10 Industrial Ave, Suite 3
Mahwah, NJ 07430
Phone: (845)499-4712
Jennifer Notaro
Real Estate Consultant

October 14, 2014

Hand Delivered

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

CC to Property Owner
Long Ridge Fire Department
366 Old Long Ridge Road
Stamford, CT 06901

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 366 Old Long Ridge Road Stamford, CT 06901 . Known to Sprint Spectrum L.P. as site CT03XC328.

Dear Ms. Bachman:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, Sprint Spectrum L.P. plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

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

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons Sprint Spectrum L.P. respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (201)-704-8157 or email JArdis@transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Jennifer Ardis
Real Estate Consultant

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY FCC REGULATORY COMPLIANCE MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT03XC328

Stamford Fire Department

366 Old Long Ridge Road
Stamford, CT 06903

October 14, 2014

EBI Project Number: 62145487

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

EBI Consulting
environmental | engineering | due diligence

October 14, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT03XC328 - Stamford Fire Department

Site Total: 40.09% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **366 Old Long Ridge Road, Stamford, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades 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 µW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band (850 MHz Band) is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz and 2500 MHz 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 upgrades to the existing Sprint Wireless antenna facility located at **366 Old Long Ridge Road, Stamford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 4 channels in the 1900 MHz Band were considered for each sector of the proposed installation.

2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation.

3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.

4) 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.

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

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline for the proposed antennas is **128 feet** above ground level (AGL).

8) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC328 - Stamford Fire Department
Site Addresss	366 Old Long Ridge Road, Stamford, CT, 06903
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	5.9	128	122	1/2 "	0.5	0	277.39	0.67%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	128	122	1/2 "	0.5	0	39.00	0.17%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	128	122	1/2 "	0.5	0	138.69	0.59%
														Sector total Power Density Value:		1.43%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	5.9	128	122	1/2 "	0.5	0	277.39	0.67%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	128	122	1/2 "	0.5	0	39.00	0.17%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	128	122	1/2 "	0.5	0	138.69	0.59%
														Sector total Power Density Value:		1.43%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	5.9	128	122	1/2 "	0.5	0	277.39	0.67%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	128	122	1/2 "	0.5	0	39.00	0.17%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	128	122	1/2 "	0.5	0	138.69	0.59%
														Sector total Power Density Value:		1.43%

Site Composite MPE %	
Carrier	MPE %
Sprint	4.28%
Nextel	4.03%
AT&T	14.91%
T-Mobile	7.32%
EMCC	9.55% Per field measurement baseline for these antennas listed in CSC database
City of Stamford	
AirTouch	
SkyTel	
Fire Dept.	
Gardella Trans.	
Hoffman Fuel	
Pronet	
Total Site MPE %	**40.09%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **4.28% (1.43% from sector 1, 1.43% from sector 2 and 1.43% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **40.09%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE 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.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 152' SELF SUPPORTING LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENTS

Site I.D: (Verizon) Stamford NW
(AT&T) CT5047
(Sprint) CT03XC328

Address: 366 Old Long Ridge Road
Stamford, CT

prepared for

Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT. 06067

1 International Blvd.
Suite 800
Mahwah, NJ. 07495

prepared by

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

(Sprint) 36928702.00000
(Verizon) 36922268.00000
(AT&T) 36922483.00000

July 15, 2014

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural re-analysis of the modified existing 152' self-supporting lattice tower located at 366 Old Long Ridge Road, in Stamford, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a basic wind velocity of 85 mph (fastest mile) and 74 mph (fastest mile) concurrent with 0.50" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

The proposed antenna modifications are as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(12) Decibel DB844H90E-XY Panel Antennas** **(3) T-Frame Mounts** **(12) 1 1/4 Coaxial Cable**	**Nextel (Existing)**	**118'**
(6) Amphenol LPA-80063-4CF Panel Antennas **(3) Amphenol BXA-171063-8BF-EDIN-2 Panel Antennas** **(3) Amphenol BXA 171063-12CF-EDIN-2 Panel Antennas** **(3) Amphenol BXA-70063-6CF-2 Panel Antennas** **(18) 1 5/8" Coaxial Cables**	**Verizon (Previously Proposed)**	**98'**
Install **(3) RFS APXVSPP18-C-A20 Panel Antennas** **(3) 800 MHz RRH Units** **(3) 1900 MHz RRH Units** **(3) Hybriflex Cables**	**Sprint (Previously Proposed)**	**128'**
(3) RFS APXV9TM14 Panel Antennas **(3) RRH Units** **(1) Fiber Optic Cable** **(27) 8' Jumper Cables**	**Sprint (Proposed)**	**128'**
(2) Decibel LNX-8513DS-A1M Panel Antennas (Alpha Sector) **(4) Decibel LNX-6514DS-A1M Panel Antenans (Beta and Gamma Sector)** **(6) RRH Units** **(6) HBXX-6517DS-A2M Panel Antennas** **(1) Raycap DB-T1-6Z-8AB-0Z Distribution Box**	**Verizon (Proposed)**	**98'**

The results of the analysis indicate that the proposed modified tower structure and the proposed modified foundation components are in compliance with the proposed loadings. The proposed modified tower structure and proposed modified foundation components are considered structurally adequate with the wind classification specified above and all the existing and proposed antenna loading.

1. EXECUTIVE SUMMARY - *continued*

The analysis results presented herewith are based upon the previous tower modification proposed by URS Corporations' tower modification analysis report, project 36922268, signed and sealed on June 13, 2013. No installation of proposed antennas, mounts, cables of accessories shall occur prior to the completion of the tower and foundation modifications specified in the June 13, 2013 report. A copy of the reinforced drawings are included with this report.

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Original tower geometry, structural member sizes and foundation information obtained from manufacturer's design documents prepared by ROHN Industries, Engineering File No. 24269DB, dated May 16, 1989.
3) Subsurface Investigation Report from Goldberg-Zoino & Associates Inc., dated December 14, 1988.
4) Completion of subsequent tower reinforcements:
   - Drawings SS-1 'Tower Foundation Reinforcement, Elevation, Sections and Details' and drawing SS-2 'Foundation Plan, Section and Notes' prepared by Tectonic Engineering Consultants P.C; on behalf of AT&T Wireless, PCS, LLC; dated April 23, 2002.
   - Drawing S-1 'Structural Details' prepared by Diversified Technology Consultants (dtc), on behalf of Nextel Communications, dated June 11, 2002.
   - Tower reinforcement drawings sheets 1 thru 5, entitled '2007 Modifications Tower Rework For a 153' ROHN SSV Tower' Long Ridge, CT., prepared by Vertical Structures on behalf of Motorola, dated May 24, 2007.
   - Tower inventory and mapping report prepared by CSB Communications, Inc., on behalf of Verizon Wireless/URS Corporation, dated July 20, 2008.
5) Geotechnical report from Dr. Clarence Welti, P.E., Geotechnical Engineering, dated December 12, 2012.
6) Modification design/passing analysis performed by URS for Sprint, Verizon, and AT&T, dated June 13, 2013.
7) Verizon RFDS, dated May 5, 2014
8) Sprint flat file for proposed antenna inventory, obtained via e-mail dated July 11, 2014.
9) Antenna and mount configuration as specified within Section 2 and 6 of this report.
10) 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 assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

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

RAS/mcd

cc: ICA – URS
CF/Book

2. INTRODUCTION

The subject tower is located at 366 Old Long Ridge Road, in Stamford, CT. The structure is an existing 152' self supporting three-legged steel tapered lattice tower designed and manufactured by ROHN.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 20' 4-Bay Dipole	(existing)	12' Pipe Mount	162'	(1) 7/8"
(1) Decibel DB563K Directional Omni with 22"x22"x6" Filter Box	(existing)	3' Stand-off	156.70'	(2) 1-5/8"
(1) 4' HP Dish with Radome	(existing)	4" Dish Mount	152'	(1) 7/8" Elliptical
(1) 30"x3" Omni Whip with 20"x6"x8" Filter Box	(existing)	3' Stand-off	151.25'	(2) 1-1/4"
(1) 12'x3" Decibel Omni Whip	(existing)	4' Stand-off	144'	(1) 7/8"
(3) Powerwave 7770 panel antennas and (6) Powerwave LGP21401 TMA's	AT&T (existing)	Pipe Leg Mount	143'	(6) 1 5/8"
(3) Powerwave P65-16-XLH-RR Antennas (6) Erricson RRUS-11 RRU's (1) Raycap DC6-48-60-0-1B Surge Arrestor	**AT&T (Proposed)**	**(3) Valmont CWT01 Mounts**	**145'**	**3" Flex Conduit (3) 1 5/8"**
(1) Decibel DB563K Directional Omni	(existing)	3' Stand-off	141.70'	(1) 1-1/4"
(1) 4' HP Dish with Radome	(existing)	4" Dish Mount	140'	(1) 7/8" Elliptical
(1) 6'x3" Decibel Omni Whip	(existing)	3' Stand-off	138'	(2) 1-5/8"
(1) 2' HP Dish with Radome	(existing)	4" Dish Mount	136.5'	(1) 7/8" Elliptical
(1) Decibel DB495 Corner Reflector	(existing)	Leg Mount	135'	(1) 1/2"
(1) 8'x2" Decibel Omni Whip	(existing)	off Boom Gate listed above	133'	(1) 7/8"
(3) RFS APXV9TM14 Pane Antennas (3) RRH Units	**Sprint (Proposed)**	*See Below Mount*	**128'**	**(1) Fiber Optic Cable (27) 8' Jumper Cables**
(3) RFS APXVSPP18-C-A20 (3) 800 MHz RRH's (3) 1900 MHz RRH's	**Sprint (Previously Proposed)**	(3) 11' Boom Gates	**128'**	**(3) Hybriflex Cables**
(1) Decibel DB254 Corner Reflector	(existing)	Leg Mount	122'	(1) 1/2"
(3) RFS APX16DWV-S-E-ACU Panel Antennas (3) TMAs	T-Mobile (existing)	Leg Mount	108'	(12) 1-5/8" (2 rows of 6)
(1) 10'x2" Decibel Omni Whip	(existing)	3' Stand-off	101'	(1) 7/8"
(1) 8' 4-Bay Dipole	(existing)	3' Stand-off	101'	(1) 7/8"
(1) 8' 4-Bay Dipole	(existing)	3' Stand-off	101'	(1) 7/8"
(1) 20'x3" Omni Whip	(existing)	3' Stand-off	101'	(1) 7/8"

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(2) Decibel LNX-8513DS-A1M Panel Antennas (Alpha Sector) (4) Decibel LNX-6514DS-A1M Panel Antenans (Beta and Gamma Sector) (6) RRH Units (6) HBXX-6517DS-A2M Panel Antennas (1) Raycap DB-T1-6Z-8AB-0Z Distribution Box	**Verizon (Proposed)**	*See Below Mount*	**98'**	**(1) 1 1/4" Hybrid Cable**
(3) ALU RRH's (1) Raycap DB-T1-6Z-8AB-0Z Distribution Box	**Verizon (Previously Proposed)**	**(3) 13' T-frames**	**98'**	**(1) 1 1/4" Hybrid Cable**
(1) 4'x3" Omni Whip	(existing)	3' Stand-off	79'	(1) 1-1/4"
(1) 8' 2-Bay Dipole	(existing)	3' Stand-off	78'	(1) 7/8"
(1) 3' Kathrein Yagi with Radome	(existing)	same as listed above	72'	(1) 1/2"
(1) GPS antenna	Sprint (existing)	2' Stand-off	58'	(1) 1/2"
(1) 1.2M Dish	(existing)	4' Stand-off	45'	(1) 1/4"

Notes:

1) Omni-whip antenna centerline elevations based on antenna size and respective mount height.
2) Refer to Section 6 Tower Feed Line Plan for coaxial cable locations.

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

The analysis results presented herewith are based upon previous tower modification proposed by URS Corporations' tower modification analysis report, project 36922268, signed and sealed on June 13, 2013.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

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

The analysis was conducted using TNX Tower 6.1.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Basic Wind Speed:

- Fairfield County; v = **85**mph (fastest mile) [Section 16 of TIA/EIA-222-F-1996]
- Stamford; v = 105mph (3 second gust) equivalent to 85mph (fastest mile) [Appendix K, 2005 Connecticut State Building Code Supplement]

Loading Cases:

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

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

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

4. FINDINGS AND EVALUATION

Stresses on the modified tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of the analysis indicate that the calculated stresses under the proposed loading are **BELOW** the allowable stresses (see tables below). The modified tower foundation has sufficient capacity to resist the proposed uplift forces. The tower anchor bolts were found to be within the allowable limits.

TABLE 1: Tower Base Reactions:
For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

Base Reactions	Proposed Reactions
Axial Load (kips)	31
Shear per Leg (kips)	23
Total Shear (kips)	43
Uplift per Leg (kips)	189
Comp.per Leg (kips)	220
O.T. Moment (ft-kips)	3784

TABLE 2: Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Stress (% capacity)	Pass/Fail
Tower Leg (T15)	ROHN 5 X-STR w/ (3) 1.5"x0.5" Bars	Compression / 15'-20'	92.4 %	**Pass**
Diagonal (T15)	L3 1/2x3 1/2x1/4	Compression / 15'-20'	97.7 %	**Pass**
Horizontal (T16)	L2 7/8x2 7/8x1/4	Compression/10'-15'	77.4 %	**Pass**
Secondary Horizontal (T13)	L3x3x3/16	Compression/30'-40'	88.4 %	**Pass**
Top Girt (T1)	L2x2x1/8	Compression/140'-152'	10.0 %	**Pass**
Red. Horiz. Bracing (T15)	L2x2x1/4	Compression/15'-20'	34.9 %	**Pass**
Red. Diag. Bracing (T15)	L2x2x1/4	Compression/15'-20'	26.8 %	**Pass**
Bolt Checks				
Diagonal (T10)	0.500" dia A325X	Bolt Shear / 60'-67'	97.7 %	**Pass**
Anchor Bolts	(4) 1" dia A193 GR-7, A320 GR L7	Min Area per ASCE 10-97	96 %	**Pass**

TABLE 3: Foundation Summary

Foundation	Component	(% capacity/FOS)	Pass/Fail	Comments:
Drilled Concrete Caisson with Concrete Block Reinforcement & Grouted Rock Anchor	Uplift	92.3 % / 2.17	**Pass**	Min. F.O.S of 2.0 req'd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the proposed modified tower structure and the proposed modified foundation components are in compliance with the proposed loadings. The proposed modified tower structure and proposed modified foundation components are considered structurally adequate with the wind classification specified above and all the existing and proposed antenna loading.

The analysis results presented herewith are based upon the previous tower modification proposed by URS Corporations' tower modification analysis report, project 36922268, signed and sealed on June 13, 2013. No installation of proposed antennas, mounts, cables of accessories shall occur prior to the completion of the tower and foundation modifications specified in the June 13, 2013 report. A copy of the reinforced drawings are included with this report.

Limitations/Assumptions:

This report is based on the following:

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

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

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

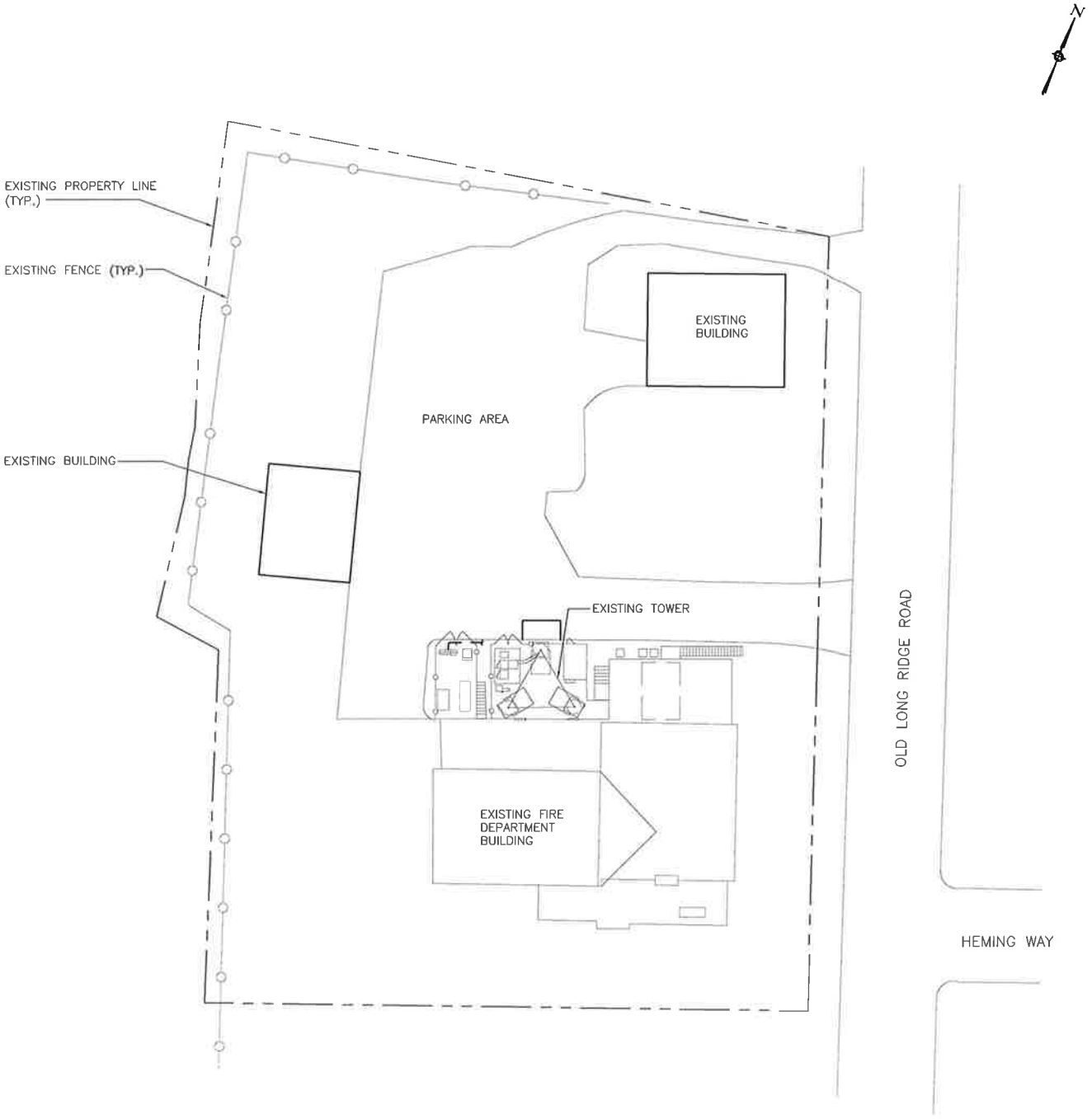
URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of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

Ongoing and Periodic Inspection and Maintenance:

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

6. DRAWINGS AND DATA

TOWER AND FOUNDATION REINFORCEMENT DRAWINGS



1 / SK-1 SITE PLAN

SCALE: 1"=50'-0"

0 10 20 30 40 50 100

PROJECT NO. 36922268	URS CORPORATION AES	SITE PLAN
Designed by: MCD	500 ENTERPRISE DRIVE	STAMFORD FIRE DEPARTMENT TOWER
Drawn by: MCD	ROCKY HILL, CONNECTICUT	SITE ADDRESS: 366 OLD LONG RIDGE ROAD STAMFORD, CT
Checked by: KB	860-529-8882	
Approved by: ICA		

REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13

Job No. VZ5-110 | File No.

Dwg. No. SK-1

Dwg. 1 of 6

STRUCTURAL NOTES

SOIL

1. SOIL BEARING CAPACITY OF 5,000 PSF USED FOR FOUNDATION DESIGN. GENERAL CONTRACTOR RESPONSIBLE FOR VERIFYING BEARING CAPACITIES.
2. ALL SURFACES MUST BE FREE OF STANDING WATER PRIOR TO PLACING
3. COMPACTED GRAVEL FILL PER CONNECTICUT DOT STANDARD SPEC. SECTION M.02.01 AND ASTM D1557.
4. CONTACT THE ENGINEER IF GROUND WATER IS IN ENCOUNTERED AND DEWATERING IS REQUIRED.

CONCRETE

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318 AND THE SPECIFICATION CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. CONCRETE SHALL BE AIR ENTRAINED TO (4% TO 6%) AND SLUMP OF 3" TO 5".
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.

   CONCRETE EXPOSED TO EARTH OR WEATHER:

   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF .....1 1/2 IN.

   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:

   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS .....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING
7. COLD WEATHER CONCRETE PLACING SHALL BE IN ACCORDANCE WITH ACI-306.
8. NO FOOTING SHALL BE PLACED ON FROZEN GROUND. UNCURED CONCRETE SHALL BE PROTECTED AGAINST FROST.
9. APPLY NON-SLIP BROOM FINISH IMMEDIATELY AFTER TROWEL FINISHING.

FOUNDATION NOTES

1. A SOIL BEARING CAPACITY OF 5000 PSF WAS USED FOR THE FOUNDATION DESIGN. THE GENERAL CONTRACTOR IS TO CONFIRM THE EXISTING SOIL BEARING PRESSURE.
2. ALL FOOTINGS SHALL BEAR ON EXISTING UNDISTURBED ORGANIC FREE SOIL. ALL UNSUITABLE SOIL SHALL BE REMOVED AS DIRECTED BY THE ENGINEER AND REPLACED WITH COMPACTED GRAVEL PLACED IN 8" LAYERS AND COMPACTED TO 95% OF MODIFIED OPTIMUM DENISTY.
3. ALL FOOTINGS TO BE A MINIMUM OF 3'-6" BELOW FINISH GRADE UNLESS OTHERWISE NOTED. EXCEPT WHERE ROCK OR LEDGE OCCURS, PIN FOUNDATION TO ROCK.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE, THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING HOLES IN CONCRETE.

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL BEAMS, CHANNELS, PLATES & ANGLES..... ASTMA572 GRADE 50
PIPE COLUMN..... ASTM A53 GRADE B
STUB COLUMNS FY=46 KSI ..... ASTM A500
BOLTS ..... ASTM A325-N
STRUCTURAL STEEL SHALL CONFORM TO ALL REQUIREMENTS OF THE 1999 AISC-LRFD 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.

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

CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 5/16" AND MINIMUM OF (2) 3/4" BOLTS.

ALL BOLT HOLES WILL BE DRILLED OR PUNCHED, WITH BURRS REMOVED PRIOR TO COATING.

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.

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

CONNECTIONS / FIELD ASSEMBLY:

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

NON-STRUCTURAL CONNECTIONS, SUCH AS FOR STEEL GRATING, MAY USE 5/8" DIA. GALVANIZED ASTM A307 BOLTS, UNLESS OTHERWISE NOTED.

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

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

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

INSPECTIONS:

SPECIAL INSPECTIONS REQUIRED PER THE 2005 CONNECTICUT STATE BUILDING CODE FOR STRUCTURAL STEEL WORK.

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

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

FOUNDATION WORK / REPLACEMENT OF TOWER MEMBERS AND BOLTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STRUCTURAL INTEGRITY OF THE TOWER WHILE MEMBERS ARE REPLACED.

ONLY ONE MEMBER PER TOWER FACE SHALL BE REPLACED AT A TIME.

THE CONTRACTOR SHALL PREPARE AND MINIMIZE THE TIME THAT MEMBERS ARE NOT CONNECTED TO THE TOWER.

ALL MEMBERS SHALL BE LEFT FULLY CONNECTED AT THE END OF THE WORK DAY.

THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM REPLACEMENT IN A WIND.

PROJECT NO. 36922268
Designed by: MCD
Drawn by: MCD
Checked by: KB
Approved by: ICA

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

GENERAL NOTES

STAMFORD FIRE DEPARTMENT TOWER
SITE ADDRESS: 366 OLD LONG RIDGE ROAD
STAMFORD, CT

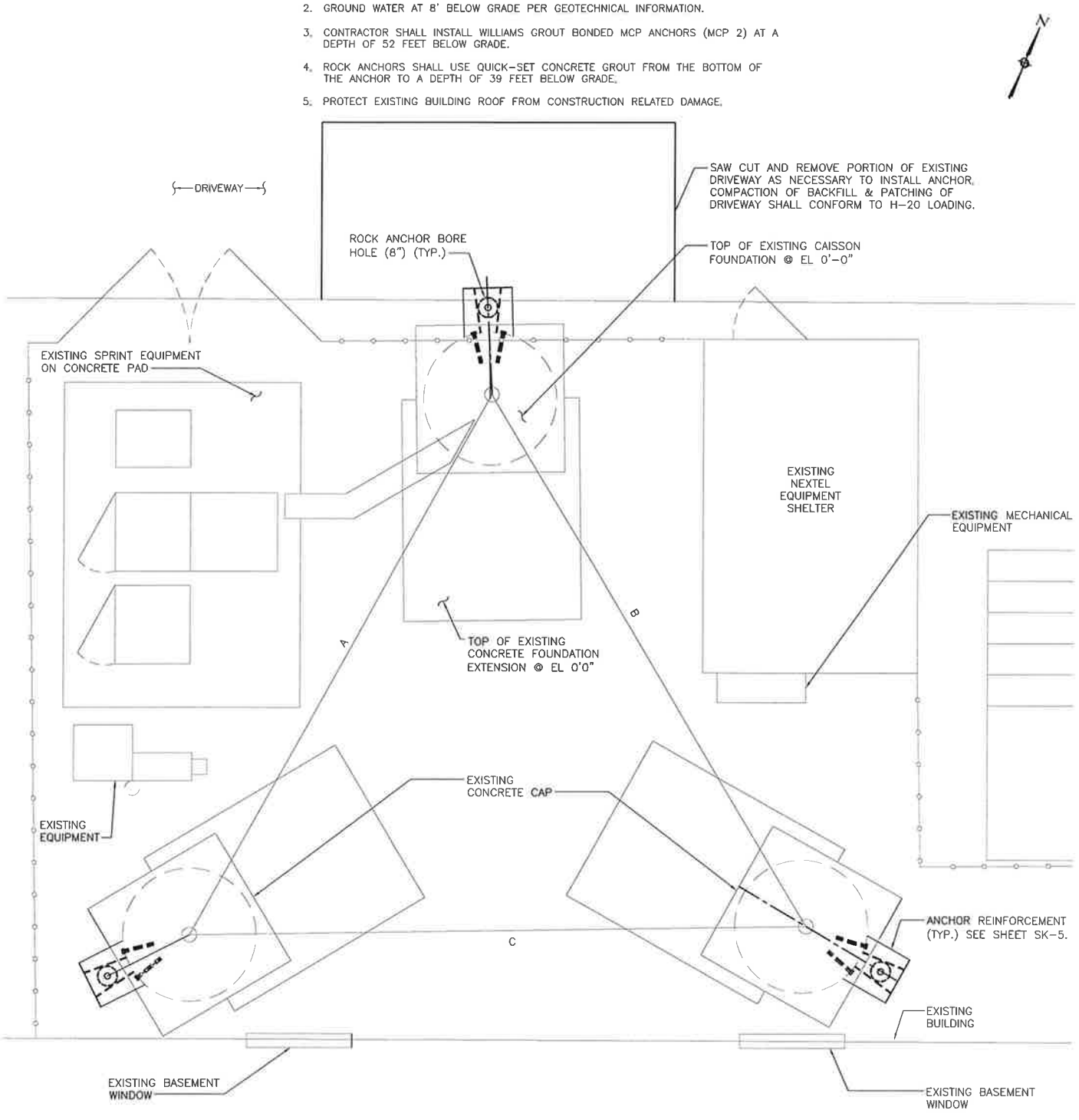
REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13
Job No. V25-110 | File No.

Dwg. No. SK-2

NOTES

1. PRIOR TO EXCAVATION, CONFIRM THAT NO CONDUITS, PIPES, LINES OR ANY OTHER OBJECTS ARE LOCATED WITHIN AREA TO BE EXCAVATED.
2. GROUND WATER AT 8' BELOW GRADE PER GEOTECHNICAL INFORMATION.
3. CONTRACTOR SHALL INSTALL WILLIAMS GROUT BONDED MCP ANCHORS (MCP 2) AT A DEPTH OF 52 FEET BELOW GRADE.
4. ROCK ANCHORS SHALL USE QUICK-SET CONCRETE GROUT FROM THE BOTTOM OF THE ANCHOR TO A DEPTH OF 39 FEET BELOW GRADE.
5. PROTECT EXISTING BUILDING ROOF FROM CONSTRUCTION RELATED DAMAGE.



1 / SK-3 TOWER PLAN

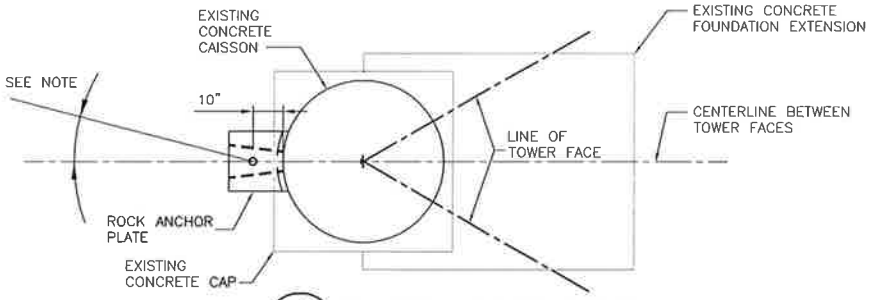
SCALE: 1"=5'-0"

0 1 2 3 4 5 10

PROJECT NO. 36922268	URS CORPORATION AES	TOWER PLAN
Designed by: MCD	500 ENTERPRISE DRIVE	STAMFORD FIRE DEPARTMENT TOWER
Drawn by: MCD	ROCKY HILL, CONNECTICUT	SITE ADDRESS: 366 OLD LONG RIDGE ROAD STAMFORD, CT
Checked by: KB	860-529-8882	
Approved by: ICA		

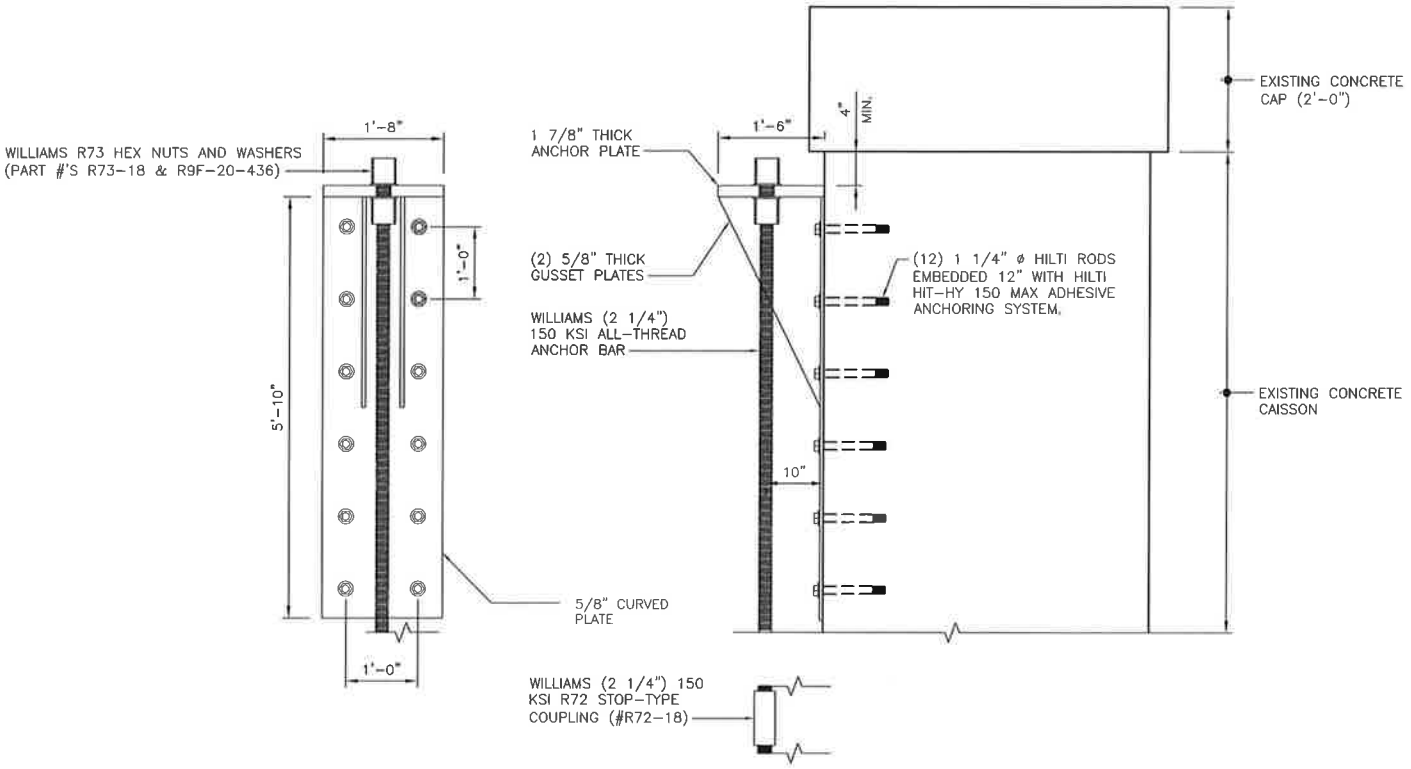
REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13 | Job No. VZ5-110 | File No. | Dwg. No. SK-3 | Dwg. 3 of 6



1 / SK-4 TOWER LEG FOUNDATION
N.T.S.

NOTE:
INSTALL ANCHOR ASSEMBLY ON THE SOUTH WEST CAISSON ROTATED 4" CLOCKWISE FROM THE CENTERLINE BETWEEN TOWER FACES. OTHER CAISSON ANCHOR ASSEMBLIES WILL NOT NEED THIS ADJUSTMENT.



2 / SK-4 ANCHOR ASSEMBLY
N.T.S.

3 / SK-4 REINFORCED TOWER FOUNDATION
N.T.S.

ANCHOR NOTES:

CONTRACTOR SHALL USE QUIKCRETE QUICK-SETTING CEMENT (PRODUCT # 1240) FOR DEPTHS OF 39 FEET BELOW GRADE TO A MINIMUM DEPTH OF 52 FEET BELOW GRADE.

GROUT/BOND STRESS SHALL BE VERIFIED FOR TYPE OF ROCK ENCOUNTERED BEFORE INSTALLATION OF ANCHOR AND INJECTION OF GROUT CEMENT MATERIAL.

PROJECT NO.	36922268
Designed by:	MCD
Drawn by:	MCD
Checked by:	KB
Approved by:	ICA

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

TOWER FOUNDATION DETAILS

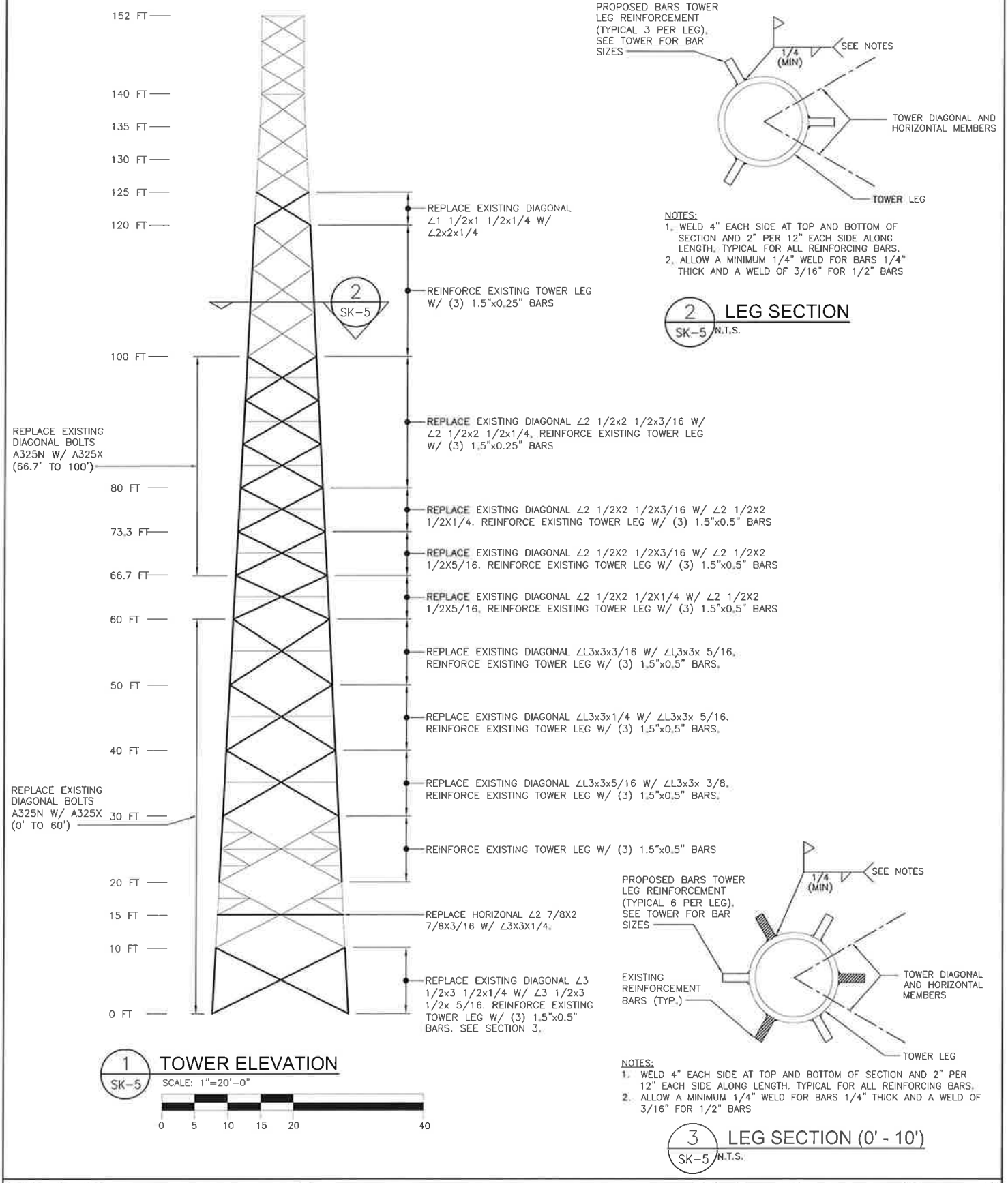
STAMFORD FIRE DEPARTMENT TOWER
SITE ADDRESS: 366 OLD LONG RIDGE ROAD
STAMFORD, CT

REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13
Job No. VZ5-110 | File No.

Dwg. No. SK-4

SEE STRUCTURAL NOTES SK-1



1 SK-5 TOWER ELEVATION

SCALE: 1"=20'-0"

0 5 10 15 20 40

NOTES:
1. WELD 4" EACH SIDE AT TOP AND BOTTOM OF SECTION AND 2" PER 12" EACH SIDE ALONG LENGTH. TYPICAL FOR ALL REINFORCING BARS.
2. ALLOW A MINIMUM 1/4" WELD FOR BARS 1/4" THICK AND A WELD OF 3/16" FOR 1/2" BARS

2 SK-5 LEG SECTION N.T.S.

NOTES:
1. WELD 4" EACH SIDE AT TOP AND BOTTOM OF SECTION AND 2" PER 12" EACH SIDE ALONG LENGTH. TYPICAL FOR ALL REINFORCING BARS.
2. ALLOW A MINIMUM 1/4" WELD FOR BARS 1/4" THICK AND A WELD OF 3/16" FOR 1/2" BARS

3 SK-5 LEG SECTION (0' - 10') N.T.S.

PROJECT NO. 36922268
Designed by: MCD
Drawn by: MCD
Checked by: KB
Approved by: ICA

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

TOWER ELEVATION

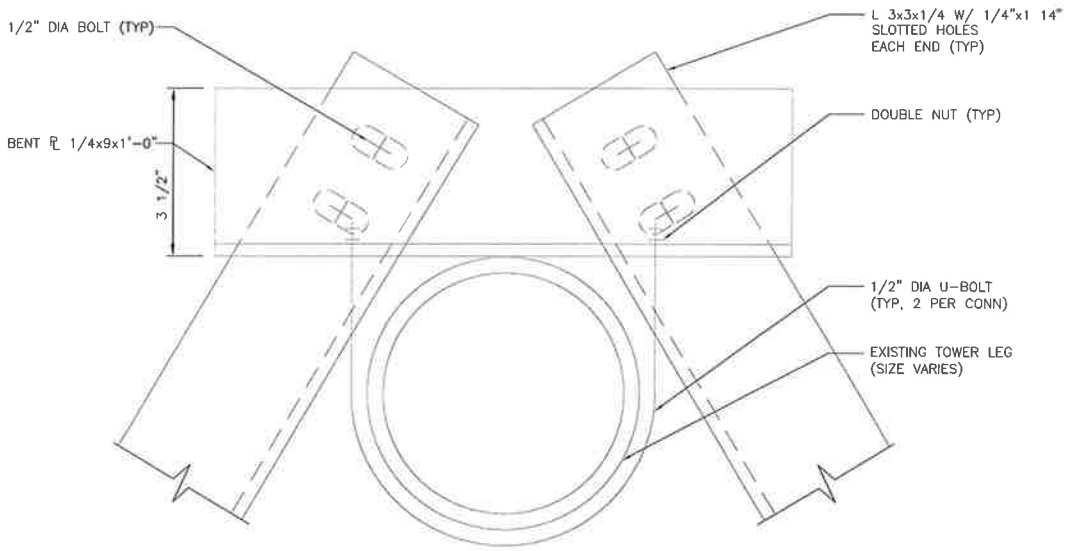
STAMFORD FIRE DEPARTMENT TOWER
SITE ADDRESS: 366 OLD LONG RIDGE ROAD
STAMFORD, CT

REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13
Job No. VZ5-110 | File No.

Dwg. No. SK-5

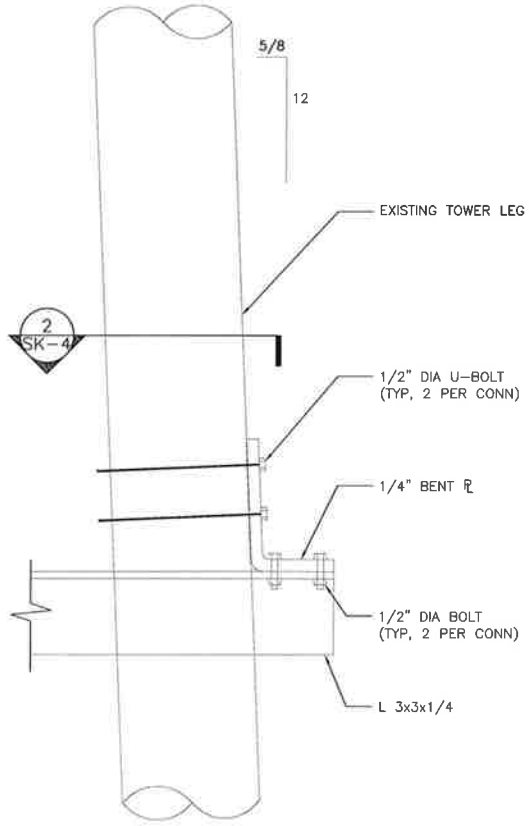
Dwg. 5 of 6



2 / SK-6 TOWER LEG SECTION

SCALE: 3"=1'-0"

0 2" 4" 8" 12"



1 / SK-6 TOWER LEG DETAIL

SCALE: 3"=1'-0"

0 2" 4" 8" 12"

PROJECT NO.	36922268
Designed by:	MCD
Drawn by:	MCD
Checked by:	KB
Approved by:	ICA

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

ATTACHMENT DETAILS

STAMFORD FIRE DEPARTMENT TOWER

SITE ADDRESS: 366 OLD LONG RIDGE ROAD
STAMFORD, CT

REV.	DATE:	DESCRIPTION
1	7/16/14	RE-ISSUE/NO CHANGE

Scale: AS NOTED | Date: 06/13/13

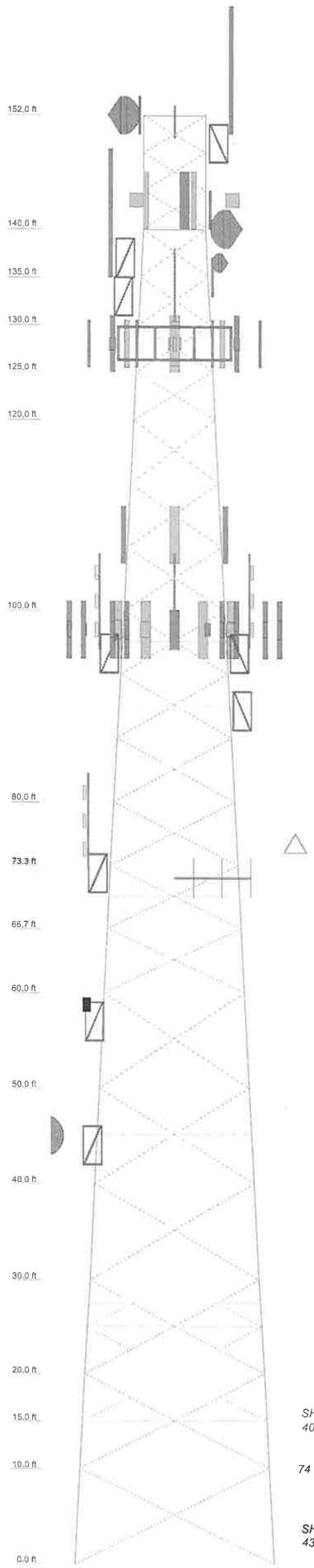
Job No. VZ5-110 | File No.

Dwg. No. SK-6

Dwg. 6 of 6

TNX TOWER INPUT / OUTPUT SUMMARY

Section	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	B		A		Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars			Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars			Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars			ROHN 2.5 STD			ROHN 2 STD
Leg Grade										A572-50							
Diagonals	L3 1/2x3 1/2x5/16		L3 1/2x3 1/2x1/4	L3x3x5/16	L3x3x3/8	L3x3x5/16		L2 1/2x2 1/2x5/16			L2 1/2x2 1/2x1/4			C	L1 1/2x1 1/2x3/16		L1 1/2x1 1/2x1/8
Diagonal Grade										A36							
Top Girts																	L2x2x1/8
Horizontals	N.A.		E	N.A.	L3x3x3/16					N.A.							
Sec. Horizontals			N.A.			L3x3x3/16		N.A.		L3x3x3/16			N.A.				
Red. Horizontals			N.A.	L2x2x1/4						N.A.							
Red. Diagonals			N.A.	L2x2x1/4						N.A.							
Face Width (ft)	20.7813		19.7813	19.2604	18.7708	17.6979	16.6979	15.6979	14.6979	14	13.3021	12.6042	10.5625	8.5625	8.0625	7.5625	7.0625	6.5625	6.5208
# Panels @ (ft)			1 @ 10		4 @ 5			3 @ 10			9 @ 6.66667					3 @ 5	1 @ 4.83333	3 @ 3.94444	
Weight (K)	17.9	2.0		1.9	3.8	2.0	1.7	1.6	1.4	1.0	2.1	0.7	1.8	0.2	0.2	0.2	0.2	0.2	0.3



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' 4-Bay Dipole (Unknown)	162	(2) DB980H90E-M (Sprint)	128
DB563K-CR (Unknown)	156.701	DB254-A (Unknown)	122
4'x4" Pipe Mount (Unknown)	152	APX16DWV-16DWV-S-E-ACU w/ Mount (T-Mobile)	108
4' w/Radome (Unknown)	152	TMA (T-Mobile)	108
DB803KHE-YP (Unknown)	151.25	APX16DWV-16DWV-S-E-ACU w/ Mount (T-Mobile)	108
Filter Box 22"x22"x6" (Unknown)	149	TMA (T-Mobile)	108
3' Sidearm (Unknown)	149	APX16DWV-16DWV-S-E-ACU w/ Mount (T-Mobile)	108
Filter Box 20"x6"x8" (Unknown)	148.5	TMA (T-Mobile)	108
3' Sidearm (Unknown)	148.5	20' x 3" Dia Omni (Unknown)	101
12'x2 1/2" STD Pipe Mount (Unknown)	146	2" Dia 10' Omni (Unknown)	101
12' x 3" Dia Omni (Unknown)	144	8' 4-Bay Dipole (Unknown)	101
4'x3" Pipe Mount (ATT)	143	8' 4-Bay Dipole (Unknown)	101
4'x3" Pipe Mount (ATT)	143	DB-T1-6Z-8AB-0Z (Verizon)	98
7770 (ATT)	143	Valmont 13' Lightweight T-Frame (Verizon)	98
7770 (ATT)	143	Valmont 13' Lightweight T-Frame (Verizon)	98
7770 (ATT)	143	Valmont 13' Lightweight T-Frame (Verizon)	98
(2) LPG 21401 TMA (ATT)	143	RRH (Verizon)	98
(2) LPG 21401 TMA (ATT)	143	RRH (Verizon)	98
(2) LPG 21401 TMA (ATT)	143	RRH (Verizon)	98
P65-16-XLH-RR (ATT)	143	LNX-8513DS-VTM (Verizon - LTE)	98
P65-16-XLH-RR (ATT)	143	LNX-6514DS-T4M (Verizon - LTE)	98
P65-16-XLH-RR (ATT)	143	LNX-6514DS-T4M (Verizon - LTE)	98
(2) RRUS-11 (ATT)	143	RH_2x40-700 (Verizon - LTE)	98
(2) RRUS-11 (ATT)	143	RH_2x40-700 (Verizon - LTE)	98
(2) RRUS-11 (ATT)	143	RH_2x40-700 (Verizon - LTE)	98
4'x3" Pipe Mount (ATT)	143	LNX-8513DS-VTM (Verizon - 850MHz)	98
4'x3" Pipe Mount (ATT)	143	LNX-6514DS-T4M (Verizon - 850MHz)	98
4'x3" Pipe Mount (ATT)	143	LNX-6514DS-T4M (Verizon - 850MHz)	98
4'x4" Pipe Mount (Unknown)	142	HBXX-6517DS-VTM (Verizon - PCS)	98
DB563K-CR (Unknown)	141.701	HBXX-6517DS-VTM (Verizon - PCS)	98
4' w/Radome (Unknown)	140	HBXX-6517DS-VTM (Verizon - PCS)	98
6' x 3" Dia Omni (Unknown)	138	Panasonic RRH 1900MHZ (Verizon - PCS)	98
4' Side Mount Standoff (1) (Unknown)	137	Panasonic RRH 1900MHZ (Verizon - PCS)	98
2' w/Radome (Unknown)	136.5	Panasonic RRH 1900MHZ (Verizon - PCS)	98
4'x4" Pipe Mount (Unknown)	135	HBXX-6517DS-VTM (Verizon - AWS)	98
DB495-A (Unknown)	135	HBXX-6517DS-VTM (Verizon - AWS)	98
3' Sidearm (Unknown)	133.5	HBXX-6517DS-VTM (Verizon - AWS)	98
4' Side Mount Standoff (1) (Unknown)	133	RH_2X40-AWS (Verizon - AWS)	98
2" Dia 8' Omni (Unknown)	133	RH_2X40-AWS (Verizon - AWS)	98
APXV9TM14-120 (Sprint)	128	RH_2X40-AWS (Verizon - AWS)	98
APXV9TM14-120 (Sprint)	128	DB-T1-6Z-8AB-0Z (Verizon)	98
APXV9TM14-120 (Sprint)	128	3' Sidearm (Vacant)	95.5
800 MHz Filter (Sprint)	128	3' Sidearm (Unknown)	95.5
800 MHz Filter (Sprint)	128	3' Sidearm (Unknown)	95.5
800 MHz Filter (Sprint)	128	3' Sidearm (Unknown)	94.5
RRH (Sprint)	128	3' Sidearm (Unknown)	89.5
RRH (Sprint)	128	4' x 3" DIA Omni (Unknown)	79
RRH (Sprint)	128	8' 2-Bay Dipole (Unknown)	78
APXVSPP18-C-A20 w/ Mounting Pipe (Sprint)	128	3' Sidearm (Unknown)	72.5
APXVSPP18-C-A20 w/ Mounting Pipe (Sprint)	128	3' Sidearm (Unknown)	72.5
APXVSPP18-C-A20 w/ Mounting Pipe (Sprint)	128	Scala Yagi w/ Radome (Unknown)	72
(3) 11' Boom Gate w/3 - 2 3/8" Pipe (Tapered) (Sprint)	128	GPS (Sprint)	58
RRH (Sprint)	128	2' Sidearm (Sprint)	57
RRH (Sprint)	128	1.2M (Unknown)	45
RRH (Sprint)	128	4'x4" Stand-off (Unknown)	44
(2) DB980H90E-M (Sprint)	128		
(2) DB980H90E-M (Sprint)	128		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	D	L1 3/4x1 3/4x3/16
B	Rohn 5 STD w/ (6) 1.5"x0.5" Bars	E	L2.875x2.875x0.25
C	L1 1/2x1 1/2x1/4		

MATERIAL STRENGTH

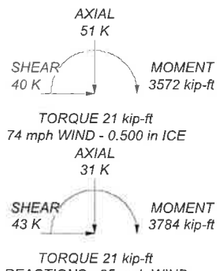
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.7%

MAX. CORNER REACTIONS AT BASE:
DOWN: 220 K
SHEAR: 26 K

UPLIFT: -189 K
SHEAR: 23 K



TORQUE 21 kip-ft
74 mph WIND - 0.500 in ICE

TORQUE 21 kip-ft
REACTIONS - 85 mph WIND

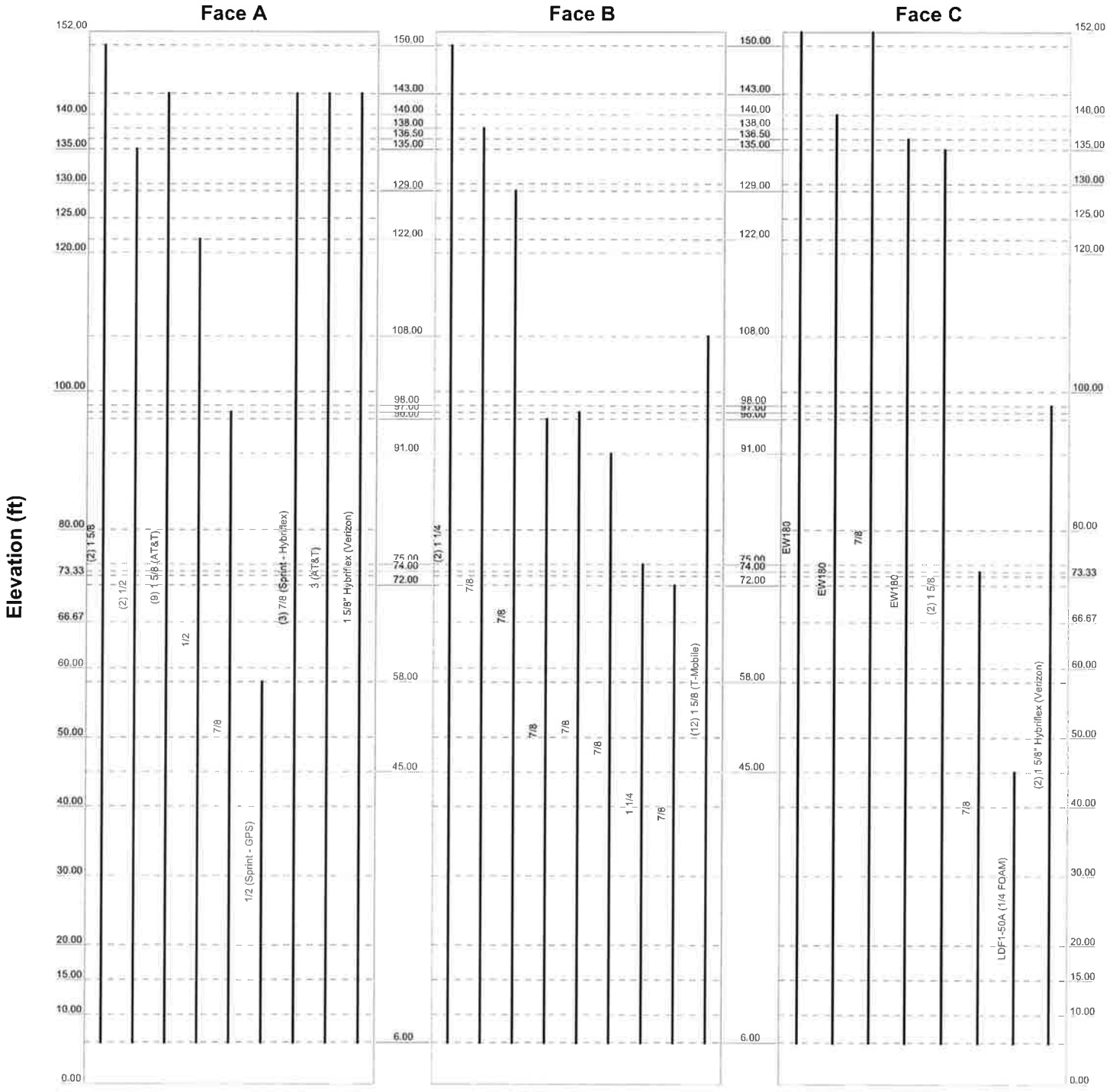
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job: **152' ROHN SSV Tower**
Project: **366 Old Long Ridge Road, Stamford, CT**
Client: Verizon, Sprint and AT&T / S.A. Evaluation
Drawn by: MCD
App'd:
Code: TIA/EIA-222-F
Date: 07/15/14
Scale: NTS
Path:
Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 152'

Round Flat App In Face App Out Face Truss Leg



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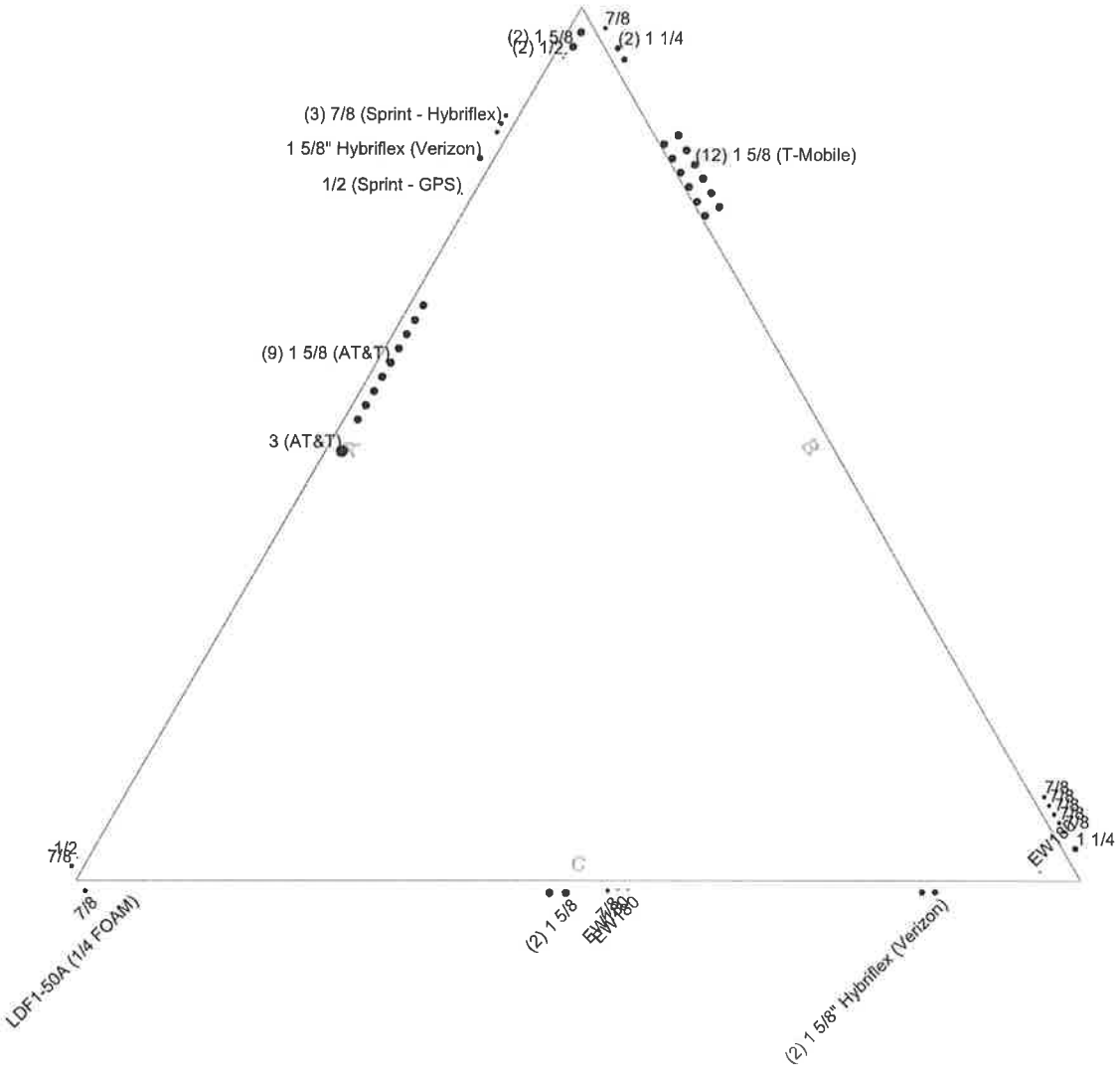
Job:	***152' ROHN SSV Tower***		
Project:	***366 Old Long Ridge Road, Stamford, CT***		
Client:	Verizion, Sprint and AT&T / S.A. Evaluation	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 07/15/14	Scale: NTS
Path:			Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round _____ Flat _____ App In Face App Out Face



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

Job:	***152' ROHN SSV Tower***		
Project:	***366 Old Long Ridge Road, Stamford, CT***		
Client:	Verizion, Sprint and AT&T / S.A. Evaluation	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 07/15/14	Scale: NTS
Path:			Dwg No. E-7

TNX TOWER DETAILED OUTPUT

tnxTower	Job	Page
URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	152' ROHN SSV Tower	1 of 55
	Project 366 Old Long Ridge Road, Stamford, CT	Date 11:46:06 07/15/14
	Client Verizion, Sprint and AT&T / S.A. Evaluation	Designed by MCD

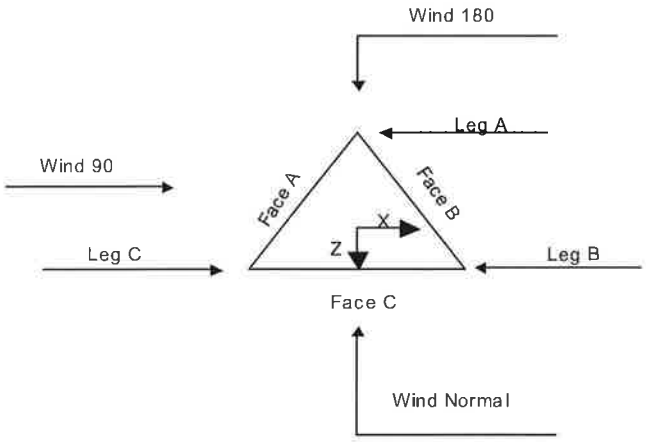
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 152.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.52 ft at the top and 20.78 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	152.00-140.00			6.52	1	12.00
T2	140.00-135.00			6.56	1	5.00
T3	135.00-130.00			7.06	1	5.00
T4	130.00-125.00			7.56	1	5.00
T5	125.00-120.00			8.06	1	5.00
T6	120.00-100.00			8.56	1	20.00
T7	100.00-80.00			10.56	1	20.00
T8	80.00-73.33			12.60	1	6.67
T9	73.33-66.67			13.30	1	6.67
T10	66.67-60.00			14.00	1	6.67
T11	60.00-50.00			14.70	1	10.00
T12	50.00-40.00			15.70	1	10.00
T13	40.00-30.00			16.70	1	10.00
T14	30.00-20.00			17.70	1	10.00
T15	20.00-15.00			18.77	1	5.00
T16	15.00-10.00			19.26	1	5.00
T17	10.00-0.00			19.78	1	10.00

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	152.00-140.00	3.94	X Brace	No	Yes	1.000	1.000
T2	140.00-135.00	4.83	X Brace	No	Yes	1.000	1.000
T3	135.00-130.00	5.00	X Brace	No	No	0.000	0.000
T4	130.00-125.00	5.00	X Brace	No	No	0.000	0.000
T5	125.00-120.00	5.00	X Brace	No	No	0.000	0.000
T6	120.00-100.00	6.67	X Brace	No	No	0.000	0.000
T7	100.00-80.00	6.67	X Brace	No	Yes	0.000	0.000
T8	80.00-73.33	6.67	X Brace	No	No	0.000	0.000
T9	73.33-66.67	6.67	X Brace	No	Yes	0.000	0.000
T10	66.67-60.00	6.67	X Brace	No	Yes	0.000	0.000
T11	60.00-50.00	10.00	X Brace	No	No	0.000	0.000
T12	50.00-40.00	10.00	X Brace	No	Yes	0.000	0.000
T13	40.00-30.00	10.00	X Brace	No	Yes	0.000	0.000
T14	30.00-20.00	5.00	Double K1	No	Yes	0.000	0.000
T15	20.00-15.00	5.00	K1 Up	No	Yes	0.000	0.000
T16	15.00-10.00	5.00	K Brace Down	No	Yes	0.000	0.000
T17	10.00-0.00	10.00	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 152.00-140.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T2 140.00-135.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 135.00-130.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T4 130.00-125.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/4	A36 (36 ksi)
T5 125.00-120.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T6 120.00-100.00	Arbitrary Shape	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T7 100.00-80.00	Arbitrary Shape	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 80.00-73.33	Arbitrary Shape	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T9 73.33-66.67	Arbitrary Shape	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T10 66.67-60.00	Arbitrary Shape	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T11 60.00-50.00	Arbitrary Shape	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T12 50.00-40.00	Arbitrary Shape	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T13 40.00-30.00	Arbitrary Shape	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3x3x3/8	A36 (36 ksi)
T14 30.00-20.00	Arbitrary Shape	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T15 20.00-15.00	Arbitrary Shape	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T16 15.00-10.00	Arbitrary Shape	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T17 10.00-0.00	Arbitrary Shape	Rohn 5 STD w/ (6) 1.5"x0.5"	A572-50	Single Angle	L3 1/2x3 1/2x5/16	A36

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
		Bars	(50 ksi)			(36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 152.00-140.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 140.00-135.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T14 30.00-20.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T15 20.00-15.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2.875x2.875x0.25	A36 (36 ksi)
T16 15.00-10.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2.875x2.875x0.25	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T7 100.00-80.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T9 73.33-66.67	Single Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T10 66.67-60.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T12 50.00-40.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T13 40.00-30.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T14	A36	Horizontal (1)	Equal Angle	L2x2x1/4	1
30.00-20.00	(36 ksi)	Diagonal (1)	Equal Angle	L2x2x1/4	1
T15	A36	Horizontal (1)	Equal Angle	L2x2x1/4	1
20.00-15.00	(36 ksi)	Diagonal (1)	Equal Angle	L2x2x1/4	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
T1	0.00	0.000	A36	1	1	1	36.000	36.000
152.00-140.00			(36 ksi)					
T2	0.00	0.000	A36	1	1	1	36.000	36.000
140.00-135.00			(36 ksi)					
T3	0.00	0.000	A36	1	1	1	36.000	36.000
135.00-130.00			(36 ksi)					
T4	0.00	0.000	A36	1	1	1	36.000	36.000
130.00-125.00			(36 ksi)					
T5	0.00	0.000	A36	1	1	1	36.000	36.000
125.00-120.00			(36 ksi)					
T6	0.00	0.000	A36	1	1	1	36.000	36.000
120.00-100.00			(36 ksi)					
T7	0.00	0.000	A36	1	1	1	36.000	36.000
100.00-80.00			(36 ksi)					
T8 80.00-73.33	0.00	0.000	A36	1	1	1	36.000	36.000
			(36 ksi)					
T9 73.33-66.67	0.00	0.000	A36	1	1	1	36.000	36.000
			(36 ksi)					
T10	0.00	0.000	A36	1	1	1	36.000	36.000
66.67-60.00			(36 ksi)					
T11	0.00	0.000	A36	1	1	1	36.000	36.000
60.00-50.00			(36 ksi)					
T12	0.00	0.000	A36	1	1	1	36.000	36.000
50.00-40.00			(36 ksi)					
T13	0.00	0.000	A36	1	1	1	36.000	36.000
40.00-30.00			(36 ksi)					
T14	0.00	0.000	A36	1	1	1	36.000	36.000
30.00-20.00			(36 ksi)					
T15	0.00	0.000	A36	1	1	1	36.000	36.000
20.00-15.00			(36 ksi)					
T16	0.00	0.000	A36	1	1	1	36.000	36.000
15.00-10.00			(36 ksi)					
T17 10.00-0.00	0.00	0.000	A36	1	1	1	36.000	36.000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

K Factors[1]

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	No	1	1	1	1	1	1	1	1
152.00-140.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
140.00-135.00				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
135.00-130.00				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
130.00-125.00				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
125.00-120.00				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
80.00-73.33				1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1
73.33-66.67				1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1
66.67-60.00				1	1	1	1	1	1	1
T11	Yes	No	1	1	1	1	1	1	1	1
60.00-50.00				1	1	1	1	1	1	1
T12	Yes	No	1	1	1	1	1	1	1	1
50.00-40.00				1	1	1	1	1	1	1
T13	Yes	No	1	1	1	1	1	1	1	1
40.00-30.00				1	1	1	1	1	1	1
T14	Yes	No	1	1	1	1	1	1	1	1
30.00-20.00				1	1	1	1	1	1	1
T15	Yes	No	1	1	1	1	1	1	1	1
20.00-15.00				1	1	1	1	1	1	1
T16	Yes	No	1	1	1	1	1	1	1	1
15.00-10.00				1	1	1	1	1	1	1
T17	Yes	No	1	1	1	1	1	1	1	1
10.00-0.00				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	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
152.00-140.00														
T2	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
140.00-135.00														
T3	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
135.00-130.00														
T4	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
130.00-125.00														

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
T5 125.00-120.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120.00-100.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100.00-80.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80.00-73.33	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 73.33-66.67	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 66.67-60.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 60.00-50.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 50.00-40.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 40.00-30.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T14 30.00-20.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T15 20.00-15.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T16 15.00-10.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T17 10.00-0.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 152.00-140.00	Flange	0.000 A325N	0	0.500 A325N	1	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 140.00-135.00	Flange	0.625 A325N	4	0.500 A325N	1	0.500 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 135.00-130.00	Flange	0.625 A325N	0	0.500 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 130.00-125.00	Flange	0.625 A325N	0	0.500 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 125.00-120.00	Flange	0.625 A325N	0	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T6 120.00-100.00	Flange	0.625 A325N	4	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 100.00-80.00	Flange	0.750 A325N	4	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2
T8 80.00-73.33	Flange	0.875 A325N	4	0.500 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T9 73.33-66.67	Flange	0.875 A325N	0	0.500 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2
T10 66.67-60.00	Flange	0.875 A325N	0	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T11 60.00-50.00	Flange	0.875 A325N	4	0.625 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T12 50.00-40.00	Flange	0.875 A325N	0	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2
T13 40.00-30.00	Flange	1.000 A325N	4	0.625 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2
T14 30.00-20.00	Flange	1.000 A325N	0	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.500 A325N	2	0.625 A325N	0
T15 20.00-15.00	Flange	1.000 A325N	4	0.625 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T16 15.00-10.00	Flange	1.000 A325N	0	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1	0.625 A325N	0
T17 10.00-0.00	Flange	1.000 A325N	0	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 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 klf
1 1/4	B	Yes	Ar (CfAe)	150.00 - 6.00	2.000	-0.44	2	2	1.550	1.550		0.001
1 5/8	A	Yes	Ar (CfAe)	150.00 - 6.00	-2.000	0.47	2	2	1.980	1.980		0.001
1/2	A	Yes	Ar (CfAe)	135.00 - 6.00	-2.000	0.45	2	2	0.580	0.580		0.000
EW180	C	Yes	Af (CfAe)	152.00 - 6.00	2.000	-0.04	1	1	0.590	0.590	2.006	0.000
EW180	C	Yes	Af (CfAe)	140.00 - 6.00	2.000	-0.05	1	1	0.590	0.590	2.006	0.000
1 5/8 (AT&T)	A	Yes	Ar (CfAe)	143.00 - 6.00	-2.000	0.1	9	9	1.980	1.980		0.001
7/8	C	Yes	Ar (CfAe)	152.00 - 6.00	2.000	-0.03	1	1	1.110	1.110		0.001
EW180	C	Yes	Af (CfAe)	136.50 - 6.00	-2.000	-0.46	1	1	0.590	0.590	2.006	0.000
1 5/8	C	Yes	Ar (CfAe)	135.00 - 6.00	2.000	0.02	2	2	1.980	1.980		0.001
7/8	B	Yes	Ar (CfAe)	138.00 - 6.00	2.000	0.41	1	1	1.110	1.110		0.001
1/2	A	Yes	Ar (CfAe)	122.00 - 6.00	2.000	-0.48	1	1	0.580	0.580		0.000
7/8	B	Yes	Ar (CfAe)	129.00 - 6.00	2.000	0.42	1	1	1.110	1.110		0.001
7/8	B	Yes	Ar (CfAe)	96.00 - 6.00	2.000	0.43	1	1	1.110	1.110		0.001
7/8	A	Yes	Ar (CfAe)	97.00 - 6.00	2.000	-0.49	1	1	1.110	1.110		0.001
7/8	B	Yes	Ar (CfAe)	97.00 - 6.00	2.000	0.44	1	1	1.110	1.110		0.001
7/8	B	Yes	Ar (CfAe)	91.00 - 6.00	2.000	0.45	1	1	1.110	1.110		0.001
1 1/4	B	Yes	Ar (CfAe)	75.00 - 6.00	2.000	0.47	1	1	1.550	1.550		0.001
7/8	B	Yes	Ar (CfAe)	72.00 - 6.00	2.000	-0.47	1	1	1.110	1.110		0.001
7/8	C	Yes	Ar (CfAe)	74.00 - 6.00	2.000	0.49	1	1	1.110	1.110		0.001
1/2 (Sprint - GPS)	A	Yes	Ar (CfAe)	58.00 - 6.00	2.000	0.28	1	1	0.580	0.580		0.000
LDF1-50A (1/4 FOAM)	C	Yes	Ar (CfAe)	45.00 - 6.00	2.000	0.45	1	1	0.350	0.350		0.000
1 5/8 (T-Mobile)	B	Yes	Ar (CfAe)	108.00 - 6.00	0.000	-0.3	12	6	1.980	1.980		0.001
7/8 (Sprint - Hybriflex)	A	Yes	Ar (CfAe)	143.00 - 6.00	2.000	0.36	3	3	1.110	1.110		0.001
1 5/8" Hybriflex (Verizon)	C	Yes	Ar (CfAe)	98.00 - 6.00	2.000	-0.35	2	2	1.625	1.625		0.000
3 (AT&T)	A	Yes	Ar (CfAe)	143.00 - 6.00	-2.000	0	1	1	3.010	3.010		0.002

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 klf
1 5/8" Hybriflex (Verizon)	A	Yes	Ar (CfAe)	143.00 - 6.00	2.000	0.32	1	1	1.625	1.625		0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	152.00-140.00	A	9.746	0.000	0.000	0.000	0.060
		B	2.583	0.000	0.000	0.000	0.013
		C	1.110	0.590	0.000	0.000	0.008
T2	140.00-135.00	A	12.394	0.000	0.000	0.000	0.075
		B	1.569	0.000	0.000	0.000	0.008
		C	0.463	0.565	0.000	0.000	0.004
T3	135.00-130.00	A	12.877	0.000	0.000	0.000	0.078
		B	1.754	0.000	0.000	0.000	0.009
		C	2.112	0.737	0.000	0.000	0.015
T4	130.00-125.00	A	12.877	0.000	0.000	0.000	0.078
		B	2.124	0.000	0.000	0.000	0.011
		C	2.112	0.737	0.000	0.000	0.015
T5	125.00-120.00	A	12.974	0.000	0.000	0.000	0.078
		B	2.217	0.000	0.000	0.000	0.012
		C	2.112	0.737	0.000	0.000	0.015
T6	120.00-100.00	A	52.475	0.000	0.000	0.000	0.316
		B	16.787	0.000	0.000	0.000	0.148
		C	8.450	2.949	0.000	0.000	0.061
T7	100.00-80.00	A	54.047	0.000	0.000	0.000	0.325
		B	32.737	0.000	0.000	0.000	0.321
		C	13.325	2.949	0.000	0.000	0.069
T8	80.00-73.33	A	18.108	0.000	0.000	0.000	0.109
		B	11.621	0.000	0.000	0.000	0.111
		C	4.684	0.983	0.000	0.000	0.024
T9	73.33-66.67	A	18.108	0.000	0.000	0.000	0.109
		B	12.760	0.000	0.000	0.000	0.117
		C	5.239	0.983	0.000	0.000	0.027
T10	66.67-60.00	A	18.108	0.000	0.000	0.000	0.109
		B	12.883	0.000	0.000	0.000	0.118
		C	5.239	0.983	0.000	0.000	0.027
T11	60.00-50.00	A	27.549	0.000	0.000	0.000	0.165
		B	19.325	0.000	0.000	0.000	0.177
		C	7.858	1.475	0.000	0.000	0.040
T12	50.00-40.00	A	27.646	0.000	0.000	0.000	0.166
		B	19.325	0.000	0.000	0.000	0.177
		C	8.004	1.475	0.000	0.000	0.041
T13	40.00-30.00	A	27.646	0.000	0.000	0.000	0.166
		B	19.325	0.000	0.000	0.000	0.177
		C	8.150	1.475	0.000	0.000	0.041
T14	30.00-20.00	A	27.646	0.000	0.000	0.000	0.166
		B	19.325	0.000	0.000	0.000	0.177
		C	8.150	1.475	0.000	0.000	0.041
T15	20.00-15.00	A	13.823	0.000	0.000	0.000	0.083
		B	9.662	0.000	0.000	0.000	0.088
		C	4.075	0.737	0.000	0.000	0.020
T16	15.00-10.00	A	13.823	0.000	0.000	0.000	0.083
		B	9.662	0.000	0.000	0.000	0.088
		C	4.075	0.737	0.000	0.000	0.020

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
T17	10.00-0.00	A	11.058	0.000	0.000	0.000	0.066
		B	7.730	0.000	0.000	0.000	0.071
		C	3.260	0.590	0.000	0.000	0.016

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	152.00-140.00	A	0.500	14.913	0.000	0.000	0.000	0.150
		B		4.250	0.000	0.000	0.000	0.038
		C		2.110	1.257	0.000	0.000	0.029
T2	140.00-135.00	A	0.500	19.060	0.000	0.000	0.000	0.191
		B		2.652	0.000	0.000	0.000	0.024
		C		0.879	1.204	0.000	0.000	0.018
T3	135.00-130.00	A	0.500	19.719	0.483	0.000	0.000	0.199
		B		3.004	0.000	0.000	0.000	0.027
		C		3.363	1.571	0.000	0.000	0.047
T4	130.00-125.00	A	0.500	19.719	0.483	0.000	0.000	0.199
		B		3.708	0.000	0.000	0.000	0.033
		C		3.363	1.571	0.000	0.000	0.047
T5	125.00-120.00	A	0.500	19.982	0.483	0.000	0.000	0.201
		B		3.883	0.000	0.000	0.000	0.034
		C		3.363	1.571	0.000	0.000	0.047
T6	120.00-100.00	A	0.500	81.508	1.933	0.000	0.000	0.816
		B		27.453	0.000	0.000	0.000	0.383
		C		13.450	6.283	0.000	0.000	0.187
T7	100.00-80.00	A	0.500	84.498	1.933	0.000	0.000	0.842
		B		53.070	0.000	0.000	0.000	0.818
		C		21.325	6.283	0.000	0.000	0.242
T8	80.00-73.33	A	0.500	28.342	0.644	0.000	0.000	0.282
		B		18.982	0.000	0.000	0.000	0.284
		C		7.517	2.094	0.000	0.000	0.084
T9	73.33-66.67	A	0.500	28.342	0.644	0.000	0.000	0.282
		B		20.982	0.000	0.000	0.000	0.302
		C		8.572	2.094	0.000	0.000	0.093
T10	66.67-60.00	A	0.500	28.342	0.644	0.000	0.000	0.282
		B		21.217	0.000	0.000	0.000	0.304
		C		8.572	2.094	0.000	0.000	0.093
T11	60.00-50.00	A	0.500	43.566	0.967	0.000	0.000	0.430
		B		31.825	0.000	0.000	0.000	0.455
		C		12.858	3.141	0.000	0.000	0.139
T12	50.00-40.00	A	0.500	43.829	0.967	0.000	0.000	0.432
		B		31.825	0.000	0.000	0.000	0.455
		C		13.421	3.141	0.000	0.000	0.142
T13	40.00-30.00	A	0.500	43.829	0.967	0.000	0.000	0.432
		B		31.825	0.000	0.000	0.000	0.455
		C		13.983	3.141	0.000	0.000	0.145
T14	30.00-20.00	A	0.500	43.829	0.967	0.000	0.000	0.432
		B		31.825	0.000	0.000	0.000	0.455
		C		13.983	3.141	0.000	0.000	0.145
T15	20.00-15.00	A	0.500	21.915	0.483	0.000	0.000	0.216
		B		15.913	0.000	0.000	0.000	0.228
		C		6.992	1.571	0.000	0.000	0.072
T16	15.00-10.00	A	0.500	21.915	0.483	0.000	0.000	0.216
		B		15.913	0.000	0.000	0.000	0.228
		C		6.992	1.571	0.000	0.000	0.072
T17	10.00-0.00	A	0.500	17.532	0.387	0.000	0.000	0.173

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		12.730	0.000	0.000	0.000	0.182
		C		5.593	1.257	0.000	0.000	0.058

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	152.00-140.00	A	0.000	0.829	0.847	1.296
		B	0.000	0.236	0.224	0.369
		C	0.000	0.206	0.148	0.321
T2	140.00-135.00	A	0.000	1.097	1.173	1.804
		B	0.000	0.153	0.148	0.251
		C	0.000	0.138	0.097	0.227
T3	135.00-130.00	A	0.000	0.816	0.780	1.224
		B	0.000	0.121	0.106	0.182
		C	0.000	0.216	0.173	0.324
T4	130.00-125.00	A	0.000	0.799	0.764	1.199
		B	0.000	0.147	0.126	0.220
		C	0.000	0.212	0.169	0.318
T5	125.00-120.00	A	0.000	0.796	0.883	1.393
		B	0.000	0.151	0.151	0.264
		C	0.000	0.208	0.194	0.364
T6	120.00-100.00	A	0.000	2.546	3.203	5.093
		B	0.000	0.838	1.025	1.676
		C	0.000	0.653	0.696	1.306
T7	100.00-80.00	A	0.000	3.575	5.927	9.479
		B	0.000	2.195	3.590	5.820
		C	0.000	1.211	1.785	3.210
T8	80.00-73.33	A	0.000	0.815	1.273	2.037
		B	0.000	0.534	0.817	1.334
		C	0.000	0.286	0.398	0.715
T9	73.33-66.67	A	0.000	1.169	1.939	3.103
		B	0.000	0.846	1.366	2.246
		C	0.000	0.452	0.666	1.201
T10	66.67-60.00	A	0.000	1.161	1.927	3.085
		B	0.000	0.850	1.371	2.258
		C	0.000	0.450	0.662	1.194
T11	60.00-50.00	A	0.000	0.888	1.649	2.665
		B	0.000	0.635	1.157	1.905
		C	0.000	0.336	0.559	1.007
T12	50.00-40.00	A	0.000	1.251	2.316	3.752
		B	0.000	0.889	1.619	2.666
		C	0.000	0.486	0.794	1.457
T13	40.00-30.00	A	0.000	1.237	2.290	3.711
		B	0.000	0.879	1.601	2.636
		C	0.000	0.496	0.797	1.488
T14	30.00-20.00	A	0.000	2.823	4.241	6.872
		B	0.000	2.006	2.964	4.882
		C	0.000	1.132	1.476	2.755
T15	20.00-15.00	A	0.000	1.215	1.891	3.064
		B	0.000	0.863	1.322	2.177
		C	0.000	0.487	0.658	1.228
T16	15.00-10.00	A	0.000	0.792	1.566	2.537
		B	0.000	0.562	1.095	1.803
		C	0.000	0.317	0.545	1.017

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T17	10.00-0.00	A	0.000	0.333	0.719	1.165
		B	0.000	0.237	0.503	0.828
		C	0.000	0.133	0.250	0.467

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	152.00-140.00	-1.168	-6.466	-1.039	-6.056
T2	140.00-135.00	-3.510	-9.595	-3.192	-9.377
T3	135.00-130.00	-3.602	-9.703	-3.126	-9.159
T4	130.00-125.00	-3.308	-9.965	-2.696	-9.324
T5	125.00-120.00	-3.395	-9.914	-2.882	-9.288
T6	120.00-100.00	-2.757	-11.477	-2.645	-11.603
T7	100.00-80.00	-0.030	-10.890	0.398	-10.741
T8	80.00-73.33	0.533	-12.636	1.204	-12.438
T9	73.33-66.67	0.548	-10.990	1.057	-10.763
T10	66.67-60.00	0.539	-11.491	1.066	-11.293
T11	60.00-50.00	0.541	-14.249	1.157	-14.566
T12	50.00-40.00	0.354	-13.399	0.747	-13.601
T13	40.00-30.00	0.233	-13.935	0.477	-14.021
T14	30.00-20.00	0.170	-12.079	0.350	-11.682
T15	20.00-15.00	0.158	-12.925	0.360	-12.689
T16	15.00-10.00	0.142	-12.724	0.358	-12.884
T17	10.00-0.00	0.084	-8.205	0.251	-9.099

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
20' 4-Bay Dipole	C	From Face	0.50	0.0000	162.00	No Ice	3.15	3.15	0.032
(Unknown)			0.000			1/2" Ice	5.67	5.67	0.042
			0.000						
DB563K-CR	B	From Leg	3.00	0.0000	156.70	No Ice	19.01	19.01	0.050
(Unknown)			0.000			1/2" Ice	19.99	19.99	0.163
			0.000						
4'x4" Pipe Mount	C	From Leg	0.50	0.0000	152.00	No Ice	1.32	1.32	0.044
(Unknown)			0.000			1/2" Ice	1.58	1.58	0.057
			0.000						
DB803KHE-YP	A	From Leg	3.00	0.0000	151.25	No Ice	0.55	0.55	0.006
(Unknown)			0.000			1/2" Ice	0.76	0.76	0.011
			0.000						
3' Sidearm	B	From Leg	1.50	0.0000	149.00	No Ice	3.43	3.43	0.089
(Unknown)			0.000			1/2" Ice	4.34	4.34	0.122
			0.000						
Filter Box 22"x22"x6"	B	From Leg	1.50	0.0000	149.00	No Ice	4.71	1.28	0.025

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
(Unknown)			0.000 0.000			1/2" Ice	5.00	1.47	0.051
3' Sidearm	A	From Leg	1.50	0.0000	148.50	No Ice	5.90	5.90	0.130
(Unknown)			0.000 0.000			1/2" Ice	6.60	6.60	0.146
Filter Box 20"x6"x8"	A	From Leg	1.50	0.0000	148.50	No Ice	1.17	1.56	0.020
(Unknown)			0.000 0.000			1/2" Ice	1.34	1.74	0.032
12'x2 1/2" STD Pipe Mount	C	From Face	0.00	0.0000	146.00	No Ice	3.45	3.45	0.069
(Unknown)			0.000 0.000			1/2" Ice	4.68	4.68	0.095
12' x 3" Dia Omni	C	From Leg	4.00	0.0000	144.00	No Ice	3.60	3.60	0.035
(Unknown)			0.000 0.000			1/2" Ice	4.83	4.83	0.061
4'x3" Pipe Mount	A	From Leg	0.50	0.0000	143.00	No Ice	1.11	1.11	0.030
(AT&T)			0.000 0.000			1/2" Ice	1.36	1.36	0.041
4'x3" Pipe Mount	B	From Leg	0.50	0.0000	143.00	No Ice	1.11	1.11	0.030
(AT&T)			0.000 0.000			1/2" Ice	1.36	1.36	0.041
4'x3" Pipe Mount	C	From Leg	0.50	0.0000	143.00	No Ice	1.11	1.11	0.030
(AT&T)			0.000 0.000			1/2" Ice	1.36	1.36	0.041
7770	A	From Leg	1.00	0.0000	143.00	No Ice	5.88	2.93	0.035
(AT&T)			0.000 0.000			1/2" Ice	6.31	3.27	0.068
7770	B	From Leg	1.00	0.0000	143.00	No Ice	5.88	2.93	0.035
(AT&T)			0.000 0.000			1/2" Ice	6.31	3.27	0.068
7770	C	From Leg	1.00	0.0000	143.00	No Ice	5.88	2.93	0.035
(AT&T)			0.000 0.000			1/2" Ice	6.31	3.27	0.068
(2) LPG 21401 TMA	A	From Leg	0.50	0.0000	143.00	No Ice	0.95	0.37	0.018
(AT&T)			0.000 0.000			1/2" Ice	1.09	0.48	0.023
(2) LPG 21401 TMA	B	From Leg	0.50	0.0000	143.00	No Ice	0.95	0.37	0.018
(AT&T)			0.000 0.000			1/2" Ice	1.09	0.48	0.023
(2) LPG 21401 TMA	C	From Leg	0.50	0.0000	143.00	No Ice	0.95	0.37	0.018
(AT&T)			0.000 0.000			1/2" Ice	1.09	0.48	0.023
P65-16-XLH-RR	A	From Face	1.00	0.0000	143.00	No Ice	8.40	4.70	0.050
(ATT)			-1.000 0.000			1/2" Ice	8.95	5.15	0.097
P65-16-XLH-RR	B	From Face	1.00	0.0000	143.00	No Ice	8.40	4.70	0.050
(ATT)			-1.000 0.000			1/2" Ice	8.95	5.15	0.097
P65-16-XLH-RR	C	From Face	1.00	0.0000	143.00	No Ice	8.40	4.70	0.050
(ATT)			-1.000 0.000			1/2" Ice	8.95	5.15	0.097
(2) RRUS-11	A	From Leg	1.00	0.0000	143.00	No Ice	2.94	1.25	0.055
(ATT)			1.000 0.000			1/2" Ice	3.17	1.41	0.074
(2) RRUS-11	A	From Leg	1.00	0.0000	143.00	No Ice	2.94	1.25	0.055
(ATT)			1.000 0.000			1/2" Ice	3.17	1.41	0.074
(2) RRUS-11	A	From Leg	1.00	0.0000	143.00	No Ice	2.94	1.25	0.055

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(ATT)			1.000 0.000			1/2" Ice	3.17	1.41	0.074
4'x3" Pipe Mount (AT&T)	A	From Leg	0.08 1.000 0.000	0.0000	143.00	No Ice 1/2" Ice	1.11 1.36	1.11 1.36	0.030 0.041
4'x3" Pipe Mount (AT&T)	B	From Leg	1.00 1.000 0.000	0.0000	143.00	No Ice 1/2" Ice	1.11 1.36	1.11 1.36	0.030 0.041
4'x3" Pipe Mount (AT&T)	C	From Leg	1.00 1.000 0.000	0.0000	143.00	No Ice 1/2" Ice	1.11 1.36	1.11 1.36	0.030 0.041
4'x4" Pipe Mount (Unknown)	B	From Leg	0.50 0.000 0.000	0.0000	142.00	No Ice 1/2" Ice	1.32 1.58	1.32 1.58	0.044 0.057
DB563K-CR (Unknown)	C	From Leg	4.00 0.000 0.000	0.0000	141.70	No Ice 1/2" Ice	19.01 19.99	19.01 19.99	0.050 0.163
6' x 3" Dia Omni (Unknown)	A	From Leg	3.00 0.000 0.000	0.0000	138.00	No Ice 1/2" Ice	1.77 2.13	1.77 2.13	0.020 0.033
4' Side Mount Standoff (1) (Unknown)	C	From Leg	2.00 0.000 0.000	0.0000	137.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	0.050 0.089
4'x4" Pipe Mount (Unknown)	B	From Leg	0.50 0.000 0.000	0.0000	135.00	No Ice 1/2" Ice	1.32 1.58	1.32 1.58	0.044 0.057
DB495-A (Unknown)	C	From Leg	0.00 0.000 0.000	0.0000	135.00	No Ice 1/2" Ice	2.35 4.23	2.35 4.23	0.010 0.013
3' Sidearm (Unknown)	A	From Leg	1.50 0.000 0.000	0.0000	133.50	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.130 0.146
4' Side Mount Standoff (1) (Unknown)	C	From Leg	2.00 0.000 0.000	0.0000	133.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	0.050 0.089
2" Dia 8' Omni (Unknown)	A	From Leg	4.50 0.000 0.000	0.0000	133.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.005 0.018
(2) DB980H90E-M (Sprint)	A	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.009 0.029
(2) DB980H90E-M (Sprint)	B	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.009 0.029
(2) DB980H90E-M (Sprint)	C	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.009 0.029
APXV9TM14-120 (Sprint)	A	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.067 0.106
APXV9TM14-120 (Sprint)	B	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.067 0.106
APXV9TM14-120 (Sprint)	C	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	6.90 7.35	3.61 3.97	0.067 0.106
800 MHz Filter	A	From Leg	3.00	0.0000	128.00	No Ice	0.52	0.38	0.005

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
(Sprint)			0.000 0.000			1/2" Ice	0.65	0.50	0.009
800 MHz Filter	B	From Leg	3.00	0.0000	128.00	No Ice	0.52	0.38	0.005
(Sprint)			0.000 0.000			1/2" Ice	0.65	0.50	0.009
800 MHz Filter	C	From Leg	3.00	0.0000	128.00	No Ice	0.52	0.38	0.005
(Sprint)			0.000 0.000			1/2" Ice	0.65	0.50	0.009
RRH	A	From Leg	3.00	0.0000	128.00	No Ice	2.25	1.23	0.050
(Sprint)			0.000 0.000			1/2" Ice	2.45	1.39	0.067
RRH	B	From Leg	3.00	0.0000	128.00	No Ice	2.25	1.23	0.050
(Sprint)			0.000 0.000			1/2" Ice	2.45	1.39	0.067
RRH	C	From Leg	3.00	0.0000	128.00	No Ice	2.25	1.23	0.050
(Sprint)			0.000 0.000			1/2" Ice	2.45	1.39	0.067
DB254-A	C	From Leg	0.00	0.0000	122.00	No Ice	1.10	1.10	0.010
(Unknown)			0.000 0.000			1/2" Ice	1.98	1.98	0.013
APX16DWV-16DWV-S-E-A	A	From Leg	0.50	0.0000	108.00	No Ice	6.70	3.27	0.073
CU w/ Mount			0.000			1/2" Ice	7.13	3.86	0.122
(T-Mobile)			0.000						
TMA	A	From Leg	0.25	0.0000	108.00	No Ice	1.06	0.45	0.020
(T-Mobile)			0.000 0.000			1/2" Ice	1.21	0.57	0.027
APX16DWV-16DWV-S-E-A	B	From Leg	0.50	0.0000	108.00	No Ice	6.70	3.27	0.073
CU w/ Mount			0.000			1/2" Ice	7.13	3.86	0.122
(T-Mobile)			0.000						
TMA	B	From Leg	0.25	0.0000	108.00	No Ice	1.06	0.45	0.020
(T-Mobile)			0.000 0.000			1/2" Ice	1.21	0.57	0.027
APX16DWV-16DWV-S-E-A	C	From Leg	0.50	0.0000	108.00	No Ice	6.70	3.27	0.073
CU w/ Mount			0.000			1/2" Ice	7.13	3.86	0.122
(T-Mobile)			0.000						
TMA	C	From Leg	0.25	0.0000	108.00	No Ice	1.06	0.45	0.020
(T-Mobile)			0.000 0.000			1/2" Ice	1.21	0.57	0.027
2" Dia 10' Omni	A	From Leg	3.00	0.0000	101.00	No Ice	2.00	2.00	0.025
(Unknown)			0.000 0.000			1/2" Ice	3.02	3.02	0.041
8' 4-Bay Dipole	B	From Leg	3.00	0.0000	101.00	No Ice	1.50	1.50	0.025
(Unknown)			0.000 0.000			1/2" Ice	2.70	2.70	0.033
8' 4-Bay Dipole	C	From Leg	3.00	0.0000	101.00	No Ice	1.50	1.50	0.025
(Unknown)			0.000 0.000			1/2" Ice	2.70	2.70	0.033
20' x 3" Dia Omni	B	From Leg	3.00	0.0000	101.00	No Ice	6.00	6.00	0.050
(Unknown)			0.000 0.000			1/2" Ice	8.03	8.03	0.093
Valmont 13' Lightweight	A	From Leg	1.25	0.0000	98.00	No Ice	10.60	10.60	0.255
T-Frame			0.000			1/2" Ice	16.80	16.80	0.359
(Verizon)			0.000						
Valmont 13' Lightweight	B	From Leg	1.25	0.0000	98.00	No Ice	10.60	10.60	0.255
T-Frame			0.000			1/2" Ice	16.80	16.80	0.359
(Verizon)			0.000						
Valmont 13' Lightweight	C	From Leg	1.25	0.0000	98.00	No Ice	10.60	10.60	0.255

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
T-Frame			0.000			1/2" Ice	16.80	16.80	0.359
(Verizon)			0.000						
RRH	A	From Leg	1.25	0.0000	98.00	No Ice	2.25	1.23	0.050
(Verizon)			6.000			1/2" Ice	2.45	1.39	0.067
			0.000						
RRH	B	From Leg	1.25	0.0000	98.00	No Ice	2.25	1.23	0.050
(Verizon)			6.000			1/2" Ice	2.45	1.39	0.067
			0.000						
RRH	C	From Leg	1.25	0.0000	98.00	No Ice	2.25	1.23	0.050
(Verizon)			6.000			1/2" Ice	2.45	1.39	0.067
			0.000						
DB-T1-6Z-8AB-0Z	A	None		0.0000	98.00	No Ice	5.35	2.40	0.044
(Verizon)						1/2" Ice	5.75	2.72	0.073
3' Sidearm	A	From Leg	1.50	0.0000	95.50	No Ice	3.58	3.58	0.124
(Vacant)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
3' Sidearm	B	From Leg	1.50	0.0000	95.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
3' Sidearm	C	From Leg	1.50	0.0000	95.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
3' Sidearm	A	From Leg	1.50	0.0000	94.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
3' Sidearm	B	From Leg	1.50	0.0000	89.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
4' x 3" DIA Omni	A	From Leg	3.00	0.0000	79.00	No Ice	1.00	1.00	0.015
(Unknown)			0.000			1/2" Ice	1.25	1.25	0.024
			0.000						
8' 2-Bay Dipole	C	From Leg	3.00	0.0000	78.00	No Ice	1.60	1.60	0.018
(Unknown)			0.000			1/2" Ice	2.88	2.88	0.023
			0.000						
3' Sidearm	A	From Leg	1.50	0.0000	72.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
3' Sidearm	C	From Leg	1.50	0.0000	72.50	No Ice	3.58	3.58	0.124
(Unknown)			0.000			1/2" Ice	5.01	5.01	0.167
			0.000						
Scala Yagi w/ Radome	A	From Leg	3.00	0.0000	72.00	No Ice	2.78	2.78	0.016
(Unknown)			0.000			1/2" Ice	5.00	5.00	0.021
			0.000						
GPS	C	From Leg	2.00	0.0000	58.00	No Ice	1.00	1.00	0.010
(Sprint)			0.000			1/2" Ice	1.50	1.50	0.015
			0.000						
2' Sidearm	C	From Leg	1.00	0.0000	57.00	No Ice	2.09	2.09	0.069
(Sprint)			0.000			1/2" Ice	3.20	3.20	0.092
			0.000						
4'x4" Stand-off	C	From Leg	0.50	0.0000	44.00	No Ice	0.47	0.47	0.061
(Unknown)			0.000			1/2" Ice	0.93	0.93	0.066
			0.000						
APXVSPP18-C-A20 w/	A	From Leg	3.00	0.0000	128.00	No Ice	5.93	4.61	0.026
Mounting Pipe			0.000			1/2" Ice	6.39	4.99	0.066
(Sprint)			0.000						
APXVSPP18-C-A20 w/	B	From Leg	3.00	0.0000	128.00	No Ice	5.93	4.61	0.026
Mounting Pipe			0.000			1/2" Ice	6.39	4.99	0.066

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
(Sprint)			0.000						
APXVSPP18-C-A20 w/ Mounting Pipe (Sprint)	C	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	5.93 6.39	4.61 4.99	0.026 0.066
(3) 11' Boom Gate w/3 - 2 3/8" Pipe (Tapered) (Sprint)	A	None		0.0000	128.00	No Ice 1/2" Ice	35.30 46.40	35.30 46.40	1.750 2.400
RRH (Sprint)	A	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.050 0.067
RRH (Sprint)	B	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.050 0.067
RRH (Sprint)	C	From Leg	3.00 0.000 0.000	0.0000	128.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.050 0.067
LNX-8513DS-VTM (Verizon - LTE)	A	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.039 0.090
LNX-6514DS-T4M (Verizon - LTE)	B	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.038 0.089
LNX-6514DS-T4M (Verizon - LTE)	C	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.038 0.089
RH_2x40-700 (Verizon - LTE)	A	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	2.12 2.32	1.77 1.97	0.060 0.077
RH_2x40-700 (Verizon - LTE)	B	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	2.12 2.32	1.77 1.97	0.060 0.077
RH_2x40-700 (Verizon - LTE)	C	From Leg	3.00 6.000 0.000	0.0000	98.00	No Ice 1/2" Ice	2.12 2.32	1.77 1.97	0.060 0.077
LNX-8513DS-VTM (Verizon - 850MHz)	A	From Leg	3.00 3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.039 0.090
LNX-6514DS-T4M (Verizon - 850MHz)	B	From Leg	3.00 3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.038 0.089
LNX-6514DS-T4M (Verizon - 850MHz)	C	From Leg	3.00 3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.38 8.93	5.41 5.86	0.038 0.089
HBXX-6517DS-VTM (Verizon - PCS)	A	From Leg	3.00 -3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.74 9.31	6.11 6.82	0.058 0.119
HBXX-6517DS-VTM (Verizon - PCS)	B	From Leg	3.00 -3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.74 9.31	6.11 6.82	0.058 0.119
HBXX-6517DS-VTM (Verizon - PCS)	C	From Leg	3.00 -3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	8.74 9.31	6.11 6.82	0.058 0.119
Panasonic RRH 1900MHZ (Verizon - PCS)	A	From Leg	3.00 -3.000 0.000	0.0000	98.00	No Ice 1/2" Ice	2.49 2.71	3.06 3.30	0.090 0.117
Panasonic RRH 1900MHZ (Verizon - PCS)	B	From Leg	3.00 -3.000	0.0000	98.00	No Ice 1/2" Ice	2.49 2.71	3.06 3.30	0.090 0.117

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
			0.000						
Panasonic RRH 1900MHZ	C	From Leg	3.00	0.0000	98.00	No Ice	2.49	3.06	0.090
(Verizon - PCS)			-3.000			1/2" Ice	2.71	3.30	0.117
			0.000						
HBXX-6517DS-VTM	A	From Leg	3.00	0.0000	98.00	No Ice	8.74	6.11	0.058
(Verizon - AWS)			-6.000			1/2" Ice	9.31	6.82	0.119
			0.000						
HBXX-6517DS-VTM	B	From Leg	3.00	0.0000	98.00	No Ice	8.74	6.11	0.058
(Verizon - AWS)			-6.000			1/2" Ice	9.31	6.82	0.119
			0.000						
HBXX-6517DS-VTM	C	From Leg	3.00	0.0000	98.00	No Ice	8.74	6.11	0.058
(Verizon - AWS)			-6.000			1/2" Ice	9.31	6.82	0.119
			0.000						
RH_2X40-AWS	A	From Leg	3.00	0.0000	98.00	No Ice	2.52	1.59	0.044
(Verizon - AWS)			-6.000			1/2" Ice	2.75	1.80	0.061
			0.000						
RH_2X40-AWS	B	From Leg	3.00	0.0000	98.00	No Ice	2.52	1.59	0.044
(Verizon - AWS)			-6.000			1/2" Ice	2.75	1.80	0.061
			0.000						
RH_2X40-AWS	C	From Leg	3.00	0.0000	98.00	No Ice	2.52	1.59	0.044
(Verizon - AWS)			-6.000			1/2" Ice	2.75	1.80	0.061
			0.000						
DB-T1-6Z-8AB-0Z	A	None		0.0000	98.00	No Ice	5.35	2.40	0.044
(Verizon)						1/2" Ice	5.75	2.72	0.073

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4' w/Radome	C	Paraboloid	From	0.50	Worst		152.00	4.00	No Ice	12.57	0.140
(Unknown)		w/Radome	Leg	0.000					1/2" Ice	13.10	0.282
				0.000							
4' w/Radome	B	Paraboloid	From	0.50	Worst		140.00	4.00	No Ice	12.57	0.140
(Unknown)		w/Radome	Leg	0.000					1/2" Ice	13.10	0.282
				0.000							
2' w/Radome	B	Paraboloid	From	0.50	Worst		136.50	2.00	No Ice	3.14	0.070
(Unknown)		w/Radome	Leg	0.000					1/2" Ice	3.41	0.282
				0.000							
1.2M	C	Paraboloid w/o	From	4.00	Worst		45.00	4.00	No Ice	12.17	0.165
(Unknown)		Radome	Leg	0.000					1/2" Ice	13.09	0.232
				0.000							

Tower Pressures - No Ice

$G_H = 1.132$

Section Elevation ft	z ft	K_Z	q_z ksf	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	146.00	1.529	0.028	80.875	A	5.763	14.496	4.750	23.45	0.000	0.000
152.00-140.00					B	6.385	7.333		34.62	0.000	0.000
					C	7.052	5.860		36.79	0.000	0.000
T2	137.50	1.503	0.028	35.262	A	1.897	14.794	2.400	14.38	0.000	0.000
140.00-135.00					B	2.922	3.969		34.83	0.000	0.000
					C	3.538	2.862		37.49	0.000	0.000
T3	132.50	1.488	0.028	37.762	A	1.362	15.277	2.400	14.42	0.000	0.000
135.00-130.00					B	2.036	4.154		38.77	0.000	0.000
					C	2.707	4.512		33.24	0.000	0.000
T4	127.50	1.471	0.027	40.262	A	1.484	15.277	2.400	14.32	0.000	0.000
130.00-125.00					B	2.122	4.524		36.11	0.000	0.000
					C	2.816	4.512		32.75	0.000	0.000
T5	122.50	1.455	0.027	42.762	A	1.865	15.374	2.400	13.92	0.000	0.000
125.00-120.00					B	2.597	4.616		33.27	0.000	0.000
					C	3.291	4.512		30.75	0.000	0.000
T6	110.00	1.411	0.026	199.956	A	25.390	52.475	17.420	22.37	0.000	0.000
120.00-100.00					B	27.568	16.787		39.27	0.000	0.000
					C	30.846	8.450		44.33	0.000	0.000
T7	90.00	1.332	0.025	240.373	A	35.931	54.047	17.421	19.36	0.000	0.000
100.00-80.00					B	38.269	32.737		24.53	0.000	0.000
					C	43.023	13.325		30.92	0.000	0.000
T8 80.00-73.33	76.67	1.272	0.024	89.625	A	11.125	18.108	6.544	22.39	0.000	0.000
					B	11.581	11.621		28.21	0.000	0.000
					C	12.983	4.684		37.04	0.000	0.000
T9 73.33-66.67	70.00	1.24	0.023	94.278	A	13.997	18.108	6.544	20.38	0.000	0.000
					B	14.570	12.760		23.95	0.000	0.000
					C	16.253	5.239		30.45	0.000	0.000
T10	63.33	1.205	0.022	98.930	A	14.448	18.108	6.544	20.10	0.000	0.000
66.67-60.00					B	15.004	12.883		23.47	0.000	0.000
					C	16.696	5.239		29.84	0.000	0.000
T11	55.00	1.157	0.021	157.607	A	18.395	27.549	11.261	24.51	0.000	0.000
60.00-50.00					B	18.887	19.325		29.47	0.000	0.000
					C	20.960	7.858		39.08	0.000	0.000
T12	45.00	1.093	0.020	167.607	A	22.039	27.646	11.261	22.66	0.000	0.000
50.00-40.00					B	22.736	19.325		26.77	0.000	0.000
					C	25.035	8.004		34.08	0.000	0.000
T13	35.00	1.017	0.019	177.607	A	22.749	27.646	11.261	22.35	0.000	0.000
40.00-30.00					B	23.438	19.325		26.33	0.000	0.000
					C	25.716	8.150		33.25	0.000	0.000
T14	25.00	1	0.018	187.973	A	27.625	27.646	11.264	20.38	0.000	0.000
30.00-20.00					B	28.901	19.325		23.36	0.000	0.000
					C	31.864	8.150		28.15	0.000	0.000
T15	17.50	1	0.018	98.650	A	7.352	20.216	6.394	23.19	0.000	0.000
20.00-15.00					B	7.921	16.056		26.67	0.000	0.000
					C	9.321	10.469		32.31	0.000	0.000
T16	12.50	1	0.018	101.177	A	9.153	20.218	6.395	21.77	0.000	0.000
15.00-10.00					B	9.624	16.057		24.90	0.000	0.000
					C	10.911	10.470		29.91	0.000	0.000
T17 10.00-0.00	5.00	1	0.018	209.955	A	26.348	11.058	14.290	38.20	0.000	0.000
					B	26.564	7.730		41.67	0.000	0.000
					C	27.406	3.260		46.60	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.132$

Section Elevation ft	z ft	K_Z	q_z ksf	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	146.00	1.529	0.021	0.500	81.875	A	5.314	25.065	6.750	22.22	0.000	0.000
152.00-140.00						B	6.240	14.995		31.79	0.000	0.000
						C	7.545	12.885		33.04	0.000	0.000
T2	137.50	1.503	0.021	0.500	35.679	A	1.267	23.069	3.235	13.29	0.000	0.000
140.00-135.00						B	2.819	7.605		31.03	0.000	0.000
						C	4.047	5.846		32.69	0.000	0.000
T3	132.50	1.488	0.021	0.500	38.179	A	1.402	23.566	3.235	12.95	0.000	0.000
135.00-130.00						B	1.960	7.546		34.03	0.000	0.000
						C	3.389	7.809		28.88	0.000	0.000
T4	127.50	1.471	0.020	0.500	40.679	A	1.532	23.653	3.235	12.84	0.000	0.000
130.00-125.00						B	2.028	8.294		31.34	0.000	0.000
						C	3.501	7.884		28.41	0.000	0.000
T5	122.50	1.455	0.020	0.500	43.179	A	1.838	23.991	3.235	12.52	0.000	0.000
125.00-120.00						B	2.484	8.537		29.35	0.000	0.000
						C	3.955	7.959		27.15	0.000	0.000
T6	110.00	1.411	0.020	0.500	201.625	A	27.659	84.548	19.646	17.51	0.000	0.000
120.00-100.00						B	29.143	32.202		32.02	0.000	0.000
						C	35.795	18.383		36.26	0.000	0.000
T7 100.00-80.00	90.00	1.332	0.018	0.500	242.042	A	36.539	90.140	19.647	15.51	0.000	0.000
						B	38.265	60.093		19.97	0.000	0.000
						C	47.157	29.332		25.69	0.000	0.000
T8 80.00-73.33	76.67	1.272	0.018	0.500	90.181	A	11.747	29.868	7.286	17.51	0.000	0.000
						B	11.806	20.790		22.35	0.000	0.000
						C	14.520	9.573		30.24	0.000	0.000
T9 73.33-66.67	70.00	1.24	0.017	0.500	94.834	A	14.219	30.710	7.286	16.22	0.000	0.000
						B	14.432	23.674		19.12	0.000	0.000
						C	17.571	11.657		24.93	0.000	0.000
T10 66.67-60.00	63.33	1.205	0.017	0.500	99.487	A	14.677	30.882	7.286	15.99	0.000	0.000
						B	14.859	24.068		18.72	0.000	0.000
						C	18.017	11.824		24.42	0.000	0.000
T11 60.00-50.00	55.00	1.157	0.016	0.500	158.442	A	19.458	45.605	12.374	19.02	0.000	0.000
						B	19.252	34.118		23.19	0.000	0.000
						C	23.290	15.450		31.94	0.000	0.000
T12 50.00-40.00	45.00	1.093	0.015	0.500	168.442	A	22.682	46.943	12.374	17.77	0.000	0.000
						B	22.802	35.301		21.30	0.000	0.000
						C	27.152	17.300		27.84	0.000	0.000
T13 40.00-30.00	35.00	1.017	0.014	0.500	178.442	A	23.408	47.185	12.374	17.53	0.000	0.000
						B	23.516	35.539		20.95	0.000	0.000
						C	27.806	18.080		26.97	0.000	0.000
T14 30.00-20.00	25.00	1	0.014	0.500	188.807	A	27.074	48.891	12.377	16.29	0.000	0.000
						B	28.097	37.704		18.81	0.000	0.000
						C	33.366	20.736		22.88	0.000	0.000
T15 20.00-15.00	17.50	1	0.014	0.500	99.068	A	6.662	31.260	7.228	19.06	0.000	0.000
						B	7.066	25.609		22.12	0.000	0.000
						C	9.585	17.065		27.12	0.000	0.000
T16 15.00-10.00	12.50	1	0.014	0.500	101.594	A	8.665	31.692	7.230	17.91	0.000	0.000
						B	8.916	25.919		20.75	0.000	0.000
						C	11.272	17.244		25.35	0.000	0.000
T17 10.00-0.00	5.00	1	0.014	0.500	210.789	A	27.401	20.849	15.403	31.92	0.000	0.000
						B	27.352	16.144		35.41	0.000	0.000
						C	28.969	9.110		40.45	0.000	0.000

Tower Pressure - Service

$G_H = 1.132$

Section Elevation ft	z ft	K_Z	q_z ksf	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	146.00	1.529	0.010	80.875	A	5.763	14.496	4.750	23.45	0.000	0.000
152.00-140.00					B	6.385	7.333		34.62	0.000	0.000
					C	7.052	5.860		36.79	0.000	0.000
T2	137.50	1.503	0.010	35.262	A	1.897	14.794	2.400	14.38	0.000	0.000
140.00-135.00					B	2.922	3.969		34.83	0.000	0.000
					C	3.538	2.862		37.49	0.000	0.000
T3	132.50	1.488	0.010	37.762	A	1.362	15.277	2.400	14.42	0.000	0.000
135.00-130.00					B	2.036	4.154		38.77	0.000	0.000
					C	2.707	4.512		33.24	0.000	0.000
T4	127.50	1.471	0.009	40.262	A	1.484	15.277	2.400	14.32	0.000	0.000
130.00-125.00					B	2.122	4.524		36.11	0.000	0.000
					C	2.816	4.512		32.75	0.000	0.000
T5	122.50	1.455	0.009	42.762	A	1.865	15.374	2.400	13.92	0.000	0.000
125.00-120.00					B	2.597	4.616		33.27	0.000	0.000
					C	3.291	4.512		30.75	0.000	0.000
T6	110.00	1.411	0.009	199.956	A	25.390	52.475	17.420	22.37	0.000	0.000
120.00-100.00					B	27.568	16.787		39.27	0.000	0.000
					C	30.846	8.450		44.33	0.000	0.000
T7	90.00	1.332	0.009	240.373	A	35.931	54.047	17.421	19.36	0.000	0.000
100.00-80.00					B	38.269	32.737		24.53	0.000	0.000
					C	43.023	13.325		30.92	0.000	0.000
T8 80.00-73.33	76.67	1.272	0.008	89.625	A	11.125	18.108	6.544	22.39	0.000	0.000
					B	11.581	11.621		28.21	0.000	0.000
					C	12.983	4.684		37.04	0.000	0.000
T9 73.33-66.67	70.00	1.24	0.008	94.278	A	13.997	18.108	6.544	20.38	0.000	0.000
					B	14.570	12.760		23.95	0.000	0.000
					C	16.253	5.239		30.45	0.000	0.000
T10	63.33	1.205	0.008	98.930	A	14.448	18.108	6.544	20.10	0.000	0.000
66.67-60.00					B	15.004	12.883		23.47	0.000	0.000
					C	16.696	5.239		29.84	0.000	0.000
T11	55.00	1.157	0.007	157.607	A	18.395	27.549	11.261	24.51	0.000	0.000
60.00-50.00					B	18.887	19.325		29.47	0.000	0.000
					C	20.960	7.858		39.08	0.000	0.000
T12	45.00	1.093	0.007	167.607	A	22.039	27.646	11.261	22.66	0.000	0.000
50.00-40.00					B	22.736	19.325		26.77	0.000	0.000
					C	25.035	8.004		34.08	0.000	0.000
T13	35.00	1.017	0.007	177.607	A	22.749	27.646	11.261	22.35	0.000	0.000
40.00-30.00					B	23.438	19.325		26.33	0.000	0.000
					C	25.716	8.150		33.25	0.000	0.000
T14	25.00	1	0.006	187.973	A	27.625	27.646	11.264	20.38	0.000	0.000
30.00-20.00					B	28.901	19.325		23.36	0.000	0.000
					C	31.864	8.150		28.15	0.000	0.000
T15	17.50	1	0.006	98.650	A	7.352	20.216	6.394	23.19	0.000	0.000
20.00-15.00					B	7.921	16.056		26.67	0.000	0.000
					C	9.321	10.469		32.31	0.000	0.000
T16	12.50	1	0.006	101.177	A	9.153	20.218	6.395	21.77	0.000	0.000
15.00-10.00					B	9.624	16.057		24.90	0.000	0.000
					C	10.911	10.470		29.91	0.000	0.000
T17 10.00-0.00	5.00	1	0.006	209.955	A	26.348	11.058	14.290	38.20	0.000	0.000
					B	26.564	7.730		41.67	0.000	0.000
					C	27.406	3.260		46.60	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	1	1	14.490	1.131	0.094	A
152.00-140.00			B	0.17	2.701	0.585	1	1	10.673			
			C	0.16	2.736	0.583	1	1	10.468			
T2	0.088	0.211	A	0.473	1.937	0.684	1	1	12.020	0.733	0.147	A
140.00-135.00			B	0.195	2.611	0.589	1	1	5.261			
			C	0.182	2.659	0.587	1	1	5.218			
T3	0.102	0.184	A	0.441	1.989	0.669	1	1	11.583	0.718	0.144	A
135.00-130.00			B	0.164	2.721	0.584	1	1	4.461			
			C	0.191	2.626	0.589	1	1	5.363			
T4	0.105	0.219	A	0.416	2.033	0.658	1	1	11.542	0.723	0.145	A
130.00-125.00			B	0.165	2.717	0.584	1	1	4.763			
			C	0.182	2.657	0.587	1	1	5.464			
T5	0.106	0.212	A	0.403	2.058	0.653	1	1	11.902	0.746	0.149	A
125.00-120.00			B	0.169	2.704	0.585	1	1	5.296			
			C	0.182	2.656	0.587	1	1	5.940			
T6	0.525	1.382	A	0.389	2.085	0.647	1	1	59.358	3.657	0.183	A
120.00-100.00			B	0.222	2.525	0.595	1	1	37.557			
			C	0.197	2.608	0.59	1	1	35.829			
T7	0.716	2.073	A	0.374	2.117	0.641	1	1	70.601	4.170	0.208	A
100.00-80.00			B	0.295	2.308	0.615	1	1	58.385			
			C	0.234	2.485	0.598	1	1	50.992			
T8	0.244	0.721	A	0.326	2.229	0.624	1	1	22.430	1.332	0.200	A
80.00-73.33			B	0.259	2.411	0.604	1	1	18.603			
			C	0.197	2.606	0.59	1	1	15.746			
T9	0.253	0.972	A	0.341	2.194	0.629	1	1	25.390	1.446	0.217	A
73.33-66.67			B	0.29	2.323	0.613	1	1	22.390			
			C	0.228	2.505	0.597	1	1	19.378			
T10	0.254	0.998	A	0.329	2.222	0.625	1	1	25.770	1.445	0.217	A
66.67-60.00			B	0.282	2.345	0.611	1	1	22.870			
			C	0.222	2.525	0.595	1	1	19.813			
T11	0.383	1.354	A	0.292	2.319	0.613	1	1	35.292	1.983	0.198	A
60.00-50.00			B	0.242	2.46	0.6	1	1	30.481			
			C	0.183	2.654	0.587	1	1	25.573			
T12	0.384	1.565	A	0.296	2.306	0.615	1	1	39.036	2.060	0.206	A
50.00-40.00			B	0.251	2.435	0.602	1	1	34.372			
			C	0.197	2.606	0.59	1	1	29.756			
T13	0.384	1.741	A	0.284	2.34	0.611	1	1	39.642	1.976	0.198	A
40.00-30.00			B	0.241	2.465	0.6	1	1	35.025			
			C	0.191	2.627	0.589	1	1	30.513			
T14	0.384	2.026	A	0.294	2.312	0.614	1	1	44.602	2.160	0.216	A
30.00-20.00			B	0.257	2.418	0.604	1	1	40.565			
			C	0.213	2.554	0.593	1	1	36.698			
T15	0.192	0.907	A	0.279	2.352	0.61	1	1	19.680	0.970	0.194	A
20.00-15.00			B	0.243	2.459	0.6	1	1	17.556			
			C	0.201	2.594	0.591	1	1	15.503			
T16	0.192	0.995	A	0.29	2.322	0.613	1	1	21.546	1.048	0.210	A
15.00-10.00			B	0.254	2.426	0.603	1	1	19.304			
			C	0.211	2.559	0.593	1	1	17.117			
T17	0.154	1.983	A	0.178	2.671	0.586	1	1	32.830	1.836	0.184	A
10.00-0.00			B	0.163	2.723	0.584	1	1	31.075			
			C	0.146	2.786	0.581	1	1	29.300			
Sum Weight:	4.545	17.879						OTM	1981.158 kip-ft	28.133		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	0.825	1	13.481	1.052	0.088	A
152.00-140.00			B	0.17	2.701	0.585	0.825	1	9.555			
			C	0.16	2.736	0.583	0.825	1	9.234			
T2	0.088	0.211	A	0.473	1.937	0.684	0.825	1	11.688	0.713	0.143	A
140.00-135.00			B	0.195	2.611	0.589	0.825	1	4.750			
			C	0.182	2.659	0.587	0.825	1	4.599			
T3	0.102	0.184	A	0.441	1.989	0.669	0.825	1	11.345	0.703	0.141	A
135.00-130.00			B	0.164	2.721	0.584	0.825	1	4.104			
			C	0.191	2.626	0.589	0.825	1	4.889			
T4	0.105	0.219	A	0.416	2.033	0.658	0.825	1	11.282	0.707	0.141	A
130.00-125.00			B	0.165	2.717	0.584	0.825	1	4.392			
			C	0.182	2.657	0.587	0.825	1	4.972			
T5	0.106	0.212	A	0.403	2.058	0.653	0.825	1	11.576	0.726	0.145	A
125.00-120.00			B	0.169	2.704	0.585	0.825	1	4.841			
			C	0.182	2.656	0.587	0.825	1	5.364			
T6	0.525	1.382	A	0.389	2.085	0.647	0.825	1	54.915	3.383	0.169	A
120.00-100.00			B	0.222	2.525	0.595	0.825	1	32.733			
			C	0.197	2.608	0.59	0.825	1	30.431			
T7	0.716	2.073	A	0.374	2.117	0.641	0.825	1	64.313	3.798	0.190	A
100.00-80.00			B	0.295	2.308	0.615	0.825	1	51.688			
			C	0.234	2.485	0.598	0.825	1	43.463			
T8	0.244	0.721	A	0.326	2.229	0.624	0.825	1	20.483	1.216	0.182	A
80.00-73.33			B	0.259	2.411	0.604	0.825	1	16.576			
			C	0.197	2.606	0.59	0.825	1	13.474			
T9	0.253	0.972	A	0.341	2.194	0.629	0.825	1	22.940	1.307	0.196	A
73.33-66.67			B	0.29	2.323	0.613	0.825	1	19.840			
			C	0.228	2.505	0.597	0.825	1	16.534			
T10	0.254	0.998	A	0.329	2.222	0.625	0.825	1	23.241	1.303	0.195	A
66.67-60.00			B	0.282	2.345	0.611	0.825	1	20.244			
			C	0.222	2.525	0.595	0.825	1	16.892			
T11	0.383	1.354	A	0.292	2.319	0.613	0.825	1	32.073	1.802	0.180	A
60.00-50.00			B	0.242	2.46	0.6	0.825	1	27.176			
			C	0.183	2.654	0.587	0.825	1	21.905			
T12	0.384	1.565	A	0.296	2.306	0.615	0.825	1	35.179	1.856	0.186	A
50.00-40.00			B	0.251	2.435	0.602	0.825	1	30.393			
			C	0.197	2.606	0.59	0.825	1	25.375			
T13	0.384	1.741	A	0.284	2.34	0.611	0.825	1	35.661	1.777	0.178	A
40.00-30.00			B	0.241	2.465	0.6	0.825	1	30.923			
			C	0.191	2.627	0.589	0.825	1	26.013			
T14	0.384	2.026	A	0.294	2.312	0.614	0.825	1	39.768	1.926	0.193	A
30.00-20.00			B	0.257	2.418	0.604	0.825	1	35.508			
			C	0.213	2.554	0.593	0.825	1	31.122			
T15	0.192	0.907	A	0.279	2.352	0.61	0.825	1	18.394	0.906	0.181	A
20.00-15.00			B	0.243	2.459	0.6	0.825	1	16.170			
			C	0.201	2.594	0.591	0.825	1	13.872			
T16	0.192	0.995	A	0.29	2.322	0.613	0.825	1	19.944	0.970	0.194	A
15.00-10.00			B	0.254	2.426	0.603	0.825	1	17.620			
			C	0.211	2.559	0.593	0.825	1	15.208			
T17	0.154	1.983	A	0.178	2.671	0.586	0.825	1	28.219	1.578	0.158	A
10.00-0.00			B	0.163	2.723	0.584	0.825	1	26.427			
			C	0.146	2.786	0.581	0.825	1	24.504			
Sum Weight:	4.545	17.879						OTM	1833.925 kip-ft	25.724		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl Face
T1	0.081	0.335	A	0.251	2.436	0.602	0.8	1	13.337	1.041	0.087	A
152.00-140.00			B	0.17	2.701	0.585	0.8	1	9.396			
			C	0.16	2.736	0.583	0.8	1	9.058			
T2	0.088	0.211	A	0.473	1.937	0.684	0.8	1	11.641	0.710	0.142	A
140.00-135.00			B	0.195	2.611	0.589	0.8	1	4.677			
			C	0.182	2.659	0.587	0.8	1	4.510			
T3	0.102	0.184	A	0.441	1.989	0.669	0.8	1	11.311	0.701	0.140	A
135.00-130.00			B	0.164	2.721	0.584	0.8	1	4.054			
			C	0.191	2.626	0.589	0.8	1	4.822			
T4	0.105	0.219	A	0.416	2.033	0.658	0.8	1	11.245	0.704	0.141	A
130.00-125.00			B	0.165	2.717	0.584	0.8	1	4.339			
			C	0.182	2.657	0.587	0.8	1	4.901			
T5	0.106	0.212	A	0.403	2.058	0.653	0.8	1	11.529	0.723	0.145	A
125.00-120.00			B	0.169	2.704	0.585	0.8	1	4.776			
			C	0.182	2.656	0.587	0.8	1	5.282			
T6	0.525	1.382	A	0.389	2.085	0.647	0.8	1	54.281	3.344	0.167	A
120.00-100.00			B	0.222	2.525	0.595	0.8	1	32.044			
			C	0.197	2.608	0.59	0.8	1	29.660			
T7	0.716	2.073	A	0.374	2.117	0.641	0.8	1	63.415	3.745	0.187	A
100.00-80.00			B	0.295	2.308	0.615	0.8	1	50.732			
			C	0.234	2.485	0.598	0.8	1	42.387			
T8	0.244	0.721	A	0.326	2.229	0.624	0.8	1	20.205	1.200	0.180	A
80.00-73.33			B	0.259	2.411	0.604	0.8	1	16.286			
			C	0.197	2.606	0.59	0.8	1	13.149			
T9	0.253	0.972	A	0.341	2.194	0.629	0.8	1	22.591	1.287	0.193	A
73.33-66.67			B	0.29	2.323	0.613	0.8	1	19.476			
			C	0.228	2.505	0.597	0.8	1	16.127			
T10	0.254	0.998	A	0.329	2.222	0.625	0.8	1	22.880	1.283	0.192	A
66.67-60.00			B	0.282	2.345	0.611	0.8	1	19.869			
			C	0.222	2.525	0.595	0.8	1	16.474			
T11	0.383	1.354	A	0.292	2.319	0.613	0.8	1	31.613	1.777	0.178	A
60.00-50.00			B	0.242	2.46	0.6	0.8	1	26.704			
			C	0.183	2.654	0.587	0.8	1	21.381			
T12	0.384	1.565	A	0.296	2.306	0.615	0.8	1	34.628	1.827	0.183	A
50.00-40.00			B	0.251	2.435	0.602	0.8	1	29.825			
			C	0.197	2.606	0.59	0.8	1	24.749			
T13	0.384	1.741	A	0.284	2.34	0.611	0.8	1	35.092	1.749	0.175	A
40.00-30.00			B	0.241	2.465	0.6	0.8	1	30.337			
			C	0.191	2.627	0.589	0.8	1	25.370			
T14	0.384	2.026	A	0.294	2.312	0.614	0.8	1	39.077	1.892	0.189	A
30.00-20.00			B	0.257	2.418	0.604	0.8	1	34.785			
			C	0.213	2.554	0.593	0.8	1	30.325			
T15	0.192	0.907	A	0.279	2.352	0.61	0.8	1	18.210	0.897	0.179	A
20.00-15.00			B	0.243	2.459	0.6	0.8	1	15.972			
			C	0.201	2.594	0.591	0.8	1	13.639			
T16	0.192	0.995	A	0.29	2.322	0.613	0.8	1	19.715	0.959	0.192	A
15.00-10.00			B	0.254	2.426	0.603	0.8	1	17.379			
			C	0.211	2.559	0.593	0.8	1	14.935			
T17	0.154	1.983	A	0.178	2.671	0.586	0.8	1	27.560	1.542	0.154	A
10.00-0.00			B	0.163	2.723	0.584	0.8	1	25.763			
			C	0.146	2.786	0.581	0.8	1	23.819			
Sum Weight:	4.545	17.879						OTM	1812.892 kip-ft	25.380		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	0.85	1	13.625	1.063	0.089	A
152.00-140.00			B	0.17	2.701	0.585	0.85	1	9.715			
			C	0.16	2.736	0.583	0.85	1	9.410			
T2	0.088	0.211	A	0.473	1.937	0.684	0.85	1	11.736	0.716	0.143	A
140.00-135.00			B	0.195	2.611	0.589	0.85	1	4.823			
			C	0.182	2.659	0.587	0.85	1	4.687			
T3	0.102	0.184	A	0.441	1.989	0.669	0.85	1	11.379	0.705	0.141	A
135.00-130.00			B	0.164	2.721	0.584	0.85	1	4.155			
			C	0.191	2.626	0.589	0.85	1	4.957			
T4	0.105	0.219	A	0.416	2.033	0.658	0.85	1	11.319	0.709	0.142	A
130.00-125.00			B	0.165	2.717	0.584	0.85	1	4.445			
			C	0.182	2.657	0.587	0.85	1	5.042			
T5	0.106	0.212	A	0.403	2.058	0.653	0.85	1	11.622	0.729	0.146	A
125.00-120.00			B	0.169	2.704	0.585	0.85	1	4.906			
			C	0.182	2.656	0.587	0.85	1	5.446			
T6	0.525	1.382	A	0.389	2.085	0.647	0.85	1	55.550	3.422	0.171	A
120.00-100.00			B	0.222	2.525	0.595	0.85	1	33.422			
			C	0.197	2.608	0.59	0.85	1	31.202			
T7	0.716	2.073	A	0.374	2.117	0.641	0.85	1	65.211	3.851	0.193	A
100.00-80.00			B	0.295	2.308	0.615	0.85	1	52.645			
			C	0.234	2.485	0.598	0.85	1	44.538			
T8	0.244	0.721	A	0.326	2.229	0.624	0.85	1	20.761	1.233	0.185	A
80.00-73.33			B	0.259	2.411	0.604	0.85	1	16.865			
			C	0.197	2.606	0.59	0.85	1	13.798			
T9	0.253	0.972	A	0.341	2.194	0.629	0.85	1	23.290	1.327	0.199	A
73.33-66.67			B	0.29	2.323	0.613	0.85	1	20.204			
			C	0.228	2.505	0.597	0.85	1	16.940			
T10	0.254	0.998	A	0.329	2.222	0.625	0.85	1	23.603	1.323	0.198	A
66.67-60.00			B	0.282	2.345	0.611	0.85	1	20.619			
			C	0.222	2.525	0.595	0.85	1	17.309			
T11	0.383	1.354	A	0.292	2.319	0.613	0.85	1	32.532	1.828	0.183	A
60.00-50.00			B	0.242	2.46	0.6	0.85	1	27.648			
			C	0.183	2.654	0.587	0.85	1	22.429			
T12	0.384	1.565	A	0.296	2.306	0.615	0.85	1	35.730	1.885	0.189	A
50.00-40.00			B	0.251	2.435	0.602	0.85	1	30.962			
			C	0.197	2.606	0.59	0.85	1	26.001			
T13	0.384	1.741	A	0.284	2.34	0.611	0.85	1	36.230	1.806	0.181	A
40.00-30.00			B	0.241	2.465	0.6	0.85	1	31.509			
			C	0.191	2.627	0.589	0.85	1	26.656			
T14	0.384	2.026	A	0.294	2.312	0.614	0.85	1	40.458	1.959	0.196	A
30.00-20.00			B	0.257	2.418	0.604	0.85	1	36.230			
			C	0.213	2.554	0.593	0.85	1	31.918			
T15	0.192	0.907	A	0.279	2.352	0.61	0.85	1	18.577	0.915	0.183	A
20.00-15.00			B	0.243	2.459	0.6	0.85	1	16.368			
			C	0.201	2.594	0.591	0.85	1	14.105			
T16	0.192	0.995	A	0.29	2.322	0.613	0.85	1	20.173	0.981	0.196	A
15.00-10.00			B	0.254	2.426	0.603	0.85	1	17.861			
			C	0.211	2.559	0.593	0.85	1	15.480			
T17	0.154	1.983	A	0.178	2.671	0.586	0.85	1	28.878	1.615	0.162	A
10.00-0.00			B	0.163	2.723	0.584	0.85	1	27.091			
			C	0.146	2.786	0.581	0.85	1	25.189			
Sum Weight:	4.545	17.879						OTM	1854.958 kip-ft	26.068		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.218	0.649	A	0.371	2.124	0.64	1	1	21.361	1.090	0.091	A
152.00-140.00			B	0.259	2.41	0.604	1	1	15.302			
			C	0.25	2.439	0.602	1	1	15.298			
T2	0.232	0.358	A	0.682	1.776	0.807	1	1	19.890	0.834	0.167	A
140.00-135.00			B	0.292	2.317	0.614	1	1	7.485			
			C	0.277	2.358	0.609	1	1	7.609			
T3	0.273	0.298	A	0.654	1.78	0.788	1	1	19.975	0.831	0.166	A
135.00-130.00			B	0.249	2.441	0.602	1	1	6.500			
			C	0.293	2.314	0.614	1	1	8.183			
T4	0.279	0.336	A	0.619	1.793	0.765	1	1	19.638	0.814	0.163	A
130.00-125.00			B	0.254	2.426	0.603	1	1	7.028			
			C	0.28	2.351	0.61	1	1	8.310			
T5	0.282	0.344	A	0.598	1.805	0.752	1	1	19.891	0.820	0.164	A
125.00-120.00			B	0.255	2.422	0.603	1	1	7.634			
			C	0.276	2.362	0.609	1	1	8.800			
T6	1.386	2.086	A	0.557	1.837	0.728	1	1	89.206	3.632	0.182	A
120.00-100.00			B	0.304	2.285	0.617	1	1	49.018			
			C	0.269	2.383	0.607	1	1	46.950			
T7	1.901	3.212	A	0.523	1.871	0.71	1	1	100.512	3.936	0.197	A
100.00-80.00			B	0.406	2.052	0.654	1	1	77.579			
			C	0.316	2.254	0.621	1	1	65.370			
T8	0.649	1.038	A	0.461	1.955	0.679	1	1	32.016	1.251	0.188	A
80.00-73.33			B	0.361	2.145	0.637	1	1	25.042			
			C	0.267	2.387	0.606	1	1	20.325			
T9	0.676	1.409	A	0.474	1.936	0.684	1	1	35.240	1.329	0.199	A
73.33-66.67			B	0.402	2.06	0.652	1	1	29.875			
			C	0.308	2.274	0.618	1	1	24.780			
T10	0.678	1.450	A	0.458	1.961	0.677	1	1	35.582	1.320	0.198	A
66.67-60.00			B	0.391	2.082	0.648	1	1	30.457			
			C	0.3	2.296	0.616	1	1	25.299			
T11	1.025	1.856	A	0.411	2.043	0.656	1	1	49.375	1.834	0.183	A
60.00-50.00			B	0.337	2.203	0.628	1	1	40.673			
			C	0.245	2.454	0.6	1	1	32.568			
T12	1.030	2.213	A	0.413	2.038	0.657	1	1	53.530	1.873	0.187	A
50.00-40.00			B	0.345	2.183	0.631	1	1	45.066			
			C	0.264	2.396	0.606	1	1	37.627			
T13	1.032	2.411	A	0.396	2.073	0.65	1	1	54.070	1.790	0.179	A
40.00-30.00			B	0.331	2.217	0.626	1	1	45.758			
			C	0.257	2.416	0.604	1	1	38.721			
T14	1.032	2.946	A	0.402	2.059	0.653	1	1	58.978	1.908	0.191	A
30.00-20.00			B	0.349	2.175	0.632	1	1	51.924			
			C	0.287	2.332	0.612	1	1	46.054			
T15	0.516	1.349	A	0.383	2.099	0.645	1	1	26.816	0.884	0.177	A
20.00-15.00			B	0.33	2.22	0.625	1	1	23.084			
			C	0.269	2.382	0.607	1	1	19.941			
T16	0.516	1.476	A	0.397	2.07	0.65	1	1	29.280	0.952	0.190	A
15.00-10.00			B	0.343	2.188	0.63	1	1	25.244			
			C	0.281	2.349	0.61	1	1	21.794			
T17	0.413	2.705	A	0.229	2.502	0.597	1	1	39.842	1.566	0.157	A
10.00-0.00			B	0.206	2.575	0.592	1	1	36.905			
			C	0.181	2.662	0.587	1	1	34.314			
Sum Weight:	12.139	26.137						OTM	1945.221 kip-ft	26.664		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.218	0.649	A	0.371	2.124	0.64	0.825	1	20.431	1.043	0.087	A
152.00-140.00			B	0.259	2.41	0.604	0.825	1	14.210			
			C	0.25	2.439	0.602	0.825	1	13.978			
T2	0.232	0.358	A	0.682	1.776	0.807	0.825	1	19.668	0.825	0.165	A
140.00-135.00			B	0.292	2.317	0.614	0.825	1	6.992			
			C	0.277	2.358	0.609	0.825	1	6.901			
T3	0.273	0.298	A	0.654	1.78	0.788	0.825	1	19.729	0.821	0.164	A
135.00-130.00			B	0.249	2.441	0.602	0.825	1	6.157			
			C	0.293	2.314	0.614	0.825	1	7.590			
T4	0.279	0.336	A	0.619	1.793	0.765	0.825	1	19.370	0.803	0.161	A
130.00-125.00			B	0.254	2.426	0.603	0.825	1	6.673			
			C	0.28	2.351	0.61	0.825	1	7.697			
T5	0.282	0.344	A	0.598	1.805	0.752	0.825	1	19.570	0.807	0.161	A
125.00-120.00			B	0.255	2.422	0.603	0.825	1	7.199			
			C	0.276	2.362	0.609	0.825	1	8.108			
T6	1.386	2.086	A	0.557	1.837	0.728	0.825	1	84.365	3.435	0.172	A
120.00-100.00			B	0.304	2.285	0.617	0.825	1	43.918			
			C	0.269	2.383	0.607	0.825	1	40.686			
T7	1.901	3.212	A	0.523	1.871	0.71	0.825	1	94.118	3.685	0.184	A
100.00-80.00			B	0.406	2.052	0.654	0.825	1	70.882			
			C	0.316	2.254	0.621	0.825	1	57.118			
T8	0.649	1.038	A	0.461	1.955	0.679	0.825	1	29.960	1.171	0.176	A
80.00-73.33			B	0.361	2.145	0.637	0.825	1	22.975			
			C	0.267	2.387	0.606	0.825	1	17.784			
T9	0.676	1.409	A	0.474	1.936	0.684	0.825	1	32.751	1.235	0.185	A
73.33-66.67			B	0.402	2.06	0.652	0.825	1	27.349			
			C	0.308	2.274	0.618	0.825	1	21.705			
T10	0.678	1.450	A	0.458	1.961	0.677	0.825	1	33.014	1.225	0.184	A
66.67-60.00			B	0.391	2.082	0.648	0.825	1	27.857			
			C	0.3	2.296	0.616	0.825	1	22.146			
T11	1.025	1.856	A	0.411	2.043	0.656	0.825	1	45.970	1.707	0.171	A
60.00-50.00			B	0.337	2.203	0.628	0.825	1	37.304			
			C	0.245	2.454	0.6	0.825	1	28.492			
T12	1.030	2.213	A	0.413	2.038	0.657	0.825	1	49.561	1.734	0.173	A
50.00-40.00			B	0.345	2.183	0.631	0.825	1	41.076			
			C	0.264	2.396	0.606	0.825	1	32.876			
T13	1.032	2.411	A	0.396	2.073	0.65	0.825	1	49.973	1.655	0.165	A
40.00-30.00			B	0.331	2.217	0.626	0.825	1	41.643			
			C	0.257	2.416	0.604	0.825	1	33.855			
T14	1.032	2.946	A	0.402	2.059	0.653	0.825	1	54.240	1.755	0.175	A
30.00-20.00			B	0.349	2.175	0.632	0.825	1	47.007			
			C	0.287	2.332	0.612	0.825	1	40.215			
T15	0.516	1.349	A	0.383	2.099	0.645	0.825	1	25.650	0.846	0.169	A
20.00-15.00			B	0.33	2.22	0.625	0.825	1	21.847			
			C	0.269	2.382	0.607	0.825	1	18.264			
T16	0.516	1.476	A	0.397	2.07	0.65	0.825	1	27.763	0.903	0.181	A
15.00-10.00			B	0.343	2.188	0.63	0.825	1	23.684			
			C	0.281	2.349	0.61	0.825	1	19.821			
T17	0.413	2.705	A	0.229	2.502	0.597	0.825	1	35.047	1.378	0.138	A
10.00-0.00			B	0.206	2.575	0.592	0.825	1	32.118			
			C	0.181	2.662	0.587	0.825	1	29.244			
Sum Weight:	12.139	26.137						OTM	1845.630 kip-ft	25.026		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.218	0.649	A	0.371	2.124	0.64	0.8	1	20.298	1.036	0.086	A
152.00-140.00			B	0.259	2.41	0.604	0.8	1	14.054			
			C	0.25	2.439	0.602	0.8	1	13.790			
T2	0.232	0.358	A	0.682	1.776	0.807	0.8	1	19.636	0.824	0.165	A
140.00-135.00			B	0.292	2.317	0.614	0.8	1	6.922			
			C	0.277	2.358	0.609	0.8	1	6.799			
T3	0.273	0.298	A	0.654	1.78	0.788	0.8	1	19.694	0.819	0.164	A
135.00-130.00			B	0.249	2.441	0.602	0.8	1	6.108			
			C	0.293	2.314	0.614	0.8	1	7.505			
T4	0.279	0.336	A	0.619	1.793	0.765	0.8	1	19.331	0.801	0.160	A
130.00-125.00			B	0.254	2.426	0.603	0.8	1	6.622			
			C	0.28	2.351	0.61	0.8	1	7.610			
T5	0.282	0.344	A	0.598	1.805	0.752	0.8	1	19.524	0.805	0.161	A
125.00-120.00			B	0.255	2.422	0.603	0.8	1	7.137			
			C	0.276	2.362	0.609	0.8	1	8.009			
T6	1.386	2.086	A	0.557	1.837	0.728	0.8	1	83.674	3.407	0.170	A
120.00-100.00			B	0.304	2.285	0.617	0.8	1	43.189			
			C	0.269	2.383	0.607	0.8	1	39.791			
T7	1.901	3.212	A	0.523	1.871	0.71	0.8	1	93.204	3.650	0.182	A
100.00-80.00			B	0.406	2.052	0.654	0.8	1	69.926			
			C	0.316	2.254	0.621	0.8	1	55.939			
T8	0.649	1.038	A	0.461	1.955	0.679	0.8	1	29.667	1.159	0.174	A
80.00-73.33			B	0.361	2.145	0.637	0.8	1	22.680			
			C	0.267	2.387	0.606	0.8	1	17.421			
T9	0.676	1.409	A	0.474	1.936	0.684	0.8	1	32.396	1.222	0.183	A
73.33-66.67			B	0.402	2.06	0.652	0.8	1	26.989			
			C	0.308	2.274	0.618	0.8	1	21.266			
T10	0.678	1.450	A	0.458	1.961	0.677	0.8	1	32.647	1.211	0.182	A
66.67-60.00			B	0.391	2.082	0.648	0.8	1	27.485			
			C	0.3	2.296	0.616	0.8	1	21.696			
T11	1.025	1.856	A	0.411	2.043	0.656	0.8	1	45.483	1.689	0.169	A
60.00-50.00			B	0.337	2.203	0.628	0.8	1	36.823			
			C	0.245	2.454	0.6	0.8	1	27.910			
T12	1.030	2.213	A	0.413	2.038	0.657	0.8	1	48.994	1.714	0.171	A
50.00-40.00			B	0.345	2.183	0.631	0.8	1	40.505			
			C	0.264	2.396	0.606	0.8	1	32.197			
T13	1.032	2.411	A	0.396	2.073	0.65	0.8	1	49.388	1.635	0.164	A
40.00-30.00			B	0.331	2.217	0.626	0.8	1	41.055			
			C	0.257	2.416	0.604	0.8	1	33.160			
T14	1.032	2.946	A	0.402	2.059	0.653	0.8	1	53.563	1.733	0.173	A
30.00-20.00			B	0.349	2.175	0.632	0.8	1	46.305			
			C	0.287	2.332	0.612	0.8	1	39.381			
T15	0.516	1.349	A	0.383	2.099	0.645	0.8	1	25.484	0.840	0.168	A
20.00-15.00			B	0.33	2.22	0.625	0.8	1	21.671			
			C	0.269	2.382	0.607	0.8	1	18.024			
T16	0.516	1.476	A	0.397	2.07	0.65	0.8	1	27.547	0.896	0.179	A
15.00-10.00			B	0.343	2.188	0.63	0.8	1	23.461			
			C	0.281	2.349	0.61	0.8	1	19.539			
T17	0.413	2.705	A	0.229	2.502	0.597	0.8	1	34.362	1.351	0.135	A
10.00-0.00			B	0.206	2.575	0.592	0.8	1	31.434			
			C	0.181	2.662	0.587	0.8	1	28.520			
Sum Weight:	12.139	26.137						OTM	1831.402 kip-ft	24.792		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.218	0.649	A	0.371	2.124	0.64	0.85	1	20.564	1.049	0.087	A
152.00-140.00			B	0.259	2.41	0.604	0.85	1	14.366			
			C	0.25	2.439	0.602	0.85	1	14.167			
T2	0.232	0.358	A	0.682	1.776	0.807	0.85	1	19.700	0.826	0.165	A
140.00-135.00			B	0.292	2.317	0.614	0.85	1	7.063			
			C	0.277	2.358	0.609	0.85	1	7.002			
T3	0.273	0.298	A	0.654	1.78	0.788	0.85	1	19.764	0.822	0.164	A
135.00-130.00			B	0.249	2.441	0.602	0.85	1	6.206			
			C	0.293	2.314	0.614	0.85	1	7.675			
T4	0.279	0.336	A	0.619	1.793	0.765	0.85	1	19.408	0.804	0.161	A
130.00-125.00			B	0.254	2.426	0.603	0.85	1	6.724			
			C	0.28	2.351	0.61	0.85	1	7.785			
T5	0.282	0.344	A	0.598	1.805	0.752	0.85	1	19.616	0.809	0.162	A
125.00-120.00			B	0.255	2.422	0.603	0.85	1	7.261			
			C	0.276	2.362	0.609	0.85	1	8.207			
T6	1.386	2.086	A	0.557	1.837	0.728	0.85	1	85.057	3.463	0.173	A
120.00-100.00			B	0.304	2.285	0.617	0.85	1	44.647			
			C	0.269	2.383	0.607	0.85	1	41.581			
T7	1.901	3.212	A	0.523	1.871	0.71	0.85	1	95.031	3.721	0.186	A
100.00-80.00			B	0.406	2.052	0.654	0.85	1	71.839			
			C	0.316	2.254	0.621	0.85	1	58.297			
T8	0.649	1.038	A	0.461	1.955	0.679	0.85	1	30.254	1.182	0.177	A
80.00-73.33			B	0.361	2.145	0.637	0.85	1	23.271			
			C	0.267	2.387	0.606	0.85	1	18.147			
T9	0.676	1.409	A	0.474	1.936	0.684	0.85	1	33.107	1.248	0.187	A
73.33-66.67			B	0.402	2.06	0.652	0.85	1	27.710			
			C	0.308	2.274	0.618	0.85	1	22.144			
T10	0.678	1.450	A	0.458	1.961	0.677	0.85	1	33.381	1.239	0.186	A
66.67-60.00			B	0.391	2.082	0.648	0.85	1	28.228			
			C	0.3	2.296	0.616	0.85	1	22.597			
T11	1.025	1.856	A	0.411	2.043	0.656	0.85	1	46.456	1.725	0.173	A
60.00-50.00			B	0.337	2.203	0.628	0.85	1	37.785			
			C	0.245	2.454	0.6	0.85	1	29.074			
T12	1.030	2.213	A	0.413	2.038	0.657	0.85	1	50.128	1.754	0.175	A
50.00-40.00			B	0.345	2.183	0.631	0.85	1	41.646			
			C	0.264	2.396	0.606	0.85	1	33.555			
T13	1.032	2.411	A	0.396	2.073	0.65	0.85	1	50.558	1.674	0.167	A
40.00-30.00			B	0.331	2.217	0.626	0.85	1	42.231			
			C	0.257	2.416	0.604	0.85	1	34.550			
T14	1.032	2.946	A	0.402	2.059	0.653	0.85	1	54.917	1.777	0.178	A
30.00-20.00			B	0.349	2.175	0.632	0.85	1	47.709			
			C	0.287	2.332	0.612	0.85	1	41.049			
T15	0.516	1.349	A	0.383	2.099	0.645	0.85	1	25.817	0.851	0.170	A
20.00-15.00			B	0.33	2.22	0.625	0.85	1	22.024			
			C	0.269	2.382	0.607	0.85	1	18.504			
T16	0.516	1.476	A	0.397	2.07	0.65	0.85	1	27.980	0.910	0.182	A
15.00-10.00			B	0.343	2.188	0.63	0.85	1	23.907			
			C	0.281	2.349	0.61	0.85	1	20.103			
T17	0.413	2.705	A	0.229	2.502	0.597	0.85	1	35.732	1.405	0.140	A
10.00-0.00			B	0.206	2.575	0.592	0.85	1	32.802			
			C	0.181	2.662	0.587	0.85	1	29.968			
Sum Weight:	12.139	26.137						OTM	1859.857 kip-ft	25.260		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	1	1	14.490	0.391	0.033	A
152.00-140.00			B	0.17	2.701	0.585	1	1	10.673			
			C	0.16	2.736	0.583	1	1	10.468			
T2	0.088	0.211	A	0.473	1.937	0.684	1	1	12.020	0.254	0.051	A
140.00-135.00			B	0.195	2.611	0.589	1	1	5.261			
			C	0.182	2.659	0.587	1	1	5.218			
T3	0.102	0.184	A	0.441	1.989	0.669	1	1	11.583	0.248	0.050	A
135.00-130.00			B	0.164	2.721	0.584	1	1	4.461			
			C	0.191	2.626	0.589	1	1	5.363			
T4	0.105	0.219	A	0.416	2.033	0.658	1	1	11.542	0.250	0.050	A
130.00-125.00			B	0.165	2.717	0.584	1	1	4.763			
			C	0.182	2.657	0.587	1	1	5.464			
T5	0.106	0.212	A	0.403	2.058	0.653	1	1	11.902	0.258	0.052	A
125.00-120.00			B	0.169	2.704	0.585	1	1	5.296			
			C	0.182	2.656	0.587	1	1	5.940			
T6	0.525	1.382	A	0.389	2.085	0.647	1	1	59.358	1.265	0.063	A
120.00-100.00			B	0.222	2.525	0.595	1	1	37.557			
			C	0.197	2.608	0.59	1	1	35.829			
T7	0.716	2.073	A	0.374	2.117	0.641	1	1	70.601	1.443	0.072	A
100.00-80.00			B	0.295	2.308	0.615	1	1	58.385			
			C	0.234	2.485	0.598	1	1	50.992			
T8	0.244	0.721	A	0.326	2.229	0.624	1	1	22.430	0.461	0.069	A
80.00-73.33			B	0.259	2.411	0.604	1	1	18.603			
			C	0.197	2.606	0.59	1	1	15.746			
T9	0.253	0.972	A	0.341	2.194	0.629	1	1	25.390	0.500	0.075	A
73.33-66.67			B	0.29	2.323	0.613	1	1	22.390			
			C	0.228	2.505	0.597	1	1	19.378			
T10	0.254	0.998	A	0.329	2.222	0.625	1	1	25.770	0.500	0.075	A
66.67-60.00			B	0.282	2.345	0.611	1	1	22.870			
			C	0.222	2.525	0.595	1	1	19.813			
T11	0.383	1.354	A	0.292	2.319	0.613	1	1	35.292	0.686	0.069	A
60.00-50.00			B	0.242	2.46	0.6	1	1	30.481			
			C	0.183	2.654	0.587	1	1	25.573			
T12	0.384	1.565	A	0.296	2.306	0.615	1	1	39.036	0.713	0.071	A
50.00-40.00			B	0.251	2.435	0.602	1	1	34.372			
			C	0.197	2.606	0.59	1	1	29.756			
T13	0.384	1.741	A	0.284	2.34	0.611	1	1	39.642	0.684	0.068	A
40.00-30.00			B	0.241	2.465	0.6	1	1	35.025			
			C	0.191	2.627	0.589	1	1	30.513			
T14	0.384	2.026	A	0.294	2.312	0.614	1	1	44.602	0.747	0.075	A
30.00-20.00			B	0.257	2.418	0.604	1	1	40.565			
			C	0.213	2.554	0.593	1	1	36.698			
T15	0.192	0.907	A	0.279	2.352	0.61	1	1	19.680	0.335	0.067	A
20.00-15.00			B	0.243	2.459	0.6	1	1	17.556			
			C	0.201	2.594	0.591	1	1	15.503			
T16	0.192	0.995	A	0.29	2.322	0.613	1	1	21.546	0.363	0.073	A
15.00-10.00			B	0.254	2.426	0.603	1	1	19.304			
			C	0.211	2.559	0.593	1	1	17.117			
T17	0.154	1.983	A	0.178	2.671	0.586	1	1	32.830	0.635	0.064	A
10.00-0.00			B	0.163	2.723	0.584	1	1	31.075			
			C	0.146	2.786	0.581	1	1	29.300			
Sum Weight:	4.545	17.879						OTM	685.522 kip-ft	9.735		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	0.825	1	13.481	0.364	0.030	A
152.00-140.00			B	0.17	2.701	0.585	0.825	1	9.555			
			C	0.16	2.736	0.583	0.825	1	9.234			
T2	0.088	0.211	A	0.473	1.937	0.684	0.825	1	11.688	0.247	0.049	A
140.00-135.00			B	0.195	2.611	0.589	0.825	1	4.750			
			C	0.182	2.659	0.587	0.825	1	4.599			
T3	0.102	0.184	A	0.441	1.989	0.669	0.825	1	11.345	0.243	0.049	A
135.00-130.00			B	0.164	2.721	0.584	0.825	1	4.104			
			C	0.191	2.626	0.589	0.825	1	4.889			
T4	0.105	0.219	A	0.416	2.033	0.658	0.825	1	11.282	0.245	0.049	A
130.00-125.00			B	0.165	2.717	0.584	0.825	1	4.392			
			C	0.182	2.657	0.587	0.825	1	4.972			
T5	0.106	0.212	A	0.403	2.058	0.653	0.825	1	11.576	0.251	0.050	A
125.00-120.00			B	0.169	2.704	0.585	0.825	1	4.841			
			C	0.182	2.656	0.587	0.825	1	5.364			
T6	0.525	1.382	A	0.389	2.085	0.647	0.825	1	54.915	1.171	0.059	A
120.00-100.00			B	0.222	2.525	0.595	0.825	1	32.733			
			C	0.197	2.608	0.59	0.825	1	30.431			
T7	0.716	2.073	A	0.374	2.117	0.641	0.825	1	64.313	1.314	0.066	A
100.00-80.00			B	0.295	2.308	0.615	0.825	1	51.688			
			C	0.234	2.485	0.598	0.825	1	43.463			
T8	0.244	0.721	A	0.326	2.229	0.624	0.825	1	20.483	0.421	0.063	A
80.00-73.33			B	0.259	2.411	0.604	0.825	1	16.576			
			C	0.197	2.606	0.59	0.825	1	13.474			
T9	0.253	0.972	A	0.341	2.194	0.629	0.825	1	22.940	0.452	0.068	A
73.33-66.67			B	0.29	2.323	0.613	0.825	1	19.840			
			C	0.228	2.505	0.597	0.825	1	16.534			
T10	0.254	0.998	A	0.329	2.222	0.625	0.825	1	23.241	0.451	0.068	A
66.67-60.00			B	0.282	2.345	0.611	0.825	1	20.244			
			C	0.222	2.525	0.595	0.825	1	16.892			
T11	0.383	1.354	A	0.292	2.319	0.613	0.825	1	32.073	0.624	0.062	A
60.00-50.00			B	0.242	2.46	0.6	0.825	1	27.176			
			C	0.183	2.654	0.587	0.825	1	21.905			
T12	0.384	1.565	A	0.296	2.306	0.615	0.825	1	35.179	0.642	0.064	A
50.00-40.00			B	0.251	2.435	0.602	0.825	1	30.393			
			C	0.197	2.606	0.59	0.825	1	25.375			
T13	0.384	1.741	A	0.284	2.34	0.611	0.825	1	35.661	0.615	0.062	A
40.00-30.00			B	0.241	2.465	0.6	0.825	1	30.923			
			C	0.191	2.627	0.589	0.825	1	26.013			
T14	0.384	2.026	A	0.294	2.312	0.614	0.825	1	39.768	0.666	0.067	A
30.00-20.00			B	0.257	2.418	0.604	0.825	1	35.508			
			C	0.213	2.554	0.593	0.825	1	31.122			
T15	0.192	0.907	A	0.279	2.352	0.61	0.825	1	18.394	0.314	0.063	A
20.00-15.00			B	0.243	2.459	0.6	0.825	1	16.170			
			C	0.201	2.594	0.591	0.825	1	13.872			
T16	0.192	0.995	A	0.29	2.322	0.613	0.825	1	19.944	0.336	0.067	A
15.00-10.00			B	0.254	2.426	0.603	0.825	1	17.620			
			C	0.211	2.559	0.593	0.825	1	15.208			
T17	0.154	1.983	A	0.178	2.671	0.586	0.825	1	28.219	0.546	0.055	A
10.00-0.00			B	0.163	2.723	0.584	0.825	1	26.427			
			C	0.146	2.786	0.581	0.825	1	24.504			
Sum Weight:	4.545	17.879						OTM	634.576 kip-ft	8.901		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	R_R	D_F	D_R	A_E	F	w	Ctrl. Face
ft	K	K							ft^2	K	klf	
T1	0.081	0.335	A	0.251	2.436	0.602	0.8	1	13.337	0.360	0.030	A
152.00-140.00			B	0.17	2.701	0.585	0.8	1	9.396			
			C	0.16	2.736	0.583	0.8	1	9.058			
T2	0.088	0.211	A	0.473	1.937	0.684	0.8	1	11.641	0.246	0.049	A
140.00-135.00			B	0.195	2.611	0.589	0.8	1	4.677			
			C	0.182	2.659	0.587	0.8	1	4.510			
T3	0.102	0.184	A	0.441	1.989	0.669	0.8	1	11.311	0.243	0.049	A
135.00-130.00			B	0.164	2.721	0.584	0.8	1	4.054			
			C	0.191	2.626	0.589	0.8	1	4.822			
T4	0.105	0.219	A	0.416	2.033	0.658	0.8	1	11.245	0.244	0.049	A
130.00-125.00			B	0.165	2.717	0.584	0.8	1	4.339			
			C	0.182	2.657	0.587	0.8	1	4.901			
T5	0.106	0.212	A	0.403	2.058	0.653	0.8	1	11.529	0.250	0.050	A
125.00-120.00			B	0.169	2.704	0.585	0.8	1	4.776			
			C	0.182	2.656	0.587	0.8	1	5.282			
T6	0.525	1.382	A	0.389	2.085	0.647	0.8	1	54.281	1.157	0.058	A
120.00-100.00			B	0.222	2.525	0.595	0.8	1	32.044			
			C	0.197	2.608	0.59	0.8	1	29.660			
T7	0.716	2.073	A	0.374	2.117	0.641	0.8	1	63.415	1.296	0.065	A
100.00-80.00			B	0.295	2.308	0.615	0.8	1	50.732			
			C	0.234	2.485	0.598	0.8	1	42.387			
T8	0.244	0.721	A	0.326	2.229	0.624	0.8	1	20.205	0.415	0.062	A
80.00-73.33			B	0.259	2.411	0.604	0.8	1	16.286			
			C	0.197	2.606	0.59	0.8	1	13.149			
T9	0.253	0.972	A	0.341	2.194	0.629	0.8	1	22.591	0.445	0.067	A
73.33-66.67			B	0.29	2.323	0.613	0.8	1	19.476			
			C	0.228	2.505	0.597	0.8	1	16.127			
T10	0.254	0.998	A	0.329	2.222	0.625	0.8	1	22.880	0.444	0.067	A
66.67-60.00			B	0.282	2.345	0.611	0.8	1	19.869			
			C	0.222	2.525	0.595	0.8	1	16.474			
T11	0.383	1.354	A	0.292	2.319	0.613	0.8	1	31.613	0.615	0.061	A
60.00-50.00			B	0.242	2.46	0.6	0.8	1	26.704			
			C	0.183	2.654	0.587	0.8	1	21.381			
T12	0.384	1.565	A	0.296	2.306	0.615	0.8	1	34.628	0.632	0.063	A
50.00-40.00			B	0.251	2.435	0.602	0.8	1	29.825			
			C	0.197	2.606	0.59	0.8	1	24.749			
T13	0.384	1.741	A	0.284	2.34	0.611	0.8	1	35.092	0.605	0.061	A
40.00-30.00			B	0.241	2.465	0.6	0.8	1	30.337			
			C	0.191	2.627	0.589	0.8	1	25.370			
T14	0.384	2.026	A	0.294	2.312	0.614	0.8	1	39.077	0.655	0.065	A
30.00-20.00			B	0.257	2.418	0.604	0.8	1	34.785			
			C	0.213	2.554	0.593	0.8	1	30.325			
T15	0.192	0.907	A	0.279	2.352	0.61	0.8	1	18.210	0.310	0.062	A
20.00-15.00			B	0.243	2.459	0.6	0.8	1	15.972			
			C	0.201	2.594	0.591	0.8	1	13.639			
T16	0.192	0.995	A	0.29	2.322	0.613	0.8	1	19.715	0.332	0.066	A
15.00-10.00			B	0.254	2.426	0.603	0.8	1	17.379			
			C	0.211	2.559	0.593	0.8	1	14.935			
T17	0.154	1.983	A	0.178	2.671	0.586	0.8	1	27.560	0.533	0.053	A
10.00-0.00			B	0.163	2.723	0.584	0.8	1	25.763			
			C	0.146	2.786	0.581	0.8	1	23.819			
Sum Weight:	4.545	17.879						OTM	627.298 kip-ft	8.782		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
T1	0.081	0.335	A	0.251	2.436	0.602	0.85	1	13.625	0.368	0.031	A
152.00-140.00			B	0.17	2.701	0.585	0.85	1	9.715			
			C	0.16	2.736	0.583	0.85	1	9.410			
T2	0.088	0.211	A	0.473	1.937	0.684	0.85	1	11.736	0.248	0.050	A
140.00-135.00			B	0.195	2.611	0.589	0.85	1	4.823			
			C	0.182	2.659	0.587	0.85	1	4.687			
T3	0.102	0.184	A	0.441	1.989	0.669	0.85	1	11.379	0.244	0.049	A
135.00-130.00			B	0.164	2.721	0.584	0.85	1	4.155			
			C	0.191	2.626	0.589	0.85	1	4.957			
T4	0.105	0.219	A	0.416	2.033	0.658	0.85	1	11.319	0.245	0.049	A
130.00-125.00			B	0.165	2.717	0.584	0.85	1	4.445			
			C	0.182	2.657	0.587	0.85	1	5.042			
T5	0.106	0.212	A	0.403	2.058	0.653	0.85	1	11.622	0.252	0.050	A
125.00-120.00			B	0.169	2.704	0.585	0.85	1	4.906			
			C	0.182	2.656	0.587	0.85	1	5.446			
T6	0.525	1.382	A	0.389	2.085	0.647	0.85	1	55.550	1.184	0.059	A
120.00-100.00			B	0.222	2.525	0.595	0.85	1	33.422			
			C	0.197	2.608	0.59	0.85	1	31.202			
T7	0.716	2.073	A	0.374	2.117	0.641	0.85	1	65.211	1.333	0.067	A
100.00-80.00			B	0.295	2.308	0.615	0.85	1	52.645			
			C	0.234	2.485	0.598	0.85	1	44.538			
T8	0.244	0.721	A	0.326	2.229	0.624	0.85	1	20.761	0.427	0.064	A
80.00-73.33			B	0.259	2.411	0.604	0.85	1	16.865			
			C	0.197	2.606	0.59	0.85	1	13.798			
T9	0.253	0.972	A	0.341	2.194	0.629	0.85	1	23.290	0.459	0.069	A
73.33-66.67			B	0.29	2.323	0.613	0.85	1	20.204			
			C	0.228	2.505	0.597	0.85	1	16.940			
T10	0.254	0.998	A	0.329	2.222	0.625	0.85	1	23.603	0.458	0.069	A
66.67-60.00			B	0.282	2.345	0.611	0.85	1	20.619			
			C	0.222	2.525	0.595	0.85	1	17.309			
T11	0.383	1.354	A	0.292	2.319	0.613	0.85	1	32.532	0.633	0.063	A
60.00-50.00			B	0.242	2.46	0.6	0.85	1	27.648			
			C	0.183	2.654	0.587	0.85	1	22.429			
T12	0.384	1.565	A	0.296	2.306	0.615	0.85	1	35.730	0.652	0.065	A
50.00-40.00			B	0.251	2.435	0.602	0.85	1	30.962			
			C	0.197	2.606	0.59	0.85	1	26.001			
T13	0.384	1.741	A	0.284	2.34	0.611	0.85	1	36.230	0.625	0.062	A
40.00-30.00			B	0.241	2.465	0.6	0.85	1	31.509			
			C	0.191	2.627	0.589	0.85	1	26.656			
T14	0.384	2.026	A	0.294	2.312	0.614	0.85	1	40.458	0.678	0.068	A
30.00-20.00			B	0.257	2.418	0.604	0.85	1	36.230			
			C	0.213	2.554	0.593	0.85	1	31.918			
T15	0.192	0.907	A	0.279	2.352	0.61	0.85	1	18.577	0.317	0.063	A
20.00-15.00			B	0.243	2.459	0.6	0.85	1	16.368			
			C	0.201	2.594	0.591	0.85	1	14.105			
T16	0.192	0.995	A	0.29	2.322	0.613	0.85	1	20.173	0.339	0.068	A
15.00-10.00			B	0.254	2.426	0.603	0.85	1	17.861			
			C	0.211	2.559	0.593	0.85	1	15.480			
T17	0.154	1.983	A	0.178	2.671	0.586	0.85	1	28.878	0.559	0.056	A
10.00-0.00			B	0.163	2.723	0.584	0.85	1	27.091			
			C	0.146	2.786	0.581	0.85	1	25.189			
Sum Weight:	4.545	17.879						OTM	641.854 kip-ft	9.020		

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	7.490					
Bracing Weight	10.389					
Total Member Self-Weight	17.879			-14.558	2.671	
Total Weight	30.749			-14.558	2.671	
Wind 0 deg - No Ice		-0.048	-43.134	-3775.457	9.785	-7.307
Wind 30 deg - No Ice		20.365	-35.543	-3158.744	-1790.387	-15.502
Wind 45 deg - No Ice		28.582	-28.763	-2564.776	-2521.905	-17.923
Wind 60 deg - No Ice		34.725	-20.149	-1804.714	-3073.679	-19.004
Wind 90 deg - No Ice		40.813	0.048	-7.444	-3595.766	-18.421
Wind 120 deg - No Ice		37.157	21.608	1872.052	-3226.516	-14.022
Wind 135 deg - No Ice		28.650	28.831	2545.720	-2531.966	-7.659
Wind 150 deg - No Ice		20.448	35.591	3136.741	-1802.709	-2.919
Wind 180 deg - No Ice		0.048	40.381	3578.075	-4.443	7.251
Wind 210 deg - No Ice		-20.365	35.543	3129.627	1795.729	15.502
Wind 225 deg - No Ice		-28.582	28.763	2535.659	2527.247	17.923
Wind 240 deg - No Ice		-37.109	21.526	1859.730	3224.744	21.329
Wind 270 deg - No Ice		-40.813	-0.048	-21.672	3601.108	18.421
Wind 300 deg - No Ice		-34.773	-20.232	-1817.036	3086.135	11.753
Wind 315 deg - No Ice		-28.650	-28.831	-2574.837	2537.308	7.659
Wind 330 deg - No Ice		-20.448	-35.591	-3165.858	1808.050	2.919
Member Ice	8.258					
Total Weight Ice	51.144			-33.540	1.392	
Wind 0 deg - Ice		-0.037	-40.072	-3559.413	6.889	-6.505
Wind 30 deg - Ice		19.202	-33.469	-3010.359	-1699.969	-14.952
Wind 45 deg - Ice		27.009	-27.151	-2452.399	-2397.481	-17.613
Wind 60 deg - Ice		32.890	-19.068	-1734.806	-2926.306	-18.992
Wind 90 deg - Ice		38.468	0.037	-28.043	-3410.851	-18.619
Wind 120 deg - Ice		34.549	20.068	1734.157	-3030.374	-14.048
Wind 135 deg - Ice		27.061	27.203	2393.093	-2405.255	-8.397
Wind 150 deg - Ice		19.266	33.506	2948.776	-1709.491	-3.667
Wind 180 deg - Ice		0.037	38.200	3378.513	-4.106	6.519
Wind 210 deg - Ice		-19.202	33.469	2943.279	1702.752	14.952
Wind 225 deg - Ice		-27.009	27.151	2385.319	2400.264	17.613
Wind 240 deg - Ice		-34.512	20.004	1724.635	3027.660	20.553
Wind 270 deg - Ice		-38.468	-0.037	-39.037	3413.634	18.619
Wind 300 deg - Ice		-32.927	-19.132	-1744.328	2934.586	12.473
Wind 315 deg - Ice		-27.061	-27.203	-2460.174	2408.038	8.397
Wind 330 deg - Ice		-19.266	-33.506	-3015.856	1712.274	3.667
Total Weight	30.749			-14.558	2.671	
Wind 0 deg - Service		-0.017	-14.925	-1301.532	5.017	-2.528
Wind 30 deg - Service		7.047	-12.299	-1088.136	-617.880	-5.364
Wind 45 deg - Service		9.890	-9.953	-882.611	-871.001	-6.202
Wind 60 deg - Service		12.016	-6.972	-619.614	-1061.926	-6.576
Wind 90 deg - Service		14.122	0.017	2.279	-1242.579	-6.374
Wind 120 deg - Service		12.857	7.477	652.623	-1114.811	-4.852
Wind 135 deg - Service		9.913	9.976	885.726	-874.482	-2.650
Wind 150 deg - Service		7.075	12.315	1090.232	-622.144	-1.010
Wind 180 deg - Service		0.017	13.973	1242.943	0.094	2.509
Wind 210 deg - Service		-7.047	12.299	1087.770	622.990	5.364
Wind 225 deg - Service		-9.890	9.953	882.245	876.111	6.202
Wind 240 deg - Service		-12.841	7.448	648.360	1117.459	7.380
Wind 270 deg - Service		-14.122	-0.017	-2.645	1247.689	6.374
Wind 300 deg - Service		-12.032	-7.001	-623.878	1069.498	4.067
Wind 315 deg - Service		-9.913	-9.976	-886.093	879.592	2.650
Wind 330 deg - Service		-7.075	-12.315	-1090.598	627.254	1.010

Load Combinations

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

Maximum Member Forces

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

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	152 - 140	Leg	Max Tension	15	5.558	-0.129	0.081
			Max. Compression	2	-7.018	0.380	0.130
			Max. Mx	2	-7.018	0.380	0.130
			Max. My	17	-0.575	-0.005	-0.502
			Max. Vy	2	-2.890	0.380	0.130
			Max. Vx	8	1.088	-0.077	-0.403
		Diagonal	Max Tension	6	1.915	0.000	0.000
			Max. Compression	14	-1.935	0.000	0.000
			Max. Mx	26	1.468	0.006	0.000
			Max. My	11	-0.355	0.001	0.002
			Max. Vy	26	-0.006	0.006	0.000
			Max. Vx	11	-0.000	0.001	0.002
		Top Girt	Max Tension	2	0.287	0.000	0.000
			Max. Compression	10	-0.284	0.000	0.000
			Max. Mx	18	0.005	-0.019	0.000
			Max. My	27	0.131	0.000	0.000
			Max. Vy	18	0.012	0.000	0.000
			Max. Vx	27	0.000	0.000	0.000
T2	140 - 135	Leg	Max Tension	10	10.129	0.260	0.008
			Max. Compression	2	-12.229	-0.030	-0.005
			Max. Mx	2	-7.168	0.598	0.130
			Max. My	9	-0.615	0.019	-0.516
			Max. Vy	2	-2.909	-0.030	-0.005
			Max. Vx	8	1.202	0.003	0.065
		Diagonal	Max Tension	14	2.776	0.000	0.000
			Max. Compression	14	-2.788	0.000	0.000
			Max. Mx	23	0.688	0.008	-0.001
			Max. My	6	-2.778	0.002	-0.003
			Max. Vy	23	0.008	0.008	-0.001
			Max. Vx	23	0.001	0.000	0.000
		Top Girt	Max Tension	7	0.144	0.000	0.000
			Max. Compression	15	-0.157	0.000	0.000
			Max. Mx	18	-0.024	-0.019	0.000
			Max. My	21	0.056	0.000	0.001
			Max. Vy	18	0.012	0.000	0.000
			Max. Vx	21	0.000	0.000	0.000
T3	135 - 130	Leg	Max Tension	10	12.213	0.024	0.005
			Max. Compression	2	-14.620	0.472	0.024
			Max. Mx	10	12.009	-0.508	-0.026
			Max. My	14	-1.337	-0.017	-0.510
			Max. Vy	10	0.166	-0.508	-0.026
			Max. Vx	14	0.203	-0.017	-0.510
		Diagonal	Max Tension	14	2.604	0.000	0.000
			Max. Compression	14	-2.612	0.000	0.000
			Max. Mx	24	1.618	0.010	-0.001
			Max. My	24	-0.148	0.008	-0.002
			Max. Vy	33	0.008	0.009	0.001
			Max. Vx	24	0.001	0.000	0.000
T4	130 - 125	Leg	Max Tension	15	17.210	-0.503	-0.025
			Max. Compression	2	-20.859	0.346	0.002
			Max. Mx	15	17.210	0.821	-0.025
			Max. My	11	-1.256	-0.013	-0.810
			Max. Vy	10	-0.671	-0.508	-0.026
			Max. Vx	14	-0.669	-0.017	-0.510
		Diagonal	Max Tension	14	3.424	0.000	0.000
			Max. Compression	14	-3.479	0.000	0.000
			Max. Mx	33	2.686	0.012	-0.001
			Max. My	32	-2.654	0.007	0.002
			Max. Vy	33	0.010	0.012	-0.001
			Max. Vx	32	-0.001	0.000	0.000
T5	125 - 120	Leg	Max Tension	10	23.212	-0.385	-0.003

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-27.981	-0.043	0.015
			Max. Mx	5	22.904	-0.385	0.009
			Max. My	6	-2.015	-0.019	0.364
			Max. Vy	10	-0.111	-0.385	-0.003
			Max. Vx	6	0.109	-0.019	0.364
		Diagonal	Max Tension	14	3.945	0.000	0.000
			Max. Compression	14	-3.948	0.000	0.000
			Max. Mx	33	2.689	0.017	-0.001
			Max. My	27	-3.392	0.008	-0.003
			Max. Vy	33	0.012	0.017	-0.001
			Max. Vx	27	0.001	0.000	0.000
T6	120 - 100	Leg	Max Tension	10	47.129	0.040	0.003
			Max. Compression	2	-53.902	0.958	-0.016
			Max. Mx	10	46.998	-0.987	0.018
			Max. My	6	-2.798	-0.020	0.989
			Max. Vy	32	0.295	-0.940	-0.037
			Max. Vx	11	-0.313	-0.014	0.955
		Diagonal	Max Tension	11	4.531	0.000	0.000
			Max. Compression	11	-4.607	0.000	0.000
			Max. Mx	19	3.474	0.031	0.003
			Max. My	28	-4.386	0.010	-0.007
			Max. Vy	33	0.018	0.028	0.003
			Max. Vx	28	0.002	0.000	0.000
T7	100 - 80	Leg	Max Tension	10	76.836	0.263	0.022
			Max. Compression	2	-88.559	0.063	0.012
			Max. Mx	5	55.183	1.240	0.019
			Max. My	6	-3.662	0.017	-1.447
			Max. Vy	10	-1.124	-0.987	0.018
			Max. Vx	6	1.237	-0.020	0.989
		Diagonal	Max Tension	11	6.897	0.000	0.000
			Max. Compression	11	-6.923	0.000	0.000
			Max. Mx	19	5.149	0.066	0.004
			Max. My	21	-5.607	0.015	0.008
			Max. Vy	19	-0.029	0.066	0.004
			Max. Vx	21	-0.002	0.000	0.000
		Secondary Horizontal	Max Tension	2	1.536	0.000	0.000
			Max. Compression	2	-1.536	0.000	0.000
			Max. Mx	18	0.148	-0.121	0.000
			Max. My	30	1.465	0.000	0.004
			Max. Vy	18	0.039	0.000	0.000
			Max. Vx	30	-0.001	0.000	0.000
T8	80 - 73.3333	Leg	Max Tension	10	87.346	-0.116	-0.009
			Max. Compression	2	-100.326	0.188	0.010
			Max. Mx	27	78.260	-0.411	-0.011
			Max. My	6	-5.146	-0.023	0.544
			Max. Vy	27	0.115	-0.411	-0.011
			Max. Vx	6	-0.112	-0.023	0.544
		Diagonal	Max Tension	11	6.790	0.000	0.000
			Max. Compression	11	-6.848	0.000	0.000
			Max. Mx	32	5.175	0.050	-0.006
			Max. My	22	-5.623	0.025	0.008
			Max. Vy	32	0.028	0.050	-0.006
			Max. Vx	22	-0.002	0.000	0.000
T9	73.3333 - 66.6667	Leg	Max Tension	10	96.963	-0.225	-0.009
			Max. Compression	2	-111.296	-0.246	0.006
			Max. Mx	2	-111.169	0.558	-0.004
			Max. My	6	-5.277	-0.023	0.544
			Max. Vy	2	0.257	0.558	-0.004
			Max. Vx	23	0.378	-0.225	0.532

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	11	7.057	0.000	0.000
			Max. Compression	28	-7.190	0.000	0.000
			Max. Mx	19	5.166	0.077	0.007
			Max. My	30	-0.097	0.062	-0.009
			Max. Vy	33	0.035	0.074	0.007
			Max. Vx	30	-0.002	0.000	0.000
		Secondary Horizontal	Max Tension	2	1.930	0.000	0.000
			Max. Compression	2	-1.930	0.000	0.000
			Max. Mx	18	0.176	-0.149	0.000
			Max. My	30	1.843	0.000	0.005
			Max. Vy	18	0.044	0.000	0.000
			Max. Vx	30	-0.001	0.000	0.000
T10	66.6667 - 60	Leg	Max Tension	10	106.572	0.091	-0.005
			Max. Compression	2	-122.542	0.251	-0.025
			Max. Mx	19	-120.507	0.802	-0.001
			Max. My	14	-6.801	-0.020	-0.604
			Max. Vy	2	-0.317	0.720	-0.005
			Max. Vx	14	0.275	-0.020	-0.604
		Diagonal	Max Tension	28	7.191	0.000	0.000
			Max. Compression	11	-7.178	0.000	0.000
			Max. Mx	33	4.605	0.066	-0.007
			Max. My	21	-6.367	0.029	0.014
			Max. Vy	33	0.035	0.066	-0.007
			Max. Vx	21	-0.003	0.000	0.000
		Secondary Horizontal	Max Tension	2	2.125	0.000	0.000
			Max. Compression	2	-2.125	0.000	0.000
			Max. Mx	18	0.198	-0.165	0.000
			Max. My	30	2.038	0.000	0.005
			Max. Vy	18	0.046	0.000	0.000
			Max. Vx	30	-0.001	0.000	0.000
T11	60 - 50	Leg	Max Tension	10	118.266	-0.291	0.016
			Max. Compression	2	-135.919	0.162	0.172
			Max. Mx	27	107.705	-0.669	0.010
			Max. My	17	-5.452	-0.048	0.994
			Max. Vy	27	-0.171	-0.669	0.010
			Max. Vx	13	0.140	-0.157	-0.784
		Diagonal	Max Tension	11	8.153	0.000	0.000
			Max. Compression	28	-8.503	0.000	0.000
			Max. Mx	32	5.594	0.131	-0.012
			Max. My	22	-7.288	0.071	0.018
			Max. Vy	32	0.048	0.131	-0.012
			Max. Vx	22	-0.003	0.000	0.000
T12	50 - 40	Leg	Max Tension	10	132.090	-0.285	-0.138
			Max. Compression	2	-151.941	-0.230	0.164
			Max. Mx	19	-149.459	1.174	-0.293
			Max. My	17	-6.287	-0.056	1.608
			Max. Vy	19	0.561	1.174	-0.293
			Max. Vx	17	-0.556	-0.056	1.608
		Diagonal	Max Tension	28	8.601	0.000	0.000
			Max. Compression	11	-8.569	0.000	0.000
			Max. Mx	19	6.857	0.109	0.011
			Max. My	30	0.314	0.085	-0.014
			Max. Vy	32	0.048	0.107	0.011
			Max. Vx	30	-0.003	0.000	0.000
		Secondary Horizontal	Max Tension	2	2.635	0.000	0.000
			Max. Compression	2	-2.635	0.000	0.000
			Max. Mx	18	0.240	-0.210	0.000
			Max. My	30	2.540	0.000	0.006

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	18	-0.052	0.000	0.000
			Max. Vx	30	-0.001	0.000	0.000
T13	40 - 30	Leg	Max Tension	15	145.569	-0.041	0.076
			Max. Compression	2	-167.671	-1.860	-0.084
			Max. Mx	32	133.936	2.168	-0.072
			Max. My	17	-6.650	-0.056	1.608
			Max. Vy	2	0.640	1.269	0.069
			Max. Vx	14	-0.534	-0.053	-1.429
		Diagonal	Max Tension	11	8.824	0.000	0.000
			Max. Compression	28	-9.333	0.000	0.000
			Max. Mx	32	6.074	0.181	-0.015
			Max. My	21	-8.725	0.101	0.022
			Max. Vy	32	0.061	0.181	-0.015
			Max. Vx	21	-0.004	0.000	0.000
		Secondary Horizontal	Max Tension	2	2.908	0.000	0.000
			Max. Compression	2	-2.908	0.000	0.000
			Max. Mx	18	0.242	-0.237	0.000
			Max. My	31	2.387	0.000	0.007
			Max. Vy	18	0.055	0.000	0.000
			Max. Vx	31	-0.002	0.000	0.000
T14	30 - 20	Leg	Max Tension	15	157.929	1.363	-0.080
			Max. Compression	2	-182.598	1.873	-0.035
			Max. Mx	19	-179.462	-5.753	0.006
			Max. My	14	-9.140	-0.173	-1.318
			Max. Vy	19	3.165	2.153	-0.031
			Max. Vx	14	0.607	-0.238	-1.007
		Diagonal	Max Tension	4	9.038	0.048	-0.003
			Max. Compression	13	-9.591	0.000	0.000
			Max. Mx	19	7.427	0.129	-0.005
			Max. My	28	-8.589	-0.005	-0.008
			Max. Vy	19	-0.045	0.129	-0.005
			Max. Vx	28	-0.002	0.000	0.000
		Horizontal	Max Tension	2	3.167	0.000	0.000
			Max. Compression	2	-3.167	0.040	0.027
			Max. Mx	32	1.663	0.048	0.034
			Max. My	22	1.655	0.046	0.036
			Max. Vy	32	0.035	0.048	0.034
			Max. Vx	22	-0.005	0.000	0.000
		Redund Horz 1 Bracing	Max Tension	2	3.167	0.000	0.000
			Max. Compression	2	-3.167	0.000	0.000
			Max. Mx	33	2.364	-0.013	0.000
			Max. My	31	2.617	0.000	0.000
			Max. Vy	33	0.012	0.000	0.000
			Max. Vx	31	-0.000	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	2	1.847	0.000	0.000
			Max. Compression	2	-1.847	0.000	0.000
			Max. Mx	34	0.919	-0.016	0.000
			Max. My	30	0.511	0.000	0.001
			Max. Vy	34	0.012	0.000	0.000
			Max. Vx	30	-0.000	0.000	0.000
T15	20 - 15	Leg	Max Tension	15	170.161	2.994	-0.023
			Max. Compression	2	-197.172	4.273	0.037
			Max. Mx	19	-191.572	-5.753	0.006
			Max. My	14	-10.050	-0.238	-1.007
			Max. Vy	19	-3.908	4.006	0.033
			Max. Vx	6	0.587	0.147	0.796
		Diagonal	Max Tension	11	8.854	0.153	0.003
			Max. Compression	28	-9.619	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	13	6.756	0.162	0.003
			Max. My	21	-8.187	-0.105	0.007
			Max. Vy	30	-0.050	0.156	0.005
			Max. Vx	27	0.002	0.000	0.000
		Redund Horz 1 Bracing	Max Tension	2	3.419	0.000	0.000
			Max. Compression	2	-3.419	0.000	0.000
			Max. Mx	33	0.980	-0.015	0.000
			Max. My	20	2.982	0.000	0.000
			Max. Vy	33	0.012	0.000	0.000
			Max. Vx	20	-0.000	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	2	1.985	0.000	0.000
			Max. Compression	2	-1.985	0.000	0.000
			Max. Mx	20	0.854	-0.018	0.000
			Max. My	30	0.029	0.000	0.001
			Max. Vy	20	0.013	0.000	0.000
			Max. Vx	30	-0.000	0.000	0.000
T16	15 - 10	Leg	Max Tension	15	171.068	-0.662	0.030
			Max. Compression	2	-198.809	0.038	0.005
			Max. Mx	30	-189.630	1.983	-0.045
			Max. My	14	-10.547	-0.113	-1.878
			Max. Vy	32	-0.645	-1.318	0.032
			Max. Vx	14	0.548	-0.113	-1.878
		Diagonal	Max Tension	11	8.416	0.000	0.000
			Max. Compression	28	-9.671	0.000	0.000
			Max. Mx	19	5.399	-0.121	0.000
			Max. My	30	-0.510	0.000	0.004
			Max. Vy	19	0.044	0.000	0.000
			Max. Vx	30	-0.002	0.000	0.000
		Horizontal	Max Tension	2	3.448	0.000	0.000
			Max. Compression	2	-3.448	0.051	0.032
			Max. Mx	19	-0.782	0.116	0.071
			Max. My	29	-3.110	0.112	0.088
			Max. Vy	19	-0.047	0.116	0.071
			Max. Vx	29	0.010	0.000	0.000
T17	10 - 0	Leg	Max Tension	15	183.278	-0.230	-0.050
			Max. Compression	2	-213.234	0.000	-0.000
			Max. Mx	30	-205.599	1.983	-0.045
			Max. My	14	-10.929	-0.113	-1.878
			Max. Vy	30	0.270	1.983	-0.045
			Max. Vx	14	-0.306	-0.113	-1.878
		Diagonal	Max Tension	28	10.450	0.000	0.000
			Max. Compression	11	-9.509	0.000	0.000
			Max. Mx	17	3.965	0.157	-0.016
			Max. My	29	6.567	0.122	-0.021
			Max. Vy	34	0.063	0.112	0.019
			Max. Vx	29	-0.004	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	217.548	21.846	-13.310
	Max. H_x	13	217.548	21.846	-13.310
	Max. H_z	21	-167.086	-19.369	12.681

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	5	-188.230	-19.265	11.731
	Min. H_x	22	-172.616	-20.296	12.307
	Min. H_z	13	217.548	21.846	-13.310
Leg B	Max. Vert	7	217.978	-21.988	-13.159
	Max. H_x	32	-173.282	20.424	12.173
	Max. H_z	33	-167.812	19.537	12.483
	Min. Vert	15	-189.174	19.414	11.587
	Min. H_x	7	217.978	-21.988	-13.159
	Min. H_z	7	217.978	-21.988	-13.159
Leg A	Max. Vert	2	220.495	-0.201	25.737
	Max. H_x	14	11.455	4.046	0.791
	Max. H_z	2	220.495	-0.201	25.737
	Min. Vert	10	-189.001	0.199	-22.679
	Min. H_x	6	10.662	-4.051	0.731
	Min. H_z	27	-171.327	0.180	-23.800

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	30.749	0.000	-0.000	-14.559	2.671	0.000
Dead+Wind 0 deg - No Ice	30.749	-0.048	-43.126	-3783.801	9.823	-7.312
Dead+Wind 30 deg - No Ice	30.749	20.360	-35.536	-3165.771	-1794.247	-15.544
Dead+Wind 45 deg - No Ice	30.749	28.576	-28.757	-2570.475	-2527.377	-17.976
Dead+Wind 60 deg - No Ice	30.749	34.718	-20.145	-1808.709	-3080.397	-19.068
Dead+Wind 90 deg - No Ice	30.749	40.805	0.048	-7.426	-3603.695	-18.485
Dead+Wind 120 deg - No Ice	30.749	37.150	21.604	1876.168	-3233.642	-14.087
Dead+Wind 135 deg - No Ice	30.749	28.644	28.825	2551.347	-2537.637	-7.717
Dead+Wind 150 deg - No Ice	30.749	20.444	35.583	3143.636	-1806.745	-2.955
Dead+Wind 180 deg - No Ice	30.749	0.048	40.372	3585.932	-4.445	7.255
Dead+Wind 210 deg - No Ice	30.749	-20.362	35.536	3136.489	1799.761	15.546
Dead+Wind 225 deg - No Ice	30.749	-28.577	28.757	2541.243	2532.913	17.988
Dead+Wind 240 deg - No Ice	30.749	-37.102	21.522	1863.798	3231.865	21.401
Dead+Wind 270 deg - No Ice	30.749	-40.805	-0.047	-21.694	3609.044	18.485
Dead+Wind 300 deg - No Ice	30.749	-34.765	-20.227	-1821.054	3092.885	11.814
Dead+Wind 315 deg - No Ice	30.749	-28.643	-28.825	-2580.550	2542.827	7.707
Dead+Wind 330 deg - No Ice	30.749	-20.443	-35.584	-3172.890	1811.967	2.962
Dead+Ice+Temp	51.144	0.000	0.000	-33.639	1.393	-0.000
Dead+Wind 0 deg+Ice+Temp	51.144	-0.037	-40.059	-3571.711	6.960	-6.502
Dead+Wind 30 deg+Ice+Temp	51.144	19.195	-33.457	-3020.844	-1705.774	-15.012
Dead+Wind 45 deg+Ice+Temp	51.144	26.999	-27.141	-2460.936	-2405.703	-17.701
Dead+Wind 60 deg+Ice+Temp	51.144	32.878	-19.061	-1740.833	-2936.390	-19.106
Dead+Wind 90 deg+Ice+Temp	51.144	38.454	0.038	-28.105	-3422.664	-18.759
Dead+Wind 120 deg+Ice+Temp	51.144	34.538	20.062	1740.071	-3040.889	-14.176
Dead+Wind 135 deg+Ice+Temp	51.144	27.052	27.193	2401.402	-2413.671	-8.495
Dead+Wind 150 deg+Ice+Temp	51.144	19.260	33.494	2958.977	-1715.475	-3.736
Dead+Wind 180 deg+Ice+Temp	51.144	0.037	38.185	3390.200	-4.115	6.515
Dead+Wind 210 deg+Ice+Temp	51.144	-19.196	33.457	2953.443	1708.720	15.014
Dead+Wind 225 deg+Ice+Temp	51.144	-27.000	27.141	2393.578	2408.662	17.705
Dead+Wind 240 deg+Ice+Temp	51.144	-34.501	19.998	1730.465	3038.178	20.678
Dead+Wind 270 deg+Ice+Temp	51.144	-38.454	-0.036	-39.150	3425.447	18.759
Dead+Wind 300 deg+Ice+Temp	51.144	-32.915	-19.124	-1750.387	2944.699	12.593
Dead+Wind 315 deg+Ice+Temp	51.144	-27.051	-27.193	-2468.733	2416.305	8.489
Dead+Wind 330 deg+Ice+Temp	51.144	-19.259	-33.494	-3026.357	1718.138	3.736
Dead+Wind 0 deg - Service	30.749	-0.017	-14.922	-1318.817	5.144	-2.530
Dead+Wind 30 deg - Service	30.749	7.045	-12.296	-1104.969	-619.123	-5.377

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 45 deg - Service	30.749	9.888	-9.951	-898.987	-872.807	-6.220
Dead+Wind 60 deg - Service	30.749	12.013	-6.971	-635.403	-1064.162	-6.599
Dead+Wind 90 deg - Service	30.749	14.119	0.017	-12.122	-1245.217	-6.400
Dead+Wind 120 deg - Service	30.749	12.855	7.475	639.653	-1117.154	-4.873
Dead+Wind 135 deg - Service	30.749	9.911	9.974	873.285	-876.319	-2.668
Dead+Wind 150 deg - Service	30.749	7.074	12.313	1078.239	-623.417	-1.019
Dead+Wind 180 deg - Service	30.749	0.017	13.970	1231.293	0.208	2.512
Dead+Wind 210 deg - Service	30.749	-7.045	12.296	1075.769	624.494	5.377
Dead+Wind 225 deg - Service	30.749	-9.888	9.951	869.792	878.179	6.222
Dead+Wind 240 deg - Service	30.749	-12.838	7.447	635.376	1120.036	7.404
Dead+Wind 270 deg - Service	30.749	-14.119	-0.016	-17.059	1250.567	6.400
Dead+Wind 300 deg - Service	30.749	-12.030	-6.999	-639.678	1071.980	4.088
Dead+Wind 315 deg - Service	30.749	-9.911	-9.974	-902.476	881.648	2.666
Dead+Wind 330 deg - Service	30.749	-7.074	-12.313	-1107.436	628.750	1.019

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	0.000	-30.749	0.000	-0.000	30.749	0.000	0.000%
2	-0.048	-30.749	-43.134	0.048	30.749	43.126	0.016%
3	20.365	-30.749	-35.543	-20.360	30.749	35.536	0.017%
4	28.582	-30.749	-28.763	-28.576	30.749	28.757	0.018%
5	34.725	-30.749	-20.149	-34.718	30.749	20.145	0.018%
6	40.813	-30.749	0.048	-40.805	30.749	-0.048	0.017%
7	37.157	-30.749	21.608	-37.150	30.749	-21.604	0.015%
8	28.650	-30.749	28.831	-28.644	30.749	-28.825	0.016%
9	20.448	-30.749	35.591	-20.444	30.749	-35.583	0.017%
10	0.048	-30.749	40.381	-0.048	30.749	-40.372	0.018%
11	-20.365	-30.749	35.543	20.362	30.749	-35.536	0.017%
12	-28.582	-30.749	28.763	28.577	30.749	-28.757	0.016%
13	-37.109	-30.749	21.526	37.102	30.749	-21.522	0.015%
14	-40.813	-30.749	-0.048	40.805	30.749	0.047	0.017%
15	-34.773	-30.749	-20.232	34.765	30.749	20.227	0.018%
16	-28.650	-30.749	-28.831	28.643	30.749	28.825	0.018%
17	-20.448	-30.749	-35.591	20.443	30.749	35.584	0.017%
18	0.000	-51.144	0.000	-0.000	51.144	-0.000	0.000%
19	-0.037	-51.144	-40.072	0.037	51.144	40.059	0.021%
20	19.202	-51.144	-33.469	-19.195	51.144	33.457	0.022%
21	27.009	-51.144	-27.151	-26.999	51.144	27.141	0.022%
22	32.890	-51.144	-19.068	-32.878	51.144	19.061	0.022%
23	38.468	-51.144	0.037	-38.454	51.144	-0.038	0.021%
24	34.549	-51.144	20.068	-34.538	51.144	-20.062	0.020%
25	27.061	-51.144	27.203	-27.052	51.144	-27.193	0.021%
26	19.266	-51.144	33.506	-19.260	51.144	-33.494	0.021%
27	0.037	-51.144	38.200	-0.037	51.144	-38.185	0.022%
28	-19.202	-51.144	33.469	19.196	51.144	-33.457	0.021%
29	-27.009	-51.144	27.151	27.000	51.144	-27.141	0.021%
30	-34.512	-51.144	20.004	34.501	51.144	-19.998	0.020%
31	-38.468	-51.144	-0.037	38.454	51.144	0.036	0.021%
32	-32.927	-51.144	-19.132	32.915	51.144	19.124	0.022%
33	-27.061	-51.144	-27.203	27.051	51.144	27.193	0.022%
34	-19.266	-51.144	-33.506	19.259	51.144	33.494	0.022%
35	-0.017	-30.749	-14.925	0.017	30.749	14.922	0.009%
36	7.047	-30.749	-12.299	-7.045	30.749	12.296	0.009%
37	9.890	-30.749	-9.953	-9.888	30.749	9.951	0.009%
38	12.016	-30.749	-6.972	-12.013	30.749	6.971	0.009%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
39	14.122	-30.749	0.017	-14.119	30.749	-0.017	0.009%
40	12.857	-30.749	7.477	-12.855	30.749	-7.475	0.009%
41	9.913	-30.749	9.976	-9.911	30.749	-9.974	0.009%
42	7.075	-30.749	12.315	-7.074	30.749	-12.313	0.009%
43	0.017	-30.749	13.973	-0.017	30.749	-13.970	0.009%
44	-7.047	-30.749	12.299	7.045	30.749	-12.296	0.009%
45	-9.890	-30.749	9.953	9.888	30.749	-9.951	0.009%
46	-12.841	-30.749	7.448	12.838	30.749	-7.447	0.009%
47	-14.122	-30.749	-0.017	14.119	30.749	0.016	0.009%
48	-12.032	-30.749	-7.001	12.030	30.749	6.999	0.009%
49	-9.913	-30.749	-9.976	9.911	30.749	9.974	0.009%
50	-7.075	-30.749	-12.315	7.074	30.749	12.313	0.009%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00017843	0.00035923
3	Yes	4	0.00019246	0.00038685
4	Yes	4	0.00020170	0.00040479
5	Yes	4	0.00020558	0.00041232
6	Yes	4	0.00019300	0.00038744
7	Yes	4	0.00017861	0.00035913
8	Yes	4	0.00018327	0.00036928
9	Yes	4	0.00019279	0.00038798
10	Yes	4	0.00020562	0.00041337
11	Yes	4	0.00019301	0.00038779
12	Yes	4	0.00018342	0.00036882
13	Yes	4	0.00017873	0.00035865
14	Yes	4	0.00019321	0.00038766
15	Yes	4	0.00020558	0.00041281
16	Yes	4	0.00020164	0.00040527
17	Yes	4	0.00019246	0.00038730
18	Yes	4	0.00000001	0.00006344
19	Yes	4	0.00032503	0.00062535
20	Yes	4	0.00033933	0.00065077
21	Yes	4	0.00034836	0.00066761
22	Yes	4	0.00035211	0.00067486
23	Yes	4	0.00033921	0.00065151
24	Yes	4	0.00032558	0.00062535
25	Yes	4	0.00032998	0.00063464
26	Yes	4	0.00033920	0.00065181
27	Yes	4	0.00035151	0.00067604
28	Yes	4	0.00033980	0.00065144
29	Yes	4	0.00033078	0.00063390
30	Yes	4	0.00032608	0.00062450
31	Yes	4	0.00033935	0.00065135
32	Yes	4	0.00035164	0.00067518
33	Yes	4	0.00034763	0.00066794
34	Yes	4	0.00033840	0.00065103
35	Yes	4	0.00000001	0.00037143
36	Yes	4	0.00000001	0.00038077
37	Yes	4	0.00000001	0.00038692
38	Yes	4	0.00000001	0.00038957
39	Yes	4	0.00000001	0.00038073

40	Yes	4	0.00000001	0.00037079
41	Yes	4	0.00000001	0.00037438
42	Yes	4	0.00000001	0.00038052
43	Yes	4	0.00000001	0.00038928
44	Yes	4	0.00000001	0.00038004
45	Yes	4	0.00000001	0.00037372
46	Yes	4	0.00000001	0.00037012
47	Yes	4	0.00000001	0.00038031
48	Yes	4	0.00000001	0.00038936
49	Yes	4	0.00000001	0.00038684
50	Yes	4	0.00000001	0.00038081

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	152 - 140	4.165	35	0.2337	0.0047
T2	140 - 135	3.571	35	0.2283	0.0074
T3	135 - 130	3.325	35	0.2242	0.0099
T4	130 - 125	3.088	35	0.2180	0.0112
T5	125 - 120	2.855	35	0.2098	0.0115
T6	120 - 100	2.630	35	0.1993	0.0117
T7	100 - 80	1.827	35	0.1696	0.0104
T8	80 - 73.3333	1.165	35	0.1272	0.0086
T9	73.3333 - 66.6667	0.981	35	0.1165	0.0078
T10	66.6667 - 60	0.816	35	0.1052	0.0070
T11	60 - 50	0.664	35	0.0932	0.0061
T12	50 - 40	0.470	35	0.0782	0.0051
T13	40 - 30	0.308	35	0.0625	0.0041
T14	30 - 20	0.181	35	0.0461	0.0031
T15	20 - 15	0.087	35	0.0294	0.0021
T16	15 - 10	0.049	35	0.0207	0.0015
T17	10 - 0	0.024	35	0.0118	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
162.00	20' 4-Bay Dipole	35	4.165	0.2337	0.0047	Inf
156.70	DB563K-CR	35	4.165	0.2337	0.0047	Inf
152.00	4' w/Radome	35	4.165	0.2337	0.0047	Inf
151.25	DB803KHE-YP	35	4.128	0.2334	0.0043	Inf
149.00	3' Sidearm	35	4.017	0.2326	0.0043	Inf
148.50	3' Sidearm	35	3.992	0.2325	0.0044	Inf
146.00	12'x2 1/2" STD Pipe Mount	35	3.868	0.2315	0.0050	949526
144.00	12' x 3" Dia Omni	35	3.769	0.2306	0.0060	692894
143.00	4'x3" Pipe Mount	35	3.719	0.2301	0.0063	528557
142.00	4'x4" Pipe Mount	35	3.670	0.2295	0.0066	355999
141.70	DB563K-CR	35	3.655	0.2294	0.0067	311557
140.00	4' w/Radome	35	3.571	0.2283	0.0074	142572
138.00	6' x 3" Dia Omni	35	3.472	0.2269	0.0083	65647
137.00	4' Side Mount Standoff (1)	35	3.423	0.2260	0.0089	51056
136.50	2' w/Radome	35	3.398	0.2256	0.0092	46474
135.00	4'x4" Pipe Mount	35	3.325	0.2242	0.0099	39509

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.50	3' Sidearm	35	3.253	0.2225	0.0104	39873
133.00	4' Side Mount Standoff (1)	35	3.229	0.2220	0.0106	41094
128.00	(2) DB980H90E-M	35	2.994	0.2151	0.0114	52555
122.00	DB254-A	35	2.719	0.2035	0.0116	32778
108.00	APX16DWV-16DWV-S-E-ACU w/ Mount	35	2.131	0.1812	0.0111	33828
101.00	2" Dia 10' Omni	35	1.864	0.1713	0.0105	37510
98.00	Valmont 13' Lightweight T-Frame	35	1.754	0.1659	0.0102	36831
95.50	3' Sidearm	35	1.665	0.1608	0.0100	35076
94.50	3' Sidearm	35	1.630	0.1586	0.0099	34327
89.50	3' Sidearm	35	1.460	0.1473	0.0095	31013
79.00	4' x 3" DIA Omni	35	1.136	0.1255	0.0085	26646
78.00	8' 2-Bay Dipole	35	1.108	0.1238	0.0084	26674
72.50	3' Sidearm	35	0.960	0.1152	0.0077	30090
72.00	Scala Yagi w/ Radome	35	0.947	0.1144	0.0077	30946
58.00	GPS	35	0.622	0.0900	0.0059	28352
57.00	2' Sidearm	35	0.601	0.0884	0.0058	29057
45.00	1.2M	35	0.385	0.0706	0.0046	38242
44.00	4'x4" Stand-off	35	0.369	0.0690	0.0045	37862

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	152 - 140	11.926	2	0.6674	0.0135
T2	140 - 135	10.228	2	0.6520	0.0292
T3	135 - 130	9.527	2	0.6404	0.0351
T4	130 - 125	8.847	2	0.6231	0.0373
T5	125 - 120	8.183	2	0.5999	0.0374
T6	120 - 100	7.539	2	0.5700	0.0369
T7	100 - 80	5.239	2	0.4852	0.0312
T8	80 - 73.3333	3.342	2	0.3643	0.0252
T9	73.3333 - 66.6667	2.816	2	0.3337	0.0227
T10	66.6667 - 60	2.342	2	0.3013	0.0202
T11	60 - 50	1.906	2	0.2671	0.0177
T12	50 - 40	1.349	2	0.2242	0.0148
T13	40 - 30	0.887	2	0.1792	0.0118
T14	30 - 20	0.520	2	0.1321	0.0091
T15	20 - 15	0.249	2	0.0841	0.0060
T16	15 - 10	0.141	2	0.0593	0.0044
T17	10 - 0	0.071	2	0.0339	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
162.00	20' 4-Bay Dipole	2	11.926	0.6674	0.0135	333631
156.70	DB563K-CR	2	11.926	0.6674	0.0135	333631
152.00	4' w/Radome	2	11.926	0.6674	0.0135	333631
151.25	DB803KHE-YP	2	11.820	0.6667	0.0124	333631

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	3' Sidearm	2	11.501	0.6643	0.0157	333631
148.50	3' Sidearm	2	11.430	0.6638	0.0164	333631
146.00	12'x2 1/2" STD Pipe Mount	2	11.077	0.6610	0.0208	278026
144.00	12' x 3" Dia Omni	2	10.794	0.6584	0.0241	204933
143.00	4'x3" Pipe Mount	2	10.652	0.6569	0.0256	164838
142.00	4'x4" Pipe Mount	2	10.511	0.6554	0.0270	121057
141.70	DB563K-CR	2	10.469	0.6549	0.0274	108830
140.00	4' w/Radome	2	10.228	0.6520	0.0292	50849
138.00	6' x 3" Dia Omni	2	9.946	0.6479	0.0318	23599
137.00	4' Side Mount Standoff (1)	2	9.805	0.6457	0.0330	18231
136.50	2' w/Radome	2	9.735	0.6444	0.0336	16558
135.00	4'x4" Pipe Mount	2	9.527	0.6404	0.0351	14027
133.50	3' Sidearm	2	9.321	0.6358	0.0361	14151
133.00	4' Side Mount Standoff (1)	2	9.252	0.6342	0.0364	14590
128.00	(2) DB980H90E-M	2	8.579	0.6148	0.0375	18803
122.00	DB254-A	2	7.793	0.5820	0.0371	11542
108.00	APX16DWV-16DWV-S-E-ACU w/ Mount	2	6.110	0.5185	0.0338	11859
101.00	2" Dia 10' Omni	2	5.345	0.4901	0.0315	13182
98.00	Valmont 13' Lightweight T-Frame	2	5.031	0.4747	0.0306	12939
95.50	3' Sidearm	2	4.776	0.4601	0.0298	12310
94.50	3' Sidearm	2	4.675	0.4540	0.0296	12042
89.50	3' Sidearm	2	4.189	0.4217	0.0281	10858
79.00	4' x 3" DIA Omni	2	3.260	0.3593	0.0248	9319
78.00	8' 2-Bay Dipole	2	3.178	0.3546	0.0244	9336
72.50	3' Sidearm	2	2.754	0.3299	0.0224	10556
72.00	Scala Yagi w/ Radome	2	2.718	0.3276	0.0222	10851
58.00	GPS	2	1.786	0.2578	0.0171	9923
57.00	2' Sidearm	2	1.727	0.2534	0.0167	10172
45.00	1.2M	2	1.107	0.2023	0.0133	13326
44.00	4'x4" Stand-off	2	1.061	0.1977	0.0130	13180

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	152	Diagonal	A325N	0.500	1	1.915	2.719	0.704 ✔	1.333	Member Bearing
		Top Girt	A325N	0.500	1	0.287	2.719	0.106 ✔	1.333	Member Bearing
T2	140	Leg	A325N	0.625	4	1.424	13.435	0.106 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.500	1	2.776	4.078	0.681 ✔	1.333	Member Bearing
		Top Girt	A325N	0.500	1	0.144	2.719	0.053 ✔	1.333	Member Bearing
T3	135	Diagonal	A325N	0.500	1	2.604	4.078	0.639 ✔	1.333	Member Bearing
T4	130	Diagonal	A325N	0.500	1	3.479	4.123	0.844 ✔	1.333	Bolt Shear
T5	125	Diagonal	A325N	0.500	1	3.945	4.078	0.967 ✔	1.333	Member Bearing
T6	120	Leg	A325N	0.625	4	7.682	13.499	0.569 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.500	1	4.607	4.123	1.117 ✔	1.333	Bolt Shear
T7	100	Leg	A325N	0.750	4	13.969	19.430	0.719 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.500	1	6.897	5.438	1.268 ✔	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Secondary Horizontal	A325N	0.500	2	0.768	4.123	0.186 ✔	1.333	Bolt Shear
T8	80	Leg	A325N	0.875	4	21.837	26.458	0.825 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.500	1	6.790	5.438	1.249 ✔	1.333	Member Bearing
T9	73.3333	Diagonal	A325X	0.500	1	7.190	5.890	1.221 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.500	2	0.965	4.123	0.234 ✔	1.333	Bolt Shear
T10	66.6667	Diagonal	A325X	0.500	1	7.191	5.890	1.221 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.500	2	1.063	4.123	0.258 ✔	1.333	Bolt Shear
T11	60	Leg	A325N	0.875	4	29.567	26.458	1.117 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	8.153	8.496	0.960 ✔	1.333	Member Bearing
T12	50	Diagonal	A325X	0.625	1	8.601	8.496	1.012 ✔	1.333	Member Bearing
		Secondary Horizontal	A325N	0.500	2	1.317	4.123	0.320 ✔	1.333	Bolt Shear
T13	40	Leg	A325N	1.000	4	36.392	34.557	1.053 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	9.333	9.204	1.014 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.500	2	1.454	4.123	0.353 ✔	1.333	Bolt Shear
T14	30	Diagonal	A325X	0.625	1	9.038	8.496	1.064 ✔	1.333	Member Bearing
		Horizontal	A325N	0.500	2	1.584	4.123	0.384 ✔	1.333	Bolt Shear
T15	20	Leg	A325N	1.000	4	42.540	34.529	1.232 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	8.854	6.797	1.303 ✔	1.333	Member Bearing
T16	15	Diagonal	A325X	0.625	1	8.416	6.797	1.238 ✔	1.333	Member Bearing
		Horizontal	A325N	0.625	1	3.448	6.443	0.535 ✔	1.333	Bolt Shear
T17	10	Diagonal	A325X	0.625	1	10.451	8.496	1.230 ✔	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	152 - 140	ROHN 2 STD	12.00	3.94	60.1 K=1.00	22.695	1.075	-7.018	24.386	0.288 ✔
T2	140 - 135	ROHN 2.5 STD	5.01	4.84	61.3 K=1.00	22.491	1.704	-12.229	38.325	0.319 ✔
T3	135 - 130	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.704	-14.620	37.698	0.388 ✔
T4	130 - 125	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.704	-20.859	37.698	0.553 ✔
T5	125 - 120	ROHN 2.5 STD	5.01	5.01	63.4	22.122	1.704	-27.981	37.698	0.742

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
					K=1.00					✔
T6	120 - 100	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	20.03	6.68	67.8 K=1.00	21.334	3.413	-53.902	72.823	0.740 ✔
T7	100 - 80	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	20.03	3.44	35.0 K=1.00	26.516	3.413	-88.559	90.509	0.978 ✔
T8	80 - 73.3333	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	6.68	55.1 K=1.00	23.542	5.275	-100.326	124.180	0.808 ✔
T9	73.3333 - 66.6667	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	3.42	28.2 K=1.00	27.368	5.275	-111.296	144.363	0.771 ✔
T10	66.6667 - 60	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	3.42	28.2 K=1.00	27.372	5.275	-122.542	144.385	0.849 ✔
T11	60 - 50	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	10.02	69.4 K=1.00	21.056	6.640	-135.919	139.821	0.972 ✔
T12	50 - 40	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	5.16	35.7 K=1.00	26.414	6.640	-151.941	175.395	0.866 ✔
T13	40 - 30	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	5.15	35.7 K=1.00	26.422	6.640	-167.671	175.450	0.956 ✔
T14	30 - 20	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	2.50	17.3 K=1.00	28.573	6.640	-182.598	189.733	0.962 ✔
T15	20 - 15	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	5.01	2.50	14.2 K=1.00	28.881	6.555	-197.172	189.312	1.042 ✔
T16	15 - 10	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	5.01	5.01	28.4 K=1.00	27.353	6.555	-198.809	179.298	1.109 ✔
T17	10 - 0	Rohn 5 STD w/ (6) 1.5"x0.5" Bars	10.02	10.02	56.9 K=1.00	23.237	9.761	-213.234	226.818	0.940 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	152 - 140	L1 1/2x1 1/2x1/8	7.65	3.61	146.2 K=1.00	6.982	0.359	-1.935	2.509	0.771 ✔
T2	140 - 135	L1 1/2x1 1/2x3/16	8.35	4.07	166.7 K=1.00	5.376	0.527	-2.788	2.835	0.983 ✔
T3	135 - 130	L1 1/2x1 1/2x3/16	8.86	4.33	177.2 K=1.00	4.755	0.527	-2.612	2.508	1.041 ✔
T4	130 - 125	L1 1/2x1 1/2x1/4	9.28	4.54	186.6 K=1.00	4.289	0.688	-3.479	2.949	1.180 ✔
T5	125 - 120	L1 3/4x1 3/4x3/16	9.70	4.75	166.1 K=1.00	5.415	0.621	-3.948	3.364	1.174 ✔
T6	120 - 100	L2x2x1/4	12.21	5.94	182.3 K=1.00	4.492	0.938	-4.607	4.213	1.093 ✔
T7	100 - 80	L2 1/2x2 1/2x1/4	13.96	6.82	166.7 K=1.00	5.372	1.190	-6.830	6.392	1.069 ✔
T8	80 - 73.3333	L2 1/2x2 1/2x1/4	14.57	7.10	173.6 K=1.00	4.958	1.190	-6.848	5.900	1.161 ✔
T9	73.3333 - 66.6667	L2 1/2x2 1/2x5/16	15.19	7.41	181.9 K=1.00	4.511	1.460	-7.190	6.586	1.092 ✔
T10	66.6667 - 60	L2 1/2x2 1/2x5/16	15.82	7.73	189.7	4.150	1.460	-7.178	6.059	1.185

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
					K=1.00					✔
T11	60 - 50	L3x3x5/16	18.20	8.94	182.2 K=1.00	4.501	1.780	-8.503	8.011	1.061 ✔
T12	50 - 40	L3x3x5/16	19.04	9.36	190.8 K=1.00	4.104	1.780	-8.569	7.305	1.173 ✔
T13	40 - 30	L3x3x3/8	19.90	9.79	200.2 K=1.00	3.726	2.110	-9.333	7.863	1.187 ✔
		KL/R > 200 (C) - 177								
T14	30 - 20	L3x3x5/16	10.64	10.08	131.2 K=1.00	8.681	1.780	-9.591	15.452	0.621 ✔
T15	20 - 15	L3 1/2x3 1/2x1/4	10.64	10.08	115.5 K=1.04	10.922	1.690	-9.619	18.459	0.521 ✔
T16	15 - 10	L3 1/2x3 1/2x1/4	11.08	10.49	181.3 K=1.00	4.542	1.690	-9.671	7.676	1.260 ✔
T17	10 - 0	L3 1/2x3 1/2x5/16	22.61	11.11	193.2 K=1.00	4.000	2.090	-9.509	8.360	1.137 ✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T14	30 - 20	L3x3x3/16	18.23	17.34	182.5 K=0.82	4.485	1.090	-3.167	4.888	0.648 ✔
T16	15 - 10	L2.875x2.875x0.25	19.26	18.38	247.8 K=1.00	2.432	1.375	-3.448	3.343	1.031 ✔
		KL/R > 200 (C) - 233								

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T7	100 - 80	L3x3x3/16	12.25	11.49	191.9 K=0.83	4.054	1.090	-1.536	4.419	0.348 ✔
T9	73.3333 - 66.6667	L3x3x3/16	13.64	12.82	210.2 K=0.81	3.379	1.090	-1.930	3.683	0.524 ✔
T10	66.6667 - 60	L3x3x3/16	14.34	13.52	219.7 K=0.81	3.093	1.090	-2.125	3.371	0.630 ✔
T12	50 - 40	L3x3x3/16	16.18	15.29	243.6 K=0.79	2.518	1.090	-2.635	2.744	0.960 ✔
T13	40 - 30	L3x3x3/16	17.18	16.29	256.9 K=0.78	2.263	1.090	-2.908	2.467	1.179 ✔
		KL/R > 250 (C) - 179								

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	152 - 140	L2x2x1/8	6.52	6.11	184.6 K=1.00	4.383	0.484	-0.284	2.123	0.134 ✔
T2	140 - 135	L2x2x1/8	6.57	6.12	184.8 K=1.00	4.372	0.484	-0.157	2.117	0.074 ✔

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T14	30 - 20	L2x2x1/4	4.56	4.28	131.3 K=1.00	8.665	0.938	-3.167	8.127	0.390 ✔
T15	20 - 15	L2x2x1/4	4.82	4.50	138.0 K=1.00	7.843	0.938	-3.419	7.357	0.465 ✔

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T14	30 - 20	L2x2x1/4	5.32	4.99	153.3 K=1.00	6.355	0.938	-1.847	5.961	0.310 ✔
T15	20 - 15	L2x2x1/4	5.53	5.18	158.9 K=1.00	5.915	0.938	-1.985	5.549	0.358 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	152 - 140	ROHN 2 STD	12.00	3.94	60.1	30.000	1.075	5.558	32.236	0.172 ✔
T2	140 - 135	ROHN 2.5 STD	5.01	4.84	61.3	30.000	1.704	10.129	51.121	0.198 ✔
T3	135 - 130	ROHN 2.5 STD	5.01	5.01	63.4	30.000	1.704	12.214	51.121	0.239 ✔
T4	130 - 125	ROHN 2.5 STD	5.01	5.01	63.4	30.000	1.704	17.210	51.121	0.337 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T5	125 - 120	ROHN 2.5 STD	5.01	5.01	63.4	30.000	1.704	23.212	51.121	0.454 ✔
T6	120 - 100	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	20.03	6.68	67.8	30.000	3.413	47.129	102.402	0.460 ✔
T7	100 - 80	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	20.03	3.44	35.0	30.000	3.413	76.836	102.402	0.750 ✔
T8	80 - 73.3333	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	6.68	55.1	30.000	5.275	87.346	158.247	0.552 ✔
T9	73.3333 - 66.6667	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	3.42	28.2	30.000	5.275	96.963	158.247	0.613 ✔
T10	66.6667 - 60	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	6.68	3.42	28.2	30.000	5.275	106.572	158.247	0.673 ✔
T11	60 - 50	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	10.02	69.4	30.000	6.640	118.266	199.209	0.594 ✔
T12	50 - 40	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	5.16	35.7	30.000	6.640	132.090	199.209	0.663 ✔
T13	40 - 30	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	5.15	35.7	30.000	6.640	145.569	199.209	0.731 ✔
T14	30 - 20	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	10.02	2.50	17.3	30.000	6.640	157.929	199.209	0.793 ✔
T15	20 - 15	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	5.01	2.50	14.2	30.000	6.555	170.161	196.650	0.865 ✔
T16	15 - 10	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	5.01	5.01	28.4	30.000	6.555	171.068	196.650	0.870 ✔
T17	10 - 0	Rohn 5 STD w/ (6) 1.5"x0.5" Bars	10.02	10.02	56.9	30.000	9.761	183.278	292.833	0.626 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	152 - 140	L1 1/2x1 1/2x1/8	7.65	3.61	95.8	29.000	0.211	1.915	6.117	0.313 ✔
T2	140 - 135	L1 1/2x1 1/2x3/16	8.35	4.07	109.8	29.000	0.308	2.776	8.921	0.311 ✔
T3	135 - 130	L1 1/2x1 1/2x3/16	8.86	4.33	116.6	29.000	0.308	2.604	8.921	0.292 ✔
T4	130 - 125	L1 1/2x1 1/2x1/4	9.28	4.54	124.2	29.000	0.398	3.424	11.555	0.296 ✔
T5	125 - 120	L1 3/4x1 3/4x3/16	9.70	4.75	108.5	29.000	0.378	3.945	10.960	0.360 ✔
T6	120 - 100	L2x2x1/4	12.21	5.94	119.1	29.000	0.586	4.531	17.003	0.266 ✔
T7	100 - 80	L2 1/2x2 1/2x1/4	13.37	6.53	103.5	29.000	0.775	6.897	22.484	0.307 ✔
T8	80 - 73.3333	L2 1/2x2 1/2x1/4	14.57	7.10	112.4	29.000	0.775	6.790	22.484	0.302 ✔
T9	73.3333 - 66.6667	L2 1/2x2 1/2x5/16	15.19	7.41	118.6	29.000	0.949	7.057	27.507	0.257 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T10	66.6667 - 60	L2 1/2x2 1/2x5/16	15.82	7.73	123.5	29.000	0.949	7.191	27.507	0.261 ✔
T11	60 - 50	L3x3x5/16	18.20	8.94	117.9	29.000	1.159	8.153	33.617	0.243 ✔
T12	50 - 40	L3x3x5/16	19.04	9.36	123.4	29.000	1.159	8.601	33.617	0.256 ✔
T13	40 - 30	L3x3x3/8	19.90	9.79	130.3	29.000	1.372	8.824	39.775	0.222 ✔
T14	30 - 20	L3x3x5/16	10.64	10.08	134.3	29.000	1.159	9.038	33.617	0.269 ✔
T15	20 - 15	L3 1/2x3 1/2x1/4	10.64	10.08	113.6	29.000	1.127	8.854	32.679	0.271 ✔
T16	15 - 10	L3 1/2x3 1/2x1/4	11.08	10.49	118.1	29.000	1.127	8.416	32.679	0.258 ✔
T17	10 - 0	L3 1/2x3 1/2x5/16	22.61	11.11	124.8	29.000	1.392	10.451	40.360	0.259 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T14	30 - 20	L3x3x3/16	18.23	17.34	225.8	29.000	0.730	3.167	21.159	0.150 ✔
T16	15 - 10	L2.875x2.875x0.25	19.26	18.38	251.1	29.000	0.891	3.448	25.828	0.134 ✔

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T7	100 - 80	L3x3x3/16	12.25	11.49	151.1	29.000	0.730	1.536	21.159	0.073 ✔
T9	73.3333 - 66.6667	L3x3x3/16	13.64	12.82	168.1	29.000	0.730	1.930	21.159	0.091 ✔
T10	66.6667 - 60	L3x3x3/16	14.34	13.52	177.0	29.000	0.730	2.125	21.159	0.100 ✔
T12	50 - 40	L3x3x3/16	16.18	15.29	199.6	29.000	0.730	2.635	21.159	0.125 ✔
T13	40 - 30	L3x3x3/16	17.18	16.29	212.4	29.000	0.730	2.908	21.159	0.137 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	152 - 140	L2x2x1/8	6.52	6.11	121.2	29.000	0.305	0.287	8.836	0.033 ✔
T2	140 - 135	L2x2x1/8	6.57	6.12	121.3	29.000	0.305	0.144	8.836	0.016 ✔

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T14	30 - 20	L2x2x1/4	4.56	4.28	84.3	21.600	0.938	3.167	20.261	0.156 ✔
T15	20 - 15	L2x2x1/4	4.82	4.50	88.6	21.600	0.938	3.419	20.261	0.169 ✔

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T14	30 - 20	L2x2x1/4	5.32	4.99	98.4	21.600	0.938	1.847	20.261	0.091 ✔
T15	20 - 15	L2x2x1/4	5.53	5.18	102.0	21.600	0.938	1.985	20.261	0.098 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	152 - 140	Leg	ROHN 2 STD	3	-7.018	32.507	21.6	Pass
T2	140 - 135	Leg	ROHN 2.5 STD	27	-12.229	51.088	23.9	Pass
T3	135 - 130	Leg	ROHN 2.5 STD	39	-14.620	50.251	29.1	Pass
T4	130 - 125	Leg	ROHN 2.5 STD	48	-20.859	50.251	41.5	Pass
T5	125 - 120	Leg	ROHN 2.5 STD	57	-27.981	50.251	55.7	Pass
T6	120 - 100	Leg	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	66	-53.902	97.073	55.5	Pass
T7	100 - 80	Leg	Rohn 2.5 X-Str w/ (3) 1.5"x0.25" Bars	87	-88.559	120.648	73.4	Pass
T8	80 - 73.3333	Leg	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	117	-100.326	165.532	60.6 61.9 (b)	Pass
T9	73.3333 - 66.6667	Leg	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	126	-111.296	192.436	57.8	Pass
T10	66.6667 - 60	Leg	Rohn 3 X-Str w/ (3) 1.5"x0.5" Bars	138	-122.542	192.465	63.7	Pass
T11	60 - 50	Leg	Rohn 4 X-Str w/ (3) 1.5"x0.5"	150	-135.919	186.381	72.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
			Bars				83.8 (b)	
T12	50 - 40	Leg	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	159	-151.941	233.802	65.0	Pass
T13	40 - 30	Leg	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	171	-167.671	233.875	71.7	Pass
							79.0 (b)	
T14	30 - 20	Leg	Rohn 4 X-Str w/ (3) 1.5"x0.5" Bars	183	-182.598	252.914	72.2	Pass
T15	20 - 15	Leg	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	225	-197.172	252.353	78.1	Pass
							92.4 (b)	
T16	15 - 10	Leg	Rohn 5 STD w/ (3) 1.5"x0.5" Bars	249	-198.809	239.004	83.2	Pass
T17	10 - 0	Leg	Rohn 5 STD w/ (6) 1.5"x0.5" Bars	258	-213.234	302.348	70.5	Pass
T1	152 - 140	Diagonal	L1 1/2x1 1/2x1/8	7	-1.935	3.345	57.8	Pass
T2	140 - 135	Diagonal	L1 1/2x1 1/2x3/16	31	-2.788	3.779	73.8	Pass
T3	135 - 130	Diagonal	L1 1/2x1 1/2x3/16	40	-2.612	3.343	78.1	Pass
T4	130 - 125	Diagonal	L1 1/2x1 1/2x1/4	49	-3.479	3.931	88.5	Pass
T5	125 - 120	Diagonal	L1 3/4x1 3/4x3/16	58	-3.948	4.484	88.1	Pass
T6	120 - 100	Diagonal	L2x2x1/4	72	-4.607	5.616	82.0	Pass
							83.8 (b)	
T7	100 - 80	Diagonal	L2 1/2x2 1/2x1/4	93	-6.830	8.521	80.2	Pass
							95.2 (b)	
T8	80 - 73.3333	Diagonal	L2 1/2x2 1/2x1/4	123	-6.848	7.864	87.1	Pass
							93.7 (b)	
T9	73.3333 - 66.6667	Diagonal	L2 1/2x2 1/2x5/16	132	-7.190	8.780	81.9	Pass
							91.6 (b)	
T10	66.6667 - 60	Diagonal	L2 1/2x2 1/2x5/16	144	-7.178	8.077	88.9	Pass
							91.6 (b)	
T11	60 - 50	Diagonal	L3x3x5/16	156	-8.503	10.679	79.6	Pass
T12	50 - 40	Diagonal	L3x3x5/16	165	-8.569	9.738	88.0	Pass
T13	40 - 30	Diagonal	L3x3x3/8	177	-9.333	10.481	89.0	Pass
T14	30 - 20	Diagonal	L3x3x5/16	202	-9.591	20.597	46.6	Pass
							79.8 (b)	
T15	20 - 15	Diagonal	L3 1/2x3 1/2x1/4	241	-9.619	24.606	39.1	Pass
							97.7 (b)	
T16	15 - 10	Diagonal	L3 1/2x3 1/2x1/4	255	-9.671	10.232	94.5	Pass
T17	10 - 0	Diagonal	L3 1/2x3 1/2x5/16	264	-9.509	11.143	85.3	Pass
							92.3 (b)	
T14	30 - 20	Horizontal	L3x3x3/16	191	-3.167	6.516	48.6	Pass
T16	15 - 10	Horizontal	L2.875x2.875x0.25	240	-3.448	4.457	77.4	Pass
T7	100 - 80	Secondary Horizontal	L3x3x3/16	95	-1.536	5.891	26.1	Pass
T9	73.3333 - 66.6667	Secondary Horizontal	L3x3x3/16	135	-1.930	4.909	39.3	Pass
T10	66.6667 - 60	Secondary Horizontal	L3x3x3/16	146	-2.125	4.494	47.3	Pass
T12	50 - 40	Secondary Horizontal	L3x3x3/16	167	-2.635	3.658	72.0	Pass
T13	40 - 30	Secondary Horizontal	L3x3x3/16	179	-2.908	3.288	88.4	Pass
T1	152 - 140	Top Girt	L2x2x1/8	4	-0.284	2.830	10.0	Pass
T2	140 - 135	Top Girt	L2x2x1/8	30	-0.157	2.823	5.6	Pass
T14	30 - 20	Redund Horz 1 Bracing	L2x2x1/4	200	-3.167	10.834	29.2	Pass
T15	20 - 15	Redund Horz 1 Bracing	L2x2x1/4	238	-3.419	9.807	34.9	Pass
T14	30 - 20	Redund Diag 1 Bracing	L2x2x1/4	216	-1.847	7.946	23.2	Pass
T15	20 - 15	Redund Diag 1 Bracing	L2x2x1/4	239	-1.985	7.396	26.8	Pass
							Summary	
						Leg (T15)	92.4	Pass
						Diagonal (T15)	97.7	Pass
						Horizontal	77.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						(T16)		
						Secondary Horizontal (T13)	88.4	Pass
						Top Girt (T1)	10.0	Pass
						Redund Horz 1 Bracing (T15)	34.9	Pass
						Redund Diag 1 Bracing (T15)	26.8	Pass
						Bolt Checks	97.7	Pass
						RATING =	**97.7**	**Pass**

Program Version 6.1.3.1 - 3/21/2014 File:C:/Users/Michael_Dalickas/Desktop/VZW-### and TWS-###_Stamford_CT/ERI/150'_ROHN_SSV_Lattice_Stamford_CT_w_Mods.eri

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Max Corner Reactions:

Uplift:	Uplift := 189·kips	*user input*
Shear:	Shear := 26·kips	*user input*
Compression:	Compression := 220·kips	*user input*

Anchor Bolt Data:

Use ASTM A-193 GR B7/ASTM A-320 GR L7

Number of Anchor Bolts = N	N := 4	*user input*	
Bolt Ultimate Strength:	F_u := 125·ksi	*user input*	
Bolt Yield Strength:	Fy := 105·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.0in	*user input*	
Threads per Inch:	n := 8.0	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 0.785 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 0.606 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) \qquad AllowableTension = 43.2 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333 \cdot (0.60 \cdot A_n \cdot Fy) \qquad F_{net.area} = 50.9 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 47.3 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.93$$

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

Condition1 = "OK"

Check Anchor Bolt Area:

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

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 2.3 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 0.8 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 2.4 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.96$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.34$$

Condition3 = "OK"

FOUNDATION EVALUATION

FOUNDATION ANALYSIS

Input Data

Maximum Pier Reactions:

Compression:	$C_t := 220 \cdot kips$	*user input*
Uplift:	$U_t := 189 \cdot kips$	*user input*

Foundation Dimensions:

Drilled Caisson Length:	$C_{Length} := 21.0 \cdot ft$	*user input*
Diameter of Pier:	$d_p := 4.5ft$	*user input*
Extension of Pier Above Grade:	$L_{pag} := 0.5ft$	*user input*
Conc Pad Length:	$Pad_{Length} := 5.0ft$	*user input*
Conc Pad Width:	$Pad_{Width} := 6ft$	*user input*
Conc Pad Depth:	$Pad_{Depth} := 5.0ft$	*user input*

Note: Above concrete pad dimensions based on foundation reinforcement design by Tectonic Engineering P.C; for AT&T Wireless, dated 04/23/02.

Material Properties:

Unit Weight of Concrete:	$\gamma c := 150pcf$	*user input*
Unit Weight of Water:	$\gamma w := 62.4pcf$	*user input*
Unit Weight of Soil:	$\gamma s := 120pcf$	*user input*
Allowable Soil Bearing Capacity (Allowable Bearing Pressure at Depth 21')	$q_s := 10 \cdot ksf$	*user input*
Water Table Below Grade:	$Wd := 8 \cdot ft$	*user input*
Average Allowable Shear:	$fl := 410 \cdot psf$	*user input*
Depth Neglected for Skin Friction at Top:	$Depthunbond := 0.5 \cdot ft$	*user input*
Assumed Allowable Soil Bearing Capacity For Conc Pad:	$q_u := 5ksf$	*user input*

Loading:

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

$TotalDownLoad = 270.1 \cdot kips$

$PadWeight := Pad_{Length} \cdot Pad_{Width} \cdot Pad_{Depth} \cdot \gamma c$ $\quad PadWeight = 22.5 \cdot kips$

$$PierWeight := \pi \cdot \frac{d_p^{\,2}}{4} \cdot \left[\left(Wd + L_{pag} \right) \cdot \gamma c + \left(C_{Length} - Wd - L_{pag} \right) \cdot (\gamma c - \gamma w) \right]$$ $PierWeight = 37.7 \cdot kips$

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

$SoilShear = 115.9 \cdot kips$

Compression Capacity:

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

$TotalDownLoadCapacity = 425.0 \cdot kips$

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

$CheckDownLoadCapacity = "Okay"$

Tension Capacity:

$TotalUpLiftCapacity := SoilShear + PierWeight + PadWeight$

$TotalUpLiftCapacity = 176.1 \cdot kips$

Required Safety Factor: $Fs_{reqd} := 2.0$

$$CheckUpLiftCapacity := if\left[\left(\frac{TotalUpLiftCapacity}{U_t}\right) \geq 2.0, "Okay", "No Good"\right]$$

$CheckUpLiftCapacity = "No Good"$

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

$SafetyFactor_{provided} = 0.93$

$AdditionalUplift := 2 \cdot U_t - TotalUpLiftCapacity$

$AdditionalUplift = 201.9 \cdot kip$

Include the use of (1) Rock Anchor (Williams Form Engineering Corp.) with 150ksi All-Threaded Anchor Bar (2 1/4" diameter) and Concrete Grouting at each caisson anchor. (See following support calculations)

Check Cone Failure:

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

$ConeFailureCapacity = 511.12 \cdot kips$

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

$CheckConeFailureCapacity = "Okay"$

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

$ConeSafetyFactor_{provided} = 2.70$

URS

Job Stamford, CT | Project No. | Page ___ of ___
Description MOD Foundation Design | Computed by MCD | Date 7/2014 | Sheet ___ of ___
Checked by | Date

Reference

- Consider factored uplift for applications not involving allowable stress design:

202 K.IP x 1.4 = 283 K.IP

- Determine Anchor rod:
  - Page 18 (Williams Form Engineering Corp.)

Use 2 1/4"
(Yield) $P_n = F_y \times A_g = 128\ KSI \times 4.08\ in^2 \times 0.9 = 470\ K.IP$ (OK)
(Rupture) $P_n = F_u \times A_e = 150\ KSI \times (4.08\ in^2 - (0.2 \times 4.08\ in^2)) \times 0.75 = 367.2\ K.IP$ (OK)

Check 1 3/4"
(Yield) $P_n = F_y \times A_g = 128 \times 2.60\ in^2 \times 0.9 = 299.52\ K.IP$ (OK)
(Rupture) $P_n = F_u \times A_e = 150\ KSI \times (2.60\ in^2 - (0.2 \times 2.60\ in^2)) \times 0.75 = 234\ K.IP$ (NG)

- Determine Anchor Length:
  - Page 10 & 11 (Williams Form Engineering Corp.) "Free Stress Length"

U = 613 K.IP → 613 K.IP x 0.5 = 306.5 K.IP > 283 K.IP (OK)
F.S. = 0.5

V x Y (See attached spread sheet)
Note: "S" will be ignored for conservative design

297 K.IP > 283 K.IP (OK) ∴ "Free-Stress Length" = 39 ft below grade

"Rock Anchor Length"

$$L_b = \frac{P}{\pi (D)(T_w)}$$

T_w = 300 PSI (Assumed soil/rock conditions of Shist & Gneiss are similar to Dolomitic Limestone (Pg 11 - Williams)

$L_b = \frac{283\ K.IP \times 1000\ LB/K.IP}{\pi (8.in)(75\ PSI)} = 12.5\ ft$ (min) bond Length

39 ft + 12.5 ft = 51.5 ft below grade (Min).

1/3	Pi	Area	Ht	U. WT	H2O Wt.	lb/kip	Kips	
0.333333	3.141593	161.6581	8	120	0	1000	162.5164	
0.333333	3.141593	89.7058	5.5	120	62.4	1000	29.7601	
0.333333	3.141593	94.1803	7.5	130	62.4	1000	50.00307	
0.333333	3.141593	28.5788	3	140	62.4	1000	6.967157	
0.333333	3.141593	36.0844	5	160	62.4	1000	18.4403	
0.333333	3.141593	28.8675	10	160	62.4	1000	29.50446	(rock embedment)
			39				297.1915	288.26 CAPACITY NEEDED

URS

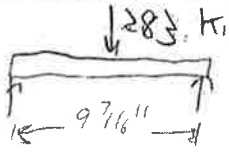
Job Stamford, CT | Project No. | Page ____ of ____
Description Foundation Design | Computed by MCD | Date 7/2014 | Sheet ____ of ____
Checked by | Date | Reference

- Consider Anchor bolts attached to caisson:
  See Attached calculations Spreasheet using Hilti 1¼" Diameter HAS-E super Rod (Reference Pages 154-162; Section 4.2.1)

  * Use 12 bolts Spaced 12" apart

  Design capacity ≈ 77%

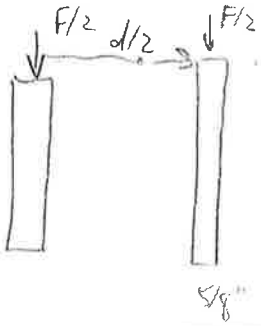
- Consider Anchor plate thickness:
  Steel = 50 ksi



$f = \frac{M}{S} \rightarrow S = \frac{M}{f} = \frac{b \cdot d^2}{3} \Rightarrow d_{min} = \sqrt{\frac{3 \times \frac{PL}{4}}{f \cdot b}}$

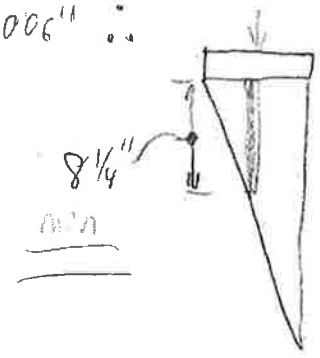
$= \sqrt{\frac{3 \times \frac{(283 \text{ kip})(9\frac{7}{16}")}{4}}{50 \text{ ksi} \times 9\frac{7}{16}"}} = 2.06 \text{ in} \approx 2\frac{1}{16}" (t)$

- Consider min material for gusset plate Supports:



$d_{min} = \sqrt{\frac{3 \times F \times d}{f b}} = \sqrt{\frac{3 \times \frac{(283 \text{ kip})}{2}(9\frac{7}{16}"/2)}{50 \text{ ksi} \times \frac{5}{8}}}$

$= 8.006" \therefore$



- Consider connection plate thickness

F = 283 kip
e = 10 in
M = 2830 kip·in

$f_{steel} = \frac{M}{S}$

$f_{steel} = \frac{M}{\frac{bd^2}{3}} \rightarrow b = \frac{3 \times M}{d^2 \times f_{steel}} = \frac{(3)(2830 \text{ kip·in})}{(\frac{20}{2} \text{ in})^2 \times 50 \text{ ksi}}$

$b = \frac{0.139 \text{ in}}{0.75} = 0.185 \text{ in} < \frac{5}{8}" (ok)$

Vert Force	202	kip
Eccentricity	10	in
Moment	2020	in*kip

Number of Rows	6
Number of Columns	2
Number of Bolts	12
Bolt Spacing	12 in

Row Number	1	2	3	4	5	6
Number of Bolts	2	2	2	2	2	2
Dist from Center	30	18	6	-6	-18	-30
A * d^2	1800	648	72	72	648	1800

I	5040	in^2
S	168	in

Shear per Bolt	16.83333	kip
Tension per Bolt	12.0	kip

Use	Hilti HVA Capsule Achesive Anchoring System Hilti HAS Rod

Diameter	1.25	in
Embedment	18	in
Spacing	12	in

For 3000 ksi concrete (4.2.1, p. 154)

Allow Tension	33728	lb
Allow Shear	85627.5	lb

Reduction Factors (4.2.1, p. 162)

Spacing for Tension	0.75
Spacing for Shear	0.75
Edge Distance Shear	1

Concrete Capacity

Tension	25.3	kip
Shear	64.2	kip

For 1.25" Diameter HAS-E Super Rod

Allow Tension	50.62	kip
Allow Shear	26.08	kip

Governing Capacities

Tension	25.3	kip
Shear	26.1	kip

Applied Forces

Tension	12.0	kip
Shear	16.8	kip

Percent Capacity

Tension	48%
Shear	65%

Interaction

per Hilti 4.1.8.3	77.2%

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PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	STAMFORD FIRE DEPARTMENT
SITE CASCADE:	CT03XC328-A
SITE ADDRESS:	366 OLD LONG RIDGE ROAD STAMFORD, CT 06903
SITE TYPE:	152'-0' SELF SUPPORT TOWER

SITE INFORMATION

PROPERTY OWNER:
LONG RIDGE FIRE CO. INC.
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903-1133

SITE ADDRESS:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903-1133
FAIRFIELD COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.153111° (41° 09' 11.1954" N)
LONGITUDE: -73.5929° (73° 35' 34.44" W)

ZONING JURISDICTION:
CITY OF STAMFORD

ZONING DISTRICT:
RA-2 ONE FAMILY RESIDENCE

POWER COMPANY:
CONNECTICUT LIGHT & POWER
PH.: (800) 286-2000

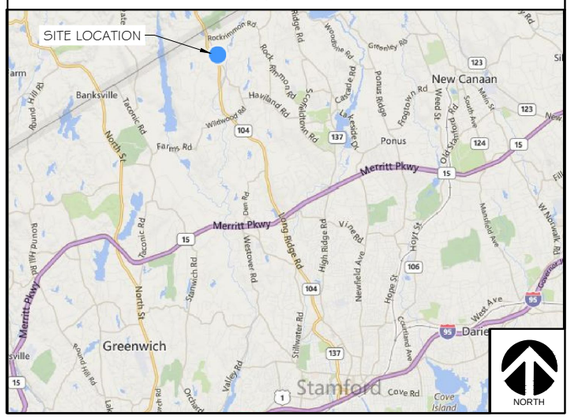
AAV PROVIDER:
VERIZON
PH.: (203) 968-6116

SPRINT CONSTRUCTION MANAGER:
NAME: GARY WOOD
PHONE: (860) 940-9168
E-MAIL: gary.wood@sprint.com

EQUIPMENT SUPPLIER:
ALCATEL-LUCENT
600-700 MOUNTAIN AVENUE
MURRAY HILL, NJ 07974
PH.: (908) 508-8080

PLANS PREPARED BY:
RAMAKER & ASSOCIATES, INC.
CONTACT: KEITH BOHNSACK, PROJECT MANAGER
PH.: (608) 643-4100
EMAIL: kbohnsack@ramaker.com

AREA MAP



LOCATION MAP

PROJECT DESCRIPTION

- INSTALL NEW 2.5 EQUIPMENT IN EXISTING BTS CABINET
  *(1) RECTIFIER SHELF AND (3) RECTIFIERS
  *(1) BASE BAND UNIT
- INSTALL (2) NEW BATTERY STRINGS IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON TOWER
- INSTALL (1) FIBER CABLE AND (3) SECTOR JUMPERS
- INSTALL (27) ANTENNA / RRH JUMPERS

APPLICABLE CODES

* ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH 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
2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. NATIONAL ELECTRIC CODE

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SHEET INDEX

SHT NO:	SHEET TITLE:	REV:	ENGINEER:
T-1	TITLE SHEET	A	JRS
SP-1	SPRINT SPECIFICATIONS	A	JRS
SP-2	SPRINT SPECIFICATIONS	A	JRS
SP-3	SPRINT SPECIFICATIONS	A	JRS
A-1	SITE PLAN	A	JRS
A-2	EQUIPMENT PLAN	A	JRS
A-3	BUILDING ELEVATION & ANTENNA DETAILS	A	JRS
A-4	RF DATA SHEET	A	JRS
A-5	FIBER PLUMBING DIAGRAM	A	JRS
A-6	CABLE COLOR CODING	A	JRS
A-7	ANTENNA & HYBRID CABLE DETAILS	A	JRS
A-8	EQUIPMENT DETAILS	A	JRS
E-1	EQUIPMENT UTILITY & GROUNDING PLAN	A	JRS
E-2	GROUNDING DETAILS	A	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	A	JRS

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Transcend Wireless
48 SPRUCE STREET
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Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: _____ Date: 8/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 29012
SHEET NUMBER: T-1

DRAWN BY: TWS CHECKED BY: KAB

SECTION 01 100 - SCOPE OF WORK

THE WORK:
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
   1. EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
   2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
   3. EL-0568: (FIBER TESTING POLICY)
   4. NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
   5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

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

NATIONALLY RECOGNIZED CODES AND STANDARDS:
THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
G. AMERICAN CONCRETE INSTITUTE (ACI)
H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
K. PORTLAND CEMENT ASSOCIATION (PCA)
L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
M. BRICK INDUSTRY ASSOCIATION (BIA)
N. AMERICAN WELDING SOCIETY (AWS)
O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
Q. DOOR AND HARDWARE INSTITUTE (DHI)
R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
S. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:
A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND IT'S OPERATING ENTITIES.
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, 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. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

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.

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

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.

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

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.

UTILITY 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:

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.

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

USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:
CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

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 LESSOR'S OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

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.

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

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

FURNISHED MATERIALS:
COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFIC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

RECEIPT OF MATERIAL AND EQUIPMENT:
A. 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.
B. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
C. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
D. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

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.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S 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.

GENERAL REQUIREMENTS FOR 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

FUNCTIONAL REQUIREMENTS:
A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE 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:
   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 BACKHAUL (FIBER, COPPER, OR MICROWAVE).
   4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
   5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
   6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
   7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS 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. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
   19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
   20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

DELIVERABLES:
A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
   1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
   2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
   3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
   4. ALL REQUIRED TEST REPORTS.
   5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
      a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
      b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
      c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
      d. LIEN WAIVERS
      e. FINAL PAYMENT APPLICATION
      f. REQUIRED FINAL CONSTRUCTION PHOTOS
      g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
      h. LISTS OF SUBCONTRACTORS
B. PROVIDE ADDITIONAL 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. PRE-CONSTRUCTION MEETING NOTES.

SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT

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 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
   2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
   3. CONCRETE BREAK TESTS
   4. SITE RESISTANCE TO EARTH TEST
   5. STRUCTURAL BACKFILL COMPACTION TESTS
   6. 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.
   7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

SUBMITTALS:
A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
   2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
   3. CHEMICAL GROUNDING SYSTEM .
   4. REINFORCEMENT CERTIFICATIONS
   5. STRUCTURAL BACKFILL TEST RESULTS
   6. SWEEP AND FIBER TESTS
   7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
   8. POST CONSTRUCTION HEIGHT VERIFICATION
   9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
C. 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.

TESTING BY THIRD PARTY AGENCY:
A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
   1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
   2. 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.
B. REQUIRED THIRD PARTY TESTS:
   1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
   2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
   3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
   4. REBAR PLACEMENT VERIFICATION WITH REPORT
   5. TESTING TENSION STUDY FOR ROCK ANCHORS
   6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
C. REQUIRED TESTS BY CONTRACTOR
   1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
   2. FIBER TESTS PER SPRINT STANDARD EL-0568
   3. MICROWAVE LINK TESTS PER NP-760-500
   4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.

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Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29012
SHEET NUMBER: SP-1

DRAWN BY: TWS CHECKED BY: KAB

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HEREWITH IN THE TOWER INSTALLATION SPECIFICATIONS.
6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HEREWITH IN THE ASPHALT PAVING SPECIFICATIONS.
7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HEREWITH IN THE CONCRETE PAVING SPECIFICATIONS.
8. TESTING REQUIRED HEREWITH UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION

D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING

E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES 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. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

PROJECT CLOSEOUT:

A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.

B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    a. TOWER, ANTENNAS, RRUS, 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/CABLE 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.
    b. 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;
    c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    d. 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.

PROJECT PHOTOGRAPHS:

A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
10. VIEW OF COMPOUND FROM A DISTANCE
11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

DEFICIENCY CORRECTIONS:

CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:

A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.

B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

PROJECT CONFERENCE CALLS:

SPRINT MAY HOLD PERIODIC 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.

FINAL PROJECT ACCEPTANCE: PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10'-0".

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
    a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
    b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
    a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
    b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
    c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS.

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

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Certification & Seal:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · No. 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 08/29/2014

PROJECT TITLE:

STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29012

SHEET NUMBER: SP-2

DRAWN BY: TWS CHECKED BY: KAB

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

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Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

Signature: Date: 8/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 29012
SHEET NUMBER: SP-3

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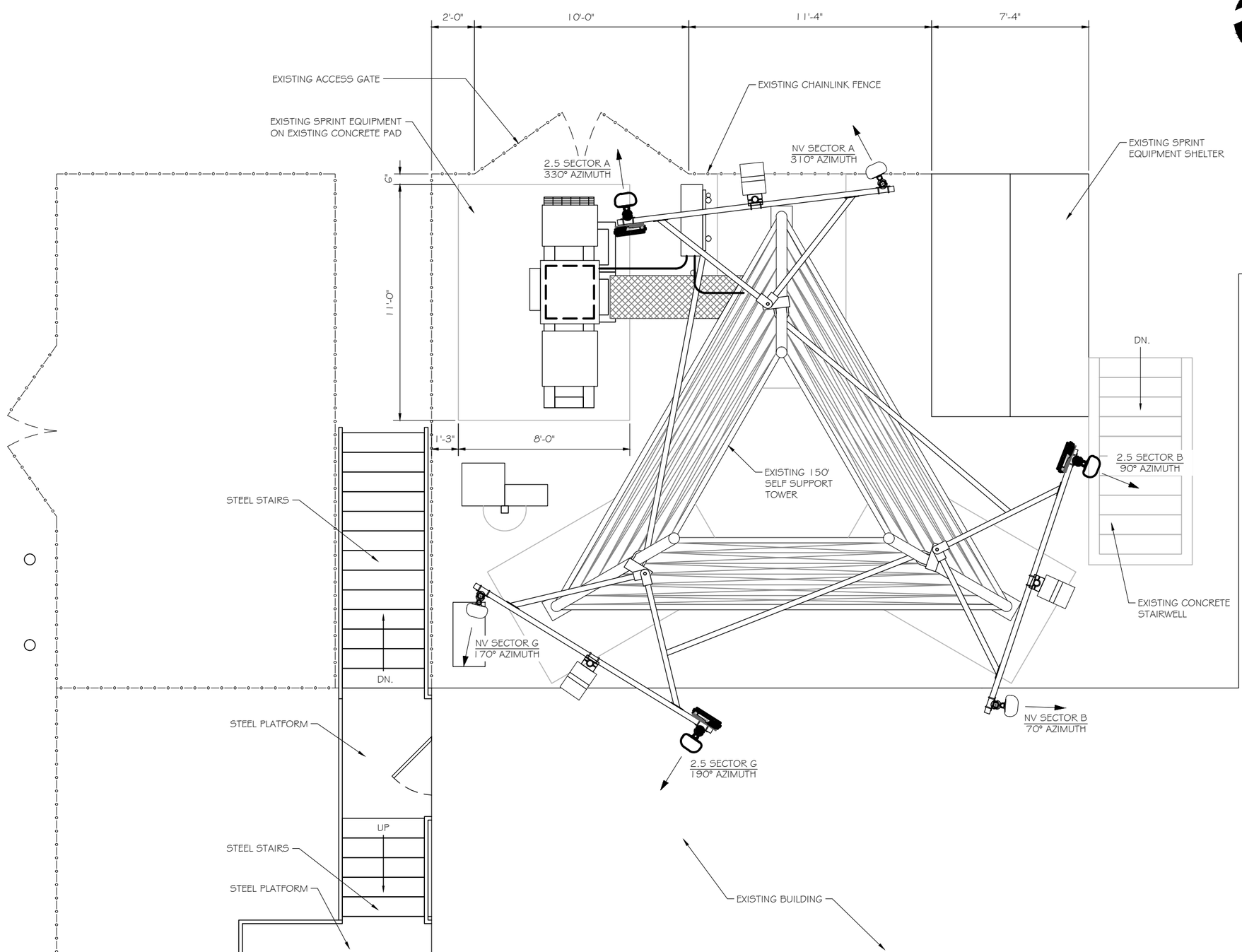

SITE PLAN
SCALE: 1" = 5'

1

NORTH

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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
SITE PLAN

0 2.5' 5' 10'
11" x 17" - 1" = 5'
22" x 34" - 1" = 2.5'

PROJECT NUMBER: 29012
SHEET NUMBER: A-1

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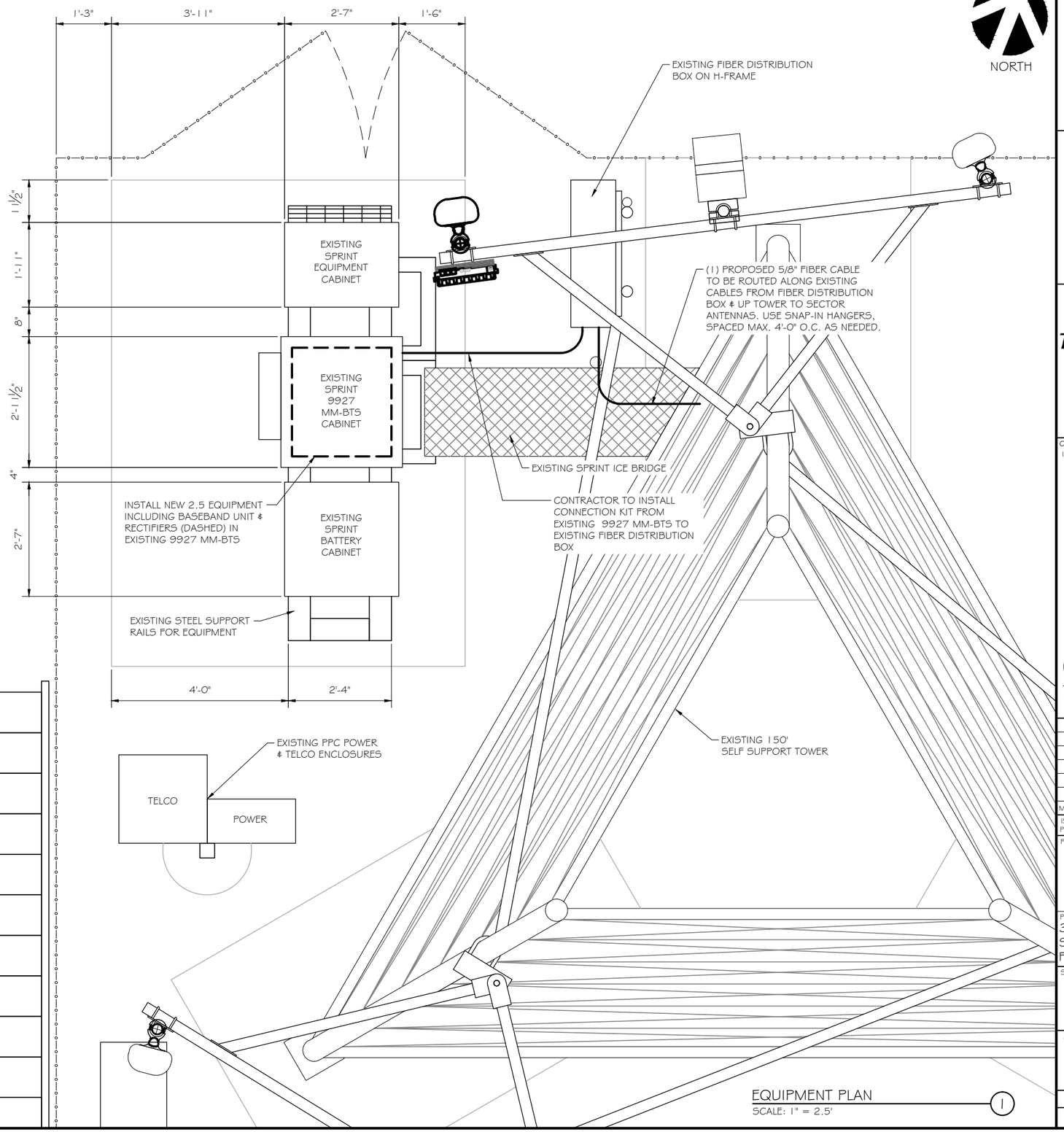
DRAWN BY: TWS CHECKED BY: KAB



EQUIPMENT PLAN
SCALE: 1" = 2.5'

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STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

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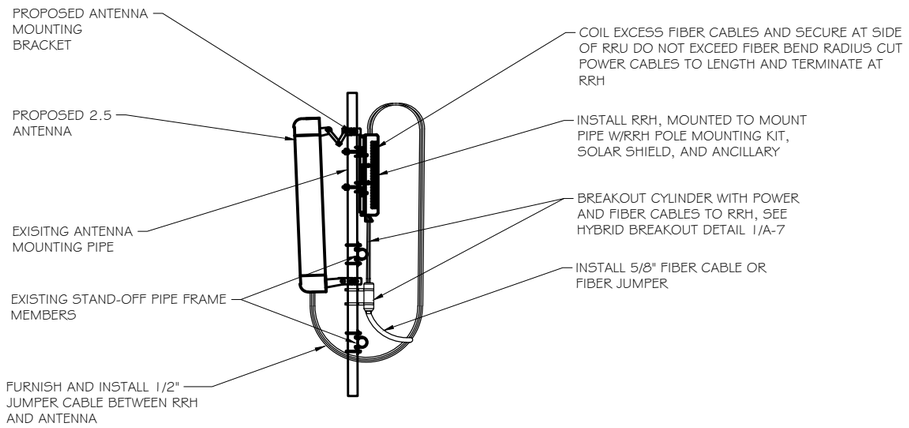
SHEET TITLE:
EQUIPMENT PLAN

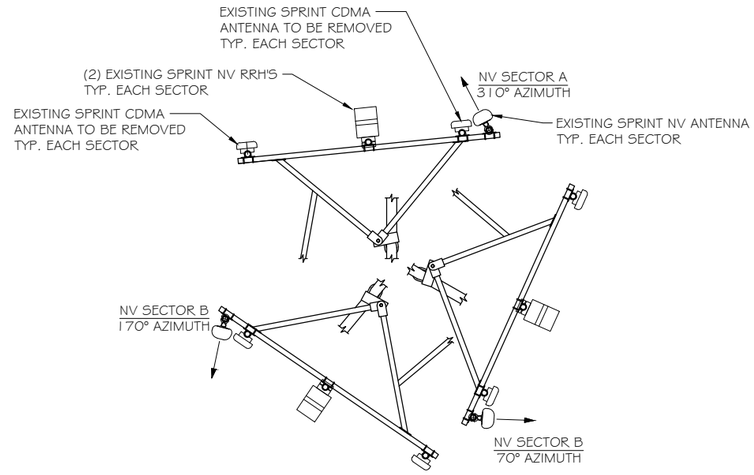
0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 29012
SHEET NUMBER: A-2

I:\29000\29012\CAD\Sprnt 2.5\29012 Sprnt 2.5 CD.dwg Printed by: kgalston on Aug 29, 2014 - 10:02am

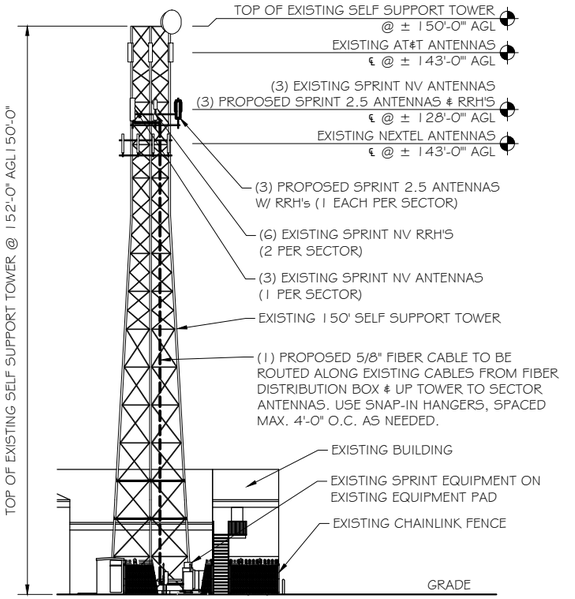


ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS



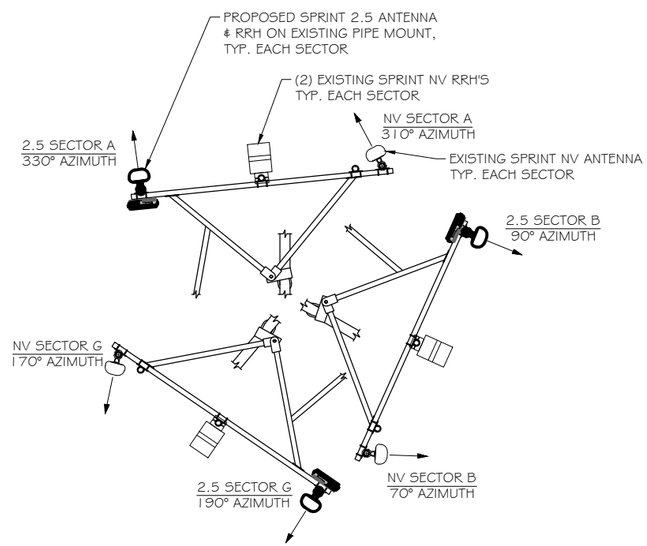
NORTH

EXISTING ANTENNA ARRAY (3)
SCALE: NTS



BUILDING ELEVATION (2)
SCALE: 1" = 40'

0 20' 40' 80'
11" x 17" - 1" = 40'
22" x 34" - 1" = 20'



NORTH

PROPOSED ANTENNA ARRAY (4)
SCALE: NTS

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OAKLAND, NJ 07346

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED PROFESSIONAL ENGINEER

Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: A-3

RFDS Sheet

General Site Information

Site ID	CT03XC328	Equipment Vendor	Alcatel-Lucent
Market	Southern Connecticut	Lattitude	41.15311
Region	Northeast	Longitude	-73.5929397
MLA	N/A	LL SITE ID	N/A
Structure Type	SELF SUPPORT		
BTS Type			

Solution ID		Siterra SR Equipment type		Incremental Power Draw needed by added Equipment
		Equipment Vendor	Alcatel-Lucent	0

Base Equipment

BBU Kit	ALU BBU Kit	Top Hat	None
BBU Kit Qty	1	Top Hat Qty	N/A
		Top Hat Dimenstions	N/A
Growth Cabinet	N/A	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	N/A		
Growth Cabinet Dimensions	N/A		
Growth Cabinet Weight	N/A		

RF Path Information

RRH	TD-RRH8x20-25	
RRH Qty	3	
RRH Dimensions	26.1"x18.6"x6.7"	
RRH Weight. lbs.	70	
RRH Mount Weight. Lbs.	10	
Power and Fiber Cable	ALU Fiber Only	
Cable Qty	1	
Weight per foot. Lbs.	0.242	
Diameter. Inches.	0.73	
Length Ft.	150	(calculated as antenna height plus 20%)
Coax Jumper	TBD	
Coax Jumper Qty	27	
Coax Jumper Length. Feet.	25	
Coax Jumper Weight	1.7	
Coax Jumper Diameter. Inches	0.5	
AISG Cable	Commscope ATCB-B01-006	
AISG Cable Qty	3	
AISG Diameter. Inches.	0.315	
AISG Cable length.	8	
Weight of entire AISG cable. Lbs.	1.3	

Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"
Antenna Weight. Lbs	55.12	55.12	55.12
Antenna Mounting Kit Weight. Lbs.	11.5	11.5	11.5
CL Height	128	128	128
Antenna Azimuth	330	90	190
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

*RFDS SHEET WAS GENERATED BY RAMAKER & ASSOCIATES FROM PLAN OF RECORD (POR) PROVIDED BY SPRINT. CONTRACTOR SHALL VERIFY AND OBTAIN FINAL RFDS FROM SPRINT CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

NOTES:

1. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND C/L HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHZ ANTENNA AT SAME C/L HEIGHT AS 1.9GHZ ANTENNA AND EMAIL CORRECT C/L HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
2. AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5GHZ. TEST TO INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
3. GENERAL CONTRACTOR MUST ENSURE THAT NO OBJECT IS LOCATED WITHIN 45 DEGREES OF LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHZ ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
4. 2.5GHZ ANTENNA MUST BE AT LEAST 6" FROM 1.9GHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30" FROM DUAL BAND 1.9GHZ AND 800MHZ ANTENNA.
5. GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREE. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · No. 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 08/29/2014

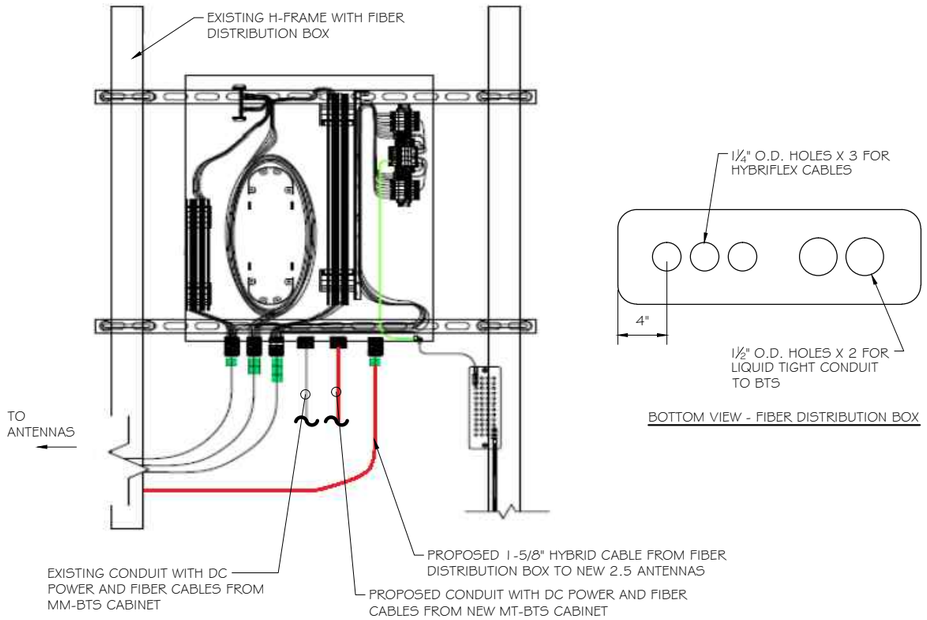
PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
RF DATA SHEET

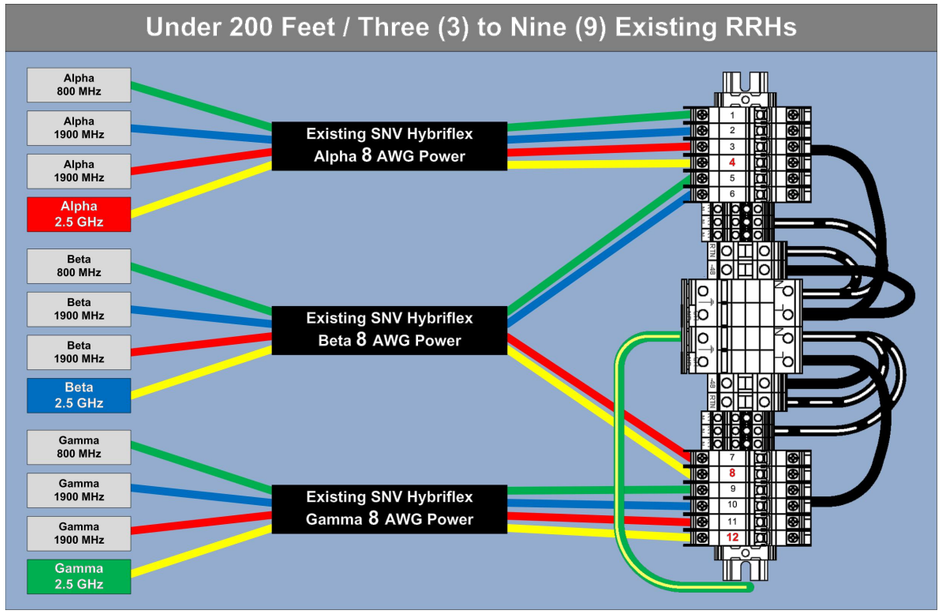
SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: A-4

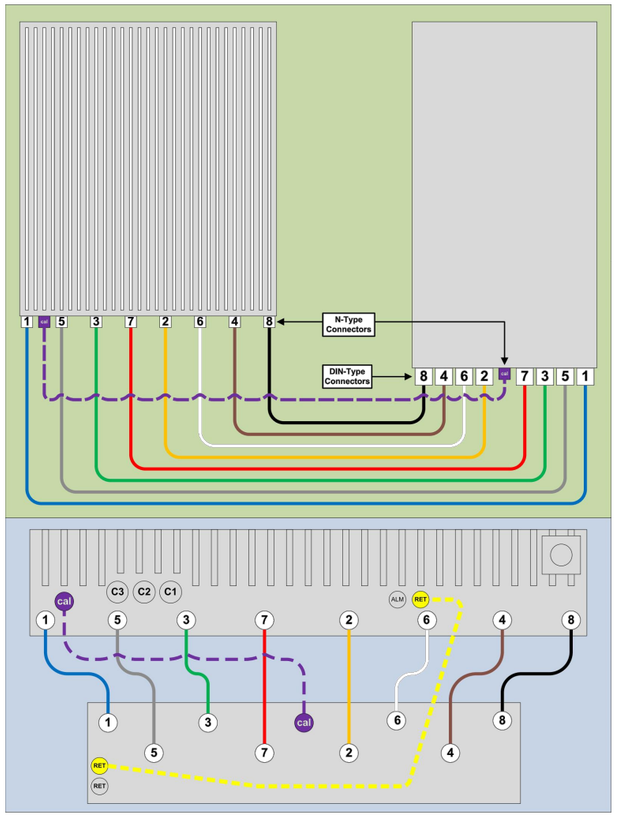


BOTTOM VIEW - FIBER DISTRIBUTION BOX

TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS

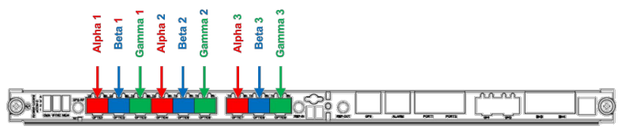


RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS

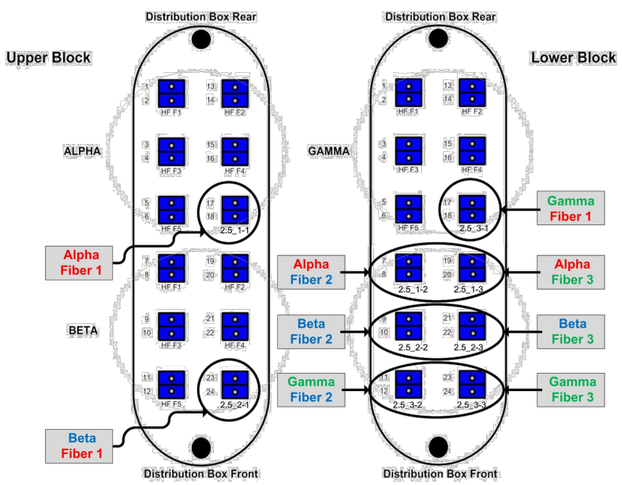


8T8R DETAIL (3)
SCALE: NTS

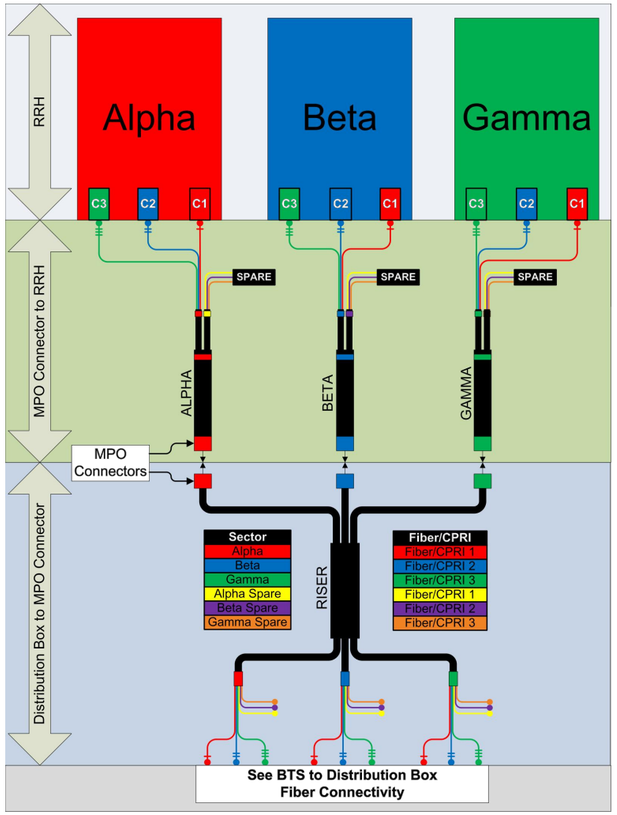
eCCM2-HR



Distribution Box Fiber Panel



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (4)
SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (5)
SCALE: NTS

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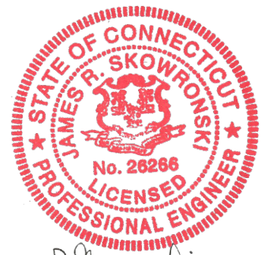


Signature: 8/29/2014 Date:

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

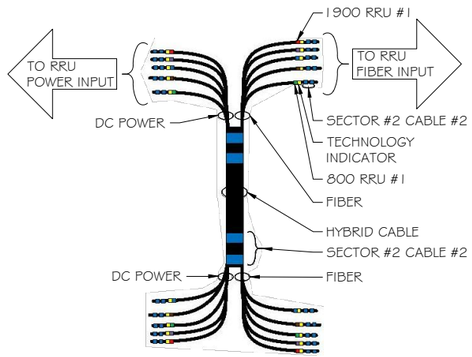
SCALE:
AS NOTED

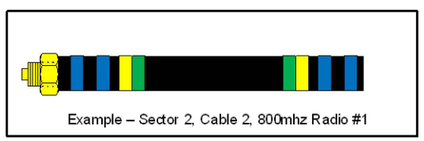
PROJECT NUMBER: 29012
SHEET NUMBER: A-5

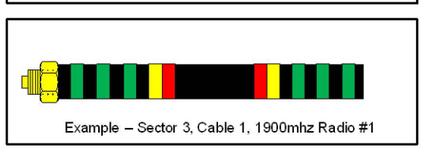
2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

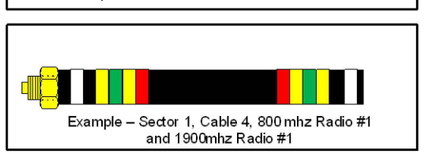
NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange




Example – Sector 2, Cable 2, 800mhz Radio #1


Example – Sector 3, Cable 1, 1900mhz Radio #1


Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

COLOR CODING CHARTS (1)
SCALE: NTS

CABLE MARKING NOTES

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
4. THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

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Signature: James R Skowronski Date: 8/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 08/29/2014

PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: A-6

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF:RFS

CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
Fiber Only	Varies	Use NV Hybriflex	5/8"
Hybriflex	<200'	8 AWG	1-1/4"
Hybriflex	225-300'	6 AWG	1-1/4"
Hybriflex	325-375'	4 AWG	1-1/4"

RFS HYBRIFLEX RISER CABLE SCHEDULE

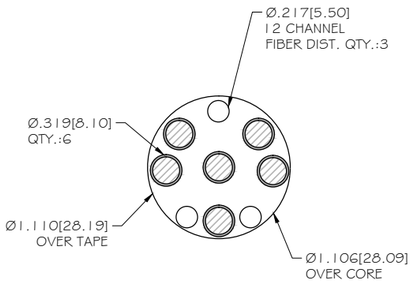
FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	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
	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 pairs, 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 pairs, 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

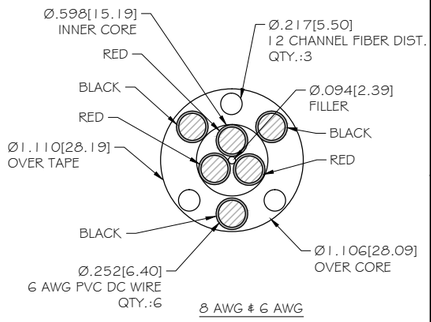
FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN:HBF012-M3-10F1	10 ft
	MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	

*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

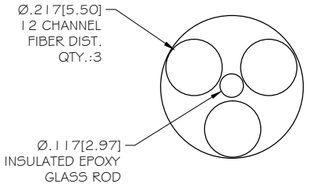
HYBRID CABLE CROSS SECTION & DATA
SCALE: NTS (1)



4 AWG



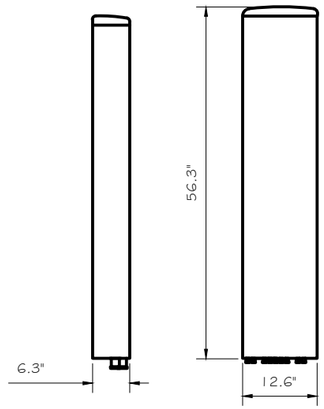
8 AWG & 6 AWG



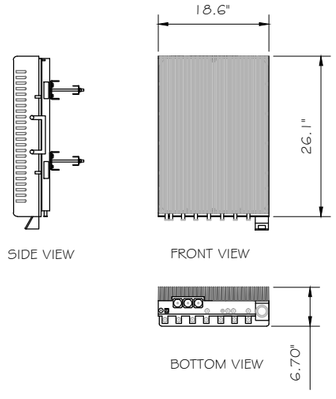
FIBER ONLY

RFS: APXV9TM14-ALU-120

DIMENSIONS, HxWxD:	56.3" x 12.6" x 6.3"
WEIGHT, WITHOUT PRE-MOUNTED BRACKETS:	55.12 lbs
CONNECTOR:	(9) MINI-DIN FEMALE/BOTTOM



2.5 ANTENNA DETAIL
SCALE: NTS (2)



ALCATEL-LUCENT: TD-RRH8x20

HxWxD = (26.1" x 18.6" x 6.7")

WEIGHT = 70 lbs.

2.5 RRH DETAIL
SCALE: NTS (3)

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STATE OF CONNECTICUT ★ JAMES R. SKOWRONSKI ★ No. 26266 LICENSED PROFESSIONAL ENGINEER

Signature: James R Skowronski Date: 8/29/2014

MARK	DATE	DESCRIPTION

ISSUE PHASE: FINAL
DATE ISSUED: 08/29/2014

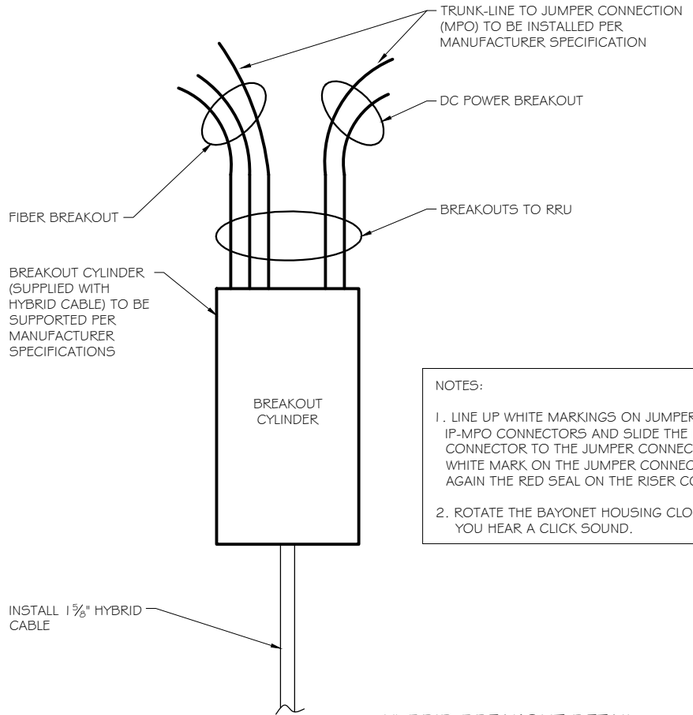
PROJECT TITLE:
STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE:
AS NOTED

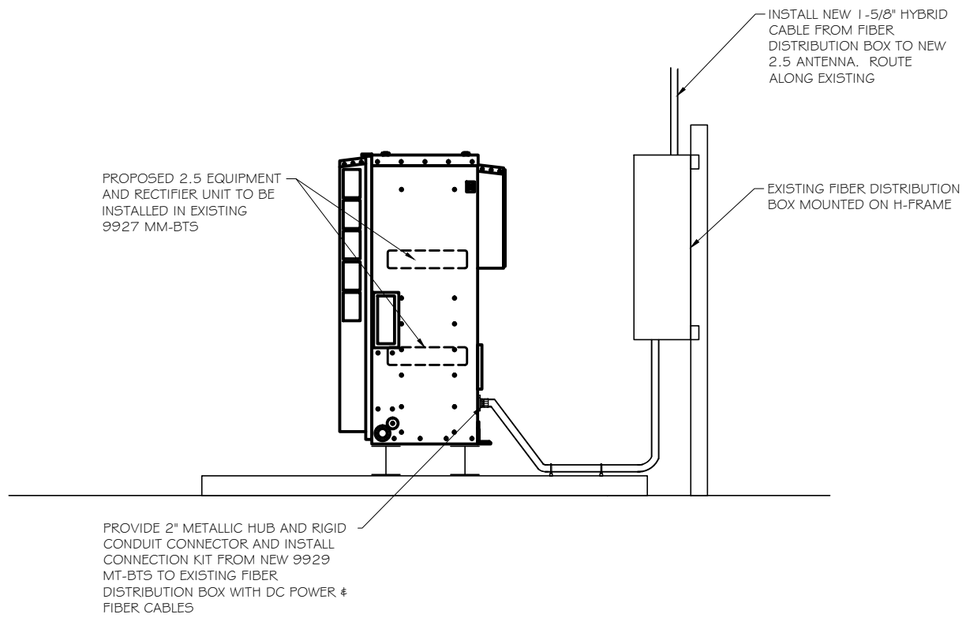
PROJECT NUMBER: 29012
SHEET NUMBER: A-7



NOTES:

1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

HYBRID BREAKOUT DETAIL (1)
SCALE: NTS



CABLE ROUTE FROM CABINET (2)
SCALE: NTS

EXISTING BBU CABINET (3)
SCALE: NTS

EXISTING MMBS CABINET (4)
SCALE: NTS

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STAMFORD FIRE DEPT.
CT03XC328-A

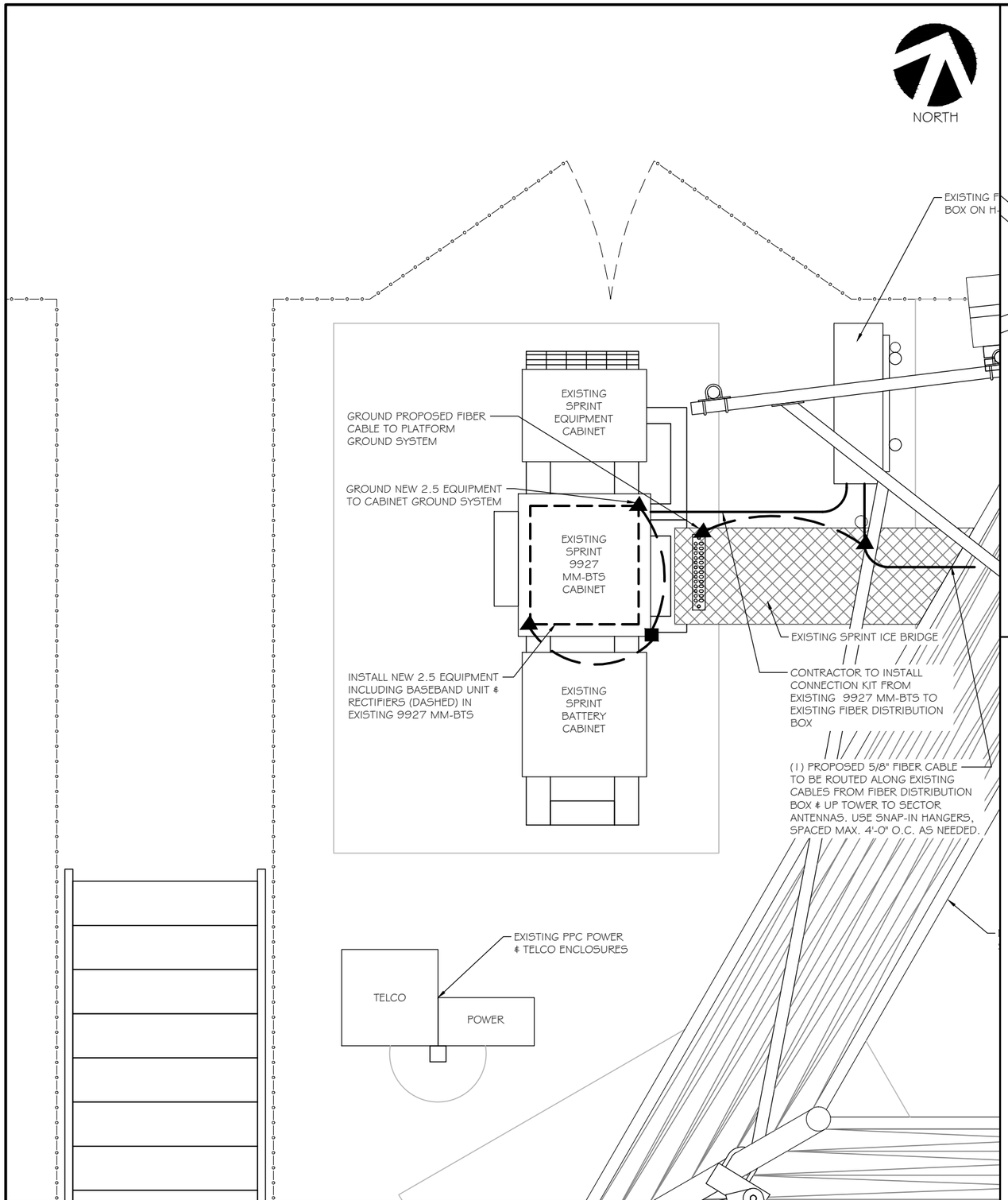
PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
EQUIPMENT DETAILS

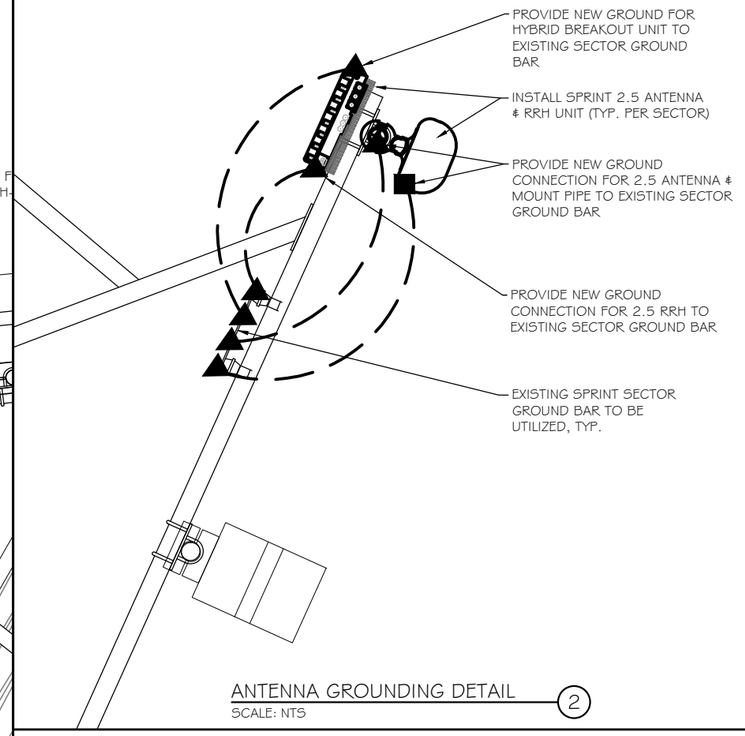
SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: A-8

DRAWN BY: TWS CHECKED BY: KAB



EQUIPMENT UTILITY & GROUNDING PLAN (1)
SCALE: NTS



ANTENNA GROUNDING DETAIL (2)
SCALE: NTS

GROUNDING NOTES:

1. CONTRACTOR TO ENSURE PROPER SEQUENCING OF GROUNDING AND UNDERGROUND CONDUIT INSTALLATION TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM AND/OR DAMAGE TO THE CONDUIT.
2. ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS NOTED OTHERWISE.
3. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
4. ALL GROUND CONNECTIONS ABOVE GRADE AND/OR INTERIOR SHALL BE COMPRESSION TYPE, TWO-HOLE LUGS OR DOUBLE-CRIMP "C" TAPS.
5. CONTACT AREAS WHERE CONNECTIONS ARE MADE SHALL BE PREPARED TO A BARE BRIGHT FINISH AND COATED WITH AN ANTI-OXIDATION MATERIAL BEFORE CONNECTIONS ARE MADE.
6. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS.
7. WHERE GROUNDING CONNECTIONS ARE MADE TO PAINTED METAL SURFACES, PAINT SHALL BE REMOVED TO BEAR METAL TO ENSURE PROPER CONTACT AND RESTORED/PAINTED TO ORIGINAL FINISH.
8. GROUND DEPTH SHALL BE 30" MINIMUM BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS GREATER.

LEGEND:	
– – – – – – – – – – – – –	EXISTING GROUND CABLE
▬▬▬▬▬▬▬▬▬▬▬▬▬	PROPOSED GROUND CABLE
▲	MECHANICAL CONNECTION
■	EXOTHERMIC CONNECTION
—E—E—E—E—	PROPOSED ELECTRIC

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STAMFORD FIRE DEPT.
CT03XC328-A

PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

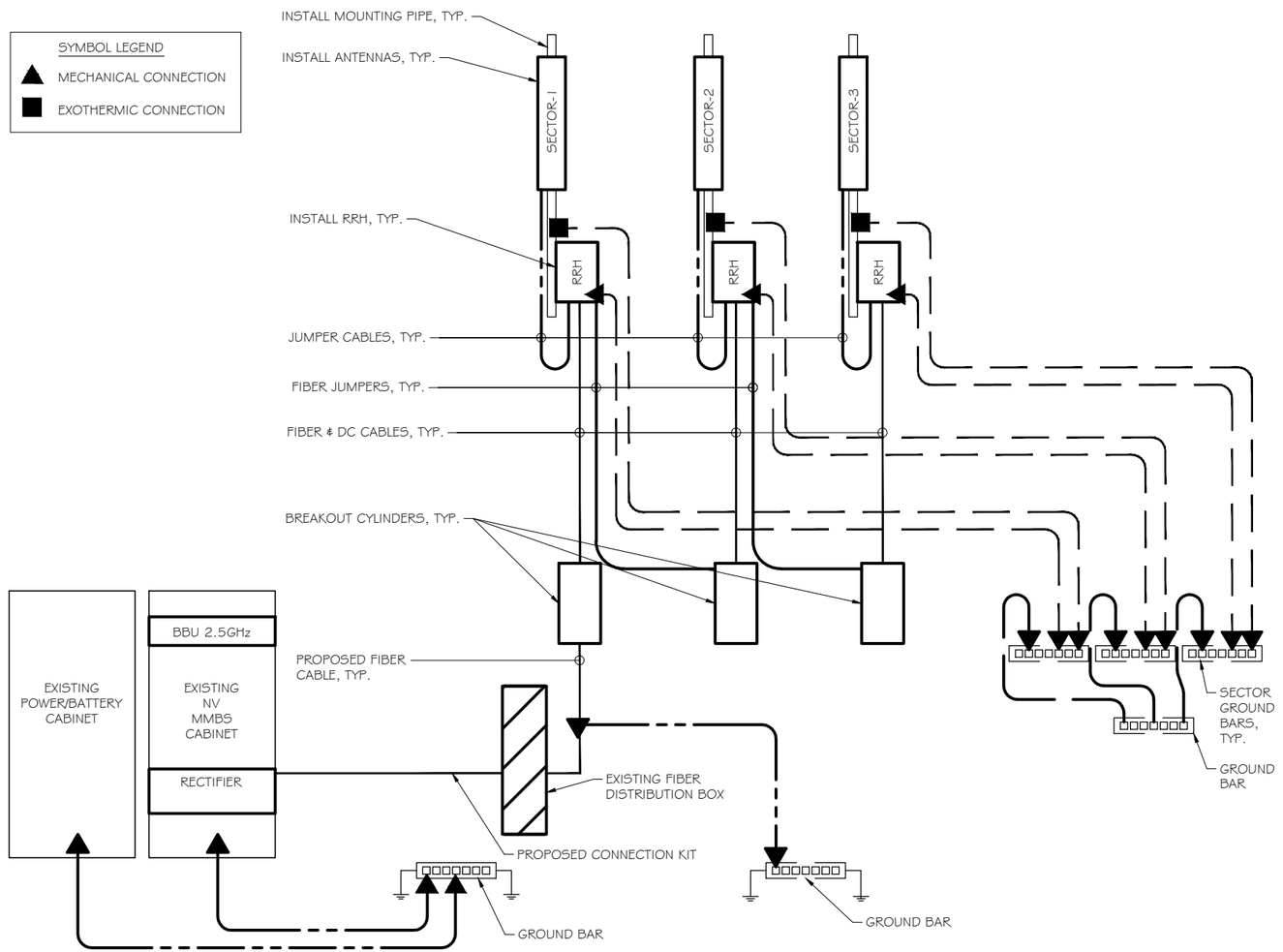
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE:
AS NOTED

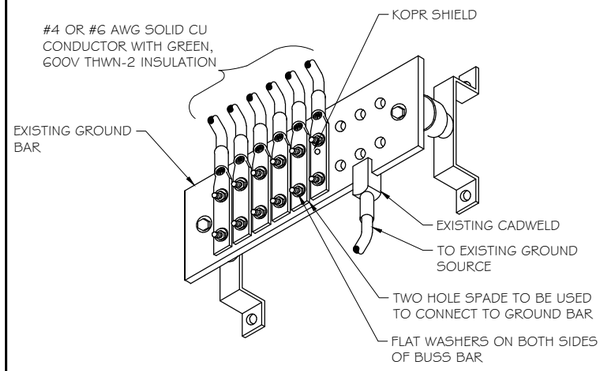
PROJECT NUMBER: 29012
SHEET NUMBER: E-1

DRAWN BY: TWS CHECKED BY: KAB

SYMBOL LEGEND
- MECHANICAL CONNECTION
- EXOTHERMIC CONNECTION



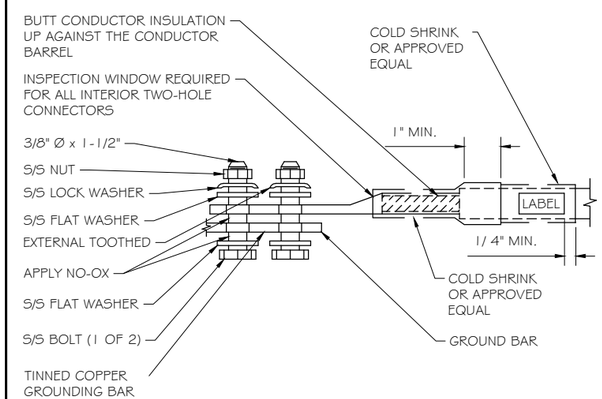
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



NOTES:
1. APPLY NO-OX TO LUG AND GROUND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.

2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

GROUNDING CONDUCTOR INSTALLATION (2)
SCALE: NTS



TWO-HOLE LUG (3)
SCALE: NTS

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CT03XC328-A

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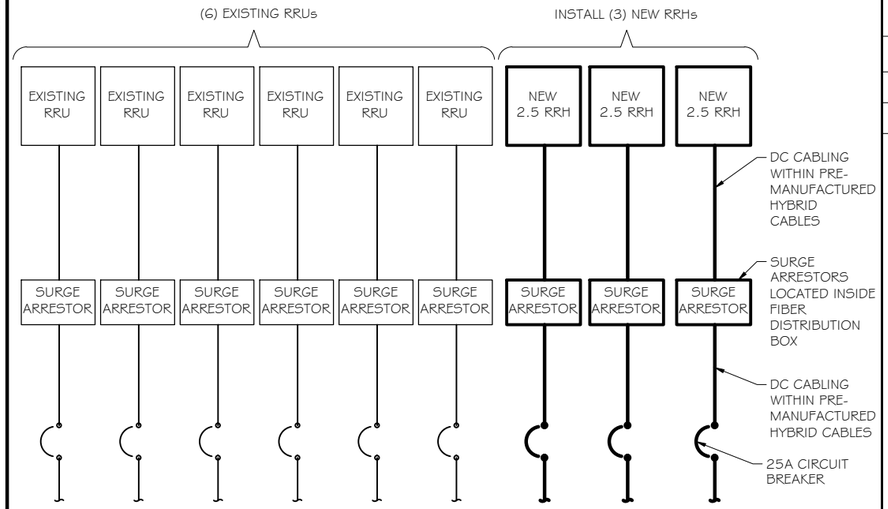
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: E-2



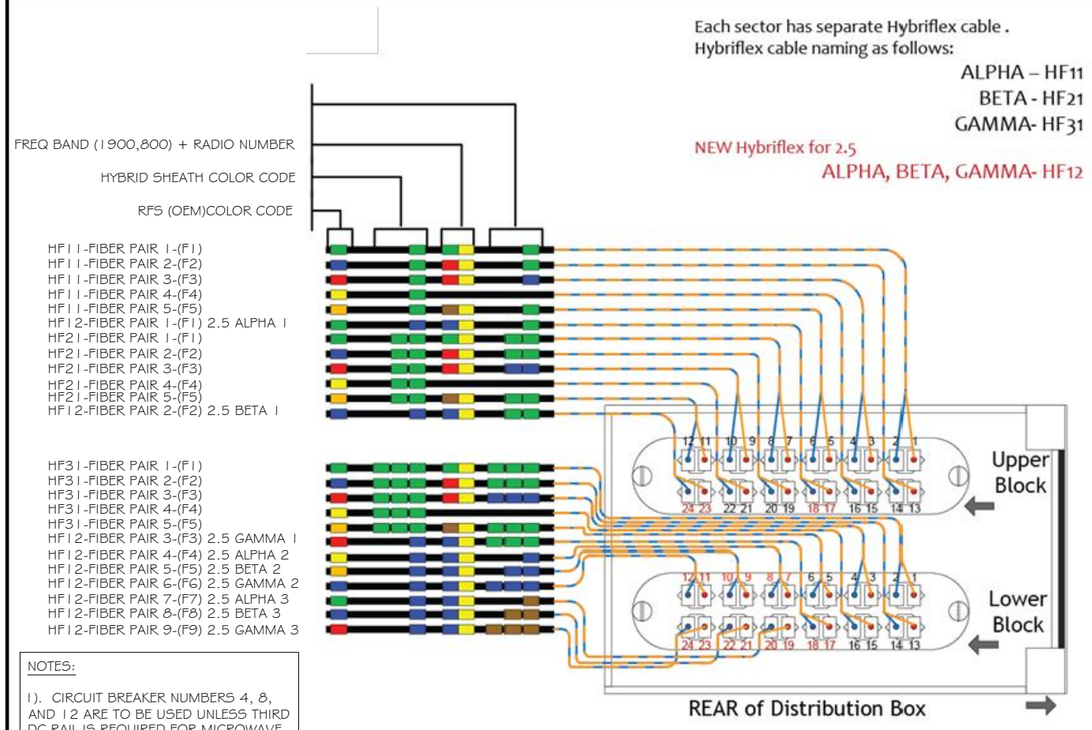
DC ONE-LINE DIAGRAM (1)
SCALE: NTS

A/C PANEL SCHEDULE

VOLTAGE:	240V/120		PANEL STATUS:	EXISTING		N TO GROUND BOND:	YES
MAIN BREAKER:	200 AMP		MODEL NUMBER:	TBD		INTERNAL TVSS:	YES
MOUNT:	GROUND		PHASE:	1		WIRE:	3
ENCLOSURE TYPE:	NEMA 3R		BUSS RATING:	200 AMP		GROUND BAR:	YES
			NEUTRAL BAR:	YES			

CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	MMBTS	100	2	ON			ON	2	60	SURGE PROTECTION	7
2											8
3	BLANK (UNUSED)	-	-	-			OFF	2	40	CCI	9
4	BLANK (UNUSED)	-	-	-							10
5	BLANK (UNUSED)	-	-	-			ON	1	15	NOT LABELED	11
6	TELCO FAN	10	1	ON			-	-	-	BLANK (UNUSED)	12

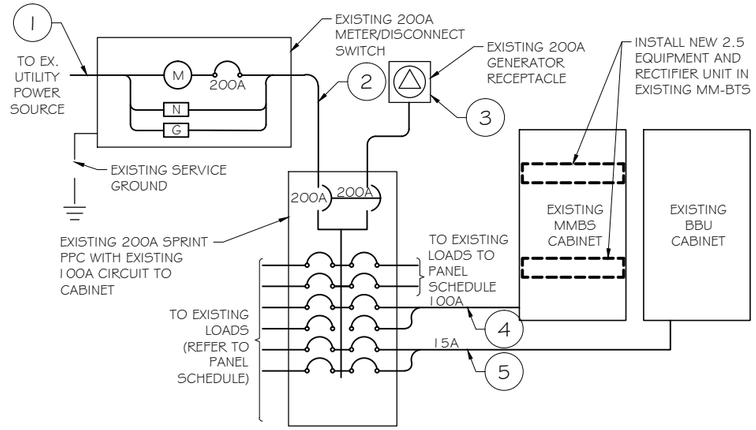
AC PANEL SCHEDULE (2)
SCALE: NTS



NOTES:

1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE.
2). USE DC POWER LOOP.
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED.
4). REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE.

TYPICAL FIBER DISTRIBUTION (3)
SCALE: NTS



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	EX. MMBS CABINET	(3) #2 AWG, (1) #8 GND IN 1½" CONDUIT
5	TRANSFER & LOAD CENTER	EX. BBU CABINET	(2) #12 AWG, (1) #12 GND IN ¾" CONDUIT

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS

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PROJECT INFORMATION:
366 OLD LONG RIDGE ROAD
STAMFORD, CT 06903
FAIRFIELD COUNTY

SHEET TITLE:

DC POWER DETAILS & PANEL SCHEDULES

SCALE:
AS NOTED

PROJECT NUMBER: 29012
SHEET NUMBER: E-3