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

March 20, 2018

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

Notice of Exempt Modification
1 Westerberg Drive, Farmington, CT
41 43 49.8 N
-72 50 7.8 W
Sprint #: CT33XC579

Dear Ms. Bachman:

Sprint currently maintains antennas at the 150-foot level of the existing 155-foot Monopole Tower at 1 Westerberg Drive in Farmington, CT. The tower is owned by SBA 2012 TC Assets, LLC. The property is owned by the Town of Farmington. Sprint now intends to replace (3) existing cell antennas with (3) newer technology cell antennas at the 150-foot level of the tower. The proposed full scope of work is as follows:

Remove: N/A

Remove and Replace:

- Remove (3) RFS - APXVSPP18-C-A20 – Panel Antennas and replace with (3) Commscope DHHTT65B-3XR – Panel Antennas

Install:

- (3) RFS KIT-FD9R6004/1C-DL – Diplexers
- (3) CCI DPO-7126Y-0-T1 – Diplexers
- (3) 3/8" RET lines

At ground level (no change to existing compound size or area – all work within leased area of compound):

- (3) 2.5 GHz RRHs mounted on H-Frame
- (3) 800 MHz RRHs mounted on H-Frame

Existing Equipment to Remain (Including entitlements):

- (4) RFS - ACU-A20-N – RETs
- (1) Concealed 27" Canister
- (12) 1-5/8" lines

This facility was originally approved by the Council on June 9th, 2004 under Docket 282. The tower was:

- to be designed as a flagpole
- to be constructed no taller than 156 feet above ground level
- to provide the proposed telecommunications services to both public and private entities
- to include a D&M plan
- to have RF updates when changes warranted
- to allow public/private shared space for fair consideration
- to provide space for municipal use for no compensation
- to have obsolete antennas removed within 60 days

This modification complies with all 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 Town of Farmington's Council Chair, Nancy Nickerson, as elected official, Town Manager, Kathleen A. Eagen as representative for the Town as landowner, and Zoning Enforcement Officer, Bruce Cyr. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

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

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

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

Sincerely,

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

Attachments

cc: Nancy Nickerson, Council Chair / with attachments
Town of Farmington, 45 Farmington Ridge Drive, Farmington, CT 06032
Kathleen A. Eagen, Town Manager / with attachments
Town of Farmington, Town Manager's Office, 1 Monteith Drive, Farmington, CT 06032
Bruce Cyr, Zoning Enforcement Officer / with attachments
Town of Farmington, Office of Planning & Zoning, 1 Monteith Drive, Farmington, CT 06032

POWER DENSITY

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR
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):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 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%	**2.21 %**	Antenna B1 MPE%	**2.21 %**	Antenna C1 MPE%	**2.21 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.21 %**
Nextel	0.59 %
T-Mobile	0.29 %
AT&T	3.24 %
Verizon Wireless	1.11 %
Site Total MPE %:	**7.44 %**

SPRINT Sector A Total:	2.21 %
SPRINT Sector B Total:	2.21 %
SPRINT Sector C Total:	2.21 %
Site Total:	7.44 %

SPRINT _ Frequency Band / Technology Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	432.54	150	0.75	850 MHz	567	0.13%
Sprint 850 MHz LTE	2	432.54	150	1.50	850 MHz	567	0.26%
Sprint 1900 MHz (PCS) CDMA	5	535.94	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 1900 MHz (PCS) LTE	2	1,339.86	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 2500 MHz (BRS) LTE	8	639.78	150	8.87	2500 MHz (BRS)	1000	0.89%
						Total*:	**2.21%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

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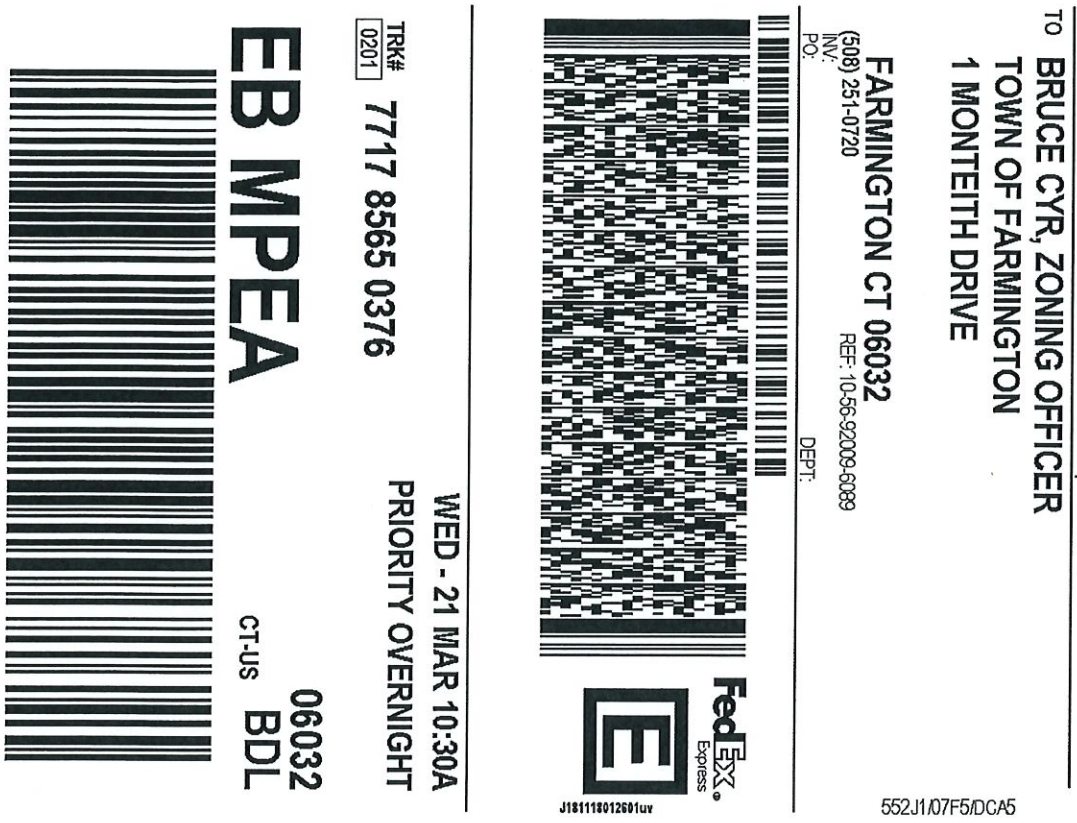

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The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2012.

Information on the Property Records for the Municipality of Farmington was last updated on 3/15/2018.

Property Summary Information

Parcel Data And Values | Building | Outbuildings | Sales | Google Map

Parcel Information

Location:	1 WESTERBERG DR	Property Use:	Special Purpose	Primary Use:	Sewage Treatment Plant
Unique ID:	21350001	Map Block Lot:	0078 38	Acres:	28.00
490 Acres:	0.00	Zone:	CR	Volume / Page:	0148/0503
Developers Map / Lot:		Census:	4602-01		

Value Information

	Appraised Value	Assessed Value
Land	4,200,000	2,940,000
Buildings	27,707,914	19,395,540
Detached Outbuildings	0	0
Total	31,907,914	22,335,540

Owner's Information

Owner's Data
FARMINGTON TOWN OF TREATMENT PLANT 00000

Back To Search (JavaScript:window.history.back(1);)

Print View (PrintPage.aspx?towncode=052&uniqueid=21350001)

Information Published With Permission From The Assessor

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: CT33XC579

Water Treatment Plant
1 Westerberg Drive
Farmington, CT 06032

March 3, 2018

EBI Project Number: 6218001767

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**7.44 %**

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

EBI Consulting
environmental | engineering | due diligence

March 3, 2018

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

Emissions Analysis for Site: **CT33XC579 – Water Treatment Plant**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1 Westerberg Drive, Farmington, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1 Westerberg Drive, Farmington, 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 **Commscope DT465B-2XR** 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 **150 feet** above ground level (AGL) for **Sector A**, **150 feet** above ground level (AGL) for **Sector B** and **150 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR
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):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 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%	**2.21 %**	Antenna B1 MPE%	**2.21 %**	Antenna C1 MPE%	**2.21 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.21 %**
Nextel	0.59 %
T-Mobile	0.29 %
AT&T	3.24 %
Verizon Wireless	1.11 %
Site Total MPE %:	**7.44 %**

SPRINT Sector A Total:	2.21 %
SPRINT Sector B Total:	2.21 %
SPRINT Sector C Total:	2.21 %
Site Total:	7.44 %

SPRINT _ Frequency Band / Technology Power Values (Per Sector)	**# Channels**	**Watts ERP (Per Channel)**	**Height (feet)**	**Total Power Density ($\mu W/cm^2$)**	**Frequency (MHz)**	**Allowable MPE ($\mu W/cm^2$)**	**Calculated % MPE**
Sprint 850 MHz CDMA	1	432.54	150	0.75	850 MHz	567	0.13%
Sprint 850 MHz LTE	2	432.54	150	1.50	850 MHz	567	0.26%
Sprint 1900 MHz (PCS) CDMA	5	535.94	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 1900 MHz (PCS) LTE	2	1,339.86	150	4.65	1900 MHz (PCS)	1000	0.46%
Sprint 2500 MHz (BRS) LTE	8	639.78	150	8.87	2500 MHz (BRS)	1000	0.89%
						Total*:	**2.21%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	2.21 %
Sector B:	2.21 %
Sector C:	2.21 %
SPRINT Maximum Total (per sector):	2.21 %
Site Total:	7.44 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.44 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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

Structural Analysis Report

Existing 155 ft SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46141-A

Customer Site Name: Water Treatment Plant 2, CT

Carrier Name: Sprint Nextel

Carrier Site ID / Name: CT33XC579 / Water Treatment Plant

Site Location: 1 Westerberg Drive

FARMINGTON, Connecticut

HARTFORD County

Latitude: 41.730499

Longitude: -72.835500

2/16/18

Analysis Result:

Max Structural Usage: 78.5% [Pass]

Max Foundation Usage: 33.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: n/a

Report Prepared By: Mariana Franco

Introduction

The purpose of this report is to summarize the analysis results on the 155 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 #05-07054 Rev B dated 9/2/04 Canister Drawing prepared by Stealth, Title #CUST-CELL-4C-80-40 Rev A dated 9/23/04
Foundation Drawing	Foundation Drawing prepared by Sabre, Job #05-07054 Rev B dated 9/2/04
Geotechnical Report	Geotechnical Report prepared by Clarence Welti Assoc, dated 6/18/04
Modification Drawings	Modification Drawing prepared by Stealth, Job #AT12-00957W-05R1 dated 9/18/12

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 1" 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 = 0.183g, S_1 = 0.064g

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

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
-	150.0	3	RFS - APXVSPP18-C-A20 - Panel	Concealed (27" Canister)	(12) 1 5/8"	Sprint
-		4	RFS - ACU-A20-N - RET			
5	139.0	3	CCI - TPA-65R-LCUUUU-H8 - Panel	Concealed (36" Canister)	(6) 1 5/8"	AT&T
6		6	CCI - DTMABP0723VG12A - TMA/TTA			
7		6	Kaelus - DBC0062F3V52-1 - Diplexer			
8	129.0	3	RFS - APX18-206517S-C-A20 - Panel	Concealed (29" Canister)	(6) 1 5/8"	T-Mobile
9	127.0	6	RFS - CBC721-DF - Diplexers	Concealed (30" Canister)	(12) 1 5/8"	Verizon
10	122.0	3	Commscope - SBNHH-1D6565A - Panel			

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	150.0	3	Commscope DHHTT65B-3XR - Panel	Concealed (27" Canister)	(12) 1 5/8" (3) 3/8" RET Line	Sprint Nextel
2		3	RFS KIT-FD9R6004/1C-DL - Diplexers			
3		3	CCI DPO-7126Y-0-T1 - Diplexers			
4		4	RFS ACU-A20-N - RETs			

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	Flange
Max. Usage:	**78.5%**	**67.9%**	**60.5%**	**66.1%**
Pass/Fail	**Pass**	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)
Original Design Reactions	1230.0	13.2
Analysis Reactions	1395.5	16.3
Factored Reactions*	1660.5	17.8
% of Design Reactions	84.0%	91.3%

* 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):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 2.2194 degrees under the operational wind speed as specified in the Analysis Criteria.

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.

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.

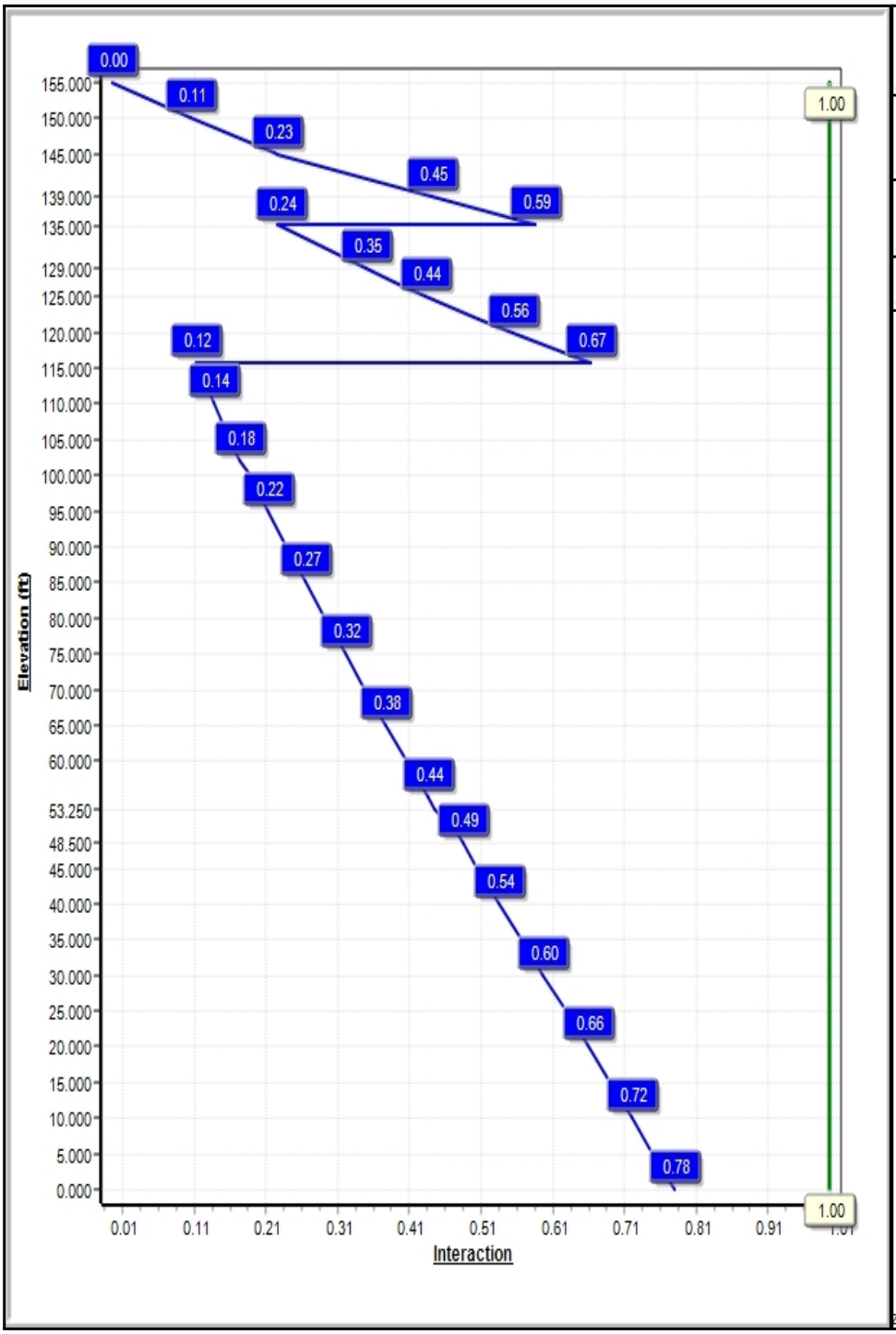
Usage Diagram - Max Ratio 78.46% at 0.0ft

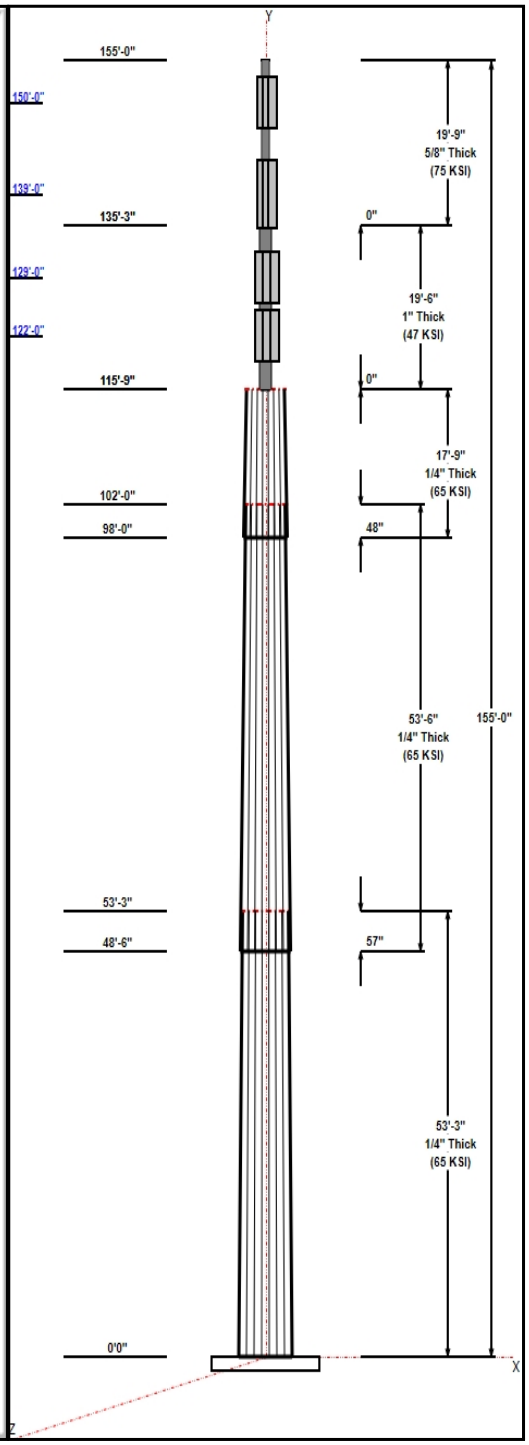
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C	
Height:	155.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

Tower Engineering Solutions

Dead Load Factor:	1.20	**Iterations:**	31
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 97 mph Wind





Structure: CT46141-A-SBA

Type: Custom
Site Name: Water Treatment Plant 2, CT
Height: 155.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 16 Sided
Taper: 0.00000

2/16/2018

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	36.92	43.67	0.250		0.12674	65
2	53.50	31.24	38.02	0.250	Slip	0.12674	65
3	17.75	30.00	32.25	0.250	Slip	0.12674	65
4	19.50	8.00	8.00	1.000	Butt	0.00000	47
5	19.75	5.00	5.00	0.625	Butt	0.00000	75

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
155.00	155.00	1	27" Canister	
155.00	155.00	1	Flag (20'x30')	
155.00	155.00	1	Truck Ball	
150.00	150.00	3	Commscope	Sprint Nextel
150.00	150.00	3	RFS	Sprint Nextel
150.00	150.00	3	CCI DPO-7126Y-0-T1	Sprint Nextel
150.00	150.00	4	RFS ACU-A20-N	Sprint Nextel
145.12	145.12	1	27" Canister & 36"	
139.00	139.00	3	TPA-65R-LCUUUU-H8	AT&T
139.00	139.00	6	DTMABP0723VG12A	AT&T
139.00	139.00	6	DBC0062F3V52-1	AT&T
135.25	135.25	1	36" Canister & 29"	
129.00	129.00	3	APX18-206517S-C-A20	T-Mobile
127.00	127.00	6	CBC721-DF	Verizon
125.50	125.50	1	29" Canister & 30"	
122.00	122.00	3	SBNHH-1D6565A	Verizon
115.75	115.75	1	30" Canister	

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	150.00	Inside	1 5/8" Coax	Sprint Nextel
0.00	150.00	Inside	3/8" RET	Sprint Nextel
0.00	139.00	Inside	1 5/8" Coax	AT&T
0.00	129.00	Inside	1 5/8" Coax	T-Mobile
0.00	122.00	Inside	1 5/8" Coax	Verizon

Anchor Bolts

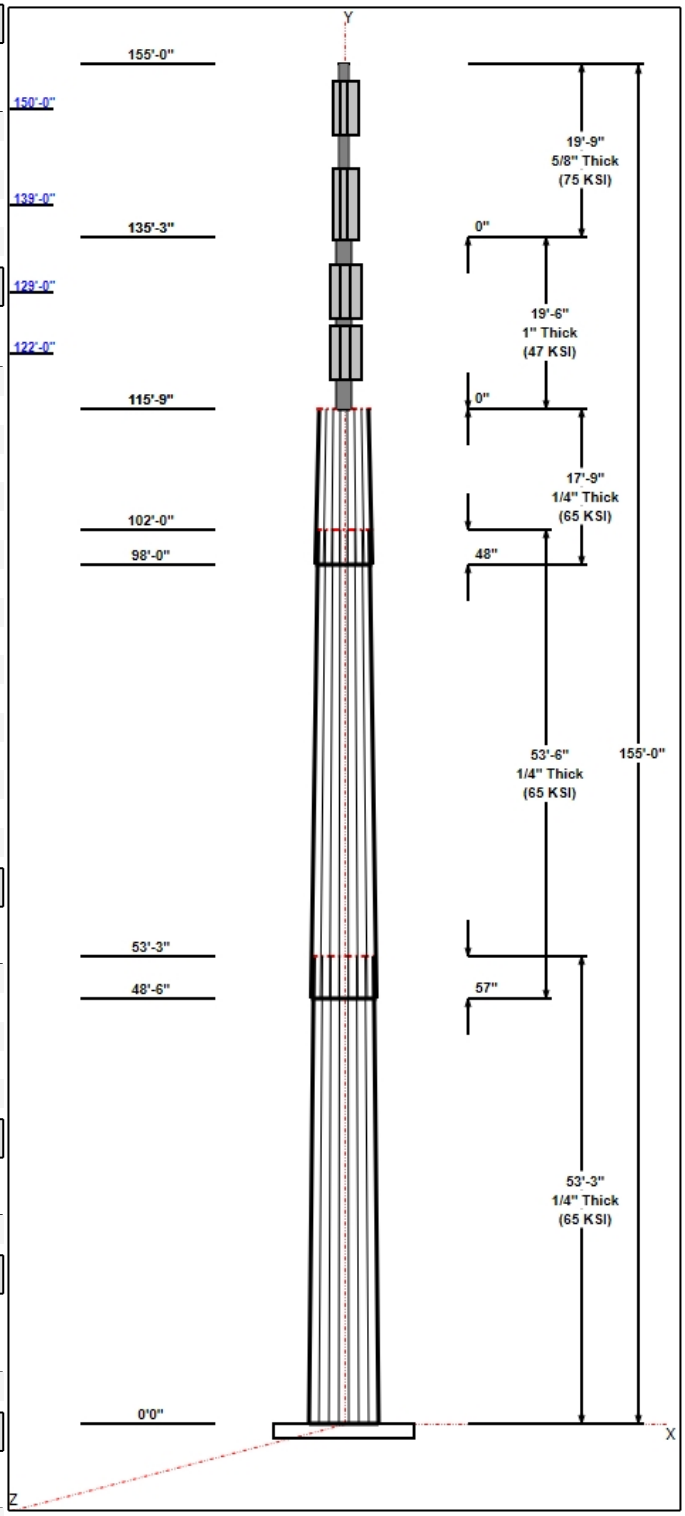
Qty	Specifications	Grade (ksi)	Arrangement
8	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.2500	47.0	60.0	Clipped

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	1395.5	16.3	25.0
0.9D + 1.6W 97 mph Wind	1378.9	16.3	18.7
1.2D + 1.0Di + 1.0Wi 50 mph Wind	490.2	5.3	40.5
1.2D + 1.0E	37.6	0.4	25.0
0.9D + 1.0E	37.1	0.4	18.8



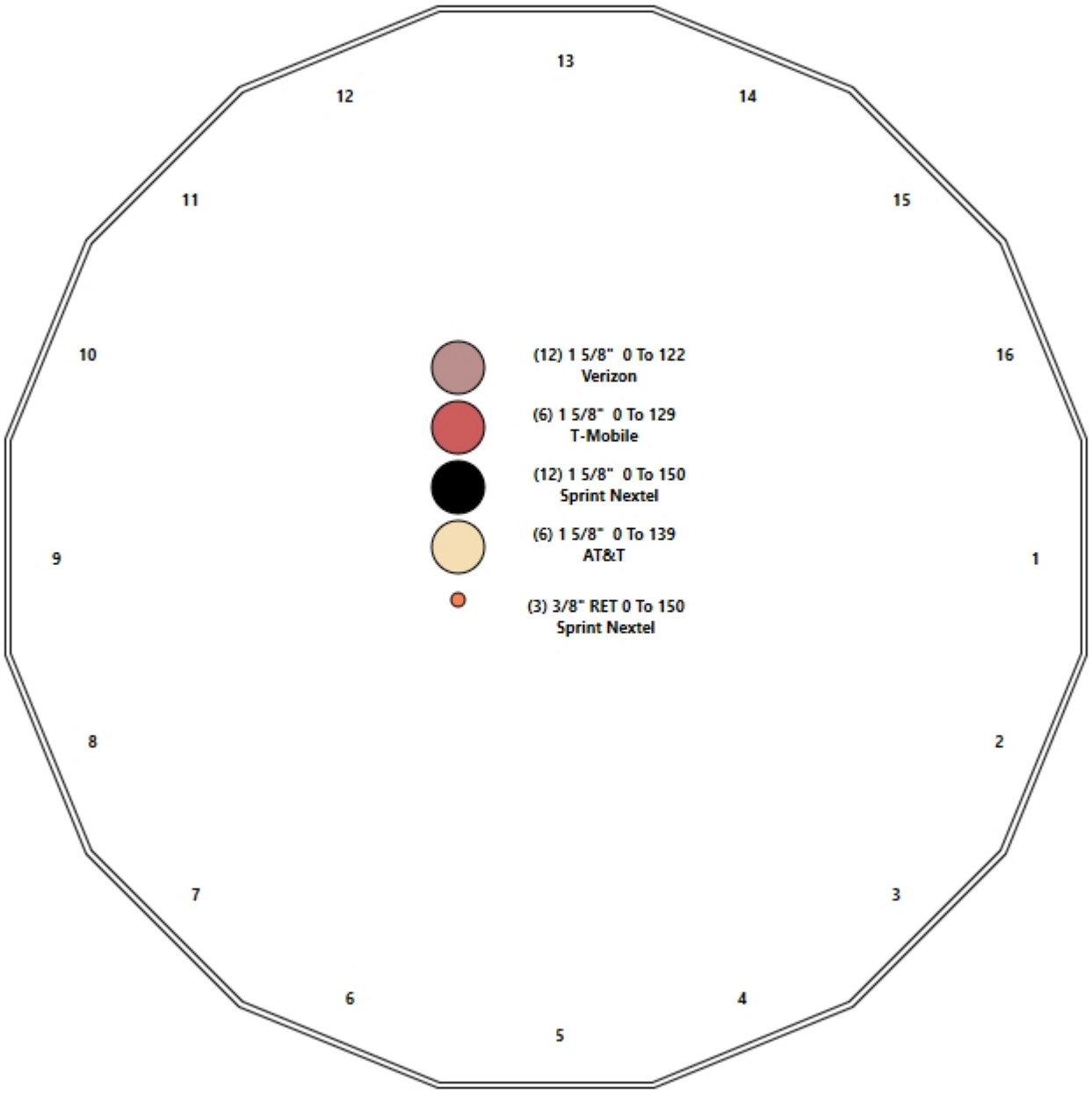
1.0D + 1.0W 60 mph Wind	343.0	4.0	20.8

Structure: CT46141-A-SBA - Coax Line Placement

Type: Stealth
Site Name: Water Treatment Plant 2, CT
Height: 155.00 (ft)

2/16/2018

Tower Engineering Solutions



Shaft Properties

Structure:	CT46141-A-SBA		**Code:**	EIA/TIA-222-G	2/16/2018
Site Name:	Water Treatment Plant 2, CT		**Exposure:**	C	
Height:	155.00 (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	16	53.250	0.2500	65		0.00	5,787
2	16	53.500	0.2500	65	Slip	57.00	4,992
3	16	17.750	0.2500	65	Slip	48.00	1,487
4	R	19.500	1.0000	47	Flange	0.00	1,459
5	R	19.750	0.6250	75	Flange	0.00	577
					Total Shaft Weight:		**14,302**

	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	43.67	0.00	34.63	8247.35	33.15	174.68	36.92	53.25	29.25	4968.43	27.79	147.6	0.126739
2	38.02	48.50	30.12	5429.95	28.66	152.09	31.24	102.00	24.72	2999.31	23.27	124.9	0.126739
3	32.25	98.00	25.52	3301.26	24.07	129.00	30.00	115.75	23.73	2652.81	22.28	120.0	0.126739
4	8.00	115.7	21.99	134.80	0.00	8.00	8.00	135.25	21.99	134.80	0.00	8.00	0.000000
5	5.00	135.2	8.59	20.57	0.00	8.00	5.00	155.00	8.59	20.57	0.00	8.00	0.000000

Load Summary

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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 Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	155.00	27" Canister	1	50.00	5.07	1.00	54.67	5.543	1.00	0.00	0.00
2	155.00	Flag (20'x30')	1	200.00	14.56	1.00	218.68	15.920	1.00	0.00	0.00
3	155.00	Truck Ball	1	50.00	3.77	1.00	54.67	4.122	1.00	0.00	0.00
4	150.00	Commscope DHHTT65B-3XR	3	45.40	0.00	1.00	49.63	0.000	1.00	0.00	0.00
5	150.00	RFS KIT-FD9R6004/1C-DL	3	6.50	0.00	1.00	22.73	0.000	1.00	0.00	0.00
6	150.00	CCI DPO-7126Y-0-T1	3	7.30	0.00	1.00	7.98	0.000	1.00	0.00	0.00
7	150.00	RFS ACU-A20-N	4	1.00	0.00	1.00	6.73	0.000	1.00	0.00	0.00
8	145.12	27" Canister & 36" Canister	1	100.00	12.37	1.00	109.28	13.518	1.00	0.00	0.00
9	139.00	TPA-65R-LCUUUU-H8	3	75.00	0.00	1.00	509.48	15.522	1.00	0.00	0.00
10	139.00	DTMABP0723VG12A	6	19.20	0.00	1.00	52.97	0.000	1.00	0.00	0.00
11	139.00	DBC0062F3V52-1	6	6.60	0.00	1.00	24.71	0.000	1.00	0.00	0.00
12	135.25	36" Canister & 29" Canister	1	100.00	12.55	1.00	109.21	13.706	1.00	0.00	0.00
13	129.00	APX18-206517S-C-A20	3	24.20	0.00	1.00	144.92	0.000	1.00	0.00	0.00
14	127.00	CBC721-DF	6	4.40	0.00	1.00	16.92	0.000	1.00	0.00	0.00
15	125.50	29" Canister & 30" Canister	1	100.00	10.75	1.00	109.14	11.733	1.00	0.00	0.00
16	122.00	SBNHH-1D6565A	3	47.40	0.00	1.00	328.78	9.909	1.00	0.00	0.00
17	115.75	30" Canister	1	50.00	5.50	1.00	54.53	5.999	1.00	0.00	0.00
		Totals:	**47**	**1,452.60**			**4,495.24**				

Linear Appurtenances

Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Exposed Width**	**Exposed**
0.00	150.00	(12) 1 5/8" Coax	0.00	Inside
0.00	150.00	(3) 3/8" RET	0.00	Inside
0.00	139.00	(6) 1 5/8" Coax	0.00	Inside
0.00	129.00	(6) 1 5/8" Coax	0.00	Inside
0.00	122.00	(12) 1 5/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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	

Tower Engineering Solutions

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		0.2500	43.670	34.627	8247.4	33.15	174.68	65.1	370.5	0.0
5.00		0.2500	43.036	34.122	7891.5	32.65	172.15	65.6	359.7	584.8
10.00		0.2500	42.403	33.617	7546.0	32.15	169.61	66.2	349.1	576.3
15.00		0.2500	41.769	33.111	7210.8	31.64	167.08	66.8	338.6	567.7
20.00		0.2500	41.135	32.606	6885.6	31.14	164.54	67.3	328.3	559.1
25.00		0.2500	40.502	32.101	6570.4	30.63	162.01	67.9	318.2	550.5
30.00		0.2500	39.868	31.595	6264.9	30.13	159.47	68.5	308.2	541.9
35.00		0.2500	39.234	31.090	5969.1	29.63	156.94	69.1	298.4	533.3
40.00		0.2500	38.600	30.584	5682.7	29.12	154.40	69.6	288.8	524.7
45.00		0.2500	37.967	30.079	5405.7	28.62	151.87	70.2	279.3	516.1
48.50	Bot - Section 2	0.2500	37.523	29.725	5217.2	28.26	150.09	70.6	272.7	356.1
50.00		0.2500	37.333	29.574	5137.7	28.11	149.33	70.8	269.9	304.7
53.25	Top - Section 1	0.2500	37.421	29.644	5174.4	28.18	149.68	0.0	0.0	654.9
55.00		0.2500	37.199	29.467	5082.4	28.01	148.80	70.9	268.0	176.0
60.00		0.2500	36.566	28.962	4825.3	27.50	146.26	71.5	258.9	497.1
65.00		0.2500	35.932	28.456	4577.1	27.00	143.73	72.0	249.9	488.5
70.00		0.2500	35.298	27.951	4337.6	26.49	141.19	72.6	241.0	479.9
75.00		0.2500	34.665	27.446	4106.5	25.99	138.66	73.2	232.4	471.3
80.00		0.2500	34.031	26.940	3883.8	25.49	136.12	73.7	223.9	462.7
85.00		0.2500	33.397	26.435	3669.3	24.98	133.59	74.3	215.5	454.1
90.00		0.2500	32.764	25.930	3462.9	24.48	131.05	74.9	207.3	445.5
95.00		0.2500	32.130	25.424	3264.3	23.97	128.52	75.4	199.3	436.9
98.00	Bot - Section 3	0.2500	31.750	25.121	3148.9	23.67	127.00	75.8	194.5	258.0
100.00		0.2500	31.496	24.919	3073.5	23.47	125.98	76.0	191.4	343.3
102.00	Top - Section 2	0.2500	31.743	25.115	3146.8	23.66	126.97	0.0	0.0	340.5
105.00		0.2500	31.362	24.812	3034.2	23.36	125.45	76.1	189.8	254.8
110.00		0.2500	30.729	24.307	2852.6	22.86	122.91	76.7	182.1	417.9
115.00		0.2500	30.095	23.801	2678.3	22.35	120.38	77.3	174.6	409.3
115.75	Top - Section 3	0.2500	30.000	23.726	2652.8	22.28	120.00	77.4	173.5	60.6
115.75	Bot - Section 4	1.0000	8.000	21.991	134.8	5.57	30.00	47.0	33.7	
120.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	318.0
122.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
125.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	224.5
125.50		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	37.4
127.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	112.2
129.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	149.7
130.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	74.8
135.00		1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	374.2
135.25	Top - Section 4	1.0000	8.000	21.991	134.8	0.00	8.00	47.0	33.7	18.7
135.25	Bot - Section 5	0.6250	5.000	8.590	20.6	0.00	12.80	75.0	8.2	
139.00		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	109.6
140.00		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	29.2
145.00		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	146.2
145.12		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	3.5
150.00		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	142.6
155.00		0.6250	5.000	8.590	20.6	0.00	8.00	75.0	8.2	146.2
										14302.3

Wind Loading - Shaft

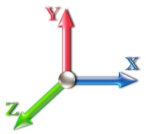
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 31

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	331.83	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	327.01	0.750	0.000	5.00	18.418	13.81	472.9	0.0	701.8
10.00		1.00	0.85	19.450	21.40	322.19	0.750	0.000	5.00	18.148	13.61	466.0	0.0	691.5
15.00		1.00	0.85	19.450	21.40	317.38	0.750	0.000	5.00	17.879	13.41	459.0	0.0	681.2
20.00		1.00	0.90	20.638	22.70	321.96	0.750	0.000	5.00	17.610	13.21	479.7	0.0	670.9
25.00		1.00	0.95	21.630	23.79	324.54	0.750	0.000	5.00	17.341	13.01	495.1	0.0	660.5
30.00		1.00	0.98	22.477	24.72	325.65	0.750	0.000	5.00	17.072	12.80	506.5	0.0	650.2
35.00		1.00	1.01	23.218	25.54	325.72	0.750	0.000	5.00	16.802	12.60	515.0	0.0	639.9
40.00		1.00	1.04	23.880	26.27	324.99	0.750	0.000	5.00	16.533	12.40	521.2	0.0	629.6
45.00		1.00	1.07	24.479	26.93	323.64	0.750	0.000	5.00	16.264	12.20	525.5	0.0	619.3
48.50	Bot - Section 2	1.00	1.09	24.869	27.36	322.39	0.750	0.000	3.50	11.225	8.42	368.5	0.0	427.4
50.00		1.00	1.09	25.029	27.53	321.79	0.750	0.000	1.50	4.834	3.63	159.7	0.0	365.6
53.25	Top - Section 1	1.00	1.11	25.363	27.90	320.36	0.750	0.000	3.25	10.390	7.79	347.9	0.0	785.9
55.00		1.00	1.12	25.536	28.09	323.87	0.750	0.000	1.75	5.548	4.16	187.0	0.0	211.2
60.00		1.00	1.14	26.008	28.61	321.28	0.750	0.000	5.00	15.669	11.75	537.9	0.0	596.5
65.00		1.00	1.16	26.450	29.09	318.39	0.750	0.000	5.00	15.400	11.55	537.7	0.0	586.1
70.00		1.00	1.17	26.866	29.55	315.22	0.750	0.000	5.00	15.130	11.35	536.6	0.0	575.8
75.00		1.00	1.19	27.259	29.98	311.82	0.750	0.000	5.00	14.861	11.15	534.7	0.0	565.5
80.00		1.00	1.21	27.632	30.39	308.21	0.750	0.000	5.00	14.592	10.94	532.2	0.0	555.2
85.00		1.00	1.22	27.987	30.79	304.40	0.750	0.000	5.00	14.323	10.74	529.1	0.0	544.9
90.00		1.00	1.24	28.325	31.16	300.43	0.750	0.000	5.00	14.054	10.54	525.5	0.0	534.6
95.00		1.00	1.25	28.650	31.51	296.30	0.750	0.000	5.00	13.784	10.34	521.3	0.0	524.2
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	293.75	0.750	0.000	3.00	8.141	6.11	309.9	0.0	309.6
100.00		1.00	1.27	28.961	31.86	292.03	0.750	0.000	2.00	5.459	4.09	208.7	0.0	411.9
102.00	Top - Section 2	1.00	1.27	29.082	31.99	290.28	0.750	0.000	2.00	5.416	4.06	207.9	0.0	408.6
105.00		1.00	1.28	29.260	32.19	292.29	0.750	0.000	3.00	8.043	6.03	310.6	0.0	305.8
110.00		1.00	1.29	29.548	32.50	287.79	0.750	0.000	5.00	13.189	9.89	514.4	0.0	501.4
115.00		1.00	1.30	29.826	32.81	283.17	0.750	0.000	5.00	12.920	9.69	508.7	0.0	491.1
115.75	Top - Section 3	1.00	1.31	29.866	32.85	282.47	0.750	0.000	0.75	1.915	1.44	75.5	0.0	72.8
120.00		1.00	1.32	30.094	33.10	74.16	0.600	0.000	4.25	2.833	1.70	90.0	0.0	381.6
122.00	Appurtenance(s)	1.00	1.32	30.199	33.22	74.29	0.600	0.000	2.00	1.333	0.80	42.5	0.0	179.6
125.00		1.00	1.33	30.354	33.39	74.48	0.600	0.000	3.00	2.000	1.20	64.1	0.0	269.4
125.50	Appurtenance(s)	1.00	1.33	30.379	33.42	74.51	0.600	0.000	0.50	0.333	0.20	10.7	0.0	44.9
127.00	Appurtenance(s)	1.00	1.33	30.455	33.50	74.60	0.600	0.000	1.50	1.000	0.60	32.2	0.0	134.7
129.00	Appurtenance(s)	1.00	1.34	30.556	33.61	74.73	0.600	0.000	2.00	1.333	0.80	43.0	0.0	179.6
130.00		1.00	1.34	30.605	33.67	74.79	0.600	0.000	1.00	0.667	0.40	21.5	0.0	89.8
135.00		1.00	1.35	30.850	33.93	75.08	0.600	0.000	5.00	3.333	2.00	108.6	0.0	449.0
135.25	Top - Section 4	1.00	1.35	30.862	33.95	75.10	0.600	0.000	0.25	0.167	0.10	5.4	0.0	22.4
139.00	Appurtenance(s)	1.00	1.36	31.040	34.14	47.07	0.816	0.000	3.75	1.563	1.27	69.6	0.0	131.5
140.00		1.00	1.36	31.087	34.20	47.11	0.815	0.000	1.00	0.417	0.34	18.6	0.0	35.1
145.00		1.00	1.37	31.317	34.45	47.28	0.812	0.000	5.00	2.083	1.69	93.3	0.0	175.4
145.12	Appurtenance(s)	1.00	1.37	31.323	34.45	47.29	0.812	0.000	0.12	0.050	0.04	2.2	0.0	4.2
150.00	Appurtenance(s)	1.00	1.38	31.541	34.70	47.45	0.809	0.000	4.88	2.033	1.65	91.3	0.0	171.2
155.00	Appurtenance(s)	1.00	1.39	31.760	34.94	47.62	0.806	0.000	5.00	2.083	1.68	93.9	0.0	175.4
								Totals:	**155.00**			**12,681.6**		**17,162.8**

Discrete Appurtenance Forces

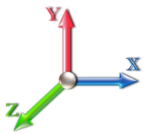
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 31

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	155.00	Truck Ball	1	31.760	34.936	1.00	1.00	3.77	60.00	0.000	0.000	210.73	0.00	0.00
2	155.00	Flag (20'x30')	1	31.760	34.936	1.00	1.00	14.56	240.00	0.000	0.000	813.87	0.00	0.00
3	155.00	27" Canister	1	31.760	34.936	1.00	1.00	5.07	60.00	0.000	0.000	283.40	0.00	0.00
4	150.00	RFS ACU-A20-N	4	31.541	34.696	1.00	1.00	0.00	4.80	0.000	0.000	0.00	0.00	0.00
5	150.00	CCI DPO-7126Y-0-T1	3	31.541	34.696	1.00	1.00	0.00	26.28	0.000	0.000	0.00	0.00	0.00
6	150.00	RFS	3	31.541	34.696	1.00	1.00	0.00	23.40	0.000	0.000	0.00	0.00	0.00
7	150.00	Commscope	3	31.541	34.696	1.00	1.00	0.00	163.44	0.000	0.000	0.00	0.00	0.00
8	145.12	27" Canister & 36"	1	31.323	34.455	1.00	1.00	12.37	120.00	0.000	0.000	681.93	0.00	0.00
9	139.00	DBC0062F3V52-1	6	31.040	34.144	1.00	1.00	0.00	47.52	0.000	0.000	0.00	0.00	0.00
10	139.00	DTMABP0723VG12A	6	31.040	34.144	1.00	1.00	0.00	138.24	0.000	0.000	0.00	0.00	0.00
11	139.00	TPA-65R-LCUUUU-H8	3	31.040	34.144	1.00	1.00	0.00	270.00	0.000	0.000	0.00	0.00	0.00
12	135.25	36" Canister & 29"	1	30.862	33.948	1.00	1.00	12.55	120.00	0.000	0.000	681.67	0.00	0.00
13	129.00	APX18-206517S-C-A20	3	30.556	33.611	1.00	1.00	0.00	87.12	0.000	0.000	0.00	0.00	0.00
14	127.00	CBC721-DF	6	30.455	33.501	1.00	1.00	0.00	31.68	0.000	0.000	0.00	0.00	0.00
15	125.50	29" Canister & 30"	1	30.379	33.417	1.00	1.00	10.75	120.00	0.000	0.000	574.78	0.00	0.00
16	122.00	SBNHH-1D6565A	3	30.199	33.219	1.00	1.00	0.00	170.64	0.000	0.000	0.00	0.00	0.00
17	115.75	30" Canister	1	29.866	32.853	1.00	1.00	5.50	60.00	0.000	0.000	289.11	0.00	0.00
							Totals:		**1,743.12**			**3,535.48**		

Total Applied Force Summary

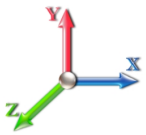
Structure:	CT46141-A-SBA		**Code:**	EIA/TIA-222-G	2/16/2018
Site Name:	Water Treatment Plant 2, CT		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 31

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		472.86	927.54	0.00	0.00
10.00		465.95	917.22	0.00	0.00
15.00		459.04	906.90	0.00	0.00
20.00		479.73	896.58	0.00	0.00
25.00		495.11	886.27	0.00	0.00
30.00		506.50	875.95	0.00	0.00
35.00		514.96	865.63	0.00	0.00
40.00		521.15	855.31	0.00	0.00
45.00		525.54	844.99	0.00	0.00
48.50		368.46	585.36	0.00	0.00
50.00		159.70	433.37	0.00	0.00
53.25		347.85	932.59	0.00	0.00
55.00		187.00	290.20	0.00	0.00
60.00		537.92	822.18	0.00	0.00
65.00		537.66	811.86	0.00	0.00
70.00		536.57	801.55	0.00	0.00
75.00		534.73	791.23	0.00	0.00
80.00		532.22	780.91	0.00	0.00
85.00		529.12	770.59	0.00	0.00
90.00		525.46	760.27	0.00	0.00
95.00		521.29	749.96	0.00	0.00
98.00		309.91	445.02	0.00	0.00
100.00		208.68	502.20	0.00	0.00
102.00		207.89	498.90	0.00	0.00
105.00		310.63	441.24	0.00	0.00
110.00		514.41	727.14	0.00	0.00
115.00		508.65	716.82	0.00	0.00
115.75	(1) attachments	364.59	166.63	0.00	0.00
120.00		90.04	573.50	0.00	0.00
122.00	(3) attachments	42.52	440.52	0.00	0.00
125.00		64.11	359.90	0.00	0.00
125.50	(1) attachments	585.47	179.98	0.00	0.00
127.00	(6) attachments	32.16	211.63	0.00	0.00
129.00	(3) attachments	43.02	327.05	0.00	0.00
130.00		21.55	112.48	0.00	0.00
135.00		108.59	562.39	0.00	0.00
135.25	(1) attachments	687.10	148.12	0.00	0.00
139.00	(15) attachments	69.63	672.35	0.00	0.00
140.00		18.58	50.27	0.00	0.00
145.00		93.26	251.35	0.00	0.00
145.12	(1) attachments	684.17	126.03	0.00	0.00
150.00	(13) attachments	91.35	463.23	0.00	0.00
155.00	(3) attachments	1401.92	535.39	0.00	0.00
	Totals:	**16,217.04**	**25,018.59**	**0.00**	**0.00**

Calculated Forces

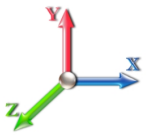
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 31

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	-24.98	-16.27	0.00	-1395.4	0.00	1395.46	2027.49	1013.74	3641.02	1807.56	0.00	0.000	0.000	0.785
5.00	-23.99	-15.89	0.00	-1314.1	0.00	1314.12	2015.42	1007.71	3566.22	1770.42	0.13	-0.234	0.000	0.754
10.00	-23.02	-15.51	0.00	-1234.6	0.00	1234.66	2002.83	1001.41	3491.15	1733.15	0.49	-0.463	0.000	0.724
15.00	-22.06	-15.13	0.00	-1157.1	0.00	1157.11	1989.72	994.86	3415.85	1695.77	1.10	-0.689	0.000	0.694
20.00	-21.11	-14.72	0.00	-1081.4	0.00	1081.47	1976.09	988.05	3340.37	1658.30	1.94	-0.910	0.000	0.663
25.00	-20.18	-14.28	0.00	-1007.8	0.00	1007.88	1961.94	980.97	3264.74	1620.75	3.01	-1.125	0.000	0.632
30.00	-19.27	-13.83	0.00	-936.48	0.00	936.48	1947.28	973.64	3189.01	1583.16	4.30	-1.336	0.000	0.602
35.00	-18.37	-13.35	0.00	-867.35	0.00	867.35	1932.09	966.05	3113.21	1545.53	5.81	-1.541	0.000	0.571
40.00	-17.48	-12.87	0.00	-800.57	0.00	800.57	1916.39	958.20	3037.39	1507.89	7.53	-1.739	0.000	0.540
45.00	-16.62	-12.36	0.00	-736.23	0.00	736.23	1900.17	950.08	2961.59	1470.26	9.46	-1.932	0.000	0.510
48.50	-16.03	-12.00	0.00	-692.96	0.00	692.96	1888.50	944.25	2908.57	1443.94	10.92	-2.063	0.000	0.489
50.00	-15.58	-11.85	0.00	-674.96	0.00	674.96	1883.43	941.71	2885.86	1432.66	11.58	-2.119	0.000	0.480
53.25	-14.65	-11.49	0.00	-636.45	0.00	636.45	1885.78	942.89	2896.38	1437.89	13.06	-2.237	0.000	0.451
55.00	-14.34	-11.32	0.00	-616.35	0.00	616.35	1879.83	939.91	2869.89	1424.73	13.89	-2.300	0.000	0.440
60.00	-13.51	-10.79	0.00	-559.75	0.00	559.75	1862.46	931.23	2794.28	1387.20	16.39	-2.465	0.000	0.411
65.00	-12.70	-10.25	0.00	-505.82	0.00	505.82	1844.57	922.28	2718.82	1349.74	19.06	-2.622	0.000	0.382
70.00	-11.90	-9.70	0.00	-454.59	0.00	454.59	1826.16	913.08	2643.55	1312.37	21.88	-2.771	0.000	0.353
75.00	-11.11	-9.16	0.00	-406.08	0.00	406.08	1807.23	903.62	2568.52	1275.12	24.86	-2.912	0.000	0.325
80.00	-10.34	-8.61	0.00	-360.30	0.00	360.30	1787.79	893.89	2493.75	1238.00	27.98	-3.045	0.000	0.297
85.00	-9.58	-8.06	0.00	-317.26	0.00	317.26	1767.82	883.91	2419.31	1201.05	31.23	-3.169	0.000	0.270
90.00	-8.84	-7.51	0.00	-276.98	0.00	276.98	1747.34	873.67	2345.22	1164.27	34.61	-3.284	0.000	0.243
95.00	-8.11	-6.95	0.00	-239.44	0.00	239.44	1726.34	863.17	2271.53	1127.68	38.11	-3.390	0.000	0.217
98.00	-7.68	-6.62	0.00	-218.58	0.00	218.58	1713.49	856.74	2227.52	1105.83	40.26	-3.450	0.000	0.202
100.00	-7.19	-6.39	0.00	-205.33	0.00	205.33	1704.82	852.41	2198.27	1091.31	41.71	-3.488	0.000	0.192
102.00	-6.70	-6.16	0.00	-192.55	0.00	192.55	1713.25	856.63	2226.72	1105.44	43.18	-3.525	0.000	0.178
105.00	-6.27	-5.83	0.00	-174.08	0.00	174.08	1700.21	850.10	2182.88	1083.67	45.41	-3.577	0.000	0.164
110.00	-5.57	-5.28	0.00	-144.94	0.00	144.94	1678.06	839.03	2110.21	1047.60	49.20	-3.652	0.000	0.142
115.00	-4.88	-4.72	0.00	-118.56	0.00	118.56	1655.39	827.70	2038.07	1011.78	53.05	-3.718	0.000	0.120
115.75	-4.74	-4.35	0.00	-115.02	0.00	115.02	1651.95	825.97	2027.30	1006.43	53.64	-3.727	0.000	0.117
115.75	-4.74	-4.35	0.00	-115.02	0.00	115.02	930.23	465.11	237.26	173.90	53.64	-3.727	0.000	0.667
120.00	-4.16	-4.24	0.00	-96.52	0.00	96.52	930.23	465.11	237.26	173.90	56.98	-3.775	0.000	0.560
122.00	-3.69	-4.20	0.00	-88.03	0.00	88.03	930.23	465.11	237.26	173.90	58.64	-4.165	0.000	0.510
125.00	-3.31	-4.12	0.00	-75.44	0.00	75.44	930.23	465.11	237.26	173.90	61.42	-4.683	0.000	0.437
125.50	-3.17	-3.53	0.00	-73.38	0.00	73.38	930.23	465.11	237.26	173.90	61.92	-4.761	0.000	0.425
127.00	-2.95	-3.50	0.00	-68.08	0.00	68.08	930.23	465.11	237.26	173.90	63.45	-4.985	0.000	0.395
129.00	-2.61	-3.43	0.00	-61.09	0.00	61.09	930.23	465.11	237.26	173.90	65.59	-5.258	0.000	0.354
130.00	-2.48	-3.42	0.00	-57.65	0.00	57.65	930.23	465.11	237.26	173.90	66.70	-5.383	0.000	0.334
135.00	-1.92	-3.26	0.00	-40.57	0.00	40.57	930.23	465.11	237.26	173.90	72.62	-5.901	0.000	0.235
135.25	-1.84	-2.57	0.00	-39.76	0.00	39.76	930.23	465.11	237.26	173.90	72.93	-5.922	0.000	0.231
135.25	-1.84	-2.57	0.00	-39.76	0.00	39.76	579.84	289.92	92.43	67.75	72.93	-5.922	0.000	0.590
139.00	-1.16	-2.43	0.00	-30.13	0.00	30.13	579.84	289.92	92.43	67.75	77.68	-6.199	0.000	0.447
140.00	-1.07	-2.43	0.00	-27.70	0.00	27.70	579.84	289.92	92.43	67.75	79.02	-6.599	0.000	0.411
145.00	-0.81	-2.31	0.00	-15.55	0.00	15.55	579.84	289.92	92.43	67.75	86.77	-8.094	0.000	0.231
145.12	-0.77	-1.63	0.00	-15.27	0.00	15.27	579.84	289.92	92.43	67.75	86.97	-8.120	0.000	0.227
150.00	-0.31	-1.47	0.00	-7.34	0.00	7.34	579.84	289.92	92.43	67.75	95.67	-8.883	0.000	0.109
155.00	0.00	-1.40	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75	105.11	-9.137	0.000	0.000

Wind Loading - Shaft

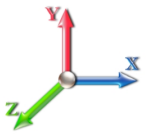
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 31

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	331.83	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	327.01	0.750	0.000	5.00	18.418	13.81	472.9	0.0	526.4
10.00		1.00	0.85	19.450	21.40	322.19	0.750	0.000	5.00	18.148	13.61	466.0	0.0	518.6
15.00		1.00	0.85	19.450	21.40	317.38	0.750	0.000	5.00	17.879	13.41	459.0	0.0	510.9
20.00		1.00	0.90	20.638	22.70	321.96	0.750	0.000	5.00	17.610	13.21	479.7	0.0	503.1
25.00		1.00	0.95	21.630	23.79	324.54	0.750	0.000	5.00	17.341	13.01	495.1	0.0	495.4
30.00		1.00	0.98	22.477	24.72	325.65	0.750	0.000	5.00	17.072	12.80	506.5	0.0	487.7
35.00		1.00	1.01	23.218	25.54	325.72	0.750	0.000	5.00	16.802	12.60	515.0	0.0	479.9
40.00		1.00	1.04	23.880	26.27	324.99	0.750	0.000	5.00	16.533	12.40	521.2	0.0	472.2
45.00		1.00	1.07	24.479	26.93	323.64	0.750	0.000	5.00	16.264	12.20	525.5	0.0	464.5
48.50	Bot - Section 2	1.00	1.09	24.869	27.36	322.39	0.750	0.000	3.50	11.225	8.42	368.5	0.0	320.5
50.00		1.00	1.09	25.029	27.53	321.79	0.750	0.000	1.50	4.834	3.63	159.7	0.0	274.2
53.25	Top - Section 1	1.00	1.11	25.363	27.90	320.36	0.750	0.000	3.25	10.390	7.79	347.9	0.0	589.4
55.00		1.00	1.12	25.536	28.09	323.87	0.750	0.000	1.75	5.548	4.16	187.0	0.0	158.4
60.00		1.00	1.14	26.008	28.61	321.28	0.750	0.000	5.00	15.669	11.75	537.9	0.0	447.3
65.00		1.00	1.16	26.450	29.09	318.39	0.750	0.000	5.00	15.400	11.55	537.7	0.0	439.6
70.00		1.00	1.17	26.866	29.55	315.22	0.750	0.000	5.00	15.130	11.35	536.6	0.0	431.9
75.00		1.00	1.19	27.259	29.98	311.82	0.750	0.000	5.00	14.861	11.15	534.7	0.0	424.1
80.00		1.00	1.21	27.632	30.39	308.21	0.750	0.000	5.00	14.592	10.94	532.2	0.0	416.4
85.00		1.00	1.22	27.987	30.79	304.40	0.750	0.000	5.00	14.323	10.74	529.1	0.0	408.7
90.00		1.00	1.24	28.325	31.16	300.43	0.750	0.000	5.00	14.054	10.54	525.5	0.0	400.9
95.00		1.00	1.25	28.650	31.51	296.30	0.750	0.000	5.00	13.784	10.34	521.3	0.0	393.2
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	293.75	0.750	0.000	3.00	8.141	6.11	309.9	0.0	232.2
100.00		1.00	1.27	28.961	31.86	292.03	0.750	0.000	2.00	5.459	4.09	208.7	0.0	308.9
102.00	Top - Section 2	1.00	1.27	29.082	31.99	290.28	0.750	0.000	2.00	5.416	4.06	207.9	0.0	306.5
105.00		1.00	1.28	29.260	32.19	292.29	0.750	0.000	3.00	8.043	6.03	310.6	0.0	229.4
110.00		1.00	1.29	29.548	32.50	287.79	0.750	0.000	5.00	13.189	9.89	514.4	0.0	376.1
115.00		1.00	1.30	29.826	32.81	283.17	0.750	0.000	5.00	12.920	9.69	508.7	0.0	368.3
115.75	Top - Section 3	1.00	1.31	29.866	32.85	282.47	0.750	0.000	0.75	1.915	1.44	75.5	0.0	54.6
120.00		1.00	1.32	30.094	33.10	74.16	0.600	0.000	4.25	2.833	1.70	90.0	0.0	286.2
122.00	Appurtenance(s)	1.00	1.32	30.199	33.22	74.29	0.600	0.000	2.00	1.333	0.80	42.5	0.0	134.7
125.00		1.00	1.33	30.354	33.39	74.48	0.600	0.000	3.00	2.000	1.20	64.1	0.0	202.0
125.50	Appurtenance(s)	1.00	1.33	30.379	33.42	74.51	0.600	0.000	0.50	0.333	0.20	10.7	0.0	33.7
127.00	Appurtenance(s)	1.00	1.33	30.455	33.50	74.60	0.600	0.000	1.50	1.000	0.60	32.2	0.0	101.0
129.00	Appurtenance(s)	1.00	1.34	30.556	33.61	74.73	0.600	0.000	2.00	1.333	0.80	43.0	0.0	134.7
130.00		1.00	1.34	30.605	33.67	74.79	0.600	0.000	1.00	0.667	0.40	21.5	0.0	67.3
135.00		1.00	1.35	30.850	33.93	75.08	0.600	0.000	5.00	3.333	2.00	108.6	0.0	336.7
135.25	Top - Section 4	1.00	1.35	30.862	33.95	75.10	0.600	0.000	0.25	0.167	0.10	5.4	0.0	16.8
139.00	Appurtenance(s)	1.00	1.36	31.040	34.14	47.07	0.816	0.000	3.75	1.563	1.27	69.6	0.0	98.7
140.00		1.00	1.36	31.087	34.20	47.11	0.815	0.000	1.00	0.417	0.34	18.6	0.0	26.3
145.00		1.00	1.37	31.317	34.45	47.28	0.812	0.000	5.00	2.083	1.69	93.3	0.0	131.5
145.12	Appurtenance(s)	1.00	1.37	31.323	34.45	47.29	0.812	0.000	0.12	0.050	0.04	2.2	0.0	3.2
150.00	Appurtenance(s)	1.00	1.38	31.541	34.70	47.45	0.809	0.000	4.88	2.033	1.65	91.3	0.0	128.4
155.00	Appurtenance(s)	1.00	1.39	31.760	34.94	47.62	0.806	0.000	5.00	2.083	1.68	93.9	0.0	131.5
								Totals:	**155.00**			**12,681.6**		**12,872.1**

Discrete Appurtenance Forces

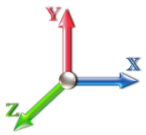
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 31

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	155.00	Truck Ball	1	31.760	34.936	1.00	1.00	3.77	45.00	0.000	0.000	210.73	0.00	0.00
2	155.00	Flag (20'x30')	1	31.760	34.936	1.00	1.00	14.56	180.00	0.000	0.000	813.87	0.00	0.00
3	155.00	27" Canister	1	31.760	34.936	1.00	1.00	5.07	45.00	0.000	0.000	283.40	0.00	0.00
4	150.00	RFS ACU-A20-N	4	31.541	34.696	1.00	1.00	0.00	3.60	0.000	0.000	0.00	0.00	0.00
5	150.00	CCI DPO-7126Y-0-T1	3	31.541	34.696	1.00	1.00	0.00	19.71	0.000	0.000	0.00	0.00	0.00
6	150.00	RFS	3	31.541	34.696	1.00	1.00	0.00	17.55	0.000	0.000	0.00	0.00	0.00
7	150.00	Commscope	3	31.541	34.696	1.00	1.00	0.00	122.58	0.000	0.000	0.00	0.00	0.00
8	145.12	27" Canister & 36"	1	31.323	34.455	1.00	1.00	12.37	90.00	0.000	0.000	681.93	0.00	0.00
9	139.00	DBC0062F3V52-1	6	31.040	34.144	1.00	1.00	0.00	35.64	0.000	0.000	0.00	0.00	0.00
10	139.00	DTMABP0723VG12A	6	31.040	34.144	1.00	1.00	0.00	103.68	0.000	0.000	0.00	0.00	0.00
11	139.00	TPA-65R-LCUUUU-H8	3	31.040	34.144	1.00	1.00	0.00	202.50	0.000	0.000	0.00	0.00	0.00
12	135.25	36" Canister & 29"	1	30.862	33.948	1.00	1.00	12.55	90.00	0.000	0.000	681.67	0.00	0.00
13	129.00	APX18-206517S-C-A20	3	30.556	33.611	1.00	1.00	0.00	65.34	0.000	0.000	0.00	0.00	0.00
14	127.00	CBC721-DF	6	30.455	33.501	1.00	1.00	0.00	23.76	0.000	0.000	0.00	0.00	0.00
15	125.50	29" Canister & 30"	1	30.379	33.417	1.00	1.00	10.75	90.00	0.000	0.000	574.78	0.00	0.00
16	122.00	SBNHH-1D6565A	3	30.199	33.219	1.00	1.00	0.00	127.98	0.000	0.000	0.00	0.00	0.00
17	115.75	30" Canister	1	29.866	32.853	1.00	1.00	5.50	45.00	0.000	0.000	289.11	0.00	0.00
							Totals:		**1,307.34**			**3,535.48**		

Total Applied Force Summary

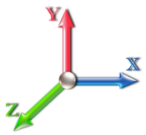
Structure:	CT46141-A-SBA		**Code:**	EIA/TIA-222-G	2/16/2018
Site Name:	Water Treatment Plant 2, CT		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 31

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		472.86	695.65	0.00	0.00
10.00		465.95	687.92	0.00	0.00
15.00		459.04	680.18	0.00	0.00
20.00		479.73	672.44	0.00	0.00
25.00		495.11	664.70	0.00	0.00
30.00		506.50	656.96	0.00	0.00
35.00		514.96	649.22	0.00	0.00
40.00		521.15	641.48	0.00	0.00
45.00		525.54	633.75	0.00	0.00
48.50		368.46	439.02	0.00	0.00
50.00		159.70	325.02	0.00	0.00
53.25		347.85	699.44	0.00	0.00
55.00		187.00	217.65	0.00	0.00
60.00		537.92	616.64	0.00	0.00
65.00		537.66	608.90	0.00	0.00
70.00		536.57	601.16	0.00	0.00
75.00		534.73	593.42	0.00	0.00
80.00		532.22	585.68	0.00	0.00
85.00		529.12	577.94	0.00	0.00
90.00		525.46	570.21	0.00	0.00
95.00		521.29	562.47	0.00	0.00
98.00		309.91	333.77	0.00	0.00
100.00		208.68	376.65	0.00	0.00
102.00		207.89	374.18	0.00	0.00
105.00		310.63	330.93	0.00	0.00
110.00		514.41	545.36	0.00	0.00
115.00		508.65	537.62	0.00	0.00
115.75	(1) attachments	364.59	124.98	0.00	0.00
120.00		90.04	430.13	0.00	0.00
122.00	(3) attachments	42.52	330.39	0.00	0.00
125.00		64.11	269.92	0.00	0.00
125.50	(1) attachments	585.47	134.99	0.00	0.00
127.00	(6) attachments	32.16	158.72	0.00	0.00
129.00	(3) attachments	43.02	245.29	0.00	0.00
130.00		21.55	84.36	0.00	0.00
135.00		108.59	421.79	0.00	0.00
135.25	(1) attachments	687.10	111.09	0.00	0.00
139.00	(15) attachments	69.63	504.26	0.00	0.00
140.00		18.58	37.70	0.00	0.00
145.00		93.26	188.51	0.00	0.00
145.12	(1) attachments	684.17	94.52	0.00	0.00
150.00	(13) attachments	91.35	347.42	0.00	0.00
155.00	(3) attachments	1401.92	401.54	0.00	0.00
	Totals:	**16,217.04**	**18,763.94**	**0.00**	**0.00**

Calculated Forces

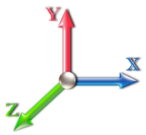
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 31

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	-18.73	-16.26	0.00	-1378.9	0.00	1378.91	2027.49	1013.74	3641.02	1807.56	0.00	0.000	0.000	0.772
5.00	-17.97	-15.85	0.00	-1297.6	0.00	1297.63	2015.42	1007.71	3566.22	1770.42	0.12	-0.231	0.000	0.742
10.00	-17.23	-15.45	0.00	-1218.3	0.00	1218.37	2002.83	1001.41	3491.15	1733.15	0.49	-0.458	0.000	0.712
15.00	-16.49	-15.05	0.00	-1141.1	0.00	1141.12	1989.72	994.86	3415.85	1695.77	1.09	-0.680	0.000	0.681
20.00	-15.77	-14.62	0.00	-1065.8	0.00	1065.88	1976.09	988.05	3340.37	1658.30	1.92	-0.898	0.000	0.651
25.00	-15.07	-14.17	0.00	-992.79	0.00	992.79	1961.94	980.97	3264.74	1620.75	2.97	-1.110	0.000	0.620
30.00	-14.37	-13.70	0.00	-921.95	0.00	921.95	1947.28	973.64	3189.01	1583.16	4.24	-1.318	0.000	0.590
35.00	-13.69	-13.21	0.00	-853.46	0.00	853.46	1932.09	966.05	3113.21	1545.53	5.73	-1.519	0.000	0.559
40.00	-13.02	-12.72	0.00	-787.39	0.00	787.39	1916.39	958.20	3037.39	1507.89	7.43	-1.715	0.000	0.529
45.00	-12.37	-12.21	0.00	-723.80	0.00	723.80	1900.17	950.08	2961.59	1470.26	9.33	-1.904	0.000	0.499
48.50	-11.92	-11.84	0.00	-681.07	0.00	681.07	1888.50	944.25	2908.57	1443.94	10.77	-2.033	0.000	0.478
50.00	-11.59	-11.69	0.00	-663.30	0.00	663.30	1883.43	941.71	2885.86	1432.66	11.42	-2.088	0.000	0.469
53.25	-10.88	-11.33	0.00	-625.31	0.00	625.31	1885.78	942.89	2896.38	1437.89	12.88	-2.204	0.000	0.441
55.00	-10.65	-11.16	0.00	-605.48	0.00	605.48	1879.83	939.91	2869.89	1424.73	13.70	-2.266	0.000	0.431
60.00	-10.03	-10.62	0.00	-549.68	0.00	549.68	1862.46	931.23	2794.28	1387.20	16.16	-2.427	0.000	0.402
65.00	-9.42	-10.08	0.00	-496.57	0.00	496.57	1844.57	922.28	2718.82	1349.74	18.78	-2.582	0.000	0.373
70.00	-8.82	-9.54	0.00	-446.14	0.00	446.14	1826.16	913.08	2643.55	1312.37	21.57	-2.728	0.000	0.345
75.00	-8.23	-9.00	0.00	-398.43	0.00	398.43	1807.23	903.62	2568.52	1275.12	24.50	-2.867	0.000	0.317
80.00	-7.65	-8.45	0.00	-353.43	0.00	353.43	1787.79	893.89	2493.75	1238.00	27.57	-2.997	0.000	0.290
85.00	-7.09	-7.91	0.00	-311.16	0.00	311.16	1767.82	883.91	2419.31	1201.05	30.77	-3.119	0.000	0.263
90.00	-6.54	-7.37	0.00	-271.62	0.00	271.62	1747.34	873.67	2345.22	1164.27	34.10	-3.232	0.000	0.237
95.00	-5.99	-6.82	0.00	-234.79	0.00	234.79	1726.34	863.17	2271.53	1127.68	37.54	-3.336	0.000	0.212
98.00	-5.67	-6.50	0.00	-214.32	0.00	214.32	1713.49	856.74	2227.52	1105.83	39.65	-3.394	0.000	0.197
100.00	-5.31	-6.27	0.00	-201.33	0.00	201.33	1704.82	852.41	2198.27	1091.31	41.08	-3.432	0.000	0.188
102.00	-4.94	-6.04	0.00	-188.79	0.00	188.79	1713.25	856.63	2226.72	1105.44	42.53	-3.468	0.000	0.174
105.00	-4.62	-5.72	0.00	-170.66	0.00	170.66	1700.21	850.10	2182.88	1083.67	44.72	-3.519	0.000	0.160
110.00	-4.10	-5.18	0.00	-142.06	0.00	142.06	1678.06	839.03	2110.21	1047.60	48.44	-3.592	0.000	0.138
115.00	-3.60	-4.64	0.00	-116.18	0.00	116.18	1655.39	827.70	2038.07	1011.78	52.24	-3.657	0.000	0.117
115.75	-3.49	-4.27	0.00	-112.70	0.00	112.70	1651.95	825.97	2027.30	1006.43	52.81	-3.666	0.000	0.114
115.75	-3.49	-4.27	0.00	-112.70	0.00	112.70	930.23	465.11	237.26	173.90	52.81	-3.666	0.000	0.652
120.00	-3.05	-4.16	0.00	-94.57	0.00	94.57	930.23	465.11	237.26	173.90	56.10	-3.713	0.000	0.547
122.00	-2.70	-4.12	0.00	-86.25	0.00	86.25	930.23	465.11	237.26	173.90	57.73	-4.095	0.000	0.499
125.00	-2.41	-4.04	0.00	-73.90	0.00	73.90	930.23	465.11	237.26	173.90	60.47	-4.602	0.000	0.428
125.50	-2.31	-3.46	0.00	-71.87	0.00	71.87	930.23	465.11	237.26	173.90	60.95	-4.679	0.000	0.416
127.00	-2.14	-3.42	0.00	-66.69	0.00	66.69	930.23	465.11	237.26	173.90	62.45	-4.898	0.000	0.386
129.00	-1.89	-3.36	0.00	-59.85	0.00	59.85	930.23	465.11	237.26	173.90	64.56	-5.165	0.000	0.346
130.00	-1.79	-3.34	0.00	-56.49	0.00	56.49	930.23	465.11	237.26	173.90	65.65	-5.288	0.000	0.327
135.00	-1.37	-3.20	0.00	-39.77	0.00	39.77	930.23	465.11	237.26	173.90	71.46	-5.796	0.000	0.230
135.25	-1.32	-2.51	0.00	-38.97	0.00	38.97	930.23	465.11	237.26	173.90	71.77	-5.817	0.000	0.226
135.25	-1.32	-2.51	0.00	-38.97	0.00	38.97	579.84	289.92	92.43	67.75	71.77	-5.817	0.000	0.578
139.00	-0.81	-2.39	0.00	-29.56	0.00	29.56	579.84	289.92	92.43	67.75	76.44	-6.088	0.000	0.438
140.00	-0.74	-2.38	0.00	-27.17	0.00	27.17	579.84	289.92	92.43	67.75	77.75	-6.480	0.000	0.402
145.00	-0.53	-2.27	0.00	-15.25	0.00	15.25	579.84	289.92	92.43	67.75	85.36	-7.947	0.000	0.226
145.12	-0.52	-1.59	0.00	-14.98	0.00	14.98	579.84	289.92	92.43	67.75	85.56	-7.972	0.000	0.222
150.00	-0.18	-1.45	0.00	-7.24	0.00	7.24	579.84	289.92	92.43	67.75	94.10	-8.722	0.000	0.107
155.00	0.00	-1.40	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75	103.38	-8.972	0.000	0.000

Wind Loading - Shaft

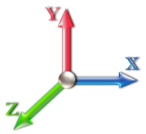
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

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 30

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	1.656	5.00	19.798	23.76	135.1	460.7	1162.5
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.775	5.00	19.628	23.55	133.9	488.0	1179.5
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.848	5.00	19.420	23.30	132.5	501.7	1182.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.902	5.00	19.195	23.03	138.9	509.5	1180.3
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.945	5.00	18.962	22.75	143.9	513.8	1174.4
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.981	5.00	18.723	22.47	147.6	515.9	1166.1
35.00		1.00	1.01	6.169	6.79	0.00	1.200	2.012	5.00	18.479	22.17	150.5	516.3	1156.2
40.00		1.00	1.04	6.345	6.98	0.00	1.200	2.039	5.00	18.232	21.88	152.7	515.6	1145.2
45.00		1.00	1.07	6.504	7.15	0.00	1.200	2.063	5.00	17.983	21.58	154.4	513.8	1133.1
48.50	Bot - Section 2	1.00	1.09	6.608	7.27	0.00	1.200	2.079	3.50	12.437	14.92	108.5	358.5	785.9
50.00		1.00	1.09	6.650	7.32	0.00	1.200	2.085	1.50	5.355	6.43	47.0	155.3	521.0
53.25	Top - Section 1	1.00	1.11	6.739	7.41	0.00	1.200	2.098	3.25	11.527	13.83	102.5	335.3	1121.2
55.00		1.00	1.12	6.785	7.46	0.00	1.200	2.105	1.75	6.162	7.39	55.2	180.2	391.4
60.00		1.00	1.14	6.910	7.60	0.00	1.200	2.123	5.00	17.438	20.93	159.1	511.1	1107.5
65.00		1.00	1.16	7.028	7.73	0.00	1.200	2.140	5.00	17.183	20.62	159.4	507.0	1093.1
70.00		1.00	1.17	7.138	7.85	0.00	1.200	2.156	5.00	16.927	20.31	159.5	502.4	1078.3
75.00		1.00	1.19	7.243	7.97	0.00	1.200	2.171	5.00	16.670	20.00	159.4	497.5	1063.1
80.00		1.00	1.21	7.342	8.08	0.00	1.200	2.185	5.00	16.413	19.70	159.1	492.3	1047.5
85.00		1.00	1.22	7.436	8.18	0.00	1.200	2.198	5.00	16.155	19.39	158.6	486.8	1031.7
90.00		1.00	1.24	7.526	8.28	0.00	1.200	2.211	5.00	15.896	19.08	157.9	481.1	1015.6
95.00		1.00	1.25	7.612	8.37	0.00	1.200	2.223	5.00	15.637	18.76	157.1	475.1	999.3
98.00	Bot - Section 3	1.00	1.26	7.662	8.43	0.00	1.200	2.230	3.00	9.256	11.11	93.6	282.8	592.4
100.00		1.00	1.27	7.695	8.46	0.00	1.200	2.234	2.00	6.204	7.44	63.0	190.3	602.2
102.00	Top - Section 2	1.00	1.27	7.727	8.50	0.00	1.200	2.239	2.00	6.162	7.39	62.9	189.3	597.9
105.00		1.00	1.28	7.774	8.55	0.00	1.200	2.245	3.00	9.165	11.00	94.1	281.6	587.5
110.00		1.00	1.29	7.851	8.64	0.00	1.200	2.256	5.00	15.069	18.08	156.2	462.8	964.3
115.00		1.00	1.30	7.925	8.72	0.00	1.200	2.266	5.00	14.808	17.77	154.9	456.1	947.2
115.75	Top - Section 3	1.00	1.31	7.936	8.73	0.00	1.200	2.267	0.75	2.198	2.64	23.0	68.3	141.0
120.00		1.00	1.32	7.996	8.80	0.00	1.200	2.276	4.25	4.445	5.33	46.9	121.4	503.1
122.00	Appurtenance(s)	1.00	1.32	8.024	8.83	0.00	1.200	2.279	2.00	2.093	2.51	22.2	57.3	236.8
125.00		1.00	1.33	8.065	8.87	0.00	1.200	2.285	3.00	3.142	3.77	33.5	86.1	355.5
125.50	Appurtenance(s)	1.00	1.33	8.072	8.88	0.00	1.200	2.286	0.50	0.524	0.63	5.6	14.4	59.3
127.00	Appurtenance(s)	1.00	1.33	8.092	8.90	0.00	1.200	2.289	1.50	1.572	1.89	16.8	43.1	177.8
129.00	Appurtenance(s)	1.00	1.34	8.119	8.93	0.00	1.200	2.292	2.00	2.097	2.52	22.5	57.6	237.2
130.00		1.00	1.34	8.132	8.95	0.00	1.200	2.294	1.00	1.049	1.26	11.3	28.8	118.6
135.00		1.00	1.35	8.197	9.02	0.00	1.200	2.303	5.00	5.252	6.30	56.8	144.9	593.9
135.25	Top - Section 4	1.00	1.35	8.200	9.02	0.00	1.200	2.303	0.25	0.263	0.32	2.8	7.2	29.7
139.00	Appurtenance(s)	1.00	1.36	8.247	9.07	24.26	1.200	2.309	3.75	3.006	3.61	32.7	77.3	208.9
140.00		1.00	1.36	8.260	9.09	24.28	1.200	2.311	1.00	0.802	0.96	8.7	20.6	55.7
145.00		1.00	1.37	8.321	9.15	24.37	1.200	2.319	5.00	4.016	4.82	44.1	103.7	279.1
145.12	Appurtenance(s)	1.00	1.37	8.323	9.15	24.37	1.200	2.319	0.12	0.096	0.12	1.1	2.5	6.7
150.00	Appurtenance(s)	1.00	1.38	8.381	9.22	24.46	1.200	2.327	4.88	3.926	4.71	43.4	101.6	272.8
155.00	Appurtenance(s)	1.00	1.39	8.439	9.28	24.54	1.200	2.335	5.00	4.029	4.83	44.9	104.6	280.0
								Totals:	**155.00**			**3,913.5**		**29,583.4**

Discrete Appurtenance Forces

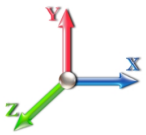
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

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 30

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	155.00	Truck Ball	1	8.439	9.283	1.00	1.00	4.12	114.67	0.000	0.000	38.26	0.00	0.00
2	155.00	Flag (20'x30')	1	8.439	9.283	1.00	1.00	15.92	240.12	0.000	0.000	147.78	0.00	0.00
3	155.00	27" Canister	1	8.439	9.283	1.00	1.00	5.54	60.00	0.000	0.000	51.46	0.00	0.00
4	150.00	RFS ACU-A20-N	4	8.381	9.219	1.00	1.00	0.00	22.51	0.000	0.000	0.00	0.00	0.00
5	150.00	CCI DPO-7126Y-0-T1	3	8.381	9.219	1.00	1.00	0.00	20.82	0.000	0.000	0.00	0.00	0.00
6	150.00	RFS	3	8.381	9.219	1.00	1.00	0.00	61.90	0.000	0.000	0.00	0.00	0.00
7	150.00	Commscope	3	8.381	9.219	1.00	1.00	0.00	37.52	0.000	0.000	0.00	0.00	0.00
8	145.12	27" Canister & 36"	1	8.323	9.155	1.00	1.00	13.52	229.28	0.000	0.000	123.75	0.00	0.00
9	139.00	DBC0062F3V52-1	6	8.247	9.072	1.00	1.00	0.00	139.36	0.000	0.000	0.00	0.00	0.00
10	139.00	DTMABP0723VG12A	6	8.247	9.072	1.00	1.00	0.00	297.05	0.000	0.000	0.00	0.00	0.00
11	139.00	TPA-65R-LCUUUU-H8	3	8.247	9.072	1.00	1.00	46.57	1573.44	0.000	0.000	422.44	0.00	0.00
12	135.25	36" Canister & 29"	1	8.200	9.020	1.00	1.00	13.71	229.21	0.000	0.000	123.63	0.00	0.00
13	129.00	APX18-206517S-C-A20	3	8.119	8.931	1.00	1.00	0.00	370.09	0.000	0.000	0.00	0.00	0.00
14	127.00	CBC721-DF	6	8.092	8.901	1.00	1.00	0.00	90.62	0.000	0.000	0.00	0.00	0.00
15	125.50	29" Canister & 30"	1	8.072	8.879	1.00	1.00	11.73	229.14	0.000	0.000	104.18	0.00	0.00
16	122.00	SBNHH-1D6565A	3	8.024	8.826	1.00	1.00	29.73	1014.78	0.000	0.000	262.37	0.00	0.00
17	115.75	30" Canister	1	7.936	8.729	1.00	1.00	6.00	114.53	0.000	0.000	52.36	0.00	0.00
							Totals:		**4,845.04**			**1,326.23**		

Total Applied Force Summary

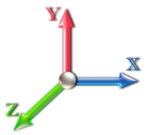
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

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 30

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		135.06	1388.19	0.00	0.00
10.00		133.89	1405.22	0.00	0.00
15.00		132.48	1408.63	0.00	0.00
20.00		138.94	1406.07	0.00	0.00
25.00		143.85	1400.08	0.00	0.00
30.00		147.59	1391.83	0.00	0.00
35.00		150.48	1381.96	0.00	0.00
40.00		152.70	1370.88	0.00	0.00
45.00		154.40	1358.83	0.00	0.00
48.50		108.48	943.86	0.00	0.00
50.00		47.01	588.71	0.00	0.00
53.25		102.53	1267.91	0.00	0.00
55.00		55.18	470.36	0.00	0.00
60.00		159.07	1333.27	0.00	0.00
65.00		159.40	1318.83	0.00	0.00
70.00		159.50	1303.98	0.00	0.00
75.00		159.38	1288.77	0.00	0.00
80.00		159.06	1273.24	0.00	0.00
85.00		158.57	1257.42	0.00	0.00
90.00		157.92	1241.33	0.00	0.00
95.00		157.12	1225.01	0.00	0.00
98.00		93.62	727.83	0.00	0.00
100.00		63.01	692.52	0.00	0.00
102.00		62.85	688.21	0.00	0.00
105.00		94.06	722.88	0.00	0.00
110.00		156.16	1189.98	0.00	0.00
115.00		154.90	1172.92	0.00	0.00
115.75	(1) attachments	75.39	289.43	0.00	0.00
120.00		46.92	694.91	0.00	0.00
122.00	(3) attachments	284.54	1341.92	0.00	0.00
125.00		33.45	446.03	0.00	0.00
125.50	(1) attachments	109.76	303.49	0.00	0.00
127.00	(6) attachments	16.79	313.71	0.00	0.00
129.00	(3) attachments	22.48	667.66	0.00	0.00
130.00		11.26	141.33	0.00	0.00
135.00		56.83	707.30	0.00	0.00
135.25	(1) attachments	126.47	264.58	0.00	0.00
139.00	(15) attachments	455.17	2303.77	0.00	0.00
140.00		8.74	70.91	0.00	0.00
145.00		44.11	355.03	0.00	0.00
145.12	(1) attachments	124.81	237.80	0.00	0.00
150.00	(13) attachments	43.43	489.71	0.00	0.00
155.00	(3) attachments	282.37	694.78	0.00	0.00
	Totals:	**5,239.74**	**40,541.07**	**0.00**	**0.00**

Calculated Forces

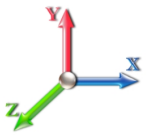
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

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 30

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	-40.54	-5.27	0.00	-490.15	0.00	490.15	2027.49	1013.74	3641.02	1807.56	0.00	0.000	0.000	0.291
5.00	-39.14	-5.19	0.00	-463.81	0.00	463.81	2015.42	1007.71	3566.22	1770.42	0.04	-0.082	0.000	0.281
10.00	-37.73	-5.10	0.00	-437.87	0.00	437.87	2002.83	1001.41	3491.15	1733.15	0.17	-0.164	0.000	0.272
15.00	-36.31	-5.02	0.00	-412.34	0.00	412.34	1989.72	994.86	3415.85	1695.77	0.39	-0.244	0.000	0.261
20.00	-34.90	-4.92	0.00	-387.25	0.00	387.25	1976.09	988.05	3340.37	1658.30	0.69	-0.323	0.000	0.251
25.00	-33.50	-4.81	0.00	-362.66	0.00	362.66	1961.94	980.97	3264.74	1620.75	1.06	-0.400	0.000	0.241
30.00	-32.10	-4.70	0.00	-338.60	0.00	338.60	1947.28	973.64	3189.01	1583.16	1.52	-0.476	0.000	0.230
35.00	-30.71	-4.57	0.00	-315.12	0.00	315.12	1932.09	966.05	3113.21	1545.53	2.06	-0.550	0.000	0.220
40.00	-29.34	-4.44	0.00	-292.27	0.00	292.27	1916.39	958.20	3037.39	1507.89	2.68	-0.623	0.000	0.209
45.00	-27.98	-4.30	0.00	-270.06	0.00	270.06	1900.17	950.08	2961.59	1470.26	3.37	-0.693	0.000	0.198
48.50	-27.03	-4.20	0.00	-255.01	0.00	255.01	1888.50	944.25	2908.57	1443.94	3.89	-0.741	0.000	0.191
50.00	-26.44	-4.16	0.00	-248.71	0.00	248.71	1883.43	941.71	2885.86	1432.66	4.13	-0.762	0.000	0.188
53.25	-25.17	-4.05	0.00	-235.20	0.00	235.20	1885.78	942.89	2896.38	1437.89	4.66	-0.805	0.000	0.177
55.00	-24.70	-4.01	0.00	-228.11	0.00	228.11	1879.83	939.91	2869.89	1424.73	4.96	-0.829	0.000	0.173
60.00	-23.37	-3.85	0.00	-208.07	0.00	208.07	1862.46	931.23	2794.28	1387.20	5.86	-0.890	0.000	0.163
65.00	-22.05	-3.69	0.00	-188.81	0.00	188.81	1844.57	922.28	2718.82	1349.74	6.83	-0.948	0.000	0.152
70.00	-20.74	-3.53	0.00	-170.34	0.00	170.34	1826.16	913.08	2643.55	1312.37	7.85	-1.004	0.000	0.141
75.00	-19.45	-3.37	0.00	-152.68	0.00	152.68	1807.23	903.62	2568.52	1275.12	8.93	-1.057	0.000	0.131
80.00	-18.18	-3.20	0.00	-135.84	0.00	135.84	1787.79	893.89	2493.75	1238.00	10.06	-1.107	0.000	0.120
85.00	-16.92	-3.03	0.00	-119.84	0.00	119.84	1767.82	883.91	2419.31	1201.05	11.25	-1.154	0.000	0.109
90.00	-15.68	-2.86	0.00	-104.69	0.00	104.69	1747.34	873.67	2345.22	1164.27	12.48	-1.197	0.000	0.099
95.00	-14.46	-2.68	0.00	-90.40	0.00	90.40	1726.34	863.17	2271.53	1127.68	13.76	-1.237	0.000	0.089
98.00	-13.74	-2.58	0.00	-82.36	0.00	82.36	1713.49	856.74	2227.52	1105.83	14.54	-1.260	0.000	0.082
100.00	-13.04	-2.50	0.00	-77.20	0.00	77.20	1704.82	852.41	2198.27	1091.31	15.07	-1.274	0.000	0.078
102.00	-12.36	-2.43	0.00	-72.20	0.00	72.20	1713.25	856.63	2226.72	1105.44	15.61	-1.288	0.000	0.073
105.00	-11.63	-2.32	0.00	-64.91	0.00	64.91	1700.21	850.10	2182.88	1083.67	16.43	-1.308	0.000	0.067
110.00	-10.45	-2.14	0.00	-53.30	0.00	53.30	1678.06	839.03	2110.21	1047.60	17.81	-1.335	0.000	0.057
115.00	-9.28	-1.96	0.00	-42.59	0.00	42.59	1655.39	827.70	2038.07	1011.78	19.22	-1.359	0.000	0.048
115.75	-8.99	-1.88	0.00	-41.11	0.00	41.11	1651.95	825.97	2027.30	1006.43	19.44	-1.363	0.000	0.046
115.75	-8.99	-1.88	0.00	-41.11	0.00	41.11	930.23	465.11	237.26	173.90	19.44	-1.363	0.000	0.246
120.00	-8.29	-1.83	0.00	-33.11	0.00	33.11	930.23	465.11	237.26	173.90	20.66	-1.380	0.000	0.199
122.00	-6.96	-1.53	0.00	-29.45	0.00	29.45	930.23	465.11	237.26	173.90	21.26	-1.512	0.000	0.177
125.00	-6.51	-1.50	0.00	-24.86	0.00	24.86	930.23	465.11	237.26	173.90	22.27	-1.684	0.000	0.150
125.50	-6.21	-1.38	0.00	-24.12	0.00	24.12	930.23	465.11	237.26	173.90	22.45	-1.709	0.000	0.145
127.00	-5.89	-1.36	0.00	-22.04	0.00	22.04	930.23	465.11	237.26	173.90	22.99	-1.782	0.000	0.133
129.00	-5.22	-1.33	0.00	-19.31	0.00	19.31	930.23	465.11	237.26	173.90	23.76	-1.870	0.000	0.117
130.00	-5.08	-1.32	0.00	-17.99	0.00	17.99	930.23	465.11	237.26	173.90	24.15	-1.909	0.000	0.109
135.00	-4.37	-1.24	0.00	-11.39	0.00	11.39	930.23	465.11	237.26	173.90	26.24	-2.064	0.000	0.070
135.25	-4.11	-1.11	0.00	-11.08	0.00	11.08	930.23	465.11	237.26	173.90	26.35	-2.070	0.000	0.068
135.25	-4.11	-1.11	0.00	-11.08	0.00	11.08	579.84	289.92	92.43	67.75	26.35	-2.070	0.000	0.171
139.00	-1.83	-0.57	0.00	-6.92	0.00	6.92	579.84	289.92	92.43	67.75	28.00	-2.141	0.000	0.105
140.00	-1.75	-0.57	0.00	-6.34	0.00	6.34	579.84	289.92	92.43	67.75	28.46	-2.233	0.000	0.097
145.00	-1.40	-0.51	0.00	-3.50	0.00	3.50	579.84	289.92	92.43	67.75	31.00	-2.573	0.000	0.054
145.12	-1.17	-0.38	0.00	-3.44	0.00	3.44	579.84	289.92	92.43	67.75	31.06	-2.579	0.000	0.053
150.00	-0.68	-0.32	0.00	-1.58	0.00	1.58	579.84	289.92	92.43	67.75	33.79	-2.748	0.000	0.024
155.00	0.00	-0.28	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75	36.71	-2.803	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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	

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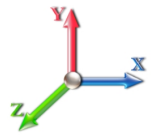
Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.12	**Iterations**	26
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.34	**SA**	0.01	**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		584.85	0.00	0.03	0.02	8.55	
10.00		576.25	0.01	0.05	0.03	11.60	
15.00		567.65	0.02	0.06	0.04	12.89	
20.00		559.05	0.03	0.07	0.04	13.42	
25.00		550.46	0.05	0.07	0.04	13.63	
30.00		541.86	0.07	0.07	0.04	13.74	
35.00		533.26	0.10	0.07	0.04	13.86	
40.00		524.66	0.13	0.07	0.03	13.99	
45.00		516.06	0.16	0.07	0.03	14.10	
48.50	Bot - Section 2	356.13	0.19	0.06	0.03	9.84	
50.00		304.71	0.20	0.06	0.02	8.44	
53.25	Top - Section 1	654.89	0.22	0.06	0.02	18.11	
55.00		176.00	0.24	0.06	0.02	4.83	
60.00		497.05	0.28	0.05	0.01	12.88	
65.00		488.45	0.33	0.04	0.01	10.89	
70.00		479.85	0.39	0.02	0.01	7.55	
75.00		471.26	0.44	0.00	0.01	2.80	
80.00		462.66	0.50	-0.02	0.01	-2.72	
85.00		454.06	0.57	-0.04	0.01	-7.81	
90.00		445.46	0.64	-0.07	0.02	-11.45	
95.00		436.86	0.71	-0.09	0.03	-13.33	
98.00	Bot - Section 3	257.99	0.76	-0.10	0.04	-8.16	
100.00		343.26	0.79	-0.11	0.05	-10.88	
102.00	Top - Section 2	340.51	0.82	-0.12	0.06	-10.64	
105.00		254.84	0.87	-0.12	0.08	-7.55	
110.00		417.85	0.95	-0.12	0.11	-10.25	
115.00		409.25	1.04	-0.10	0.15	-6.79	
115.75	Top - Section 3	110.65	1.05	-0.09	0.16	-1.68	
120.00		318.03	1.13	-0.05	0.21	-1.87	
122.00	Appurtenance(s)	291.86	1.17	-0.02	0.23	-0.23	
125.00		224.49	1.23	0.03	0.28	1.72	
125.50	Appurtenance(s)	137.42	1.24	0.04	0.28	1.26	
127.00	Appurtenance(s)	138.65	1.27	0.08	0.31	1.93	
129.00	Appurtenance(s)	222.26	1.31	0.13	0.34	4.57	
130.00		74.83	1.33	0.16	0.36	1.80	
135.00		374.15	1.43	0.35	0.47	16.25	
135.25	Top - Section 4	118.71	1.44	0.36	0.47	5.28	
139.00	Appurtenance(s)	489.42	1.52	0.55	0.57	29.90	
140.00		29.23	1.54	0.61	0.59	1.92	
145.00		146.15	1.65	0.96	0.75	13.34	
145.12	Appurtenance(s)	103.51	1.66	0.96	0.75	9.52	
150.00	Appurtenance(s)	324.25	1.77	1.41	0.93	38.89	
155.00	Appurtenance(s)	446.15	1.89	1.98	1.14	67.77	
	Totals:	**15,754.9**				**292.0**	**Total Wind:** **16,217.0**

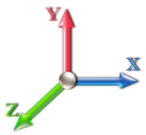
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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**	0.12	**Iterations**	26		
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.18		
Wind Load Factor	0.00	**Structure Frequency**	0.34	**SA**	0.01	**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	-25.02	-0.39	0.00	-37.62	0.00	37.62	2027.49	1013.74	3641.02	1807.56		0.00	0.00	0.033
5.00	-24.09	-0.38	0.00	-35.70	0.00	35.70	2015.42	1007.71	3566.22	1770.42		0.00	-0.01	0.032
10.00	-23.17	-0.37	0.00	-33.80	0.00	33.80	2002.83	1001.41	3491.15	1733.15		0.01	-0.01	0.031
15.00	-22.27	-0.36	0.00	-31.95	0.00	31.95	1989.72	994.86	3415.85	1695.77		0.03	-0.02	0.030
20.00	-21.37	-0.35	0.00	-30.15	0.00	30.15	1976.09	988.05	3340.37	1658.30		0.05	-0.02	0.029
25.00	-20.48	-0.34	0.00	-28.41	0.00	28.41	1961.94	980.97	3264.74	1620.75		0.08	-0.03	0.028
30.00	-19.61	-0.32	0.00	-26.73	0.00	26.73	1947.28	973.64	3189.01	1583.16		0.12	-0.04	0.027
35.00	-18.74	-0.31	0.00	-25.11	0.00	25.11	1932.09	966.05	3113.21	1545.53		0.16	-0.04	0.026
40.00	-17.89	-0.30	0.00	-23.56	0.00	23.56	1916.39	958.20	3037.39	1507.89		0.21	-0.05	0.025
45.00	-17.04	-0.28	0.00	-22.07	0.00	22.07	1900.17	950.08	2961.59	1470.26		0.26	-0.05	0.024
48.50	-16.46	-0.28	0.00	-21.07	0.00	21.07	1888.50	944.25	2908.57	1443.94		0.30	-0.06	0.023
50.00	-16.02	-0.27	0.00	-20.66	0.00	20.66	1883.43	941.71	2885.86	1432.66		0.32	-0.06	0.023
53.25	-15.09	-0.25	0.00	-19.79	0.00	19.79	1885.78	942.89	2896.38	1437.89		0.36	-0.06	0.022
55.00	-14.80	-0.24	0.00	-19.35	0.00	19.35	1879.83	939.91	2869.89	1424.73		0.39	-0.07	0.021
60.00	-13.98	-0.23	0.00	-18.13	0.00	18.13	1862.46	931.23	2794.28	1387.20		0.46	-0.07	0.021
65.00	-13.17	-0.22	0.00	-16.97	0.00	16.97	1844.57	922.28	2718.82	1349.74		0.54	-0.08	0.020
70.00	-12.36	-0.21	0.00	-15.86	0.00	15.86	1826.16	913.08	2643.55	1312.37		0.62	-0.08	0.019
75.00	-11.57	-0.21	0.00	-14.79	0.00	14.79	1807.23	903.62	2568.52	1275.12		0.71	-0.09	0.018
80.00	-10.79	-0.21	0.00	-13.74	0.00	13.74	1787.79	893.89	2493.75	1238.00		0.80	-0.09	0.017
85.00	-10.02	-0.21	0.00	-12.68	0.00	12.68	1767.82	883.91	2419.31	1201.05		0.90	-0.10	0.016
90.00	-9.26	-0.21	0.00	-11.63	0.00	11.63	1747.34	873.67	2345.22	1164.27		1.00	-0.10	0.015
95.00	-8.51	-0.21	0.00	-10.59	0.00	10.59	1726.34	863.17	2271.53	1127.68		1.11	-0.11	0.014
98.00	-8.07	-0.21	0.00	-9.96	0.00	9.96	1713.49	856.74	2227.52	1105.83		1.17	-0.11	0.014
100.00	-7.56	-0.21	0.00	-9.54	0.00	9.54	1704.82	852.41	2198.27	1091.31		1.22	-0.11	0.013
102.00	-7.07	-0.21	0.00	-9.13	0.00	9.13	1713.25	856.63	2226.72	1105.44		1.27	-0.11	0.012
105.00	-6.62	-0.21	0.00	-8.51	0.00	8.51	1700.21	850.10	2182.88	1083.67		1.34	-0.11	0.012
110.00	-5.90	-0.21	0.00	-7.47	0.00	7.47	1678.06	839.03	2110.21	1047.60		1.46	-0.12	0.011
115.00	-5.18	-0.20	0.00	-6.45	0.00	6.45	1655.39	827.70	2038.07	1011.78		1.58	-0.12	0.009
115.75	-5.01	-0.20	0.00	-6.29	0.00	6.29	1651.95	825.97	2027.30	1006.43		1.60	-0.12	0.009
115.75	-5.01	-0.20	0.00	-6.29	0.00	6.29	930.23	465.11	237.26	173.90		1.60	-0.12	0.042
120.00	-4.44	-0.20	0.00	-5.42	0.00	5.42	930.23	465.11	237.26	173.90		1.71	-0.12	0.036
122.00	-4.00	-0.20	0.00	-5.02	0.00	5.02	930.23	465.11	237.26	173.90		1.77	-0.15	0.033
125.00	-3.64	-0.20	0.00	-4.40	0.00	4.40	930.23	465.11	237.26	173.90		1.87	-0.18	0.029
125.50	-3.46	-0.20	0.00	-4.30	0.00	4.30	930.23	465.11	237.26	173.90		1.89	-0.18	0.028
127.00	-3.25	-0.20	0.00	-4.00	0.00	4.00	930.23	465.11	237.26	173.90		1.95	-0.19	0.026
129.00	-2.92	-0.20	0.00	-3.60	0.00	3.60	930.23	465.11	237.26	173.90		2.03	-0.21	0.024
130.00	-2.81	-0.19	0.00	-3.40	0.00	3.40	930.23	465.11	237.26	173.90		2.08	-0.22	0.023
135.00	-2.25	-0.18	0.00	-2.43	0.00	2.43	930.23	465.11	237.26	173.90		2.32	-0.25	0.016
135.25	-2.10	-0.17	0.00	-2.39	0.00	2.39	930.23	465.11	237.26	173.90		2.33	-0.25	0.016
135.25	-2.10	-0.17	0.00	-2.39	0.00	2.39	579.84	289.92	92.43	67.75		2.33	-0.25	0.039
139.00	-1.43	-0.14	0.00	-1.75	0.00	1.75	579.84	289.92	92.43	67.75		2.54	-0.27	0.028
140.00	-1.38	-0.14	0.00	-1.61	0.00	1.61	579.84	289.92	92.43	67.75		2.60	-0.29	0.026
145.00	-1.12	-0.12	0.00	-0.93	0.00	0.93	579.84	289.92	92.43	67.75		2.95	-0.38	0.016
145.12	-1.00	-0.11	0.00	-0.91	0.00	0.91	579.84	289.92	92.43	67.75		2.96	-0.38	0.015
150.00	-0.53	-0.07	0.00	-0.36	0.00	0.36	579.84	289.92	92.43	67.75		3.37	-0.42	0.006
155.00	0.00	-0.07	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75		3.82	-0.43	0.000

Calculated Forces

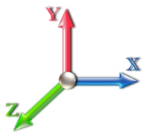
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Seismic Segment Forces (Factored)

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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**	0.12	**Iterations**	26
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.34	**SA**	0.01	**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		584.85	0.00	0.03	0.02	8.55	
10.00		576.25	0.01	0.05	0.03	11.60	
15.00		567.65	0.02	0.06	0.04	12.89	
20.00		559.05	0.03	0.07	0.04	13.42	
25.00		550.46	0.05	0.07	0.04	13.63	
30.00		541.86	0.07	0.07	0.04	13.74	
35.00		533.26	0.10	0.07	0.04	13.86	
40.00		524.66	0.13	0.07	0.03	13.99	
45.00		516.06	0.16	0.07	0.03	14.10	
48.50	Bot - Section 2	356.13	0.19	0.06	0.03	9.84	
50.00		304.71	0.20	0.06	0.02	8.44	
53.25	Top - Section 1	654.89	0.22	0.06	0.02	18.11	
55.00		176.00	0.24	0.06	0.02	4.83	
60.00		497.05	0.28	0.05	0.01	12.88	
65.00		488.45	0.33	0.04	0.01	10.89	
70.00		479.85	0.39	0.02	0.01	7.55	
75.00		471.26	0.44	0.00	0.01	2.80	
80.00		462.66	0.50	-0.02	0.01	-2.72	
85.00		454.06	0.57	-0.04	0.01	-7.81	
90.00		445.46	0.64	-0.07	0.02	-11.45	
95.00		436.86	0.71	-0.09	0.03	-13.33	
98.00	Bot - Section 3	257.99	0.76	-0.10	0.04	-8.16	
100.00		343.26	0.79	-0.11	0.05	-10.88	
102.00	Top - Section 2	340.51	0.82	-0.12	0.06	-10.64	
105.00		254.84	0.87	-0.12	0.08	-7.55	
110.00		417.85	0.95	-0.12	0.11	-10.25	
115.00		409.25	1.04	-0.10	0.15	-6.79	
115.75	Top - Section 3	110.65	1.05	-0.09	0.16	-1.68	
120.00		318.03	1.13	-0.05	0.21	-1.87	
122.00	Appurtenance(s)	291.86	1.17	-0.02	0.23	-0.23	
125.00		224.49	1.23	0.03	0.28	1.72	
125.50	Appurtenance(s)	137.42	1.24	0.04	0.28	1.26	
127.00	Appurtenance(s)	138.65	1.27	0.08	0.31	1.93	
129.00	Appurtenance(s)	222.26	1.31	0.13	0.34	4.57	
130.00		74.83	1.33	0.16	0.36	1.80	
135.00		374.15	1.43	0.35	0.47	16.25	
135.25	Top - Section 4	118.71	1.44	0.36	0.47	5.28	
139.00	Appurtenance(s)	489.42	1.52	0.55	0.57	29.90	
140.00		29.23	1.54	0.61	0.59	1.92	
145.00		146.15	1.65	0.96	0.75	13.34	
145.12	Appurtenance(s)	103.51	1.66	0.96	0.75	9.52	
150.00	Appurtenance(s)	324.25	1.77	1.41	0.93	38.89	
155.00	Appurtenance(s)	446.15	1.89	1.98	1.14	67.77	
	Totals:	**15,754.9**				**292.0**	**Total Wind:** **16,217.0**

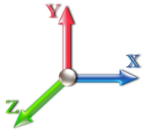
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.12			**Iterations**	26
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.04			**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.34	**SA**	0.01			**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	-18.76	-0.39	0.00	-37.12	0.00	37.12	2027.49	1013.74	3641.02	1807.56		0.00	0.00	0.030
5.00	-18.07	-0.38	0.00	-35.20	0.00	35.20	2015.42	1007.71	3566.22	1770.42		0.00	-0.01	0.029
10.00	-17.38	-0.37	0.00	-33.31	0.00	33.31	2002.83	1001.41	3491.15	1733.15		0.01	-0.01	0.028
15.00	-16.70	-0.36	0.00	-31.46	0.00	31.46	1989.72	994.86	3415.85	1695.77		0.03	-0.02	0.027
20.00	-16.03	-0.35	0.00	-29.68	0.00	29.68	1976.09	988.05	3340.37	1658.30		0.05	-0.02	0.026
25.00	-15.36	-0.33	0.00	-27.95	0.00	27.95	1961.94	980.97	3264.74	1620.75		0.08	-0.03	0.025
30.00	-14.71	-0.32	0.00	-26.28	0.00	26.28	1947.28	973.64	3189.01	1583.16		0.12	-0.04	0.024
35.00	-14.06	-0.31	0.00	-24.68	0.00	24.68	1932.09	966.05	3113.21	1545.53		0.16	-0.04	0.023
40.00	-13.42	-0.29	0.00	-23.15	0.00	23.15	1916.39	958.20	3037.39	1507.89		0.20	-0.05	0.022
45.00	-12.78	-0.28	0.00	-21.67	0.00	21.67	1900.17	950.08	2961.59	1470.26		0.26	-0.05	0.021
48.50	-12.34	-0.27	0.00	-20.69	0.00	20.69	1888.50	944.25	2908.57	1443.94		0.30	-0.06	0.021
50.00	-12.02	-0.26	0.00	-20.29	0.00	20.29	1883.43	941.71	2885.86	1432.66		0.32	-0.06	0.021
53.25	-11.32	-0.24	0.00	-19.43	0.00	19.43	1885.78	942.89	2896.38	1437.89		0.36	-0.06	0.020
55.00	-11.10	-0.24	0.00	-19.00	0.00	19.00	1879.83	939.91	2869.89	1424.73		0.38	-0.06	0.019
60.00	-10.48	-0.23	0.00	-17.80	0.00	17.80	1862.46	931.23	2794.28	1387.20		0.45	-0.07	0.018
65.00	-9.87	-0.22	0.00	-16.67	0.00	16.67	1844.57	922.28	2718.82	1349.74		0.53	-0.07	0.018
70.00	-9.27	-0.21	0.00	-15.58	0.00	15.58	1826.16	913.08	2643.55	1312.37		0.61	-0.08	0.017
75.00	-8.68	-0.21	0.00	-14.54	0.00	14.54	1807.23	903.62	2568.52	1275.12		0.69	-0.08	0.016
80.00	-8.09	-0.21	0.00	-13.51	0.00	13.51	1787.79	893.89	2493.75	1238.00		0.79	-0.09	0.015
85.00	-7.52	-0.21	0.00	-12.48	0.00	12.48	1767.82	883.91	2419.31	1201.05		0.88	-0.09	0.015
90.00	-6.95	-0.21	0.00	-11.45	0.00	11.45	1747.34	873.67	2345.22	1164.27		0.98	-0.10	0.014
95.00	-6.38	-0.20	0.00	-10.42	0.00	10.42	1726.34	863.17	2271.53	1127.68		1.09	-0.10	0.013
98.00	-6.05	-0.20	0.00	-9.81	0.00	9.81	1713.49	856.74	2227.52	1105.83		1.16	-0.11	0.012
100.00	-5.67	-0.20	0.00	-9.40	0.00	9.40	1704.82	852.41	2198.27	1091.31		1.20	-0.11	0.012
102.00	-5.30	-0.20	0.00	-8.99	0.00	8.99	1713.25	856.63	2226.72	1105.44		1.25	-0.11	0.011
105.00	-4.97	-0.20	0.00	-8.38	0.00	8.38	1700.21	850.10	2182.88	1083.67		1.32	-0.11	0.011
110.00	-4.42	-0.20	0.00	-7.36	0.00	7.36	1678.06	839.03	2110.21	1047.60		1.43	-0.12	0.010
115.00	-3.89	-0.20	0.00	-6.35	0.00	6.35	1655.39	827.70	2038.07	1011.78		1.56	-0.12	0.009
115.75	-3.76	-0.20	0.00	-6.20	0.00	6.20	1651.95	825.97	2027.30	1006.43		1.58	-0.12	0.008
115.75	-3.76	-0.20	0.00	-6.20	0.00	6.20	930.23	465.11	237.26	173.90		1.58	-0.12	0.040
120.00	-3.33	-0.20	0.00	-5.34	0.00	5.34	930.23	465.11	237.26	173.90		1.68	-0.12	0.034
122.00	-3.00	-0.20	0.00	-4.94	0.00	4.94	930.23	465.11	237.26	173.90		1.74	-0.14	0.032
125.00	-2.73	-0.20	0.00	-4.34	0.00	4.34	930.23	465.11	237.26	173.90		1.84	-0.17	0.028
125.50	-2.59	-0.20	0.00	-4.24	0.00	4.24	930.23	465.11	237.26	173.90		1.86	-0.18	0.027
127.00	-2.44	-0.20	0.00	-3.94	0.00	3.94	930.23	465.11	237.26	173.90		1.92	-0.19	0.025
129.00	-2.19	-0.19	0.00	-3.54	0.00	3.54	930.23	465.11	237.26	173.90		2.00	-0.21	0.023
130.00	-2.11	-0.19	0.00	-3.35	0.00	3.35	930.23	465.11	237.26	173.90		2.04	-0.21	0.022
135.00	-1.68	-0.17	0.00	-2.40	0.00	2.40	930.23	465.11	237.26	173.90		2.28	-0.24	0.016
135.25	-1.57	-0.17	0.00	-2.35	0.00	2.35	930.23	465.11	237.26	173.90		2.30	-0.25	0.015
135.25	-1.57	-0.17	0.00	-2.35	0.00	2.35	579.84	289.92	92.43	67.75		2.30	-0.25	0.037
139.00	-1.07	-0.14	0.00	-1.73	0.00	1.73	579.84	289.92	92.43	67.75		2.50	-0.26	0.027
140.00	-1.03	-0.14	0.00	-1.59	0.00	1.59	579.84	289.92	92.43	67.75		2.55	-0.28	0.025
145.00	-0.84	-0.12	0.00	-0.91	0.00	0.91	579.84	289.92	92.43	67.75		2.90	-0.37	0.015
145.12	-0.75	-0.11	0.00	-0.90	0.00	0.90	579.84	289.92	92.43	67.75		2.91	-0.37	0.015
150.00	-0.40	-0.07	0.00	-0.35	0.00	0.35	579.84	289.92	92.43	67.75		3.32	-0.41	0.006
155.00	0.00	-0.07	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75		3.76	-0.43	0.000

Calculated Forces

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (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	

Wind Loading - Shaft

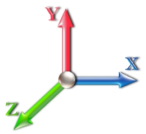
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 29

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	205.25	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	202.27	0.750	0.000	5.00	18.418	13.81	113.1	0.0	584.8
10.00		1.00	0.85	7.442	8.19	199.30	0.750	0.000	5.00	18.148	13.61	111.4	0.0	576.3
15.00		1.00	0.85	7.442	8.19	196.32	0.750	0.000	5.00	17.879	13.41	109.8	0.0	567.7
20.00		1.00	0.90	7.896	8.69	199.15	0.750	0.000	5.00	17.610	13.21	114.7	0.0	559.1
25.00		1.00	0.95	8.276	9.10	200.74	0.750	0.000	5.00	17.341	13.01	118.4	0.0	550.5
30.00		1.00	0.98	8.600	9.46	201.43	0.750	0.000	5.00	17.072	12.80	121.1	0.0	541.9
35.00		1.00	1.01	8.883	9.77	201.47	0.750	0.000	5.00	16.802	12.60	123.1	0.0	533.3
40.00		1.00	1.04	9.137	10.05	201.03	0.750	0.000	5.00	16.533	12.40	124.6	0.0	524.7
45.00		1.00	1.07	9.366	10.30	200.19	0.750	0.000	5.00	16.264	12.20	125.7	0.0	516.1
48.50	Bot - Section 2	1.00	1.09	9.515	10.47	199.42	0.750	0.000	3.50	11.225	8.42	88.1	0.0	356.1
50.00		1.00	1.09	9.576	10.53	199.05	0.750	0.000	1.50	4.834	3.63	38.2	0.0	304.7
53.25	Top - Section 1	1.00	1.11	9.704	10.67	198.16	0.750	0.000	3.25	10.390	7.79	83.2	0.0	654.9
55.00		1.00	1.12	9.770	10.75	200.33	0.750	0.000	1.75	5.548	4.16	44.7	0.0	176.0
60.00		1.00	1.14	9.951	10.95	198.73	0.750	0.000	5.00	15.669	11.75	128.6	0.0	497.1
65.00		1.00	1.16	10.120	11.13	196.94	0.750	0.000	5.00	15.400	11.55	128.6	0.0	488.5
70.00		1.00	1.17	10.279	11.31	194.98	0.750	0.000	5.00	15.130	11.35	128.3	0.0	479.9
75.00		1.00	1.19	10.430	11.47	192.88	0.750	0.000	5.00	14.861	11.15	127.9	0.0	471.3
80.00		1.00	1.21	10.572	11.63	190.64	0.750	0.000	5.00	14.592	10.94	127.3	0.0	462.7
85.00		1.00	1.22	10.708	11.78	188.29	0.750	0.000	5.00	14.323	10.74	126.5	0.0	454.1
90.00		1.00	1.24	10.838	11.92	185.83	0.750	0.000	5.00	14.054	10.54	125.7	0.0	445.5
95.00		1.00	1.25	10.962	12.06	183.28	0.750	0.000	5.00	13.784	10.34	124.7	0.0	436.9
98.00	Bot - Section 3	1.00	1.26	11.034	12.14	181.70	0.750	0.000	3.00	8.141	6.11	74.1	0.0	258.0
100.00		1.00	1.27	11.081	12.19	180.64	0.750	0.000	2.00	5.459	4.09	49.9	0.0	343.3
102.00	Top - Section 2	1.00	1.27	11.127	12.24	179.56	0.750	0.000	2.00	5.416	4.06	49.7	0.0	340.5
105.00		1.00	1.28	11.195	12.31	180.80	0.750	0.000	3.00	8.043	6.03	74.3	0.0	254.8
110.00		1.00	1.29	11.305	12.44	178.01	0.750	0.000	5.00	13.189	9.89	123.0	0.0	417.9
115.00		1.00	1.30	11.412	12.55	175.16	0.750	0.000	5.00	12.920	9.69	121.6	0.0	409.3
115.75	Top - Section 3	1.00	1.31	11.427	12.57	174.73	0.750	0.000	0.75	1.915	1.44	18.1	0.0	60.6
120.00		1.00	1.32	11.514	12.67	45.87	0.837	0.000	4.25	2.833	2.37	30.0	0.0	318.0
122.00	Appurtenance(s)	1.00	1.32	11.554	12.71	45.95	0.836	0.000	2.00	1.333	1.11	14.2	0.0	149.7
125.00		1.00	1.33	11.614	12.78	46.07	0.834	0.000	3.00	2.000	1.67	21.3	0.0	224.5
125.50	Appurtenance(s)	1.00	1.33	11.623	12.79	46.09	0.833	0.000	0.50	0.333	0.28	3.6	0.0	37.4
127.00	Appurtenance(s)	1.00	1.33	11.653	12.82	46.15	0.832	0.000	1.50	1.000	0.83	10.7	0.0	112.2
129.00	Appurtenance(s)	1.00	1.34	11.691	12.86	46.22	0.831	0.000	2.00	1.333	1.11	14.2	0.0	149.7
130.00		1.00	1.34	11.710	12.88	46.26	0.830	0.000	1.00	0.667	0.55	7.1	0.0	74.8
135.00		1.00	1.35	11.803	12.98	46.44	0.827	0.000	5.00	3.333	2.76	35.8	0.0	374.2
135.25	Top - Section 4	1.00	1.35	11.808	12.99	46.45	0.827	0.000	0.25	0.167	0.14	1.8	0.0	18.7
139.00	Appurtenance(s)	1.00	1.36	11.876	13.06	29.12	1.200	0.000	3.75	1.563	1.88	24.5	0.0	109.6
140.00		1.00	1.36	11.894	13.08	29.14	1.200	0.000	1.00	0.417	0.50	6.5	0.0	29.2
145.00		1.00	1.37	11.982	13.18	29.25	1.200	0.000	5.00	2.083	2.50	33.0	0.0	146.2
145.12	Appurtenance(s)	1.00	1.37	11.984	13.18	29.25	1.200	0.000	0.12	0.050	0.06	0.8	0.0	3.5
150.00	Appurtenance(s)	1.00	1.38	12.068	13.27	29.35	1.200	0.000	4.88	2.033	2.44	32.4	0.0	142.6
155.00	Appurtenance(s)	1.00	1.39	12.152	13.37	29.45	1.200	0.000	5.00	2.083	2.50	33.4	0.0	146.2
								Totals:	**155.00**			**3,113.6**		**14,302.3**

Discrete Appurtenance Forces

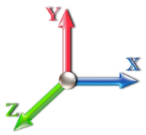
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 29

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	155.00	Truck Ball	1	12.152	13.367	1.00	1.00	3.77	50.00	0.000	0.000	50.39	0.00	0.00
2	155.00	Flag (20'x30')	1	12.152	13.367	1.00	1.00	14.56	200.00	0.000	0.000	194.62	0.00	0.00
3	155.00	27" Canister	1	12.152	13.367	1.00	1.00	5.07	50.00	0.000	0.000	67.77	0.00	0.00
4	150.00	RFS ACU-A20-N	4	12.068	13.275	1.00	1.00	0.00	4.00	0.000	0.000	0.00	0.00	0.00
5	150.00	CCI DPO-7126Y-0-T1	3	12.068	13.275	1.00	1.00	0.00	21.90	0.000	0.000	0.00	0.00	0.00
6	150.00	RFS	3	12.068	13.275	1.00	1.00	0.00	19.50	0.000	0.000	0.00	0.00	0.00
7	150.00	Commscope	3	12.068	13.275	1.00	1.00	0.00	136.20	0.000	0.000	0.00	0.00	0.00
8	145.12	27" Canister & 36"	1	11.984	13.183	1.00	1.00	12.37	100.00	0.000	0.000	163.07	0.00	0.00
9	139.00	DBC0062F3V52-1	6	11.876	13.064	1.00	1.00	0.00	39.60	0.000	0.000	0.00	0.00	0.00
10	139.00	DTMABP0723VG12A	6	11.876	13.064	1.00	1.00	0.00	115.20	0.000	0.000	0.00	0.00	0.00
11	139.00	TPA-65R-LCUUUU-H8	3	11.876	13.064	1.00	1.00	0.00	225.00	0.000	0.000	0.00	0.00	0.00
12	135.25	36" Canister & 29"	1	11.808	12.989	1.00	1.00	12.55	100.00	0.000	0.000	163.01	0.00	0.00
13	129.00	APX18-206517S-C-A20	3	11.691	12.860	1.00	1.00	0.00	72.60	0.000	0.000	0.00	0.00	0.00
14	127.00	CBC721-DF	6	11.653	12.818	1.00	1.00	0.00	26.40	0.000	0.000	0.00	0.00	0.00
15	125.50	29" Canister & 30"	1	11.623	12.786	1.00	1.00	10.75	100.00	0.000	0.000	137.45	0.00	0.00
16	122.00	SBNHH-1D6565A	3	11.554	12.710	1.00	1.00	0.00	142.20	0.000	0.000	0.00	0.00	0.00
17	115.75	30" Canister	1	11.427	12.570	1.00	1.00	5.50	50.00	0.000	0.000	69.13	0.00	0.00
							Totals:		**1,452.60**			**845.45**		

Total Applied Force Summary

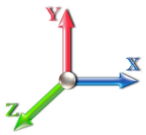
Structure:	CT46141-A-SBA		**Code:**	EIA/TIA-222-G	2/16/2018
Site Name:	Water Treatment Plant 2, CT		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 28

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 29

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		113.08	772.95	0.00	0.00
10.00		111.42	764.35	0.00	0.00
15.00		109.77	755.75	0.00	0.00
20.00		114.72	747.15	0.00	0.00
25.00		118.40	738.56	0.00	0.00
30.00		121.12	729.96	0.00	0.00
35.00		123.14	721.36	0.00	0.00
40.00		124.62	712.76	0.00	0.00
45.00		125.67	704.16	0.00	0.00
48.50		88.11	487.80	0.00	0.00
50.00		38.19	361.14	0.00	0.00
53.25		83.18	777.16	0.00	0.00
55.00		44.72	241.83	0.00	0.00
60.00		128.63	685.15	0.00	0.00
65.00		128.57	676.55	0.00	0.00
70.00		128.31	667.95	0.00	0.00
75.00		127.87	659.36	0.00	0.00
80.00		127.27	650.76	0.00	0.00
85.00		126.53	642.16	0.00	0.00
90.00		125.65	633.56	0.00	0.00
95.00		124.66	624.96	0.00	0.00
98.00		74.11	370.85	0.00	0.00
100.00		49.90	418.50	0.00	0.00
102.00		49.71	415.75	0.00	0.00
105.00		74.28	367.70	0.00	0.00
110.00		123.01	605.95	0.00	0.00
115.00		121.64	597.35	0.00	0.00
115.75	(1) attachments	87.19	138.86	0.00	0.00
120.00		30.04	477.92	0.00	0.00
122.00	(3) attachments	14.16	367.10	0.00	0.00
125.00		21.30	299.91	0.00	0.00
125.50	(1) attachments	141.00	149.99	0.00	0.00
127.00	(6) attachments	10.67	176.36	0.00	0.00
129.00	(3) attachments	14.24	272.54	0.00	0.00
130.00		7.13	93.73	0.00	0.00
135.00		35.78	468.65	0.00	0.00
135.25	(1) attachments	164.80	123.43	0.00	0.00
139.00	(15) attachments	24.49	560.29	0.00	0.00
140.00		6.54	41.89	0.00	0.00
145.00		32.95	209.45	0.00	0.00
145.12	(1) attachments	163.86	105.03	0.00	0.00
150.00	(13) attachments	32.39	386.03	0.00	0.00
155.00	(3) attachments	346.20	446.15	0.00	0.00
	Totals:	**3,959.06**	**20,848.83**	**0.00**	**0.00**

Calculated Forces

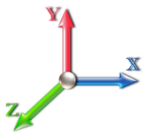
Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 29

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	-20.85	-3.97	0.00	-343.00	0.00	343.00	2027.49	1013.74	3641.02	1807.56	0.00	0.000	0.000	0.200
5.00	-20.07	-3.88	0.00	-323.16	0.00	323.16	2015.42	1007.71	3566.22	1770.42	0.03	-0.057	0.000	0.193
10.00	-19.30	-3.78	0.00	-303.78	0.00	303.78	2002.83	1001.41	3491.15	1733.15	0.12	-0.114	0.000	0.185
15.00	-18.54	-3.69	0.00	-284.87	0.00	284.87	1989.72	994.86	3415.85	1695.77	0.27	-0.169	0.000	0.177
20.00	-17.79	-3.59	0.00	-266.43	0.00	266.43	1976.09	988.05	3340.37	1658.30	0.48	-0.224	0.000	0.170
25.00	-17.05	-3.48	0.00	-248.50	0.00	248.50	1961.94	980.97	3264.74	1620.75	0.74	-0.277	0.000	0.162
30.00	-16.32	-3.37	0.00	-231.09	0.00	231.09	1947.28	973.64	3189.01	1583.16	1.06	-0.329	0.000	0.154
35.00	-15.60	-3.26	0.00	-214.24	0.00	214.24	1932.09	966.05	3113.21	1545.53	1.43	-0.379	0.000	0.147
40.00	-14.88	-3.14	0.00	-197.95	0.00	197.95	1916.39	958.20	3037.39	1507.89	1.85	-0.429	0.000	0.139
45.00	-14.18	-3.02	0.00	-182.26	0.00	182.26	1900.17	950.08	2961.59	1470.26	2.33	-0.476	0.000	0.131
48.50	-13.69	-2.93	0.00	-171.69	0.00	171.69	1888.50	944.25	2908.57	1443.94	2.69	-0.509	0.000	0.126
50.00	-13.33	-2.90	0.00	-167.29	0.00	167.29	1883.43	941.71	2885.86	1432.66	2.85	-0.523	0.000	0.124
53.25	-12.55	-2.81	0.00	-157.88	0.00	157.88	1885.78	942.89	2896.38	1437.89	3.22	-0.552	0.000	0.116
55.00	-12.31	-2.77	0.00	-152.97	0.00	152.97	1879.83	939.91	2869.89	1424.73	3.42	-0.567	0.000	0.114
60.00	-11.62	-2.64	0.00	-139.12	0.00	139.12	1862.46	931.23	2794.28	1387.20	4.04	-0.608	0.000	0.107
65.00	-10.94	-2.51	0.00	-125.92	0.00	125.92	1844.57	922.28	2718.82	1349.74	4.70	-0.647	0.000	0.099
70.00	-10.28	-2.38	0.00	-113.36	0.00	113.36	1826.16	913.08	2643.55	1312.37	5.40	-0.685	0.000	0.092
75.00	-9.62	-2.25	0.00	-101.44	0.00	101.44	1807.23	903.62	2568.52	1275.12	6.13	-0.720	0.000	0.085
80.00	-8.97	-2.12	0.00	-90.18	0.00	90.18	1787.79	893.89	2493.75	1238.00	6.90	-0.753	0.000	0.078
85.00	-8.32	-1.99	0.00	-79.57	0.00	79.57	1767.82	883.91	2419.31	1201.05	7.71	-0.784	0.000	0.071
90.00	-7.69	-1.86	0.00	-69.61	0.00	69.61	1747.34	873.67	2345.22	1164.27	8.55	-0.813	0.000	0.064
95.00	-7.07	-1.73	0.00	-60.31	0.00	60.31	1726.34	863.17	2271.53	1127.68	9.41	-0.840	0.000	0.058
98.00	-6.70	-1.65	0.00	-55.12	0.00	55.12	1713.49	856.74	2227.52	1105.83	9.94	-0.855	0.000	0.054
100.00	-6.28	-1.60	0.00	-51.82	0.00	51.82	1704.82	852.41	2198.27	1091.31	10.30	-0.864	0.000	0.051
102.00	-5.87	-1.54	0.00	-48.63	0.00	48.63	1713.25	856.63	2226.72	1105.44	10.67	-0.874	0.000	0.047
105.00	-5.50	-1.46	0.00	-44.00	0.00	44.00	1700.21	850.10	2182.88	1083.67	11.22	-0.887	0.000	0.044
110.00	-4.89	-1.33	0.00	-36.69	0.00	36.69	1678.06	839.03	2110.21	1047.60	12.16	-0.906	0.000	0.038
115.00	-4.30	-1.20	0.00	-30.03	0.00	30.03	1655.39	827.70	2038.07	1011.78	13.12	-0.922	0.000	0.032
115.75	-4.16	-1.11	0.00	-29.13	0.00	29.13	1651.95	825.97	2027.30	1006.43	13.26	-0.925	0.000	0.031
115.75	-4.16	-1.11	0.00	-29.13	0.00	29.13	930.23	465.11	237.26	173.90	13.26	-0.925	0.000	0.172
120.00	-3.68	-1.08	0.00	-24.40	0.00	24.40	930.23	465.11	237.26	173.90	14.09	-0.937	0.000	0.144
122.00	-3.31	-1.06	0.00	-22.24	0.00	22.24	930.23	465.11	237.26	173.90	14.51	-1.035	0.000	0.131
125.00	-3.01	-1.04	0.00	-19.05	0.00	19.05	930.23	465.11	237.26	173.90	15.20	-1.166	0.000	0.113
125.50	-2.87	-0.90	0.00	-18.52	0.00	18.52	930.23	465.11	237.26	173.90	15.32	-1.186	0.000	0.110
127.00	-2.69	-0.89	0.00	-17.18	0.00	17.18	930.23	465.11	237.26	173.90	15.70	-1.243	0.000	0.102
129.00	-2.42	-0.87	0.00	-15.40	0.00	15.40	930.23	465.11	237.26	173.90	16.24	-1.311	0.000	0.091
130.00	-2.32	-0.86	0.00	-14.53	0.00	14.53	930.23	465.11	237.26	173.90	16.52	-1.343	0.000	0.086
135.00	-1.85	-0.82	0.00	-10.21	0.00	10.21	930.23	465.11	237.26	173.90	18.00	-1.473	0.000	0.061
135.25	-1.73	-0.65	0.00	-10.00	0.00	10.00	930.23	465.11	237.26	173.90	18.07	-1.479	0.000	0.059
135.25	-1.73	-0.65	0.00	-10.00	0.00	10.00	579.84	289.92	92.43	67.75	18.07	-1.479	0.000	0.151
139.00	-1.17	-0.61	0.00	-7.56	0.00	7.56	579.84	289.92	92.43	67.75	19.26	-1.548	0.000	0.114
140.00	-1.13	-0.61	0.00	-6.94	0.00	6.94	579.84	289.92	92.43	67.75	19.60	-1.649	0.000	0.104
145.00	-0.92	-0.58	0.00	-3.88	0.00	3.88	579.84	289.92	92.43	67.75	21.54	-2.023	0.000	0.059
145.12	-0.82	-0.41	0.00	-3.81	0.00	3.81	579.84	289.92	92.43	67.75	21.59	-2.029	0.000	0.058
150.00	-0.43	-0.36	0.00	-1.82	0.00	1.82	579.84	289.92	92.43	67.75	23.77	-2.219	0.000	0.028
155.00	0.00	-0.35	0.00	0.00	0.00	0.00	579.84	289.92	92.43	67.75	26.14	-2.282	0.000	0.000

Final Analysis Summary

Structure:	CT46141-A-SBA	**Code:**	EIA/TIA-222-G	2/16/2018	
Site Name:	Water Treatment Plant 2, CT	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

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	16.3	0.00	24.98	0.00	0.00	1395.46
0.9D + 1.6W 97 mph Wind	16.3	0.00	18.73	0.00	0.00	1378.91
1.2D + 1.0Di + 1.0Wi 50 mph Wind	5.3	0.00	40.54	0.00	0.00	490.15
1.2D + 1.0E	0.4	0.00	25.02	0.00	0.00	37.62
0.9D + 1.0E	0.4	0.00	18.76	0.00	0.00	37.12
1.0D + 1.0W 60 mph Wind	4.0	0.00	20.85	0.00	0.00	343.00

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	-24.98	-16.27	0.00	-1395.4	0.00	-1395.4	2027.49	1013.7	3641.02	1807.56	0.00	0.785
0.9D + 1.6W 97 mph Wind	-18.73	-16.26	0.00	-1378.9	0.00	-1378.9	2027.49	1013.7	3641.02	1807.56	0.00	0.772
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-40.54	-5.27	0.00	-490.15	0.00	-490.15	2027.49	1013.7	3641.02	1807.56	0.00	0.291
1.2D + 1.0E	-5.01	-0.20	0.00	-6.29	0.00	-6.29	1651.95	825.97	2027.30	1006.43	115.75	0.042
0.9D + 1.0E	-3.76	-0.20	0.00	-6.20	0.00	-6.20	1651.95	825.97	2027.30	1006.43	115.75	0.040
1.0D + 1.0W 60 mph Wind	-20.85	-3.97	0.00	-343.00	0.00	-343.00	2027.49	1013.7	3641.02	1807.56	0.00	0.200

Pier Foundation Design For Monopole

			Date: 2/16/2018
Customer Name:	**Sprint Nextel**	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	155
Site Number:	CT46141-A-SBA	**Engineer Name:**	J. Tibbetts
Engr. Number:	47578	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

Analysis or Design? Analysis

Acceptable overstress (5.0%

Base Reactions (Factored):

Axial Load (Kips):	25.0	Shear Force (Kips):	16.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1395.5

Foundation Geometries:

Mods required -Yes/No ?:	No			ft.
Diameter of Pier (ft.):	6.0	Depth of Base B. G. S. :	29.0	ft.
Pier Height A. G. (ft.):	1.00			

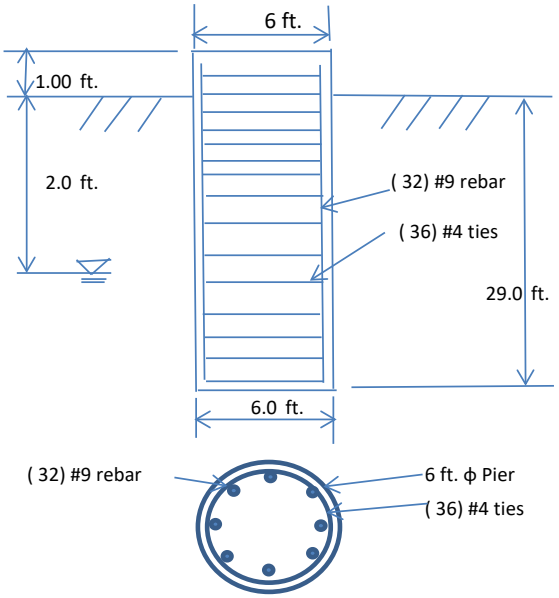
Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	60	ksi
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	32	Tie Spacing:	12.0	in.
Concrete Cover (in.):	3	Concrete unit weight:	150.0	pcf

Soil Design Parameters:

Water Table B.G.S. (ft):	2.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.0	Pullout failure Angle:	30	(°)

Skin Frictions are to be obtained from: Soil Report



Monopole Pier Foundation

Depth of Layers (ft) Top	Depth of Layers (ft) Bottom	γ_{soil} (pcf)	ϕ (°)	Cohesion (psf)	Ultimate Skin Friction (psf)	Ultimate Bearing (psf)	Soil Types
0.0	3.0	130	0	0			Sand
3.0	30.0	130	34	0			Sand
30.0	35.0	130					

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Soil Bearing Strength Reduction Factor:	0.75	
Total Dry Soil Volume from Conical Failure (cu. Ft.):	2224	Dry Soil Weight from Conical Failure:	289	Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	10837	Buoyant Soil Weight from Conical Failure (Ki	944	Kips
Total Dry Concrete Volume (cu. Ft.):	85	Total Dry Concrete Weight:	12.7	Kips
Total Buoyant Concrete Volume (cu. Ft.):	763.4	Total Buoyant Concrete Weight:	66.87	Kips
Total Effective Concrete Weight (Kips):	79.6	Total Effective Soil Weight:	1233.0	Kips
Total Effective Vertical Load on Base (Kips):	30.7			

Check Soil Capacities:

					Usage	
Allowable Foundation Overturning Resistance (kips-ft.):	7490.5	>	Design Factored Momont (kips-ft):	1732	0.23	OK!
Factor of Safety of Passive Soil Resistance against Moment:	4.32	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	

Reinforcing Concrete Pier:

					Usage	
Vertical Steel Rebar Area (sq. in./each):	1.00		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4465.7	>	Design Factored Moment (Mu, K-Ft):	1463.7	0.33	OK!
Calculated Shear Capacity (Kips):	818.1	>	Design Factored Shear (Kips):	129.6	0.16	OK!
Calculated Tension Capacity (Tn, Kips):	1728.0	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7142	>	Design Factored Axial Load (Pu Kips):	25.0	0.00	OK!
Moment & Axial Strength Combination:	0.33	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.	
Pier Reinforcement Ratio:	0.008	Reinforcement Ratio is satisfied per ACI				

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: WATER TREATMENT PLANT

SITE NUMBER: CT33XC579

AUGMENT ID: CT33XC579Q17.1

SITE ADDRESS: 1 WESTERBERG DRIVE
FARMINGTON, CT 06032

JURISDICTION: TOWN OF FARMINGTON/ CT SITING COUNCIL

SITE TYPE: EXISTING 155' FLAGPOLE

PROGRAM: DO MACRO UPGRADE EQUIPMENT DEPLOYMENT

PROJECT INFORMATION

SITE INFORMATION

LATTITUDE: (PER SBA RECORD)	41° 43' 49.80" N (41.7305°)
LONGITUDE: (PER SBA RECORD)	72° 50' 07.80" W (-72.8355°)
GROUND ELEVATION:	168'± AMSL (PER GOOGLE EARTH)
STRUCTURE HEIGHT:	155'± AGL (FROM RECORD STRUCTURAL)
STRUCTURE TYPE:	FLAGPOLE
ZONING JURISDICTION	TOWN OF FARMINGTON/ CT SITING COUNCIL
ZONING DISTRICT/ OCCUPANCY:	R40 (RESIDENTIAL)
COUNTY:	HARTFORD

APPLICANT

SPRINT
1 INTERNATIONAL BLVD. SUITE 800
MAHWAH, NJ 07495

PROPERTY OWNER:

N/F STEPHEN G. & BARBARA L. BORRELLI
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

TOWER OWNER:

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

SBA SITE ID:	CT46141-A
SBA SITE NAME:	WATER TREATMENT PLANT 2, CT

SBA CONTACT:

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

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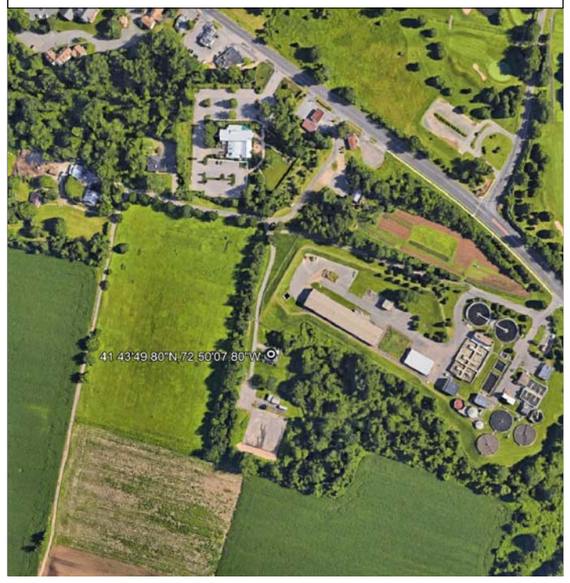
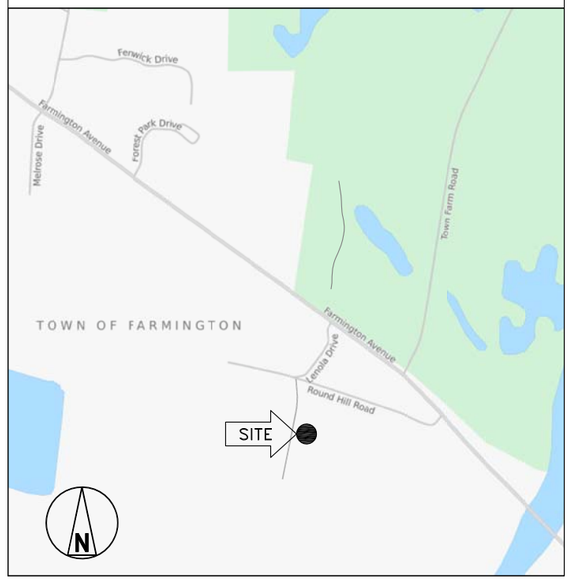
LOCATION MAP N.T.S.



AREA MAP N.T.S.



SCOPE OF WORK

1. REMOVE (3) EXISTING SPRINT PANEL ANTENNAS AND REPLACE WITH (3) NEW SPRINT PANEL ANTENNAS.
2. INSTALL (3) NEW SPRINT 2500 MHz RRHS.
3. INSTALL (6) NEW SPRINT 800 MHz RRHS.

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 MOUNTING DETAILS	0
S-2	RRH MOUNTING 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: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

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

CHECKED BY: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

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

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

CHECKED BY: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

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 ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
   c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED PER SPRINT TS 0200 CURRENT VERSION.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA–NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE–EN 2012–001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

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

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF–AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF–AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF–AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF–AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

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

SUMMARY:

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

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

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START–UP REQUIREMENTS

DC CIRCUIT BREAKER LABELING

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

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

SUMMARY:

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

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

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START–UP REQUIREMENTS

SUPPORTING DEVICES:

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

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

SUPPORTING DEVICES:

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

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

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

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

E. USE VIBRATION AND SHOCK–RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

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

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

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

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

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

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

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

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

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

HUBS AND BOXES:

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

B. CABLE TERMINATION FITTINGS FOR CONDUIT
1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O–Z/GEDNEY OR EQUAL.
2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

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

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

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

SUPPLEMENTAL GROUNDING SYSTEM

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

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

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

EXISTING STRUCTURE:

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

CONDUIT AND CONDUCTOR INSTALLATION:

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

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

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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: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

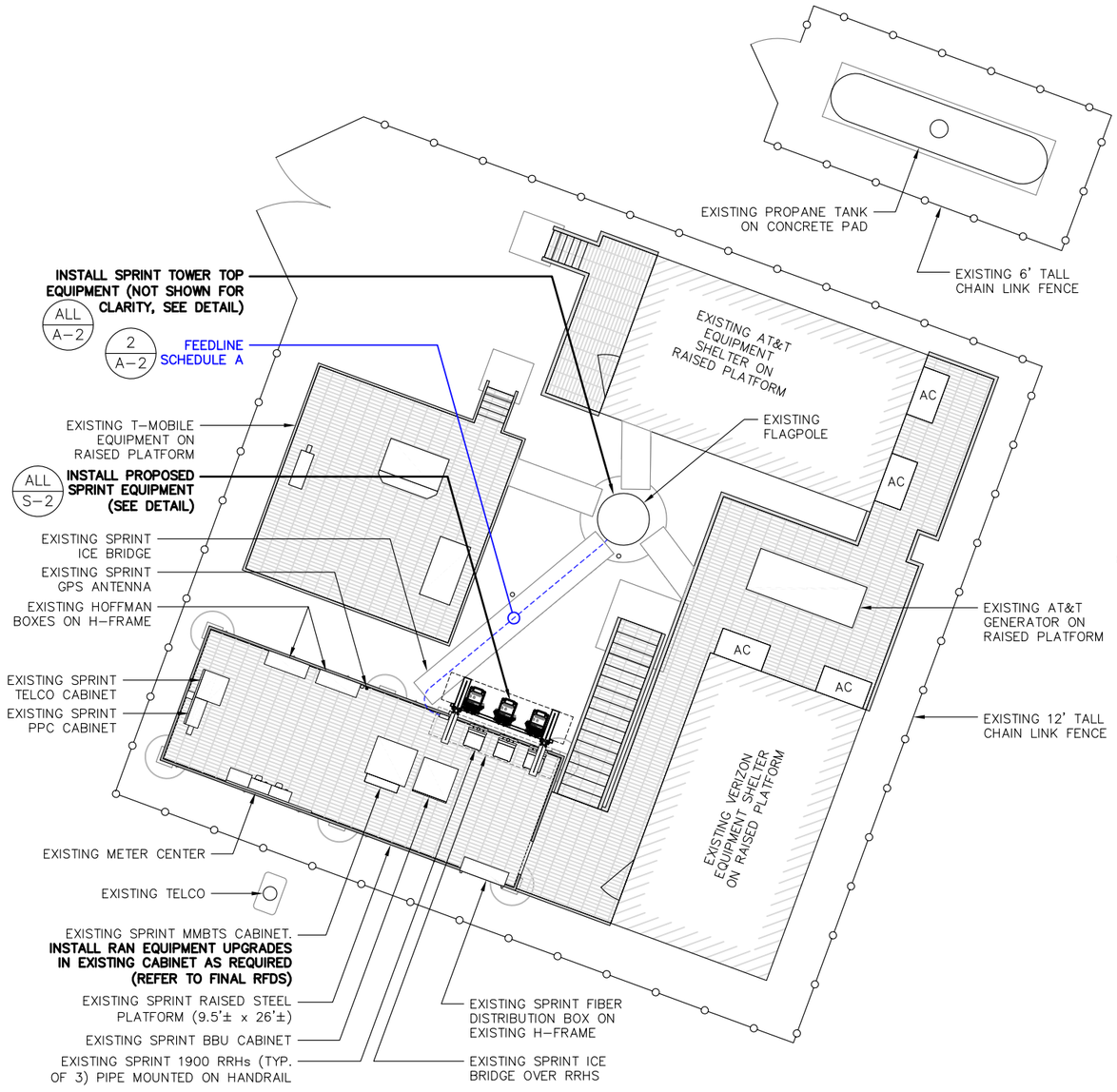
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP–3



COMPOSITE PLAN

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

1 / A-1

10 5 0 10

IMAGE SOURCE: PROTERRA 11/07/2017
(VIEW FROM SOUTHWEST)

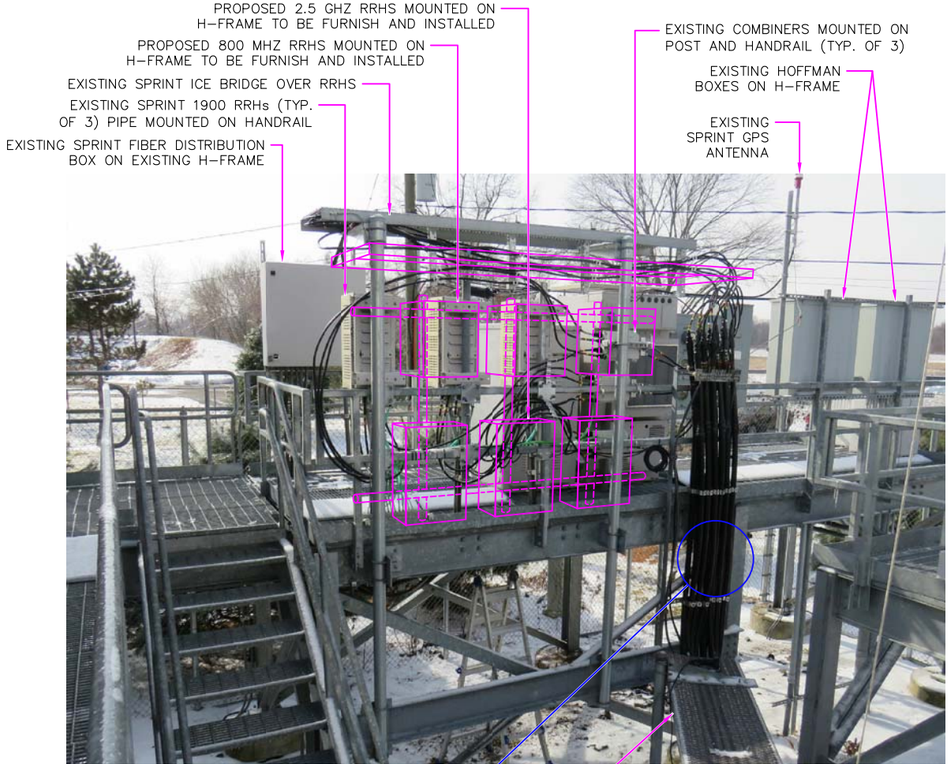


IMAGE SOURCE: PROTERRA 11/07/2017
(VIEW FROM NORTHEAST)

EQUIPMENT PLAN PHOTO DETAIL

SCALE: N.T.S.

2 / A-1

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WATER TREATMENT PLANT

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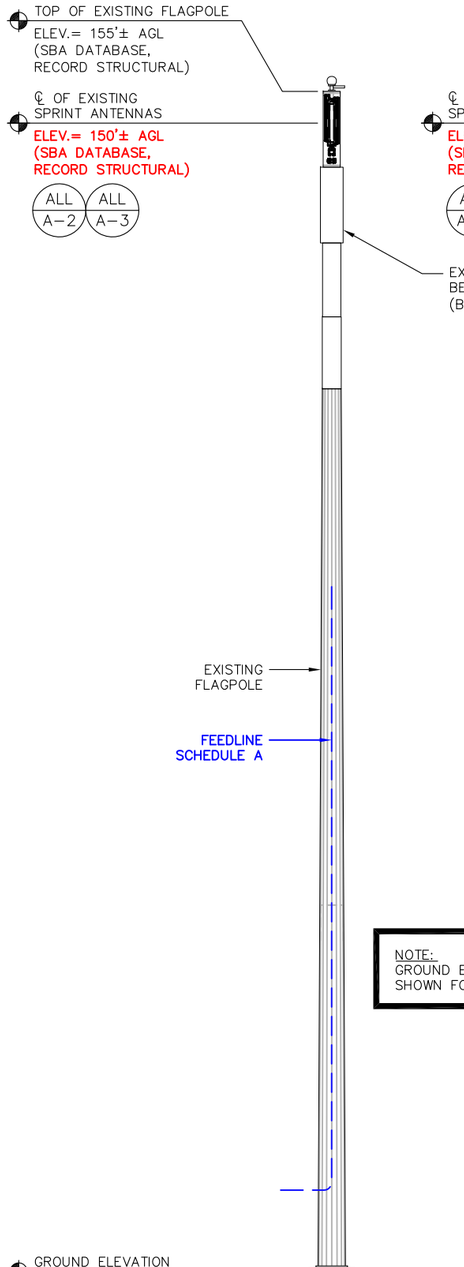
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
A-1



ELEVATION

1 / A-2

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

20 10 0 20

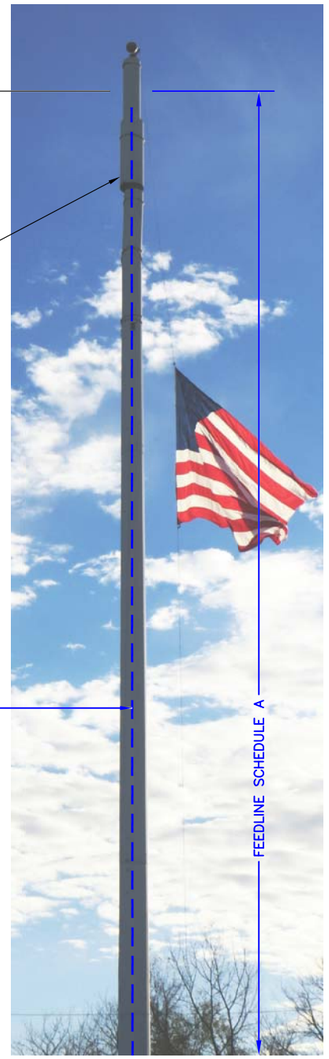


IMAGE SOURCE: PROTERRA 11/07/2017

NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (12) 1⅝" COAX TO 150' RAD, (6 ACTIVE, 6 UNUSED) EXISTING TO REMAIN: (3) ⅜" RET TO 150' RAD	UP INSIDE FLAGPOLE TO RAD

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

TOWER ELEVATION PHOTO DETAIL

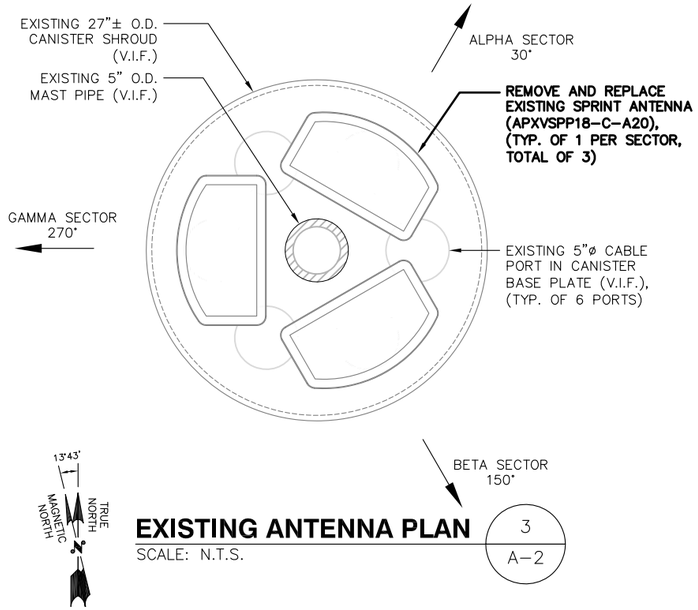
2 / A-2

SCALE: N.T.S.

SPECIAL 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.

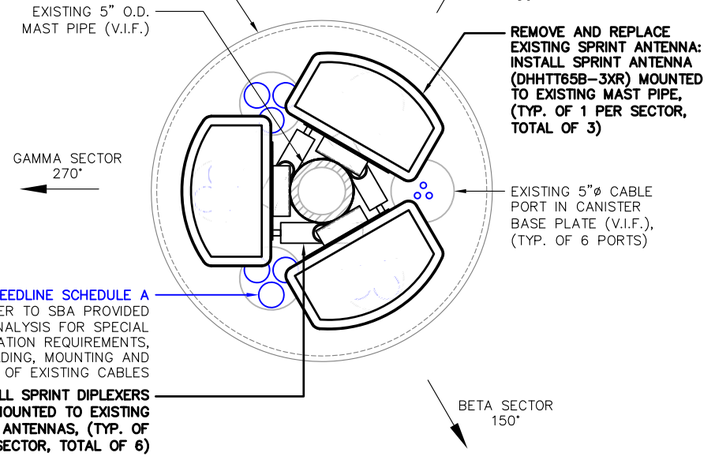
SPECIAL WORK NOTE (EXISTING SBA-PROVIDED WINDBAND CLAMPS):
GENERAL CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND USER MANUAL FOR UNFASTENING AND REFASTENING EXISTING SBA-PROVIDED WINDBAND CLAMPS. ANY DAMAGED CANISTER SHROUDS OR DAMAGED WINDBAND CLAMPS LOCATED AT THE SPRINT RAD SHALL BE REPLACED AT NO COST TO SBA.



EXISTING ANTENNA PLAN

3 / A-2

SCALE: N.T.S.



PROPOSED ANTENNA PLAN

4 / A-2

SCALE: N.T.S.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

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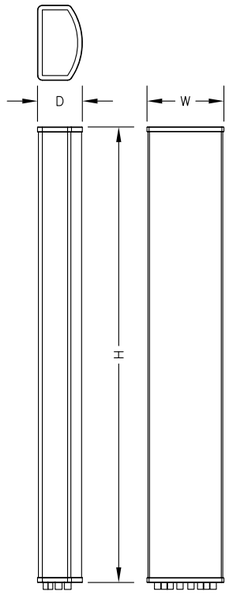
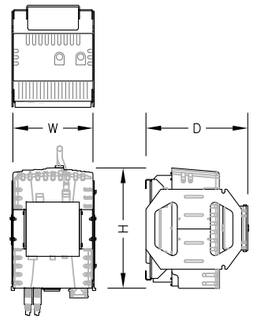
SHEET TITLE
ELEVATION AND ANTENNA PLANS

SHEET NUMBER
A-2



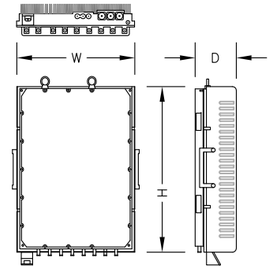
ANTENNA SPECIFICATIONS	
MANUF.	COMMSCOPE
MODEL #	DHHTT65B-3XR
HEIGHT	72.1"
WIDTH	11.9"
DEPTH	7.1"
WEIGHT	45.4 ± LBS.

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.



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

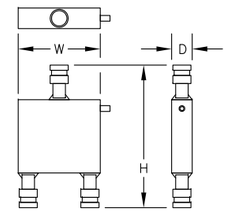
2.5 GHz RRH DETAIL 3 / A-3
SCALE: N.T.S.

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	COMMSCOPE DHHTT65B-3XR	SPRINT
2500 RRH	3	EA	NOKIA (ALU) TD-RRH8x20-25	SPRINT
800 RRH	3	EA	NOKIA (ALU) 800MHz 2x50W	SPRINT
DIPLEXER	6	EA	RFS FD9R6004/1C-3L	SPRINT

SPRINT-PROVIDED EQUIPMENT SCHEDULE 4 / A-3
SCALE: N.T.S.



800/1900 MHZ DIPLEXER SPECIFICATIONS	
MANUF.	RFS
MODEL #	FD9R6004/1C-3L
HEIGHT	6.5"
WIDTH	5.8"
DEPTH	1.5"
WEIGHT	2.6 ± LBS

2.5 GHz RRH DETAIL 5 / A-3
SCALE: N.T.S.

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

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

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: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

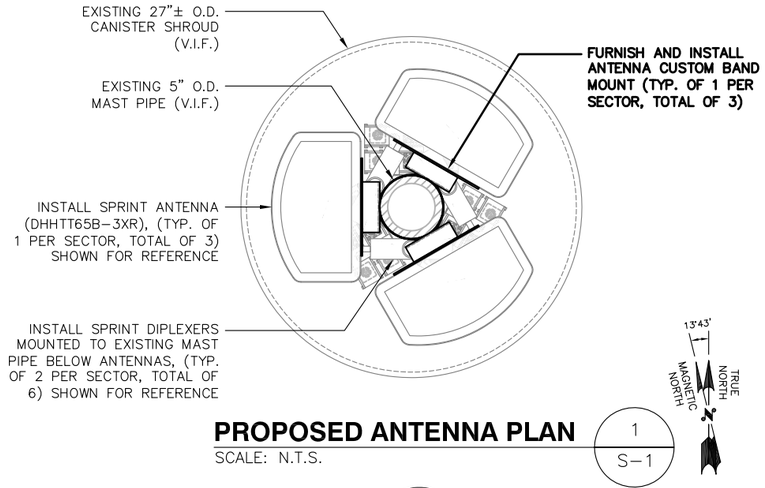
REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT

SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
TOWER EQUIPMENT DETAILS

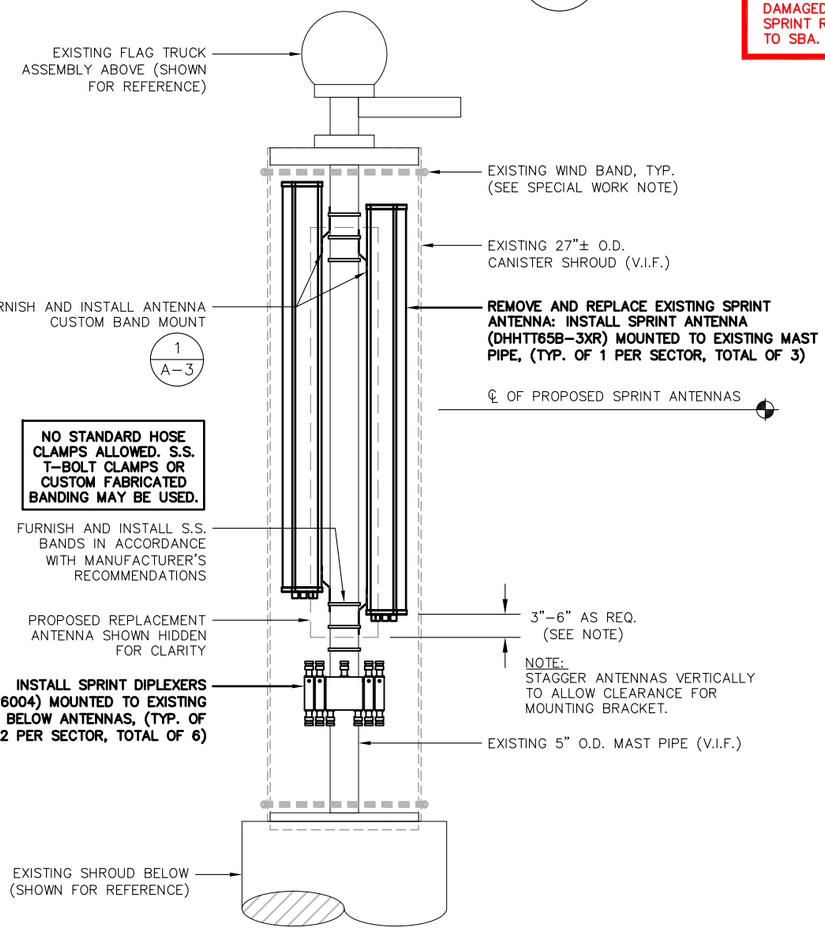
SHEET NUMBER
A-3



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

1 / S-1



PROPOSED ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

2 / S-1

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.

SPECIAL WORK NOTE (EXISTING SBA-PROVIDED WINDBAND CLAMPS):
GENERAL CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND USER MANUAL FOR UNFASTENING AND REFASTENING EXISTING SBA-PROVIDED WINDBAND CLAMPS. ANY DAMAGED CANISTER SHROUDS OR DAMAGED WINDBAND CLAMPS LOCATED AT THE SPRINT RAD SHALL BE REPLACED AT NO COST TO SBA.

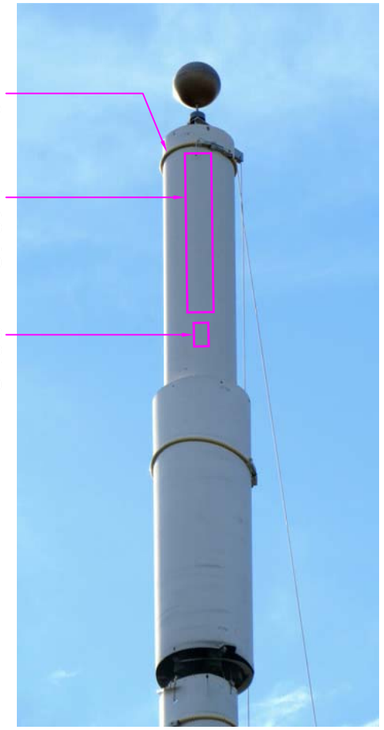


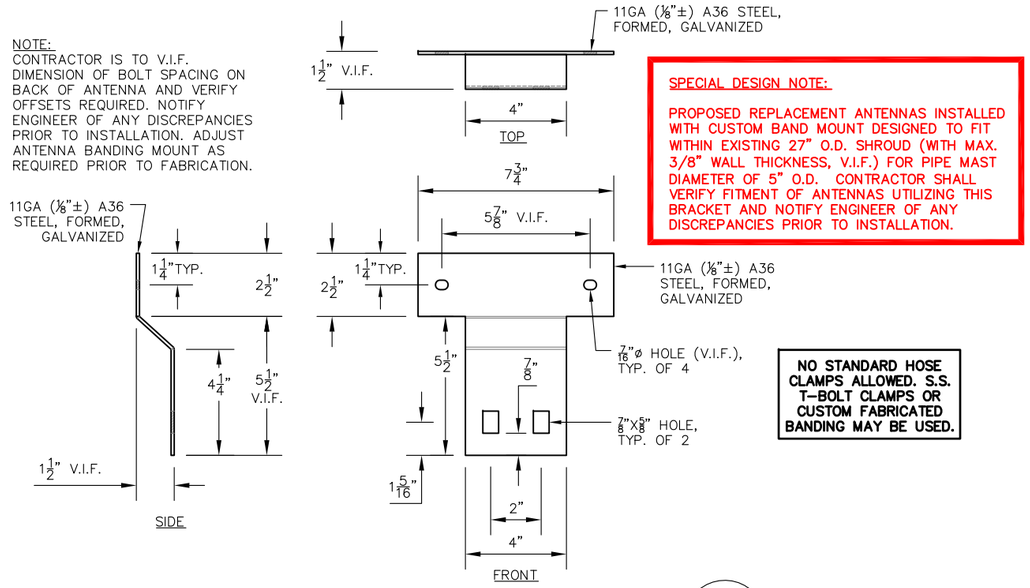
IMAGE SOURCE: PROTERRA 11/07/2017

ANTENNA MOUNT PHOTO DETAIL

SCALE: N.T.S.

3 / S-1

NOTE:
CONTRACTOR IS TO V.I.F. DIMENSION OF BOLT SPACING ON BACK OF ANTENNA AND VERIFY OFFSETS REQUIRED. NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION. ADJUST ANTENNA BANDING MOUNT AS REQUIRED PRIOR TO FABRICATION.



SPECIAL DESIGN NOTE:

PROPOSED REPLACEMENT ANTENNAS INSTALLED WITH CUSTOM BAND MOUNT DESIGNED TO FIT WITHIN EXISTING 27" O.D. SHROUD (WITH MAX. 3/8" WALL THICKNESS, V.I.F.) FOR PIPE MAST DIAMETER OF 5" O.D. CONTRACTOR SHALL VERIFY FITMENT OF ANTENNAS UTILIZING THIS BRACKET AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO INSTALLATION.

NO STANDARD HOSE CLAMPS ALLOWED. S.S. T-BOLT CLAMPS OR CUSTOM FABRICATED BANDING MAY BE USED.

ANTENNA BANDING MOUNT

SCALE: N.T.S.

1 / S-1

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1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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Hadley, MA 01035 Ph: (413)320-4918

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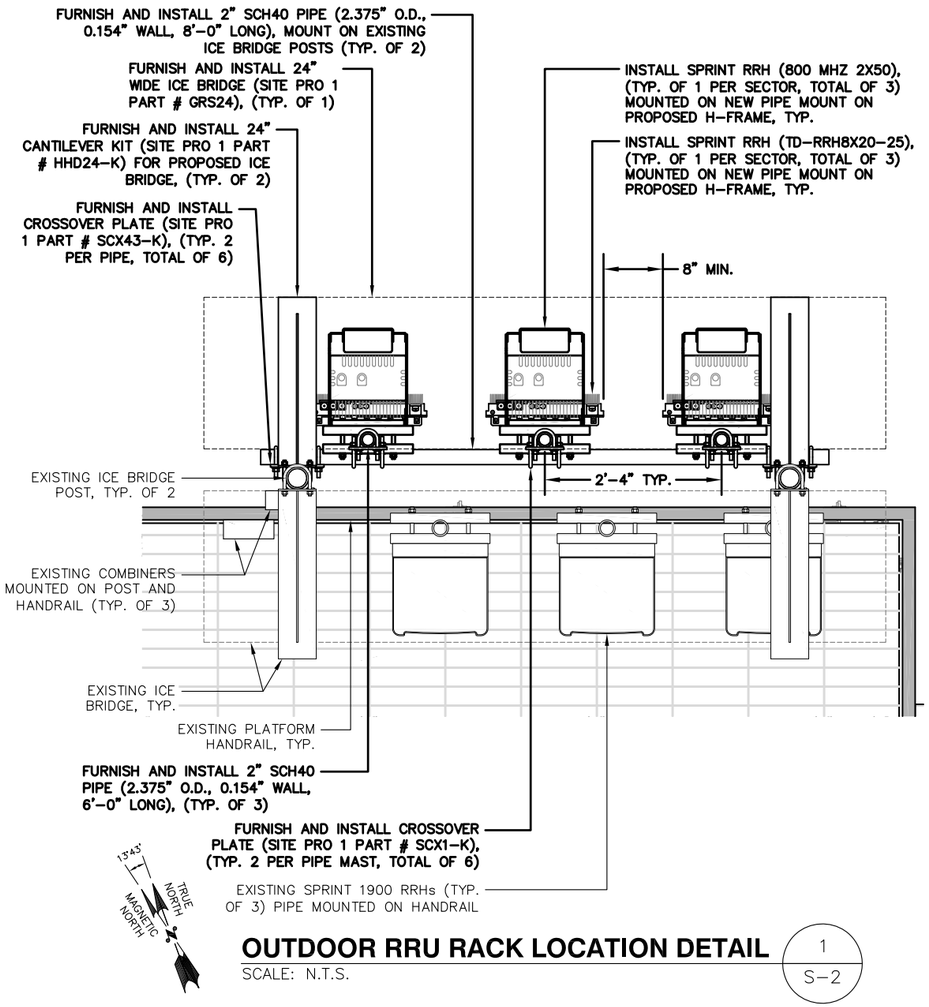
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
ANTENNA MOUNTING DETAILS

SHEET NUMBER
S-1

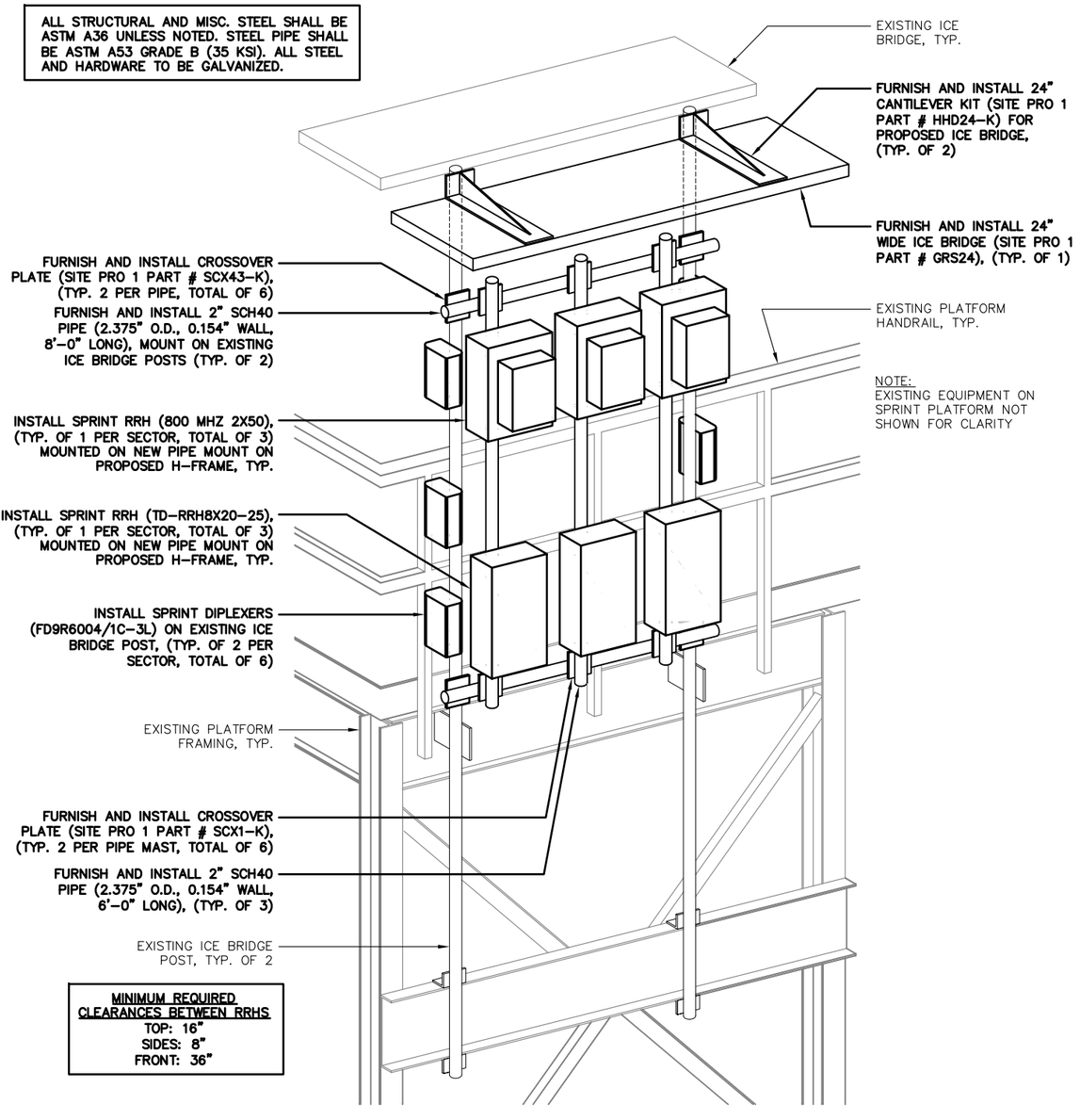


OUTDOOR RRU RACK LOCATION DETAIL

1 / S-2

SCALE: N.T.S.

ALL STRUCTURAL AND MISC. STEEL SHALL BE ASTM A36 UNLESS NOTED. STEEL PIPE SHALL BE ASTM A53 GRADE B (35 KSI). ALL STEEL AND HARDWARE TO BE GALVANIZED.



MINIMUM REQUIRED CLEARANCES BETWEEN RRHS
TOP: 16"
SIDES: 8"
FRONT: 36"

OUTDOOR RRU RACK

2 / S-2

SCALE: N.T.S.

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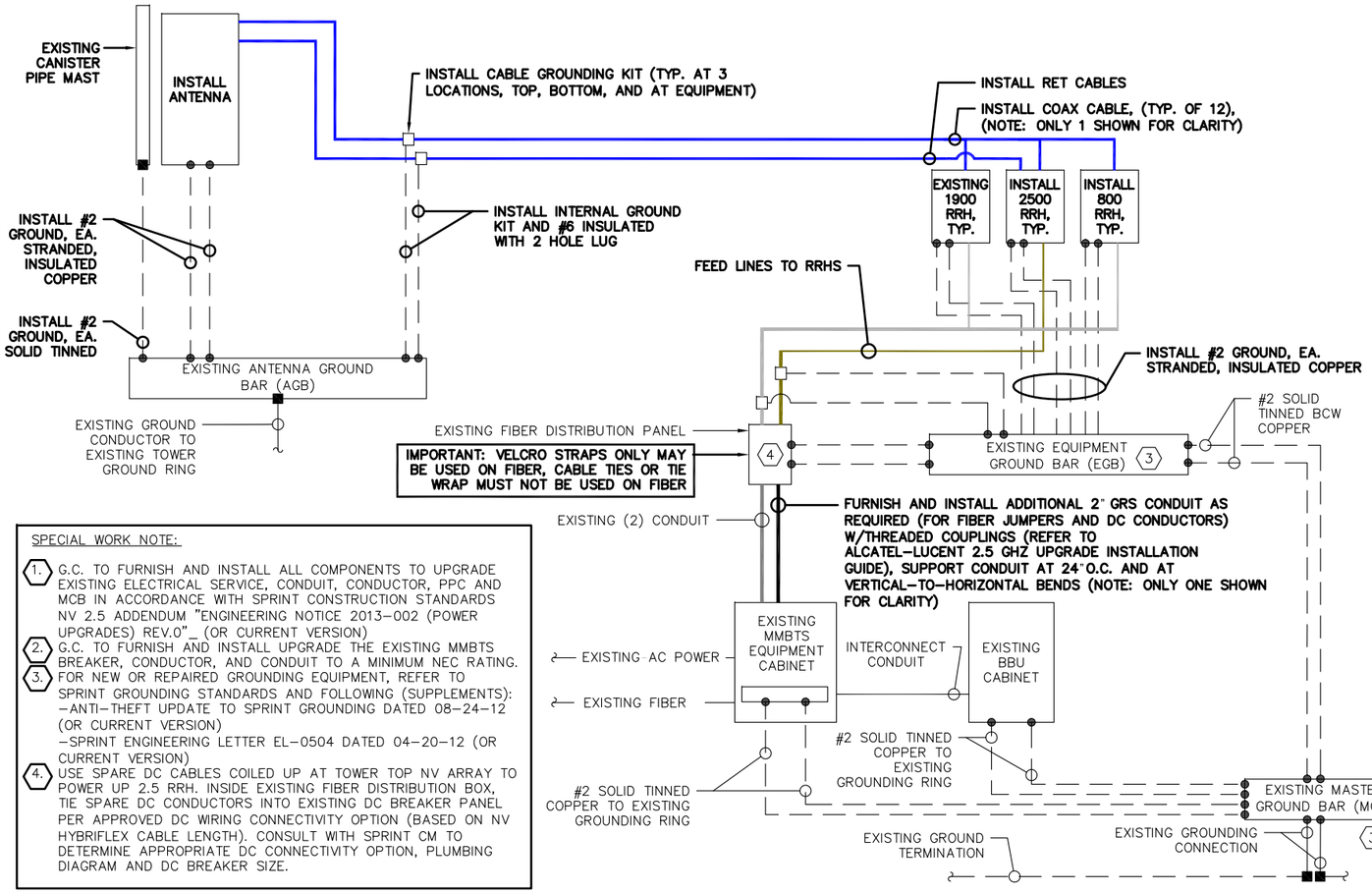
FARMINGTON, CT 06032

SHEET TITLE
RRH MOUNTING DETAILS

SHEET NUMBER
S-2



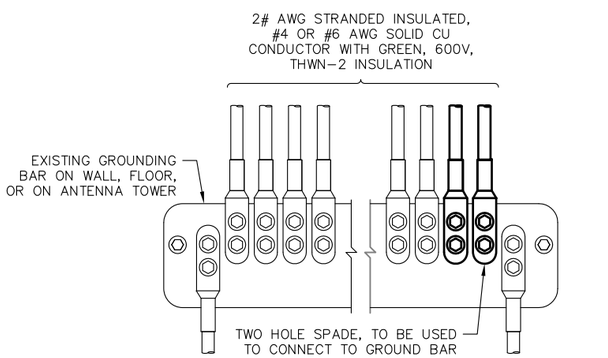
TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

1 / E-1

SCALE: N.T.S.

SPECIAL WORK NOTE:

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

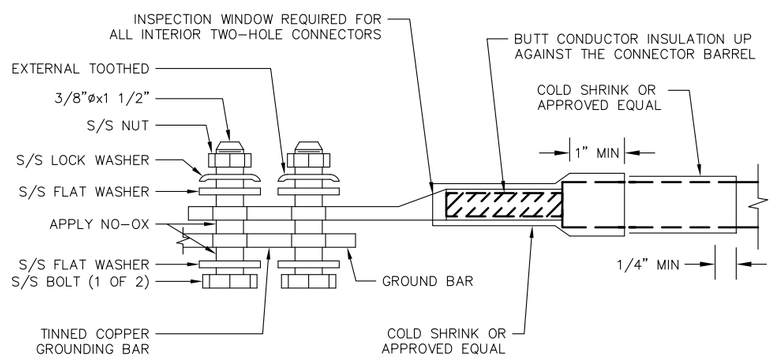


1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

2 / E-1

SCALE: N.T.S.



TWO HOLE LUG

3 / E-1

SCALE: N.T.S.

ELECTRICAL NOTES

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

PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:

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

Sprint
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No. 28192
LICENSED PROFESSIONAL ENGINEER
FOR SCHEMATIC ONLY

CHECKED BY: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
ELECTRICAL AND GROUNDING DETAILS

SHEET NUMBER
E-1

Augment ID: CT33XC579Q17.1

RFDS ID: 111278

SprintVision **RF Design Sheet**

Site Identification	
Cascade	CT33XC579
SMS Schedule ID	52406680
SMS Schedule Name	DO Macro Upgrade
PID	
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	2017-08-15 00:00:00.0
RFDS Revision Date	2017-10-19 00:00:00.0
RFDS Revision	2
Filter Analysis Complete	YES
RFDS - Issue Date	08/15/2017
Design Status	Complete
Project Description	DO Macro Upgrade - Add (6)RRUs (3C x 4D) and (6)RUFAs

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	41.7304916
Longitude	-72.8314611
Market	Northern Connecticut
Region	Northeast
City	Farmington
State	CT
Zip Code	CT06032
County	Hartford

2500MHz	3
1900MHz	3
800MHz	3

Battery Backup Cabinet Model	
Model Number	60ECV2
Weight (Lbs.)	2830
Dimensions (In.)	60 x 31 x 30
Manufacturer	ALU

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

BTS #1 Model	
Model Number	9927 Cabinet
Weight (Lbs.)	864
Dimensions (In.)	67.5 x 31.5 x 38.1
Manufacturer	ALU
Number of BTS #1	1

A&E Drawing Requirements

10/17/2017 (WR): RFDS revised to ground mount RRUs add 6 twin Diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes

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

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	N/A	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A	N/A
Manufacturer	ALU	ALU	N/A	N/A	N/A	N/A
Number of RRUs needed	1	1	0	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
Trunk Cable 1 Qty						

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

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	DHHTT65B-3XR	DHHTT65B-3XR	DHHTT65B-3XR			
Weight (lbs)	48.5	48.5	48.5	N/A	N/A	N/A
Dimensions	72 x 12 x 7.1	72 x 12 x 7.1	72 x 12 x 7.1	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	800/1900 Jumper 4	600/1900 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)	150.0000048	150.0000048	150.0000048	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

NOTE: RFDS PROVIDED BY SPRINT DATED 08/15/2017, REVISED 10/17/2017.. EXCERPTS TAKEN DEPICT RELEVANT RF DESIGN INFORMATION. A&E VENDOR SCOPE OF WORK LIMITED TO DESIGN OF MECHANICAL/STRUCUTRAL EQUIPMENT ATTACHMENTS.

RF DATA SHEET

SCALE: N.T.S.

1 / RF-1

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

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/.

Antenna 1 Upper Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	1900MHz	1900MHz	1900MHz			
Antenna 1 Lower Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4.2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	1900MHz	1900MHz	1900MHz			
Position Ant 1						

Antenna 1 Upper Passive Component Model						
Model Number	FD9R6004/1C-3L	FD9R6004/1C-3L	FD9R6004/1C-3L			
Weight (lbs)	2.6	2.6	2.6	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 1.5	5.8 x 6.5 x 1.5	5.8 x 6.5 x 1.5	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	800MHz	800MHz	800MHz			
Antenna 1 Lower Passive Component Model						
Model Number	FD9R6004/1C-3L	FD9R6004/1C-3L	FD9R6004/1C-3L			
Weight (lbs)	2.6	2.6	2.6	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 1.5	5.8 x 6.5 x 1.5	5.8 x 6.5 x 1.5	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	800MHz	800MHz	800MHz			
Position Ant 1						

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

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

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

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

CHECKED BY: 2-14-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT

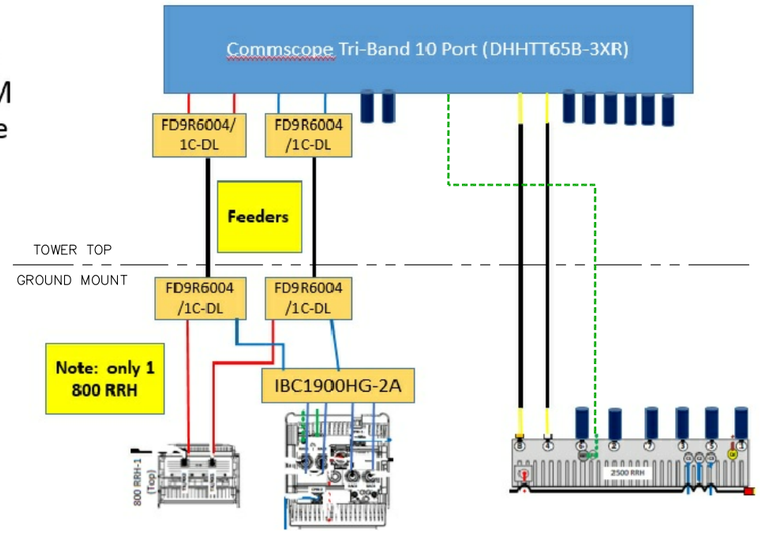
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
RF DATA SHEET

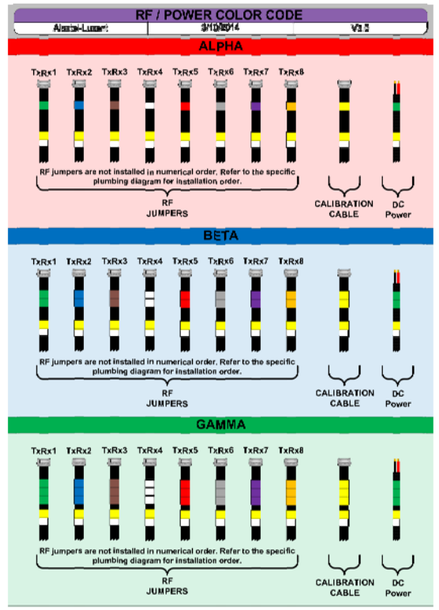
SHEET NUMBER
RF–1

Option Z-12 (All Ground Mount) Plumb. Diag.

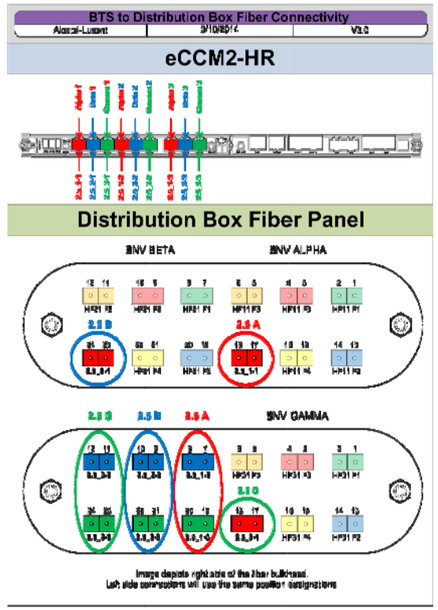
- 12 Total Coax Runs
- 2.5 RRHs are on GM 800/1900 RRH's are Ground Mounted
- RED: 2 x 800
- BLUE: 4 x 1900
- YELLOW: 2 x 2500



RAN WIRING DIAGRAM: ALU EQUIPMENT
SCALE: N.T.S.



COLOR CODING
SCALE: N.T.S.



DISTRIBUTION BOX CONNECTIVITY
SCALE: N.T.S.

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SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	02/14/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT33XC579
SITE NAME:
WATER TREATMENT PLANT
SITE ADDRESS:
1 WESTERBERG DRIVE
FARMINGTON, CT 06032

SHEET TITLE
PLUMBING DIAGRAM AND RAN WIRING

SHEET NUMBER
RF-2