NY 12866
518-306-1711 desk & fax
518-871-3707 cell
aperkowski@airosmithdevelopment.com

Attachment

CC: CURT B. LENG (MAYOR / Hamden, CT)
BRIAN BENITO (Manager, CT State Police Towers)
DANIEL KOPS (TOWN PLANNER / Hamden, CT)
STATE OF CONNECTICUT (Land Owner)

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Postage $0.50

Total Postage and Fees $6.70

Sent To Curt D Leavy

Street and Apt. No., or PO Box No. 2750 Dixwell Ave

City, State, ZIP+4® Hamden CT 06518

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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City, State, ZIP+4® Hamden CT 06518

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SARATOGA FINANCE 0867

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HARTFORD, CT 06106

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Total Postage and Fees $6.70

Sent To Donnel Malloy

Street and Apt. No., or PO Box No. 450 Capital Ave

City, State, ZIP+4® Hartford CT 06106

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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MIDDLETOWN, CT 06457

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- Certified Mail Restricted Delivery $
- Adult Signature Required $
- Adult Signature Restricted Delivery $

Postage $0.50

Total Postage and Fees $6.70

Sent To Brian Bento

Street and Apt. No., or PO Box No. 1111 Country Club Rd

City, State, ZIP+4® Middletown CT 06457

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SARATOGA FINANCE 0867

OCT 02 2018

Postmark Here

10/02/2018

7018 0680 0002 1201 3933

Town of Hamden, CT

Property Listing Report

Map Block Lot **2221-035-00-0000**

Account

Property Information

Property Location	**1065 WINTERGREEN AVE**
Owner	**CONNECTICUT STATE OF**
Co-Owner	
Mailing Address	**UNKNOWN** **HAMDEN CT 06514**
Land Use	**901V STATE M00**
Land Class	**E**
Zoning Code	**R1**
Census Tract	**6**
Sub Lot	
Neighborhood	**75**
Acreage	**267.78**
Lot Setting/Desc	**Suburban Level**
Survey Map	
Utilities	**Public Water,Septic,Gas/Electric**
Additional Info	

Photo

2221-035-00-0000 04/24/2015

Sketch

Primary Construction Details

Year Built		Bedrooms		Exterior Walls	
Stories		Full Bathrooms		Interior Walls	
Building Style		Half Bathrooms		Heating Type	
Building Use		Bath Style		Heating Fuel	
Building Condition		Kitchen Style		AC Type	
Floors		Roof Style		Gross Bldg Area	
Total Rooms		Roof Cover		Total Living Area	

Report Created On **10/2/2018**

Town of Hamden, CT

Property Listing Report | **Map Block Lot** 2221-035-00-0000 | **Account**

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings		
Extras		
Outbuildings		
Land		
Total		

Outbuilding and Extra Items

Type	Description

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		0

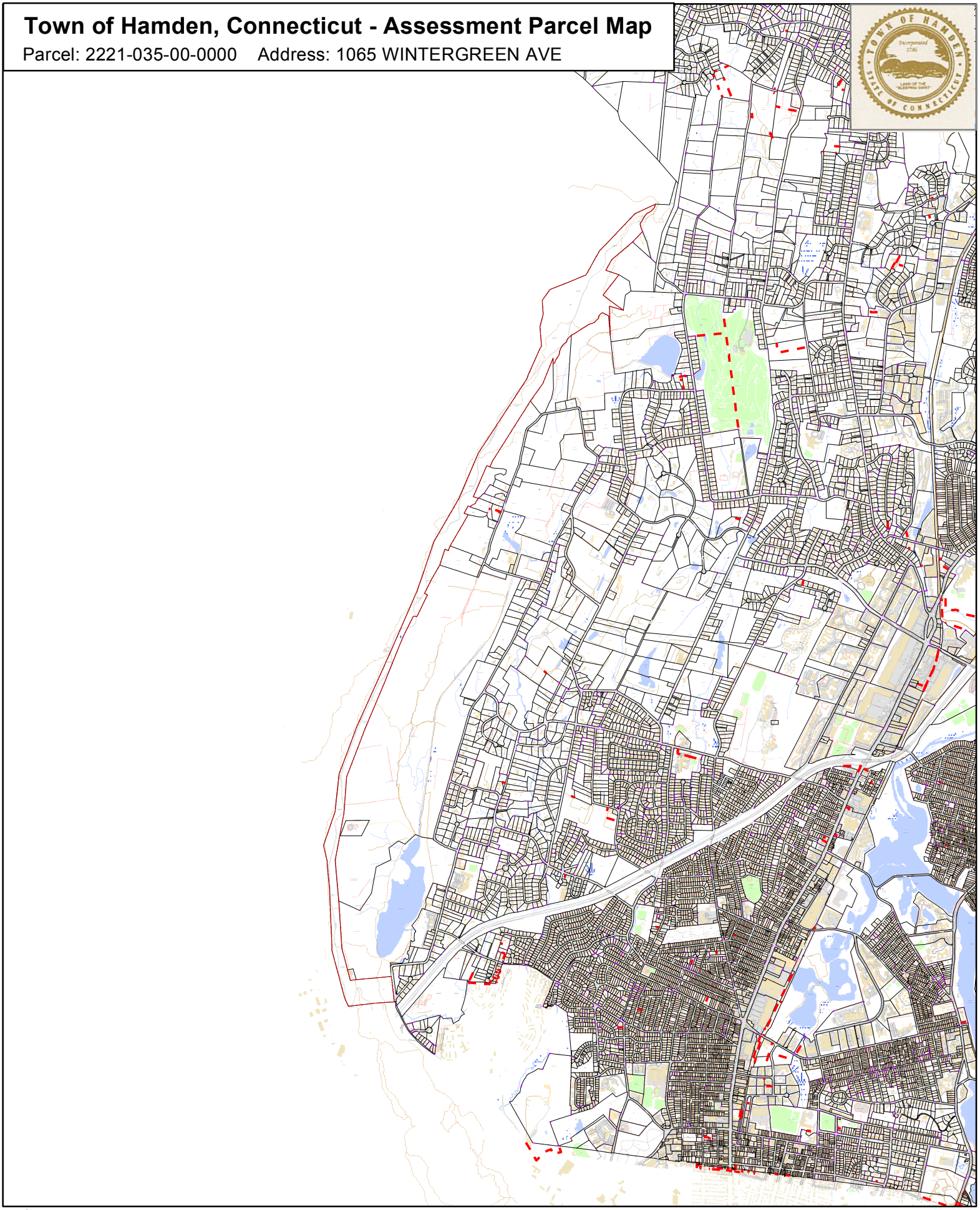
Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CONNECTICUT STATE OF	686/ 485	3/11/1983	0

Report Created On 10/2/2018

Town of Hamden, Connecticut - Assessment Parcel Map

Parcel: 2221-035-00-0000 Address: 1065 WINTERGREEN AVE



N

Approximate Scale: **1 inch = 3,250 feet**

0 1,600 3,200 4,800 6,400 Feet

Map Produced: March 2018

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Hamden and its mapping contractors assume no legal responsibility for the information contained herein.

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC003

West Rock Ridge - CT State Police
1065 Wintergreen Avenue
Hamden, CT 06514

September 29, 2018

EBI Project Number: 6218006309

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	29.61 %

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

AECOM

Submitted to
AT&T / Smartlink
85 Rangeway Road
Building 3, Suite 102
N. Billerica, MA 01862

Sprint /
Airosmith Development, Inc.
32 Clinton Street
Saratoga Springs, NY 12866

T-Mobile / Northeast Site Solutions
420 Main Street
Sturbridge, MA 01566

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
August 14, 2018

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

AT&T Site ID # : CTLO2013
Sprint Site I.D # : CT03XC003
T-Mobile Site I.D. #: CT11086A
Site Name : New Haven – State Police Tower #27
Site Address: 142 Baldwin Drive, New Haven, CT

60579836 / SMK-003
60579840 / ASM-010
60579905 / NSS-044

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the existing 120' self-supporting lattice tower structure located at 142 Baldwin Drive, New Haven, Connecticut.

The structural analysis was conducted in accordance with the 2016 Connecticut State Building Code which includes the TIA-222-G[1] Standard, 2012 International Building Code, the 2016 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F[4].

The antenna loading considered in the analysis consists of all the existing and proposed antennas, transmission lines and ancillary items as outlined in the Introduction Section of this Report.

The proposed T-Mobile, AT&T and Sprint antenna installations are listed below:

Proposed Appurtenances	Carrier	Antenna Center Elevation
Remove:		
(3) Ericsson AIR 21 B2A/B4P Panel Antennas **(3) Commscope LNX-6515DS-A1M Panel Antennas** **(3) Ericsson RRUS-11 RRH Units**	**T-Mobile (existing)**	**@ 95'**
(3) RFS APXVSPP18-C-A20 Panel Antennas	**Sprint (existing)**	**@ 71'**
Install:		
(3) RFS APXVAARR24_43—U-NA20 Panel Antennas **(3) Ericsson AIR 3246 B66 Panel Antennas** **(3) Ericsson 2217 B2 Radio Units (RRH)** **(3) Ericsson 4449 B71 + B12 Radio Units (RRH)** **(1) Ericsson 6x12 (6 AWG) Hybrid Cable**	**T-Mobile (Proposed)**	**@ 95'**
(2) Kathrein 800-10966 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector) **(1) Kathrein 800-10965 Panel antenna (Gamma Sector)** **(3) RRUS-12 RRH Units** **(3) RRUS-B14 / Radio 4478 RRH Units** **(1) DC6-48-60-0-8F Surge Suppressor Units** **(2) 3/4" Diameter DC Cables**	**AT&T (Proposed)**	**@ 80'**
(3) Commscope NNVV-65B-R4 Panel Antennas **(3) Nokia Dual Band MIMO AAHC Panel Antennas** **(3) 800 MHz RRH Units**	**Sprint (Proposed)**	**@ 71'**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version G)

2. AISC = American Institute of Steel Construction (14th Edition)

3. ASCE 7 = American Society of Civil Engineers Standard 7 (2010 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

1. EXECUTIVE SUMMARY - *continued*

The results of an initial structural analysis indicated that the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions above. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. **Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and anchor bolts are considered structurally adequate with the load specification specified above with the existing and proposed antenna loading herein.**

The results of the analysis indicate the modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police requirements of 0.75 degrees for combined twist (rotation) and sway (deflection) when applying the TIA/EIA-222-F design conditions.

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes utilized in the preparation of this report were obtained from manufacturer's original design documents prepared by Stainless, Inc. report number 358810, noted as revision B, dated March 3, 1995.
3) Tower Mapping and Existing Inventory via tower climb, performed by D&K Nationwide Communications, Inc. on March 30, 2016.
5) Antenna inventory provided by Connecticut State Police via e-mail on April 7, 2016.
6) Previous structural analysis and evaluation performed by AECOM on behalf of AT&T, project number 60565638 / SMK-001, signed and sealed in May 21, 2018.
7) Previous structural analysis and evaluation performed by AECOM on behalf of T-Mobile, project number 60577309 / NSS-043, signed and sealed on May 25, 2018.
8) Previous structural analysis and evaluation performed by AECOM on behalf of Sprint, project number 60565103 / ASM-005, signed and sealed on June 11, 2018.
9) Updated antenna Radio Frequency Data Sheet provided by Smartlink on behalf of AT&T, obtained via e-mail dated June 22, 2018.
10) Geotechnical Review of Existing State Police Communications Tower #27, prepared by Welti Geotechnical, P.C. dated August 13, 2018.
11) Antenna and mount configuration as specified within Section 2 and 6 of this report.
12) Coax cable orientation as specified in section 6 of this report.

1. EXECUTIVE SUMMARY - *continued*

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

If you should have any questions, please contact this office as (860) 990-6767.

Sincerely,

AECOM,

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

RAS/mcd

cc: IA, CF/Book - AECOM

2. INTRODUCTION

The subject tower is located at 142 Baldwin Drive, New Haven, Connecticut. The structure is an existing 120' self supporting steel tapered lattice tower, designed and manufactured by Stainless, Inc.

The structural analysis was conducted in accordance with the following:

- TIA-222-G Standard for Standard for a wind velocity of range of 95 mph to 115 mph (3-second gust) and 50 mph (3-second gust) concurrent with 0.75" ice thickness, considered to increase in thickness with height
- 2012 International Building Code with 2016 Connecticut State Building Code Amendments for a wind speed of 105 mph (3-second gust)
- 2010 AISC Load Resistance Factor Design (LRFD)
- 2010 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-G Standard
- Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice, analyzed under the TIA/EIA-222-F design Standard.

The inventory together with the proposed T-Mobile, AT&T and Sprint antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) 4' Lightning Rod	#27 Tower (existing)	18' Pipe Mast on Top of Tower	138'	---
(1) UHF3 Dipole Antenna	#26 CSP-15 (existing)	2' Flange Mount	120'	(1) LDF6-50A
(1) UHF-6 Whip Antenna	CSP-1 (existing)	*Share with below mount*	120'	(1) LDF5-50A
(1) OGT9-806 Whip Antenna	#25-B CSP-7 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	#24-C CSP-21 (existing)	*Share with below Mount*	120'	(1) AVA7-50A
(1) OGT9-806 Whip Antenna	#24-D CSP-8 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	#25-A CSP-17 (existing)	(2) 5' Sidearm Mounts w/ 8' Pipe	114'	(1) AVA7-50A
(1) Junction Box	#24-A (existing)	(2) 4' Sidearm mounts w/ 8' Pipe	113.5'	(2) 3/8"
(1) (Inverted) Whip Antenna	#24-B (existing)	*Share with above Mount*	113.5'	(1) 1/2"
(1) (Inverted) Dipole Antenna	#24-E (existing)	*Share with above Mount*	113.5	(1) 1-1/4" Cable
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-A CSP-22 (existing)	*Share with above mount*	112.75'	(1) AVA7-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-B CSP-23 (existing)	*Share with above mount*	112.75’	(1) AVA7-50A
(1) Sinclair Whip Antenna	#22 (existing)	(1) 4’x8’ Gate-boom 3’ Standoff w/ 2-1/2” Pipe	112’	(3) 1 5/8”
(1) Junction Box	#23-C (existing)	(1) Unistrut mount attached to Waveguide ladder	112’	(1) 1/2"
(1) PA6-65 Dish Antenna	#21 CSP-5 (existing)	2-1/2” Pipe Mounted to leg	110’	(1) WEP65
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-9 (existing)	*See above mount @ 113’*	110’	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	CSP-18 (existing)	*See above mount @ 113’*	110’	(1) AVA7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-19 (existing)	*See above mount @ 113’*	110’	(1) AVA7-50A
(1) 432E-83I-01T TTA Unit	CSP-20 (existing)	*See above mount @ 113’*	110’	(1) LDF4-50A
(1) WPA-70040-4CF-EDIN Panel Antenna	CSP-28 (existing)	Leg Mounted	110’	(1) AVA7-50A
(1) PA6-65 Dish Antenna	#20 CSP-3 (existing)	2-1/2” Pipe Mounted to leg	109’	(1) WEP65
(1) PA6-65 Dish Antenna	#19 CSP-6 (existing)	2-1/2” Pipe Mounted to leg	107’	(1) WEP65
(1) SE419-SWBPALDF Panel Antenna	CSP-29 (existing)	Leg Mounted	105’	(1) AVA7-50A
(1) 432E-83I-01T TTA Unit	CSP-30 (existing)	Face Mounted	105’	(1) LDF4-50A
(1) 422-86A-99116 TTA Unit	CSP-31 (existing)	Face Mounted	105’	(1) LDF3-50A
(1) 422-86A-99116 TTA Unit	CSP-32 (existing)	Face Mounted	105’	(1) LDF3-50A
(1) AP13-850 Panel Antenna	#18A CSP-12 (existing)	2-1/2” Pipe Mounted to Face	101’	(1) LDF7-50A
(1) SE419-SWBPALDF Panel Antenna	#18B CSP-13 (existing)	2-1/2” Pipe Mounted to Face	101’	(1) LDF7-50A
(3) APXVAARR24_43—U-NA20 Panels (3) Ericsson AIR 3246 B66 Panels (3) Ericsson 2217 B2 RRH’s (3) Ericsson 4449 B71 + B12 RRH’s	**T-Mobile (Proposed)**	Shared with Below Mount	**95’**	**(1) 1-1/4” F.O. Cable (6x12 6AWG)**
(3) AIR32 B66 Panel Antennas (3) TMA Units	T-Mobile (existing)	(3) EUSF10-U T-Arm Mounts attached to Leg	95’	(6) 1-5/8” (2) 1-1/4” Fiber Optic Cables
(1) (Inverted) OGT9-806 Whip Antenna	#16A CSP-10 (existing)	(2) 5’ Standoff Mounts w/ 4-1/2” Pipe Mount	92’	(1) LDF7-50A
(1) PD-458 Whip Antenna	#16B CSP-2 (existing)	*Share with above mount*	92’	(1) LDF5-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Dipole Antenna	#15 (existing)	3' Sidearm w/ 2" Pipe Mount	86'	(1) 7/8"
(1) 3' Yagi Antenna	#12 (existing)	*Share with above mount*	81'	(1) 1/2"
(1) DB-230 Yagi Antenna	#13 CSP-11 (existing)	*Share with above mount*	81'	(1) LDF5-50A
(2) Kathrein 800-10966 Panel Antennas (1 A; 1 B Sectors) (1) Kathrein 800-10965 Panel antenna (Gamma Sector) (3) RRUS-12 RRH Units (3) RRUS-B14 / Radio 4478 RRH Units (1) DC6-48-60-0-8F Surge Suppressor Units	**AT&T (Proposed)**	*See below Mount*	**80'**	**(2) 3/4" DC Cables**
(2) CCI TPA-65R-LCUUUU-H8 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector) (2) CCI HPA-65R-BUU-H8 Panels (Alpha & Beta Sectors,1 per sector) (2) Andrew SBNH-1D6565C Panels (Alpha & Beta Sectors, 1 per sector) (1) CCI HPA-65R-BUU-H6 (Gamma) Panel (1) Quintel QS66512-3 Panel Antenna (Gamma Sector) (3) RRUS-11 RRH Units (6) RRUS-32 RRH Units (2) DC6-48-60-18-8F Surge Suppressor Units (2) DTMABP7819VG12A TMA Units	AT&T (existing)	(3) Antenna Face Mounts	80'	(4) 1-1/4" (2) 1/2" Fiber Optic Cables (4) 3/4" DC Cables
(1) 22' Dipole Antenna	#14 (existing)	4' Sidearm	77'	(1) 1/2"
(3) NNVV-65B-R4 Panel Antennas (3) Nokia MIMO Panel Antennas (3) TD-RRH8x20-25 RRH Units	**Sprint (Proposed)**	*Shared with below Mount*	**71'**	*Shared with below Cables*
(3) ALU RRH 800 MHz 2x50W (3) 1900 RRH Units	Sprint (existing)	Pipe Mounts on Existing Frame	71'	(4) 1-1/4" Hybriflex Cables
(1) 6' Dual Yagi Antenna	#9 (existing)	2' Sidearm	65'	(1) 1/2"
(1) GPS Antenna	#8 (existing)	3' Sidearm	63'	(1) 7/8"
(1) DB-264 20' Dipole Antenna	#7 CSP-4 (existing)	2' Sidearm	55'	(1) LDF5-50A
(1) DB-803 Whip Antenna	#6 CSP-16 (existing)	2' Sidearm	53'	(1) LDF4-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 10’ Dipole Antenna	#4A (existing)	3’ Sidearm	48’	(1) 1/2"
(1) 3’ Yagi Antenna	#4B (existing)	*Shared with above mount*	48’	(1) 1/2"
(1) 5’ Whip Antenna	#3 (existing)	Leg Mounted	47’	(1) 1/2"
(1) 3’ Whip Antenna	#2 (existing)	Leg Mounted	43’	(1) 7/8”
(1) 4’ Dish with Shroud Cover	#1A (existing)	4’ Sidearm	41’	(2) 1/2"
(1) 1’x1’ Panel Antenna	#1B (existing)	*Shared with above mount*	41’	(1) 3/8”
(1) 6’ Whip Antenna	#5 CSP-14 (existing)	1’ Sidearm Mount	39’	(1) LDF4-50A

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

“A#” refers to the antenna number used in the structural analysis program to identify tower appurtenances.

This structural analysis and evaluation of the communications tower was performed by AECOM for T-Mobile, AT&T and Sprint. The purpose of this analysis was to investigate the structural integrity of the modified tower and foundation for existing and proposed antenna loads in compliance with the 2016 Connecticut State Building Code. This analysis was conducted to evaluate stress on the tower and the effect forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-G–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2012 International Building Code with 2016 Connecticut State Building Code Amendments and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 7.0.8.5 and used the following conditions for this tower review (following the TIA/EIA-222-G Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 4 – (Tower location on top of ridge – rolling wind conditions considered)
  - Crest Height used for analysis: (approximate elevations listed below)
    - Tower Base Elevation = 450 feet
    - High point (2 mile Radius) = 550 feet (Ref. NW Regicides Trail)
    - Low Point (2 mile Radius) = 50 feet (Ref. Benchmark @ Southern Connecticut State University)
    - "H" = (Avg of High/Low) – Base Elevation = 150 feet
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA-222-G Standard.

Basic Wind Speed:

- TIA-222-G:
  - New Haven County (Wind Speed Range): V = 95 mph - 115 mph (3-second gust) [Annex of TIA/EIA-222-G 2006]
- IBC 2012 w/ 2016 CT State Building Code Amendment:
  - (2012) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2016) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.asd = 105 mph** (3-Second Gust) Wind Design Parameter for the City of New Haven, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police).

Load Condition 1 = 105 mph (3-second gust) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **0.75 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-G and follows the same design criteria as the ASCE 7 Standard.

The load conditions below implement the design requirements of the Connecticut State Police for the tower structures deflection limits with the allowable deflection limit of the combination of the tower's sway (deflection) and twist (rotation) under the TIA-222-F design Standard. This design limit required the design combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA-222-F design Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Seismic event consideration factors/values for design:

- S.s = 0.186 (2016 CT State Building Code – Location Specific Value)
- S.1 = 0.062 (2016 CT State Building Code – Location Specific Value)
- Site Classification = "C" – from Geotechnical Report description of "Fractured Rock"
- Seismic Design Category = "C" – (2012 International Building Code)
- F.a = 1.2 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 1.7 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

Strength Limit State Load Combinations (TIA-222-G Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above "Dead Load Guy Assemblies" are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The "Load effects due to temperature" do not apply for structures that are self-sustaining (from the TIA-222-G Standard)

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the strength design in accordance with AISC (LRFD). The results of an initial analysis indicated that the existing tower did not have enough capacity to support the proposed loading conditions. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and existing foundation are considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein.

The modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police required maximum 0.75 degrees for combined twist and sway when applying the TIA/EIA-222-F design conditions.

Controlling Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Critical Component Size	Controlling Elevation	Stress (% capacity)	Pass/Fail
Leg (T8)	Pipe 5"x0.400" (t) / Compression	25' – 50'	**94.8**	Pass
Diagonal (T9)	(2)L3-1/2x3-1/2x3/8 / Compression	0' – 25'	**90.7**	Pass
Horizontal (T7)	L3-1/2x3-1/2x1/4 / Compression	50' – 75'	**96.9**	Pass
Top Grit (T9)	L4x4x5/16 / Compression	0' – 25'	**97.7**	Pass
Redundant Horizontal Bracing (T9)	L2-1/2x2-1/2x1/4 / Compression	0' – 25'	**34.9**	Pass
Redundant Diagonal Bracing (T9)	L2-1/2x2-1/2x1/4 / Compression	0' – 25'	**61.6**	Pass
Inner Bracing (T9)	L2-1/2x2-1/2x3/16 / Compression	0' – 25'	**13.5**	Pass
Tower Connection Bolt	(2) 5/8" Diameter A325X Bolts / Shear Capacity	25'	**97.7**	Pass

Foundation Summary:

Component	Required	Computed	% Capacity	Pass/Fail
(Modified) Anchor Rod - Capacity (TIA-222-G – 4.9.9)	Ratio < 1.0	0.970	**97.0**	Pass
Foundation – Spread Foot (6'x6') Uplift Capacity	625.89 Kip (Factored Resistance)	393 Kip	**62.9**	Pass
Foundation – Rock Anchorage – Bonded Embedment Length	20 Feet (installed)	16.59 Ft	**78.7**	Pass
Foundation – Bearing on Rock Capacity	13.4400 ksf (Factored Resistance)	12.676 ksf	**73.5**	Pass

4. FINDINGS AND EVALUATION (cont.)

Maximum Deformations – Proposed Condition

ANSI/TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.1334	0.7365	4.0	3.6

Tower Twist & Sway at Top (Connecticut State Police Requirements - TIA-222-F):

Description	Current	Total	Allowable
Tower Twist (degrees)	0.1562	0.4299	0.750
Tower Sway (degrees)	0.2737		

5. CONCLUSIONS AND RECOMMENDATIONS

The results of an initial structural analysis indicated that the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions above. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. **Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and anchor bolts are considered structurally adequate with the load specification specified above with the existing and proposed antenna loading herein.**

The results of the analysis indicate the modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police requirements of 0.75 degrees for combined twist (rotation) and sway (deflection) when applying the TIA/EIA-222-F design conditions.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.

2. Tower is properly installed and maintained.

3. All members are as specified in the original design documents and are in good condition.

4. All required members are in place.

5. All bolts are in place and are properly tightened.

6. Tower is in plumb condition.

7. All member protective coatings are in good condition.

8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

9. Foundations are in good condition without defect and were properly constructed to support original design loads as specified in the original design documents.

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

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

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

Ongoing and Periodic Inspection and Maintenance:

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

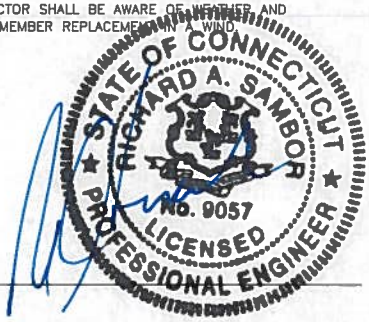
The tower owner shall refer to TIA-222-G Section 14.2 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and through inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

REINFORCEMENT DRAWINGS SK-1 THROUGH SK-5

GENERAL CONSTRUCTION NOTES

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



STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL LEG:
- LEG PIPES 0.400 THICK AND THICKER ..... A572-60 (60 KSI)
- LEG PIPES 3/8" THICK AND THINNER ..... A572-50 (50 KSI)

EXISTING BEAMS, CHANNELS, PLATES, ANGLES A36
REPLACEMENT ANGLES ..... A529 Gr 50 (50 KSI)
WELDED "T" BEAM ..... A992 (50 KSI)

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

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

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

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

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

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8", 3/4", 7/8", 1" DIA. A325-X & A490-X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

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

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

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONTRUCTION", 14TH EDITION.

INSPECTIONS:

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

PLEASE CONTACT AECOM @ 860-990-6767 FOR CONSTRUCTION PHASE SERVICES AND/OR SPECIAL INSPECTIONS.

AT&T, SPRINT, AND T-MOBILE WILL SUPPLY THE SERVICES OF THE REQUIRED SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO AT&T, SPRINT, T-MOBILE, STATE BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

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SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

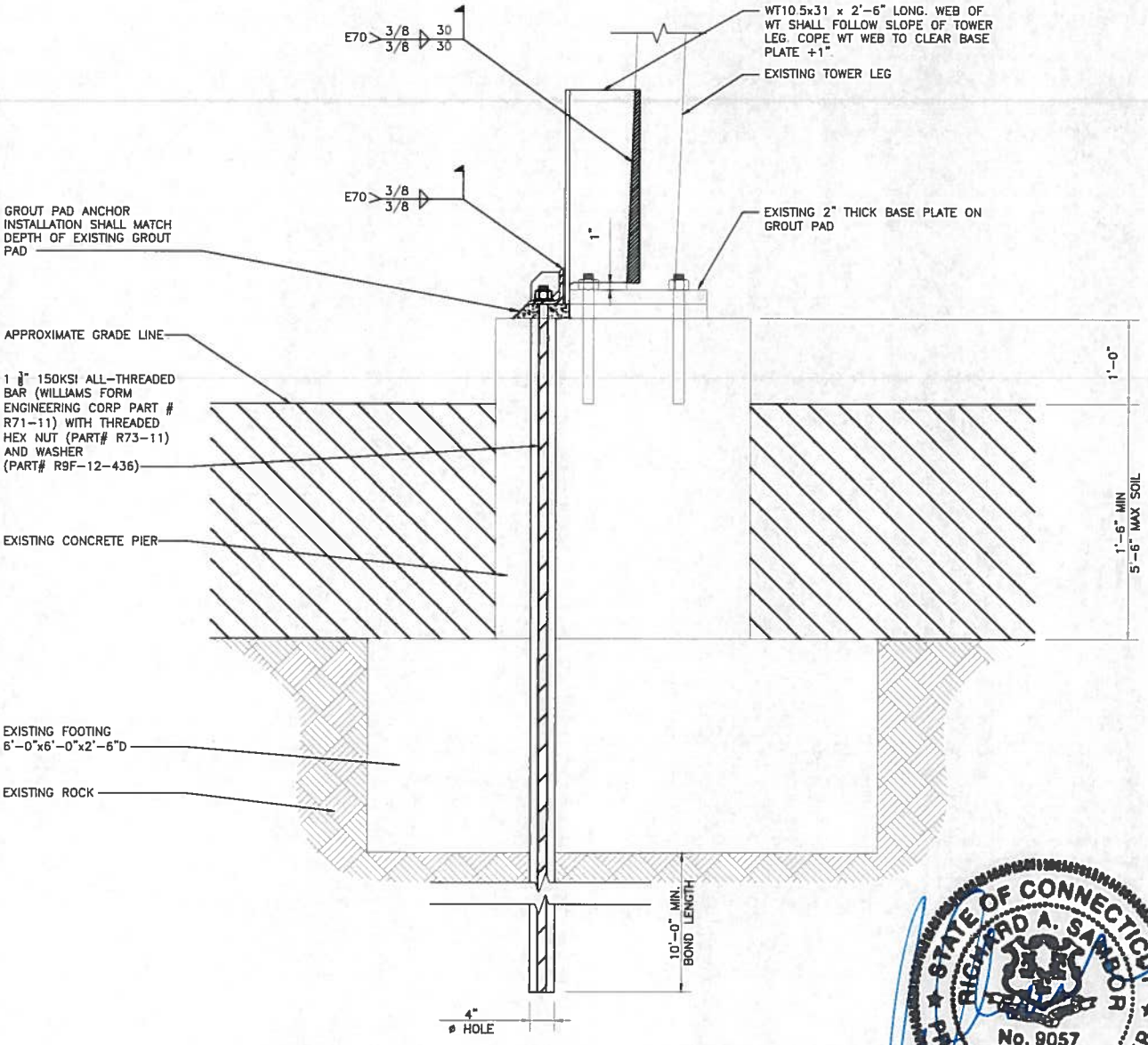
REV.	DATE:	DESCRIPTION

Dwg. No. SK-1

Scale: AS NOTED | Date: 08/14/18

Job No. | File No. | Dwg. 1 of 5

NOTES:
1. ELEVATION OF EXISTING SOIL AND ROCK DETERMINED FROM GEOTECHNICAL REPORT DATED AUGUST 13, 2018.
2. PRODUCTS LISTED BY WILLIAMS FORM ENGINEERING CORP. ARE MINIMUM DESIGN REQUIREMENTS. CONTRACTOR MAY SUBSTITUTE MATERIALS THAT MEET OR EXCEED THESE LISTED PRODUCTS.
3. CONTRACTOR SHALL AVOID EXISTING PIER REINFORCING WHEN DRILLING 4" DIAMETER ROCK ANCHOR HOLE.
4. ROCK ANCHOR BAR IS NOT INTENDED TO BE PRE-STRESSED FOR THIS INSTALLATION. MINIMUM GROUT BOND LENGTH FOR ANCHOR SHALL BE NO LESS THAN 10 FEET INTO ROCK.
5. GROUT SHALL FILL DRILLED HOLE AND MUST SET PRIOR TO FURTHER ANCHORAGE INSTALLATION. GROUT MATERIAL CONSIDERED FOR DESIGN IS US SPEC RA GROUT SUPPLIED BY WILLIAMS FORM ENGINEERING CORP.
6. GROUT PAD EXTENSION SHALL CREATE LEVEL SURFACE AREA FOR ANCHOR TO BE INSTALLED.



1 / SK-2 ANCHOR ELEVATION @ LEGS A, B & C

SCALE: 1/2"=1'-0" (EXISTING ROCK ANCHORS NOT SHOWN FOR CLARITY)

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

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

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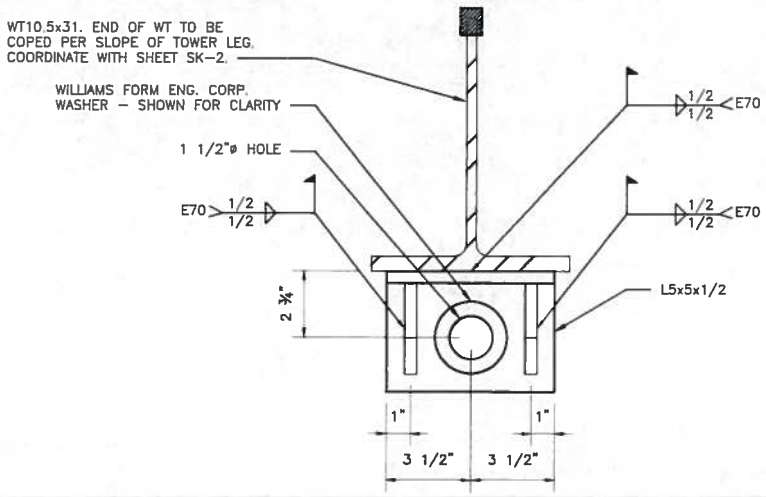
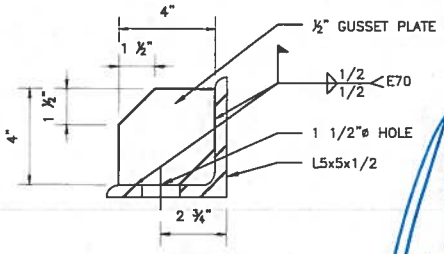
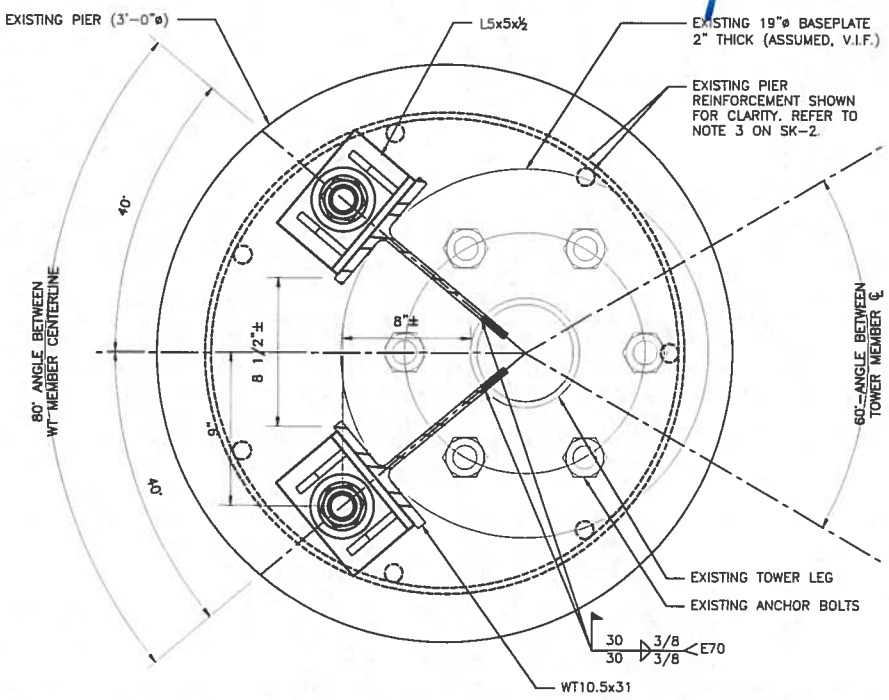
Dwg. No. SK-2

Dwg. 2 of 5





2 / SK-3 **ANCHOR DETAIL**
SCALE: 1-1/2"=1'-0"



1 / SK-3 **ANCHOR LAYOUT @ LEGS A, B &C**
SCALE: 1"=1'-0" (FOOTING NOT SHOWN FOR CLARITY)

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

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

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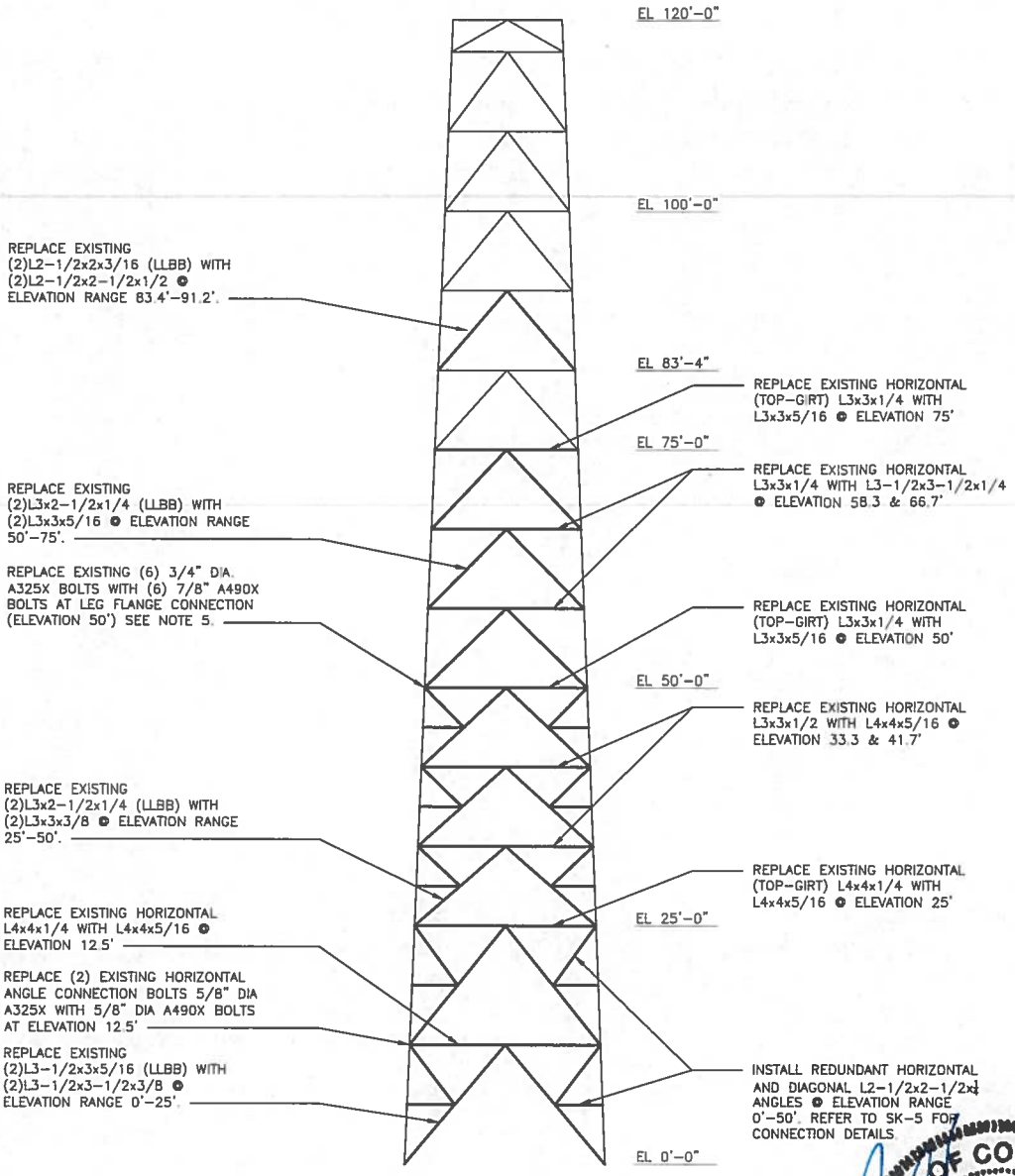
Dwg. No. SK-3

Dwg. 3 of 5

NOTES:
1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR REPLACEMENT MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING TOWER INFORMATION AND ANGLE MEMBER ORIENTATION PRIOR TO ORDERING MATERIALS.
3. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
4. CONNECTION BOLTS FOR REPLACEMENT MEMBERS SHALL BE REPLACED IN KIND. EXISTING BOLTS SHALL NOT BE RE-USED FOR CONNECTING REPLACEMENT MEMBERS.
5. CONTRACTOR SHALL VERIFY THE APPLICABILITY OF INSTALLING A 7/8" DIA BOLT AT THE INDICATED TOWER LEG FLANGE CONNECTION. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE CONNECTICUT STATE POLICE IF THE EXISTING FLANGE BOLT HOLES NEED TO BE INCREASED VIA DRILLING OR OTHER METHODS OF CONSTRUCTION.



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

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

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

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
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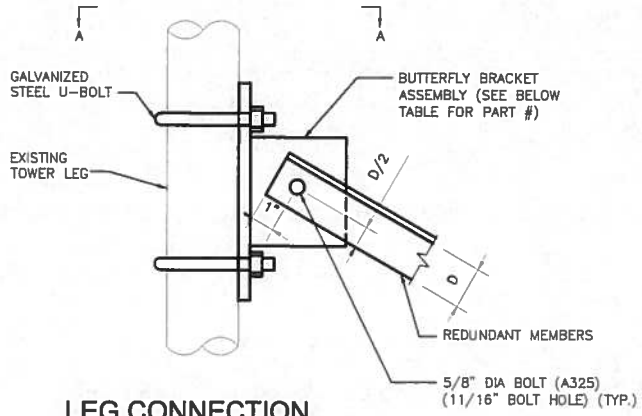
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/14/18
Job No. | File No.

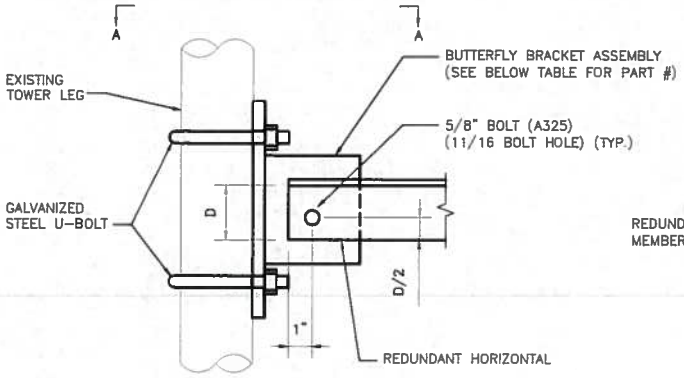
Dwg. No. SK-4



3 SK-5 LEG CONNECTION REDUNDANT DIAGONAL

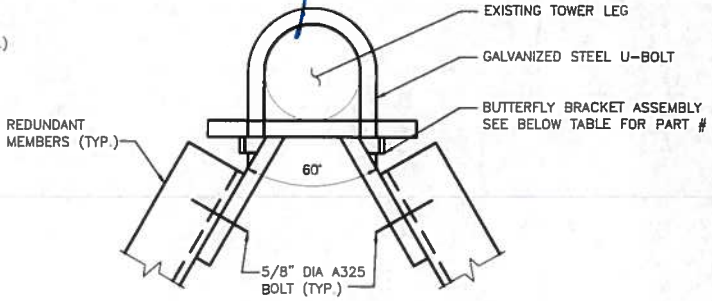
SCALE: 1-1/2"=1'-0"

NOTES:
1. REFER TO SK-1 FOR STRUCTURAL NOTES. COORDINATE SHEET WITH SK-4 FOR SECONDARY HORIZONTAL/DIAGONAL CONNECTION MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS SHOWN PRIOR TO ORDERING MATERIALS.
3. DIMENSIONS NOTED AS 'D' (DEPTH) VARY. REFER TO SK-4 FOR MEMBER SIZE REQUIREMENTS.



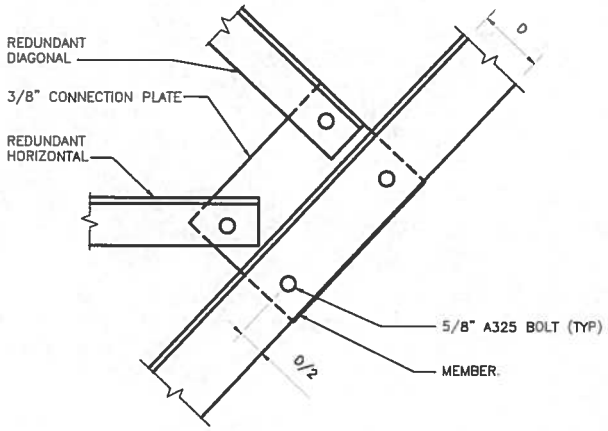
2 SK-5 LEG CONNECTION REDUNDANT HORIZONTAL

SCALE: 1-1/2"=1'-0"



5 SK-5 SECTION A

SCALE: N.T.S.

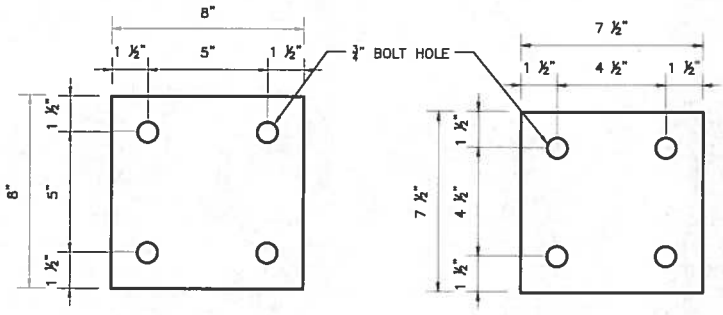


1 SK-5 REDUNDANT MEMBER CONNECTION

SCALE: 1-1/2"=1'-0"

ELEVATION	LEG BUTTERFLY BRACKET #
0'-25'	RSH-0568-86
25'-50'	RSH-0545-68

NOTE: LEG BUTTERFLY BRACKET ASSEMBLY INFORMATION BASED PRIMUS ELECTRONICS CORPORATION. CONTRACTOR SHALL USE PRODUCTS SIMILAR TO OR EXCEEDING IN QUALITY FOR CONSTRUCTION.



4 SK-5 CONNECTION PLATES

SCALE: 1-1/2"=1'-0"

NOTE:
1. DETAILS 2 & 3 ABOVE ILLUSTRATE CONNECTIONS OF DIAGONAL AND HORIZONTAL MEMBERS TO TOWER LEGS. BUTTERFLY BRACKET ASSEMBLIES USED FOR CONNECTION TO EXISTING LEGS SHALL BE INSTALLED AS CLOSE TO EXISTING ADJOINING MEMBER AS POSSIBLE.

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

PROJECT NO.
Designed by: MCD
Drawn by: GAT
Checked by: KAB
Approved by: RAS

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

T-Mobile · Sprint · at&t

SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/14/18
Job No. | File No.

Dwg. No. SK-5

Dwg. 5 of 5

SEISMIC BASE SHEAR ANALYSIS

AECOM

Seismic (Vs) Base Shear Implementing TIA–222-G, IBC 2012 & Connecticut State Building Code of 2016

Calculation of Seismic Base Shear Implementing TIA-222-G, IBC 2012 & & CT State Building Code 2016.

Location: New Haven, CT -Site Class "C"

$S_{DS} = \frac{2}{3} F_A S_S$, where $S_S = 0.186$ and $F_A = 1.2$ $S_{DS} = \frac{2}{3} F_A S_S = \frac{2}{3} * 1.2 * 0.186 = 0.1488$

$S_{D1} = \frac{2}{3} F_V S_1$, where $S_1 = 0.062$ and $F_V = 1.7$ $S_{D1} = \frac{2}{3} F_V S_1 = \frac{2}{3} * 1.7 * 0.062 = 0.0703$

TIA-222-G SECTION 2.7 EARTHQUAKE LOADS (PROCEDURES):

1. Importance Factor "I" (tables 2-3 TIA-222-G) = 1.5 (Structure Class 3)

ANSI/TIA-222-G 2.7.7.1 (TOTAL BASE SEISMIC SHEAR (Vs)

W=DL TOWER	=	20.090	Kips
W=Antennas/Mounts	=	11.358	Kips
W=Cables	=	4.464	Kips
		35.9120	Kips = WT Total = "W"

$$V_S = \frac{S_{DS} * W * I}{R} = \frac{0.149 * 35.9120 kips * 1.5}{3.0} = 2.675444\ kips,$$ where R = 3.0 for Lattice Tower

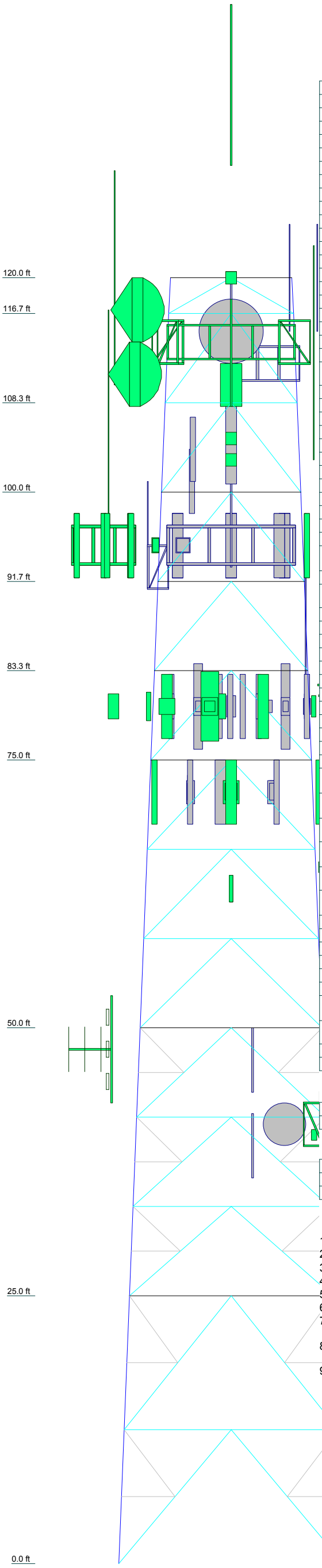
$$V_{S.min} = \frac{0.5 * S_{D1} * W * I}{R} = \frac{0.5 * 0.0703\ *\ 35.9120 kips\ *\ 1.5}{3.0} = 0.6312\quad kips$$

*By visual inspection, the above "Base Shear" value when considering the following Load Combination is less that the base shear of wind on structure.

$1.2 * DL + 1.0\ E\ < 1.2\ DL + 1.6\ W,$ (122 Kips), therefore seismic effect on structure Does NOT control Design.

TNX TOWER INPUT/OUTPUT SUMMARY

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	P.5x.250				A500-50		P5x.375	P.5x.400	P6.875x.400
Leg Grade									A572-60
Diagonals	2L2 1/2x2x3/16				2L2 1/2x2 1/2x1/4	2L2 1/2x2x3/8	2L3x3x5/16	2L3x3x3/8	2L3 1/2x3 1/2x3/8
Diagonal Grade	A36				A529-50	A36		A529-50	
Top Girts	N.A.				L3x3x1/4		L3x3x5/16	L3 1/2x3 1/2x5/16	L4x4x5/16
Horizontals	L2 1/2x2 1/2x3/16				N.A.		L3 1/2x3 1/2x1/4	L4x4x3/8	L4x4x3/8
Red. Horizontals	N.A.				N.A.				L2 1/2x2 1/2x1/4
Red. Diagonals	N.A.				N.A.				L2 1/2x2 1/2x1/4
Inner Bracing	N.A.						L2 1/2x2 1/2x3/16		L2 1/2x2 1/2x3/16
Face Width (ft)	11.4146	11.6814	12.3483	13.0153	13.6822	14.3492	15.0162	17.017	19.0179
# Panels @ (ft)	B	A					11 @ 8.33333		2 @ 12.5
Weight (K)	0.5	0.8	0.8	0.9	1.1	1.3	5.1	6.9	7.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (#27)	138	3' Yagi (#13 - CSP-11)	82
16'x2.5" Pipe Mount (#27 Mount)	138	3' Yagi (#12)	81
16'x3" Omni (inverted) (#23-A - CSP-22)	120 - 106	RRUS-32 (ATT)	80
16'x3" Omni (inverted) (#23-B - CSP-23)	120 - 106	SBNH-1D6565C (ATT)	80
SC479-HF1LDF (inverted) (#24-B)	120 - 106	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
SC479-HF1LDF (#24-C - CSP#21)	120	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
OGT9-840 (#24-D - CSP#8)	120	RRUS-11 (ATT)	80
OGT9-840 (#25-B - CSP#7)	120	RRUS-32 (ATT)	80
10'x2" Dipole Antenna (#26 - CSP-15)	120	HPA-65R-BUU-H8 Panel (ATT)	80
TMA 432-83H-01T (CSP-24)	120	RRUS-32 (ATT)	80
SC479-HF1LDF (inverted) (CSP - 9 (P))	120 - 106	SBNH-1D6565C (ATT)	80
TMA 432-83H-01T (CSP-24)	120	(2) DTMABP7819VG12A TMA (ATT)	80
6' DISH (SOLID) (#19 - CSP-3)	117	QS66512-2 Panel Antenna (ATT)	80
6' DISH (SOLID) (#21 - CSP-5)	115	RRUS-11 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	(2) RRUS-32 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	HPA-65R-BUU-H8 Panel (ATT)	80
Junction Box (#24-A)	114	800-10966 Kathrien Panel w/ Pipe Mt. (ATT - Proposed)	80
10'x2" Dipole Antenna (inverted) (#24-E)	114 - 104	RRUS-12 (ATT - Proposed)	80
Rohn 6' Side-Arm(1) (#25 Antennas Mount)	114	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (inverted) (#25-A - CSP-17)	114 - 100	800-10966 Kathrien Panel w/ Pipe Mt. (ATT - Proposed)	80
Pirod 4' Side Mount Standoff (1) (#22, 23-A, 23-B Mount)	113	RRUS-12 (ATT - Proposed)	80
16'x3" Omni (#22)	113	4478 Radio Unit (4x40W) (ATT - Proposed)	80
Junction Box (#23-C)	112	800-10965 Kathrien Panel w/ Pipe Mount (ATT - Proposed)	80
6' DISH (SOLID) (#20 - CSP-6)	111	RRUS-12 (ATT - Proposed)	80
6'8"x4" Pipe Mount (#21 - Dish Mount)	110	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (CSP-18 (New Install))	110	DC6-48-60-0-8F (Squid) Unit (ATT - Proposed)	80
SC479-HF1LDF (inverted) (CSP-19 (New Install))	110 - 96	RRUS-11 (ATT)	80
TMA 432-83H-01T (CSP-20)	110	RRUS-32 (ATT)	80
WPA-70040-4CF-EDIN Panel (CSP-28)	110	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
6'8"x4" Pipe Mount (#19 - Dish Mount)	107	Face Mount ((#11) ATT)	80
6'8"x4" Pipe Mount (#20 - Dish Mount)	107	Face Mount ((#11) ATT)	80
SE419-SWBPALDF Panel Antenna (CSP-29)	105	Face Mount ((#11) ATT)	80
TMA 432-83H-01T (CSP-30)	105	HPA-65R-BUU-H8 Panel (ATT)	80
AP13-850/065D w/Mount Pipe (#18-B - CSP-12(E))	104	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
TMA 432-83H-01T (CSP-32)	103	20' 4-Bay Dipole (#14)	77
SE419-SWBPALDF Panel Antenna (#18-A - CSP 13(P))	101	3'4"x4" Pipe Mount (horizontal) ((Bottom mount) #15)	76
PD458-406 (# 16-B - CSP-2)	100 - 92	Face Mount (Sprint)	72
3'4"x4" Pipe Mount (horizontal) ((Top Mount) #15)	96	Face Mount (Sprint)	72
SC479-HF1LDF (inverted) (# 16-A - CSP-10)	95 - 81	Face Mount (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
2217 B2 Radio Unit (T-Mobile - Proposed)	95	4'6"x3" Pipe Mount (horizontal) ((Bottom mount) #14)	67
2217 B2 Radio Unit (T-Mobile - Proposed)	95	6' Yagi w/ Mount (#9)	65
2217 B2 Radio Unit (T-Mobile - Proposed)	95	GPS (#8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	2'6"x4" Pipe Mount (For #8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	20' 4-Bay Dipole w/ 2' Sidearm Mount (#7 - CSP-4)	55
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	1.0" Dia 4' Omni w/Pipe Mount (#6 - CSP#16)	53
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Invert #16-A) (# 16-AB)	92	3' Yagi (#4-B)	48
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Upright # 16-B) (# 16-AB)	92	Pirod 4' Side Mount Standoff (1) (#4-AB)	48
4'6"x3" Pipe Mount (horizontal) ((Top Mount) #14)	87	10'x6" Dipole Antenna (#4-A)	48
20' 4-Bay Dipole (#15)	86	5'x1.5in dia Whip Antenna /w mount (#3)	47
		3' Whip (3in diameter) /w mount (#2)	43
		4 FT DISH (#1-A)	41
		Pirod 6' Side Mount Standoff (1) (#1-A Dish Mount)	41
		1'x1' Panel Antenna (#1-B (mount Share #1-A))	40
		6'x1" Whip Antenna w/ Mount (#5 - CSP#14)	39

SYMBOL LIST

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

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A572-60	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 4 with Crest Height of 150.00 ft
7. Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016).
8. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
9. TOWER RATING: 97.7%

206 K
SHEAR 43 K *MOMENT 2799 kip-ft*
TORQUE 81 kip-ft
50 mph WIND - 0.7500 in ICE
AXIAL 48 K
SHEAR 122 K *MOMENT 7694 kip-ft*
TORQUE 150 kip-ft
REACTIONS - 97 mph WIND

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

Job: **120' Self-Supporting Lattice Tower**
Project: **Connecticut State Police Tower - West Rock - MODification**
Client: SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile) | Drawn by: MCD | App'd:
Code: TIA-222-G | Date: 08/14/18 | Scale: NTS
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHaven\CSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri | Dwg No. E-1

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x1/4	C	1 @ 3.33333
B	L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
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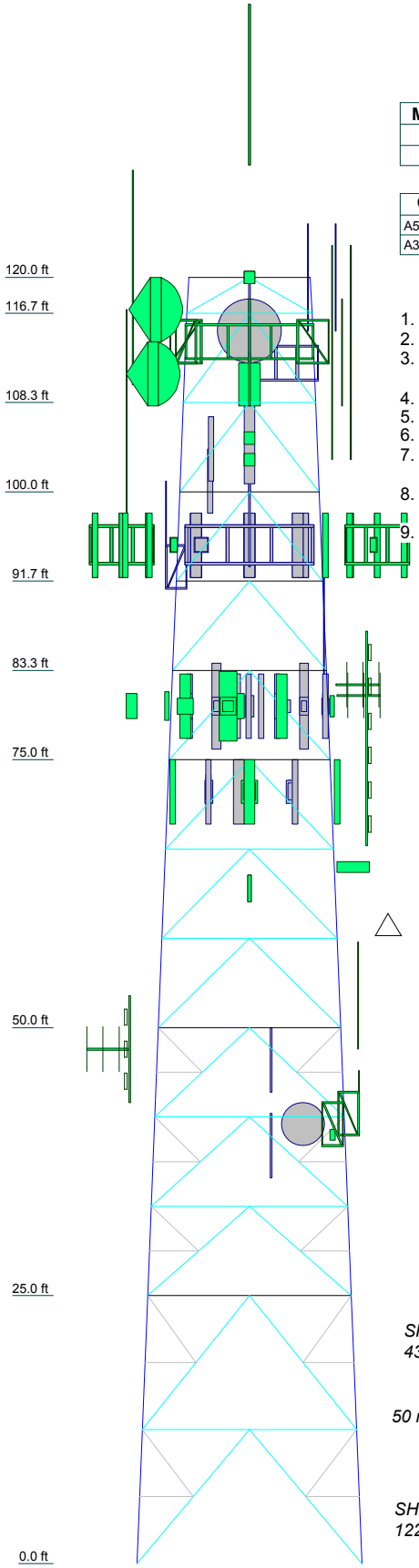

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P6.875x.400	P.5x.400	P5x.375			P.5x.250			
Leg Grade	A572-60		A500-50						
Diagonals	2L3 1/2x3 1/2x3/8	2L3x3x3/8	2L3x3x5/16	2L2 1/2x2x3/8	A	2L2 1/2x2x3/16			
Diagonal Grade		A529-50		A36	A529-50		A36		
Top Girts	L4x4x5/16	L3 1/2x3 1/2x5/16	L3x3x5/16		L3x3x1/4		N.A.		B
Horizontals	L4x4x3/8	L4x4x5/16	L3 1/2x3 1/2x1/4		N.A.		L2 1/2x2 1/2x3/16		N.A.
Red. Horizontals	L2 1/2x2 1/2x1/4		N.A.						
Red. Diagonals	L2 1/2x2 1/2x1/4		N.A.						
Inner Bracing	L2 1/2x2 1/2x3/16		L2 1/2x2x3/16			N.A.			
Face Width (ft) 21.0188	19.0179	17.017	15.0162	14.3492	13.6822	13.0153	12.3483	11.6814	4.4146
# Panels @ (ft)	2 @ 12.5		11 @ 8.33333						C
Weight (K) 24.6	7.2	6.9	5.1	1.3	1.1	0.9	0.8	0.8	0.5

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 439 K
SHEAR: 66 K

UPLIFT: -393 K
SHEAR: 61 K

AXIAL 206 K
SHEAR 43 K *MOMENT 2799 kip-ft*
TORQUE 81 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 48 K
SHEAR 122 K *MOMENT 7694 kip-ft*
TORQUE 150 kip-ft
REACTIONS - 97 mph WIND

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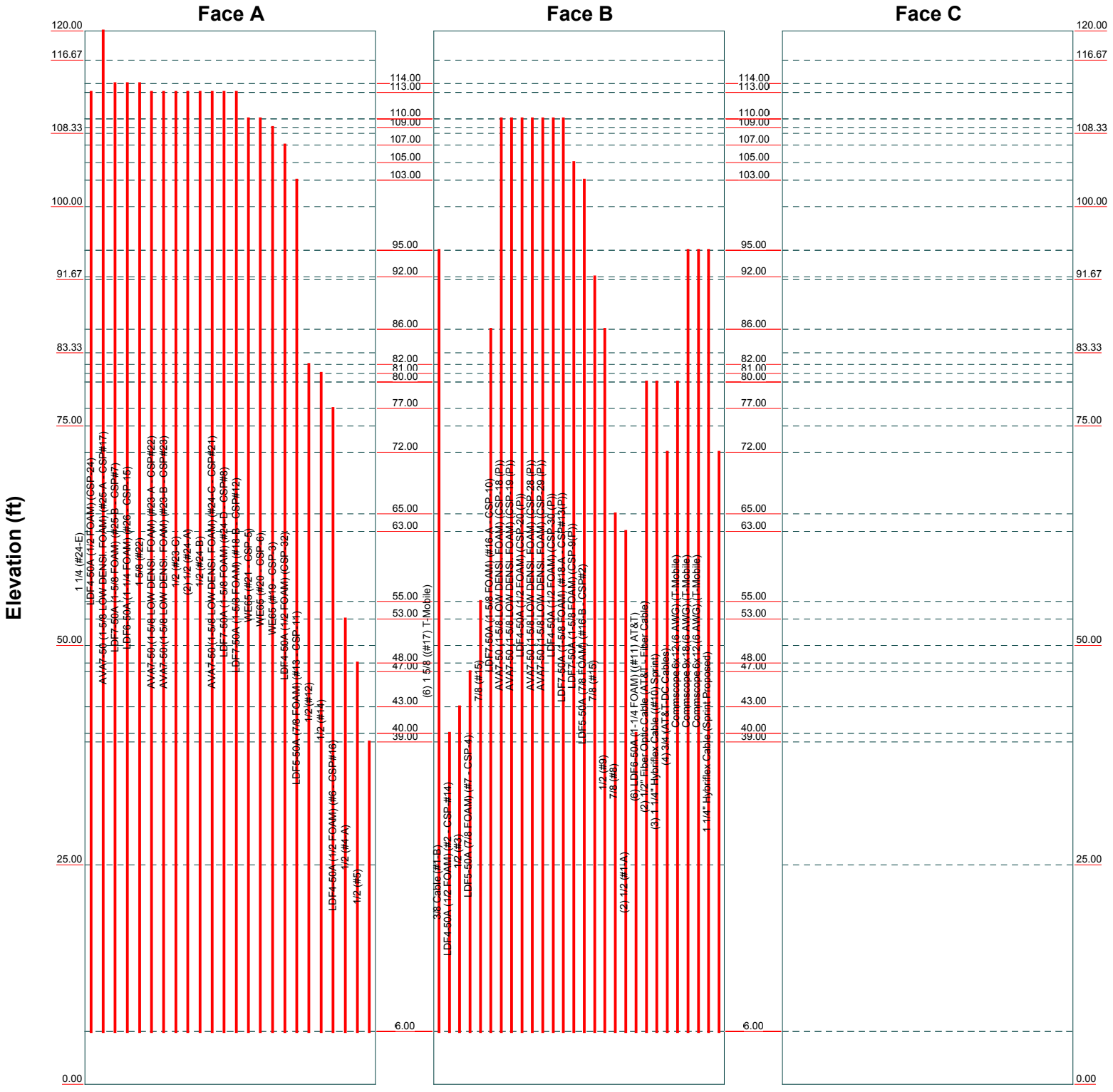
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHavenCSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 120'

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



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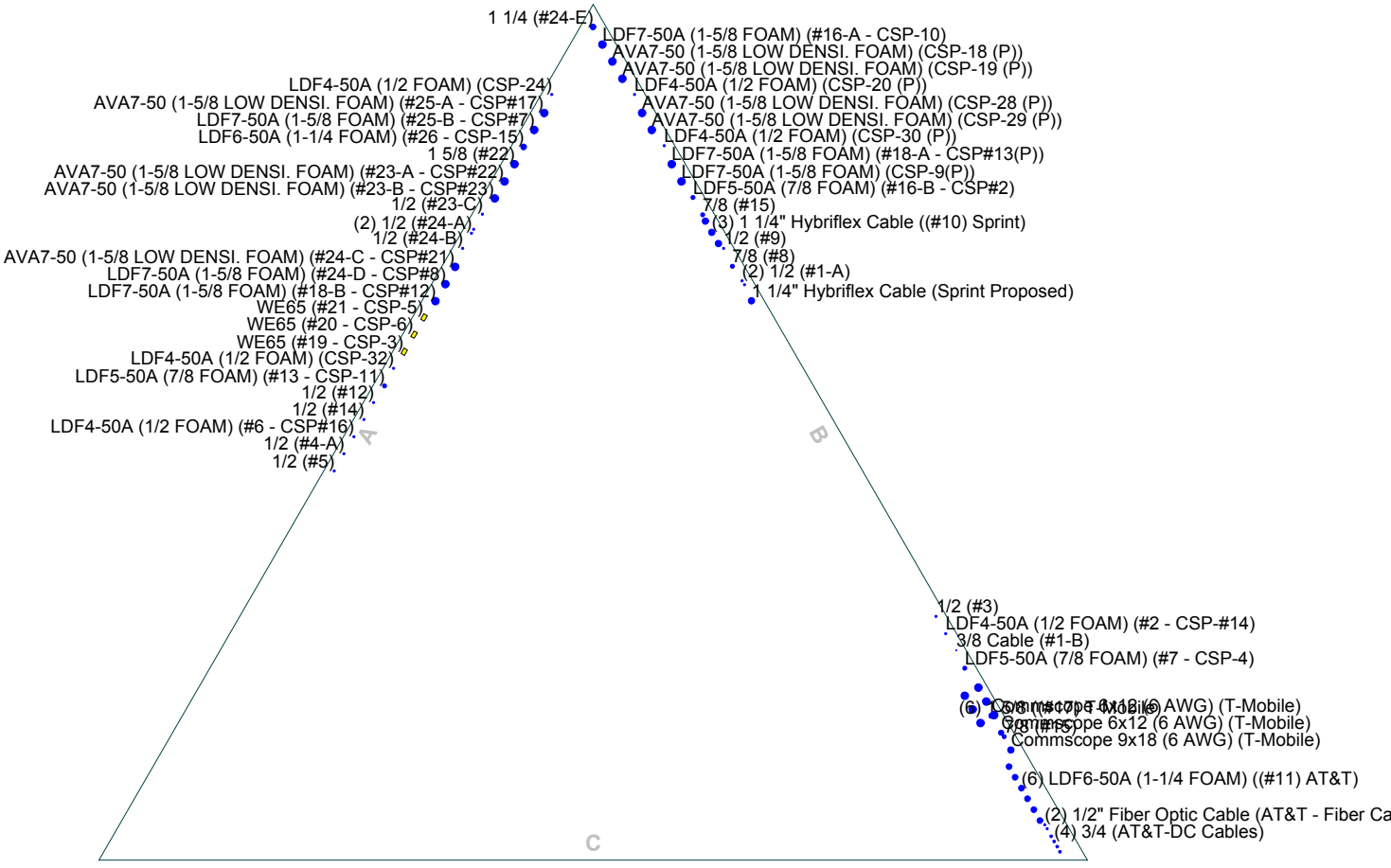
TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face



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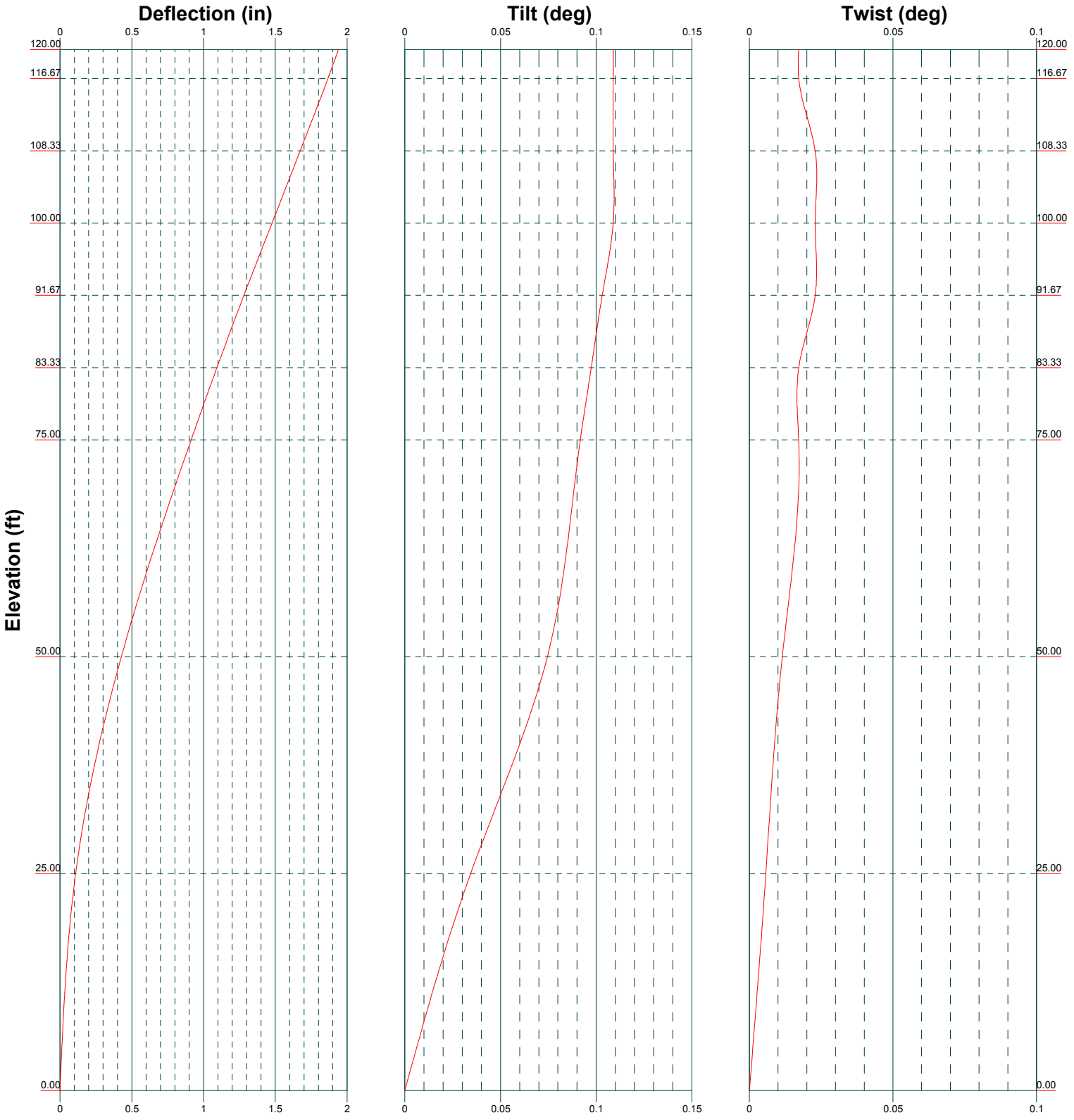
TNX DEFLECTION, TILT AND TWIST

TIA-222-G - Service - 60 mph

Maximum Values



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Project: ***Connecticut State Police Tower - West Rock - MODification***			
Client: SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile)	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 08/14/18	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHavenCSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri		Dwg No. E-5	

TNX TOWER DETAILED OUTPUT

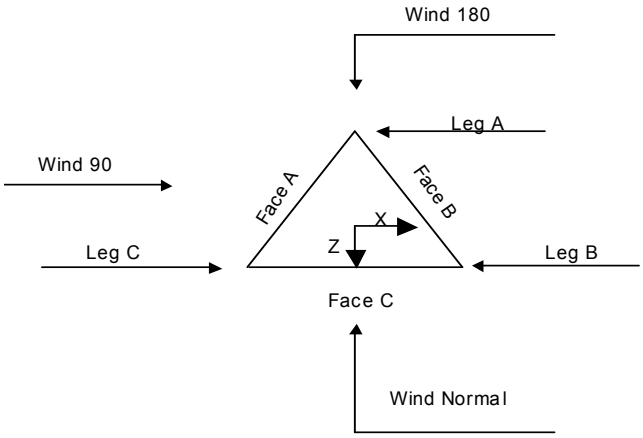
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 11.41 ft at the top and 21.02 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 97 mph.
Structure Class III.
Exposure Category C.
Topographic Category 4.
Crest Height 150.00 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.
Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016)..
Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016..
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 ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	120.00-116.67			11.41	1	3.33
T2	116.67-108.33			11.68	1	8.33
T3	108.33-100.00			12.35	1	8.33
T4	100.00-91.67			13.02	1	8.33
T5	91.67-83.33			13.68	1	8.33
T6	83.33-75.00			14.35	1	8.33
T7	75.00-50.00			15.02	1	25.00
T8	50.00-25.00			17.02	1	25.00
T9	25.00-0.00			19.02	1	25.00

Tower Section Geometry *(cont'd)*

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

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	75.00-50.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	50.00-25.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T9	25.00-0.00	12.50	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-116.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 116.67-108.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 108.33-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-91.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x1/4	A529-50 (50 ksi)
T6 83.33-75.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/8	A36 (36 ksi)
T7 75.00-50.00	Pipe	P5x.375	A500-50 (50 ksi)	Double Equal Angle	2L3x3x5/16	A529-50 (50 ksi)
T8 50.00-25.00	Pipe	P.5x.400	A572-60 (60 ksi)	Double Equal Angle	2L3x3x3/8	A529-50 (50 ksi)
T9 25.00-0.00	Pipe	P6.875x.400	A572-60 (60 ksi)	Double Equal Angle	2L3 1/2x3 1/2x3/8	A529-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 120.00-116.67	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 100.00-91.67	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 91.67-83.33	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 83.33-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T7 75.00-50.00	Single Angle	L3x3x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)
T8 50.00-25.00	Equal Angle	L3 1/2x3 1/2x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)
T9 25.00-0.00	Equal Angle	L4x4x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 120.00-116.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 116.67-108.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 108.33-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T6 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T7 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A529-50 (50 ksi)
T8 50.00-25.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x5/16	A529-50 (50 ksi)
T9 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x3/8	A529-50 (50 ksi)

Tower Section Geometry *(cont'd)*

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T8	A36	Horizontal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
50.00-25.00	(36 ksi)	Diagonal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
T9 25.00-0.00	A36	Horizontal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
	(36 ksi)	Diagonal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1

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 120.00-116.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T2 116.67-108.33	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T3 108.33-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T4 100.00-91.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T5 91.67-83.33	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T6 83.33-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T7 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T8 50.00-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T9 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

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

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120.00-116.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 116.67-108.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 108.33-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-91.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 83.33-75.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 75.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-25.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 25.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120.00-116.67	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 116.67-108.33	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 108.33-100.00	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-91.67	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 91.67-83.33	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 83.33-75.00	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 75.00-50.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-25.00	Flange	0.8750 A490X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A490X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 ((#17) T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-5.0000	0.31	6	3	1.9800	1.9800		1.04
3/8 Cable (#1-B)	B	No	Ar (CaAa)	40.00 - 6.00	-2.0000	0.25	1	1	0.3750	0.3750		0.20
LDF4-50A (1/2 FOAM) (#2 - CSP-#14)	B	No	Ar (CaAa)	43.00 - 6.00	-2.0000	0.23	1	1	0.6300	0.6300		0.15
1/2 (#3)	B	No	Ar (CaAa)	47.00 - 6.00	-2.0000	0.21	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (#7 - CSP-4)	B	No	Ar (CaAa)	55.00 - 6.00	-2.0000	0.27	1	1	1.0900	1.0900		0.33
7/8 (#15)	B	No	Ar (CaAa)	86.00 - 6.00	-2.0000	0.35	1	1	1.1100	1.1100		0.54
1 1/4 (#24-E)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.48	1	1	1.5500	1.5500		0.66
LDF4-50A (1/2 FOAM) (CSP-24)	A	No	Ar (CaAa)	120.00 - 6.00	-2.0000	0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#25-A - CSP#17)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.38	1	1	1.9800	1.9800		0.72
LDF7-50A (1-5/8 FOAM) (#25-B - CSP#7)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.36	1	1	1.9800	1.9800		0.82
LDF6-50A (1-1/4 FOAM) (#26 - CSP-15)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.34	1	1	1.5500	1.5500		0.66
1 5/8 (#22)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.32	1	1	1.9800	1.9800		1.04
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-A - CSP#22)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.3	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-B - CSP#23)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.28	1	1	1.9800	1.9800		0.72
1/2 (#23-C)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.26	1	1	0.5800	0.5800		0.25
1/2 (#24-A)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.24	2	2	0.5800	0.5800		0.25
1/2 (#24-B)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.22	1	1	0.5800	0.5800		0.25
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#24-C - CSP#21)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.2	1	1	1.9800	1.9800		0.72

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (#24-D - CSP#8)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.18	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (#18-B - CSP#12)	A	No	Ar (CaAa)	110.00 - 6.00	-2.0000	0.16	1	1	1.9800	1.9800		0.82
WE65 (#21 - CSP-5)	A	No	Af (CaAa)	110.00 - 6.00	-2.0000	0.14	1	1	1.5836	1.5836		0.53
WE65 (#20 - CSP-6)	A	No	Af (CaAa)	109.00 - 6.00	-2.0000	0.12	1	1	1.5836	1.5836		0.53
WE65 (#19 - CSP-3)	A	No	Af (CaAa)	107.00 - 6.00	-2.0000	0.1	1	1	1.5836	1.5836		0.53
LDF4-50A (1/2 FOAM) (CSP-32)	A	No	Ar (CaAa)	103.00 - 6.00	-2.0000	0.08	1	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM) (#13 - CSP-11)	A	No	Ar (CaAa)	82.00 - 6.00	-2.0000	0.06	1	1	1.0900	1.0900		0.33
1/2 (#12)	A	No	Ar (CaAa)	81.00 - 6.00	-2.0000	0.04	1	1	0.5800	0.5800		0.25
1/2 (#14)	A	No	Ar (CaAa)	77.00 - 6.00	-2.0000	0.02	1	1	0.5800	0.5800		0.25
LDF4-50A (1/2 FOAM) (#6 - CSP#16)	A	No	Ar (CaAa)	53.00 - 6.00	-2.0000	0	1	1	0.6300	0.6300		0.15
1/2 (#4-A)	A	No	Ar (CaAa)	48.00 - 6.00	-2.0000	-0.02	1	1	0.5800	0.5800		0.25
1/2 (#5)	A	No	Ar (CaAa)	39.00 - 6.00	-2.0000	-0.04	1	1	0.5800	0.5800		0.25
LDF7-50A (1-5/8 FOAM) (#16-A - CSP-10)	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.46	1	1	1.9800	1.9800		0.82
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-18 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.44	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-19 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.42	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP-20 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-28 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.38	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-29 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.36	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM)	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.34	1	1	0.6300	0.6300		0.15

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
(CSP-30 (P)) LDF7-50A (1-5/8 FOAM) (#18-A - CSP#13(P))	B	No	Ar (CaAa)	105.00 - 6.00	-2.0000	-0.32	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (CSP-9(P))	B	No	Ar (CaAa)	103.00 - 6.00	-2.0000	-0.3	1	1	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (#16-B - CSP#2)	B	No	Ar (CaAa)	92.00 - 6.00	-2.0000	-0.28	1	1	1.0900	1.0900		0.33
7/8 (#15)	B	No	Ar (CaAa)	86.00 - 6.00	-2.0000	-0.26	1	1	1.1100	1.1100		0.54
1/2 (#9)	B	No	Ar (CaAa)	65.00 - 6.00	-2.0000	-0.22	1	1	0.5800	0.5800		0.25
7/8 (#8)	B	No	Ar (CaAa)	63.00 - 6.00	-2.0000	-0.2	1	1	1.1100	1.1100		0.54
1/2 (#1-A)	B	No	Ar (CaAa)	40.00 - 6.00	-2.0000	-0.18	2	2	0.5800	0.5800		0.25
LDF6-50A (1-1/4 FOAM) ((#11) AT&T)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.41	6	6	1.5500	1.5500		0.66
1/2" Fiber Optic Cable (AT&T - Fiber Cable)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.45	2	2	0.5800	0.5800		0.25
1 1/4" Hybriflex Cable ((#10) Sprint)	B	No	Ar (CaAa)	72.00 - 6.00	-2.0000	-0.24	3	3	1.6250	1.6250		1.60
3/4 (AT&T-DC Cables)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.47	4	4	0.7500	0.7500		0.54
Commscope 6x12 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.345	1	1	1.4300	1.4300		1.63
Commscope 9x18 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.365	1	1	1.5900	1.5900		2.59
Commscope 6x12 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.325	1	1	1.4300	1.4300		1.63
1 1/4" Hybriflex Cable (Sprint Proposed)	B	No	Ar (CaAa)	72.00 - 6.00	-2.0000	-0.16	1	1	1.6250	1.6250		1.60

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	0.000	0.000	0.210	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	0.000	0.000	11.019	0.000	0.04
		B	0.000	0.000	1.860	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	0.000	0.000	24.677	0.000	0.09
		B	0.000	0.000	10.884	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	0.000	0.000	25.365	0.000	0.09
		B	0.000	0.000	18.080	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	0.000	0.000	25.365	0.000	0.09
		B	0.000	0.000	27.709	0.000	0.15
		C	0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	0.000	0.000	26.592	0.000	0.09
		B	0.000	0.000	35.697	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	0.000	0.000	81.909	0.000	0.29
		B	0.000	0.000	137.708	0.000	0.80
		C	0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	0.000	0.000	85.441	0.000	0.30
		B	0.000	0.000	148.462	0.000	0.85
		C	0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	0.000	0.000	65.508	0.000	0.23
		B	0.000	0.000	114.466	0.000	0.65
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	2.449	0.000	0.000	1.843	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	2.455	0.000	0.000	48.248	0.000	0.90
		B		0.000	0.000	7.589	0.000	0.15
		C		0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	2.465	0.000	0.000	99.265	0.000	1.86
		B		0.000	0.000	43.581	0.000	0.86
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	2.474	0.000	0.000	103.539	0.000	1.94
		B		0.000	0.000	64.018	0.000	1.32
		C		0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	2.484	0.000	0.000	103.845	0.000	1.96
		B		0.000	0.000	93.486	0.000	1.98
		C		0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	2.494	0.000	0.000	112.856	0.000	2.12
		B		0.000	0.000	127.803	0.000	2.55
		C		0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	2.511	0.000	0.000	359.051	0.000	6.77
		B		0.000	0.000	514.176	0.000	9.98
		C		0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	2.516	0.000	0.000	392.866	0.000	7.37
		B		0.000	0.000	594.764	0.000	11.33
		C		0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	2.401	0.000	0.000	293.263	0.000	5.29

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	454.656	0.000	8.31
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120.00-116.67	-0.0376	-0.5107	-0.1519	-2.0620
T2	116.67-108.33	-2.2305	-13.1796	-3.6731	-22.3636
T3	108.33-100.00	-4.3428	-25.7198	-6.6826	-37.5175
T4	100.00-91.67	-0.3030	-23.8707	-4.0005	-36.4919
T5	91.67-83.33	5.2055	-21.2043	0.5143	-34.2535
T6	83.33-75.00	9.6302	-18.2291	3.5146	-30.8136
T7	75.00-50.00	12.5901	-18.1358	5.7488	-30.8121
T8	50.00-25.00	12.5044	-17.6954	7.0077	-30.4967
T9	25.00-0.00	12.1647	-17.1729	7.4973	-30.2122

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	8	LDF4-50A (1/2 FOAM)	116.67 - 120.00	0.6000	0.5082
T2	7	1 1/4	108.33 - 113.00	0.6000	0.6000
T2	8	LDF4-50A (1/2 FOAM)	108.33 - 116.67	0.6000	0.6000
T2	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 114.00	0.6000	0.6000
T2	10	LDF7-50A (1-5/8 FOAM)	108.33 - 114.00	0.6000	0.6000
T2	11	LDF6-50A (1-1/4 FOAM)	108.33 - 114.00	0.6000	0.6000
T2	12	1 5/8	108.33 - 113.00	0.6000	0.6000
T2	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	15	1/2	108.33 - 113.00	0.6000	0.6000
T2	16	1/2	108.33 - 113.00	0.6000	0.6000
T2	17	1/2	108.33 - 113.00	0.6000	0.6000
T2	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	19	LDF7-50A (1-5/8 FOAM)	108.33 - 113.00	0.6000	0.6000
T2	20	LDF7-50A (1-5/8 FOAM)	108.33 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			110.00		
T2	21	WE65	108.33 - 110.00	0.6000	0.6000
T2	22	WE65	108.33 - 109.00	0.6000	0.6000
T2	31	LDF7-50A (1-5/8 FOAM)	108.33 - 110.00	0.6000	0.6000
T2	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	34	LDF4-50A (1/2 FOAM)	108.33 - 110.00	0.6000	0.6000
T2	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	37	LDF4-50A (1/2 FOAM)	108.33 - 110.00	0.6000	0.6000
T3	7	1 1/4	100.00 - 108.33	0.6000	0.6000
T3	8	LDF4-50A (1/2 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	10	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	11	LDF6-50A (1-1/4 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	12	1 5/8	100.00 - 108.33	0.6000	0.6000
T3	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	15	1/2	100.00 - 108.33	0.6000	0.6000
T3	16	1/2	100.00 - 108.33	0.6000	0.6000
T3	17	1/2	100.00 - 108.33	0.6000	0.6000
T3	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	19	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	20	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	21	WE65	100.00 - 108.33	0.6000	0.6000
T3	22	WE65	100.00 - 108.33	0.6000	0.6000
T3	23	WE65	100.00 - 107.00	0.6000	0.6000
T3	24	LDF4-50A (1/2 FOAM)	100.00 - 103.00	0.6000	0.6000
T3	31	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	34	LDF4-50A (1/2 FOAM)	100.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			108.33		
T3	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	37	LDF4-50A (1/2 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	38	LDF7-50A (1-5/8 FOAM)	100.00 - 105.00	0.6000	0.6000
T3	39	LDF7-50A (1-5/8 FOAM)	100.00 - 103.00	0.6000	0.6000
T4	1	1 5/8	91.67 - 95.00	0.6000	0.6000
T4	7	1 1/4	91.67 - 100.00	0.6000	0.6000
T4	8	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	10	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	11	LDF6-50A (1-1/4 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	12	1 5/8	91.67 - 100.00	0.6000	0.6000
T4	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	15	1/2	91.67 - 100.00	0.6000	0.6000
T4	16	1/2	91.67 - 100.00	0.6000	0.6000
T4	17	1/2	91.67 - 100.00	0.6000	0.6000
T4	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	19	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	20	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	21	WE65	91.67 - 100.00	0.6000	0.6000
T4	22	WE65	91.67 - 100.00	0.6000	0.6000
T4	23	WE65	91.67 - 100.00	0.6000	0.6000
T4	24	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	31	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	34	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	37	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	38	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	39	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	40	LDF5-50A (7/8 FOAM)	91.67 - 92.00	0.6000	0.6000
T4	50	Commscope 6x12 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T4	51	Commscope 9x18 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T4	52	Commscope 6x12 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T5	1	1 5/8	83.33 - 91.67	0.6000	0.6000
T5	6	7/8	83.33 - 86.00	0.6000	0.6000
T5	7	1 1/4	83.33 - 91.67	0.6000	0.6000
T5	8	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	10	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	11	LDF6-50A (1-1/4 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	12	1 5/8	83.33 - 91.67	0.6000	0.6000
T5	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	15	1/2	83.33 - 91.67	0.6000	0.6000
T5	16	1/2	83.33 - 91.67	0.6000	0.6000
T5	17	1/2	83.33 - 91.67	0.6000	0.6000
T5	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	19	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	20	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	21	WE65	83.33 - 91.67	0.6000	0.6000
T5	22	WE65	83.33 - 91.67	0.6000	0.6000
T5	23	WE65	83.33 - 91.67	0.6000	0.6000
T5	24	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	31	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	34	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	37	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	38	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	39	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	40	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	41	7/8	83.33 - 86.00	0.6000	0.6000
T5	50	Commscope 6x12 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T5	51	Commscope 9x18 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T5	52	Commscope 6x12 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T6	1	1 5/8	75.00 - 83.33	0.6000	0.6000
T6	6	7/8	75.00 - 83.33	0.6000	0.6000
T6	7	1 1/4	75.00 - 83.33	0.6000	0.6000
T6	8	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	10	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	11	LDF6-50A (1-1/4 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	12	1 5/8	75.00 - 83.33	0.6000	0.6000
T6	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	15	1/2	75.00 - 83.33	0.6000	0.6000
T6	16	1/2	75.00 - 83.33	0.6000	0.6000
T6	17	1/2	75.00 - 83.33	0.6000	0.6000
T6	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	19	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	20	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	21	WE65	75.00 - 83.33	0.6000	0.6000
T6	22	WE65	75.00 - 83.33	0.6000	0.6000
T6	23	WE65	75.00 - 83.33	0.6000	0.6000
T6	24	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	25	LDF5-50A (7/8 FOAM)	75.00 - 82.00	0.6000	0.6000
T6	26	1/2	75.00 - 81.00	0.6000	0.6000
T6	27	1/2	75.00 - 77.00	0.6000	0.6000
T6	31	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	33	AVA7-50 (1-5/8 LOW	75.00 - 83.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		DENSI. FOAM)			
T6	34	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	37	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	38	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	39	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	40	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	41	7/8	75.00 - 83.33	0.6000	0.6000
T6	45	LDF6-50A (1-1/4 FOAM)	75.00 - 80.00	0.6000	0.6000
T6	47	1/2" Fiber Optic Cable	75.00 - 80.00	0.6000	0.6000
T6	49	3/4	75.00 - 80.00	0.6000	0.6000
T6	50	Commscope 6x12 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T6	51	Commscope 9x18 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T6	52	Commscope 6x12 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T7	1	1 5/8	50.00 - 75.00	0.6000	0.6000
T7	5	LDF5-50A (7/8 FOAM)	50.00 - 55.00	0.6000	0.6000
T7	6	7/8	50.00 - 75.00	0.6000	0.6000
T7	7	1 1/4	50.00 - 75.00	0.6000	0.6000
T7	8	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	10	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	11	LDF6-50A (1-1/4 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	12	1 5/8	50.00 - 75.00	0.6000	0.6000
T7	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	15	1/2	50.00 - 75.00	0.6000	0.6000
T7	16	1/2	50.00 - 75.00	0.6000	0.6000
T7	17	1/2	50.00 - 75.00	0.6000	0.6000
T7	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	19	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	20	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	21	WE65	50.00 - 75.00	0.6000	0.6000
T7	22	WE65	50.00 - 75.00	0.6000	0.6000
T7	23	WE65	50.00 - 75.00	0.6000	0.6000
T7	24	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	25	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	26	1/2	50.00 - 75.00	0.6000	0.6000
T7	27	1/2	50.00 - 75.00	0.6000	0.6000
T7	28	LDF4-50A (1/2 FOAM)	50.00 - 53.00	0.6000	0.6000
T7	31	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	34	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	37	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	38	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	39	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	40	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	41	7/8	50.00 - 75.00	0.6000	0.6000
T7	42	1/2	50.00 - 65.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	43	7/8	50.00 - 63.00	0.6000	0.6000
T7	45	LDF6-50A (1-1/4 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	47	1/2" Fiber Optic Cable	50.00 - 75.00	0.6000	0.6000
T7	48	1 1/4" Hybriflex Cable	50.00 - 72.00	0.6000	0.6000
T7	49	3/4	50.00 - 75.00	0.6000	0.6000
T7	50	Commscope 6x12 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	51	Commscope 9x18 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	52	Commscope 6x12 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	53	1 1/4" Hybriflex Cable	50.00 - 72.00	0.6000	0.6000
T8	1	1 5/8	25.00 - 50.00	0.6000	0.6000
T8	2	3/8 Cable	25.00 - 40.00	0.6000	0.6000
T8	3	LDF4-50A (1/2 FOAM)	25.00 - 43.00	0.6000	0.6000
T8	4	1/2	25.00 - 47.00	0.6000	0.6000
T8	5	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	6	7/8	25.00 - 50.00	0.6000	0.6000
T8	7	1 1/4	25.00 - 50.00	0.6000	0.6000
T8	8	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	10	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	11	LDF6-50A (1-1/4 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	12	1 5/8	25.00 - 50.00	0.6000	0.6000
T8	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	15	1/2	25.00 - 50.00	0.6000	0.6000
T8	16	1/2	25.00 - 50.00	0.6000	0.6000
T8	17	1/2	25.00 - 50.00	0.6000	0.6000
T8	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	19	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	20	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	21	WE65	25.00 - 50.00	0.6000	0.6000
T8	22	WE65	25.00 - 50.00	0.6000	0.6000
T8	23	WE65	25.00 - 50.00	0.6000	0.6000
T8	24	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	25	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	26	1/2	25.00 - 50.00	0.6000	0.6000
T8	27	1/2	25.00 - 50.00	0.6000	0.6000
T8	28	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	29	1/2	25.00 - 48.00	0.6000	0.6000
T8	30	1/2	25.00 - 39.00	0.6000	0.6000
T8	31	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	34	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	37	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	38	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	39	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	40	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	41	7/8	25.00 - 50.00	0.6000	0.6000
T8	42	1/2	25.00 - 50.00	0.6000	0.6000
T8	43	7/8	25.00 - 50.00	0.6000	0.6000
T8	44	1/2	25.00 - 40.00	0.6000	0.6000
T8	45	LDF6-50A (1-1/4 FOAM)	25.00 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	47	1/2" Fiber Optic Cable	25.00 - 50.00	0.6000	0.6000
T8	48	1 1/4" Hybriflex Cable	25.00 - 50.00	0.6000	0.6000
T8	49	3/4	25.00 - 50.00	0.6000	0.6000
T8	50	Commscope 6x12 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	51	Commscope 9x18 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	52	Commscope 6x12 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	53	1 1/4" Hybriflex Cable	25.00 - 50.00	0.6000	0.6000
T9	1	1 5/8	6.00 - 25.00	0.6000	0.6000
T9	2	3/8 Cable	6.00 - 25.00	0.6000	0.6000
T9	3	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	4	1/2	6.00 - 25.00	0.6000	0.6000
T9	5	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	6	7/8	6.00 - 25.00	0.6000	0.6000
T9	7	1 1/4	6.00 - 25.00	0.6000	0.6000
T9	8	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	10	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	11	LDF6-50A (1-1/4 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	12	1 5/8	6.00 - 25.00	0.6000	0.6000
T9	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	15	1/2	6.00 - 25.00	0.6000	0.6000
T9	16	1/2	6.00 - 25.00	0.6000	0.6000
T9	17	1/2	6.00 - 25.00	0.6000	0.6000
T9	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	19	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	20	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	21	WE65	6.00 - 25.00	0.6000	0.6000
T9	22	WE65	6.00 - 25.00	0.6000	0.6000
T9	23	WE65	6.00 - 25.00	0.6000	0.6000
T9	24	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	25	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	26	1/2	6.00 - 25.00	0.6000	0.6000
T9	27	1/2	6.00 - 25.00	0.6000	0.6000
T9	28	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	29	1/2	6.00 - 25.00	0.6000	0.6000
T9	30	1/2	6.00 - 25.00	0.6000	0.6000
T9	31	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	34	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	37	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	38	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	39	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	40	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	41	7/8	6.00 - 25.00	0.6000	0.6000
T9	42	1/2	6.00 - 25.00	0.6000	0.6000
T9	43	7/8	6.00 - 25.00	0.6000	0.6000
T9	44	1/2	6.00 - 25.00	0.6000	0.6000
T9	45	LDF6-50A (1-1/4 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	47	1/2" Fiber Optic Cable	6.00 - 25.00	0.6000	0.6000
T9	48	1 1/4" Hybriflex Cable	6.00 - 25.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	49	3/4	6.00 - 25.00	0.6000	0.6000
T9	50	Commscope 6x12 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	51	Commscope 9x18 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	52	Commscope 6x12 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	53	1 1/4" Hybriflex Cable	6.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 6' Side Mount Standoff	B	From Leg	1.00	0.0000	41.00	No Ice	4.97	4.97	0.07
(1)			4.00			1/2" Ice	6.12	6.12	0.13
(#1-A Dish Mount)			0.00			1" Ice	7.27	7.27	0.19
1'x1' Panel Antenna	B	From Leg	1.00	0.0000	40.00	No Ice	1.20	0.13	0.01
(#1-B (mount Share #1-A))			4.00			1/2" Ice	1.34	0.21	0.02
			0.00			1" Ice	1.48	0.29	0.02
3' Whip (3in diameter) /w	B	From Leg	0.50	0.0000	43.00	No Ice	1.18	1.18	0.02
mount			0.00			1/2" Ice	1.64	1.64	0.03
(#2)			0.00			1" Ice	2.04	2.04	0.05
5'x1.5in dia Whip Antenna /w	A	From Leg	0.50	0.0000	47.00	No Ice	1.81	1.81	0.03
mount			0.00			1/2" Ice	2.64	2.64	0.05
(#3)			0.00			1" Ice	3.30	3.30	0.07
10'x6" Dipole Antenna	C	From Leg	3.00	0.0000	48.00	No Ice	9.17	1.67	0.05
(#4-A)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00			1" Ice	10.62	3.93	0.12
3' Yagi	C	From Leg	3.00	0.0000	48.00	No Ice	2.08	2.08	0.03
(#4-B)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
Pirod 4' Side Mount Standoff	C	None		0.0000	48.00	No Ice	2.72	2.72	0.05
(1)						1/2" Ice	4.91	4.91	0.09
(#4-A&B)						1" Ice	7.10	7.10	0.13
6'x1" Whip Antenna w/	A	From Leg	1.00	0.0000	39.00	No Ice	2.02	2.02	0.05
Mount			0.00			1/2" Ice	3.14	3.14	0.07
(#5 - CSP#14)			0.00			1" Ice	4.13	4.13	0.10
1.0" Dia 4' Omni w/Pipe	B	From Leg	2.00	0.0000	53.00	No Ice	0.94	0.94	0.02
Mount			0.00			1/2" Ice	1.39	1.39	0.03
(#6 - CSP#16)			0.00			1" Ice	1.80	1.80	0.05
20' 4-Bay Dipole w/ 2'	A	From Leg	2.00	0.0000	55.00	No Ice	4.00	4.00	0.06
Sidearm Mount			0.00			1/2" Ice	6.00	6.00	0.10
(#7 - CSP-4)			0.00			1" Ice	8.00	8.00	0.14
GPS	B	From Leg	3.00	0.0000	63.00	No Ice	1.00	1.00	0.01
(#8)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
2'6"x4" Pipe Mount	B	None		0.0000	63.00	No Ice	0.58	0.58	0.03
(For #8)						1/2" Ice	0.91	0.91	0.04
						1" Ice	1.09	1.09	0.05
6' Yagi w/ Mount	B	From Leg	2.00	0.0000	65.00	No Ice	7.59	0.71	0.05
(#9)			0.00			1/2" Ice	8.18	0.98	0.09
			0.00			1" Ice	8.79	1.26	0.14
3' Yagi	B	From Leg	1.00	40.0000	81.00	No Ice	2.08	2.08	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(#12)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
3' Yagi	B	From Leg	1.00	-40.0000	82.00	No Ice	2.08	2.08	0.03
(#13 - CSP-11)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
20' 4-Bay Dipole	B	From Leg	4.00	0.0000	77.00	No Ice	4.00	4.00	0.06
(#14)			0.00			1/2" Ice	6.00	6.00	0.10
			0.00			1" Ice	8.00	8.00	0.14
4'6"x3" Pipe Mount	B	None		0.0000	67.00	No Ice	1.30	1.30	0.03
(horizontal)						1/2" Ice	1.57	1.57	0.08
((Bottom mount) #14)						1" Ice	1.86	1.86	0.14
4'6"x3" Pipe Mount	B	None		0.0000	87.00	No Ice	1.30	1.30	0.03
(horizontal)						1/2" Ice	1.57	1.57	0.08
((Top Mount) #14)						1" Ice	1.86	1.86	0.14
20' 4-Bay Dipole	A	From Leg	4.00	0.0000	86.00	No Ice	4.00	4.00	0.06
(#15)			0.00			1/2" Ice	6.00	6.00	0.10
			0.00			1" Ice	8.00	8.00	0.14
3'4"x4" Pipe Mount	A	None		0.0000	76.00	No Ice	1.05	1.05	0.04
(horizontal)						1/2" Ice	1.27	1.27	0.09
((Bottom mount) #15)						1" Ice	1.52	1.52	0.13
3'4"x4" Pipe Mount	A	None		0.0000	96.00	No Ice	1.05	1.05	0.04
(horizontal)						1/2" Ice	1.27	1.27	0.09
((Top Mount) #15)						1" Ice	1.52	1.52	0.13
SC479-HF1LDF (inverted)	B	From Face	4.00	0.0000	81.00 - 95.00	No Ice	1.74	1.74	0.04
(# 16-A - CSP-10)			0.00			1/2" Ice	2.60	2.60	0.05
			0.00			1" Ice	3.31	3.31	0.08
PD458-406	A	From Face	4.00	0.0000	100.00 - 92.00	No Ice	4.59	4.59	0.02
(# 16-B - CSP-2)			0.00			1/2" Ice	6.89	6.89	0.04
			0.00			1" Ice	9.19	9.19	0.05
(2) (Horizontal) 8'x2 1/2"	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
Pipe Mount (Upright # 16-B)						1/2" Ice	3.13	3.13	0.15
(# 16-A&B)						1" Ice	3.62	3.62	0.27
(2) (Horizontal) 8'x2 1/2"	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
Pipe Mount (Invert #16-A)						1/2" Ice	3.13	3.13	0.15
(# 16-A&B)						1" Ice	3.62	3.62	0.27
SE419-SWBPALDF Panel	A	From Face	0.50	0.0000	101.00	No Ice	11.64	7.88	0.05
Antenna			0.00			1/2" Ice	12.29	8.51	0.11
(#18-A - CSP 13(P))			0.00			1" Ice	12.95	9.14	0.19
AP13-850/065D w/Mount	A	From Face	0.50	0.0000	104.00	No Ice	5.31	3.92	0.04
Pipe			0.00			1/2" Ice	5.93	4.96	0.08
(#18-B - CSP-12(E))			0.00			1" Ice	6.44	5.72	0.14
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	1.68	1.68	0.07
(#19 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	1.68	1.68	0.07
(#20 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
6'8"x4" Pipe Mount	A	None		0.0000	110.00	No Ice	1.69	1.69	0.07
(#21 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
Pirod 4' Side Mount Standoff	B	None		0.0000	113.00	No Ice	2.72	2.72	0.05
(1)						1/2" Ice	4.91	4.91	0.09
(#22, 23-A, 23-B Mount)						1" Ice	7.10	7.10	0.13
16'x3" Omni	B	From Leg	4.00	0.0000	113.00	No Ice	5.06	5.06	0.03
(#22)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
16'x3" Omni (inverted)	B	From Leg	4.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(#23-A - CSP-22)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
16'x3" Omni (inverted)	B	From Leg	2.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#23-B - CSP-23)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
Junction Box	B	From Face	0.50	0.0000	112.00	No Ice	3.15	1.05	0.02
(#23-C)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00			1" Ice	3.63	1.37	0.06
Rohn 6' Side-Arm(1)	B	From Leg	0.00	20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
Rohn 6' Side-Arm(1)	C	From Leg	0.00	-20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
Junction Box	C	From Face	3.00	0.0000	114.00	No Ice	3.15	1.05	0.02
(#24-A)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00			1" Ice	3.63	1.37	0.06
SC479-HF1LDF (inverted)	C	From Face	6.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#24-B)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	B	From Face	6.00	0.0000	120.00	No Ice	3.82	3.82	0.03
(#24-C - CSP#21)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
OGT9-840	B	From Face	3.00	0.0000	120.00	No Ice	2.27	2.27	0.02
(#24-D - CSP#8)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00			1" Ice	4.61	4.61	0.06
10'x2" Dipole Antenna	C	From Face	3.00	0.0000	104.00 - 114.00	No Ice	9.17	1.67	0.05
(inverted)			0.00			1/2" Ice	9.89	2.79	0.08
(#24-E)			0.00			1" Ice	10.62	3.93	0.12
Rohn 6' Side-Arm(1)	C	From Leg	0.00	60.0000	114.00	No Ice	10.60	10.60	0.14
(#25 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
SC479-HF1LDF (inverted)	C	From Leg	6.00	60.0000	100.00 - 114.00	No Ice	5.06	5.06	0.03
(#25-A - CSP-17)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
OGT9-840	C	From Leg	6.00	60.0000	120.00	No Ice	2.27	2.27	0.02
(#25-B - CSP#7)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00			1" Ice	4.61	4.61	0.06
10'x2" Dipole Antenna	A	From Leg	0.50	0.0000	120.00	No Ice	9.17	1.67	0.05
(#26 - CSP-15)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00			1" Ice	10.62	3.93	0.12
Lightning Rod 5/8x4'	C	None		0.0000	138.00	No Ice	0.25	0.25	0.03
(#27)						1/2" Ice	0.66	0.66	0.03
						1" Ice	0.97	0.97	0.04
16'x2.5" Pipe Mount	C	None		0.0000	138.00	No Ice	4.00	4.00	0.09
(#27 Mount)						1/2" Ice	4.80	4.80	0.09
						1" Ice	5.60	5.60	0.10
TMA 432-83H-01T	C	None		0.0000	103.00	No Ice	1.40	0.82	0.03
(CSP-32)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
TMA 432-83H-01T	B	None		0.0000	120.00	No Ice	1.40	0.82	0.03
(CSP-24)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
SC479-HF1LDF (inverted)	B	From Leg	3.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(CSP - 9 (P))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	A	From Leg	3.00	0.0000	110.00	No Ice	3.79	3.79	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(CSP-18 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF (inverted)	A	From Leg	3.00	0.0000	96.00 - 110.00	No Ice	5.06	5.06	0.03
(CSP-19 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
TMA 432-83H-01T	A	None		0.0000	110.00	No Ice	1.40	0.82	0.03
(CSP-20)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
SE419-SWBPALDF Panel	A	From Leg	0.50	0.0000	105.00	No Ice	11.64	7.88	0.05
Antenna			0.00			1/2" Ice	12.29	8.51	0.11
(CSP-29)			0.00			1" Ice	12.95	9.14	0.19
TMA 432-83H-01T	A	None		0.0000	105.00	No Ice	1.40	0.82	0.03
(CSP-30)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
WPA-70040-4CF-EDIN	A	None		0.0000	110.00	No Ice	9.46	3.53	0.02
Panel						1/2" Ice	9.86	3.84	0.08
(CSP-28)						1" Ice	10.27	4.15	0.14
TMA 432-83H-01T	A	None		0.0000	120.00	No Ice	1.40	0.82	0.03
(CSP-24)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
** Remove AIROSMITH ASM-005									
** AT&T Existing Inventory									
Face Mount	A	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
Face Mount	B	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
Face Mount	C	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
TPA-65R-LCUUUU-H8	A	From Face	0.50	0.0000	80.00	No Ice	12.86	10.38	0.10
Panel w/ RET			6.00			1/2" Ice	13.46	11.79	0.20
(ATT)			0.00			1" Ice	14.08	13.05	0.31
RRUS-11	A	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	A	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	80.00	No Ice	0.79	0.79	0.02
Suppressor			0.00			1/2" Ice	1.27	1.27	0.04
(ATT)			0.00			1" Ice	1.45	1.45	0.05
HPA-65R-BUU-H8 Panel	A	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
RRUS-32	A	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			-3.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
SBNH-1D6565C	A	From Face	0.50	0.0000	80.00	No Ice	11.48	9.64	0.08
(ATT)			8.00			1/2" Ice	12.11	11.07	0.17
			0.00			1" Ice	12.75	12.39	0.27
DC6-48-60-18-8F (Squid)	B	From Leg	0.50	0.0000	80.00	No Ice	0.79	0.79	0.02
Suppressor			0.00			1/2" Ice	1.27	1.27	0.04
(ATT)			0.00			1" Ice	1.45	1.45	0.05
TPA-65R-LCUUUU-H8	B	From Face	0.50	0.0000	80.00	No Ice	12.86	10.38	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Panel w/ RET			6.00			1/2" Ice	13.46	11.79	0.20
(ATT)			0.00			1" Ice	14.08	13.05	0.31
RRUS-11	B	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	B	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
HPA-65R-BUU-H8 Panel	B	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
RRUS-32	B	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			-3.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
SBNH-1D6565C	B	From Face	0.50	0.0000	80.00	No Ice	11.48	9.64	0.08
(ATT)			-6.00			1/2" Ice	12.11	11.07	0.17
			0.00			1" Ice	12.75	12.39	0.27
(2) DTMABP7819VG12A	B	From Face	0.50	0.0000	80.00	No Ice	1.36	0.51	0.02
TMA			-6.00			1/2" Ice	1.51	0.61	0.03
(ATT)			0.00			1" Ice	1.66	0.72	0.04
QS66512-2 Panel Antenna	C	From Face	0.50	0.0000	80.00	No Ice	8.13	8.22	0.13
(ATT)			6.00			1/2" Ice	8.59	9.19	0.21
			0.00			1" Ice	9.05	10.02	0.29
RRUS-11	C	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-32	C	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
HPA-65R-BUU-H8 Panel	C	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
** AT&T Existing Inventory									
** AT&T Proposed Inventory									
800-10966 Kathrien Panel w/	A	From Face	0.50	0.0000	80.00	No Ice	17.36	9.40	0.14
Pipe Mt.			2.00			1/2" Ice	17.99	10.82	0.26
(ATT - Proposed)			0.00			1" Ice	18.63	12.09	0.38
RRUS-12	A	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	A	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
800-10966 Kathrien Panel w/	B	From Face	0.50	0.0000	80.00	No Ice	17.36	9.40	0.14
Pipe Mt.			2.00			1/2" Ice	17.99	10.82	0.26
(ATT - Proposed)			0.00			1" Ice	18.63	12.09	0.38
RRUS-12	B	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	B	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
800-10965 Kathrien Panel w/	C	From Face	0.50	0.0000	80.00	No Ice	13.84	7.42	0.13
Pipe Mount			2.00			1/2" Ice	14.38	8.56	0.23
(ATT - Proposed)			0.00			1" Ice	14.93	9.46	0.33
RRUS-12	C	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	C	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
DC6-48-60-0-8F (Squid) Unit	C	From Leg	0.50	0.0000	80.00	No Ice	1.09	1.09	0.03
(ATT - Proposed)			0.00			1/2" Ice	1.70	1.70	0.05
			0.00			1" Ice	1.91	1.91	0.07
** AT&T Proposed Inventory									
* T-Mobile Existing Inventory									
EUSF10-U	A	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
EUSF10-U	C	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
EUSF10-U	B	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
TMA2093F00V1-1 Twin TMA	A	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
TMA2093F00V1-1 Twin TMA	B	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
TMA2093F00V1-1 Twin TMA	C	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
AIR32 B66Aa/B2a Antenna Panel	A	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
AIR32 B66Aa/B2a Antenna Panel	B	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
AIR32 B66Aa/B2a Antenna Panel	C	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
* T-Mobile Existing Inventory									
* T-Mobile Proposed Inventory									
APXVAARR24_43-U-NA20 Panel (RFS)	A	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
APXVAARR24_43-U-NA20 Panel (RFS)	B	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
APXVAARR24_43-U-NA20 Panel (RFS)	C	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
AIR 3246 B66 Panel Antenna	A	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
AIR 3246 B66 Panel Antenna	B	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
AIR 3246 B66 Panel Antenna	C	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
2217 B2 Radio Unit	A	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
2217 B2 Radio Unit	B	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
2217 B2 Radio Unit	C	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
4449 B71 + B12 Radio Unit	A	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B71 + B12 Radio Unit	B	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B71 + B12 Radio Unit	C	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
* T-Mobile Propsoed Inventory * Sprint Inventory Exist/Proposed									
Face Mount	A	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
Face Mount	B	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
Face Mount	C	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
ALU 4x45W (1900 MHz)	A	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.50			1" Ice	2.97	1.98	0.10
ALU 4x45W (1900 MHz)	B	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
ALU 4x45W (1900 MHz)	C	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
ALU TD-RRH-8x20-25	A	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU TD-RRH-8x20-25	B	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU TD-RRH-8x20-25	C	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU 800MHz 2x50W	A	From Face	0.00	0.0000	72.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
ALU 800MHz 2x50W	B	From Face	0.00	0.0000	72.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11

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 K
ALU 800MHz 2x50W (Sprint)	C	From Face	0.00 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
NNVV-65B-R4 Panel Antenna (Sprint)	A	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
NNVV-65B-R4 Panel Antenna (Sprint)	B	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
NNVV-65B-R4 Panel Antenna (Sprint)	C	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
AAHC Panel Antenna (Sprint)	A	From Face	0.00 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
AAHC Panel Antenna (Sprint)	B	From Face	0.50 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
AAHC Panel Antenna (Sprint)	C	From Face	0.50 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
* Sprint Inventory Exist/Proposed									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH (#1-A)	A	Paraboloid w/Shroud (HP)	From Leg	1.50 5.00 0.00	Worst		41.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.14 0.28 0.42
6' DISH (SOLID) (#19 - CSP-3)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		117.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39
6' DISH (SOLID) (#21 - CSP-5)	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		115.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39
6' DISH (SOLID) (#20 - CSP-6)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		111.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39

222-G Verification Constants

Constant	Value
Wind Importance Factor Without Ice	1.15

Constant	*Value*
Wind Importance Factor With Ice Factor	1
Ice Importance Factor	1.25
K_d	0.85
Z_g	900
α	9.5
K_{zmin}	0.85
K_e	1
K_t	0.72
f	1.5

222-G Section Verification ArRr By Element

Section Elevation *ft*	*Elem. Num.*	*Size*	*C*	*C w/Ice*	*Face*	*e*	*e w/Ice*	A_r ft^2	A_r *w/Ice* ft^2	A_rR_r ft^2	A_rR_r *w/Ice* ft^2
T1 120.00-116.67	1	P.5x.250	60.575	57.643	C	0.195	0.492	1.390	2.753	0.635	1.873
	1	P.5x.250	60.575	57.643	A	0.195	0.492	1.390	2.753	0.635	1.873
	2	P.5x.250	60.575	57.643	C	0.195	0.492	1.390	2.753	0.635	1.873
	2	P.5x.250	60.575	57.643	B	0.195	0.492	1.390	2.753	0.635	1.873
	3	P.5x.250	60.575	57.643	B	0.195	0.492	1.390	2.753	0.635	1.873
	3	P.5x.250	60.575	57.643	A	0.195	0.492	1.390	2.753	0.635	1.873
					A		Sum:	2.781	5.505	1.270	3.747
					B			2.781	5.505	1.270	3.747
					C			2.781	5.505	1.270	3.747
T2 116.67-108.33	13	P.5x.250	60.908	58.031	C	0.13	0.309	3.476	6.890	1.474	4.147
	13	P.5x.250	60.908	58.031	A	0.13	0.309	3.476	6.890	1.474	4.147
	14	P.5x.250	60.908	58.031	C	0.13	0.309	3.476	6.890	1.474	4.147
	14	P.5x.250	60.908	58.031	B	0.13	0.309	3.476	6.890	1.474	4.147
	15	P.5x.250	60.908	58.031	B	0.13	0.309	3.476	6.890	1.474	4.147
	15	P.5x.250	60.908	58.031	A	0.13	0.309	3.476	6.890	1.474	4.147
					A		Sum:	6.952	13.780	2.948	8.294
					B			6.952	13.780	2.948	8.294
					C			6.952	13.780	2.948	8.294
T3 108.33-100.00	25	P.5x.250	61.411	58.619	C	0.126	0.301	3.476	6.903	1.458	4.136
	25	P.5x.250	61.411	58.619	A	0.126	0.301	3.476	6.903	1.458	4.136
	26	P.5x.250	61.411	58.619	C	0.126	0.301	3.476	6.903	1.458	4.136
	26	P.5x.250	61.411	58.619	B	0.126	0.301	3.476	6.903	1.458	4.136
	27	P.5x.250	61.411	58.619	B	0.126	0.301	3.476	6.903	1.458	4.136
	27	P.5x.250	61.411	58.619	A	0.126	0.301	3.476	6.903	1.458	4.136
					A		Sum:	6.952	13.805	2.916	8.272
					B			6.952	13.805	2.916	8.272
					C			6.952	13.805	2.916	8.272
T4 100.00-91.67	37	P.5x.250	61.946	59.244	C	0.126	0.298	3.476	6.916	1.450	4.137
	37	P.5x.250	61.946	59.244	A	0.126	0.298	3.476	6.916	1.450	4.137
	38	P.5x.250	61.946	59.244	C	0.126	0.298	3.476	6.916	1.450	4.137
	38	P.5x.250	61.946	59.244	B	0.126	0.298	3.476	6.916	1.450	4.137
	39	P.5x.250	61.946	59.244	B	0.126	0.298	3.476	6.916	1.450	4.137
	39	P.5x.250	61.946	59.244	A	0.126	0.298	3.476	6.916	1.450	4.137
					A		Sum:	6.952	13.832	2.900	8.274
					B			6.952	13.832	2.900	8.274
					C			6.952	13.832	2.900	8.274
T5 91.67-83.33	52	P.5x.250	62.51	59.9	C	0.122	0.291	3.476	6.930	1.434	4.130
	52	P.5x.250	62.51	59.9	A	0.122	0.291	3.476	6.930	1.434	4.130
	53	P.5x.250	62.51	59.9	C	0.122	0.291	3.476	6.930	1.434	4.130
	53	P.5x.250	62.51	59.9	B	0.122	0.291	3.476	6.930	1.434	4.130
	54	P.5x.250	62.51	59.9	B	0.122	0.291	3.476	6.930	1.434	4.130

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	54	P.5x.250	62.51	59.9	A	0.122	0.291	3.476	6.930	1.434	4.130
					A		Sum:	6.952	13.859	2.869	8.261
					B			6.952	13.859	2.869	8.261
					C			6.952	13.859	2.869	8.261
T6 83.33-75.00	67	P.5x.250	63.095	60.58	C	0.119	0.284	3.476	6.943	1.419	4.126
	67	P.5x.250	63.095	60.58	A	0.119	0.284	3.476	6.943	1.419	4.126
	68	P.5x.250	63.095	60.58	C	0.119	0.284	3.476	6.943	1.419	4.126
	68	P.5x.250	63.095	60.58	B	0.119	0.284	3.476	6.943	1.419	4.126
	69	P.5x.250	63.095	60.58	B	0.119	0.284	3.476	6.943	1.419	4.126
	69	P.5x.250	63.095	60.58	A	0.119	0.284	3.476	6.943	1.419	4.126
					A		Sum:	6.952	13.886	2.838	8.251
					B			6.952	13.886	2.838	8.251
					C			6.952	13.886	2.838	8.251
T7 75.00-50.00	82	P5x.375	71.529	65.42	C	0.129	0.288	11.602	22.075	4.735	13.138
	82	P5x.375	71.529	65.42	A	0.129	0.288	11.602	22.075	4.735	13.138
	83	P5x.375	71.529	65.42	C	0.129	0.288	11.602	22.075	4.735	13.138
	83	P5x.375	71.529	65.42	B	0.129	0.288	11.602	22.075	4.735	13.138
	84	P5x.375	71.529	65.42	B	0.129	0.288	11.602	22.075	4.735	13.138
	84	P5x.375	71.529	65.42	A	0.129	0.288	11.602	22.075	4.735	13.138
					A		Sum:	23.204	44.151	9.469	26.277
					B			23.204	44.151	9.469	26.277
					C			23.204	44.151	9.469	26.277
T8 50.00-25.00	121	P.5x.400	65.738	63.404	C	0.147	0.352	10.428	20.924	4.352	12.906
	121	P.5x.400	65.738	63.404	A	0.147	0.352	10.428	20.924	4.352	12.906
	122	P.5x.400	65.738	63.404	C	0.147	0.352	10.428	20.924	4.352	12.906
	122	P.5x.400	65.738	63.404	B	0.147	0.352	10.428	20.924	4.352	12.906
	123	P.5x.400	65.738	63.404	B	0.147	0.352	10.428	20.924	4.352	12.906
	123	P.5x.400	65.738	63.404	A	0.147	0.352	10.428	20.924	4.352	12.906
					A		Sum:	20.856	41.848	8.705	25.813
					B			20.856	41.848	8.705	25.813
					C			20.856	41.848	8.705	25.813
T9 25.00-0.00	196	P6.875x.400	89.856	73.358	C	0.135	0.284	14.338	24.353	5.899	14.471
	196	P6.875x.400	89.856	73.358	A	0.135	0.284	14.338	24.353	5.899	14.471
	197	P6.875x.400	89.856	73.358	C	0.135	0.284	14.338	24.353	5.899	14.471
	197	P6.875x.400	89.856	73.358	B	0.135	0.284	14.338	24.353	5.899	14.471
	198	P6.875x.400	89.856	73.358	B	0.135	0.284	14.338	24.353	5.899	14.471
	198	P6.875x.400	89.856	73.358	A	0.135	0.284	14.338	24.353	5.899	14.471
					A		Sum:	28.676	48.705	11.797	28.941
					B			28.676	48.705	11.797	28.941
					C			28.676	48.705	11.797	28.941

222-G Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 120.00-116.67	118.33		1.311	3.265	1.49		46	A	0.195	1.270
								B	0.195	1.270
								C	0.195	1.270
T2 116.67-108.33	112.50		1.297	3.08	1.522		46	A	0.13	2.948
								B	0.13	2.948
								C	0.13	2.948

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T3 108.33-100.00	104.17		1.277	2.834	1.573		47	A	0.126	2.916
								B	0.126	2.916
								C	0.126	2.916
T4 100.00-91.67	95.83		1.254	2.607	1.629		48	A	0.126	2.900
								B	0.126	2.900
								C	0.126	2.900
T5 91.67-83.33	87.50		1.231	2.399	1.69		49	A	0.122	2.869
								B	0.122	2.869
								C	0.122	2.869
T6 83.33-75.00	79.17		1.205	2.207	1.759		50	A	0.119	2.838
								B	0.119	2.838
								C	0.119	2.838
T7 75.00-50.00	62.50		1.146	1.868	1.919		52	A	0.129	9.469
								B	0.129	9.469
								C	0.129	9.469
T8 50.00-25.00	37.50		1.029	1.455	2.235		54	A	0.147	8.705
								B	0.147	8.705
								C	0.147	8.705
T9 25.00-0.00	12.50		0.85	1.133	2.675		54	A	0.135	11.797
								B	0.135	11.797
								C	0.135	11.797

222-G Section Verification Tables - Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 120.00-116.67	118.33	118.33	1.311	3.265	1.49	2.4493	11	A	0.492	10.406
								B	0.492	10.406
								C	0.492	10.406
T2 116.67-108.33	112.50	112.50	1.297	3.08	1.522	2.4554	11	A	0.309	16.007
								B	0.309	16.007
								C	0.309	16.007
T3 108.33-100.00	104.17	104.17	1.277	2.834	1.573	2.4646	11	A	0.301	16.247
								B	0.301	16.247
								C	0.301	16.247
T4 100.00-91.67	95.83	95.83	1.254	2.607	1.629	2.4742	11	A	0.298	16.539
								B	0.298	16.539
								C	0.298	16.539
T5 91.67-83.33	87.50	87.50	1.231	2.399	1.69	2.4840	11	A	0.291	16.805
								B	0.291	16.805
								C	0.291	16.805
T6 83.33-75.00	79.17	79.17	1.205	2.207	1.759	2.4937	12	A	0.284	17.080
								B	0.284	17.080
								C	0.284	17.080
T7 75.00-50.00	62.50	62.50	1.146	1.868	1.919	2.5109	12	A	0.288	54.616
								B	0.288	54.616
								C	0.288	54.616
T8 50.00-25.00	37.50	37.50	1.029	1.455	2.235	2.5163	13	A	0.352	73.321
								B	0.352	73.321
								C	0.352	73.321
T9 25.00-0.00	12.50	12.50	0.85	1.133	2.675	2.4009	12	A	0.284	64.315
								B	0.284	64.315
								C	0.284	64.315

222-G Section Verification Tables - Service

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 120.00-116.67	118.33		1.311	3.265	1.49		15	A	0.195	1.270
								B	0.195	1.270
								C	0.195	1.270
T2 116.67-108.33	112.50		1.297	3.08	1.522		15	A	0.13	2.948
								B	0.13	2.948
								C	0.13	2.948
T3 108.33-100.00	104.17		1.277	2.834	1.573		16	A	0.126	2.916
								B	0.126	2.916
								C	0.126	2.916
T4 100.00-91.67	95.83		1.254	2.607	1.629		16	A	0.126	2.900
								B	0.126	2.900
								C	0.126	2.900
T5 91.67-83.33	87.50		1.231	2.399	1.69		16	A	0.122	2.869
								B	0.122	2.869
								C	0.122	2.869
T6 83.33-75.00	79.17		1.205	2.207	1.759		17	A	0.119	2.838
								B	0.119	2.838
								C	0.119	2.838
T7 75.00-50.00	62.50		1.146	1.868	1.919		17	A	0.129	9.469
								B	0.129	9.469
								C	0.129	9.469
T8 50.00-25.00	37.50		1.029	1.455	2.235		18	A	0.147	8.705
								B	0.147	8.705
								C	0.147	8.705
T9 25.00-0.00	12.50		0.85	1.133	2.675		18	A	0.135	11.797
								B	0.135	11.797
								C	0.135	11.797

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	46	39.883	A	4.994	2.781	2.781	35.77	0.210	0.000
120.00-116.67					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.297	46	103.599	A	6.523	6.952	6.952	51.59	11.019	0.000
116.67-108.33					B	6.523	6.952		51.59	1.860	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.277	47	109.157	A	6.751	6.952	6.952	50.73	24.677	0.000
108.33-100.00					B	6.751	6.952		50.73	10.884	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.254	48	114.715	A	7.506	6.952	6.952	48.08	25.365	0.000
100.00-91.67					B	7.506	6.952		48.08	18.080	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.231	49	120.273	A	7.766	6.952	6.952	47.23	25.365	0.000
					B	7.766	6.952		47.23	27.709	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.205	50	125.831	A	8.028	6.952	6.952	46.41	26.592	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	8.028	6.952		46.41	35.697	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.146	52	412.014	A	29.741	23.204	23.204	43.83	81.909	0.000
					B	29.741	23.204		43.83	137.708	0.000
					C	29.741	23.204		43.83	0.000	0.000
T8 50.00-25.00	37.50	1.029	54	460.861	A	47.069	20.856	20.856	30.70	85.441	0.000
					B	47.069	20.856		30.70	148.462	0.000
					C	47.069	20.856		30.70	0.000	0.000
T9 25.00-0.00	12.50	0.85	54	514.792	A	40.991	28.676	28.676	41.16	65.508	0.000
					B	40.991	28.676		41.16	114.466	0.000
					C	40.991	28.676		41.16	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	11	2.4493	41.245	A	4.994	15.290	5.505	27.14	1.843	0.000
120.00-116.67						B	4.994	15.290		27.14	0.000	0.000
						C	4.994	15.290		27.14	0.000	0.000
T2	112.50	1.297	11	2.4554	107.012	A	6.523	26.593	13.780	41.61	48.248	0.000
116.67-108.33						B	6.523	26.593		41.61	7.589	0.000
						C	6.523	26.593		41.61	0.000	0.000
T3	104.17	1.277	11	2.4646	112.583	A	6.751	27.116	13.805	40.76	99.265	0.000
108.33-100.00						B	6.751	27.116		40.76	43.581	0.000
						C	6.751	27.116		40.76	0.000	0.000
T4 100.00-91.67	95.83	1.254	11	2.4742	118.154	A	7.506	27.650	13.832	39.34	103.539	0.000
						B	7.506	27.650		39.34	64.018	0.000
						C	7.506	27.650		39.34	0.000	0.000
T5 91.67-83.33	87.50	1.231	11	2.4840	123.725	A	7.766	28.193	13.859	38.54	103.845	0.000
						B	7.766	28.193		38.54	93.486	0.000
						C	7.766	28.193		38.54	0.000	0.000
T6 83.33-75.00	79.17	1.205	12	2.4937	129.297	A	8.028	28.743	13.886	37.76	112.856	0.000
						B	8.028	28.743		37.76	127.803	0.000
						C	8.028	28.743		37.76	0.000	0.000
T7 75.00-50.00	62.50	1.146	12	2.5109	422.484	A	29.741	91.767	44.151	36.34	359.051	0.000
						B	29.741	91.767		36.34	514.176	0.000
						C	29.741	91.767		36.34	0.000	0.000
T8 50.00-25.00	37.50	1.029	13	2.5163	471.355	A	47.069	118.868	41.848	25.22	392.866	0.000
						B	47.069	118.868		25.22	594.764	0.000
						C	47.069	118.868		25.22	0.000	0.000
T9 25.00-0.00	12.50	0.85	12	2.4009	524.804	A	40.991	108.237	48.705	32.64	293.263	0.000
						B	40.991	108.237		32.64	454.656	0.000
						C	40.991	108.237		32.64	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	15	39.883	A	4.994	2.781	2.781	35.77	0.210	0.000
120.00-116.67					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.297	15	103.599	A	6.523	6.952	6.952	51.59	11.019	0.000
116.67-108.33					B	6.523	6.952		51.59	1.860	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.277	16	109.157	A	6.751	6.952	6.952	50.73	24.677	0.000
108.33-100.00					B	6.751	6.952		50.73	10.884	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.254	16	114.715	A	7.506	6.952	6.952	48.08	25.365	0.000
100.00-91.67					B	7.506	6.952		48.08	18.080	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.231	16	120.273	A	7.766	6.952	6.952	47.23	25.365	0.000
					B	7.766	6.952		47.23	27.709	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.205	17	125.831	A	8.028	6.952	6.952	46.41	26.592	0.000
					B	8.028	6.952		46.41	35.697	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.146	17	412.014	A	29.741	23.204	23.204	43.83	81.909	0.000
					B	29.741	23.204		43.83	137.708	0.000
					C	29.741	23.204		43.83	0.000	0.000
T8 50.00-25.00	37.50	1.029	18	460.861	A	47.069	20.856	20.856	30.70	85.441	0.000
					B	47.069	20.856		30.70	148.462	0.000
					C	47.069	20.856		30.70	0.000	0.000
T9 25.00-0.00	12.50	0.85	18	514.792	A	40.991	28.676	28.676	41.16	65.508	0.000
					B	40.991	28.676		41.16	114.466	0.000
					C	40.991	28.676		41.16	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	1	1	6.264	0.64	193.44	C
120.00-116.67			B	0.195	2.613		1	1	6.264			
			C	0.195	2.613		1	1	6.264			
T2	0.05	0.77	A	0.13	2.846	46	1	1	9.471	1.37	164.49	C
116.67-108.33			B	0.13	2.846		1	1	9.471			
			C	0.13	2.846		1	1	9.471			
T3	0.13	0.78	A	0.126	2.864	47	1	1	9.668	1.97	236.35	C
108.33-100.00			B	0.126	2.864		1	1	9.668			
			C	0.126	2.864		1	1	9.668			
T4	0.18	0.92	A	0.126	2.862	48	1	1	10.406	2.28	273.96	C
100.00-91.67			B	0.126	2.862		1	1	10.406			
			C	0.126	2.862		1	1	10.406			
T5	0.24	1.11	A	0.122	2.876	49	1	1	10.635	2.60	311.85	C
91.67-83.33			B	0.122	2.876		1	1	10.635			
			C	0.122	2.876		1	1	10.635			
T6	0.29	1.30	A	0.119	2.889	50	1	1	10.866	2.92	349.96	C
83.33-75.00			B	0.119	2.889		1	1	10.866			
			C	0.119	2.889		1	1	10.866			
T7	1.08	5.12	A	0.129	2.852	52	1	1	39.210	10.73	429.08	C
75.00-50.00			B	0.129	2.852		1	1	39.210			
			C	0.129	2.852		1	1	39.210			
T8	1.15	6.90	A	0.147	2.781	54	1	1	55.773	13.60	544.12	C
50.00-25.00			B	0.147	2.781		1	1	55.773			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.147	2.781		1	1	55.773			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	1	1	52.788	11.70	468.03	C
			B	0.135	2.826		1	1	52.788			
			C	0.135	2.826		1	1	52.788			
Sum Weight:	3.99	24.56						OTM	2439.53 kip-ft	47.81		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.825	1	5.390	0.56	166.66	C
120.00-116.67			B	0.195	2.613		0.825	1	5.390			
			C	0.195	2.613		0.825	1	5.390			
T2	0.05	0.77	A	0.13	2.846	46	0.825	1	8.329	1.24	149.08	C
116.67-108.33			B	0.13	2.846		0.825	1	8.329			
			C	0.13	2.846		0.825	1	8.329			
T3	0.13	0.78	A	0.126	2.864	47	0.825	1	8.486	1.83	220.04	C
108.33-100.00			B	0.126	2.864		0.825	1	8.486			
			C	0.126	2.864		0.825	1	8.486			
T4	0.18	0.92	A	0.126	2.862	48	0.825	1	9.092	2.13	255.52	C
100.00-91.67			B	0.126	2.862		0.825	1	9.092			
			C	0.126	2.862		0.825	1	9.092			
T5	0.24	1.11	A	0.122	2.876	49	0.825	1	9.275	2.44	292.33	C
91.67-83.33			B	0.122	2.876		0.825	1	9.275			
			C	0.122	2.876		0.825	1	9.275			
T6	0.29	1.30	A	0.119	2.889	50	0.825	1	9.461	2.74	329.30	C
83.33-75.00			B	0.119	2.889		0.825	1	9.461			
			C	0.119	2.889		0.825	1	9.461			
T7	1.08	5.12	A	0.129	2.852	52	0.825	1	34.006	10.07	402.93	C
75.00-50.00			B	0.129	2.852		0.825	1	34.006			
			C	0.129	2.852		0.825	1	34.006			
T8	1.15	6.90	A	0.147	2.781	54	0.825	1	47.536	12.55	501.93	C
50.00-25.00			B	0.147	2.781		0.825	1	47.536			
			C	0.147	2.781		0.825	1	47.536			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.825	1	45.615	10.78	431.13	C
			B	0.135	2.826		0.825	1	45.615			
			C	0.135	2.826		0.825	1	45.615			
Sum Weight:	3.99	24.56						OTM	2265.84 kip-ft	44.34		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.8	1	5.265	0.54	162.83	C
120.00-116.67			B	0.195	2.613		0.8	1	5.265			
			C	0.195	2.613		0.8	1	5.265			
T2	0.05	0.77	A	0.13	2.846	46	0.8	1	8.166	1.22	146.88	C
116.67-108.33			B	0.13	2.846		0.8	1	8.166			
			C	0.13	2.846		0.8	1	8.166			
T3	0.13	0.78	A	0.126	2.864	47	0.8	1	8.317	1.81	217.71	C
108.33-100.00			B	0.126	2.864		0.8	1	8.317			
			C	0.126	2.864		0.8	1	8.317			
T4	0.18	0.92	A	0.126	2.862	48	0.8	1	8.904	2.11	252.88	C
100.00-91.67			B	0.126	2.862		0.8	1	8.904			
			C	0.126	2.862		0.8	1	8.904			
T5	0.24	1.11	A	0.122	2.876	49	0.8	1	9.081	2.41	289.54	C
91.67-83.33			B	0.122	2.876		0.8	1	9.081			
			C	0.122	2.876		0.8	1	9.081			
T6	0.29	1.30	A	0.119	2.889	50	0.8	1	9.260	2.72	326.35	C
83.33-75.00			B	0.119	2.889		0.8	1	9.260			
			C	0.119	2.889		0.8	1	9.260			
T7	1.08	5.12	A	0.129	2.852	52	0.8	1	33.262	9.98	399.20	C
75.00-50.00			B	0.129	2.852		0.8	1	33.262			
			C	0.129	2.852		0.8	1	33.262			
T8	1.15	6.90	A	0.147	2.781	54	0.8	1	46.360	12.40	495.90	C
50.00-25.00			B	0.147	2.781		0.8	1	46.360			
			C	0.147	2.781		0.8	1	46.360			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.8	1	44.590	10.65	425.86	C
			B	0.135	2.826		0.8	1	44.590			
			C	0.135	2.826		0.8	1	44.590			
Sum Weight:	3.99	24.56						OTM	2241.02 kip-ft	43.84		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.85	1	5.515	0.57	170.48	C
120.00-116.67			B	0.195	2.613		0.85	1	5.515			
			C	0.195	2.613		0.85	1	5.515			
T2	0.05	0.77	A	0.13	2.846	46	0.85	1	8.492	1.26	151.28	C
116.67-108.33			B	0.13	2.846		0.85	1	8.492			
			C	0.13	2.846		0.85	1	8.492			
T3	0.13	0.78	A	0.126	2.864	47	0.85	1	8.655	1.85	222.37	C
108.33-100.00			B	0.126	2.864		0.85	1	8.655			
			C	0.126	2.864		0.85	1	8.655			
T4	0.18	0.92	A	0.126	2.862	48	0.85	1	9.280	2.15	258.15	C
100.00-91.67			B	0.126	2.862		0.85	1	9.280			
			C	0.126	2.862		0.85	1	9.280			
T5	0.24	1.11	A	0.122	2.876	49	0.85	1	9.470	2.46	295.12	C
91.67-83.33			B	0.122	2.876		0.85	1	9.470			
			C	0.122	2.876		0.85	1	9.470			
T6	0.29	1.30	A	0.119	2.889	50	0.85	1	9.661	2.77	332.25	C
83.33-75.00			B	0.119	2.889		0.85	1	9.661			
			C	0.119	2.889		0.85	1	9.661			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	1.08	5.12	A	0.129	2.852	52	0.85	1	34.749	10.17	406.67	C
75.00-50.00			B	0.129	2.852		0.85	1	34.749			
			C	0.129	2.852		0.85	1	34.749			
T8	1.15	6.90	A	0.147	2.781	54	0.85	1	48.713	12.70	507.95	C
50.00-25.00			B	0.147	2.781		0.85	1	48.713			
			C	0.147	2.781		0.85	1	48.713			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.85	1	46.640	10.91	436.40	C
			B	0.135	2.826		0.85	1	46.640			
			C	0.135	2.826		0.85	1	46.640			
Sum Weight:	3.99	24.56						OTM	2290.65 kip-ft	44.84		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	1	1	15.399	0.27	82.27	C
120.00-116.67			B	0.492	1.911		1	1	15.399			
			C	0.492	1.911		1	1	15.399			
T2	1.05	3.35	A	0.309	2.271	11	1	1	22.530	0.77	92.78	C
116.67-108.33			B	0.309	2.271		1	1	22.530			
			C	0.309	2.271		1	1	22.530			
T3	2.72	3.44	A	0.301	2.294	11	1	1	22.998	1.29	154.24	C
108.33-100.00			B	0.301	2.294		1	1	22.998			
			C	0.301	2.294		1	1	22.998			
T4	3.27	4.07	A	0.298	2.303	11	1	1	24.045	1.47	176.71	C
100.00-91.67			B	0.298	2.303		1	1	24.045			
			C	0.298	2.303		1	1	24.045			
T5	3.94	4.37	A	0.291	2.321	11	1	1	24.571	1.69	202.48	C
91.67-83.33			B	0.291	2.321		1	1	24.571			
			C	0.291	2.321		1	1	24.571			
T6	4.68	4.66	A	0.284	2.338	12	1	1	25.107	1.99	238.83	C
83.33-75.00			B	0.284	2.338		1	1	25.107			
			C	0.284	2.338		1	1	25.107			
T7	16.75	16.84	A	0.288	2.329	12	1	1	84.357	7.33	293.19	C
75.00-50.00			B	0.288	2.329		1	1	84.357			
			C	0.288	2.329		1	1	84.357			
T8	18.70	23.24	A	0.352	2.167	13	1	1	120.390	9.08	363.14	C
50.00-25.00			B	0.352	2.167		1	1	120.390			
			C	0.352	2.167		1	1	120.390			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	1	1	105.306	7.31	292.24	C
			B	0.284	2.338		1	1	105.306			
			C	0.284	2.338		1	1	105.306			
Sum Weight:	64.74	83.20						OTM	1589.53 kip-ft	31.20		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.825	1	14.526	0.26	77.75	C
120.00-116.67			B	0.492	1.911		0.825	1	14.526			
			C	0.492	1.911		0.825	1	14.526			
T2	1.05	3.35	A	0.309	2.271	11	0.825	1	21.389	0.75	89.94	C
116.67-108.33			B	0.309	2.271		0.825	1	21.389			
			C	0.309	2.271		0.825	1	21.389			
T3	2.72	3.44	A	0.301	2.294	11	0.825	1	21.817	1.26	151.22	C
108.33-100.00			B	0.301	2.294		0.825	1	21.817			
			C	0.301	2.294		0.825	1	21.817			
T4	3.27	4.07	A	0.298	2.303	11	0.825	1	22.731	1.44	173.28	C
100.00-91.67			B	0.298	2.303		0.825	1	22.731			
			C	0.298	2.303		0.825	1	22.731			
T5	3.94	4.37	A	0.291	2.321	11	0.825	1	23.212	1.66	198.84	C
91.67-83.33			B	0.291	2.321		0.825	1	23.212			
			C	0.291	2.321		0.825	1	23.212			
T6	4.68	4.66	A	0.284	2.338	12	0.825	1	23.702	1.96	234.97	C
83.33-75.00			B	0.284	2.338		0.825	1	23.702			
			C	0.284	2.338		0.825	1	23.702			
T7	16.75	16.84	A	0.288	2.329	12	0.825	1	79.152	7.21	288.26	C
75.00-50.00			B	0.288	2.329		0.825	1	79.152			
			C	0.288	2.329		0.825	1	79.152			
T8	18.70	23.24	A	0.352	2.167	13	0.825	1	112.153	8.89	355.54	C
50.00-25.00			B	0.352	2.167		0.825	1	112.153			
			C	0.352	2.167		0.825	1	112.153			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.825	1	98.133	7.13	285.18	C
			B	0.284	2.338		0.825	1	98.133			
			C	0.284	2.338		0.825	1	98.133			
Sum Weight:	64.74	83.20						OTM	1557.48 kip-ft	30.55		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.8	1	14.401	0.26	77.10	C
120.00-116.67			B	0.492	1.911		0.8	1	14.401			
			C	0.492	1.911		0.8	1	14.401			
T2	1.05	3.35	A	0.309	2.271	11	0.8	1	21.226	0.75	89.53	C
116.67-108.33			B	0.309	2.271		0.8	1	21.226			
			C	0.309	2.271		0.8	1	21.226			
T3	2.72	3.44	A	0.301	2.294	11	0.8	1	21.648	1.26	150.79	C
108.33-100.00			B	0.301	2.294		0.8	1	21.648			
			C	0.301	2.294		0.8	1	21.648			
T4	3.27	4.07	A	0.298	2.303	11	0.8	1	22.544	1.44	172.79	C
100.00-91.67			B	0.298	2.303		0.8	1	22.544			
			C	0.298	2.303		0.8	1	22.544			
T5	3.94	4.37	A	0.291	2.321	11	0.8	1	23.017	1.65	198.32	C
91.67-83.33			B	0.291	2.321		0.8	1	23.017			
			C	0.291	2.321		0.8	1	23.017			
T6	4.68	4.66	A	0.284	2.338	12	0.8	1	23.502	1.95	234.42	C
83.33-75.00			B	0.284	2.338		0.8	1	23.502			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.284	2.338		0.8	1	23.502			
T7	16.75	16.84	A	0.288	2.329	12	0.8	1	78.409	7.19	287.55	C
75.00-50.00			B	0.288	2.329		0.8	1	78.409			
			C	0.288	2.329		0.8	1	78.409			
T8	18.70	23.24	A	0.352	2.167	13	0.8	1	110.976	8.86	354.46	C
50.00-25.00			B	0.352	2.167		0.8	1	110.976			
			C	0.352	2.167		0.8	1	110.976			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.8	1	97.108	7.10	284.17	C
			B	0.284	2.338		0.8	1	97.108			
			C	0.284	2.338		0.8	1	97.108			
Sum Weight:	64.74	83.20						OTM	1552.91 kip-ft	30.46		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.85	1	14.650	0.26	78.40	C
120.00-116.67			B	0.492	1.911		0.85	1	14.650			
			C	0.492	1.911		0.85	1	14.650			
T2	1.05	3.35	A	0.309	2.271	11	0.85	1	21.552	0.75	90.35	C
116.67-108.33			B	0.309	2.271		0.85	1	21.552			
			C	0.309	2.271		0.85	1	21.552			
T3	2.72	3.44	A	0.301	2.294	11	0.85	1	21.986	1.26	151.65	C
108.33-100.00			B	0.301	2.294		0.85	1	21.986			
			C	0.301	2.294		0.85	1	21.986			
T4	3.27	4.07	A	0.298	2.303	11	0.85	1	22.919	1.45	173.77	C
100.00-91.67			B	0.298	2.303		0.85	1	22.919			
			C	0.298	2.303		0.85	1	22.919			
T5	3.94	4.37	A	0.291	2.321	11	0.85	1	23.406	1.66	199.36	C
91.67-83.33			B	0.291	2.321		0.85	1	23.406			
			C	0.291	2.321		0.85	1	23.406			
T6	4.68	4.66	A	0.284	2.338	12	0.85	1	23.903	1.96	235.52	C
83.33-75.00			B	0.284	2.338		0.85	1	23.903			
			C	0.284	2.338		0.85	1	23.903			
T7	16.75	16.84	A	0.288	2.329	12	0.85	1	79.896	7.22	288.96	C
75.00-50.00			B	0.288	2.329		0.85	1	79.896			
			C	0.288	2.329		0.85	1	79.896			
T8	18.70	23.24	A	0.352	2.167	13	0.85	1	113.330	8.92	356.63	C
50.00-25.00			B	0.352	2.167		0.85	1	113.330			
			C	0.352	2.167		0.85	1	113.330			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.85	1	99.158	7.15	286.19	C
			B	0.284	2.338		0.85	1	99.158			
			C	0.284	2.338		0.85	1	99.158			
Sum Weight:	64.74	83.20						OTM	1562.06 kip-ft	30.64		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	1	1	6.264	0.21	64.36	C
120.00-116.67			B	0.195	2.613		1	1	6.264			
			C	0.195	2.613		1	1	6.264			
T2	0.05	0.77	A	0.13	2.846	15	1	1	9.471	0.46	54.73	C
116.67-108.33			B	0.13	2.846		1	1	9.471			
			C	0.13	2.846		1	1	9.471			
T3	0.13	0.78	A	0.126	2.864	16	1	1	9.668	0.66	78.63	C
108.33-100.00			B	0.126	2.864		1	1	9.668			
			C	0.126	2.864		1	1	9.668			
T4	0.18	0.92	A	0.126	2.862	16	1	1	10.406	0.76	91.15	C
100.00-91.67			B	0.126	2.862		1	1	10.406			
			C	0.126	2.862		1	1	10.406			
T5	0.24	1.11	A	0.122	2.876	16	1	1	10.635	0.86	103.75	C
91.67-83.33			B	0.122	2.876		1	1	10.635			
			C	0.122	2.876		1	1	10.635			
T6	0.29	1.30	A	0.119	2.889	17	1	1	10.866	0.97	116.43	C
83.33-75.00			B	0.119	2.889		1	1	10.866			
			C	0.119	2.889		1	1	10.866			
T7	1.08	5.12	A	0.129	2.852	17	1	1	39.210	3.57	142.76	C
75.00-50.00			B	0.129	2.852		1	1	39.210			
			C	0.129	2.852		1	1	39.210			
T8	1.15	6.90	A	0.147	2.781	18	1	1	55.773	4.53	181.03	C
50.00-25.00			B	0.147	2.781		1	1	55.773			
			C	0.147	2.781		1	1	55.773			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	1	1	52.788	3.89	155.72	C
			B	0.135	2.826		1	1	52.788			
			C	0.135	2.826		1	1	52.788			
Sum Weight:	3.99	24.56						OTM	811.65 kip-ft	15.91		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.825	1	5.390	0.18	55.45	C
120.00-116.67			B	0.195	2.613		0.825	1	5.390			
			C	0.195	2.613		0.825	1	5.390			
T2	0.05	0.77	A	0.13	2.846	15	0.825	1	8.329	0.41	49.60	C
116.67-108.33			B	0.13	2.846		0.825	1	8.329			
			C	0.13	2.846		0.825	1	8.329			
T3	0.13	0.78	A	0.126	2.864	16	0.825	1	8.486	0.61	73.21	C
108.33-100.00			B	0.126	2.864		0.825	1	8.486			
			C	0.126	2.864		0.825	1	8.486			
T4	0.18	0.92	A	0.126	2.862	16	0.825	1	9.092	0.71	85.01	C
100.00-91.67			B	0.126	2.862		0.825	1	9.092			
			C	0.126	2.862		0.825	1	9.092			
T5	0.24	1.11	A	0.122	2.876	16	0.825	1	9.275	0.81	97.26	C
91.67-83.33			B	0.122	2.876		0.825	1	9.275			
			C	0.122	2.876		0.825	1	9.275			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	0.29	1.30	A	0.119	2.889	17	0.825	1	9.461	0.91	109.56	C
83.33-75.00			B	0.119	2.889		0.825	1	9.461			
			C	0.119	2.889		0.825	1	9.461			
T7	1.08	5.12	A	0.129	2.852	17	0.825	1	34.006	3.35	134.06	C
75.00-50.00			B	0.129	2.852		0.825	1	34.006			
			C	0.129	2.852		0.825	1	34.006			
T8	1.15	6.90	A	0.147	2.781	18	0.825	1	47.536	4.17	166.99	C
50.00-25.00			B	0.147	2.781		0.825	1	47.536			
			C	0.147	2.781		0.825	1	47.536			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.825	1	45.615	3.59	143.44	C
			B	0.135	2.826		0.825	1	45.615			
			C	0.135	2.826		0.825	1	45.615			
Sum Weight:	3.99	24.56						OTM	753.86 kip-ft	14.75		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.8	1	5.265	0.18	54.17	C
120.00-116.67			B	0.195	2.613		0.8	1	5.265			
			C	0.195	2.613		0.8	1	5.265			
T2	0.05	0.77	A	0.13	2.846	15	0.8	1	8.166	0.41	48.87	C
116.67-108.33			B	0.13	2.846		0.8	1	8.166			
			C	0.13	2.846		0.8	1	8.166			
T3	0.13	0.78	A	0.126	2.864	16	0.8	1	8.317	0.60	72.43	C
108.33-100.00			B	0.126	2.864		0.8	1	8.317			
			C	0.126	2.864		0.8	1	8.317			
T4	0.18	0.92	A	0.126	2.862	16	0.8	1	8.904	0.70	84.14	C
100.00-91.67			B	0.126	2.862		0.8	1	8.904			
			C	0.126	2.862		0.8	1	8.904			
T5	0.24	1.11	A	0.122	2.876	16	0.8	1	9.081	0.80	96.33	C
91.67-83.33			B	0.122	2.876		0.8	1	9.081			
			C	0.122	2.876		0.8	1	9.081			
T6	0.29	1.30	A	0.119	2.889	17	0.8	1	9.260	0.90	108.58	C
83.33-75.00			B	0.119	2.889		0.8	1	9.260			
			C	0.119	2.889		0.8	1	9.260			
T7	1.08	5.12	A	0.129	2.852	17	0.8	1	33.262	3.32	132.82	C
75.00-50.00			B	0.129	2.852		0.8	1	33.262			
			C	0.129	2.852		0.8	1	33.262			
T8	1.15	6.90	A	0.147	2.781	18	0.8	1	46.360	4.12	164.99	C
50.00-25.00			B	0.147	2.781		0.8	1	46.360			
			C	0.147	2.781		0.8	1	46.360			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.8	1	44.590	3.54	141.69	C
			B	0.135	2.826		0.8	1	44.590			
			C	0.135	2.826		0.8	1	44.590			
Sum Weight:	3.99	24.56						OTM	745.60 kip-ft	14.59		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.85	1	5.515	0.19	56.72	C
120.00-116.67			B	0.195	2.613		0.85	1	5.515			
			C	0.195	2.613		0.85	1	5.515			
T2	0.05	0.77	A	0.13	2.846	15	0.85	1	8.492	0.42	50.33	C
116.67-108.33			B	0.13	2.846		0.85	1	8.492			
			C	0.13	2.846		0.85	1	8.492			
T3	0.13	0.78	A	0.126	2.864	16	0.85	1	8.655	0.62	73.98	C
108.33-100.00			B	0.126	2.864		0.85	1	8.655			
			C	0.126	2.864		0.85	1	8.655			
T4	0.18	0.92	A	0.126	2.862	16	0.85	1	9.280	0.72	85.89	C
100.00-91.67			B	0.126	2.862		0.85	1	9.280			
			C	0.126	2.862		0.85	1	9.280			
T5	0.24	1.11	A	0.122	2.876	16	0.85	1	9.470	0.82	98.19	C
91.67-83.33			B	0.122	2.876		0.85	1	9.470			
			C	0.122	2.876		0.85	1	9.470			
T6	0.29	1.30	A	0.119	2.889	17	0.85	1	9.661	0.92	110.54	C
83.33-75.00			B	0.119	2.889		0.85	1	9.661			
			C	0.119	2.889		0.85	1	9.661			
T7	1.08	5.12	A	0.129	2.852	17	0.85	1	34.749	3.38	135.30	C
75.00-50.00			B	0.129	2.852		0.85	1	34.749			
			C	0.129	2.852		0.85	1	34.749			
T8	1.15	6.90	A	0.147	2.781	18	0.85	1	48.713	4.22	169.00	C
50.00-25.00			B	0.147	2.781		0.85	1	48.713			
			C	0.147	2.781		0.85	1	48.713			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.85	1	46.640	3.63	145.19	C
			B	0.135	2.826		0.85	1	46.640			
			C	0.135	2.826		0.85	1	46.640			
Sum Weight:	3.99	24.56						OTM	762.11 kip-ft	14.92		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.83					
Bracing Weight	17.73					
Total Member Self-Weight	24.56			-11.52	-11.72	
Total Weight	39.89			-11.52	-11.72	
Wind 0 deg - No Ice		-0.03	-76.01	-4985.65	-6.81	37.18
Wind 30 deg - No Ice		36.47	-63.24	-4187.85	-2402.26	-11.02
Wind 45 deg - No Ice		51.24	-51.27	-3402.47	-3377.44	-33.33
Wind 60 deg - No Ice		62.34	-36.00	-2395.08	-4114.18	-52.95
Wind 90 deg - No Ice		72.99	0.03	-6.61	-4801.30	-82.20
Wind 120 deg - No Ice		65.80	38.03	2479.80	-4291.01	-93.61
Wind 135 deg - No Ice		53.31	53.35	3488.14	-3486.15	-86.57
Wind 150 deg - No Ice		36.52	63.26	4169.72	-2410.76	-71.19
Wind 180 deg - No Ice		0.03	72.04	4764.10	-16.63	-33.92
Wind 210 deg - No Ice		-36.47	63.24	4164.81	2378.82	11.02

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 225 deg - No Ice		-51.24	51.27	3379.43	3354.01	33.33
Wind 240 deg - No Ice		-65.77	37.98	2471.29	4262.66	56.43
Wind 270 deg - No Ice		-72.99	-0.03	-16.43	4777.86	82.20
Wind 300 deg - No Ice		-62.36	-36.04	-2403.58	4095.66	86.88
Wind 315 deg - No Ice		-53.31	-53.35	-3511.18	3462.72	86.57
Wind 330 deg - No Ice		-36.52	-63.26	-4192.76	2387.32	71.19
Member Ice	58.64					
Total Weight Ice	198.10			-247.56	-101.30	
Wind 0 deg - Ice		-0.01	-43.35	-2924.02	-100.10	13.63
Wind 30 deg - Ice		21.37	-37.06	-2541.05	-1420.41	-28.98
Wind 45 deg - Ice		30.17	-30.19	-2116.59	-1964.18	-47.78
Wind 60 deg - Ice		36.87	-21.30	-1566.44	-2379.33	-63.22
Wind 90 deg - Ice		42.77	0.01	-246.36	-2741.60	-81.17
Wind 120 deg - Ice		37.53	21.69	1091.71	-2412.25	-78.31
Wind 135 deg - Ice		30.57	30.59	1641.95	-1984.66	-67.78
Wind 150 deg - Ice		21.40	37.07	2047.13	-1422.49	-52.19
Wind 180 deg - Ice		0.01	42.62	2392.28	-102.50	-13.33
Wind 210 deg - Ice		-21.37	37.06	2045.93	1217.81	28.98
Wind 225 deg - Ice		-30.17	30.19	1621.47	1761.59	47.78
Wind 240 deg - Ice		-37.51	21.66	1089.63	2208.45	64.68
Wind 270 deg - Ice		-42.77	-0.01	-248.76	2539.00	81.17
Wind 300 deg - Ice		-36.89	-21.32	-1568.52	2177.94	76.55
Wind 315 deg - Ice		-30.57	-30.59	-2137.07	1782.06	67.78
Wind 330 deg - Ice		-21.40	-37.07	-2542.25	1219.89	52.19
Total Weight	39.89			-11.52	-11.72	
Wind 0 deg - Service		-0.01	-25.29	-1656.73	1.04	12.37
Wind 30 deg - Service		12.13	-21.04	-1391.30	-795.94	-3.67
Wind 45 deg - Service		17.05	-17.06	-1130.00	-1120.39	-11.09
Wind 60 deg - Service		20.74	-11.98	-794.83	-1365.51	-17.62
Wind 90 deg - Service		24.28	0.01	-0.17	-1594.12	-27.35
Wind 120 deg - Service		21.89	12.65	827.07	-1424.34	-31.14
Wind 135 deg - Service		17.74	17.75	1162.55	-1156.56	-28.80
Wind 150 deg - Service		12.15	21.05	1389.32	-798.77	-23.68
Wind 180 deg - Service		0.01	23.97	1587.07	-2.23	-11.29
Wind 210 deg - Service		-12.13	21.04	1387.69	794.75	3.67
Wind 225 deg - Service		-17.05	17.06	1126.38	1119.20	11.09
Wind 240 deg - Service		-21.88	12.64	824.24	1421.52	18.77
Wind 270 deg - Service		-24.28	-0.01	-3.44	1592.93	27.35
Wind 300 deg - Service		-20.75	-11.99	-797.66	1365.95	28.90
Wind 315 deg - Service		-17.74	-17.75	-1166.16	1155.37	28.80
Wind 330 deg - Service		-12.15	-21.05	-1392.93	797.58	23.68

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 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice

Comb. No.	Description
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	120 - 116.667	Leg	Max Tension	9	0.42	0.00	0.00
			Max. Compression	46	-1.33	0.51	0.10
			Max. Mx	18	0.29	-2.05	-0.21
			Max. My	16	-0.26	0.00	-2.16
			Max. Vy	3	-1.18	2.05	0.21
			Max. Vx	16	1.69	0.00	-2.16
		Diagonal	Max Tension	29	0.18	0.00	0.00
			Max. Compression	41	-0.50	0.00	0.00
			Max. Mx	34	-0.31	0.14	0.00
			Max. My	34	-0.31	0.00	-0.00
			Max. Vy	34	-0.08	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	31	0.25	0.00	0.00
			Max. Compression	14	-0.25	0.02	0.00
			Max. Mx	43	0.03	0.09	0.02
			Max. My	35	0.06	0.08	0.02
			Max. Vy	43	-0.08	0.09	0.02
			Max. Vx	35	0.01	0.00	0.00
T2	116.667 - 108.333	Leg	Max Tension	19	0.19	-2.05	-0.21
			Max. Compression	46	-4.55	0.33	-0.05
			Max. Mx	18	0.10	-2.05	-0.21
			Max. My	32	-0.34	-0.06	-2.23
			Max. Vy	3	1.65	2.05	0.21
			Max. Vx	16	-1.69	0.00	-2.16
		Diagonal	Max Tension	5	5.37	0.00	0.00
			Max. Compression	4	-5.49	0.00	0.00
			Max. Mx	34	-0.15	0.23	0.00
			Max. My	34	-0.16	0.00	-0.01
			Max. Vy	34	0.09	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Horizontal	Max Tension	18	3.91	0.00	0.00
			Max. Compression	3	-3.92	0.01	0.00
			Max. Mx	43	-0.20	0.09	0.03
			Max. My	35	0.64	0.09	0.03
			Max. Vy	43	-0.08	0.09	0.03
			Max. Vx	35	0.01	0.00	0.00
T3	108.333 - 100	Leg	Max Tension	19	6.89	-1.39	-0.30
			Max. Compression	35	-9.82	0.28	0.04
			Max. Mx	18	6.31	-1.99	-0.06
			Max. My	26	-1.30	-0.02	-2.36
			Max. Vy	13	-0.70	1.94	0.37
			Max. Vx	26	0.98	-0.02	-2.36
		Diagonal	Max Tension	5	9.11	0.00	0.00
			Max. Compression	4	-9.22	0.00	0.00
			Max. Mx	34	-0.18	0.25	0.00
			Max. My	34	-0.17	0.00	-0.01
			Max. Vy	34	-0.09	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Horizontal	Max Tension	18	5.92	0.00	0.00
			Max. Compression	3	-6.04	0.02	0.00
			Max. Mx	48	-0.17	0.11	0.03
			Max. My	38	-0.29	0.11	0.03
			Max. Vy	48	0.08	0.11	0.03
			Max. Vx	35	-0.01	0.00	0.00
T4	100 - 91.6667	Leg	Max Tension	19	17.83	-1.98	-0.06
			Max. Compression	2	-22.93	1.57	0.04
			Max. Mx	8	16.22	3.95	0.42
			Max. My	10	-1.62	-0.07	-3.98
			Max. Vy	8	1.93	-1.61	0.17
			Max. Vx	10	-2.04	-0.04	1.74

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	5	13.20	0.00	0.00
			Max. Compression	4	-13.37	0.00	0.00
			Max. Mx	34	-0.39	0.27	0.00
			Max. My	34	-0.34	0.00	0.01
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	20	8.42	0.00	0.00
			Max. Compression	3	-8.41	0.03	0.01
			Max. Mx	48	-0.51	0.16	0.00
			Max. My	2	0.66	0.02	-0.03
			Max. Vy	48	-0.11	0.16	0.00
			Max. Vx	2	0.00	0.02	-0.03
		Inner Bracing	Max Tension	3	0.14	0.00	0.00
			Max. Compression	2	-0.15	0.00	0.00
			Max. Mx	34	-0.01	-0.11	0.00
			Max. Vy	34	0.07	0.00	0.00
T5	91.6667 - 83.3333	Leg	Max Tension	19	32.34	-1.62	-0.04
			Max. Compression	2	-39.90	2.30	-0.19
			Max. Mx	25	-37.22	2.39	-0.40
			Max. My	26	-3.90	-0.04	-3.01
			Max. Vy	24	-0.35	2.39	-0.40
			Max. Vx	10	-0.62	-0.02	3.01
		Diagonal	Max Tension	21	16.84	0.00	0.00
			Max. Compression	20	-17.06	0.00	0.00
			Max. Mx	34	-0.46	0.32	0.00
			Max. My	34	-0.32	0.00	-0.01
			Max. Vy	34	-0.12	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Top Girt	Max Tension	20	11.04	0.00	0.00
			Max. Compression	5	-11.00	0.03	-0.00
			Max. Mx	48	-0.70	0.18	0.01
			Max. My	2	2.60	0.01	-0.03
			Max. Vy	48	0.12	0.18	0.01
			Max. Vx	2	-0.01	0.01	-0.03
		Inner Bracing	Max Tension	5	0.19	0.00	0.00
			Max. Compression	4	-0.19	0.00	0.00
			Max. Mx	34	-0.01	-0.12	0.00
			Max. Vy	34	0.07	0.00	0.00
T6	83.3333 - 75	Leg	Max Tension	19	51.89	-2.32	0.18
			Max. Compression	2	-62.66	4.40	-0.25
			Max. Mx	8	47.91	5.41	0.28
			Max. My	26	-5.82	-0.09	6.17
			Max. Vy	8	-2.44	-2.39	0.39
			Max. Vx	26	-2.89	-0.04	-3.01
		Diagonal	Max Tension	21	21.41	0.00	0.00
			Max. Compression	20	-21.69	0.00	0.00
			Max. Mx	34	-0.54	0.37	0.00
			Max. My	34	-0.38	0.00	0.01
			Max. Vy	34	0.13	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	6	14.64	0.03	-0.01
			Max. Compression	23	-14.56	0.00	0.00
			Max. Mx	38	-1.25	0.20	0.01
			Max. My	2	2.80	0.01	-0.04
			Max. Vy	38	-0.12	0.20	0.01
			Max. Vx	2	0.01	0.01	-0.04
		Inner Bracing	Max Tension	23	0.25	0.00	0.00
			Max. Compression	22	-0.26	0.00	0.00
			Max. Mx	34	-0.01	-0.13	0.00
			Max. Vy	34	-0.07	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	75 - 50	Leg	Max Tension	19	140.58	-0.84	0.21
			Max. Compression	2	-160.76	-0.42	-0.08
			Max. Mx	8	72.33	-4.58	0.28
			Max. My	10	-6.13	-0.05	4.99
			Max. Vy	8	-1.92	-4.58	0.28
			Max. Vx	26	-2.07	-0.09	-4.99
		Diagonal	Max Tension	17	30.35	0.00	0.00
			Max. Compression	16	-30.71	0.00	0.00
			Max. Mx	34	-0.71	0.51	0.00
			Max. My	34	-0.60	0.00	-0.02
			Max. Vy	34	-0.17	0.00	0.00
			Max. Vx	34	0.01	0.00	0.00
		Horizontal	Max Tension	32	21.87	0.00	0.00
			Max. Compression	17	-21.67	0.05	-0.00
			Max. Mx	38	1.15	0.30	0.02
			Max. My	12	3.14	0.00	-0.07
			Max. Vy	38	0.16	0.30	0.02
			Max. Vx	12	0.01	0.00	-0.07
		Top Girt	Max Tension	6	19.31	0.05	-0.01
			Max. Compression	23	-19.24	0.00	0.00
			Max. Mx	38	-1.63	0.23	0.01
			Max. My	2	2.82	0.02	-0.05
			Max. Vy	38	-0.14	0.23	0.01
			Max. Vx	2	0.01	0.02	-0.05
		Inner Bracing	Max Tension	23	0.33	0.00	0.00
			Max. Compression	22	-0.34	0.00	0.00
			Max. Mx	34	-0.01	-0.17	0.00
			Max. Vy	34	0.09	0.00	0.00
T8	50 - 25	Leg	Max Tension	19	242.26	2.93	0.12
			Max. Compression	2	-272.39	5.00	0.08
			Max. Mx	2	-272.34	-5.03	-0.20
			Max. My	10	-12.23	-0.41	3.79
			Max. Vy	2	2.50	5.00	0.08
			Max. Vx	10	1.84	-0.27	2.50
		Diagonal	Max Tension	17	37.32	-0.17	0.01
			Max. Compression	32	-38.04	0.00	0.00
			Max. Mx	30	19.28	-0.34	0.01
			Max. My	35	-0.92	-0.15	0.03
			Max. Vy	37	0.13	-0.18	-0.03
			Max. Vx	48	0.01	0.00	0.00
		Horizontal	Max Tension	16	27.81	0.12	-0.00
			Max. Compression	17	-27.63	0.09	-0.00
			Max. Mx	38	-1.83	0.49	0.02
			Max. My	24	-0.36	-0.05	-0.10
			Max. Vy	38	0.21	0.49	0.02
			Max. Vx	24	-0.01	-0.05	-0.10
		Top Girt	Max Tension	16	23.33	0.09	-0.00
			Max. Compression	17	-23.26	0.06	-0.00
			Max. Mx	38	-1.71	0.36	0.01
			Max. My	24	-0.64	-0.01	-0.07
			Max. Vy	38	-0.18	0.36	0.01
			Max. Vx	24	0.01	-0.01	-0.07
		Redund Horz 1 Bracing	Max Tension	2	4.72	0.00	0.00
			Max. Compression	2	-4.72	0.00	0.00
			Max. Mx	34	0.87	-0.06	0.00
			Max. My	34	0.75	0.00	0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	3.24	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-3.24	0.00	0.00
			Max. Mx	34	0.75	-0.08	0.00
			Max. My	34	0.50	0.00	-0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Inner Bracing	Max Tension	33	0.40	0.00	0.00
			Max. Compression	32	-0.41	0.00	0.00
			Max. Mx	34	-0.02	-0.22	0.00
			Max. Vy	34	0.10	0.00	0.00
T9	25 - 0	Leg	Max Tension	19	333.99	6.62	0.29
			Max. Compression	2	-374.04	0.00	0.00
			Max. Mx	2	-373.97	9.64	0.14
			Max. My	10	-13.59	-0.61	5.75
			Max. Vy	2	-2.98	9.64	0.14
			Max. Vx	10	-1.62	-0.61	5.75
		Diagonal	Max Tension	17	49.76	-0.43	0.01
			Max. Compression	16	-50.57	0.00	0.00
			Max. Mx	30	26.80	-0.66	0.02
			Max. My	43	-1.60	-0.02	-0.05
			Max. Vy	37	0.17	-0.33	-0.05
			Max. Vx	46	0.01	0.00	0.00
		Horizontal	Max Tension	30	31.51	0.00	0.00
			Max. Compression	15	-31.47	0.19	0.02
			Max. Mx	38	-2.76	0.54	0.02
			Max. My	24	-0.08	-0.08	-0.10
			Max. Vy	38	-0.23	0.54	0.02
			Max. Vx	24	0.01	-0.08	-0.10
		Top Girt	Max Tension	16	29.67	0.13	-0.00
			Max. Compression	17	-29.49	0.09	-0.00
			Max. Mx	38	-2.02	0.52	0.02
			Max. My	24	-0.93	-0.07	-0.10
			Max. Vy	38	-0.21	0.52	0.02
			Max. Vx	24	0.01	-0.07	-0.10
		Redund Horz 1 Bracing	Max Tension	2	6.49	0.00	0.00
			Max. Compression	2	-6.49	0.00	0.00
			Max. Mx	34	1.07	-0.07	0.00
			Max. My	34	0.91	0.00	0.00
			Max. Vy	34	0.06	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	5.26	0.00	0.00
			Max. Compression	2	-5.26	0.00	0.00
			Max. Mx	34	1.13	-0.10	0.00
			Max. My	34	0.78	0.00	-0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Inner Bracing	Max Tension	17	0.51	0.00	0.00
			Max. Compression	16	-0.52	0.00	0.00
			Max. Mx	34	-0.02	-0.26	0.00
			Max. Vy	34	0.11	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	434.12	55.77	-35.05
	Max. H_x	24	434.12	55.77	-35.05
	Max. H_z	7	-380.12	-48.29	34.17
	Min. Vert	9	-391.56	-51.32	32.30
	Min. H_x	9	-391.56	-51.32	32.30
	Min. H_z	22	406.21	49.98	-35.16
Leg B	Max. Vert	12	436.21	-55.01	-36.51
	Max. H_x	29	-391.30	50.61	33.61
	Max. H_z	31	-379.95	47.16	36.21
	Min. Vert	29	-391.30	50.61	33.61
	Min. H_x	12	436.21	-55.01	-36.51
	Min. H_z	14	408.38	-48.87	-37.23
Leg A	Max. Vert	2	438.65	1.65	65.93
	Max. H_x	26	17.15	19.22	1.17
	Max. H_z	2	438.65	1.65	65.93
	Min. Vert	19	-392.92	-1.49	-60.66
	Min. H_x	11	12.11	-19.20	0.83
	Min. H_z	19	-392.92	-1.49	-60.66

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	39.89	-0.00	0.00	-11.52	-11.72	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	47.87	-0.04	-121.62	-7694.26	-6.21	59.49
0.9 Dead+1.6 Wind 0 deg - No Ice	35.90	-0.04	-121.62	-7690.81	-2.69	59.49
1.2 Dead+1.6 Wind 30 deg - No Ice	47.87	58.35	-101.18	-6466.55	-3706.47	-17.63
0.9 Dead+1.6 Wind 30 deg - No Ice	35.90	58.35	-101.18	-6463.09	-3702.96	-17.63
1.2 Dead+1.6 Wind 45 deg - No Ice	47.87	81.98	-82.04	-5253.59	-5213.47	-53.33
0.9 Dead+1.6 Wind 45 deg - No Ice	35.90	81.98	-82.04	-5250.14	-5209.96	-53.33
1.2 Dead+1.6 Wind 60 deg - No Ice	47.87	99.74	-57.60	-3697.28	-6352.42	-84.73
0.9 Dead+1.6 Wind 60 deg - No Ice	35.90	99.74	-57.60	-3693.82	-6348.91	-84.73
1.2 Dead+1.6 Wind 90 deg - No Ice	47.87	116.78	0.04	-5.97	-7412.49	-131.53
0.9 Dead+1.6 Wind 90 deg - No Ice	35.90	116.78	0.04	-2.51	-7408.97	-131.53
1.2 Dead+1.6 Wind 120 deg - No Ice	47.87	105.28	60.85	3833.20	-6620.02	-149.77
0.9 Dead+1.6 Wind 120 deg - No Ice	35.90	105.28	60.85	3836.65	-6616.50	-149.77
1.2 Dead+1.6 Wind 135 deg - No Ice	47.87	82.05	82.10	5237.05	-5224.59	-138.51
0.9 Dead+1.6 Wind 135 deg - No Ice	35.90	82.05	82.10	5240.51	-5221.07	-138.51
1.2 Dead+1.6 Wind 150 deg - No Ice	47.87	58.43	101.22	6446.75	-3720.08	-113.90
0.9 Dead+1.6 Wind 150 deg - No Ice	35.90	58.43	101.22	6450.21	-3716.56	-113.90

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 180 deg - No Ice	47.87	0.04	115.27	7366.69	-21.92	-54.28
0.9 Dead+1.6 Wind 180 deg - No Ice	35.90	0.04	115.27	7370.15	-18.40	-54.28
1.2 Dead+1.6 Wind 210 deg - No Ice	47.87	-58.35	101.18	6438.90	3678.35	17.63
0.9 Dead+1.6 Wind 210 deg - No Ice	35.90	-58.35	101.18	6442.35	3681.86	17.63
1.2 Dead+1.6 Wind 225 deg - No Ice	47.87	-81.98	82.04	5225.94	5185.35	53.33
0.9 Dead+1.6 Wind 225 deg - No Ice	35.90	-81.98	82.04	5229.40	5188.87	53.33
1.2 Dead+1.6 Wind 240 deg - No Ice	47.87	-105.24	60.77	3819.59	6584.04	90.28
0.9 Dead+1.6 Wind 240 deg - No Ice	35.90	-105.24	60.77	3823.05	6587.55	90.28
1.2 Dead+1.6 Wind 270 deg - No Ice	47.87	-116.78	-0.04	-21.68	7384.37	131.53
0.9 Dead+1.6 Wind 270 deg - No Ice	35.90	-116.78	-0.04	-18.23	7387.88	131.53
1.2 Dead+1.6 Wind 300 deg - No Ice	47.87	-99.78	-57.67	-3710.89	6332.16	139.00
0.9 Dead+1.6 Wind 300 deg - No Ice	35.90	-99.78	-57.67	-3707.43	6335.67	139.00
1.2 Dead+1.6 Wind 315 deg - No Ice	47.87	-82.05	-82.10	-5264.70	5196.46	138.51
0.9 Dead+1.6 Wind 315 deg - No Ice	35.90	-82.05	-82.10	-5261.25	5199.98	138.51
1.2 Dead+1.6 Wind 330 deg - No Ice	47.87	-58.43	-101.22	-6474.40	3691.96	113.90
0.9 Dead+1.6 Wind 330 deg - No Ice	35.90	-58.43	-101.22	-6470.95	3695.47	113.90
1.2 Dead+1.0 Ice+1.0 Temp	206.08	-0.00	0.00	-249.86	-103.64	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	206.08	-0.01	-43.35	-2797.43	-102.44	13.63
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	206.08	21.37	-37.06	-2433.24	-1359.17	-28.98
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	206.08	30.17	-30.19	-2029.19	-1876.82	-47.78
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	206.08	36.87	-21.30	-1505.46	-2272.06	-63.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	206.08	42.77	0.01	-248.66	-2616.79	-81.17
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	206.08	37.53	21.69	1024.96	-2302.97	-78.31
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	206.08	30.19	30.21	1531.16	-1878.52	-67.78
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	206.08	21.40	37.07	1934.71	-1361.25	-52.19
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	206.08	0.01	42.62	2263.40	-104.84	-13.33
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	206.08	-21.37	37.06	1933.51	1151.89	28.98
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	206.08	-30.17	30.19	1529.46	1669.54	47.78
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	206.08	-37.51	21.66	1022.88	2094.48	64.68
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	206.08	-42.77	-0.01	-251.07	2409.51	81.17
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	206.08	-36.89	-21.32	-1507.54	2065.98	76.55

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	206.08	-30.19	-30.21	-2030.89	1671.24	67.78
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	206.08	-21.40	-37.07	-2434.44	1153.97	52.19
Dead+Wind 0 deg - Service	39.89	-0.01	-25.29	-1608.60	-10.08	12.37
Dead+Wind 30 deg - Service	39.89	12.13	-21.04	-1353.31	-779.52	-3.67
Dead+Wind 45 deg - Service	39.89	17.05	-17.06	-1101.09	-1092.89	-11.09
Dead+Wind 60 deg - Service	39.89	20.74	-11.98	-777.46	-1329.73	-17.62
Dead+Wind 90 deg - Service	39.89	24.28	0.01	-9.89	-1550.16	-27.35
Dead+Wind 120 deg - Service	39.89	21.89	12.65	788.44	-1385.37	-31.14
Dead+Wind 135 deg - Service	39.89	17.06	17.07	1080.36	-1095.20	-28.80
Dead+Wind 150 deg - Service	39.89	12.15	21.05	1331.90	-782.35	-23.68
Dead+Wind 180 deg - Service	39.89	0.01	23.97	1523.20	-13.35	-11.29
Dead+Wind 210 deg - Service	39.89	-12.13	21.04	1330.27	756.09	3.67
Dead+Wind 225 deg - Service	39.89	-17.05	17.06	1078.04	1069.46	11.09
Dead+Wind 240 deg - Service	39.89	-21.88	12.64	785.61	1360.30	18.77
Dead+Wind 270 deg - Service	39.89	-24.28	-0.01	-13.15	1526.72	27.35
Dead+Wind 300 deg - Service	39.89	-20.75	-11.99	-780.29	1307.92	28.90
Dead+Wind 315 deg - Service	39.89	-17.06	-17.07	-1103.40	1071.77	28.80
Dead+Wind 330 deg - Service	39.89	-12.15	-21.05	-1354.94	758.92	23.68

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-39.89	0.00	0.00	39.89	-0.00	0.000%
2	-0.04	-47.87	-121.62	0.04	47.87	121.62	0.000%
3	-0.04	-35.90	-121.62	0.04	35.90	121.62	0.000%
4	58.35	-47.87	-101.18	-58.35	47.87	101.18	0.000%
5	58.35	-35.90	-101.18	-58.35	35.90	101.18	0.000%
6	81.98	-47.87	-82.04	-81.98	47.87	82.04	0.000%
7	81.98	-35.90	-82.04	-81.98	35.90	82.04	0.000%
8	99.74	-47.87	-57.60	-99.74	47.87	57.60	0.000%
9	99.74	-35.90	-57.60	-99.74	35.90	57.60	0.000%
10	116.78	-47.87	0.04	-116.78	47.87	-0.04	0.000%
11	116.78	-35.90	0.04	-116.78	35.90	-0.04	0.000%
12	105.28	-47.87	60.85	-105.28	47.87	-60.85	0.000%
13	105.28	-35.90	60.85	-105.28	35.90	-60.85	0.000%
14	82.05	-47.87	82.10	-82.05	47.87	-82.10	0.000%
15	82.05	-35.90	82.10	-82.05	35.90	-82.10	0.000%
16	58.43	-47.87	101.22	-58.43	47.87	-101.22	0.000%
17	58.43	-35.90	101.22	-58.43	35.90	-101.22	0.000%
18	0.04	-47.87	115.27	-0.04	47.87	-115.27	0.000%
19	0.04	-35.90	115.27	-0.04	35.90	-115.27	0.000%
20	-58.35	-47.87	101.18	58.35	47.87	-101.18	0.000%
21	-58.35	-35.90	101.18	58.35	35.90	-101.18	0.000%
22	-81.98	-47.87	82.04	81.98	47.87	-82.04	0.000%
23	-81.98	-35.90	82.04	81.98	35.90	-82.04	0.000%
24	-105.24	-47.87	60.77	105.24	47.87	-60.77	0.000%
25	-105.24	-35.90	60.77	105.24	35.90	-60.77	0.000%
26	-116.78	-47.87	-0.04	116.78	47.87	0.04	0.000%
27	-116.78	-35.90	-0.04	116.78	35.90	0.04	0.000%
28	-99.78	-47.87	-57.67	99.78	47.87	57.67	0.000%
29	-99.78	-35.90	-57.67	99.78	35.90	57.67	0.000%
30	-82.05	-47.87	-82.10	82.05	47.87	82.10	0.000%
31	-82.05	-35.90	-82.10	82.05	35.90	82.10	0.000%
32	-58.43	-47.87	-101.22	58.43	47.87	101.22	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-58.43	-35.90	-101.22	58.43	35.90	101.22	0.000%
34	0.00	-206.08	0.00	0.00	206.08	-0.00	0.000%
35	-0.01	-206.08	-43.35	0.01	206.08	43.35	0.000%
36	21.37	-206.08	-37.06	-21.37	206.08	37.06	0.000%
37	30.17	-206.08	-30.19	-30.17	206.08	30.19	0.000%
38	36.87	-206.08	-21.30	-36.87	206.08	21.30	0.000%
39	42.77	-206.08	0.01	-42.77	206.08	-0.01	0.000%
40	37.53	-206.08	21.69	-37.53	206.08	-21.69	0.000%
41	30.19	-206.08	30.21	-30.19	206.08	-30.21	0.000%
42	21.40	-206.08	37.07	-21.40	206.08	-37.07	0.000%
43	0.01	-206.08	42.62	-0.01	206.08	-42.62	0.000%
44	-21.37	-206.08	37.06	21.37	206.08	-37.06	0.000%
45	-30.17	-206.08	30.19	30.17	206.08	-30.19	0.000%
46	-37.51	-206.08	21.66	37.51	206.08	-21.66	0.000%
47	-42.77	-206.08	-0.01	42.77	206.08	0.01	0.000%
48	-36.89	-206.08	-21.32	36.89	206.08	21.32	0.000%
49	-30.19	-206.08	-30.21	30.19	206.08	30.21	0.000%
50	-21.40	-206.08	-37.07	21.40	206.08	37.07	0.000%
51	-0.01	-39.89	-25.29	0.01	39.89	25.29	0.000%
52	12.13	-39.89	-21.04	-12.13	39.89	21.04	0.000%
53	17.05	-39.89	-17.06	-17.05	39.89	17.06	0.000%
54	20.74	-39.89	-11.98	-20.74	39.89	11.98	0.000%
55	24.28	-39.89	0.01	-24.28	39.89	-0.01	0.000%
56	21.89	-39.89	12.65	-21.89	39.89	-12.65	0.000%
57	17.06	-39.89	17.07	-17.06	39.89	-17.07	0.000%
58	12.15	-39.89	21.05	-12.15	39.89	-21.05	0.000%
59	0.01	-39.89	23.97	-0.01	39.89	-23.97	0.000%
60	-12.13	-39.89	21.04	12.13	39.89	-21.04	0.000%
61	-17.05	-39.89	17.06	17.05	39.89	-17.06	0.000%
62	-21.88	-39.89	12.64	21.88	39.89	-12.64	0.000%
63	-24.28	-39.89	-0.01	24.28	39.89	0.01	0.000%
64	-20.75	-39.89	-11.99	20.75	39.89	11.99	0.000%
65	-17.06	-39.89	-17.07	17.06	39.89	17.07	0.000%
66	-12.15	-39.89	-21.05	12.15	39.89	21.05	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	1.940	51	0.1065	0.0196
T2	116.667 - 108.333	1.866	51	0.1065	0.0195
T3	108.333 - 100	1.673	51	0.1067	0.0204
T4	100 - 91.6667	1.477	51	0.1061	0.0213
T5	91.6667 - 83.3333	1.281	51	0.1041	0.0206
T6	83.3333 - 75	1.093	51	0.1002	0.0198
T7	75 - 50	0.913	51	0.0942	0.0187
T8	50 - 25	0.427	51	0.0737	0.0134
T9	25 - 0	0.109	51	0.0359	0.0068

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	51	1.940	0.1065	0.0196	68791
120.00	16'x3" Omni (inverted)	51	1.940	0.1065	0.0196	68791
117.00	6' DISH (SOLID)	51	1.873	0.1065	0.0195	68791
115.00	6' DISH (SOLID)	51	1.828	0.1065	0.0195	68791
114.00	Rohn 6' Side-Arm(1)	51	1.805	0.1065	0.0196	73783
113.00	Pirod 4' Side Mount Standoff (1)	51	1.782	0.1066	0.0197	84945
112.00	Junction Box	51	1.759	0.1066	0.0198	104467
111.00	6' DISH (SOLID)	51	1.736	0.1066	0.0200	135678
110.00	6'8"x4" Pipe Mount	51	1.712	0.1067	0.0201	185467
109.00	10'x2" Dipole Antenna (inverted)	51	1.689	0.1067	0.0203	267709
107.00	6'8"x4" Pipe Mount	51	1.642	0.1067	0.0206	588473
106.00	16'x3" Omni (inverted)	51	1.618	0.1066	0.0207	795917
105.00	SE419-SWBPALDF Panel Antenna	51	1.595	0.1066	0.0209	930763
104.00	AP13-850/065D w/Mount Pipe	51	1.571	0.1065	0.0210	801245
103.00	TMA 432-83H-01T	51	1.548	0.1064	0.0211	700482
101.00	SE419-SWBPALDF Panel Antenna	51	1.501	0.1062	0.0212	752388
100.00	PD458-406	51	1.477	0.1061	0.0213	Inf
96.00	3'4"x4" Pipe Mount (horizontal)	51	1.383	0.1053	0.0211	242773
95.00	SC479-HF1LDF (inverted)	51	1.359	0.1051	0.0210	184713
92.00	PD458-406	51	1.289	0.1042	0.0207	114461
88.00	SC479-HF1LDF (inverted)	51	1.197	0.1027	0.0203	91632
87.00	4'6"x3" Pipe Mount (horizontal)	51	1.174	0.1022	0.0202	89319
86.00	20' 4-Bay Dipole	51	1.152	0.1017	0.0201	87672
82.00	3' Yagi	51	1.063	0.0994	0.0197	91942
81.00	3' Yagi	51	1.041	0.0987	0.0196	96904
80.00	Face Mount	51	1.020	0.0980	0.0194	103625
77.00	20' 4-Bay Dipole	51	0.955	0.0957	0.0190	130961
76.00	3'4"x4" Pipe Mount (horizontal)	51	0.934	0.0950	0.0188	138389
72.00	Face Mount	51	0.850	0.0921	0.0181	125319
67.00	4'6"x3" Pipe Mount (horizontal)	51	0.747	0.0886	0.0172	88114
65.00	6' Yagi w/ Mount	51	0.706	0.0872	0.0168	78568
63.00	GPS	51	0.666	0.0857	0.0163	70889
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	51	0.515	0.0790	0.0146	50963
53.00	1.0" Dia 4' Omni w/Pipe Mount	51	0.479	0.0770	0.0141	47638
48.00	10'x6" Dipole Antenna	51	0.394	0.0713	0.0129	41542
47.00	5'x1.5in dia Whip Antenna /w mount	51	0.378	0.0700	0.0126	40632
43.00	3' Whip (3in diameter) /w mount	51	0.317	0.0645	0.0116	37469
41.00	4 FT DISH	51	0.288	0.0615	0.0111	36071
40.00	1'x1' Panel Antenna	51	0.274	0.0600	0.0108	35411
39.00	6'x1" Whip Antenna w/ Mount	51	0.260	0.0585	0.0106	34774

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	9.267	2	0.5084	0.0941
T2	116.667 - 108.333	8.914	2	0.5084	0.0935
T3	108.333 - 100	7.994	2	0.5091	0.0981
T4	100 - 91.6667	7.057	2	0.5060	0.1022
T5	91.6667 - 83.3333	6.123	2	0.4964	0.0991
T6	83.3333 - 75	5.223	2	0.4781	0.0952
T7	75 - 50	4.365	2	0.4496	0.0898
T8	50 - 25	2.045	2	0.3520	0.0643
T9	25 - 0	0.524	2	0.1717	0.0326

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

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	2	9.267	0.5084	0.0941	14476
120.00	16'x3" Omni (inverted)	2	9.267	0.5084	0.0941	14476
117.00	6' DISH (SOLID)	2	8.950	0.5084	0.0935	14476
115.00	6' DISH (SOLID)	2	8.734	0.5085	0.0939	14476
114.00	Rohn 6' Side-Arm(1)	2	8.625	0.5086	0.0942	15545
113.00	Pirod 4' Side Mount Standoff (1)	2	8.515	0.5088	0.0948	17925
112.00	Junction Box	2	8.404	0.5089	0.0954	22097
111.00	6' DISH (SOLID)	2	8.293	0.5090	0.0961	28801
110.00	6'8"x4" Pipe Mount	2	8.181	0.5091	0.0968	39582
109.00	10'x2" Dipole Antenna (inverted)	2	8.069	0.5091	0.0976	57596
107.00	6'8"x4" Pipe Mount	2	7.844	0.5090	0.0991	129506
106.00	16'x3" Omni (inverted)	2	7.732	0.5088	0.0998	176135
105.00	SE419-SWBPALDF Panel Antenna	2	7.620	0.5085	0.1004	205030
104.00	AP13-850/065D w/Mount Pipe	2	7.507	0.5082	0.1010	179953
103.00	TMA 432-83H-01T	2	7.395	0.5078	0.1015	157386
101.00	SE419-SWBPALDF Panel Antenna	2	7.170	0.5067	0.1021	173096
100.00	PD458-406	2	7.057	0.5060	0.1022	253348
96.00	3'4"x4" Pipe Mount (horizontal)	2	6.607	0.5023	0.1013	51004
95.00	SC479-HF1LDF (inverted)	2	6.495	0.5011	0.1008	38719
92.00	PD458-406	2	6.160	0.4970	0.0993	23963
88.00	SC479-HF1LDF (inverted)	2	5.722	0.4898	0.0974	19283
87.00	4'6"x3" Pipe Mount (horizontal)	2	5.614	0.4876	0.0970	18828
86.00	20' 4-Bay Dipole	2	5.506	0.4853	0.0964	18511
82.00	3' Yagi	2	5.083	0.4740	0.0946	19485
81.00	3' Yagi	2	4.979	0.4708	0.0941	20543
80.00	Face Mount	2	4.876	0.4674	0.0935	21970
77.00	20' 4-Bay Dipole	2	4.568	0.4567	0.0914	27755
76.00	3'4"x4" Pipe Mount (horizontal)	2	4.466	0.4532	0.0906	29317
72.00	Face Mount	2	4.064	0.4393	0.0872	26457
67.00	4'6"x3" Pipe Mount (horizontal)	2	3.571	0.4227	0.0826	18541
65.00	6' Yagi w/ Mount	2	3.378	0.4160	0.0806	16519
63.00	GPS	2	3.188	0.4090	0.0786	14895
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	2	2.463	0.3772	0.0700	10690
53.00	1.0" Dia 4' Omni w/Pipe Mount	2	2.292	0.3677	0.0677	9989
48.00	10'x6" Dipole Antenna	2	1.887	0.3404	0.0619	8707
47.00	5'x1.5in dia Whip Antenna /w mount	2	1.810	0.3342	0.0607	8516
43.00	3' Whip (3in diameter) /w mount	2	1.516	0.3079	0.0558	7852
41.00	4 FT DISH	2	1.378	0.2937	0.0533	7559
40.00	1'x1' Panel Antenna	2	1.312	0.2865	0.0520	7420
39.00	6'x1" Whip Antenna w/ Mount	2	1.247	0.2791	0.0508	7287

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	120	Diagonal	A325X	0.7500	1	0.50	31.32	0.016 ✔	1	Member Bearing
		Top Girt	A325X	0.6250	2	0.12	7.19	0.017 ✔	1	Member Block Shear
T2	116.667	Diagonal	A325X	0.7500	1	5.37	17.94	0.299 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	1.96	7.19	0.272 ✔	1	Member Block Shear
T3	108.333	Diagonal	A325X	0.7500	1	9.11	17.94	0.507 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	2.96	7.19	0.412 ✔	1	Member Block Shear
T4	100	Leg	A325X	0.7500	6	2.97	29.82	0.100 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	13.20	17.94	0.736 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	4.21	10.26	0.410 ✔	1	Member Block Shear
T5	91.6667	Diagonal	A325X	0.7500	1	16.84	26.81	0.628 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	5.52	10.26	0.538 ✔	1	Member Block Shear
T6	83.3333	Diagonal	A325X	0.7500	1	21.41	35.89	0.597 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	7.32	10.26	0.713 ✔	1	Member Block Shear
T7	75	Leg	A325X	0.7500	6	23.43	29.82	0.786 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	30.35	35.34	0.859 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	10.93	13.03	0.839 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	9.66	14.38	0.672 ✔	1	Member Block Shear
T8	50	Leg	A490X	0.8750	6	40.33	50.96	0.791 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	37.32	42.41	0.880 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	13.90	15.19	0.915 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	2	11.66	15.19	0.768 ✔	1	Bolt Shear
T9	25	Leg	A325X	1.0000	8	41.70	53.01	0.787 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	49.76	54.84	0.907 ✔	1	Member Block Shear
		Horizontal	A490X	0.6250	2	15.75	18.98	0.830 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	2	14.84	15.19	0.977 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8 K=1.00	3.7306	-1.33	161.06	0.008 [1] ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-4.55	129.56	0.035 [1] ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-9.82	129.56	0.076 [1] ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-22.93	129.56	0.177 [1] ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-39.90	129.56	0.308 [1] ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-62.66	129.56	0.484 [1] ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4 K=1.00	6.1120	-160.76	221.46	0.726 [1] ✔
T8	50 - 25	P.5x.400	25.03	4.17	30.7 K=1.00	5.7805	-272.39	287.44	0.948 [1] ✔
T9	25 - 0	P6.875x.400	25.03	6.26	32.7 K=1.00	8.1367	-374.04	399.96	0.935 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	94.4 K=1.00	1.6200	-0.50	32.83	0.015 [1] ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	148.1 K=1.00	1.6200	-5.49	16.68	0.329 [1] ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	151.4 K=1.00	1.6200	-9.22	15.97	0.578 [1] ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	154.7 K=1.00	1.6200	-13.37	15.29	0.874 [1] ✔
T5	91.6667 - 83.3333	2L2 1/2x2 1/2x1/4	11.00	10.41	162.4 K=1.00	2.3800	-17.06	20.38	0.837 [1] ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	166.2 K=1.00	3.0900	-21.69	25.27	0.858 [1] ✔
T7	75 - 50	2L3x3x5/16	11.91	11.32	147.3 K=1.00	3.5500	-30.71	36.97	0.831 [1] ✔
T8	50 - 25	2L3x3x3/8	12.65	12.10	114.3 K=1.00	4.2200	-38.04	72.96	0.521 [1] ✔
T9	25 - 0	2L3 1/2x3 1/2x3/8	16.33	15.56	126.1 K=1.00	4.9700	-50.57	70.59	0.716 [1] ✔

[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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	5.43	129.0 K=0.98	0.9020	-3.92	12.17	0.322 [1] ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	5.77	135.1 K=0.97	0.9020	-6.04	11.16	0.542 [1] ✔
T7	75 - 50	L3 1/2x3 1/2x1/4	16.35	7.75	130.7 K=0.98	1.6900	-21.67	22.37	0.969 [1] ✔
T8	50 - 25	L4x4x5/16	18.35	8.77	130.0 K=0.98	2.4000	-27.63	32.10	0.861 [1] ✔
T9	25 - 0	L4x4x3/8	20.02	9.52	139.1 K=0.96	2.8600	-31.47	33.38	0.943 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	5.30	126.5 K=0.98	0.9020	-0.25	12.58	0.020 [1] ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	122.8 K=0.99	1.4400	-8.41	21.08	0.399 [1] ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	128.0 K=0.98	1.4400	-11.00	19.70	0.559 [1] ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	133.1 K=0.97	1.4400	-14.56	18.35	0.794 [1] ✔
T7	75 - 50	L3x3x5/16	15.02	7.10	138.9 K=0.96	1.7800	-19.24	20.86	0.923 [1] ✔
T8	50 - 25	L3 1/2x3 1/2x5/16	17.02	8.08	135.7 K=0.97	2.0900	-23.26	25.66	0.906 [1] ✔
T9	25 - 0	L4x4x5/16	19.02	9.10	133.8 K=0.97	2.4000	-29.49	30.27	0.974 [1] ✔

[1] $P_u / \phi P_n$ controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	4.59	4.38	113.5 K=1.06	1.1900	-4.72	19.57	0.241 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	5.00	4.72	117.7 K=1.02	1.1900	-6.49	18.60	0.349 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	6.08	5.79	141.5 K=1.00	1.1900	-3.13	13.43	0.233 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	7.85	7.38	180.4 K=1.00	1.1900	-5.09	8.26	0.616 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	182.9 K=1.00	0.8090	-0.15	5.46	0.027 [1] ✔
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	192.3 K=1.00	0.8090	-0.19	4.94	0.039 [1] ✔
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	201.6 K=1.00	0.8090	-0.26	4.50	0.057 [1] ✔
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	211.0 K=1.00	0.8090	-0.34	4.11	0.082 [1] ✔
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	239.1 K=1.00	0.8090	-0.41	3.20	0.128 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	230.5 K=1.00	0.9020	-0.52	3.83	0.135 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8	3.7306	0.42	167.88	0.002 [1] ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5	3.7306	0.19	167.88	0.001 [1] ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5	3.7306	6.89	167.88	0.041 [1] ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5	3.7306	17.83	167.88	0.106 [1] ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5	3.7306	32.34	167.88	0.193 [1] ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5	3.7306	51.89	167.88	0.309 [1] ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4	6.1120	140.58	275.04	0.511 [1] ✔
T8	50 - 25	P.5x.400	25.03	4.17	30.7	5.7805	242.26	312.15	0.776 [1] ✔
T9	25 - 0	P6.875x.400	25.03	6.26	32.7	8.1367	333.99	439.38	0.760 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	98.5	0.9689	0.18	42.15	0.004 [1] ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	152.3	0.9689	5.37	42.15	0.127 [1] ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	155.5	0.9689	9.11	42.15	0.216 [1] ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	158.8	0.9689	13.20	42.15	0.313 [1] ✔
T5	91.6667 - 83.3333	2L2 1/2x2 1/2x1/4	11.00	10.41	166.6	1.4569	16.84	71.02	0.237 [1] ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	170.4	1.8253	21.41	79.40	0.270 [1] ✔
T7	75 - 50	2L3x3x5/16	11.91	11.32	150.8	2.2523	30.35	109.80	0.276 [1] ✔
T8	50 - 25	2L3x3x3/8	12.65	12.10	116.9	2.6728	37.32	130.30	0.286 [1] ✔
T9	25 - 0	2L3 1/2x3 1/2x3/8	16.33	15.56	128.8	3.0947	49.76	150.87	0.330 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	5.43	130.3	0.5710	3.91	24.84	0.157 [1] ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	5.77	138.0	0.5710	5.92	24.84	0.238 [1] ✔
T7	75 - 50	L3 1/2x3 1/2x1/4	16.35	7.75	87.4	1.1269	21.87	54.94	0.398 [1] ✔
T8	50 - 25	L4x4x5/16	18.35	8.77	86.8	1.6242	27.81	79.18	0.351 [1] ✔
T9	25 - 0	L4x4x3/8	20.02	9.52	94.9	1.9341	31.51	94.29	0.334 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	5.30	127.2	0.5710	0.25	24.84	0.010 [1] ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	81.3	0.9394	8.42	40.86	0.206 [1] ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	85.6	0.9394	11.04	40.86	0.270 [1] ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	89.9	0.9394	14.64	40.86	0.358 [1] ✔
T7	75 - 50	L3x3x5/16	15.02	7.10	95.0	1.1592	19.31	56.51	0.342 [1] ✔
T8	50 - 25	L3 1/2x3 1/2x5/16	17.02	8.08	92.0	1.3917	23.33	67.85	0.344 [1] ✔
T9	25 - 0	L4x4x5/16	19.02	9.10	90.0	1.6242	29.67	79.18	0.375 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	4.59	4.38	68.3	1.1900	4.72	38.56	0.123 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	5.00	4.72	73.6	1.1900	6.49	38.56	0.168 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	5.84	5.55	86.6	1.1900	3.24	38.56	0.084 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	7.71	7.23	112.9	1.1900	5.26	38.56	0.136 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	130.2	0.8090	0.14	26.21	0.006 [1] ✔
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	136.9	0.8090	0.19	26.21	0.007 [1] ✔
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	143.6	0.8090	0.25	26.21	0.010 [1] ✔
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	150.2	0.8090	0.33	26.21	0.013 [1] ✔
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	170.2	0.8090	0.40	26.21	0.015 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	146.7	0.9020	0.51	29.22	0.017 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	120 - 116.667	Leg	P.5x.250	1	-1.33	161.06	2.0	Pass
		Leg	P.5x.250	2	-1.18	161.06	1.6	Pass
		Leg	P.5x.250	3	-1.10	161.06	1.5	Pass
T2	116.667 - 108.333	Leg	P.5x.250	13	-4.55	129.56	3.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Leg	P.5x.250	14	-4.14	129.56	3.2	Pass
		Leg	P.5x.250	15	-3.77	129.56	2.9	Pass
T3	108.333 - 100	Leg	P.5x.250	25	-8.94	129.56	6.9	Pass
		Leg	P.5x.250	26	-8.61	129.56	6.6	Pass
		Leg	P.5x.250	27	-9.82	129.56	7.6	Pass
T4	100 - 91.6667	Leg	P.5x.250	37	-22.02	129.56	17.0	Pass
		Leg	P.5x.250	38	-21.67	129.56	16.7	Pass
		Leg	P.5x.250	39	-22.93	129.56	17.7	Pass
T5	91.6667 - 83.3333	Leg	P.5x.250	52	-38.15	129.56	29.4	Pass
		Leg	P.5x.250	53	-38.04	129.56	29.4	Pass
		Leg	P.5x.250	54	-39.90	129.56	30.8	Pass
T6	83.3333 - 75	Leg	P.5x.250	67	-60.07	129.56	46.4	Pass
		Leg	P.5x.250	68	-60.27	129.56	46.5	Pass
		Leg	P.5x.250	69	-62.66	129.56	48.4	Pass
T7	75 - 50	Leg	P5x.375	82	-156.94	221.46	70.9 77.3 (b)	Pass
		Leg	P5x.375	83	-157.99	221.46	71.3 77.4 (b)	Pass
		Leg	P5x.375	84	-160.76	221.46	72.6 78.6 (b)	Pass
T8	50 - 25	Leg	P.5x.400	121	-267.99	287.44	93.2	Pass
		Leg	P.5x.400	122	-269.71	287.44	93.8	Pass
		Leg	P.5x.400	123	-272.39	287.44	94.8	Pass
T9	25 - 0	Leg	P6.875x.400	196	-369.42	399.96	92.4	Pass
		Leg	P6.875x.400	197	-371.51	399.96	92.9	Pass
		Leg	P6.875x.400	198	-374.04	399.96	93.5	Pass
T1	120 - 116.667	Diagonal	2L2 1/2x2x3/16	7	-0.49	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	8	-0.48	32.83	1.5 1.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	9	-0.50	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	10	-0.49	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	11	-0.47	32.83	1.4 1.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	12	-0.49	32.83	1.5 1.6 (b)	Pass
T2	116.667 - 108.333	Diagonal	2L2 1/2x2x3/16	17	-5.39	16.68	32.3	Pass
		Diagonal	2L2 1/2x2x3/16	18	-5.40	16.68	32.4	Pass
		Diagonal	2L2 1/2x2x3/16	20	-4.21	16.68	25.3	Pass
		Diagonal	2L2 1/2x2x3/16	21	-4.22	16.68	25.3	Pass
		Diagonal	2L2 1/2x2x3/16	23	-5.49	16.68	32.9	Pass
		Diagonal	2L2 1/2x2x3/16	24	-5.47	16.68	32.8	Pass
T3	108.333 - 100	Diagonal	2L2 1/2x2x3/16	29	-8.48	15.97	53.1	Pass
		Diagonal	2L2 1/2x2x3/16	30	-8.49	15.97	53.1	Pass
		Diagonal	2L2 1/2x2x3/16	32	-7.09	15.97	44.4	Pass
		Diagonal	2L2 1/2x2x3/16	33	-7.10	15.97	44.4	Pass
		Diagonal	2L2 1/2x2x3/16	35	-9.22	15.97	57.8	Pass
		Diagonal	2L2 1/2x2x3/16	36	-9.21	15.97	57.7	Pass
T4	100 - 91.6667	Diagonal	2L2 1/2x2x3/16	43	-11.15	15.29	72.9	Pass
		Diagonal	2L2 1/2x2x3/16	44	-11.16	15.29	73.0	Pass
		Diagonal	2L2 1/2x2x3/16	45	-11.03	15.29	72.1	Pass
		Diagonal	2L2 1/2x2x3/16	46	-11.03	15.29	72.1	Pass
		Diagonal	2L2 1/2x2x3/16	47	-13.37	15.29	87.4	Pass
		Diagonal	2L2 1/2x2x3/16	48	-13.37	15.29	87.4	Pass
T5	91.6667 - 83.3333	Diagonal	2L2 1/2x2 1/2x1/4	58	-14.29	20.38	70.1	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	59	-14.30	20.38	70.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2 1/2x1/4	60	-14.84	20.38	72.8	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	61	-14.84	20.38	72.8	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	62	-17.06	20.38	83.7	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	63	-17.06	20.38	83.7	Pass
T6	83.3333 - 75	Diagonal	2L2 1/2x2x3/8	73	-17.91	25.27	70.9	Pass
		Diagonal	2L2 1/2x2x3/8	74	-17.92	25.27	70.9	Pass
		Diagonal	2L2 1/2x2x3/8	75	-20.29	25.27	80.3	Pass
		Diagonal	2L2 1/2x2x3/8	76	-20.27	25.27	80.2	Pass
		Diagonal	2L2 1/2x2x3/8	77	-21.67	25.27	85.7	Pass
		Diagonal	2L2 1/2x2x3/8	78	-21.69	25.27	85.8	Pass
T7	75 - 50	Diagonal	2L3x3x5/16	89	-25.79	36.97	69.7 71.9 (b)	Pass
		Diagonal	2L3x3x5/16	90	-25.77	36.97	69.7 72.0 (b)	Pass
		Diagonal	2L3x3x5/16	92	-30.71	36.97	83.1 85.8 (b)	Pass
		Diagonal	2L3x3x5/16	93	-30.69	36.97	83.0 85.9 (b)	Pass
		Diagonal	2L3x3x5/16	95	-29.86	36.97	80.8 83.6 (b)	Pass
		Diagonal	2L3x3x5/16	96	-29.90	36.97	80.9 83.5 (b)	Pass
		Diagonal	2L3x3x5/16	101	-25.12	38.56	65.1 70.1 (b)	Pass
		Diagonal	2L3x3x5/16	102	-25.11	38.56	65.1 70.1 (b)	Pass
		Diagonal	2L3x3x5/16	104	-29.21	38.56	75.8 81.7 (b)	Pass
		Diagonal	2L3x3x5/16	105	-29.20	38.56	75.7 81.7 (b)	Pass
		Diagonal	2L3x3x5/16	107	-29.01	38.56	75.2 81.2 (b)	Pass
		Diagonal	2L3x3x5/16	108	-29.03	38.56	75.3 81.1 (b)	Pass
		Diagonal	2L3x3x5/16	112	-23.65	40.22	58.8 66.0 (b)	Pass
		Diagonal	2L3x3x5/16	113	-23.64	40.22	58.8 66.0 (b)	Pass
		Diagonal	2L3x3x5/16	114	-27.25	40.22	67.8 76.1 (b)	Pass
		Diagonal	2L3x3x5/16	115	-27.24	40.22	67.7 76.2 (b)	Pass
		Diagonal	2L3x3x5/16	116	-27.76	40.22	69.0 77.7 (b)	Pass
		Diagonal	2L3x3x5/16	117	-27.78	40.22	69.1 77.6 (b)	Pass
T8	50 - 25	Diagonal	2L3x3x3/8	128	-30.65	72.96	42.0 70.5 (b)	Pass
		Diagonal	2L3x3x3/8	131	-30.62	72.96	42.0 70.6 (b)	Pass
		Diagonal	2L3x3x3/8	135	-38.04	72.96	52.1 87.9 (b)	Pass
		Diagonal	2L3x3x3/8	138	-38.04	72.96	52.1 88.0 (b)	Pass
		Diagonal	2L3x3x3/8	142	-35.55	72.96	48.7 82.2 (b)	Pass
		Diagonal	2L3x3x3/8	145	-35.80	72.96	49.1 82.6 (b)	Pass
		Diagonal	2L3x3x3/8	152	-29.33	75.95	38.6 67.5 (b)	Pass
		Diagonal	2L3x3x3/8	155	-29.31	75.95	38.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							67.6 (b)	
		Diagonal	2L3x3x3/8	159	-36.31	75.95	47.8	Pass
							84.0 (b)	
		Diagonal	2L3x3x3/8	162	-36.32	75.95	47.8	Pass
							84.1 (b)	
		Diagonal	2L3x3x3/8	166	-34.17	75.95	45.0	Pass
							79.1 (b)	
		Diagonal	2L3x3x3/8	169	-34.32	75.95	45.2	Pass
							79.3 (b)	
		Diagonal	2L3x3x3/8	175	-27.55	78.85	34.9	Pass
							63.6 (b)	
		Diagonal	2L3x3x3/8	178	-27.56	78.85	35.0	Pass
							63.7 (b)	
		Diagonal	2L3x3x3/8	181	-32.75	78.85	41.5	Pass
							75.8 (b)	
		Diagonal	2L3x3x3/8	184	-32.75	78.85	41.5	Pass
							75.9 (b)	
		Diagonal	2L3x3x3/8	187	-31.88	78.85	40.4	Pass
							73.9 (b)	
		Diagonal	2L3x3x3/8	190	-31.86	78.85	40.4	Pass
							73.7 (b)	
T9	25 - 0	Diagonal	2L3 1/2x3 1/2x3/8	203	-40.10	70.59	56.8	Pass
							71.6 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	206	-40.06	70.59	56.8	Pass
							71.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	210	-50.57	70.59	71.6	Pass
							90.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	213	-50.56	70.59	71.6	Pass
							90.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	217	-46.45	70.59	65.8	Pass
							83.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	220	-46.67	70.59	66.1	Pass
							83.5 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	226	-39.40	73.56	53.6	Pass
							70.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	229	-39.37	73.56	53.5	Pass
							70.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	232	-49.14	73.56	66.8	Pass
							88.0 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	235	-49.14	73.56	66.8	Pass
							88.1 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	238	-45.57	73.56	62.0	Pass
							81.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	241	-45.91	73.56	62.4	Pass
							82.1 (b)	
T2	116.667 - 108.333	Horizontal	L2 1/2x2 1/2x3/16	16	-3.80	12.17	31.2	Pass
		Horizontal	L2 1/2x2 1/2x3/16	19	-3.08	12.17	25.3	Pass
		Horizontal	L2 1/2x2 1/2x3/16	22	-3.92	12.17	32.2	Pass
T3	108.333 - 100	Horizontal	L2 1/2x2 1/2x3/16	28	-5.60	11.16	50.2	Pass
		Horizontal	L2 1/2x2 1/2x3/16	31	-4.54	11.16	40.7	Pass
		Horizontal	L2 1/2x2 1/2x3/16	34	-6.04	11.16	54.2	Pass
T7	75 - 50	Horizontal	L3 1/2x3 1/2x1/4	88	-18.14	22.37	81.1	Pass
		Horizontal	L3 1/2x3 1/2x1/4	91	-21.67	22.37	96.9	Pass
		Horizontal	L3 1/2x3 1/2x1/4	94	-21.07	22.37	94.2	Pass
		Horizontal	L3 1/2x3 1/2x1/4	100	-17.37	23.95	72.5	Pass
		Horizontal	L3 1/2x3 1/2x1/4	103	-20.28	23.95	84.7	Pass
		Horizontal	L3 1/2x3 1/2x1/4	106	-20.07	23.95	83.8	Pass
T8	50 - 25	Horizontal	L4x4x5/16	127	-22.00	32.10	68.5	Pass
							73.0 (b)	
		Horizontal	L4x4x5/16	134	-27.63	32.10	86.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							91.5 (b)	
		Horizontal	L4x4x5/16	141	-25.89	32.10	80.7	Pass
							85.7 (b)	
		Horizontal	L4x4x5/16	151	-20.83	34.09	61.1	Pass
							69.0 (b)	
		Horizontal	L4x4x5/16	158	-26.03	34.09	76.4	Pass
							86.1 (b)	
		Horizontal	L4x4x5/16	165	-24.70	34.09	72.5	Pass
							81.6 (b)	
T9	25 - 0	Horizontal	L4x4x3/8	202	-24.61	33.38	73.7	Pass
		Horizontal	L4x4x3/8	209	-31.47	33.38	94.3	Pass
		Horizontal	L4x4x3/8	216	-29.24	33.38	87.6	Pass
T1	120 - 116.667	Top Girt	L2 1/2x2 1/2x3/16	4	-0.25	12.58	2.0	Pass
		Top Girt	L2 1/2x2 1/2x3/16	5	-0.21	12.58	1.7	Pass
		Top Girt	L2 1/2x2 1/2x3/16	6	-0.11	12.58	0.9	Pass
T4	100 - 91.6667	Top Girt	L3x3x1/4	40	-7.44	21.08	35.3	Pass
							35.4 (b)	
		Top Girt	L3x3x1/4	41	-7.22	21.08	34.3	Pass
							35.2 (b)	
		Top Girt	L3x3x1/4	42	-8.41	21.08	39.9	Pass
							41.0 (b)	
T5	91.6667 - 83.3333	Top Girt	L3x3x1/4	55	-9.41	19.70	47.8	Pass
		Top Girt	L3x3x1/4	56	-9.85	19.70	50.0	Pass
		Top Girt	L3x3x1/4	57	-11.00	19.70	55.9	Pass
T6	83.3333 - 75	Top Girt	L3x3x1/4	70	-11.82	18.35	64.4	Pass
		Top Girt	L3x3x1/4	71	-13.85	18.35	75.5	Pass
		Top Girt	L3x3x1/4	72	-14.56	18.35	79.4	Pass
T7	75 - 50	Top Girt	L3x3x5/16	85	-16.00	20.86	76.7	Pass
		Top Girt	L3x3x5/16	86	-19.00	20.86	91.1	Pass
		Top Girt	L3x3x5/16	87	-19.24	20.86	92.3	Pass
T8	50 - 25	Top Girt	L3 1/2x3 1/2x5/16	124	-19.43	25.66	75.7	Pass
		Top Girt	L3 1/2x3 1/2x5/16	125	-23.26	25.66	90.6	Pass
		Top Girt	L3 1/2x3 1/2x5/16	126	-22.62	25.66	88.2	Pass
T9	25 - 0	Top Girt	L4x4x5/16	199	-23.34	30.27	77.1	Pass
							77.5 (b)	
		Top Girt	L4x4x5/16	200	-29.49	30.27	97.4	Pass
							97.7 (b)	
		Top Girt	L4x4x5/16	201	-27.45	30.27	90.7	Pass
							90.9 (b)	
T8	50 - 25	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	129	-4.65	19.57	23.7	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	132	-4.68	19.57	23.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	136	-4.68	19.57	23.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	139	-4.72	19.57	24.1	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	143	-4.72	19.57	24.1	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	146	-4.65	19.57	23.7	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	153	-4.65	20.04	23.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	156	-4.68	20.04	23.3	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	160	-4.68	20.04	23.3	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	163	-4.72	20.04	23.6	Pass
		Redund Horz 1	L2 1/2x2 1/2x1/4	167	-4.72	20.04	23.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Bracing						
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	170	-4.65	20.04	23.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	176	-4.65	20.52	22.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	179	-4.68	20.52	22.8	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	182	-4.68	20.52	22.8	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	185	-4.72	20.52	23.0	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	188	-4.72	20.52	23.0	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	191	-4.65	20.52	22.6	Pass
T9	25 - 0	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	204	-6.41	18.60	34.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	207	-6.44	18.60	34.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	211	-6.44	18.60	34.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	214	-6.49	18.60	34.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	218	-6.49	18.60	34.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	221	-6.41	18.60	34.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	227	-6.41	19.31	33.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	230	-6.44	19.31	33.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	233	-6.44	19.31	33.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	236	-6.49	19.31	33.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	239	-6.49	19.31	33.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	242	-6.41	19.31	33.2	Pass
T8	50 - 25	Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	130	-3.08	13.43	22.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	133	-3.10	13.43	23.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	137	-3.10	13.43	23.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	140	-3.13	13.43	23.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	144	-3.13	13.43	23.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	147	-3.08	13.43	22.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	154	-3.13	14.00	22.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	157	-3.15	14.00	22.5	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	161	-3.15	14.00	22.5	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	164	-3.18	14.00	22.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	168	-3.18	14.00	22.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	171	-3.13	14.00	22.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	177	-3.19	14.60	21.8	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	180	-3.21	14.60	22.0	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	183	-3.21	14.60	22.0	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	186	-3.24	14.60	22.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	189	-3.24	14.60	22.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	192	-3.19	14.60	21.8	Pass
T9	25 - 0	Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	205	-5.03	8.26	60.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	208	-5.06	8.26	61.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	212	-5.06	8.26	61.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	215	-5.09	8.26	61.6	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	219	-5.09	8.26	61.6	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	222	-5.03	8.26	60.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	228	-5.19	8.60	60.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	231	-5.22	8.60	60.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	234	-5.22	8.60	60.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	237	-5.26	8.60	61.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	240	-5.26	8.60	61.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	243	-5.19	8.60	60.3	Pass
T4	100 - 91.6667	Inner Bracing	L2 1/2x2x3/16	49	-0.13	5.46	2.4	Pass
		Inner Bracing	L2 1/2x2x3/16	50	-0.15	5.46	2.7	Pass
		Inner Bracing	L2 1/2x2x3/16	51	-0.15	5.46	2.7	Pass
T5	91.6667 - 83.3333	Inner Bracing	L2 1/2x2x3/16	64	-0.17	4.94	3.5	Pass
		Inner Bracing	L2 1/2x2x3/16	65	-0.19	4.94	3.9	Pass
		Inner Bracing	L2 1/2x2x3/16	66	-0.19	4.94	3.9	Pass
T6	83.3333 - 75	Inner Bracing	L2 1/2x2x3/16	79	-0.24	4.50	5.4	Pass
		Inner Bracing	L2 1/2x2x3/16	80	-0.26	4.50	5.7	Pass
		Inner Bracing	L2 1/2x2x3/16	81	-0.26	4.50	5.7	Pass
T7	75 - 50	Inner Bracing	L2 1/2x2x3/16	97	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	98	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	99	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	109	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	110	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	111	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	118	-0.33	4.11	8.1	Pass
		Inner Bracing	L2 1/2x2x3/16	119	-0.34	4.11	8.2	Pass
		Inner Bracing	L2 1/2x2x3/16	120	-0.34	4.11	8.2	Pass
T8	50 - 25	Inner Bracing	L2 1/2x2x3/16	148	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	149	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	150	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	172	-0.03	2.96	1.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Inner Bracing	L2 1/2x2x3/16	173	-0.03	2.96	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	174	-0.03	2.96	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	193	-0.41	3.20	12.8	Pass
		Inner Bracing	L2 1/2x2x3/16	194	-0.41	3.20	12.8	Pass
		Inner Bracing	L2 1/2x2x3/16	195	-0.40	3.20	12.4	Pass
T9	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	223	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	224	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	225	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	244	-0.52	3.83	13.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	245	-0.52	3.83	13.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	246	-0.48	3.83	12.6	Pass
							Summary	
						Leg (T8)	94.8	Pass
						Diagonal (T9)	90.7	Pass
						Horizontal (T7)	96.9	Pass
						Top Girt (T9)	97.7	Pass
						Redund Horz 1 Bracing (T9)	34.9	Pass
						Redund Diag 1 Bracing (T9)	61.6	Pass
						Inner Bracing (T9)	13.5	Pass
						Bolt Checks	97.7	Pass
						RATING =	**97.7**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift: $Uplift := 393 \cdot kips$ *user input*

Shear: $Shear := 66 \cdot kips$ *user input*

Compression: $Compression := 439 \cdot kips$ *user input*

Anchor Bolt Data:

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

Number of Anchor Bolts = N $N := 6$ *user input*

Bolt Ultimate Strength: $F_u := 58 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy := 36 \cdot ksi$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D := 1.50in$ *user input*

Threads per Inch: $n := 6$ *user input*

Coefficient of Friction: $\mu := 0.55$ *user input*

(for baseplate with grout ASCE 10-15)

Length from top of pier to bottom of leveling nut: $L_{ar} := 0in$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

MODified Anchorage - Steel Bolts

Number of Anchor Bolts = N $N_{M1} := 0$ *user input*

Bolt Ultimate Strength: $F_{u.M1} := 72.5 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy_{M1} := 58 \cdot ksi$ *user input*

Bolt Modulus: $E_{M1} := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D_{M1} := 1.25in$ *user input*

Threads per Inch: $n_{M1} := 7$ *user input*

Anchor Bolt Section Properties:

Gross Area of Bolt:

$A_{ge} := N\frac{\pi}{4}\cdot D^2$ $A_{ge} = 10.6\cdot in^2$ $A_{g.pm} := N_{M1}\frac{\pi}{4}\cdot D_{M1}^2$ $A_{g.pm} = 0\cdot in^2$

Net Area of Bolt:

$A_{ne} := N\cdot\left[\frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2\right]$ $A_{n.pm} := N_{M1}\cdot\left[\frac{\pi}{4}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^2\right]$

$A_{ne} = 8.43\cdot in^2$ $A_{n.pm} = 0\cdot in^2$

Net Diameter:

$D_{ne} := N\left(D - \frac{0.9743in}{n}\right)$ $D_{ne} = 8.03\cdot in$ $D_{n.pm} := N_{M1}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)$ $D_{n.pm} = 0\cdot in$

Radius of Gyration of Bolt:

$r_e := N\cdot\frac{\left(D - \frac{0.9743in}{n}\right)}{4}$ $r_e = 2.01\cdot in$ $r_{pm} := N_{M1}\cdot\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)}{4}$ $r_{pm} = 0\cdot in$

Plastic Section Modulus of Bolt:

$Z_{xe} := N\frac{\left(D - \frac{0.9743in}{n}\right)^3}{6}$ $Z_{xe} = 2.39\cdot in^3$ $Z_{x.pm} := N_{M1}\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^3}{6}$ $Z_{x.pm} = 0\cdot in^3$

Forces:

Tension Force:

$T_u := \frac{Uplift}{1}$

$T_u = 393\cdot kip$ $T_{ub} := T_u$

Shear Force:

$V_u := \frac{Shear}{1}$

$V_u = 66\cdot kip$ $V_{ub} := V_u$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$\phi_f := 0.9$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$\phi_b := 0.80$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$\phi_t := 0.75$ $\phi_{t.pm} := 0.65$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$\phi_v := 0.75$ $\phi_{v.pm} := 0.60$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_{xe} + Fy \cdot Z_{x.pm}$

$M_n = 7.18 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 6.46 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if\left(M_u \le \phi_f \cdot M_n, "OK", "NO\ GOOD"\right)$

FlexureCheck = "OK"

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_{ne}$ $\quad R_{nt.pm} := F_u \cdot A_{n.pm}$

$R_{nt} = 489.03 \cdot ft \cdot kip$ $\quad R_{nt.pm} = 0 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 366.77 \cdot ft \cdot kip$ $\quad \phi_{t.pm} \cdot R_{nt.pm} = 0 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if\left[T_u \le \left(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}\right), "OK", "NO\ GOOD"\right]$

TensionCheck = "NO GOOD"

$\frac{T_u}{\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}} = 107.15 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_{ge}$ $\quad R_{nv.pm} := 0.45 \cdot F_u \cdot A_{g.pm}$

$R_{nv} = 276.74 \cdot ft \cdot kip$ $\quad R_{nv.pm} = 0 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 207.55 \cdot ft \cdot kip$ $\quad \phi_{v.pm} \cdot R_{nv.pm} = 0 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if\left[V_u \le \left(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}\right), "OK", "NO\ GOOD"\right]$

ShearCheck = "OK"

$\frac{V_u}{\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}} = 31.8 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 = 1.25$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "NO GOOD"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} = 1.31$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "NO GOOD"

$T_u + \left(\frac{V_u}{\eta}\right) = 513 \cdot \text{kip}$

$\phi_b \cdot F_{up} \cdot A_{ne} = \blacksquare \cdot \text{kip}$

$(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm}) = 391.22 \cdot \text{kip}$

$513\text{kip} - 391.22\text{kip} = 121.78 \cdot \text{kip}$

Above force required for additional anchorage required for uplift resistance for Strength Design (LRFD) - see prevously instlled anchors for Strength design check. (Disregard above note if value is negative)

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift: $Uplift := 393 \cdot kips$ *user input*

Shear: $Shear := 66 \cdot kips$ *user input*

Compression: $Compression := 439 \cdot kips$ *user input*

Anchor Bolt Data:

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

Number of Anchor Bolts = N $N := 6$ *user input*

Bolt Ultimate Strength: $F_u := 58 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy := 36 \cdot ksi$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D := 1.50in$ *user input*

Threads per Inch: $n := 6$ *user input*

Coefficient of Friction: $\mu := 0.55$ *user input*

(for baseplate with grout ASCE 10-15)

Length from top of pier to bottom of leveling nut: $L_{ar} := 0in$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

MODified Anchorage - Steel Bolts

Number of Anchor Bolts = N $N_{M1} := 2$ *user input*

Bolt Ultimate Strength: $F_{u.M1} := 150 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy_{M1} := 120 \cdot ksi$ *user input*

Bolt Modulus: $E_{M1} := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D_{M1} := 1.42in$ *user input*

Threads per Inch: $n_{M1} := 7$ *user input*

Anchor Bolt Section Properties:

Gross Area of Bolt:

$A_{ge} := N\frac{\pi}{4}\cdot D^2$ $A_{ge} = 10.6\cdot in^2$ $A_{g.pm} := N_{M1}\frac{\pi}{4}\cdot D_{M1}^2$ $A_{g.pm} = 3.17\cdot in^2$

Net Area of Bolt:

$A_{ne} := N\cdot\left[\frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2\right]$ $A_{n.pm} := N_{M1}\cdot\left[\frac{\pi}{4}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^2\right]$

$A_{ne} = 8.43\cdot in^2$ $A_{n.pm} = 2.58\cdot in^2$

Net Diameter:

$D_{ne} := N\left(D - \frac{0.9743in}{n}\right)$ $D_{ne} = 8.03\cdot in$ $D_{n.pm} := N_{M1}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)$ $D_{n.pm} = 2.56\cdot in$

Radius of Gyration of Bolt:

$r_e := N\cdot\frac{\left(D - \frac{0.9743in}{n}\right)}{4}$ $r_e = 2.01\cdot in$ $r_{pm} := N_{M1}\cdot\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)}{4}$ $r_{pm} = 0.64\cdot in$

Plastic Section Modulus of Bolt:

$Z_{xe} := N\frac{\left(D - \frac{0.9743in}{n}\right)^3}{6}$ $Z_{xe} = 2.39\cdot in^3$ $Z_{x.pm} := N_{M1}\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^3}{6}$ $Z_{x.pm} = 0.7\cdot in^3$

Forces:

Tension Force:

$T_u := \frac{Uplift}{1}$

$T_u = 393\cdot kip$ $T_{ub} := T_u$

Shear Force:

$V_u := \frac{Shear}{1}$

$V_u = 66\cdot kip$ $V_{ub} := V_u$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$\phi_f := 0.9$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$\phi_b := 0.80$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$\phi_t := 0.75$ $\phi_{t.pm} := 0.65$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$\phi_v := 0.75$ $\phi_{v.pm} := 0.60$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_{xe} + Fy \cdot Z_{x.pm}$

$M_n = 9.28 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 8.35 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if\left(M_u \le \phi_f \cdot M_n, "OK", "NO\ GOOD"\right)$

FlexureCheck = "OK"

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_{ne}$ $\quad R_{nt.pm} := F_u \cdot A_{n.pm}$

$R_{nt} = 489.03 \cdot ft \cdot kip$ $\quad R_{nt.pm} = 149.46 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 366.77 \cdot ft \cdot kip$ $\quad \phi_{t.pm} \cdot R_{nt.pm} = 97.15 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if\left[T_u \le \left(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}\right), "OK", "NO\ GOOD"\right]$

TensionCheck = "OK"

$\frac{T_u}{\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}} = 84.71 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_{ge}$ $\quad R_{nv.pm} := 0.45 \cdot F_u \cdot A_{g.pm}$

$R_{nv} = 276.74 \cdot ft \cdot kip$ $\quad R_{nv.pm} = 82.67 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 207.55 \cdot ft \cdot kip$ $\quad \phi_{v.pm} \cdot R_{nv.pm} = 49.6 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if\left[V_u \le \left(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}\right), "OK", "NO\ GOOD"\right]$

ShearCheck = "OK"

$\frac{V_u}{\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}} = 25.67 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 = 0.78$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "OK"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} = 0.970$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "OK"

NOTE: Because the reinforcement of additional bolts are within capacity, the anchor bolts are considered to be OK for the design loads. Apply the previously calculated force that is not contained by the existing anchorage (prior to the additional anchorage modifications) with the previously installed anchorage to verify the capacity of the existing anchorage system.

$$T_u + \left(\frac{V_u}{\eta}\right) = 513 \cdot \text{kip}$$

$$\phi_b \cdot F_{up} \cdot A_{ne} = \blacksquare \cdot \text{kip}$$

$$(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm}) = 529 \cdot \text{kip}$$

$$513\text{kip} - 529\text{kip} = -16.00 \cdot \text{kip}$$

Above force required for additional anchorage required for uplift resistance for Strength Design (LRFD) - see prevously instlled anchors for Strength design check. (Disregard above note if value is negative)

WELDED BEAM TO LEG ANCHOR ANALYSIS

NOTE: The following calculation sheets are checking the capacity of the welded connection and anchorage for the New Haven / Hamden (CSP), CT Tower.

* From the Mathcad analysis for anchor bolts, the force required to be contained (by the additional anchors) -->

$$Des_{Uplift} := \frac{(513kip - 391.22kip)}{N_{M1}} = 60890 \cdot lbf$$

"d" arm --> $d := 1ft + 2in$

* Identify Existing Conditions (Materials and Weld Length)

Yield Steel (f.y) --> $F_y := 50ksi$

Modulus Steel (E) --> $E := 29000ksi$

WT 10.5x31 --> $t_w := 0.40in$ $t_f := 0.615in$

$d_{WT} := (10.5 - t_f)in$

Weld Length: $l_{weld} := 30in$

Area (WT 8x45 Stem) --> $A_{stem} := t_w \cdot l_{weld} = 12 \cdot in^2$

Section Modulus (x-axis) (Stem) --> $S_{stem} := \frac{t_w \cdot l_{weld}^2}{6} = 60 \cdot in^3$

$$\sigma_{force.M} := \frac{Des_{Uplift} \cdot d}{S_{stem}} = 14207.67 \cdot psi \qquad \sigma_{force.P} := \frac{Des_{Uplift}}{A_{stem}} = 5074.17 \cdot psi$$

* CHECK - Flexure in WT (AISC - LRFD Method):

* Apply AISC Chapter F - Flexure, Section F9, Equation F9-10 (governs design): $\theta_f := 0.90$

$$F_{cr} := \left(1.43 - 0.515 \cdot \frac{d_{WT} + t_f}{t_w} \cdot \sqrt{\frac{F_y}{E}}\right) \cdot F_y = 41.93 \cdot ksi$$

$$M_{capacity.beam} := F_{cr} \cdot \frac{t_w \cdot l_{weld}^2}{6} \cdot \theta_f = 2264.02 \cdot kip \cdot in$$

* CHECK - Flexure in WT (AISC - LRFD Method):

$$CHECK_1 := if\left(\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} < 1.0, "OK", "No\ Good"\right) \qquad \frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} = 0.38$$

$CHECK_1 = "OK"$

* CHECK - Axial Stress in WT (AISC - LRFD Method):

$$CHECK_2 := if\left(\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} < 1.0, "OK", "No\ Good"\right) \qquad \frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} = 0.51$$

$CHECK_2 = "OK"$

* CHECK - Shear in WT (AISC - LRFD Method):

* Apply AISC Chapter G - Shear, Section G2, Equation G2-1:

$\theta_v := 0.90$

$V_{cap} := 0.6 \cdot F_y \cdot A_w \cdot C_v$ ----> $C_v := 1.0$ $A_w := t_w \cdot (d_{WT} - 0.630in) = 3.93 \cdot in^2$ $F_y = 50 \cdot ksi$

$V_{cap} := \theta_v \cdot 0.6 \cdot F_y \cdot A_w \cdot C_v = 106.04 \cdot kip$

* CHECK - Shear in WT (AISC - LRFD Method):

$CHECK_3 := if\left(\frac{Des_{Uplift}}{V_{cap}} < 1.0, "OK", "No\ Good"\right)$ $\frac{Des_{Uplift}}{V_{cap}} = 0.57$ $CHECK_3 = "OK"$

* CHECK - Shear Stress in WT (AISC - LRFD Method):

$CHECK_4 := if\left(\frac{\sigma_{force.P}}{F_y \cdot \theta_v \cdot 0.6} < 1.0, "OK", "No\ Good"\right)$ $\frac{\sigma_{force.P}}{F_y \cdot \theta_v \cdot 0.6} = 0.19$ $CHECK_4 = "OK"$

* CHECK - Combined Flexure - Shear Stress in WT (AISC - LRFD Method):

$CHECK_5 := if\left[\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} + \frac{\sigma_{force.P}}{(F_y \cdot \theta_v \cdot 0.6)} < 1.0, "OK", "No\ Good"\right]$ $\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} + \frac{\sigma_{force.P}}{(F_y \cdot \theta_v \cdot 0.6)} = 0.7$

$CHECK_5 = "OK"$

* CHECK - Combined Flexure - Shear Force in WT (AISC - LRFD Method):

$CHECK_6 := if\left(\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} + \frac{Des_{Uplift}}{V_{cap}} < 1.0, "OK", "No\ Good"\right)$ $\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} + \frac{Des_{Uplift}}{V_{cap}} = 0.95$

$CHECK_6 = "OK"$

* CHECK - Weld in WT (AISC - LRFD Method):

$t_{weld} := \frac{3}{8}in$

$Fy_{Electrode} := 70ksi$

$\theta_{weld} := 0.75$

$S_{x.weld} := 2 \cdot \frac{t_{weld} \cdot \left(l_{weld} - \frac{9}{16}in\right)^2}{6} = 108.32 \cdot in^3$

* Moment Induced into Weld (AISC - LRFD Method):

$M_{applied} := Des_{Uplift} \cdot d = 852.46 \cdot kip \cdot in$

* Stress Caused by Moment on Weld (AISC - LRFD Method):

$\sigma_{applied.M} := \frac{M_{applied}}{S_{x.weld}} = 7.87 \cdot ksi$

* Stress Capacity in Weld (AISC - LRFD Method):

$\sigma_{weld} := Fy_{Electrode} \cdot 0.6 \cdot \theta_{weld} = 31.5 \cdot ksi$

* CHECK - Stress in Weld on WT - Moment Induced (AISC - LRFD Method):

$CHECK_7 := if\left(\frac{\sigma_{applied.M}}{\sigma_{weld}} < 1.0, "OK", "No Good"\right)$

$\frac{\sigma_{applied.M}}{\sigma_{weld}} = 0.25$

$CHECK_7 = "OK"$

* CHECK - Stress in Weld on WT - Shear Induced (AISC - LRFD Method):

$CHECK_8 := if\left(\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} < 1.0, "OK", "No Good"\right)$

$\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} = 0.49$

$CHECK_8 = "OK"$

* CHECK - Combined Flexure - Shear Stress Force in Weld on WT (AISC - LRFD Method):

$CHECK_9 := if\left(\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} + \frac{\sigma_{applied.M}}{\sigma_{weld}} < 1.0, "OK", "No Good"\right)$

$\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} + \frac{\sigma_{applied.M}}{\sigma_{weld}} = 0.74$

$CHECK_9 = "OK"$

FOUNDATION ANALYSIS

AECOM

				Page	of
Job	120' Stainless Lattice Tower - New Haven, CT	Project No.		Sheet 1	of 3
Description	Foundation with Rock Anchors - TIA-222-G Check	Computed by	MCD	Date	08/14/18
	Structural Analysis (after Tower MODification)	Checked by		Date	

FOUNDATION CHECK

INPUT DATA

Factored Max Pier Reactions:

Uplift: $Uplift := 393 \cdot kips$

Shear: $Shear := 66 kips$

Compression: $Compression := 439 \cdot kips$

Foundation Structure

Footing Width: $B_{ftg} := 6ft$

Footing Length: $L_{ftg} := 6ft$

Footing Thickness: $TH_{ftg} := 2.5ft$

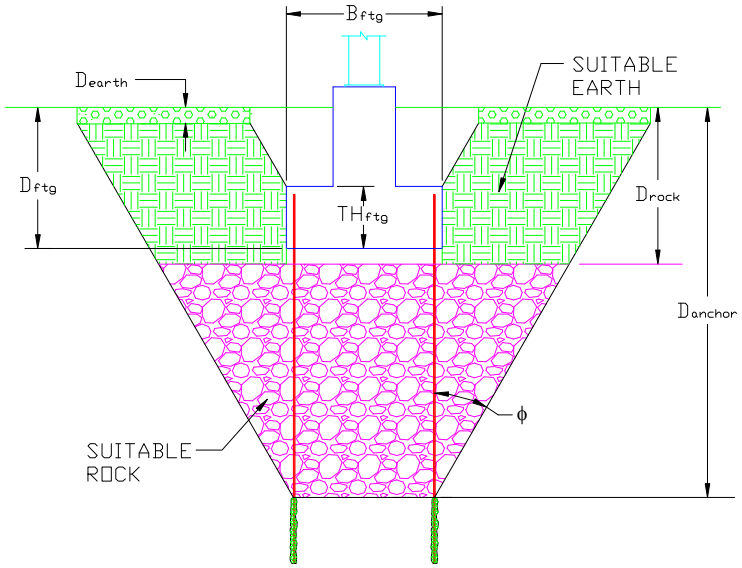
Depths:

Depth to Bottom of Footing: (from grade line) $D_{ftg} := 3.50ft$

Depth to Suitable Rock: (from grade line) $D_{rock} := 2.5ft$

Depth to Suitable Earth: (from grade line) $D_{earth} := 1ft$

Anchor Depth: $D_{anchor} := 24.5ft$



Soil Properties:

Internal Friction Angle: $\phi := 30deg$

Unit Weight of Earth: $\gamma_{earth} := 120 \frac{lb}{ft^3}$

Unit Weight of Rock: $\gamma_{rock} := 165 \frac{lb}{ft^3}$

Allowable Bearing: $Bearing := 11500 \cdot psf$

Ultimate Bearing: $U_{Bearing} := 2 \cdot Bearing$

$$DL_{foot} := \left[\left(B_{ftg} \cdot L_{ftg} \cdot TH_{ftg} \right) + \left[\frac{\pi}{4} \cdot (2ft)^2 \cdot 2.0ft \right] \right] \cdot 0.150 \frac{kips}{ft^3} \qquad DL_{foot} = 14442.48\ lb$$

$$DL_{Soil} := \left[B_{ftg} \cdot L_{ftg} \cdot D_{earth} - \left[\frac{\pi}{4} \cdot (3ft)^2 \cdot D_{earth} \right] + \left[\frac{1}{2} \cdot (1.5ft) \cdot \tan(\phi) \cdot (1.5ft) \cdot 4 \cdot B_{ftg} \right] \right] \cdot \gamma_{earth} \qquad DL_{Soil} = 5342.38\ lb$$

Anchors:

Number of Anchors (along width): $NW_{anchor} := 2$

Number of Anchors (along length): $NL_{anchor} := 2$

Anchor Spacing* (along width): $SW_{anchor} := 3ft$

Anchor Spacing* (along length): $SL_{anchor} := 3ft$

Hole Diameter: $hole_d := 2.5in$

Ultimate Bond Stress: $\sigma_{bond} := 200 \cdot psi$

NOTE: Ultimate Bond Stress is 2x allowable per TIA-222-G, Section 9.

Ultimate Bond Stress: $\sigma_{Work.bond} := \frac{\sigma_{bond}}{2}$

Force (per anchor): $P_{design} := \frac{Uplift - \left[0.9 \cdot \left(DL_{foot} + DL_{Soil}\right)\right]}{NW_{anchor} + NL_{anchor}}$

$P_{design} = 93.80 \cdot kips$

CALCULATE RESISTANCE

Intermediate Dimensions:

Suitable Earth Height: $H := D_{rock} - D_{earth}$ $H = 1.50\ ft$

Suitable Rock Height: $Z := D_{anchor} - D_{earth} - D_{rock}$ $Z = 21.00\ ft$

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

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

Earth Above Footing: $PD := D_{ftg} - TH_{ftg} + 6in$ $PD = 1.50\ ft$

Volumes:

Gross Volume:

$GV_1 := W \cdot L \cdot (Z + H)$ $GV_1 = 202.50 \cdot ft^3$

$GV_2 := \left[\frac{1}{2} \cdot (Z + H) \cdot \tan(\phi) \cdot (Z + H)\right] \cdot (W + L) \cdot 2$ $GV_2 = 1753.70 \cdot ft^3$

$GV_3 := \frac{1}{3} \cdot \pi \cdot [(Z + H) \cdot \tan(\phi)]^2 \cdot (Z + H)$ $GV_3 = 3976.08 \cdot ft^3$

$GV := GV_1 + GV_2 + GV_3$ $GV = 5932.28 \cdot ft^3$

Rock Volume:

$RV_1 := W \cdot L \cdot (Z)$ $RV_1 = 189.00 \cdot ft^3$

$RV_2 := \left[\frac{1}{2} \cdot (Z) \cdot \tan(\phi) \cdot (Z)\right] \cdot (W + L) \cdot 2$ $RV_2 = 1527.67 \cdot ft^3$

$RV_3 := \frac{1}{3} \cdot \pi \cdot [(Z) \cdot \tan(\phi)]^2 \cdot (Z)$ $RV_3 = 3232.70 \cdot ft^3$

$RV := RV_1 + RV_2 + RV_3$ $RV = 4949.37 \cdot ft^3$

Volume of Neglect Above Footing:

$NV_1 := B_{ftg} \cdot L_{ftg} \cdot H - \frac{\pi}{4} \cdot (3ft)^2 \cdot H$ $NV_1 = 43.40 \cdot ft^3$

$NV_2 := \left[\frac{1}{2} \cdot (PD) \cdot \tan(\phi) \cdot (PD)\right] \cdot \left(B_{ftg} + L_{ftg}\right) \cdot 2$ $NV_2 = 15.59 \cdot ft^3$

$NV_3 := \frac{1}{3} \cdot \pi \cdot [(PD) \cdot \tan(\phi)]^2 \cdot (PD)$ $NV_3 = 1.18 \cdot ft^3$

$NV := NV_1 + NV_2 + NV_3$ $NV = 60.16 \cdot ft^3$

Total Suitable Earth Volume: $EV := GV - RV - NV$ $EV = 922.75 \cdot ft^3$

Resisting Forces:

Resisting Rock Force: $F_{rock} := RV \cdot \gamma_{rock}$ $F_{rock} = 816.65 \cdot kips$

Resisting Earth Force: $F_{earth} := EV \cdot \gamma_{earth}$ $F_{earth} = 110.73 \cdot kips$

Total Resisting Force: $F_{total} := (F_{rock} + F_{earth}) \cdot 0.9$ $F_{total} = 834.64 \cdot kips$

NOTE: "0.9" is TIA-222-G Reducing factor for uplift resistance (LC2)

Check Uplift:

$$Condition1 := if\left(\frac{F_{total} \cdot 0.75}{Uplift} \geq 1.00, "OK", "Overstressed"\right) \qquad \frac{F_{total} \cdot 0.75}{Uplift} = 1.59$$

Condition1 = "OK"

Embedment Length:

$$L_b := \frac{P_{design}}{\pi \cdot hole_d \cdot \sigma_{Work.bond} \cdot 0.60} \qquad L_b = 16.59\,ft$$

NOTE: "0.60" reduction factor from TIA-222-G for uplift resistance for Rock Anchor

$$Condition2 := if\left(\frac{Z}{L_b} \geq 1.00, "OK", "Overstressed"\right) \qquad \frac{Z}{L_b} = 1.27$$

Condition2 = "OK"

Check Bearing:

$$MaxBearing := \frac{Compression + 1.2 \cdot DL_{foot}}{B_{ftg} \cdot L_{ftg}} \qquad MaxBearing = 12675.86 \cdot psf$$

$$Condition3 := if\left(\frac{MaxBearing}{U_{Bearing} \cdot 0.75} \leq 1.00, "OK", "Overstressed"\right)$$

NOTE: "0.75" is TIA-222-G Reducing factor for bearing resistance

$$\frac{MaxBearing}{U_{Bearing} \cdot 0.75} = 0.7348$$

Condition3 = "OK"

GEOTECHNICAL STUDY

WELTI GEOTECHNICAL, P.C.
Formerly Dr. Clarence Welti, PE. PC.

227 Williams Street · P.O. Box 397
Glastonbury, CT 06033-0397

(860) 633-4623 / FAX (860) 657-2514

August 13, 2018

Mr. Ignacio C. Artaiz
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067

Ref: Geotechnical Review of Existing State Police Communications Tower #27
West Rock, New Haven, CT

Dear Naish:

1.0 The existing tower foundation plan notes from Stainless, Inc. dated 12/9/93 indicate that the foundation design was based on a geotechnical assessment by Dr. Clarence Welti, P.E., P.C. (CWPEPC) dated 12/29/93. The foundation plan and notes and foundation design calculations dated 11/16/93 have been reviewed and for conformance with the recommendations in the geotechnical report and to evaluate the adequacy of existing lattice tower foundation with an increase in loading on the structure.

2.0 The geotechnical assessment by CWPEPC dated 12/29/93 was based on boring B-4 which encountered hard Basalt bedrock at 1.5 feet below the ground surface. The report recommended that the foundations be placed at least 2 feet into the bedrock to resist shear loading and that rock anchors be used to resist uplift. The recommended foundation design parameters were as follows.

Parameter	Value
Allowable Bearing on Hard Bedrock	40 Tons/sf
Allowable Lateral Loading on Hard Bedrock	20 Kips/sf
Allowable Cement/Rock Bond Value for the design of rock anchors	100 psi
Friction between Rock and Concrete Foundation	0.70

3.0 The foundation plans and notes by Stainless Inc. dated 12/9/1993 (with revisions to 7/5/94) show the tower foundation design includes a lattice tower with three legs, spaced at 21 feet apart, supported on individual piers and footings. Each of the footings is set a minimum 2'-6" into the bedrock with 4 rock anchors installed to a minimum 20 feet into the bedrock. The plan notes indicated that one anchor from each foundation should be proof tested to 85 Kips and that the foundation design is based on a maximum bearing pressure of 11,500 psf. The rock anchors are 1" dia. (150 ksi) bars with an allowable design loading of 76.5 Kips (0.65Fy).

3.1 The foundation design calculations indicate that the tension load on the anchors was up to 74.12 Kips/anchor and the maximum cement/rock bond stress was up to 39.3 psi. If additional resistance to up lift is needed to address new loading or code requirements, additional anchors or concrete weight would be required.

4.0 This report has been prepared for specific a application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours,

Max Welti, P. E.

About AECOM

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500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
860-529-8882
Fax: 860-529-3991

EBI Consulting
environmental | engineering | due diligence

September 29, 2018

SPRINT
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT03XC003 – West Rock Ridge - CT State Pol**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1065 Wintergreen Avenue, Hamden, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT 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.

General population 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 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) 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 SPRINT Wireless antenna facility located at **1065 Wintergreen Avenue, Hamden, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT 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) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

7) 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.

8) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the Nokia AAHC** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the 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.

9) The antenna mounting height centerlines of the proposed panel antennas are **71 feet** above ground level (AGL) for **Sector A**, **71 feet** above ground level (AGL) for **Sector B** and **71 feet** above ground level (AGL) for Sector C.

10) 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.

All calculations were done with respect to uncontrolled / general population threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**71 feet**	Height (AGL):	**71 feet**	Height (AGL):	**71 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**7.75 %**	Antenna B1 MPE%	**7.75 %**	Antenna C1 MPE%	**7.75 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**71 feet**	Height (AGL):	**71 feet**	Height (AGL):	**71 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	5,118.23	ERP (W):	5,118.23	ERP (W):	5,118.23
Antenna A2 MPE%	**4.36 %**	Antenna B2 MPE%	**4.36 %**	Antenna C2 MPE%	**4.36 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**12.11 %**
AT&T	3.62 %
MetroPCS	3.49 %
Clearwire	0.40 %
Verizon Wireless	7.85 %
T-Mobile	2.14 %
Site Total MPE %:	**29.61 %**

SPRINT Sector A Total:	12.11 %
SPRINT Sector B Total:	12.11 %
SPRINT Sector C Total:	12.11 %
Site Total:	29.61 %

SPRINT _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	71	3.21	850 MHz	567	0.56%
Sprint 850 MHz LTE	2	941.82	71	16.03	850 MHz	567	2.83%
Sprint 1900 MHz (PCS) CDMA	5	511.82	71	21.78	1900 MHz (PCS)	1000	2.18%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	71	21.78	1900 MHz (PCS)	1000	2.18%
Sprint 2500 MHz (BRS) LTE	8	639.78	71	43.55	2500 MHz (BRS)	1000	4.36%
						Total:	**12.11%**

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 SPRINT 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:

SPRINT Sector	Power Density Value (%)
Sector A:	12.11 %
Sector B:	12.11 %
Sector C:	12.11 %
SPRINT Maximum MPE % (per sector):	12.11 %
Site Total:	29.61 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **29.61 %** 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.

Sprint

PROJECT:	DO MACRO UPGRADE
SITE NAME:	WEST ROCK RIDGE - CT STATE POLICE
SITE CASCADE:	CT03XC003
SITE ADDRESS:	1065 WINTERGREEN AVENUE HAMDEN, CT 06514
SITE TYPE:	SELF SUPPORT TOWER
MARKET:	SOUTHERN CONNECTICUT

SITE INFORMATION

TOWER OWNER:
STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF STATE POLICE
1111 COUNTRY CLUB ROAD
MIDDLETON, CT 06457

LATITUDE (NAD83):
41° 20' 43.56" N
41.34543333°

LONGITUDE (NAD83):
-72° 58' 14.57" W
-72.97071388°

COUNTY:
NEW HAVEN

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

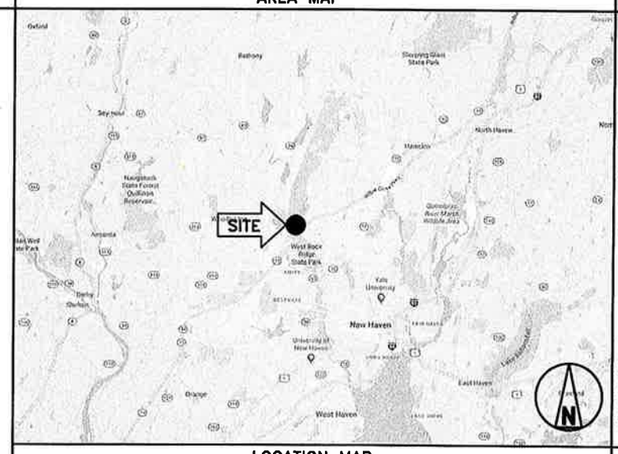
ZONING DISTRICT:
TBD

POWER COMPANY:
CONNECTICUT LIGHT AND POWER
(800) 922-4455

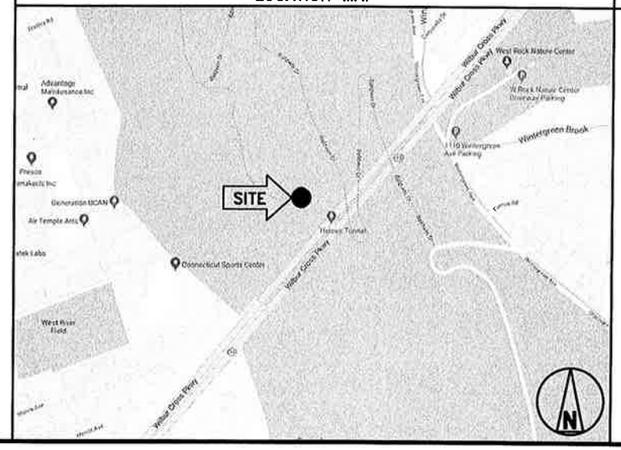
AAV PROVIDER:
AT&T
(800) 924-9420

PROJECT MANAGER:
AIROSMITH DEVELOPMENT
TERRI BURKHOLDER
(315) 719-2928
TBURKHOLDER@AIROSMITHDEVELOPMENT.COM

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- REMOVE (3) PANEL ANTENNAS
- INSTALL (6) PANEL ANTENNAS
- INSTALL (3) 800 MHz RRH'S ON EXISTING PIPE MOUNT
- INSTALL (6) JUMPER CABLES
- INSTALL (2) HYBRID CABLES
- INSTALL 2.5 EQUIPMENT INSIDE EXISTING N.V. MMBS CABINET

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY SPRINT. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE (2015 IBC)
2. TIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2011 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

811 Know what's **below.** **Call** before you dig. www.call811.com

DRAWING INDEX

SHEET NO.	SHEET TITLE	REV.
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	SPRINT SPECIFICATIONS	0
SP-2	SPRINT SPECIFICATIONS	0
SP-3	SPRINT SPECIFICATIONS	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	EQUIPMENT & MOUNTING DETAILS	0
A-5	CIVIL DETAILS	0
A-6	PLUMBING DIAGRAM	0
E-1	ELECTRICAL & GROUNDING PLAN	0
E-2	ELECTRICAL & GROUNDING DETAILS	0
S-1	STRUCTURAL NOTES	0
S-2	STRUCTURAL NOTES	0
S-3	STRUCTURAL NOTES	0
S-4	STRUCTURAL NOTES	0
S-5	STRUCTURAL NOTES	0

PLANS PREPARED FOR:
Sprint

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

PROJECT MANAGER:
AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 306-3740

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
PROFESSIONAL ENGINEER
6-21-2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:
WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:
CT03XC003

SITE ADDRESS:
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:
TITLE SHEET & PROJECT DATA

SHEET NUMBER:
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:

1. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
5. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
3. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
4. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
5. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
6. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
7. AMERICAN CONCRETE INSTITUTE (ACI)
8. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
9. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
10. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
11. PORTLAND CEMENT ASSOCIATION (PCA)
12. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13. BRICK INDUSTRY ASSOCIATION (BIA)
14. AMERICAN WELDING SOCIETY (AWS)
15. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
16. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
17. DOOR AND HARDWARE INSTITUTE (DHI)
18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
19. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.

B. COMPANY: SPRINT CORPORATION

C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.

D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.

E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.

C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

NOTE: IN SHORT-FORM SPECIFICATIONS ON THE DRAWINGS, A/E TO INSERT LIST OF APPLICABLE MOPS INCLUDING EN-2012-001, EN-2013-002, EL-0568, AND TS-0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

A. A COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.

2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.

3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.

4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.

5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.

6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED

A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

PLANS PREPARED FOR:

Sprint

PLANS PREPARED BY:

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

PROJECT MANAGER:

AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 308-3740

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
06.21.2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:

WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:

CT03XC003

SITE ADDRESS:

1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-1

CONTINUE FROM SP-1

1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H-FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.

1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 - SUBMITTALS & TESTS

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN

D. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;

1. AZIMUTH, DOWNTILT, AGL - UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS-BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPs

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

1. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
2. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS - ANTENNALIGN ALIGNMENT TOOL (AAT)

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www.infinigy.com
JOB NUMBER 526-104

PROJECT MANAGER:

AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (516) 308-3740

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
PROFESSIONAL ENGINEER
AUG 21 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:

WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:

CT03XC003

SITE ADDRESS:

1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

D. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:

1. 1SHELTER AND TOWER OVERVIEW.
2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
5. PHOTOS OF TOWER SECTION STACKING.
6. CONCRETE TESTING / SAMPLES.
7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.
10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
11. COAX CABLE ENTRY INTO SHELTER.
12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING-TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING -TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

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www.Infinigy.com
JOB NUMBER 526-104

PROJECT MANAGER:

AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (516) 306-3740

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
DATE: 8.21.2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:

WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:

CT03XC003

SITE ADDRESS:

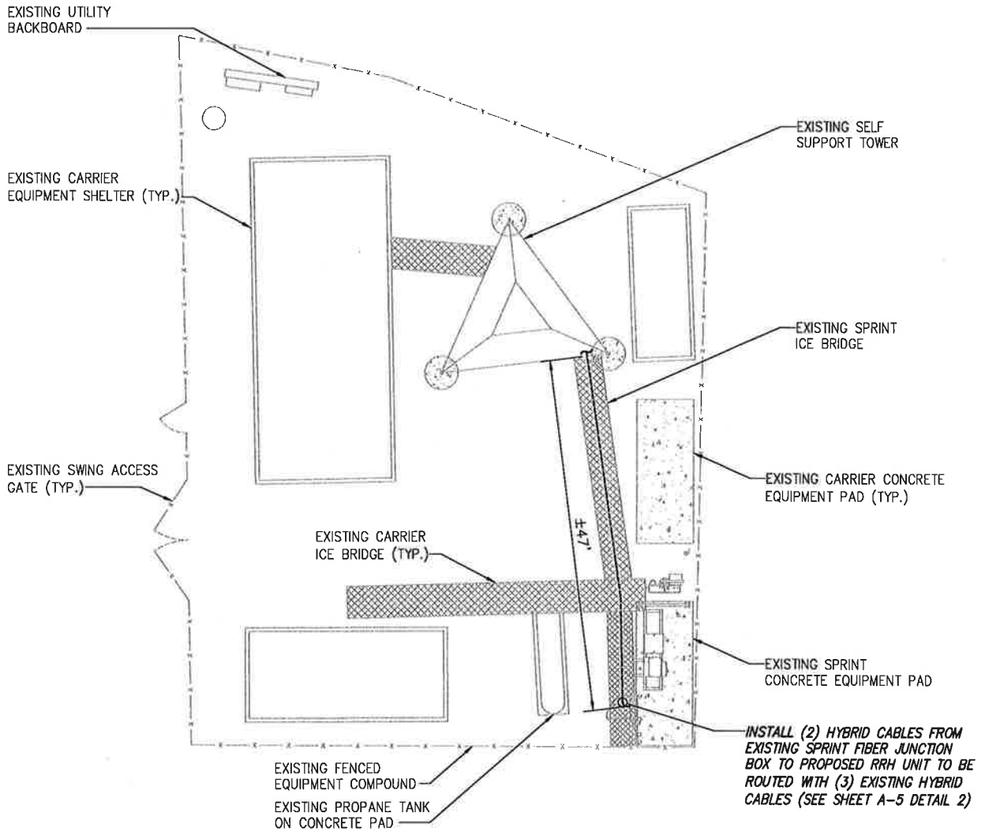
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-3



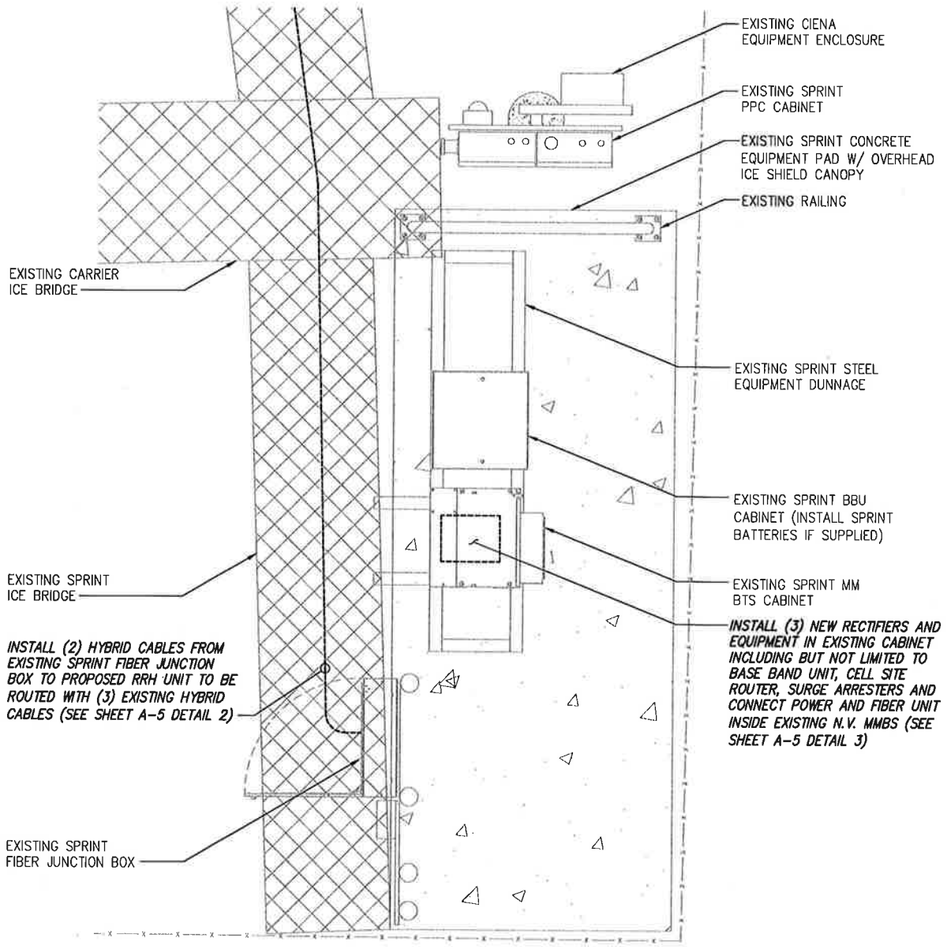
GRAPHIC SCALE:

20' 10' 0 10' 20'

SCALE (11x17): 1" = 20'-0"
SCALE (22x34): 1" = 10'-0"

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.

OVERALL SITE PLAN | SCALE: AS NOTED | 1



GRAPHIC SCALE:

10' 5' 0 5' 10'

SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"

SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

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PLANS PREPARED BY:

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SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 308-3740

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
AUG. 21, 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:

WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:

CT03XC003

SITE ADDRESS:

1065 WINTERGREEN AVE
HAMDEN, CT 06514

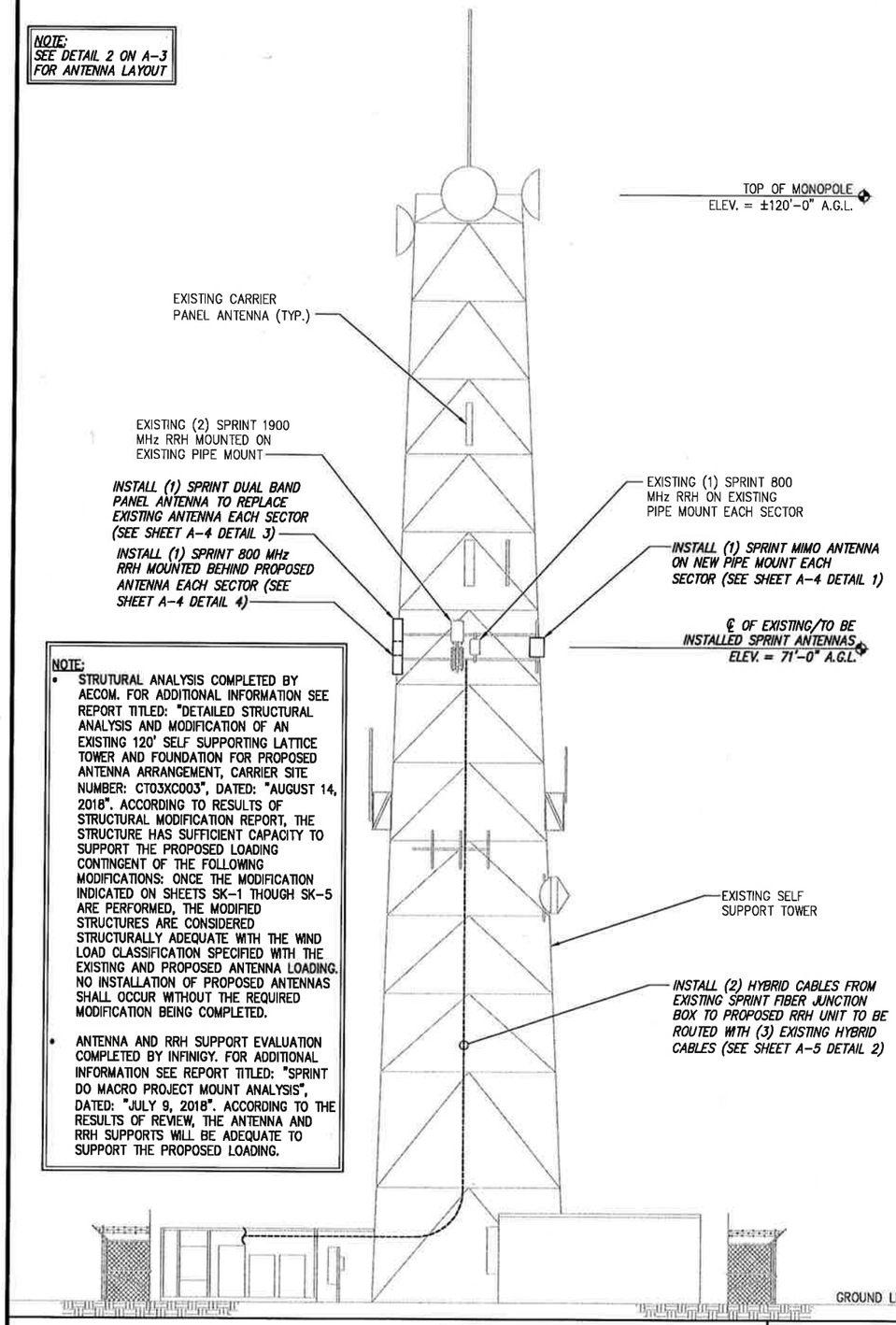
SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1

NOTE:
SEE DETAIL 2 ON A-3
FOR ANTENNA LAYOUT



NOTE:

- STRUTURAL ANALYSIS COMPLETED BY AECOM. FOR ADDITIONAL INFORMATION SEE REPORT TITLED: "DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 120' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT, CARRIER SITE NUMBER: CT03XC003", DATED: "AUGUST 14, 2018". ACCORDING TO RESULTS OF STRUCTURAL MODIFICATION REPORT, THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING CONTINGENT OF THE FOLLOWING MODIFICATIONS: ONCE THE MODIFICATION INDICATED ON SHEETS SK-1 THOUGH SK-5 ARE PERFORMED, THE MODIFIED STRUCTURES ARE CONSIDERED STRUCTURALLY ADEQUATE WITH THE WIND LOAD CLASSIFICATION SPECIFIED WITH THE EXISTING AND PROPOSED ANTENNA LOADING. NO INSTALLATION OF PROPOSED ANTENNAS SHALL OCCUR WITHOUT THE REQUIRED MODIFICATION BEING COMPLETED.
- ANTENNA AND RRH SUPPORT EVALUATION COMPLETED BY INFINIGY. FOR ADDITIONAL INFORMATION SEE REPORT TITLED: "SPRINT DO MACRO PROJECT MOUNT ANALYSIS", DATED: "JULY 9, 2018". ACCORDING TO THE RESULTS OF REVIEW, THE ANTENNA AND RRH SUPPORTS WILL BE ADEQUATE TO SUPPORT THE PROPOSED LOADING.

TOWER ELEVATION | NO SCALE | 1

SITE LOADING CHART

SECTOR	EXISTING/ PROPOSED	ANTENNA MODEL #	VENDOR	AZIMUTH	QTY.	REMAIN/ REMOVED	RRH (QTY/MODEL)	CABLE	CABLE LENGTH	RAD CENTER
ALPHA	PROPOSED	AAHC	NOKIA	20°	1	–	(2) 800 MHZ 2X50W RRH (2) 1900 MHz 4X45 RRH	SEE SHEET A-5 DETAIL 1	±138'*	±71' AGL
	PROPOSED	NNVV-65B-R4	COMMSCOPE	20°	1	–		SEE SHEET A-5 DETAIL 1		
	EXISTING	APXVSPP18-C-A20	RFS	20°	1	REMOVE		EXISTING HYBRID		
BETA	PROPOSED	AAHC	NOKIA	110°	1	–	(2) 800 MHZ 2X50W RRH (2) 1900 MHz 4X45 RRH	SEE SHEET A-5 DETAIL 1		±71' AGL
	PROPOSED	NNVV-65B-R4	COMMSCOPE	110°	1	–		SEE SHEET A-5 DETAIL 1		
	EXISTING	APXVSPP18-C-A20	RFS	110°	1	REMOVE		EXISTING HYBRID		
GAMMA	PROPOSED	AAHC	NOKIA	210°	1	–	(2) 800 MHZ 2X50W RRH (2) 1900 MHz 4X45 RRH	SEE SHEET A-5 DETAIL 1		±71' AGL
	PROPOSED	NNVV-65B-R4	COMMSCOPE	210°	1	–		SEE SHEET A-5 DETAIL 1		
	EXISTING	APXVSPP18-C-A20	RFS	210°	1	REMOVE		EXISTING HYBRID		

PROJECT SCOPE:

REMOVE: (3) PANEL ANTENNAS INSTALL: (6) PANEL ANTENNAS AND (3) RRH'S

* PROPOSED CABLE LENGTH WAS DETERMINED USING THE SUM OF THE RAD CENTER OF ANTENNAS, AND DISTANCE FROM EXISTING EQUIPMENT AREA TO TOWER BASE WITH AN ADDITIONAL 20' BUFFER. LENGTH TO BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

SITE LOADING CHART | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3

PLANS PREPARED FOR:
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Phone: 518-690-0790 | Fax: 518-690-0793
www.Infinigy.com
JOB NUMBER 526-104

PROJECT MANAGER:

AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 306-3740

ENGINEERING LICENSE:


DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

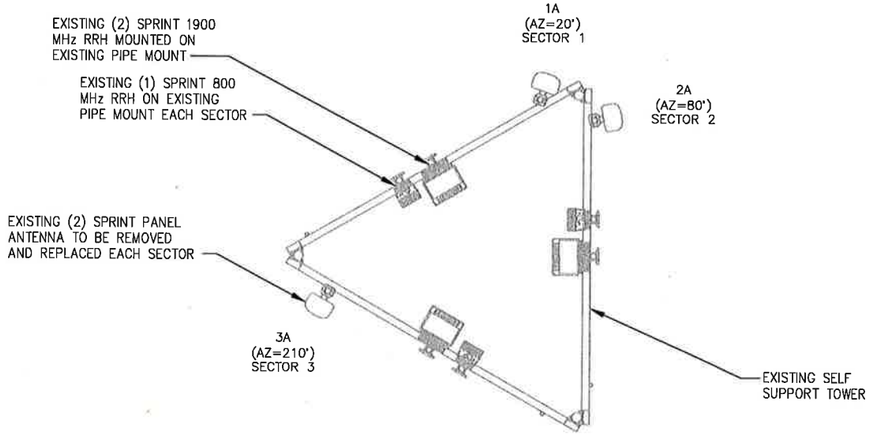
SITE NAME:
WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:
CT03XC003

SITE ADDRESS:
1065 WINTERGREEN AVE
HAMDEN, CT 06514

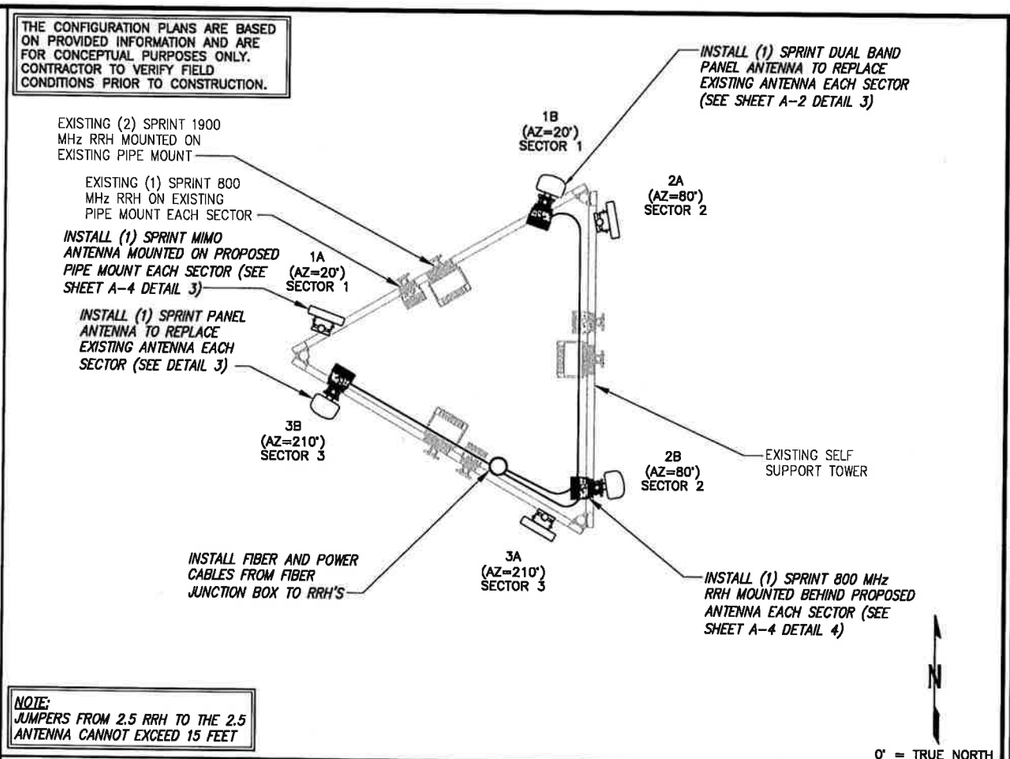
SHEET DESCRIPTION:
TOWER ELEVATION

SHEET NUMBER:
A-2



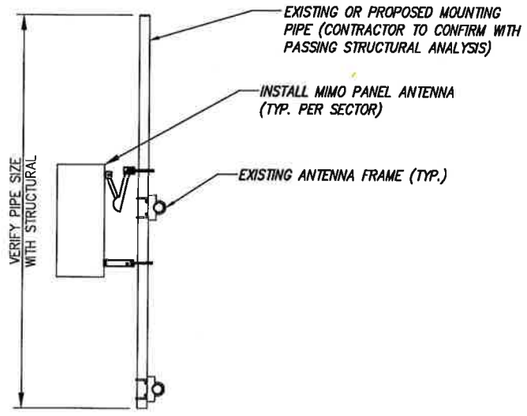
EXISTING ANTENNA LAYOUT | NO SCALE | 1

THE CONFIGURATION PLANS ARE BASED ON PROVIDED INFORMATION AND ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.



NOTE:
JUMPERS FROM 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET

FINAL ANTENNA & RRH LAYOUT | NO SCALE | 2

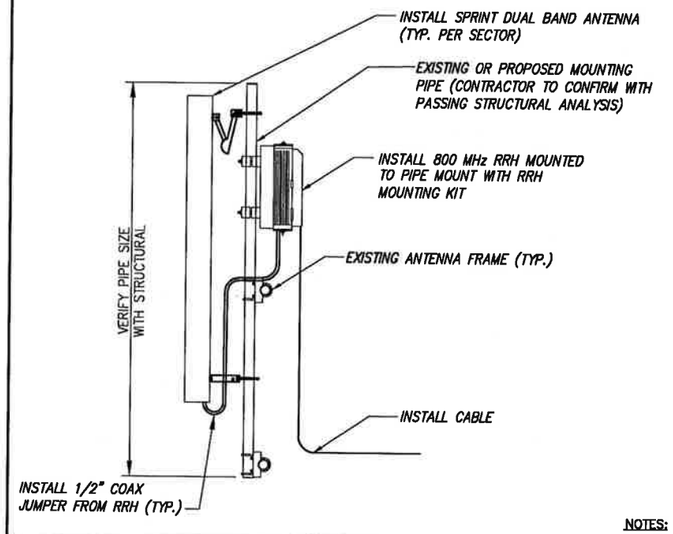


NOTE:
CONTRACTOR TO POSITION RRH ON MOUNT BEHIND ANTENNA SUCH THAT THE RRH DOES NOT INTERFERE WITH THE EXISTING PLATFORM/T-ARM MOUNTING HARDWARE.

NOTE:
THE DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO REFER TO PASSING STRUCTURAL ANALYSIS FOR ANTENNA AND RRH MOUNTING DETAILS

NOTES:
1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE AT SIDE OF RRH.

TYPICAL MIMO ANTENNA MOUNTING DETAILS | NO SCALE | 3



NOTE:
CONTRACTOR TO POSITION RRH ON MOUNT BEHIND ANTENNA SUCH THAT THE RRH DOES NOT INTERFERE WITH THE EXISTING PLATFORM/T-ARM MOUNTING HARDWARE.

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NOTES:
1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE AT SIDE OF RRH.

TYPICAL DUAL BAND ANTENNA & RRH MOUNTING DETAILS | NO SCALE | 4

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AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 308-3740

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
8.21.2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:
WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:
CT03XC003

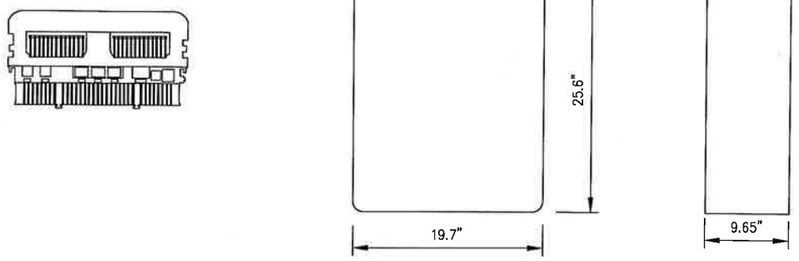
SITE ADDRESS:
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:
ANTENNA LAYOUT & MOUNTING DETAILS

SHEET NUMBER:
A-3

ANTENNA NOKIA AAHC

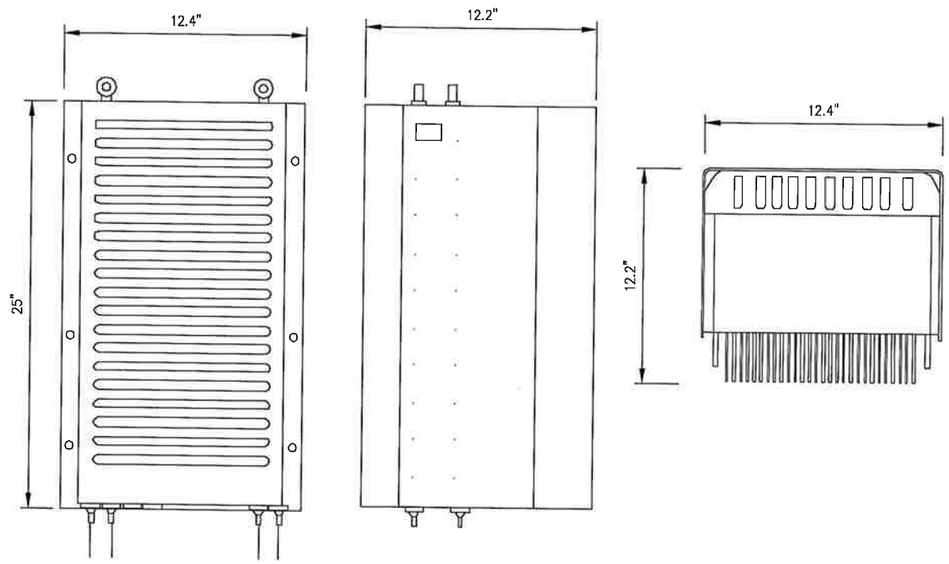
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD.In(mim):	25.6"x19.7"x9.9" (651x501x245mm)
WEIGHT:	99.2 lbs
CONNECTORS:	(2) 7/16" DIN FEMALE
	(8) 4.1/9.5 DIN FEMALE



2.5 ANTENNA DETAIL | NO SCALE | 1

RRH: ALCATEL LUCENT 1900 MHz

COLOR: LIGHT GREY
WEIGHT: 70 LBS.
(INCLUDING OPTIONAL SOLAR SHIELD)

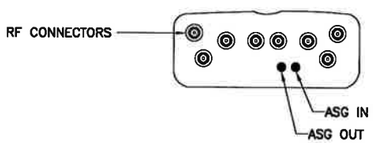


FRONT VIEW | SIDE VIEW | TOP VIEW

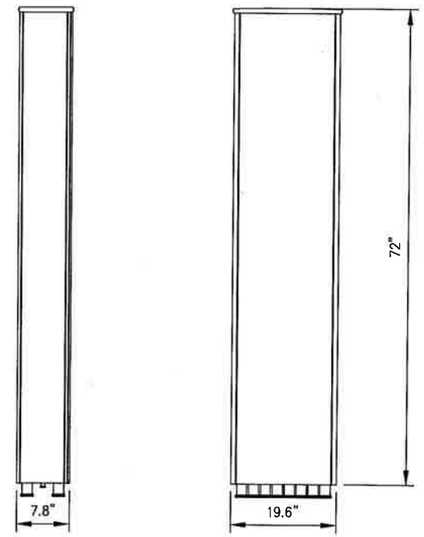
EXISTING 1900 MHz RRH | NO SCALE | 2

ANTENNA COMMSCOPE NNVV-65B-R4

RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD.In(mim):	72"x19.6"x7.8" (1829x498x198mm)
WEIGHT:	77.4 lbs
CONNECTORS:	(8) PIN DIN FEMALE
	(8) 8 PIN DIN MALE



PLAN VIEW



SIDE VIEW | FRONT VIEW

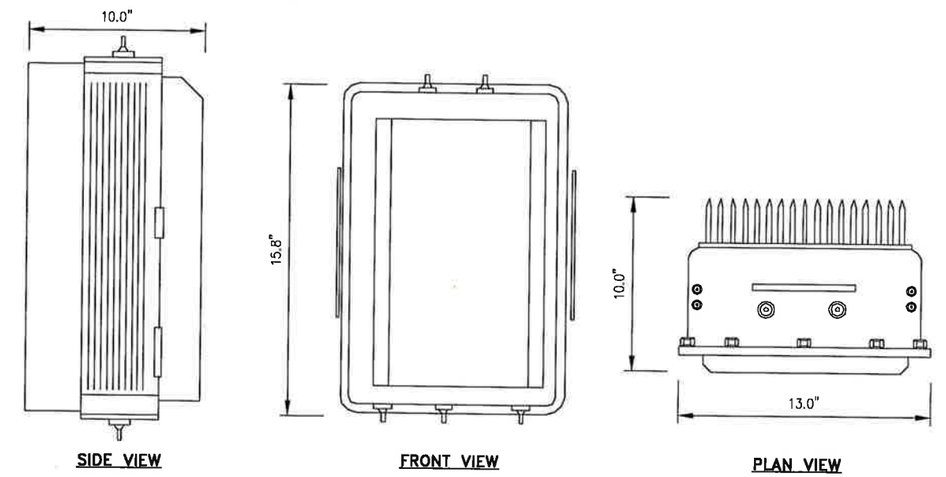
DUAL BAND ANTENNA DETAIL | NO SCALE | 3

RRH: ALCATEL LUCENT RRH 800 MHz 2x50W

COLOR: LIGHT GREY
WEIGHT: 53 LBS.

NOTES

COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.



SIDE VIEW | FRONT VIEW | PLAN VIEW

800 MHz RRH | NO SCALE | 4

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JOB NUMBER 526-104

PROJECT MANAGER:
AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 306-3740

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
8/21/2018

DRAWING NOTICE:

REVISIONS:

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SITE NAME:
WEST ROCK RIDGE - CT STATE POLICE

SITE NUMBER:
CT03XC003

SITE ADDRESS:
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-4

RFS HYBRIFLEX RISER CABLE SCHEDULE

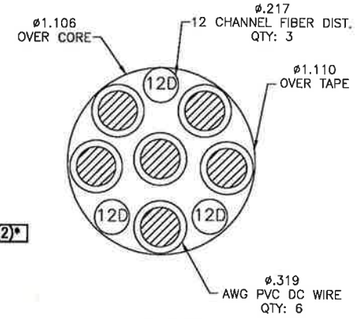
Fiber Only (Existing DC Power)	**Hybrid cable** MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom: LC Connectors, 5/8 cable, 50 ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN: HB058-M12-125F	125 ft
	MN: HB058-M12-150F	150 ft
	MN: HB058-M12-175F	175 ft
	MN: HB058-M12-200F	200 ft
8 AWG Power	**Hybrid cable** MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50 ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft (2)*
	MN: HB114-08U3M12-175F	175 ft
	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	**Hybrid cable** MN: HB114-13U3M12-225F 3x 6 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 225 ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-325F 3x 4 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 325 ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

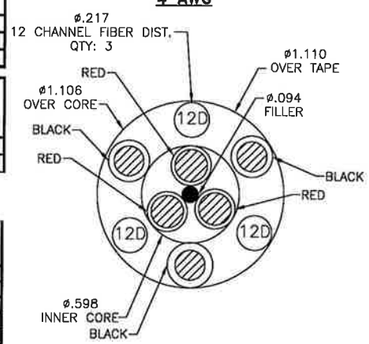
Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
6 AWG Power	**Hybrid Jumper cable** MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft (3)*
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.

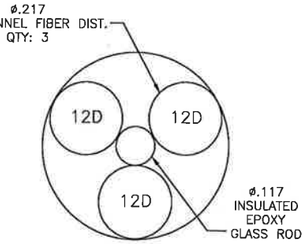
* PROPOSED CABLE LENGTH WAS DETERMINED USING THE SUM OF THE RAD CENTER OF ANTENNAS, AND DISTANCE FROM EXISTING EQUIPMENT AREA TO TOWER BASE WITH AN ADDITIONAL 20' BUFFER. LENGTH TO BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.



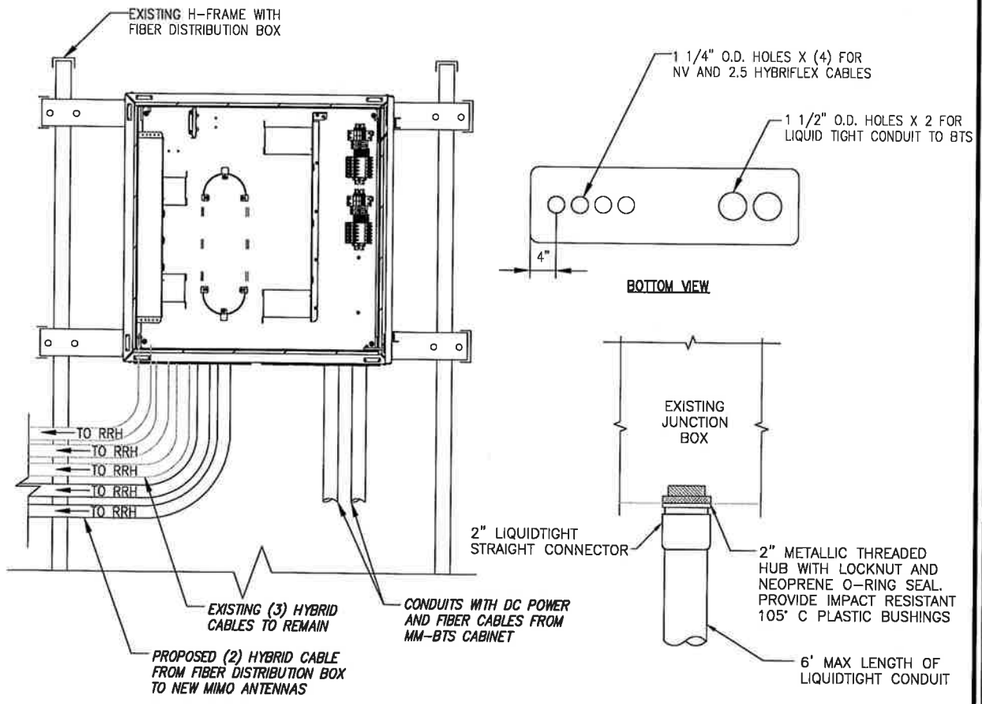
4 AWG



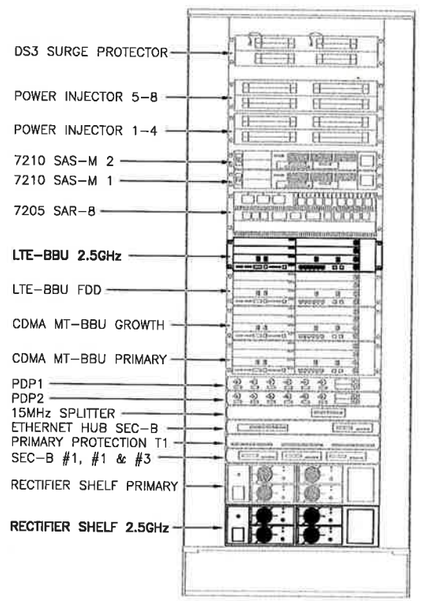
8 & 6 AWG



FIBER ONLY



FIBER JUNCTION BOX & PENETRATION | NO SCALE | 2



FRONT VIEW

NEW EQUIPMENT IN EXISTING CABINET | NO SCALE | 3

800/1900/2500 CROSS SECTION DATA | NO SCALE | 1

PLANS PREPARED FOR:
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JOB NUMBER 526-104

PROJECT MANAGER:
AIROSMITH DEVELOPMENT
32 CLINTON ST.
SARATOGA SPRINGS, NY 12866
OFFICE#. (518) 308-3740

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
AUG 21 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR PERMIT	08/21/18	ETC	0

SITE NAME:
WEST ROCK RIDGE - CT STATE POLICE

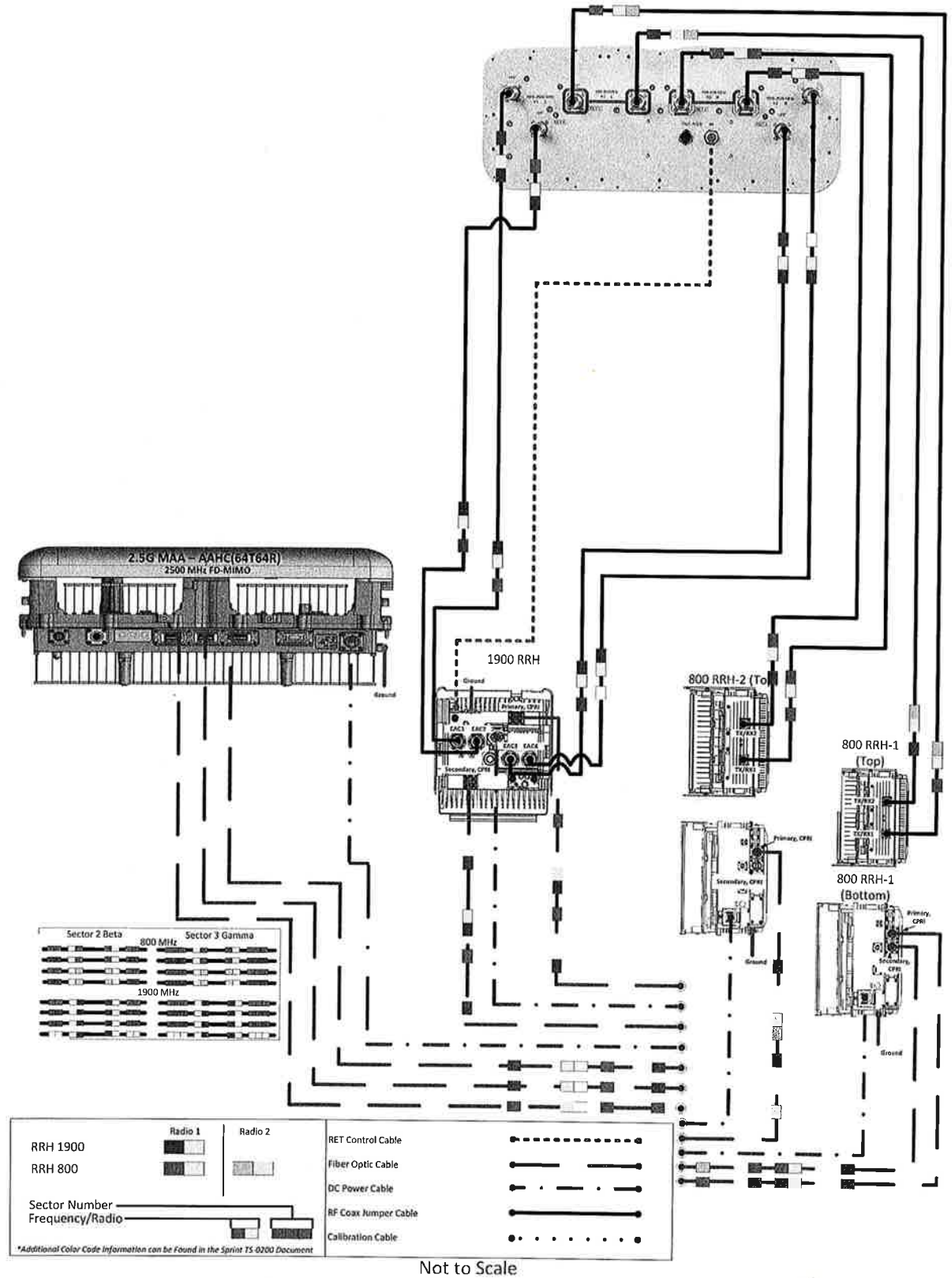
SITE NUMBER:
CT03XC003

SITE ADDRESS:
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:
CIVIL DETAILS

SHEET NUMBER:
A-5

ALU 21-MIMO NNVV-65B-R4 wo Filters



Not to Scale

PLUMBING DIAGRAM | NO SCALE | 1

PLANS PREPARED FOR:

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ENGINEERING LICENSE:

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JOHN S. STEVENS
No. 24765
LICENSED PROFESSIONAL ENGINEER
8.21.2018

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SITE NUMBER:

CT03XC003

SITE ADDRESS:

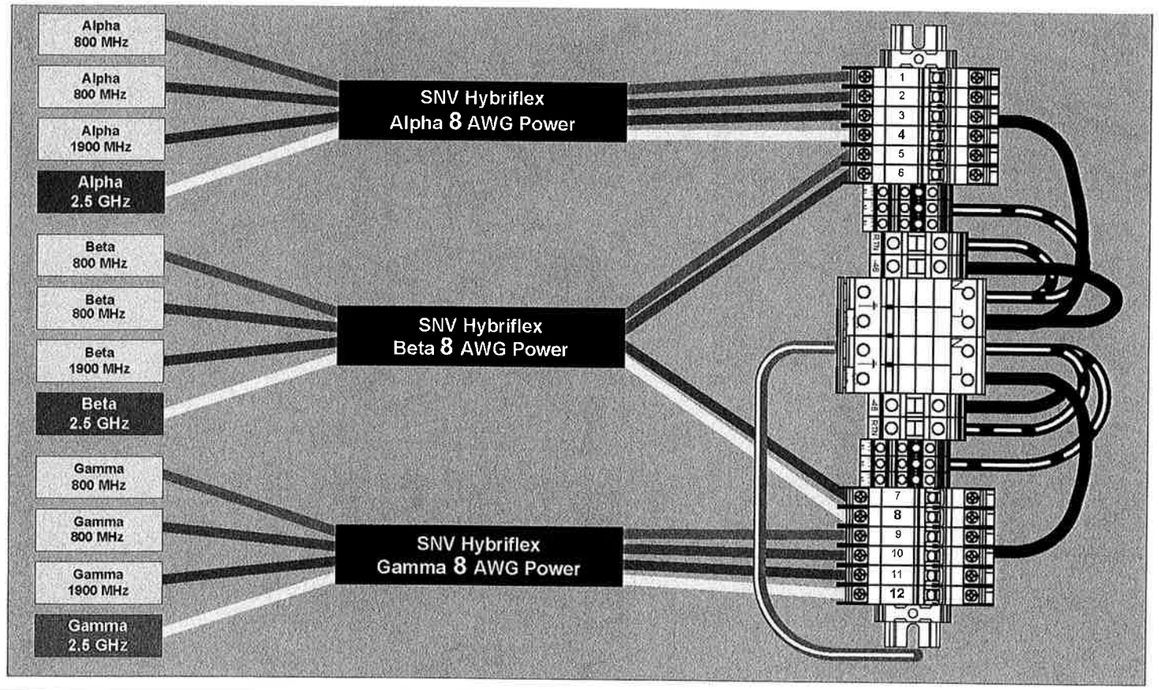
1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:

PLUMBING DIAGRAM

SHEET NUMBER:

A-6

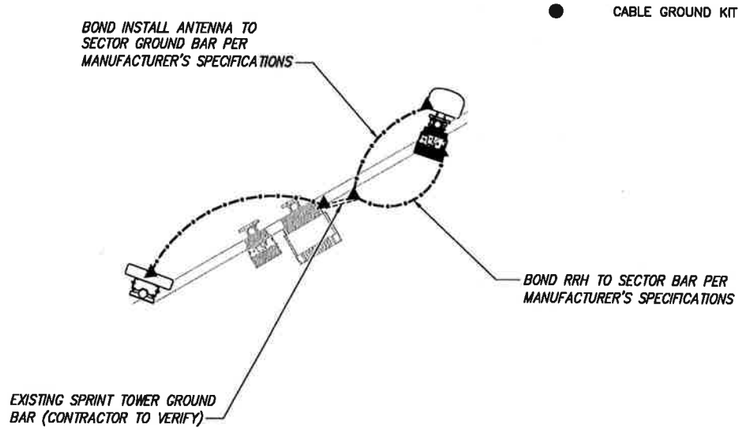


RRH TO DISTRIBUTION BOX POWER CONNECTIVITY

NO SCALE | 1

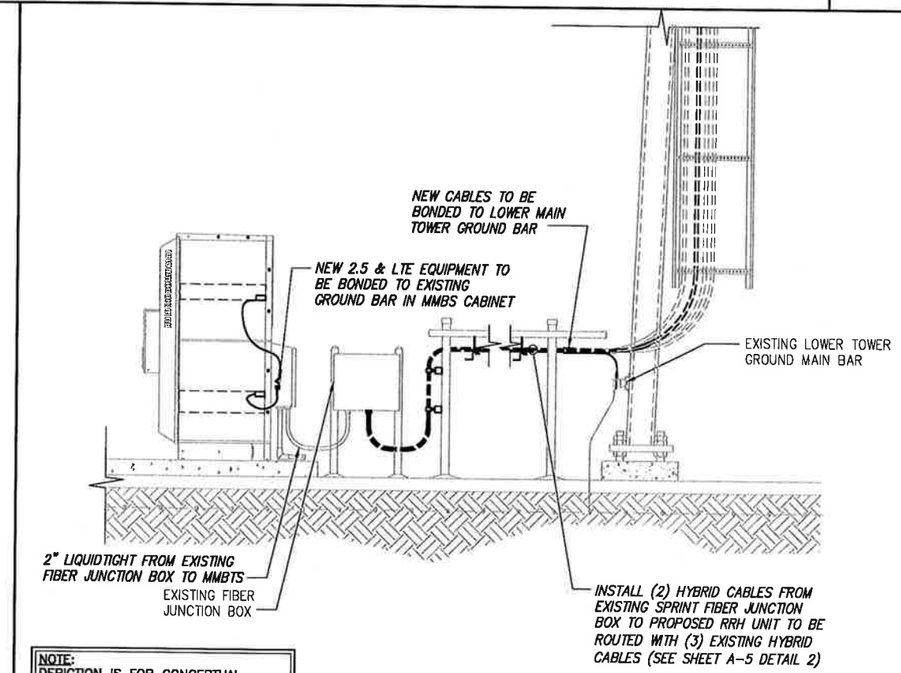
LEGEND:

- EXISTING GROUND RING
- CADWELD CONNECTION (EXOTHERMIC WELD)
- MECHANICAL CONNECTION
- GROUND ROD
- CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2



NOTE:
DEPICTION IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO FIELD VERIFY PRIOR TO CONSTRUCTION

TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION)

NO SCALE | 3

PLANS PREPARED FOR:

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ENGINEERING LICENSE:

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JOHN S. STEVENS
No. 24705
PROFESSIONAL ENGINEER
2/1/2019

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WEST ROCK RIDGE - CT STATE POLICE

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CT03XC003

SITE ADDRESS:

1065 WINTERGREEN AVE
HAMDEN, CT 06514

SHEET DESCRIPTION:

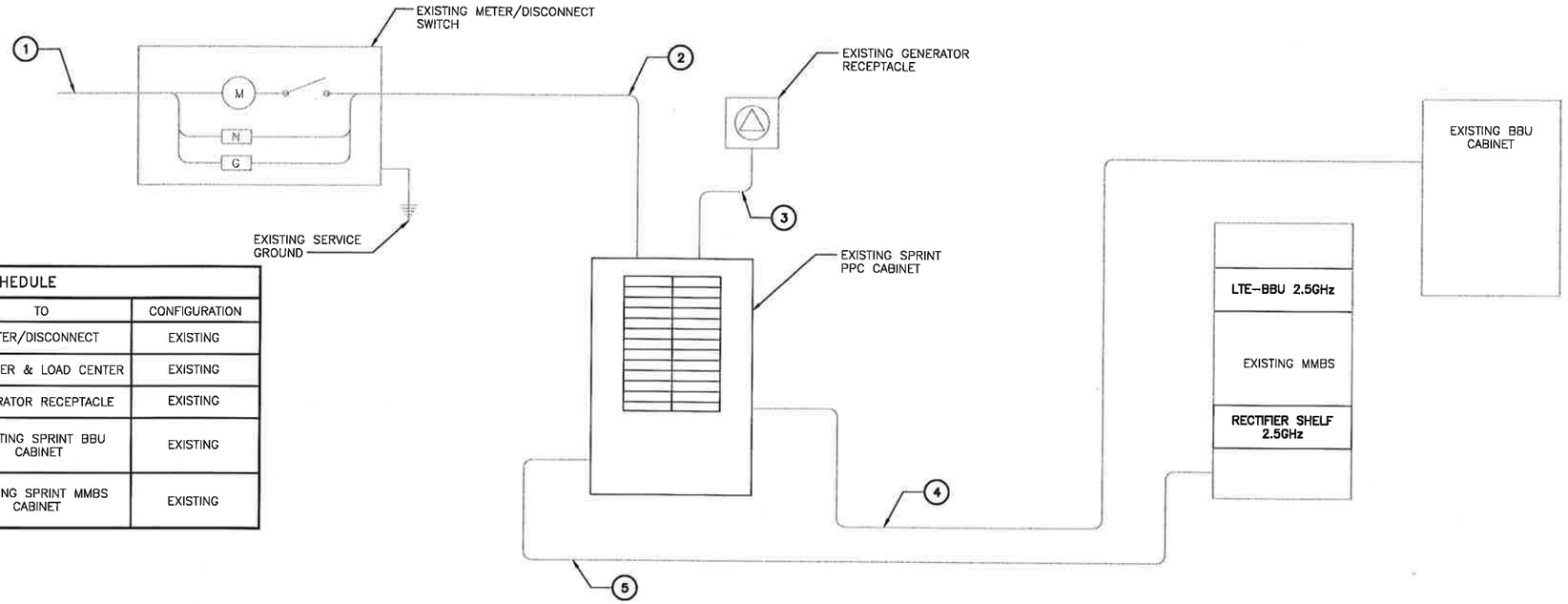
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-1

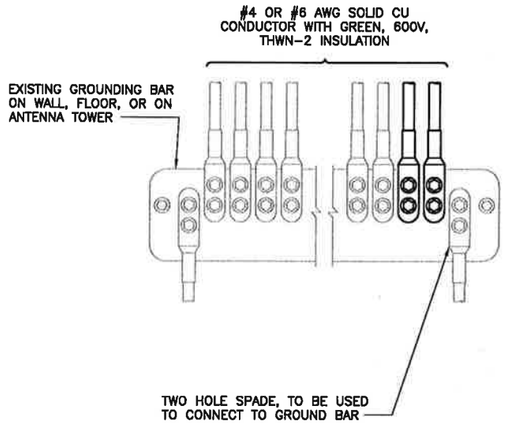
NOTES

CG SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT MMBS CABINET	EXISTING

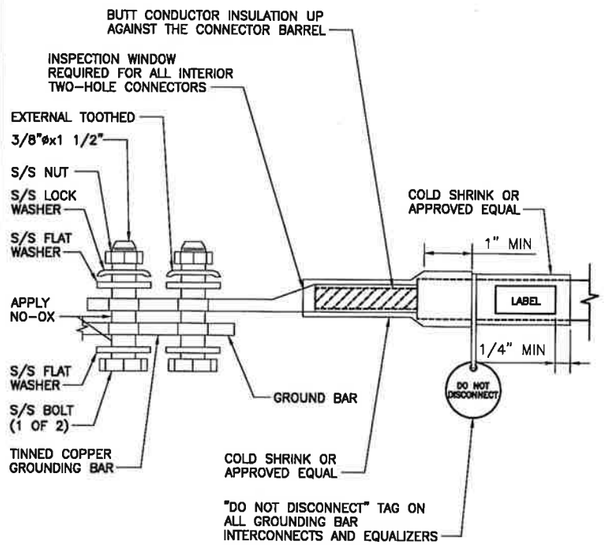
ELECTRICAL ONE–LINE DIAGRAM | NO SCALE | 1



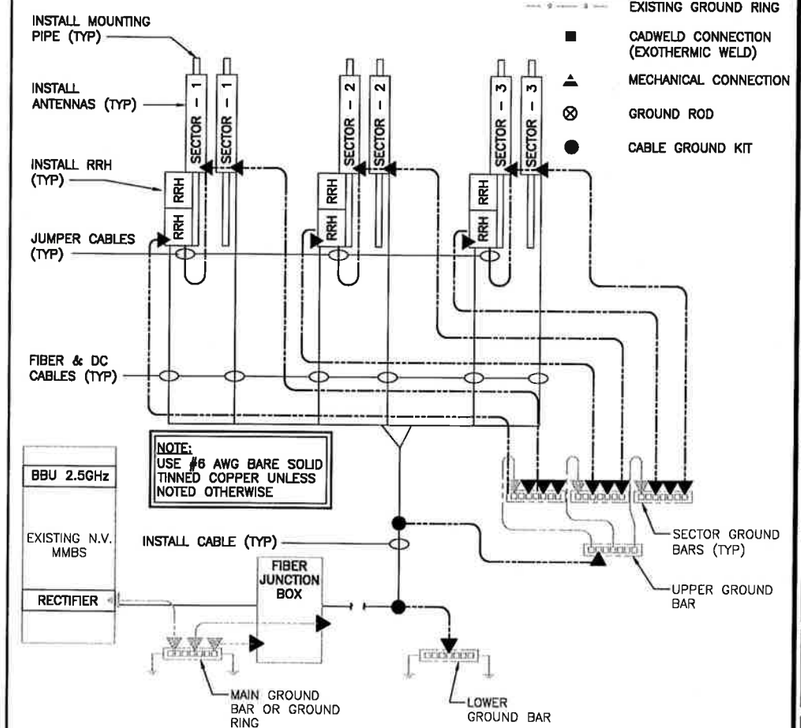
NOTES

1. APPLY NO–OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR | NO SCALE | 2



TWO HOLE LUG | NO SCALE | 3



GROUNDING RISER DIAGRAM | NO SCALE | 4

PLANS PREPARED FOR:

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PLANS PREPARED BY:

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8.2.2018

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HAMDEN, CT 06514

SHEET DESCRIPTION:

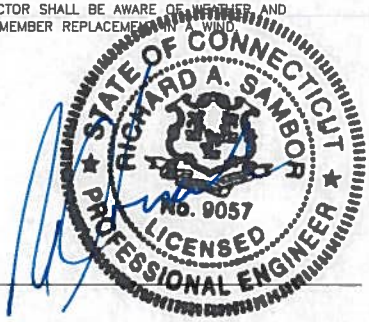
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-2

GENERAL CONSTRUCTION NOTES

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



STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL LEG:
- LEG PIPES 0.400 THICK AND THICKER ..... A572-60 (60 KSI)
- LEG PIPES 3/8" THICK AND THINNER ..... A572-50 (50 KSI)

EXISTING BEAMS, CHANNELS, PLATES, ANGLES A36
REPLACEMENT ANGLES ..... A529 Gr 50 (50 KSI)
WELDED "T" BEAM ..... A992 (50 KSI)

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

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

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

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

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

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8", 3/4", 7/8", 1" DIA. A325-X & A490-X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

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

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

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONTRUCTION", 14TH EDITION.

INSPECTIONS:

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

PLEASE CONTACT AECOM @ 860-990-6767 FOR CONSTRUCTION PHASE SERVICES AND/OR SPECIAL INSPECTIONS.

AT&T, SPRINT, AND T-MOBILE WILL SUPPLY THE SERVICES OF THE REQUIRED SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO AT&T, SPRINT, T-MOBILE, STATE BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

T-Mobile · Sprint · at&t

SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

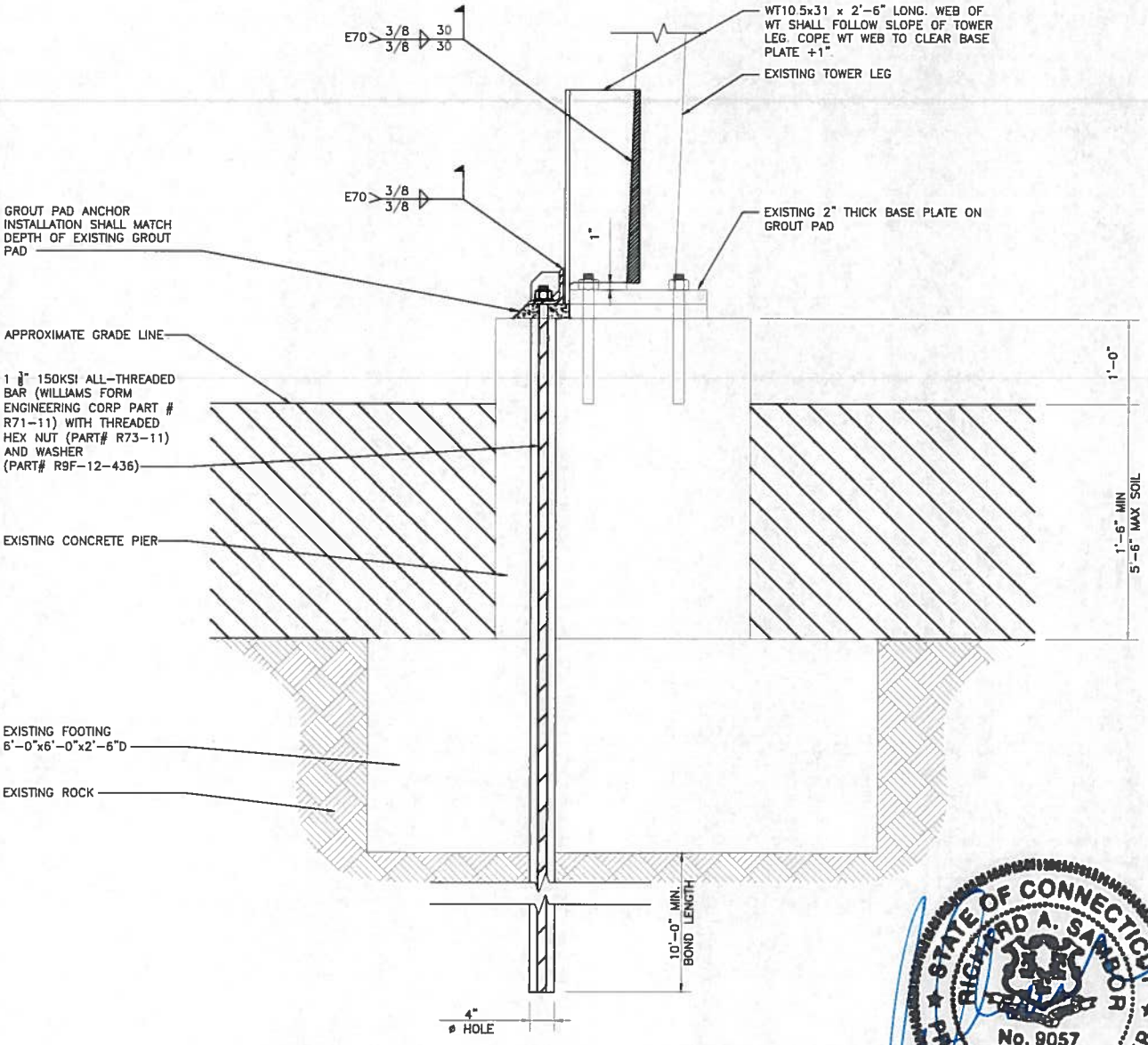
REV.	DATE:	DESCRIPTION

Dwg. No. SK-1

Scale: AS NOTED | Date: 08/14/18

Job No. | File No. | Dwg. 1 of 5

NOTES:
1. ELEVATION OF EXISTING SOIL AND ROCK DETERMINED FROM GEOTECHNICAL REPORT DATED AUGUST 13, 2018.
2. PRODUCTS LISTED BY WILLIAMS FORM ENGINEERING CORP. ARE MINIMUM DESIGN REQUIREMENTS. CONTRACTOR MAY SUBSTITUTE MATERIALS THAT MEET OR EXCEED THESE LISTED PRODUCTS.
3. CONTRACTOR SHALL AVOID EXISTING PIER REINFORCING WHEN DRILLING 4" DIAMETER ROCK ANCHOR HOLE.
4. ROCK ANCHOR BAR IS NOT INTENDED TO BE PRE-STRESSED FOR THIS INSTALLATION. MINIMUM GROUT BOND LENGTH FOR ANCHOR SHALL BE NO LESS THAN 10 FEET INTO ROCK.
5. GROUT SHALL FILL DRILLED HOLE AND MUST SET PRIOR TO FURTHER ANCHORAGE INSTALLATION. GROUT MATERIAL CONSIDERED FOR DESIGN IS US SPEC RA GROUT SUPPLIED BY WILLIAMS FORM ENGINEERING CORP.
6. GROUT PAD EXTENSION SHALL CREATE LEVEL SURFACE AREA FOR ANCHOR TO BE INSTALLED.



1 / SK-2 ANCHOR ELEVATION @ LEGS A, B & C

SCALE: 1/2"=1'-0" (EXISTING ROCK ANCHORS NOT SHOWN FOR CLARITY)

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

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

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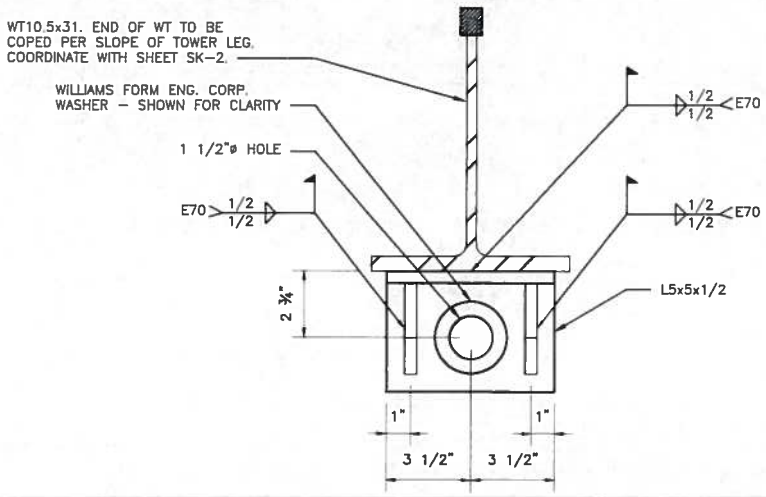
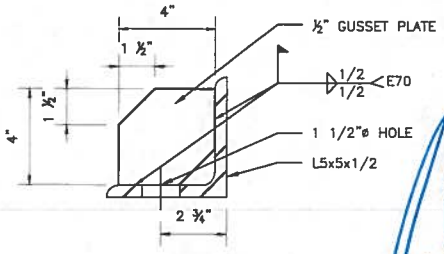
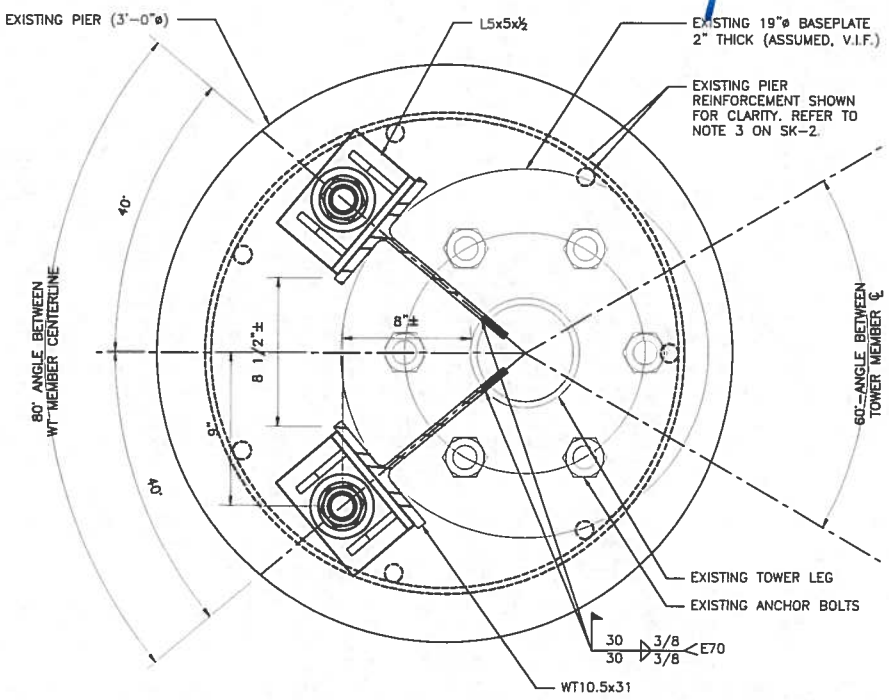
Dwg. No. SK-2

Dwg. 2 of 5





2 / SK-3 **ANCHOR DETAIL**
SCALE: 1-1/2"=1'-0"



1 / SK-3 **ANCHOR LAYOUT @ LEGS A, B &C**
SCALE: 1"=1'-0" (FOOTING NOT SHOWN FOR CLARITY)

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

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

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

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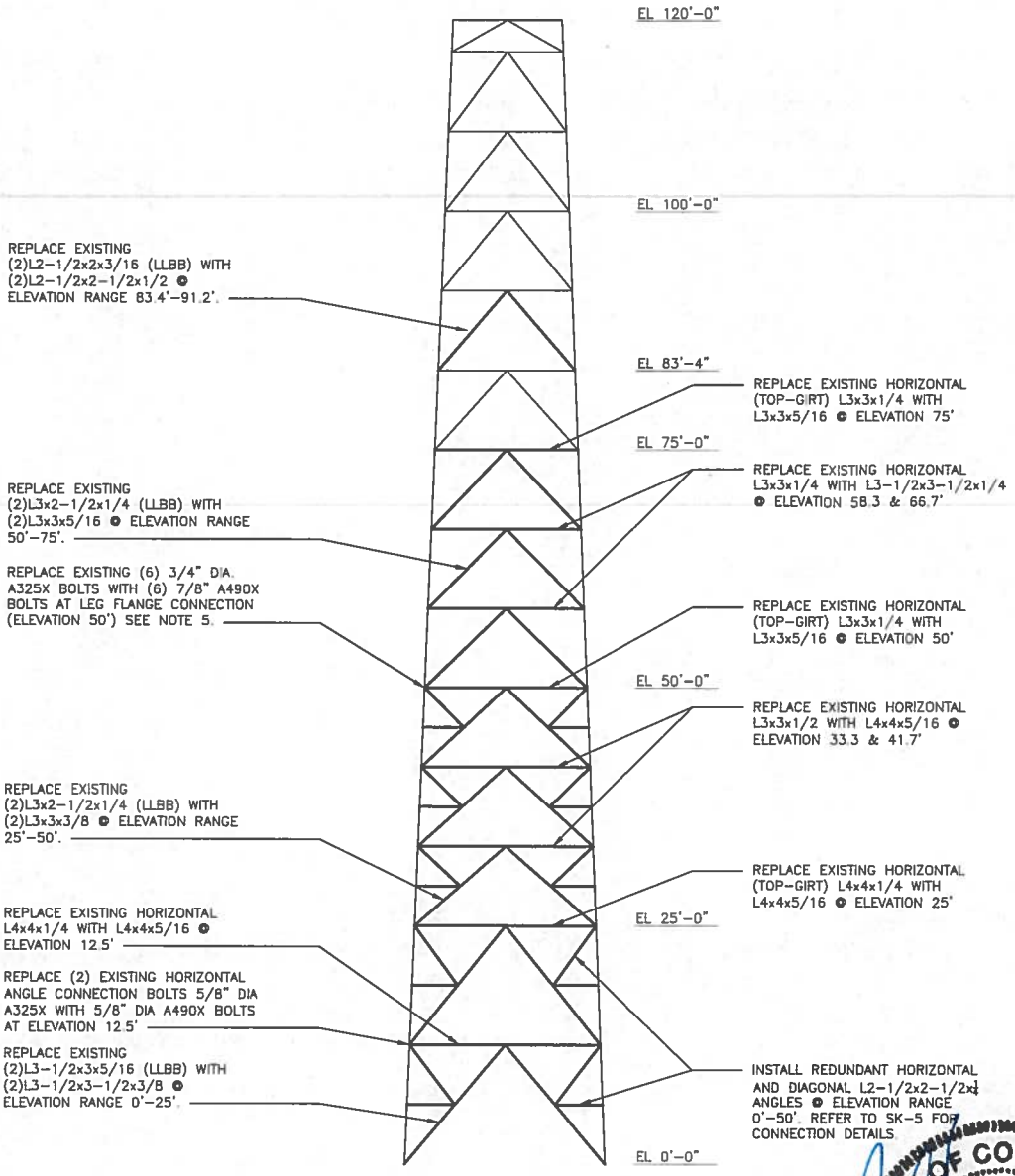
Dwg. No. SK-3

Dwg. 3 of 5

NOTES:
1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR REPLACEMENT MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING TOWER INFORMATION AND ANGLE MEMBER ORIENTATION PRIOR TO ORDERING MATERIALS.
3. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
4. CONNECTION BOLTS FOR REPLACEMENT MEMBERS SHALL BE REPLACED IN KIND. EXISTING BOLTS SHALL NOT BE RE-USED FOR CONNECTING REPLACEMENT MEMBERS.
5. CONTRACTOR SHALL VERIFY THE APPLICABILITY OF INSTALLING A 7/8" DIA BOLT AT THE INDICATED TOWER LEG FLANGE CONNECTION. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE CONNECTICUT STATE POLICE IF THE EXISTING FLANGE BOLT HOLES NEED TO BE INCREASED VIA DRILLING OR OTHER METHODS OF CONSTRUCTION.



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

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

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

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500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
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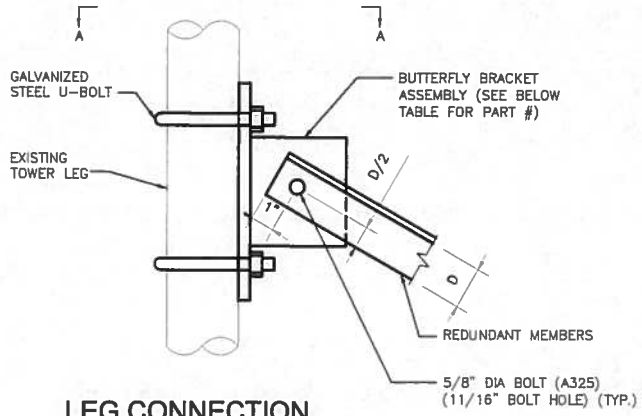
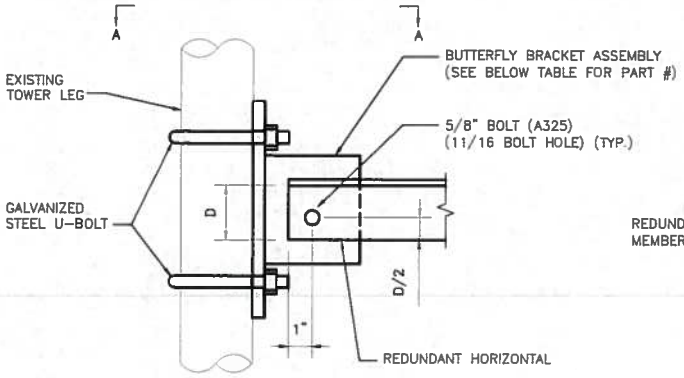
Dwg. No. SK-4



3 SK-5 LEG CONNECTION REDUNDANT DIAGONAL

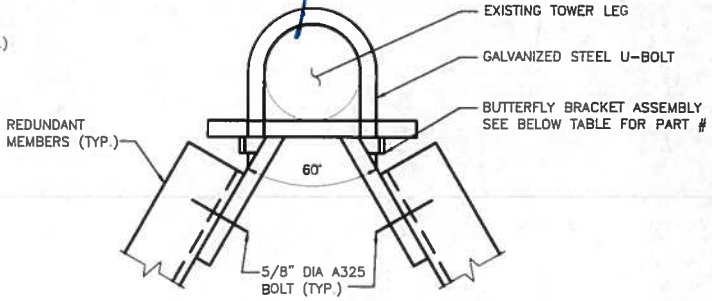
SCALE: 1-1/2"=1'-0"

NOTES:
1. REFER TO SK-1 FOR STRUCTURAL NOTES. COORDINATE SHEET WITH SK-4 FOR SECONDARY HORIZONTAL/DIAGONAL CONNECTION MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS SHOWN PRIOR TO ORDERING MATERIALS.
3. DIMENSIONS NOTED AS 'D' (DEPTH) VARY. REFER TO SK-4 FOR MEMBER SIZE REQUIREMENTS.



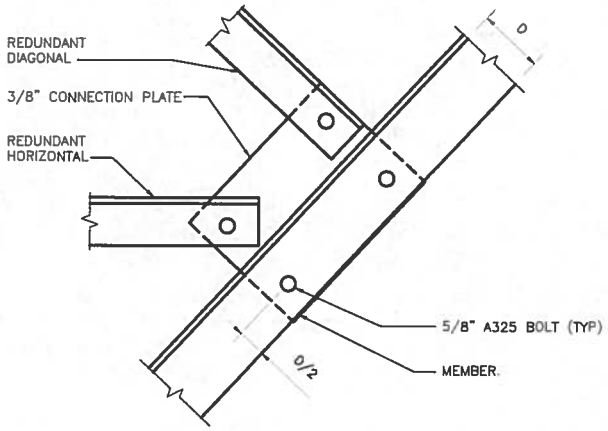
2 SK-5 LEG CONNECTION REDUNDANT HORIZONTAL

SCALE: 1-1/2"=1'-0"



5 SK-5 SECTION A

SCALE: N.T.S.

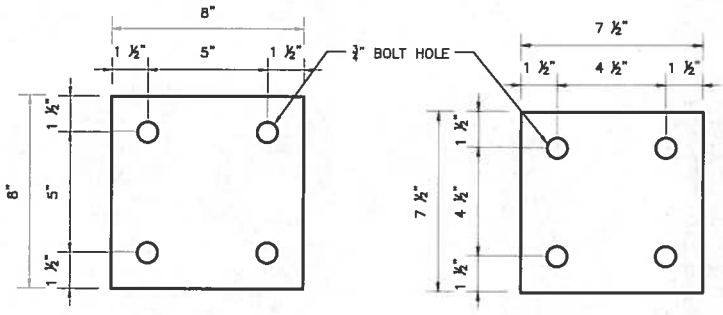


1 SK-5 REDUNDANT MEMBER CONNECTION

SCALE: 1-1/2"=1'-0"

ELEVATION	LEG BUTTERFLY BRACKET #
0'-25'	RSH-0568-86
25'-50'	RSH-0545-68

NOTE: LEG BUTTERFLY BRACKET ASSEMBLY INFORMATION BASED PRIMUS ELECTRONICS CORPORATION. CONTRACTOR SHALL USE PRODUCTS SIMILAR TO OR EXCEEDING IN QUALITY FOR CONSTRUCTION.



4 SK-5 CONNECTION PLATES

SCALE: 1-1/2"=1'-0"

NOTE:
1. DETAILS 2 & 3 ABOVE ILLUSTRATE CONNECTIONS OF DIAGONAL AND HORIZONTAL MEMBERS TO TOWER LEGS. BUTTERFLY BRACKET ASSEMBLIES USED FOR CONNECTION TO EXISTING LEGS SHALL BE INSTALLED AS CLOSE TO EXISTING ADJOINING MEMBER AS POSSIBLE.

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