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

December 18, 2017

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

Notice of Exempt Modification
940 Meriden Road, Waterbury, CT
41 33 11.8 N
-72 59 36.1 W
Sprint #: CT52XC056_DO Macro Upgrade

Dear Ms. Bachman:

Sprint (Clearwire) currently maintains antennas at the 118-foot level of the existing 119-foot Monopole Tower at 940 Meriden Rd., Waterbury, CT. The property is owned by Pine Grove Cemetery Association, Inc. The Tower is owned by SBA Infrastructure, LLC. Sprint now intends to remove (3) existing cell antennas and replace with (3) newer technology cell antennas at the 118-foot level of the tower. The proposed full scope of work is as follows:

Remove:
(3) 2.5GHz RRHs
(3) 5/16" lines
(3) 5/8" lines
(3) ¾" lines
(2) (Clearwire) junction boxes

Remove and Replace:
Remove: (3) Argus - LLPX310R – Panel Antennas
Replace with: (3) KMW - ETCR-654L12H6 – Panel Antennas
Remove: Existing mount
Replace with: (6) 36" standoff arms / (6) back-to-back pipe mounts / (6) pipes – 6' / (6) pipes – 8'
On ground: Note – no change to compound – cabinet swap on existing pad
Remove: (1) Clearwire equipment cabinet
Replace with : (1) New equipment cabinet

Install:
(3) ALU - 1900 MHz – RRUs
(3) ALU - TD-RRH8x20-25 – RRUs
(6) ALU - 800 MHz – RRUs
(1) Ring Mount
(4) 1-1/4" fiber

On ground: Note – no change to compound – cabinet swap on existing pad

(1) H-frame

(1) PPC mounted to H-frame

Existing Equipment to Remain (Including entitlements):

(2) Andrew - VHLP2.5-11 – Dishes (at 120')

(3) Standoff arms

(2) ½" lines

This facility was approved by the Council on February 27, 2007 under Docket 321. Approval was for a steel monopole no taller than 110' to provide public and private services. A D&M plan was to be produced and an RF report whenever emissions were to change. Space was to be provided for City safety services at no cost. It is SBA's opinion that the proposed modification complies with all tower conditions.

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 City's Mayor, Neil M. O'Leary, and City Planner, James A. Sequin, as well as to the Property Owner. (Separate notice is not being sent to the 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 - kpelletier@sbasite.com

Attachments

cc: Neil M. O'Leary, Mayor / with attachments
City of Waterbury, City Hall Building, 235 Grand Street, Waterbury, CT 06702
James A. Sequin, AICP, City Planner / with attachments
City of Waterbury, City Hall Building, 235 Grand Street, Waterbury, CT 06702
Pine Grove Cemetery Association, Inc. / with attachments
850 Meriden Road Waterbury CT 06705

POWER DENSITY

SPRINT Site Inventory and Power Data by Antenna

Sector:	A
Antenna #:	1
Make / Model:	KMW ETCR-654L12H6
Gain:	13.35 / 15.25 / 15.05 dBd
Height (AGL):	**118 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count	18
Total TX Power(W):	380 Watts
ERP (W):	11,775.31
Antenna A1 MPE%	**3.66 %**

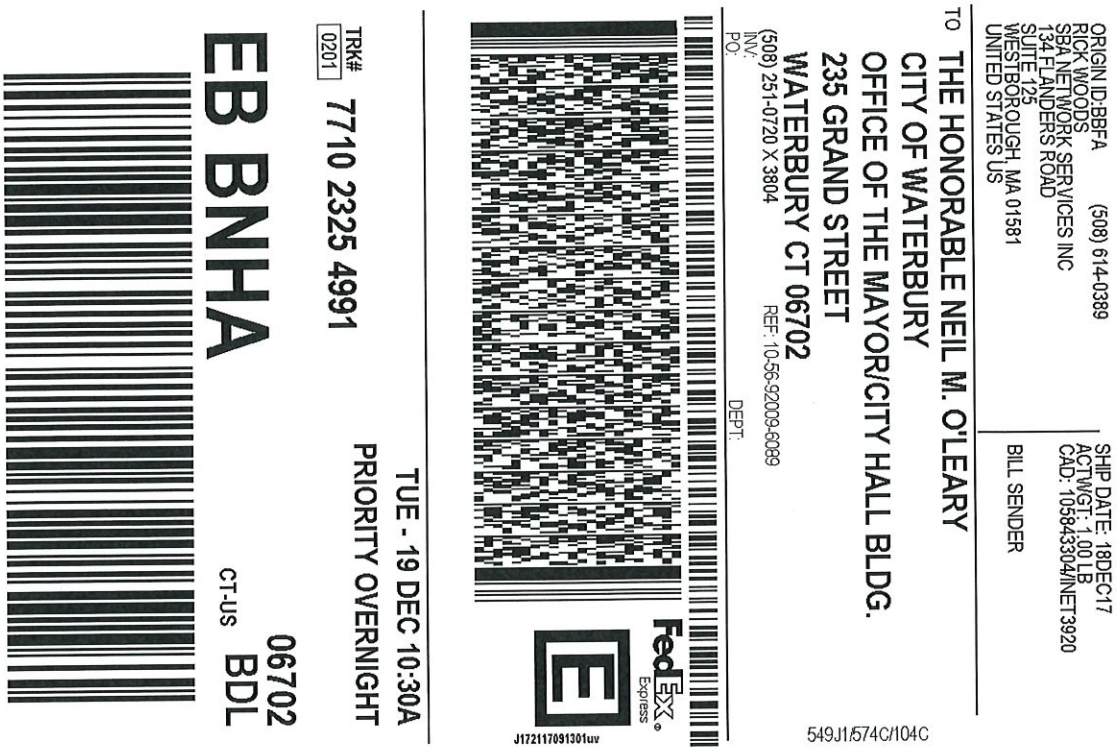
Sector:	B
Antenna #:	1
Make / Model:	KMW ETCR-654L12H6
Gain:	13.35 / 15.25 / 15.05 dBd
Height (AGL):	**118 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count	18
Total TX Power(W):	380 Watts
ERP (W):	11,775.31
Antenna B1 MPE%	**3.66 %**

Sector:	C
Antenna #:	1
Make / Model:	KMW ETCR-654L12H6
Gain:	13.35 / 15.25 / 15.05 dBd
Height (AGL):	**118 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count	18
Total TX Power(W):	380 Watts
ERP (W):	11,775.31
Antenna C1 MPE%	**3.66 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**3.66 %**
Nextel	0.37 %
Clearwire	0.15 %
MetroPCS	2.41 %
T-Mobile	6.82 %
Verizon Wireless	6.25 %
Site Total MPE %:	**19.66 %**

SPRINT Sector A Total:	3.66 %
SPRINT Sector B Total:	3.66 %
SPRINT Sector C Total:	3.66 %
Site Total:	19.66 %

SPRINT _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	432.54	118	1.24	850 MHz	567	0.22%
Sprint 850 MHz LTE	2	432.54	118	2.48	850 MHz	567	0.44%
Sprint 1900 MHz (PCS) CDMA	5	535.94	118	7.68	1900 MHz (PCS)	1000	0.77%
Sprint 1900 MHz (PCS) LTE	2	1,339.86	118	7.68	1900 MHz (PCS)	1000	0.77%
Sprint 2500 MHz (BRS) LTE	8	639.78	118	14.67	2500 MHz (BRS)	1000	1.46%
						Total:	**3.66%**



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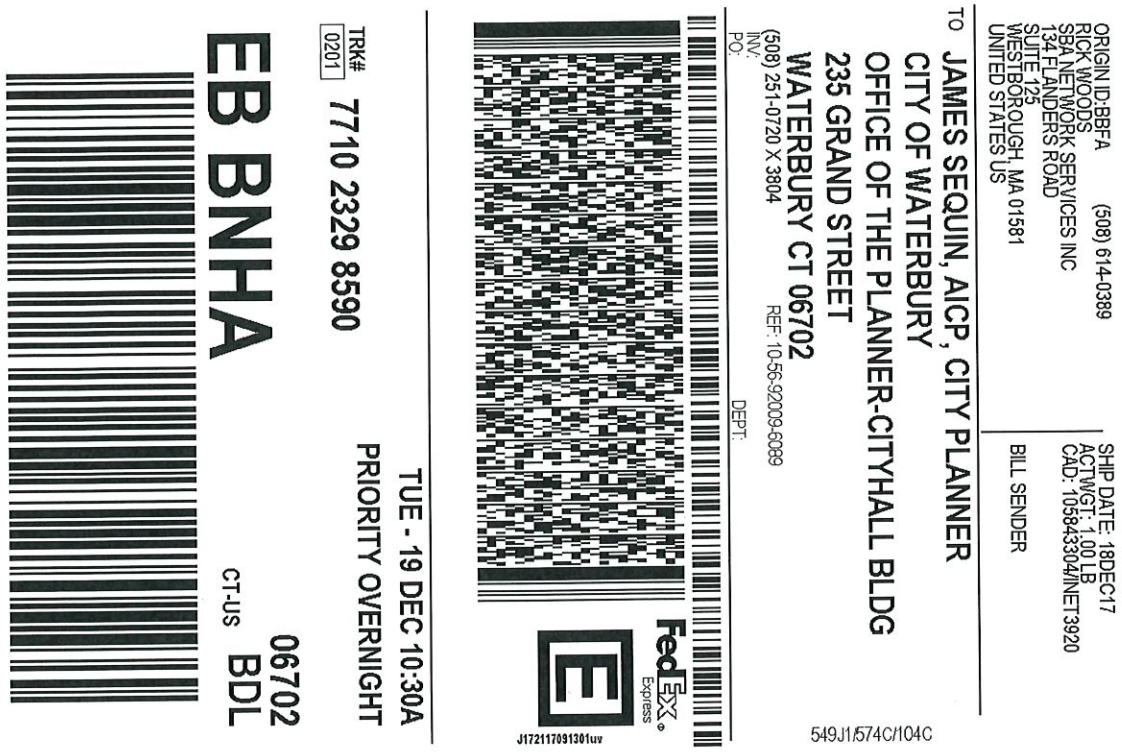
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.



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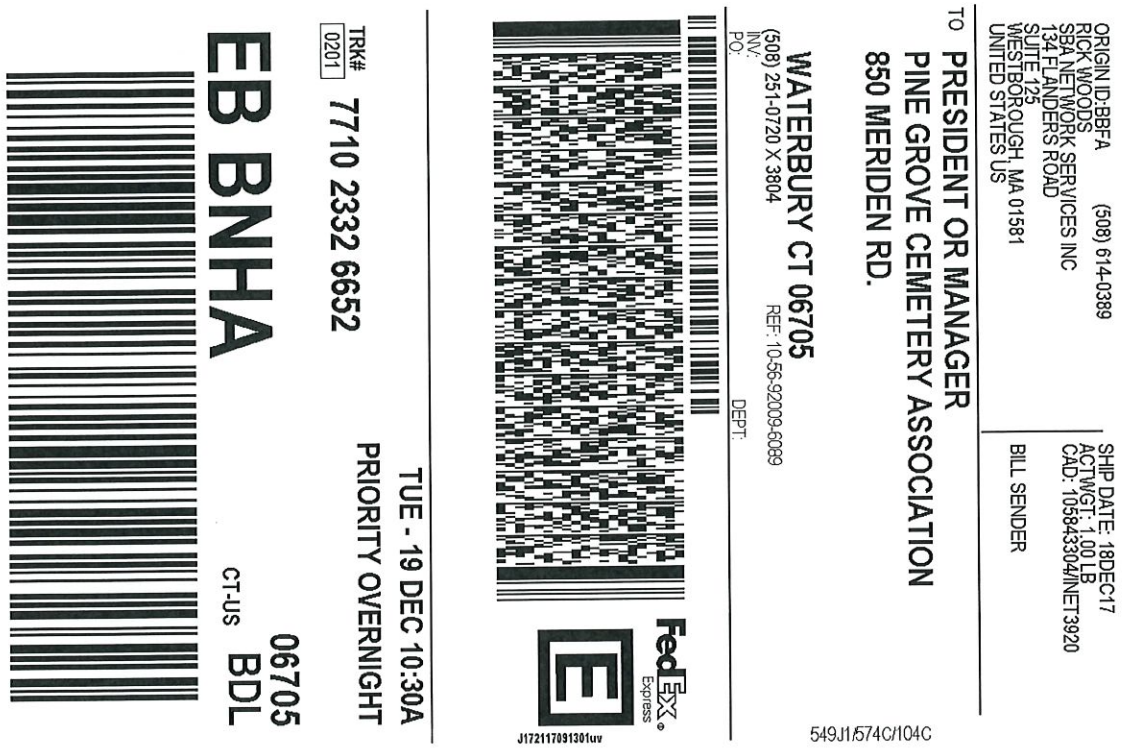

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The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2012.

CITY OF WATERBURY

Information on the Property Records for the Municipality of Waterbury was last updated on 12/15/2017.

Parcel Information

Location:	940 MERIDEN RD	Property Use:	Church	Primary Use:	Church - Sanctuary (Chapel)
Unique ID:	030203770070	Map Block Lot:	0302-0377-0070	Acres:	104.00
490 Acres:	0.00	Zone:	RL	Volume / Page:	368/ 217
Developers Map / Lot:		Census:			

Value Information

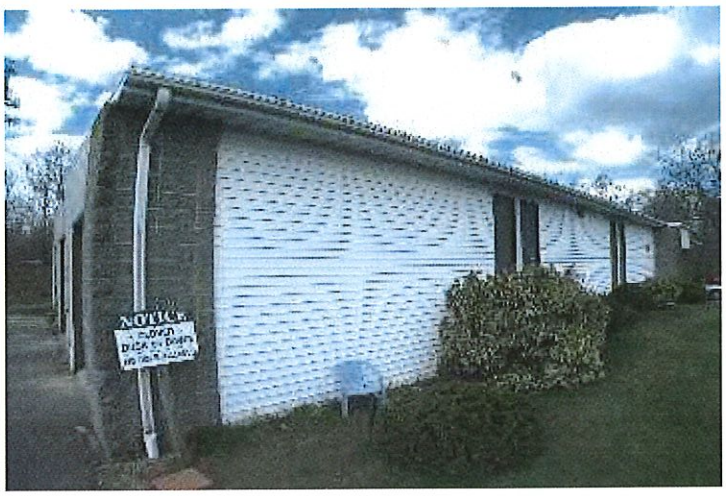
	Appraised Value	70% Assessed Value
Land	1,615,498	1,130,840

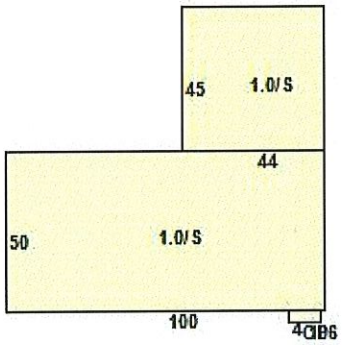
	Appraised Value	70% Assessed Value
Buildings	364,741	255,320
Detached Outbuildings	89,467	62,630
Total	2,069,706	1,448,790

Owner's Information

Owner's Data
PINE GROVE CEMETERY ASSOCIATION 850 MERIDEN RD WATERBURY CT 06705-0000

Building 1





Category:	Public Use	Use:	Funeral Home	GLA:	6,980
Stories:	1.00	Construction:	Average	Year Built:	1984
Heating:	Forced Air	Fuel:		Cooling Percent:	0%
Siding:	Wood Siding /Metal on Steel Frame	Roof Material:		Beds/Units:	0

Special Features

Sprinklers	80

Attached Components

Type:	Year Built:	Area:
Canopy Canopy	1984	40

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Asphalt Paving	1984			61,000

Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
2016.2277	Electrical	08/03/2016		Closed	REPLACE 3 EXISTING ANTENNA WITH 3 NEW ANTENNA
2015.3462	Electrical	11/17/2015		Closed	INSTALL 3 NEW ANTENNAS TO EXISTING POLE
2015.3463	Electrical	11/17/2015		Closed	UPGRADE EQUIPMENT IN EXISTING CELL TOWER SHELTER PINE GROVE CEMETARY
2015.1894	Mechanical	07/20/2015		Closed	INSTALL A/C CONDENSOR AND COIL
2015.0049	Commercial Demolition	01/08/2015		Closed	DECONSTRUCT CELL TOWER/REMOVE ANTENNAS & EQUIPMENT
2013.2811	Electrical	10/02/2013		Closed	REPLACE 1 COAXIAL CABLE1 FIBER OPTIC ETC

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT52XC056

SBA Grove
940 Meriden Road
Waterbury, CT 06705

December 6, 2017

EBI Project Number: 6217005418

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	19.66 %

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

EBI Consulting
environmental | engineering | due diligence

December 6, 2017

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

Emissions Analysis for Site: **CT52XC056 – SBA Grove**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **940 Meriden Road, Waterbury, 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure 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 **940 Meriden Road, Waterbury, 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 20 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 **KMW ETCR-654L12H6** 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 **118 feet** above ground level (AGL) for **Sector A**, **118 feet** above ground level (AGL) for **Sector B** and **118 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 public threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	KMW ETCR-654L12H6	Make / Model:	KMW ETCR-654L12H6	Make / Model:	KMW ETCR-654L12H6
Gain:	13.35 / 15.25 / 15.05 dBd	Gain:	13.35 / 15.25 / 15.05 dBd	Gain:	13.35 / 15.25 / 15.05 dBd
Height (AGL):	**118 feet**	Height (AGL):	**118 feet**	Height (AGL):	**118 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count	18	Channel Count	18	Channel Count	18
Total TX Power(W):	380 Watts	Total TX Power(W):	380 Watts	Total TX Power(W):	380 Watts
ERP (W):	11,775.31	ERP (W):	11,775.31	ERP (W):	11,775.31
Antenna A1 MPE%	**3.66 %**	Antenna B1 MPE%	**3.66 %**	Antenna C1 MPE%	**3.66 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**3.66 %**
Nextel	0.37 %
Clearwire	0.15 %
MetroPCS	2.41 %
T-Mobile	6.82 %
Verizon Wireless	6.25 %
Site Total MPE %:	**19.66 %**

SPRINT Sector A Total:	3.66 %
SPRINT Sector B Total:	3.66 %
SPRINT Sector C Total:	3.66 %
Site Total:	19.66 %

SPRINT _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	432.54	118	1.24	850 MHz	567	0.22%
Sprint 850 MHz LTE	2	432.54	118	2.48	850 MHz	567	0.44%
Sprint 1900 MHz (PCS) CDMA	5	535.94	118	7.68	1900 MHz (PCS)	1000	0.77%
Sprint 1900 MHz (PCS) LTE	2	1,339.86	118	7.68	1900 MHz (PCS)	1000	0.77%
Sprint 2500 MHz (BRS) LTE	8	639.78	118	14.67	2500 MHz (BRS)	1000	1.46%
						Total:	**3.66%**

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	3.66 %
Sector B:	3.66 %
Sector C:	3.66 %
SPRINT Maximum Total (per sector):	3.66 %
Site Total:	19.66 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **19.66 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 119 ft SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13070-A

Customer Site Name: Waterbury 4, CT

Carrier Name: Sprint Nextel

Carrier Site ID / Name: CT52XC056 / SBA Grove

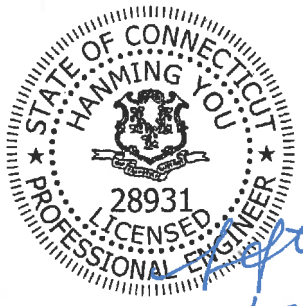
Site Location: 940 Meriden Road

Waterbury, Connecticut

New Haven County

Latitude: 41.553278

Longitude: -72.993361



10/18/17

Analysis Result:

Max Structural Usage: 60.6% [Pass]

Max Foundation Usage: 55% [Pass]

Report Prepared By : Jarryd Tibbetts

Introduction

The purpose of this report is to summarize the analysis results on the 119 ft SABRE Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawing prepared by Sabre, Job #07-03039 dated 4/23/07 Structural Analysis prepared by FDH, Project #12-06C54E S2 dated 6/17/11
Foundation Drawing	Foundation Drawing prepared by Sabre, Job #03039 dated 4/23/07
Geotechnical Report	Geotechnical Report prepared by Gemini Geotechnical Associates, Project #07023CT dated 3/13/07
Modification Drawings	Modification Drawing prepared by FDH, Project #09-01077E S3 dated 10/13/09

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.189g, S_1 = 0.064g

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	120.0	2	Andrew - VHLP2.5-11 - Dish	(3) Standoff	(3) 5/16" (2) 1/2" (3) 5/8" (3) 3/4"	Clearwire
2	118.0	3	Argus - LLPX310R - Panel			
3		3	2.5GHz RRH			
8	99.0	3	RFS - APX16DWV-16DWVS-E-A20 - Panel	Low Profile Platform	(18) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
9		3	Commscope - LNX-6515DS-A1M - Panel			
10		3	Ericsson - AIR 32 - Panel			
11		3	Ericsson - KRY 112 489/2 - TMA			
12		3	Ericsson - KRY 112 144/1 - TMA			
13		3	Kathrein - 782 11056 - Bias T			
14	87.0	3	Antel - BXA-80063/4CF - Panel	Low Profile Platform	(18) 1 5/8" (2) 1 5/8" Hybrid	Verizon
15		9	Andrew - SBNHH-1D65B - Panel			
16		3	Alcatel Lucent - RRH4X45-19 - RRU			
17		3	Alcatel Lucent - RRH2X60-700 - RRU			
18		3	Alcatel Lucent - RRH2X60-PCS - RRU			
19		2	RFS - DB-T1-6Z-8AB-0Z - Distribution Box			
20	77.0	3	RFS - APXV18-206517S-C - Panel	Pipe	(6) 1 5/8"	Metro PCS

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	118.0	2	Andrew - VHLP2.5-11 - Dish	(3) Standoff Ring Mount @ (+/-)3ft	(2) 1/2" (4) 1-1/4" Fiber	Sprint Nextel
4		3	KMW - ETCR-654L12H6 - Panel			
5		3	ALU - 1900 MHz - RRU			
6		6	ALU - 800 MHz - RRU			
7		3	ALU - TD-RRH8x20-25 - RRU			

All transmission lines are considered running inside of the pole shafts.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**52.7%**	**60.6%**	**38.8%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	3142.0	29.0	42.0
Analysis Reactions	2080.8	24.6	51.1
Factored Reactions*	4241.7	39.2	56.7
% of Design Reactions	49.1%	62.8%	90.2%

* Per section 15.5.1 of the TIA-222-G standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

The maximum twist and sway of the microwave dish under the operational wind speed as specified in the Analysis Criteria is listed in the table below:

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
118.0	Andrew - VHLP2.5-11 - Dish	Sprint Nextel	0.002	0.697

It is recommended that the carrier reviews the twist and sway values of the microwave dish.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Antenna Mount Note:

The new proposed mount contributes **0.93%** of additional stress to the tower structure.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 52.73% at 0.0ft

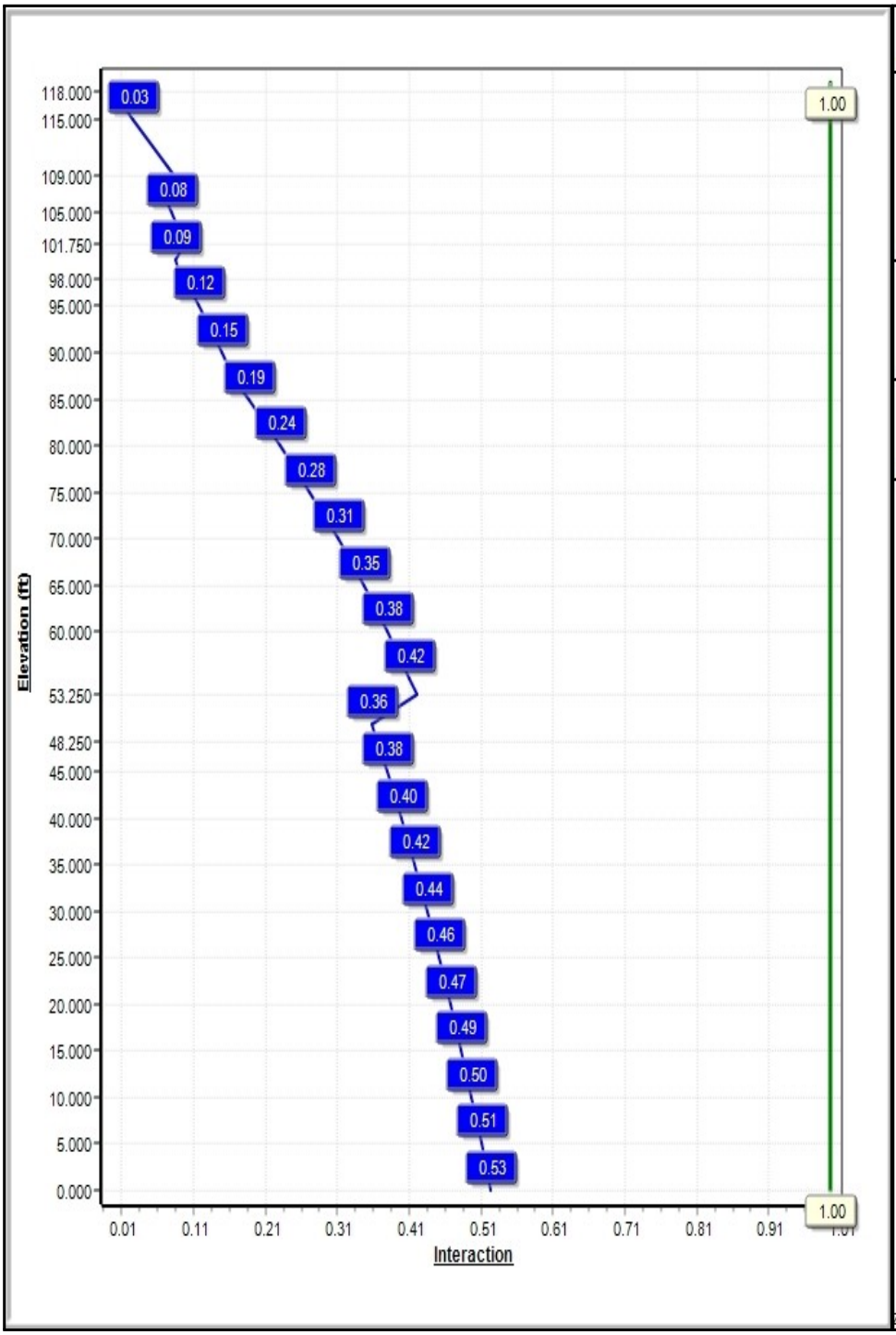
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT	**Exposure:**	C	
Height:	119.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

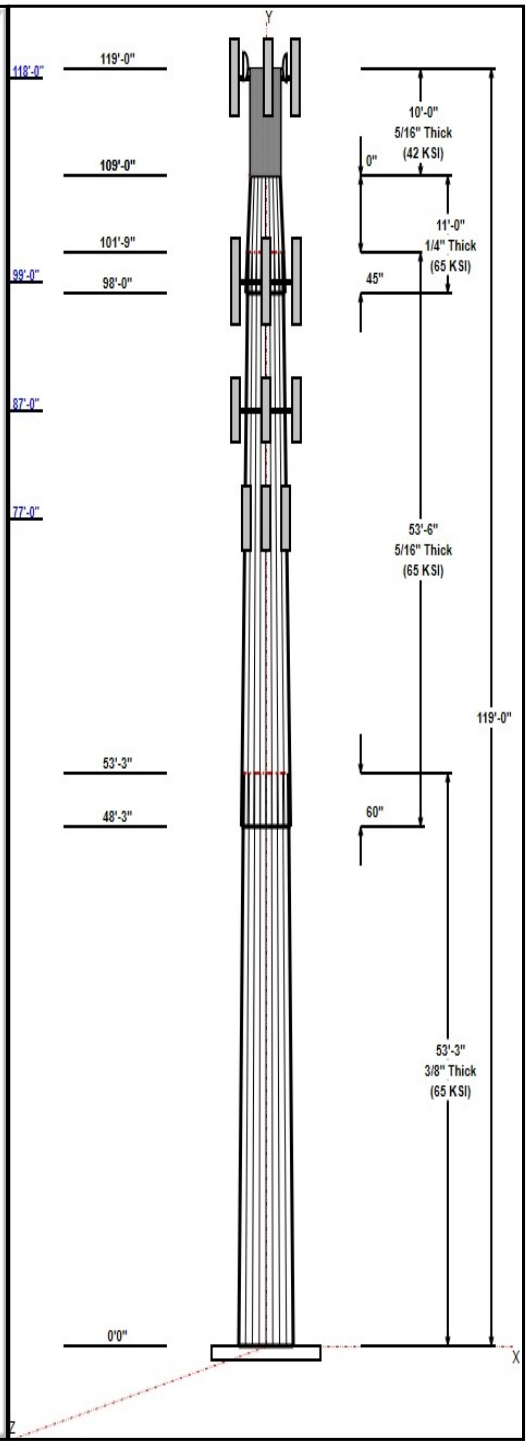
Tower Engineering Solutions

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 97 mph Wind

Iterations: 22





Structure: CT13070-A-SBA

Type: Custom
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.00000

10/18/2017

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	37.99	49.39	0.375		0.21408	65
2	53.50	28.23	39.69	0.313	Slip	0.21408	65
3	11.00	27.18	29.53	0.250	Slip	0.21408	65
4	10.00	26.00	26.00	0.312	Butt	0.00000	42

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
119.00	120.00	2	VHLP2.5-11	Sprint Nextel
118.00	118.00	3	3 ft Standoff	Sprint Nextel
118.00	118.00	3	ETCR-654L12H6	Sprint Nextel
118.00	118.00	3	1900 MHz RRH	Sprint Nextel
118.00	118.00	6	800 MHz RRH	Sprint Nextel
118.00	118.00	3	TD-RRH8x20-25	Sprint Nextel
115.00	115.00	1	Tri-Antenna Mount	Sprint Nextel
99.00	99.00	1	Low Profile Platform	T-Mobile
99.00	99.00	3	AIR 32	T-Mobile
99.00	99.00	3	KRY 112 489/2	T-Mobile
99.00	99.00	3	APX16DWV-16DWVS-E-A	T-Mobile
99.00	99.00	3	LNX-6515DS-A1M	T-Mobile
99.00	99.00	3	782 11056	T-Mobile
99.00	99.00	3	KRY 112 144/1	T-Mobile
87.00	87.00	3	BXA-80063/4CF	Verizon
87.00	87.00	9	SBNHH-1D65B	Verizon
87.00	87.00	3	1900 MHz 4X45 RRH	Verizon
87.00	87.00	3	RRH2X60-PCS	Verizon
87.00	87.00	3	RRH2X60-700	Verizon
87.00	87.00	2	DB-T1-6Z-8AB-0Z	Verizon
87.00	87.00	1	Low Profile Platform	Verizon
77.00	77.00	3	APXV18-206517S-C	Metro PCS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	118.00	Inside	1-1/4" Fiber	Sprint Nextel
0.00	118.00	Inside	1/2" Coax	Sprint Nextel
0.00	99.00	Inside	1 5/8" Coax	T-Mobile
0.00	99.00	Inside	1 5/8" Hybrid	T-Mobile
0.00	87.00	Inside	1 5/8" Coax	Verizon
0.00	87.00	Inside	1 5/8" Hybrid	Verizon
0.00	77.00	Inside	1 5/8" Coax	Metro PCS

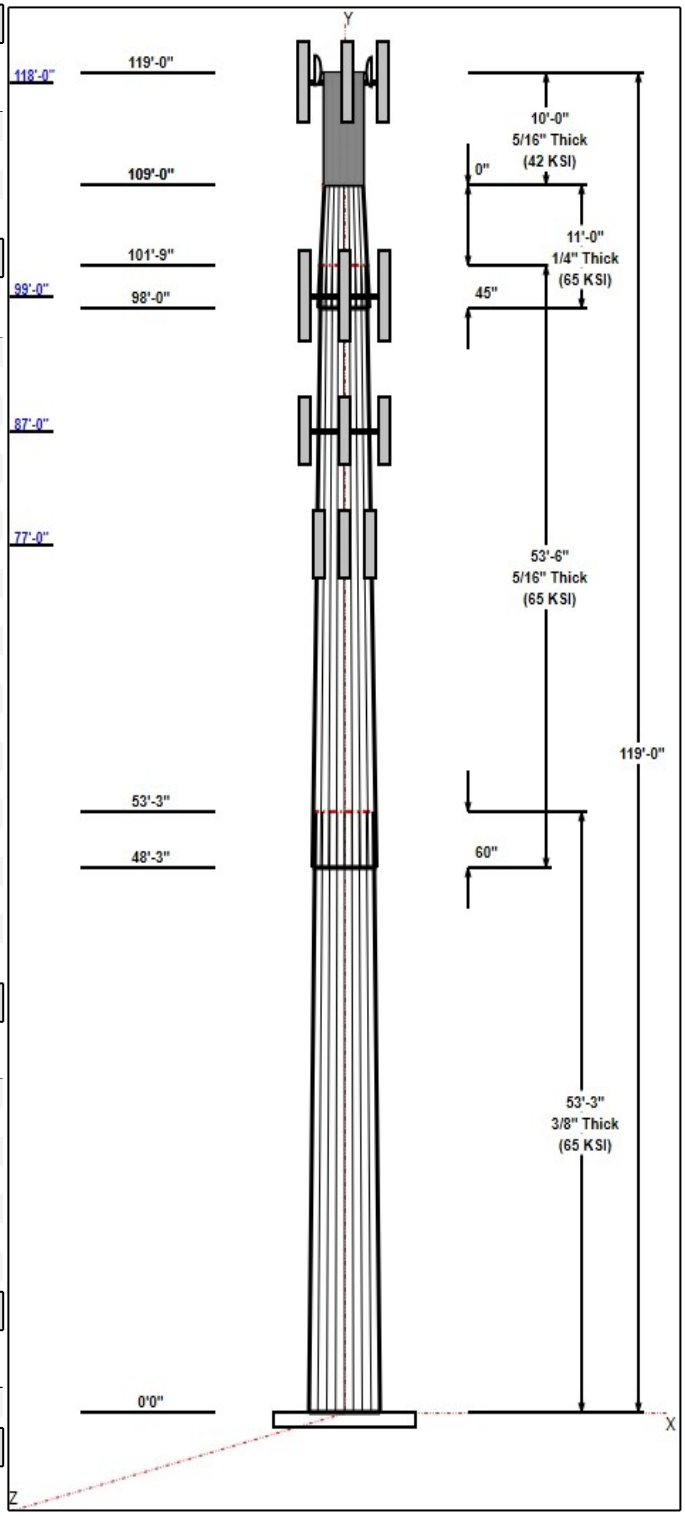
Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	53.3	60.0	Clipped

Reactions



Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	2080.8	24.6	33.8
0.9D + 1.6W 97 mph Wind	2068.8	24.6	25.3
1.2D + 1.0Di + 1.0Wi 50 mph Wind	587.2	7.0	51.1
1.2D + 1.0E	58.4	0.7	33.8
0.9D + 1.0E	58.1	0.7	25.3
1.0D + 1.0W 60 mph Wind	495.8	5.9	28.2

Structure: CT13070-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Waterbury 4, CT
Height: 119.00 (ft)

10/18/2017

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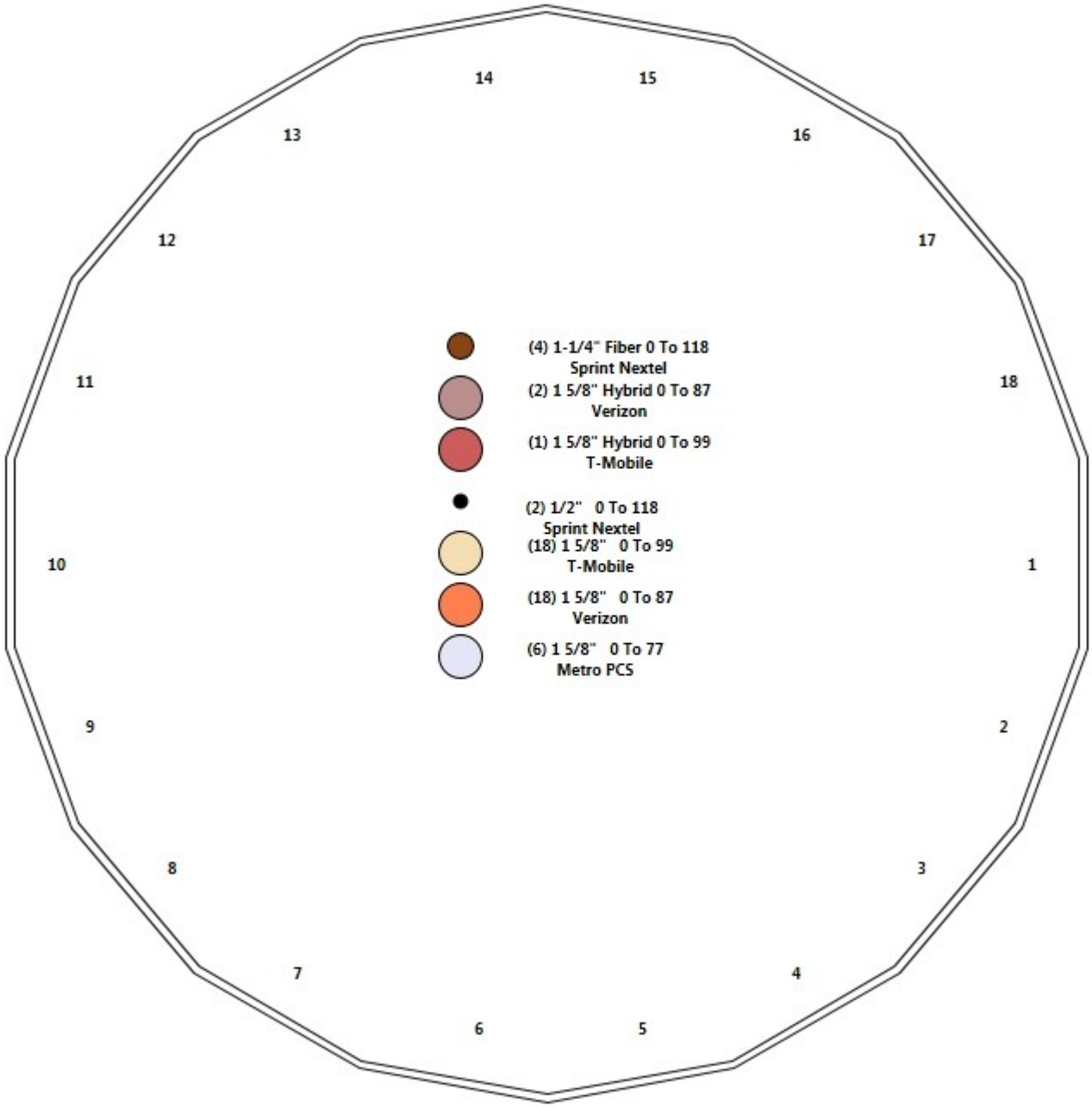

Shaft Properties

Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.250	0.3750	65		0.00	9,341
2	18	53.500	0.3125	65	Slip	60.00	6,075
3	18	11.000	0.2500	65	Slip	45.00	835
4	R	10.000	0.3120	42	Flange	0.00	857
					Total Shaft Weight:		**17,108**

	Bottom						Top						
Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	49.39	0.00	58.34	17707.72	21.81	131.71	37.99	53.25	44.77	8003.18	16.45	101.3	0.214083
2	39.69	48.25	39.05	7648.75	20.98	126.99	28.23	101.75	27.69	2727.23	14.52	90.34	0.214083
3	29.53	98.00	23.24	2517.77	19.42	118.14	27.18	109.00	21.37	1957.91	17.76	108.7	0.214083
4	26.00	109.0	25.18	2078.44	0.00	83.33	26.00	119.00	25.18	2078.44	0.00	83.33	0.000000

Load Summary

Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 6

Tower Engineering Solutions

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	119.00	VHLP2.5-11	2	47.60	8.43	1.00	216.34	10.098	1.00	0.50	1.00
2	118.00	3 ft Standoff	3	40.00	2.63	0.75	118.38	8.457	0.75	0.00	0.00
3	118.00	ETCR-654L12H6	3	99.00	15.71	0.71	413.08	17.348	0.00	0.00	0.00
4	118.00	1900 MHz RRH	3	60.00	2.77	0.99	141.46	4.008	0.00	0.00	0.00
5	118.00	800 MHz RRH	6	53.00	2.49	0.92	125.21	3.607	0.00	0.00	0.00
6	118.00	TD-RRH8x20-25	3	70.00	4.05	0.69	177.31	4.842	0.00	0.00	0.00
7	115.00	Tri-Antenna Mount	1	250.00	5.00	1.00	844.81	13.497	1.00	0.00	0.00
8	99.00	Low Profile Platform	1	1500.00	22.00	1.00	2755.64	38.943	1.00	0.00	0.00
9	99.00	AIR 32	3	132.20	6.51	0.86	307.75	7.641	0.87	0.00	0.00
10	99.00	KRY 112 489/2	3	15.40	0.65	0.82	32.30	1.237	0.84	0.00	0.00
11	99.00	APX16DWV-16DWVS-E-ACU	3	40.70	6.08	0.65	121.73	8.059	0.66	0.00	0.00
12	99.00	LNX-6515DS-A1M	3	50.30	11.46	0.84	266.35	14.584	0.84	0.00	0.00
13	99.00	782 11056	3	1.80	0.66	0.78	4.28	1.245	0.82	0.00	0.00
14	99.00	KRY 112 144/1	3	11.02	0.41	0.73	21.38	0.866	0.75	0.00	0.00
15	87.00	BXA-80063/4CF	3	9.90	4.72	0.72	105.07	6.471	0.73	0.00	0.00
16	87.00	SBNHH-1D65B	9	40.00	8.16	0.82	230.41	9.386	0.82	0.00	0.00
17	87.00	1900 MHz 4X45 RRH	3	59.50	2.71	0.99	135.34	3.907	0.99	0.00	0.00
18	87.00	RRH2X60-PCS	3	55.00	2.20	0.89	134.05	2.799	0.90	0.00	0.00
19	87.00	RRH2X60-700	3	60.00	3.50	0.73	142.66	4.247	0.74	0.00	0.00
20	87.00	DB-T1-6Z-8AB-0Z	2	44.00	4.80	0.85	178.82	5.624	0.86	0.00	0.00
21	87.00	Low Profile Platform	1	1500.00	22.00	1.00	2739.52	38.725	1.00	0.00	0.00
22	77.00	APXV18-206517S-C	3	26.40	5.17	0.74	113.26	7.392	0.76	0.00	0.00
		Totals:	**67**	**6,304.86**			**16,658.44**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	118.00	(4) 1-1/4" Fiber	0.00	Inside
0.00	118.00	(2) 1/2" Coax	0.00	Inside
0.00	99.00	(18) 1 5/8" Coax	0.00	Inside
0.00	99.00	(1) 1 5/8" Hybrid	0.00	Inside
0.00	87.00	(18) 1 5/8" Coax	0.00	Inside
0.00	87.00	(2) 1 5/8" Hybrid	0.00	Inside
0.00	77.00	(6) 1 5/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	49.390	58.338	17707.7	21.81	131.71	75.7	706.2	0.0
5.00		0.3750	48.320	57.064	16572.7	21.31	128.85	76.3	675.5	981.7
10.00		0.3750	47.249	55.790	15487.3	20.81	126.00	76.9	645.6	960.0
15.00		0.3750	46.179	54.516	14450.4	20.30	123.14	77.5	616.3	938.4
20.00		0.3750	45.108	53.242	13460.8	19.80	120.29	78.1	587.8	916.7
25.00		0.3750	44.038	51.968	12517.4	19.30	117.43	78.7	559.8	895.0
30.00		0.3750	42.968	50.694	11619.2	18.79	114.58	79.3	532.6	873.3
35.00		0.3750	41.897	49.420	10765.0	18.29	111.73	79.9	506.1	851.7
40.00		0.3750	40.827	48.146	9953.7	17.79	108.87	80.5	480.2	830.0
45.00		0.3750	39.756	46.872	9184.3	17.28	106.02	81.1	455.0	808.3
48.25	Bot - Section 2	0.3750	39.061	46.044	8706.0	16.96	104.16	81.5	439.0	513.8
50.00		0.3750	38.686	45.598	8455.5	16.78	103.16	81.7	430.5	504.3
53.25	Top - Section 1	0.3125	38.615	37.990	7041.7	20.38	123.57	0.0	0.0	923.6
55.00		0.3125	38.240	37.618	6837.1	20.17	122.37	77.7	352.2	225.1
60.00		0.3125	37.170	36.557	6274.4	19.56	118.94	78.4	332.5	631.0
65.00		0.3125	36.100	35.495	5743.5	18.96	115.52	79.1	313.4	612.9
70.00		0.3125	35.029	34.433	5243.4	18.35	112.09	79.8	294.8	594.9
75.00		0.3125	33.959	33.372	4773.2	17.75	108.67	80.5	276.8	576.8
77.00		0.3125	33.531	32.947	4593.3	17.51	107.30	80.8	269.8	225.7
80.00		0.3125	32.888	32.310	4332.0	17.15	105.24	81.2	259.4	333.1
85.00		0.3125	31.818	31.248	3918.8	16.54	101.82	81.9	242.6	540.7
87.00		0.3125	31.390	30.824	3761.2	16.30	100.45	82.2	236.0	211.2
90.00		0.3125	30.748	30.187	3532.8	15.94	98.39	82.6	226.3	311.4
95.00		0.3125	29.677	29.125	3173.0	15.33	94.97	82.6	210.6	504.6
98.00	Bot - Section 3	0.3125	29.035	28.488	2969.3	14.97	92.91	82.6	201.4	294.1
99.00		0.3125	28.821	28.276	2903.4	14.85	92.23	82.6	198.4	175.4
100.00		0.3125	28.607	28.063	2838.5	14.73	91.54	82.6	195.4	174.1
101.75	Top - Section 2	0.2500	28.732	22.600	2316.3	18.85	114.93	0.0	0.0	301.5
105.00		0.2500	28.036	22.048	2150.7	18.36	112.15	79.8	151.1	246.9
109.00	Top - Section 3	0.2500	27.180	21.368	1957.9	17.76	108.72	80.5	141.9	295.5
109.00	Bot - Section 4	0.3120	26.000	25.179	2078.4	14.23	87.12	41.2	159.9	
110.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	85.7
115.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	428.4
118.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	257.0
119.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	85.7
										17108.3

Wind Loading - Shaft

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

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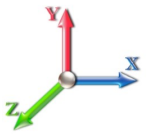
Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	373.76	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	365.66	0.650	0.000	5.00	20.670	13.44	459.9	0.0	1178.1
10.00		1.00	0.85	19.450	21.40	357.55	0.650	0.000	5.00	20.217	13.14	449.9	0.0	1152.1
15.00		1.00	0.85	19.450	21.40	349.45	0.650	0.000	5.00	19.764	12.85	439.8	0.0	1126.0
20.00		1.00	0.90	20.638	22.70	351.62	0.650	0.000	5.00	19.312	12.55	455.9	0.0	1100.0
25.00		1.00	0.95	21.630	23.79	351.43	0.650	0.000	5.00	18.859	12.26	466.7	0.0	1074.0
30.00		1.00	0.98	22.477	24.72	349.54	0.650	0.000	5.00	18.406	11.96	473.3	0.0	1048.0
35.00		1.00	1.01	23.218	25.54	346.40	0.650	0.000	5.00	17.953	11.67	476.9	0.0	1022.0
40.00		1.00	1.04	23.880	26.27	342.33	0.650	0.000	5.00	17.500	11.37	478.1	0.0	996.0
45.00		1.00	1.07	24.479	26.93	337.51	0.650	0.000	5.00	17.047	11.08	477.4	0.0	970.0
48.25	Bot - Section 2	1.00	1.09	24.841	27.33	334.05	0.650	0.000	3.25	10.838	7.04	308.0	0.0	616.5
50.00		1.00	1.09	25.029	27.53	332.09	0.650	0.000	1.75	5.849	3.80	167.5	0.0	605.2
53.25	Top - Section 1	1.00	1.11	25.363	27.90	328.29	0.650	0.000	3.25	10.715	6.96	310.9	0.0	1108.4
55.00		1.00	1.12	25.536	28.09	331.58	0.650	0.000	1.75	5.691	3.70	166.2	0.0	270.1
60.00		1.00	1.14	26.008	28.61	325.26	0.650	0.000	5.00	15.953	10.37	474.6	0.0	757.2
65.00		1.00	1.16	26.450	29.09	318.57	0.650	0.000	5.00	15.500	10.07	469.0	0.0	735.5
70.00		1.00	1.17	26.866	29.55	311.54	0.650	0.000	5.00	15.047	9.78	462.5	0.0	713.9
75.00		1.00	1.19	27.259	29.98	304.22	0.650	0.000	5.00	14.594	9.49	455.1	0.0	692.2
77.00	Appurtenance(s)	1.00	1.20	27.410	30.15	301.22	0.650	0.000	2.00	5.711	3.71	179.1	0.0	270.8
80.00		1.00	1.21	27.632	30.39	296.64	0.650	0.000	3.00	8.430	5.48	266.5	0.0	399.7
85.00		1.00	1.22	27.987	30.79	288.82	0.650	0.000	5.00	13.688	8.90	438.3	0.0	648.8
87.00	Appurtenance(s)	1.00	1.23	28.124	30.94	285.64	0.650	0.000	2.00	5.349	3.48	172.1	0.0	253.5
90.00		1.00	1.24	28.325	31.16	280.79	0.650	0.000	3.00	7.887	5.13	255.6	0.0	373.7
95.00		1.00	1.25	28.650	31.51	272.56	0.650	0.000	5.00	12.783	8.31	419.0	0.0	605.5
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	267.54	0.650	0.000	3.00	7.452	4.84	245.9	0.0	352.9
99.00	Appurtenance(s)	1.00	1.26	28.900	31.79	265.85	0.650	0.000	1.00	2.490	1.62	82.3	0.0	210.4
100.00		1.00	1.27	28.961	31.86	264.16	0.650	0.000	1.00	2.472	1.61	81.9	0.0	208.9
101.75	Top - Section 2	1.00	1.27	29.067	31.97	261.17	0.650	0.000	1.75	4.282	2.78	142.4	0.0	361.8
105.00		1.00	1.28	29.260	32.19	260.22	0.650	0.000	3.25	7.806	5.07	261.3	0.0	296.3
109.00	Top - Section 3	1.00	1.29	29.491	32.44	253.27	0.650	0.000	4.00	9.345	6.07	315.3	0.0	354.6
110.00		1.00	1.29	29.548	32.50	238.82	0.600	0.000	1.00	2.167	1.30	67.6	0.0	102.8
115.00	Appurtenance(s)	1.00	1.30	29.826	32.81	239.94	0.600	0.000	5.00	10.833	6.50	341.2	0.0	514.1
118.00	Appurtenance(s)	1.00	1.31	29.988	32.99	240.59	0.600	0.000	3.00	6.500	3.90	205.8	0.0	308.4
119.00	Appurtenance(s)	1.00	1.31	30.041	33.05	240.81	0.600	0.000	1.00	2.167	1.30	68.7	0.0	102.8
								Totals:	**119.00**			**10,534.5**		**20,530.0**

Discrete Appurtenance Forces

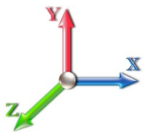
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	30.094	33.103	1.00	1.00	16.86	114.24	1.583	1.000	893.00	883.69	893.00
2	118.00	1900 MHz RRH	3	29.988	32.986	0.99	1.00	8.23	216.00	0.000	0.000	434.20	0.00	0.00
3	118.00	ETCR-654L12H6	3	29.988	32.986	0.71	1.00	33.46	356.40	0.000	0.000	1766.08	0.00	0.00
4	118.00	3 ft Standoff	3	29.988	32.986	0.75	1.00	5.92	144.00	0.000	0.000	312.32	0.00	0.00
5	118.00	800 MHz RRH	6	29.988	32.986	0.92	1.00	13.74	381.60	0.000	0.000	725.43	0.00	0.00
6	118.00	TD-RRH8x20-25	3	29.988	32.986	0.69	1.00	8.38	252.00	0.000	0.000	442.47	0.00	0.00
7	115.00	Tri-Antenna Mount	1	29.826	32.808	1.00	1.00	5.00	300.00	0.000	0.000	262.46	0.00	0.00
8	99.00	KRY 112 144/1	3	28.900	31.790	0.58	0.80	0.72	39.67	0.000	0.000	36.54	0.00	0.00
9	99.00	782 11056	3	28.900	31.790	0.62	0.80	1.24	6.48	0.000	0.000	62.92	0.00	0.00
10	99.00	LNX-6515DS-A1M	3	28.900	31.790	0.67	0.80	22.99	181.08	0.000	0.000	1169.52	0.00	0.00
11	99.00	APX16DWV-16DWVS-E-	3	28.900	31.790	0.52	0.80	9.47	146.52	0.000	0.000	481.69	0.00	0.00
12	99.00	KRY 112 489/2	3	28.900	31.790	0.66	0.80	1.28	55.44	0.000	0.000	65.30	0.00	0.00
13	99.00	AIR 32	3	28.900	31.790	0.69	0.80	13.48	475.92	0.000	0.000	685.81	0.00	0.00
14	99.00	Low Profile Platform	1	28.900	31.790	1.00	1.00	22.00	1800.00	0.000	0.000	1118.99	0.00	0.00
15	87.00	Low Profile Platform	1	28.124	30.936	1.00	1.00	22.00	1800.00	0.000	0.000	1088.96	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	28.124	30.936	0.68	0.80	6.56	105.60	0.000	0.000	324.65	0.00	0.00
17	87.00	RRH2X60-700	3	28.124	30.936	0.58	0.80	6.12	216.00	0.000	0.000	303.11	0.00	0.00
18	87.00	RRH2X60-PCS	3	28.124	30.936	0.71	0.80	4.71	198.00	0.000	0.000	233.12	0.00	0.00
19	87.00	1900 MHz 4X45 RRH	3	28.124	30.936	0.79	0.80	6.42	214.20	0.000	0.000	317.75	0.00	0.00
20	87.00	SBNHH-1D65B	9	28.124	30.936	0.66	0.80	48.24	432.00	0.000	0.000	2387.57	0.00	0.00
21	87.00	BXA-80063/4CF	3	28.124	30.936	0.65	0.90	9.15	35.64	0.000	0.000	452.92	0.00	0.00
22	77.00	APXV18-206517S-C	3	27.410	30.151	0.59	0.80	9.18	95.04	0.000	0.000	442.95	0.00	0.00
							Totals:		**7,565.83**			**14,007.76**		

Total Applied Force Summary

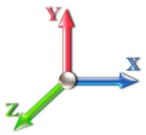
Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		459.94	1484.76	0.00	0.00
10.00		449.86	1458.75	0.00	0.00
15.00		439.78	1432.74	0.00	0.00
20.00		455.93	1406.72	0.00	0.00
25.00		466.66	1380.71	0.00	0.00
30.00		473.27	1354.70	0.00	0.00
35.00		476.85	1328.69	0.00	0.00
40.00		478.08	1302.68	0.00	0.00
45.00		477.40	1276.67	0.00	0.00
48.25		307.99	815.89	0.00	0.00
50.00		167.47	712.50	0.00	0.00
53.25		310.90	1307.72	0.00	0.00
55.00		166.24	377.49	0.00	0.00
60.00		474.65	1063.90	0.00	0.00
65.00		469.01	1042.23	0.00	0.00
70.00		462.46	1020.55	0.00	0.00
75.00		455.11	998.87	0.00	0.00
77.00	(3) attachments	622.03	488.52	0.00	0.00
80.00		266.49	561.25	0.00	0.00
85.00		438.26	918.08	0.00	0.00
87.00	(24) attachments	5280.16	3362.60	0.00	0.00
90.00		255.57	459.93	0.00	0.00
95.00		418.96	749.21	0.00	0.00
98.00		245.85	439.12	0.00	0.00
99.00	(19) attachments	3703.09	2944.29	0.00	0.00
100.00		81.90	213.83	0.00	0.00
101.75		142.40	370.45	0.00	0.00
105.00		261.29	312.38	0.00	0.00
109.00		315.27	374.42	0.00	0.00
110.00		67.61	107.78	0.00	0.00
115.00	(1) attachments	603.67	838.88	0.00	0.00
118.00	(18) attachments	3886.33	1673.33	0.00	0.00
119.00	(2) attachments	961.73	217.05	883.69	893.00
	Totals:	**24,542.21**	**33,796.70**	**883.69**	**893.00**

Calculated Forces

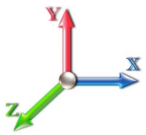
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-33.76	-24.59	-0.88	-2080.7	0.00	2080.78	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.527
5.00	-32.21	-24.22	-0.88	-1957.8	0.00	1957.82	3920.48	1960.24	7723.84	3867.66	0.09	-0.162	0.000	0.515
10.00	-30.68	-23.85	-0.88	-1836.7	-0.01	1836.72	3862.67	1931.34	7438.74	3724.90	0.35	-0.325	0.000	0.501
15.00	-29.19	-23.49	-0.88	-1717.4	-0.01	1717.46	3803.51	1901.75	7156.21	3583.42	0.77	-0.488	0.000	0.487
20.00	-27.72	-23.09	-0.88	-1600.0	-0.01	1600.04	3742.99	1871.49	6876.43	3443.32	1.37	-0.652	0.000	0.472
25.00	-26.28	-22.68	-0.88	-1484.5	-0.01	1484.57	3681.11	1840.56	6599.58	3304.69	2.14	-0.815	0.000	0.457
30.00	-24.87	-22.26	-0.88	-1371.1	-0.01	1371.15	3617.88	1808.94	6325.84	3167.62	3.08	-0.977	-0.001	0.440
35.00	-23.49	-21.83	-0.88	-1259.8	-0.01	1259.85	3553.28	1776.64	6055.40	3032.20	4.20	-1.138	-0.001	0.422
40.00	-22.14	-21.38	-0.88	-1150.7	-0.01	1150.72	3487.33	1743.67	5788.43	2898.52	5.47	-1.297	-0.001	0.404
45.00	-20.83	-20.92	-0.88	-1043.8	-0.01	1043.82	3420.03	1710.01	5525.12	2766.66	6.92	-1.454	-0.001	0.384
48.25	-19.99	-20.62	-0.88	-975.84	-0.01	975.84	3375.55	1687.77	5356.01	2681.98	7.94	-1.556	-0.001	0.370
50.00	-19.26	-20.46	-0.88	-939.76	-0.01	939.76	3351.36	1675.68	5265.64	2636.73	8.52	-1.610	-0.001	0.362
53.25	-17.93	-20.13	-0.88	-873.28	-0.01	873.28	2647.50	1323.75	4165.57	2085.88	9.65	-1.710	-0.001	0.426
55.00	-17.52	-19.99	-0.88	-838.05	-0.01	838.05	2630.02	1315.01	4097.26	2051.68	10.29	-1.763	-0.001	0.415
60.00	-16.42	-19.52	-0.88	-738.11	-0.02	738.11	2579.17	1289.59	3903.72	1954.76	12.23	-1.927	-0.001	0.384
65.00	-15.34	-19.06	-0.88	-640.49	-0.02	640.49	2526.96	1263.48	3712.68	1859.10	14.33	-2.083	-0.002	0.351
70.00	-14.29	-18.59	-0.88	-545.19	-0.02	545.19	2473.39	1236.70	3524.34	1764.79	16.59	-2.230	-0.002	0.315
75.00	-13.29	-18.12	-0.88	-452.22	-0.02	452.22	2418.47	1209.23	3338.88	1671.92	19.00	-2.365	-0.002	0.276
77.00	-12.80	-17.49	-0.88	-415.98	-0.02	415.98	2396.12	1198.06	3265.54	1635.20	20.00	-2.417	-0.002	0.260
80.00	-12.23	-17.22	-0.88	-363.50	-0.03	363.50	2362.18	1181.09	3156.47	1580.58	21.55	-2.489	-0.002	0.235
85.00	-11.31	-16.76	-0.88	-277.39	-0.03	277.39	2304.54	1152.27	2977.30	1490.86	24.21	-2.595	-0.003	0.191
87.00	-8.18	-11.34	-0.88	-243.88	-0.03	243.88	2281.10	1140.55	2906.58	1455.45	25.31	-2.632	-0.003	0.171
90.00	-7.72	-11.07	-0.88	-209.87	-0.03	209.87	2242.72	1121.36	2798.02	1401.09	26.98	-2.684	-0.003	0.153
95.00	-6.99	-10.62	-0.88	-154.53	-0.03	154.53	2163.84	1081.92	2603.70	1303.79	29.83	-2.757	-0.003	0.122
98.00	-6.55	-10.36	-0.88	-122.67	-0.04	122.67	2116.52	1058.26	2490.47	1247.09	31.57	-2.795	-0.003	0.102
99.00	-3.79	-6.51	-0.88	-112.32	-0.04	112.32	2100.74	1050.37	2453.28	1228.47	32.16	-2.806	-0.004	0.093
100.00	-3.58	-6.42	-0.88	-105.80	-0.04	105.80	2084.97	1042.48	2416.38	1209.99	32.75	-2.816	-0.004	0.089
101.75	-3.22	-6.26	-0.88	-94.56	-0.04	94.56	1611.41	805.70	1884.17	943.49	33.79	-2.834	-0.004	0.102
105.00	-2.91	-5.99	-0.88	-74.21	-0.04	74.21	1583.50	791.75	1805.91	904.30	35.72	-2.863	-0.004	0.084
109.00	-2.55	-5.66	-0.88	-50.25	-0.04	50.25	1548.36	774.18	1710.93	856.74	38.14	-2.896	-0.005	0.060
109.00	-2.55	-5.66	-0.88	-50.25	-0.04	50.25	933.38	466.69	986.46	590.00	38.14	-2.896	-0.005	0.088
110.00	-2.45	-5.58	-0.88	-44.60	-0.04	44.60	933.38	466.69	986.46	590.00	38.74	-2.902	-0.005	0.078
115.00	-1.64	-4.94	-0.88	-16.68	-0.04	16.68	933.38	466.69	986.46	590.00	41.80	-2.923	-0.005	0.030
118.00	-0.17	-0.97	-0.88	-1.86	-0.04	1.87	933.38	466.69	986.46	590.00	43.63	-2.927	-0.006	0.003
119.00	0.00	-0.96	-0.88	-0.89	0.00	0.89	933.38	466.69	986.46	590.00	44.25	-2.927	-0.006	0.002

Wind Loading - Shaft

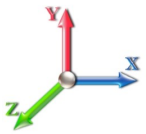
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	373.76	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	365.66	0.650	0.000	5.00	20.670	13.44	459.9	0.0	883.5
10.00		1.00	0.85	19.450	21.40	357.55	0.650	0.000	5.00	20.217	13.14	449.9	0.0	864.0
15.00		1.00	0.85	19.450	21.40	349.45	0.650	0.000	5.00	19.764	12.85	439.8	0.0	844.5
20.00		1.00	0.90	20.638	22.70	351.62	0.650	0.000	5.00	19.312	12.55	455.9	0.0	825.0
25.00		1.00	0.95	21.630	23.79	351.43	0.650	0.000	5.00	18.859	12.26	466.7	0.0	805.5
30.00		1.00	0.98	22.477	24.72	349.54	0.650	0.000	5.00	18.406	11.96	473.3	0.0	786.0
35.00		1.00	1.01	23.218	25.54	346.40	0.650	0.000	5.00	17.953	11.67	476.9	0.0	766.5
40.00		1.00	1.04	23.880	26.27	342.33	0.650	0.000	5.00	17.500	11.37	478.1	0.0	747.0
45.00		1.00	1.07	24.479	26.93	337.51	0.650	0.000	5.00	17.047	11.08	477.4	0.0	727.5
48.25	Bot - Section 2	1.00	1.09	24.841	27.33	334.05	0.650	0.000	3.25	10.838	7.04	308.0	0.0	462.4
50.00		1.00	1.09	25.029	27.53	332.09	0.650	0.000	1.75	5.849	3.80	167.5	0.0	453.9
53.25	Top - Section 1	1.00	1.11	25.363	27.90	328.29	0.650	0.000	3.25	10.715	6.96	310.9	0.0	831.3
55.00		1.00	1.12	25.536	28.09	331.58	0.650	0.000	1.75	5.691	3.70	166.2	0.0	202.6
60.00		1.00	1.14	26.008	28.61	325.26	0.650	0.000	5.00	15.953	10.37	474.6	0.0	567.9
65.00		1.00	1.16	26.450	29.09	318.57	0.650	0.000	5.00	15.500	10.07	469.0	0.0	551.6
70.00		1.00	1.17	26.866	29.55	311.54	0.650	0.000	5.00	15.047	9.78	462.5	0.0	535.4
75.00		1.00	1.19	27.259	29.98	304.22	0.650	0.000	5.00	14.594	9.49	455.1	0.0	519.1
77.00	Appurtenance(s)	1.00	1.20	27.410	30.15	301.22	0.650	0.000	2.00	5.711	3.71	179.1	0.0	203.1
80.00		1.00	1.21	27.632	30.39	296.64	0.650	0.000	3.00	8.430	5.48	266.5	0.0	299.8
85.00		1.00	1.22	27.987	30.79	288.82	0.650	0.000	5.00	13.688	8.90	438.3	0.0	486.6
87.00	Appurtenance(s)	1.00	1.23	28.124	30.94	285.64	0.650	0.000	2.00	5.349	3.48	172.1	0.0	190.1
90.00		1.00	1.24	28.325	31.16	280.79	0.650	0.000	3.00	7.887	5.13	255.6	0.0	280.3
95.00		1.00	1.25	28.650	31.51	272.56	0.650	0.000	5.00	12.783	8.31	419.0	0.0	454.1
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	267.54	0.650	0.000	3.00	7.452	4.84	245.9	0.0	264.7
99.00	Appurtenance(s)	1.00	1.26	28.900	31.79	265.85	0.650	0.000	1.00	2.490	1.62	82.3	0.0	157.8
100.00		1.00	1.27	28.961	31.86	264.16	0.650	0.000	1.00	2.472	1.61	81.9	0.0	156.7
101.75	Top - Section 2	1.00	1.27	29.067	31.97	261.17	0.650	0.000	1.75	4.282	2.78	142.4	0.0	271.3
105.00		1.00	1.28	29.260	32.19	260.22	0.650	0.000	3.25	7.806	5.07	261.3	0.0	222.2
109.00	Top - Section 3	1.00	1.29	29.491	32.44	253.27	0.650	0.000	4.00	9.345	6.07	315.3	0.0	265.9
110.00		1.00	1.29	29.548	32.50	238.82	0.600	0.000	1.00	2.167	1.30	67.6	0.0	77.1
115.00	Appurtenance(s)	1.00	1.30	29.826	32.81	239.94	0.600	0.000	5.00	10.833	6.50	341.2	0.0	385.6
118.00	Appurtenance(s)	1.00	1.31	29.988	32.99	240.59	0.600	0.000	3.00	6.500	3.90	205.8	0.0	231.3
119.00	Appurtenance(s)	1.00	1.31	30.041	33.05	240.81	0.600	0.000	1.00	2.167	1.30	68.7	0.0	77.1
								Totals:	**119.00**			**10,534.5**		**15,397.5**

Discrete Appurtenance Forces

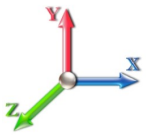
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	30.094	33.103	1.00	1.00	16.86	85.68	1.583	1.000	893.00	883.69	893.00
2	118.00	1900 MHz RRH	3	29.988	32.986	0.99	1.00	8.23	162.00	0.000	0.000	434.20	0.00	0.00
3	118.00	ETCR-654L12H6	3	29.988	32.986	0.71	1.00	33.46	267.30	0.000	0.000	1766.08	0.00	0.00
4	118.00	3 ft Standoff	3	29.988	32.986	0.75	1.00	5.92	108.00	0.000	0.000	312.32	0.00	0.00
5	118.00	800 MHz RRH	6	29.988	32.986	0.92	1.00	13.74	286.20	0.000	0.000	725.43	0.00	0.00
6	118.00	TD-RRH8x20-25	3	29.988	32.986	0.69	1.00	8.38	189.00	0.000	0.000	442.47	0.00	0.00
7	115.00	Tri-Antenna Mount	1	29.826	32.808	1.00	1.00	5.00	225.00	0.000	0.000	262.46	0.00	0.00
8	99.00	KRY 112 144/1	3	28.900	31.790	0.58	0.80	0.72	29.75	0.000	0.000	36.54	0.00	0.00
9	99.00	782 11056	3	28.900	31.790	0.62	0.80	1.24	4.86	0.000	0.000	62.92	0.00	0.00
10	99.00	LNX-6515DS-A1M	3	28.900	31.790	0.67	0.80	22.99	135.81	0.000	0.000	1169.52	0.00	0.00
11	99.00	APX16DWV-16DWVS-E-	3	28.900	31.790	0.52	0.80	9.47	109.89	0.000	0.000	481.69	0.00	0.00
12	99.00	KRY 112 489/2	3	28.900	31.790	0.66	0.80	1.28	41.58	0.000	0.000	65.30	0.00	0.00
13	99.00	AIR 32	3	28.900	31.790	0.69	0.80	13.48	356.94	0.000	0.000	685.81	0.00	0.00
14	99.00	Low Profile Platform	1	28.900	31.790	1.00	1.00	22.00	1350.00	0.000	0.000	1118.99	0.00	0.00
15	87.00	Low Profile Platform	1	28.124	30.936	1.00	1.00	22.00	1350.00	0.000	0.000	1088.96	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	28.124	30.936	0.68	0.80	6.56	79.20	0.000	0.000	324.65	0.00	0.00
17	87.00	RRH2X60-700	3	28.124	30.936	0.58	0.80	6.12	162.00	0.000	0.000	303.11	0.00	0.00
18	87.00	RRH2X60-PCS	3	28.124	30.936	0.71	0.80	4.71	148.50	0.000	0.000	233.12	0.00	0.00
19	87.00	1900 MHz 4X45 RRH	3	28.124	30.936	0.79	0.80	6.42	160.65	0.000	0.000	317.75	0.00	0.00
20	87.00	SBNHH-1D65B	9	28.124	30.936	0.66	0.80	48.24	324.00	0.000	0.000	2387.57	0.00	0.00
21	87.00	BXA-80063/4CF	3	28.124	30.936	0.65	0.90	9.15	26.73	0.000	0.000	452.92	0.00	0.00
22	77.00	APXV18-206517S-C	3	27.410	30.151	0.59	0.80	9.18	71.28	0.000	0.000	442.95	0.00	0.00
							Totals:		**5,674.37**			**14,007.76**		

Total Applied Force Summary

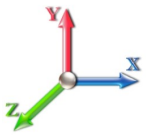
Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		459.94	1113.57	0.00	0.00
10.00		449.86	1094.06	0.00	0.00
15.00		439.78	1074.55	0.00	0.00
20.00		455.93	1055.04	0.00	0.00
25.00		466.66	1035.54	0.00	0.00
30.00		473.27	1016.03	0.00	0.00
35.00		476.85	996.52	0.00	0.00
40.00		478.08	977.01	0.00	0.00
45.00		477.40	957.50	0.00	0.00
48.25		307.99	611.91	0.00	0.00
50.00		167.47	534.38	0.00	0.00
53.25		310.90	980.79	0.00	0.00
55.00		166.24	283.11	0.00	0.00
60.00		474.65	797.93	0.00	0.00
65.00		469.01	781.67	0.00	0.00
70.00		462.46	765.41	0.00	0.00
75.00		455.11	749.16	0.00	0.00
77.00	(3) attachments	622.03	366.39	0.00	0.00
80.00		266.49	420.94	0.00	0.00
85.00		438.26	688.56	0.00	0.00
87.00	(24) attachments	5280.16	2521.95	0.00	0.00
90.00		255.57	344.95	0.00	0.00
95.00		418.96	561.91	0.00	0.00
98.00		245.85	329.34	0.00	0.00
99.00	(19) attachments	3703.09	2208.22	0.00	0.00
100.00		81.90	160.37	0.00	0.00
101.75		142.40	277.84	0.00	0.00
105.00		261.29	234.29	0.00	0.00
109.00		315.27	280.81	0.00	0.00
110.00		67.61	80.83	0.00	0.00
115.00	(1) attachments	603.67	629.16	0.00	0.00
118.00	(18) attachments	3886.33	1255.00	0.00	0.00
119.00	(2) attachments	961.73	162.79	883.69	893.00
	Totals:	**24,542.21**	**25,347.52**	**883.69**	**893.00**

Calculated Forces

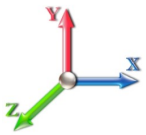
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-25.31	-24.58	-0.88	-2068.7	0.00	2068.79	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.522
5.00	-24.13	-24.19	-0.88	-1945.8	0.00	1945.89	3920.48	1960.24	7723.84	3867.66	0.09	-0.161	0.000	0.509
10.00	-22.97	-23.80	-0.88	-1824.9	0.00	1824.97	3862.67	1931.34	7438.74	3724.90	0.34	-0.323	0.000	0.496
15.00	-21.83	-23.41	-0.88	-1705.9	0.00	1705.99	3803.51	1901.75	7156.21	3583.42	0.77	-0.485	0.000	0.482
20.00	-20.72	-23.00	-0.88	-1588.9	-0.01	1588.94	3742.99	1871.49	6876.43	3443.32	1.37	-0.647	0.000	0.467
25.00	-19.63	-22.58	-0.88	-1473.9	-0.01	1473.93	3681.11	1840.56	6599.58	3304.69	2.13	-0.809	0.000	0.451
30.00	-18.55	-22.14	-0.88	-1361.0	-0.01	1361.04	3617.88	1808.94	6325.84	3167.62	3.07	-0.970	-0.001	0.435
35.00	-17.51	-21.69	-0.88	-1250.3	-0.01	1250.33	3553.28	1776.64	6055.40	3032.20	4.17	-1.130	-0.001	0.417
40.00	-16.48	-21.24	-0.88	-1141.8	-0.01	1141.86	3487.33	1743.67	5788.43	2898.52	5.44	-1.288	-0.001	0.399
45.00	-15.49	-20.78	-0.88	-1035.6	-0.01	1035.65	3420.03	1710.01	5525.12	2766.66	6.87	-1.444	-0.001	0.379
48.25	-14.86	-20.47	-0.88	-968.13	-0.01	968.13	3375.55	1687.77	5356.01	2681.98	7.89	-1.545	-0.001	0.366
50.00	-14.30	-20.31	-0.88	-932.31	-0.01	932.31	3351.36	1675.68	5265.64	2636.73	8.47	-1.599	-0.001	0.358
53.25	-13.30	-19.99	-0.88	-866.30	-0.01	866.30	2647.50	1323.75	4165.57	2085.88	9.59	-1.697	-0.001	0.421
55.00	-12.99	-19.84	-0.88	-831.32	-0.01	831.32	2630.02	1315.01	4097.26	2051.68	10.22	-1.750	-0.001	0.410
60.00	-12.15	-19.37	-0.88	-732.14	-0.02	732.14	2579.17	1289.59	3903.72	1954.76	12.14	-1.913	-0.001	0.379
65.00	-11.34	-18.91	-0.88	-635.28	-0.02	635.28	2526.96	1263.48	3712.68	1859.10	14.23	-2.068	-0.002	0.346
70.00	-10.55	-18.44	-0.88	-540.75	-0.02	540.75	2473.39	1236.70	3524.34	1764.79	16.48	-2.214	-0.002	0.311
75.00	-9.79	-17.97	-0.88	-448.55	-0.02	448.55	2418.47	1209.23	3338.88	1671.92	18.87	-2.348	-0.002	0.273
77.00	-9.43	-17.35	-0.88	-412.61	-0.02	412.61	2396.12	1198.06	3265.54	1635.20	19.86	-2.399	-0.002	0.256
80.00	-8.99	-17.08	-0.88	-360.57	-0.03	360.57	2362.18	1181.09	3156.47	1580.58	21.40	-2.471	-0.002	0.232
85.00	-8.30	-16.62	-0.88	-275.20	-0.03	275.20	2304.54	1152.27	2977.30	1490.86	24.04	-2.575	-0.003	0.188
87.00	-6.01	-11.23	-0.88	-241.96	-0.03	241.96	2281.10	1140.55	2906.58	1455.45	25.13	-2.613	-0.003	0.169
90.00	-5.67	-10.97	-0.88	-208.27	-0.03	208.27	2242.72	1121.36	2798.02	1401.09	26.79	-2.664	-0.003	0.151
95.00	-5.12	-10.53	-0.88	-153.43	-0.03	153.43	2163.84	1081.92	2603.70	1303.79	29.62	-2.737	-0.003	0.120
98.00	-4.80	-10.27	-0.88	-121.85	-0.04	121.85	2116.52	1058.26	2490.47	1247.09	31.35	-2.774	-0.003	0.100
99.00	-2.77	-6.46	-0.88	-111.58	-0.04	111.58	2100.74	1050.37	2453.28	1228.47	31.93	-2.785	-0.004	0.092
100.00	-2.61	-6.37	-0.88	-105.12	-0.04	105.12	2084.97	1042.48	2416.38	1209.99	32.52	-2.796	-0.004	0.088
101.75	-2.34	-6.22	-0.88	-93.96	-0.04	93.96	1611.41	805.70	1884.17	943.49	33.54	-2.813	-0.004	0.101
105.00	-2.11	-5.95	-0.88	-73.75	-0.04	73.75	1583.50	791.75	1805.91	904.30	35.47	-2.841	-0.004	0.083
109.00	-1.85	-5.62	-0.88	-49.96	-0.04	49.96	1548.36	774.18	1710.93	856.74	37.86	-2.874	-0.005	0.060
109.00	-1.85	-5.62	-0.88	-49.96	-0.04	49.96	933.38	466.69	986.46	590.00	37.86	-2.874	-0.005	0.087
110.00	-1.77	-5.55	-0.88	-44.34	-0.04	44.34	933.38	466.69	986.46	590.00	38.47	-2.881	-0.005	0.077
115.00	-1.17	-4.91	-0.88	-16.60	-0.04	16.60	933.38	466.69	986.46	590.00	41.49	-2.902	-0.005	0.030
118.00	-0.11	-0.97	-0.88	-1.86	-0.04	1.86	933.38	466.69	986.46	590.00	43.32	-2.906	-0.006	0.003
119.00	0.00	-0.96	-0.88	-0.89	0.00	0.89	933.38	466.69	986.46	590.00	43.93	-2.906	-0.006	0.002

Wind Loading - Shaft

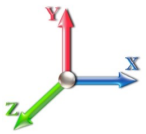
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	21.705	26.05	148.1	381.7	1559.8
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	21.327	25.59	145.5	401.0	1553.0
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	20.920	25.10	142.7	408.8	1534.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	20.500	24.60	148.4	411.6	1511.7
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	20.074	24.09	152.3	411.5	1485.5
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	19.644	23.57	154.9	409.5	1457.5
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	19.210	23.05	156.4	406.0	1428.0
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	18.774	22.53	157.2	401.5	1397.5
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	5.00	18.336	22.00	157.4	396.2	1366.2
48.25	Bot - Section 2	1.00	1.09	6.600	7.26	0.00	1.200	1.558	3.25	11.682	14.02	101.8	255.0	871.6
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	1.75	6.305	7.57	55.3	138.7	743.8
53.25	Top - Section 1	1.00	1.11	6.739	7.41	0.00	1.200	1.574	3.25	11.568	13.88	102.9	254.8	1363.2
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	1.75	6.151	7.38	55.1	136.4	406.5
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	17.280	20.74	157.6	382.6	1139.8
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	16.838	20.21	156.2	375.2	1110.7
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	16.395	19.67	154.5	367.4	1081.2
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	5.00	15.951	19.14	152.5	359.2	1051.4
77.00	Appurtenance(s)	1.00	1.20	7.283	8.01	0.00	1.200	1.633	2.00	6.255	7.51	60.1	142.3	413.1
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	3.00	9.250	11.10	89.6	210.4	610.1
85.00		1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	15.062	18.07	147.8	342.0	990.9
87.00	Appurtenance(s)	1.00	1.23	7.473	8.22	0.00	1.200	1.653	2.00	5.899	7.08	58.2	135.4	388.9
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	3.00	8.716	10.46	86.6	199.8	573.5
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	5.00	14.172	17.01	142.4	323.9	929.4
98.00	Bot - Section 3	1.00	1.26	7.662	8.43	0.00	1.200	1.672	3.00	8.288	9.95	83.8	191.0	543.9
99.00	Appurtenance(s)	1.00	1.26	7.679	8.45	0.00	1.200	1.674	1.00	2.769	3.32	28.1	64.3	274.8
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	1.00	2.751	3.30	27.9	63.9	272.8
101.75	Top - Section 2	1.00	1.27	7.723	8.50	0.00	1.200	1.679	1.75	4.772	5.73	48.6	110.7	472.5
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	3.25	8.718	10.46	89.5	201.6	497.9
109.00	Top - Section 3	1.00	1.29	7.836	8.62	0.00	1.200	1.690	4.00	10.472	12.57	108.3	242.0	596.5
110.00		1.00	1.29	7.851	8.64	0.00	1.200	1.692	1.00	2.449	2.94	25.4	57.2	160.1
115.00	Appurtenance(s)	1.00	1.30	7.925	8.72	0.00	1.200	1.699	5.00	12.250	14.70	128.1	287.6	801.6
118.00	Appurtenance(s)	1.00	1.31	7.968	8.76	0.00	1.200	1.704	3.00	7.352	8.82	77.3	173.0	481.4
119.00	Appurtenance(s)	1.00	1.31	7.982	8.78	0.00	1.200	1.705	1.00	2.451	2.94	25.8	57.7	160.5
								Totals:	**119.00**			**3,526.6**		**29,230.2**

Discrete Appurtenance Forces

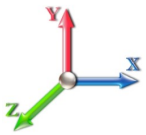
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	7.996	8.796	1.00	1.00	20.20	352.92	1.583	1.000	177.63	281.25	177.63
2	118.00	1900 MHz RRH	3	7.968	8.765	0.00	1.00	12.03	388.67	0.000	0.000	105.40	0.00	0.00
3	118.00	ETCR-654L12H6	3	7.968	8.765	0.00	1.00	52.04	1298.63	0.000	0.000	456.14	0.00	0.00
4	118.00	3 ft Standoff	3	7.968	8.765	0.75	1.00	19.03	310.13	0.000	0.000	166.78	0.00	0.00
5	118.00	800 MHz RRH	6	7.968	8.765	0.00	1.00	21.64	688.24	0.000	0.000	189.66	0.00	0.00
6	118.00	TD-RRH8x20-25	3	7.968	8.765	0.00	1.00	14.53	573.93	0.000	0.000	127.33	0.00	0.00
7	115.00	Tri-Antenna Mount	1	7.925	8.717	1.00	1.00	13.50	719.81	0.000	0.000	117.66	0.00	0.00
8	99.00	KRY 112 144/1	3	7.679	8.447	0.60	0.80	1.57	64.76	0.000	0.000	13.23	0.00	0.00
9	99.00	782 11056	3	7.679	8.447	0.65	0.80	2.44	10.82	0.000	0.000	20.60	0.00	0.00
10	99.00	LNX-6515DS-A1M	3	7.679	8.447	0.67	0.80	29.40	643.81	0.000	0.000	248.33	0.00	0.00
11	99.00	APX16DWV-16DWVS-E-	3	7.679	8.447	0.52	0.80	12.69	295.95	0.000	0.000	107.17	0.00	0.00
12	99.00	KRY 112 489/2	3	7.679	8.447	0.67	0.80	2.49	94.57	0.000	0.000	21.04	0.00	0.00
13	99.00	AIR 32	3	7.679	8.447	0.70	0.80	15.94	1002.58	0.000	0.000	134.61	0.00	0.00
14	99.00	Low Profile Platform	1	7.679	8.447	1.00	1.00	38.94	2755.64	0.000	0.000	328.93	0.00	0.00
15	87.00	Low Profile Platform	1	7.473	8.220	1.00	1.00	38.73	2739.52	0.000	0.000	318.32	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	7.473	8.220	0.69	0.80	7.72	375.25	0.000	0.000	63.47	0.00	0.00
17	87.00	RRH2X60-700	3	7.473	8.220	0.59	0.80	7.55	403.59	0.000	0.000	62.09	0.00	0.00
18	87.00	RRH2X60-PCS	3	7.473	8.220	0.72	0.80	6.03	435.15	0.000	0.000	49.54	0.00	0.00
19	87.00	1900 MHz 4X45 RRH	3	7.473	8.220	0.79	0.80	9.25	385.10	0.000	0.000	76.07	0.00	0.00
20	87.00	SBNHH-1D65B	9	7.473	8.220	0.66	0.80	55.62	2145.72	0.000	0.000	457.19	0.00	0.00
21	87.00	BXA-80063/4CF	3	7.473	8.220	0.65	0.90	12.67	245.20	0.000	0.000	104.11	0.00	0.00
22	77.00	APXV18-206517S-C	3	7.283	8.011	0.61	0.80	13.48	275.81	0.000	0.000	108.01	0.00	0.00
							Totals:		**16,205.79**			**3,453.30**		

Total Applied Force Summary

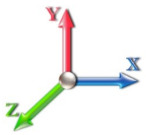
Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 18

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		148.07	1866.45	0.00	0.00
10.00		145.49	1859.72	0.00	0.00
15.00		142.71	1841.56	0.00	0.00
20.00		148.39	1818.36	0.00	0.00
25.00		152.29	1792.24	0.00	0.00
30.00		154.86	1764.18	0.00	0.00
35.00		156.43	1734.72	0.00	0.00
40.00		157.24	1704.21	0.00	0.00
45.00		157.43	1672.85	0.00	0.00
48.25		101.78	1070.90	0.00	0.00
50.00		55.35	851.18	0.00	0.00
53.25		102.90	1562.53	0.00	0.00
55.00		55.09	513.87	0.00	0.00
60.00		157.62	1446.54	0.00	0.00
65.00		156.20	1417.41	0.00	0.00
70.00		154.48	1387.90	0.00	0.00
75.00		152.50	1358.07	0.00	0.00
77.00	(3) attachments	168.14	811.63	0.00	0.00
80.00		89.64	771.70	0.00	0.00
85.00		147.85	1260.11	0.00	0.00
87.00	(24) attachments	1188.98	7226.08	0.00	0.00
90.00		86.59	659.78	0.00	0.00
95.00		142.40	1073.11	0.00	0.00
98.00		83.83	630.10	0.00	0.00
99.00	(19) attachments	901.98	5171.62	0.00	0.00
100.00		27.95	277.78	0.00	0.00
101.75		48.65	481.19	0.00	0.00
105.00		89.47	514.01	0.00	0.00
109.00		108.31	616.37	0.00	0.00
110.00		25.38	165.02	0.00	0.00
115.00	(1) attachments	245.80	1546.25	0.00	0.00
118.00	(18) attachments	1122.62	3755.94	0.00	0.00
119.00	(2) attachments	203.45	513.45	281.25	177.63
	Totals:	**6,979.86**	**51,136.85**	**281.25**	**177.63**

Calculated Forces

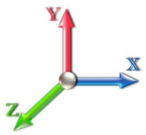
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-51.13	-7.00	-0.28	-587.17	0.00	587.17	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.159
5.00	-49.26	-6.89	-0.28	-552.17	0.00	552.17	3920.48	1960.24	7723.84	3867.66	0.02	-0.046	0.000	0.155
10.00	-47.40	-6.78	-0.28	-517.72	0.00	517.72	3862.67	1931.34	7438.74	3724.90	0.10	-0.092	0.000	0.151
15.00	-45.55	-6.67	-0.28	-483.81	0.00	483.81	3803.51	1901.75	7156.21	3583.42	0.22	-0.138	0.000	0.147
20.00	-43.73	-6.55	-0.28	-450.46	0.00	450.46	3742.99	1871.49	6876.43	3443.32	0.39	-0.184	0.000	0.143
25.00	-41.93	-6.43	-0.28	-417.70	0.00	417.70	3681.11	1840.56	6599.58	3304.69	0.60	-0.230	0.000	0.138
30.00	-40.16	-6.30	-0.28	-385.57	0.00	385.57	3617.88	1808.94	6325.84	3167.62	0.87	-0.275	0.000	0.133
35.00	-38.42	-6.16	-0.28	-354.09	0.00	354.09	3553.28	1776.64	6055.40	3032.20	1.18	-0.320	0.000	0.128
40.00	-36.72	-6.02	-0.28	-323.28	0.00	323.28	3487.33	1743.67	5788.43	2898.52	1.54	-0.365	0.000	0.122
45.00	-35.04	-5.88	-0.28	-293.17	0.00	293.17	3420.03	1710.01	5525.12	2766.66	1.95	-0.409	0.000	0.116
48.25	-33.97	-5.78	-0.28	-274.08	0.00	274.08	3375.55	1687.77	5356.01	2681.98	2.24	-0.438	0.000	0.112
50.00	-33.11	-5.73	-0.28	-263.96	0.00	263.96	3351.36	1675.68	5265.64	2636.73	2.40	-0.453	0.000	0.110
53.25	-31.55	-5.63	-0.28	-245.34	0.00	245.34	2647.50	1323.75	4165.57	2085.88	2.72	-0.481	0.000	0.130
55.00	-31.03	-5.58	-0.28	-235.50	0.00	235.50	2630.02	1315.01	4097.26	2051.68	2.90	-0.496	0.000	0.127
60.00	-29.59	-5.44	-0.28	-207.59	0.00	207.59	2579.17	1289.59	3903.72	1954.76	3.44	-0.542	0.000	0.118
65.00	-28.17	-5.29	-0.28	-180.41	0.00	180.41	2526.96	1263.48	3712.68	1859.10	4.03	-0.586	0.000	0.108
70.00	-26.78	-5.14	-0.28	-153.98	0.00	153.98	2473.39	1236.70	3524.34	1764.79	4.67	-0.627	-0.001	0.098
75.00	-25.42	-4.98	-0.28	-128.30	0.00	128.30	2418.47	1209.23	3338.88	1671.92	5.35	-0.666	-0.001	0.087
77.00	-24.61	-4.81	-0.28	-118.35	0.00	118.35	2396.12	1198.06	3265.54	1635.20	5.63	-0.680	-0.001	0.083
80.00	-23.83	-4.72	-0.28	-103.92	0.00	103.92	2362.18	1181.09	3156.47	1580.58	6.07	-0.701	-0.001	0.076
85.00	-22.57	-4.57	-0.28	-80.31	0.00	80.31	2304.54	1152.27	2977.30	1490.86	6.82	-0.731	-0.001	0.064
87.00	-15.36	-3.29	-0.28	-71.18	0.00	71.18	2281.10	1140.55	2906.58	1455.45	7.13	-0.742	-0.001	0.056
90.00	-14.70	-3.20	-0.28	-61.32	0.00	61.32	2242.72	1121.36	2798.02	1401.09	7.60	-0.757	-0.001	0.050
95.00	-13.63	-3.04	-0.28	-45.34	0.00	45.34	2163.84	1081.92	2603.70	1303.79	8.40	-0.779	-0.001	0.041
98.00	-13.00	-2.95	-0.28	-36.21	0.00	36.21	2116.52	1058.26	2490.47	1247.09	8.90	-0.790	-0.001	0.035
99.00	-7.84	-1.98	-0.28	-33.25	0.00	33.25	2100.74	1050.37	2453.28	1228.47	9.06	-0.793	-0.001	0.031
100.00	-7.57	-1.95	-0.28	-31.27	0.00	31.27	2084.97	1042.48	2416.38	1209.99	9.23	-0.796	-0.001	0.029
101.75	-7.09	-1.89	-0.28	-27.86	0.00	27.86	1611.41	805.70	1884.17	943.49	9.52	-0.802	-0.001	0.034
105.00	-6.57	-1.80	-0.28	-21.70	0.00	21.70	1583.50	791.75	1805.91	904.30	10.07	-0.810	-0.001	0.028
109.00	-5.96	-1.68	-0.28	-14.51	0.00	14.51	1548.36	774.18	1710.93	856.74	10.75	-0.820	-0.001	0.021
109.00	-5.96	-1.68	-0.28	-14.51	0.00	14.51	933.38	466.69	986.46	590.00	10.75	-0.820	-0.001	0.031
110.00	-5.79	-1.66	-0.28	-12.83	0.00	12.83	933.38	466.69	986.46	590.00	10.93	-0.821	-0.001	0.028
115.00	-4.25	-1.39	-0.28	-4.55	0.00	4.55	933.38	466.69	986.46	590.00	11.79	-0.827	-0.002	0.012
118.00	-0.51	-0.21	-0.28	-0.39	0.00	0.39	933.38	466.69	986.46	590.00	12.31	-0.828	-0.002	0.001
119.00	0.00	-0.20	-0.28	-0.18	0.00	0.18	933.38	466.69	986.46	590.00	12.48	-0.828	-0.002	0.000

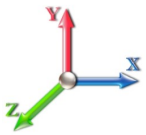
Seismic Segment Forces (Factored)

Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.13	**Iterations**	18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.53	**SA**	0.02	**S1**	0.06
						Seismic Importance Factor	1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		981.72	0.00	0.04	0.02	13.83	
10.00		960.04	0.01	0.06	0.03	18.57	
15.00		938.37	0.03	0.07	0.04	20.21	
20.00		916.69	0.05	0.07	0.04	20.72	
25.00		895.01	0.08	0.07	0.04	20.89	
30.00		873.34	0.12	0.07	0.03	21.00	
35.00		851.66	0.16	0.07	0.03	20.98	
40.00		829.99	0.21	0.06	0.02	20.45	
45.00		808.31	0.27	0.05	0.01	18.85	
48.25	Bot - Section 2	513.78	0.31	0.04	0.01	10.93	
50.00		504.30	0.33	0.04	0.01	9.92	
53.25	Top - Section 1	923.64	0.38	0.02	0.01	14.40	
55.00		225.12	0.40	0.02	0.01	2.88	
60.00		631.00	0.48	-0.01	0.01	1.71	
65.00		612.94	0.56	-0.04	0.01	-5.36	
70.00		594.88	0.65	-0.07	0.02	-10.99	
75.00		576.81	0.75	-0.10	0.04	-13.82	
77.00	Appurtenance(s)	304.87	0.79	-0.11	0.05	-7.53	
80.00		333.08	0.85	-0.12	0.07	-8.04	
85.00		540.69	0.96	-0.12	0.11	-10.22	
87.00	Appurtenance(s)	2712.4	1.01	-0.11	0.14	-41.54	
90.00		311.41	1.08	-0.08	0.18	-2.60	
95.00		504.56	1.20	0.01	0.26	3.75	
98.00	Bot - Section 3	294.07	1.28	0.10	0.32	5.71	
99.00	Appurtenance(s)	2429.6	1.31	0.13	0.34	57.90	
100.00		174.06	1.33	0.17	0.37	4.95	
101.75	Top - Section 2	301.47	1.38	0.25	0.41	11.18	
105.00		246.88	1.47	0.43	0.51	13.54	
109.00	Top - Section 3	295.47	1.59	0.73	0.65	23.60	
110.00		85.68	1.61	0.83	0.69	7.43	
115.00	Appurtenance(s)	678.39	1.77	1.38	0.92	84.24	
118.00	Appurtenance(s)	1382.0	1.86	1.82	1.08	206.53	
119.00	Appurtenance(s)	180.88	1.89	1.98	1.14	28.64	
	Totals:	**23,413.2**				**562.7**	**Total Wind:** **24,542.2**

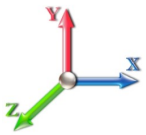
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E



Gust Response Factor	1.10			**Sds**	0.13			**Iterations**	18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.04			**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.53	**SA**	0.02			**S1**	0.06
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-33.80	-0.66	0.00	-58.42	0.00	58.42	3976.93	1988.46	8011.33	4011.62		0.00	0.00	0.023
5.00	-32.31	-0.65	0.00	-55.10	0.00	55.10	3920.48	1960.24	7723.84	3867.66		0.00	0.00	0.022
10.00	-30.85	-0.64	0.00	-51.85	0.00	51.85	3862.67	1931.34	7438.74	3724.90		0.01	-0.01	0.022
15.00	-29.42	-0.62	0.00	-48.67	0.00	48.67	3803.51	1901.75	7156.21	3583.42		0.02	-0.01	0.021
20.00	-28.01	-0.60	0.00	-45.58	0.00	45.58	3742.99	1871.49	6876.43	3443.32		0.04	-0.02	0.021
25.00	-26.63	-0.58	0.00	-42.59	0.00	42.59	3681.11	1840.56	6599.58	3304.69		0.06	-0.02	0.020
30.00	-25.28	-0.56	0.00	-39.70	0.00	39.70	3617.88	1808.94	6325.84	3167.62		0.09	-0.03	0.020
35.00	-23.95	-0.54	0.00	-36.90	0.00	36.90	3553.28	1776.64	6055.40	3032.20		0.12	-0.03	0.019
40.00	-22.65	-0.52	0.00	-34.20	0.00	34.20	3487.33	1743.67	5788.43	2898.52		0.16	-0.04	0.018
45.00	-21.37	-0.50	0.00	-31.60	0.00	31.60	3420.03	1710.01	5525.12	2766.66		0.20	-0.04	0.018
48.25	-20.55	-0.49	0.00	-29.96	0.00	29.96	3375.55	1687.77	5356.01	2681.98		0.23	-0.04	0.017
50.00	-19.84	-0.48	0.00	-29.10	0.00	29.10	3351.36	1675.68	5265.64	2636.73		0.24	-0.05	0.017
53.25	-18.53	-0.47	0.00	-27.54	0.00	27.54	2647.50	1323.75	4165.57	2085.88		0.28	-0.05	0.020
55.00	-18.16	-0.47	0.00	-26.72	0.00	26.72	2630.02	1315.01	4097.26	2051.68		0.29	-0.05	0.020
60.00	-17.09	-0.46	0.00	-24.39	0.00	24.39	2579.17	1289.59	3903.72	1954.76		0.35	-0.06	0.019
65.00	-16.05	-0.46	0.00	-22.07	0.00	22.07	2526.96	1263.48	3712.68	1859.10		0.41	-0.06	0.018
70.00	-15.03	-0.46	0.00	-19.75	0.00	19.75	2473.39	1236.70	3524.34	1764.79		0.48	-0.07	0.017
75.00	-14.03	-0.46	0.00	-17.43	0.00	17.43	2418.47	1209.23	3338.88	1671.92		0.55	-0.07	0.016
77.00	-13.54	-0.46	0.00	-16.50	0.00	16.50	2396.12	1198.06	3265.54	1635.20		0.58	-0.07	0.016
80.00	-12.98	-0.46	0.00	-15.11	0.00	15.11	2362.18	1181.09	3156.47	1580.58		0.63	-0.08	0.015
85.00	-12.06	-0.46	0.00	-12.78	0.00	12.78	2304.54	1152.27	2977.30	1490.86		0.72	-0.08	0.014
87.00	-8.70	-0.46	0.00	-11.86	0.00	11.86	2281.10	1140.55	2906.58	1455.45		0.75	-0.08	0.012
90.00	-8.24	-0.46	0.00	-10.48	0.00	10.48	2242.72	1121.36	2798.02	1401.09		0.80	-0.09	0.011
95.00	-7.49	-0.45	0.00	-8.18	0.00	8.18	2163.84	1081.92	2603.70	1303.79		0.90	-0.09	0.010
98.00	-7.05	-0.45	0.00	-6.82	0.00	6.82	2116.52	1058.26	2490.47	1247.09		0.95	-0.09	0.009
99.00	-4.11	-0.39	0.00	-6.37	0.00	6.37	2100.74	1050.37	2453.28	1228.47		0.97	-0.09	0.007
100.00	-3.89	-0.38	0.00	-5.98	0.00	5.98	2084.97	1042.48	2416.38	1209.99		0.99	-0.09	0.007
101.75	-3.52	-0.37	0.00	-5.32	0.00	5.32	1611.41	805.70	1884.17	943.49		1.03	-0.09	0.008
105.00	-3.21	-0.36	0.00	-4.12	0.00	4.12	1583.50	791.75	1805.91	904.30		1.09	-0.10	0.007
109.00	-2.84	-0.33	0.00	-2.69	0.00	2.69	1548.36	774.18	1710.93	856.74		1.17	-0.10	0.005
109.00	-2.84	-0.33	0.00	-2.69	0.00	2.69	933.38	466.69	986.46	590.00		1.17	-0.10	0.008
110.00	-2.73	-0.32	0.00	-2.36	0.00	2.36	933.38	466.69	986.46	590.00		1.19	-0.10	0.007
115.00	-1.89	-0.24	0.00	-0.74	0.00	0.74	933.38	466.69	986.46	590.00		1.30	-0.10	0.003
118.00	-0.22	-0.03	0.00	-0.03	0.00	0.03	933.38	466.69	986.46	590.00		1.36	-0.10	0.000
119.00	0.00	-0.03	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00		1.38	-0.10	0.000

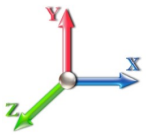
Seismic Segment Forces (Factored)

Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 22

Tower Engineering Solutions

Load Case: 0.9D + 1.0E

Gust Response Factor	1.10			**Sds**	0.13	**Iterations**	18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.53	**SA**	0.02	**S1**	0.06
						Seismic Importance Factor	1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		981.72	0.00	0.04	0.02	13.83	
10.00		960.04	0.01	0.06	0.03	18.57	
15.00		938.37	0.03	0.07	0.04	20.21	
20.00		916.69	0.05	0.07	0.04	20.72	
25.00		895.01	0.08	0.07	0.04	20.89	
30.00		873.34	0.12	0.07	0.03	21.00	
35.00		851.66	0.16	0.07	0.03	20.98	
40.00		829.99	0.21	0.06	0.02	20.45	
45.00		808.31	0.27	0.05	0.01	18.85	
48.25	Bot - Section 2	513.78	0.31	0.04	0.01	10.93	
50.00		504.30	0.33	0.04	0.01	9.92	
53.25	Top - Section 1	923.64	0.38	0.02	0.01	14.40	
55.00		225.12	0.40	0.02	0.01	2.88	
60.00		631.00	0.48	-0.01	0.01	1.71	
65.00		612.94	0.56	-0.04	0.01	-5.36	
70.00		594.88	0.65	-0.07	0.02	-10.99	
75.00		576.81	0.75	-0.10	0.04	-13.82	
77.00	Appurtenance(s)	304.87	0.79	-0.11	0.05	-7.53	
80.00		333.08	0.85	-0.12	0.07	-8.04	
85.00		540.69	0.96	-0.12	0.11	-10.22	
87.00	Appurtenance(s)	2712.4	1.01	-0.11	0.14	-41.54	
90.00		311.41	1.08	-0.08	0.18	-2.60	
95.00		504.56	1.20	0.01	0.26	3.75	
98.00	Bot - Section 3	294.07	1.28	0.10	0.32	5.71	
99.00	Appurtenance(s)	2429.6	1.31	0.13	0.34	57.90	
100.00		174.06	1.33	0.17	0.37	4.95	
101.75	Top - Section 2	301.47	1.38	0.25	0.41	11.18	
105.00		246.88	1.47	0.43	0.51	13.54	
109.00	Top - Section 3	295.47	1.59	0.73	0.65	23.60	
110.00		85.68	1.61	0.83	0.69	7.43	
115.00	Appurtenance(s)	678.39	1.77	1.38	0.92	84.24	
118.00	Appurtenance(s)	1382.0	1.86	1.82	1.08	206.53	
119.00	Appurtenance(s)	180.88	1.89	1.98	1.14	28.64	
	Totals:	**23,413.2**				**562.7**	**Total Wind:** **24,542.2**

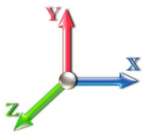
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.13			**Iterations**	18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.04			**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.53	**SA**	0.02			**S1**	0.06
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-25.35	-0.66	0.00	-58.06	0.00	58.06	3976.93	1988.46	8011.33	4011.62		0.00	0.00	0.021
5.00	-24.23	-0.65	0.00	-54.75	0.00	54.75	3920.48	1960.24	7723.84	3867.66		0.00	0.00	0.020
10.00	-23.14	-0.63	0.00	-51.50	0.00	51.50	3862.67	1931.34	7438.74	3724.90		0.01	-0.01	0.020
15.00	-22.07	-0.62	0.00	-48.33	0.00	48.33	3803.51	1901.75	7156.21	3583.42		0.02	-0.01	0.019
20.00	-21.01	-0.60	0.00	-45.25	0.00	45.25	3742.99	1871.49	6876.43	3443.32		0.04	-0.02	0.019
25.00	-19.97	-0.58	0.00	-42.27	0.00	42.27	3681.11	1840.56	6599.58	3304.69		0.06	-0.02	0.018
30.00	-18.96	-0.56	0.00	-39.39	0.00	39.39	3617.88	1808.94	6325.84	3167.62		0.09	-0.03	0.018
35.00	-17.96	-0.54	0.00	-36.61	0.00	36.61	3553.28	1776.64	6055.40	3032.20		0.12	-0.03	0.017
40.00	-16.98	-0.52	0.00	-33.93	0.00	33.93	3487.33	1743.67	5788.43	2898.52		0.15	-0.04	0.017
45.00	-16.03	-0.50	0.00	-31.35	0.00	31.35	3420.03	1710.01	5525.12	2766.66		0.20	-0.04	0.016
48.25	-15.42	-0.49	0.00	-29.73	0.00	29.73	3375.55	1687.77	5356.01	2681.98		0.22	-0.04	0.016
50.00	-14.88	-0.48	0.00	-28.88	0.00	28.88	3351.36	1675.68	5265.64	2636.73		0.24	-0.05	0.015
53.25	-13.90	-0.46	0.00	-27.32	0.00	27.32	2647.50	1323.75	4165.57	2085.88		0.27	-0.05	0.018
55.00	-13.62	-0.46	0.00	-26.51	0.00	26.51	2630.02	1315.01	4097.26	2051.68		0.29	-0.05	0.018
60.00	-12.82	-0.46	0.00	-24.21	0.00	24.21	2579.17	1289.59	3903.72	1954.76		0.35	-0.06	0.017
65.00	-12.04	-0.46	0.00	-21.91	0.00	21.91	2526.96	1263.48	3712.68	1859.10		0.41	-0.06	0.017
70.00	-11.27	-0.46	0.00	-19.61	0.00	19.61	2473.39	1236.70	3524.34	1764.79		0.48	-0.07	0.016
75.00	-10.52	-0.46	0.00	-17.31	0.00	17.31	2418.47	1209.23	3338.88	1671.92		0.55	-0.07	0.015
77.00	-10.16	-0.46	0.00	-16.39	0.00	16.39	2396.12	1198.06	3265.54	1635.20		0.58	-0.07	0.014
80.00	-9.74	-0.46	0.00	-15.01	0.00	15.01	2362.18	1181.09	3156.47	1580.58		0.63	-0.08	0.014
85.00	-9.05	-0.46	0.00	-12.71	0.00	12.71	2304.54	1152.27	2977.30	1490.86		0.71	-0.08	0.012
87.00	-6.52	-0.46	0.00	-11.79	0.00	11.79	2281.10	1140.55	2906.58	1455.45		0.75	-0.08	0.011
90.00	-6.18	-0.46	0.00	-10.43	0.00	10.43	2242.72	1121.36	2798.02	1401.09		0.80	-0.09	0.010
95.00	-5.62	-0.45	0.00	-8.15	0.00	8.15	2163.84	1081.92	2603.70	1303.79		0.89	-0.09	0.009
98.00	-5.29	-0.45	0.00	-6.79	0.00	6.79	2116.52	1058.26	2490.47	1247.09		0.95	-0.09	0.008
99.00	-3.08	-0.38	0.00	-6.34	0.00	6.34	2100.74	1050.37	2453.28	1228.47		0.97	-0.09	0.007
100.00	-2.92	-0.38	0.00	-5.96	0.00	5.96	2084.97	1042.48	2416.38	1209.99		0.98	-0.09	0.006
101.75	-2.64	-0.37	0.00	-5.30	0.00	5.30	1611.41	805.70	1884.17	943.49		1.02	-0.09	0.007
105.00	-2.41	-0.35	0.00	-4.10	0.00	4.10	1583.50	791.75	1805.91	904.30		1.08	-0.10	0.006
109.00	-2.13	-0.33	0.00	-2.68	0.00	2.68	1548.36	774.18	1710.93	856.74		1.16	-0.10	0.005
109.00	-2.13	-0.33	0.00	-2.68	0.00	2.68	933.38	466.69	986.46	590.00		1.16	-0.10	0.007
110.00	-2.05	-0.32	0.00	-2.35	0.00	2.35	933.38	466.69	986.46	590.00		1.18	-0.10	0.006
115.00	-1.42	-0.24	0.00	-0.74	0.00	0.74	933.38	466.69	986.46	590.00		1.29	-0.10	0.003
118.00	-0.16	-0.03	0.00	-0.03	0.00	0.03	933.38	466.69	986.46	590.00		1.35	-0.10	0.000
119.00	0.00	-0.03	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00		1.37	-0.10	0.000

Wind Loading - Shaft

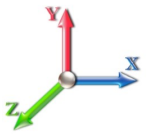
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	231.19	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	226.18	0.650	0.000	5.00	20.670	13.44	110.0	0.0	981.7
10.00		1.00	0.85	7.442	8.19	221.17	0.650	0.000	5.00	20.217	13.14	107.6	0.0	960.0
15.00		1.00	0.85	7.442	8.19	216.16	0.650	0.000	5.00	19.764	12.85	105.2	0.0	938.4
20.00		1.00	0.90	7.896	8.69	217.50	0.650	0.000	5.00	19.312	12.55	109.0	0.0	916.7
25.00		1.00	0.95	8.276	9.10	217.38	0.650	0.000	5.00	18.859	12.26	111.6	0.0	895.0
30.00		1.00	0.98	8.600	9.46	216.21	0.650	0.000	5.00	18.406	11.96	113.2	0.0	873.3
35.00		1.00	1.01	8.883	9.77	214.27	0.650	0.000	5.00	17.953	11.67	114.0	0.0	851.7
40.00		1.00	1.04	9.137	10.05	211.75	0.650	0.000	5.00	17.500	11.37	114.3	0.0	830.0
45.00		1.00	1.07	9.366	10.30	208.77	0.650	0.000	5.00	17.047	11.08	114.2	0.0	808.3
48.25	Bot - Section 2	1.00	1.09	9.505	10.46	206.63	0.650	0.000	3.25	10.838	7.04	73.7	0.0	513.8
50.00		1.00	1.09	9.576	10.53	205.42	0.650	0.000	1.75	5.849	3.80	40.0	0.0	504.3
53.25	Top - Section 1	1.00	1.11	9.704	10.67	203.06	0.650	0.000	3.25	10.715	6.96	74.3	0.0	923.6
55.00		1.00	1.12	9.770	10.75	205.10	0.650	0.000	1.75	5.691	3.70	39.8	0.0	225.1
60.00		1.00	1.14	9.951	10.95	201.19	0.650	0.000	5.00	15.953	10.37	113.5	0.0	631.0
65.00		1.00	1.16	10.120	11.13	197.05	0.650	0.000	5.00	15.500	10.07	112.2	0.0	612.9
70.00		1.00	1.17	10.279	11.31	192.71	0.650	0.000	5.00	15.047	9.78	110.6	0.0	594.9
75.00		1.00	1.19	10.430	11.47	188.18	0.650	0.000	5.00	14.594	9.49	108.8	0.0	576.8
77.00	Appurtenance(s)	1.00	1.20	10.488	11.54	186.32	0.650	0.000	2.00	5.711	3.71	42.8	0.0	225.7
80.00		1.00	1.21	10.572	11.63	183.49	0.650	0.000	3.00	8.430	5.48	63.7	0.0	333.1
85.00		1.00	1.22	10.708	11.78	178.65	0.650	0.000	5.00	13.688	8.90	104.8	0.0	540.7
87.00	Appurtenance(s)	1.00	1.23	10.761	11.84	176.68	0.650	0.000	2.00	5.349	3.48	41.2	0.0	211.2
90.00		1.00	1.24	10.838	11.92	173.69	0.650	0.000	3.00	7.887	5.13	61.1	0.0	311.4
95.00		1.00	1.25	10.962	12.06	168.60	0.650	0.000	5.00	12.783	8.31	100.2	0.0	504.6
98.00	Bot - Section 3	1.00	1.26	11.034	12.14	165.49	0.650	0.000	3.00	7.452	4.84	58.8	0.0	294.1
99.00	Appurtenance(s)	1.00	1.26	11.057	12.16	164.44	0.650	0.000	1.00	2.490	1.62	19.7	0.0	175.4
100.00		1.00	1.27	11.081	12.19	163.39	0.650	0.000	1.00	2.472	1.61	19.6	0.0	174.1
101.75	Top - Section 2	1.00	1.27	11.121	12.23	161.55	0.650	0.000	1.75	4.282	2.78	34.1	0.0	301.5
105.00		1.00	1.28	11.195	12.31	160.96	0.650	0.000	3.25	7.806	5.07	62.5	0.0	246.9
109.00	Top - Section 3	1.00	1.29	11.284	12.41	156.66	0.650	0.000	4.00	9.345	6.07	75.4	0.0	295.5
110.00		1.00	1.29	11.305	12.44	147.72	0.600	0.000	1.00	2.167	1.30	16.2	0.0	85.7
115.00	Appurtenance(s)	1.00	1.30	11.412	12.55	148.42	0.600	0.000	5.00	10.833	6.50	81.6	0.0	428.4
118.00	Appurtenance(s)	1.00	1.31	11.474	12.62	148.82	0.600	0.000	3.00	6.500	3.90	49.2	0.0	257.0
119.00	Appurtenance(s)	1.00	1.31	11.494	12.64	148.95	0.600	0.000	1.00	2.167	1.30	16.4	0.0	85.7
								Totals:	**119.00**			**2,519.1**		**17,108.3**

Discrete Appurtenance Forces

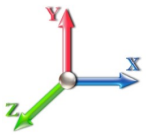
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	11.514	12.666	1.00	1.00	16.86	95.20	1.583	1.000	213.54	338.11	213.54
2	118.00	1900 MHz RRH	3	11.474	12.621	0.99	1.00	8.23	180.00	0.000	0.000	103.83	0.00	0.00
3	118.00	ETCR-654L12H6	3	11.474	12.621	0.71	1.00	33.46	297.00	0.000	0.000	422.33	0.00	0.00
4	118.00	3 ft Standoff	3	11.474	12.621	0.75	1.00	5.92	120.00	0.000	0.000	74.68	0.00	0.00
5	118.00	800 MHz RRH	6	11.474	12.621	0.92	1.00	13.74	318.00	0.000	0.000	173.47	0.00	0.00
6	118.00	TD-RRH8x20-25	3	11.474	12.621	0.69	1.00	8.38	210.00	0.000	0.000	105.81	0.00	0.00
7	115.00	Tri-Antenna Mount	1	11.412	12.553	1.00	1.00	5.00	250.00	0.000	0.000	62.76	0.00	0.00
8	99.00	KRY 112 144/1	3	11.057	12.163	0.58	0.80	0.72	33.06	0.000	0.000	8.74	0.00	0.00
9	99.00	782 11056	3	11.057	12.163	0.62	0.80	1.24	5.40	0.000	0.000	15.05	0.00	0.00
10	99.00	LNX-6515DS-A1M	3	11.057	12.163	0.67	0.80	22.99	150.90	0.000	0.000	279.67	0.00	0.00
11	99.00	APX16DWV-16DWVS-E-	3	11.057	12.163	0.52	0.80	9.47	122.10	0.000	0.000	115.19	0.00	0.00
12	99.00	KRY 112 489/2	3	11.057	12.163	0.66	0.80	1.28	46.20	0.000	0.000	15.62	0.00	0.00
13	99.00	AIR 32	3	11.057	12.163	0.69	0.80	13.48	396.60	0.000	0.000	164.00	0.00	0.00
14	99.00	Low Profile Platform	1	11.057	12.163	1.00	1.00	22.00	1500.00	0.000	0.000	267.59	0.00	0.00
15	87.00	Low Profile Platform	1	10.761	11.837	1.00	1.00	22.00	1500.00	0.000	0.000	260.41	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	10.761	11.837	0.68	0.80	6.56	88.00	0.000	0.000	77.63	0.00	0.00
17	87.00	RRH2X60-700	3	10.761	11.837	0.58	0.80	6.12	180.00	0.000	0.000	72.48	0.00	0.00
18	87.00	RRH2X60-PCS	3	10.761	11.837	0.71	0.80	4.71	165.00	0.000	0.000	55.75	0.00	0.00
19	87.00	1900 MHz 4X45 RRH	3	10.761	11.837	0.79	0.80	6.42	178.50	0.000	0.000	75.98	0.00	0.00
20	87.00	SBNHH-1D65B	9	10.761	11.837	0.66	0.80	48.24	360.00	0.000	0.000	570.95	0.00	0.00
21	87.00	BXA-80063/4CF	3	10.761	11.837	0.65	0.90	9.15	29.70	0.000	0.000	108.31	0.00	0.00
22	77.00	APXV18-206517S-C	3	10.488	11.536	0.59	0.80	9.18	79.20	0.000	0.000	105.92	0.00	0.00
							Totals:		**6,304.86**			**3,349.71**		

Total Applied Force Summary

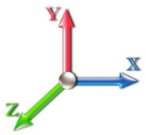
Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 26

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		109.99	1237.30	0.00	0.00
10.00		107.58	1215.62	0.00	0.00
15.00		105.17	1193.95	0.00	0.00
20.00		109.03	1172.27	0.00	0.00
25.00		111.59	1150.59	0.00	0.00
30.00		113.17	1128.92	0.00	0.00
35.00		114.03	1107.24	0.00	0.00
40.00		114.32	1085.57	0.00	0.00
45.00		114.16	1063.89	0.00	0.00
48.25		73.65	679.91	0.00	0.00
50.00		40.05	593.75	0.00	0.00
53.25		74.35	1089.76	0.00	0.00
55.00		39.75	314.57	0.00	0.00
60.00		113.50	886.58	0.00	0.00
65.00		112.16	868.52	0.00	0.00
70.00		110.59	850.46	0.00	0.00
75.00		108.83	832.39	0.00	0.00
77.00	(3) attachments	148.75	407.10	0.00	0.00
80.00		63.73	467.71	0.00	0.00
85.00		104.80	765.07	0.00	0.00
87.00	(24) attachments	1262.66	2802.17	0.00	0.00
90.00		61.12	383.28	0.00	0.00
95.00		100.19	624.34	0.00	0.00
98.00		58.79	365.93	0.00	0.00
99.00	(19) attachments	885.53	2453.57	0.00	0.00
100.00		19.59	178.19	0.00	0.00
101.75		34.05	308.71	0.00	0.00
105.00		62.48	260.32	0.00	0.00
109.00		75.39	312.01	0.00	0.00
110.00		16.17	89.81	0.00	0.00
115.00	(1) attachments	144.36	699.07	0.00	0.00
118.00	(18) attachments	929.35	1394.44	0.00	0.00
119.00	(2) attachments	229.98	180.88	338.11	213.54
	Totals:	**5,868.85**	**28,163.91**	**338.11**	**213.54**

Calculated Forces

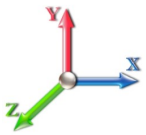
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-G	10/18/2017	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.16	-5.88	-0.34	-495.80	0.00	495.80	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.131
5.00	-26.92	-5.79	-0.34	-466.41	0.00	466.41	3920.48	1960.24	7723.84	3867.66	0.02	-0.039	0.000	0.127
10.00	-25.70	-5.69	-0.34	-437.48	0.00	437.48	3862.67	1931.34	7438.74	3724.90	0.08	-0.077	0.000	0.124
15.00	-24.50	-5.60	-0.34	-409.01	0.00	409.01	3803.51	1901.75	7156.21	3583.42	0.18	-0.116	0.000	0.121
20.00	-23.33	-5.51	-0.34	-381.00	0.00	381.00	3742.99	1871.49	6876.43	3443.32	0.33	-0.155	0.000	0.117
25.00	-22.17	-5.41	-0.34	-353.46	0.00	353.46	3681.11	1840.56	6599.58	3304.69	0.51	-0.194	0.000	0.113
30.00	-21.04	-5.30	-0.34	-326.42	0.00	326.42	3617.88	1808.94	6325.84	3167.62	0.73	-0.233	0.000	0.109
35.00	-19.93	-5.20	-0.34	-299.90	0.00	299.90	3553.28	1776.64	6055.40	3032.20	1.00	-0.271	0.000	0.105
40.00	-18.84	-5.09	-0.34	-273.91	0.00	273.91	3487.33	1743.67	5788.43	2898.52	1.30	-0.309	0.000	0.100
45.00	-17.78	-4.98	-0.34	-248.45	0.00	248.45	3420.03	1710.01	5525.12	2766.66	1.65	-0.346	0.000	0.095
48.25	-17.10	-4.91	-0.34	-232.27	0.00	232.27	3375.55	1687.77	5356.01	2681.98	1.89	-0.370	0.000	0.092
50.00	-16.50	-4.87	-0.34	-223.68	0.00	223.68	3351.36	1675.68	5265.64	2636.73	2.03	-0.383	0.000	0.090
53.25	-15.41	-4.79	-0.34	-207.85	0.00	207.85	2647.50	1323.75	4165.57	2085.88	2.30	-0.407	0.000	0.105
55.00	-15.09	-4.76	-0.34	-199.46	0.00	199.46	2630.02	1315.01	4097.26	2051.68	2.45	-0.420	0.000	0.103
60.00	-14.21	-4.65	-0.34	-175.68	0.00	175.68	2579.17	1289.59	3903.72	1954.76	2.91	-0.459	-0.001	0.095
65.00	-13.34	-4.54	-0.34	-152.45	0.00	152.45	2526.96	1263.48	3712.68	1859.10	3.41	-0.496	-0.001	0.087
70.00	-12.48	-4.42	-0.34	-129.77	0.00	129.77	2473.39	1236.70	3524.34	1764.79	3.95	-0.531	-0.001	0.079
75.00	-11.65	-4.31	-0.34	-107.65	0.00	107.65	2418.47	1209.23	3338.88	1671.92	4.53	-0.563	-0.001	0.069
77.00	-11.24	-4.16	-0.34	-99.02	0.00	99.02	2396.12	1198.06	3265.54	1635.20	4.76	-0.575	-0.001	0.065
80.00	-10.78	-4.10	-0.34	-86.53	0.00	86.53	2362.18	1181.09	3156.47	1580.58	5.13	-0.593	-0.001	0.059
85.00	-10.01	-3.99	-0.34	-66.04	0.00	66.04	2304.54	1152.27	2977.30	1490.86	5.77	-0.618	-0.001	0.049
87.00	-7.22	-2.70	-0.34	-58.07	0.00	58.07	2281.10	1140.55	2906.58	1455.45	6.03	-0.627	-0.001	0.043
90.00	-6.84	-2.63	-0.34	-49.98	0.00	49.98	2242.72	1121.36	2798.02	1401.09	6.42	-0.639	-0.001	0.039
95.00	-6.21	-2.53	-0.34	-36.81	0.00	36.81	2163.84	1081.92	2603.70	1303.79	7.10	-0.656	-0.001	0.031
98.00	-5.85	-2.46	-0.34	-29.23	0.00	29.23	2116.52	1058.26	2490.47	1247.09	7.52	-0.665	-0.001	0.026
99.00	-3.41	-1.55	-0.34	-26.77	0.00	26.77	2100.74	1050.37	2453.28	1228.47	7.66	-0.668	-0.001	0.023
100.00	-3.23	-1.53	-0.34	-25.22	0.00	25.22	2084.97	1042.48	2416.38	1209.99	7.80	-0.671	-0.001	0.022
101.75	-2.92	-1.49	-0.34	-22.54	0.00	22.54	1611.41	805.70	1884.17	943.49	8.05	-0.675	-0.001	0.026
105.00	-2.66	-1.43	-0.34	-17.69	0.00	17.69	1583.50	791.75	1805.91	904.30	8.51	-0.682	-0.002	0.021
109.00	-2.35	-1.35	-0.34	-11.98	0.00	11.98	1548.36	774.18	1710.93	856.74	9.08	-0.689	-0.002	0.016
109.00	-2.35	-1.35	-0.34	-11.98	0.00	11.98	933.38	466.69	986.46	590.00	9.08	-0.689	-0.002	0.023
110.00	-2.26	-1.33	-0.34	-10.64	0.00	10.64	933.38	466.69	986.46	590.00	9.23	-0.691	-0.002	0.020
115.00	-1.56	-1.18	-0.34	-3.98	0.00	3.98	933.38	466.69	986.46	590.00	9.95	-0.696	-0.002	0.008
118.00	-0.18	-0.23	-0.34	-0.45	0.00	0.45	933.38	466.69	986.46	590.00	10.39	-0.697	-0.002	0.001
119.00	0.00	-0.23	-0.34	-0.21	0.00	0.21	933.38	466.69	986.46	590.00	10.54	-0.697	-0.002	0.000

Final Analysis Summary

Structure:	CT13070-A-SBA		**Code:**	EIA/TIA-222-G	10/18/2017
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 28

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 97 mph Wind	24.6	0.00	33.76	0.00	0.88	2080.78
0.9D + 1.6W 97 mph Wind	24.6	0.00	25.31	0.00	0.88	2068.79
1.2D + 1.0Di + 1.0Wi 50 mph Wind	7.0	0.00	51.13	0.00	0.28	587.17
1.2D + 1.0E	0.7	0.00	33.80	0.00	0.00	58.42
0.9D + 1.0E	0.7	0.00	25.35	0.00	0.00	58.06
1.0D + 1.0W 60 mph Wind	5.9	0.00	28.16	0.00	0.34	495.80

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 97 mph Wind	-33.76	-24.59	-0.88	-2080.7	0.00	-2080.7	3976.93	1988.4	8011.33	4011.62	0.00	0.527
0.9D + 1.6W 97 mph Wind	-25.31	-24.58	-0.88	-2068.7	0.00	-2068.7	3976.93	1988.4	8011.33	4011.62	0.00	0.522
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-51.13	-7.00	-0.28	-587.17	0.00	-587.17	3976.93	1988.4	8011.33	4011.62	0.00	0.159
1.2D + 1.0E	-33.80	-0.66	0.00	-58.42	0.00	-58.42	3976.93	1988.4	8011.33	4011.62	0.00	0.023
0.9D + 1.0E	-25.35	-0.66	0.00	-58.06	0.00	-58.06	3976.93	1988.4	8011.33	4011.62	0.00	0.021
1.0D + 1.0W 60 mph Wind	-28.16	-5.88	-0.34	-495.80	0.00	-495.80	3976.93	1988.4	8011.33	4011.62	0.00	0.131

Monopole Mat Foundation Design

			Date: 10/18/2017
Customer Name:	Sprint Nextel	**EIA/TIA Standard:**	EIA-222-G
Site Name:	Waterbury 4, CT	**Structure Height (Ft.):**	119
Site Number:	CT13070-A-SBA	**Engineer Name:**	J. Tibbetts
Engr. Number:	41660	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

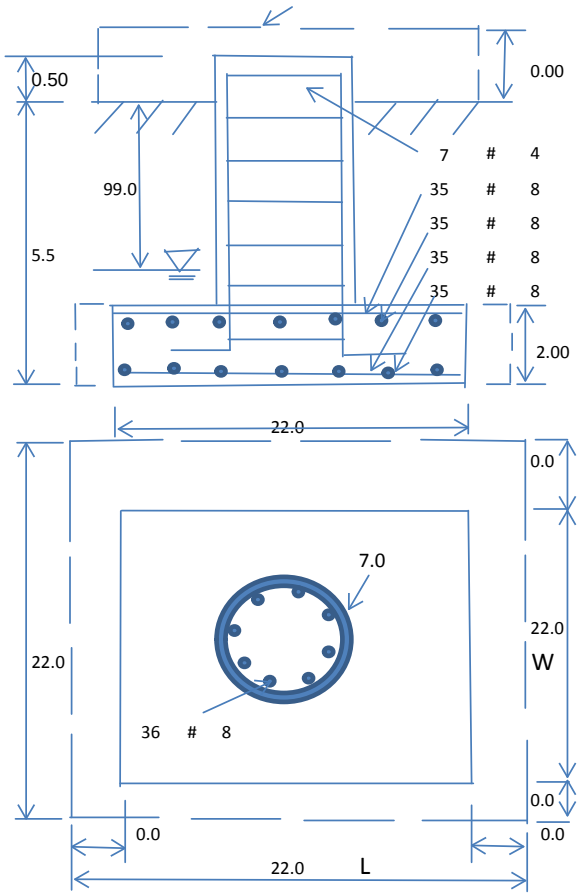
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	33.8	Shear Force (Kips):	24.6
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2080.8
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	5.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	22	Width of Pad (ft.):	22
Final Length of pad (ft)	22.0	Final width of pad (ft):	22.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	130.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	16000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	1559.30	Total Dry Soil Weight (Kips):	202.71
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	202.71	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1121.94	Total Dry Concrete Weight (Kips):	168.29
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	168.29	Total Vertical Load on Base (Kips):	404.76

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2254	<	Allowable Factored Soil Bearing (psf): 12000	0.19	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	4044.3	>	Design Factored Momont (kips-ft): 2228	0.55	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.81	OK!			

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00		

(1) Concrete Pier:

Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4845.7	>	Design Factored Moment (Mu, Kips-Ft	2179.2	0.45	OK!
Calculated Shear Capacity (Kips):	660.1	>	Design Factored Shear (Kips):	24.6	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1535.8	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9747.6	>	Design Factored Axial Load (Pu Kips):	33.8	0.00	OK!
Moment & Axial Strength Combination:	0.45	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI				

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	513.4	>	One-Way Factored Shear (L-D. Kips):	156.4	0.30	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	513.4	>	One-Way Factored Shear (W-D., Kips)	156.4	0.30	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	562.7	>	One-Way Factored Shear (C-C, Kips):	153.8	0.27	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0051		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at Bottom (L-Direct. K-Ft):	452.8	0.19	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at Bottom (W-Direct. K-Ft):	452.8	0.19	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3397.4	>	Moment at Bottom (C-C Dir. K-Ft):	640.4	0.19	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0051		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at the top (L-Dir Kips-Ft):	87.8	0.04	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at the top (W-Dir Kips-Ft):	87.8	0.04	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3397.4	>	Moment at the top (C-C Direc. K-Ft):	243.0	0.07	OK!

SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT.
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

Sprint®

SITE NAME: SBA GROVE

SITE NUMBER: CT52XC056

AUGMENT ID: CT-NHN0014Q17.1

SITE ADDRESS: 940 MERIDEN ROAD
WATERBURY, CT 06705

JURISDICTION: CITY OF WATERBURY / CT SITING COUNCIL

SITE TYPE: EXISTING 119' MONOPOLE

PROGRAM: DO MACRO UPGRADE EQUIPMENT DEPLOYMENT

PROJECT INFORMATION

SITE INFORMATION

LATTITUDE: (PER SBA RECORD)	41° 33' 11.80" N (41.55328°)
LONGITUDE: (PER SBA RECORD)	72° 59' 36.10" W (-72.99336°)
GROUND ELEVATION:	615'± AMSL (PER GOOGLE EARTH)
STRUCTURE HEIGHT:	119'± AGL (FROM RECORD STRUCTURAL)
STRUCTURE TYPE:	MONOPOLE
ZONING JURISDICTION	CITY OF WATERBURY / CT SITING COUNCIL
ZONING DISTRICT/ OCCUPANCY:	RL (LOW DENSITY RESIDENTIAL)
COUNTY:	NEW HAVEN

APPLICANT

SPRINT
1 INTERNATIONAL BLVD. SUITE 800
MAHWAH, NJ 07495

PROPERTY OWNER:

N/F PINE GROVE CEMETERY ASSOCIATION
850 MERIDEN ROAD
WATERBURY, CT 06705

TOWER OWNER:

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

SBA SITE ID:	CT13070-A
SBA SITE NAME:	WATERBURY 4, CT

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. REMOVE (2) EXISTING SPRINT (CLEARWIRE) TOWER TOP JUNCTION BOXES.
2. REMOVE EXISTING CABLING AND REPLACE WITH (4) HYBRID CABLES.
3. REMOVE (3) EXISTING SPRINT (CLEARWIRE) PANEL ANTENNAS AND REPLACE WITH (3) NEW SPRINT PANEL ANTENNAS.
4. REMOVE (3) EXISTING SPRINT (CLEARWIRE) RRHS.
5. INSTALL (6) NEW SPRINT 800 MHz RRHS.
6. INSTALL (3) NEW SPRINT 1900 MHz RRHS.
7. INSTALL (3) NEW SPRINT 2500 MHz RRHS.
8. REMOVE EXISTING SPRINT (CLEARWIRE) EQUIPMENT CABINET AND REPLACE WITH NEW SPRINT EQUIPMENT CABINET WITH CABLING CABINET.
9. REMOVE EXISTING SPRINT (CLEARWIRE) GPS ANTENNA AND REPLACE WITH NEW SPRINT GPS ANTENNA.
10. INSTALL NEW SPRINT PPC MOUNTED TO A NEW H-FRAME.

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.

DRAWING INDEX

SHEET NO.	SHEET DESCRIPTION	REV. NO.
T-1	TITLE SHEET	0
SP-1	OUTLINE SPECIFICATIONS	0
SP-2	OUTLINE SPECIFICATIONS	0
SP-3	OUTLINE SPECIFICATIONS	0
A-1	COMPOUND PLAN	0
A-2	ELEVATION AND ANTENNA PLANS	0
A-3	TOWER EQUIPMENT DETAILS	0
S-1	ANTENNA AND RRH MOUNTING DETAILS	0
S-2	GROUND EQUIPMENT DETAILS	0
E-1	ELECTRICAL AND GROUNDING DETAILS	0
RF-1	RF DATA SHEET	0
RF-2	PLUMBING DIAGRAM AND RAN WIRING	0

CODE COMPLIANCE

1. 2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS.
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
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/FN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

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

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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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SBA COMMUNICATIONS CORP.
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: 11/20/17 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB FN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

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
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

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.

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
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

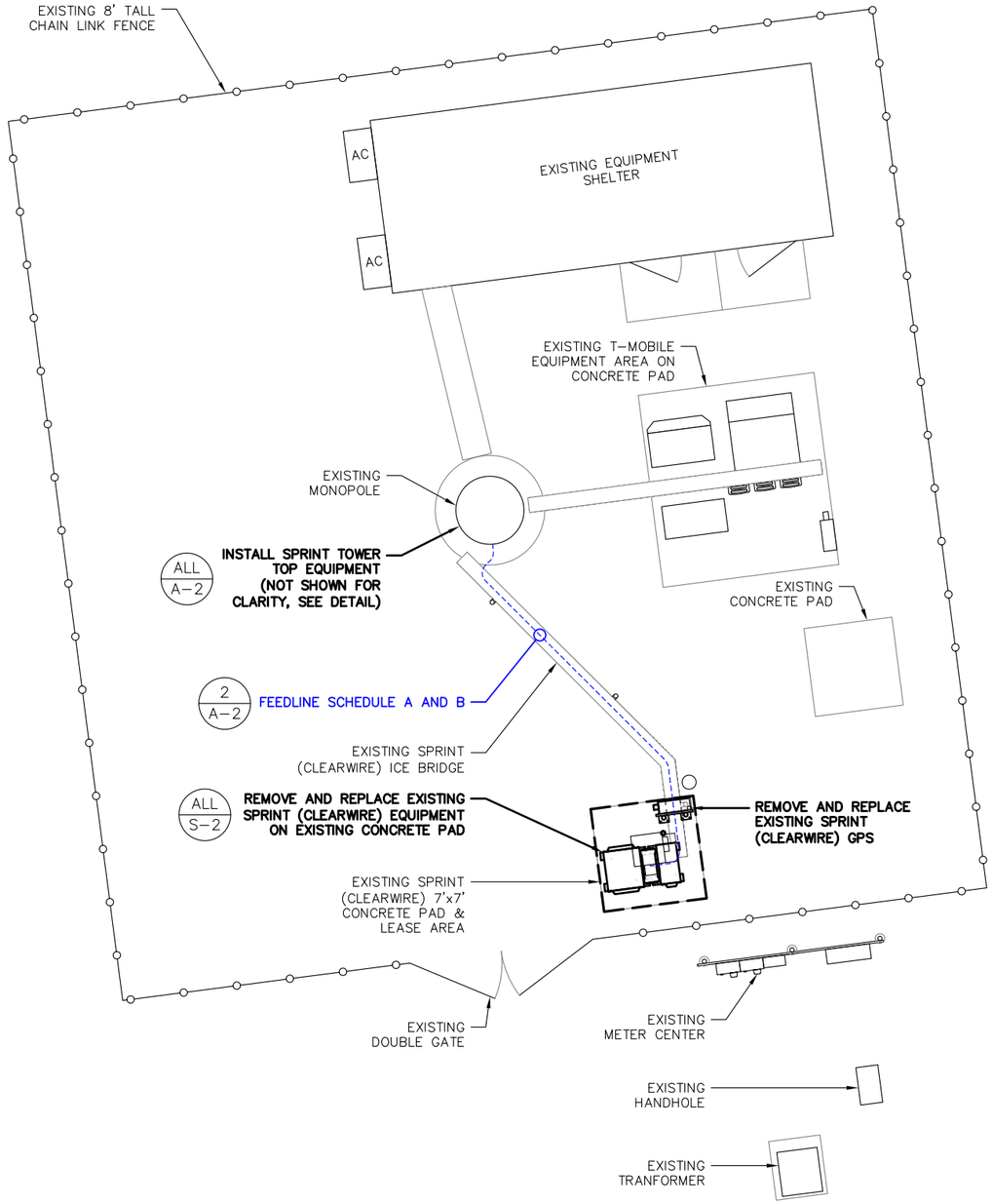
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP-3



COMPOUND PLAN

1 / A-1

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

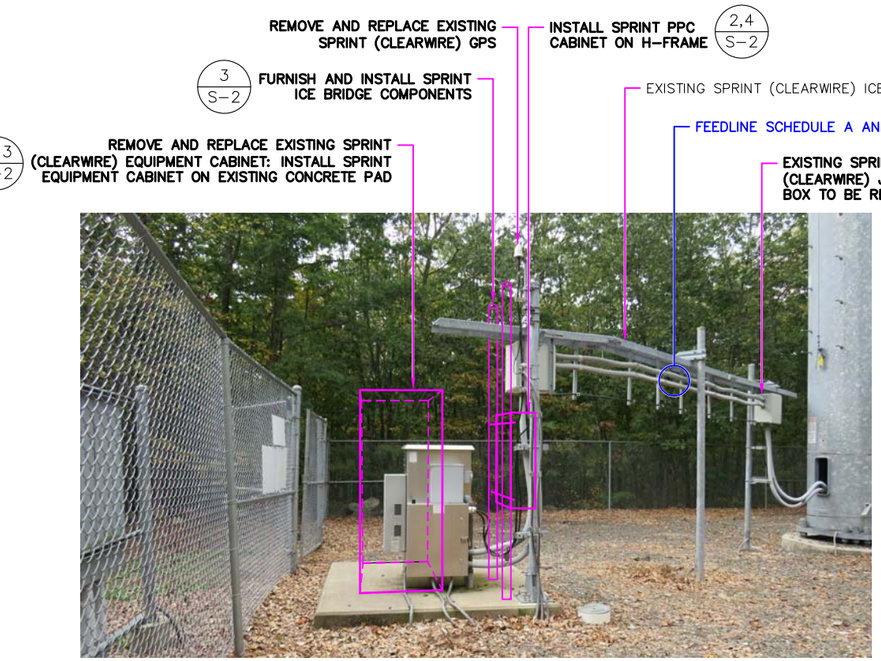


IMAGE SOURCE: PROTERRA 10/14/2017
(VIEW FROM EAST)

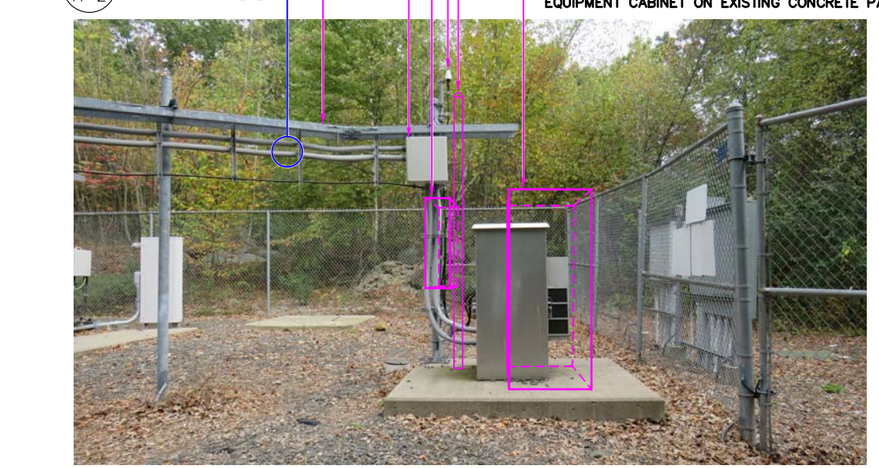


IMAGE SOURCE: PROTERRA 10/14/2017
(VIEW FROM WEST)

EQUIPMENT PLAN PHOTO DETAIL

2 / A-1

SCALE: N.T.S.

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

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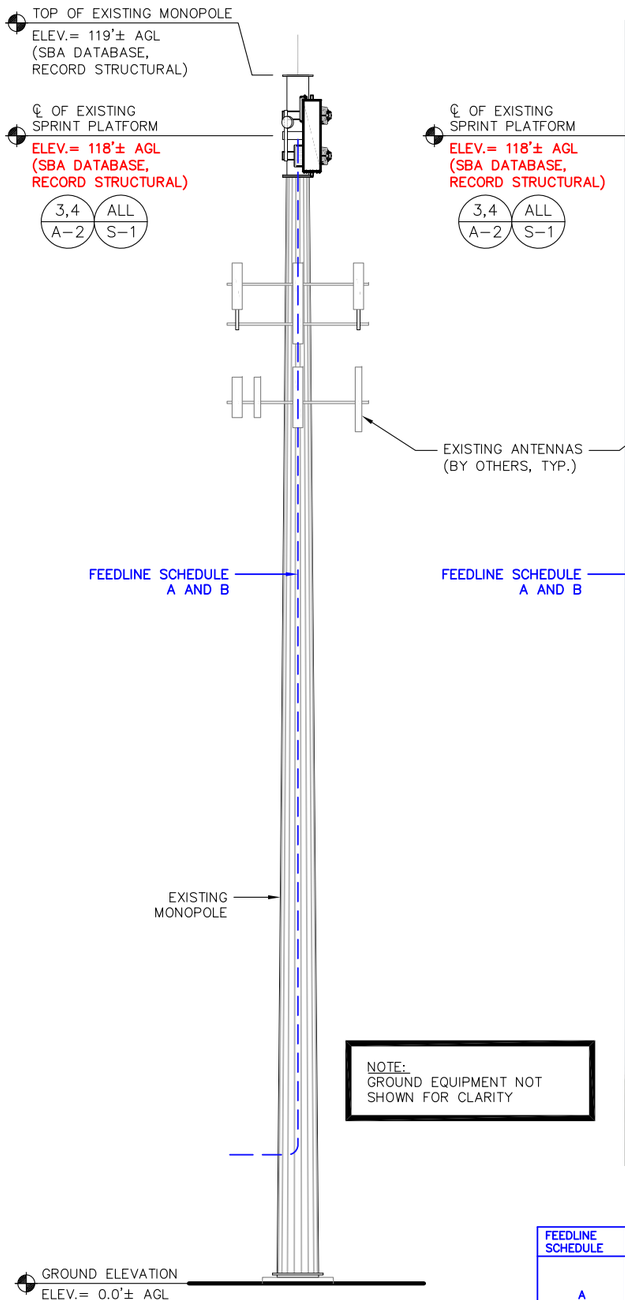
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
A-1



NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

ELEVATION

SCALE: 1"=15' (11"x17")
1"=7.5' (22"x34")

1 / A-2

15 7.5 0 15

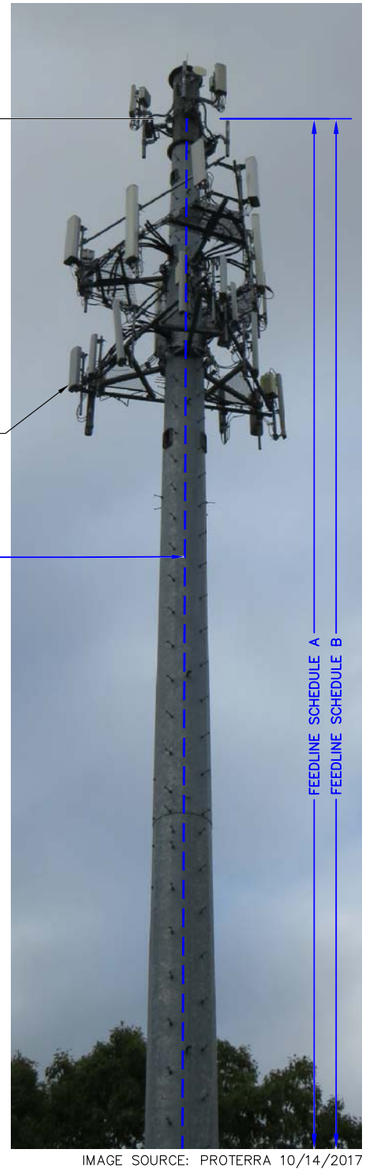


IMAGE SOURCE: PROTERRA 10/14/2017

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (3) 7/8" COAX, (3) 1/2" COAX, AND (1) 5/8" COAX (PER COLO-APP, IN FLEX CONDUIT) TO 118' RAD EXISTING TO REMAIN: (2) 1/2" MICROWAVE DISH CABLE TO 118' RAD	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: (4) HYBRID TO 118' RAD;	UP INSIDE MONOPOLE TO RAD

NOTE:
EXISTING SPRINT EQUIPMENT FEEDLINE INVENTORY BASED ON COLOCATION APPLICATION AND SBA RECORD, NOT FIELD OBSERVATIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER

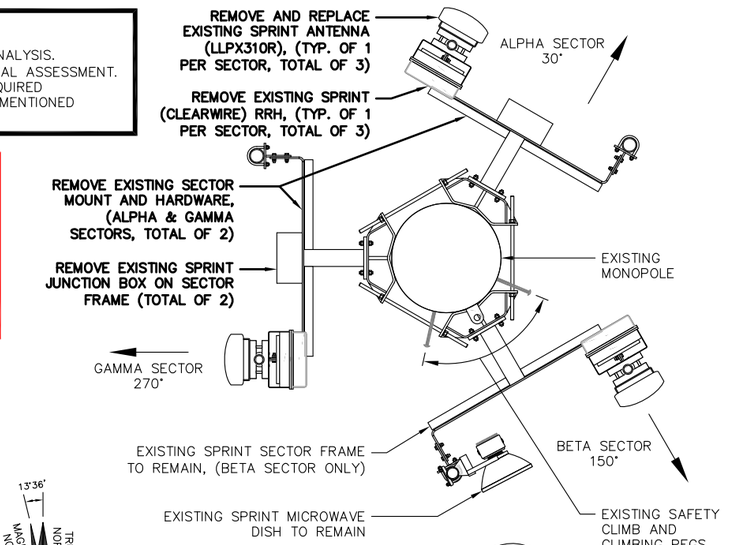
TOWER ELEVATION PHOTO DETAIL

SCALE: N.T.S.

2 / A-2

SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT.
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

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.

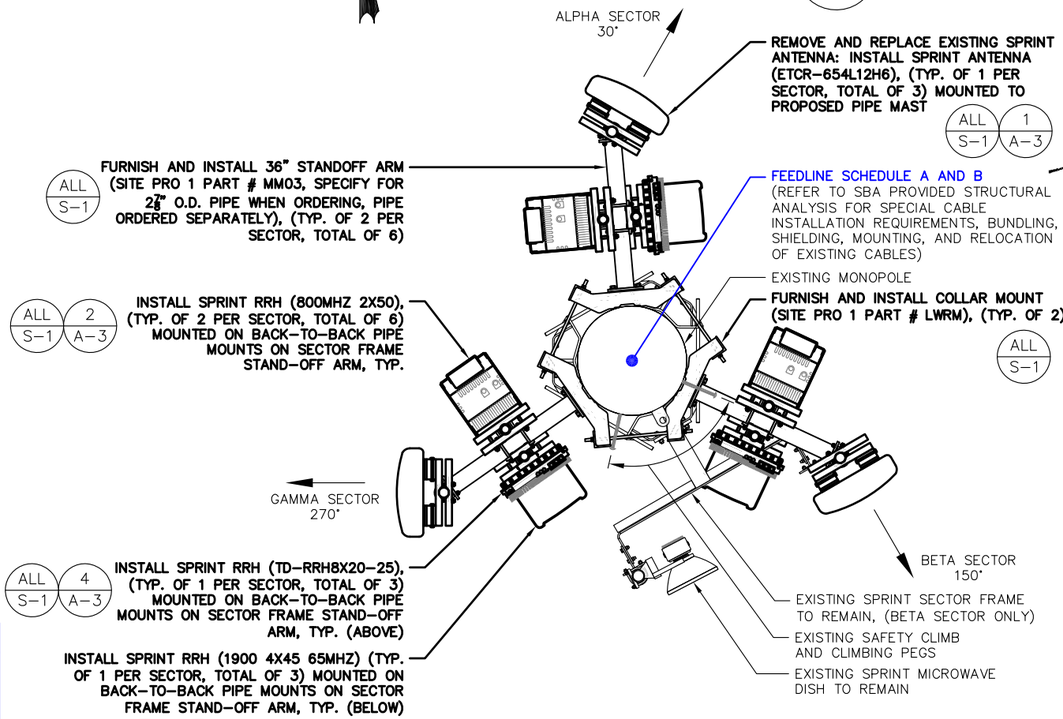


13°36'
MAGNETIC NORTH
TRUE NORTH

EXISTING ANTENNA PLAN

SCALE: N.T.S.

3 / A-2



13°36'
MAGNETIC NORTH
TRUE NORTH

PROPOSED ANTENNA PLAN

SCALE: N.T.S.

4 / A-2

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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STATE OF CONNECTICUT
THOMAS E. JOHNSON
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LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

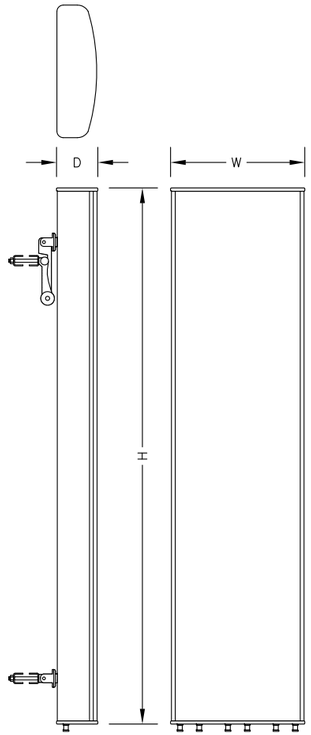
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/FN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

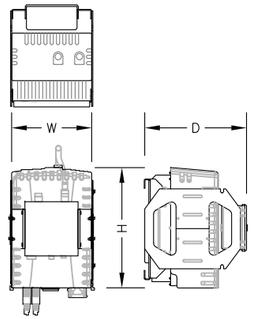
SHEET TITLE
ELEVATION AND ANTENNA PLANS

SHEET NUMBER
A-2



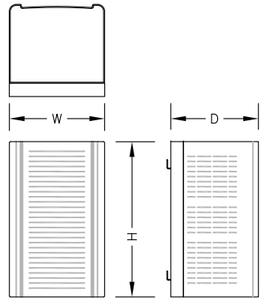
ANTENNA SPECIFICATIONS	
MANUF.	KMW
MODEL #	ETCR-654L12H6
HEIGHT	84.9"
WIDTH	21.0"
DEPTH	6.3"
WEIGHT	84.9± LBS.

ANTENNA DETAIL 1 / A-3
SCALE: N.T.S.



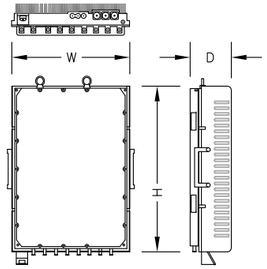
800 MHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	800MHZ 2X50W
HEIGHT	19.7"
WIDTH	13"
DEPTH	10.8"
WEIGHT	53± LBS

800 MHz RRH DETAIL 2 / 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

1900 MHz RRH DETAIL 3 / 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 4 / 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	KMW ETCR-654L12H6	SPRINT
2500 RRH	3	EA	NOKIA (ALU) TD-RRH8x20-25	SPRINT
1900 RRH	3	EA	NOKIA (ALU) 1900 4X45 65MHZ	SPRINT
800 RRH	6	EA	NOKIA (ALU) 800MHz 2x50W	SPRINT
FIBER	4 @ 195'± FROM FIBER CABINET	LINEAR FEET LISTED [INCLUDES (2) 10' COILS]	1-1/4" HYBRIFLEX	SPRINT

SPRINT-PROVIDED EQUIPMENT SCHEDULE 5 / A-3
SCALE: N.T.S.

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

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WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

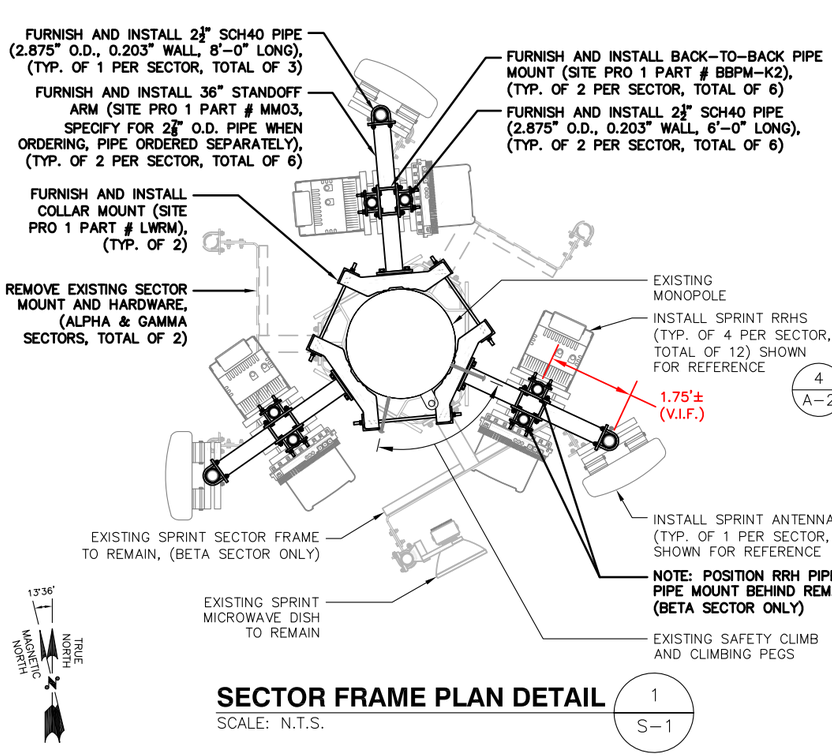
REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE

SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
TOWER EQUIPMENT DETAILS

SHEET NUMBER
A-3



SECTOR FRAME PLAN DETAIL

1 / S-1

SCALE: N.T.S.

SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT.
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

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.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

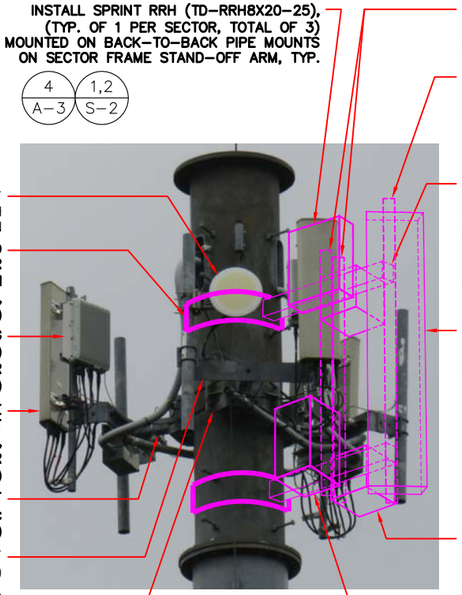
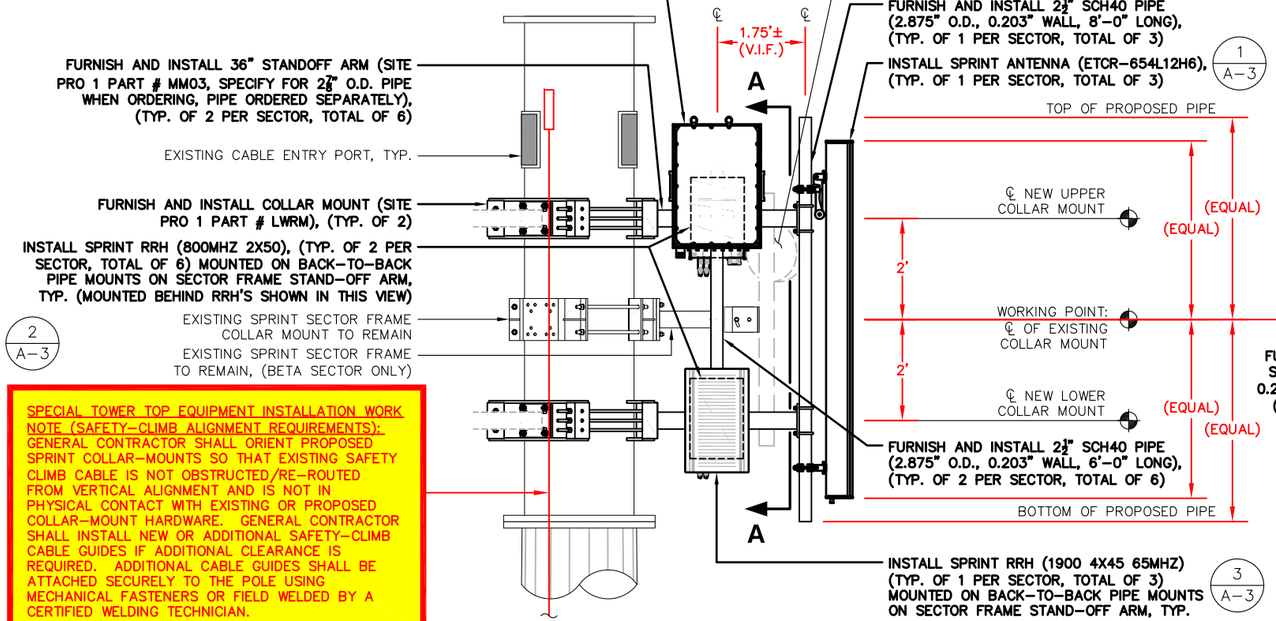


IMAGE SOURCE:
PROTERRA 10/14/2017

ANTENNA AND RRH MOUNT PHOTO DETAIL

3 / S-1

SCALE: N.T.S.



SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED SPRINT COLLAR-MOUNTS SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH EXISTING OR PROPOSED COLLAR-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

ANTENNA AND RRH MOUNTING DETAIL

2 / S-1

SCALE: N.T.S.

SECTION A-A

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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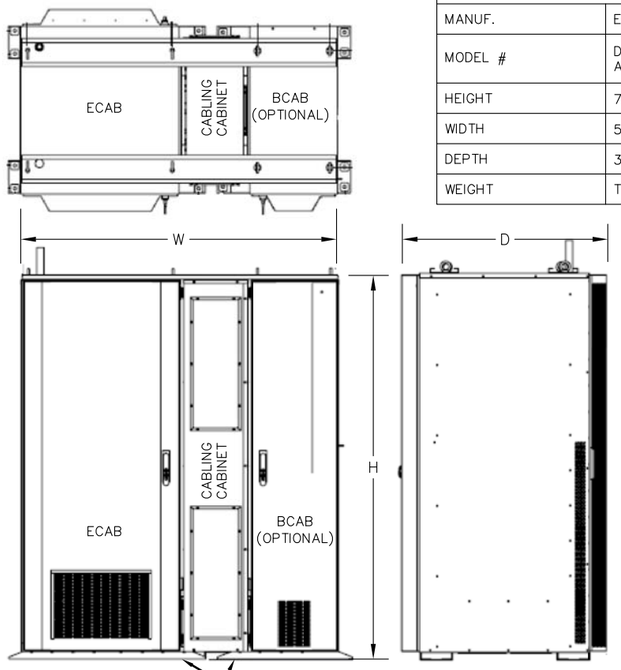
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
ANTENNA AND RRH MOUNTING DETAILS

SHEET NUMBER
S-1

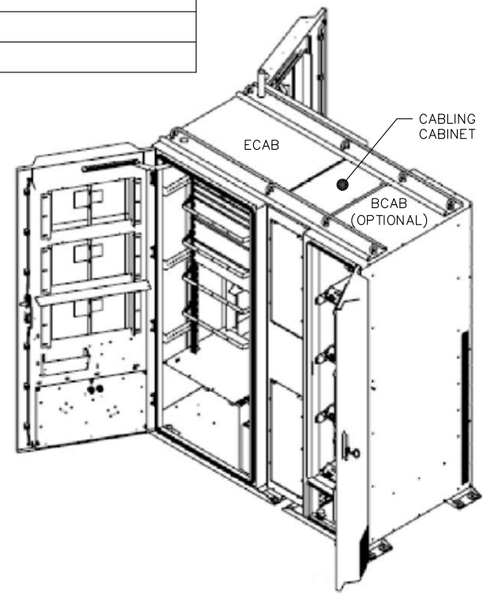
ELTEK EQUIPMENT CABINET	
MANUF.	ELTEK
MODEL #	DO EXTERNAL ECAB & BCAB ASSEMBLY
HEIGHT	72.3"
WIDTH	59.5"
DEPTH	38"
WEIGHT	TBD

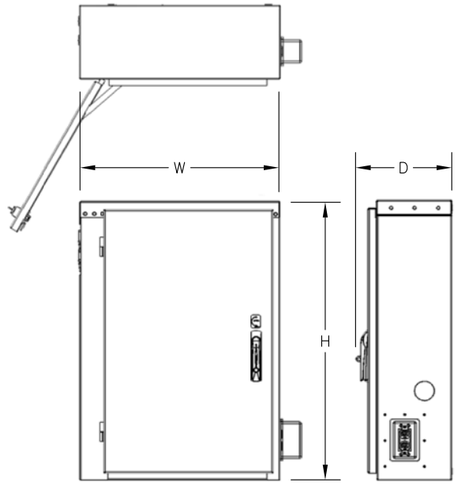


ELTEK EQUIPMENT CABINET DETAIL

SCALE: N.T.S.

1 / S-2





PPC CABINET	
MANUF.	PURCELL SYSTEMS, INC.
MODEL #	PPC (VERIFY WITH SPRINT MODEL)
HEIGHT	36"
WIDTH	26"
DEPTH	12.2"
WEIGHT	67± LBS

PPC DETAIL

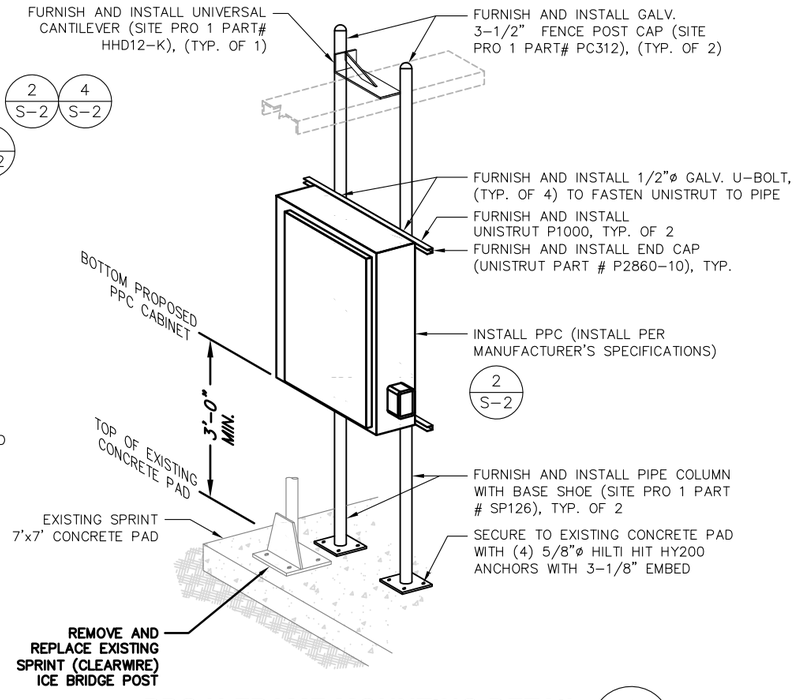
SCALE: N.T.S.

2 / S-2

GROUND LEVEL EQUIPMENT PLAN

SCALE: N.T.S.

3 / S-2



PPC H-FRAME MOUNTING DETAIL

SCALE: N.T.S.

4 / S-2

Sprint
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MAHWAH, NJ 07495
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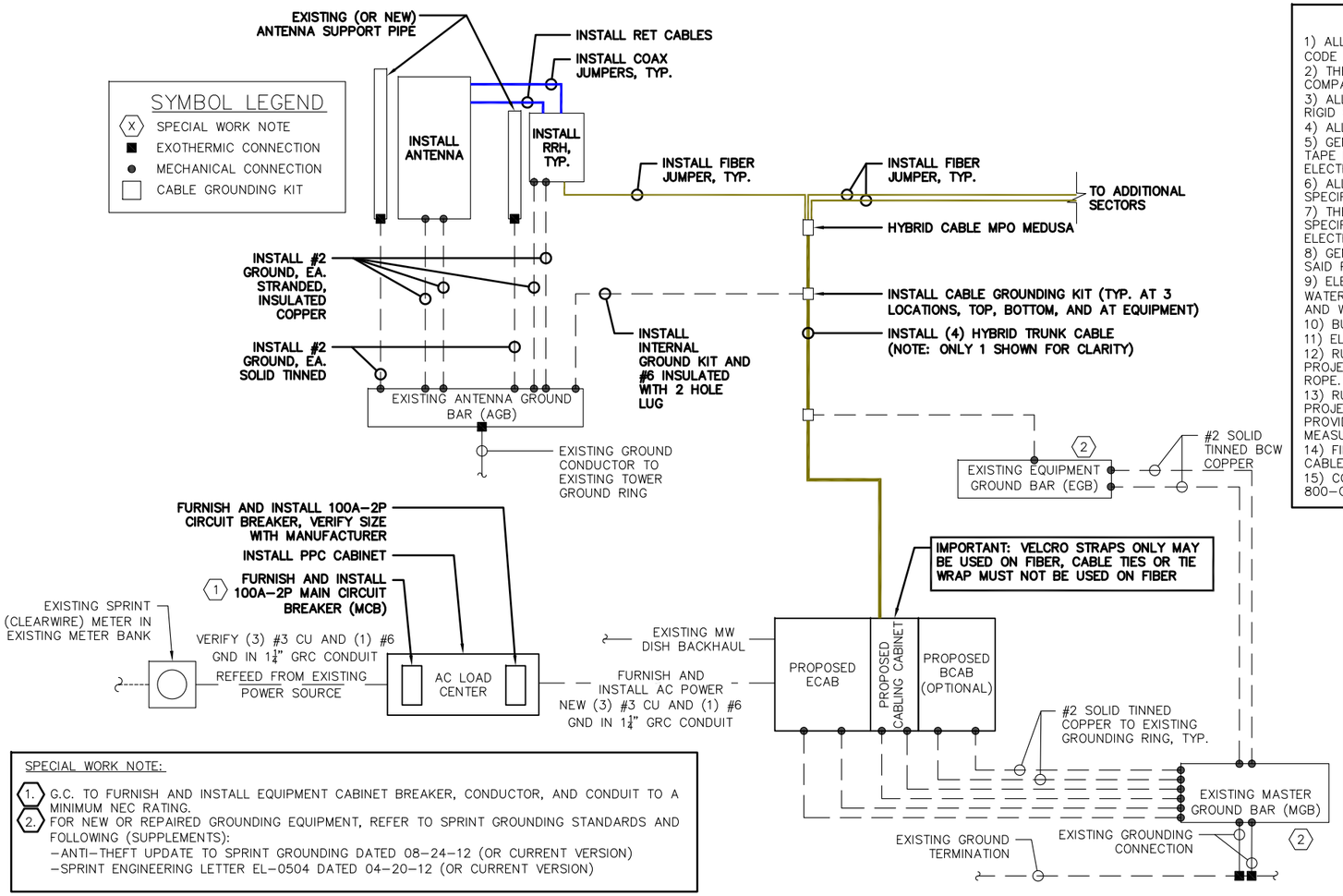
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
ANTENNA AND RRH MOUNTING DETAILS

SHEET NUMBER
S-2



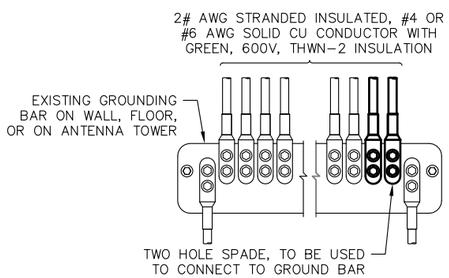
SPECIAL WORK NOTE:

1. G.C. TO FURNISH AND INSTALL EQUIPMENT CABINET BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING.
2. 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)

TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

SCALE: N.T.S.

1 / E–1

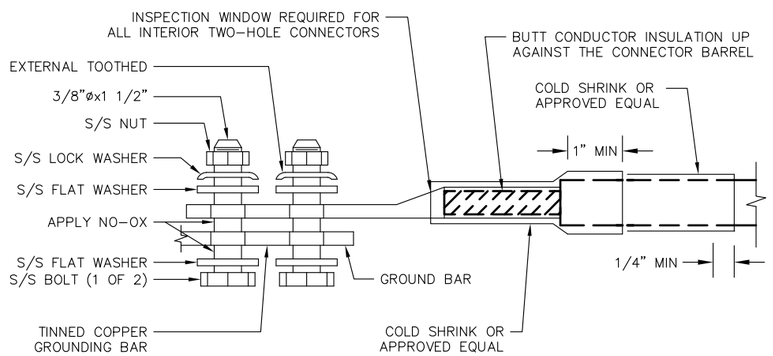


1. APPLY NO–OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

SCALE: N.T.S.

2 / E–1



TWO HOLE LUG

SCALE: N.T.S.

3 / E–1

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.

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)

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Hadley, MA 01035 Ph: (413)320–4918

STATE OF CONNECTICUT · THOMAS E. JOHNSON · No. 28192 · LICENSED PROFESSIONAL ENGINEER

FOR SCHEMATIC ONLY

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
ELECTRICAL AND GROUNDING DETAILS

SHEET NUMBER
E–1

SprintVision RF Design Sheet

Site Identification	
Cascade	CTNHN0014
SMS Schedule ID	12323418
SMS Schedule Name	DO Macro Upgrade
PID	DOKU_CT52XC056
RRU OEM	Alcatel Lucent
Switch OEM	ALU
RFDS Issue Date	
RFDS Revision Date	2017-04-06 00:00:00.0
RFDS Revision	1

Filter Analysis Complete	YES
RFDS - Issue Date	
Design Status	Complete
Border Analysis Complete	YES
Project Description	DO Macro Upgrade - Add 600MHz (3G + 4G) and 1900 MHz

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.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

Location Details	
Latitude	41.5533
Longitude	-72.9934
Market	Southern Connecticut
Region	Northeast
City	Waterbury
State	CT
Zip Code	CT/06705
County	New Haven

2500MHz	3
1900MHz	3
800MHz	3

Additional RF Notes

Replace Existing Antenna with 16 port KMW Panel Antenna for 1900 4T4R, 800 2T4R and 2500 8T8R.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

Band: 2500	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	KMW	KMW	KMW	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	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	150	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)	116.9947544	116.9947544	116.9947544	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	ETCR-654L12H6	ETCR-654L12H6	ETCR-654L12H6			
Weight (lbs)	85	85	85	N/A	N/A	N/A
Dimensions	84.9 x 21 x 6.3	84.9 x 21 x 6.3	84.9 x 21 x 6.3	N/A	N/A	N/A
Manufacturer	KMW	KMW	KMW	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	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	150	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)	116.9947544	116.9947544	116.9947544	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	KMW	KMW	KMW	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	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	150	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)	116.9947544	116.9947544	116.9947544	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

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
GPS Antenna needed at site	1

BTS #1 Model	
Model Number	Ecab Eltek
Weight (Lbs.)	505
Dimensions (In.)	73.5 x 30 x 38
Manufacturer	Eltek
Number of BTS #1	1

Power Protection Cabinet Model	
Model Number	PPC w/ATS cabinet
Weight (Lbs.)	175
Dimensions (In.)	64.00 x 30.18 x 12.28
Manufacturer	
Power Protection Cabinet	1

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	1

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/.

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
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: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-4x45-1900	RRH-4x45-1900	RRH-4x45-1900	N/A	N/A	N/A
Weight (lbs)	69.5	69.5	69.5	N/A	N/A	N/A
Dimensions	25 x 12 x 12	25 x 12 x 12	25 x 12 x 12	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
Trunk Cable 1						
Model Number	1900 Hybrid_ALU	1900 Hybrid_ALU	1900 Hybrid_ALU	N/A	N/A	N/A
Weight (Lbs.)	1.1	1.1	1.1	N/A	N/A	N/A
Dimensions (In.)	1.25	1.25	1.25	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	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	2	2	2	0	0	0

NOTE: RFDS PROVIDED BY SPRINT DATED 04/06/2017. 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

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1 INTERNATIONAL BLVD, SUITE 800
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Hadley, MA 01035 Ph: (413)320–4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

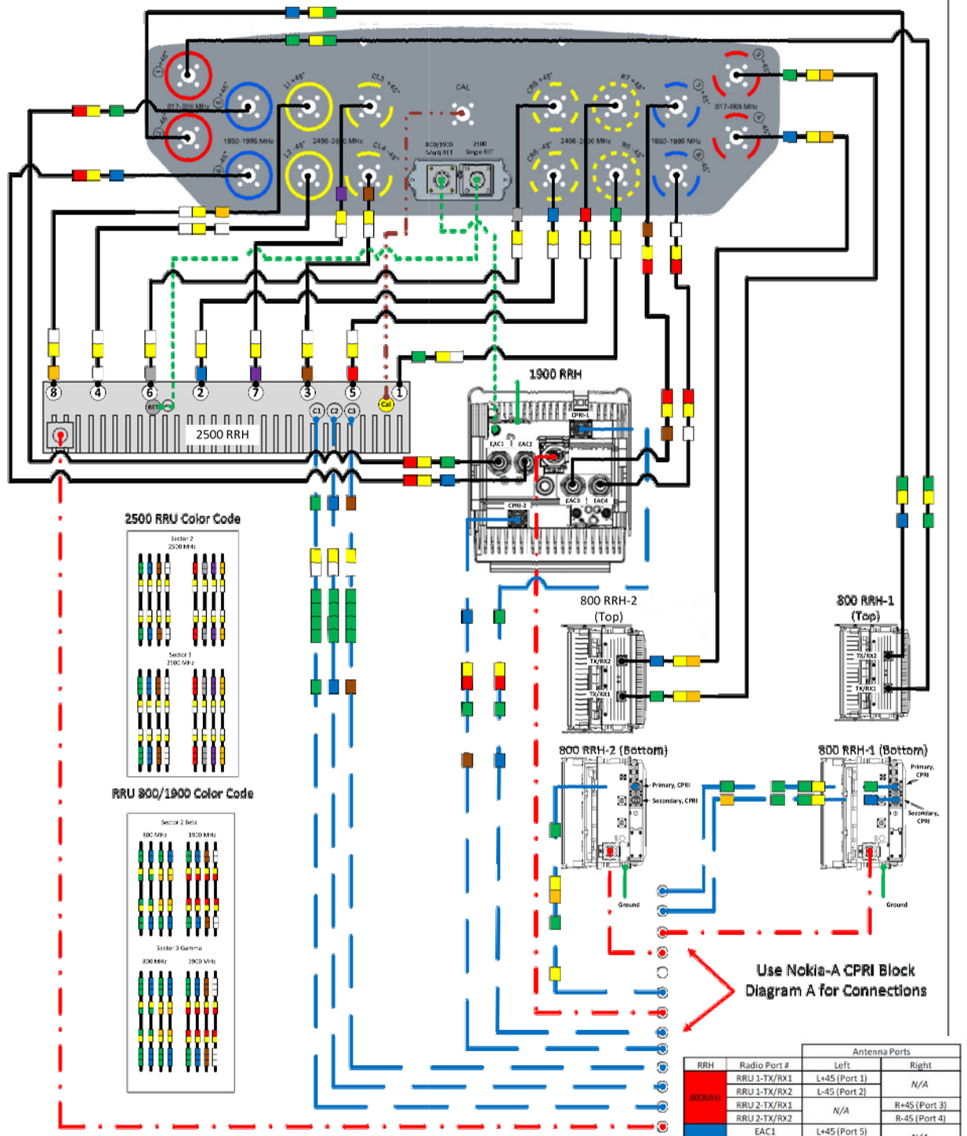
SHEET TITLE
RF DATA SHEET

SHEET NUMBER
RF–1

Prepared By	Creation Date / Revision Number	
Mark Elliott	September 12, 2016	R-4
Approved By	Approval Date	
TBD	TBD	

Sprint

KMW 16 Port Nokia-A RRH 800, 1900, and 2500 (Sprint Scenario 4)

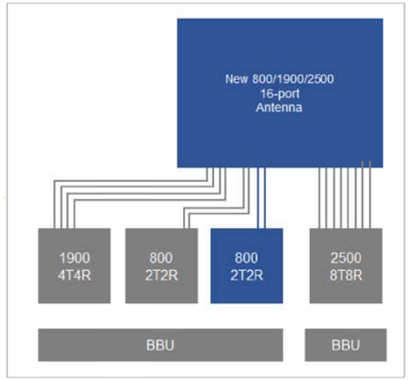


Not to Scale

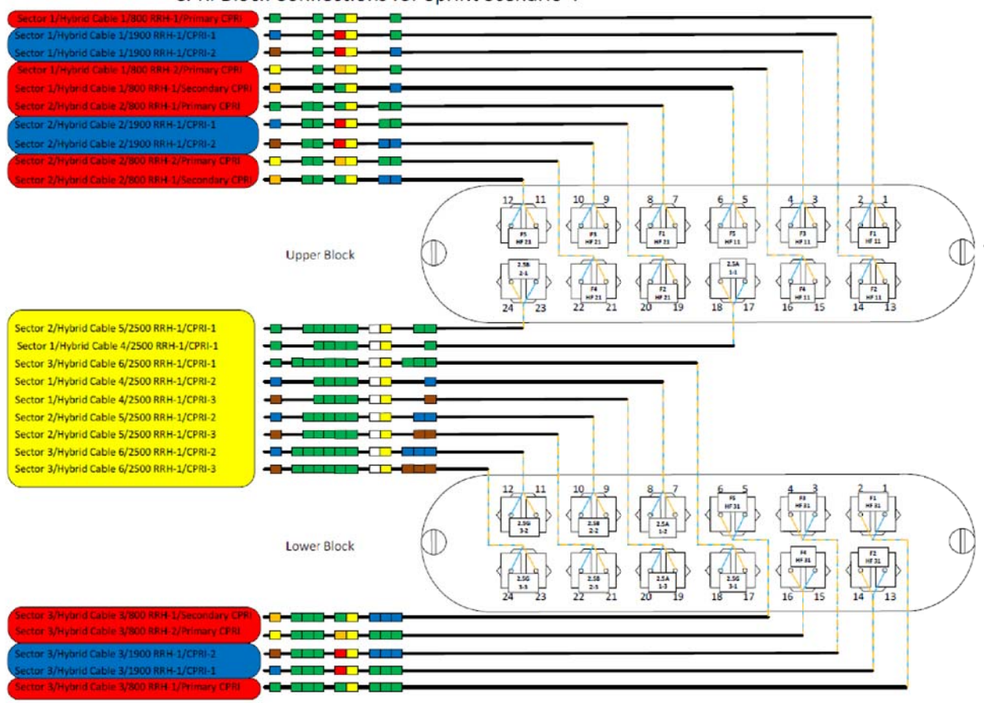
RRH	Radio Port #	Antenna Ports Left	Antenna Ports Right
800MHz	RRU 1-TX/RX1	L+45 (Port 1)	N/A
	RRU 1-TX/RX2	L-45 (Port 2)	
	RRU 2-TX/RX1	N/A	R+45 (Port 3)
	RRU 2-TX/RX2		R-45 (Port 4)
1900MHz	EAC1	L+45 (Port 5)	N/A
	EAC2	L-45 (Port 6)	
	EAC3	N/A	R+45 (Port 7)
	EAC4		R-45 (Port 8)
2500MHz	1	N/A	RB -45
	2		CR6 -45
	3	CL4 -45	N/A
	4	L2 -45	
	5	N/A	R7 +45
	6		CR5 +45
	7	CL3 +45	N/A
	8	L1 +45	

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

Future



CPRI Block Connections for Sprint Scenario 4



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

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

Sprint
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STATE OF CONNECTICUT
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LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

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SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	11/20/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC056
SITE NAME:
SBA GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
PLUMBING DIAGRAM AND RAN WIRING

SHEET NUMBER
RF-2