Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

July 27, 2018

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

Notice of Exempt Modification
35 Lower County Road, Roxbury, CT 06783
41 33 34.3 N
-73 17 32.3 W
Sprint #: CT72XC031 _DOMU

Dear Ms. Bachman:

Sprint currently maintains antennas at the 177-foot level of the existing 180-foot Self Support Tower at Lower County Road in Roxbury, CT. The tower is owned by SBA 2012 TC Assets, LLC. The property is owned by the Town of Roxbury. Sprint now intends to replace (3) existing cell antennas with (3) newer technology cell antennas and add an additional (3) antennas at the 177-foot level of the tower. Sprint's proposed full scope of work is as follows:

Remove: N/A

Remove and Replace:

- Remove:
  - (3) KMW ETCR-654L12H6 Panel Antennas
- Replace with:
  - (3) Commscope NNVV-65B-R4 Panel Antennas

Install:

- (3) RFS APXVTM14-C-120 Panel Antennas
- (3) ALU 1900 Mhz RRUs
- (6) ALU 800 Mhz RRUs
- (3) ALU TD-RRH8x20-25 RRUs
- (1) 1-1/4" fiber
- (1) Tie Back Kit SPBT

Existing Equipment to Remain (Including entitlements):

- (3) Sector Frames
- (3) 1-1/4" fiber

This facility was approved prior to the Council's jurisdiction. The Town of Roxbury's Zoning Commission granted Special Permit and Site Plan Approval on October 21, 1999 for a 180' tower. Nextel's (Sprint's) original approval was for 12 panel antennas at the top of the Tower to be colored "blue gray" to blend with the sky. A 22'x26'x10.3' equipment shelter was approved to be placed at the base. There were no further conditions placed on the tower. It is SBA's opinion that this modification is in full compliance.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town of Roxbury's First Selectman as representative for the Town and Landowner, The Town of Roxbury, as well as to the Zoning Enforcement Officer, John Cody. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-referenced telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T
508.366.2610 + F
203.446.7700 + C
kpelletier@sbasite.com

Attachments
cc: Barbara Henry, First Selectman / with attachments
Town of Roxbury, Roxbury Town Hall, 29 North Street, Roxbury, CT 06783
John Cody, Zoning Enforcement Officer / with attachments
Town of Roxbury, Roxbury Town Hall, 29 North Street, Roxbury, CT 06783

POWER DENSITY

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**177 feet**	Height (AGL):	**177 feet**	Height (AGL):	**177 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**1.11 %**	Antenna B1 MPE%	**1.11 %**	Antenna C1 MPE%	**1.11 %**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**177 feet**	Height (AGL):	**177 feet**	Height (AGL):	**177 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**0.77 %**	Antenna B2 MPE%	**0.77 %**	Antenna C2 MPE%	**0.77 %**

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	**1.88 %**
Town	0.13 %
Alltel	0.41 %
AT&T	2.24 %
Verizon Wireless	1.48 %
Site Total MPE %:	**6.14 %**

SPRINT Sector A Total:	1.88 %
SPRINT Sector B Total:	1.88 %
SPRINT Sector C Total:	1.88 %
Site Total:	6.14 %

SPRINT _ Frequency Band / Technology Max Power Values (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	177	0.46	850 MHz	567	0.08%
Sprint 850 MHz LTE	2	941.82	177	2.32	850 MHz	567	0.41%
Sprint 1900 MHz (PCS) CDMA	5	511.82	177	3.15	1900 MHz (PCS)	1000	0.31%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	177	3.15	1900 MHz (PCS)	1000	0.31%
Sprint 2500 MHz (BRS) LTE	8	778.09	177	7.65	2500 MHz (BRS)	1000	0.77%
						Total:	**1.88%**

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

SPRINT Existing Facility

Site ID: CT72XC031

Roxbury-Lower County Road
35 Lower County Road
Roxbury, CT 06783

July 10, 2018

EBI Project Number: 6218004837

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	6.14 %

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

EBI Consulting
environmental | engineering | due diligence

July 10, 2018

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

Emissions Analysis for Site: **CT72XC031 – Roxbury-Lower County Road**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **35 Lower County Road, Roxbury, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **35 Lower County Road, Roxbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

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

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

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

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

8) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **177 feet** above ground level (AGL) for **Sector A**, **177 feet** above ground level (AGL) for **Sector B** and **177 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**177 feet**	Height (AGL):	**177 feet**	Height (AGL):	**177 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**1.11 %**	Antenna B1 MPE%	**1.11 %**	Antenna C1 MPE%	**1.11 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**177 feet**	Height (AGL):	**177 feet**	Height (AGL):	**177 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**0.77 %**	Antenna B2 MPE%	**0.77 %**	Antenna C2 MPE%	**0.77 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**1.88 %**
Town	0.13 %
Alltel	0.41 %
AT&T	2.24 %
Verizon Wireless	1.48 %
Site Total MPE %:	**6.14 %**

SPRINT Sector A Total:	1.88 %
SPRINT Sector B Total:	1.88 %
SPRINT Sector C Total:	1.88 %
Site Total:	6.14 %

SPRINT _ Frequency Band / Technology Max Power Values (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	177	0.46	850 MHz	567	0.08%
Sprint 850 MHz LTE	2	941.82	177	2.32	850 MHz	567	0.41%
Sprint 1900 MHz (PCS) CDMA	5	511.82	177	3.15	1900 MHz (PCS)	1000	0.31%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	177	3.15	1900 MHz (PCS)	1000	0.31%
Sprint 2500 MHz (BRS) LTE	8	778.09	177	7.65	2500 MHz (BRS)	1000	0.77%
						Total:	**1.88%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	1.88 %
Sector B:	1.88 %
Sector C:	1.88 %
SPRINT Maximum Total (per sector):	1.88 %
Site Total:	6.14 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.14 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

ALLPRO
CONSULTING GROUP, INC.
9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
www.allprocgi.com ★ e-mail: info@allprocgi.com

Tower Structural Analysis Report for
SBA Network Services, Inc.

Existing 180' Self Supported Tower

SBA Site Name: Roxbury-lower County Rd
SBA Site ID: CT46125-A-03
Application #: 86556, v1
Carrier Name: Sprint Nextel
Carrier Site ID: CT72XC031/Roxbury-Lower County Rd.

Site Location:
Lower County Road
Roxbury, CT 06783
Litchfield County

Latitude: 41.559528°
Longitude: -73.292306°

ACGI Job # 18-3703
(Ref Previous: ACGI Job # 17-6610 dated 10/26/2017)

ANALYSIS RESULTS		
Tower Components	78.0 %	**Pass**
Tower Base Foundation	98.6 %	**Pass**
Net change in tower stress	+ 0.8 %	**Change from previous SA, ACGI # 17-6610 dated 10/26/2017**
Net change in stress due to Mount Reinforcement	+0.1 %	Reinforcement of (3) T-Frames with (3) Site Pro SPTB

Prepared By:
Bob Akech

STATE OF CONNECTICUT
JOJI M. GEORGE
No. 24444
LICENSED
PROFESSIONAL ENGINEER

06/05/2018
Approved By:
Joji M. George, P.E.
CT PE # 24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 182' Self Supported Tower located in Roxbury, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed Sprint Nextel antennas and coaxes per Application 86556, v1 as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with mentioned proposed and existing loading is found to be in compliance with TIA-222-G Addendum 2, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2012 International Building Code (IBC 2012).

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional proposed loads.

SOURCE OF INFORMATION		
Tower Data:	FDH Engineering, Inc.	Structural Analysis for SBA Network Services, Inc., Project #: 12-09661E S1, dated 10/02/2012
	Vertical Solutions, Inc.	Rigorous Structural Analysis, Project #: 111673, Revision 1, dated 02/16/2012
	URS Corporation.	Detailed Structural Analysis, Evaluation, and Foundation reinforcement Design for 180' Existing SST for proposed antenna addition, dated 12/03/2003
	Allpro Consulting Group, Inc.	Previous Structural Analysis by Allpro Consulting Group Inc., (ACGI Job # 17-6610, dated 10/26/2017
Foundation Data:	Fred A. Nudd Corporation.	Original Foundation design by Fred A. Nudd Corporation, Drawing #: 99-7018-2R, dated 10/12/1999
	URS Corporation.	Detailed Structural Analysis, Evaluation, and Foundation reinforcement Design for 180' Existing SST for proposed antenna addition, dated 12/03/2003
Geotechnical Report:	Tectonic Engineering Consultants P.C	Geotehnical Evaluation of Proposed 180' SST and Equipment Building, Reference#: 1170.C056, dated 07/04/1999
Loading Data:	SBA Communication Corp.	Existing loading as per previous Structural Analysis by Allpro consulting Group Inc., ACGI #17-6610, dated 10/26/2017 Proposed final loading for Sprint Nextel as per sbasite.com, Application # 86556, v1 downloaded from the SBA portal.
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G-Addendum 2. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	Roxbury-lower County Rd
SBA Site Number:	CT46125-A-03
Carrier Site ID:	Sprint Nextel: CT72XC031/ Roxbury-Lower County Rd.
City, State:	Roxbury, CT
County:	Litchfield
Code Wind Load Requirement:	TIA-222-G & 2012 International Building Code (IBC 2012) (118 mph Ultimate wind speed equivalent to 91 mph nominal wind speed)
Wind Load Used:	TIA-222-G Code: • Nominal wind speed of 91 mph (3 second gust wind speed) • Structure Class II. • Exposure Category C. • Topographic Category 1. • Crest Height 0.00 ft. • A wind speed of 40 mph is used in combination with ice. • Nominal ice thickness of 1 in.
Seismic Check	Ss = 0.196g < 1.0g, thus seismic loading can be ignored as per 2.7.3 of the TIA-222-G code.

TOWER DATA	
Tower Type:	Self-Supported Tower
Height:	180'
Cross Section:	4 sided
Steel Strength:	Legs – 54 ksi , Braces – 36 ksi
Type of Foundation:	Drilled Shafts with rock anchors

TOWER HISTORY	
Tower Manufacturer / Model:	Fred A. Nudd Corporation
Date of Original Design:	10/12/1999
Previous Modifications:	Detailled Structural Analysis, Evaluation, and Foundation Reinforcement Design for 180' Existing SST by URS Corporation, Revision 2, dated 12/03/2003.
Original Design Code Requirements:	ANSI/EIA/TIA 222-F with ½'' radial Ice

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	***% Capacity***	***Result***
Legs	**70.8 %**	**Pass**
Diagonals	**78.0 %**	**Pass**
Top Girt	**0.6 %**	**Pass**
Bolt Checks	**78.0 %**	**Pass**
Tower Foundation	**Download capacity (11.6 %)**	**Pass**
	Uplift capacity for pier (66.0 %)	**Pass**
	Required Pier Length (98.6 %)	**Pass**
	Anchor bolt check (90.2 %)	**Pass**
OVERALL TOWER RATING = 98.6 %, Pass		

As per the results of the analysis, the existing tower **is in code compliance** for the proposed and existing antenna loads.

Maximum tower member stress **is less than allowable,** making **it in code compliance** under the TIA-222-G code and 2012 International Building Code (IBC 2012) requirements.

5. DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

6. ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained
- Tower erection was in accordance to manufacturer drawings
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction
- Foundation was constructed in accordance to manufacturer drawings
- Foundation does not have structural damage
- Bolts have been properly tightened according to manufacturer specifications
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information

7. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
179.25'±	1	10' Dipole	(1) Pipe Mount	(1) 1/2"	Town Of Roxbury
178.5'±	1	5' Omni	(1) Pipe Mount	(1) 7/8"	
141.5'±	1	18' Dipole	(2) Pipe Mounts	(2) 1/2"	
	1	10' Dipole			
18'±	1	Yagi	Leg Mounted	(1) 1/2"	
177'±	3	KMW ETCR-654L12H6 Antennas	(3) Sector Frames	(3) 1-1/4" Fiber	Sprint Nextel
	3	ALU 1900 Mhz Radios			
	6	ALU 800 Mhz Radios			
	3	ALU TD-RRH8x20-25 Radios			
163'±	3	BXA-70063-6CF-2 Antennas	(3) Sector Frames	(24) 1-5/8"	Verizon
	6	LPA-80080-6CF Antennas			
	3	BXA-171085-8CF-2 Antennas			
	6	FD9R6004/2C-3L Diplexers			
130'±	2	KMW AM-C-CD-16-65-00T-RET Antennas	(3) Sector Frames	(15) 1-5/8" (2) 3/4" DC Power (1) 7/16"	AT&T
	3	CSS DU04-8670 Antennas			
	1	Powerwave P65-17-XLH-RR Antennas			
	6	Powerwave 7770 Antennas			
	6	Powerwave TT19-08BP111-001 TMAs			
	6	Powerwave LGP21903 Diplexers			
	6	Ericsson RRUS 11 Radios			
	3	Raycap DC6-48-60-8-8F DF Surge			
	6	Powerwave 7020.30 DB RET			

FINAL SPRINT NEXTEL LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
177.0'±	**3**	**Commscope NNVV-65B-R4 Antenna**	(3) Sector Frames **(3) Tie Back Kit SPBT**	(4) 1-1/4" Fiber	Sprint Nextel
	3	**RFS APXVTM14-C-120 Antenna**			
	3	ALU 1900 Mhz RRU			
	6	ALU 800 Mhz RRU			
	3	ALU TD-RRH 8x20-25 RRU			

Notes:

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify ACGI if any potential physical and other interference with existing antennas for a redesign.

8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	P2.5x.203 (2.875 OD)	4	-11.884	60.269	19.7	Pass
T2	160 - 140	Leg	P3x.216 (3.5 OD)	44	-29.915	74.468	40.2	Pass
T3	140 - 120	Leg	P3.5x.226 (4 OD)	72	-53.238	98.046	54.3	Pass
T4	120 - 100	Leg	P5 x 0.258(5.563 OD)	97	-76.837	124.619	61.7	Pass
T5	100 - 80	Leg	P6 x 0.28 (6.625 OD)	117	-103.817	185.123	56.1	Pass
T6	80 - 60	Leg	P6 x 0.28 (6.625 OD)	137	-131.008	185.123	70.8	Pass
T7	60 - 40	Leg	P8x.332 (8.625 OD)	157	-158.700	368.199	43.1	Pass
T8	40 - 20	Leg	P8x.332 (8.625 OD)	177	-186.555	368.199	50.7	Pass
T9	20 - 0	Leg	P8x.332 (8.625 OD)	197	-214.129	368.199	58.2	Pass
T1	180 - 160	Diagonal	L1-3/4x1-3/4x3/16	13	-2.679	6.795	39.4	Pass
							45.7 (b)	
T2	160 - 140	Diagonal	L2 1/2x2 1/2x3/16	49	-3.847	12.293	31.3	Pass
							48.7 (b)	
T3	140 - 120	Diagonal	L3x3x3/16	77	-5.670	16.457	34.5	Pass
							72.2 (b)	
T4	120 - 100	Diagonal	L3 1/2x3 1/2x1/4	105	-6.781	21.598	31.4	Pass
							64.3 (b)	
T5	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	125	-7.101	18.474	38.4	Pass
							67.1 (b)	
T6	80 - 60	Diagonal	L4x4x1/4	142	-7.556	23.870	31.7	Pass
							71.2 (b)	
T7	60 - 40	Diagonal	L4x4x1/4	162	-8.214	20.582	39.9	Pass
							77.1 (b)	
T8	40 - 20	Diagonal	L4x4x3/8	181	-8.889	25.858	34.4	Pass
							71.5 (b)	
T9	20 - 0	Diagonal	L5x5x5/16	201	-9.692	37.986	25.5	Pass
							78.0 (b)	
T1	180 - 160	Top Girt	L1 3/4x1 3/4x3/16	5	-0.020	5.944	0.6	Pass
							Summary	
						Leg (T6)	70.8	Pass
						Diagonal (T9)	78.0	Pass
						Top Girt (T1)	0.6	Pass
						Bolt Checks	78.0	Pass
						RATING =	**78.0**	**Pass**

APPENDIX

TOWER DATA

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

Hazards by Location

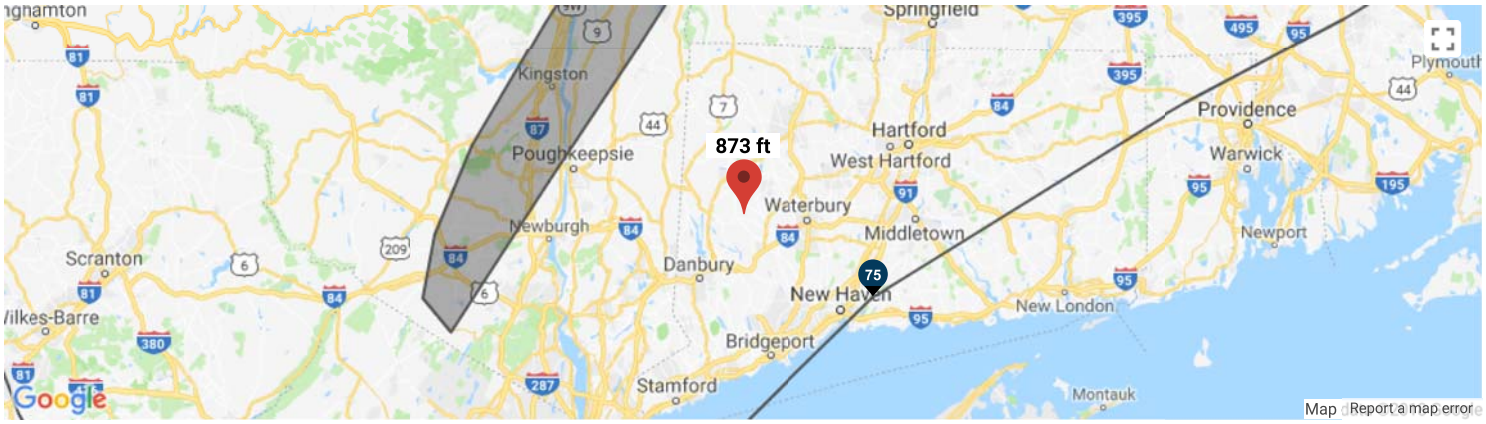
Search Information

Coordinates: 41.559528, -73.292306

Timestamp: 2018-06-01T23:15:33.907Z

Hazard Type: Wind

Map Results



Text Results

ASCE 7-16

MRI 10-Year	75 mph
MRI 25-Year	83 mph
MRI 50-Year	89 mph
MRI 100-Year	96 mph
Risk Category I	106 mph
Risk Category II	116 mph
Risk Category III	125 mph
Risk Category IV	129 mph

ASCE 7-10

MRI 10-Year	76 mph
MRI 25-Year	85 mph
MRI 50-Year	90 mph
MRI 100-Year	96 mph
Risk Category I	107 mph
Risk Category II	118 mph
Risk Category III-IV	125 mph

ASCE 7-05

ASCE 7-05 Wind Speed	97 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

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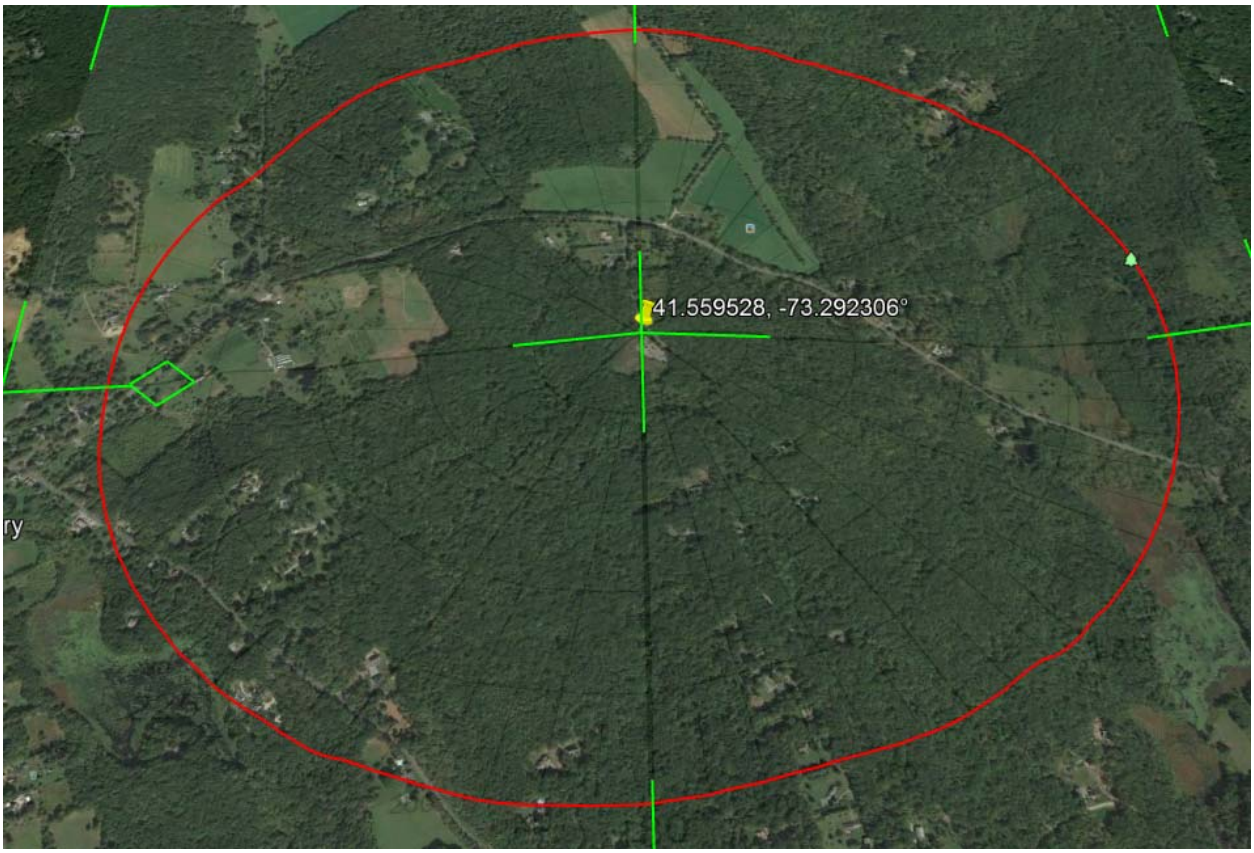
CT46125-A-03 ROXBURY-LOWER COUNTY RD.



Exposure Category C.
Topographic Category 1.

Design Maps Summary Report

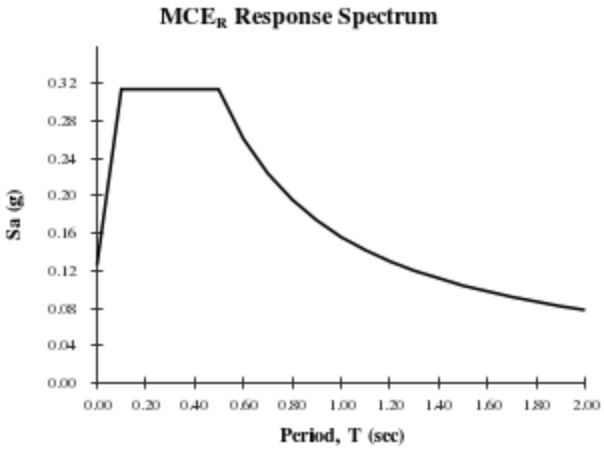
User–Specified Input

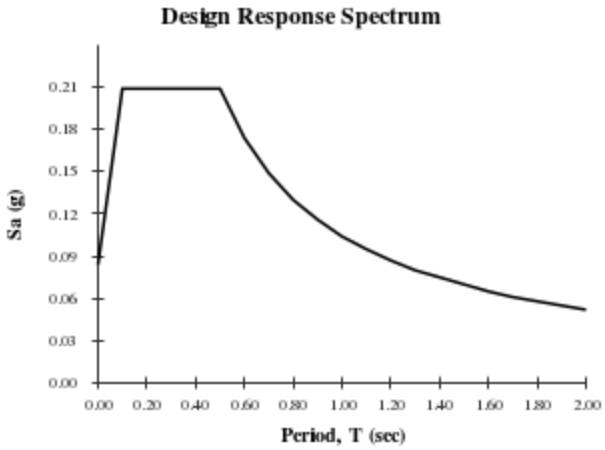
Report Title	CT46125-A-03 ROXBURY-LOWER COUNTY RD Fri June 1, 2018 23:21:01 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.55953°N, 73.29231°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

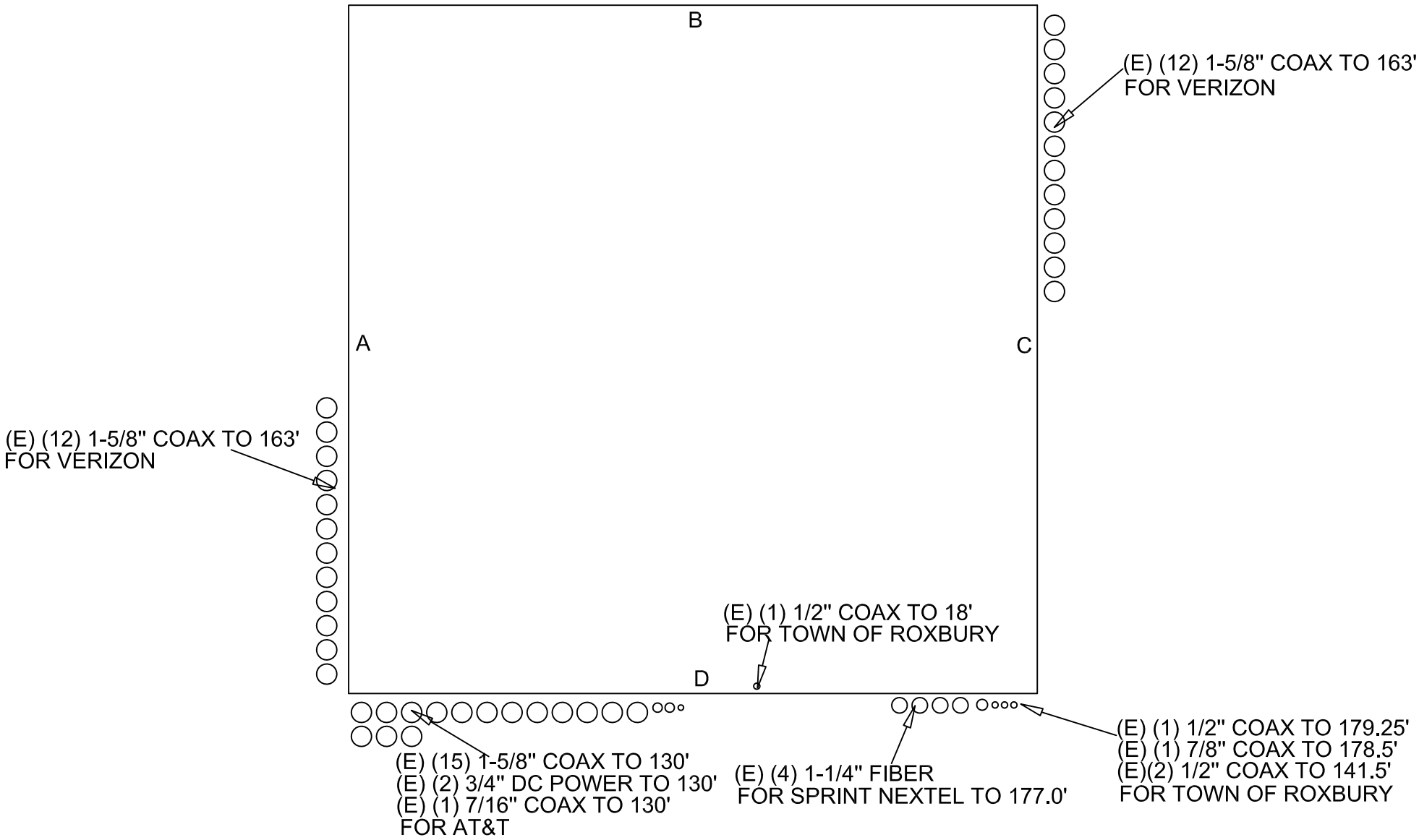
S_S =	0.196 g	S_{MS} =	0.314 g	S_{DS} =	0.209 g
S_1 =	0.065 g	S_{M1} =	0.156 g	S_{D1} =	0.104 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





COAX LAYOUT

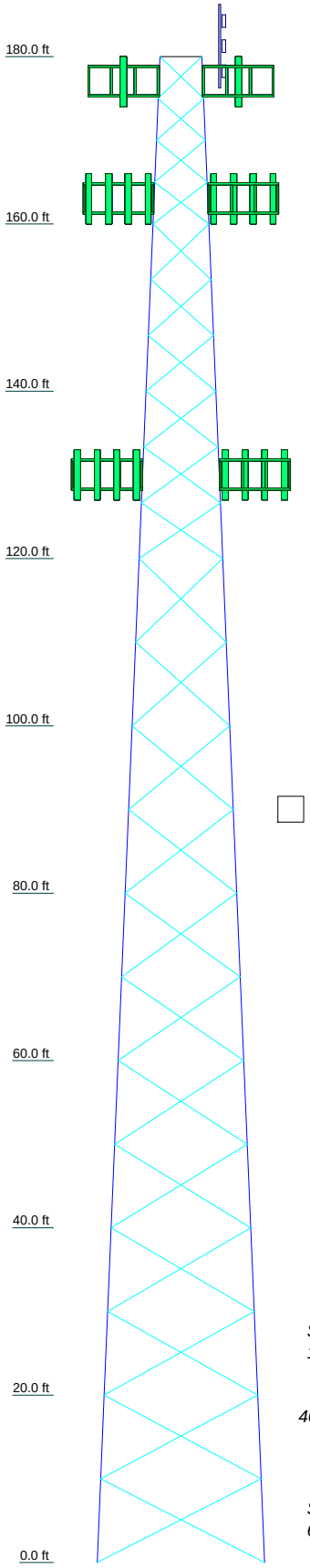


COAX LAYOUT

N.T.S.

TOWER ELEVATION DRAWING

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9				
Legs	P2.5x.203 (2.875 OD)	P3x.216 (3.5 OD)	P3.5x.226 (4 OD)	P5 x 0.258(5.563 OD)	P6 x 0.28 (6.625 OD)		P8x.332 (8.625 OD)						
Leg Grade	Nudd 54 ksi												
Diagonals	L1-3/4x1-3/4x3/16	L2 1/2x2 1/2x3/16	L3x3x3/16	L3 1/2x3 1/2x1/4		L4x4x1/4		L4x4x3/8	L5x5x5/16				
Diagonal Grade	A36												
Top Girts	L1 3/4x1 3/4x3/16	N.A.											
Face Width (ft)	5	6.66667	8.33333	10	11.6667	13.3333	15	16.6667	18.3333	20			
# Panels @ (ft)	4 @ 5	6 @ 6.66667				12 @ 10							
Weight (K)	1.1	1.4	1.8	2.5	3.0	3.4	4.6	5.8	6.2	29.7			



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
Nudd 54 ksi	54 ksi	65 ksi	A36	36 ksi	58 ksi

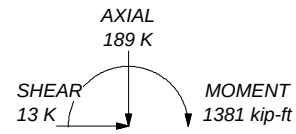
TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 91 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 78%

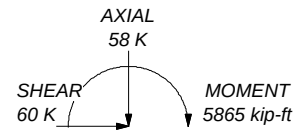
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 222 K
SHEAR: 24 K

UPLIFT: -196 K
SHEAR: 22 K



TORQUE 10 kip-ft
40 mph WIND - 1.000 in ICE

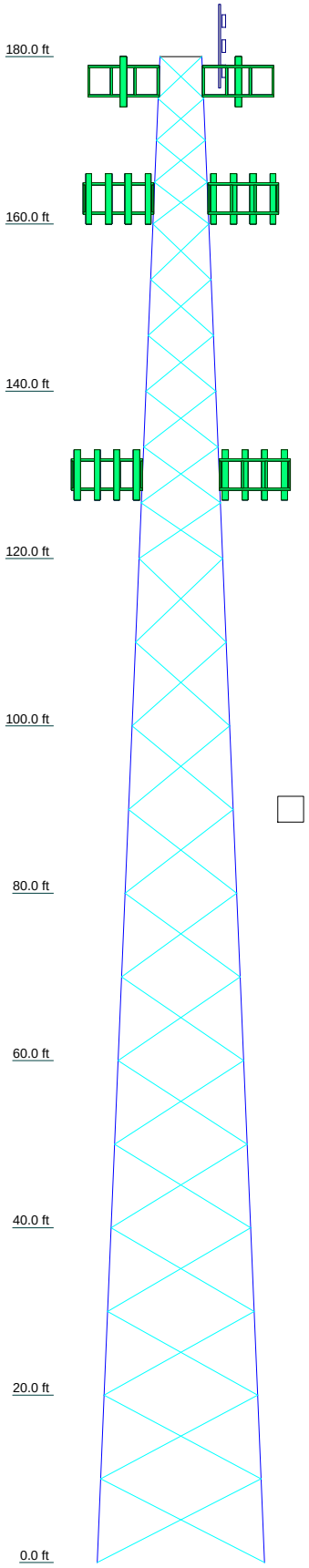


TORQUE 41 kip-ft
REACTIONS - 91 mph WIND

Allpro Consultants group inc
9221 lyndon B johson Freeway. Suite 204
Dalls Tx. 75243
Phone: 972 231 8893
FAX: 866 364 8375

Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation	Drawn by: bakech	App'd:	
Code: TIA-222-G	Date: 06/05/18	Scale: NTS	
Path:		Dwg No. E-1	

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9											
Legs	P2.5x.203 (2.875 OD)	P3x.216 (3.5 OD)	P3.5x.226 (4 OD)	P5 x 0.258(5.563 OD)	P6 x 0.28 (6.625 OD)			P8x.332 (8.625 OD)												
Leg Grade	Nudd 54 ksi																			
Diagonals	L1-3/4x1-3/4x3/16	L2 1/2x2 1/2x3/16	L3x3x3/16	L3 1/2x3 1/2x1/4		L4x4x1/4		L4x4x3/8	L5x5x5/16											
Diagonal Grade	A36																			
Top Girts	L1 3/4x1 3/4x3/16	N.A.																		
Face Width (ft)	5	6.66667	8.33333	10	11.6667	13.3333	15	16.6667	18.3333	20										
# Panels @ (ft)	4 @ 5	6 @ 6.66667				12 @ 10														
Weight (K)	1.1	1.4	1.8	2.5	3.0	3.4	4.6	5.8	6.2	29.7										



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10'x1.75" dipole (Town of Roxbury)	179.25	T-Frame Sector Mount (Verizon)	163
6'8"x4" Pipe Mount (Town of Roxbury)	179.25	BXA-70063-6CF-2 (Verizon)	163
08010 Omni (Town of Roxbury)	178.5	BXA-70063-6CF-2 (Verizon)	163
6'8"x4" Pipe Mount (Town of Roxbury)	178.5	BXA-70063-6CF-2 (Verizon)	163
APXVTM14-C-I20 (Sprint Nextel)	177	(2) LPA-80080/6CF (Verizon)	163
APXVTM14-C-I20 (Sprint Nextel)	177	10'x1.75" dipole (Town of Roxbury)	141.5
1900 MHz RRH (Sprint Nextel)	177	6'8"x4" Pipe Mount (Town of Roxbury)	141.5
1900 MHz RRH (Sprint Nextel)	177	18' Dipole (Town of Roxbury)	141.5
1900 MHz RRH (Sprint Nextel)	177	6'8"x4" Pipe Mount (Town of Roxbury)	141.5
(2) 800 MHz RRH (Sprint Nextel)	177	(2) 7770 (ATT)	130
(2) 800 MHz RRH (Sprint Nextel)	177	(2) TT19-08BP111-001 TMA (ATT)	130
(2) 800 MHz RRH (Sprint Nextel)	177	(2) TT19-08BP111-001 TMA (ATT)	130
TD-RRH8x20-25 (Sprint Nextel)	177	(2) TT19-08BP111-001 TMA (ATT)	130
TD-RRH8x20-25 (Sprint Nextel)	177	(2) LGP21903 Diplexer (ATT)	130
TD-RRH8x20-25 (Sprint Nextel)	177	(2) LGP21903 Diplexer (ATT)	130
T-Frame Sector Mount (Sprint Nextel)	177	(2) LGP21903 Diplexer (ATT)	130
T-Frame Sector Mount (Sprint Nextel)	177	(2) RRUS 11 (ATT)	130
T-Frame Sector Mount (Sprint Nextel)	177	(2) RRUS 11 (ATT)	130
Site Pro SPTB Tie Back (Sprint Nextel)	177	(2) RRUS 11 (ATT)	130
		DC6-48-60-18-8F (ATT)	130
Site Pro SPTB Tie Back (Sprint Nextel)	177	DC6-48-60-18-8F (ATT)	130
Site Pro SPTB Tie Back (Sprint Nextel)	177	DC6-48-60-18-8F (ATT)	130
		(2) 7020 RET (ATT)	130
NNVV-65B-R4 Antenna (Sprint Nextel)	177	(2) 7020 RET (ATT)	130
NNVV-65B-R4 Antenna (Sprint Nextel)	177	(2) 7020 RET (ATT)	130
NNVV-65B-R4 Antenna (Sprint Nextel)	177	T-Frame Sector Mount (ATT)	130
APXVTM14-C-I20 (Sprint Nextel)	177	T-Frame Sector Mount (ATT)	130
(2) LPA-80080/6CF (Verizon)	163	T-Frame Sector Mount (ATT)	130
(2) LPA-80080/6CF (Verizon)	163	AM-C-CD-16-65-00T-RET (ATT)	130
BXA-171085-8CF-2 (Verizon)	163	AM-C-CD-16-65-00T-RET (ATT)	130
BXA-171085-8CF-2 (Verizon)	163	DU04-8670 (ATT)	130
BXA-171085-8CF-2 (Verizon)	163	DU04-8670 (ATT)	130
(2) FDR9R6004/2C-3L (Verizon)	163	DU04-8670 (ATT)	130
(2) FDR9R6004/2C-3L (Verizon)	163	P65-17-XLH-RR (ATT)	130
(2) FDR9R6004/2C-3L (Verizon)	163	(2) 7770 (ATT)	130
T-Frame Sector Mount (Verizon)	163	(2) 7770 (ATT)	130
T-Frame Sector Mount (Verizon)	163	6' "Yagi" (Town of Roxbury)	18

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
Nudd 54 ksi	54 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 91 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft

Allpro Consultants group inc
9221 lyndon B johson Freeway. Suite 204
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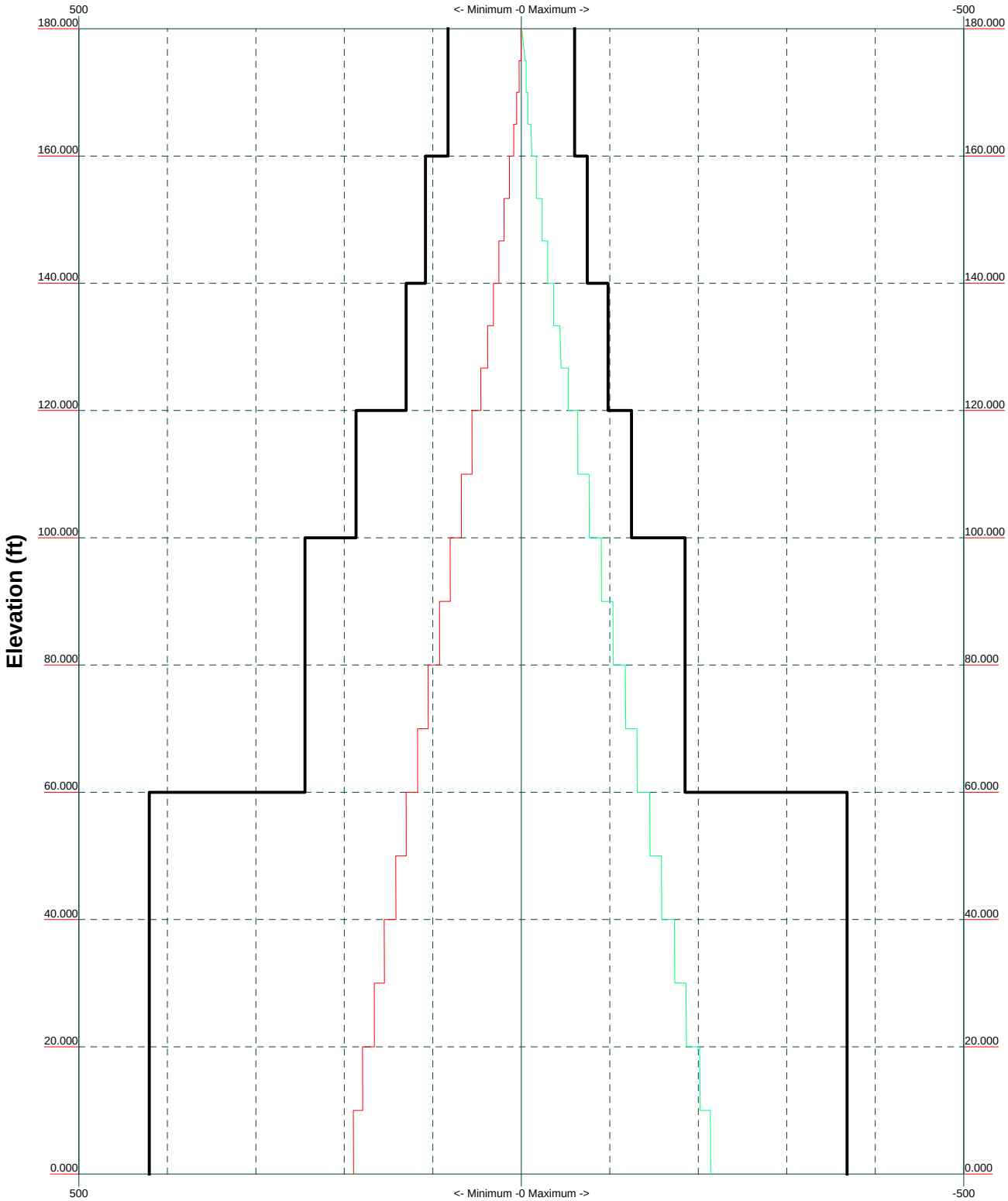
Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation	Drawn by: bakech	App'd:	
Code: TIA-222-G	Date: 06/05/18	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA-222-G - 91 mph/40 mph 1.000 in Ice Exposure C

Leg Capacity ——— **Leg Compression (K)**



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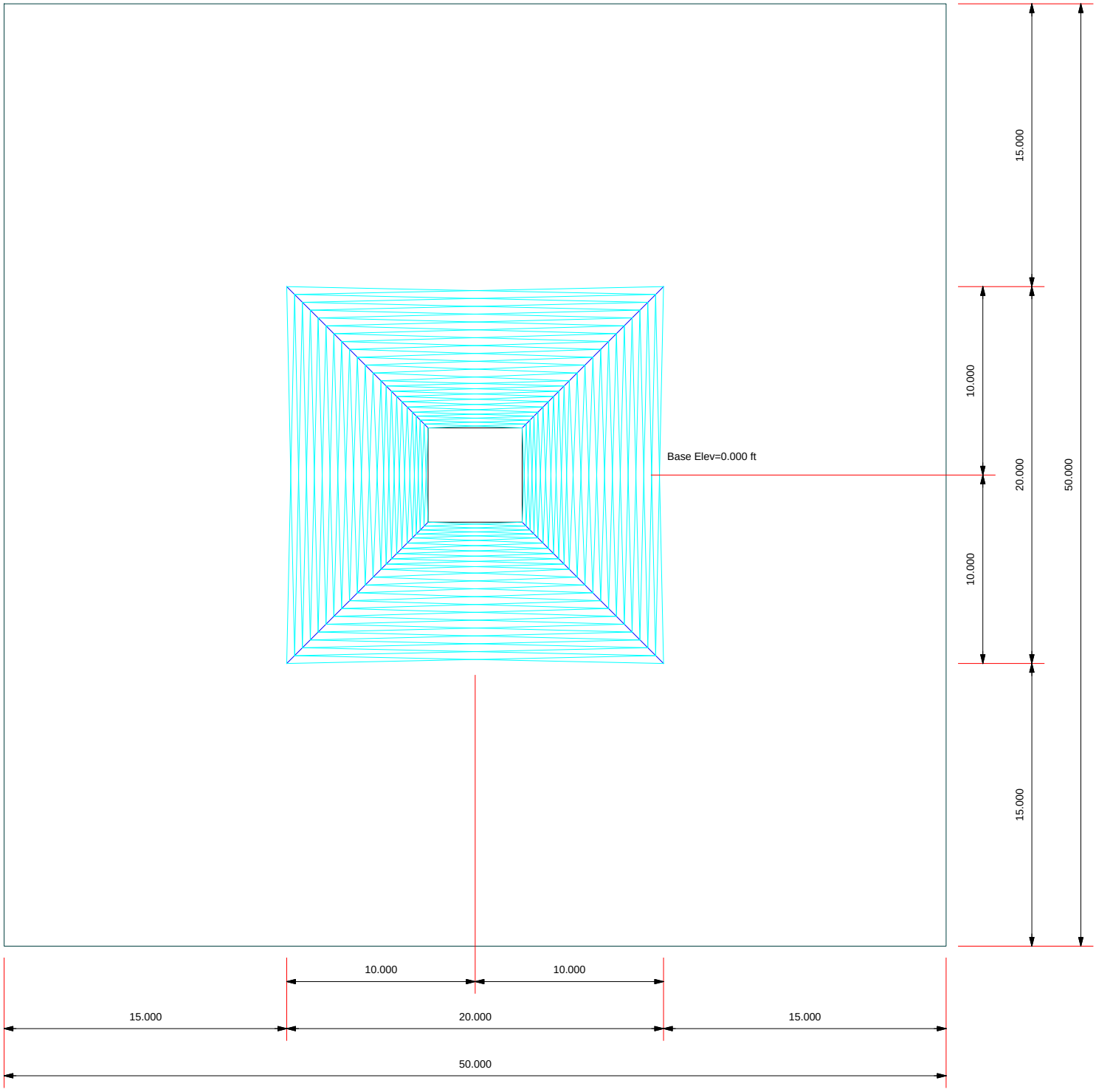
Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation	Drawn by: bakech	App'd:	
Code: TIA-222-G	Date: 06/05/18	Scale: NTS	
Path:		Dwg No. E-3	

Plot Plan
Total Area - 0.06 Acres



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9221 lyndon B johson Freeway. Suite 204
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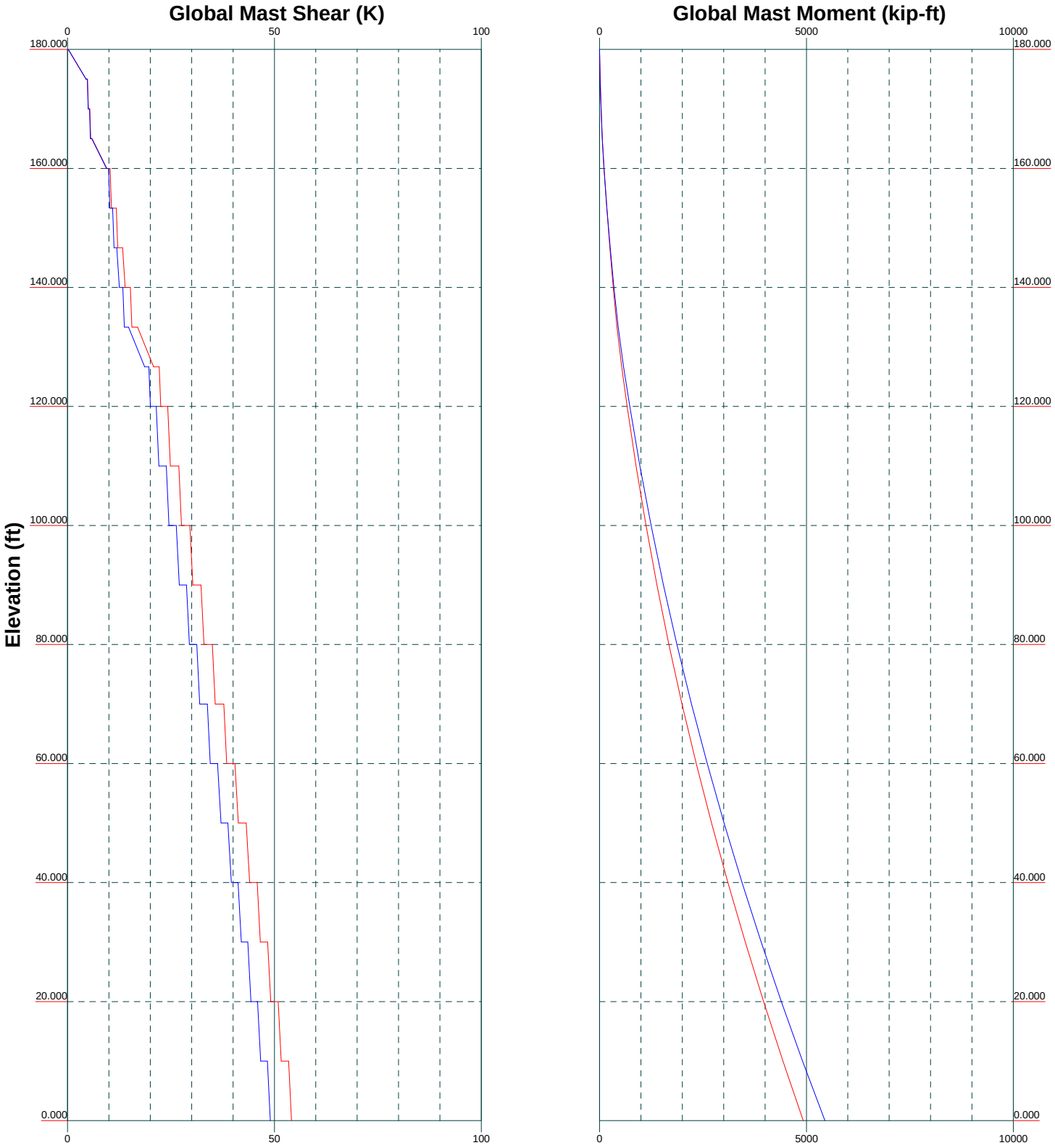
Phone: 972 231 8893
FAX: 866 364 8375

Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation		Drawn by: bakech	App'd:
Code: TIA-222-G		Date: 06/05/18	Scale: NTS
Path:			Dwg No. E-2

TIA-222-G - 91 mph/40 mph 1.000 in Ice Exposure C

Maximum Values

Vx Vz Mx Mz

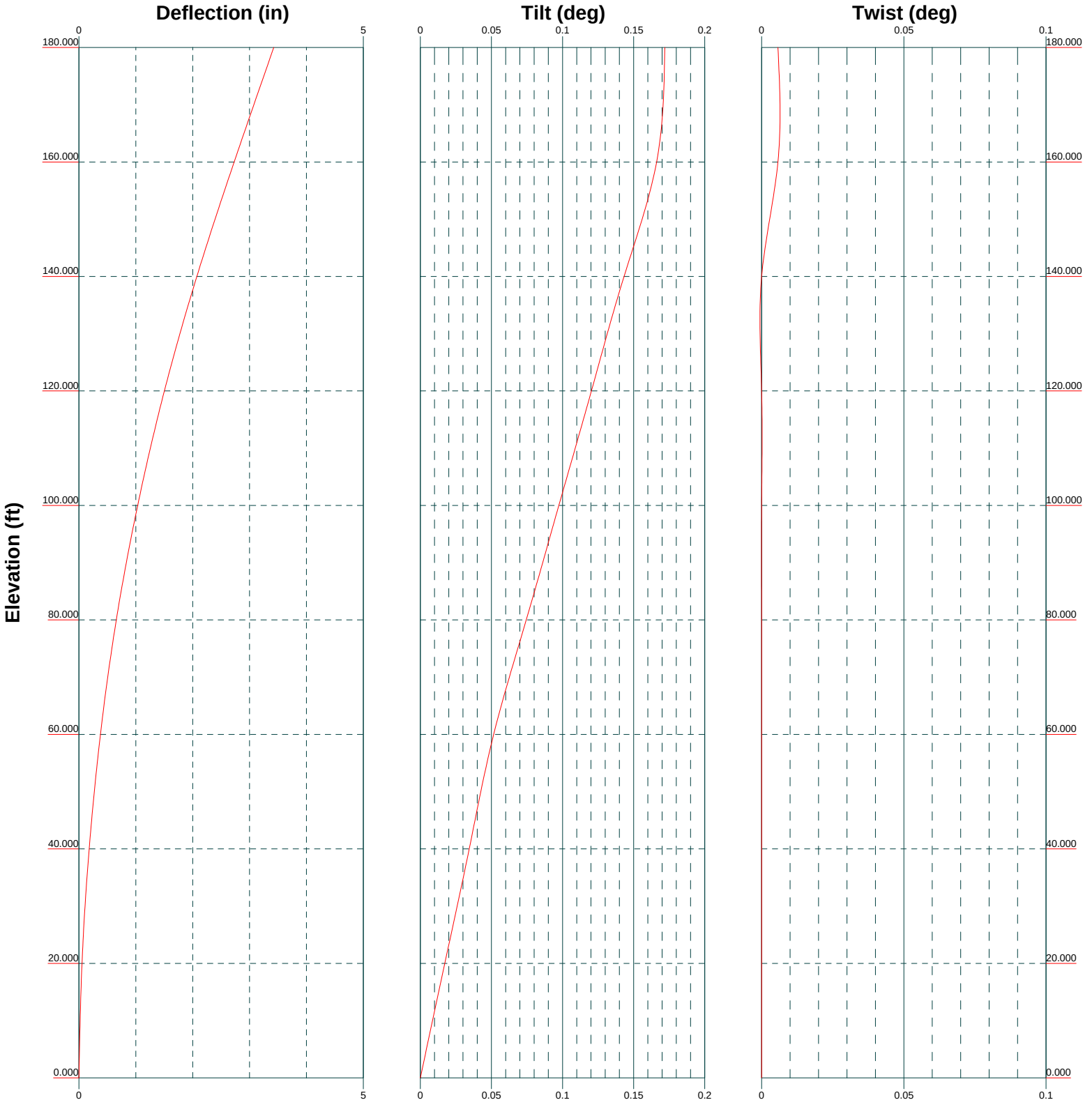


Allpro Consultants group inc
9221 lyndon B johson Freeway. Suite 204
Dalls Tx. 75243
Phone: 972 231 8893
FAX: 866 364 8375

Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation	Drawn by: bakech	App'd:	
Code: TIA-222-G	Date: 06/05/18	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values

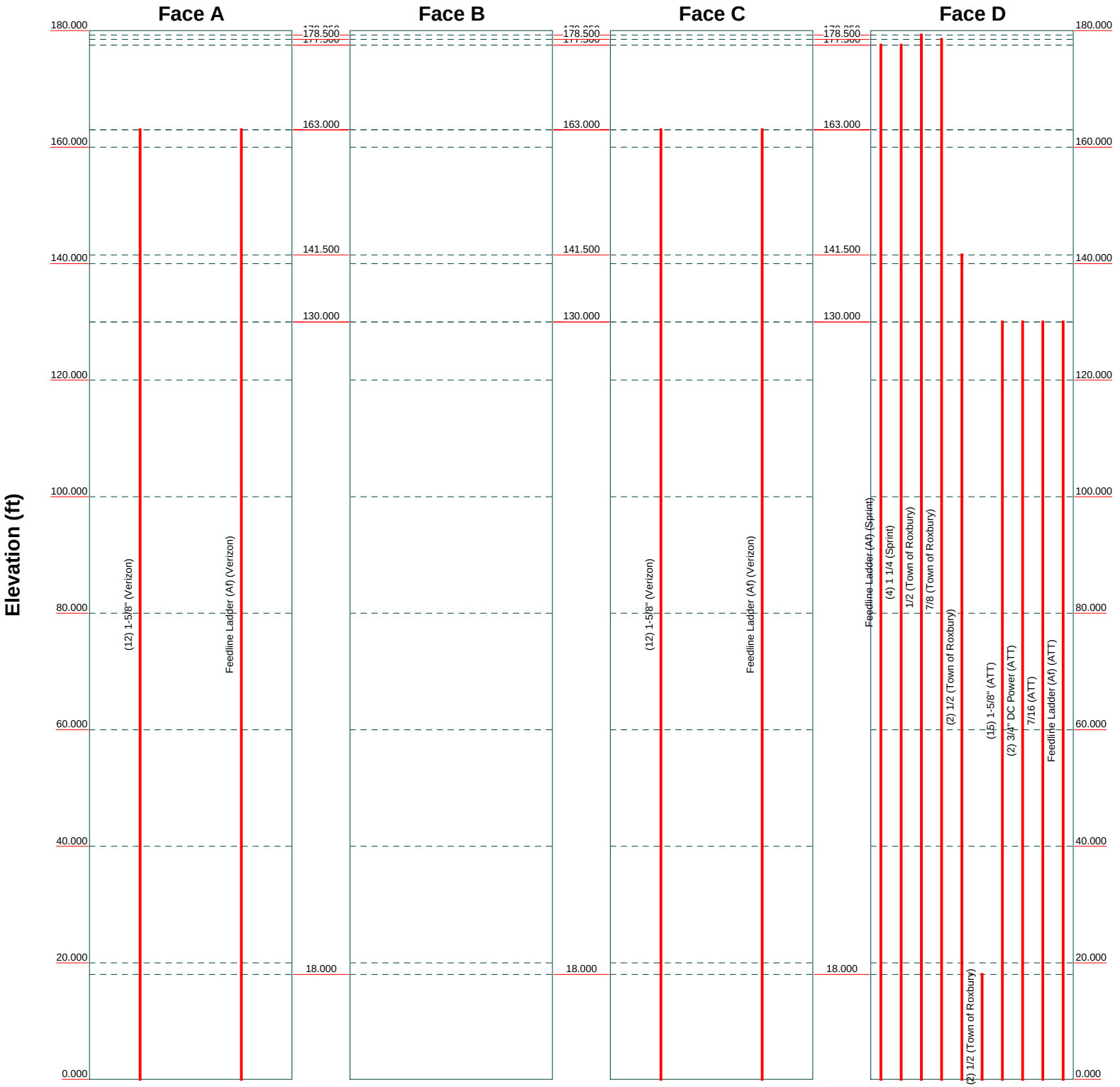


Allpro Consultants group inc
9221 lyndon B johson Freeway. Suite 204
Dalls Tx. 75243
Phone: 972 231 8893
FAX: 866 364 8375

Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation		Drawn by: bakech	App'd:
Code: TIA-222-G		Date: 06/05/18	Scale: NTS
Path:			Dwg No. E-5

Feed Line Distribution Chart
0' - 180'

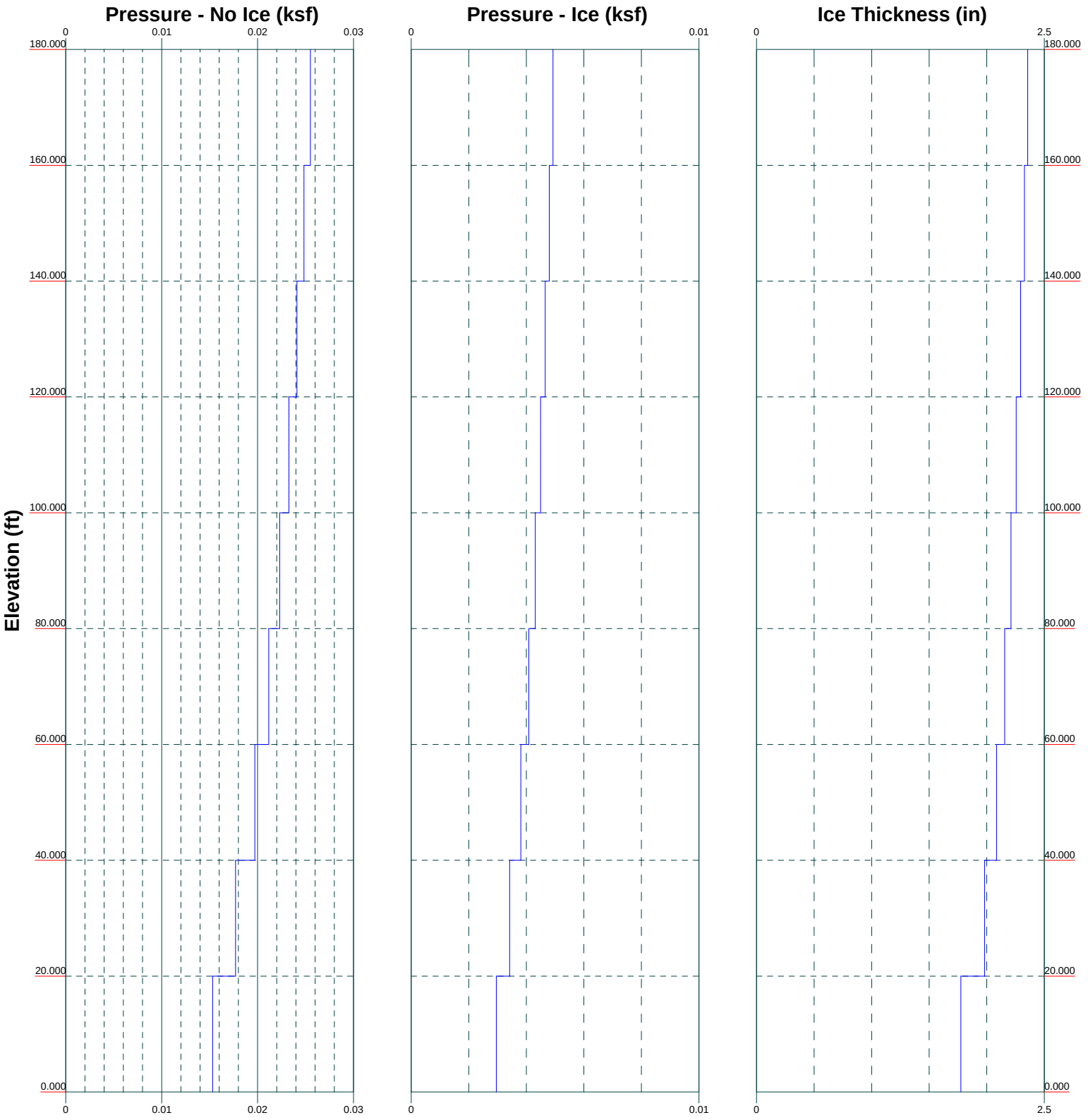
Round | Flat | App In Face | App Out Face | Truss Leg



Allpro Consultants group inc	Job: ***CT46125-A-03/ Roxbury-lower County Rd***
9221 lyndon B johson Freeway. Suite 204	Project: ***18-3703***
Dalls Tx. 75243	Client: SBA Communications Corporation — Drawn by: bakech — App'd:
Phone: 972 231 8893	Code: TIA-222-G — Date: 06/05/18 — Scale: NTS
FAX: 866 364 8375	Path: — Dwg No. E-7

Wind Pressures and Ice Thickness

TIA-222-G - 91 mph/40 mph 1.000 in Ice Exposure C



Allpro Consultants group inc
9221 lyndon B johson Freeway. Suite 204
Dalls Tx. 75243
Phone: 972 231 8893
FAX: 866 364 8375

Job: ***CT46125-A-03/ Roxbury-lower County Rd***			
Project: ***18-3703***			
Client: SBA Communications Corporation	Drawn by: bakech	App'd:	
Code: TIA-222-G	Date: 06/05/18	Scale: NTS	
Path:		Dwg No. E-9	

CALCULATION PRINTOUT

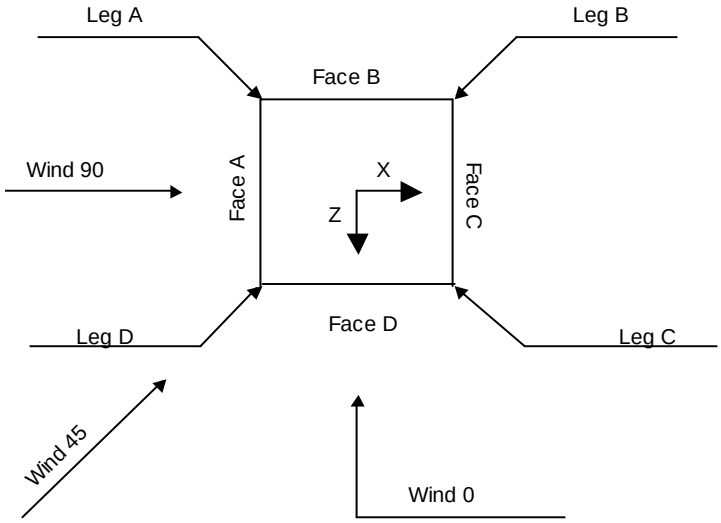
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 180.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 5.000 ft at the top and 20.000 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Litchfield County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 91 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
√	Use Diamond Inner Bracing (4 Sided)	√	Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.000-160.000			5.000	1	20.000
T2	160.000-140.000			6.667	1	20.000
T3	140.000-120.000			8.333	1	20.000
T4	120.000-100.000			10.000	1	20.000
T5	100.000-80.000			11.667	1	20.000
T6	80.000-60.000			13.333	1	20.000
T7	60.000-40.000			15.000	1	20.000
T8	40.000-20.000			16.667	1	20.000
T9	20.000-0.000			18.333	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.000-160.000	5.000	X Brace	No	No	0.000	0.000
T2	160.000-140.000	6.667	X Brace	No	No	0.000	0.000
T3	140.000-120.000	6.667	X Brace	No	No	0.000	0.000
T4	120.000-100.000	10.000	X Brace	No	No	0.000	0.000
T5	100.000-80.000	10.000	X Brace	No	No	0.000	0.000
T6	80.000-60.000	10.000	X Brace	No	No	0.000	0.000
T7	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T8	40.000-20.000	10.000	X Brace	No	No	0.000	0.000
T9	20.000-0.000	10.000	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 180.000-160.000	Pipe	P2.5x.203 (2.875 OD)	Nudd 54 ksi (54 ksi)	Equal Angle	L1-3/4x1-3/4x3/16	A36 (36 ksi)
T2 160.000-140.000	Pipe	P3x.216 (3.5 OD)	Nudd 54 ksi (54 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 140.000-120.000	Pipe	P3.5x.226 (4 OD)	Nudd 54 ksi (54 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T4 120.000-100.000	Pipe	P5 x 0.258(5.563 OD)	Nudd 54 ksi (54 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T5 100.000-80.000	Pipe	P6 x 0.28 (6.625 OD)	Nudd 54 ksi (54 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T6 80.000-60.000	Pipe	P6 x 0.28 (6.625 OD)	Nudd 54 ksi (54 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T7 60.000-40.000	Pipe	P8x.332 (8.625 OD)	Nudd 54 ksi (54 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T8 40.000-20.000	Pipe	P8x.332 (8.625 OD)	Nudd 54 ksi (54 ksi)	Single Angle	L4x4x3/8	A36 (36 ksi)
T9 20.000-0.000	Pipe	P8x.332 (8.625 OD)	Nudd 54 ksi (54 ksi)	Single Angle	L5x5x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.000-160.000	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.000-160.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T2 160.000-140.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T3 140.000-120.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T4 120.000-100.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T5 100.000-80.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T6 80.000-60.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T7 60.000-40.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T8 40.000-20.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000
T9 20.000-0.000	0.000	0.000	A36 (36 ksi)	1	1	1.05	0.000	0.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.000-160.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.000-140.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.000-120.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.000-100.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.000-80.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T6 80.000-60.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.000-40.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.000-20.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.000-0.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	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 180.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	1	0.000	0.75	0.000	0.75
T2 160.000-140.000	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
T3 140.000-120.000	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
T4 120.000-100.000	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
T5 100.000-80.000	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 80.000-60.000	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 60.000-40.000	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 40.000-20.000	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 20.000-0.000	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 180.000-160.000	Flange	0.750 A325N	4	0.500 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	1	0.000 A325N	0
T2 160.000-140.000	Flange	0.750 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	1.000 A325N	0	0.625 A325N	1	0.000 A325N	0
T3 140.000-120.000	Flange	1.000 A325N	6	0.625 A325N	1	0.625 A325N	1	0.000 A325N	0	1.000 A325N	0	0.625 A325N	1	0.000 A325N	0
T4 120.000-100.000	Flange	1.000 A325N	8	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	1.000 A325N	0	0.625 A325N	1	0.000 A325N	0
T5 100.000-80.000	Flange	1.000 A325N	8	0.625 A325N	1	0.625 A325N	1	0.000 A325N	0	1.000 A325N	0	0.625 A325N	1	0.625 A325N	1
T6 80.000-60.000	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	1.000 A325N	0	0.625 A325N	1	0.000 A325N	0
T7 60.000-40.000	Flange	1.250 A325N	8	0.625 A325N	1	0.625 A325N	1	0.000 A325N	0	1.000 A325N	0	0.000 A325N	0	0.000 A325N	0
T8 40.000-20.000	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	1.000 A325N	0	0.000 A325N	0	0.000 A325N	0

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.
T9 20.000-0.000	Flange	1.250 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325N	0	1.000 A325N	0	0.000 A325N	0	0.625 A325N	1

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
Feedline Ladder (Af) (Sprint)	D	No	Af (CaAa)	177.500 - 0.000	0.000	0	1	1	1.500	3.000		0.008
1 1/4 (Sprint)	D	No	Ar (CaAa)	177.500 - 0.000	0.000	0	4	4	0.500	1.550		0.001
********** *												
1/2 (Town of Roxbury)	D	No	Ar (CaAa)	179.250 - 0.000	0.000	0.45	1	1	0.500	0.580		0.000
7/8 (Town of Roxbury)	D	No	Ar (CaAa)	178.500 - 0.000	0.000	0.45	1	1	0.500	1.110		0.001
1/2 (Town of Roxbury)	D	No	Ar (CaAa)	141.500 - 0.000	0.000	0.45	2	2	0.500	0.580		0.000
1/2 (Town of Roxbury)	D	No	Ar (CaAa)	18.000 - 0.000	0.000	0	2	2	0.500	0.580		0.000
********** **												
1-5/8" (Verizon)	A	No	Ar (CaAa)	163.000 - 0.000	0.000	-0.3	12	12	0.500	1.980		0.001
1-5/8" (Verizon)	C	No	Ar (CaAa)	163.000 - 0.000	0.000	-0.3	12	12	0.500	1.980		0.001
Feedline Ladder (Af) (Verizon)	A	No	Af (CaAa)	163.000 - 0.000	0.000	-0.3	1	1	1.500	3.000		0.008
Feedline Ladder (Af) (Verizon)	C	No	Af (CaAa)	163.000 - 0.000	0.000	-0.3	1	1	1.500	3.000		0.008
********** *												
1-5/8" (ATT)	D	No	Ar (CaAa)	130.000 - 0.000	0.000	-0.3	15	12	0.500	1.980		0.001
3/4" DC Power (ATT)	D	No	Ar (CaAa)	130.000 - 0.000	0.000	-0.35	2	2	0.500	0.865		0.000
7/16 (ATT)	D	No	Ar (CaAa)	130.000 - 0.000	0.000	-0.35	1	1	0.500	0.560		0.000
Feedline Ladder (Af) (ATT)	D	No	Af (CaAa)	130.000 - 0.000	0.000	-0.35	1	1	1.500	3.000		0.008

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	180.000-160.000	A	0.000	0.000	8.628	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	8.628	0.000	0.055
		D	0.000	0.000	22.770	0.000	0.208
T2	160.000-140.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	25.954	0.000	0.237
T3	140.000-120.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	65.090	0.000	0.459
T4	120.000-100.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	102.080	0.000	0.672
T5	100.000-80.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	102.080	0.000	0.672
T6	80.000-60.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	102.080	0.000	0.672
T7	60.000-40.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	102.080	0.000	0.672
T8	40.000-20.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	102.080	0.000	0.672
T9	20.000-0.000	A	0.000	0.000	57.520	0.000	0.365
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	57.520	0.000	0.365
		D	0.000	0.000	104.168	0.000	0.681

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	180.000-160.000	A	2.356	0.000	0.000	15.898	0.000	0.323
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	15.898	0.000	0.323
		D		0.000	0.000	68.369	0.000	1.311
T2	160.000-140.000	A	2.327	0.000	0.000	105.699	0.000	2.130
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	105.699	0.000	2.130
		D		0.000	0.000	77.402	0.000	1.463
T3	140.000-120.000	A	2.294	0.000	0.000	105.373	0.000	2.103
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	105.373	0.000	2.103
		D		0.000	0.000	164.959	0.000	2.978
T4	120.000-100.000	A	2.256	0.000	0.000	104.999	0.000	2.073

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	104.999	0.000	2.073
		D		0.000	0.000	232.620	0.000	4.246
T5	100.000-80.000	A	2.211	0.000	0.000	104.557	0.000	2.036
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	104.557	0.000	2.036
		D		0.000	0.000	230.520	0.000	4.157
T6	80.000-60.000	A	2.156	0.000	0.000	104.017	0.000	1.993
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	104.017	0.000	1.993
		D		0.000	0.000	227.948	0.000	4.050
T7	60.000-40.000	A	2.085	0.000	0.000	103.316	0.000	1.936
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	103.316	0.000	1.936
		D		0.000	0.000	224.607	0.000	3.913
T8	40.000-20.000	A	1.981	0.000	0.000	102.297	0.000	1.854
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	102.297	0.000	1.854
		D		0.000	0.000	219.748	0.000	3.717
T9	20.000-0.000	A	1.775	0.000	0.000	100.281	0.000	1.696
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	100.281	0.000	1.696
		D		0.000	0.000	225.073	0.000	3.473

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.000-160.000	-4.143	16.215	-8.782	22.628
T2	160.000-140.000	-2.992	5.486	-6.525	9.975
T3	140.000-120.000	11.429	11.346	2.431	18.692
T4	120.000-100.000	20.764	17.091	11.242	25.868
T5	100.000-80.000	23.958	19.665	13.085	29.606
T6	80.000-60.000	27.153	22.239	14.992	33.247
T7	60.000-40.000	30.347	24.813	16.997	36.735
T8	40.000-20.000	33.542	27.386	19.191	39.936
T9	20.000-0.000	36.118	30.709	21.004	44.407

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Feedline Ladder (Af)	160.00 - 177.50	0.6000	0.5386
T1	2	1 1/4	160.00 - 177.50	0.6000	0.5386
T1	4	1/2	160.00 - 179.25	0.6000	0.5386
T1	5	7/8	160.00 - 178.50	0.6000	0.5386

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	10	1-5/8"	160.00 - 163.00	0.6000	0.5386
T1	11	1-5/8"	160.00 - 163.00	0.6000	0.5386
T1	12	Feedline Ladder (Af)	160.00 - 163.00	0.6000	0.5386
T1	13	Feedline Ladder (Af)	160.00 - 163.00	0.6000	0.5386
T2	1	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T2	2	1 1/4	140.00 - 160.00	0.6000	0.6000
T2	4	1/2	140.00 - 160.00	0.6000	0.6000
T2	5	7/8	140.00 - 160.00	0.6000	0.6000
T2	6	1/2	140.00 - 141.50	0.6000	0.6000
T2	10	1-5/8"	140.00 - 160.00	0.6000	0.6000
T2	11	1-5/8"	140.00 - 160.00	0.6000	0.6000
T2	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T2	13	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	1	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	2	1 1/4	120.00 - 140.00	0.6000	0.6000
T3	4	1/2	120.00 - 140.00	0.6000	0.6000
T3	5	7/8	120.00 - 140.00	0.6000	0.6000
T3	6	1/2	120.00 - 140.00	0.6000	0.6000
T3	10	1-5/8"	120.00 - 140.00	0.6000	0.6000
T3	11	1-5/8"	120.00 - 140.00	0.6000	0.6000
T3	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	13	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T3	15	1-5/8"	120.00 - 130.00	0.6000	0.6000
T3	16	3/4" DC Power	120.00 - 130.00	0.6000	0.6000
T3	17	7/16	120.00 - 130.00	0.6000	0.6000
T3	18	Feedline Ladder (Af)	120.00 - 130.00	0.6000	0.6000
T4	1	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	2	1 1/4	100.00 - 120.00	0.6000	0.6000
T4	4	1/2	100.00 - 120.00	0.6000	0.6000
T4	5	7/8	100.00 - 120.00	0.6000	0.6000
T4	6	1/2	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	10	1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	11	1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	15	1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	16	3/4" DC Power	100.00 - 120.00	0.6000	0.6000
T4	17	7/16	100.00 - 120.00	0.6000	0.6000
T4	18	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	1	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	2	1 1/4	80.00 - 100.00	0.6000	0.6000
T5	4	1/2	80.00 - 100.00	0.6000	0.6000
T5	5	7/8	80.00 - 100.00	0.6000	0.6000
T5	6	1/2	80.00 - 100.00	0.6000	0.6000
T5	10	1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	11	1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T5	15	1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	16	3/4" DC Power	80.00 - 100.00	0.6000	0.6000
T5	17	7/16	80.00 - 100.00	0.6000	0.6000
T5	18	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	1	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	2	1 1/4	60.00 - 80.00	0.6000	0.6000
T6	4	1/2	60.00 - 80.00	0.6000	0.6000
T6	5	7/8	60.00 - 80.00	0.6000	0.6000
T6	6	1/2	60.00 - 80.00	0.6000	0.6000
T6	10	1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	11	1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T6	15	1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	16	3/4" DC Power	60.00 - 80.00	0.6000	0.6000
T6	17	7/16	60.00 - 80.00	0.6000	0.6000
T6	18	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	1	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	2	1 1/4	40.00 - 60.00	0.6000	0.6000
T7	4	1/2	40.00 - 60.00	0.6000	0.6000
T7	5	7/8	40.00 - 60.00	0.6000	0.6000
T7	6	1/2	40.00 - 60.00	0.6000	0.6000
T7	10	1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	11	1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	13	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T7	15	1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	16	3/4" DC Power	40.00 - 60.00	0.6000	0.6000
T7	17	7/16	40.00 - 60.00	0.6000	0.6000
T7	18	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	1	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	2	1 1/4	20.00 - 40.00	0.6000	0.6000
T8	4	1/2	20.00 - 40.00	0.6000	0.6000
T8	5	7/8	20.00 - 40.00	0.6000	0.6000
T8	6	1/2	20.00 - 40.00	0.6000	0.6000
T8	10	1-5/8"	20.00 - 40.00	0.6000	0.6000
T8	11	1-5/8"	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	13	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T8	15	1-5/8"	20.00 - 40.00	0.6000	0.6000
T8	16	3/4" DC Power	20.00 - 40.00	0.6000	0.6000
T8	17	7/16	20.00 - 40.00	0.6000	0.6000
T8	18	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	1	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	2	1 1/4	0.00 - 20.00	0.6000	0.6000
T9	4	1/2	0.00 - 20.00	0.6000	0.6000
T9	5	7/8	0.00 - 20.00	0.6000	0.6000
T9	6	1/2	0.00 - 20.00	0.6000	0.6000
T9	7	1/2	0.00 - 18.00	0.6000	0.6000
T9	10	1-5/8"	0.00 - 20.00	0.6000	0.6000
T9	11	1-5/8"	0.00 - 20.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	13	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T9	15	1-5/8"	0.00 - 20.00	0.6000	0.6000
T9	16	3/4" DC Power	0.00 - 20.00	0.6000	0.6000
T9	17	7/16	0.00 - 20.00	0.6000	0.6000
T9	18	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

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
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NNVV-65B-R4 Antenna	A	From Leg	3.000	0.000	177.000	No Ice	12.271	5.750	0.085
(Sprint Nextel)			0.000			1/2" Ice	12.766	6.207	0.157
			0.000			1" Ice	13.268	6.671	0.236
NNVV-65B-R4 Antenna	B	From Leg	3.000	0.000	177.000	No Ice	12.271	5.750	0.085
(Sprint Nextel)			0.000			1/2" Ice	12.766	6.207	0.157
			0.000			1" Ice	13.268	6.671	0.236
NNVV-65B-R4 Antenna	C	From Leg	3.000	0.000	177.000	No Ice	12.271	5.750	0.085
(Sprint Nextel)			0.000			1/2" Ice	12.766	6.207	0.157
			0.000			1" Ice	13.268	6.671	0.236
APXVTM14-C-I20	A	From Leg	3.000	0.000	177.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
APXVTM14-C-I20	B	From Leg	3.000	0.000	177.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
APXVTM14-C-I20	C	From Leg	3.000	0.000	177.000	No Ice	6.342	3.607	0.056
(Sprint Nextel)			0.000			1/2" Ice	6.716	3.967	0.096
			0.000			1" Ice	7.097	4.333	0.140
1900 MHz RRH	A	From Leg	3.000	0.000	177.000	No Ice	2.313	2.375	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.517	2.581	0.074
			0.000			1" Ice	2.728	2.794	0.101
1900 MHz RRH	B	From Leg	3.000	0.000	177.000	No Ice	2.313	2.375	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.517	2.581	0.074
			0.000			1" Ice	2.728	2.794	0.101

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
1900 MHz RRH	C	From Leg	3.000	0.000	177.000	No Ice	2.313	2.375	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.517	2.581	0.074
			0.000			1" Ice	2.728	2.794	0.101
(2) 800 MHz RRH	B	From Leg	3.000	0.000	177.000	No Ice	2.058	1.710	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.240	1.879	0.071
			0.000			1" Ice	2.429	2.056	0.094
(2) 800 MHz RRH	A	From Leg	3.000	0.000	177.000	No Ice	2.058	1.710	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.240	1.879	0.071
			0.000			1" Ice	2.429	2.056	0.094
(2) 800 MHz RRH	D	From Leg	3.000	0.000	177.000	No Ice	2.058	1.710	0.050
(Sprint Nextel)			0.000			1/2" Ice	2.240	1.879	0.071
			0.000			1" Ice	2.429	2.056	0.094
TD-RRH8x20-25	A	From Leg	3.000	0.000	177.000	No Ice	3.704	1.294	0.066
(Sprint Nextel)			0.000			1/2" Ice	3.946	1.465	0.090
			0.000			1" Ice	4.196	1.642	0.117
TD-RRH8x20-25	B	From Leg	3.000	0.000	177.000	No Ice	3.704	1.294	0.066
(Sprint Nextel)			0.000			1/2" Ice	3.946	1.465	0.090
			0.000			1" Ice	4.196	1.642	0.117
TD-RRH8x20-25	D	From Leg	3.000	0.000	177.000	No Ice	3.704	1.294	0.066
(Sprint Nextel)			0.000			1/2" Ice	3.946	1.465	0.090
			0.000			1" Ice	4.196	1.642	0.117
T-Frame Sector Mount	A	From Leg	1.500	0.000	177.000	No Ice	13.600	10.800	0.465
(Sprint Nextel)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
T-Frame Sector Mount	B	From Leg	1.500	0.000	177.000	No Ice	13.600	10.800	0.465
(Sprint Nextel)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
T-Frame Sector Mount	D	From Leg	1.500	0.000	177.000	No Ice	13.600	10.800	0.465
(Sprint Nextel)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
Site Pro SPTB Tie Back	A	From Leg	1.500	0.000	177.000	No Ice	1.445	2.494	0.088
(Sprint Nextel)			0.000			1/2" Ice	1.963	3.572	0.124
			0.000			1" Ice	2.481	4.650	0.159
Site Pro SPTB Tie Back	B	From Leg	1.500	0.000	177.000	No Ice	1.445	2.494	0.088
(Sprint Nextel)			0.000			1/2" Ice	1.963	3.572	0.124
			0.000			1" Ice	2.481	4.650	0.159
Site Pro SPTB Tie Back	C	From Leg	1.500	0.000	177.000	No Ice	1.445	2.494	0.088
(Sprint Nextel)			0.000			1/2" Ice	1.963	3.572	0.124
			0.000			1" Ice	2.481	4.650	0.159
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BXA-70063-6CF-2	A	From Leg	3.000	0.000	163.000	No Ice	8.024	4.642	0.017
(Verizon)			0.000			1/2" Ice	8.480	5.088	0.063
			0.000			1" Ice	8.943	5.542	0.116
BXA-70063-6CF-2	B	From Leg	3.000	0.000	163.000	No Ice	8.024	4.642	0.017
(Verizon)			0.000			1/2" Ice	8.480	5.088	0.063
			0.000			1" Ice	8.943	5.542	0.116
BXA-70063-6CF-2	D	From Leg	3.000	0.000	163.000	No Ice	8.024	4.642	0.017
(Verizon)			0.000			1/2" Ice	8.480	5.088	0.063
			0.000			1" Ice	8.943	5.542	0.116
(2) LPA-80080/6CF	B	From Leg	3.000	0.000	163.000	No Ice	4.326	8.619	0.021
(Verizon)			0.000			1/2" Ice	4.764	9.075	0.069
			0.000			1" Ice	5.210	9.539	0.123
(2) LPA-80080/6CF	A	From Leg	3.000	0.000	163.000	No Ice	4.326	8.619	0.021
(Verizon)			0.000			1/2" Ice	4.764	9.075	0.069
			0.000			1" Ice	5.210	9.539	0.123
(2) LPA-80080/6CF	D	From Leg	3.000	0.000	163.000	No Ice	4.326	8.619	0.021
(Verizon)			0.000			1/2" Ice	4.764	9.075	0.069

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			1" Ice	5.210	9.539	0.123
BXA-171085-8CF-2	A	From Leg	3.000	0.000	163.000	No Ice	7.059	4.273	0.050
(Verizon)			0.000			1/2" Ice	7.486	4.694	0.092
			0.000			1" Ice	7.920	5.122	0.140
BXA-171085-8CF-2	B	From Leg	3.000	0.000	163.000	No Ice	7.059	4.273	0.050
(Verizon)			0.000			1/2" Ice	7.486	4.694	0.092
			0.000			1" Ice	7.920	5.122	0.140
BXA-171085-8CF-2	D	From Leg	3.000	0.000	163.000	No Ice	7.059	4.273	0.050
(Verizon)			0.000			1/2" Ice	7.486	4.694	0.092
			0.000			1" Ice	7.920	5.122	0.140
(2) FDR9R6004/2C-3L	A	From Leg	3.000	0.000	163.000	No Ice	0.314	0.076	0.006
(Verizon)			0.000			1/2" Ice	0.386	0.119	0.008
			0.000			1" Ice	0.466	0.169	0.011
(2) FDR9R6004/2C-3L	B	From Leg	3.000	0.000	163.000	No Ice	0.314	0.076	0.006
(Verizon)			0.000			1/2" Ice	0.386	0.119	0.008
			0.000			1" Ice	0.466	0.169	0.011
(2) FDR9R6004/2C-3L	D	From Leg	3.000	0.000	163.000	No Ice	0.314	0.076	0.006
(Verizon)			0.000			1/2" Ice	0.386	0.119	0.008
			0.000			1" Ice	0.466	0.169	0.011
T-Frame Sector Mount	A	From Leg	1.500	0.000	163.000	No Ice	13.600	10.800	0.465
(Verizon)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
T-Frame Sector Mount	B	From Leg	1.500	0.000	163.000	No Ice	13.600	10.800	0.465
(Verizon)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
T-Frame Sector Mount	D	From Leg	1.500	0.000	163.000	No Ice	13.600	10.800	0.465
(Verizon)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
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AM-C-CD-16-65-00T-RET	A	From Leg	3.000	0.000	130.000	No Ice	8.024	4.642	0.060
(ATT)			0.000			1/2" Ice	8.480	5.088	0.106
			0.000			1" Ice	8.943	5.542	0.159
AM-C-CD-16-65-00T-RET	B	From Leg	3.000	0.000	130.000	No Ice	8.024	4.642	0.060
(ATT)			0.000			1/2" Ice	8.480	5.088	0.106
			0.000			1" Ice	8.943	5.542	0.159
DU04-8670	A	From Leg	3.000	0.000	130.000	No Ice	6.065	3.009	0.060
(ATT)			0.000			1/2" Ice	6.412	3.331	0.097
			0.000			1" Ice	6.765	3.660	0.140
DU04-8670	B	From Leg	3.000	0.000	130.000	No Ice	6.065	3.009	0.060
(ATT)			0.000			1/2" Ice	6.412	3.331	0.097
			0.000			1" Ice	6.765	3.660	0.140
DU04-8670	D	From Leg	3.000	0.000	130.000	No Ice	6.065	3.009	0.060
(ATT)			0.000			1/2" Ice	6.412	3.331	0.097
			0.000			1" Ice	6.765	3.660	0.140
P65-17-XLH-RR	D	From Leg	3.000	0.000	130.000	No Ice	11.467	6.800	0.059
(ATT)			0.000			1/2" Ice	12.083	7.384	0.121
			0.000			1" Ice	12.707	7.976	0.191
(2) 7770	A	From Leg	3.000	0.000	130.000	No Ice	5.508	2.928	0.035
(ATT)			0.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
(2) 7770	B	From Leg	3.000	0.000	130.000	No Ice	5.508	2.928	0.035
(ATT)			0.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
(2) 7770	D	From Leg	3.000	0.000	130.000	No Ice	5.508	2.928	0.035
(ATT)			0.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
(2) TT19-08BP111-001 TMA	B	From Leg	3.000	0.000	130.000	No Ice	0.553	0.446	0.016

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)			0.000			1/2" Ice	0.649	0.534	0.022
			0.000			1" Ice	0.752	0.630	0.029
(2) TT19-08BP111-001 TMA	A	From Leg	3.000	0.000	130.000	No Ice	0.553	0.446	0.016
(ATT)			0.000			1/2" Ice	0.649	0.534	0.022
			0.000			1" Ice	0.752	0.630	0.029
(2) TT19-08BP111-001 TMA	D	From Leg	3.000	0.000	130.000	No Ice	0.553	0.446	0.016
(ATT)			0.000			1/2" Ice	0.649	0.534	0.022
			0.000			1" Ice	0.752	0.630	0.029
(2) LGP21903 Diplexer	A	From Leg	3.000	0.000	130.000	No Ice	0.231	0.158	0.005
(ATT)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21903 Diplexer	B	From Leg	3.000	0.000	130.000	No Ice	0.231	0.158	0.005
(ATT)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) LGP21903 Diplexer	D	From Leg	3.000	0.000	130.000	No Ice	0.231	0.158	0.005
(ATT)			0.000			1/2" Ice	0.294	0.213	0.007
			0.000			1" Ice	0.365	0.276	0.011
(2) RRUS 11	A	From Leg	3.000	0.000	130.000	No Ice	2.522	1.020	0.055
(ATT)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
(2) RRUS 11	B	From Leg	3.000	0.000	130.000	No Ice	2.522	1.020	0.055
(ATT)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
(2) RRUS 11	D	From Leg	3.000	0.000	130.000	No Ice	2.522	1.020	0.055
(ATT)			0.000			1/2" Ice	2.719	1.158	0.074
			0.000			1" Ice	2.923	1.304	0.097
DC6-48-60-18-8F	A	From Leg	3.000	0.000	130.000	No Ice	1.560	4.783	0.026
(ATT)			0.000			1/2" Ice	1.722	5.063	0.063
			0.000			1" Ice	1.892	5.350	0.104
DC6-48-60-18-8F	B	From Leg	3.000	0.000	130.000	No Ice	1.560	4.783	0.026
(ATT)			0.000			1/2" Ice	1.722	5.063	0.063
			0.000			1" Ice	1.892	5.350	0.104
DC6-48-60-18-8F	D	From Leg	3.000	0.000	130.000	No Ice	1.560	4.783	0.026
(ATT)			0.000			1/2" Ice	1.722	5.063	0.063
			0.000			1" Ice	1.892	5.350	0.104
(2) 7020 RET	A	From Leg	3.000	0.000	130.000	No Ice	0.344	0.100	0.002
(ATT)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
(2) 7020 RET	B	From Leg	3.000	0.000	130.000	No Ice	0.344	0.100	0.002
(ATT)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
(2) 7020 RET	D	From Leg	3.000	0.000	130.000	No Ice	0.344	0.100	0.002
(ATT)			0.000			1/2" Ice	0.422	0.145	0.005
			0.000			1" Ice	0.507	0.197	0.009
T-Frame Sector Mount	A	From Leg	1.500	0.000	130.000	No Ice	13.600	13.600	0.465
(ATT)			0.000			1/2" Ice	18.400	18.400	0.600
			0.000			1" Ice	23.200	23.200	0.735
T-Frame Sector Mount	B	From Leg	1.500	0.000	130.000	No Ice	13.600	10.800	0.465
(ATT)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
T-Frame Sector Mount	D	From Leg	1.500	0.000	130.000	No Ice	13.600	10.800	0.465
(ATT)			0.000			1/2" Ice	18.400	13.050	0.600
			0.000			1" Ice	23.200	15.300	0.735
**********									
**********									
10'x1.75" dipole	B	From Leg	3.000	0.000	179.250	No Ice	0.875	0.875	0.030
(Town of Roxbury)			0.000			1/2" Ice	1.325	1.325	0.037

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.000			1" Ice	1.634	1.634	0.048
6'8"x4" Pipe Mount	B	From Leg	1.500	0.000	179.250	No Ice	2.126	2.126	0.072
(Town of Roxbury)			0.000			1/2" Ice	3.006	3.006	0.093
			0.000			1" Ice	3.423	3.423	0.119
08010 Omni	A	From Leg	3.000	0.000	178.500	No Ice	1.642	1.642	0.018
(Town of Roxbury)			0.000			1/2" Ice	2.238	2.238	0.035
			2.000			1" Ice	2.582	2.582	0.055
6'8"x4" Pipe Mount	A	From Leg	1.500	0.000	178.500	No Ice	2.126	2.126	0.072
(Town of Roxbury)			0.000			1/2" Ice	3.006	3.006	0.093
			0.000			1" Ice	3.423	3.423	0.119
10'x1.75" dipole	B	From Leg	3.000	0.000	141.500	No Ice	0.875	0.875	0.030
(Town of Roxbury)			0.000			1/2" Ice	1.325	1.325	0.037
			2.000			1" Ice	1.634	1.634	0.048
6'8"x4" Pipe Mount	B	From Leg	1.500	0.000	141.500	No Ice	2.169	2.169	0.072
(Town of Roxbury)			0.000			1/2" Ice	3.006	3.006	0.093
			0.000			1" Ice	3.423	3.423	0.119
6' "Yagi"	C	From Leg	3.000	0.000	18.000	No Ice	1.767	1.767	0.041
(Town of Roxbury)			0.000			1/2" Ice	2.129	2.129	0.054
			2.000			1" Ice	2.501	2.501	0.071
18' Dipole	D	From Leg	3.000	0.000	141.500	No Ice	4.000	4.000	0.055
(Town of Roxbury)			0.000			1/2" Ice	6.000	6.000	0.100
			2.000			1" Ice	8.000	8.000	0.145
6'8"x4" Pipe Mount	D	From Leg	1.500	0.000	141.500	No Ice	2.169	2.169	0.072
(Town of Roxbury)			0.000			1/2" Ice	3.006	3.006	0.093
			0.000			1" Ice	3.423	3.423	0.119

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 45 deg - No Ice
5	0.9 Dead+1.6 Wind 45 deg - No Ice
6	1.2 Dead+1.6 Wind 90 deg - No Ice
7	0.9 Dead+1.6 Wind 90 deg - No Ice
8	1.2 Dead+1.6 Wind 135 deg - No Ice
9	0.9 Dead+1.6 Wind 135 deg - No Ice
10	1.2 Dead+1.6 Wind 180 deg - No Ice
11	0.9 Dead+1.6 Wind 180 deg - No Ice
12	1.2 Dead+1.6 Wind 225 deg - No Ice
13	0.9 Dead+1.6 Wind 225 deg - No Ice
14	1.2 Dead+1.6 Wind 270 deg - No Ice
15	0.9 Dead+1.6 Wind 270 deg - No Ice
16	1.2 Dead+1.6 Wind 315 deg - No Ice
17	0.9 Dead+1.6 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.425	32	0.172	0.008
T2	160 - 140	2.729	32	0.163	0.005
T3	140 - 120	2.073	32	0.144	0.003
T4	120 - 100	1.502	32	0.119	0.002
T5	100 - 80	1.033	32	0.096	0.002
T6	80 - 60	0.657	32	0.074	0.002
T7	60 - 40	0.378	32	0.050	0.001
T8	40 - 20	0.180	32	0.034	0.001
T9	20 - 0	0.054	32	0.018	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.250	10'x1.75" dipole	32	3.399	0.172	0.008	319680
178.500	08010 Omni	32	3.372	0.172	0.008	319680
177.000	NNVV-65B-R4 Antenna	32	3.320	0.171	0.008	319680
163.000	BXA-70063-6CF-2	32	2.832	0.165	0.005	94144
141.500	10'x1.75" dipole	32	2.120	0.145	0.003	51716
130.000	AM-C-CD-16-65-00T-RET	32	1.775	0.131	0.003	45082
18.000	6' "Yagi"	32	0.046	0.016	0.000	60042

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	12.564	12	0.614	0.030
T2	160 - 140	9.999	12	0.589	0.018
T3	140 - 120	7.593	12	0.524	0.009
T4	120 - 100	5.500	12	0.436	0.009

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	100 - 80	3.784	12	0.350	0.008
T6	80 - 60	2.406	12	0.271	0.006
T7	60 - 40	1.384	12	0.182	0.005
T8	40 - 20	0.659	12	0.125	0.003
T9	20 - 0	0.199	12	0.064	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.250	10'x1.75" dipole	12	12.467	0.614	0.030	104850
178.500	08010 Omni	12	12.370	0.613	0.029	104850
177.000	NNVV-65B-R4 Antenna	12	12.175	0.612	0.028	104850
163.000	BXA-70063-6CF-2	12	10.378	0.596	0.020	30853
141.500	10'x1.75" dipole	12	7.765	0.530	0.009	14752
130.000	AM-C-CD-16-65-00T-RET	12	6.501	0.481	0.009	12748
18.000	6' "Yagi"	12	0.170	0.058	0.002	16422

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.750	4	2.145	29.821	0.072 ✔	1	Bolt Tension
		Diagonal	A325N	0.500	1	2.609	5.709	0.457 ✔	1	Member Block Shear
T2	160	Leg	A325N	0.750	6	4.241	29.821	0.142 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	3.813	7.830	0.487 ✔	1	Member Bearing
T3	140	Leg	A325N	1.000	6	7.636	53.014	0.144 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	5.651	7.830	0.722 ✔	1	Member Bearing
T4	120	Leg	A325N	1.000	8	8.471	53.014	0.160 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	6.712	10.440	0.643 ✔	1	Member Bearing
T5	100	Leg	A325N	1.000	8	11.562	53.014	0.218 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	7.006	10.440	0.671 ✔	1	Member Bearing
T6	80	Leg	A325N	1.250	8	14.653	82.835	0.177 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	7.433	10.440	0.712 ✔	1	Member Bearing
T7	60	Leg	A325N	1.250	8	17.741	82.835	0.214 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	8.046	10.440	0.771 ✔	1	Member Bearing
T8	40	Leg	A325N	1.250	8	20.772	82.835	0.251 ✔	1	Bolt Tension
		Diagonal	A325N	0.625	1	8.889	12.425	0.715 ✔	1	Bolt Shear
T9	20	Diagonal	A325N	0.625	1	9.692	12.425	0.780 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	P2.5x.203 (2.875 OD)	20.035	5.009	63.4 K=1.00	1.704	-11.884	60.269	0.197 [1] ✔
T2	160 - 140	P3x.216 (3.5 OD)	20.035	6.678	68.9 K=1.00	2.228	-29.915	74.468	0.402 [1] ✔
T3	140 - 120	P3.5x.226 (4 OD)	20.035	6.678	60.0 K=1.00	2.680	-53.238	98.046	0.543 [1] ✔
T4	120 - 100	P5 x 0.258(5.563 OD)	20.035	10.017	71.6 K=1.00	3.844	-76.837	124.619	0.617 [1] ✔
T5	100 - 80	P6 x 0.28 (6.625 OD)	20.035	10.017	59.4 K=1.00	5.032	-103.817	185.123	0.561 [1] ✔
T6	80 - 60	P6 x 0.28 (6.625 OD)	20.035	10.017	59.4 K=1.00	5.032	-131.008	185.123	0.708 [1] ✔
T7	60 - 40	P8x.332 (8.625 OD)	20.035	10.017	41.0 K=1.00	8.650	-158.700	368.199	0.431 [1] ✔
T8	40 - 20	P8x.332 (8.625 OD)	20.035	10.017	41.0 K=1.00	8.650	-186.555	368.199	0.507 [1] ✔
T9	20 - 0	P8x.332 (8.625 OD)	20.035	10.017	41.0 K=1.00	8.650	-214.129	368.199	0.582 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L1-3/4x1-3/4x3/16	8.170	4.113	143.7 K=1.00	0.621	-2.679	6.795	0.394 [1] ✔
T2	160 - 140	L2 1/2x2 1/2x3/16	10.460	5.291	128.3 K=1.00	0.902	-3.847	12.293	0.313 [1] ✔
T3	140 - 120	L3x3x3/16	11.792	5.944	119.7 K=1.00	1.090	-5.670	16.457	0.345 [1] ✔
T4	120 - 100	L3 1/2x3 1/2x1/4	15.058	7.688	132.9 K=1.00	1.690	-6.781	21.598	0.314 [1] ✔
T5	100 - 80	L3 1/2x3 1/2x1/4	16.341	8.314	143.8 K=1.00	1.690	-7.101	18.474	0.384 [1] ✔
T6	80 - 60	L4x4x1/4	17.688	8.977	135.5 K=1.00	1.940	-7.556	23.870	0.317 [1] ✔
T7	60 - 40	L4x4x1/4	19.085	9.667	145.9 K=1.00	1.940	-8.214	20.582	0.399 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	40 - 20	L4x4x3/8	20.523	10.380	158.1 K=1.00	2.860	-8.889	25.858	0.344 [1] ✔
T9	20 - 0	L5x5x5/16	21.993	11.111	134.1 K=1.00	3.030	-9.692	37.986	0.255 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L1 3/4x1 3/4x3/16	5.000	5.000	153.6 K=0.88	0.621	-0.020	5.944	0.003 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	P2.5x.203 (2.875 OD)	20.035	5.009	63.4	1.704	8.578	82.817	0.104 [1] ✔
T2	160 - 140	P3x.216 (3.5 OD)	20.035	6.678	68.9	2.228	25.445	108.304	0.235 [1] ✔
T3	140 - 120	P3.5x.226 (4 OD)	20.035	6.678	60.0	2.680	45.816	130.226	0.352 [1] ✔
T4	120 - 100	P5 x 0.258(5.563 OD)	20.035	10.017	71.6	3.844	67.772	186.796	0.363 [1] ✔
T5	100 - 80	P6 x 0.28 (6.625 OD)	20.035	10.017	59.4	5.032	92.497	244.535	0.378 [1] ✔
T6	80 - 60	P6 x 0.28 (6.625 OD)	20.035	10.017	59.4	5.032	117.221	244.535	0.479 [1] ✔
T7	60 - 40	P8x.332 (8.625 OD)	20.035	10.017	41.0	8.650	141.931	420.374	0.338 [1] ✔
T8	40 - 20	P8x.332 (8.625 OD)	20.035	10.017	41.0	8.650	166.173	420.374	0.395 [1] ✔
T9	20 - 0	P8x.332 (8.625 OD)	20.035	10.017	41.0	8.650	189.860	420.374	0.452 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L1-3/4x1-3/4x3/16	8.170	4.113	94.2	0.378	2.609	16.440	0.159 [1] ✔
T2	160 - 140	L2 1/2x2 1/2x3/16	10.460	5.291	83.4	0.571	3.813	24.851	0.153 [1] ✔
T3	140 - 120	L3x3x3/16	11.792	5.944	77.5	0.712	5.651	30.968	0.182 [1] ✔
T4	120 - 100	L3 1/2x3 1/2x1/4	15.058	7.688	86.0	1.127	6.712	49.019	0.137 [1] ✔
T5	100 - 80	L3 1/2x3 1/2x1/4	16.341	8.314	92.8	1.127	7.006	49.019	0.143 [1] ✔
T6	80 - 60	L4x4x1/4	17.688	8.977	87.3	1.314	7.433	57.175	0.130 [1] ✔
T7	60 - 40	L4x4x1/4	19.085	9.667	94.0	1.314	8.046	57.175	0.141 [1] ✔
T8	40 - 20	L4x4x3/8	20.523	10.380	102.4	1.934	8.679	84.132	0.103 [1] ✔
T9	20 - 0	L5x5x5/16	21.993	11.111	85.8	2.097	9.316	91.207	0.102 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L1 3/4x1 3/4x3/16	5.000	5.000	111.7	0.621	0.054	20.123	0.003 [1] ✔

[1] $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	P2.5x.203 (2.875 OD)	4	-11.884	60.269	19.7	Pass
T2	160 - 140	Leg	P3x.216 (3.5 OD)	44	-29.915	74.468	40.2	Pass
T3	140 - 120	Leg	P3.5x.226 (4 OD)	72	-53.238	98.046	54.3	Pass
T4	120 - 100	Leg	P5 x 0.258(5.563 OD)	97	-76.837	124.619	61.7	Pass
T5	100 - 80	Leg	P6 x 0.28 (6.625 OD)	117	-103.817	185.123	56.1	Pass
T6	80 - 60	Leg	P6 x 0.28 (6.625 OD)	137	-131.008	185.123	70.8	Pass
T7	60 - 40	Leg	P8x.332 (8.625 OD)	157	-158.700	368.199	43.1	Pass
T8	40 - 20	Leg	P8x.332 (8.625 OD)	177	-186.555	368.199	50.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T9	20 - 0	Leg	P8x.332 (8.625 OD)	197	-214.129	368.199	58.2	Pass
T1	180 - 160	Diagonal	L1-3/4x1-3/4x3/16	13	-2.679	6.795	39.4	Pass
							45.7 (b)	
T2	160 - 140	Diagonal	L2 1/2x2 1/2x3/16	49	-3.847	12.293	31.3	Pass
							48.7 (b)	
T3	140 - 120	Diagonal	L3x3x3/16	77	-5.670	16.457	34.5	Pass
							72.2 (b)	
T4	120 - 100	Diagonal	L3 1/2x3 1/2x1/4	105	-6.781	21.598	31.4	Pass
							64.3 (b)	
T5	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	125	-7.101	18.474	38.4	Pass
							67.1 (b)	
T6	80 - 60	Diagonal	L4x4x1/4	142	-7.556	23.870	31.7	Pass
							71.2 (b)	
T7	60 - 40	Diagonal	L4x4x1/4	162	-8.214	20.582	39.9	Pass
							77.1 (b)	
T8	40 - 20	Diagonal	L4x4x3/8	181	-8.889	25.858	34.4	Pass
							71.5 (b)	
T9	20 - 0	Diagonal	L5x5x5/16	201	-9.692	37.986	25.5	Pass
							78.0 (b)	
T1	180 - 160	Top Girt	L1 3/4x1 3/4x3/16	5	-0.020	5.944	0.6	Pass
							Summary	
						Leg (T6)	70.8	Pass
						Diagonal (T9)	78.0	Pass
						Top Girt (T1)	0.6	Pass
						Bolt Checks	78.0	Pass
						RATING =	**78.0**	**Pass**

MATHCAD CALCULATION PRINTOUT

EXISTING 180' SST TOWER ANCHOR ROD CHECK

REACTIONS ON THE FOUNDATION

As per Tnx output (see attached)

Down load; $Pv := 222 \cdot kips$ Shear; $S := 22 \cdot kips$

Uplift load; $P_{up} := 196 \cdot kips$ Moment; $M := 0 \cdot kips \cdot ft$

Anchor Rod Data is as per Tower drawings by Universal Tower Inc., Job No. S-168, dated 07/1999

Number of Anchor Roads: $N_{anchors} := 4$

Diameter of Anchors: $D_{anchors} := 1.5in$ $n := \frac{5}{in}$

Net Tensile Area of Anchors: $A_{anchors} := 1.41in^2$ (Table 7-17, AISC 14th)

Ultimate Tensile Stress: $F_{anchors} := 58ksi$ (Grade A 36) Fy = 36Ksi Fu = 58 Ksi

Saftey Factor for Anchor: $\phi_{anchor} := 0.80$ (Section 4.9.9, TIA-222-G)

Allowable Axial Load per Anchor: $T_{cap} := \phi_{anchor} \cdot F_{anchors} \cdot A_{anchors}$

$T_{cap} = 65.42 \cdot kips$

For detail type (C) as per Figure 4.4 $\eta := 0.55$

Maximum Load on Anchor: $T_{max} := \frac{P_{up} + \frac{S}{\eta}}{N_{anchors}}$ $T_{max} = 59 \cdot kips$

Anchor Rod Capacity: $\frac{T_{max}}{T_{cap}} = 90.18 \cdot \%$ OK!

Summary

$S = 22 \cdot kips$

Down load $Pv = 222 \cdot kips$

Uplift load $P_{up} = 196 \cdot kips$

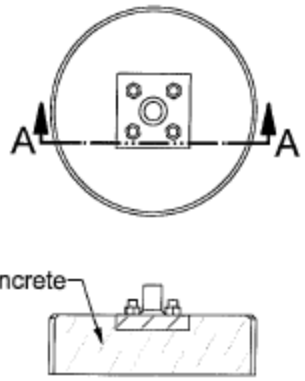
Moment $M = 0 \cdot ft \cdot kip$

Anchor Rod Check $T_{max} = 59 \cdot kips$ < $T_{cap} = 65.42 \cdot kips$

$Anchor\_Rod\_Check := if(T_{max} < T_{cap}, "OK", "Not OK")$

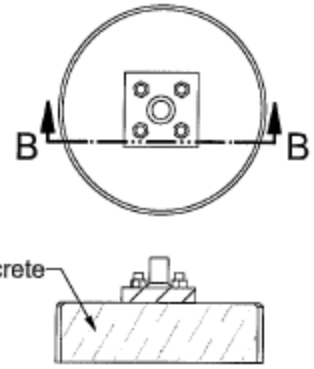
$Anchor\_Rod\_Check = "OK"$

ANSI/TIA-222-G
Addendum 1



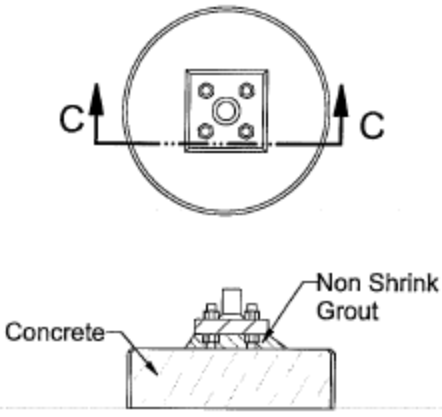
SECTION A-A

Detail Type (a)



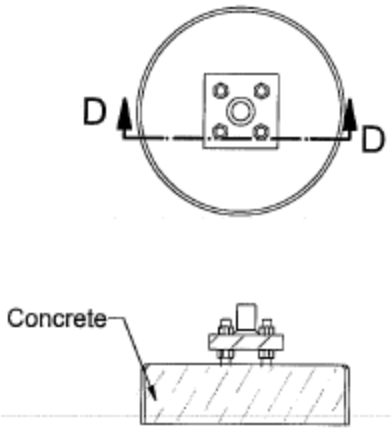
SECTION B-B

Detail Type (b)



SECTION C-C

Detail Type (c)



SECTION D-D

Detail Type (d)
(See Note 1 below)

Note:

1. When clear distance from top of concrete to the bottom face of the leveling nut exceeds 1.0 times the diameter of the anchor rod, bending of the anchor rod shall be considered (refer to 4.9.9).

Figure 4-4: Anchor Rod Detail Types

4.9.9 Anchor Rods

For anchor rods, the following interaction equation shall be satisfied:

$$\left(\frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1$$

where:

$\phi = 0.80$

P_u = tension force for detail types (a), (b) & (c) and larger of compression or tension force for type (d) as depicted in Figure 4-4.

V_u = shear force (direct shear and torsion components) corresponding to P_u

R_{nt} = nominal tensile strength of anchor rod as per 4.9.6.1

η = 0.90 for detail type (a)
= 0.70 for detail type (b)
= 0.55 for detail type (c)
= 0.50 for detail type (d)

For detail type (d), when the clear distance from the top of concrete to the bottom leveling nut exceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied:

$$\left(\frac{V_u}{\phi R_{nv}} \right)^2 + \left(\left| \frac{P_u}{\phi R_{nt}} \right| + \left| \frac{M_u}{\phi R_{nm}} \right| \right)^2 \leq 1$$

where:

M_u = bending moment corresponding to V_u
= $0.65\, l_{ar} V_u$

l_{ar} = length from top of concrete to bottom of anchor rod leveling nut

Pier Foundation with rock anchor for 180' Self Supporting Tower

Customer Name: SBA Communication Corp
Customer Site Number: CT46125-A-03
Customer Site Name: CT72XC031/Roxbury-Lower County Rd.

Carrier Name: Sprint Nextel
Application: 86556, v1

ACGI Job # 18-3703

By:

Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Freeway, Suite 204
Dallas, TX 75243
Tel: 972-231-8893, Fax: 866-364-8375

PIER WITH ROCK ANCHOR REINFORCEMENT

INPUT DATA

-Foundation Reactions- G Code, (factored)

(As per TNX Output)

Down Load $P_{dwn} := 222 \cdot kips$

Uplift Load $P_{up} := 196 \cdot kips$

Shear Load $S := 24 \cdot kips$

Moment $M := 0 \cdot ft \cdot kips$

-Pier Dimensions-

-Foundation Data as per

Diameter $B_{ftg} := 2.5 \cdot ft$

Extension above grade $D_{proj} := 0.25 \cdot ft$

Concrete unit weight $\gamma_c := 150 \frac{lb}{ft^3}$

Rebar Fy $F_y := 60 \cdot ksi$

Depths ,

Depth to bottom of socket , $D_{socket} := 10ft$

Depth to suitable rock , $D_{rock} := 2ft$

Depth to suitable earth , $D_{earth} := 0ft$

Soil Properties ,

Rock failure angle, $\phi := 30deg$

Unit weight of earth, $\gamma_{earth} := 125 \frac{lb}{ft^3}$

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

Dimensions

Overall footing length , $L_{ftg} := D_{proj} + D_{socket} = 10.25\,ft$

Suitable Earth height , $E := D_{rock} - D_{earth}$

Suitable rock height , $R := D_{socket} - D_{rock} - D_{earth}$

Socket radius , $R_{ftg} := \frac{B_{ftg}}{2} = 1.25\,ft$

Gross Cone triangle leg , $X_L := (E + R) \cdot \tan(\phi) = 5.77\,ft$

Rock Cone triangle leg , $X_R := R \cdot \tan(\phi) = 4.62\,ft$

Cone Height Below Ftg , $h := \frac{2 \cdot B_{ftg}}{\tan(\phi)} = 8.66\,ft$

Depth below Caisson $h_{ra} := 8ft$

Rock Anchor Spacing $SP := 4ft$

Anchors

Hole Diameter $hole_d := 3.5in$

Bond Strength $\sigma_{bond} := 60\,\frac{lb}{in^2}$

Design :

Resistance from rock Anchors:

Radius of Rock cone, $X_{rac} := h_{ra}\cdot\tan(\phi) = 4.62\,ft$

Conical volume $V_1 := \frac{\pi\cdot X_{rac}^{\,2}\cdot h_{ra}}{3} = 178.72\,ft^3$

Triangular Volume $V_2 := X_{rac}\cdot h_{ra}\cdot SP = 147.8\,ft^3$

Resisting Force $F_{anchor} := \frac{(V_1 + V_2)\cdot\gamma_{rock}}{2} = 26938.18\,lb$

Volumes:

Revised total gross cone volume $TCV_1 := \frac{\pi}{3}\cdot\left(X_{rac} + \frac{SP}{2} + X_L\right)^2\cdot(E + R + h) = 3000.89\,ft^3$

Revised total gross cone volume $TRCV_1 := \frac{\pi}{3}\cdot\left(X_{rac} + \frac{SP}{2} + X_R\right)^2\cdot(R + h) = 2203.22\,ft^3$

Revised cone point volume $CPV_1 := \frac{\pi}{3}\cdot\left(X_{rac} + \frac{SP}{2} + R_{ftg}\right)^2\cdot(h) = 561.53\,ft^3$

Revised Rock volume(Net) $R_{net.1} := TRCV_1 - CPV_1 - \left(\pi\cdot R_{ftg}^{\,2}\cdot R\right) = 1602.41\,ft^3$

Revised Rock volume(Net) $E_{net.1} := TCV_1 - TRCV_1 - \left(\pi\cdot R_{ftg}^{\,2}\cdot E\right) = 787.86\,ft^3$

Caisson Volume $C_{vol1} := \pi\cdot R_{ftg}^{\,2}\cdot L_{ftg} = 50.31\,ft^3$

Resisting Forces:

Revised resisting rock force $F_{rock1} := R_{net.1}\cdot\gamma_{rock} = 264398.43\,lb$

Revised resisting rock force $F_{earth1} := E_{net.1}\cdot\gamma_{earth} = 98481.9\,lb$

Revised resisting concrete force $F_{concrete1} := C_{vol1}\cdot\gamma_c = 7547.19\,lb$

Revised resisting socket force $F_{socket1} := F_{rock1} + F_{earth1} + F_{concrete1} = 370427.51\,lb$

Anchor Resisting force $F_{anchor1} := 26.94kips$

Check TIA-G Code:

$UP2 := 0.75F_{rock1} + 0.75F_{earth1} + 0.75F_{concrete1} + 0.75F_{anchor1} = 298025.63\,lb$

Percentage Capacity, $\frac{P_{up}}{UP2} = 0.66$ 66.0%, OK

Existing Pier Foundation Check for 180' SST

Customer Name: SBA Communication Corp.
Customer Site Number: CT46125-A-03
Customer Site Name: CT72XC031/Roxbury-Lower County Rd.
Carrier Name: Sprint Nextel

Latitude: 41.559528
Longitude:-73.292306

ACGI #18-3703

Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Freeway, Suite 204
Dallas, TX 75243
Tel: 972-231-8893, Fax: 866-364-8375

INPUT DATA

-*Foundation Reactions-(factored)*

(TNX output):

Down Load: $P_{dwn} := 222 \cdot kips$

Uplift Load: $P_{up} := 196 \cdot kips$

Shear Load: $S := 24 \cdot kips$

Moment: $M := 0 \cdot ft \cdot kips$

-*Pier Dimensions*-

Diameter: $D_{pier} := 2.5ft$

Extension above grade: $E_{pier} := 0.25 \cdot ft$

Concrete density See below

Concrete strength $F_c := 3000 \cdot psi$

Rebar Fy $F_y := 60 \cdot ksi$

Foundation design Building code - IBC2012, ACI318-11, TIA-222-G

ACI Strength reduction factors

$\phi_{comp} := 0.65$ (ACI 9.3.2.2)

$\phi_{tens} := 0.9$ (ACI 9.3.2.2a)

$\phi_{shear} := 0.75$ (ACI 9.3.2.3)

-*Factor of Safety for soil strength*-

$\phi_{s\_Bear} := 0.75$ as per TIA-222-G code for bearing, 9.4.1 - for SST/MP

$\phi_{s\_friction} := 0.75$ as per TIA-222-G code for skin friction resistance, 9.4.1

$\phi_{s\_lateral} := 0.75$ as per TIA-222-G code for lateral resistance, 9.4.1

-*Soil Properties*- (Note)

Number of soil layers $NSL := 3$ $j := 1 .. NSL$

Neglected soil height $L_{ngl} := 2.5 \cdot ft$ $k := 1 .. NSL$

$i_{neg} := 2$ (neglected soil layer number) $i := 1 .. NSL$

$\alpha := 0.4$ Estimated cohesion

Ground Water @ 15' depth below ground level

Height $H_j :=$	PHI $\phi_j :=$	Cu $Cu_j :=$	Soil Dens $\gamma s_j :=$	Conc Dens $\gamma c_j :=$	Ult Skin friction $SKU_{dn_j} :=$	$SKU_{up_j} :=$
2·ft	0·deg	0·ksf	0·pcf	150·pcf	0·ksf	0·ksf
0.5·ft	35·deg	0·ksf	165·pcf	150·pcf	36·ksf	36·ksf
7.5·ft	35·deg	0·ksf	165·pcf	150·pcf	36·ksf	36·ksf

$L_{pier} := \sum_{j=1}^{NSL} H_j$ $L_{pier} = 10\,ft$

Soil Bearing Safety fator: $SF := 2$ (as per GEO report)

Allowable bearing capacity: $BC_{all} := 30ksf$ (as per GEO report)

End Ultimate bearing capacity: $BC_{ult} := BC_{all} \cdot SF = 60 \cdot ksf$

CALCULATIONS

-Pier calculation-

Pier area $A_{pier} := \pi \cdot \frac{D_{pier}^2}{4}$ $A_{pier} = 4.91\,ft^2$

Pier perimeter $PM_{pier} := \pi \cdot D_{pier}$ $PM_{pier} = 7.85\,ft$

Pier volume $V_{pier} := A_{pier} \cdot (L_{pier} + E_{pier})$ $V_{pier} = 1.86 \cdot cy$

Weighted average unit weight of concrete

$$\gamma_{cave} := \frac{\sum_{n=1}^{NSL} (\gamma_{c_n} \cdot H_n)}{\sum_{n=1}^{NSL} H_n} \qquad \gamma_{cave} = 150 \cdot pcf$$

Pier concrete weight $W_{pier} := V_{pier} \cdot \gamma_{cave}$ $W_{pier} = 7.55 \cdot kips$

-Download capacity-

$\alpha = 0.4$ - (average value for soils 0.4)

$\sigma_{v_0} := 0.0 \cdot ksf$

$TL_0 := 0 \cdot ft$

$\sigma_{v_i} := \sigma_{v_{i-1}} + 1.0 \cdot \gamma_{s_i} \cdot H_i$

$SKFN_k := SKU_{dn_k} \cdot PM_{pier} \cdot H_k$ $P_k := if[k = NSL, [A_{pier} \cdot (BC_{ult})], 0 \cdot kips]$ $SKUFN_k := SKU_{up_k} \cdot PM_{pier} \cdot H_k$

$SKFN_k =$

0
141371.67
$2.12 \cdot 10^6$

$\cdot lb$

$P_k =$

0
0
294524.31

$\cdot lb$

$$P_{dcap} := \sum_k P_k \cdot \phi_{s\_Bear} + \sum_k SKFN_k \cdot \phi_{s\_friction}$$

$P_{dcap} = 1917.35 \cdot kips > P_{dwn} = 222 \cdot kips$ **OK!** $\frac{P_{dwn}}{P_{dcap}} = 11.58 \cdot \%$

-Required Pier Length Based on Brohm's method for granular soils-

$$PP_i := if\left[i > i_{neg}, \left(2 \cdot Cu_i \cdot \sqrt{\tan\left(45 \cdot deg + \frac{\phi_i}{2}\right)^2} + \sigma_{v_i} \cdot \tan\left(45 \cdot deg + \frac{\phi_i}{2}\right)^2\right) \cdot \phi_{s\_lateral}, 0 \cdot kips\right]$$

$PP_j =$

0
0
3653.27

$\cdot psf$ $\quad PP_j := PP_j + PP_{j-1}$ $\quad PP_j =$

0
0
3653.27

$\cdot psf$

$$PP := \frac{\sum_j \left[\left(PP_j + PP_{j-1} \right) \cdot \frac{H_j}{2} \right]}{\sum_j \left(H_j \right) - L_{ngl}}$$

$PP = 1.83 \cdot ksf$

Passive pressure

Depth to point of zero shear $\quad PP_{allw} := \frac{2PP}{L_{pier} - L_{ngl}}$ $\quad PP_{allw} = 0.49 \cdot kcf$

$$f := \left(\frac{S}{D_{pier} \cdot PP_{allw}} \right)^{\frac{1}{2}} \cdot 0.816 \qquad f = 3.62\,ft$$

-Required pier length- $\quad L_1 := 5 \cdot ft$

$A := root\left[S \cdot \left(E_{pier} + L_{ngl} + L_1 \right) + M - \left[D_{pier} \cdot PP_{allw} \cdot {L_1}^3 \cdot (.5) \right], L_1 \right]$ $\quad A = 7.36\,ft$

$L_{req} := A + L_{ngl}$

$L_{req} = 9.86\,ft$ $\quad <$ Available $\quad L_{pier} = 10\,ft$ $\quad Ratio := \frac{L_{req}}{L_{pier}}$ $\quad Ratio = 98.585 \cdot \%$ **OK!**

SUMMARY

-Pier Dimensions-

Depth of pier	$L_{pier} = 10\,ft$	Concrete strength	$F_c = 3000 \cdot psi$
Extension above grade	$E_{pier} = 0.25\,ft$	Rebar Fy	$F_y = 60 \cdot ksi$
Total length of pier	$L_{tot} := L_{pier} + E_{pier}$	$L_{tot} = 10.25\,ft$	
Diameter	$D_{pier} = 2.5\,ft$		
Volume of pier concrete	$V_{pier} = 1.86 \cdot cy$		
Weight of pier concrete	$W_{pier} = 7.55 \cdot kips$		

Calculations summary

-Download capacity-

$P_{dcap} = 1917.35 \cdot kips$ > $P_{dwn} = 222 \cdot kips$ **OK!** $\frac{P_{dwn}}{P_{dcap}} = 11.58 \cdot \%$

-Required Pier Length Based on Brohm's method for cohesive soils-

$L_{req} = 9.86\,ft$ < $L_{pier} = 10\,ft$ **OK!** $\frac{L_{req}}{L_{pier}} = 98.58 \cdot \%$

SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT UPON ALL SPECIAL WORK NOTES ON SHEET A-2

Sprint®

SITE NAME: ROXBURY-LOWER COUNTY ROAD
SITE NUMBER: CT72XC031
AUGMENT ID: CT72XC031Q17.1
SITE ADDRESS: 35 LOWER COUNTY ROAD
ROXBURY, CT 06783
JURISDICTION: TOWN OF ROXBURY/ CT SITING COUNCIL
SITE TYPE: EXISTING 180' SELF SUPPORT
PROGRAM: DO MACRO UPGRADE EQUIPMENT DEPLOYMENT

PROJECT INFORMATION

SITE INFORMATION

LATTITUDE: (PER SBA RECORD)	41° 33' 34.30" N (41.559528°)
LONGITUDE: (PER SBA RECORD)	73° 17' 32.30" W (-73.292306°)
GROUND ELEVATION:	872'± AMSL (PER GOOGLE EARTH)
STRUCTURE HEIGHT:	180'± AGL (FROM RECORD STRUCTURAL)
STRUCTURE TYPE:	SELF SUPPORT
ZONING JURISDICTION	TOWN OF ROXBURY/ CT SITING COUNCIL
ZONING DISTRICT/ OCCUPANCY:	RESIDENCE ZONE C
COUNTY:	LITCHFIELD

APPLICANT

SPRINT
1 INTERNATIONAL BLVD. SUITE 800
MAHWAH, NJ 07495

PROPERTY OWNER:

N/F TOWN OF ROXBURY
29 NORTH STREET
ROXBURY, CT 06783

TOWER OWNER:

SBA 2012 TC ASSETS, LLC
8051 CONGRESS AVENUE
BOCA RATON, FL 33487
(561) 995-7670

SBA SITE ID:	CT46125-A
SBA SITE NAME:	ROXBURY-LOWER COUNTY ROAD

SBA CONTACT:

STEPHEN ROTH
(860) 539-4920
SRoth@sbasite.com

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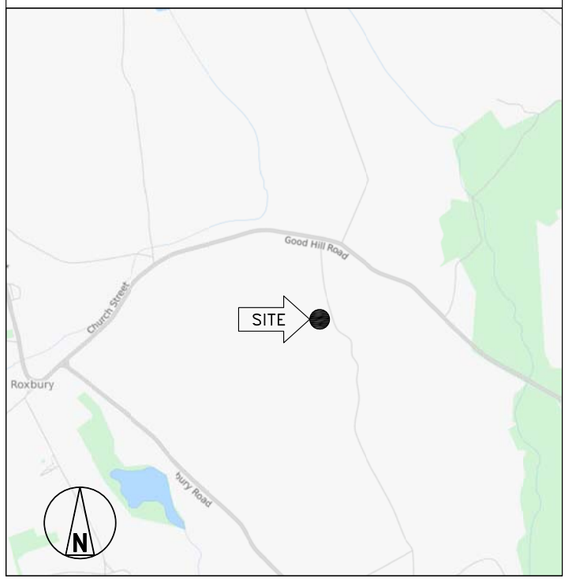
LOCATION MAP N.T.S.

AREA MAP N.T.S.



SCOPE OF WORK

1. FURNISH AND INSTALL ANTENNA MOUNT STRUCTURAL AUGMENTS PER ANTENNA MOUNT STRUCTURAL ANALYSIS, (BY GEOSTRUCTURAL REV1 DATED 05/11/18) AND ANTENNA MOUNT CONSTRUCTION MODIFICATION DRAWINGS, (BY GEOSTRUCTURAL REV0 DATED 01/18/18).
2. REMOVE (3) EXISTING SPRINT PANEL ANTENNAS AND REPLACE WITH (3) NEW SPRINT PANEL ANTENNAS.
3. INSTALL (3) NEW SPRINT PANEL ANTENNAS.
4. INSTALL (3) NEW SPRINT 2500 MHz RRHS.
5. INSTALL (3) NEW SPRINT 800 MHz RRHS.
6. RELOCATE (1) EXISTING SPRINT 1900 RRH.
7. INSTALL (1) HYBRID CABLE.

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. THIS DRAWING IS CONTINGENT ON THE COMPLETION OF A GLOBAL STRUCTURAL ANALYSIS OF THE TOWER AND AND MOUNT ANALYSIS TO BE COMPLETED BY THE TOWER OWNER, SBA PRIOR TO CONSTRUCTION. SEE SPECIAL CONSTRUCTION NOTES ON A-2 AND S-1 HEREIN.
4. ALL AUGMENTS SPECIFIED IN THE ANTENNA MOUNT STRUCTURAL ANALYSIS FOR THIS SITE BY GEOSTRUCTURAL DATED 05/11/2018 (REV1) SHALL BE COMPLETED PRIOR TO ANTENNA INSTALLATION.

DRAWING INDEX

SHEET NO.	SHEET DESCRIPTION	REV. NO.
T-1	TITLE SHEET	3
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SP-2	OUTLINE SPECIFICATIONS	3
SP-3	OUTLINE SPECIFICATIONS	3
A-1	COMPOUND PLAN	3
A-2	ELEVATION AND ANTENNA PLANS	3
A-3	TOWER EQUIPMENT DETAILS	3
A-4	EQUIPMENT DETAILS	3
S-1	ANTENNA AND RRH MOUNTING DETAILS	3
E-1	ONE LINE DIAGRAM	3
E-2	GROUNDING DETAILS AND NOTES	3
RF-1	RF DATA SHEET	3
RF-2	PLUMBING DIAGRAM AND RAN WIRING	3

CODE COMPLIANCE

1. 2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS. (BASED ON IBC 2012)
2. 2014 NATIONAL ELECTRICAL CODE WITH AMENDMENTS
3. TIA-EIA-222-G

BASED ON INFORMATION PROVIDED BY SPRINT, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).

APPROVALS

TITLE	SIGNATURE	DATE
PROJECT MANAGER:		
CONSTRUCTION:		
RF ENGINEER:		
ZONING/SITE ACQ:		
OPERATIONS:		
TOWER OWNER:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

Sprint®
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
6-8-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	06/08/18	CONSTRUCTION REVISED	PN
2	04/05/18	CONSTRUCTION REVISED	JEB
1	01/30/18	ISSUED FOR CONSTRUCTION	PN
0	11/07/17	ISSUED FOR REVIEW	JEB PN

SITE NUMBER:
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

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

SECTION 01 100 - SCOPE OF WORK

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

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

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

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

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

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: SPRINT CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

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

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

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

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

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS–BUILT" DRAWINGS.
B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
C . DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

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

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

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

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

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

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF HYBRID CABLE
F. INSTALLATION OF RRH'S
G. CABLING
H. TS–0200 REV 4 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.
J. COMMISSIONING MOPS
K. SPRINT CELL SITE ENGINEERING NOTICE – EN–2013–002
L. SPRINT ENGINEERING LETTER – EL–0504
M. SPRINT ENGINEERING LETTER – EL–0568
N. SPRINT TECHNICAL SPECIFICATION – TS–0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

A. 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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

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

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

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

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

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

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

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

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

1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY–FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF–LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

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

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

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

SECTION 01 300 - CELL SITE CONSTRUCTION

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 NOTICE TO PROCEED:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

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

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

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

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

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

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

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

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

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

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

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

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

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

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

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

CONTINUE SHEET SP-2

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320–4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED
PROFESSIONAL ENGINEER
6-8-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	06/08/18	CONSTRUCTION REVISED	PN
2	04/05/18	CONSTRUCTION REVISED	JEB
1	01/30/18	ISSUED FOR CONSTRUCTION	PN
0	11/07/17	ISSUED FOR REVIEW	JEB, PN

SITE NUMBER:
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP–1

CONTINUED FROM SP-1:

SECTION 01 400 - SUBMITTALS, TESTS, AND INSPECTIONS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 SUBMITTALS:

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

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

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.

1.4 TESTS AND INSPECTIONS:

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

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. COAX SWEEPS AND FIBER TESTS PER SPRINT TS-0200 CURRENT VERSION ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

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

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

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

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS:

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)
7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

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

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

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

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

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

SECTION 01 500 - PROJECT REPORTING

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

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

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

3.2 PROJECT CONFERENCE CALLS:

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

3.3 PROJECT TRACKING IN SMS:

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

3.4 ADDITIONAL REPORTING:

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

3.5 PROJECT PHOTOGRAPHS:

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

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

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:
THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING-MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

A. PRE-CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

CONTINUE SHEET SP-3

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED
PROFESSIONAL ENGINEER
6-8-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	06/08/18	CONSTRUCTION REVISED	PN
2	04/05/18	CONSTRUCTION REVISED	JEB
1	01/30/18	ISSUED FOR CONSTRUCTION	PN
0	11/07/17	ISSUED FOR REVIEW	JEB/PN

SITE NUMBER:
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP-2

CONTINUED FROM SP-2:

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.

B. ROOF TOP CONSTRUCTION: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX," "DRY GALV," OR "ZINC-IT."
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

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

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

ANTENNAS AND RRH'S:
THE NUMBER AND TYPE OF ANTENNAS AND RRH'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 RRH'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 RRH'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

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 CABLES 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 PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
   a. FIBER: SUPPORT FIBER BUNDLES USING ½" VELCRO STRAPS OF THE REQUIRED LENGTH @ 18" OC. 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 MANUFACTURES 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 PER SPRINT 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 (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBTS 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 REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

DC CIRCUIT BREAKER LABELING

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

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

SUMMARY:

A. THIS SECTION SPECIFIES MMBTS 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 REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

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.

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:

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

E. 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

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. 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 REQUIRE 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.
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 GASKETED 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 AS 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 AS INDICATED.

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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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
6-8-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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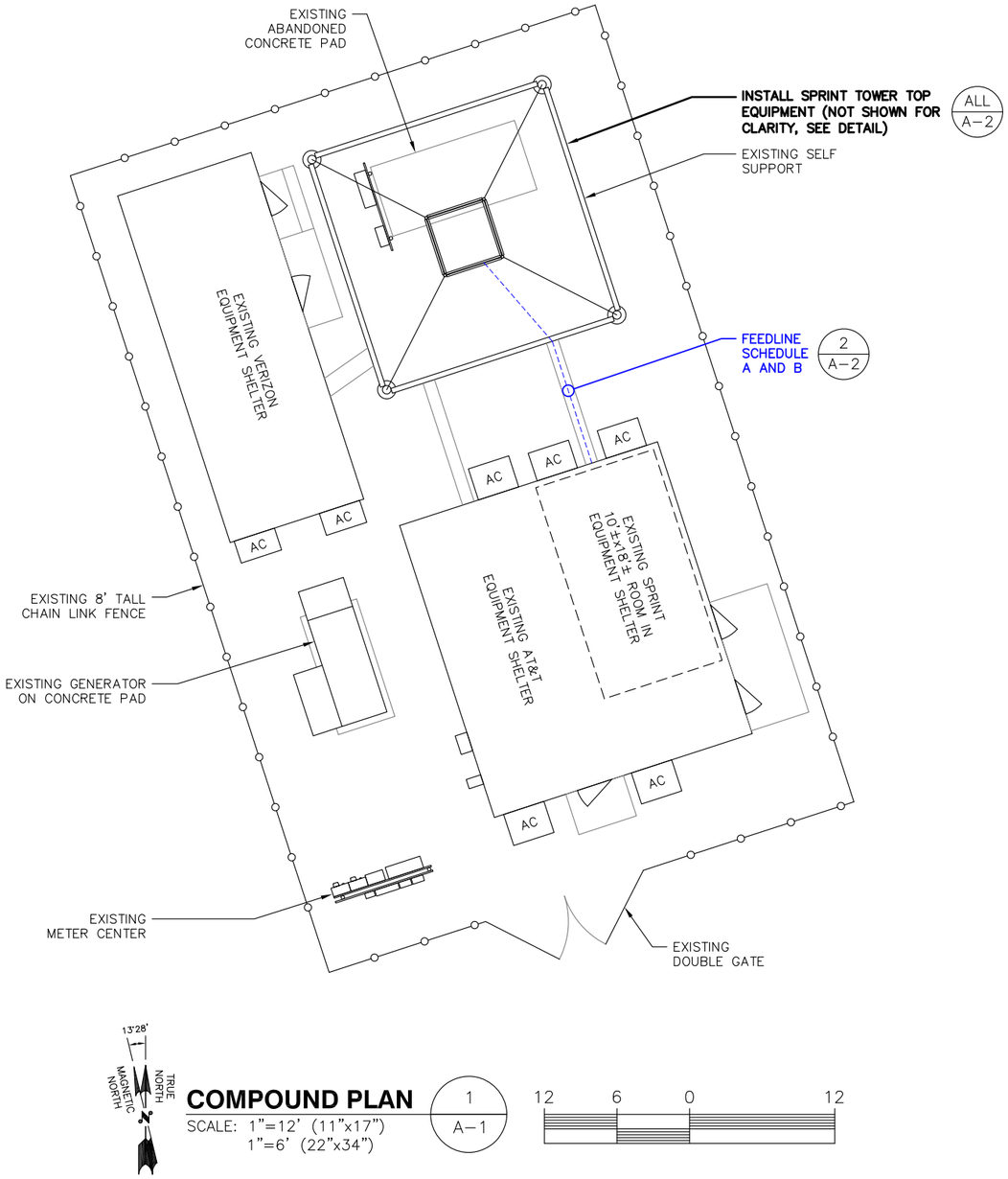
SITE NUMBER:
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP-3



COMPOUND PLAN

SCALE: 1"=12' (11"x17")
1"=6' (22"x34")

1
A-1

12 6 0 12

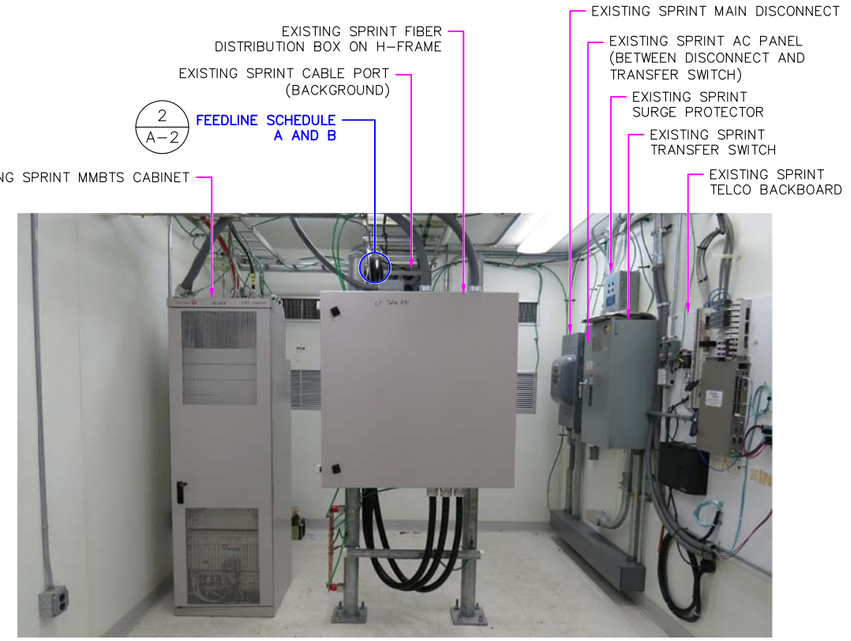


IMAGE SOURCE: PROTERRA 10/14/2017
(VIEW FROM SOUTH)

IMAGE SOURCE: PROTERRA 10/14/2017
(VIEW FROM WEST)

EQUIPMENT PLAN PHOTO DETAIL

SCALE: N.T.S.

2
A-1

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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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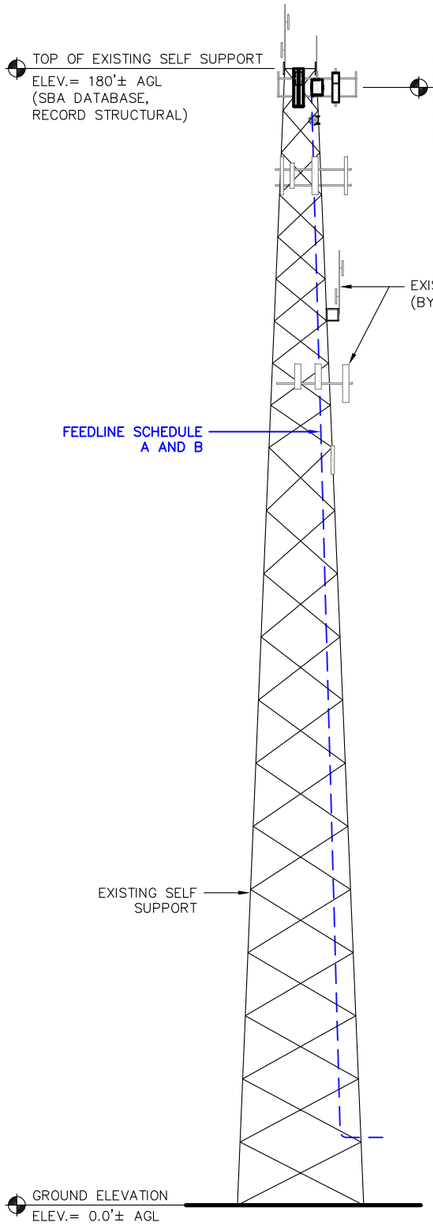
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
A-1



ELEVATION

1 / A-2

SCALE: 1"=24' (11"x17")
1"=12' (22"x34")

24 12 0 24

IMAGE SOURCE: PROTERRA 10/14/2017

NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (3) 1¼" HYBRID TO 177.5' RAD	UP FACE OF SELF SUPPORT TO RAD
B	PROPOSED: (1) HYBRID TO 177.5' RAD;	UP FACE OF SELF SUPPORT TO RAD

NOTE:
EXISTING SPRINT EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER

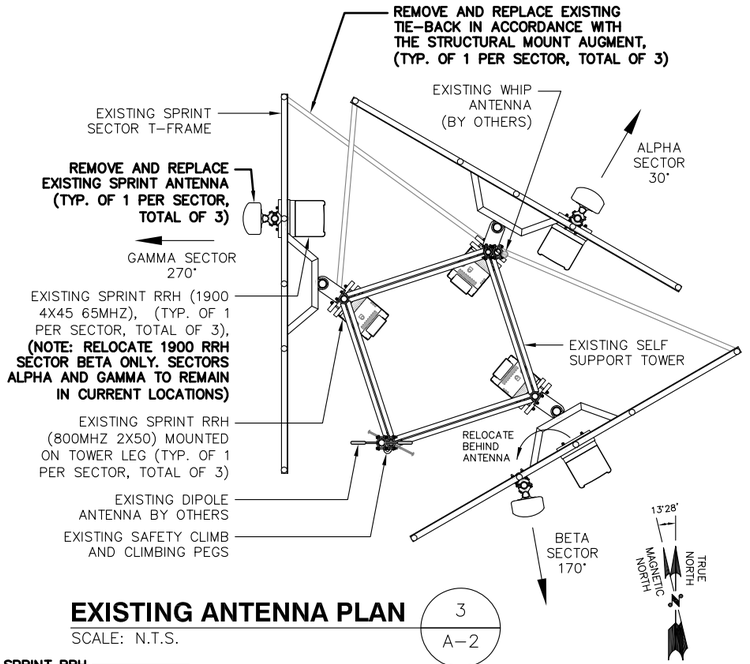
TOWER ELEVATION PHOTO DETAIL

2 / A-2

SCALE: N.T.S.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

SPECIAL CONSTRUCTION NOTE (SBA-PROVIDED ANTENNA MOUNT STRUCTURAL MOD SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE SPRINT RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS (PROVIDED BY GEOSTRUCTURAL DATED 05/11/18) AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY GEOSTRUCTURAL DATED 01/11/18).



EXISTING ANTENNA PLAN

3 / A-2

SCALE: N.T.S.

3 / A-3 · ALL / S-1 — REMOVE AND RELOCATE EXISTING SPRINT RRH (800MHZ 2X50), (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO NEW PIPE MAST ON DUAL PIPE MOUNT ASSEMBLY, TYP. (BELOW)

3 / A-3 · ALL / S-1 — INSTALL SPRINT RRH (800MHZ 2X50), (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO NEW PIPE MAST ON DUAL PIPE MOUNT ASSEMBLY, TYP. (ABOVE)

2 / A-3 · ALL / S-1 — REMOVE AND REPLACE EXISTING SPRINT ANTENNA: INSTALL SPRINT ANTENNA (NNVV-65BR4), (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO PROPOSED PIPE MAST

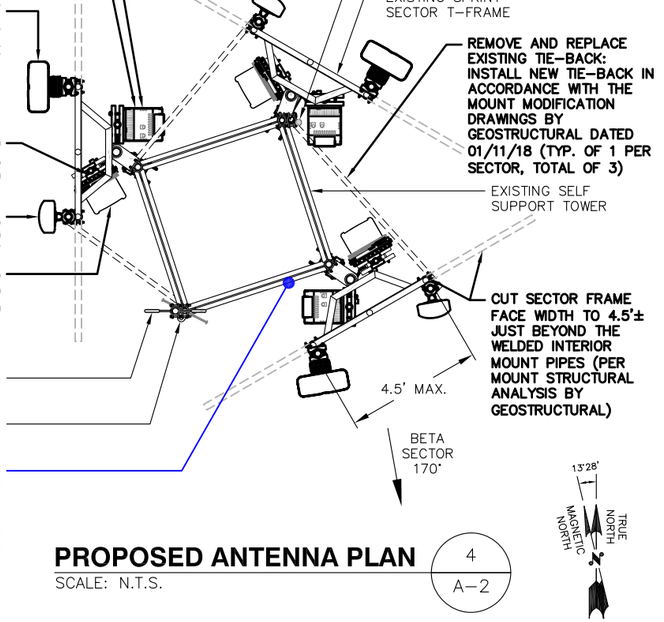
GAMMA SECTOR 270°

5 / A-3 · ALL / S-1 — INSTALL SPRINT RRH (TD-RRH8X20-25), MOUNTED TO NEW PIPE MAST ON DUAL PIPE MOUNT ASSEMBLY, TYP. (TYP. OF 1 PER SECTOR, TOTAL OF 3) (ABOVE)

1 / A-3 · ALL / S-1 — INSTALL SPRINT ANTENNA (APXVTM14-ALU-I20), (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO PROPOSED PIPE MAST

REMOVE AND RELOCATE EXISTING SPRINT RRH (1900 4X45 65MHZ), (TYP. OF 1 PER SECTOR, TOTAL OF 3) MOUNTED TO NEW PIPE MAST ON DUAL PIPE MOUNT ASSEMBLY, TYP. (BELOW)

4 / A-3 · ALL / S-1



PROPOSED ANTENNA PLAN

4 / A-2

SCALE: N.T.S.

SPECIAL INSTALLATION NOTE:
JUMPERS FROM RRHs TO ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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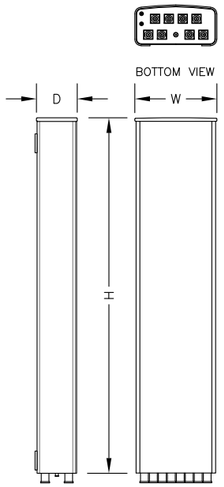
ROXBURY, CT 06783

SHEET TITLE
ELEVATION AND ANTENNA PLANS

SHEET NUMBER
A-2

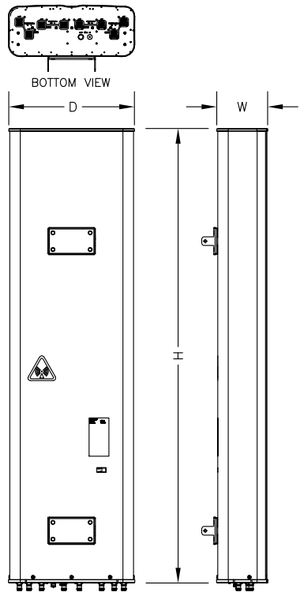


ANTENNA SPECIFICATIONS	
MANUF.	RFS
MODEL #	APXVTM14-ALU-I20
HEIGHT	56.3"
WIDTH	12.6"
DEPTH	6.3"
WEIGHT	56.2± LBS.

2.5 GHz ANTENNA DETAIL

1 / A-3

SCALE: N.T.S.

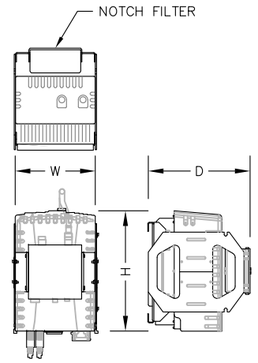


ANTENNA SPECIFICATIONS	
MANUF.	COMMSCOPE
MODEL #	NNVV-65B-R4
HEIGHT	72.0"
WIDTH	19.6"
DEPTH	7.8"
WEIGHT	77.4± LBS.

800 MHZ/1900 MHZ ANTENNA DETAIL

2 / A-3

SCALE: N.T.S.

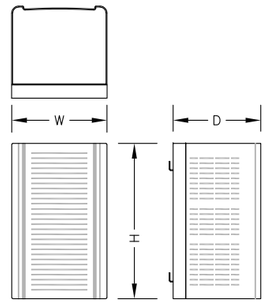


800 MHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	800MHZ 2X50W
HEIGHT	16"
WIDTH	13"
DEPTH	13.7" (INCLUDING FILTER)
WEIGHT	69.1± LBS (INCLUDING FILTER)

800 MHz RRH DETAIL

3 / A-3

SCALE: N.T.S.

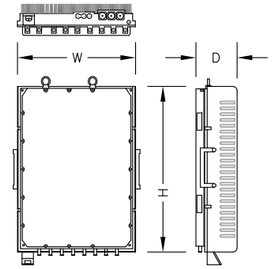


1900 MHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	1900 4X45 65MHZ
HEIGHT	25"
WIDTH	11.1"
DEPTH	11.4"
WEIGHT	60± LBS

EXISTING 1900 MHz RRH DETAIL

4 / A-3

SCALE: N.T.S.



2.5 GHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	TD-RRH8X20-25
HEIGHT	26.1"
WIDTH	18.6"
DEPTH	6.7"
WEIGHT	70± LBS

2.5 GHz RRH DETAIL

5 / A-3

SCALE: N.T.S.

MAJOR RF EQUIPMENT LIST

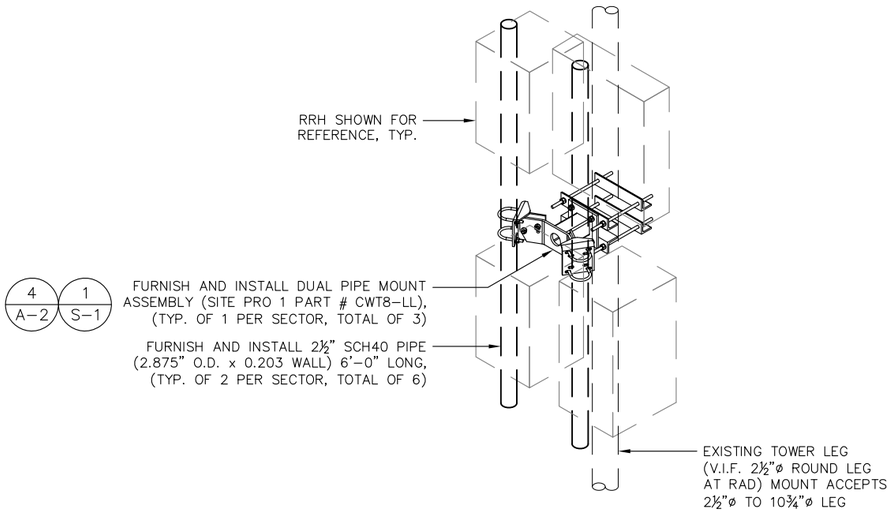
(GC SHALL FURNISH AND INSTALL ALL OTHER MATERIALS AND EQUIPMENT NOT SUPPLIED BY SPRINT)

DESCRIPTION	QUANTITY	UNITS	MAKE/MODEL/MATERIAL	PROVIDED BY
ANTENNA	3	EA	RFS APXVTM14-ALU-i20	SPRINT
ANTENNA	3	EA	COMMSCOPE NNVV-65B-R4	SPRINT
2500 RRH	3	EA	NOKIA (ALU) TD-RRH8x20-25	SPRINT
1900 RRH (EXISTING)	3	EA	NOKIA (ALU) 1900 4X45 65MHZ	SPRINT (EXISTING)
800 RRH (EXISTING)	3	EA	NOKIA (ALU) 800MHz 2x50W	SPRINT (EXISTING)
800 RRH	3	EA	NOKIA (ALU) 800MHz 2x50W	SPRINT
FIBER	1 @ 275'± FROM FIBER CABINET	LINEAR FEET LISTED [INCLUDES (2) 10' COILS]	1-1/4" HYBRIFLEX	SPRINT

SPRINT-PROVIDED EQUIPMENT SCHEDULE

6 / A-3

SCALE: N.T.S.



RRH MOUNTING DETAIL

7 / A-3

SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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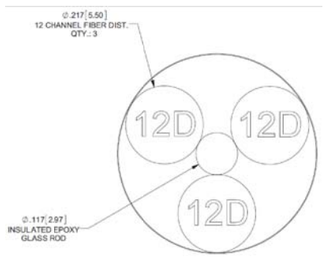
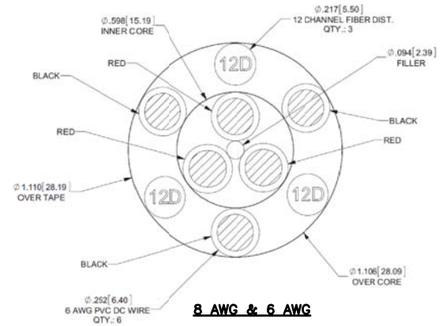
ROXBURY, CT 06783

SHEET TITLE
TOWER EQUIPMENT DETAILS

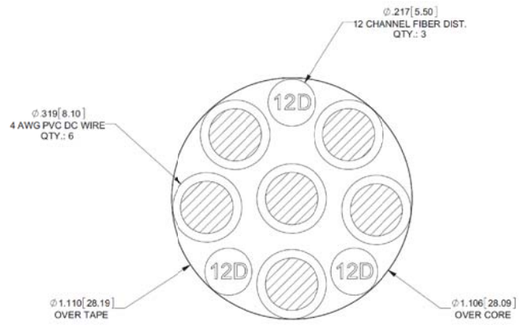
SHEET NUMBER
A-3



FIBER ONLY



8 AWG & 6 AWG



4 AWG

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF: RFS

	CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
	FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
	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 pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 225 ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
(*)	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-325F 3x 4 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 325 ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	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**	

2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: N.T.S.

1
A-4

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

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED
PROFESSIONAL ENGINEER
6-8-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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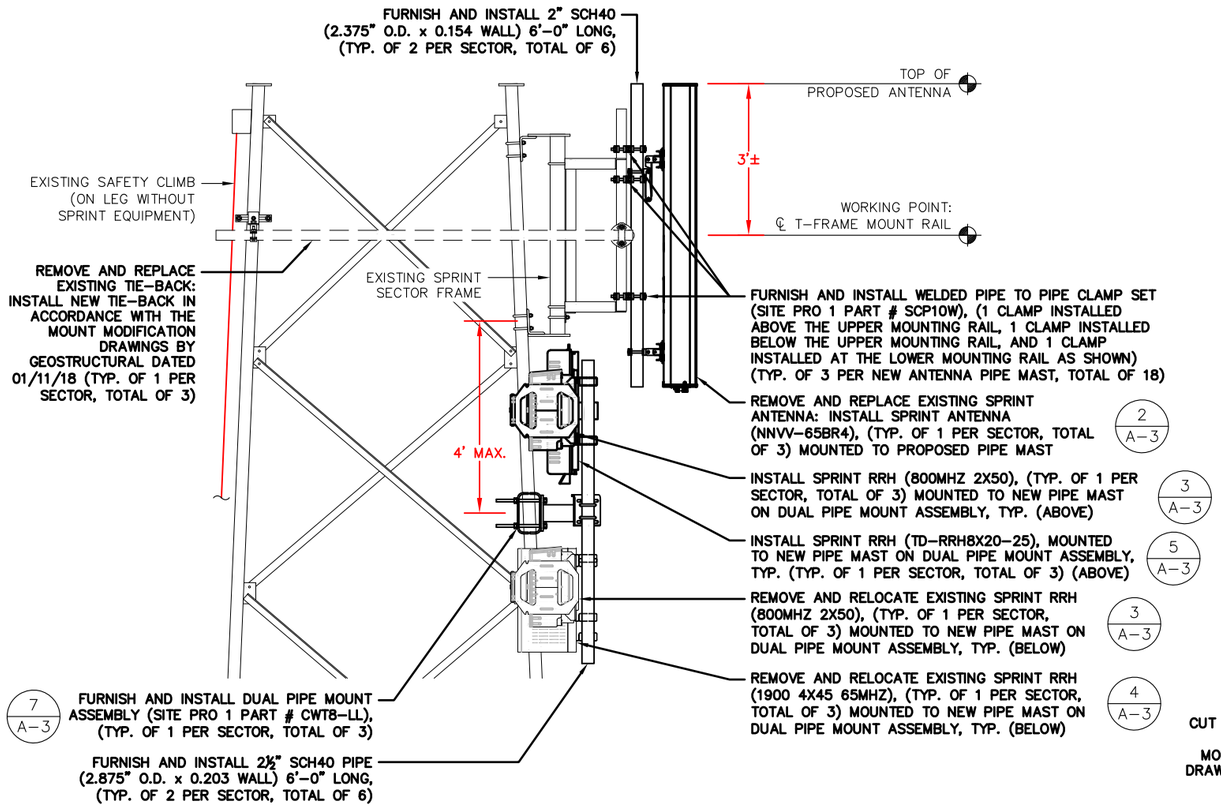
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
EQUIPMENT DETAILS

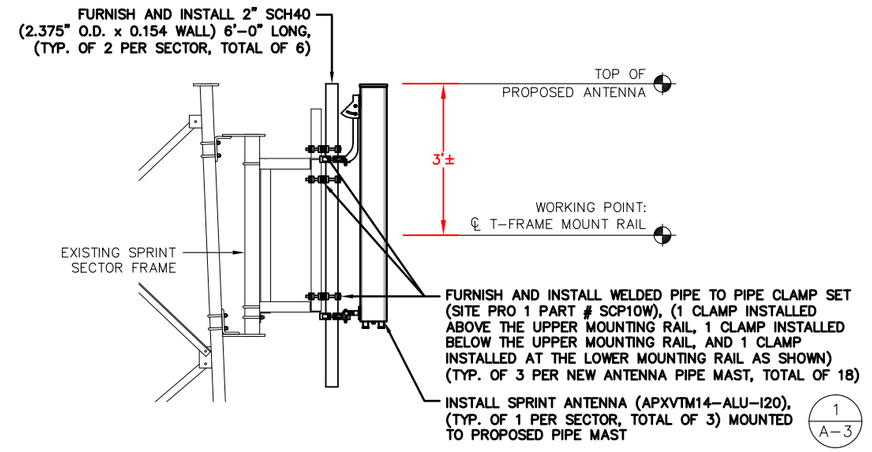
SHEET NUMBER
A-4



800 MHz/1900 MHz ANTENNA AND RRH MOUNTING DETAIL

1 / S-1

SCALE: N.T.S.



2.5 GHz ANTENNA MOUNTING DETAIL

2 / S-1

SCALE: N.T.S.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS): GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

SPECIAL CONSTRUCTION NOTE (SBA-PROVIDED ANTENNA MOUNT STRUCTURAL MOD SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS): GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE SPRINT RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS (PROVIDED BY GEOSTRUCTURAL DATED 05/11/18) AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY GEOSTRUCTURAL DATED 01/11/18).

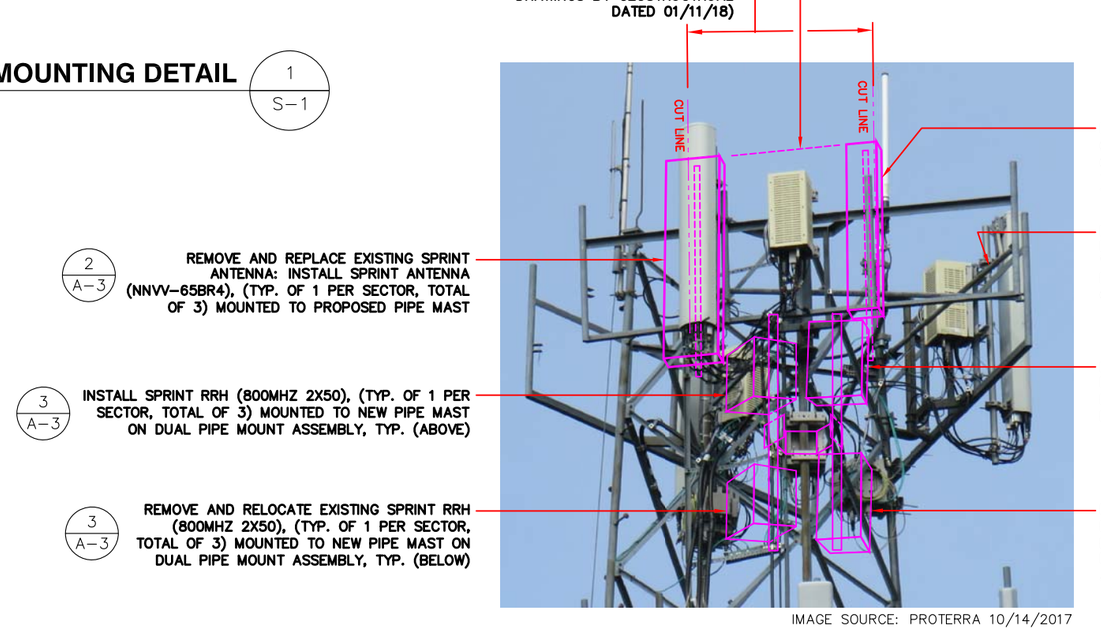


IMAGE SOURCE: PROTERRA 10/14/2017

ANTENNA AND RRH MOUNT PHOTO DETAIL

3 / S-1

SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

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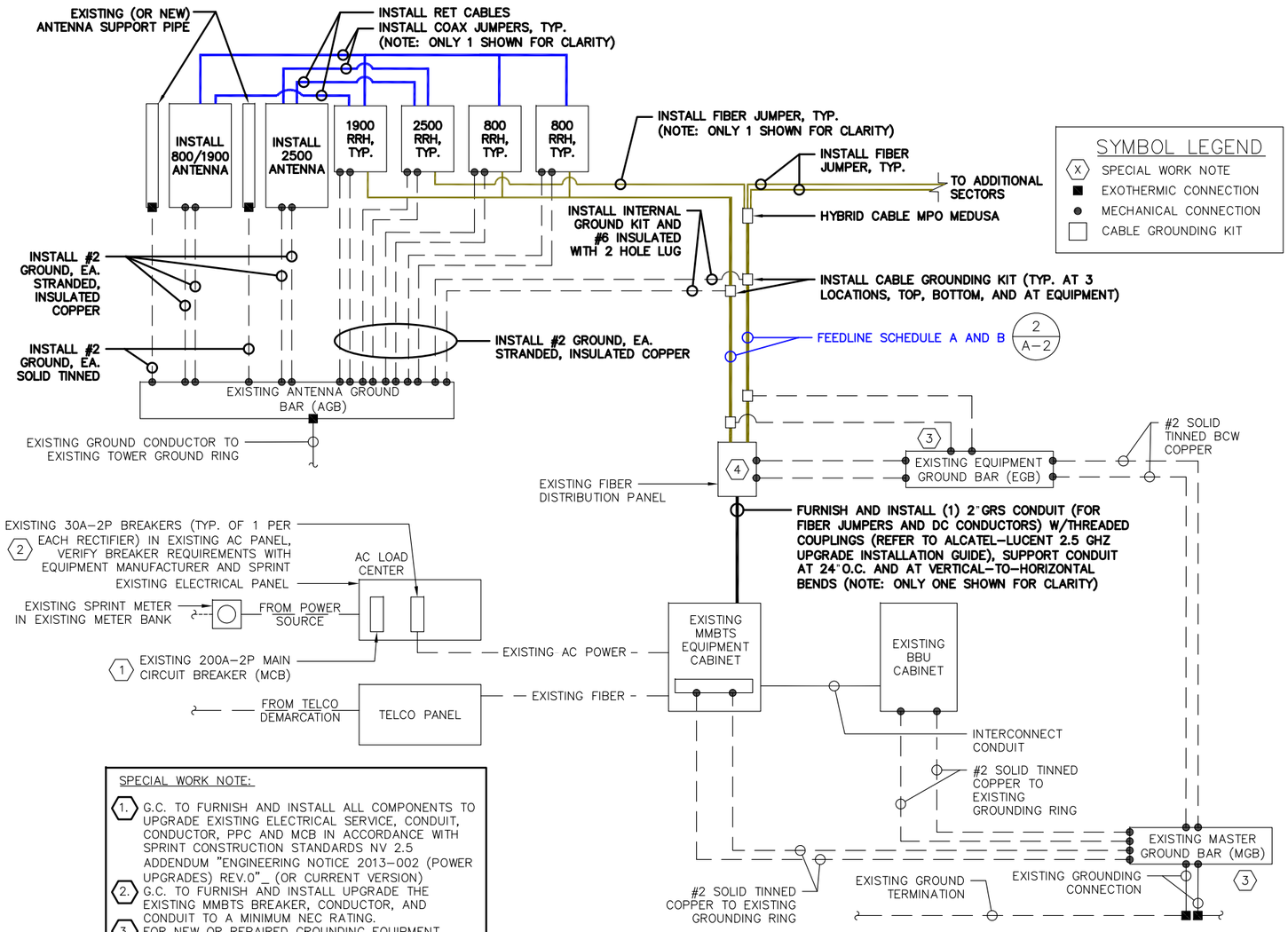
SHEET TITLE
ANTENNA AND RRH MOUNTING DETAILS

SHEET NUMBER
S-1



SPECIAL WORK NOTE:

1. G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0"_ (OR CURRENT VERSION)
2. G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING.
3. FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
   -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
   -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)
4. USE SPARE DC CABLES COILED UP AT TOWER TOP NV ARRAY TO POWER UP 2.5 RRH. INSIDE EXISTING FIBER DISTRIBUTION BOX, TIE SPARE DC CONDUCTORS INTO EXISTING DC BREAKER PANEL PER APPROVED DC WIRING CONNECTIVITY OPTION (BASED ON NV HYBRIFLEX CABLE LENGTH). CONSULT WITH SPRINT CM TO DETERMINE APPROPRIATE DC CONNECTIVITY OPTION, PLUMBING DIAGRAM AND DC BREAKER SIZE.

TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

1 / E-1

SCALE: N.T.S.

ELECTRICAL NOTES

1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
5) GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
9) ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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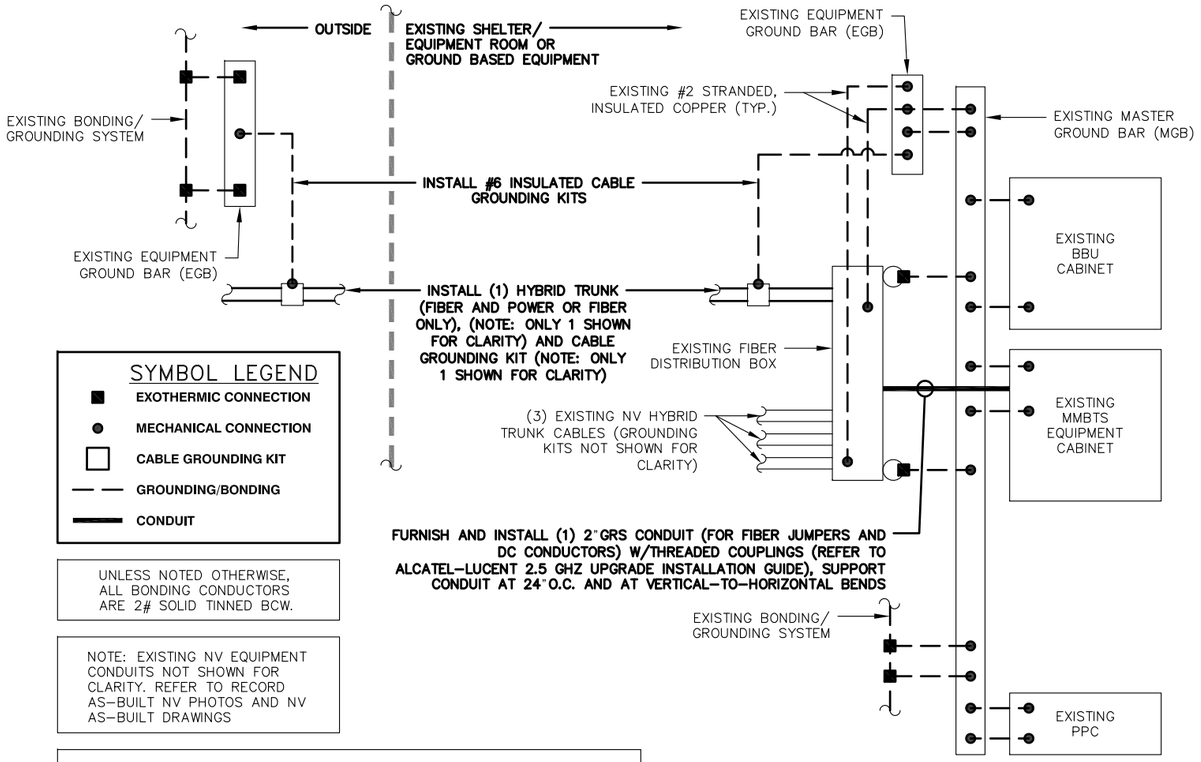
ROXBURY, CT 06783

SHEET TITLE
ONE LINE DIAGRAM

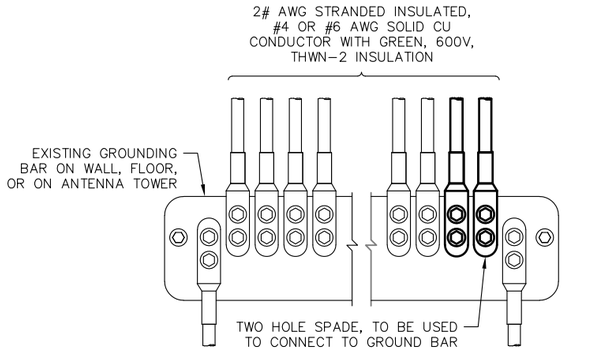
SHEET NUMBER
E-1



RAN EQUIPMENT GROUNDING SCHEMATIC

SCALE: N.T.S.

1 / E-2

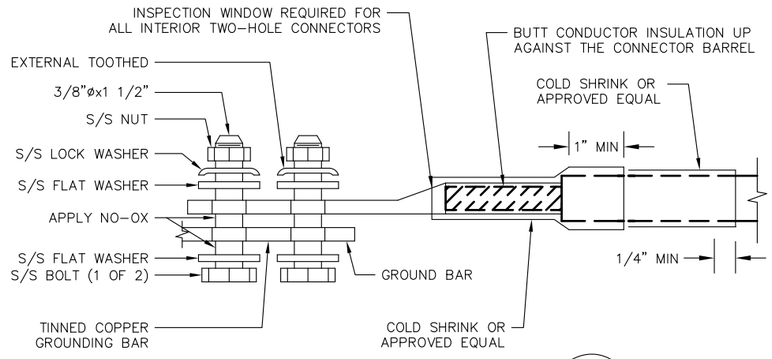


1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

SCALE: N.T.S.

2 / E-2



TWO HOLE LUG

SCALE: N.T.S.

3 / E-2

PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.
2. GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT SSEO DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES" AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING".
3. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
4. GROUND CONNECTIONS: CLEAN SURFACES THOROUGHLY BEFORE APPLYING GROUND LUGS OR CLAMPS. IF SURFACE IS COATED, REMOVE THE COATING, APPLY A NON-CORROSIVE APPROVED COMPOUND TO CLEAN SURFACE AND INSTALL LUGS OR CLAMPS. WHERE GALVANIZING IS REMOVED FROM METAL, IT SHALL BE PAINTED OR TOUCHED UP WITH "GALVAMOX" OR EQUAL.
5. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
6. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
7. ALL GROUND WIRES SHALL BE #2 SOLID TINNED BCW UNLESS NOTED OTHERWISE.
8. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
9. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
10. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 SOLID TINNED BCW EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
11. GROUND HYBRIFLEX SHIELD AT TOP, BOTTOM AND AT TRANSITION TO HYBRIFLEX JUMPER CABLES AT EQUIPMENT CABINET ENTRANCE USING MANUFACTURER'S GUIDELINES. WHEN HYBRIFLEX CABLE EXCEEDS 200', GROUND AT INTERVALS NOT EXCEEDING 100'.
12. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
13. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL OTHERWISE. THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES, LONG BARREL LUGS OR DOUBLE CRIMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH AN ANTI-OXIDANT (THOMAS BETTS KOPR-SHILD) BEFORE MAKING THE CRIMP CONNECTIONS THE CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDED TORQUES ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS.
14. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
15. THE MASTER GROUND BAR (MGB) SHALL BE MADE OF BARE 1/4"x2" COPPER (FOR OUTDOOR APPLICATIONS IT SHALL BE TINNED COPPER) AND LARGE ENOUGH TO ACCOMMODATE THE REQUIRED NUMBER OF GROUND CONNECTIONS. THE HARDWARE SECURING THE MGB SHALL ELECTRICAL INSULATE THE MGB FROM ANY STRUCTURE TO WHICH IT IS FASTENED.
16. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
17. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH SPRINT CONSTRUCTION MANAGER.
18. FOR NEW OR REPAIRED GROUNDING EQUIPMENT. REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
    -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
    -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)

Sprint
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MAHWAH, NJ 07495
TEL: (800) 357-7641

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ROXBURY, CT 06783

SHEET TITLE
GROUNDING DETAILS AND NOTES

SHEET NUMBER
E-2

Augment ID: CT72XC031Q17.1
RFDS ID: 45901

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT72XC031
SMS Schedule ID	172830
SMS Schedule Name	DO Macro Upgrade
PID	DOMU_CT72XC031
RRU OEM	Alcatel-Lucent
Switch OEM	ALU
RFDS Issue Date	
RFDS Revision Date	2017 11 17 14:12:43.0
RFDS Revision	2

Filter Analysis Complete	YES
RFDS - Issue Date	
Design Status	Complete
Border Analysis Complete	YES
Project Description	DO Macro Upgrade - Add 2500 MHz

Ancillary Cabinet1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	

Battery Backup Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
Junction Boxes needed at site	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
Needed at site	

A&E Drawing Requirements

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
Sprint Badged RF Engineer	Bill Hastings
RF Engineer Email	Bill.M.Hastings@sprint.com
RF Engineer Phone	978.590.9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.D.Hull@Sprint.com
RF Manager Phone	617.233.2900

Carrier Count	
2500 LTE	3
1900 LTE	3
1900 EVDO	3
1900 Voice	3
800 LTE	3
800 Voice	3

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

Ancillary Cabinet2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	

ALU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
Top Hat Quantity	

Power Protection Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
Power Protection Cabinet	

Location Details	
Latitude	41.55054766
Longitude	-73.29738553
Market	Southern Connecticut
Region	Northeast
City	Roxbury
State	CT
Zip Code	06783
County	Litchfield

Sector Count	
2500MHz	3
1900MHz	3
800MHz	3

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
GPS Antenna needed at site	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	

BTS #1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (in.)	
Manufacturer	
Number of BTS #1	

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	APXVTM14-ALU-I20	APXVTM14-ALU-I20	APXVTM14-ALU-I20			
Weight (lbs)	56.2	56.2	56.2	N/A	N/A	N/A
Dimensions	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	2.5 Jumper 8	2.5 Jumper 8	2.5 Jumper 8	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	30	170	270	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	177.001318	177.001318	177.001318	N/A	N/A	N/A
Antenna 1 Electrical DT	2	2	2	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	NNVV-65B-R4	NNVV-65B-R4	NNVV-65B-R4			
Weight (lbs)	84.7	84.7	84.7	N/A	N/A	N/A
Dimensions	72 x 19.6 x 7.8	72 x 19.6 x 7.8	72 x 19.6 x 7.8	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	800/1900 Jumper 4	800/1900 Jumper 4	800/1900 Jumper 4	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	30	170	270	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	177.001318	177.001318	177.001318	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	3	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	800/1900 Jumper 2	800/1900 Jumper 2	800/1900 Jumper 2	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	30	170	270	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	177.001318	177.001318	177.001318	N/A	N/A	N/A
Antenna 1 Electrical DT	5	5	5	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A

SPRINT CONSTRUCTION STANDARDS:

GENERAL CONTRACTOR SHALL ADHERE TO THE FOLLOWING SPRINT CONSTRUCTION STANDARDS.

- CONSTRUCTION STANDARDS: INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES – CURRENT VERSION, INCLUDING EXHIBITS A–M.
- CONSTRUCTION SPECIFICATIONS: CONSTRUCTION STANDARDS EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES (CURRENT VERSION).
- GROUNDING STANDARDS: EXTERIOR GROUNDING SYSTEM DESIGN. GROUNDING STANDARDS (SUPPLEMENT): ANTI–THEFT UPDATE TO SPRINT GROUNDING 082412 AND SPRINT ENGINEERING LETTER EL–0504 DATED 04.20.12.
- WEATHER PROOFING STANDARDS: EXCERPT FROM CONSTRUCTION STANDARDS EXHIBIT A, SECTION 3.6 WEATHERPROOFING CONNECTORS AND GROUND KITS.
- COLOR CODING: SPRINT NEXTEL ANT AND LINE COLOR CODING PER SPRINT TS–0200 CURRENT VERSION.
- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT IN RFDS, 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 SPRINT–PROVIDED CONTACT INFORMATION FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE ANTENNA AT SAME CL HEIGHT AS PLAN AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS–BUILT DRAWING WITH CORRECT CL HEIGHT. ALSO EMAIL CORRECT ANTENNA CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- 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 2.5G. TEST INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA. THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES 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.
- GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREES. 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.
  HTTP://WWW.3ZTELECOM.COM/ANTENNA–ALIGNMENT–TOOL/.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
RRU to Filter Jumper Make/Model						
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (in.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
RRU to Filter Jumper Make/Model						

NOTE: RFDS PROVIDED BY SPRINT DATED 11/17/2017. EXCERPTS TAKEN DEPICT RELEVANT RF DESIGN INFORMATION. A&E VENDOR SCOPE OF WORK LIMITED TO DESIGN OF MECHANICAL/STRUCUTRAL EQUIPMENT ATTACHMENTS.

RF DATA SHEET
SCALE: N.T.S.

1
RF–1

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320–4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED
PROFESSIONAL ENGINEER
6-8-18
FOR SCHEMATIC ONLY

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	06/08/18	CONSTRUCTION REVISED	PN
2	04/05/18	CONSTRUCTION REVISED	JEB
1	01/30/18	ISSUED FOR CONSTRUCTION	PN
0	11/07/17	ISSUED FOR REVIEW	JEB PN

SITE NUMBER:
CT72XC031
SITE NAME:
ROXBURY-LOWER COUNTY ROAD
SITE ADDRESS:
35 LOWER COUNTY ROAD
ROXBURY, CT 06783

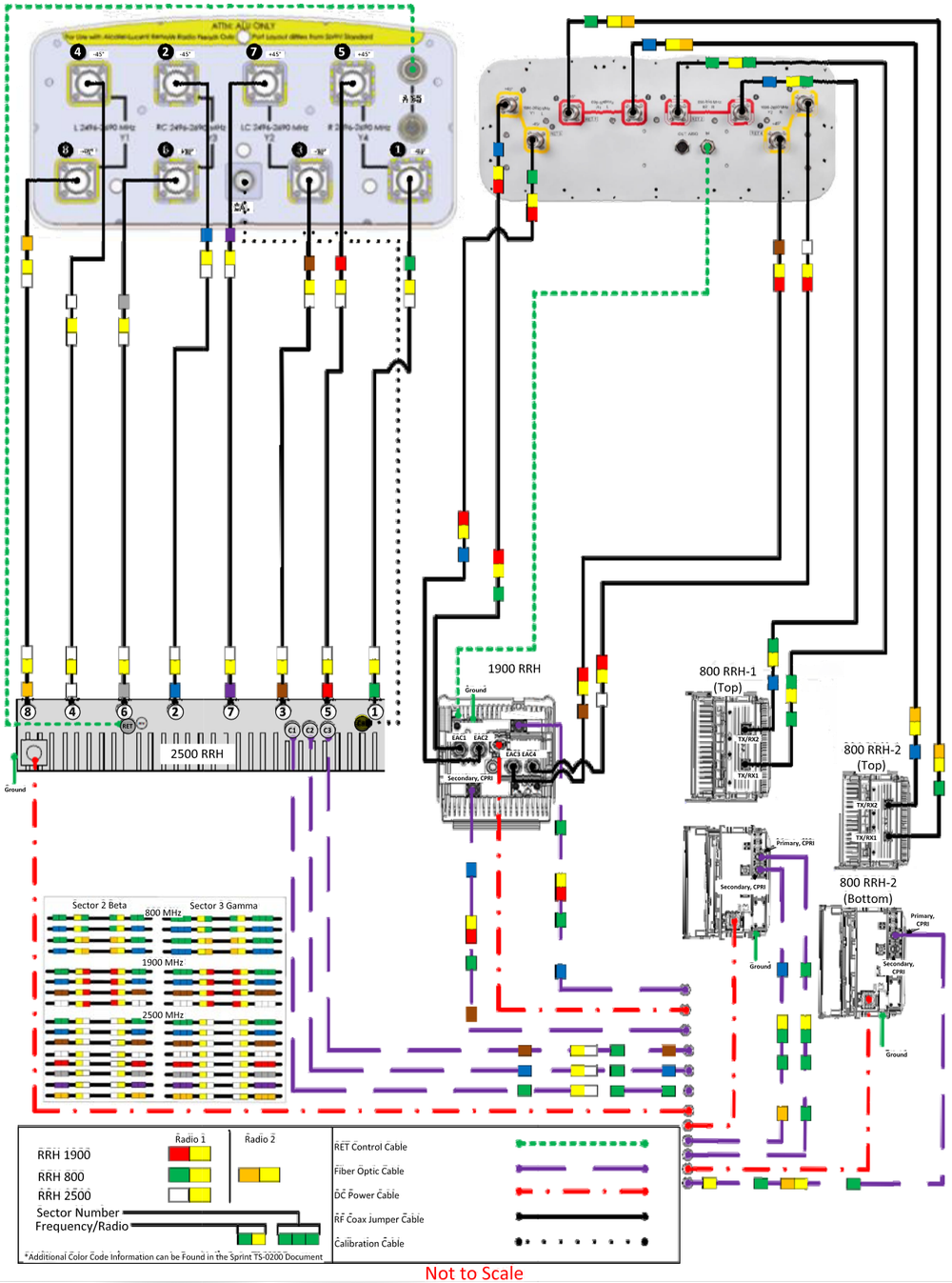
SHEET TITLE
RF DATA SHEET

SHEET NUMBER
RF–1

Prepared By	Revision Date	Revision Number
Mark Elliott	March 13, 2018	R1
Approved By	**Approval Date**	
RAN Hardware & Antenna Teams	Final-Macro Generated	

Sprint

ALU 211 APXVTM14-ALU-I20 & NNVV-65B-R4 wo Filters



Not to Scale

Prepared By	Creation Date	Revision Number
Mark Elliott	February 13, 2016	R-1
Approved By	**Approval Date**	
RAN Hardware & Antenna Teams	February 23, 2017	

Nokia-A Tri-Band Fiber Connections
(Nokia-A Two-800, One-1900, & One-2500 RRH)

Sprint

Nokia-A Site Upgrade: Adding 2500 and Second 800 RRH

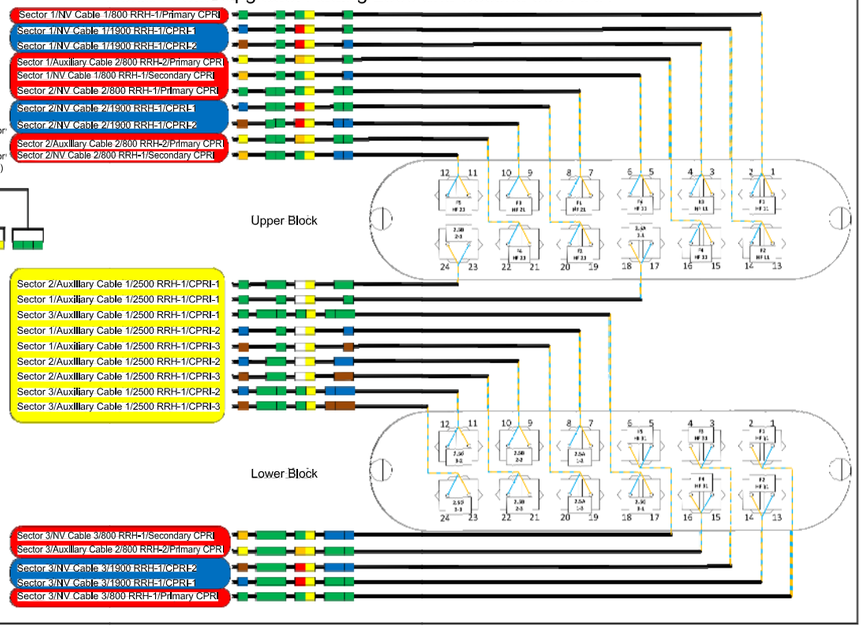
Existing Cable(s)

NV Cable 1 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 1
NV Cable 2 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 2
NV Cable 3 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 3

New Cable(s)

Auxiliary Cable 1 – Provides power and fiber for all 2500 RRHs (All Three Sectors)
Auxiliary Cable 2 – Provides power and fiber for all of the Second 800 RRHs (All Three Sectors)

Sector Number
Frequency/Radio
Fiber Cable Number
Fiber Pair Cable Number



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	Gray	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	Gray	Gray	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	Gray	Gray	Gray
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

Frequency/Radio	Indicator	ID
800 #1	Yellow	Green
800 #2	Yellow	Orange
1900 #1	Yellow	Red
1900 #2	Yellow	Brown
1900 #3	Yellow	Blue
1900 #4	Yellow	Grey
2500 #1	Yellow	White
2500 #2	Yellow	Purple

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35 LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE
PLUMBING DIAGRAM AND RAN WIRING

SHEET NUMBER
RF-2