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

July 31, 2018

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

Notice of Exempt Modification
96 Powder Mill Road, Canton, CT
41 50 3.28 N
-72 55 57.61 W
Sprint #: CT33XC023_DOMU

Dear Ms. Bachman:

Sprint currently maintains antennas at the 177-foot level of the existing 180-foot Monopole Tower at 96 Powder Mill Road, Canton, CT. The tower is owned by SBA Towers, LLC. The property is owned by Properties One, LLC. Sprint now intends to replace (6) existing cell antennas with (6) newer technology cell antennas at the 177-foot level of the tower. Sprint's proposed full scope of work is as follows:

Remove: N/A

Remove and Replace:

- Remove:
  - (6) KMW ETCR-654L12H6 panel antennas
- Replace with:
  - (3) RFS APXVTM14-C-I20 panel antennas
  - (3) Commscope NNVV-65B-R4 panel antennas

Install:

- (3) ALU 1900 MHz RRUs (showing as existing and proposed on Structural as run previously, but being added per drawings)
- (6) ALU 800 MHz RRUs (showing as existing and proposed on Structural as run previously, but being added per drawings)
- (3) ALU TD-RRH8x20-25 RRUs (showing as existing and proposed on Structural as run previously, but being added per drawings)
- (1) Sitepro PRK-1245L
- (1) Sitepro HRK 14-U

Existing Equipment to Remain (Including entitlements):

- (1) Platform
- (4) 1-1/4" fiber

This facility was approved by the Town of Canton prior to the Council's jurisdiction. The Canton Zoning Commission approved a Certificate of Action Approving Special Exception and Site Plan Application 843 on July 19, 2000. The Tower was to be 180'. If more than five carriers were to be collocate, an application was to be submitted for site plan modification. Re-inspection of the tower structure for structural integrity was to be done at five year intervals concurrent with the renewal of the removal bond. This modification complies with all known tower conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town of Canton's First Selectman, Leslee Hill, and Director of Planning and Community Development, Neil S. Pade AICP, as well as to the Property Owner. 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: Leslee Hill, First Selectman, Town of Canton / with attachments
Town of Canton, Canton Town Hall, 4 Market Street, Collinsville, CT 06022
Neil S. Pade AICP, Director of Planning and Community Development, Town of Canton / with attachments
Town of Canton, Canton Town Hall, 4 Market Street, Collinsville, CT 06022
Properties One, L.L.C. / with attachments
54 Church Street Collinsville CT 06022-0125

POWER DENSITY

SPRINT Site Inventory and Power Data by Antenna

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

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	**1.88 %**
T-Mobile	0.01 %
Verizon Wireless	1.61 %
AT&T	2.00 %
Site Total MPE %:	**5.50 %**

SPRINT Sector A Total:	1.88 %
SPRINT Sector B Total:	1.88 %
SPRINT Sector C Total:	1.88 %
Site Total:	5.50 %

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

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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

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 2013.

TOWN OF CANTON CT

Information on the Property Records for the Municipality of Canton was last updated on 7/27/2018.

Property Summary Information

Parcel Data And Values | Building | Sales | Google Map

Parcel Information

Location:	96 POWDER MILL ROAD	Property Use:	Farms/Barns	Primary Use:	Storage Building
Unique ID:	4310096	Map Block Lot:	26/431/0096	Acres:	1.61
490 Acres:	0.00	Zone:	LI	Volume / Page:	219 /467
Developers Map / Lot:		Census:			

Value Information

	Appraised Value	Assessed Value
Land	128,800	90,160
Buildings	308,829	216,180
Detached Outbuildings	0	0
Total	437,629	306,340

Owner's Information

Owner's Data
PROPERTIES ONE LLC P O BOX 125 COLLINSVILLE CT 06022

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

Print View (PrintPage.aspx?towncode=023&uniqueid=4310096)

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: CT33XC023

South Canton
96 Powder Mill Road
Canton, CT 06019

July 2, 2018

EBI Project Number: 6218004714

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	5.50 %

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

EBI Consulting
environmental | engineering | due diligence

July 2, 2018

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

Emissions Analysis for Site: **CT33XC023 – South Canton**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **96 Powder Mill Road, Canton, 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 **96 Powder Mill Road, Canton, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

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

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

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

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

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

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

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

SPRINT Site Inventory and Power Data by Antenna

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

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**1.88 %**
T-Mobile	0.01 %
Verizon Wireless	1.61 %
AT&T	2.00 %
Site Total MPE %:	**5.50 %**

SPRINT Sector A Total:	1.88 %
SPRINT Sector B Total:	1.88 %
SPRINT Sector C Total:	1.88 %
Site Total:	5.50 %

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

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	1.88 %
Sector B:	1.88 %
Sector C:	1.88 %
SPRINT Maximum Total (per sector):	1.88 %
Site Total:	5.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.50 %** 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 180 ft Valmont Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT01722-S

Customer Site Name: South Canton

Carrier Name: Sprint Nextel

Carrier Site ID / Name: CT33XC023 / South Canton

Site Location: 96 Powder Mill Road

Canton, Connecticut

Hartford County

Latitude: 41.834244

Longitude: -72.932669

6/7/18

Analysis Result:

Max Structural Usage: 62.9% [Pass]

Max Foundation Usage: 99% [Pass]

Additional Usage Caused by Mount Modification: +2.2%

Report Prepared By: Gustavo Zaragoza

Introduction

The purpose of this report is to summarize the analysis results on the 180 ft Valmont 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	Valmont Design Calculations, Order #12156-00, 8/03/2000 Valmont Record Drawings, Order #12156-00, 8/03/2000
Foundation Drawing	FDH Nondestructive Testing Report, Project #1206272EN1, 8/01/2012
Geotechnical Report	FDH Geotechnical Evaluation, Project #1206272EG1, 8/06/2012

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} = 120 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 93 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 = 0.18, S_1 = 0.065

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
-	177.0	3	KMW ETCR-654L12H6	(1) Platform w/ Hand Rails	(4) 1-1/4" Fiber	Sprint Nextel
-		3	ALU 1900 MHz			
-		6	ALU 800 MHz			
-		3	ALU TD-RRH8x20-25			
6	167.5	3	Kathrein 742 351	(3) Pipe Mounts	(6) 1 5/8"	T-Mobile
7	147.0	3	Antel BXA-70063/6CF	(1) Low Profile Platform	(12) 1 5/8"	Verizon
8	146.5	4	Antel LPA-80080/4CF-EDIN			
9		2	Antel BXA-171085-8CF-2			
10		1	Antel BXA-171063/8CF-2			
11		2	Antel LPA-80063/4CF			
12	146.0	6	RFS FD9R6004/2C-3			
13	139.5	6	Powerwave LGP 21903	(3) T-Arms	(12) 1 5/8" (2) 3/4" DC* (1) 7/16 Fiber*	AT&T
14	139.0	6	Powerwave 7770			
15		3	CSS DUO1417-8686-40			
16		2	Powerwave P65-17-XLH-RR			
17		1	KMW AM-X-CD-16-65-001-RET			
18		6	Powerwave LGP 21401			
19		6	Ericsson RRUS-11			
20		3	Andrew ABT-DF-DMADBH			
21		1	Raycap DC6-48-60-18-8F			
22	50.0	1	GPS	(1) Stand Off	(1) 1/2"	Sprint Nextel

*Coax installed inside 3" Flex conduit inside the monopole's shaft.

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	177.0	3	ALU 1900 MHz	(1) Platform w/ Sitepro HRK14-U & Sitepro PRK-1245L	(4) 1-1/4" Fiber	Sprint Nextel
2		6	ALU 800 MHz			
3		3	ALU TD-RRH8x20-25			
4		3	RFS APXVTM14-C-I20			
5		3	Commscope NNVV-65B-R4			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

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

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**62.9%**	**43.3%**	**37.6%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)
Original Design Reactions	4923.8	38.7
Analysis Reactions	4264.2	35.6
Factored Reactions*	6647.1	52.2
% of Design Reactions	64.2%	68.1%

* 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 1.2372 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 62.94% at 98.0ft

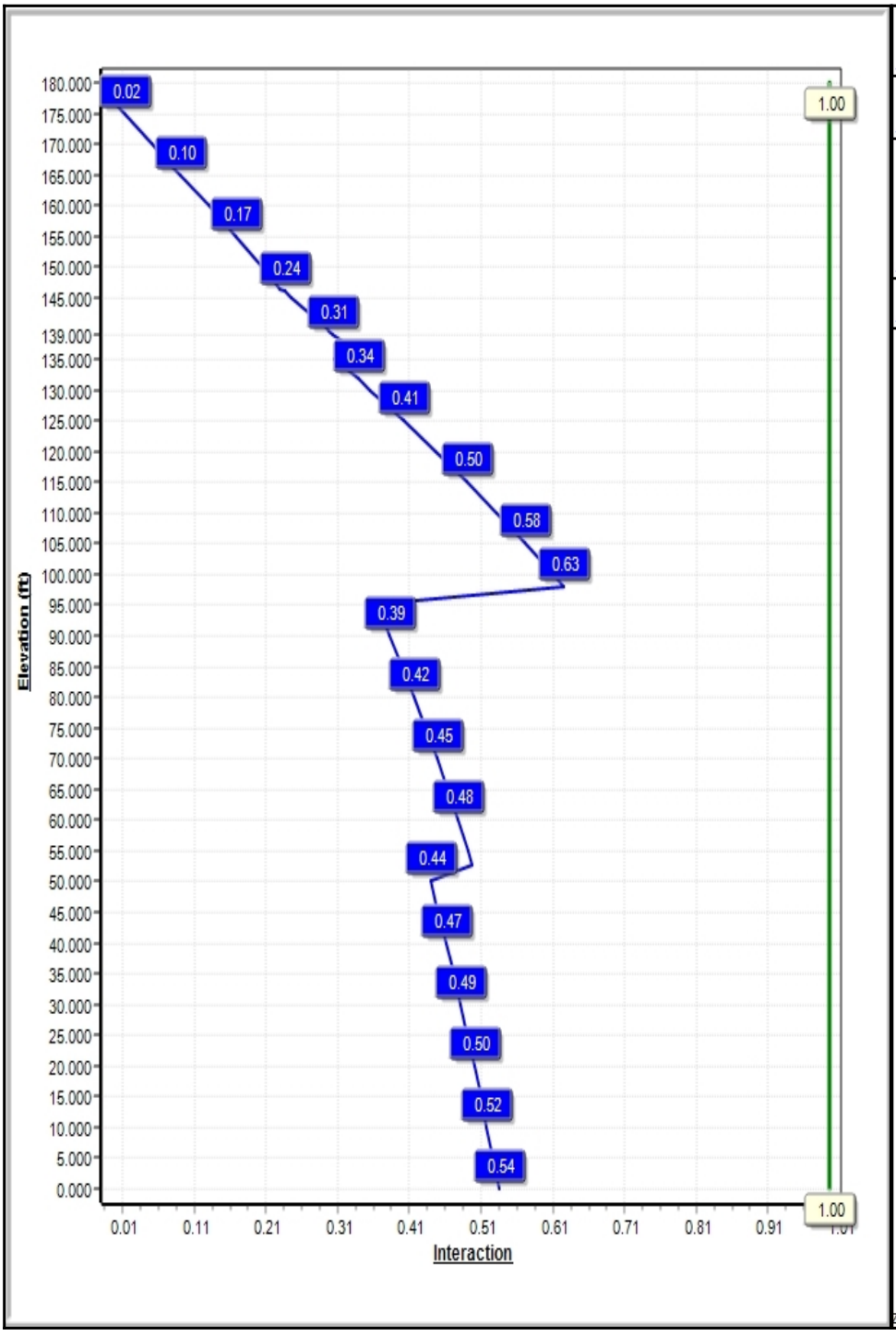
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Gh:**	1.1		
Base Elev:	0.000 (ft)			Page: 1	

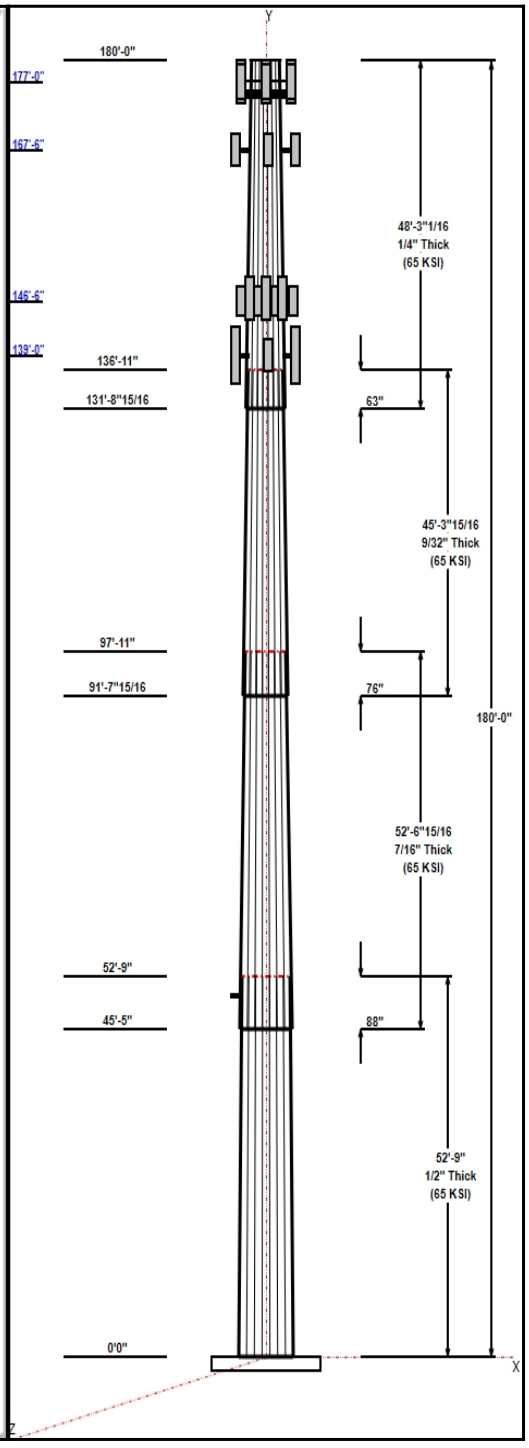
Tower Engineering Solutions

Dead Load Factor:	1.20	**Iterations:**	25
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 93 mph Wind

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.





Structure: CT01722-S-SBA

Type: Tapered
Site Name: South Canton
Height: 180.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 16 Sided
Taper: 0.19501

6/7/2018

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	52.75	49.71	60.00	0.500		0.19501	65
2	52.58	41.77	52.02	0.438	Slip	0.19501	65
3	45.33	34.72	43.56	0.281	Slip	0.19501	65
4	48.26	26.84	36.25	0.250	Slip	0.19501	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
177.00	177.00	3	ALU 1900 MHz	Sprint Nextel
177.00	177.00	6	ALU 800 MHz	Sprint Nextel
177.00	177.00	3	ALU TD-RRH8x20-25	Sprint Nextel
177.00	177.00	1	Platform w/ Hand Rails	Sprint Nextel
177.00	177.00	3	RFS APXVTM14-C-I20	Sprint Nextel
177.00	177.00	3	Commscope	Sprint Nextel
177.00	177.00	1	Sitepro PRK-1245L	Sprint Nextel
167.50	167.50	3	Kathrein 742 351	T-Mobile
167.50	167.50	3	Pipe Mounts	T-Mobile
147.00	147.00	3	Antel BXA-70063/6CF	Verizon
146.50	146.50	4	Antel	Verizon
146.50	146.50	2	Antel BXA-171085-8CF-2	Verizon
146.50	146.50	1	Antel BXA-171063/8CF-2	Verizon
146.50	146.50	2	Antel LPA-80063/4CF	Verizon
146.50	146.50	1	Low Profile Platform	Verizon
146.00	146.00	6	RFS FD9R6004/2C-3	Verizon
139.50	139.50	6	Powerwave LGP 21903	AT&T
139.00	139.00	6	Powerwave 7770	AT&T
139.00	139.00	3	CSS DUO1417-8686-40	AT&T
139.00	139.00	2	Powerwave	AT&T
139.00	139.00	1	KMW	AT&T
139.00	139.00	6	Powerwave LGP 21401	AT&T
139.00	139.00	6	Ericsson RRUS-11	AT&T
139.00	139.00	3	Andrew ABT-DF-DMADBH	AT&T
139.00	139.00	1	Raycap DC6-48-60-18-8F	AT&T
139.00	139.00	3	T-Arms	AT&T
50.00	50.00	1	GPS	Sprint Nextel
50.00	50.00	1	Stand Off	Sprint Nextel

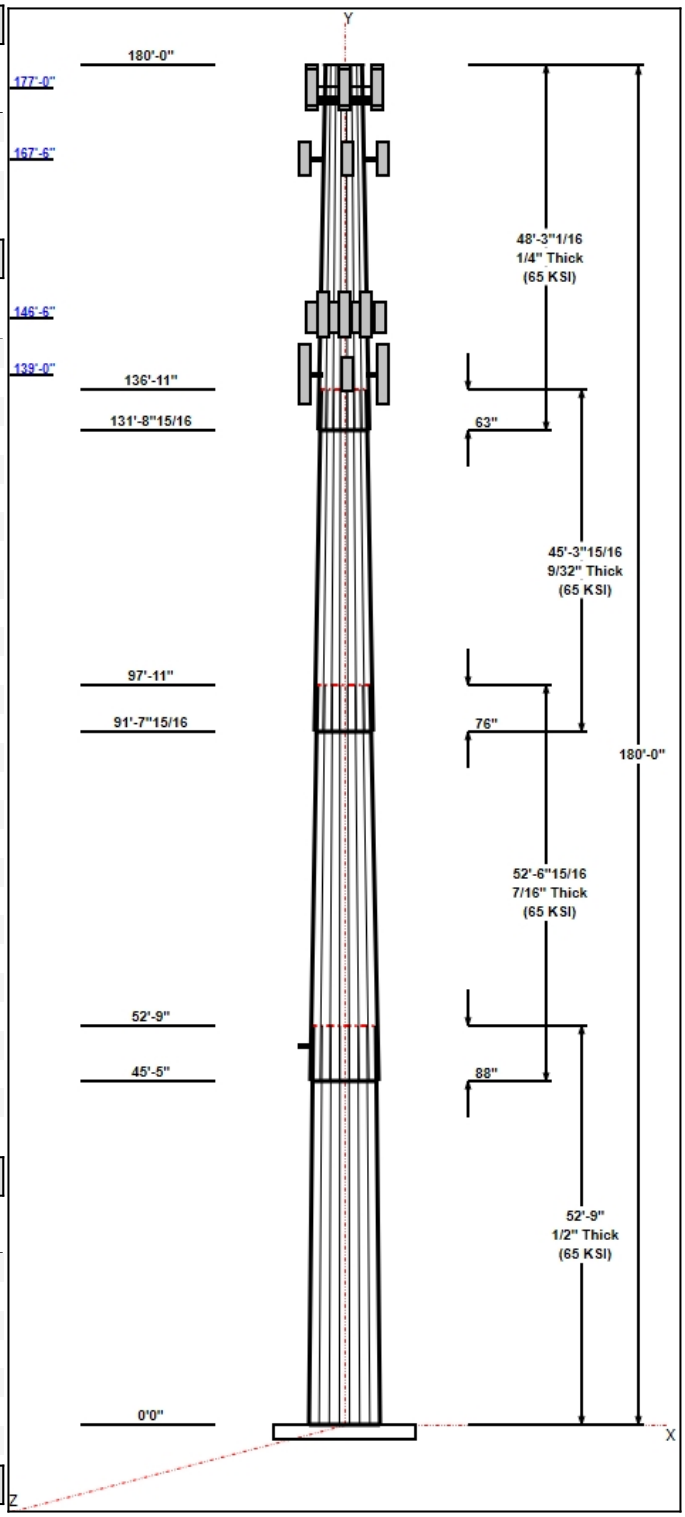
Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	177.00	Inside	1-1/4" Fiber	Sprint Nextel
0.00	167.50	Inside	1 5/8" Coax	T-Mobile
0.00	146.50	Inside	1 5/8" Coax	Verizon
0.00	139.00	Inside	1 5/8" Coax	AT&T
0.00	139.00	Inside	3/4" DC	AT&T
0.00	139.00	Inside	7/16 Fiber	AT&T
0.00	50.00	Outside	1/2" Coax	Sprint Nextel

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
28	2.25" 18J	75.0	Radial

Base Plate



Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	74.6	60.0	Polygon

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 93 mph Wind	4264.2	35.6	60.5
0.9D + 1.6W 93 mph Wind	4223.0	35.6	45.4
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1354.0	11.0	96.7
1.2D + 1.0E	273.5	2.1	60.6
0.9D + 1.0E	270.5	2.1	45.4
1.0D + 1.0W 60 mph Wind	1103.0	9.3	50.5

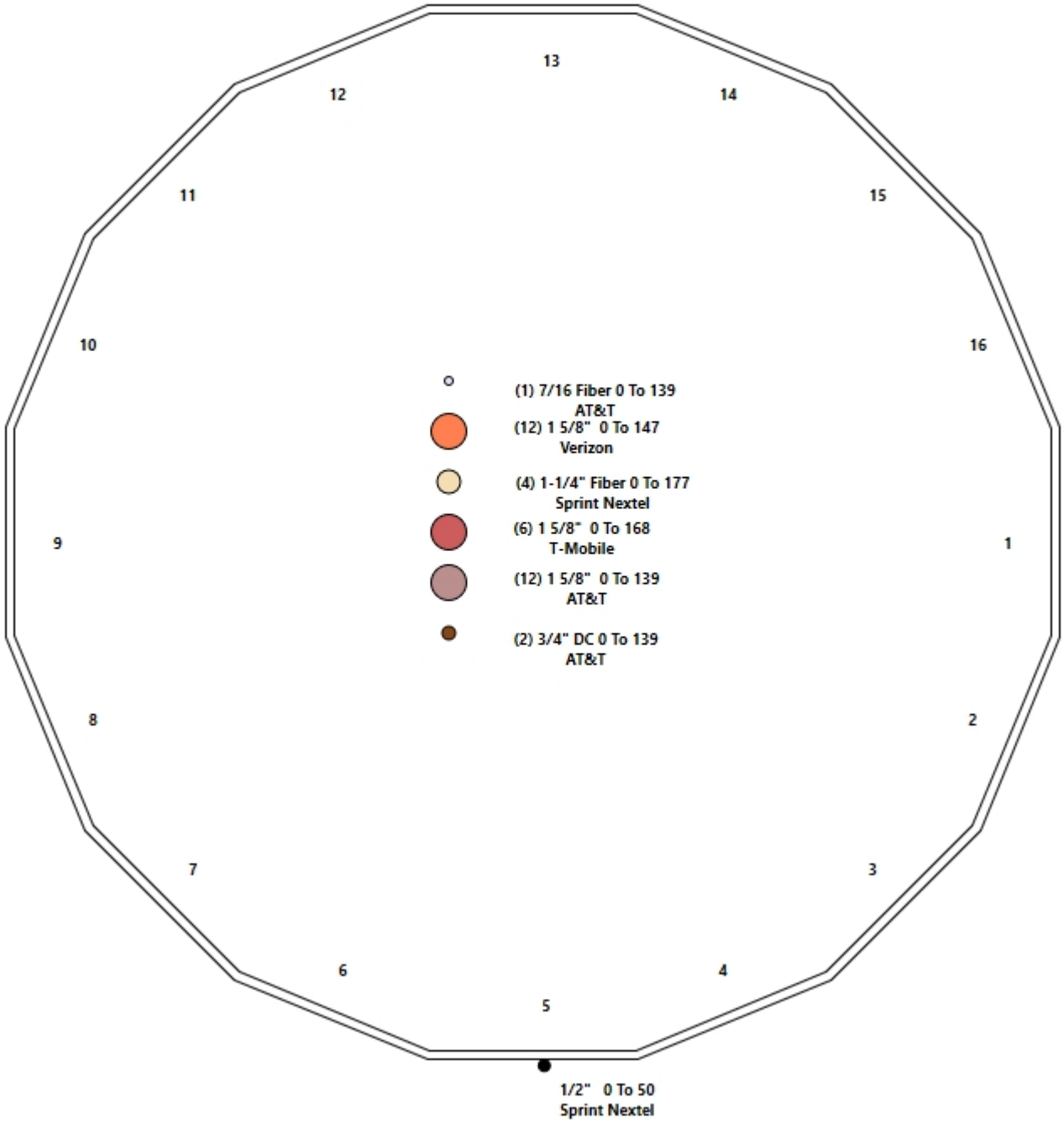
Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Structure: CT01722-S-SBA - Coax Line Placement

Type: Monopole
Site Name: South Canton
Height: 180.00 (ft)

6/7/2018

Tower Engineering Solutions



Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Shaft Properties

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
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	52.750	0.5000	65		0.00	15,562
2	16	52.580	0.4380	65	Slip	88.00	11,613
3	16	45.330	0.2813	65	Slip	76.00	5,378
4	16	48.257	0.2500	65	Slip	63.00	4,098
					Total Shaft Weight:		**36,651**

	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	60.00	0.00	94.90	42444.94	22.28	120.00	49.71	52.75	78.50	24017.2	18.19	99.43	0.195008
2	52.02	45.42	72.07	24224.67	22.03	118.77	41.77	98.00	57.74	12459.6	17.38	95.36	0.195008
3	43.56	91.66	38.83	9190.17	29.22	154.89	34.72	136.99	30.90	4631.04	22.97	123.4	0.195008
4	36.25	131.7	28.71	4699.59	27.25	144.99	26.84	180.00	21.20	1893.45	19.76	107.3	0.195008

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Load Summary

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
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	177.00	ALU 1900 MHz	3	60.00	3.80	0.67	261.79	5.684	0.67	0.00	0.00
2	177.00	ALU 800 MHz	6	53.00	2.49	0.67	153.26	4.040	0.67	0.00	0.00
3	177.00	ALU TD-RRH8x20-25	3	70.00	4.05	0.67	231.09	5.183	0.67	0.00	0.00
4	177.00	Platform w/ Hand Rails	1	2000.00	40.00	1.00	4838.95	68.389	1.00	0.00	0.00
5	177.00	RFS APXVTM14-C-I20	3	56.00	6.34	0.79	289.33	7.884	0.79	0.00	0.00
6	177.00	Commscope NNVV-65B-R4	3	77.40	12.27	0.74	464.50	14.244	0.74	0.00	0.00
7	177.00	Sitepro PRK-1245L	1	464.91	9.50	1.00	904.86	22.985	1.00	0.00	0.00
8	167.50	Kathrein 742 351	3	29.80	5.38	0.61	158.27	8.058	0.61	0.00	0.00
9	167.50	Pipe Mounts	3	350.00	5.00	0.75	745.27	9.706	0.75	0.00	0.00
10	147.00	Antel BXA-70063/6CF	3	17.00	7.57	0.70	205.56	11.248	0.70	0.00	0.00
11	146.50	Antel LPA-80080/4CF-EDIN	4	12.00	2.61	1.70	165.80	3.805	1.70	0.00	0.00
12	146.50	Antel BXA-171085-8CF-2	2	10.50	2.94	0.84	97.69	5.146	0.84	0.00	0.00
13	146.50	Antel BXA-171063/8CF-2	1	10.50	2.94	0.84	97.69	5.146	0.84	0.00	0.00
14	146.50	Antel LPA-80063/4CF	2	20.00	6.15	0.93	263.35	8.668	0.93	0.00	0.00
15	146.50	Low Profile Platform	1	1500.00	22.00	1.00	3241.10	45.493	1.00	0.00	0.00
16	146.00	RFS FD9R6004/2C-3	6	3.10	0.36	0.67	13.77	0.950	0.67	0.00	0.00
17	139.50	Powerwave LGP 21903	6	5.50	0.27	0.67	16.66	0.796	0.67	0.00	0.00
18	139.00	Powerwave 7770	6	35.00	5.50	0.73	227.22	6.939	0.73	0.00	0.00
19	139.00	CSS DUO1417-8686-40	3	20.30	5.83	0.82	216.61	8.350	0.82	0.00	0.00
20	139.00	Powerwave P65-17-XLH-RR	2	59.00	11.44	0.75	345.61	15.720	0.75	0.00	0.00
21	139.00	KMW AM-X-CD-16-65-001-RET	1	48.50	8.02	1.00	263.23	11.717	1.00	0.00	0.00
22	139.00	Powerwave LGP 21401	6	17.50	0.00	0.67	60.23	1.392	0.67	0.00	0.00
23	139.00	Ericsson RRUS-11	6	51.00	2.52	0.67	146.63	3.358	0.67	0.00	0.00
24	139.00	Andrew ABT-DF-DMADBH	3	1.10	0.05	0.67	4.05	0.305	0.67	0.00	0.00
25	139.00	Raycap DC6-48-60-18-8F	1	31.80	0.92	1.00	113.61	1.500	1.00	0.00	0.00
26	139.00	T-Arms	3	350.00	8.00	0.75	673.30	17.237	0.75	0.00	0.00
27	50.00	GPS	1	10.00	1.00	1.00	45.03	1.851	1.00	0.00	0.00
28	50.00	Stand Off	1	40.00	2.63	1.00	135.90	9.760	1.00	0.00	0.00
		Totals:	**84**	**8,418.11**			**25,172.80**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	177.00	(4) 1-1/4" Fiber	0.00	Inside
0.00	167.50	(6) 1 5/8" Coax	0.00	Inside
0.00	146.50	(12) 1 5/8" Coax	0.00	Inside
0.00	139.00	(12) 1 5/8" Coax	0.00	Inside
0.00	139.00	(2) 3/4" DC	0.00	Inside
0.00	139.00	(1) 7/16 Fiber	0.00	Inside
0.00	50.00	(1) 1/2" Coax	0.65	Outside

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Shaft Section Properties

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
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		0.5000	60.000	94.903	42444.9	22.28	120.00	77.4	1387.	0.0
5.00		0.5000	59.025	93.347	40392.3	21.89	118.05	77.8	1342.	1601.4
10.00		0.5000	58.050	91.792	38406.9	21.50	116.10	78.2	1297.	1575.0
15.00		0.5000	57.075	90.237	36487.6	21.11	114.15	78.7	1254.	1548.5
20.00		0.5000	56.100	88.682	34633.4	20.73	112.20	79.1	1211.	1522.1
25.00		0.5000	55.125	87.127	32843.1	20.34	110.25	79.6	1168.	1495.6
30.00		0.5000	54.150	85.571	31115.6	19.95	108.30	80.0	1127.	1469.1
35.00		0.5000	53.175	84.016	29449.7	19.56	106.35	80.4	1086.	1442.7
40.00		0.5000	52.200	82.461	27844.4	19.18	104.40	80.9	1046.	1416.2
45.00		0.5000	51.225	80.906	26298.5	18.79	102.45	81.3	1007.	1389.8
45.42	Bot - Section 2	0.5000	51.143	80.776	26172.4	18.75	102.29	81.3	1003.	114.6
50.00		0.5000	50.250	79.351	24811.0	18.40	100.50	81.8	968.5	2363.0
52.75	Top - Section 1	0.4380	50.589	70.072	22265.2	21.38	115.50	0.0	0.0	1397.8
55.00		0.4380	50.151	69.459	21685.9	21.18	114.50	78.6	848.2	534.1
60.00		0.4380	49.176	68.097	20434.7	20.74	112.27	79.1	815.1	1170.2
65.00		0.4380	48.200	66.735	19232.7	20.30	110.05	79.6	782.7	1147.0
70.00		0.4380	47.225	65.372	18078.7	19.86	107.82	80.1	750.9	1123.8
75.00		0.4380	46.250	64.010	16971.8	19.41	105.59	80.6	719.8	1100.6
80.00		0.4380	45.275	62.648	15911.0	18.97	103.37	81.1	689.4	1077.5
85.00		0.4380	44.300	61.285	14895.4	18.53	101.14	81.6	659.6	1054.3
90.00		0.4380	43.325	59.923	13924.0	18.08	98.92	82.1	630.4	1031.1
91.66	Bot - Section 3	0.4380	43.001	59.470	13610.4	17.94	98.18	82.3	620.9	337.9
95.00		0.4380	42.350	58.561	12995.7	17.64	96.69	82.5	601.9	1107.6
98.00	Top - Section 2	0.2813	42.328	37.724	8425.7	28.35	150.50	0.0	0.0	980.3
100.00		0.2813	41.938	37.374	8193.0	28.07	149.11	70.8	383.2	256.0
105.00		0.2813	40.963	36.499	7631.1	27.38	145.64	71.6	365.4	628.4
110.00		0.2813	39.988	35.624	7095.4	26.69	142.18	72.4	348.1	613.5
115.00		0.2813	39.013	34.749	6585.4	26.00	138.71	73.2	331.1	598.7
120.00		0.2813	38.038	33.874	6100.5	25.31	135.24	73.9	314.6	583.8
125.00		0.2813	37.062	33.000	5640.0	24.62	131.78	74.7	298.5	568.9
130.00		0.2813	36.087	32.125	5203.2	23.93	128.31	75.5	282.8	554.0
131.74	Bot - Section 4	0.2813	35.747	31.820	5056.4	23.69	127.10	75.8	277.5	189.7
135.00		0.2813	35.112	31.250	4789.6	23.24	124.84	76.3	267.6	664.8
136.99	Top - Section 3	0.2500	35.224	27.891	4309.9	26.43	140.89	0.0	0.0	401.0
139.00		0.2500	34.832	27.579	4166.9	26.12	139.33	73.0	234.7	189.4
139.50		0.2500	34.735	27.502	4131.7	26.05	138.94	73.1	233.3	46.9
140.00		0.2500	34.637	27.424	4096.8	25.97	138.55	73.2	232.0	46.7
145.00		0.2500	33.662	26.646	3758.1	25.19	134.65	74.1	219.0	460.0
146.00		0.2500	33.467	26.491	3692.6	25.04	133.87	74.2	216.4	90.4
146.50		0.2500	33.370	26.413	3660.2	24.96	133.48	74.3	215.2	45.0
147.00		0.2500	33.272	26.335	3628.0	24.88	133.09	74.4	213.9	44.9
150.00		0.2500	32.687	25.869	3438.6	24.42	130.75	74.9	206.3	266.5
155.00		0.2500	31.712	25.091	3137.7	23.64	126.85	75.8	194.1	433.5
160.00		0.2500	30.737	24.314	2854.9	22.86	122.95	76.7	182.2	420.3
165.00		0.2500	29.762	23.536	2589.7	22.09	119.05	77.6	170.7	407.1
167.50		0.2500	29.275	23.147	2463.5	21.70	117.10	78.0	165.1	198.6
170.00		0.2500	28.787	22.758	2341.4	21.31	115.15	78.5	159.5	195.3
175.00		0.2500	27.812	21.981	2109.5	20.54	111.25	79.3	148.8	380.6
177.00		0.2500	27.422	21.670	2021.2	20.23	109.69	79.7	144.6	148.5
180.00		0.2500	26.837	21.203	1893.4	19.76	107.35	80.2	138.4	218.8

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

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)
										36651.2

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

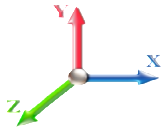
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

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	17.879	19.67	437.11	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	17.879	19.67	430.00	0.750	0.000	5.00	25.283	18.96	596.7	0.0	1921.7
10.00		1.00	0.85	17.879	19.67	422.90	0.750	0.000	5.00	24.868	18.65	586.9	0.0	1890.0
15.00		1.00	0.85	17.879	19.67	415.80	0.750	0.000	5.00	24.454	18.34	577.1	0.0	1858.2
20.00		1.00	0.90	18.971	20.87	420.98	0.750	0.000	5.00	24.040	18.03	602.0	0.0	1826.5
25.00		1.00	0.95	19.883	21.87	423.50	0.750	0.000	5.00	23.626	17.72	620.1	0.0	1794.7
30.00		1.00	0.98	20.661	22.73	424.07	0.750	0.000	5.00	23.212	17.41	633.0	0.0	1763.0
35.00		1.00	1.01	21.343	23.48	423.24	0.750	0.000	5.00	22.797	17.10	642.3	0.0	1731.2
40.00		1.00	1.04	21.951	24.15	421.37	0.750	0.000	5.00	22.383	16.79	648.6	0.0	1699.5
45.00		1.00	1.07	22.502	24.75	418.65	0.750	0.000	5.00	21.969	16.48	652.5	0.0	1667.7
45.42	Bot - Section 2	1.00	1.07	22.546	24.80	418.39	0.750	0.000	0.42	1.812	1.36	53.9	0.0	137.5
50.00	Appurtenance(s)	1.00	1.09	23.007	25.31	415.26	0.750	0.000	4.58	20.084	15.06	609.9	0.0	2835.5
52.75	Top - Section 1	1.00	1.11	23.268	25.59	413.15	0.750	0.000	2.75	11.883	8.91	365.0	0.0	1677.3
55.00		1.00	1.12	23.473	25.82	418.62	0.750	0.000	2.25	9.629	7.22	298.4	0.0	641.0
60.00		1.00	1.14	23.907	26.30	414.26	0.750	0.000	5.00	21.098	15.82	665.8	0.0	1404.2
65.00		1.00	1.16	24.313	26.74	409.48	0.750	0.000	5.00	20.684	15.51	663.8	0.0	1376.4
70.00		1.00	1.17	24.696	27.17	404.34	0.750	0.000	5.00	20.270	15.20	660.8	0.0	1348.6
75.00		1.00	1.19	25.057	27.56	398.88	0.750	0.000	5.00	19.856	14.89	656.7	0.0	1320.8
80.00		1.00	1.21	25.400	27.94	393.13	0.750	0.000	5.00	19.441	14.58	651.8	0.0	1293.0
85.00		1.00	1.22	25.726	28.30	387.13	0.750	0.000	5.00	19.027	14.27	646.1	0.0	1265.1
90.00		1.00	1.24	26.037	28.64	380.89	0.750	0.000	5.00	18.613	13.96	639.7	0.0	1237.3
91.66	Bot - Section 3	1.00	1.24	26.138	28.75	378.77	0.750	0.000	1.66	6.100	4.58	210.5	0.0	405.5
95.00		1.00	1.25	26.336	28.97	374.45	0.750	0.000	3.34	12.258	9.19	426.1	0.0	1329.2
98.00	Top - Section 2	1.00	1.26	26.508	29.16	370.49	0.750	0.000	3.00	10.852	8.14	379.7	0.0	1176.4
100.00		1.00	1.27	26.621	29.28	372.81	0.750	0.000	2.00	7.172	5.38	252.0	0.0	307.2
105.00		1.00	1.28	26.896	29.59	366.01	0.750	0.000	5.00	17.609	13.21	625.2	0.0	754.1
110.00		1.00	1.29	27.161	29.88	359.06	0.750	0.000	5.00	17.195	12.90	616.5	0.0	736.3
115.00		1.00	1.30	27.416	30.16	351.94	0.750	0.000	5.00	16.781	12.59	607.3	0.0	718.4
120.00		1.00	1.32	27.663	30.43	344.69	0.750	0.000	5.00	16.367	12.27	597.6	0.0	700.5
125.00		1.00	1.33	27.902	30.69	337.30	0.750	0.000	5.00	15.952	11.96	587.5	0.0	682.7
130.00		1.00	1.34	28.133	30.95	329.78	0.750	0.000	5.00	15.538	11.65	577.0	0.0	664.8
131.74	Bot - Section 4	1.00	1.34	28.212	31.03	327.14	0.750	0.000	1.74	5.320	3.99	198.1	0.0	227.6
135.00		1.00	1.35	28.358	31.19	322.15	0.750	0.000	3.26	9.942	7.46	372.2	0.0	797.7
136.99	Top - Section 3	1.00	1.35	28.445	31.29	319.08	0.750	0.000	1.99	5.999	4.50	225.2	0.0	481.2
139.00	Appurtenance(s)	1.00	1.36	28.533	31.39	320.56	0.750	0.000	2.01	5.972	4.48	224.9	0.0	227.3
139.50	Appurtenance(s)	1.00	1.36	28.554	31.41	319.79	0.750	0.000	0.50	1.478	1.11	55.7	0.0	56.2
140.00		1.00	1.36	28.576	31.43	319.01	0.750	0.000	0.50	1.474	1.11	55.6	0.0	56.1
145.00		1.00	1.37	28.788	31.67	311.18	0.750	0.000	5.00	14.508	10.88	551.3	0.0	552.0
146.00	Appurtenance(s)	1.00	1.37	28.829	31.71	309.60	0.750	0.000	1.00	2.852	2.14	108.5	0.0	108.5
146.50	Appurtenance(s)	1.00	1.37	28.850	31.73	308.81	0.750	0.000	0.50	1.420	1.06	54.1	0.0	54.0
147.00	Appurtenance(s)	1.00	1.37	28.871	31.76	308.02	0.750	0.000	0.50	1.416	1.06	53.9	0.0	53.8
150.00		1.00	1.38	28.994	31.89	303.24	0.750	0.000	3.00	8.406	6.30	321.7	0.0	319.7
155.00		1.00	1.39	29.195	32.11	295.22	0.750	0.000	5.00	13.679	10.26	527.2	0.0	520.2
160.00		1.00	1.40	29.390	32.33	287.10	0.750	0.000	5.00	13.265	9.95	514.6	0.0	504.3
165.00		1.00	1.41	29.581	32.54	278.89	0.750	0.000	5.00	12.851	9.64	501.8	0.0	488.5
167.50	Appurtenance(s)	1.00	1.41	29.675	32.64	274.76	0.750	0.000	2.50	6.270	4.70	245.6	0.0	238.3
170.00		1.00	1.42	29.768	32.74	270.60	0.750	0.000	2.50	6.167	4.62	242.3	0.0	234.3

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

175.00	1.00	1.42	29.950	32.95	262.24	0.750	0.000	5.00	12.022	9.02	475.3	0.0	456.7
177.00 Appurtenance(s)	1.00	1.43	30.022	33.02	258.87	0.750	0.000	2.00	4.693	3.52	186.0	0.0	178.2
180.00	1.00	1.43	30.128	33.14	253.80	0.750	0.000	3.00	6.915	5.19	275.0	0.0	262.6
							Totals:	**180.00**			**21,539.7**		**43,981.5**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Discrete Appurtenance Forces

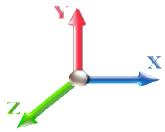
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

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	177.00	ALU TD-RRH8x20-25	3	30.022	33.024	0.60	0.90	7.33	252.00	0.000	0.000	387.12	0.00	0.00
2	177.00	ALU 1900 MHz	3	30.022	33.024	0.60	0.90	6.87	216.00	0.000	0.000	363.22	0.00	0.00
3	177.00	ALU 800 MHz	6	30.022	33.024	0.60	0.90	9.01	381.60	0.000	0.000	476.01	0.00	0.00
4	177.00	Sitepro PRK-1245L	1	30.022	33.024	1.00	1.00	9.50	557.89	0.000	0.000	501.97	0.00	0.00
5	177.00	Platform w/ Hand Rails	1	30.022	33.024	1.00	1.00	40.00	2400.00	0.000	0.000	2113.54	0.00	0.00
6	177.00	RFS APXVTM14-C-I20	3	30.022	33.024	0.71	0.90	13.52	201.60	0.000	0.000	714.55	0.00	0.00
7	177.00	Commscope	3	30.022	33.024	0.67	0.90	24.52	278.64	0.000	0.000	1295.36	0.00	0.00
8	167.50	Pipe Mounts	3	29.675	32.643	0.56	0.75	8.44	1260.00	0.000	0.000	440.68	0.00	0.00
9	167.50	Kathrein 742 351	3	29.675	32.643	0.49	0.80	7.88	107.28	0.000	0.000	411.37	0.00	0.00
10	147.00	Antel BXA-70063/6CF	3	28.871	31.758	0.56	0.80	12.72	61.20	0.000	0.000	646.21	0.00	0.00
11	146.50	Low Profile Platform	1	28.850	31.735	1.00	1.00	22.00	1800.00	0.000	0.000	1117.07	0.00	0.00
12	146.50	Antel LPA-80063/4CF	2	28.850	31.735	0.74	0.80	9.15	48.00	0.000	0.000	464.66	0.00	0.00
13	146.50	Antel BXA-171063/8CF-2	1	28.850	31.735	0.67	0.80	1.98	12.60	0.000	0.000	100.32	0.00	0.00
14	146.50	Antel BXA-171085-8CF-2	2	28.850	31.735	0.67	0.80	3.95	25.20	0.000	0.000	200.63	0.00	0.00
15	146.50	Antel	4	28.850	31.735	1.36	0.80	14.20	57.60	0.000	0.000	720.94	0.00	0.00
16	146.00	RFS FD9R6004/2C-3	6	28.829	31.712	0.54	0.80	1.16	22.32	0.000	0.000	58.74	0.00	0.00
17	139.50	Powerwave LGP 21903	6	28.554	31.410	0.54	0.80	0.87	39.60	0.000	0.000	43.64	0.00	0.00
18	139.00	Powerwave 7770	6	28.533	31.386	0.58	0.80	19.27	252.00	0.000	0.000	967.79	0.00	0.00
19	139.00	CSS DUO1417-8686-40	3	28.533	31.386	0.66	0.80	11.47	73.08	0.000	0.000	576.17	0.00	0.00
20	139.00	Powerwave	2	28.533	31.386	0.60	0.80	13.73	141.60	0.000	0.000	689.38	0.00	0.00
21	139.00	KMW	1	28.533	31.386	1.00	1.00	8.02	58.20	0.000	0.000	402.74	0.00	0.00
22	139.00	Powerwave LGP 21401	6	28.533	31.386	0.54	0.80	0.00	126.00	0.000	0.000	0.00	0.00	0.00
23	139.00	Ericsson RRUS-11	6	28.533	31.386	0.54	0.80	8.10	367.20	0.000	0.000	406.98	0.00	0.00
24	139.00	Andrew ABT-DF-DMADBH	3	28.533	31.386	0.54	0.80	0.08	3.96	0.000	0.000	4.04	0.00	0.00
25	139.00	Raycap DC6-48-60-18-8F	1	28.533	31.386	1.00	1.00	0.92	38.16	0.000	0.000	46.20	0.00	0.00
26	139.00	T-Arms	3	28.533	31.386	0.56	0.75	13.50	1260.00	0.000	0.000	677.93	0.00	0.00
27	50.00	Stand Off	1	23.007	25.308	1.00	1.00	2.63	48.00	0.000	0.000	106.49	0.00	0.00
28	50.00	GPS	1	23.007	25.308	1.00	1.00	1.00	12.00	0.000	0.000	40.49	0.00	0.00
							Totals:		**10,101.73**			**13,974.23**		

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

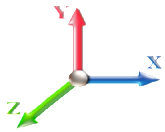
Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 12

TES Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

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		596.69	2138.47	0.00	0.00
10.00		586.91	2106.72	0.00	0.00
15.00		577.13	2074.97	0.00	0.00
20.00		601.99	2043.22	0.00	0.00
25.00		620.07	2011.47	0.00	0.00
30.00		633.04	1979.71	0.00	0.00
35.00		642.25	1947.96	0.00	0.00
40.00		648.56	1916.21	0.00	0.00
45.00		652.54	1884.46	0.00	0.00
45.42		53.93	155.60	0.00	0.00
50.00	(2) attachments	756.91	3094.24	0.00	0.00
52.75		364.97	1795.99	0.00	0.00
55.00		298.36	738.08	0.00	0.00
60.00		665.81	1620.02	0.00	0.00
65.00		663.83	1592.20	0.00	0.00
70.00		660.76	1564.39	0.00	0.00
75.00		656.73	1536.57	0.00	0.00
80.00		651.83	1508.76	0.00	0.00
85.00		646.13	1480.94	0.00	0.00
90.00		639.72	1453.13	0.00	0.00
91.66		210.47	477.24	0.00	0.00
95.00		426.13	1473.17	0.00	0.00
98.00		379.72	1305.72	0.00	0.00
100.00		252.02	393.62	0.00	0.00
105.00		625.18	969.91	0.00	0.00
110.00		616.49	952.05	0.00	0.00
115.00		607.29	934.19	0.00	0.00
120.00		597.63	916.33	0.00	0.00
125.00		587.53	898.47	0.00	0.00
130.00		577.02	880.61	0.00	0.00
131.74		198.13	302.84	0.00	0.00
135.00		372.15	938.30	0.00	0.00
136.99		225.23	567.25	0.00	0.00
139.00	(31) attachments	3996.16	2634.07	0.00	0.00
139.50	(6) attachments	99.33	109.35	0.00	0.00
140.00		55.58	69.59	0.00	0.00
145.00		551.29	687.18	0.00	0.00
146.00	(6) attachments	167.27	157.85	0.00	0.00
146.50	(10) attachments	2657.69	2010.93	0.00	0.00
147.00	(3) attachments	700.16	121.08	0.00	0.00
150.00		321.73	355.95	0.00	0.00
155.00		527.16	580.55	0.00	0.00
160.00		514.63	564.67	0.00	0.00
165.00		501.80	548.80	0.00	0.00
167.50	(6) attachments	1097.65	1635.73	0.00	0.00
170.00		242.31	245.76	0.00	0.00

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

175.00		475.30	479.61	0.00	0.00
177.00	(20) attachments	6037.74	4475.13	0.00	0.00
180.00		275.01	262.60	0.00	0.00
	Totals:	**35,513.95**	**60,591.67**	**0.00**	**0.00**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Linear Appurtenance Segment Forces (Factored)

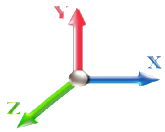
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.96
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.96
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.96
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	18.971	0.00	0.96
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	19.883	0.00	0.96
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	20.661	0.00	0.96
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	21.343	0.00	0.96
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	21.951	0.00	0.96
45.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	22.502	0.00	0.96
45.42	1/2" Coax	Yes	0.42	0.000	0.65	0.02	0.00	0.012	0.000	22.546	0.00	0.08
50.00	1/2" Coax	Yes	4.58	0.000	0.65	0.25	0.00	0.013	0.000	23.007	0.00	0.88
									Totals:		**0.0**	**9.6**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

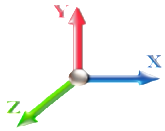
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

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	-60.55	-35.59	0.00	-4264.2	0.00	4264.21	6607.78	3303.89	16218.3	8051.48	0.00	0.000	0.000	0.539
5.00	-58.32	-35.13	0.00	-4086.2	0.00	4086.27	6536.37	3268.19	15777.9	7832.86	0.08	-0.140	0.000	0.531
10.00	-56.13	-34.68	0.00	-3910.6	0.00	3910.61	6463.73	3231.87	15340.5	7615.67	0.30	-0.281	0.000	0.522
15.00	-53.98	-34.22	0.00	-3737.2	0.00	3737.24	6389.86	3194.93	14906.0	7399.99	0.67	-0.422	0.000	0.514
20.00	-51.86	-33.73	0.00	-3566.1	0.00	3566.14	6314.77	3157.38	14474.7	7185.88	1.19	-0.565	0.000	0.505
25.00	-49.77	-33.21	0.00	-3397.5	0.00	3397.50	6238.44	3119.22	14046.7	6973.42	1.86	-0.708	0.000	0.495
30.00	-47.72	-32.67	0.00	-3231.4	0.00	3231.44	6160.89	3080.44	13622.3	6762.68	2.67	-0.851	0.000	0.486
35.00	-45.70	-32.11	0.00	-3068.0	0.00	3068.09	6082.10	3041.05	13201.4	6553.75	3.64	-0.995	0.000	0.476
40.00	-43.71	-31.54	0.00	-2907.5	0.00	2907.52	6002.09	3001.05	12784.3	6346.69	4.76	-1.140	0.000	0.466
45.00	-41.80	-30.90	0.00	-2749.8	0.00	2749.83	5920.85	2960.42	12371.1	6141.58	6.03	-1.284	0.000	0.455
45.42	-41.61	-30.90	0.00	-2736.9	0.00	2736.95	5914.02	2957.01	12336.9	6124.58	6.15	-1.297	0.000	0.454
50.00	-38.48	-30.14	0.00	-2595.3	0.00	2595.33	5838.38	2919.19	11962.1	5938.49	7.46	-1.429	0.000	0.444
52.75	-36.65	-29.78	0.00	-2512.4	0.00	2512.45	4942.80	2471.40	10222.2	5074.76	8.30	-1.510	0.000	0.503
55.00	-35.87	-29.53	0.00	-2445.4	0.00	2445.45	4913.65	2456.82	10072.3	5000.32	9.03	-1.576	0.000	0.497
60.00	-34.19	-28.91	0.00	-2297.8	0.00	2297.82	4847.98	2423.99	9741.07	4835.88	10.77	-1.732	0.000	0.482
65.00	-32.54	-28.28	0.00	-2153.2	0.00	2153.28	4781.08	2390.54	9412.76	4672.89	12.66	-1.886	0.000	0.468
70.00	-30.93	-27.65	0.00	-2011.8	0.00	2011.87	4712.96	2356.48	9087.49	4511.41	14.72	-2.040	0.000	0.453
75.00	-29.34	-27.02	0.00	-1873.6	0.00	1873.61	4643.60	2321.80	8765.44	4351.53	16.94	-2.193	0.000	0.437
80.00	-27.79	-26.38	0.00	-1738.5	0.00	1738.53	4573.02	2286.51	8446.74	4193.32	19.32	-2.345	0.000	0.421
85.00	-26.27	-25.74	0.00	-1606.6	0.00	1606.64	4501.21	2250.60	8131.55	4036.84	21.85	-2.494	0.000	0.404
90.00	-24.81	-25.08	0.00	-1477.9	0.00	1477.95	4428.17	2214.08	7820.02	3882.19	24.55	-2.642	0.000	0.386
91.66	-24.31	-24.88	0.00	-1436.2	0.00	1436.24	4403.60	2201.80	7717.21	3831.15	25.47	-2.691	0.000	0.381
95.00	-22.82	-24.42	0.00	-1353.2	0.00	1353.24	4350.76	2175.38	7506.87	3726.73	27.39	-2.788	0.000	0.368
98.00	-21.50	-24.00	0.00	-1280.0	0.00	1280.08	2393.56	1196.78	4158.66	2064.53	29.17	-2.875	0.000	0.629
100.00	-21.07	-23.78	0.00	-1232.0	0.00	1232.00	2381.84	1190.92	4099.59	2035.21	30.39	-2.932	0.000	0.615
105.00	-20.05	-23.17	0.00	-1113.1	0.00	1113.12	2351.72	1175.86	3952.36	1962.12	33.57	-3.136	0.000	0.576
110.00	-19.06	-22.57	0.00	-997.27	0.00	997.27	2320.37	1160.18	3805.57	1889.24	36.96	-3.332	0.000	0.536
115.00	-18.09	-21.96	0.00	-884.44	0.00	884.44	2287.79	1143.89	3659.35	1816.65	40.55	-3.521	0.000	0.495
120.00	-17.15	-21.36	0.00	-774.63	0.00	774.63	2253.98	1126.99	3513.86	1744.43	44.33	-3.700	0.000	0.452
125.00	-16.24	-20.76	0.00	-667.83	0.00	667.83	2218.95	1109.47	3369.25	1672.64	48.29	-3.868	0.000	0.407
130.00	-15.36	-20.15	0.00	-564.04	0.00	564.04	2182.68	1091.34	3225.66	1601.35	52.43	-4.024	0.000	0.360
131.74	-15.05	-19.95	0.00	-528.91	0.00	528.91	2169.75	1084.87	3175.87	1576.63	53.91	-4.076	0.000	0.343
135.00	-14.12	-19.53	0.00	-463.93	0.00	463.93	2145.19	1072.59	3083.25	1530.65	56.72	-4.167	0.000	0.310
136.99	-13.55	-19.28	0.00	-425.00	0.00	425.00	1823.96	911.98	2634.70	1307.98	58.47	-4.219	0.000	0.333
139.00	-11.21	-15.10	0.00	-386.32	0.00	386.32	1812.30	906.15	2588.35	1284.97	60.25	-4.270	0.000	0.307
139.50	-11.10	-15.00	0.00	-378.77	0.00	378.77	1809.36	904.68	2576.82	1279.24	60.70	-4.283	0.000	0.303
140.00	-11.02	-14.95	0.00	-371.27	0.00	371.27	1806.41	903.20	2565.29	1273.52	61.15	-4.295	0.000	0.298
145.00	-10.36	-14.36	0.00	-296.53	0.00	296.53	1776.24	888.12	2450.41	1216.49	65.71	-4.411	0.000	0.250
146.00	-10.21	-14.18	0.00	-282.17	0.00	282.17	1770.06	885.03	2427.52	1205.13	66.63	-4.433	0.000	0.240
146.50	-8.41	-11.38	0.00	-275.07	0.00	275.07	1766.95	883.47	2416.09	1199.45	67.10	-4.444	0.000	0.234
147.00	-8.34	-10.68	0.00	-269.38	0.00	269.38	1763.83	881.91	2404.67	1193.78	67.56	-4.455	0.000	0.231
150.00	-8.00	-10.34	0.00	-237.35	0.00	237.35	1744.84	872.42	2336.33	1159.85	70.38	-4.514	0.000	0.209
155.00	-7.45	-9.78	0.00	-185.65	0.00	185.65	1712.21	856.11	2223.20	1103.69	75.15	-4.602	0.000	0.173
160.00	-6.91	-9.23	0.00	-136.76	0.00	136.76	1678.36	839.18	2111.17	1048.07	80.01	-4.675	0.000	0.135
165.00	-6.40	-8.69	0.00	-90.62	0.00	90.62	1643.27	821.64	2000.39	993.08	84.93	-4.731	0.000	0.095
167.50	-4.86	-7.46	0.00	-68.90	0.00	68.90	1625.27	812.64	1945.52	965.84	87.41	-4.753	0.000	0.074
170.00	-4.63	-7.20	0.00	-50.26	0.00	50.26	1606.96	803.48	1891.02	938.78	89.90	-4.771	0.000	0.056
175.00	-4.19	-6.69	0.00	-14.26	0.00	14.26	1569.42	784.71	1783.19	885.25	94.90	-4.790	0.000	0.019

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

177.00	-0.24	-0.30	0.00	-0.89	0.00	0.89	1554.06	777.03	1740.53	864.07	96.91	-4.792	0.000	0.001
180.00	0.00	-0.27	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	99.92	-4.792	0.000	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

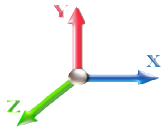
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

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	17.879	19.67	437.11	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	17.879	19.67	430.00	0.750	0.000	5.00	25.283	18.96	596.7	0.0	1441.3
10.00		1.00	0.85	17.879	19.67	422.90	0.750	0.000	5.00	24.868	18.65	586.9	0.0	1417.5
15.00		1.00	0.85	17.879	19.67	415.80	0.750	0.000	5.00	24.454	18.34	577.1	0.0	1393.7
20.00		1.00	0.90	18.971	20.87	420.98	0.750	0.000	5.00	24.040	18.03	602.0	0.0	1369.8
25.00		1.00	0.95	19.883	21.87	423.50	0.750	0.000	5.00	23.626	17.72	620.1	0.0	1346.0
30.00		1.00	0.98	20.661	22.73	424.07	0.750	0.000	5.00	23.212	17.41	633.0	0.0	1322.2
35.00		1.00	1.01	21.343	23.48	423.24	0.750	0.000	5.00	22.797	17.10	642.3	0.0	1298.4
40.00		1.00	1.04	21.951	24.15	421.37	0.750	0.000	5.00	22.383	16.79	648.6	0.0	1274.6
45.00		1.00	1.07	22.502	24.75	418.65	0.750	0.000	5.00	21.969	16.48	652.5	0.0	1250.8
45.42	Bot - Section 2	1.00	1.07	22.546	24.80	418.39	0.750	0.000	0.42	1.812	1.36	53.9	0.0	103.2
50.00	Appurtenance(s)	1.00	1.09	23.007	25.31	415.26	0.750	0.000	4.58	20.084	15.06	609.9	0.0	2126.7
52.75	Top - Section 1	1.00	1.11	23.268	25.59	413.15	0.750	0.000	2.75	11.883	8.91	365.0	0.0	1258.0
55.00		1.00	1.12	23.473	25.82	418.62	0.750	0.000	2.25	9.629	7.22	298.4	0.0	480.7
60.00		1.00	1.14	23.907	26.30	414.26	0.750	0.000	5.00	21.098	15.82	665.8	0.0	1053.2
65.00		1.00	1.16	24.313	26.74	409.48	0.750	0.000	5.00	20.684	15.51	663.8	0.0	1032.3
70.00		1.00	1.17	24.696	27.17	404.34	0.750	0.000	5.00	20.270	15.20	660.8	0.0	1011.4
75.00		1.00	1.19	25.057	27.56	398.88	0.750	0.000	5.00	19.856	14.89	656.7	0.0	990.6
80.00		1.00	1.21	25.400	27.94	393.13	0.750	0.000	5.00	19.441	14.58	651.8	0.0	969.7
85.00		1.00	1.22	25.726	28.30	387.13	0.750	0.000	5.00	19.027	14.27	646.1	0.0	948.9
90.00		1.00	1.24	26.037	28.64	380.89	0.750	0.000	5.00	18.613	13.96	639.7	0.0	928.0
91.66	Bot - Section 3	1.00	1.24	26.138	28.75	378.77	0.750	0.000	1.66	6.100	4.58	210.5	0.0	304.1
95.00		1.00	1.25	26.336	28.97	374.45	0.750	0.000	3.34	12.258	9.19	426.1	0.0	996.9
98.00	Top - Section 2	1.00	1.26	26.508	29.16	370.49	0.750	0.000	3.00	10.852	8.14	379.7	0.0	882.3
100.00		1.00	1.27	26.621	29.28	372.81	0.750	0.000	2.00	7.172	5.38	252.0	0.0	230.4
105.00		1.00	1.28	26.896	29.59	366.01	0.750	0.000	5.00	17.609	13.21	625.2	0.0	565.6
110.00		1.00	1.29	27.161	29.88	359.06	0.750	0.000	5.00	17.195	12.90	616.5	0.0	552.2
115.00		1.00	1.30	27.416	30.16	351.94	0.750	0.000	5.00	16.781	12.59	607.3	0.0	538.8
120.00		1.00	1.32	27.663	30.43	344.69	0.750	0.000	5.00	16.367	12.27	597.6	0.0	525.4
125.00		1.00	1.33	27.902	30.69	337.30	0.750	0.000	5.00	15.952	11.96	587.5	0.0	512.0
130.00		1.00	1.34	28.133	30.95	329.78	0.750	0.000	5.00	15.538	11.65	577.0	0.0	498.6
131.74	Bot - Section 4	1.00	1.34	28.212	31.03	327.14	0.750	0.000	1.74	5.320	3.99	198.1	0.0	170.7
135.00		1.00	1.35	28.358	31.19	322.15	0.750	0.000	3.26	9.942	7.46	372.2	0.0	598.3
136.99	Top - Section 3	1.00	1.35	28.445	31.29	319.08	0.750	0.000	1.99	5.999	4.50	225.2	0.0	360.9
139.00	Appurtenance(s)	1.00	1.36	28.533	31.39	320.56	0.750	0.000	2.01	5.972	4.48	224.9	0.0	170.4
139.50	Appurtenance(s)	1.00	1.36	28.554	31.41	319.79	0.750	0.000	0.50	1.478	1.11	55.7	0.0	42.2
140.00		1.00	1.36	28.576	31.43	319.01	0.750	0.000	0.50	1.474	1.11	55.6	0.0	42.1
145.00		1.00	1.37	28.788	31.67	311.18	0.750	0.000	5.00	14.508	10.88	551.3	0.0	414.0
146.00	Appurtenance(s)	1.00	1.37	28.829	31.71	309.60	0.750	0.000	1.00	2.852	2.14	108.5	0.0	81.4
146.50	Appurtenance(s)	1.00	1.37	28.850	31.73	308.81	0.750	0.000	0.50	1.420	1.06	54.1	0.0	40.5
147.00	Appurtenance(s)	1.00	1.37	28.871	31.76	308.02	0.750	0.000	0.50	1.416	1.06	53.9	0.0	40.4
150.00		1.00	1.38	28.994	31.89	303.24	0.750	0.000	3.00	8.406	6.30	321.7	0.0	239.8
155.00		1.00	1.39	29.195	32.11	295.22	0.750	0.000	5.00	13.679	10.26	527.2	0.0	390.2
160.00		1.00	1.40	29.390	32.33	287.10	0.750	0.000	5.00	13.265	9.95	514.6	0.0	378.3
165.00		1.00	1.41	29.581	32.54	278.89	0.750	0.000	5.00	12.851	9.64	501.8	0.0	366.3
167.50	Appurtenance(s)	1.00	1.41	29.675	32.64	274.76	0.750	0.000	2.50	6.270	4.70	245.6	0.0	178.7
170.00		1.00	1.42	29.768	32.74	270.60	0.750	0.000	2.50	6.167	4.62	242.3	0.0	175.7

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

175.00	1.00	1.42	29.950	32.95	262.24	0.750	0.000	5.00	12.022	9.02	475.3	0.0	342.5
177.00 Appurtenance(s)	1.00	1.43	30.022	33.02	258.87	0.750	0.000	2.00	4.693	3.52	186.0	0.0	133.7
180.00	1.00	1.43	30.128	33.14	253.80	0.750	0.000	3.00	6.915	5.19	275.0	0.0	196.9
							Totals:	**180.00**			**21,539.7**		**32,986.1**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Discrete Appurtenance Forces

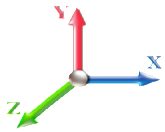
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

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	177.00	ALU TD-RRH8x20-25	3	30.022	33.024	0.60	0.90	7.33	189.00	0.000	0.000	387.12	0.00	0.00
2	177.00	ALU 1900 MHz	3	30.022	33.024	0.60	0.90	6.87	162.00	0.000	0.000	363.22	0.00	0.00
3	177.00	ALU 800 MHz	6	30.022	33.024	0.60	0.90	9.01	286.20	0.000	0.000	476.01	0.00	0.00
4	177.00	Sitepro PRK-1245L	1	30.022	33.024	1.00	1.00	9.50	418.42	0.000	0.000	501.97	0.00	0.00
5	177.00	Platform w/ Hand Rails	1	30.022	33.024	1.00	1.00	40.00	1800.00	0.000	0.000	2113.54	0.00	0.00
6	177.00	RFS APXVTM14-C-I20	3	30.022	33.024	0.71	0.90	13.52	151.20	0.000	0.000	714.55	0.00	0.00
7	177.00	Commscope	3	30.022	33.024	0.67	0.90	24.52	208.98	0.000	0.000	1295.36	0.00	0.00
8	167.50	Pipe Mounts	3	29.675	32.643	0.56	0.75	8.44	945.00	0.000	0.000	440.68	0.00	0.00
9	167.50	Kathrein 742 351	3	29.675	32.643	0.49	0.80	7.88	80.46	0.000	0.000	411.37	0.00	0.00
10	147.00	Antel BXA-70063/6CF	3	28.871	31.758	0.56	0.80	12.72	45.90	0.000	0.000	646.21	0.00	0.00
11	146.50	Low Profile Platform	1	28.850	31.735	1.00	1.00	22.00	1350.00	0.000	0.000	1117.07	0.00	0.00
12	146.50	Antel LPA-80063/4CF	2	28.850	31.735	0.74	0.80	9.15	36.00	0.000	0.000	464.66	0.00	0.00
13	146.50	Antel BXA-171063/8CF-2	1	28.850	31.735	0.67	0.80	1.98	9.45	0.000	0.000	100.32	0.00	0.00
14	146.50	Antel BXA-171085-8CF-2	2	28.850	31.735	0.67	0.80	3.95	18.90	0.000	0.000	200.63	0.00	0.00
15	146.50	Antel	4	28.850	31.735	1.36	0.80	14.20	43.20	0.000	0.000	720.94	0.00	0.00
16	146.00	RFS FD9R6004/2C-3	6	28.829	31.712	0.54	0.80	1.16	16.74	0.000	0.000	58.74	0.00	0.00
17	139.50	Powerwave LGP 21903	6	28.554	31.410	0.54	0.80	0.87	29.70	0.000	0.000	43.64	0.00	0.00
18	139.00	Powerwave 7770	6	28.533	31.386	0.58	0.80	19.27	189.00	0.000	0.000	967.79	0.00	0.00
19	139.00	CSS DUO1417-8686-40	3	28.533	31.386	0.66	0.80	11.47	54.81	0.000	0.000	576.17	0.00	0.00
20	139.00	Powerwave	2	28.533	31.386	0.60	0.80	13.73	106.20	0.000	0.000	689.38	0.00	0.00
21	139.00	KMW	1	28.533	31.386	1.00	1.00	8.02	43.65	0.000	0.000	402.74	0.00	0.00
22	139.00	Powerwave LGP 21401	6	28.533	31.386	0.54	0.80	0.00	94.50	0.000	0.000	0.00	0.00	0.00
23	139.00	Ericsson RRUS-11	6	28.533	31.386	0.54	0.80	8.10	275.40	0.000	0.000	406.98	0.00	0.00
24	139.00	Andrew ABT-DF-DMADBH	3	28.533	31.386	0.54	0.80	0.08	2.97	0.000	0.000	4.04	0.00	0.00
25	139.00	Raycap DC6-48-60-18-8F	1	28.533	31.386	1.00	1.00	0.92	28.62	0.000	0.000	46.20	0.00	0.00
26	139.00	T-Arms	3	28.533	31.386	0.56	0.75	13.50	945.00	0.000	0.000	677.93	0.00	0.00
27	50.00	Stand Off	1	23.007	25.308	1.00	1.00	2.63	36.00	0.000	0.000	106.49	0.00	0.00
28	50.00	GPS	1	23.007	25.308	1.00	1.00	1.00	9.00	0.000	0.000	40.49	0.00	0.00
							Totals:		**7,576.30**			**13,974.23**		

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

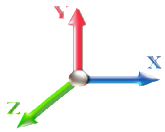
Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

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		596.69	1603.85	0.00	0.00
10.00		586.91	1580.04	0.00	0.00
15.00		577.13	1556.23	0.00	0.00
20.00		601.99	1532.41	0.00	0.00
25.00		620.07	1508.60	0.00	0.00
30.00		633.04	1484.79	0.00	0.00
35.00		642.25	1460.97	0.00	0.00
40.00		648.56	1437.16	0.00	0.00
45.00		652.54	1413.34	0.00	0.00
45.42		53.93	116.70	0.00	0.00
50.00	(2) attachments	756.91	2320.68	0.00	0.00
52.75		364.97	1346.99	0.00	0.00
55.00		298.36	553.56	0.00	0.00
60.00		665.81	1215.01	0.00	0.00
65.00		663.83	1194.15	0.00	0.00
70.00		660.76	1173.29	0.00	0.00
75.00		656.73	1152.43	0.00	0.00
80.00		651.83	1131.57	0.00	0.00
85.00		646.13	1110.71	0.00	0.00
90.00		639.72	1089.85	0.00	0.00
91.66		210.47	357.93	0.00	0.00
95.00		426.13	1104.88	0.00	0.00
98.00		379.72	979.29	0.00	0.00
100.00		252.02	295.22	0.00	0.00
105.00		625.18	727.43	0.00	0.00
110.00		616.49	714.04	0.00	0.00
115.00		607.29	700.64	0.00	0.00
120.00		597.63	687.25	0.00	0.00
125.00		587.53	673.85	0.00	0.00
130.00		577.02	660.46	0.00	0.00
131.74		198.13	227.13	0.00	0.00
135.00		372.15	703.73	0.00	0.00
136.99		225.23	425.44	0.00	0.00
139.00	(31) attachments	3996.16	1975.55	0.00	0.00
139.50	(6) attachments	99.33	82.01	0.00	0.00
140.00		55.58	52.19	0.00	0.00
145.00		551.29	515.39	0.00	0.00
146.00	(6) attachments	167.27	118.39	0.00	0.00
146.50	(10) attachments	2657.69	1508.20	0.00	0.00
147.00	(3) attachments	700.16	90.81	0.00	0.00
150.00		321.73	266.96	0.00	0.00
155.00		527.16	435.41	0.00	0.00
160.00		514.63	423.51	0.00	0.00
165.00		501.80	411.60	0.00	0.00
167.50	(6) attachments	1097.65	1226.79	0.00	0.00
170.00		242.31	184.32	0.00	0.00

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 21

Tower Engineering Solutions

175.00		475.30	359.71	0.00	0.00
177.00	(20) attachments	6037.74	3356.35	0.00	0.00
180.00		275.01	196.95	0.00	0.00
	Totals:	**35,513.95**	**45,443.75**	**0.00**	**0.00**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Linear Appurtenance Segment Forces (Factored)

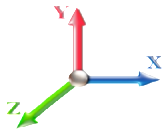
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.72
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.72
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	17.879	0.00	0.72
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	18.971	0.00	0.72
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	19.883	0.00	0.72
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	20.661	0.00	0.72
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	21.343	0.00	0.72
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	21.951	0.00	0.72
45.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	22.502	0.00	0.72
45.42	1/2" Coax	Yes	0.42	0.000	0.65	0.02	0.00	0.012	0.000	22.546	0.00	0.06
50.00	1/2" Coax	Yes	4.58	0.000	0.65	0.25	0.00	0.013	0.000	23.007	0.00	0.66
									Totals:		**0.0**	**7.2**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

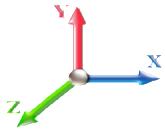
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

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	-45.40	-35.57	0.00	-4223.0	0.00	4223.04	6607.78	3303.89	16218.3	8051.48	0.00	0.000	0.000	0.531
5.00	-43.71	-35.08	0.00	-4045.2	0.00	4045.20	6536.37	3268.19	15777.9	7832.86	0.07	-0.139	0.000	0.523
10.00	-42.05	-34.59	0.00	-3869.8	0.00	3869.82	6463.73	3231.87	15340.5	7615.67	0.29	-0.278	0.000	0.515
15.00	-40.41	-34.10	0.00	-3696.8	0.00	3696.89	6389.86	3194.93	14906.0	7399.99	0.66	-0.418	0.000	0.506
20.00	-38.80	-33.58	0.00	-3526.4	0.00	3526.40	6314.77	3157.38	14474.7	7185.88	1.17	-0.559	0.000	0.497
25.00	-37.22	-33.04	0.00	-3358.5	0.00	3358.50	6238.44	3119.22	14046.7	6973.42	1.84	-0.700	0.000	0.488
30.00	-35.66	-32.47	0.00	-3193.3	0.00	3193.33	6160.89	3080.44	13622.3	6762.68	2.65	-0.842	0.000	0.478
35.00	-34.13	-31.89	0.00	-3030.9	0.00	3030.97	6082.10	3041.05	13201.4	6553.75	3.60	-0.984	0.000	0.468
40.00	-32.63	-31.30	0.00	-2871.5	0.00	2871.53	6002.09	3001.05	12784.3	6346.69	4.71	-1.127	0.000	0.458
45.00	-31.19	-30.66	0.00	-2715.0	0.00	2715.05	5920.85	2960.42	12371.1	6141.58	5.97	-1.270	0.000	0.447
45.42	-31.04	-30.64	0.00	-2702.2	0.00	2702.27	5914.02	2957.01	12336.9	6124.58	6.08	-1.282	0.000	0.447
50.00	-28.68	-29.88	0.00	-2561.8	0.00	2561.85	5838.38	2919.19	11962.1	5938.49	7.38	-1.413	0.000	0.436
52.75	-27.31	-29.52	0.00	-2479.6	0.00	2479.68	4942.80	2471.40	10222.2	5074.76	8.21	-1.493	0.000	0.494
55.00	-26.70	-29.25	0.00	-2413.2	0.00	2413.27	4913.65	2456.82	10072.3	5000.32	8.93	-1.558	0.000	0.488
60.00	-25.43	-28.62	0.00	-2267.0	0.00	2267.00	4847.98	2423.99	9741.07	4835.88	10.65	-1.711	0.000	0.474
65.00	-24.18	-27.99	0.00	-2123.8	0.00	2123.89	4781.08	2390.54	9412.76	4672.89	12.52	-1.864	0.000	0.460
70.00	-22.96	-27.35	0.00	-1983.9	0.00	1983.96	4712.96	2356.48	9087.49	4511.41	14.56	-2.016	0.000	0.445
75.00	-21.76	-26.70	0.00	-1847.2	0.00	1847.24	4643.60	2321.80	8765.44	4351.53	16.75	-2.167	0.000	0.429
80.00	-20.59	-26.06	0.00	-1713.7	0.00	1713.71	4573.02	2286.51	8446.74	4193.32	19.10	-2.316	0.000	0.413
85.00	-19.44	-25.42	0.00	-1583.4	0.00	1583.40	4501.21	2250.60	8131.55	4036.84	21.60	-2.463	0.000	0.397
90.00	-18.34	-24.76	0.00	-1456.3	0.00	1456.30	4428.17	2214.08	7820.02	3882.19	24.26	-2.608	0.000	0.379
91.66	-17.96	-24.56	0.00	-1415.1	0.00	1415.11	4403.60	2201.80	7717.21	3831.15	25.18	-2.657	0.000	0.374
95.00	-16.84	-24.11	0.00	-1333.1	0.00	1333.16	4350.76	2175.38	7506.87	3726.73	27.07	-2.753	0.000	0.362
98.00	-15.85	-23.70	0.00	-1260.9	0.00	1260.92	2393.56	1196.78	4158.66	2064.53	28.82	-2.838	0.000	0.618
100.00	-15.52	-23.47	0.00	-1213.4	0.00	1213.44	2381.84	1190.92	4099.59	2035.21	30.03	-2.895	0.000	0.603
105.00	-14.75	-22.86	0.00	-1096.0	0.00	1096.09	2351.72	1175.86	3952.36	1962.12	33.16	-3.095	0.000	0.565
110.00	-13.99	-22.25	0.00	-981.79	0.00	981.79	2320.37	1160.18	3805.57	1889.24	36.51	-3.289	0.000	0.526
115.00	-13.26	-21.64	0.00	-870.54	0.00	870.54	2287.79	1143.89	3659.35	1816.65	40.05	-3.475	0.000	0.485
120.00	-12.55	-21.04	0.00	-762.32	0.00	762.32	2253.98	1126.99	3513.86	1744.43	43.79	-3.651	0.000	0.443
125.00	-11.86	-20.45	0.00	-657.11	0.00	657.11	2218.95	1109.47	3369.25	1672.64	47.70	-3.816	0.000	0.399
130.00	-11.20	-19.84	0.00	-554.88	0.00	554.88	2182.68	1091.34	3225.66	1601.35	51.78	-3.969	0.000	0.352
131.74	-10.97	-19.64	0.00	-520.29	0.00	520.29	2169.75	1084.87	3175.87	1576.63	53.24	-4.021	0.000	0.335
135.00	-10.27	-19.24	0.00	-456.31	0.00	456.31	2145.19	1072.59	3083.25	1530.65	56.01	-4.110	0.000	0.303
136.99	-9.84	-18.99	0.00	-417.97	0.00	417.97	1823.96	911.98	2634.70	1307.98	57.73	-4.162	0.000	0.325
139.00	-8.16	-14.86	0.00	-379.86	0.00	379.86	1812.30	906.15	2588.35	1284.97	59.49	-4.211	0.000	0.300
139.50	-8.08	-14.76	0.00	-372.43	0.00	372.43	1809.36	904.68	2576.82	1279.24	59.94	-4.224	0.000	0.296
140.00	-8.01	-14.71	0.00	-365.05	0.00	365.05	1806.41	903.20	2565.29	1273.52	60.38	-4.237	0.000	0.291
145.00	-7.53	-14.13	0.00	-291.50	0.00	291.50	1776.24	888.12	2450.41	1216.49	64.87	-4.351	0.000	0.244
146.00	-7.42	-13.96	0.00	-277.36	0.00	277.36	1770.06	885.03	2427.52	1205.13	65.79	-4.372	0.000	0.235
146.50	-6.11	-11.19	0.00	-270.39	0.00	270.39	1766.95	883.47	2416.09	1199.45	66.25	-4.383	0.000	0.229
147.00	-6.07	-10.49	0.00	-264.79	0.00	264.79	1763.83	881.91	2404.67	1193.78	66.70	-4.393	0.000	0.225
150.00	-5.82	-10.16	0.00	-233.31	0.00	233.31	1744.84	872.42	2336.33	1159.85	69.48	-4.452	0.000	0.205
155.00	-5.41	-9.61	0.00	-182.52	0.00	182.52	1712.21	856.11	2223.20	1103.69	74.19	-4.538	0.000	0.169
160.00	-5.02	-9.07	0.00	-134.49	0.00	134.49	1678.36	839.18	2111.17	1048.07	78.97	-4.609	0.000	0.131
165.00	-4.64	-8.53	0.00	-89.16	0.00	89.16	1643.27	821.64	2000.39	993.08	83.83	-4.665	0.000	0.093
167.50	-3.51	-7.34	0.00	-67.83	0.00	67.83	1625.27	812.64	1945.52	965.84	86.28	-4.687	0.000	0.072
170.00	-3.34	-7.09	0.00	-49.47	0.00	49.47	1606.96	803.48	1891.02	938.78	88.73	-4.704	0.000	0.055
175.00	-3.02	-6.58	0.00	-14.04	0.00	14.04	1569.42	784.71	1783.19	885.25	93.67	-4.723	0.000	0.018

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

177.00	-0.17	-0.29	0.00	-0.87	0.00	0.87	1554.06	777.03	1740.53	864.07	95.64	-4.725	0.000	0.001
180.00	0.00	-0.27	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	98.61	-4.725	0.000	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

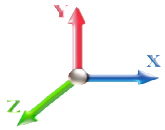
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

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 25

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	26.663	32.00	181.9	635.2	2556.9
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.775	5.00	26.348	31.62	179.7	671.2	2561.1
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.848	5.00	25.995	31.19	177.3	688.4	2546.6
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.902	5.00	25.625	30.75	185.5	697.4	2523.8
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.945	5.00	25.247	30.30	191.5	701.6	2496.3
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.981	5.00	24.862	29.83	196.0	702.8	2465.7
35.00		1.00	1.01	6.169	6.79	0.00	1.200	2.012	5.00	24.474	29.37	199.3	701.7	2432.9
40.00		1.00	1.04	6.345	6.98	0.00	1.200	2.039	5.00	24.082	28.90	201.7	698.9	2398.3
45.00		1.00	1.07	6.504	7.15	0.00	1.200	2.063	5.00	23.688	28.43	203.4	694.7	2362.4
45.42	Bot - Section 2	1.00	1.07	6.517	7.17	0.00	1.200	2.065	0.42	1.955	2.35	16.8	57.9	195.4
50.00	Appurtenance(s)	1.00	1.09	6.650	7.32	0.00	1.200	2.085	4.58	21.676	26.01	190.3	642.6	3478.2
52.75	Top - Section 1	1.00	1.11	6.726	7.40	0.00	1.200	2.096	2.75	12.844	15.41	114.0	383.8	2061.1
55.00		1.00	1.12	6.785	7.46	0.00	1.200	2.105	2.25	10.419	12.50	93.3	312.8	953.8
60.00		1.00	1.14	6.910	7.60	0.00	1.200	2.123	5.00	22.868	27.44	208.6	688.3	2092.5
65.00		1.00	1.16	7.028	7.73	0.00	1.200	2.140	5.00	22.468	26.96	208.4	680.8	2057.2
70.00		1.00	1.17	7.138	7.85	0.00	1.200	2.156	5.00	22.067	26.48	207.9	672.8	2021.4
75.00		1.00	1.19	7.243	7.97	0.00	1.200	2.171	5.00	21.665	26.00	207.1	664.3	1985.1
80.00		1.00	1.21	7.342	8.08	0.00	1.200	2.185	5.00	21.262	25.51	206.1	655.3	1948.3
85.00		1.00	1.22	7.436	8.18	0.00	1.200	2.198	5.00	20.859	25.03	204.7	645.9	1911.1
90.00		1.00	1.24	7.526	8.28	0.00	1.200	2.211	5.00	20.456	24.55	203.2	636.2	1873.5
91.66	Bot - Section 3	1.00	1.24	7.555	8.31	0.00	1.200	2.215	1.66	6.714	8.06	67.0	210.5	616.0
95.00		1.00	1.25	7.612	8.37	0.00	1.200	2.223	3.34	13.494	16.19	135.6	423.1	1752.2
98.00	Top - Section 2	1.00	1.26	7.662	8.43	0.00	1.200	2.230	3.00	11.966	14.36	121.0	376.3	1552.7
100.00		1.00	1.27	7.695	8.46	0.00	1.200	2.234	2.00	7.918	9.50	80.4	249.9	557.0
105.00		1.00	1.28	7.774	8.55	0.00	1.200	2.245	5.00	19.480	23.38	199.9	613.0	1367.1
110.00		1.00	1.29	7.851	8.64	0.00	1.200	2.256	5.00	19.075	22.89	197.7	602.1	1338.3
115.00		1.00	1.30	7.925	8.72	0.00	1.200	2.266	5.00	18.669	22.40	195.3	590.9	1309.3
120.00		1.00	1.32	7.996	8.80	0.00	1.200	2.276	5.00	18.263	21.92	192.8	579.5	1280.1
125.00		1.00	1.33	8.065	8.87	0.00	1.200	2.285	5.00	17.856	21.43	190.1	568.0	1250.6
130.00		1.00	1.34	8.132	8.95	0.00	1.200	2.294	5.00	17.450	20.94	187.3	556.2	1221.0
131.74	Bot - Section 4	1.00	1.34	8.155	8.97	0.00	1.200	2.297	1.74	5.988	7.19	64.5	192.5	420.1
135.00		1.00	1.35	8.197	9.02	0.00	1.200	2.303	3.26	11.192	13.43	121.1	359.2	1156.9
136.99	Top - Section 3	1.00	1.35	8.222	9.04	0.00	1.200	2.306	1.99	6.765	8.12	73.4	217.9	699.2
139.00	Appurtenance(s)	1.00	1.36	8.247	9.07	0.00	1.200	2.309	2.01	6.745	8.09	73.4	217.4	444.7
139.50	Appurtenance(s)	1.00	1.36	8.254	9.08	0.00	1.200	2.310	0.50	1.670	2.00	18.2	54.1	110.3
140.00		1.00	1.36	8.260	9.09	0.00	1.200	2.311	0.50	1.666	2.00	18.2	53.9	110.0
145.00		1.00	1.37	8.321	9.15	0.00	1.200	2.319	5.00	16.440	19.73	180.6	527.1	1079.0
146.00	Appurtenance(s)	1.00	1.37	8.333	9.17	0.00	1.200	2.321	1.00	3.239	3.89	35.6	104.9	213.4
146.50	Appurtenance(s)	1.00	1.37	8.339	9.17	0.00	1.200	2.321	0.50	1.613	1.94	17.8	52.3	106.3
147.00	Appurtenance(s)	1.00	1.37	8.345	9.18	0.00	1.200	2.322	0.50	1.609	1.93	17.7	52.2	106.1
150.00		1.00	1.38	8.381	9.22	0.00	1.200	2.327	3.00	9.570	11.48	105.9	308.8	628.5
155.00		1.00	1.39	8.439	9.28	0.00	1.200	2.335	5.00	15.625	18.75	174.0	502.0	1022.2
160.00		1.00	1.40	8.495	9.34	0.00	1.200	2.342	5.00	15.217	18.26	170.6	489.3	993.6
165.00		1.00	1.41	8.551	9.41	0.00	1.200	2.349	5.00	14.809	17.77	167.1	476.4	964.9
167.50	Appurtenance(s)	1.00	1.41	8.578	9.44	0.00	1.200	2.353	2.50	7.250	8.70	82.1	235.0	473.2
170.00		1.00	1.42	8.604	9.46	0.00	1.200	2.356	2.50	7.148	8.58	81.2	231.7	466.0

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

175.00		1.00	1.42	8.657	9.52	0.00	1.200	2.363	5.00	13.992	16.79	159.9	450.3	907.0
177.00	Appurtenance(s)	1.00	1.43	8.678	9.55	0.00	1.200	2.366	2.00	5.482	6.58	62.8	178.0	356.2
180.00		1.00	1.43	8.709	9.58	0.00	1.200	2.370	3.00	8.100	9.72	93.1	262.2	524.8
								Totals:	**180.00**			**6,861.1**		**65,948.6**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Discrete Appurtenance Forces

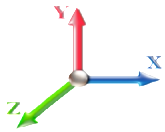
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

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 25

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	177.00	ALU TD-RRH8x20-25	3	8.678	9.546	0.60	0.90	9.38	735.26	0.000	0.000	89.49	0.00	0.00
2	177.00	ALU 1900 MHz	3	8.678	9.546	0.60	0.90	10.28	775.78	0.000	0.000	98.16	0.00	0.00
3	177.00	ALU 800 MHz	6	8.678	9.546	0.60	0.90	14.62	856.56	0.000	0.000	139.54	0.00	0.00
4	177.00	Sitepro PRK-1245L	1	8.678	9.546	1.00	1.00	22.98	902.75	0.000	0.000	219.41	0.00	0.00
5	177.00	Platform w/ Hand Rails	1	8.678	9.546	1.00	1.00	68.39	4638.95	0.000	0.000	652.82	0.00	0.00
6	177.00	RFS APXVTM14-C-I20	3	8.678	9.546	0.71	0.90	16.82	901.58	0.000	0.000	160.52	0.00	0.00
7	177.00	Commscope	3	8.678	9.546	0.67	0.90	28.46	1242.54	0.000	0.000	271.66	0.00	0.00
8	167.50	Pipe Mounts	3	8.578	9.435	0.56	0.75	16.38	2145.80	0.000	0.000	154.53	0.00	0.00
9	167.50	Kathrein 742 351	3	8.578	9.435	0.49	0.80	11.80	410.80	0.000	0.000	111.31	0.00	0.00
10	147.00	Antel BXA-70063/6CF	3	8.345	9.180	0.56	0.80	18.90	505.09	0.000	0.000	173.46	0.00	0.00
11	146.50	Low Profile Platform	1	8.339	9.173	1.00	1.00	45.49	3241.10	0.000	0.000	417.31	0.00	0.00
12	146.50	Antel LPA-80063/4CF	2	8.339	9.173	0.74	0.80	12.90	429.89	0.000	0.000	118.32	0.00	0.00
13	146.50	Antel BXA-171063/8CF-2	1	8.339	9.173	0.67	0.80	3.46	80.99	0.000	0.000	31.72	0.00	0.00
14	146.50	Antel BXA-171085-8CF-2	2	8.339	9.173	0.67	0.80	6.92	162.17	0.000	0.000	63.44	0.00	0.00
15	146.50	Antel	4	8.339	9.173	1.36	0.80	20.70	540.38	0.000	0.000	189.87	0.00	0.00
16	146.00	RFS FD9R6004/2C-3	6	8.333	9.166	0.54	0.80	3.05	72.56	0.000	0.000	27.99	0.00	0.00
17	139.50	Powerwave LGP 21903	6	8.254	9.079	0.54	0.80	2.56	92.13	0.000	0.000	23.25	0.00	0.00
18	139.00	Powerwave 7770	6	8.247	9.072	0.58	0.80	24.32	1405.34	0.000	0.000	220.59	0.00	0.00
19	139.00	CSS DUO1417-8686-40	3	8.247	9.072	0.66	0.80	16.43	534.51	0.000	0.000	149.09	0.00	0.00
20	139.00	Powerwave	2	8.247	9.072	0.60	0.80	18.86	590.83	0.000	0.000	171.13	0.00	0.00
21	139.00	KMW	1	8.247	9.072	1.00	1.00	11.72	226.43	0.000	0.000	106.30	0.00	0.00
22	139.00	Powerwave LGP 21401	6	8.247	9.072	0.54	0.80	4.48	382.39	0.000	0.000	40.61	0.00	0.00
23	139.00	Ericsson RRUS-11	6	8.247	9.072	0.54	0.80	10.80	845.00	0.000	0.000	97.97	0.00	0.00
24	139.00	Andrew ABT-DF-DMADBH	3	8.247	9.072	0.54	0.80	0.49	10.72	0.000	0.000	4.45	0.00	0.00
25	139.00	Raycap DC6-48-60-18-8F	1	8.247	9.072	1.00	1.00	1.50	102.27	0.000	0.000	13.60	0.00	0.00
26	139.00	T-Arms	3	8.247	9.072	0.56	0.75	29.09	2019.91	0.000	0.000	263.89	0.00	0.00
27	50.00	Stand Off	1	6.650	7.315	1.00	1.00	9.76	120.90	0.000	0.000	71.40	0.00	0.00
28	50.00	GPS	1	6.650	7.315	1.00	1.00	1.85	39.03	0.000	0.000	13.54	0.00	0.00
							Totals:		**24,011.63**			**4,095.36**		

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

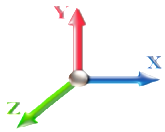
Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 28

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 25

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		181.89	2794.79	0.00	0.00
10.00		179.74	2801.79	0.00	0.00
15.00		177.33	2789.06	0.00	0.00
20.00		185.48	2767.68	0.00	0.00
25.00		191.53	2741.30	0.00	0.00
30.00		195.99	2711.63	0.00	0.00
35.00		199.29	2679.61	0.00	0.00
40.00		201.70	2645.79	0.00	0.00
45.00		203.38	2610.58	0.00	0.00
45.42		16.82	216.09	0.00	0.00
50.00	(2) attachments	275.21	3866.14	0.00	0.00
52.75		114.02	2179.81	0.00	0.00
55.00		93.31	1050.86	0.00	0.00
60.00		208.59	2308.30	0.00	0.00
65.00		208.43	2273.05	0.00	0.00
70.00		207.93	2237.21	0.00	0.00
75.00		207.13	2200.87	0.00	0.00
80.00		206.06	2164.07	0.00	0.00
85.00		204.75	2126.87	0.00	0.00
90.00		203.22	2089.29	0.00	0.00
91.66		66.96	687.77	0.00	0.00
95.00		135.60	1896.25	0.00	0.00
98.00		121.02	1681.99	0.00	0.00
100.00		80.42	643.48	0.00	0.00
105.00		199.91	1582.88	0.00	0.00
110.00		197.68	1554.12	0.00	0.00
115.00		195.29	1525.11	0.00	0.00
120.00		192.76	1495.87	0.00	0.00
125.00		190.10	1466.42	0.00	0.00
130.00		187.31	1436.78	0.00	0.00
131.74		64.45	495.31	0.00	0.00
135.00		121.09	1297.50	0.00	0.00
136.99		73.42	785.19	0.00	0.00
139.00	(31) attachments	1141.05	6648.68	0.00	0.00
139.50	(6) attachments	41.45	215.94	0.00	0.00
140.00		18.17	123.53	0.00	0.00
145.00		180.58	1214.25	0.00	0.00
146.00	(6) attachments	63.61	313.01	0.00	0.00
146.50	(10) attachments	838.42	4574.40	0.00	0.00
147.00	(3) attachments	191.18	617.19	0.00	0.00
150.00		105.87	664.72	0.00	0.00
155.00		174.05	1082.58	0.00	0.00
160.00		170.64	1053.97	0.00	0.00
165.00		167.14	1025.22	0.00	0.00
167.50	(6) attachments	347.94	3060.01	0.00	0.00
170.00		81.19	477.46	0.00	0.00

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 29

Tower Engineering Solutions

175.00		159.89	929.89	0.00	0.00
177.00	(20) attachments	1694.38	10418.81	0.00	0.00
180.00		93.11	524.82	0.00	0.00
	Totals:	**10,956.47**	**96,747.92**	**0.00**	**0.00**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Linear Appurtenance Segment Forces (Factored)

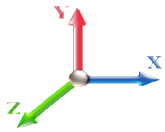
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

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 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	1.65	0.00	0.011	0.000	5.168	0.00	22.08
10.00	1/2" Coax	Yes	5.00	0.000	0.65	1.75	0.00	0.011	0.000	5.168	0.00	24.87
15.00	1/2" Coax	Yes	5.00	0.000	0.65	1.81	0.00	0.011	0.000	5.168	0.00	26.68
20.00	1/2" Coax	Yes	5.00	0.000	0.65	1.86	0.00	0.011	0.000	5.483	0.00	28.05
25.00	1/2" Coax	Yes	5.00	0.000	0.65	1.89	0.00	0.011	0.000	5.747	0.00	29.17
30.00	1/2" Coax	Yes	5.00	0.000	0.65	1.92	0.00	0.012	0.000	5.972	0.00	30.12
35.00	1/2" Coax	Yes	5.00	0.000	0.65	1.95	0.00	0.012	0.000	6.169	0.00	30.95
40.00	1/2" Coax	Yes	5.00	0.000	0.65	1.97	0.00	0.012	0.000	6.345	0.00	31.68
45.00	1/2" Coax	Yes	5.00	0.000	0.65	1.99	0.00	0.012	0.000	6.504	0.00	32.35
45.42	1/2" Coax	Yes	0.42	0.000	0.65	0.17	0.00	0.012	0.000	6.517	0.00	2.70
50.00	1/2" Coax	Yes	4.58	0.000	0.65	1.84	0.00	0.013	0.000	6.650	0.00	30.21
									Totals:		**0.0**	**288.8**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

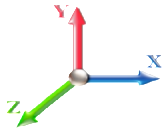
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

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 25

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	-96.74	-10.99	0.00	-1354.0	0.00	1354.02	6607.78	3303.89	16218.3	8051.48	0.00	0.000	0.000	0.183
5.00	-93.94	-10.88	0.00	-1299.0	0.00	1299.05	6536.37	3268.19	15777.9	7832.86	0.02	-0.044	0.000	0.180
10.00	-91.13	-10.77	0.00	-1244.6	0.00	1244.63	6463.73	3231.87	15340.5	7615.67	0.09	-0.089	0.000	0.178
15.00	-88.33	-10.66	0.00	-1190.7	0.00	1190.76	6389.86	3194.93	14906.0	7399.99	0.21	-0.134	0.000	0.175
20.00	-85.56	-10.53	0.00	-1137.4	0.00	1137.46	6314.77	3157.38	14474.7	7185.88	0.38	-0.180	0.000	0.172
25.00	-82.81	-10.40	0.00	-1084.7	0.00	1084.79	6238.44	3119.22	14046.7	6973.42	0.59	-0.225	0.000	0.169
30.00	-80.09	-10.26	0.00	-1032.7	0.00	1032.79	6160.89	3080.44	13622.3	6762.68	0.85	-0.271	0.000	0.166
35.00	-77.40	-10.11	0.00	-981.51	0.00	981.51	6082.10	3041.05	13201.4	6553.75	1.16	-0.317	0.000	0.163
40.00	-74.75	-9.95	0.00	-930.99	0.00	930.99	6002.09	3001.05	12784.3	6346.69	1.52	-0.363	0.000	0.159
45.00	-72.14	-9.76	0.00	-881.25	0.00	881.25	5920.85	2960.42	12371.1	6141.58	1.92	-0.410	0.000	0.156
45.42	-71.92	-9.77	0.00	-877.18	0.00	877.18	5914.02	2957.01	12336.9	6124.58	1.96	-0.414	0.000	0.155
50.00	-68.05	-9.51	0.00	-832.40	0.00	832.40	5838.38	2919.19	11962.1	5938.49	2.38	-0.456	0.000	0.152
52.75	-65.87	-9.40	0.00	-806.26	0.00	806.26	4942.80	2471.40	10222.2	5074.76	2.65	-0.482	0.000	0.172
55.00	-64.81	-9.34	0.00	-785.11	0.00	785.11	4913.65	2456.82	10072.3	5000.32	2.88	-0.503	0.000	0.170
60.00	-62.50	-9.16	0.00	-738.42	0.00	738.42	4847.98	2423.99	9741.07	4835.88	3.43	-0.553	0.000	0.166
65.00	-60.22	-8.98	0.00	-692.60	0.00	692.60	4781.08	2390.54	9412.76	4672.89	4.04	-0.603	0.000	0.161
70.00	-57.97	-8.80	0.00	-647.68	0.00	647.68	4712.96	2356.48	9087.49	4511.41	4.70	-0.653	0.000	0.156
75.00	-55.77	-8.62	0.00	-603.67	0.00	603.67	4643.60	2321.80	8765.44	4351.53	5.41	-0.702	0.000	0.151
80.00	-53.60	-8.43	0.00	-560.59	0.00	560.59	4573.02	2286.51	8446.74	4193.32	6.17	-0.751	0.000	0.145
85.00	-51.47	-8.24	0.00	-518.45	0.00	518.45	4501.21	2250.60	8131.55	4036.84	6.98	-0.799	0.000	0.140
90.00	-49.38	-8.03	0.00	-477.26	0.00	477.26	4428.17	2214.08	7820.02	3882.19	7.84	-0.846	0.000	0.134
91.66	-48.69	-7.97	0.00	-463.90	0.00	463.90	4403.60	2201.80	7717.21	3831.15	8.14	-0.862	0.000	0.132
95.00	-46.79	-7.83	0.00	-437.29	0.00	437.29	4350.76	2175.38	7506.87	3726.73	8.76	-0.894	0.000	0.128
98.00	-45.11	-7.71	0.00	-413.82	0.00	413.82	2393.56	1196.78	4158.66	2064.53	9.33	-0.922	0.000	0.219
100.00	-44.46	-7.65	0.00	-398.38	0.00	398.38	2381.84	1190.92	4099.59	2035.21	9.72	-0.940	0.000	0.214
105.00	-42.87	-7.47	0.00	-360.14	0.00	360.14	2351.72	1175.86	3952.36	1962.12	10.74	-1.006	0.000	0.202
110.00	-41.31	-7.29	0.00	-322.80	0.00	322.80	2320.37	1160.18	3805.57	1889.24	11.83	-1.070	0.000	0.189
115.00	-39.79	-7.11	0.00	-286.36	0.00	286.36	2287.79	1143.89	3659.35	1816.65	12.98	-1.131	0.000	0.175
120.00	-38.29	-6.92	0.00	-250.83	0.00	250.83	2253.98	1126.99	3513.86	1744.43	14.20	-1.189	0.000	0.161
125.00	-36.82	-6.73	0.00	-216.24	0.00	216.24	2218.95	1109.47	3369.25	1672.64	15.47	-1.243	0.000	0.146
130.00	-35.38	-6.53	0.00	-182.58	0.00	182.58	2182.68	1091.34	3225.66	1601.35	16.80	-1.294	0.000	0.130
131.74	-34.89	-6.47	0.00	-171.19	0.00	171.19	2169.75	1084.87	3175.87	1576.63	17.28	-1.311	0.000	0.125
135.00	-33.59	-6.33	0.00	-150.11	0.00	150.11	2145.19	1072.59	3083.25	1530.65	18.18	-1.340	0.000	0.114
136.99	-32.80	-6.25	0.00	-137.48	0.00	137.48	1823.96	911.98	2634.70	1307.98	18.75	-1.357	0.000	0.123
139.00	-26.18	-4.96	0.00	-124.94	0.00	124.94	1812.30	906.15	2588.35	1284.97	19.32	-1.373	0.000	0.112
139.50	-25.97	-4.91	0.00	-122.46	0.00	122.46	1809.36	904.68	2576.82	1279.24	19.46	-1.377	0.000	0.110
140.00	-25.84	-4.90	0.00	-120.00	0.00	120.00	1806.41	903.20	2565.29	1273.52	19.61	-1.382	0.000	0.109
145.00	-24.63	-4.70	0.00	-95.50	0.00	95.50	1776.24	888.12	2450.41	1216.49	21.08	-1.419	0.000	0.092
146.00	-24.32	-4.63	0.00	-90.80	0.00	90.80	1770.06	885.03	2427.52	1205.13	21.37	-1.426	0.000	0.089
146.50	-19.77	-3.68	0.00	-88.48	0.00	88.48	1766.95	883.47	2416.09	1199.45	21.52	-1.430	0.000	0.085
147.00	-19.16	-3.48	0.00	-86.64	0.00	86.64	1763.83	881.91	2404.67	1193.78	21.67	-1.433	0.000	0.083
150.00	-18.49	-3.36	0.00	-76.21	0.00	76.21	1744.84	872.42	2336.33	1159.85	22.58	-1.452	0.000	0.076
155.00	-17.41	-3.17	0.00	-59.40	0.00	59.40	1712.21	856.11	2223.20	1103.69	24.12	-1.480	0.000	0.064
160.00	-16.36	-2.98	0.00	-43.55	0.00	43.55	1678.36	839.18	2111.17	1048.07	25.68	-1.504	0.000	0.051
165.00	-15.34	-2.79	0.00	-28.67	0.00	28.67	1643.27	821.64	2000.39	993.08	27.26	-1.522	0.000	0.038
167.50	-12.29	-2.36	0.00	-21.70	0.00	21.70	1625.27	812.64	1945.52	965.84	28.06	-1.528	0.000	0.030
170.00	-11.82	-2.27	0.00	-15.81	0.00	15.81	1606.96	803.48	1891.02	938.78	28.86	-1.534	0.000	0.024
175.00	-10.89	-2.08	0.00	-4.48	0.00	4.48	1569.42	784.71	1783.19	885.25	30.47	-1.540	0.000	0.012

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 32	

177.00	-0.52	-0.11	0.00	-0.32	0.00	0.32	1554.06	777.03	1740.53	864.07	31.12	-1.541	0.000	0.001
180.00	0.00	-0.09	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	32.09	-1.541	0.000	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Seismic Segment Forces (Factored)

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 33	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E					**Iterations**	23
Gust Response Factor	1.10			**Sds**	0.19	**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10	**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency**	0.33	**SA**	0.03	**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		1601.4	0.00	0.03	0.02	26.53	
10.00		1574.9	0.01	0.05	0.03	39.16	
15.00		1548.5	0.01	0.06	0.03	45.51	
20.00		1522.0	0.02	0.07	0.04	48.60	
25.00		1495.5	0.04	0.07	0.04	49.98	
30.00		1469.1	0.05	0.07	0.04	50.53	
35.00		1442.6	0.07	0.07	0.04	50.72	
40.00		1416.2	0.09	0.07	0.04	50.81	
45.00		1389.7	0.12	0.07	0.03	50.86	
45.42	Bot - Section 2	114.62	0.12	0.07	0.03	4.20	
50.00	Appurtenance(s)	2412.9	0.15	0.07	0.03	89.86	
52.75	Top - Section 1	1397.7	0.16	0.07	0.03	52.43	
55.00		534.15	0.18	0.07	0.03	20.11	
60.00		1170.1	0.21	0.06	0.02	43.98	
65.00		1147.0	0.25	0.06	0.02	42.07	
70.00		1123.8	0.29	0.05	0.01	38.78	
75.00		1100.6	0.33	0.04	0.01	33.69	
80.00		1077.4	0.37	0.03	0.01	26.46	
85.00		1054.2	0.42	0.01	0.01	17.08	
90.00		1031.1	0.47	-0.01	0.01	6.00	
91.66	Bot - Section 3	337.88	0.49	-0.01	0.01	0.69	
95.00		1107.6	0.53	-0.03	0.01	-6.31	
98.00	Top - Section 2	980.32	0.56	-0.04	0.01	-12.35	
100.00		255.97	0.58	-0.05	0.01	-4.35	
105.00		628.43	0.64	-0.07	0.02	-16.78	
110.00		613.55	0.71	-0.09	0.03	-20.64	
115.00		598.66	0.77	-0.11	0.05	-22.29	
120.00		583.78	0.84	-0.12	0.07	-21.73	
125.00		568.89	0.91	-0.12	0.09	-19.11	
130.00		554.01	0.99	-0.11	0.12	-14.61	
131.74	Bot - Section 4	189.67	1.01	-0.11	0.14	-4.37	
135.00		664.79	1.06	-0.09	0.17	-10.40	
136.99	Top - Section 3	401.02	1.09	-0.07	0.18	-4.17	
139.00	Appurtenance(s)	2122.8	1.13	-0.05	0.20	-9.66	
139.50	Appurtenance(s)	79.86	1.14	-0.05	0.21	-0.24	
140.00		46.72	1.14	-0.04	0.21	-0.07	
145.00		459.97	1.23	0.03	0.27	7.48	
146.00	Appurtenance(s)	109.01	1.24	0.05	0.29	2.21	
146.50	Appurtenance(s)	1664.5	1.25	0.06	0.30	37.05	
147.00	Appurtenance(s)	95.87	1.26	0.07	0.30	2.33	
150.00		266.46	1.31	0.14	0.35	9.98	
155.00		433.51	1.40	0.29	0.43	26.97	
160.00		420.28	1.49	0.48	0.53	38.06	
165.00		407.05	1.59	0.74	0.65	49.89	
167.50	Appurtenance(s)	1337.9	1.64	0.90	0.72	187.26	

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Seismic Segment Forces (Factored)

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 34

Tower Engineering Solutions

170.00			195.26	1.69	1.07	0.79	30.91		
175.00			380.59	1.79	1.48	0.95	75.30		
177.00	Appurtenance(s)		3721.6	1.83	1.67	1.03	799.19		
180.00			218.83	1.89	1.98	1.14	52.80		
		Totals:	**45,069.3**				**1,940.4**	**Total Wind:**	**35,514.0**

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

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	23
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency**	0.33	**SA**	0.03	**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	-60.59	-2.11	0.00	-273.45	0.00	273.45	6607.78	3303.89	16218.3	8051.48		0.00	0.00	0.043
5.00	-58.45	-2.09	0.00	-262.89	0.00	262.89	6536.37	3268.19	15777.9	7832.86		0.00	-0.01	0.043
10.00	-56.35	-2.06	0.00	-252.42	0.00	252.42	6463.73	3231.87	15340.5	7615.67		0.02	-0.02	0.042
15.00	-54.27	-2.03	0.00	-242.11	0.00	242.11	6389.86	3194.93	14906.0	7399.99		0.04	-0.03	0.041
20.00	-52.23	-1.98	0.00	-231.98	0.00	231.98	6314.77	3157.38	14474.7	7185.88		0.08	-0.04	0.041
25.00	-50.22	-1.94	0.00	-222.06	0.00	222.06	6238.44	3119.22	14046.7	6973.42		0.12	-0.05	0.040
30.00	-48.24	-1.90	0.00	-212.36	0.00	212.36	6160.89	3080.44	13622.3	6762.68		0.17	-0.06	0.039
35.00	-46.29	-1.85	0.00	-202.87	0.00	202.87	6082.10	3041.05	13201.4	6553.75		0.24	-0.06	0.039
40.00	-44.37	-1.81	0.00	-193.61	0.00	193.61	6002.09	3001.05	12784.3	6346.69		0.31	-0.07	0.038
45.00	-42.49	-1.76	0.00	-184.58	0.00	184.58	5920.85	2960.42	12371.1	6141.58		0.39	-0.08	0.037
45.42	-42.33	-1.76	0.00	-183.85	0.00	183.85	5914.02	2957.01	12336.9	6124.58		0.40	-0.08	0.037
50.00	-39.24	-1.67	0.00	-175.81	0.00	175.81	5838.38	2919.19	11962.1	5938.49		0.48	-0.09	0.036
52.75	-37.44	-1.61	0.00	-171.23	0.00	171.23	4942.80	2471.40	10222.2	5074.76		0.54	-0.10	0.041
55.00	-36.70	-1.60	0.00	-167.59	0.00	167.59	4913.65	2456.82	10072.3	5000.32		0.59	-0.10	0.041
60.00	-35.08	-1.56	0.00	-159.61	0.00	159.61	4847.98	2423.99	9741.07	4835.88		0.70	-0.11	0.040
65.00	-33.49	-1.52	0.00	-151.83	0.00	151.83	4781.08	2390.54	9412.76	4672.89		0.83	-0.13	0.039
70.00	-31.92	-1.48	0.00	-144.24	0.00	144.24	4712.96	2356.48	9087.49	4511.41		0.96	-0.14	0.039
75.00	-30.39	-1.45	0.00	-136.83	0.00	136.83	4643.60	2321.80	8765.44	4351.53		1.11	-0.15	0.038
80.00	-28.88	-1.43	0.00	-129.58	0.00	129.58	4573.02	2286.51	8446.74	4193.32		1.27	-0.16	0.037
85.00	-27.40	-1.41	0.00	-122.46	0.00	122.46	4501.21	2250.60	8131.55	4036.84		1.45	-0.17	0.036
90.00	-25.94	-1.40	0.00	-115.41	0.00	115.41	4428.17	2214.08	7820.02	3882.19		1.63	-0.18	0.036
91.66	-25.47	-1.40	0.00	-113.08	0.00	113.08	4403.60	2201.80	7717.21	3831.15		1.69	-0.18	0.035
95.00	-23.99	-1.40	0.00	-108.40	0.00	108.40	4350.76	2175.38	7506.87	3726.73		1.83	-0.19	0.035
98.00	-22.69	-1.40	0.00	-104.20	0.00	104.20	2393.56	1196.78	4158.66	2064.53		1.95	-0.20	0.060
100.00	-22.29	-1.40	0.00	-101.40	0.00	101.40	2381.84	1190.92	4099.59	2035.21		2.03	-0.20	0.059
105.00	-21.32	-1.40	0.00	-94.39	0.00	94.39	2351.72	1175.86	3952.36	1962.12		2.26	-0.22	0.057
110.00	-20.37	-1.41	0.00	-87.37	0.00	87.37	2320.37	1160.18	3805.57	1889.24		2.50	-0.24	0.055
115.00	-19.44	-1.41	0.00	-80.34	0.00	80.34	2287.79	1143.89	3659.35	1816.65		2.76	-0.26	0.053
120.00	-18.52	-1.41	0.00	-73.30	0.00	73.30	2253.98	1126.99	3513.86	1744.43		3.03	-0.27	0.050
125.00	-17.62	-1.41	0.00	-66.25	0.00	66.25	2218.95	1109.47	3369.25	1672.64		3.33	-0.29	0.048
130.00	-16.74	-1.41	0.00	-59.21	0.00	59.21	2182.68	1091.34	3225.66	1601.35		3.64	-0.30	0.045
131.74	-16.44	-1.41	0.00	-56.75	0.00	56.75	2169.75	1084.87	3175.87	1576.63		3.75	-0.31	0.044
135.00	-15.50	-1.41	0.00	-52.16	0.00	52.16	2145.19	1072.59	3083.25	1530.65		3.96	-0.32	0.041
136.99	-14.93	-1.40	0.00	-49.36	0.00	49.36	1823.96	911.98	2634.70	1307.98		4.10	-0.33	0.046
139.00	-12.30	-1.39	0.00	-46.54	0.00	46.54	1812.30	906.15	2588.35	1284.97		4.23	-0.33	0.043
139.50	-12.19	-1.39	0.00	-45.85	0.00	45.85	1809.36	904.68	2576.82	1279.24		4.27	-0.33	0.043
140.00	-12.12	-1.39	0.00	-45.15	0.00	45.15	1806.41	903.20	2565.29	1273.52		4.30	-0.33	0.042
145.00	-11.43	-1.38	0.00	-38.20	0.00	38.20	1776.24	888.12	2450.41	1216.49		4.66	-0.35	0.038
146.00	-11.27	-1.38	0.00	-36.81	0.00	36.81	1770.06	885.03	2427.52	1205.13		4.74	-0.35	0.037
146.50	-9.26	-1.33	0.00	-36.12	0.00	36.12	1766.95	883.47	2416.09	1199.45		4.77	-0.35	0.035
147.00	-9.14	-1.33	0.00	-35.46	0.00	35.46	1763.83	881.91	2404.67	1193.78		4.81	-0.35	0.035
150.00	-8.78	-1.32	0.00	-31.48	0.00	31.48	1744.84	872.42	2336.33	1159.85		5.04	-0.36	0.032
155.00	-8.20	-1.29	0.00	-24.90	0.00	24.90	1712.21	856.11	2223.20	1103.69		5.42	-0.37	0.027
160.00	-7.64	-1.25	0.00	-18.46	0.00	18.46	1678.36	839.18	2111.17	1048.07		5.82	-0.38	0.022
165.00	-7.09	-1.19	0.00	-12.22	0.00	12.22	1643.27	821.64	2000.39	993.08		6.23	-0.39	0.017
167.50	-5.46	-1.00	0.00	-9.24	0.00	9.24	1625.27	812.64	1945.52	965.84		6.43	-0.39	0.013
170.00	-5.21	-0.96	0.00	-6.75	0.00	6.75	1606.96	803.48	1891.02	938.78		6.64	-0.40	0.010

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 36	

175.00	-4.73	-0.88	0.00	-1.93	0.00	1.93	1569.42	784.71	1783.19	885.25	7.06	-0.40	0.005
177.00	-0.26	-0.05	0.00	-0.16	0.00	0.16	1554.06	777.03	1740.53	864.07	7.22	-0.40	0.000
180.00	0.00	-0.05	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	7.47	-0.40	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Seismic Segment Forces (Factored)

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E					**Iterations**	23
Gust Response Factor	1.10			**Sds**	0.19	**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10	**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency**	0.33	**SA**	0.03	**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		1601.4	0.00	0.03	0.02	26.53	
10.00		1574.9	0.01	0.05	0.03	39.16	
15.00		1548.5	0.01	0.06	0.03	45.51	
20.00		1522.0	0.02	0.07	0.04	48.60	
25.00		1495.5	0.04	0.07	0.04	49.98	
30.00		1469.1	0.05	0.07	0.04	50.53	
35.00		1442.6	0.07	0.07	0.04	50.72	
40.00		1416.2	0.09	0.07	0.04	50.81	
45.00		1389.7	0.12	0.07	0.03	50.86	
45.42	Bot - Section 2	114.62	0.12	0.07	0.03	4.20	
50.00	Appurtenance(s)	2412.9	0.15	0.07	0.03	89.86	
52.75	Top - Section 1	1397.7	0.16	0.07	0.03	52.43	
55.00		534.15	0.18	0.07	0.03	20.11	
60.00		1170.1	0.21	0.06	0.02	43.98	
65.00		1147.0	0.25	0.06	0.02	42.07	
70.00		1123.8	0.29	0.05	0.01	38.78	
75.00		1100.6	0.33	0.04	0.01	33.69	
80.00		1077.4	0.37	0.03	0.01	26.46	
85.00		1054.2	0.42	0.01	0.01	17.08	
90.00		1031.1	0.47	-0.01	0.01	6.00	
91.66	Bot - Section 3	337.88	0.49	-0.01	0.01	0.69	
95.00		1107.6	0.53	-0.03	0.01	-6.31	
98.00	Top - Section 2	980.32	0.56	-0.04	0.01	-12.35	
100.00		255.97	0.58	-0.05	0.01	-4.35	
105.00		628.43	0.64	-0.07	0.02	-16.78	
110.00		613.55	0.71	-0.09	0.03	-20.64	
115.00		598.66	0.77	-0.11	0.05	-22.29	
120.00		583.78	0.84	-0.12	0.07	-21.73	
125.00		568.89	0.91	-0.12	0.09	-19.11	
130.00		554.01	0.99	-0.11	0.12	-14.61	
131.74	Bot - Section 4	189.67	1.01	-0.11	0.14	-4.37	
135.00		664.79	1.06	-0.09	0.17	-10.40	
136.99	Top - Section 3	401.02	1.09	-0.07	0.18	-4.17	
139.00	Appurtenance(s)	2122.8	1.13	-0.05	0.20	-9.66	
139.50	Appurtenance(s)	79.86	1.14	-0.05	0.21	-0.24	
140.00		46.72	1.14	-0.04	0.21	-0.07	
145.00		459.97	1.23	0.03	0.27	7.48	
146.00	Appurtenance(s)	109.01	1.24	0.05	0.29	2.21	
146.50	Appurtenance(s)	1664.5	1.25	0.06	0.30	37.05	
147.00	Appurtenance(s)	95.87	1.26	0.07	0.30	2.33	
150.00		266.46	1.31	0.14	0.35	9.98	
155.00		433.51	1.40	0.29	0.43	26.97	
160.00		420.28	1.49	0.48	0.53	38.06	
165.00		407.05	1.59	0.74	0.65	49.89	
167.50	Appurtenance(s)	1337.9	1.64	0.90	0.72	187.26	

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Seismic Segment Forces (Factored)

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 38	

Tower Engineering Solutions

170.00		195.26	1.69	1.07	0.79	30.91			
175.00		380.59	1.79	1.48	0.95	75.30			
177.00	Appurtenance(s)	3721.6	1.83	1.67	1.03	799.19			
180.00		218.83	1.89	1.98	1.14	52.80			
	Totals:	**45,069.3**				**1,940.4**	**Total Wind:**	**35,514.0**	

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

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 39	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E

Iterations 23

Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency**	0.33	**SA**	0.03			**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	-45.44	-2.11	0.00	-270.53	0.00	270.53	6607.78	3303.89	16218.3	8051.48		0.00	0.00	0.040
5.00	-43.84	-2.09	0.00	-259.98	0.00	259.98	6536.37	3268.19	15777.9	7832.86		0.00	-0.01	0.040
10.00	-42.26	-2.06	0.00	-249.53	0.00	249.53	6463.73	3231.87	15340.5	7615.67		0.02	-0.02	0.039
15.00	-40.70	-2.02	0.00	-239.24	0.00	239.24	6389.86	3194.93	14906.0	7399.99		0.04	-0.03	0.039
20.00	-39.17	-1.97	0.00	-229.15	0.00	229.15	6314.77	3157.38	14474.7	7185.88		0.08	-0.04	0.038
25.00	-37.66	-1.93	0.00	-219.28	0.00	219.28	6238.44	3119.22	14046.7	6973.42		0.12	-0.05	0.037
30.00	-36.18	-1.88	0.00	-209.63	0.00	209.63	6160.89	3080.44	13622.3	6762.68		0.17	-0.05	0.037
35.00	-34.71	-1.84	0.00	-200.21	0.00	200.21	6082.10	3041.05	13201.4	6553.75		0.23	-0.06	0.036
40.00	-33.28	-1.79	0.00	-191.03	0.00	191.03	6002.09	3001.05	12784.3	6346.69		0.30	-0.07	0.036
45.00	-31.86	-1.74	0.00	-182.08	0.00	182.08	5920.85	2960.42	12371.1	6141.58		0.39	-0.08	0.035
45.42	-31.75	-1.74	0.00	-181.35	0.00	181.35	5914.02	2957.01	12336.9	6124.58		0.39	-0.08	0.035
50.00	-29.43	-1.65	0.00	-173.39	0.00	173.39	5838.38	2919.19	11962.1	5938.49		0.48	-0.09	0.034
52.75	-28.08	-1.60	0.00	-168.85	0.00	168.85	4942.80	2471.40	10222.2	5074.76		0.53	-0.10	0.039
55.00	-27.53	-1.58	0.00	-165.26	0.00	165.26	4913.65	2456.82	10072.3	5000.32		0.58	-0.10	0.039
60.00	-26.31	-1.54	0.00	-157.36	0.00	157.36	4847.98	2423.99	9741.07	4835.88		0.69	-0.11	0.038
65.00	-25.12	-1.50	0.00	-149.68	0.00	149.68	4781.08	2390.54	9412.76	4672.89		0.82	-0.12	0.037
70.00	-23.94	-1.46	0.00	-142.19	0.00	142.19	4712.96	2356.48	9087.49	4511.41		0.95	-0.13	0.037
75.00	-22.79	-1.43	0.00	-134.88	0.00	134.88	4643.60	2321.80	8765.44	4351.53		1.10	-0.15	0.036
80.00	-21.66	-1.40	0.00	-127.74	0.00	127.74	4573.02	2286.51	8446.74	4193.32		1.26	-0.16	0.035
85.00	-20.55	-1.39	0.00	-120.72	0.00	120.72	4501.21	2250.60	8131.55	4036.84		1.43	-0.17	0.034
90.00	-19.46	-1.38	0.00	-113.78	0.00	113.78	4428.17	2214.08	7820.02	3882.19		1.61	-0.18	0.034
91.66	-19.10	-1.38	0.00	-111.49	0.00	111.49	4403.60	2201.80	7717.21	3831.15		1.67	-0.18	0.033
95.00	-17.99	-1.38	0.00	-106.88	0.00	106.88	4350.76	2175.38	7506.87	3726.73		1.80	-0.19	0.033
98.00	-17.01	-1.38	0.00	-102.75	0.00	102.75	2393.56	1196.78	4158.66	2064.53		1.92	-0.20	0.057
100.00	-16.72	-1.38	0.00	-99.99	0.00	99.99	2381.84	1190.92	4099.59	2035.21		2.01	-0.20	0.056
105.00	-15.99	-1.38	0.00	-93.09	0.00	93.09	2351.72	1175.86	3952.36	1962.12		2.23	-0.22	0.054
110.00	-15.28	-1.38	0.00	-86.18	0.00	86.18	2320.37	1160.18	3805.57	1889.24		2.47	-0.24	0.052
115.00	-14.58	-1.38	0.00	-79.26	0.00	79.26	2287.79	1143.89	3659.35	1816.65		2.72	-0.25	0.050
120.00	-13.89	-1.39	0.00	-72.33	0.00	72.33	2253.98	1126.99	3513.86	1744.43		2.99	-0.27	0.048
125.00	-13.21	-1.39	0.00	-65.41	0.00	65.41	2218.95	1109.47	3369.25	1672.64		3.28	-0.28	0.045
130.00	-12.55	-1.39	0.00	-58.48	0.00	58.48	2182.68	1091.34	3225.66	1601.35		3.59	-0.30	0.042
131.74	-12.33	-1.39	0.00	-56.06	0.00	56.06	2169.75	1084.87	3175.87	1576.63		3.70	-0.31	0.041
135.00	-11.62	-1.38	0.00	-51.55	0.00	51.55	2145.19	1072.59	3083.25	1530.65		3.91	-0.32	0.039
136.99	-11.20	-1.38	0.00	-48.79	0.00	48.79	1823.96	911.98	2634.70	1307.98		4.04	-0.32	0.043
139.00	-9.22	-1.37	0.00	-46.02	0.00	46.02	1812.30	906.15	2588.35	1284.97		4.18	-0.33	0.041
139.50	-9.14	-1.37	0.00	-45.33	0.00	45.33	1809.36	904.68	2576.82	1279.24		4.21	-0.33	0.040
140.00	-9.09	-1.37	0.00	-44.65	0.00	44.65	1806.41	903.20	2565.29	1273.52		4.25	-0.33	0.040
145.00	-8.57	-1.36	0.00	-37.78	0.00	37.78	1776.24	888.12	2450.41	1216.49		4.60	-0.34	0.036
146.00	-8.45	-1.36	0.00	-36.42	0.00	36.42	1770.06	885.03	2427.52	1205.13		4.67	-0.35	0.035
146.50	-6.94	-1.31	0.00	-35.74	0.00	35.74	1766.95	883.47	2416.09	1199.45		4.71	-0.35	0.034
147.00	-6.85	-1.31	0.00	-35.08	0.00	35.08	1763.83	881.91	2404.67	1193.78		4.75	-0.35	0.033
150.00	-6.59	-1.30	0.00	-31.15	0.00	31.15	1744.84	872.42	2336.33	1159.85		4.97	-0.36	0.031
155.00	-6.15	-1.27	0.00	-24.64	0.00	24.64	1712.21	856.11	2223.20	1103.69		5.35	-0.37	0.026
160.00	-5.73	-1.23	0.00	-18.27	0.00	18.27	1678.36	839.18	2111.17	1048.07		5.74	-0.38	0.021
165.00	-5.32	-1.18	0.00	-12.10	0.00	12.10	1643.27	821.64	2000.39	993.08		6.14	-0.39	0.015
167.50	-4.09	-0.99	0.00	-9.15	0.00	9.15	1625.27	812.64	1945.52	965.84		6.35	-0.39	0.012
170.00	-3.91	-0.95	0.00	-6.68	0.00	6.68	1606.96	803.48	1891.02	938.78		6.55	-0.39	0.010

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 40	

175.00	-3.55	-0.88	0.00	-1.91	0.00	1.91	1569.42	784.71	1783.19	885.25	6.96	-0.39	0.004
177.00	-0.20	-0.05	0.00	-0.16	0.00	0.16	1554.06	777.03	1740.53	864.07	7.13	-0.39	0.000
180.00	0.00	-0.05	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	7.38	-0.39	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

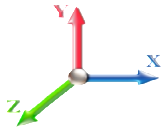
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 41	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

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	282.00	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	277.42	0.750	0.000	5.00	25.283	18.96	155.2	0.0	1601.4
10.00		1.00	0.85	7.442	8.19	272.84	0.750	0.000	5.00	24.868	18.65	152.7	0.0	1575.0
15.00		1.00	0.85	7.442	8.19	268.26	0.750	0.000	5.00	24.454	18.34	150.1	0.0	1548.5
20.00		1.00	0.90	7.896	8.69	271.60	0.750	0.000	5.00	24.040	18.03	156.6	0.0	1522.1
25.00		1.00	0.95	8.276	9.10	273.22	0.750	0.000	5.00	23.626	17.72	161.3	0.0	1495.6
30.00		1.00	0.98	8.600	9.46	273.59	0.750	0.000	5.00	23.212	17.41	164.7	0.0	1469.1
35.00		1.00	1.01	8.883	9.77	273.06	0.750	0.000	5.00	22.797	17.10	167.1	0.0	1442.7
40.00		1.00	1.04	9.137	10.05	271.85	0.750	0.000	5.00	22.383	16.79	168.7	0.0	1416.2
45.00		1.00	1.07	9.366	10.30	270.10	0.750	0.000	5.00	21.969	16.48	169.8	0.0	1389.8
45.42	Bot - Section 2	1.00	1.07	9.384	10.32	269.93	0.750	0.000	0.42	1.812	1.36	14.0	0.0	114.6
50.00	Appurtenance(s)	1.00	1.09	9.576	10.53	267.91	0.750	0.000	4.58	20.084	15.06	158.7	0.0	2363.0
52.75	Top - Section 1	1.00	1.11	9.685	10.65	266.55	0.750	0.000	2.75	11.883	8.91	94.9	0.0	1397.8
55.00		1.00	1.12	9.770	10.75	270.08	0.750	0.000	2.25	9.629	7.22	77.6	0.0	534.1
60.00		1.00	1.14	9.951	10.95	267.27	0.750	0.000	5.00	21.098	15.82	173.2	0.0	1170.2
65.00		1.00	1.16	10.120	11.13	264.18	0.750	0.000	5.00	20.684	15.51	172.7	0.0	1147.0
70.00		1.00	1.17	10.279	11.31	260.87	0.750	0.000	5.00	20.270	15.20	171.9	0.0	1123.8
75.00		1.00	1.19	10.430	11.47	257.34	0.750	0.000	5.00	19.856	14.89	170.8	0.0	1100.6
80.00		1.00	1.21	10.572	11.63	253.63	0.750	0.000	5.00	19.441	14.58	169.6	0.0	1077.5
85.00		1.00	1.22	10.708	11.78	249.76	0.750	0.000	5.00	19.027	14.27	168.1	0.0	1054.3
90.00		1.00	1.24	10.838	11.92	245.74	0.750	0.000	5.00	18.613	13.96	166.4	0.0	1031.1
91.66	Bot - Section 3	1.00	1.24	10.880	11.97	244.37	0.750	0.000	1.66	6.100	4.58	54.8	0.0	337.9
95.00		1.00	1.25	10.962	12.06	241.58	0.750	0.000	3.34	12.258	9.19	110.9	0.0	1107.6
98.00	Top - Section 2	1.00	1.26	11.034	12.14	239.03	0.750	0.000	3.00	10.852	8.14	98.8	0.0	980.3
100.00		1.00	1.27	11.081	12.19	240.52	0.750	0.000	2.00	7.172	5.38	65.6	0.0	256.0
105.00		1.00	1.28	11.195	12.31	236.14	0.750	0.000	5.00	17.609	13.21	162.6	0.0	628.4
110.00		1.00	1.29	11.305	12.44	231.65	0.750	0.000	5.00	17.195	12.90	160.4	0.0	613.5
115.00		1.00	1.30	11.412	12.55	227.06	0.750	0.000	5.00	16.781	12.59	158.0	0.0	598.7
120.00		1.00	1.32	11.514	12.67	222.38	0.750	0.000	5.00	16.367	12.27	155.5	0.0	583.8
125.00		1.00	1.33	11.614	12.78	217.61	0.750	0.000	5.00	15.952	11.96	152.8	0.0	568.9
130.00		1.00	1.34	11.710	12.88	212.76	0.750	0.000	5.00	15.538	11.65	150.1	0.0	554.0
131.74	Bot - Section 4	1.00	1.34	11.743	12.92	211.05	0.750	0.000	1.74	5.320	3.99	51.5	0.0	189.7
135.00		1.00	1.35	11.803	12.98	207.84	0.750	0.000	3.26	9.942	7.46	96.8	0.0	664.8
136.99	Top - Section 3	1.00	1.35	11.840	13.02	205.86	0.750	0.000	1.99	5.999	4.50	58.6	0.0	401.0
139.00	Appurtenance(s)	1.00	1.36	11.876	13.06	206.82	0.750	0.000	2.01	5.972	4.48	58.5	0.0	189.4
139.50	Appurtenance(s)	1.00	1.36	11.885	13.07	206.32	0.750	0.000	0.50	1.478	1.11	14.5	0.0	46.9
140.00		1.00	1.36	11.894	13.08	205.81	0.750	0.000	0.50	1.474	1.11	14.5	0.0	46.7
145.00		1.00	1.37	11.982	13.18	200.76	0.750	0.000	5.00	14.508	10.88	143.4	0.0	460.0
146.00	Appurtenance(s)	1.00	1.37	12.000	13.20	199.74	0.750	0.000	1.00	2.852	2.14	28.2	0.0	90.4
146.50	Appurtenance(s)	1.00	1.37	12.008	13.21	199.23	0.750	0.000	0.50	1.420	1.06	14.1	0.0	45.0
147.00	Appurtenance(s)	1.00	1.37	12.017	13.22	198.72	0.750	0.000	0.50	1.416	1.06	14.0	0.0	44.9
150.00		1.00	1.38	12.068	13.27	195.64	0.750	0.000	3.00	8.406	6.30	83.7	0.0	266.5
155.00		1.00	1.39	12.152	13.37	190.46	0.750	0.000	5.00	13.679	10.26	137.1	0.0	433.5
160.00		1.00	1.40	12.233	13.46	185.22	0.750	0.000	5.00	13.265	9.95	133.9	0.0	420.3
165.00		1.00	1.41	12.313	13.54	179.93	0.750	0.000	5.00	12.851	9.64	130.5	0.0	407.1
167.50	Appurtenance(s)	1.00	1.41	12.352	13.59	177.26	0.750	0.000	2.50	6.270	4.70	63.9	0.0	198.6
170.00		1.00	1.42	12.390	13.63	174.58	0.750	0.000	2.50	6.167	4.62	63.0	0.0	195.3

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Wind Loading - Shaft

Structure: CT01722-S-SBA
Site Name: South Canton
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1
Topography: 1

Code: EIA/TIA-222-G
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

6/7/2018

Tower Engineering Solutions

175.00		1.00	1.42	12.466	13.71	169.19	0.750	0.000	5.00	12.022	9.02	123.6	0.0	380.6
177.00	Appurtenance(s)	1.00	1.43	12.496	13.75	167.01	0.750	0.000	2.00	4.693	3.52	48.4	0.0	148.5
180.00		1.00	1.43	12.540	13.79	163.74	0.750	0.000	3.00	6.915	5.19	71.5	0.0	218.8
								Totals:	**180.00**			**5,603.5**		**36,651.2**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Discrete Appurtenance Forces

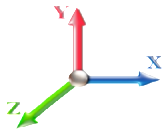
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 43	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

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	177.00	ALU TD-RRH8x20-25	3	12.496	13.746	0.60	0.90	7.33	210.00	0.000	0.000	100.71	0.00	0.00
2	177.00	ALU 1900 MHz	3	12.496	13.746	0.60	0.90	6.87	180.00	0.000	0.000	94.49	0.00	0.00
3	177.00	ALU 800 MHz	6	12.496	13.746	0.60	0.90	9.01	318.00	0.000	0.000	123.83	0.00	0.00
4	177.00	Sitepro PRK-1245L	1	12.496	13.746	1.00	1.00	9.50	464.91	0.000	0.000	130.58	0.00	0.00
5	177.00	Platform w/ Hand Rails	1	12.496	13.746	1.00	1.00	40.00	2000.00	0.000	0.000	549.83	0.00	0.00
6	177.00	RFS APXVTM14-C-I20	3	12.496	13.746	0.71	0.90	13.52	168.00	0.000	0.000	185.89	0.00	0.00
7	177.00	Commscope	3	12.496	13.746	0.67	0.90	24.52	232.20	0.000	0.000	336.98	0.00	0.00
8	167.50	Pipe Mounts	3	12.352	13.587	0.56	0.75	8.44	1050.00	0.000	0.000	114.64	0.00	0.00
9	167.50	Kathrein 742 351	3	12.352	13.587	0.49	0.80	7.88	89.40	0.000	0.000	107.02	0.00	0.00
10	147.00	Antel BXA-70063/6CF	3	12.017	13.219	0.56	0.80	12.72	51.00	0.000	0.000	168.11	0.00	0.00
11	146.50	Low Profile Platform	1	12.008	13.209	1.00	1.00	22.00	1500.00	0.000	0.000	290.60	0.00	0.00
12	146.50	Antel LPA-80063/4CF	2	12.008	13.209	0.74	0.80	9.15	40.00	0.000	0.000	120.88	0.00	0.00
13	146.50	Antel BXA-171063/8CF-2	1	12.008	13.209	0.67	0.80	1.98	10.50	0.000	0.000	26.10	0.00	0.00
14	146.50	Antel BXA-171085-8CF-2	2	12.008	13.209	0.67	0.80	3.95	21.00	0.000	0.000	52.19	0.00	0.00
15	146.50	Antel	4	12.008	13.209	1.36	0.80	14.20	48.00	0.000	0.000	187.55	0.00	0.00
16	146.00	RFS FD9R6004/2C-3	6	12.000	13.200	0.54	0.80	1.16	18.60	0.000	0.000	15.28	0.00	0.00
17	139.50	Powerwave LGP 21903	6	11.885	13.074	0.54	0.80	0.87	33.00	0.000	0.000	11.35	0.00	0.00
18	139.00	Powerwave 7770	6	11.876	13.064	0.58	0.80	19.27	210.00	0.000	0.000	251.77	0.00	0.00
19	139.00	CSS DUO1417-8686-40	3	11.876	13.064	0.66	0.80	11.47	60.90	0.000	0.000	149.89	0.00	0.00
20	139.00	Powerwave	2	11.876	13.064	0.60	0.80	13.73	118.00	0.000	0.000	179.34	0.00	0.00
21	139.00	KMW	1	11.876	13.064	1.00	1.00	8.02	48.50	0.000	0.000	104.77	0.00	0.00
22	139.00	Powerwave LGP 21401	6	11.876	13.064	0.54	0.80	0.00	105.00	0.000	0.000	0.00	0.00	0.00
23	139.00	Ericsson RRUS-11	6	11.876	13.064	0.54	0.80	8.10	306.00	0.000	0.000	105.87	0.00	0.00
24	139.00	Andrew ABT-DF-DMADBH	3	11.876	13.064	0.54	0.80	0.08	3.30	0.000	0.000	1.05	0.00	0.00
25	139.00	Raycap DC6-48-60-18-8F	1	11.876	13.064	1.00	1.00	0.92	31.80	0.000	0.000	12.02	0.00	0.00
26	139.00	T-Arms	3	11.876	13.064	0.56	0.75	13.50	1050.00	0.000	0.000	176.36	0.00	0.00
27	50.00	Stand Off	1	9.576	10.534	1.00	1.00	2.63	40.00	0.000	0.000	27.70	0.00	0.00
28	50.00	GPS	1	9.576	10.534	1.00	1.00	1.00	10.00	0.000	0.000	10.53	0.00	0.00
							Totals:		**8,418.11**			**3,635.34**		

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

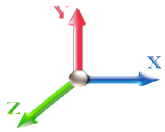
Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 44

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

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		155.23	1782.06	0.00	0.00
10.00		152.68	1755.60	0.00	0.00
15.00		150.14	1729.14	0.00	0.00
20.00		156.60	1702.68	0.00	0.00
25.00		161.31	1676.22	0.00	0.00
30.00		164.68	1649.76	0.00	0.00
35.00		167.08	1623.30	0.00	0.00
40.00		168.72	1596.84	0.00	0.00
45.00		169.75	1570.38	0.00	0.00
45.42		14.03	129.67	0.00	0.00
50.00	(2) attachments	196.91	2578.53	0.00	0.00
52.75		94.95	1496.66	0.00	0.00
55.00		77.62	615.07	0.00	0.00
60.00		173.21	1350.01	0.00	0.00
65.00		172.69	1326.84	0.00	0.00
70.00		171.89	1303.66	0.00	0.00
75.00		170.85	1280.48	0.00	0.00
80.00		169.57	1257.30	0.00	0.00
85.00		168.09	1234.12	0.00	0.00
90.00		166.42	1210.94	0.00	0.00
91.66		54.75	397.70	0.00	0.00
95.00		110.86	1227.64	0.00	0.00
98.00		98.78	1088.10	0.00	0.00
100.00		65.56	328.02	0.00	0.00
105.00		162.64	808.26	0.00	0.00
110.00		160.38	793.38	0.00	0.00
115.00		157.98	778.49	0.00	0.00
120.00		155.47	763.61	0.00	0.00
125.00		152.84	748.72	0.00	0.00
130.00		150.11	733.84	0.00	0.00
131.74		51.54	252.37	0.00	0.00
135.00		96.81	781.92	0.00	0.00
136.99		58.59	472.71	0.00	0.00
139.00	(31) attachments	1039.58	2195.06	0.00	0.00
139.50	(6) attachments	25.84	91.13	0.00	0.00
140.00		14.46	57.99	0.00	0.00
145.00		143.42	572.65	0.00	0.00
146.00	(6) attachments	43.51	131.54	0.00	0.00
146.50	(10) attachments	691.39	1675.77	0.00	0.00
147.00	(3) attachments	182.14	100.90	0.00	0.00
150.00		83.70	296.63	0.00	0.00
155.00		137.14	483.79	0.00	0.00
160.00		133.88	470.56	0.00	0.00
165.00		130.54	457.33	0.00	0.00
167.50	(6) attachments	285.55	1363.11	0.00	0.00
170.00		63.04	204.80	0.00	0.00

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Total Applied Force Summary

Structure:	CT01722-S-SBA		**Code:**	EIA/TIA-222-G	6/7/2018
Site Name:	South Canton		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 45

Tower Engineering Solutions

175.00		123.65	399.67	0.00	0.00
177.00	(20) attachments	1570.69	3729.27	0.00	0.00
180.00		71.54	218.83	0.00	0.00
	Totals:	**9,238.80**	**50,493.06**	**0.00**	**0.00**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Linear Appurtenance Segment Forces (Factored)

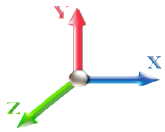
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 46	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	7.442	0.00	0.80
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	7.442	0.00	0.80
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	7.442	0.00	0.80
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	7.896	0.00	0.80
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	8.276	0.00	0.80
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	8.600	0.00	0.80
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	8.883	0.00	0.80
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	9.137	0.00	0.80
45.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	9.366	0.00	0.80
45.42	1/2" Coax	Yes	0.42	0.000	0.65	0.02	0.00	0.012	0.000	9.384	0.00	0.07
50.00	1/2" Coax	Yes	4.58	0.000	0.65	0.25	0.00	0.013	0.000	9.576	0.00	0.73
									Totals:		**0.0**	**8.0**

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

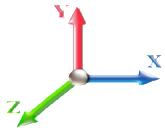
Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 47	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

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	-50.49	-9.25	0.00	-1103.0	0.00	1103.03	6607.78	3303.89	16218.3	8051.48	0.00	0.000	0.000	0.145
5.00	-48.70	-9.13	0.00	-1056.7	0.00	1056.76	6536.37	3268.19	15777.9	7832.86	0.02	-0.036	0.000	0.142
10.00	-46.94	-9.00	0.00	-1011.1	0.00	1011.11	6463.73	3231.87	15340.5	7615.67	0.08	-0.073	0.000	0.140
15.00	-45.21	-8.88	0.00	-966.09	0.00	966.09	6389.86	3194.93	14906.0	7399.99	0.17	-0.109	0.000	0.138
20.00	-43.50	-8.75	0.00	-921.69	0.00	921.69	6314.77	3157.38	14474.7	7185.88	0.31	-0.146	0.000	0.135
25.00	-41.82	-8.61	0.00	-877.94	0.00	877.94	6238.44	3119.22	14046.7	6973.42	0.48	-0.183	0.000	0.133
30.00	-40.16	-8.46	0.00	-834.90	0.00	834.90	6160.89	3080.44	13622.3	6762.68	0.69	-0.220	0.000	0.130
35.00	-38.53	-8.32	0.00	-792.58	0.00	792.58	6082.10	3041.05	13201.4	6553.75	0.94	-0.257	0.000	0.127
40.00	-36.93	-8.16	0.00	-751.00	0.00	751.00	6002.09	3001.05	12784.3	6346.69	1.23	-0.295	0.000	0.124
45.00	-35.36	-8.00	0.00	-710.18	0.00	710.18	5920.85	2960.42	12371.1	6141.58	1.56	-0.332	0.000	0.122
45.42	-35.23	-7.99	0.00	-706.85	0.00	706.85	5914.02	2957.01	12336.9	6124.58	1.59	-0.335	0.000	0.121
50.00	-32.65	-7.80	0.00	-670.21	0.00	670.21	5838.38	2919.19	11962.1	5938.49	1.93	-0.369	0.000	0.118
52.75	-31.15	-7.70	0.00	-648.76	0.00	648.76	4942.80	2471.40	10222.2	5074.76	2.15	-0.390	0.000	0.134
55.00	-30.53	-7.64	0.00	-631.43	0.00	631.43	4913.65	2456.82	10072.3	5000.32	2.33	-0.407	0.000	0.133
60.00	-29.18	-7.47	0.00	-593.25	0.00	593.25	4847.98	2423.99	9741.07	4835.88	2.78	-0.447	0.000	0.129
65.00	-27.85	-7.31	0.00	-555.89	0.00	555.89	4781.08	2390.54	9412.76	4672.89	3.27	-0.487	0.000	0.125
70.00	-26.54	-7.14	0.00	-519.34	0.00	519.34	4712.96	2356.48	9087.49	4511.41	3.80	-0.527	0.000	0.121
75.00	-25.26	-6.98	0.00	-483.62	0.00	483.62	4643.60	2321.80	8765.44	4351.53	4.38	-0.567	0.000	0.117
80.00	-24.00	-6.81	0.00	-448.73	0.00	448.73	4573.02	2286.51	8446.74	4193.32	4.99	-0.606	0.000	0.112
85.00	-22.76	-6.65	0.00	-414.67	0.00	414.67	4501.21	2250.60	8131.55	4036.84	5.65	-0.644	0.000	0.108
90.00	-21.55	-6.48	0.00	-381.44	0.00	381.44	4428.17	2214.08	7820.02	3882.19	6.34	-0.682	0.000	0.103
91.66	-21.15	-6.42	0.00	-370.67	0.00	370.67	4403.60	2201.80	7717.21	3831.15	6.58	-0.695	0.000	0.102
95.00	-19.92	-6.30	0.00	-349.24	0.00	349.24	4350.76	2175.38	7506.87	3726.73	7.08	-0.720	0.000	0.098
98.00	-18.83	-6.20	0.00	-330.35	0.00	330.35	2393.56	1196.78	4158.66	2064.53	7.54	-0.742	0.000	0.168
100.00	-18.50	-6.14	0.00	-317.93	0.00	317.93	2381.84	1190.92	4099.59	2035.21	7.85	-0.757	0.000	0.164
105.00	-17.69	-5.98	0.00	-287.23	0.00	287.23	2351.72	1175.86	3952.36	1962.12	8.67	-0.810	0.000	0.154
110.00	-16.89	-5.82	0.00	-257.33	0.00	257.33	2320.37	1160.18	3805.57	1889.24	9.55	-0.861	0.000	0.144
115.00	-16.11	-5.67	0.00	-228.20	0.00	228.20	2287.79	1143.89	3659.35	1816.65	10.48	-0.909	0.000	0.133
120.00	-15.35	-5.51	0.00	-199.87	0.00	199.87	2253.98	1126.99	3513.86	1744.43	11.46	-0.956	0.000	0.121
125.00	-14.60	-5.36	0.00	-172.31	0.00	172.31	2218.95	1109.47	3369.25	1672.64	12.48	-0.999	0.000	0.110
130.00	-13.86	-5.20	0.00	-145.52	0.00	145.52	2182.68	1091.34	3225.66	1601.35	13.55	-1.039	0.000	0.097
131.74	-13.61	-5.15	0.00	-136.46	0.00	136.46	2169.75	1084.87	3175.87	1576.63	13.93	-1.052	0.000	0.093
135.00	-12.83	-5.04	0.00	-119.69	0.00	119.69	2145.19	1072.59	3083.25	1530.65	14.66	-1.076	0.000	0.084
136.99	-12.36	-4.98	0.00	-109.64	0.00	109.64	1823.96	911.98	2634.70	1307.98	15.11	-1.089	0.000	0.091
139.00	-10.18	-3.90	0.00	-99.65	0.00	99.65	1812.30	906.15	2588.35	1284.97	15.57	-1.102	0.000	0.083
139.50	-10.09	-3.87	0.00	-97.71	0.00	97.71	1809.36	904.68	2576.82	1279.24	15.69	-1.106	0.000	0.082
140.00	-10.03	-3.86	0.00	-95.77	0.00	95.77	1806.41	903.20	2565.29	1273.52	15.80	-1.109	0.000	0.081
145.00	-9.46	-3.71	0.00	-76.48	0.00	76.48	1776.24	888.12	2450.41	1216.49	16.98	-1.139	0.000	0.068
146.00	-9.33	-3.66	0.00	-72.78	0.00	72.78	1770.06	885.03	2427.52	1205.13	17.22	-1.145	0.000	0.066
146.50	-7.67	-2.94	0.00	-70.95	0.00	70.95	1766.95	883.47	2416.09	1199.45	17.34	-1.147	0.000	0.064
147.00	-7.57	-2.75	0.00	-69.48	0.00	69.48	1763.83	881.91	2404.67	1193.78	17.46	-1.150	0.000	0.063
150.00	-7.27	-2.67	0.00	-61.22	0.00	61.22	1744.84	872.42	2336.33	1159.85	18.19	-1.165	0.000	0.057
155.00	-6.79	-2.52	0.00	-47.89	0.00	47.89	1712.21	856.11	2223.20	1103.69	19.42	-1.188	0.000	0.047
160.00	-6.32	-2.38	0.00	-35.29	0.00	35.29	1678.36	839.18	2111.17	1048.07	20.67	-1.207	0.000	0.037
165.00	-5.87	-2.24	0.00	-23.39	0.00	23.39	1643.27	821.64	2000.39	993.08	21.95	-1.222	0.000	0.027
167.50	-4.51	-1.93	0.00	-17.79	0.00	17.79	1625.27	812.64	1945.52	965.84	22.59	-1.227	0.000	0.021
170.00	-4.31	-1.86	0.00	-12.98	0.00	12.98	1606.96	803.48	1891.02	938.78	23.23	-1.232	0.000	0.017
175.00	-3.91	-1.73	0.00	-3.68	0.00	3.68	1569.42	784.71	1783.19	885.25	24.53	-1.237	0.000	0.007

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Calculated Forces

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 48	

177.00	-0.22	-0.08	0.00	-0.23	0.00	0.23	1554.06	777.03	1740.53	864.07	25.04	-1.237	0.000	0.000
180.00	0.00	-0.07	0.00	0.00	0.00	0.00	1530.65	765.32	1677.06	832.56	25.82	-1.237	0.000	0.000

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

Final Analysis Summary

Structure:	CT01722-S-SBA	**Code:**	EIA/TIA-222-G	6/7/2018	
Site Name:	South Canton	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 49	

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 93 mph Wind	35.6	0.00	60.55	0.00	0.00	4264.21
0.9D + 1.6W 93 mph Wind	35.6	0.00	45.40	0.00	0.00	4223.04
1.2D + 1.0Di + 1.0Wi 50 mph Wind	11.0	0.00	96.74	0.00	0.00	1354.02
1.2D + 1.0E	2.1	0.00	60.59	0.00	0.00	273.45
0.9D + 1.0E	2.1	0.00	45.44	0.00	0.00	270.53
1.0D + 1.0W 60 mph Wind	9.3	0.00	50.49	0.00	0.00	1103.03

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 93 mph Wind	-21.50	-24.00	0.00	-1280.0	0.00	-1280.0	2393.56	1196.7	4158.66	2064.53	98.00	0.629
0.9D + 1.6W 93 mph Wind	-15.85	-23.70	0.00	-1260.9	0.00	-1260.9	2393.56	1196.7	4158.66	2064.53	98.00	0.618
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-45.11	-7.71	0.00	-413.82	0.00	-413.82	2393.56	1196.7	4158.66	2064.53	98.00	0.219
1.2D + 1.0E	-22.69	-1.40	0.00	-104.20	0.00	-104.20	2393.56	1196.7	4158.66	2064.53	98.00	0.060
0.9D + 1.0E	-17.01	-1.38	0.00	-102.75	0.00	-102.75	2393.56	1196.7	4158.66	2064.53	98.00	0.057
1.0D + 1.0W 60 mph Wind	-18.83	-6.20	0.00	-330.35	0.00	-330.35	2393.56	1196.7	4158.66	2064.53	98.00	0.168

Copyright © 2018 by Tower Engineering Solutions, LLC. All rights reserved.

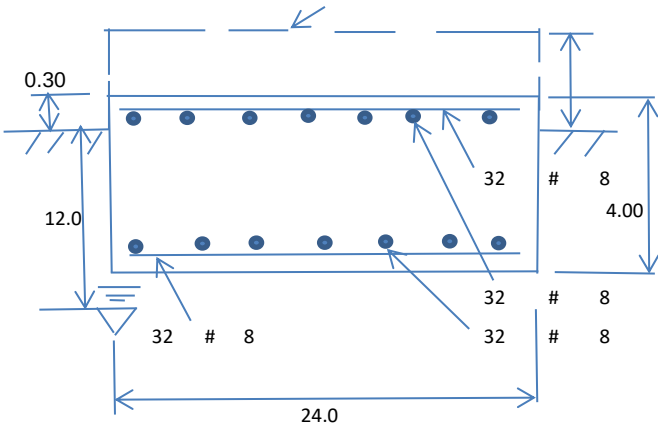
Monopole Mat Foundation Design

			Date
			10/31/2017
Customer Name:	Sprint Nextel	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	180
Site Number:	CT01722-S-SBA	**Engineer Name:**	H. You
Engr. Number:	53996	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

Analysis or Design? Analysis

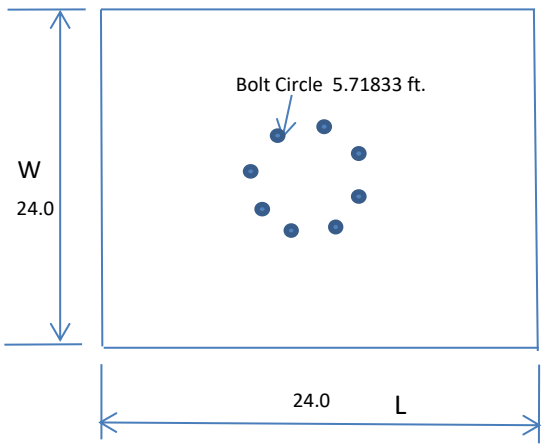


Base Reactions (Factored):

Axial Load (Kips):	60.6	Shear Force (Kips):	35.6
Uplift Force (Kips):	0.0	Moment (Kips-ft):	4264.2
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Anchor Bolt Circle (ft.):	5.72	Depth of Base BG (ft.):	3.70
Thickness of Pad (ft):	4.00		
Length of Pad (ft.):	24	Width of Pad (ft.):	24
Final Length of pad (ft)	24.0	Final width of pad (ft):	24.0



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Pad Rebar Yield (Ksi):	60	Tie Spacing (in):	12.0	
Pad Steel Rebar Size (#):	8			
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	32	Qty. of Rebar in Pad (W):	32

Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	32	Qty. of Rebar in Pad (W):	32
Apply 1.35 factor for e/w Per G:	1.35		

Soil Design Parameters:

Water Table B.G.S. (ft):	12.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	13000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	0.00	Total Dry Soil Weight (Kips):	0.00
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.00	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	2304.00	Total Dry Concrete Weight (Kips):	345.60
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	345.60	Total Vertical Load on Base (Kips):	406.20

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	4884	<	Allowable Factored Soil Bearing (psf): 9750	0.50	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	4459.7	>	Design Factored Momont (kips-ft): 4408	0.99	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.01	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	

Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1052.9	>	One-Way Factored Shear (L-D. Kips):	307.1	0.29	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1052.9	>	One-Way Factored Shear (W-D., Kips):	307.1	0.29	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1216.3	>	One-Way Factored Shear (C-C, Kips):	673.3	0.55	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0020	OK!	Lower Steel Pad Reinf. Ratio (W-Direct	0.0020		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	4944.8	>	Moment at Bottom (L-Direct. K-Ft):	795.8	0.16	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	4944.8	>	Moment at Bottom (W-Direct. K-Ft):	795.8	0.16	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	6955.8	>	Moment at Bottom (C-C Dir. K-Ft):	1125.4	0.16	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0020	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0020		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	4944.8	>	Moment at the top (L-Dir Kips-Ft):	285.2	0.06	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	4944.8	>	Moment at the top (W-Dir Kips-Ft):	285.2	0.06	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	6955.8	>	Moment at the top (C-C Direc. K-Ft):	526.7	0.08	OK!

Antenna Mount Structural Analysis

Source: SBA Date: 11.14.2017

SBA Site:	CT01722-S South Canton
Sprint Site Number:	CT33XC023
Project:	Sprint DO Macro Upgrade
Prepared For:	Sprint
Mount Description:	(1) Platform
Site Location:	96 Powder Mill Rd, Canton, CT Hartford County 41.83425°, -72.93267°
Design Codes:	ANSI/TIA-222-G IBC 2012 w/ 2016 CT Building Code
Analysis Load Case:	Sprint Final Configuration
Analysis Result:	**Adequate @ 77%** - Once Augmented See Conclusion

Revision 0
March 19, 2018

CT33XC023-PASSING-MOUNT-STRUCTURAL-ANALYSIS-03-19-18

1.0 Introduction

An antenna mount structural analysis has been performed on Sprint's existing mount assembly located at the CT01722-S South Canton communications site in Hartford County, CT considering the final equipment loading configuration listed in Section 3.0.

2.0 Analysis Criteria

An elastic three-dimensional model of the mount structure has been analyzed pursuant to the following criteria:

- IBC 2012 – International Building Code.
- ANSI/TIA-222-G – Structural Standard for Antenna Supporting Structures and Antennas.
- AISC – Steel Construction Manual.
- ANSI/AWS D1.1 – Structural Welding Code.

Wind w/o ice = 120 mph (3-sec gust Ultimate Wind Speed) Wind w/o ice = 97 mph (3-sec gust Equivalent per TIA-222-G Tower Code)	
Wind with ice = 50 mph (3-sec gust, 1" Ice) Exposure Category C	Topographic Category 1 Structure Class II

The following documents were provided:

- Prelim Construction Drawings
  Infinigy, 1/18/18.
- Mount and Tower Record Documents
  SBA
- Tower Structural Analysis
  TES, 1/3/18.
- RF Design
  Sprint DOMU Project

The results of the analysis are illustrated in Section 4.0. If any of the existing or proposed conditions reported in this analysis are fadnot properly represented, please contact our office immediately to request an amended report.

3.0 Appurtenance Information

Table 3.1 – Sprint Final Configuration[1]

COR	(Quantity) Appurtenance Make/Model	Mount Description
177.0'±	(3) RFS APXVTM14-ALU-I20	*(1) Platform*
	(3) COMMSCOPE NNVV-65B-R4	
	(6) ALU 800MHz RRH	
	(3) ALU 1900MHz RRH	
	(3) ALU 2500MHz RRH	

1. *Refer to antenna installation Construction Drawings (by others, when applicable) for additional information regarding final antenna and equipment orientations.*
2. *Panel antennas to be installed in Positions 2 and 3. RRH units to be installed on dual swivel brackets behind panel antennas in Positions 2 and 3.*

4.0 Analysis Results

Table 4.1 – Existing Mount Capacity

Load Case	Governing Mount Component[1]	% Capacity[2]	Result
Final Sprint Configuration	Connection Plates	>200%	**Inadequate[3]**

1. *Refer to the Calculations & Software Output portion of this report for mount component and structural information.*
2. *Listed results are expressed as a percentage of available mount member capacity based upon the assumed material strengths listed in Table 4.3. 105% is an acceptable allowable stress percentage for mount components.*
3. *Structural augments to the existing mount structure are required to obtain a mount structure capable of supporting the currently proposed final loading configuration in Table 3.1.*

Table 4.2 – Augmented Mount Capacity

Load Case	Governing Mount Component[1]	% Capacity[2]	Result
Final Sprint Configuration	New PRK Kit Connection Capacity	77%	**Adequate Once Augmented[3]**

1. *Refer to the Calculations & Software Output portion of this report for mount component and structural information.*
2. *Listed results are expressed as a percentage of available mount member capacity based upon the assumed material strengths listed in Table 4.3. 105% is an acceptable allowable stress percentage for mount components.*
3. *Refer to GeoStructural Mount Augmentation Drawings and Section 5.0 for information regarding required mount augments.*

Table 4.3 – Structural Component Material Strengths

Structural Component	Nominal Strength/Material[1]
Pipe	F_y = 35 ksi (A53, Gr. B)
Tube	F_y = 46 ksi (A500, Gr. B)
Structural Shapes (L, C, W, etc.), Plate / Bar	F_y = 36 ksi (A36)
Uni-Strut	F_y = 33 ksi (A570, Gr. 33)
Connection Bolts	A325
Stainless Steel Bolts	18-8 Stainless, Grade 316/304 F_y = 74 ksi (Yield) & F_u = 29 ksi (Tension)
U-Bolts / Threaded Rod	SAE J429 Grade 2 (Substitution: ASTM A449) F_y = 57 ksi (Yield) & F_u = 74 ksi (Tension)
Welds	E70XX Electrodes

1. *Strengths listed were assumed for this analysis and are based upon ASTM, AISC, RCSC, AWS and ACI preferred specification values. Values and materials are consistent with industry standards. Material strengths were taken from original design documents when available.*

5.0 Conclusion & Recommendations

Based on Sprint's final equipment loading configuration, the existing mount assembly does not have sufficient capacity to support the loading considered in this analysis pursuant to the listed standards. Structural augments (reinforcements) will be required and are briefly summarized below:

- Install Platform Reinforcement Kit; located 3.5' below the existing collar mount and attaching to the existing tube steel platform members 3.5' from collar interface.
  - Sitepro1 PRK-1245L, (1) total.
- Remove and properly dispose of existing single angle handrail.
- Install Handrail Kit; located 3.0' above the existing platform bottom rail and attaching to the mount pipes.
  - Sitepro1 HRK14-U, (1) total. Attach all mount pipes to new handrail with kit-provided cross-over plates.
  - 1/2"Ø or 5/8"Ø U-Bolts, (24) total. Attach all mount pipes to existing bottom rail w/ (2) U-Bolts each similar to existing. (6) new Pipe2.0STD x 8' tall mount pipes will be required to span between the existing rail and new top rail.
- Panel antennas to be installed in Positions 2 and 3. RRH units to be installed on dual swivel brackets behind panel antennas in Positions 2 and 3.
- Lower the panel antenna installation centerline approximately 1.0'.

Once the recommended augments are successfully implemented, the augmented mount assembly has sufficient capacity to support the loading considered in this analysis pursuant to the listed standards.

Augmentation Requirements:

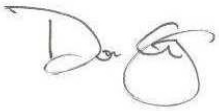
- **In order to obtain a mount structure capable of supporting the currently proposed final loading configuration, upgrade augments must be installed in accordance with GeoStructural's *Mount Augmentation Drawings*.**
- **Antennas and equipment shall be installed centered vertically on the mount front face rails. If this assumption is incorrect, the results of this analysis will be affected.**

This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If any of the existing or proposed conditions (appurtenance loading, member sizes, etc.) reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

Prepared by:

Jesse Drennen, PE, MLE
208.761.7986
jesse.drennen@geostructural.com

Reviewed and Approved by:



Don George, PE, SE, MLSE
208.602.6569
don.george@geostructural.com

6.0 Standard Conditions

- All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study to verify existing conditions and the results of this analysis are based solely on the information provided. It has been assumed that the tower, antenna support structure and foundation have been constructed according to the provided existing drawings, previous structural analysis reports, mapping documents, etc.

- The default Structure Classification is Class II in accordance with ANSI/TIA-222-G §A.2.2 & §A.15.3 and has been assumed for this analysis. The owner shall verify this classification conforms with original or desired reliability criteria.

- This analysis assumes that the structure has been properly installed and maintained in accordance with ANSI/TIA-222-G §15.5 and that no physical deterioration has occurred in any of the components of the structure. Damaged, missing, or rusted members were not considered.

- This analysis verifies the adequacy of the main components of the structure. Not all connections, welds, bolts, plates, etc. were individually detailed and analyzed. Where not specifically analyzed, the existing connection plates, welds, bolts, etc. were assumed adequate to develop the full capacity of the main structural members.

- No consideration has been made for unusual or extreme wind events, rime/in-cloud ice loadings, harmonic or nodal vibration, vortex shedding or other similar conditions.

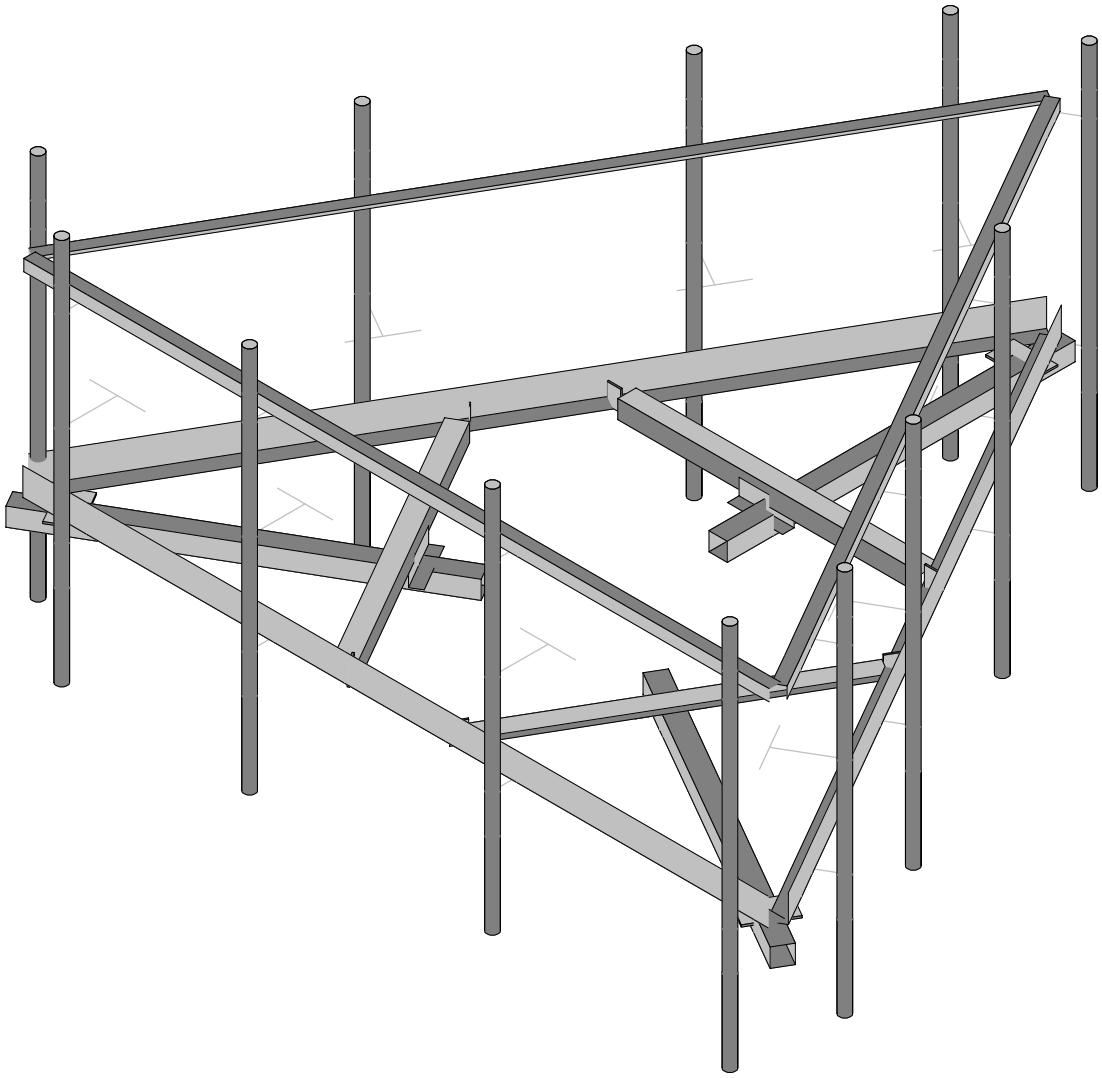
- It is the owner's responsibility to determine the appropriate design wind speed and amount of ice accumulation beyond code minimum values that should be considered in the analysis.

- This analysis report does not constitute a maintenance and condition assessment. No certifications regarding maintenance and condition are expressed or implied. If desired, GeoStructural can provide these services under a subsequent contract.

- This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If desired, GeoStructural can provide these services under a subsequent contract.

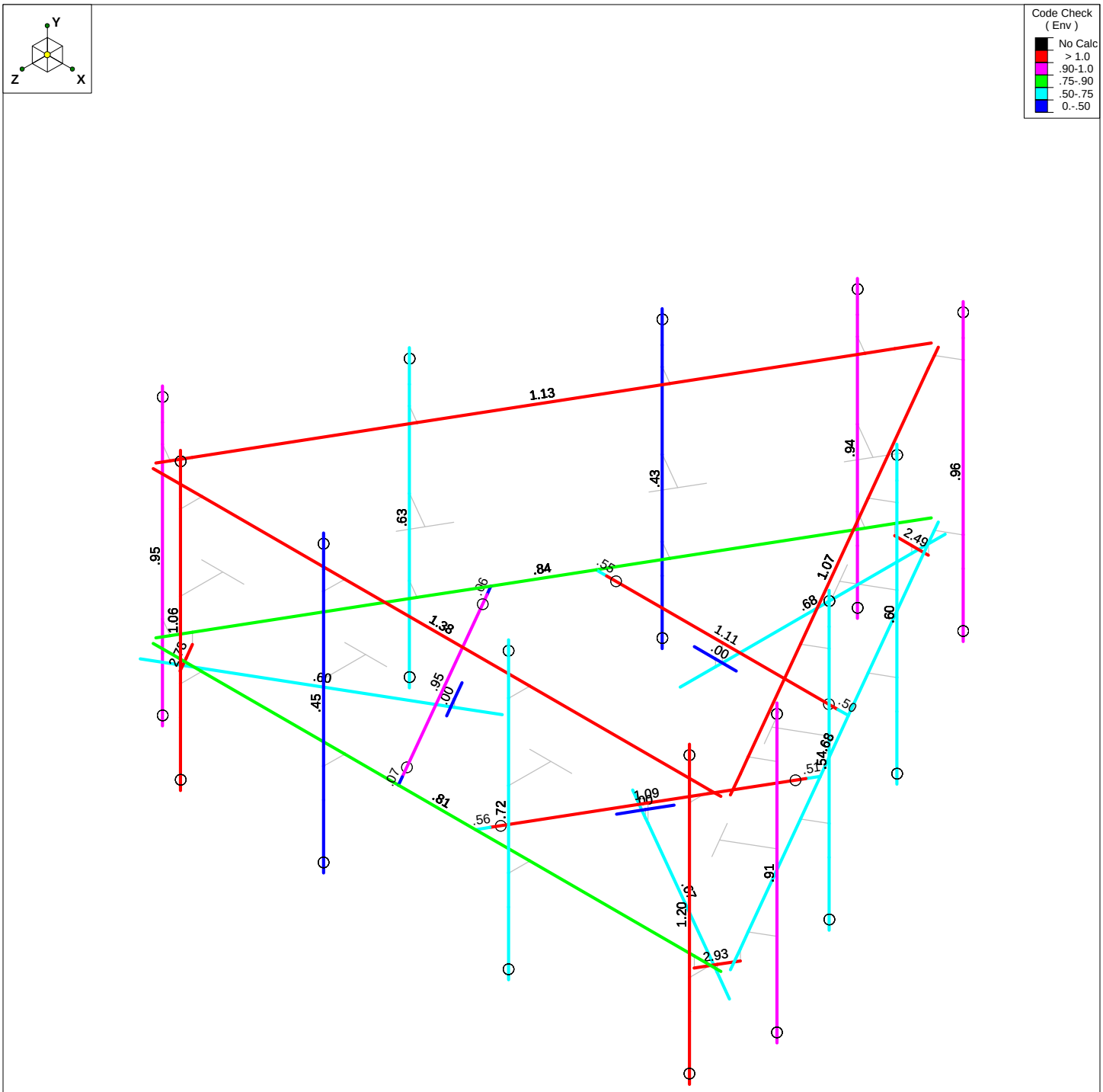
7.0 Calculations & Software Output

This page intentionally left blank.



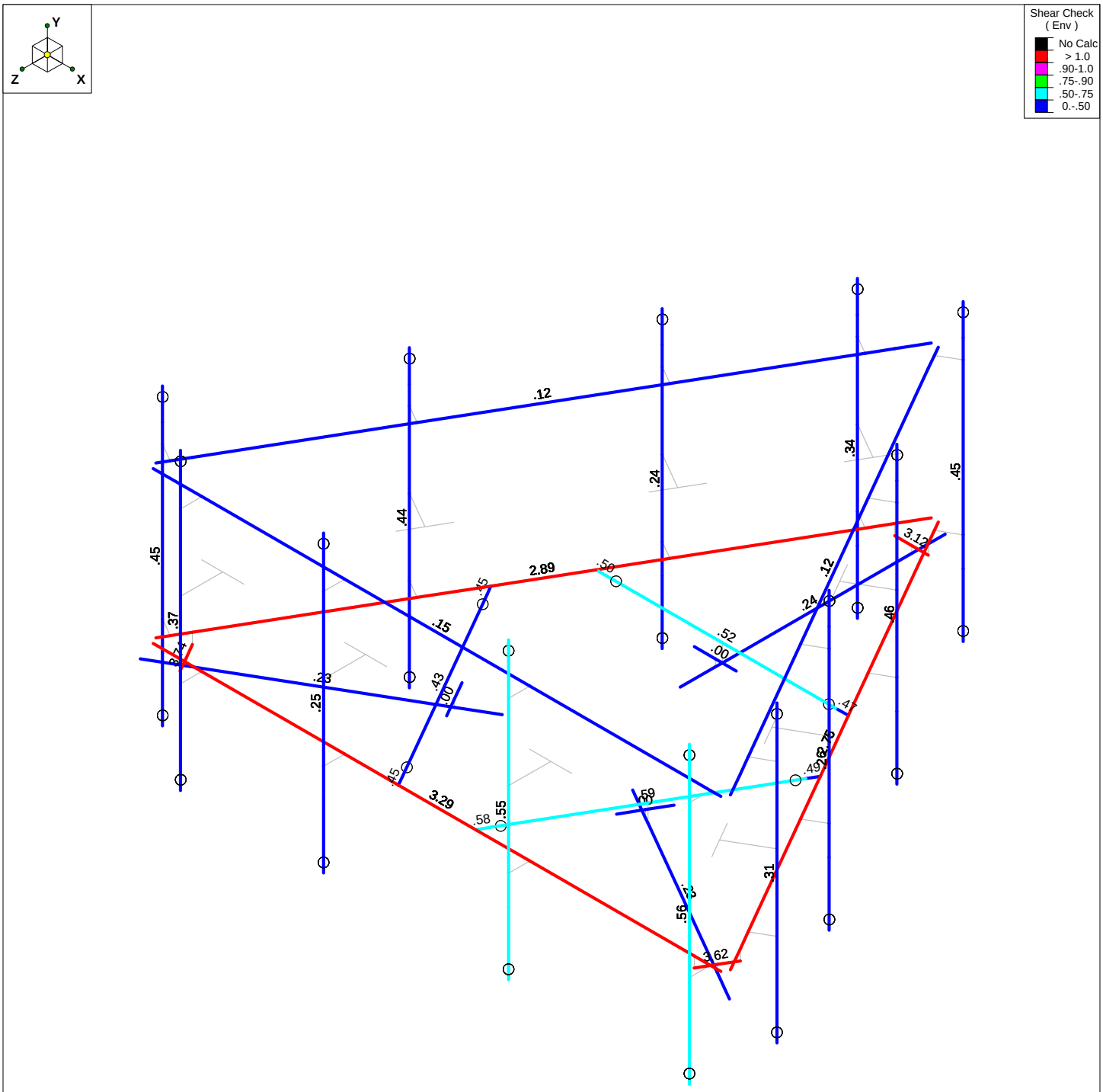
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 2
Jesse Drennen, PE		Mar 19, 2018 at 10:11 AM
		CT33XC023_Mount Analysis_R0 1...



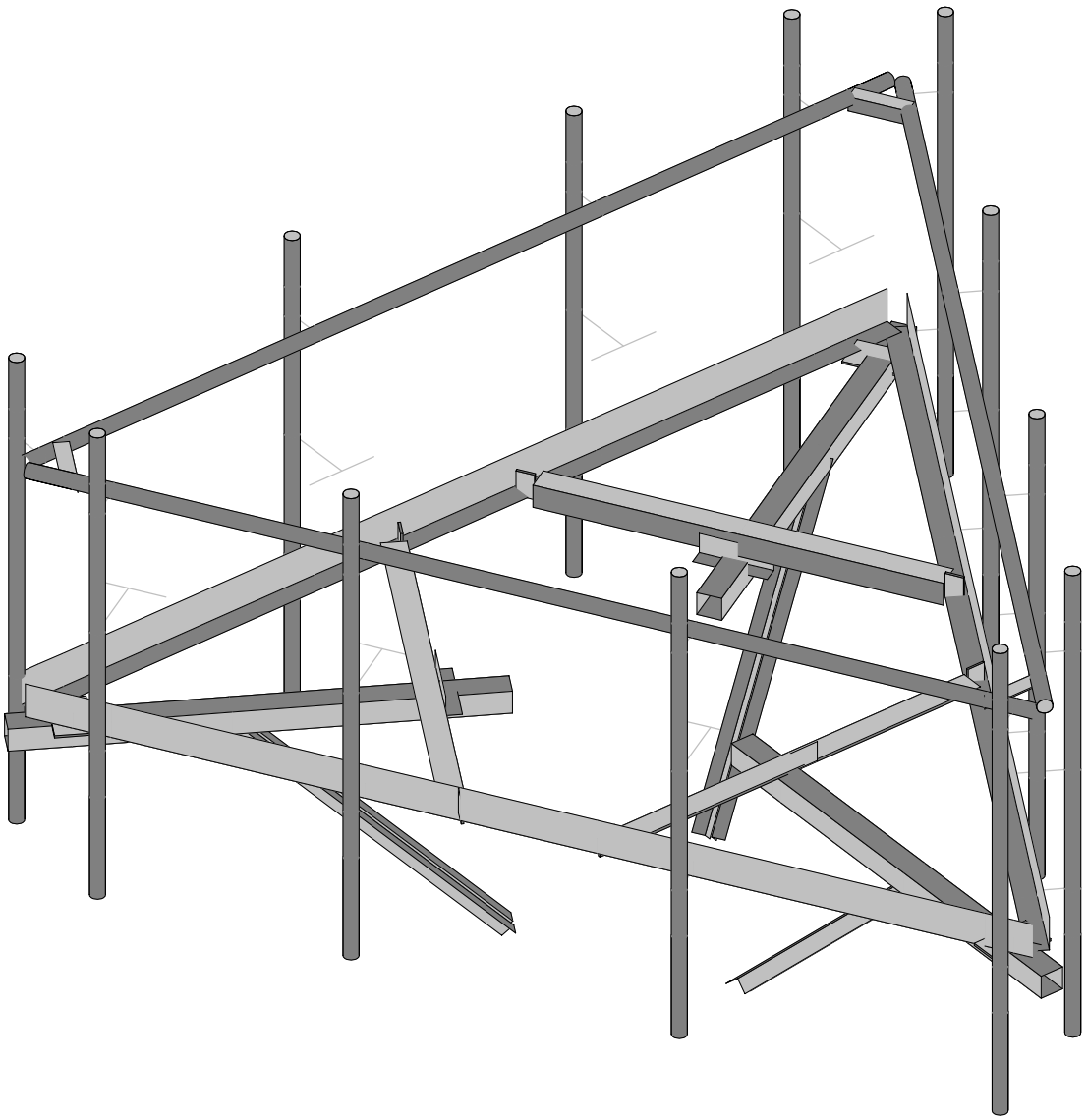
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 3
Jesse Drennen, PE		Mar 19, 2018 at 10:11 AM
		CT33XC023_Mount Analysis_R0 1...



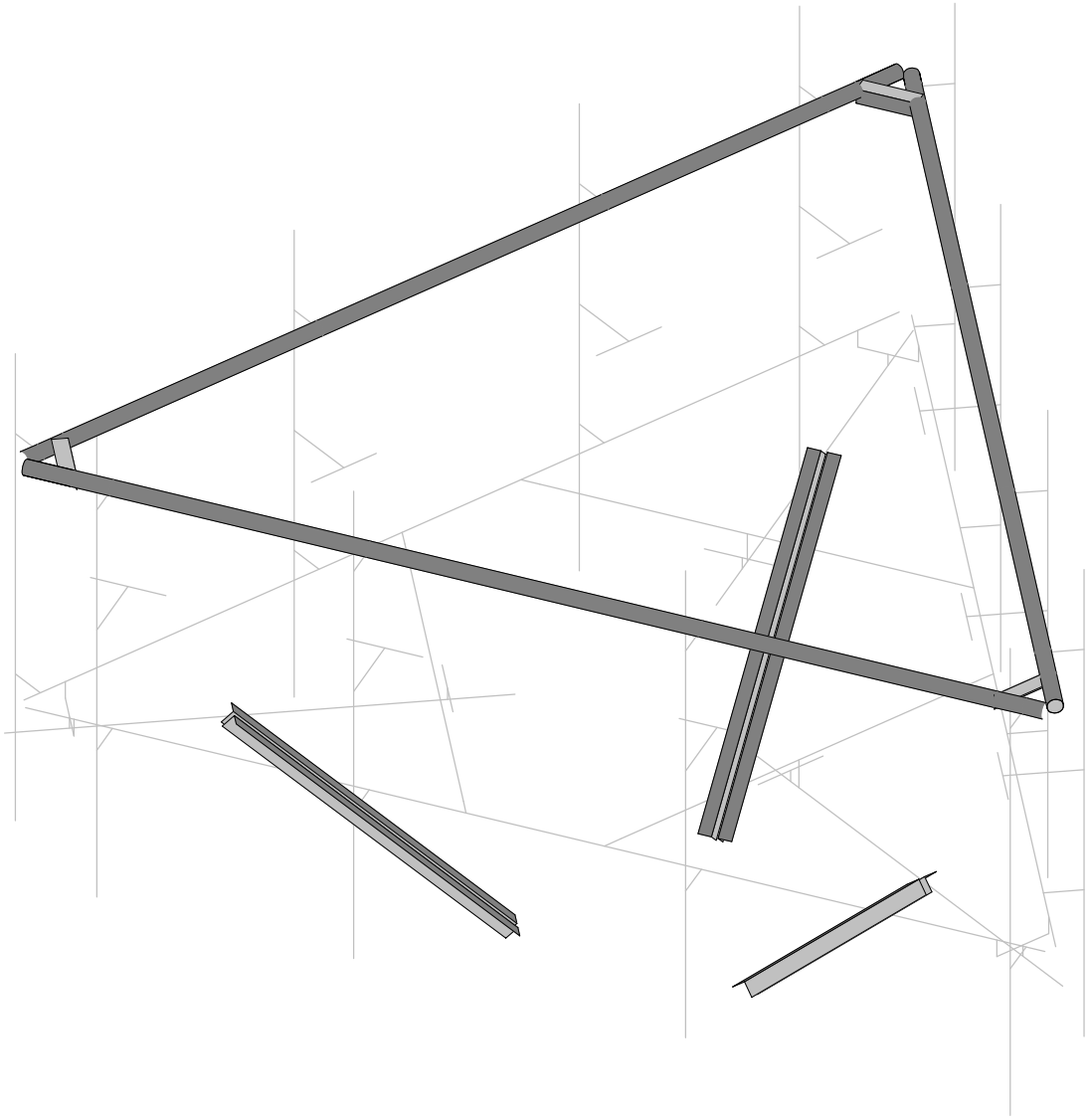
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 4
Jesse Drennen, PE		Mar 19, 2018 at 10:11 AM
		CT33XC023_Mount Analysis_R0 1...



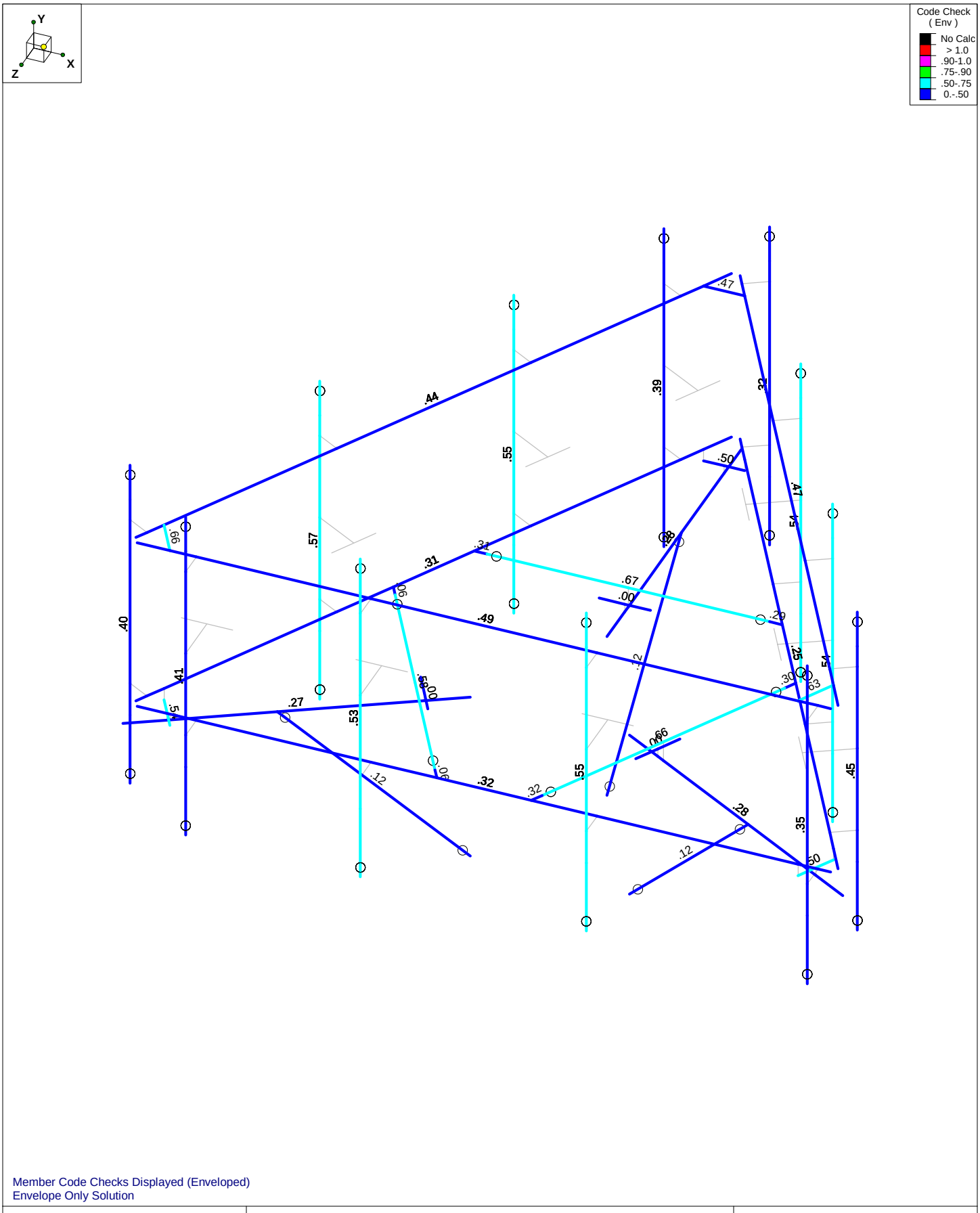
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 1
Jesse Drennen, PE		Mar 19, 2018 at 10:20 AM
		CT33XC023_Mount Analysis_R0 1...



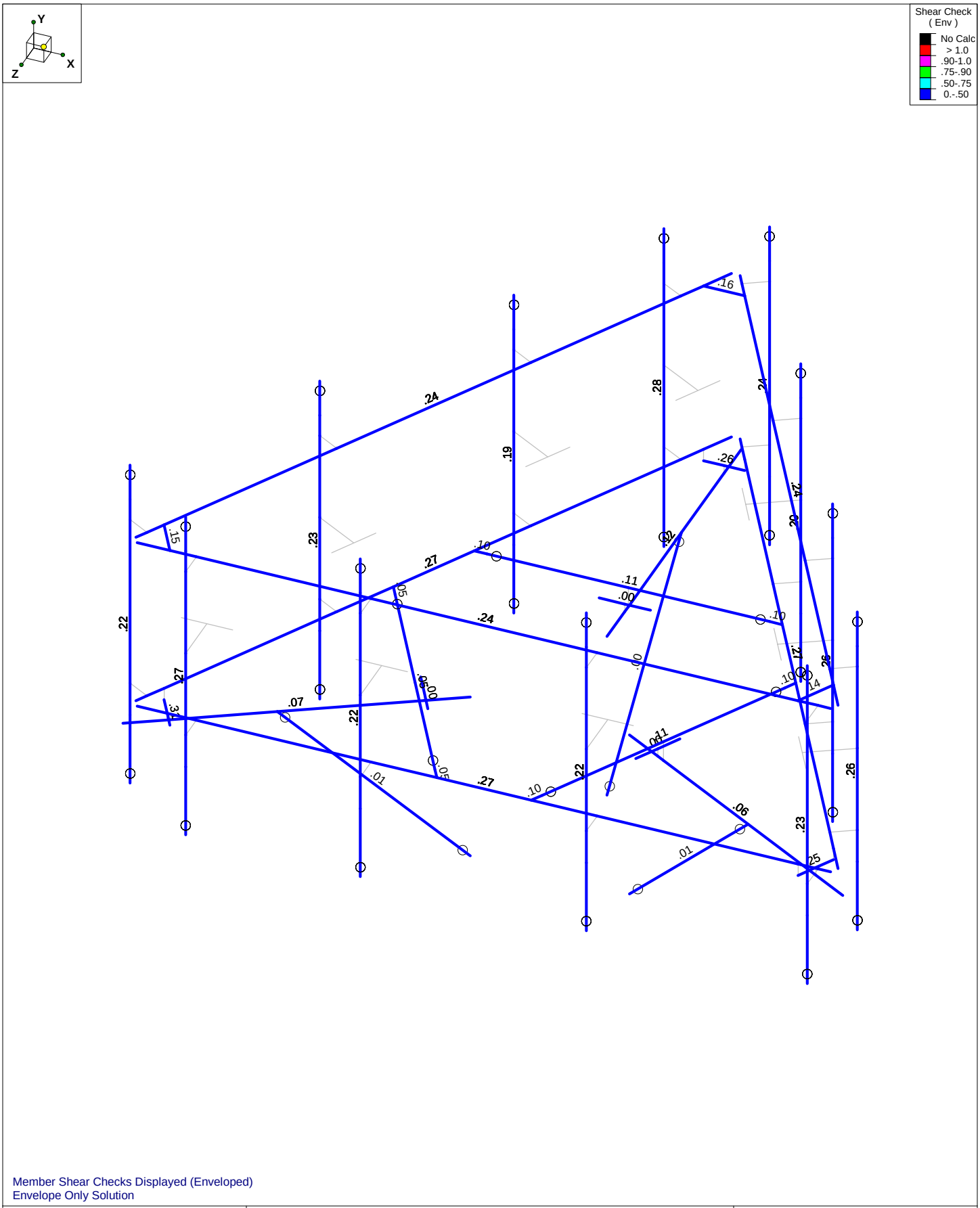
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 7
Jesse Drennen, PE		Mar 19, 2018 at 10:21 AM
		CT33XC023_Mount Analysis_R0 1...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 2
Jesse Drennen, PE		Mar 19, 2018 at 10:20 AM
		CT33XC023_Mount Analysis_R0 1...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

GeoStructural, LLC	CT33XC023	SK - 3
Jesse Drennen, PE		Mar 19, 2018 at 10:20 AM
		CT33XC023_Mount Analysis_R0 1...

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	D	DL		-1		25		6		
2	Di	SL				25		33		
3	Lm [500]	LL				1				
4	Lv [250]	LL				2				
5	Woz	WL				25		42		
6	Wox	WL				25		42		
7	Wiz	WL				25		42		
8	Wix	WL				25		42		
9	Ez	EL				25				
10	Ex	EL				25				

Load Combination Design

	Description	ASIF	CD	ABIF	Service	Hot Rolled	Cold For...	Wood	Concrete	Masonry	Footings	Aluminum	Connecti...
1	1) 1.4D					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	2) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	3) 0.9D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	4) 1.2D+1.0...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	ASIF	CD	ABIF	Service	Hot Rolled	Cold For...	Wood	Concrete	Masonry	Footings	Aluminum	Connecti...
42	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	5) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	6) 1.2D+1.5...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	7) (1.2+0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
71	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
72	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
73	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
74	8) (0.9-0.2S...					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N75	max	3.828	6	.623	24	2.245	24	.68	5	1.651	2	1.125	30
2		min	-3.503	24	-1.243	30	-2.443	6	-.362	23	-1.647	20	-.525	24
3	N59	max	4.156	16	1.222	4	2.945	15	.386	22	.453	7	.789	16
4		min	-4.505	10	-.831	22	-3.125	9	-.442	4	-.44	25	-.85	10
5	N93	max	2.67	17	1.173	8	5.4	2	.851	20	2.296	12	.299	24
6		min	-2.675	11	-.786	14	-5.002	20	-.878	2	-2.283	18	-.381	6
7	N127	max	0	1	1.367	30	0	1	0	1	0	1	0	1
8		min	0	1	.285	64	0	1	0	1	0	1	0	1
9	N204	max	.051	17	3.485	26	.946	20	0	1	0	3	0	21
10		min	-.051	23	-1.005	20	-3.411	26	0	1	0	21	0	3
11	N206	max	.835	24	3.454	30	1.69	30	0	19	0	13	0	13
12		min	-2.924	30	-1.04	24	-.485	24	0	13	0	19	0	19
13	N208	max	2.973	34	3.51	34	1.717	34	0	25	0	25	0	25
14		min	-.913	16	-1.13	16	-.531	16	0	7	0	7	0	7
15	Totals:	max	7.387	5	10.597	31	7.028	2						
16		min	-7.387	23	2.158	74	-7.028	20						

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M1	1	max	.086	19	.011	2	.171	26	6.658e-03	13	NC	1	NC	1
2			min	-.089	13	-.006	20	-.086	20	-5.79e-03	19	NC	1	182.505	23
3		2	max	.087	19	.015	2	.153	2	6.312e-03	13	NC	1	NC	20
4			min	-.089	13	-.009	20	-.08	20	-4.432e-03	19	2777.018	2	304.01	23
5		3	max	.087	19	.018	2	.143	2	6.633e-03	2	NC	1	NC	18
6			min	-.089	13	-.012	20	-.076	20	-3.749e-03	20	1385.88	2	318.276	26
7		4	max	.087	19	.022	2	.153	26	6.056e-03	3	NC	1	NC	53
8			min	-.09	13	-.016	20	-.077	20	-4.247e-03	21	891.366	2	302.181	17
9		5	max	.087	19	.026	2	.174	26	6.191e-03	4	NC	1	NC	2
10			min	-.09	13	-.02	20	-.08	20	-5.474e-03	22	656.307	2	175.394	5
11	M2	1	max	.014	6	.035	6	.136	28	1.716e-02	36	NC	1	NC	1
12			min	-.014	24	-.03	24	.018	22	-6.623e-03	18	1140.022	14	918.813	18
13		2	max	.014	6	.018	6	.041	29	8.358e-03	36	NC	16	NC	21
14			min	-.014	24	-.017	24	.007	72	-3.261e-03	18	1061.712	27	902.933	29
15		3	max	.014	6	0	20	.004	20	2.923e-04	20	NC	2	NC	6
16			min	-.013	24	-.002	26	-.004	2	-5.119e-04	2	722.291	26	618.916	29
17		4	max	.014	6	.028	13	.052	33	8.434e-03	28	NC	2	NC	2
18			min	-.013	24	-.026	19	.008	65	-3.315e-03	22	1059.578	26	944.264	30
19		5	max	.014	6	.07	13	.162	35	1.731e-02	28	NC	1	NC	4
20			min	-.014	24	-.062	19	.025	17	-6.723e-03	22	1001.157	8	782.101	12
21	M3	1	max	.104	20	.022	6	.179	30	6.881e-03	5	NC	1	NC	1
22			min	-.106	2	-.017	24	-.086	24	-6.203e-03	23	957.827	11	179.435	15
23		2	max	.104	20	.019	6	.158	30	6.435e-03	5	NC	1	NC	53
24			min	-.106	2	-.014	24	-.078	24	-4.607e-03	23	1349.047	11	296.735	15
25		3	max	.104	20	.017	6	.146	30	6.601e-03	6	NC	1	NC	73
26			min	-.106	2	-.011	24	-.074	24	-3.635e-03	24	2173.209	5	289.531	30
27		4	max	.104	20	.015	6	.158	30	6.65e-03	7	NC	1	NC	7
28			min	-.106	2	-.009	24	-.077	24	-4.854e-03	25	4344.738	5	316.1	21
29		5	max	.104	20	.013	6	.18	30	7.393e-03	7	NC	1	NC	1
30			min	-.106	2	-.007	24	-.083	24	-6.77e-03	25	9583.66	71	178.352	9
31	M4	1	max	.104	20	.045	17	.167	32	1.717e-02	28	NC	1	NC	1
32			min	-.104	14	-.045	11	.026	64	-8.563e-03	22	1603.803	10	2587.353	17
33		2	max	.105	20	.022	17	.053	32	1.641e-02	29	NC	2	6721.963	17
34			min	-.104	14	-.077	36	.007	64	-5.238e-03	23	2068.379	30	519.694	31
35		3	max	.105	20	.009	18	0	37	1.613e-02	30	NC	2	2169.678	17
36			min	-.104	14	-.106	36	0	35	-3.697e-03	24	1405.559	31	354.931	31
37		4	max	.105	20	.008	18	.055	27	1.659e-02	31	NC	6	3662.155	64
38			min	-.105	14	-.072	36	.008	70	-5.171e-03	25	2059.892	31	521.622	30
39		5	max	.105	20	.021	8	.17	27	1.756e-02	32	NC	1	NC	1
40			min	-.105	14	-.02	14	.028	70	-8.67e-03	14	1589.062	4	2138.902	50
41	M5	1	max	.052	19	.022	9	.175	10	6.409e-03	9	NC	1	NC	1
42			min	-.053	25	-.016	15	-.091	16	-5.695e-03	15	551.404	2	204.426	7
43		2	max	.052	19	.019	9	.157	10	6.292e-03	9	NC	1	NC	12
44			min	-.053	25	-.013	15	-.084	16	-4.494e-03	15	745.312	14	331.683	19
45		3	max	.052	19	.018	10	.147	10	6.803e-03	10	NC	1	NC	12
46			min	-.053	25	-.012	16	-.08	16	-3.925e-03	16	1128.355	8	299.919	34
47		4	max	.052	19	.018	11	.156	10	6.439e-03	11	NC	1	NC	23
48			min	-.053	25	-.012	17	-.084	16	-4.576e-03	17	768.481	12	373.762	6
49		5	max	.052	19	.021	11	.174	34	6.822e-03	11	NC	1	NC	1
50			min	-.053	25	-.015	17	-.091	16	-5.982e-03	17	567.882	12	207.711	25
51	M6	1	max	.001	25	.047	8	.16	36	1.687e-02	32	NC	1	NC	1
52			min	-.002	7	-.039	14	.018	18	-6.569e-03	14	926.643	13	1525.236	8
53		2	max	.001	72	.016	8	.051	37	8.209e-03	32	NC	3	NC	5
54			min	-.002	50	-.015	14	.006	19	-3.221e-03	14	1057.915	31	908.545	37
55		3	max	.001	72	0	16	.004	16	3.179e-04	16	NC	7	NC	5
56			min	-.002	50	-.002	34	-.005	10	-5.37e-04	10	713.4	31	591.157	36

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
57		4	max	.001	72	.016	12	.042	28	8.628e-03	36	NC	9	NC	2
58			min	-.002	54	-.014	18	.007	73	-3.44e-03	18	1038.923	30	863.518	36
59		5	max	.002	72	.047	12	.135	32	1.77e-02	36	NC	1	NC	1
60			min	-.002	54	-.04	18	.024	74	-6.975e-03	18	1079.03	19	2017.722	25
61	M7	1	max	.549	5	.306	2	.2	37	4.877e-03	25	NC	1	NC	1
62			min	-.543	23	-.306	8	-.088	19	-6.356e-03	7	221.773	12	65.723	6
63		2	max	.549	5	.307	2	.201	26	4.119e-03	14	NC	1	NC	1
64			min	-.543	23	-.307	8	-.083	20	-5.552e-03	8	296.726	12	88.427	6
65		3	max	.549	5	.311	2	.203	26	4.588e-03	15	NC	1	NC	1
66			min	-.543	23	-.31	8	-.083	20	-5.954e-03	9	350.664	11	109.709	5
67		4	max	.549	5	.317	2	.205	26	6.178e-03	15	NC	1	NC	1
68			min	-.543	23	-.316	8	-.084	20	-7.466e-03	9	231.049	11	72.404	5
69		5	max	.549	5	.325	2	.207	27	8.023e-03	16	NC	1	NC	1
70			min	-.543	23	-.324	8	-.093	21	-9.217e-03	10	173.197	11	53.941	5
71	M8	1	max	.522	9	.335	5	.207	29	4.84e-03	17	NC	1	NC	1
72			min	-.516	15	-.336	11	-.084	23	-6.435e-03	11	173.705	4	65.414	10
73		2	max	.522	9	.326	6	.208	30	4.368e-03	18	NC	1	NC	1
74			min	-.516	15	-.326	12	-.079	24	-5.874e-03	12	233.138	4	88.335	10
75		3	max	.522	9	.324	6	.21	30	4.859e-03	18	NC	1	NC	1
76			min	-.516	15	-.323	12	-.08	24	-6.258e-03	12	332.541	3	115.013	9
77		4	max	.522	9	.325	6	.212	30	6.236e-03	19	NC	1	NC	1
78			min	-.516	15	-.324	12	-.083	24	-7.531e-03	13	218.41	3	75.422	9
79		5	max	.522	9	.33	6	.214	31	7.749e-03	19	NC	1	NC	1
80			min	-.516	15	-.329	12	-.09	25	-8.936e-03	13	162.977	3	55.926	9
81	M9	1	max	.359	13	.325	10	.201	34	4.848e-03	21	NC	1	NC	1
82			min	-.353	19	-.325	4	-.088	16	-6.417e-03	3	176.638	2	68.915	2
83		2	max	.359	13	.325	10	.202	34	4.514e-03	22	NC	1	NC	1
84			min	-.353	19	-.324	4	-.087	16	-5.98e-03	4	238.476	2	94.733	2
85		3	max	.359	13	.329	10	.203	34	5.158e-03	22	NC	1	NC	1
86			min	-.353	19	-.327	4	-.088	16	-6.512e-03	4	286.971	19	110.688	13
87		4	max	.359	13	.336	10	.205	34	6.604e-03	23	NC	1	NC	1
88			min	-.353	19	-.335	4	-.092	16	-7.836e-03	5	190.531	19	73.638	13
89		5	max	.359	13	.347	10	.207	35	8.247e-03	23	NC	1	NC	1
90			min	-.353	19	-.346	4	-.101	17	-9.361e-03	5	143.484	19	55.34	13
91	M13	1	max	.744	8	.029	20	.171	4	9.72e-03	5	NC	1	NC	1
92			min	-.713	14	-.327	26	-.169	22	-9.478e-03	23	NC	1	NC	1
93		2	max	.744	8	-.045	21	.166	4	9.72e-03	5	NC	1	NC	1
94			min	-.713	14	-.305	27	-.164	22	-9.478e-03	23	NC	1	NC	1
95		3	max	.744	8	-.017	14	.161	4	9.72e-03	5	NC	1	NC	1
96			min	-.713	14	-.308	32	-.16	10	-9.478e-03	23	NC	1	NC	1
97		4	max	.744	8	.066	14	.158	5	9.72e-03	5	NC	1	NC	1
98			min	-.713	14	-.324	32	-.158	11	-9.478e-03	23	NC	1	NC	1
99		5	max	.744	8	.148	14	.156	17	9.72e-03	5	NC	1	NC	1
100			min	-.713	14	-.341	32	-.158	11	-9.478e-03	23	NC	1	NC	1
101	M14	1	max	.148	14	.473	14	.071	20	2.115e-03	8	NC	2	NC	1
102			min	-.34	32	-.559	8	-.077	2	-1.684e-03	14	476.406	29	6664.089	44
103		2	max	.148	14	.012	63	.06	8	2.115e-03	8	NC	1	NC	1
104			min	-.34	32	-.032	31	-.059	14	-1.684e-03	14	173.134	14	3488.972	12
105		3	max	.148	14	.582	8	.107	10	1.417e-03	2	NC	5	NC	1
106			min	-.34	32	-.548	14	-.104	16	-1.082e-03	20	82.28	14	695.397	12
107		4	max	.148	14	1.12	8	.286	11	6.272e-03	2	NC	38	NC	1
108			min	-.341	32	-1.107	2	-.286	5	-6.048e-03	20	53.17	14	276.935	11
109		5	max	.148	14	1.614	8	.38	11	7.894e-03	2	NC	1	NC	2
110			min	-.341	32	-1.628	2	-.366	17	-7.702e-03	20	40.067	14	211.502	11
111	M15	1	max	.171	4	.04	19	.728	14	2.765e-02	2	NC	1	NC	1
112			min	-.169	22	-.327	37	-.757	8	-2.631e-02	20	NC	1	NC	1
113		2	max	.171	4	.033	20	.72	14	2.765e-02	2	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
114			min	-.169	22	-.327	26	-.751	8	-2.631e-02	20	NC	1	NC	1
115		3	max	.171	4	.029	20	.713	14	2.765e-02	2	NC	1	NC	1
116			min	-.169	22	-.327	26	-.744	8	-2.631e-02	20	NC	1	NC	1
117		4	max	.171	4	.036	21	.705	14	2.765e-02	2	NC	1	NC	1
118			min	-.169	22	-.331	27	-.737	8	-2.631e-02	20	NC	1	NC	1
119		5	max	.171	4	.046	21	.697	14	2.765e-02	2	NC	1	NC	1
120			min	-.169	22	-.335	27	-.73	8	-2.631e-02	20	NC	1	NC	1
121	M19	1	max	.139	15	.238	14	.086	6	2.438e-03	19	NC	1	NC	2
122			min	-.223	9	-.252	8	-.052	24	-2.501e-03	13	NC	1	864.912	31
123		2	max	.139	15	.075	13	.056	8	2.438e-03	19	NC	3	NC	7
124			min	-.223	9	-.066	19	-.049	14	-2.501e-03	13	504.048	2	1344.982	4
125		3	max	.139	15	.118	8	.106	21	7.103e-03	19	NC	3	NC	1
126			min	-.223	9	-.097	14	-.111	3	-7.339e-03	13	253.774	2	519.535	4
127		4	max	.139	15	.258	8	.261	10	1.338e-02	19	NC	3	NC	1
128			min	-.224	9	-.253	14	-.259	4	-1.385e-02	13	171.686	2	269.676	4
129		5	max	.139	15	.404	20	.361	22	1.536e-02	19	NC	1	NC	1
130			min	-.224	9	-.427	2	-.372	4	-1.59e-02	13	126.533	2	198.113	4
131	M24	1	max	.126	25	.197	15	.051	18	1.372e-03	16	NC	1	NC	2
132			min	-.23	7	-.212	9	-.093	12	-1.384e-03	21	2907.413	49	677.842	26
133		2	max	.126	25	.072	7	.037	20	1.372e-03	16	NC	3	NC	3
134			min	-.23	7	-.064	25	-.046	13	-1.384e-03	21	329.068	2	1245.575	26
135		3	max	.126	25	.337	8	.088	11	6.836e-03	3	NC	3	NC	1
136			min	-.23	7	-.316	14	-.081	17	-6.798e-03	9	165.569	2	513.533	11
137		4	max	.126	25	.569	8	.248	11	1.419e-02	3	NC	3	NC	29
138			min	-.231	7	-.559	14	-.248	5	-1.409e-02	9	111.676	2	259.719	11
139		5	max	.126	25	.811	20	.348	11	1.652e-02	2	NC	1	NC	1
140			min	-.231	7	-.821	2	-.333	17	-1.639e-02	8	82.755	2	194.425	12
141	M28	1	max	.646	12	.029	24	.16	9	9.968e-03	9	NC	1	NC	1
142			min	-.608	18	-.304	30	-.156	15	-9.76e-03	15	NC	1	NC	1
143		2	max	.646	12	-.047	25	.159	10	9.968e-03	9	NC	1	NC	1
144			min	-.608	18	-.282	31	-.156	16	-9.76e-03	15	NC	1	NC	1
145		3	max	.646	12	-.008	18	.161	10	9.968e-03	9	NC	1	NC	1
146			min	-.608	18	-.287	36	-.159	16	-9.76e-03	15	NC	1	NC	1
147		4	max	.646	12	.073	18	.163	10	9.968e-03	9	NC	1	NC	1
148			min	-.608	18	-.303	36	-.162	4	-9.76e-03	15	NC	1	NC	1
149		5	max	.646	12	.154	18	.165	10	9.968e-03	9	NC	1	NC	1
150			min	-.608	18	-.319	36	-.165	4	-9.76e-03	15	NC	1	NC	1
151	M29	1	max	.154	18	.337	12	.473	18	1.352e-03	11	NC	2	NC	2
152			min	-.319	36	-.286	18	-.553	12	-8.819e-04	17	896.279	59	671.059	27
153		2	max	.154	18	.066	12	.055	18	1.352e-03	11	NC	1	NC	1
154			min	-.319	36	-.06	18	-.066	12	-8.819e-04	17	357.486	25	201.016	18
155		3	max	.154	18	.184	19	.449	12	2.122e-03	7	NC	13	NC	8
156			min	-.319	36	-.205	13	-.414	18	-1.795e-03	25	168.552	25	94.648	18
157		4	max	.154	18	.461	19	.934	12	7.229e-03	6	NC	1	NC	8
158			min	-.32	36	-.472	13	-.916	18	-7.091e-03	24	109.52	25	60.493	18
159		5	max	.154	18	.693	7	1.364	24	9.279e-03	5	NC	1	NC	1
160			min	-.32	36	-.703	13	-1.374	6	-9.163e-03	23	84.203	25	45.592	18
161	M30	1	max	.16	9	.056	23	.627	18	2.721e-02	6	NC	1	NC	1
162			min	-.156	15	-.307	29	-.663	12	-2.602e-02	24	NC	1	NC	1
163		2	max	.16	9	.037	24	.617	18	2.721e-02	6	NC	1	NC	1
164			min	-.156	15	-.305	30	-.654	12	-2.602e-02	24	NC	1	NC	1
165		3	max	.16	9	.029	24	.608	18	2.721e-02	6	NC	1	NC	1
166			min	-.156	15	-.304	30	-.646	12	-2.602e-02	24	NC	1	NC	1
167		4	max	.16	9	.026	25	.598	18	2.721e-02	6	NC	1	NC	1
168			min	-.156	15	-.305	31	-.637	12	-2.602e-02	24	NC	1	NC	1
169		5	max	.16	9	.034	25	.589	18	2.721e-02	6	NC	1	NC	1
170			min	-.156	15	-.309	31	-.628	12	-2.602e-02	24	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
171	M34	1	max	.142	19	.124	24	.142	17	1.369e-03	20	NC	1	NC	1
172			min	-.227	13	-.142	6	-.166	11	-1.502e-03	2	3025.618	39	NC	1
173		2	max	.142	19	.007	24	.086	13	1.369e-03	20	NC	1	NC	6
174			min	-.227	13	-.017	30	-.079	19	-1.502e-03	2	683.152	7	504.634	17
175		3	max	.142	19	.126	19	.246	12	5.34e-03	23	NC	1	NC	6
176			min	-.227	13	-.133	13	-.224	18	-5.58e-03	5	320.471	7	245.435	17
177		4	max	.142	19	.281	19	.39	11	1.21e-02	23	NC	4	NC	6
178			min	-.227	13	-.286	13	-.385	17	-1.249e-02	5	200.982	7	159.406	17
179		5	max	.142	19	.418	7	.554	23	1.422e-02	23	NC	1	NC	1
180			min	-.227	13	-.4	25	-.57	5	-1.467e-02	5	151.253	7	118.466	17
181	M43	1	max	.663	4	.056	17	.222	13	9.732e-03	13	NC	1	NC	1
182			min	-.627	22	-.329	35	-.218	19	-9.506e-03	19	NC	1	NC	1
183		2	max	.663	4	-.023	17	.224	13	9.732e-03	13	NC	1	NC	1
184			min	-.627	22	-.306	35	-.221	19	-9.506e-03	19	NC	1	NC	1
185		3	max	.663	4	-.029	21	.226	13	9.732e-03	13	NC	1	NC	1
186			min	-.627	22	-.301	27	-.224	19	-9.506e-03	19	NC	1	NC	1
187		4	max	.663	4	.057	22	.228	13	9.732e-03	13	NC	1	NC	1
188			min	-.627	22	-.317	28	-.227	7	-9.506e-03	19	NC	1	NC	1
189		5	max	.663	4	.143	22	.23	13	9.732e-03	13	NC	1	NC	1
190			min	-.627	22	-.334	28	-.23	7	-9.506e-03	19	NC	1	NC	1
191	M44	1	max	.143	22	.389	5	.62	4	2.519e-03	6	NC	2	NC	2
192			min	-.334	28	-.354	23	-.54	22	-2.085e-03	24	177.723	6	1050.687	37
193		2	max	.143	22	.1	6	.108	4	2.519e-03	6	NC	34	NC	1
194			min	-.334	28	-.096	24	-.099	22	-2.085e-03	24	288.781	12	190.201	22
195		3	max	.143	22	.26	21	.412	23	2.787e-03	9	NC	3	NC	19
196			min	-.334	28	-.277	3	-.446	5	-2.455e-03	15	145.95	10	90.702	22
197		4	max	.143	22	.584	9	.933	11	7.031e-03	9	NC	41	NC	70
198			min	-.334	28	-.592	3	-.947	5	-6.828e-03	15	94.877	10	58.697	23
199		5	max	.143	22	.844	9	1.384	11	8.479e-03	9	NC	1	NC	1
200			min	-.334	28	-.827	15	-1.382	5	-8.315e-03	15	72.267	10	44.695	23
201	M45	1	max	.222	13	.058	16	.65	22	2.904e-02	10	NC	1	NC	1
202			min	-.218	19	-.328	34	-.684	4	-2.774e-02	16	NC	1	NC	1
203		2	max	.222	13	.055	16	.639	22	2.904e-02	10	NC	1	NC	1
204			min	-.218	19	-.329	34	-.673	4	-2.774e-02	16	NC	1	NC	1
205		3	max	.222	13	.056	17	.627	22	2.904e-02	10	NC	1	NC	1
206			min	-.218	19	-.329	35	-.663	4	-2.774e-02	16	NC	1	NC	1
207		4	max	.222	13	.068	17	.616	22	2.904e-02	10	NC	1	NC	1
208			min	-.218	19	-.333	35	-.652	4	-2.774e-02	16	NC	1	NC	1
209		5	max	.222	13	.08	17	.605	22	2.904e-02	10	NC	1	NC	1
210			min	-.218	19	-.338	35	-.642	4	-2.774e-02	16	NC	1	NC	1
211	M49	1	max	.137	23	.106	5	.164	16	1.298e-03	17	NC	2	NC	1
212			min	-.226	5	-.069	23	-.168	10	-1.418e-03	11	1413.126	29	NC	1
213		2	max	.137	23	.088	7	.03	20	1.298e-03	17	NC	1	NC	5
214			min	-.226	5	-.088	25	-.041	2	-1.418e-03	11	841.455	2	549.19	23
215		3	max	.138	23	.185	20	.184	22	5.549e-03	16	NC	6	NC	6
216			min	-.226	5	-.203	2	-.2	4	-5.798e-03	10	380.924	2	266.49	23
217		4	max	.138	23	.344	20	.35	22	1.171e-02	15	NC	1	NC	8
218			min	-.226	5	-.348	2	-.355	4	-1.214e-02	9	229.84	2	173.914	11
219		5	max	.138	23	.475	8	.52	10	1.367e-02	15	NC	1	NC	1
220			min	-.226	5	-.473	14	-.494	16	-1.416e-02	9	171.414	2	130.228	11
221	M55	1	max	.3	3	.23	11	.267	18	1.087e-02	24	NC	1	NC	1
222			min	-.298	9	-.138	17	-.272	12	-1.153e-02	6	1071.464	11	8103.472	58
223		2	max	.3	3	.27	35	.98	6	1.896e-02	24	NC	9	NC	1
224			min	-.297	9	-.025	17	-.992	12	-1.998e-02	6	1591.845	29	240.089	12
225		3	max	.299	3	.304	36	1.279	6	2.287e-02	24	NC	5	NC	1
226			min	-.297	9	0	18	-1.288	12	-2.407e-02	6	1179.556	30	175.12	12
227		4	max	.3	3	.271	37	1.034	6	1.851e-02	24	NC	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
228			min	-.298	9	-.035	19	-1.036	12	-1.981e-02	6	1711.764	31	255.069	11
229		5	max	.3	3	.21	2	.457	6	7.938e-03	24	NC	1	NC	1
230			min	-.298	9	-.118	20	-.455	12	-9.307e-03	6	1630.235	7	NC	1
231	M56	1	max	.31	11	.22	6	.412	14	1.147e-02	20	NC	1	NC	1
232			min	-.308	17	-.123	24	-.417	8	-1.211e-02	2	1102.866	19	NC	1
233		2	max	.31	11	.287	31	1.102	2	1.931e-02	20	NC	5	NC	1
234			min	-.307	17	-.016	25	-1.107	8	-2.035e-02	2	1445.952	37	222.112	8
235		3	max	.31	11	.323	32	1.336	2	2.271e-02	20	NC	7	NC	1
236			min	-.307	5	.012	14	-1.335	8	-2.398e-02	2	1052.204	26	162.297	2
237		4	max	.31	11	.284	33	.953	2	1.79e-02	20	NC	8	NC	1
238			min	-.308	5	-.031	15	-.948	8	-1.925e-02	2	1525.083	27	248.628	2
239		5	max	.31	11	.215	10	.264	2	7.072e-03	20	NC	1	NC	1
240			min	-.308	5	-.124	16	-.261	8	-8.383e-03	2	1440.901	3	NC	1
241	M57	1	max	.377	7	.22	3	.38	23	1.179e-02	16	NC	1	NC	1
242			min	-.375	13	-.128	21	-.385	5	-1.236e-02	10	1174.62	21	NC	1
243		2	max	.377	7	.28	27	1.043	10	1.989e-02	16	NC	4	NC	1
244			min	-.375	13	-.008	21	-1.052	4	-2.089e-02	10	1412.457	33	236.87	4
245		3	max	.377	7	.323	28	1.305	10	2.267e-02	16	NC	3	NC	1
246			min	-.375	13	.009	22	-1.308	4	-2.388e-02	10	1043.997	34	172.251	4
247		4	max	.377	7	.291	29	1.007	10	1.739e-02	16	NC	5	NC	1
248			min	-.376	13	-.04	23	-1.005	4	-1.87e-02	10	1529.874	35	253.498	10
249		5	max	.377	7	.212	6	.389	9	7.028e-03	16	NC	1	NC	1
250			min	-.376	13	-.117	24	-.386	3	-8.456e-03	10	1601.537	17	NC	1
251	M58	1	max	.001	25	.246	33	.052	14	1.779e-02	32	NC	1	NC	1
252			min	-.002	7	.018	15	-.052	8	-6.924e-03	14	41.403	20	1577.512	22
253		2	max	.001	25	.223	33	.05	14	1.756e-02	32	NC	1	NC	7
254			min	-.002	7	.025	15	-.051	8	-6.835e-03	14	55.204	20	1945.405	26
255		3	max	.001	25	.2	34	.047	14	1.733e-02	32	NC	1	NC	7
256			min	-.002	7	.03	16	-.05	8	-6.746e-03	14	82.806	20	759.434	36
257		4	max	.001	25	.179	35	.043	14	1.71e-02	32	NC	1	NC	5
258			min	-.002	7	.029	17	-.048	8	-6.658e-03	14	165.613	20	405.877	36
259		5	max	.001	25	.16	36	.039	14	1.687e-02	32	NC	1	NC	2
260			min	-.002	7	.018	18	-.047	8	-6.569e-03	14	NC	1	266.638	36
261	M59	1	max	.002	54	.23	36	.041	12	7.351e-03	18	NC	1	NC	1
262			min	-.002	72	0	18	-.04	18	-1.866e-02	36	NC	1	NC	1
263		2	max	.002	54	.206	36	.042	12	7.257e-03	18	NC	1	NC	12
264			min	-.002	72	.008	18	-.041	18	-1.842e-02	36	NC	1	1997.729	11
265		3	max	.002	54	.182	36	.044	12	7.163e-03	18	NC	1	NC	12
266			min	-.002	72	.016	18	-.041	18	-1.818e-02	36	NC	1	750.176	36
267		4	max	.002	54	.159	36	.046	12	7.069e-03	18	NC	1	NC	12
268			min	-.002	72	.024	18	-.041	18	-1.794e-02	36	NC	1	417.395	36
269		5	max	.002	54	.135	32	.047	12	6.975e-03	18	NC	1	NC	4
270			min	-.002	72	.024	74	-.04	18	-1.77e-02	36	NC	1	279.972	36
271	M60	1	max	.003	16	0	30	0	25	1.942e-04	2	NC	1	NC	1
272			min	-.004	10	0	25	-.001	7	-1.806e-04	20	NC	1	NC	1
273		2	max	.003	16	0	6	.001	25	1.942e-04	2	NC	1	NC	1
274			min	-.004	10	0	24	-.001	7	-1.806e-04	20	NC	1	NC	1
275		3	max	.003	16	0	6	.001	25	1.942e-04	2	NC	1	NC	1
276			min	-.004	10	0	24	-.001	7	-1.806e-04	20	NC	1	NC	1
277		4	max	.003	16	0	5	.001	25	1.942e-04	2	NC	1	NC	1
278			min	-.004	10	0	23	-.001	7	-1.806e-04	20	NC	1	NC	1
279		5	max	.003	16	.001	17	.001	25	1.942e-04	2	NC	1	NC	1
280			min	-.004	10	-.001	11	-.001	7	-1.806e-04	20	NC	1	NC	1
281	M61	1	max	.004	16	.002	32	.001	60	3.49e-04	2	NC	1	NC	1
282			min	-.005	10	0	15	-.001	66	-3.315e-04	20	NC	1	NC	1
283		2	max	.004	16	.002	31	.001	60	3.49e-04	2	NC	1	NC	1
284			min	-.005	10	0	72	-.001	66	-3.315e-04	20	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
285		3	max	.004	16	.001	30	.001	72	3.49e-04	2	NC	1	NC	1
286			min	-.005	10	0	72	-.001	54	-3.315e-04	20	NC	1	NC	1
287		4	max	.004	16	0	54	.001	72	3.49e-04	2	NC	1	NC	1
288			min	-.005	10	0	72	-.001	54	-3.315e-04	20	NC	1	NC	1
289		5	max	.004	16	.001	17	.001	72	3.49e-04	2	NC	1	NC	1
290			min	-.005	10	-.001	11	-.001	54	-3.315e-04	20	NC	1	NC	1
291	M62	1	max	.091	16	.038	14	.042	13	2.025e-03	19	NC	1	NC	1
292			min	-.175	10	-.043	8	-.039	19	-2.058e-03	13	NC	1	NC	1
293		2	max	.091	16	.039	14	.038	13	2.025e-03	19	NC	1	NC	1
294			min	-.175	10	-.043	8	-.032	19	-2.058e-03	13	NC	1	NC	1
295		3	max	.091	16	.041	14	.034	13	2.025e-03	19	NC	1	NC	1
296			min	-.175	10	-.043	8	-.026	19	-2.058e-03	13	NC	1	NC	1
297		4	max	.091	16	.042	14	.033	12	2.025e-03	19	NC	1	NC	1
298			min	-.175	10	-.043	8	-.021	18	-2.058e-03	13	NC	1	NC	1
299		5	max	.091	16	.043	14	.032	12	2.025e-03	19	NC	1	NC	1
300			min	-.175	10	-.043	8	-.018	18	-2.058e-03	13	NC	1	NC	1
301	M63	1	max	.147	10	.031	14	.043	19	2.015e-03	13	NC	1	NC	1
302			min	-.08	16	-.035	8	-.047	13	-2.e-03	19	NC	1	NC	1
303		2	max	.147	10	.03	14	.044	19	2.015e-03	13	NC	1	NC	1
304			min	-.08	16	-.034	8	-.047	13	-2.e-03	19	NC	1	NC	1
305		3	max	.147	10	.03	14	.045	19	2.015e-03	13	NC	1	NC	1
306			min	-.08	16	-.032	8	-.047	13	-2.e-03	19	NC	1	NC	1
307		4	max	.147	10	.029	14	.046	19	2.015e-03	13	NC	1	NC	1
308			min	-.08	16	-.031	8	-.047	13	-2.e-03	19	NC	1	NC	1
309		5	max	.147	10	.029	14	.047	19	2.015e-03	13	NC	1	NC	1
310			min	-.08	16	-.029	8	-.047	25	-2.e-03	19	NC	1	NC	1
311	M64	1	max	.091	16	.024	15	.052	13	2.111e-03	7	NC	1	NC	1
312			min	-.174	34	-.029	9	-.048	19	-2.114e-03	25	NC	1	NC	1
313		2	max	.091	16	.024	15	.047	13	2.111e-03	7	NC	1	NC	1
314			min	-.174	34	-.031	9	-.045	19	-2.114e-03	25	NC	1	NC	1
315		3	max	.091	16	.025	16	.041	25	2.111e-03	7	NC	1	NC	1
316			min	-.174	34	-.035	10	-.042	7	-2.114e-03	25	NC	1	NC	1
317		4	max	.091	16	.029	16	.036	25	2.111e-03	7	NC	1	NC	1
318			min	-.174	34	-.041	10	-.04	7	-2.114e-03	25	NC	1	NC	1
319		5	max	.091	16	.034	16	.031	25	2.111e-03	7	NC	1	NC	1
320			min	-.174	34	-.047	10	-.037	7	-2.114e-03	25	NC	1	NC	1
321	M65	1	max	.001	7	.004	10	.001	8	5.013e-04	10	NC	1	NC	1
322			min	-.001	25	-.003	16	-.001	14	-3.452e-04	16	NC	1	NC	1
323		2	max	.001	7	.004	10	0	8	5.013e-04	10	NC	1	NC	1
324			min	-.001	25	-.003	16	0	14	-3.452e-04	16	NC	1	NC	1
325		3	max	.001	7	.004	10	0	35	5.013e-04	10	NC	1	NC	1
326			min	-.001	25	-.003	16	0	65	-3.452e-04	16	NC	1	NC	1
327		4	max	.001	7	.003	10	0	2	5.013e-04	10	NC	1	NC	1
328			min	-.001	25	-.003	16	0	20	-3.452e-04	16	NC	1	NC	1
329		5	max	.001	7	.003	22	.001	2	5.013e-04	10	NC	1	NC	1
330			min	-.001	25	-.003	4	-.001	20	-3.452e-04	16	7915.77	2	NC	1
331	M66	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
332			min	0	1	0	1	0	1	0	1	NC	1	NC	1
333		2	max	.002	10	.009	10	.003	53	3.93e-04	50	NC	1	NC	1
334			min	-.001	16	-.006	16	-.003	71	-8.395e-05	14	8442.179	10	NC	1
335		3	max	.003	10	0	50	.015	14	5.901e-04	7	NC	1	NC	1
336			min	-.003	16	0	10	-.015	20	-4.7e-04	25	NC	1	5056.994	14
337		4	max	.004	10	.046	16	.038	14	9.897e-04	7	NC	6	NC	1
338			min	-.004	16	-.085	10	-.038	8	-8.661e-04	25	887.513	10	1973.065	14
339		5	max	.005	10	.118	16	.074	25	1.186e-03	7	NC	63	NC	1
340			min	-.004	16	-.212	10	-.074	19	-1.061e-03	25	356.075	10	1019.82	25
341	M67	1	max	.035	24	.108	20	.108	19	1.011e-02	18	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
342			min	-.035	6	-.182	2	-.126	13	-1.119e-02	12	2665.838	19	825.588	2
343		2	max	.035	12	.021	19	.044	18	2.102e-02	18	NC	2	NC	1
344			min	-.035	18	-.214	37	-.055	12	-2.468e-02	12	2239.894	31	1440.827	2
345		3	max	.035	12	-.006	18	.005	30	1.361e-02	18	NC	11	NC	1
346			min	-.034	18	-.227	36	-.001	24	-3.658e-02	36	1658.593	30	2052.34	21
347		4	max	.035	12	.033	17	.05	18	1.958e-02	18	NC	9	NC	1
348			min	-.034	18	-.225	35	-.063	12	-2.251e-02	12	1990.537	29	1510.608	9
349		5	max	.035	12	.111	16	.041	15	9.732e-03	18	NC	1	NC	1
350			min	-.033	18	-.184	10	-.055	9	-1.364e-02	12	1345.829	17	1002.928	21
351	M68	1	max	.104	20	.25	28	.04	12	1.728e-02	28	NC	1	NC	1
352			min	-.104	14	.009	22	-.038	18	-9.022e-03	22	NC	1	462.757	2
353		2	max	.104	20	.228	29	.04	12	1.725e-02	28	NC	1	NC	1
354			min	-.104	14	.019	23	-.039	18	-8.907e-03	22	NC	1	626.561	2
355		3	max	.104	20	.206	29	.041	11	1.722e-02	28	NC	1	NC	1
356			min	-.104	14	.027	23	-.041	17	-8.793e-03	22	NC	1	638.948	4
357		4	max	.104	20	.185	30	.043	11	1.72e-02	28	NC	1	NC	1
358			min	-.104	14	.032	74	-.043	17	-8.678e-03	22	NC	1	416.42	4
359		5	max	.104	20	.167	32	.045	11	1.717e-02	28	NC	1	NC	1
360			min	-.104	14	.026	64	-.045	17	-8.563e-03	22	NC	1	307.418	4
361	M69	1	max	.105	14	.255	32	.01	20	9.112e-03	14	NC	1	NC	1
362			min	-.105	20	.01	14	-.009	14	-1.768e-02	32	NC	1	2190.779	35
363		2	max	.105	14	.232	32	.012	20	9.002e-03	14	NC	1	NC	1
364			min	-.105	20	.02	14	-.012	14	-1.765e-02	32	NC	1	1042.516	8
365		3	max	.105	14	.21	32	.015	8	8.891e-03	14	NC	1	NC	1
366			min	-.105	20	.031	14	-.015	14	-1.762e-02	32	NC	1	515.643	8
367		4	max	.105	14	.187	31	.018	8	8.781e-03	14	NC	1	NC	1
368			min	-.105	20	.036	71	-.017	14	-1.759e-02	32	NC	1	340.926	8
369		5	max	.105	14	.17	27	.021	8	8.67e-03	14	NC	1	NC	1
370			min	-.105	20	.028	70	-.02	14	-1.756e-02	32	NC	1	254.205	8
371	M70	1	max	.002	24	.003	14	.006	2	1.155e-03	2	NC	1	NC	1
372			min	-.005	30	-.004	8	-.006	20	-1.149e-03	20	NC	1	NC	1
373		2	max	.002	24	.003	14	.006	2	1.155e-03	2	NC	1	NC	1
374			min	-.005	30	-.004	8	-.006	20	-1.149e-03	20	NC	1	NC	1
375		3	max	.002	24	.003	14	.006	2	1.155e-03	2	NC	1	NC	1
376			min	-.005	30	-.003	8	-.006	20	-1.149e-03	20	NC	1	NC	1
377		4	max	.002	24	.003	14	.006	2	1.155e-03	2	NC	1	NC	1
378			min	-.005	30	-.003	8	-.006	20	-1.149e-03	20	NC	1	NC	1
379		5	max	.002	24	.003	2	.006	14	1.155e-03	2	NC	1	NC	1
380			min	-.005	30	-.003	20	-.006	8	-1.149e-03	20	NC	1	NC	1
381	M72	1	max	.086	24	.049	2	.096	8	1.072e-03	17	NC	1	NC	1
382			min	-.179	30	-.044	20	-.094	14	-1.16e-03	11	NC	1	NC	1
383		2	max	.086	24	.054	3	.097	20	1.072e-03	17	NC	1	NC	1
384			min	-.179	30	-.047	21	-.098	2	-1.16e-03	11	NC	1	NC	1
385		3	max	.086	24	.061	3	.099	20	1.072e-03	17	NC	1	NC	1
386			min	-.179	30	-.052	21	-.102	2	-1.16e-03	11	NC	1	NC	1
387		4	max	.086	24	.068	3	.1	20	1.072e-03	17	NC	1	NC	1
388			min	-.179	30	-.057	21	-.106	2	-1.16e-03	11	NC	1	NC	1
389		5	max	.086	24	.075	3	.102	20	1.072e-03	17	NC	1	NC	1
390			min	-.179	30	-.062	21	-.11	2	-1.16e-03	11	NC	1	NC	1
391	M73	1	max	.146	30	.05	2	.094	14	1.009e-03	12	NC	1	NC	1
392			min	-.074	24	-.044	20	-.095	8	-9.519e-04	17	NC	1	NC	1
393		2	max	.146	30	.05	2	.093	14	1.009e-03	12	NC	1	NC	1
394			min	-.074	24	-.045	20	-.094	8	-9.519e-04	17	NC	1	NC	1
395		3	max	.146	30	.05	2	.092	14	1.009e-03	12	NC	1	NC	1
396			min	-.074	24	-.047	20	-.092	8	-9.519e-04	17	NC	1	NC	1
397		4	max	.146	30	.05	2	.091	2	1.009e-03	12	NC	1	NC	1
398			min	-.074	24	-.048	20	-.09	20	-9.519e-04	17	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
399		5	max	.146	30	.05	2	.09	2	1.009e-03	12	NC	1	NC	1
400			min	-.074	24	-.049	20	-.089	20	-9.519e-04	17	NC	1	NC	1
401	M74	1	max	.083	24	.05	2	.095	8	9.488e-04	17	NC	1	NC	1
402			min	-.18	30	-.044	20	-.094	14	-9.683e-04	11	NC	1	NC	1
403		2	max	.083	24	.049	2	.106	8	9.488e-04	17	NC	1	NC	1
404			min	-.18	30	-.044	20	-.102	14	-9.683e-04	11	NC	1	NC	1
405		3	max	.083	24	.048	2	.117	8	9.488e-04	17	NC	1	NC	1
406			min	-.18	30	-.044	20	-.11	14	-9.683e-04	11	NC	1	NC	1
407		4	max	.083	24	.047	2	.129	8	9.488e-04	17	NC	1	NC	1
408			min	-.18	30	-.044	20	-.118	14	-9.683e-04	11	NC	1	NC	1
409		5	max	.083	24	.045	2	.14	8	9.488e-04	17	NC	1	NC	1
410			min	-.18	30	-.045	20	-.126	14	-9.683e-04	11	NC	1	NC	1
411	M75	1	max	.007	2	.005	5	.007	8	6.473e-04	30	NC	1	NC	1
412			min	-.007	20	-.003	23	-.007	14	-2.91e-04	24	6358.126	5	NC	1
413		2	max	.007	2	.005	30	.004	8	6.473e-04	30	NC	1	NC	1
414			min	-.007	20	-.002	24	-.003	14	-2.91e-04	24	7268.684	13	NC	1
415		3	max	.007	2	.005	30	.001	30	6.473e-04	30	NC	1	NC	1
416			min	-.007	20	-.002	24	0	24	-2.91e-04	24	3633.236	13	NC	1
417		4	max	.007	2	.005	30	.004	2	6.473e-04	30	NC	1	NC	1
418			min	-.007	20	-.002	24	-.003	20	-2.91e-04	24	2419.515	13	NC	1
419		5	max	.007	2	.005	31	.007	2	6.473e-04	30	NC	1	NC	1
420			min	-.007	20	-.003	25	-.007	20	-2.91e-04	24	1813.371	13	NC	1
421	M76	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
422			min	0	1	0	1	0	1	0	1	NC	1	NC	1
423		2	max	.001	6	.011	30	.02	2	5.11e-04	3	NC	1	NC	1
424			min	-.001	24	-.005	24	-.02	20	-5.071e-04	21	6669.847	30	8144.293	12
425		3	max	.003	6	0	37	.061	2	1.019e-03	3	NC	1	NC	1
426			min	-.003	24	0	18	-.061	20	-1.011e-03	21	NC	1	2474.352	12
427		4	max	.004	18	.042	24	.095	2	1.527e-03	3	NC	2	NC	1
428			min	-.004	12	-.086	30	-.094	20	-1.515e-03	21	876.627	30	1376.119	12
429		5	max	.004	18	.108	24	.106	2	1.777e-03	3	NC	72	NC	1
430			min	-.004	12	-.207	6	-.104	20	-1.763e-03	21	365.189	6	1006.096	12
431	M77	1	max	.043	14	.113	16	.032	18	8.271e-03	14	NC	1	NC	1
432			min	-.043	8	-.187	10	-.047	12	-9.344e-03	8	1143.714	21	4558.476	4
433		2	max	.043	14	.017	15	.01	14	2.008e-02	14	NC	7	NC	1
434			min	-.044	8	-.228	33	-.023	32	-2.355e-02	8	1708.204	21	2521.812	6
435		3	max	.044	14	-.018	14	.057	2	1.524e-02	14	NC	6	NC	1
436			min	-.044	8	-.25	32	-.056	20	-3.55e-02	32	1312.35	26	1874.682	7
437		4	max	.045	2	.022	25	.15	14	2.004e-02	14	NC	6	NC	1
438			min	-.044	20	-.245	31	-.162	8	-2.272e-02	8	1603.657	37	867.483	7
439		5	max	.045	2	.105	24	.126	14	1.088e-02	14	NC	1	NC	1
440			min	-.045	20	-.181	6	-.139	8	-1.488e-02	8	3204.653	7	848.799	13
441	M78	1	max	.014	6	.224	36	.032	12	1.81e-02	36	NC	1	NC	1
442			min	-.014	24	.009	18	-.031	18	-6.98e-03	18	43.739	23	1548.276	23
443		2	max	.014	6	.201	37	.032	24	1.786e-02	36	NC	1	NC	4
444			min	-.014	24	.017	19	-.031	6	-6.891e-03	18	58.318	23	2081.165	23
445		3	max	.014	6	.178	37	.031	24	1.763e-02	36	NC	1	NC	10
446			min	-.014	24	.024	19	-.032	6	-6.802e-03	18	87.478	23	866.109	34
447		4	max	.014	6	.155	26	.03	24	1.739e-02	36	NC	1	NC	10
448			min	-.014	24	.027	20	-.034	6	-6.712e-03	18	174.956	23	459.672	27
449		5	max	.014	6	.136	28	.03	24	1.716e-02	36	NC	1	NC	2
450			min	-.014	24	.018	22	-.035	6	-6.623e-03	18	NC	1	299.515	28
451	M79	1	max	.014	24	.249	28	.074	13	7.086e-03	22	NC	1	NC	1
452			min	-.014	6	.02	22	-.071	19	-1.826e-02	28	41.123	16	611.5	2
453		2	max	.014	24	.225	28	.072	13	6.995e-03	22	NC	1	NC	3
454			min	-.014	6	.029	22	-.069	19	-1.802e-02	28	54.831	16	826.62	2
455		3	max	.014	24	.202	27	.072	13	6.904e-03	22	NC	1	NC	3

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
456			min	-.014	6	.037	21	-.067	19	-1.778e-02	28	82.247	16	698.723	34
457		4	max	.014	24	.179	37	.071	13	6.814e-03	22	NC	1	NC	3
458			min	-.014	6	.034	66	-.064	19	-1.755e-02	28	164.495	16	377.925	34
459		5	max	.014	24	.162	35	.07	13	6.723e-03	22	NC	1	NC	2
460			min	-.014	6	.025	17	-.062	19	-1.731e-02	28	NC	1	249.778	34
461	M80	1	max	.003	20	.009	6	0	15	1.106e-03	12	NC	1	NC	1
462			min	-.003	2	-.009	24	0	34	-1.097e-03	18	NC	1	NC	1
463		2	max	.003	20	.009	6	0	14	1.106e-03	12	NC	1	NC	1
464			min	-.003	2	-.009	24	0	32	-1.097e-03	18	NC	1	NC	1
465		3	max	.003	20	.009	6	0	14	1.106e-03	12	NC	1	NC	1
466			min	-.003	2	-.009	24	0	8	-1.097e-03	18	NC	1	NC	1
467		4	max	.003	20	.009	6	0	14	1.106e-03	12	NC	1	NC	1
468			min	-.003	2	-.009	24	0	8	-1.097e-03	18	NC	1	NC	1
469		5	max	.003	20	.009	18	0	2	1.106e-03	12	NC	1	NC	1
470			min	-.003	2	-.009	12	0	20	-1.097e-03	18	NC	1	NC	1
471	M81	1	max	.004	20	.014	6	0	20	1.134e-03	12	NC	1	NC	1
472			min	-.004	2	-.013	24	-.002	26	-1.125e-03	18	NC	1	NC	1
473		2	max	.004	20	.013	6	0	20	1.134e-03	12	NC	1	NC	1
474			min	-.004	2	-.013	24	-.002	26	-1.125e-03	18	NC	1	NC	1
475		3	max	.004	20	.012	6	0	68	1.134e-03	12	NC	1	NC	1
476			min	-.004	2	-.012	24	0	35	-1.125e-03	18	NC	1	NC	1
477		4	max	.004	20	.012	6	0	14	1.134e-03	12	NC	1	NC	1
478			min	-.004	2	-.012	24	0	8	-1.125e-03	18	NC	1	NC	1
479		5	max	.004	20	.011	18	.001	2	1.134e-03	12	NC	1	NC	1
480			min	-.004	2	-.011	12	-.001	20	-1.125e-03	18	NC	1	NC	1
481	M82	1	max	.086	20	.086	19	.006	20	1.401e-03	20	NC	1	NC	1
482			min	-.171	26	-.089	13	-.011	2	-1.51e-03	2	NC	1	NC	1
483		2	max	.086	20	.091	19	.009	20	1.401e-03	20	NC	1	NC	1
484			min	-.171	26	-.096	13	-.015	2	-1.51e-03	2	NC	1	NC	1
485		3	max	.086	20	.095	19	.013	19	1.401e-03	20	NC	1	NC	1
486			min	-.171	26	-.103	13	-.02	13	-1.51e-03	2	NC	1	NC	1
487		4	max	.086	20	.099	19	.017	19	1.401e-03	20	NC	1	NC	1
488			min	-.171	26	-.11	13	-.025	13	-1.51e-03	2	NC	1	NC	1
489		5	max	.086	20	.103	19	.022	19	1.401e-03	20	NC	1	NC	1
490			min	-.171	26	-.117	13	-.03	13	-1.51e-03	2	NC	1	NC	1
491	M83	1	max	.143	2	.087	19	.018	2	1.521e-03	2	NC	1	NC	1
492			min	-.076	20	-.089	13	-.012	20	-1.431e-03	20	NC	1	NC	1
493		2	max	.143	2	.086	19	.015	2	1.521e-03	2	NC	1	NC	1
494			min	-.076	20	-.089	13	-.01	20	-1.431e-03	20	NC	1	NC	1
495		3	max	.143	2	.085	19	.011	2	1.521e-03	2	NC	1	NC	1
496			min	-.076	20	-.088	13	-.008	20	-1.431e-03	20	NC	1	NC	1
497		4	max	.143	2	.085	19	.008	2	1.521e-03	2	NC	1	NC	1
498			min	-.076	20	-.088	13	-.006	20	-1.431e-03	20	NC	1	NC	1
499		5	max	.143	2	.084	19	.005	2	1.521e-03	2	NC	1	NC	1
500			min	-.076	20	-.087	13	-.005	20	-1.431e-03	20	NC	1	NC	1
501	M84	1	max	.08	20	.087	19	.02	20	1.456e-03	20	NC	1	NC	1
502			min	-.174	26	-.09	13	-.026	2	-1.533e-03	2	NC	1	NC	1
503		2	max	.08	20	.09	7	.022	20	1.456e-03	20	NC	1	NC	1
504			min	-.174	26	-.089	25	-.029	2	-1.533e-03	2	NC	1	NC	1
505		3	max	.08	20	.093	7	.025	20	1.456e-03	20	NC	1	NC	1
506			min	-.174	26	-.089	25	-.033	2	-1.533e-03	2	NC	1	NC	1
507		4	max	.08	20	.098	6	.029	21	1.456e-03	20	NC	1	NC	1
508			min	-.174	26	-.092	24	-.036	3	-1.533e-03	2	NC	1	NC	1
509		5	max	.08	20	.105	6	.033	21	1.456e-03	20	NC	1	NC	1
510			min	-.174	26	-.095	24	-.041	3	-1.533e-03	2	NC	1	NC	1
511	M85	1	max	.009	24	.005	25	.007	6	4.77e-04	2	NC	1	NC	1
512			min	-.009	6	-.005	7	-.007	24	-3.203e-04	20	1164.59	6	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
513		2	max	.009	24	.004	2	.003	6	4.77e-04	2	NC	1	NC	1
514			min	-.009	6	-.004	20	-.003	24	-3.203e-04	20	1553.419	6	NC	1
515		3	max	.009	24	.003	2	0	34	4.77e-04	2	NC	1	NC	1
516			min	-.009	6	-.003	20	0	15	-3.203e-04	20	2331.612	6	NC	1
517		4	max	.009	24	.003	3	.003	12	4.77e-04	2	NC	1	NC	1
518			min	-.009	6	-.002	21	-.003	18	-3.203e-04	20	4085.522	22	NC	1
519		5	max	.009	24	.003	3	.007	12	4.77e-04	2	NC	1	NC	1
520			min	-.009	6	-.002	21	-.006	18	-3.203e-04	20	3061.233	22	NC	1
521	M86	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
522			min	0	1	0	1	0	1	0	1	NC	1	NC	1
523		2	max	.002	2	.009	2	.02	12	5.361e-04	24	NC	1	NC	1
524			min	-.002	20	-.006	20	-.02	18	-6.415e-04	6	8856.929	2	4360.32	13
525		3	max	.003	2	0	20	.046	12	9.468e-04	24	NC	1	NC	1
526			min	-.003	20	0	2	-.045	18	-1.052e-03	6	NC	1	1693.217	13
527		4	max	.004	2	.043	20	.074	13	1.358e-03	24	NC	6	NC	1
528			min	-.004	20	-.083	26	-.071	19	-1.482e-03	5	910.909	26	1024.822	13
529		5	max	.005	2	.112	20	.101	13	1.564e-03	23	NC	71	NC	1
530			min	-.005	20	-.206	2	-.097	19	-1.699e-03	5	366.381	2	750.764	13
531	M87	1	max	.068	13	.106	24	.094	20	9.089e-03	22	NC	1	NC	1
532			min	-.067	19	-.183	6	-.11	2	-1.025e-02	4	1327.266	23	2542.516	3
533		2	max	.069	13	.027	23	.12	21	1.972e-02	22	NC	2	NC	1
534			min	-.067	19	-.237	29	-.13	3	-2.329e-02	4	1752.038	34	1600.313	3
535		3	max	.069	13	-.017	22	.058	8	1.531e-02	22	NC	2	NC	1
536			min	-.067	19	-.25	28	-.056	14	-3.556e-02	28	1325.365	33	2827.604	12
537		4	max	.069	13	.011	21	.044	23	2.152e-02	22	NC	2	NC	1
538			min	-.067	19	-.236	27	-.058	5	-2.428e-02	4	1059.027	14	2523.953	7
539		5	max	.069	13	.102	20	.084	24	8.866e-03	22	NC	1	NC	1
540			min	-.066	19	-.174	2	-.096	6	-1.294e-02	4	743.108	14	2143.475	7
541	M92	1	max	.427	15	.102	24	.376	13	5.379e-03	13	NC	1	NC	1
542			min	-.431	9	-.203	30	-.377	7	-4.751e-03	19	NC	1	NC	1
543		2	max	.427	15	.109	23	.369	13	5.379e-03	13	NC	1	NC	1
544			min	-.431	9	-.204	5	-.37	7	-4.751e-03	19	NC	1	NC	1
545		3	max	.427	15	.119	23	.363	13	5.379e-03	13	NC	1	NC	1
546			min	-.431	9	-.212	5	-.362	7	-4.751e-03	19	NC	1	NC	1
547		4	max	.427	15	.128	23	.357	13	5.379e-03	13	NC	1	NC	1
548			min	-.431	9	-.219	5	-.355	7	-4.751e-03	19	NC	1	NC	1
549		5	max	.427	15	.138	23	.35	13	5.379e-03	13	NC	1	NC	1
550			min	-.431	9	-.226	5	-.348	6	-4.751e-03	19	NC	1	NC	1
551	M93	1	max	.11	2	.098	24	.068	13	2.862e-03	12	NC	1	NC	1
552			min	-.095	20	-.179	6	-.067	19	-1.507e-03	18	NC	1	NC	1
553		2	max	.11	2	.104	23	.069	13	2.862e-03	12	NC	1	NC	1
554			min	-.095	20	-.187	5	-.068	19	-1.507e-03	18	NC	1	NC	1
555		3	max	.11	2	.115	23	.07	13	2.862e-03	12	NC	1	NC	1
556			min	-.095	20	-.2	5	-.068	19	-1.507e-03	18	NC	1	NC	1
557		4	max	.11	2	.126	23	.07	13	2.862e-03	12	NC	1	NC	1
558			min	-.095	20	-.213	5	-.069	19	-1.507e-03	18	NC	1	NC	1
559		5	max	.11	2	.137	23	.071	13	2.862e-03	12	NC	1	NC	1
560			min	-.095	20	-.226	5	-.07	19	-1.507e-03	18	NC	1	NC	1
561	M96	1	max	1.218	4	-.006	22	.375	13	3.13e-03	25	NC	1	NC	1
562			min	-1.209	10	-.31	28	-.377	7	-3.857e-03	7	NC	1	NC	1
563		2	max	1.218	4	.031	22	.379	25	3.13e-03	25	NC	1	NC	1
564			min	-1.209	10	-.316	28	-.381	7	-3.857e-03	7	NC	1	NC	1
565		3	max	1.218	4	.069	22	.383	25	3.13e-03	25	NC	1	NC	1
566			min	-1.209	10	-.322	28	-.385	7	-3.857e-03	7	NC	1	NC	1
567		4	max	1.218	4	.106	22	.387	25	3.13e-03	25	NC	1	NC	1
568			min	-1.209	10	-.328	28	-.39	7	-3.857e-03	7	NC	1	NC	1
569		5	max	1.218	4	.143	22	.391	25	3.13e-03	25	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
570			min	-1.209	10	-.334	28	-.394	7	-3.857e-03	7	NC	1	NC	1
571	M97	1	max	.03	4	-.011	21	.069	13	1.102e-03	14	NC	1	NC	1
572			min	-.02	22	-.248	27	-.067	19	-1.522e-03	8	NC	1	NC	1
573		2	max	.03	4	.028	22	.072	13	1.102e-03	14	NC	1	NC	1
574			min	-.02	22	-.269	28	-.07	19	-1.522e-03	8	NC	1	NC	1
575		3	max	.03	4	.066	22	.074	13	1.102e-03	14	NC	1	NC	1
576			min	-.02	22	-.291	28	-.074	19	-1.522e-03	8	NC	1	NC	1
577		4	max	.03	4	.105	22	.077	25	1.102e-03	14	NC	1	NC	1
578			min	-.02	22	-.312	28	-.077	7	-1.522e-03	8	NC	1	NC	1
579		5	max	.03	4	.143	22	.08	25	1.102e-03	14	NC	1	NC	1
580			min	-.02	22	-.334	28	-.08	7	-1.522e-03	8	NC	1	NC	1
581	M104	1	max	.491	12	.104	20	.298	9	5.241e-03	9	NC	1	NC	1
582			min	-.494	6	-.197	2	-.3	3	-4.64e-03	15	NC	1	NC	1
583		2	max	.491	12	.111	19	.287	9	5.241e-03	9	NC	1	NC	1
584			min	-.494	6	-.202	13	-.288	3	-4.64e-03	15	NC	1	NC	1
585		3	max	.491	12	.122	19	.276	9	5.241e-03	9	NC	1	NC	1
586			min	-.494	6	-.211	13	-.276	3	-4.64e-03	15	NC	1	NC	1
587		4	max	.491	12	.132	19	.265	9	5.241e-03	9	NC	1	NC	1
588			min	-.494	6	-.219	13	-.265	3	-4.64e-03	15	NC	1	NC	1
589		5	max	.491	12	.142	19	.254	9	5.241e-03	9	NC	1	NC	1
590			min	-.494	6	-.227	13	-.253	3	-4.64e-03	15	NC	1	NC	1
591	M105	1	max	.122	13	.099	20	.035	24	2.984e-03	8	NC	1	NC	1
592			min	-.105	19	-.177	2	-.035	6	-1.904e-03	14	NC	1	NC	1
593		2	max	.122	13	.106	19	.036	12	2.984e-03	8	NC	1	NC	1
594			min	-.105	19	-.185	13	-.036	18	-1.904e-03	14	NC	1	NC	1
595		3	max	.122	13	.118	19	.037	12	2.984e-03	8	NC	1	NC	1
596			min	-.105	19	-.199	13	-.036	18	-1.904e-03	14	NC	1	NC	1
597		4	max	.122	13	.13	19	.038	13	2.984e-03	8	NC	1	NC	1
598			min	-.105	19	-.213	13	-.037	19	-1.904e-03	14	NC	1	NC	1
599		5	max	.122	13	.142	19	.04	13	2.984e-03	8	NC	1	NC	1
600			min	-.105	19	-.227	13	-.039	19	-1.904e-03	14	NC	1	NC	1
601	M108	1	max	1.172	12	.01	18	.297	9	3.254e-03	21	NC	1	NC	1
602			min	-1.159	6	-.296	36	-.299	3	-3.889e-03	3	NC	1	NC	1
603		2	max	1.172	12	.046	18	.302	9	3.254e-03	21	NC	1	NC	1
604			min	-1.159	6	-.302	36	-.304	3	-3.889e-03	3	NC	1	NC	1
605		3	max	1.172	12	.082	18	.308	10	3.254e-03	21	NC	1	NC	1
606			min	-1.159	6	-.308	36	-.31	4	-3.889e-03	3	NC	1	NC	1
607		4	max	1.172	12	.118	18	.318	22	3.254e-03	21	NC	1	NC	1
608			min	-1.159	6	-.314	36	-.321	4	-3.889e-03	3	NC	1	NC	1
609		5	max	1.172	12	.154	18	.329	22	3.254e-03	21	NC	1	NC	1
610			min	-1.159	6	-.32	36	-.331	4	-3.889e-03	3	NC	1	NC	1
611	M109	1	max	.054	12	.014	17	.035	12	1.343e-03	22	NC	1	NC	1
612			min	-.046	18	-.233	36	-.034	18	-1.587e-03	4	NC	1	NC	1
613		2	max	.054	12	.049	18	.033	12	1.343e-03	22	NC	1	NC	1
614			min	-.046	18	-.255	36	-.033	18	-1.587e-03	4	NC	1	NC	1
615		3	max	.054	12	.084	18	.031	24	1.343e-03	22	NC	1	NC	1
616			min	-.046	18	-.276	36	-.031	6	-1.587e-03	4	NC	1	NC	1
617		4	max	.054	12	.119	18	.029	24	1.343e-03	22	NC	1	NC	1
618			min	-.046	18	-.297	36	-.03	6	-1.587e-03	4	NC	1	NC	1
619		5	max	.054	12	.154	18	.027	24	1.343e-03	22	NC	1	NC	1
620			min	-.046	18	-.319	36	-.029	6	-1.587e-03	4	NC	1	NC	1
621	M112	1	max	.644	8	.064	25	.307	17	4.037e-03	18	NC	1	NC	1
622			min	-.639	2	-.218	31	-.31	11	-4.887e-03	12	NC	1	NC	1
623		2	max	.644	8	.08	25	.301	17	4.037e-03	18	NC	1	NC	1
624			min	-.639	2	-.22	31	-.304	11	-4.887e-03	12	NC	1	NC	1
625		3	max	.644	8	.095	25	.294	17	4.037e-03	18	NC	1	NC	1
626			min	-.639	2	-.221	31	-.297	11	-4.887e-03	12	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
627		4	max	.644	8	.111	25	.288	17	4.037e-03	18	NC	1	NC	1
628			min	-.639	2	-.223	31	-.291	11	-4.887e-03	12	NC	1	NC	1
629		5	max	.644	8	.126	25	.281	17	4.037e-03	18	NC	1	NC	1
630			min	-.639	2	-.231	7	-.284	11	-4.887e-03	12	NC	1	NC	1
631	M113	1	max	.143	8	.067	25	.045	2	1.45e-03	17	NC	1	NC	1
632			min	-.13	14	-.194	31	-.044	20	-3.096e-03	35	NC	1	NC	1
633		2	max	.143	8	.081	25	.044	2	1.45e-03	17	NC	1	NC	1
634			min	-.13	14	-.201	31	-.043	20	-3.096e-03	35	NC	1	NC	1
635		3	max	.143	8	.096	25	.042	2	1.45e-03	17	NC	1	NC	1
636			min	-.13	14	-.209	31	-.041	20	-3.096e-03	35	NC	1	NC	1
637		4	max	.143	8	.111	25	.041	2	1.45e-03	17	NC	1	NC	1
638			min	-.13	14	-.216	31	-.04	20	-3.096e-03	35	NC	1	NC	1
639		5	max	.143	8	.126	25	.039	2	1.45e-03	17	NC	1	NC	1
640			min	-.13	14	-.23	7	-.038	20	-3.096e-03	35	NC	1	NC	1
641	M116	1	max	.302	8	.109	16	.308	5	5.227e-03	5	NC	1	NC	1
642			min	-.306	2	-.202	10	-.31	11	-4.554e-03	23	NC	1	NC	1
643		2	max	.302	8	.113	16	.298	5	5.227e-03	5	NC	1	NC	1
644			min	-.306	2	-.204	10	-.299	11	-4.554e-03	23	NC	1	NC	1
645		3	max	.302	8	.12	15	.295	4	5.227e-03	5	NC	1	NC	1
646			min	-.306	2	-.209	9	-.296	10	-4.554e-03	23	NC	1	NC	1
647		4	max	.302	8	.129	15	.296	4	5.227e-03	5	NC	1	NC	1
648			min	-.306	2	-.216	9	-.297	10	-4.554e-03	23	NC	1	NC	1
649		5	max	.302	8	.139	15	.298	4	5.227e-03	5	NC	1	NC	1
650			min	-.306	2	-.224	9	-.297	10	-4.554e-03	23	NC	1	NC	1
651	M117	1	max	.041	12	.104	16	.043	14	3.134e-03	4	NC	1	NC	1
652			min	-.026	18	-.182	10	-.043	8	-1.84e-03	22	NC	1	NC	1
653		2	max	.041	12	.11	16	.046	14	3.134e-03	4	NC	1	NC	1
654			min	-.026	18	-.189	10	-.047	8	-1.84e-03	22	NC	1	NC	1
655		3	max	.041	12	.118	15	.049	14	3.134e-03	4	NC	1	NC	1
656			min	-.026	18	-.199	9	-.05	8	-1.84e-03	22	NC	1	NC	1
657		4	max	.041	12	.128	15	.053	14	3.134e-03	4	NC	1	NC	1
658			min	-.026	18	-.211	9	-.053	8	-1.84e-03	22	NC	1	NC	1
659		5	max	.041	12	.139	15	.056	14	3.134e-03	4	NC	1	NC	1
660			min	-.026	18	-.223	9	-.056	8	-1.84e-03	22	NC	1	NC	1
661	M120	1	max	1.275	8	.002	14	.307	5	3.178e-03	17	NC	1	NC	1
662			min	-1.271	2	-.316	32	-.31	11	-3.868e-03	11	NC	1	NC	1
663		2	max	1.275	8	.039	14	.31	17	3.178e-03	17	NC	1	NC	1
664			min	-1.271	2	-.322	32	-.313	11	-3.868e-03	11	NC	1	NC	1
665		3	max	1.275	8	.075	14	.313	17	3.178e-03	17	NC	1	NC	1
666			min	-1.271	2	-.328	32	-.316	11	-3.868e-03	11	NC	1	NC	1
667		4	max	1.275	8	.111	14	.316	17	3.178e-03	17	NC	1	NC	1
668			min	-1.271	2	-.335	32	-.319	11	-3.868e-03	11	NC	1	NC	1
669		5	max	1.275	8	.148	14	.318	17	3.178e-03	17	NC	1	NC	1
670			min	-1.271	2	-.341	32	-.322	11	-3.868e-03	11	NC	1	NC	1
671	M121	1	max	.146	8	.004	14	.045	2	1.25e-03	18	NC	1	NC	1
672			min	-.139	14	-.256	32	-.044	20	-1.602e-03	12	NC	1	NC	1
673		2	max	.146	8	.04	14	.047	14	1.25e-03	18	NC	1	NC	1
674			min	-.139	14	-.277	32	-.047	8	-1.602e-03	12	NC	1	NC	1
675		3	max	.146	8	.076	14	.05	14	1.25e-03	18	NC	1	NC	1
676			min	-.139	14	-.298	32	-.051	8	-1.602e-03	12	NC	1	NC	1
677		4	max	.146	8	.112	14	.052	14	1.25e-03	18	NC	1	NC	1
678			min	-.139	14	-.319	32	-.054	8	-1.602e-03	12	NC	1	NC	1
679		5	max	.146	8	.148	14	.055	14	1.25e-03	18	NC	1	NC	1
680			min	-.139	14	-.34	32	-.057	8	-1.602e-03	12	NC	1	NC	1
681	M78A	1	max	.405	8	.044	23	.196	16	8.509e-03	6	NC	1	NC	1
682			min	-.385	14	-.212	29	-.2	10	-8.055e-03	24	NC	1	NC	1
683		2	max	.405	8	.056	24	.175	16	8.509e-03	6	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
684			min	-.385	14	-.212	30	-.18	10	-8.055e-03	24	NC	1	NC	1
685		3	max	.405	8	.072	25	.155	16	8.509e-03	6	NC	1	NC	1
686			min	-.385	14	-.214	31	-.16	10	-8.055e-03	24	NC	1	NC	1
687		4	max	.405	8	.099	25	.138	17	8.509e-03	6	NC	1	NC	1
688			min	-.385	14	-.219	31	-.143	11	-8.055e-03	24	NC	1	NC	1
689		5	max	.405	8	.126	25	.13	17	8.509e-03	6	NC	1	NC	1
690			min	-.385	14	-.23	7	-.135	11	-8.055e-03	24	NC	1	NC	1
691	M79A	1	max	.196	16	-.004	23	.438	14	1.155e-02	2	NC	1	NC	1
692			min	-.2	10	-.195	29	-.457	8	-1.114e-02	20	NC	1	NC	1
693		2	max	.196	16	.02	23	.411	14	1.155e-02	2	NC	1	NC	1
694			min	-.2	10	-.203	29	-.431	8	-1.114e-02	20	NC	1	NC	1
695		3	max	.196	16	.044	23	.385	14	1.155e-02	2	NC	1	NC	1
696			min	-.2	10	-.212	29	-.405	8	-1.114e-02	20	NC	1	NC	1
697		4	max	.196	16	.068	23	.359	14	1.155e-02	2	NC	1	NC	1
698			min	-.2	10	-.221	29	-.379	8	-1.114e-02	20	NC	1	NC	1
699		5	max	.196	16	.092	23	.333	14	1.155e-02	2	NC	1	NC	1
700			min	-.2	10	-.229	29	-.352	8	-1.114e-02	20	NC	1	NC	1
701	M71	1	max	.134	17	.236	13	.251	6	2.451e-03	19	NC	1	NC	1
702			min	-.232	11	-.198	19	-.246	24	-2.474e-03	13	622.42	11	NC	1
703		2	max	.134	17	.077	13	.036	8	2.451e-03	19	NC	4	NC	1
704			min	-.232	11	-.074	19	-.025	14	-2.474e-03	13	882.744	20	370.217	18
705		3	max	.134	17	.069	20	.225	12	7.631e-03	6	NC	2	NC	3
706			min	-.232	11	-.085	2	-.208	18	-7.662e-03	12	366.447	20	183.375	18
707		4	max	.134	17	.243	20	.456	12	1.491e-02	6	NC	1	NC	7
708			min	-.232	11	-.249	2	-.445	18	-1.495e-02	12	208.561	20	120.855	6
709		5	max	.134	17	.351	20	.68	24	1.719e-02	6	NC	1	NC	1
710			min	-.232	11	-.36	2	-.694	6	-1.724e-02	12	164.488	20	88.925	6
711	M72A	1	max	.515	12	.072	17	.297	9	4.51e-03	22	NC	1	NC	1
712			min	-.509	6	-.21	35	-.3	3	-5.274e-03	4	NC	1	NC	1
713		2	max	.515	12	.088	17	.297	10	4.51e-03	22	NC	1	NC	1
714			min	-.509	6	-.211	35	-.299	4	-5.274e-03	4	NC	1	NC	1
715		3	max	.515	12	.103	17	.307	10	4.51e-03	22	NC	1	NC	1
716			min	-.509	6	-.212	35	-.309	4	-5.274e-03	4	NC	1	NC	1
717		4	max	.515	12	.119	17	.317	10	4.51e-03	22	NC	1	NC	1
718			min	-.509	6	-.218	11	-.319	4	-5.274e-03	4	NC	1	NC	1
719		5	max	.515	12	.134	17	.327	10	4.51e-03	22	NC	1	NC	1
720			min	-.509	6	-.232	11	-.33	4	-5.274e-03	4	NC	1	NC	1
721	M73A	1	max	.047	10	.075	16	.035	12	1.657e-03	21	NC	1	NC	1
722			min	-.032	16	-.185	34	-.033	18	-2.935e-03	3	NC	1	NC	1
723		2	max	.047	10	.089	17	.038	12	1.657e-03	21	NC	1	NC	1
724			min	-.032	16	-.192	35	-.037	18	-2.935e-03	3	NC	1	NC	1
725		3	max	.047	10	.104	17	.041	12	1.657e-03	21	NC	1	NC	1
726			min	-.032	16	-.2	35	-.04	18	-2.935e-03	3	NC	1	NC	1
727		4	max	.047	10	.119	17	.045	12	1.657e-03	21	NC	1	NC	1
728			min	-.032	16	-.215	11	-.043	18	-2.935e-03	3	NC	1	NC	1
729		5	max	.047	10	.134	17	.048	12	1.657e-03	21	NC	1	NC	1
730			min	-.032	16	-.232	11	-.047	18	-2.935e-03	3	NC	1	NC	1
731	M74A	1	max	.285	12	.052	16	.145	21	9.331e-03	10	NC	1	NC	1
732			min	-.265	18	-.202	33	-.149	3	-8.942e-03	16	NC	1	NC	1
733		2	max	.285	12	.065	16	.141	21	9.331e-03	10	NC	1	NC	1
734			min	-.265	18	-.203	34	-.144	3	-8.942e-03	16	NC	1	NC	1
735		3	max	.285	12	.081	17	.136	21	9.331e-03	10	NC	1	NC	1
736			min	-.265	18	-.205	35	-.139	3	-8.942e-03	16	NC	1	NC	1
737		4	max	.285	12	.107	17	.145	22	9.331e-03	10	NC	1	NC	1
738			min	-.265	18	-.21	35	-.148	4	-8.942e-03	16	NC	1	NC	1
739		5	max	.285	12	.134	17	.155	22	9.331e-03	10	NC	1	NC	1
740			min	-.265	18	-.232	11	-.158	4	-8.942e-03	16	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
741	M75A	1	max	.145	21	0	15	.323	18	1.12e-02	6	NC	1	NC	1
742			min	-.149	3	-.185	33	-.344	12	-1.081e-02	24	NC	1	NC	1
743		2	max	.145	21	.025	15	.294	18	1.12e-02	6	NC	1	NC	1
744			min	-.149	3	-.194	33	-.315	12	-1.081e-02	24	NC	1	NC	1
745		3	max	.145	21	.052	16	.265	18	1.12e-02	6	NC	1	NC	1
746			min	-.149	3	-.202	33	-.285	12	-1.081e-02	24	NC	1	NC	1
747		4	max	.145	21	.079	16	.236	18	1.12e-02	6	NC	1	NC	1
748			min	-.149	3	-.211	34	-.256	12	-1.081e-02	24	NC	1	NC	1
749		5	max	.145	21	.106	16	.207	18	1.12e-02	6	NC	1	NC	1
750			min	-.149	3	-.22	34	-.227	12	-1.081e-02	24	NC	1	NC	1
751	M76A	1	max	.125	21	.147	16	.291	4	1.28e-03	20	NC	1	NC	1
752			min	-.225	3	-.176	10	-.258	22	-1.366e-03	2	480.809	12	833.339	2
753		2	max	.125	21	.027	19	.073	14	1.28e-03	20	NC	1	NC	6
754			min	-.225	3	-.04	13	-.074	8	-1.366e-03	2	515.759	10	472.201	24
755		3	max	.125	21	.169	21	.261	23	6.402e-03	10	NC	1	NC	2
756			min	-.226	3	-.175	3	-.282	5	-6.452e-03	4	258.853	10	220.25	24
757		4	max	.125	21	.364	21	.512	23	1.406e-02	10	NC	1	NC	9
758			min	-.226	3	-.37	3	-.521	5	-1.405e-02	4	167.037	9	138.075	24
759		5	max	.125	21	.552	9	.737	11	1.646e-02	10	NC	1	NC	1
760			min	-.226	3	-.535	15	-.739	5	-1.644e-02	4	121.581	9	106.165	24
761	M77A	1	max	.62	5	.065	21	.375	13	4.031e-03	14	NC	1	NC	1
762			min	-.615	11	-.212	27	-.377	7	-4.936e-03	8	NC	1	NC	1
763		2	max	.62	5	.08	21	.369	25	4.031e-03	14	NC	1	NC	1
764			min	-.615	11	-.213	27	-.371	7	-4.936e-03	8	NC	1	NC	1
765		3	max	.62	5	.095	21	.363	25	4.031e-03	14	NC	1	NC	1
766			min	-.615	11	-.215	27	-.366	7	-4.936e-03	8	NC	1	NC	1
767		4	max	.62	5	.11	21	.358	25	4.031e-03	14	NC	1	NC	1
768			min	-.615	11	-.216	27	-.36	7	-4.936e-03	8	NC	1	NC	1
769		5	max	.62	5	.125	21	.352	25	4.031e-03	14	NC	1	NC	1
770			min	-.615	11	-.226	3	-.355	7	-4.936e-03	8	NC	1	NC	1
771	M78B	1	max	.086	6	.065	21	.069	13	1.511e-03	25	NC	1	NC	1
772			min	-.073	24	-.188	27	-.066	19	-3.007e-03	31	NC	1	NC	1
773		2	max	.086	6	.08	21	.07	13	1.511e-03	25	NC	1	NC	1
774			min	-.073	24	-.195	27	-.068	19	-3.007e-03	31	NC	1	NC	1
775		3	max	.086	6	.095	21	.072	13	1.511e-03	25	NC	1	NC	1
776			min	-.073	24	-.202	27	-.069	19	-3.007e-03	31	NC	1	NC	1
777		4	max	.086	6	.11	21	.074	13	1.511e-03	25	NC	1	NC	1
778			min	-.073	24	-.209	27	-.071	19	-3.007e-03	31	NC	1	NC	1
779		5	max	.086	6	.125	21	.075	13	1.511e-03	25	NC	1	NC	1
780			min	-.073	24	-.225	3	-.073	19	-3.007e-03	31	NC	1	NC	1
781	M79B	1	max	.366	5	.049	19	.224	24	8.359e-03	13	NC	1	NC	1
782			min	-.347	23	-.206	37	-.227	6	-7.961e-03	19	NC	1	NC	1
783		2	max	.366	5	.054	20	.217	25	8.359e-03	13	NC	1	NC	1
784			min	-.347	23	-.206	26	-.219	7	-7.961e-03	19	NC	1	NC	1
785		3	max	.366	5	.07	21	.212	25	8.359e-03	13	NC	1	NC	1
786			min	-.347	23	-.207	27	-.215	7	-7.961e-03	19	NC	1	NC	1
787		4	max	.366	5	.097	21	.208	25	8.359e-03	13	NC	1	NC	1
788			min	-.347	23	-.212	27	-.211	7	-7.961e-03	19	NC	1	NC	1
789		5	max	.366	5	.125	21	.204	25	8.359e-03	13	NC	1	NC	1
790			min	-.347	23	-.226	3	-.207	7	-7.961e-03	19	NC	1	NC	1
791	M80A	1	max	.224	24	0	19	.395	23	1.261e-02	10	NC	1	NC	1
792			min	-.227	6	-.19	37	-.415	5	-1.222e-02	16	NC	1	NC	1
793		2	max	.224	24	.025	19	.371	23	1.261e-02	10	NC	1	NC	1
794			min	-.227	6	-.198	37	-.391	5	-1.222e-02	16	NC	1	NC	1
795		3	max	.224	24	.049	19	.347	23	1.261e-02	10	NC	1	NC	1
796			min	-.227	6	-.206	37	-.366	5	-1.222e-02	16	NC	1	NC	1
797		4	max	.224	24	.072	19	.322	23	1.261e-02	10	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
798			min	-.227	6	-.215	37	-.342	5	-1.222e-02	16	NC	1	NC	1
799		5	max	.224	24	.096	19	.298	23	1.261e-02	10	NC	1	NC	1
800			min	-.227	6	-.223	37	-.317	5	-1.222e-02	16	NC	1	NC	1
801	M81A	1	max	.629	8	.05	19	.167	17	9.357e-03	17	NC	1	NC	1
802			min	-.599	14	-.318	37	-.17	11	-9.749e-03	11	NC	1	NC	1
803		2	max	.629	8	-.021	18	.164	17	9.357e-03	17	NC	1	NC	1
804			min	-.599	14	-.296	36	-.167	11	-9.749e-03	11	NC	1	NC	1
805		3	max	.629	8	-.016	15	.163	16	9.357e-03	17	NC	1	NC	1
806			min	-.599	14	-.293	33	-.165	10	-9.749e-03	11	NC	1	NC	1
807		4	max	.629	8	.057	14	.169	4	9.357e-03	17	NC	1	NC	1
808			min	-.599	14	-.306	32	-.17	10	-9.749e-03	11	NC	1	NC	1
809		5	max	.629	8	.139	14	.175	4	9.357e-03	17	NC	1	NC	1
810			min	-.599	14	-.322	32	-.176	10	-9.749e-03	11	NC	1	NC	1
811	M82A	1	max	.139	14	.644	14	.04	7	1.551e-04	20	NC	2	NC	2
812			min	-.321	32	-.725	8	-.03	25	-7.363e-04	27	731.423	35	5132.722	44
813		2	max	.139	14	.122	14	.043	8	1.551e-04	20	NC	63	NC	1
814			min	-.321	32	-.132	8	-.043	14	-7.363e-04	27	180.582	13	3170.167	4
815		3	max	.139	14	.467	8	.119	22	4.155e-03	20	NC	2	NC	1
816			min	-.322	32	-.433	14	-.121	4	-4.414e-03	2	86.928	13	667.497	4
817		4	max	.139	14	.998	8	.303	10	9.328e-03	20	NC	39	NC	1
818			min	-.322	32	-.99	2	-.299	16	-9.4e-03	2	56.697	13	276.258	5
819		5	max	.139	14	1.466	20	.383	22	1.093e-02	8	NC	1	NC	1
820			min	-.322	32	-1.49	2	-.39	4	-1.094e-02	2	43.31	13	212.346	5
821	M83A	1	max	.17	11	.056	20	.663	8	2.619e-02	20	NC	1	NC	1
822			min	-.167	17	-.315	26	-.634	14	-2.763e-02	2	NC	1	NC	1
823		2	max	.17	11	.049	20	.646	8	2.619e-02	20	NC	1	NC	1
824			min	-.167	17	-.315	26	-.616	14	-2.763e-02	2	NC	1	NC	1
825		3	max	.17	11	.05	19	.629	8	2.619e-02	20	NC	1	NC	1
826			min	-.167	17	-.318	37	-.599	14	-2.763e-02	2	NC	1	NC	1
827		4	max	.17	11	.058	19	.612	8	2.619e-02	20	NC	1	NC	1
828			min	-.167	17	-.323	37	-.581	14	-2.763e-02	2	NC	1	NC	1
829		5	max	.17	11	.067	18	.595	8	2.619e-02	20	NC	1	NC	1
830			min	-.167	17	-.327	36	-.564	14	-2.763e-02	2	NC	1	NC	1
831	M84A	1	max	1.147	8	.003	15	.308	5	3.815e-03	5	NC	1	NC	1
832			min	-1.149	2	-.303	33	-.31	11	-3.24e-03	23	NC	1	NC	1
833		2	max	1.147	8	.034	14	.31	5	3.815e-03	5	NC	1	NC	1
834			min	-1.149	2	-.307	32	-.312	11	-3.24e-03	23	NC	1	NC	1
835		3	max	1.147	8	.069	14	.313	4	3.815e-03	5	NC	1	NC	1
836			min	-1.149	2	-.312	32	-.315	10	-3.24e-03	23	NC	1	NC	1
837		4	max	1.147	8	.104	14	.323	4	3.815e-03	5	NC	1	NC	1
838			min	-1.149	2	-.317	32	-.326	10	-3.24e-03	23	NC	1	NC	1
839		5	max	1.147	8	.139	14	.333	4	3.815e-03	5	NC	1	NC	1
840			min	-1.149	2	-.322	32	-.336	10	-3.24e-03	23	NC	1	NC	1
841	M85A	1	max	.022	8	-.004	15	.044	14	1.607e-03	4	NC	1	NC	1
842			min	-.014	14	-.242	33	-.044	8	-1.12e-03	22	NC	1	NC	1
843		2	max	.022	8	.027	15	.044	2	1.607e-03	4	NC	1	NC	1
844			min	-.014	14	-.26	33	-.044	20	-1.12e-03	22	NC	1	NC	1
845		3	max	.022	8	.063	14	.045	2	1.607e-03	4	NC	1	NC	1
846			min	-.014	14	-.28	32	-.044	20	-1.12e-03	22	NC	1	NC	1
847		4	max	.022	8	.101	14	.046	2	1.607e-03	4	NC	1	NC	1
848			min	-.014	14	-.301	32	-.045	20	-1.12e-03	22	NC	1	NC	1
849		5	max	.022	8	.139	14	.047	2	1.607e-03	4	NC	1	NC	1
850			min	-.014	14	-.321	32	-.045	20	-1.12e-03	22	NC	1	NC	1
851	M86A	1	max	.651	12	.057	23	.174	22	9.143e-03	21	NC	1	NC	1
852			min	-.617	18	-.298	29	-.177	4	-9.504e-03	3	NC	1	NC	1
853		2	max	.651	12	-.018	22	.165	22	9.143e-03	21	NC	1	NC	1
854			min	-.617	18	-.276	28	-.167	4	-9.504e-03	3	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
855		3	max	.651	12	-.009	19	.156	22	9.143e-03	21	NC	1	NC	1
856			min	-.617	18	-.275	37	-.157	4	-9.504e-03	3	NC	1	NC	1
857		4	max	.651	12	.07	18	.147	10	9.143e-03	21	NC	1	NC	1
858			min	-.617	18	-.291	36	-.148	3	-9.504e-03	3	NC	1	NC	1
859		5	max	.651	12	.154	18	.141	9	9.143e-03	21	NC	1	NC	1
860			min	-.617	18	-.307	36	-.141	3	-9.504e-03	3	NC	1	NC	1
861	M87A	1	max	.154	18	.427	12	.542	18	1.652e-03	18	NC	2	NC	2
862			min	-.307	36	-.386	18	-.623	12	-2.1e-03	12	2148.956	33	1651.497	27
863		2	max	.154	18	.111	12	.083	18	1.652e-03	18	NC	1	NC	1
864			min	-.307	36	-.103	18	-.094	12	-2.1e-03	12	371.654	19	192.226	17
865		3	max	.154	18	.194	18	.437	12	2.055e-03	23	NC	6	NC	6
866			min	-.307	36	-.211	12	-.405	18	-2.309e-03	5	168.287	19	91.011	17
867		4	max	.154	18	.494	19	.924	11	6.129e-03	12	NC	4	NC	8
868			min	-.307	36	-.505	13	-.914	5	-6.113e-03	6	103.866	19	58.628	17
869		5	max	.154	18	.758	6	1.338	23	7.547e-03	12	NC	1	NC	1
870			min	-.307	36	-.747	24	-1.351	5	-7.44e-03	6	79.766	19	45.027	17
871	M88	1	max	.177	4	.051	24	.668	12	2.705e-02	24	NC	1	NC	1
872			min	-.174	22	-.293	30	-.635	18	-2.825e-02	6	NC	1	NC	1
873		2	max	.177	4	.048	24	.659	12	2.705e-02	24	NC	1	NC	1
874			min	-.174	22	-.294	30	-.626	18	-2.825e-02	6	NC	1	NC	1
875		3	max	.177	4	.057	23	.651	12	2.705e-02	24	NC	1	NC	1
876			min	-.174	22	-.298	29	-.617	18	-2.825e-02	6	NC	1	NC	1
877		4	max	.177	4	.068	23	.642	12	2.705e-02	24	NC	1	NC	1
878			min	-.174	22	-.303	29	-.607	18	-2.825e-02	6	NC	1	NC	1
879		5	max	.177	4	.079	23	.633	12	2.705e-02	24	NC	1	NC	1
880			min	-.174	22	-.308	28	-.598	18	-2.825e-02	6	NC	1	NC	1
881	M89	1	max	1.185	12	.012	18	.298	9	3.624e-03	9	NC	1	NC	1
882			min	-1.179	6	-.287	36	-.299	3	-3.143e-03	15	NC	1	NC	1
883		2	max	1.185	12	.047	18	.297	9	3.624e-03	9	NC	1	NC	1
884			min	-1.179	6	-.292	36	-.299	3	-3.143e-03	15	NC	1	NC	1
885		3	max	1.185	12	.083	18	.297	9	3.624e-03	9	NC	1	NC	1
886			min	-1.179	6	-.297	36	-.299	3	-3.143e-03	15	NC	1	NC	1
887		4	max	1.185	12	.119	18	.297	9	3.624e-03	9	NC	1	NC	1
888			min	-1.179	6	-.302	36	-.299	3	-3.143e-03	15	NC	1	NC	1
889		5	max	1.185	12	.154	18	.297	9	3.624e-03	9	NC	1	NC	1
890			min	-1.179	6	-.307	36	-.299	3	-3.143e-03	15	NC	1	NC	1
891	M90	1	max	.023	12	.002	19	.035	12	1.425e-03	8	NC	1	NC	1
892			min	-.016	18	-.223	37	-.034	18	-1.117e-03	14	NC	1	NC	1
893		2	max	.023	12	.037	18	.038	12	1.425e-03	8	NC	1	NC	1
894			min	-.016	18	-.243	36	-.037	18	-1.117e-03	14	NC	1	NC	1
895		3	max	.023	12	.076	18	.041	12	1.425e-03	8	NC	1	NC	1
896			min	-.016	18	-.264	36	-.039	18	-1.117e-03	14	NC	1	NC	1
897		4	max	.023	12	.115	18	.044	12	1.425e-03	8	NC	1	NC	1
898			min	-.016	18	-.286	36	-.042	18	-1.117e-03	14	NC	1	NC	1
899		5	max	.023	12	.154	18	.048	12	1.425e-03	8	NC	1	NC	1
900			min	-.016	18	-.307	36	-.044	18	-1.117e-03	14	NC	1	NC	1
901	M91	1	max	.679	4	.017	15	.223	25	9.986e-03	25	NC	1	NC	1
902			min	-.649	22	-.315	33	-.225	7	-1.038e-02	7	NC	1	NC	1
903		2	max	.679	4	-.043	14	.225	25	9.986e-03	25	NC	1	NC	1
904			min	-.649	22	-.295	32	-.226	7	-1.038e-02	7	NC	1	NC	1
905		3	max	.679	4	-.003	23	.227	13	9.986e-03	25	NC	1	NC	1
906			min	-.649	22	-.299	29	-.227	7	-1.038e-02	7	NC	1	NC	1
907		4	max	.679	4	.069	22	.228	13	9.986e-03	25	NC	1	NC	1
908			min	-.649	22	-.313	28	-.228	7	-1.038e-02	7	NC	1	NC	1
909		5	max	.679	4	.147	22	.23	13	9.986e-03	25	NC	1	NC	1
910			min	-.649	22	-.328	28	-.229	7	-1.038e-02	7	NC	1	NC	1
911	M92A	1	max	.147	22	.287	4	.543	4	8.764e-04	21	NC	2	NC	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
912			min	-.327	28	-.238	22	-.471	22	-1.291e-03	3	491.614	6	501.386	31
913		2	max	.147	22	.091	7	.055	5	8.764e-04	21	NC	1	NC	5
914			min	-.327	28	-.086	25	-.043	23	-1.291e-03	3	397.341	21	193.309	22
915		3	max	.147	22	.296	21	.431	22	2.511e-03	16	NC	33	NC	9
916			min	-.328	28	-.315	3	-.459	4	-2.751e-03	10	180.654	21	93.081	22
917		4	max	.147	22	.579	9	.911	10	7.872e-03	17	NC	1	NC	8
918			min	-.328	28	-.581	3	-.922	4	-7.935e-03	11	112.429	21	60.831	22
919		5	max	.147	22	.802	9	1.345	10	9.751e-03	5	NC	1	NC	1
920			min	-.328	28	-.798	15	-1.326	16	-9.745e-03	11	86.685	21	46.415	22
921	M93A	1	max	.225	7	.031	17	.702	4	2.488e-02	16	NC	1	NC	1
922			min	-.223	25	-.312	34	-.673	22	-2.617e-02	10	NC	1	NC	1
923		2	max	.225	7	.022	16	.69	4	2.488e-02	16	NC	1	NC	1
924			min	-.223	25	-.313	34	-.661	22	-2.617e-02	10	NC	1	NC	1
925		3	max	.225	7	.017	15	.679	4	2.488e-02	16	NC	1	NC	1
926			min	-.223	25	-.315	33	-.649	22	-2.617e-02	10	NC	1	NC	1
927		4	max	.225	7	.026	15	.667	4	2.488e-02	16	NC	1	NC	1
928			min	-.223	25	-.319	33	-.636	22	-2.617e-02	10	NC	1	NC	1
929		5	max	.225	7	.039	14	.655	4	2.488e-02	16	NC	1	NC	1
930			min	-.223	25	-.325	32	-.624	22	-2.617e-02	10	NC	1	NC	1
931	M94	1	max	1.174	4	.013	23	.375	13	3.995e-03	12	NC	1	NC	1
932			min	-1.174	10	-.309	29	-.377	7	-3.478e-03	18	NC	1	NC	1
933		2	max	1.174	4	.046	22	.382	13	3.995e-03	12	NC	1	NC	1
934			min	-1.174	10	-.314	28	-.383	7	-3.478e-03	18	NC	1	NC	1
935		3	max	1.174	4	.08	22	.388	13	3.995e-03	12	NC	1	NC	1
936			min	-1.174	10	-.319	28	-.389	7	-3.478e-03	18	NC	1	NC	1
937		4	max	1.174	4	.113	22	.395	13	3.995e-03	12	NC	1	NC	1
938			min	-1.174	10	-.323	28	-.396	7	-3.478e-03	18	NC	1	NC	1
939		5	max	1.174	4	.147	22	.401	13	3.995e-03	12	NC	1	NC	1
940			min	-1.174	10	-.328	28	-.402	7	-3.478e-03	18	NC	1	NC	1
941	M95	1	max	.122	3	.009	23	.069	13	1.602e-03	12	NC	1	NC	1
942			min	-.117	21	-.249	29	-.068	19	-1.199e-03	18	NC	1	NC	1
943		2	max	.122	3	.039	23	.07	13	1.602e-03	12	NC	1	NC	1
944			min	-.117	21	-.268	29	-.068	19	-1.199e-03	18	NC	1	NC	1
945		3	max	.122	3	.075	22	.071	13	1.602e-03	12	NC	1	NC	1
946			min	-.117	21	-.288	28	-.068	19	-1.199e-03	18	NC	1	NC	1
947		4	max	.122	3	.111	22	.072	13	1.602e-03	12	NC	1	NC	1
948			min	-.117	21	-.308	28	-.068	19	-1.199e-03	18	NC	1	NC	1
949		5	max	.122	3	.147	22	.072	13	1.602e-03	12	NC	1	NC	1
950			min	-.117	21	-.327	28	-.069	19	-1.199e-03	18	NC	1	NC	1
951	M96A	1	max	.007	26	.007	20	.05	18	7.956e-04	3	NC	1	NC	1
952			min	-.002	20	-.011	2	-.052	12	-6.614e-04	21	NC	1	4486.389	3
953		2	max	.005	26	.012	20	.041	18	5.967e-04	3	NC	1	NC	1
954			min	-.002	20	-.018	2	-.042	12	-4.961e-04	21	5886.442	2	7267.283	3
955		3	max	.003	26	.013	20	.029	18	3.978e-04	3	NC	1	NC	1
956			min	-.001	20	-.02	2	-.03	12	-3.307e-04	21	4194.09	2	NC	1
957		4	max	.002	26	.008	20	.016	18	1.989e-04	3	NC	1	NC	1
958			min	0	20	-.013	2	-.016	12	-1.654e-04	21	5886.442	2	NC	1
959		5	max	0	1	0	1	0	1	0	1	NC	1	NC	1
960			min	0	1	0	1	0	1	0	1	NC	1	NC	1
961	M97A	1	max	.007	30	.006	24	.07	20	9.792e-04	13	NC	1	NC	1
962			min	-.002	24	-.01	6	-.07	2	-9.545e-04	19	NC	1	1649.442	12
963		2	max	.005	30	.018	24	.057	20	7.344e-04	13	NC	1	NC	1
964			min	-.002	24	-.024	6	-.058	2	-7.159e-04	19	3516.209	6	2384.041	12
965		3	max	.003	30	.022	24	.042	20	4.896e-04	13	NC	1	NC	1
966			min	-.001	24	-.029	6	-.042	2	-4.772e-04	19	2505.299	6	3942.152	12
967		4	max	.002	30	.015	24	.022	20	2.448e-04	13	NC	1	NC	1
968			min	0	24	-.019	6	-.022	2	-2.386e-04	19	3516.209	6	8596.741	12

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
969		5	max	0	1	0	1	0	1	0	1	NC	1	NC	1
970			min	0	1	0	1	0	1	0	1	NC	1	NC	1
971	M98	1	max	.007	34	.007	16	.019	20	1.156e-03	25	NC	1	NC	1
972			min	-.002	16	-.011	10	-.019	14	-1.241e-03	7	NC	1	3103.312	14
973		2	max	.005	34	.018	16	.01	21	8.673e-04	25	NC	1	NC	1
974			min	-.002	16	-.025	10	-.01	15	-9.305e-04	7	3516.209	10	5918.944	15
975		3	max	.003	34	.022	16	.007	10	5.782e-04	25	NC	1	NC	1
976			min	-.001	16	-.029	10	-.007	16	-6.204e-04	7	2505.299	10	8169.454	23
977		4	max	.002	34	.015	16	.005	11	2.891e-04	25	NC	1	NC	1
978			min	0	16	-.02	10	-.005	17	-3.102e-04	7	3516.209	10	NC	1
979		5	max	0	1	0	1	0	1	0	1	NC	1	NC	1
980			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M2	L4x4x4	.667	2.75	35	.111	2.75	z	36	40.533	62.532	3.138	6.286	1...	H2-1
2	M8	L2.5x2.5x3	.664	0	13	.145	.804	y	9	28.107	29.192	.873	1.972	1...	H2-1
3	M6	L4x4x4	.661	2.75	37	.113	2.75	z	36	40.533	62.532	3.138	6.287	1...	H2-1
4	M9	L2.5x2.5x3	.633	0	5	.143	0	y	13	28.107	29.192	.873	1.972	1...	H2-1
5	M4	L4x4x4	.578	2.75	31	.048	2.75	z	9	40.533	62.532	3.138	6.263	1...	H2-1
6	M92A	PIPE_2.0	.572	2.26	7	.229	4.01		5	17.855	32.13	1.872	1.872	2...	H1-1b
7	M44	PIPE_2.0	.552	2.26	13	.193	2.26		5	17.855	32.13	1.872	1.872	2...	H1-1b
8	M82A	PIPE_2.0	.546	2.26	11	.218	4.01		9	17.855	32.13	1.872	1.872	1...	H1-1b
9	M29	PIPE_2.0	.542	2.26	4	.256	4.01		11	17.855	32.13	1.872	1.872	2...	H1-1b
10	M3	3/8" x 6"	.538	.402	32	.307	.804	y	3	47.934	72.9	.57	9.113	1...	H1-1b
11	M87A	PIPE_2.0	.535	2.26	3	.203	2.26		11	17.855	32.13	1.872	1.872	2...	H1-1b
12	M14	PIPE_2.0	.527	2.26	5	.217	4.01		7	17.855	32.13	1.872	1.872	1...	H1-1b
13	M5	3/8" x 6"	.505	.402	11	.246	.41	y	7	47.934	72.9	.57	9.113	1...	H1-1b
14	M1	3/8" x 6"	.496	.402	28	.264	.804	y	11	47.934	72.9	.57	9.113	1...	H1-1b
15	M56	PIPE_2.0	.494	4.5	8	.239	1.266		2	5.397	32.13	1.872	1.872	3...	H1-1b
16	M55	PIPE_2.0	.475	4.5	11	.242	1.266		12	5.397	32.13	1.872	1.872	3...	H1-1b
17	M7	L2.5x2.5x3	.469	0	9	.156	0	y	5	28.107	29.192	.873	1.972	1...	H2-1
18	M71	PIPE_2.0	.448	2.26	10	.262	5.76		12	17.855	32.13	1.872	1.872	2...	H1-1b
19	M57	PIPE_2.0	.437	4.5	4	.236	1.266		10	5.397	32.13	1.872	1.872	3...	H1-1b
20	M24	PIPE_2.0	.411	2.26	6	.265	5.76		8	17.855	32.13	1.872	1.872	2...	H1-1b
21	M49	PIPE_2.0	.399	2.26	6	.223	2.26		9	17.855	32.13	1.872	1.872	2...	H1-1b
22	M76A	PIPE_2.0	.392	2.26	13	.281	2.26		11	17.855	32.13	1.872	1.872	2...	H1-1b
23	M19	PIPE_2.0	.348	2.26	10	.227	2.26		13	17.855	32.13	1.872	1.872	2...	H1-1b
24	M58	3/8"x4.5"	.320	0	26	.098	.25	y	32	52.508	54.675	.427	5.126	1...	H1-1b
25	M77	L6x3.5x5	.319	8.859	2	.266	5.766	y	37	59.267	93.636	3.395	8.584	1	H2-1
26	M34	PIPE_2.0	.318	2.26	2	.242	2.26		5	17.855	32.13	1.872	1.872	2...	H1-1b
27	M79	3/8"x4.5"	.313	0	34	.100	.25	y	28	52.508	54.675	.427	5.126	1...	H1-1b
28	M87	L6x3.5x5	.306	7.734	4	.266	7.734	y	34	59.267	93.636	3.395	8.584	1	H2-1
29	M59	3/8"x4.5"	.296	0	30	.100	.25	y	36	52.508	54.675	.427	5.126	1...	H1-1b
30	M78	3/8"x4.5"	.293	0	29	.097	.25	y	36	52.508	54.675	.427	5.126	1...	H1-1b
31	M86	HSS4x4x3	.282	3.478	2	.121	0	z	5	91.044	106.812	12.662	12.662	1...	H1-1b
32	M66	HSS4x4x3	.279	3.478	10	.063	3.544	y	35	91.044	106.812	12.662	12.662	1...	H1-1b
33	M76	HSS4x4x3	.271	3.478	30	.066	3.544	y	29	91.044	106.812	12.662	12.662	1...	H1-1b
34	M67	L6x3.5x5	.251	5.906	12	.267	5.766	y	29	59.267	93.636	3.395	8.584	1	H2-1
35	M98	LL2.5x2.5x...	.119	2.475	11	.007	0	z	7	42.167	58.32	3.954	2.55	1...	H1-1b
36	M97A	LL2.5x2.5x...	.118	2.475	5	.007	0	y	6	42.167	58.32	3.954	2.55	1...	H1-1b
37	M96A	LL2.5x2.5x...	.116	4.95	26	.005	0	y	2	42.167	58.32	3.954	2.55	1	H1-1b*
38	M69	3/8"x4.5"	.056	0	6	.046	.25	y	3	52.508	54.675	.427	5.126	1...	H1-1b
39	M68	3/8"x4.5"	.056	0	6	.046	.25	y	3	52.508	54.675	.427	5.126	1...	H1-1b
40	M85	L3.5x2.5x4	.003	.5	2	.001	.5	z	20	44.222	46.98	1.312	3.62	1...	H2-1

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear ..	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
41	M65	L3.5x2.5x4	.003	.5	35	.001	.5	z	22	44.222	46.98	1.312	3.62	1...	H2-1
42	M75	L3.5x2.5x4	.003	.5	29	.001	.5	z	12	44.222	46.98	1.312	3.62	1...	H2-1

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 CONSTRUCTION NOTE:
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE SPRINT'S RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY OTHERS).

Sprint

PROGRAM: DO MACRO UPGRADE EQUIPMENT DEPLOYMENT

SITE NUMBER: CT33XC023

SITE ADDRESS: 96 POWDER MILL ROAD CANTON, CT 06019

SITE TYPE: MONOPOLE

PROJECT INFORMATION

SITE INFORMATION:

LATITUDE: 41° 50' 03.28" N
(PER SBA RECORDS) 41.83425°

LONGITUDE: -72° 55' 57.62" W
(PER SBA RECORDS) -72.93267°

STRUCTURE HEIGHT: 180'±

STRUCTURE TYPE: MONOPOLE

APPLICANT:

SPRINT
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

TOWER OWNER:

SBA TOWERS, LLC.
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

SBA SITE ID: CT001722-S

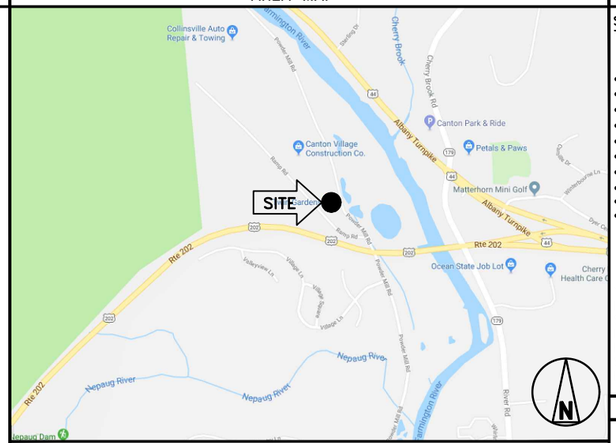
SBA SITE NAME: SOUTH CANTON

SBA CONTACT: STEPHEN ROTH
(800) 539-4920
sroth@sbasite.com

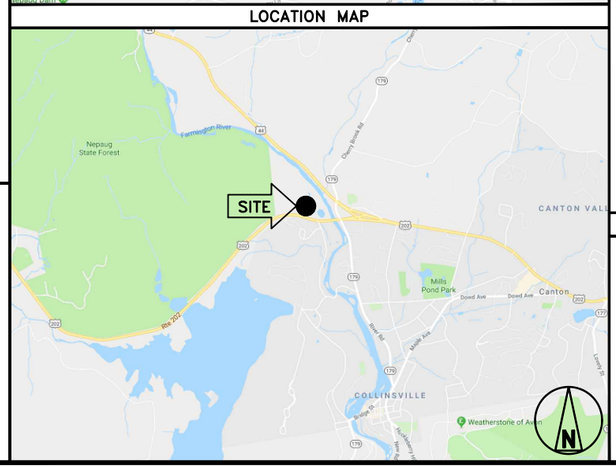
CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

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

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- REMOVE (6) PANEL ANTENNAS
- INSTALL (6) PANEL ANTENNAS
- INSTALL (12) PIPE MOUNTS
- INSTALL (3) 2.5 GHz RRH'S ON PROPOSED PIPE MOUNT
- RELOCATE (3) 1900 MHz RRH'S ON PROPOSED PIPE MOUNT
- INSTALL (6) 800 MHz RRH'S ON PROPOSED PIPE MOUNT
- REMOVE (6) COAX CABLES
- INSTALL (4) HYBRID CABLES
- INSTALL STRUCTURAL AUGMENTS
- INSTALL RAN EQUIPMENT INSIDE EXISTING MMBTS CABINET

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

APPLICABLE CODES

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

1. INTERNATIONAL BUILDING CODE (2012 IBC)
2. TIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

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 TITLE	REV.
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	OUTLINE SPECIFICATIONS	0
SP-2	OUTLINE SPECIFICATIONS	0
SP-3	OUTLINE SPECIFICATIONS	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	EQUIPMENT & MOUNTING DETAILS	0
A-5	DETAILS	0
E-1	ELECTRICAL & GROUNDING DETAILS	0
RF-1	RF DATA SHEET	0
RF-2	PLUMBING DIAGRAM	0

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.

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

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

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

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER: CT33XC023

SITE ADDRESS: 96 POWDER MILL ROAD CANTON, CT 06019

SHEET DESCRIPTION: TITLE SHEET & PROJECT DATA

SHEET NUMBER: T-1

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

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

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

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

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

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

1.5 DEFINITIONS:

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

B. COMPANY: SPRINT CORPORATION

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

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

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

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

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

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

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

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

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

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

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

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

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.

2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.

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

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

5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.

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

3.2 DELIVERABLES:

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

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

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

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 NOTICE TO PROCEED

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

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

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

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

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

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

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

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:

CT33XC023

SITE ADDRESS:

96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:

OUTLINE SPECIFICATIONS

SHEET NUMBER:

SP-1

CONTINUE FROM SP-1

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

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

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

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

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

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

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

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

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

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

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

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 SUBMITTALS:

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

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

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

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

1.4 TESTS AND INSPECTIONS:

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

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

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

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

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

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

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

3.2 REQUIRED TESTS:

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

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

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

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

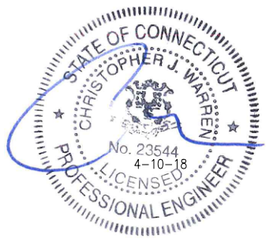
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.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

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

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

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

ENGINEERING LICENSE:



CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
OUTLINE SPECIFICATIONS

SHEET NUMBER:
SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.

8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.

9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.

10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT

11. ALL AVAILABLE JURISDICTIONAL INFORMATION

12. PDF SCAN OF REDLINES PRODUCED IN FIELD

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

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

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

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

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.

2. STRUCTURAL BACKFILL COMPACTION REPORTS.

3. SITE RESISTANCE TO EARTH TEST.

4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION

5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.

6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.

2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;

3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.

4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;

6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.

7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.

9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

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

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

3.2 PROJECT CONFERENCE CALLS:

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

3.3 PROJECT TRACKING IN SMS:

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

3.4 ADDITIONAL REPORTING:

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

3.5 PROJECT PHOTOGRAPHS:

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

1. 1SHELTER AND TOWER OVERVIEW.

2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).

3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).

4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).

5. PHOTOS OF TOWER SECTION STACKING.

6. CONCRETE TESTING / SAMPLES.

7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.

8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.

9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.

10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.

11. COAX CABLE ENTRY INTO SHELTER.

12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.

14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.

15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.

16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.

17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.

18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.

19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.

21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

25. ALL BTS GROUND CONNECTIONS.

26. ALL GROUND TEST WELLS.

27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.

28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.

29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.

30. GPS ANTENNAS.

31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.

32. DOGHOUSE/CABLE EXIT FROM ROOF.

33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.

34. MASTER BUS BAR.

35. TELCO BOARD AND NIU.

36. ELECTRICAL DISTRIBUTION WALL.

37. CABLE ENTRY WITH SURGE SUPPRESSION.

38. ENTRANCE TO EQUIPMENT ROOM.

39. COAX WEATHERPROOFING--TOP AND BOTTOM OF TOWER.

40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.

41. ANTENNA AND MAST GROUNDING.

42. LANDSCAPING – WHERE APPLICABLE.

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

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

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

PLANS PREPARED BY:

INFINIGY

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

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:

CT33XC023

SITE ADDRESS:

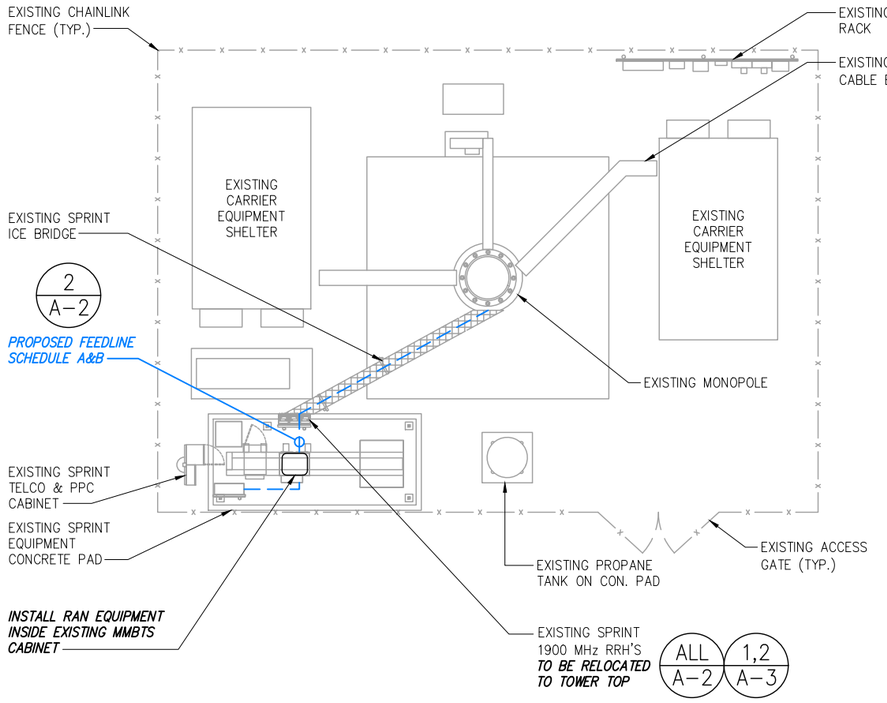
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:

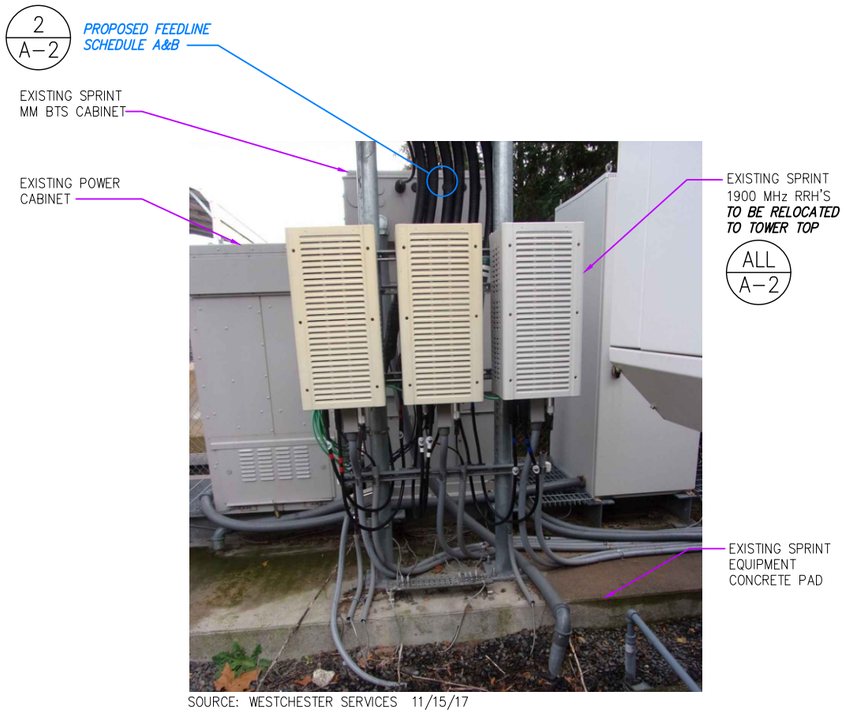
OUTLINE SPECIFICATIONS

SHEET NUMBER:

SP-3



SOURCE: WESTCHESTER SERVICES 11/15/17



SOURCE: WESTCHESTER SERVICES 11/15/17

GRAPHIC SCALE:

1/8' 1/4" 0 1/4" 1/8'

SCALE (11x17): 1/8" = 1'-0"

SCALE (22x34): 1/4" = 0'-6"

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

OVERALL SITE PLAN	SCALE: AS NOTED	1	SPRINT EQUIPMENT PHOTO DETAIL	SCALE: AS NOTED	2

PLANS PREPARED FOR:

Sprint

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

PROJECT MANAGER:

SBA

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

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-104

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:

CT33XC023

SITE ADDRESS:

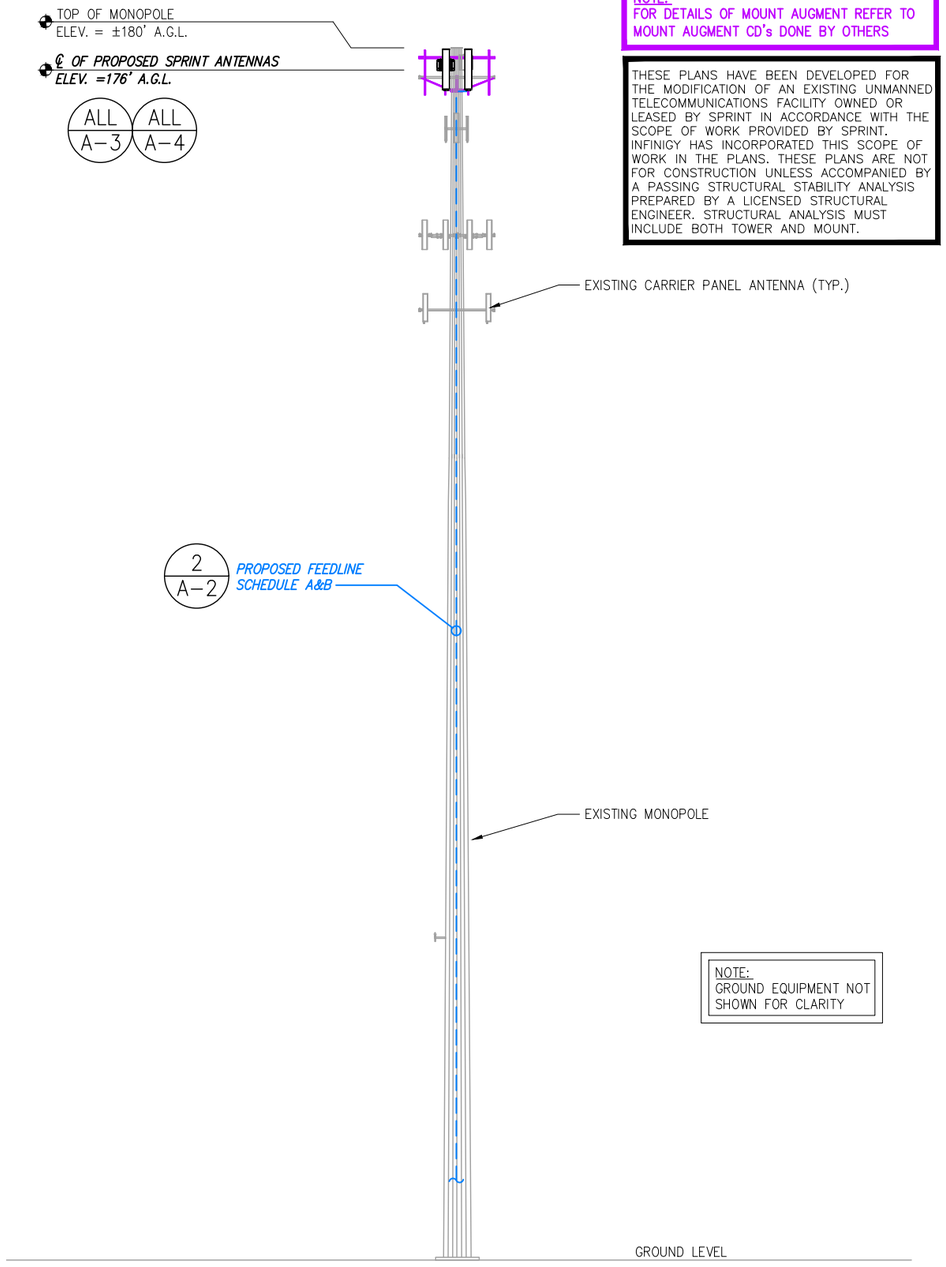
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1



NOTE:
FOR DETAILS OF MOUNT AUGMENT REFER TO MOUNT AUGMENT CD's DONE BY OTHERS

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

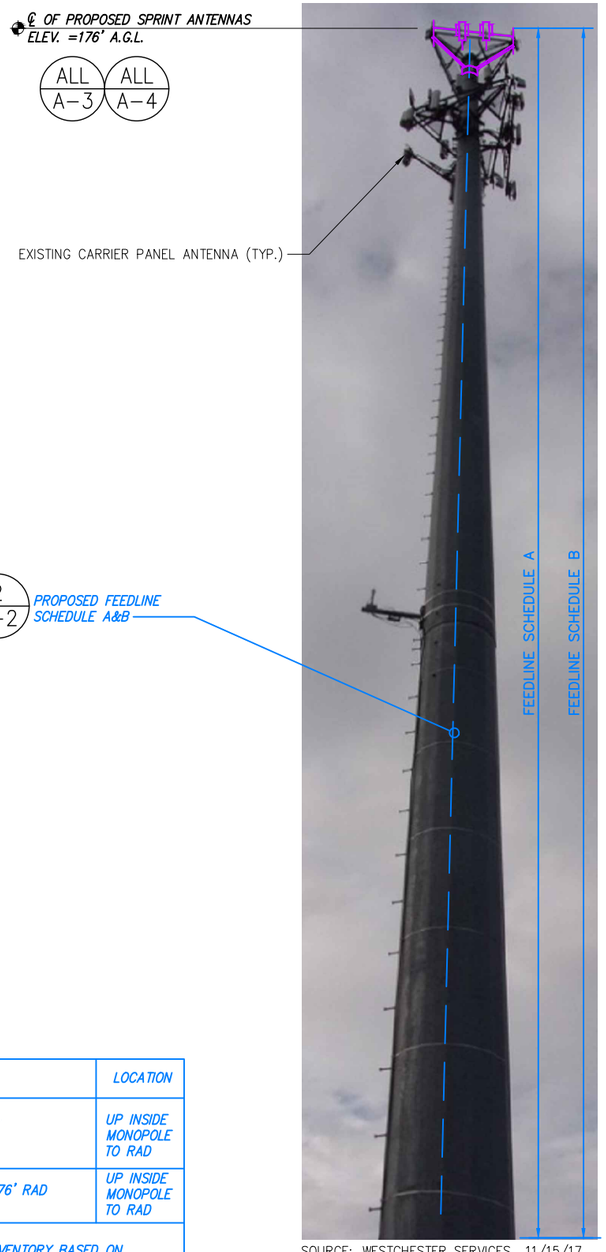
NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

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

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

TOWER ELEVATION | NO SCALE | 1

SPECIAL CONSTRUCTION NOTE:
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE SPRINT'S RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY OTHERS).



SOURCE: WESTCHESTER SERVICES 11/15/17

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (6) 1 5/8" COAX	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: (4) HYBRID TO 176' RAD	UP INSIDE MONOPOLE TO RAD

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

TOWER ELEVATION PHOTO DETAIL | NO SCALE | 2

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

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

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

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

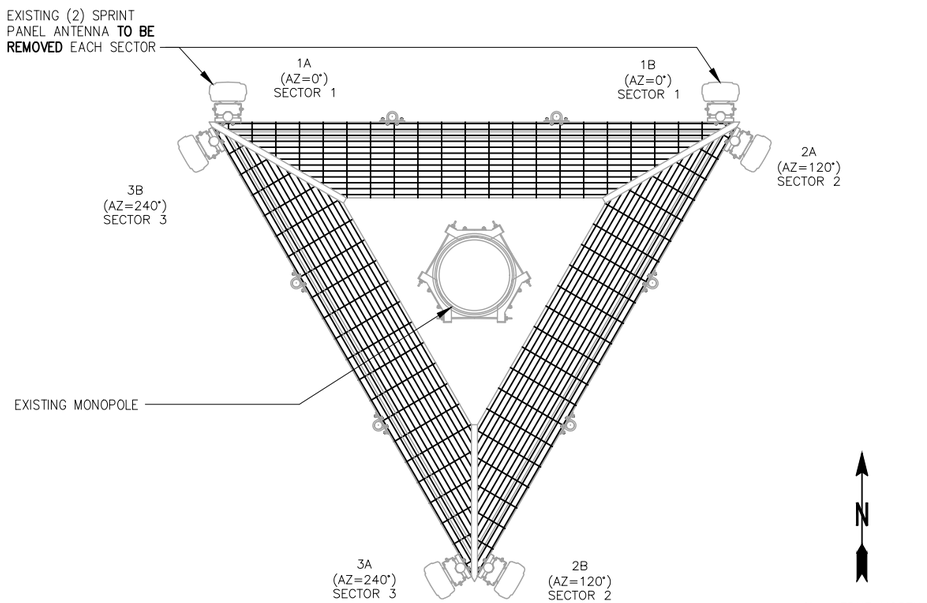
SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
TOWER ELEVATION

SHEET NUMBER:
A-2

SPECIAL CONSTRUCTION NOTE:
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE SPRINT'S RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY OTHERS).

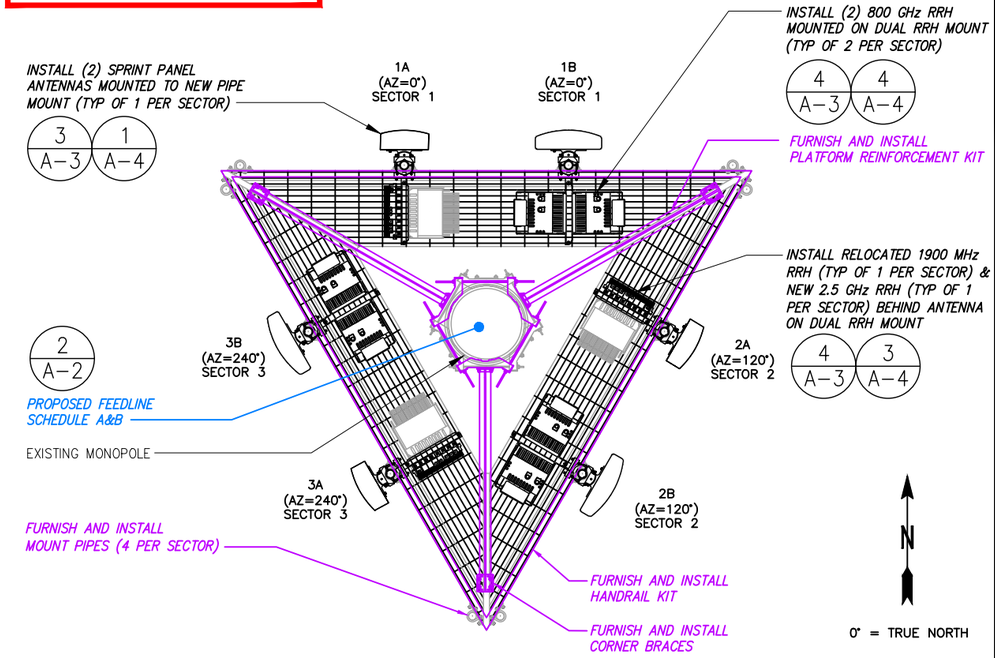


EXISTING ANTENNA & RRH LAYOUT | NO SCALE | 1

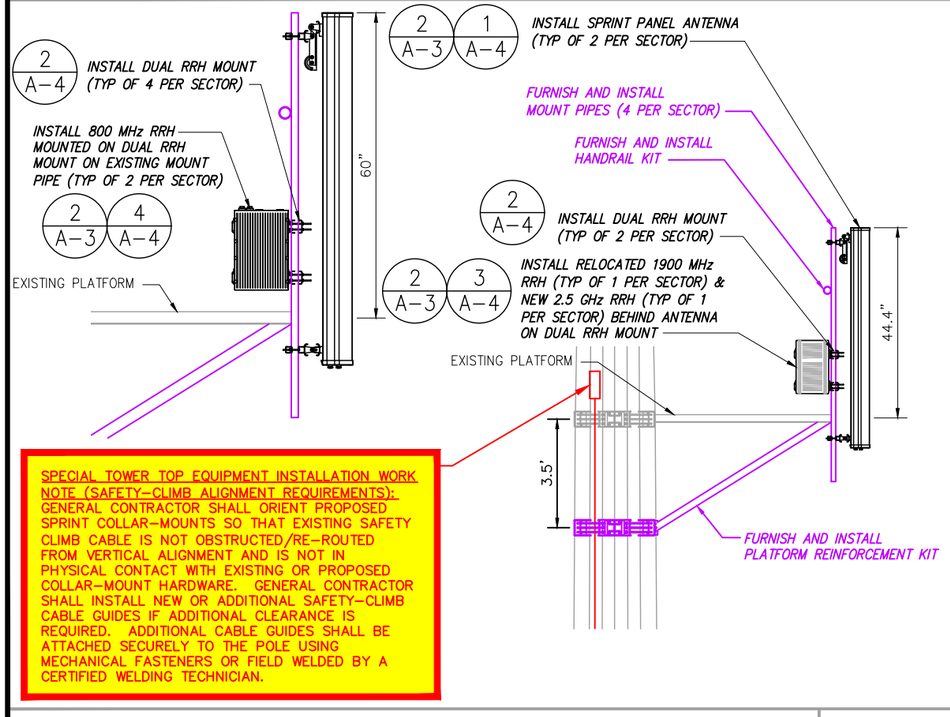
SPECIAL INSTALLATION NOTE:
JUMPERS FROM RRHs TO ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

NOTE:
FOR DETAILS OF MOUNT AUGMENT REFER TO MOUNT AUGMENT CD's DONE BY OTHERS

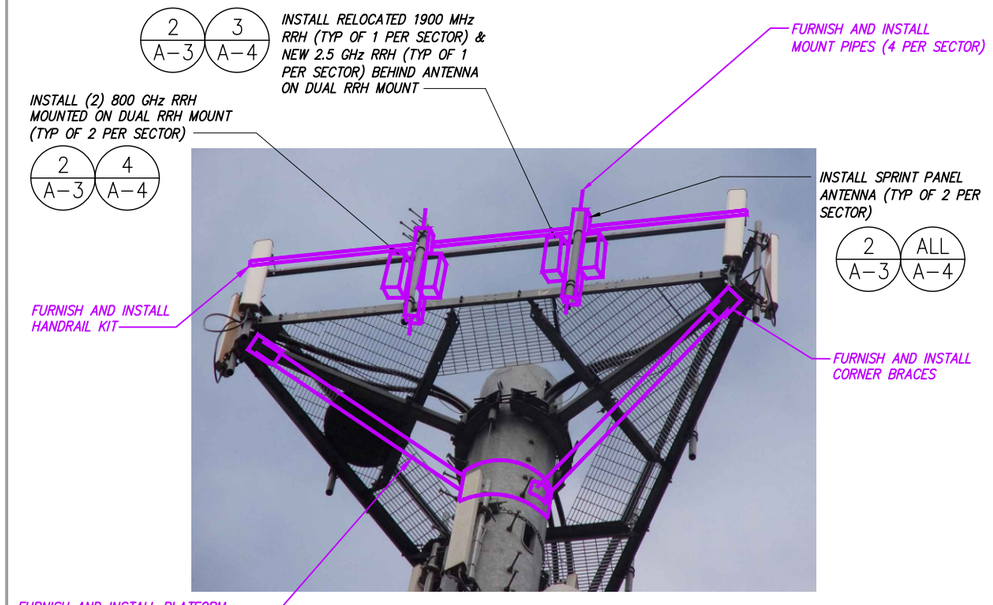


FINAL ANTENNA & RRH LAYOUT | NO SCALE | 2



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

TYPICAL MOUNTING DETAIL | NO SCALE | 3



ANTENNA & RRH MOUNT PHOTO DETAIL | NO SCALE | 4

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

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

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

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

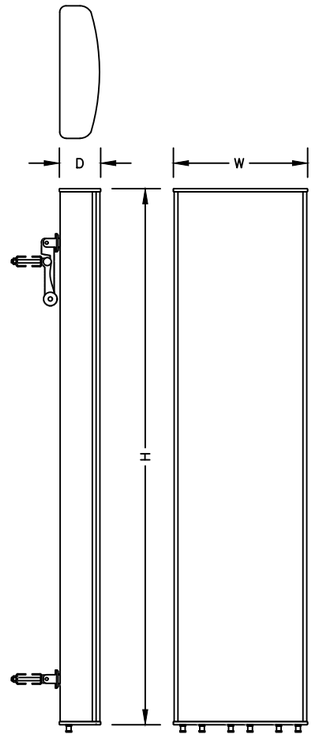
DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

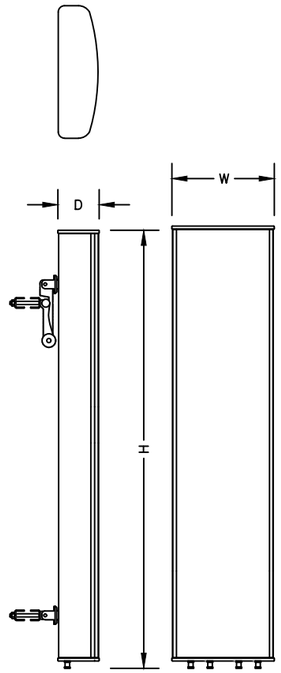
SHEET DESCRIPTION:
ANTENNA LAYOUT & MOUNTING DETAILS

SHEET NUMBER:
A-3



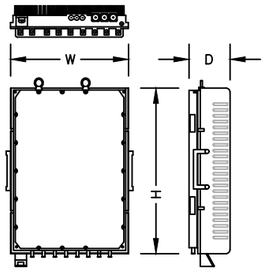
ANTENNA SPECIFICATIONS	
MANUF.	COMMSCOPE
MODEL #	NNVV-65B-R4
HEIGHT	72"
WIDTH	19.6"
DEPTH	7.8"
WEIGHT	84.7± LBS.

ANTENNA DETAIL | NO SCALE | 1



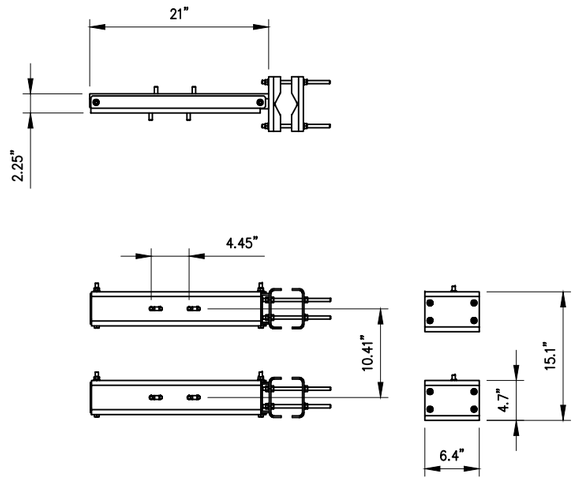
ANTENNA SPECIFICATIONS	
MANUF.	RFS
MODEL #	APXVTM14-ALU-I20
HEIGHT	56.3"
WIDTH	12.6"
DEPTH	6.3"
WEIGHT	56.2± LBS.

ANTENNA DETAIL | NO SCALE | 2

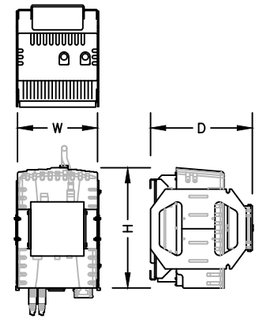


2.5 GHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	TD-RRH8X20-25
HEIGHT	26.1"
WIDTH	18.6"
DEPTH	6.7"
WEIGHT	70± LBS

2.5 RRH | NO SCALE | 3



DUAL RRH MOUNT DETAIL | NO SCALE | 4



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

800 MHz RRH | NO SCALE | 5

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

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

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

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-4

RFS HYBRIFLEX RISER CABLE SCHEDULE

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

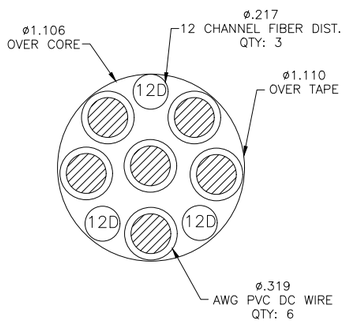
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

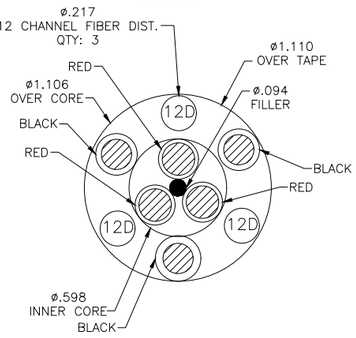
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.

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

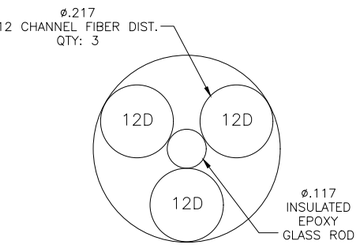
* SPRINT CM TO CONFIRM HYBRID RISER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.



4 AWG



8 & 6 AWG



FIBER ONLY

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

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

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

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

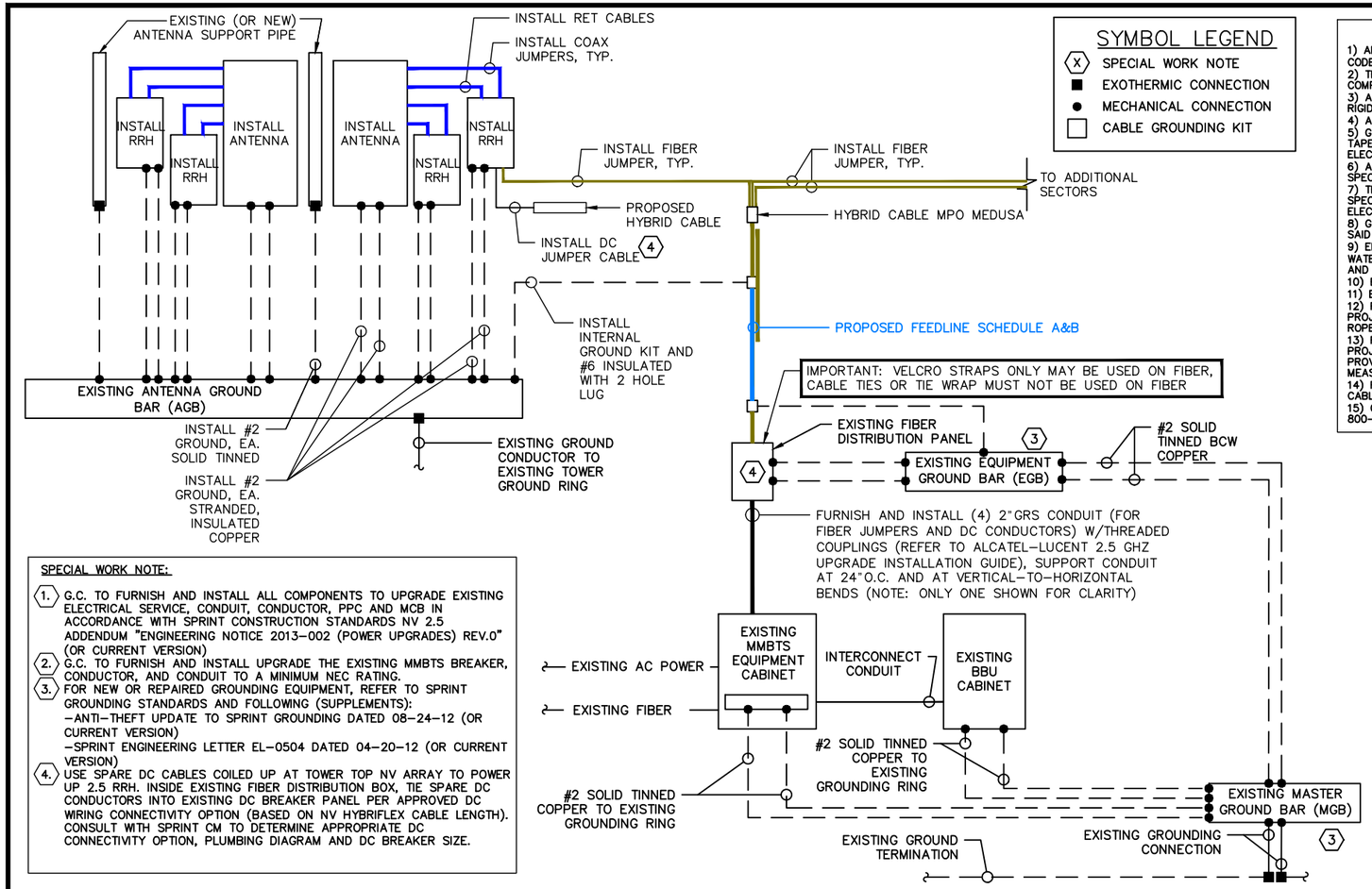
DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
DETAILS

SHEET NUMBER:
A-5



TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

1 / E-1

SCALE: N.T.S.

SYMBOL LEGEND

- (X) SPECIAL WORK NOTE
- ■ EXOTHERMIC CONNECTION
- ● MECHANICAL CONNECTION
- □ CABLE GROUNDING KIT

SPECIAL WORK NOTE:

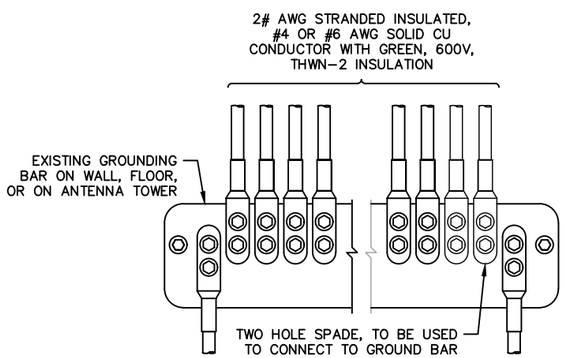
1. G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0" (OR CURRENT VERSION)
2. G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING 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.

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)

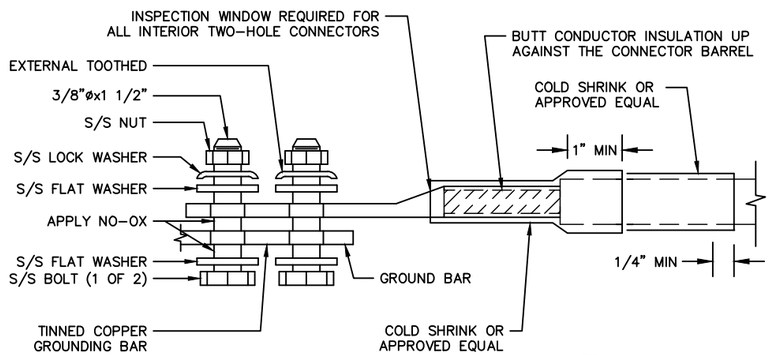


1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

2 / E-1

SCALE: N.T.S.



TWO HOLE LUG

3 / E-1

SCALE: N.T.S.

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

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

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

ENGINEERING LICENSE:

STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:
E-1

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT33XC023
SMS Schedule ID	12323208
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	2017-10-20 10:01:07.0
RFDS Revision	3

Filter Analysis Complete	YES
RFDS - Issue Date	08/15/2017
Design Status	Complete
Project Description	DO Macro Upgrade - Add 800MHz (3G + 4G) and 2500 MHz

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
Sprint Badged RF Engineer	Bill Hastings
RF Engineer Email	Bill.M.Hastings@sprint.com
RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

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

Location Details	
Latitude	41.83425
Longitude	-72.93267
Market	Northern Connecticut
Region	Northeast
City	Canton
State	CT
Zip Code	CT/06019
County	Hartford

2500MHz	3
1900MHz	3
800MHz	3

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A
Band: 800	**Alpha**	**Beta**	**Gamma**	**Delta**	**Epsilon**	**Zeta**
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	2	2	2	0	0	0
Band: 2500	**Alpha**	**Beta**	**Gamma**	**Delta**	**Epsilon**	**Zeta**
Antenna1						
Model Number	APXVTM14-ALU-I20	APXVTM14-ALU-I20	APXVTM14-ALU-I20			
Weight (lbs)	56.2	56.2	56.2	N/A	N/A	N/A
Dimensions	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	2.5 Jumper | 8	2.5 Jumper | 8	2.5 Jumper | 8	N/A | 0	N/A | 0	N/A | 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	0	120	240	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)	175.9514492	175.9514492	175.9514492	N/A	N/A	N/A
Antenna 1 Electrical DT	2	2	2	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Band: 1900	**Alpha**	**Beta**	**Gamma**	**Delta**	**Epsilon**	**Zeta**
Antenna1						
Model Number	NNVV-65B-R4	NNVV-65B-R4	NNVV-65B-R4			
Weight (lbs)	84.7	84.7	84.7	N/A	N/A	N/A
Dimensions	72 x 19.6 x 7.8	72 x 19.6 x 7.8	72 x 19.6 x 7.8	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper | 4	800/1900 Jumper | 4	800/1900 Jumper | 4	N/A | 0	N/A | 0	N/A | 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	0	120	240	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)	175.9514492	175.9514492	175.9514492	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

Additional RF Notes Special Construction Requirements

10/10/2017 (WR): RFDS revised to modify RRU location to "GM to Standard".

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

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

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

ENGINEERING LICENSE:

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

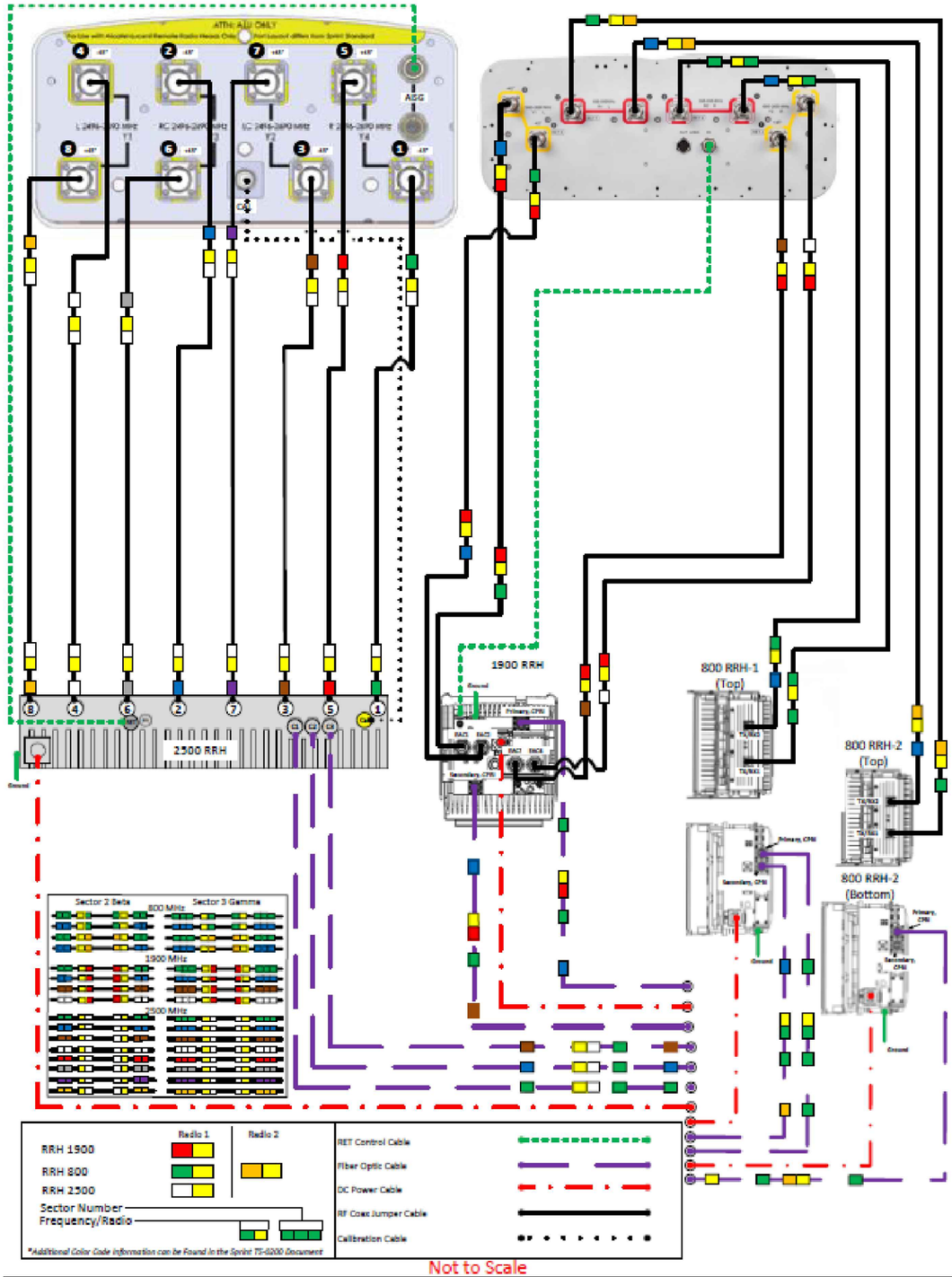
SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
RF DATA SHEET

SHEET NUMBER:
RF-1

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



Prepared By	Creation Date	Revision Number	Nokia-A Tri-Band Fiber Connections	Sprint
Mark Elliott	February 13, 2016	R-1	(Nokia-A Two-800, One-1900, & One-2500 RRH)	
Approved By	Approval Date			
RAN Hardware & Antenna Teams	February 23, 2017			

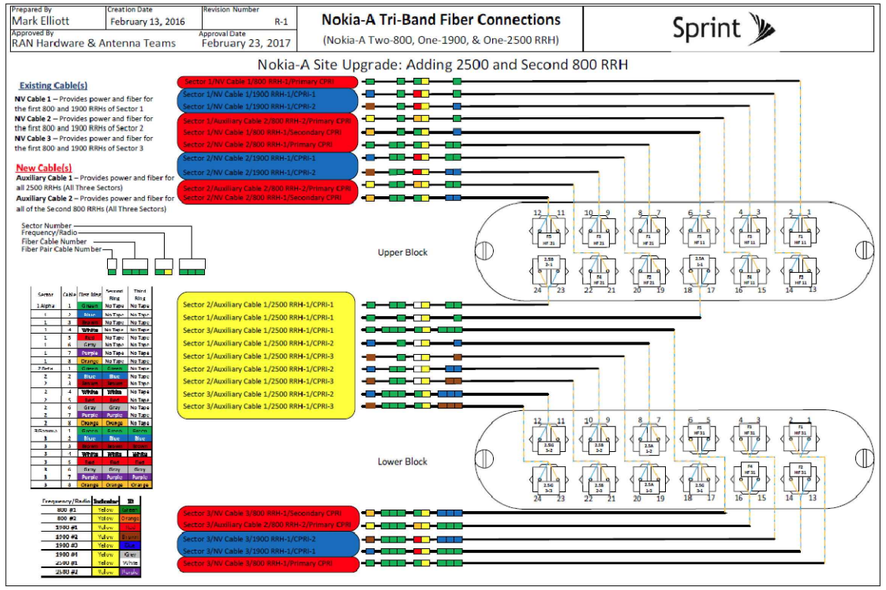
Nokia-A Site Upgrade: Adding 2500 and Second 800 RRH

Existing Cable(s)

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

New Cable(s)

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



PLUMBING DIAGRAM | NO SCALE | 1

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

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

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

ENGINEERING LICENSE:
STATE OF CONNECTICUT
CHRISTOPHER J. WARREN
No. 23544
4-10-18
LICENSED PROFESSIONAL ENGINEER

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	04/10/18	SL	0

SITE NUMBER:
CT33XC023

SITE ADDRESS:
96 POWDER MILL ROAD
CANTON, CT 06019

SHEET DESCRIPTION:
PLUMBING DIAGRAM

SHEET NUMBER:
RF-2

CT33XC023
DO MACRO EQUIPMENT DEPLOYMENT

MOUNT AUGMENTATION @ 177'

MONOPOLE TOWER

CANTON, CT
HARTFORD COUNTY

SITE INFORMATION

STRUCTURE TYPE:	MONOPOLE
MOUNT TYPE:	PLATFORM
LATITUDE:	41.83425 (NAD 83)
LONGITUDE:	-72.93267 (NAD 83)
CITY, STATE:	CANTON, CT
COUNTY:	HARTFORD
SBA SITE:	CT01722-S South Canton

COORDINATES ARE FOR NAVIGATIONAL PURPOSES ONLY, NOT TO 1A ACCURACY.

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR THE LABOR & MATERIALS FOR THE DISCREPANCIES.

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES.

BUILDING CODE AND DESIGN STANDARD: 2012 IBC / TIA-222-G / 2016 CT

RIGGING PLAN REQUIRED

THIS SET OF PLANS DOES "NOT" CONSTITUTE A RIGGING PLAN.

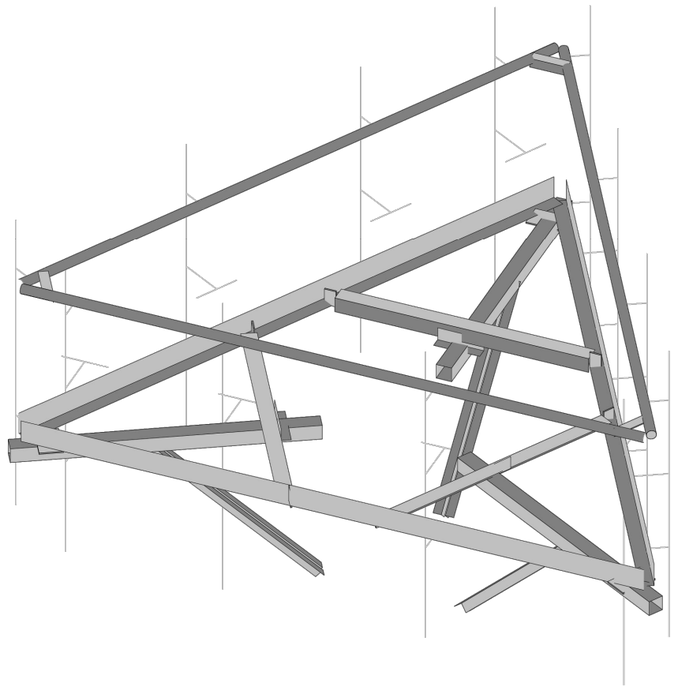
A PROPER RIGGING PLAN SHALL BE PERFORMED BY A LICENSED PROFESSIONAL ENGINEER PRIOR TO PROCEEDING ON ANY AUGMENTATIONS SHOWN HEREIN.

GENERAL DESIGN NOTES

1. THIS PLAN HAS BEEN DESIGNED UTILIZING THE CORRESPONDING MOUNT STRUCTURAL ANALYSIS.
2. THESE PLANS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, ASCE 7, AWS, ACI, AND AISC. MATERIALS AND SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE-MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
3. ALL STRUCTURE INFORMATION OBTAINED IN THE FORM OF FROM INFORMATION PROVIDED BY THE CLIENT. CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED DOCUMENTS. CONTRACTOR SHALL ISSUE A REQUEST FOR INFORMATION (RFI) IN THE EVENT ANY DISCREPANCIES ARE DISCOVERED BETWEEN THESE DOCUMENTS AND THE AS-BUILT CONDITIONS IN THE FIELD IN A SITE VISIT THAT SHALL BE PERFORMED PRIOR TO STARTING FABRICATION OR CONSTRUCTION.
4. ALL MATERIALS UTILIZED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS.
5. ALL PRODUCT OR MATERIAL SUBSTITUTIONS PROPOSED BY THE CONTRACTOR SHALL BE APPROVED IN WRITING BY THE ENGINEER. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER SUITABLE TO DETERMINE IF SUBSTITUTE IS ACCEPTABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER. CONTRACTOR SHALL PROVIDE ADDITIONAL DOCUMENTATION AND/OR SPECIFICATIONS TO THE ENGINEER AS REQUESTED.
6. PROVIDE STRUCTURAL STEEL SHOP DRAWING(S) TO THE ENGINEER OF RECORD FOR APPROVAL PRIOR TO FABRICATION (ONLY IF SPECIFICALLY REQUESTED BY ENGINEER).
7. UNLESS NOTED OTHERWISE, ALL NEW MEMBERS AND REINFORCING SHALL MAINTAIN THE EXISTING MEMBER WORK LINES AND NOT INTRODUCE ECCENTRICITIES INTO THE STRUCTURE.
8. ANY CONTRACTOR-CAUSED DAMAGE TO PROPERTY OF THE LAND OWNER, PROPERTY OF THE STRUCTURE OWNER, PROPERTY OF THE CUSTOMER, SITE FENCING OR GATES, ANY AND ALL UTILITY AND/OR SERVICE LINES, SHOWN OR NOT SHOWN ON THE PLANS, SHALL BE REPAIRED OR REPLACED AT THE SOLE COST OF THE CONTRACTOR AND SHALL BE ACCOMPLISHED BY THE CONTRACTOR OR SUBCONTRACTOR AS APPROVED BY THE ENGINEER OF RECORD AND LAND OWNER. DAMAGE TO EQUIPMENT OR PROPERTY OF ANY KIND BELONGING TO OTHER COMPANIES (BESIDES THE INDICATED CUSTOMER) SHALL BE ADDRESSED BY THE CONTRACTOR WITH THE COMPANIES THAT OWN THE DAMAGED ITEMS.

SHEET INDEX

MOUNT AUGMENTATION CONFIGURATION



AUGMENTATION SCOPE

AUGMENT ALL SECTORS OF CARRIER'S EXISTING MOUNT INSTALLATION AS REQUIRED (UNLESS NOTED OTHERWISE)

Sprint
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
P: 800.357.7641

SBA
134 FLANDERS RD., SUITE 125
WESTBOROUGH, MA 01581
P: 508.251.0720

GEOSTRUCTURAL
PO BOX 2621, BOISE, ID 83701
P: 530.539.4787
E: CONTACT@GEOSTRUCTURAL.COM
WWW.GEOSTRUCTURAL.COM

REVISIONS:

0	04/15/18	ISSUE FOR CONSTRUCTION	JAD

CHECKED BY: DWG

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMES IS STRICTLY PROHIBITED.

STATE OF CONNECTICUT
GREGORY DURGIN
No. 32155
LICENSED
PROFESSIONAL ENGINEER

SITE INFORMATION:

MOUNT AUGMENTATION

CT33XC023

CANTON, CT

LATITUDE: 41.83425
LONGITUDE: -72.93267

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

S1

CONTRACTOR NOTES

1. PRIOR TO BEGINNING CONSTRUCTION, ALL CONTRACTORS AND SUBCONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW STRUCTURE OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND STRUCTURE/TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED AUGMENTATIONS DESCRIBED. RECEIPT OF ACKNOWLEDGEMENT MUST OCCUR PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE THIS DOCUMENTATION FOR STRUCTURE OWNER ON COMPANY LETTERHEAD AND THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN THIS DOCUMENTATION FROM ANY SUBCONTRACTORS (ON SUBCONTRACTOR LETTERHEAD) AND DELIVER IT TO THE STRUCTURE OWNER.
2. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT REPRESENTED ON THESE DRAWINGS, OR ANY CONDITIONS THAT WOULD INTERFERE WITH THE INSTALLATION OF THE AUGMENTATIONS, THE ENGINEER OF RECORD SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE SIGNIFICANCE OF THE DEVIATION.
3. THE CONTRACTOR SHALL SOLICIT AND HIRE THE SERVICES OF A QUALIFIED AUGMENTATION INSPECTOR PRIOR TO BEGINNING CONSTRUCTION. THE AUGMENTATION INSPECTOR MAY BE AN EMPLOYEE OF THE CONTRACTOR'S FIRM, HOWEVER THE INSPECTOR'S ONLY DUTIES SHALL BE INSPECTION, TESTING, AND REPORT CREATION AS REQUIRED ON THE "AUGMENTATION INSPECTION NOTES" SHEET.
4. THE CONTRACTOR SHALL NOTIFY THE TOWER OWNER OF THE PLANNED CONSTRUCTION & INSPECTION SCHEDULE, AS WELL AS ANY CHANGES TO THE SCHEDULE, WITHIN TWO BUSINESS DAYS OF THE COMPLETION OF THE SCHEDULE OR SCHEDULE REVISION BOTH PRIOR TO BEGINNING CONSTRUCTION AND DURING CONSTRUCTION AS THE SCHEDULE CHANGES. THE STRUCTURE OWNER WHEN THE WORK HAS BEEN COMPLETED WITHIN 2 BUSINESS DAYS OF THE COMPLETION OF THE WORK AND ASSOCIATED AUGMENTATION INSPECTIONS & TESTING (WHEN APPLICABLE).
5. IT IS ASSUMED THAT ANY STRUCTURAL AUGMENTATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE STRUCTURE OWNER AND ENGINEER INCLUDING BUT NOT LIMITED TO TOWER CLIMBER AND RESCUE CLIMBER CERTIFICATIONS, ET CETERA.
6. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.
7. CONTRACTOR SHALL WORK WITHIN THE LIMITS OF THE STRUCTURE OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.

STRUCTURAL ERECTION AND BRACING REQUIREMENTS

1. THE STRUCTURAL DRAWINGS ILLUSTRATE THE COMPLETED STRUCTURE WITH ALL ELEMENTS IN THEIR FINAL POSITIONS, PROPERLY SUPPORTED AND BRACED.
2. THE CONTRACTOR SHALL PROVIDE SHORING AND BRACING AS REQUIRED DURING CONSTRUCTION TO ENSURE STABILITY. DESIGN AND SEQUENCING OF CONSTRUCTION SHORING AND BRACING IS OUTSIDE THE SCOPE OF THIS WORK.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, GUYING, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.

BOLTS

1. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED GALVANIZED HIGH STRENGTH ASTM A325 OR A490 BOLTS WITH THREADS EXCLUDED FROM SHEAR PLANE.
2. FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES, WITH BOLT HEADS FACING DOWN WHERE APPLICABLE.
3. ALL BOLTS AT EVERY CONNECTION SHALL BE INSTALLED SNUG-TIGHT UNTIL THE SECTION IS FULLY COMPACTED AND ALL PLIES ARE JOINED, AND THEN TIGHTENED FURTHER BY AISC - "TURN OF THE NUT" METHOD. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.
4. BOLT LENGTHS UP TO AND INCLUDING 4 DIAMETERS SHALL BE TENSIONED 1/3 TURN BEYOND SNUG-TIGHT. BOLT LENGTHS OVER 4 DIAMETERS SHALL BE 1½ TURNS BEYOND SNUG-TIGHT.
5. ALL BOLTED CONNECTIONS SHALL USE LOCK WASHERS.

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE CURRENT EDITION OF THE AISC STEEL CONSTRUCTION MANUAL AND SECTION 4 OF THE TIA CODE.
2. PRE-QUALIFIED STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING MINIMUM GRADES UNLESS OTHERWISE NOTED:
   - CHANNELS & ANGLES ..... ASTM A36, (Fy = 36 KSI)
   - PLATES ..... ASTM A36, (Fy = 36 KSI)
   - PIPES ..... ASTM A53 GR.B, (Fy = 35 KSI)
   - HSS ROUND ..... ASTM A500 GR.B, (Fy = 42 KSI)
   - HSS RECTANGULAR ..... ASTM A500 GR.B, (Fy = 46 KSI)
   - STRUCTURAL BOLTS ..... ASTM A325
   - U-BOLTS ..... ASTM A307 GR.A
   - NUTS FOR BOLTS ..... ASTM A563 (THREADING TO MATCH BOLT)
   - WASHERS FOR BOLTS ..... ASTM F436
   - SEE TABLE 5-1 OF THE TIA CODE FOR ADDITIONAL SHAPES AND STANDARDS THAT ARE NOT LISTED ABOVE.
3. NON PRE-QUALIFIED STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING STANDARDS PER THE TIA CODE:
   - THE CARBON EQUIVALENT OF STEEL SHALL NOT EXCEED 0.65 PER SECTION 5.4.2 OF THE TIA CODE
   - ELONGATION OF STEEL SHALL NOT BE LESS THAN 18%
   - TEST REPORTS SHALL BE IN ACCORDANCE WITH ASTM A6 OR A568
   - TOLERANCES SHALL BE IN ACCORDANCE WITH ASTM A6
4. FIELD CUT EDGES, EXCEPT DRILLED HOLES, SHALL BE GROUND SMOOTH AND COLD GALVANIZED.
5. ALL WELDING WORK SHALL CONFORM TO THE AWS D1.1 STRUCTURAL WELDING CODE. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS ONLY. WELDING ELECTRODES SHALL BE E70XX.
6. ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO AISC SPECS AND CODES, LATEST EDITION.
7. UPON REQUEST, THE CONTRACTOR SHALL SUBMIT DETAILED, ENGINEERED, COORDINATED AND CHECKED SHOP DRAWINGS FOR ALL STRUCTURAL STEEL TO THE ENGINEER OF RECORD TO REVIEW FOR COMPLIANCE WITH DESIGN INTENT PRIOR TO THE START OF FABRICATION AND/OR ERECTION.
8. TORCH-CUTTING OF ANY KIND SHALL NOT BE PERMITTED.
9. ALL BOLT HOLES SHALL BE STANDARD SIZE BOLT HOLES PER AISC 360, UNLESS OTHERWISE NOTED. ALL HOLES SHALL BE SHOP DRILLED OR SUB-PUNCHED AND REAMED. BURNING OF HOLES IS NOT PERMITTED. WHERE SLOTTED OR OVERSIZE HOLES ARE SPECIFIED ON THE DRAWINGS, EXTRA-THICK ASTM F436 PLATE WASHERS SHALL BE USED (3/16" MINIMUM THICKNESS) WITH A DIAMETER SUITABLE TO COVER THE EXTENTS OF THE SLOT OR HOLE. BOLTS SHALL BE HEAVY-HEX WHERE AVAILABLE IN THE SIZE AND GRADE SPECIFIED, OTHERWISE BOLTS SHALL BE HEX HEAD CAP SCREWS.
10. ALL STEEL HARDWARE, INCLUDING ADHESIVE OR EMBEDDED ANCHOR BOLTS AND THEIR ACCESSORIES, SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153 (EXCEPT BOLTS SMALLER THAN ½" SHALL CONFORM TO FE/ZN 3 AT PER ASTM F1941 WHERE HOT-DIP GALVANIZED BOLTS ARE NOT AVAILABLE). ALL STEEL MEMBERS, INCLUDING WELDMENTS, SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123. REPAIR DAMAGE TO GALVANIZED COATINGS USING ASTM A780 PROCEDURES WITH A ZINC RICH PAINT (SUCH AS ZINC GALVILITE) FOR GALVANIZING DAMAGED BY HANDLING, TRANSPORTING, CUTTING, WELDING, OR BOLTING. DO NOT HEAT SURFACES TO WHICH REPAIR PAINT HAS BEEN APPLIED. CALL OUT HOLES REQUIRED FOR HOT-DIP GALVANIZING ON SHOP DRAWINGS.
11. MEMBERS SHALL BE SHOP-FABRICATED AND WELDED TO THE EXTENT PRACTICABLE IN ORDER TO REDUCE FIELD INSTALLATION COSTS.

CONSTRUCTION INSPECTION CHECKLIST

CONSTRUCTION AND/OR INSTALLATION INSPECTIONS REQUIRED FOR REPORT? (CHECK=YES, BLANK=NO)	INSPECTION REPORT ITEM
√	CONSTRUCTION INSPECTIONS
	THIRD-PARTY CERTIFIED WELD INSPECTION (INCLUDING IBC SPECIAL INSPECTIONS)
√	GALVANIZING REPAIR MATERIAL PREPARATION, INSPECTION, & PAINT APPLICATION
√	PRIME CONTRACTOR'S AS-BUILT DOCUMENTS (SIGNED & DATED)
√	FABRICATION INSPECTION
√	MATERIAL TEST REPORT(S) / MILL CERTIFICATE(S)
√	PACKING SLIPS FOR STRUCTURAL MATERIALS

NOMINAL HOLE DIMENSIONS

BOLT Ø	STANDARD HOLE Ø
1/2"Ø	9/16"Ø
5/8"Ø	11/16"Ø
3/4"Ø	13/16"Ø
7/8"Ø	15/16"Ø
1"Ø	1 1/16"Ø

Sprint
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
P: 800.357.7641

SBA
134 FLANDERS RD., SUITE 125
WESTBOROUGH, MA 01581
P: 508.251.0720

GEOSTRUCTURAL
PO BOX 2621, BOISE, ID 83701
P: 530.539.4787
E: CONTACT@GEOSTRUCTURAL.COM
WWW.GEOSTRUCTURAL.COM

REVISIONS:

0	04/15/18	ISSUE FOR CONSTRUCTION	JAD

CHECKED BY: DWG

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMES IS STRICTLY PROHIBITED.

STATE OF CONNECTICUT
GREGORY DURGIN
No. 32155
LICENSED
PROFESSIONAL ENGINEER

SITE INFORMATION:

MOUNT AUGMENTATION

CT33XC023

CANTON, CT

LATITUDE: 41.83425
LONGITUDE: -72.93267

SHEET TITLE:

NOTES AND SPECIFICATIONS

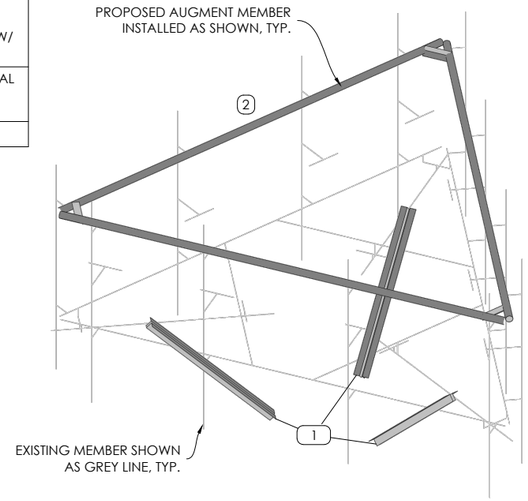
SHEET NUMBER:

S2

NEW MOUNT AUGMENTATIONS

1	PLATFORM REINFORCEMENT KIT SITEPRO1 PART# PRK-1245L. ATTACH PRK COLLAR TO MONOPOLE SHAFT ~3.5' BELOW EXISTING STANDOFF CENTERLINE AND DOUBLE ANGLE KICKER BRACKET TO STANDOFF MEMBER ~3.5' OUT FROM THE STANDOFF-TO-COLLAR INTERFACE AS SHOWN PER MANUF. SPECS. [(1) KIT TOTAL]
2	HANDRAIL KIT COMPONENTS SITEPRO1 PART# HRK12-U OR HRK14-U. ATTACH TO MOUNT PIPES ~3.0' ABOVE EXISTING STANDOFF CENTERLINE. VERIFY MOUNT FACE WIDTH IN FIELD PRIOR TO ORDERING. [(1) KIT TOTAL] ▪ PIPE2.0STD MOUNT PIPES, [(6) TOTAL] TO NEW HANDRAIL. ATTACH ALL MOUNT PIPES TO NEW TOP HANDRAIL USING KIT-PROVIDED CROSS-OVER PLATES. ▪ 1/2"Ø OR 5/8"Ø U-BOLTS, (12) TOTAL. ATTACH ALL MOUNT PIPES TO EXISTING BOTTOM RAIL W/ (2) U-BOLTS EACH SIMILAR TO EXISTING.
3	· PANEL ANTENNAS TO BE INSTALLED IN POSITIONS 2 AND 3. RRH UNITS TO BE INSTALLED ON DUAL SWIVEL BRACKETS BEHIND PANEL ANTENNAS IN POSITIONS 2 AND 3. · LOWER THE PANEL ANTENNA INSTALLATION CENTERLINE APPROXIMATELY 1.0'.
AUGMENTATIONS SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF ANY NEW EQUIPMENT.	

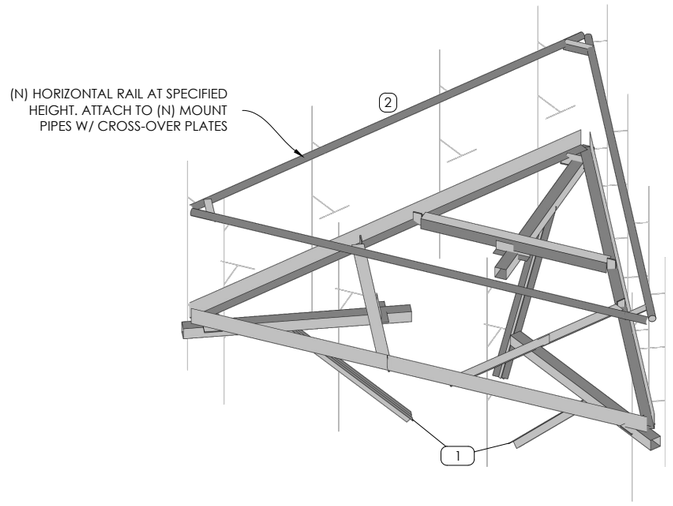
PLATFORM @ 177' AUGMENTATION



MOUNT AUGMENTATION ISOLATION
SCALE: N.T.S.

CONSTRUCTION NOTES

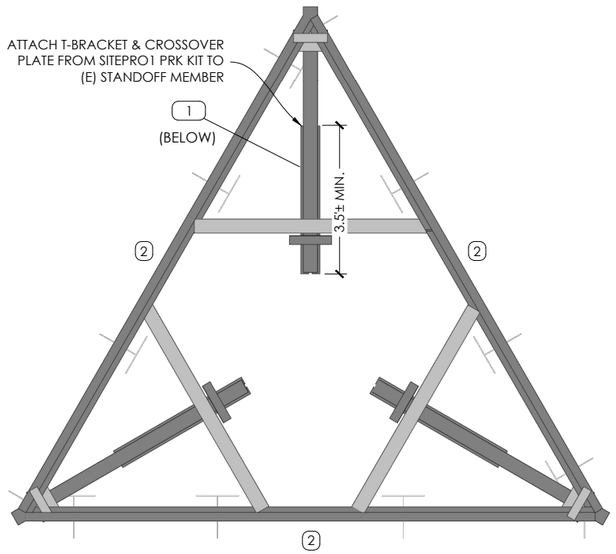
1. SCOPE OF WORK MUST BE COMPLETED AT WIND SPEEDS < 20 MPH.
2. ALL DIMENSIONS ARE APPROXIMATE. CONTRACTOR SHOULD FIELD-VERIFY ALL DIMENSIONS BEFORE FABRICATION OF STEEL AND COMMENCEMENT OF WORK. FIELD CUT MEMBERS AS REQUIRED.
3. CONTRACTOR TO COORDINATE THE TEMPORARY REMOVAL/RELOCATION/REPLACEMENT OF ELEMENTS (E.G. COAX, CLIPS, TMAs, ETC.) CONNECTED TO, OR IN THE DIRECT PATH, OF NEW AUGMENTATION MEMBERS.



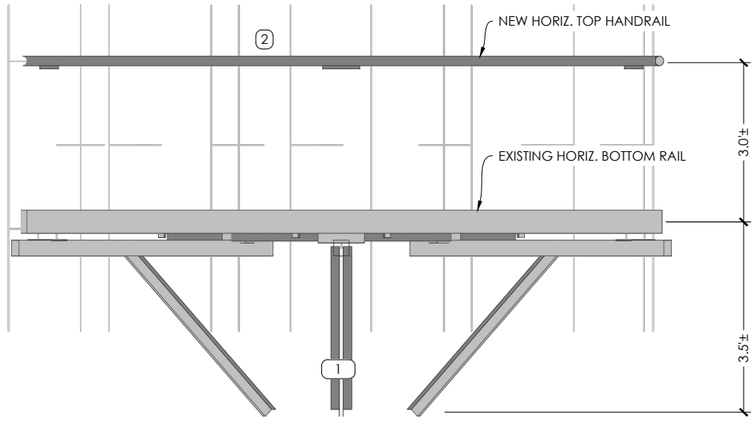
AUGMENTED MOUNT ISOMETRIC
SCALE: N.T.S.

INSTALLATION NOTES

1. AUGMENT MEMBER(S) MAY NEED TO BE FIELD-CUT TO LENGTH TO ACCOMMODATE THIS INSTALLATION. CONTRACTOR TO CUT AND DRILL TO SUIT AS REQUIRED AND APPLY (2) COATS OF COLD-GALV. COMPOUND TO CUT MEMBER ENDS.
2. CONTRACTOR TO CHECK ALL EXISTING MEMBER CONNECTION BOLTS, PARTICULARLY STANDOFF TO TOWER BOLTS, FOR PROPER INSTALLATION AND TIGHTNESS.
3. COORDINATE PLACEMENT OF NEW AUGMENT MEMBERS WITH EXISTING TOWER AND CLIMBING FACILITY ELEMENTS (E.G. STEP PEGS, COAX PORTS, ETC.)
4. REFER TO CONSTRUCTION DRAWINGS (BY OTHERS) AND MOUNT STRUCTURAL ANALYSIS FOR APPROVED INSTALLATION LOCATIONS AND QUANTITIES OF APPURTENANCES.



AUGMENTED MOUNT PLAN
SCALE: N.T.S.



AUGMENTED MOUNT FRONT ELEVATION
SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
P: 800.357.7641

SBA
134 FLANDERS RD., SUITE 125
WESTBOROUGH, MA 01581
P: 508.251.0720

GEOSTRUCTURAL
PO BOX 2621, BOISE, ID 83701
P: 530.539.4787
E: CONTACT@GEOSTRUCTURAL.COM
WWW.GEOSTRUCTURAL.COM

REVISIONS:

0	04/15/18	ISSUE FOR CONSTRUCTION	JAD

CHECKED BY: DWG

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMES IS STRICTLY PROHIBITED.

STATE OF CONNECTICUT
GREGORY DURGIN
No. 32155
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION:

MOUNT AUGMENTATION

CT33XC023

CANTON, CT

LATITUDE: 41.83425
LONGITUDE: -72.93267

SHEET TITLE:

AUGMENTATIONS, SECTIONS & DETAILS

SHEET NUMBER:

S3