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Also admitted in Massachusetts

May 7, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
126 Ledge Road, Darien, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 100-foot level of the existing 117-foot tower at 126 Ledge Road in Darien, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1992 (Docket No. 155). Cellco now intends to modify its facility by adding three (3) model MG D3-800TX, 2100 MHz antennas, all at the same 100-foot level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its new 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable attached to the outside of the monopole. Included in Attachment 1 are specifications for Cellco's additional antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 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 Jayme Stevenson, First Selectman for the Town of Darien. The Town of Darien is the owner of the Property.

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 tower. The additional antennas and RRHs will be located at the 100-foot level on the 117-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, 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 modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Modification Analysis Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Jayme Stevenson, Darien First Selectman
Sandy M. Carter

ATTACHMENT 1

SINGLE-BAND PANEL ANTENNA

BROADBAND 1710-2170 MHz

MGD3-800TX

1710 - 2170		
1710-1880	1850-1990	1920-2170
H66º V7.2º	H64º V6.6º	H63º V6.3º
Fixed Tilt	Fixed Tilt	Fixed Tilt
0º,2º,4º,6º	0º,2º,4º,6º	0º,2º,4º,6º

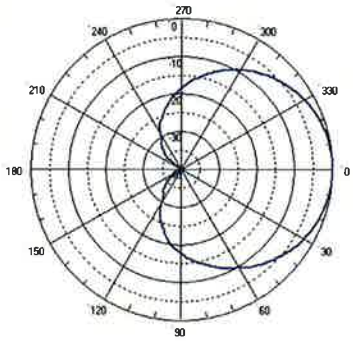
ELECTRICAL SPECIFICATIONS

BROADBAND 1710-2170 MHz

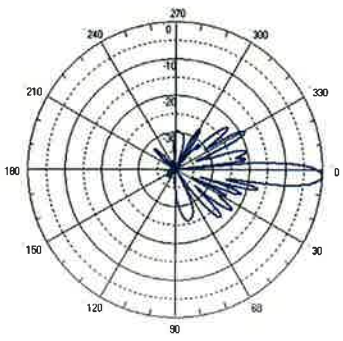
Antenna Model	MGD3-800TX		
Polarization	± 45º		
Frequency	***1710-2170***		
	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	66º	64º	63º
Vertical Beamwidth	7.2º	6.6º	6.3º
Gain (dBi)	18	18	18.5
Vertical Electrical Tilt	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º
Upper Sidelobe Suppression for the 1st lobe above main beam (dB)	20	20	20
Front-to-Back Ratio @ 180º ± 20º (dB)	> 30	> 30	> 30
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Cross Polar Ratio @ ± 60º (dB)	> 10	> 10	> 10
Isolation between Ports (dB)	> 30	> 30	> 30
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< - 150		
Impedance (Ω)	50		

MECHANICAL SPECIFICATIONS

Connectors		2 X 7/16 Female
Connector Position		Bottom
Survival Wind Speed	km/h (mph)	200 (125)
Front Windload N @ 160 km/h	(lbs @ 100 mph)	370 (85)
Lateral Windload N @ 160 km/h	(lbs @ 100 mph)	170 (40)
Radome Color		Grey, paintable
Humidity		100%
Antenna Weight	kg (lbs)	7 (15)
Antenna Dimension mm (in) H X W X D		1340 X 170 X 100 (53 X 7 X 4)



H&V Pattern



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Phone: + 1 888 622 6093
www.rymsawireless.com

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

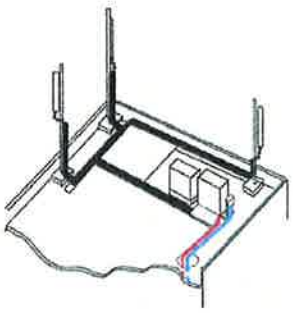
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

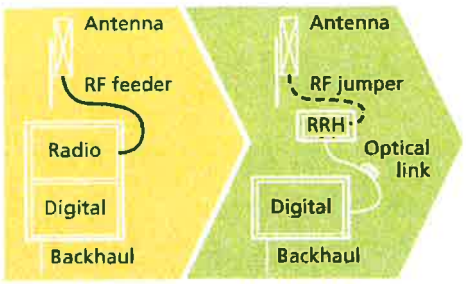
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

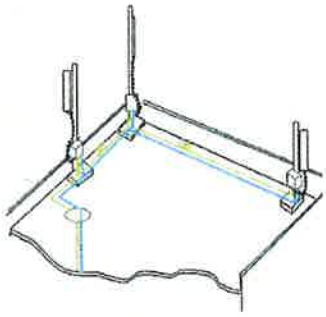
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

CPG2809100912 (09)

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

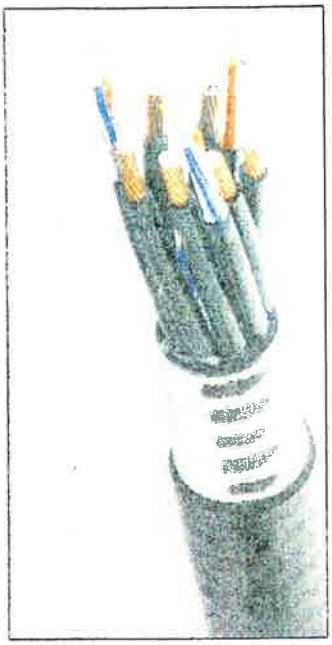


Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mechanical Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Fiber Optic Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power Cable Properties			
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-93-638 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

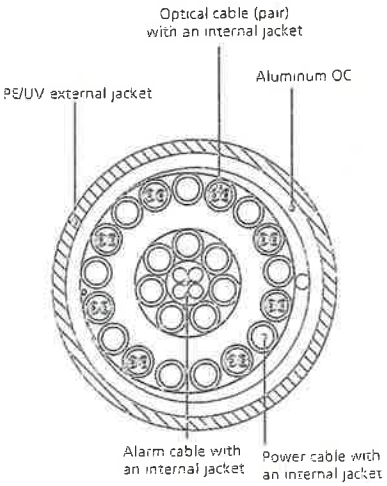


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

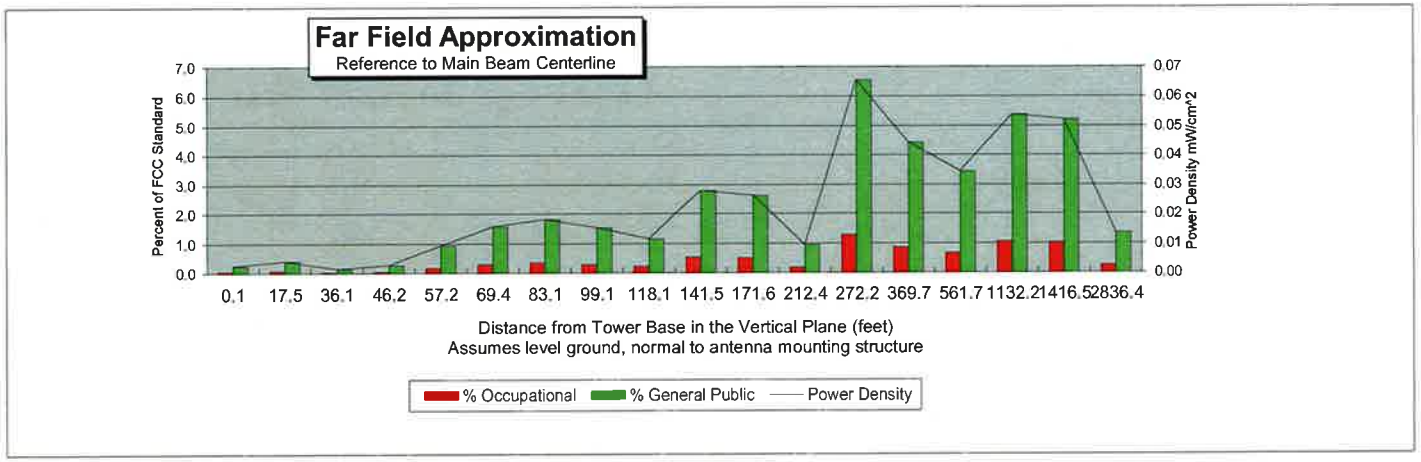
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	DARIEN, CT
Site #:	5-0073
Date:	05/05/14
Name:	Ryan Ulanday
File Name:	DARIEN, CT - FF Power

Operating Freq. (MHz)	**1971.0**
Antenna Height (ft):	**102.0**
Antenna Gain (dBi):	**18.7**
Antenna Size (in.):	**54.3**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**6855.0**



This approximation is only valid in the far field, which begins at: 36.7 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	99.0	100.5	105.4	109.3	114.4	120.9	129.3	140.1	154.1	172.7	198.1	234.4	289.6	382.7	570.4	1136.5	1419.9	2838.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	17.5	36.1	46.2	57.2	69.4	83.1	99.1	118.1	141.5	171.6	212.4	272.2	369.7	561.7	1132.2	1416.5	2836.4	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.01	0.07	0.04	0.03	0.05	0.05	0.01	#NUM!
Percent of Occupational Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.3	0.2	0.6	0.5	0.2	1.3	0.9	0.7	1.1	1.0	0.3	#NUM!
Percent of General Population Standard	0.2	0.4	0.1	0.3	0.9	1.6	1.8	1.5	1.2	2.8	2.6	1.0	6.5	4.4	3.5	5.4	5.2	1.4	#NUM!

Antenna Type MG D3-800T0
Max% 6.54%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

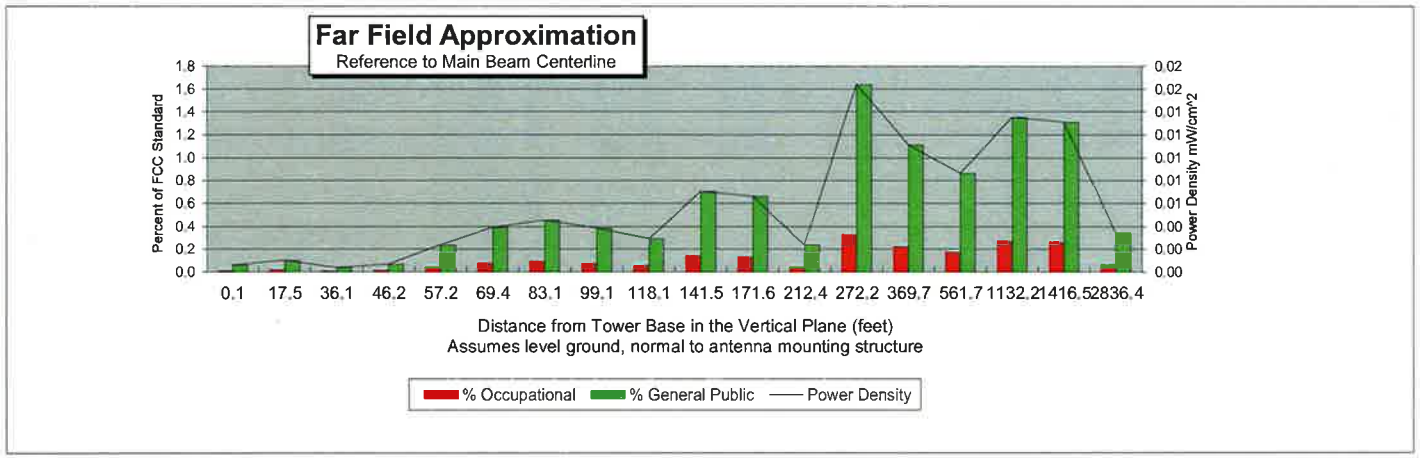
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	DARIEN, CT
Site #:	5-0073
Date:	05/05/14
Name:	Ryan Ulanday
File Name:	DARIEN, CT - FF Power

Operating Freq. (MHz)	**2110.0**
Antenna Height (ft):	**102.0**
Antenna Gain (dBi):	**18.6**
Antenna Size (in.):	**54.3**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



This approximation is only valid in the far field, which begins at: 36.7 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	99.0	100.5	105.4	109.3	114.4	120.9	129.3	140.1	154.1	172.7	198.1	234.4	289.6	382.7	570.4	1136.5	1419.9	2838.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	17.5	36.1	46.2	57.2	69.4	83.1	99.1	118.1	141.5	171.6	212.4	272.2	369.7	561.7	1132.2	1416.5	2836.4	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.3	0.3	0.1	#NUM!
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.2	0.4	0.5	0.4	0.3	0.7	0.7	0.2	1.6	1.1	0.9	1.3	1.3	0.3	#NUM!

Antenna Type MG D3-800T0
Max% 1.64%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

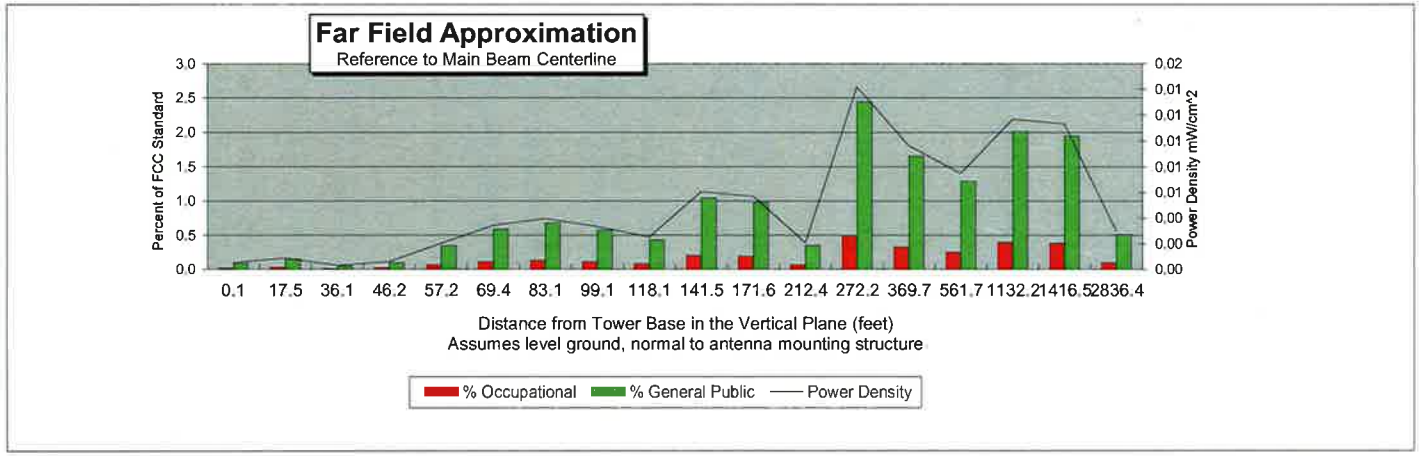
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	DARIEN, CT
Site #:	5-0073
Date:	05/05/14
Name:	Ryan Ulanday
File Name:	DARIEN, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**102.0**
Antenna Gain (dBi):	**15.7**
Antenna Size (in.):	**48.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2961.0**



This approximation is only valid in the far field, which begins at: 28.7 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	99.0	100.5	105.4	109.3	114.4	120.9	129.3	140.1	154.1	172.7	198.1	234.4	289.6	382.7	570.4	1136.5	1419.9	2838.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	17.5	36.1	46.2	57.2	69.4	83.1	99.1	118.1	141.5	171.6	212.4	272.2	369.7	561.7	1132.2	1416.5	2836.4	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.4	0.4	0.1	#NUM!
Percent of General Population Standard	0.1	0.1	0.1	0.1	0.4	0.6	0.7	0.6	0.4	1.0	1.0	0.4	2.4	1.7	1.3	2.0	2.0	0.5	#NUM!

Antenna Type DB844G65ZAXY
Max% 2.44%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

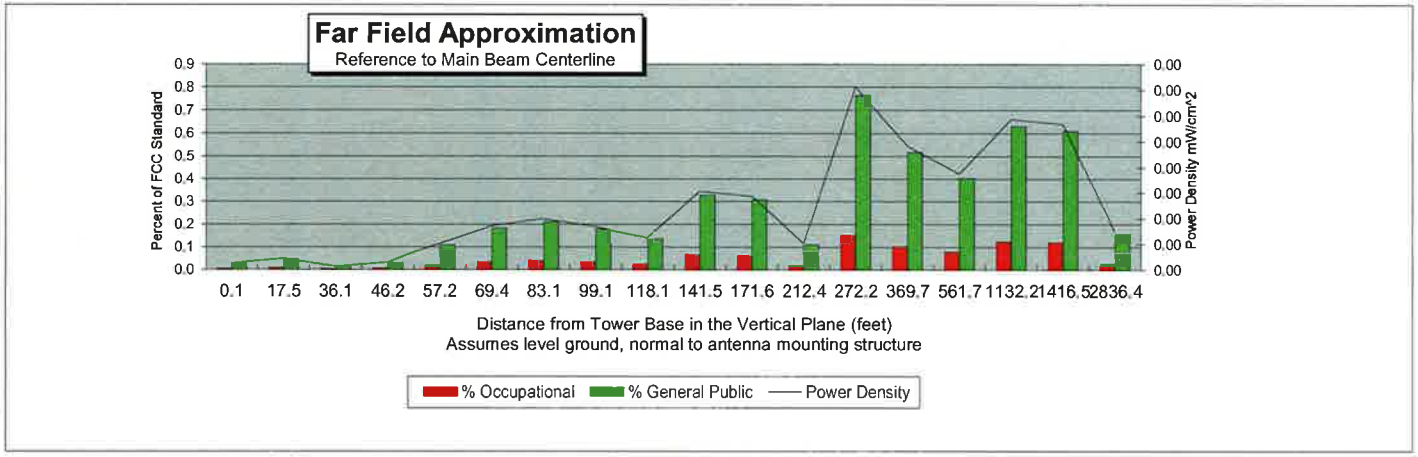
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	DARIEN, CT
Site #:	5-0073
Date:	05/05/14
Name:	Ryan Ulanday
File Name:	DARIEN, CT - FF Power

Operating Freq. (MHz)	**698.0**
Antenna Height (ft):	**102.0**
Antenna Gain (dBi):	**15.9**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**711.0**



This approximation is only valid in the far field, which begins at: 64.4 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	99.0	100.5	105.4	109.3	114.4	120.9	129.3	140.1	154.1	172.7	198.1	234.4	289.6	382.7	570.4	1136.5	1419.9	2838.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	17.5	36.1	46.2	57.2	69.4	83.1	99.1	118.1	141.5	171.6	212.4	272.2	369.7	561.7	1132.2	1416.5	2836.4	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.0	#NUM!
Percent of General Population Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.8	0.5	0.4	0.6	0.6	0.2	#NUM!

Antenna Type LNX-6514DS-A1M
Max% 0.77%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

Date: **December 20, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
(585) 899-3445

Tower Engineering Professionals
3703 Junction Blvd.
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Modification Analysis Report

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Darien, CT
Crown Castle Designation:	**Crown Castle BU Number:**	806352
	Crown Castle Site Name:	BRG 302 943052
	Crown Castle JDE Job Number:	246650
	Crown Castle Work Order Number:	686696
	Crown Castle Application Number:	200733 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	25562.12516
Site Data:	**126 Ledge Road, Darien, Fairfield County, CT 06820** **Latitude *41° 4' 20.75"*, Longitude *-73° 28' 41.4"*** **117 Foot - Monopole Tower**	

Dear Steve Tuttle,

Tower Engineering Professionals is pleased to submit this **"Structural Modification Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 600194, in accordance with application 200733, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Existing + Reserved + Proposed Equipment with Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut State Building Code (2006 International Building Code) based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawings for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *Crown Castle*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Matthew Lee, E.I. / JSC

Respectfully submitted by:

William H. Martin, P.E., S.E., C.W.I.

STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED
PROFESSIONAL ENGINEER
12/20/13

Electronic Copy

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1) INTRODUCTION

This tower is a 100-ft monopole tower designed by Valmont in January of 1993. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-E for the appurtenances listed in Table 3. The tower was extended 17-ft per reinforcement drawings by GPD Associates, bringing the total height to 117-ft. The tower has been modified multiple times in the past to accommodate additional loading. TEP visited the site in December of 2010 and in November of 2013 to perform post modification inspections. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	100.0	3	Alcatel Lucent	RRH2X40-AWS	1	1-5/8	1
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		3	Rymsa Wireless	MG D3-800TV w/ Mount Pipe			

Notes:
1) See "Appendix B – Base Level Drawing" for assumed feed line configuration.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.0	117.0	3	Alcatel Lucent	800 External Notch Filter	3	1/2	1
		9	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	Tower Mounts	Side Arm Mount [SO 102-3]	-	-	2
115.0	115.0	3	Alcatel Lucent	TME-800 MHz RRH	-	-	1
		3	Alcatel Lucent	TME-PCS 1900 MHz 4x45W-65MHz			
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
110.0	110.0	3	Ericsson	Ericsson AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	1
		3	Ericsson	KRY 112 144/1			
		1	Tower Mounts	Side Arm Mount [SO 102-3]	12	1-1/4	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	100.0	3	Andrew	LNX-6514DS-T4M w/ Mount Pipe	12	7/8	2
		6	Decibel	DB844G65ZAXY w/ Mount Pipe			
		1	GPS	GPS_A			
		6	RFS Celwave	FD9R6004/2C-3L			
		3	Rymsa Wireless	MG D3-800TV w/ Mount Pipe			
	98.0	1	Tower Mounts	Platform Mount [LP 713-1]			
93.0	95.0	1	Andrew	VHLP1-23	4	1/2	2
	94.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2.5-11			
	93.0	1	Tower Mounts	Side Arm Mount [SO 102-3]			
	92.0	1	Andrew	VHLP1-23			
88.0	89.0	3	Ericsson	RRUS-11	-	-	1
		6	Powerwave Technologies	7770.00 w/ Mount Pipe	1 2 12	3/8 5/8 1-1/4	2
		2	Powerwave Technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	Powerwave Technologies	P65-17-XLH-RR w/ Mount Pipe			
	88.0	1	Tower Mounts	Platform Mount [LP 713-1]			
	87.0	3	Ericsson	RRUS-11			
		6	Powerwave Technologies	LGP13519			
		6	Powerwave Technologies	LGP2140X			
		1	Raycap	DC6-48-60-18-8F			
81.0	81.0	3	Kathrein	800 10504 w/ Mount Pipe	6	1-5/8	2
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
72.0	72.0	3	Andrew	LBX-9012DS-VTM w/ Mount Pipe	9 6	7/8 5/16	2
		3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Decibel	DB844H90E-XY w/ Mount Pipe			
		3	Samsung Telecommuncations	FDD_R6_RRH			
		1	Tower Mounts	Platform Mount [LP 713-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
50.0	50.0	1	Tower Mounts	Side Arm Mount [SO 701-1]	-	-	3

Notes:
1) Reserved equipment
2) Existing equipment
3) Abandoned equipment; considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
97.0	97.0	6	Sinclair	SRL410C4R105	-	-
		2	Celwave	PD100		
84.0	84.0	6	Sinclair	SRL410C4R105	-	-
		2	Celwave	PD100		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	FDH Engineering, Inc.	217769	CCISites
Foundation Mapping	FDH Engineering, Inc.	3907710	CCISites
Tower Manufacturer Drawings	Valmont Industries, Inc.	217772	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	2743848	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	4062469	CCISites
Tower Reinforcement Drawings	GPD Associates	217772	CCISites
Post Modification Inspection	Tower Engineering Professionals	2785508	CCISites
Post Modification Inspection	Tower Engineering Professionals	4069331	CCISites
Previous Structural Analysis	Tower Engineering Professionals	4059511	CCISites

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

For analysis of monopole shaft reinforcements, the plates are modeled as linear appurtenances along the exterior of the pole. The loads calculated from tnxTower are then exported to a proprietary calculation sheet created by Tower Engineering Professionals, Inc. that analyzes each reinforcing element along each critical axis and presents percent capacities for each element and the pole shaft along each critical axis. The actual percent capacity of the tower structure including the reinforcing elements is reported in Table 5 - Section Capacity (Summary).

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 7.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
8) The foundation was assumed to have a longitudinal steel to concrete ratio equal to 0.5% for the purpose of the caisson flexural check.
9) The following material grades were assumed:
   a) Foundation reinforcing steel: 60 ksi
   b) Foundation concrete compressive strength: 3,000 psi

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_{allow} (K)	% Capacity	Pass / Fail
L1	117.00-110.00	Pole	TP15.94x14.36x0.1875	1	Note 1	Note 1	9.8	Pass
L2	110.00-100.00	Pole	TP18.2x15.94x0.1875	2	Note 1	Note 1	27.4	Pass
L3	100.00-47.42	Pole	TP30.09x18.2x0.25	3	Note 1	Note 1	96.4	Pass
L4	52.00-0.00	Pole	TP40.3x28.5537x0.344	4	Note 1	Note 1	76.1	Pass
M1	35.00-0.00	Mod	(Sabre) MS-600	5	Note 1	Note 1	90.5	Pass
M2	65.00-35.00	Mod	(Sabre) MS-450	6	Note 1	Note 1	84.7	Pass
M3	5.50-0.00	Mod	(ts) 1.25x6.5-65 (ch)	7	Note 1	Note 1	63.2	Pass
M4	10.50-0.50	Mod	(Sabre) MS-450	8	Note 1	Note 1	85.4	Pass
M5	45.00-30.00	Mod	(Sabre) MS-450	9	Note 1	Note 1	73.6	Pass
M6	72.25-50.00	Mod	(Sabre) MS-450	10	Note 1	Note 1	91.2	Pass
M7	40.00-0.00	Mod	Shaft Reinforcement	11	Note 1	Note 1	88.5	Pass
M8	50.00-40.00	Mod	Shaft Reinforcement	12	Note 1	Note 1	72.5	Pass
							Summary	
						Pole (L3)	96.4	Pass
						Mod (M6)	91.2	Pass
						RATING =	**96.4**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	110.0	6.2	Pass
1	Flange Connection	100.0	25.9	Pass
1	Anchor Rods	-	96.3	Pass
1	Base Plate	-	70.6	Pass
1	Base Foundation Soil Interaction	-	60.8	Pass
1	Base Foundation Structural	-	78.8	Pass

Structure Rating (max from all components) =	96.4%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

Table 7 - Dish Twist/Sway Results for 50 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
95.0	Andrew VHLP1-23	15.284	1.6596	0.0062
94.0	Andrew VHLP2-11	14.934	1.6401	0.0060
	Andrew VHLP2.5-11	14.934	1.6401	0.0060
92.0	Andrew VHLP1-23	14.246	1.5991	0.0057

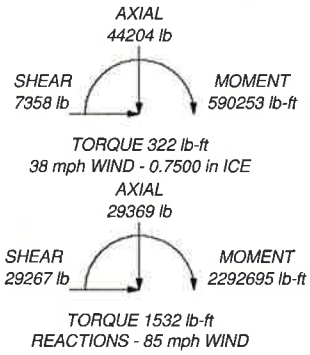
4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The modifications depicted in "Appendix D – Structural Modification Drawings" shall be installed and, upon completion, inspected. The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads once the proposed modifications are installed.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12
Length (ft)	7.00	10.00	29.25	7.25	16.08	8.50	4.75	3.75	3.50	22.50	7.00	2.00
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.1875	0.2500	0.4322	0.5821	0.6076	0.7557	0.7424	0.7824	0.5873	0.5768	0.5732
Socket Length (ft)					4.58							
Top Dia (in)	14.3600	15.9400	18.2000	24.8143	26.4538	27.8902	30.4738	31.5467	32.3936	33.1845	38.2670	39.8482
Bot Dia (in)	15.9400	18.2000	24.8143	26.4538	30.0900	30.4738	31.5467	32.3938	33.1845	38.2670	39.8482	40.3000
Grade	A572-65 (50% Density)											
Weight (lb)	215.2	346.8	1703.2	504.0	1233.4	923.5	548.9	446.9	428.0	2999.2	1021.3	999.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 EXTERNAL NOTCH FILTER	117	Platform Mount [LP 713-1]	98
800 EXTERNAL NOTCH FILTER	117	2.9" DIA x 4' mount pipe	93
800 EXTERNAL NOTCH FILTER	117	2.9" DIA x 4' mount pipe	93
(3) ACU-A20-N	117	2.9" DIA x 4' mount pipe	93
(3) ACU-A20-N	117	Side Arm Mount [SO 102-3]	93
(3) ACU-A20-N	117	VHLP2.5-11	93
APXVSPP18-C-A20 w/ Mount Pipe	117	VHLP1-23	93
APXVSPP18-C-A20 w/ Mount Pipe	117	VHLP2-11	93
APXVSPP18-C-A20 w/ Mount Pipe	117	VHLP1-23	93
Side Arm Mount [SO 102-3]	117	(2) LGP13519	88
TME-800MHZ RRH	115	(2) LGP13519	88
TME-800MHZ RRH	115	RRUS-11	88
TME-800MHZ RRH	115	RRUS-11	88
TME-PCS 1900MHz 4x45W-65MHz	115	RRUS-11	88
TME-PCS 1900MHz 4x45W-65MHz	115	(2) 7770.00 w/ Mount Pipe	88
TME-PCS 1900MHz 4x45W-65MHz	115	(2) 7770.00 w/ Mount Pipe	88
Side Arm Mount [SO 102-3]	115	(2) 7770.00 w/ Mount Pipe	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP2140X	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP2140X	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP2140X	88
KRY 112 144/1	110	DC6-48-60-18-8F	88
KRY 112 144/1	110	RRUS-11	88
KRY 112 144/1	110	RRUS-11	88
Side Arm Mount [SO 102-3]	110	RRUS-11	88
LNX-6514DS-T4M w/ Mount Pipe	98	Platform Mount [LP 713-1]	88
LNX-6514DS-T4M w/ Mount Pipe	98	P65-17-XLH-RR w/ Mount Pipe	88
LNX-6514DS-T4M w/ Mount Pipe	98	P65-16-XLH-RR w/ Mount Pipe	88
(2) DB844G65ZAXY w/ Mount Pipe	98	P65-16-XLH-RR w/ Mount Pipe	88
(2) DB844G65ZAXY w/ Mount Pipe	98	(2) LGP13519	88
(2) DB844G65ZAXY w/ Mount Pipe	98	800 10504 w/ Mount Pipe	81
GPS_A	98	800 10504 w/ Mount Pipe	81
(2) FD9R6004/2C-3L	98	800 10504 w/ Mount Pipe	81
(2) FD9R6004/2C-3L	98	Side Arm Mount [SO 102-3]	81
(2) FD9R6004/2C-3L	98	LLPX310R w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	72
RRH2X40-AWS	98	LBX-9012DS-VTM w/ Mount Pipe	72
RRH2X40-AWS	98	FDD_R6_RRH	72
RRH2X40-AWS	98	FDD_R6_RRH	72
DB-T1-6Z-8AB-0Z	98	FDD_R6_RRH	72
MG D3-800TV w/ Mount Pipe	98	Platform Mount [LP 713-1]	72
MG D3-800TV w/ Mount Pipe	98	DB844H90E-XY w/ Mount Pipe	72
MG D3-800TV w/ Mount Pipe	98	DB844H90E-XY w/ Mount Pipe	72
		DB844H90E-XY w/ Mount Pipe	72
		LLPX310R w/ Mount Pipe	72
		Side Arm Mount [SO 701-1]	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	A572-65 (50% Density)	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

Tower Engineering Professionals
3703 Junction Boulevard
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	BRG 302 943052 (BU 806352)
Project:	TEP No. 25562.12516
Client: Crown Castle	Drawn by: mlee / App'd:
Code: TIA/EIA-222-F	Date: 12/20/13 / Scale: NTS
Path: T:\25562\12516_CMPP - 806352 - BRG 302 943052\mTower\Aero\AERO_806352_LC4.7.eri	Dwg No. E-1

tnxTower	Job	Page
	BRG 302 943052 (BU 806352)	1 of 33
Tower Engineering Professionals 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	**Project** TEP No. 25562.12516	**Date** 12:00:18 12/20/13
	Client Crown Castle	**Designed by** mlee

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	117.00-110.00	7.00	0.00	12	14.3600	15.9400	0.1875	0.7500	A572-65 (65 ksi)
L2	110.00-100.00	10.00	0.00	12	15.9400	18.2000	0.1875	0.7500	A572-65 (65 ksi)
L3	100.00-70.75	29.25	0.00	12	18.2000	24.8143	0.2500	1.0000	A572-65 (65 ksi)
L4	70.75-63.50	7.25	0.00	12	24.8143	26.4538	0.4322	1.7290	A572-65 (50% Density) (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	63.50-47.42	16.08	4.58	12	26.4538	30.0900	0.5821	2.3283	A572-65 (50% Density) (65 ksi)
L6	47.42-43.50	8.50	0.00	12	27.8902	30.4738	0.6076	2.4304	A572-65 (50% Density) (65 ksi)
L7	43.50-38.75	4.75	0.00	12	30.4738	31.5467	0.7557	3.0226	A572-65 (50% Density) (65 ksi)
L8	38.75-35.00	3.75	0.00	12	31.5467	32.3938	0.7424	2.9698	A572-65 (50% Density) (65 ksi)
L9	35.00-31.50	3.50	0.00	12	32.3938	33.1845	0.7824	3.1295	A572-65 (50% Density) (65 ksi)
L10	31.50-9.00	22.50	0.00	12	33.1845	38.2670	0.5873	2.3493	A572-65 (50% Density) (65 ksi)
L11	9.00-2.00	7.00	0.00	12	38.2670	39.8482	0.5768	2.3074	A572-65 (50% Density) (65 ksi)
L12	2.00-0.00	2.00		12	39.8482	40.3000	0.5732	2.2929	A572-65 (50% Density) (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.8666	8.5566	219.3727	5.0738	7.4385	29.4916	444.5085	4.2113	3.3460	17.845
	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
L2	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
	18.8420	10.8750	450.3655	6.4485	9.4276	47.7710	912.5625	5.3524	4.3751	23.334
L3	18.8420	14.4498	594.2582	6.4261	9.4276	63.0339	1204.1282	7.1117	4.2076	16.83
	25.6897	19.7743	1522.9921	8.7940	12.8538	118.4854	3085.9948	9.7323	5.9802	23.921
L4	25.6897	33.9356	2575.0415	8.7288	12.8538	200.3326	5217.7321	16.7021	5.4918	12.705
	27.3870	36.2175	3130.1891	9.3157	13.7031	228.4298	6342.6118	17.8251	5.9312	13.722
L5	27.3870	48.4905	4142.8008	9.2621	13.7031	302.3265	8394.4376	23.8656	5.5297	9.5
	31.1515	55.3057	6146.5824	10.5638	15.5866	394.3499	12454.6424	27.2198	6.5042	11.174
L6	30.3152	53.3782	5071.3094	9.7672	14.4471	351.0258	10275.8477	26.2711	5.8462	9.622
	31.5488	58.4329	6652.7705	10.6921	15.7854	421.4505	13480.3166	28.7589	6.5386	10.761
L7	31.5488	72.3107	8151.3743	10.6391	15.7854	516.3865	16516.8943	35.5891	6.1418	8.128
	32.6596	74.9215	9066.5579	11.0232	16.3412	554.8276	18371.3043	36.8741	6.4294	8.508
L8	32.6596	73.6434	8919.5359	11.0279	16.3412	545.8306	18073.3980	36.2450	6.4648	8.707
	33.5366	75.6685	9675.7925	11.3312	16.7800	576.6262	19605.7788	37.2417	6.6918	9.013
L9	33.5366	79.6363	10157.4864	11.3169	16.7800	605.3327	20581.8212	39.1946	6.5848	8.417
	34.3551	81.6280	10938.8357	11.5999	17.1895	636.3656	22165.0467	40.1748	6.7967	8.687
L10	34.3551	61.6468	8360.9426	11.6698	17.1895	486.3969	16941.5364	30.3407	7.3194	12.462
	39.6169	71.2587	12913.3281	13.4893	19.8223	651.4546	26165.9038	35.0714	8.6815	14.782
L11	39.6169	70.0075	12693.6301	13.4931	19.8223	640.3712	25720.7361	34.4555	8.7096	15.099
	41.2539	72.9445	14359.2195	14.0592	20.6414	695.6522	29095.6717	35.9011	9.1334	15.833
L12	41.2539	72.4939	14273.1499	14.0604	20.6414	691.4824	28921.2713	35.6793	9.1431	15.95
	41.7216	73.3278	14771.3902	14.2222	20.8754	707.5979	29930.8413	36.0897	9.2641	16.161

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 117.00-110.00				1	1	1		
L2 110.00-100.00				1	1	1		
L3 100.00-70.75				1	1	1		
L4 70.75-63.50				1	1	1.16486		
L5 63.50-47.42				1	1	0.86866		
L6 47.42-43.50				1	1	1.1423		
L7 43.50-38.75				1	1	0.92264		
L8 38.75-35.00				1	1	0.93832		
L9 35.00-31.50				1	1	0.89128		
L10 31.50-9.00				1	1	1.17898		
L11 9.00-2.00				1	1	1.19976		
L12 2.00-0.00				1	1	1.20714		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
*****										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*** 117' ***								
HYBRIFLEX RRH 1-SECTOR(1/2")	A	No	CaAa (Out Of Face)	98.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55
						4" Ice	0.00	22.73
HYBRIFLEX RRH 1-SECTOR(1/2")	A	No	CaAa (Out Of Face)	117.00 - 98.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.83
						1" Ice	0.26	2.13
						2" Ice	0.46	6.55
						4" Ice	0.86	22.73
HYBRIFLEX RRH 1-SECTOR(1/2")	A	No	CaAa (Out Of Face)	117.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55
						4" Ice	0.00	22.73
*** 110' ***								
LDF6-50A(1-1/4")	B	No	Inside Pole	110.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
MLE Hybrid 9Power/18Fiber RL 2(1	B	No	CaAa (Out Of Face)	81.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	2.37

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
5/8)						1" Ice	0.00	4.28
						2" Ice	0.00	9.93
						4" Ice	0.00	28.56
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	B	No	CaAa (Out Of Face)	110.00 - 81.00	1	No Ice	0.16	1.07
						1/2" Ice	0.26	2.37
						1" Ice	0.36	4.28
						2" Ice	0.56	9.93
						4" Ice	0.96	28.56
*** 98' ***								
LDF5-50A(7/8")	C	No	Inside Pole	98.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	72.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
						2" Ice	0.00	11.02
						4" Ice	0.00	30.52
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	98.00 - 72.00	1	No Ice	0.20	1.30
						1/2" Ice	0.30	2.81
						1" Ice	0.40	4.94
						2" Ice	0.60	11.02
						4" Ice	1.00	30.52
*** 93' ***								
7983A(1/2")	A	No	CaAa (Out Of Face)	93.00 - 0.00	4	No Ice	0.00	0.08
						1/2" Ice	0.00	0.74
						1" Ice	0.00	2.01
						2" Ice	0.00	6.39
						4" Ice	0.00	22.47
*** 88' ***								
LDF6-50A(1-1/4")	B	No	Inside Pole	88.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98-002-XXX(3/8)	B	No	Inside Pole	88.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8")	B	No	Inside Pole	88.00 - 0.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
						2" Ice	0.00	0.31
						4" Ice	0.00	0.31
*** 81' ***								
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	81.00 - 0.00	2	No Ice	0.20	0.70
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.38
						2" Ice	0.60	10.50
						4" Ice	1.00	30.07
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	81.00 - 0.00	4	No Ice	0.00	0.70
						1/2" Ice	0.00	2.23
						1" Ice	0.00	4.38
						2" Ice	0.00	10.50
						4" Ice	0.00	30.07
*** 72' ***								
LDF5-50A(7/8")	A	No	Inside Pole	72.00 - 0.00	9	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
9207(5/16")	A	No	Inside Pole	72.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
						2" Ice	0.00	0.60
						4" Ice	0.00	0.60
2" Flexible Conduit	A	No	CaAa (Out Of Face)	50.00 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	72.00 - 50.00	1	No Ice	0.20	0.34
						1/2" Ice	0.30	1.87
						1" Ice	0.40	4.01
						2" Ice	0.60	10.11
						4" Ice	1.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	72.00 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
*****								
Step Pegs (3/4" SR) 7-in w/15" step	C	No	CaAa (Out Of Face)	117.00 - 0.00	1	No Ice	0.03	0.33
						1/2" Ice	0.14	0.85
						1" Ice	0.23	1.98
						2" Ice	0.43	6.08
						4" Ice	0.83	21.59
Safety Line 3/8	C	No	CaAa (Out Of Face)	117.00 - 0.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
*****								
Sabre (PL 1 x 6)	A	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
Sabre (PL 1 x 6)	B	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
Sabre (PL 1 x 6)	C	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
*****								
Sabre (PL 1 x 4.5)	A	No	CaAa (Out Of Face)	65.00 - 35.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	B	No	CaAa (Out Of Face)	65.00 - 35.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	C	No	CaAa (Out Of	65.00 - 35.00	1	No Ice	0.00	15.31

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
*****								
Sabre (PL 1 x 4.5)	A	No	CaAa (Out Of Face)	10.50 - 0.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
*****								
Sabre (PL 1 x 4.5)	A	No	CaAa (Out Of Face)	45.00 - 30.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	B	No	CaAa (Out Of Face)	45.00 - 30.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	C	No	CaAa (Out Of Face)	45.00 - 30.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
*****								
Sabre (PL 1 x 4.5)	A	No	CaAa (Out Of Face)	70.00 - 50.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	B	No	CaAa (Out Of Face)	70.00 - 50.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
Sabre (PL 1 x 4.5)	C	No	CaAa (Out Of Face)	70.00 - 50.00	1	No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
						2" Ice	0.00	20.80
						4" Ice	0.00	31.82
*****								
Aero MP3-03	A	No	CaAa (Out Of Face)	40.00 - 0.00	1	No Ice	0.26	9.90
						1/2" Ice	0.37	11.06
						1" Ice	0.48	12.57
						2" Ice	0.71	16.63
						4" Ice	1.15	28.88
Aero MP3-03	B	No	CaAa (Out Of Face)	40.00 - 0.00	1	No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
						2" Ice	0.00	16.63
						4" Ice	0.00	28.88
Aero MP3-03	C	No	CaAa (Out Of Face)	40.00 - 0.00	1	No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
						2" Ice	0.00	16.63
						4" Ice	0.00	28.88
*****								
Aero MP3-03	A	No	CaAa (Out Of Face)	50.00 - 40.00	1	No Ice	0.26	9.90
						1/2" Ice	0.37	11.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.48	12.57
						2" Ice	0.71	16.63
						4" Ice	1.15	28.88
Aero MP3-03	B	No	CaAa (Out Of Face)	50.00 - 40.00	1	No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
						2" Ice	0.00	16.63
						4" Ice	0.00	28.88
Aero MP3-03	C	No	CaAa (Out Of Face)	50.00 - 40.00	1	No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
						2" Ice	0.00	16.63
						4" Ice	0.00	28.88
*****								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	117.00-110.00	A	0.000	0.000	0.000	0.434	3.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.507	3.88
L2	110.00-100.00	A	0.000	0.000	0.000	0.620	4.50
		B	0.000	0.000	0.000	1.625	89.90
		C	0.000	0.000	0.000	0.725	5.54
L3	100.00-70.75	A	0.000	0.000	0.000	0.374	29.70
		B	0.000	0.000	0.000	7.208	454.33
		C	0.000	0.000	0.000	7.269	159.54
L4	70.75-63.50	A	0.000	0.000	0.000	1.450	180.76
		B	0.000	0.000	0.000	2.914	280.47
		C	0.000	0.000	0.000	0.526	164.65
L5	63.50-47.42	A	0.000	0.000	0.000	3.375	607.70
		B	0.000	0.000	0.000	6.464	828.85
		C	0.000	0.000	0.000	1.166	571.97
L6	47.42-43.50	A	0.000	0.000	0.000	1.026	153.30
		B	0.000	0.000	0.000	1.576	207.21
		C	0.000	0.000	0.000	0.284	144.59
L7	43.50-38.75	A	0.000	0.000	0.000	1.243	230.66
		B	0.000	0.000	0.000	1.910	295.99
		C	0.000	0.000	0.000	0.344	220.11
L8	38.75-35.00	A	0.000	0.000	0.000	0.981	182.10
		B	0.000	0.000	0.000	1.508	233.68
		C	0.000	0.000	0.000	0.272	173.77
L9	35.00-31.50	A	0.000	0.000	0.000	0.916	187.83
		B	0.000	0.000	0.000	1.407	235.96
		C	0.000	0.000	0.000	0.254	180.05
L10	31.50-9.00	A	0.000	0.000	0.000	5.888	908.87
		B	0.000	0.000	0.000	9.045	1195.34
		C	0.000	0.000	0.000	1.631	835.91
L11	9.00-2.00	A	0.000	0.000	0.000	1.832	375.66
		B	0.000	0.000	0.000	2.814	364.74
		C	0.000	0.000	0.000	0.507	252.91
L12	2.00-0.00	A	0.000	0.000	0.000	0.523	107.33
		B	0.000	0.000	0.000	0.804	104.21
		C	0.000	0.000	0.000	0.145	72.26

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	117.00-110.00	A	0.870	0.000	0.000	0.000	1.652	37.63
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.943	19.82
L2	110.00-100.00	A	0.862	0.000	0.000	0.000	2.343	53.13
		B		0.000	0.000	0.000	3.348	116.69
		C		0.000	0.000	0.000	4.172	28.04
L3	100.00-70.75	A	0.840	0.000	0.000	0.000	0.920	309.95
		B		0.000	0.000	0.000	13.842	714.13
		C		0.000	0.000	0.000	21.460	303.86
L4	70.75-63.50	A	0.817	0.000	0.000	0.000	2.634	310.63
		B		0.000	0.000	0.000	5.283	437.31
		C		0.000	0.000	0.000	2.894	213.53
L5	63.50-47.42	A	0.798	0.000	0.000	0.000	5.987	910.84
		B		0.000	0.000	0.000	11.596	1190.89
		C		0.000	0.000	0.000	6.298	701.17
L6	47.42-43.50	A	0.779	0.000	0.000	0.000	1.721	231.18
		B		0.000	0.000	0.000	2.827	299.45
		C		0.000	0.000	0.000	1.535	180.07
L7	43.50-38.75	A	0.770	0.000	0.000	0.000	2.056	325.09
		B		0.000	0.000	0.000	3.373	407.41
		C		0.000	0.000	0.000	1.807	265.66
L8	38.75-35.00	A	0.760	0.000	0.000	0.000	1.615	255.36
		B		0.000	0.000	0.000	2.648	320.24
		C		0.000	0.000	0.000	1.412	209.15
L9	35.00-31.50	A	0.751	0.000	0.000	0.000	1.500	255.59
		B		0.000	0.000	0.000	2.458	316.04
		C		0.000	0.000	0.000	1.305	213.08
L10	31.50-9.00	A	0.750	0.000	0.000	0.000	9.638	1315.62
		B		0.000	0.000	0.000	15.795	1679.04
		C		0.000	0.000	0.000	8.381	1017.49
L11	9.00-2.00	A	0.750	0.000	0.000	0.000	2.998	511.01
		B		0.000	0.000	0.000	4.914	514.54
		C		0.000	0.000	0.000	2.607	308.73
L12	2.00-0.00	A	0.750	0.000	0.000	0.000	0.857	146.00
		B		0.000	0.000	0.000	1.404	147.01
		C		0.000	0.000	0.000	0.745	88.21

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	117.00-110.00	-0.0851	-0.0349	-0.3341	-0.0236
L2	110.00-100.00	0.0967	0.0689	-0.0596	0.1184
L3	100.00-70.75	0.0057	0.2789	-0.1817	0.4916
L4	70.75-63.50	0.3253	0.0425	0.2430	0.1708
L5	63.50-47.42	0.3317	0.0312	0.2538	0.1631
L6	47.42-43.50	0.3304	-0.0283	0.2553	0.1051
L7	43.50-38.75	0.3331	-0.0285	0.2611	0.1029
L8	38.75-35.00	0.3354	-0.0287	0.2650	0.1028
L9	35.00-31.50	0.3372	-0.0289	0.2682	0.1025
L10	31.50-9.00	0.3432	-0.0294	0.2767	0.1056

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L11	9.00-2.00	0.3491	-0.0299	0.2853	0.1089
L12	2.00-0.00	0.3507	-0.0300	0.2878	0.1098

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*** 117' ***										
800 EXTERNAL NOTCH FILTER	A	From Leg	2.00 0.00 0.00		-10.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 EXTERNAL NOTCH FILTER	B	From Leg	2.00 0.00 0.00		-40.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 EXTERNAL NOTCH FILTER	C	From Leg	2.00 0.00 0.00		-20.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
(3) ACU-A20-N	A	From Leg	2.00 0.00 0.00		-10.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N	C	From Leg	2.00 0.00 0.00		-40.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N	B	From Leg	2.00 0.00 0.00		-20.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	1.04 2.32 4.41 11.80 44.85
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	2.00 0.00 0.00		-10.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	2.00 0.00 0.00		-40.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	2.00 0.00 0.00		-20.0000	117.00	No Ice 1/2" Ice 1" Ice	8.50 9.15 9.77	6.95 8.13 9.02	82.55 150.56 226.53

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	11.03	10.84	405.98
						4" Ice	13.68	14.85	908.95
Side Arm Mount [SO 102-3]	C	None		0.0000	117.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
*** 115' ***									
TME-800MHZ RRH	A	From Leg	2.00 0.75 0.00	-10.0000	115.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
TME-800MHZ RRH	B	From Leg	2.00 0.75 0.00	-40.0000	115.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
TME-800MHZ RRH	C	From Leg	2.00 0.75 0.00	-20.0000	115.00	No Ice	2.49	2.07	53.00
						1/2" Ice	2.71	2.27	74.19
						1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
TME-PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 -0.75 0.00	-10.0000	115.00	No Ice	2.71	2.61	60.00
						1/2" Ice	2.95	2.85	83.13
						1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
TME-PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 -0.75 0.00	-40.0000	115.00	No Ice	2.71	2.61	60.00
						1/2" Ice	2.95	2.85	83.13
						1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
TME-PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 -0.75 0.00	-20.0000	115.00	No Ice	2.71	2.61	60.00
						1/2" Ice	2.95	2.85	83.13
						1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
Side Arm Mount [SO 102-3]	C	None		0.0000	115.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
*** 110' ***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	2.00 0.00 0.00	0.0000	110.00	No Ice	6.83	5.64	112.18
						1/2" Ice	7.35	6.48	169.02
						1" Ice	7.86	7.26	232.59
						2" Ice	8.93	8.86	383.07
						4" Ice	11.18	12.29	806.82
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	2.00 0.00 0.00	0.0000	110.00	No Ice	6.83	5.64	112.18
						1/2" Ice	7.35	6.48	169.02
						1" Ice	7.86	7.26	232.59
						2" Ice	8.93	8.86	383.07
						4" Ice	11.18	12.29	806.82
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	2.00 0.00 0.00	0.0000	110.00	No Ice	6.83	5.64	112.18
						1/2" Ice	7.35	6.48	169.02
						1" Ice	7.86	7.26	232.59

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	8.93	8.86	383.07
						4" Ice	11.18	12.29	806.82
KRY 112 144/1	A	From Face	2.00	0.0000	110.00	No Ice	0.41	0.20	11.00
			0.00			1/2" Ice	0.50	0.27	14.18
			0.00			1" Ice	0.59	0.35	18.58
						2" Ice	0.81	0.53	31.87
						4" Ice	1.36	1.00	81.78
KRY 112 144/1	B	From Face	2.00	0.0000	110.00	No Ice	0.41	0.20	11.00
			0.00			1/2" Ice	0.50	0.27	14.18
			0.00			1" Ice	0.59	0.35	18.58
						2" Ice	0.81	0.53	31.87
						4" Ice	1.36	1.00	81.78
KRY 112 144/1	C	From Face	2.00	0.0000	110.00	No Ice	0.41	0.20	11.00
			0.00			1/2" Ice	0.50	0.27	14.18
			0.00			1" Ice	0.59	0.35	18.58
						2" Ice	0.81	0.53	31.87
						4" Ice	1.36	1.00	81.78
Side Arm Mount [SO 102-3]	C	None		0.0000	110.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
*** 98' ***									
LNX-6514DS-T4M w/ Mount Pipe	A	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.68 9.31 9.93 11.20 13.85	7.42 8.45 9.34 11.18 15.22	79.33 151.64 232.88 420.19 938.43
LNX-6514DS-T4M w/ Mount Pipe	B	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.68 9.31 9.93 11.20 13.85	7.42 8.45 9.34 11.18 15.22	79.33 151.64 232.88 420.19 938.43
LNX-6514DS-T4M w/ Mount Pipe	C	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.68 9.31 9.93 11.20 13.85	7.42 8.45 9.34 11.18 15.22	79.33 151.64 232.88 420.19 938.43
(2) DB844G65ZAXY w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	34.25 80.30 132.29 257.03 616.69
(2) DB844G65ZAXY w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	34.25 80.30 132.29 257.03 616.69
(2) DB844G65ZAXY w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.90 5.35 5.80 6.73 8.73	4.92 5.60 6.28 7.71 10.83	34.25 80.30 132.29 257.03 616.69
GPS_A	C	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.30 0.37 0.46 0.65	0.30 0.37 0.46 0.65	0.87 4.66 9.76 24.67

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice	1.15	1.15	78.80
(2) FD9R6004/2C-3L	A	From Centroid-Leg	4.00 2.50 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L	B	From Centroid-Leg	4.00 0.50 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L	C	From Centroid-Leg	4.00 0.50 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
MG D3-800TV w/ Mount Pipe	A	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	37.28 71.09 110.70 210.38 520.04
MG D3-800TV w/ Mount Pipe	B	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	37.28 71.09 110.70 210.38 520.04
MG D3-800TV w/ Mount Pipe	C	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	37.28 71.09 110.70 210.38 520.04
RRH2X40-AWS	A	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	44.00 61.40 81.69 131.76 275.24
RRH2X40-AWS	B	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	44.00 61.40 81.69 131.76 275.24
RRH2X40-AWS	C	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	44.00 61.40 81.69 131.76 275.24
DB-T1-6Z-8AB-0Z	A	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	44.00 80.13 120.22 213.04 454.67
MG D3-800TV w/ Mount Pipe	A	From Centroid-Leg	4.00 3.00 2.00	30.0000	98.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	37.28 71.09 110.70 210.38 520.04
MG D3-800TV w/ Mount	B	From	4.00	30.0000	98.00	No Ice	3.57	3.42	37.28

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Pipe		Centroid-Leg	-3.00 2.00			1/2" Ice	3.98	4.12	71.09
						1" Ice	4.39	4.78	110.70
						2" Ice	5.33	6.16	210.38
						4" Ice	7.34	9.18	520.04
MG D3-800TV w/ Mount Pipe	C	From Centroid-Leg	4.00 -3.00 2.00	30.0000	98.00	No Ice	3.57	3.42	37.28
						1/2" Ice	3.98	4.12	71.09
						1" Ice	4.39	4.78	110.70
						2" Ice	5.33	6.16	210.38
						4" Ice	7.34	9.18	520.04
Platform Mount [LP 713-1]	C	None		0.0000	98.00	No Ice	31.27	31.27	1510.00
						1/2" Ice	39.68	39.68	1929.00
						1" Ice	48.09	48.09	2348.00
						2" Ice	64.91	64.91	3186.00
						4" Ice	98.55	98.55	4862.00
*** 93' ***									
2.9" DIA x 4' mount pipe	A	From Leg	2.00 0.00 0.00	0.0000	93.00	No Ice	0.98	0.98	23.20
						1/2" Ice	1.23	1.23	31.89
						1" Ice	1.48	1.48	43.48
						2" Ice	2.02	2.02	75.94
						4" Ice	3.39	3.39	182.27
2.9" DIA x 4' mount pipe	B	From Leg	2.00 0.00 0.00	0.0000	93.00	No Ice	0.98	0.98	23.20
						1/2" Ice	1.23	1.23	31.89
						1" Ice	1.48	1.48	43.48
						2" Ice	2.02	2.02	75.94
						4" Ice	3.39	3.39	182.27
2.9" DIA x 4' mount pipe	C	From Leg	2.00 0.00 0.00	0.0000	93.00	No Ice	0.98	0.98	23.20
						1/2" Ice	1.23	1.23	31.89
						1" Ice	1.48	1.48	43.48
						2" Ice	2.02	2.02	75.94
						4" Ice	3.39	3.39	182.27
Side Arm Mount [SO 102-3]	C	None		0.0000	93.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
*** 88' ***									
P65-17-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 1.00	15.0000	88.00	No Ice	11.70	8.94	91.85
						1/2" Ice	12.42	10.45	177.61
						1" Ice	13.15	11.99	273.25
						2" Ice	14.64	14.31	498.46
						4" Ice	17.91	19.14	1125.60
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 1.00	15.0000	88.00	No Ice	8.64	6.36	78.55
						1/2" Ice	9.29	7.54	144.33
						1" Ice	9.91	8.43	218.01
						2" Ice	11.18	10.24	392.73
						4" Ice	13.83	14.10	885.61
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 1.00	15.0000	88.00	No Ice	8.64	6.36	78.55
						1/2" Ice	9.29	7.54	144.33
						1" Ice	9.91	8.43	218.01
						2" Ice	11.18	10.24	392.73
						4" Ice	13.83	14.10	885.61
(2) LGP13519	A	From Centroid-Leg	4.00 2.00 -1.00	22.0000	88.00	No Ice	0.34	0.21	5.30
						1/2" Ice	0.42	0.28	8.02
						1" Ice	0.51	0.36	11.91
						2" Ice	0.73	0.55	23.96
						4" Ice	1.25	1.03	70.63
(2) LGP13519	B	From	4.00	22.0000	88.00	No Ice	0.34	0.21	5.30

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		Centroid-Leg	2.00 -1.00			1/2" Ice	0.42	0.28	8.02
						1" Ice	0.51	0.36	11.91
						2" Ice	0.73	0.55	23.96
						4" Ice	1.25	1.03	70.63
(2) LGP13519	C	From Centroid-Leg	4.00 2.00 -1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	5.30 8.02 11.91 23.96 70.63
RRUS-11	A	From Centroid-Leg	4.00 6.00 -1.00	75.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	55.00 74.32 96.56 150.56 302.12
RRUS-11	B	From Centroid-Leg	4.00 6.00 -1.00	75.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	55.00 74.32 96.56 150.56 302.12
RRUS-11	C	From Centroid-Leg	4.00 6.00 -1.00	75.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	55.00 74.32 96.56 150.56 302.12
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	55.38 102.81 156.64 286.58 664.79
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	55.38 102.81 156.64 286.58 664.79
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	55.38 102.81 156.64 286.58 664.79
(2) LGP2140X	A	From Centroid-Leg	4.00 -6.00 -1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	14.10 21.23 30.24 54.70 134.81
(2) LGP2140X	B	From Centroid-Leg	4.00 -6.00 -1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	14.10 21.23 30.24 54.70 134.81
(2) LGP2140X	C	From Centroid-Leg	4.00 -6.00 -1.00	22.0000	88.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	14.10 21.23 30.24 54.70 134.81
DC6-48-60-18-8F	C	From Centroid-Leg	4.00 6.00 -1.00	75.0000	88.00	No Ice 1/2" Ice 1" Ice	1.27 1.46 1.66	1.27 1.46 1.66	20.00 35.12 52.57

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	2.09	2.09	95.09
						4" Ice	3.10	3.10	214.90
RRUS-11	A	From Centroid-Leg	4.00 6.00 1.00	75.0000	88.00	No Ice	2.94	1.25	55.00
						1/2" Ice	3.17	1.41	74.32
						1" Ice	3.41	1.59	96.56
						2" Ice	3.91	1.96	150.56
						4" Ice	5.02	2.82	302.12
RRUS-11	B	From Centroid-Leg	4.00 6.00 1.00	75.0000	88.00	No Ice	2.94	1.25	55.00
						1/2" Ice	3.17	1.41	74.32
						1" Ice	3.41	1.59	96.56
						2" Ice	3.91	1.96	150.56
						4" Ice	5.02	2.82	302.12
RRUS-11	C	From Centroid-Leg	4.00 6.00 1.00	75.0000	88.00	No Ice	2.94	1.25	55.00
						1/2" Ice	3.17	1.41	74.32
						1" Ice	3.41	1.59	96.56
						2" Ice	3.91	1.96	150.56
						4" Ice	5.02	2.82	302.12
Platform Mount [LP 713-1]	C	None		0.0000	88.00	No Ice	31.27	31.27	1510.00
						1/2" Ice	39.68	39.68	1929.00
						1" Ice	48.09	48.09	2348.00
						2" Ice	64.91	64.91	3186.00
						4" Ice	98.55	98.55	4862.00
*** 81' ***									
800 10504 w/ Mount Pipe	A	From Face	2.00 0.00 0.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	70.42
						1" Ice	4.42	4.58	108.95
						2" Ice	5.34	5.98	206.66
						4" Ice	7.38	8.98	513.56
800 10504 w/ Mount Pipe	B	From Face	2.00 0.00 0.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	70.42
						1" Ice	4.42	4.58	108.95
						2" Ice	5.34	5.98	206.66
						4" Ice	7.38	8.98	513.56
800 10504 w/ Mount Pipe	C	From Face	2.00 0.00 0.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	70.42
						1" Ice	4.42	4.58	108.95
						2" Ice	5.34	5.98	206.66
						4" Ice	7.38	8.98	513.56
Side Arm Mount [SO 102-3]	C	None		0.0000	81.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
*** 72' ***									
DB844H90E-XY w/ Mount Pipe	A	From Centroid-Leg	4.00 6.00 0.00	30.0000	72.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	71.83
						1" Ice	4.12	6.28	117.13
						2" Ice	5.01	7.71	227.81
						4" Ice	6.92	10.83	556.61
DB844H90E-XY w/ Mount Pipe	B	From Centroid-Leg	4.00 6.00 0.00	30.0000	72.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	71.83
						1" Ice	4.12	6.28	117.13
						2" Ice	5.01	7.71	227.81
						4" Ice	6.92	10.83	556.61
DB844H90E-XY w/ Mount Pipe	C	From Centroid-Leg	4.00 6.00 0.00	30.0000	72.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	71.83
						1" Ice	4.12	6.28	117.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	5.01	7.71	227.81
						4" Ice	6.92	10.83	556.61
LLPX310R w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	25.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.98 5.38 5.78 6.62 8.44	2.87 3.40 3.94 5.12 7.89	43.87 80.95 123.32 226.55 531.24
LLPX310R w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	35.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.98 5.38 5.78 6.62 8.44	2.87 3.40 3.94 5.12 7.89	43.87 80.95 123.32 226.55 531.24
LLPX310R w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	35.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.98 5.38 5.78 6.62 8.44	2.87 3.40 3.94 5.12 7.89	43.87 80.95 123.32 226.55 531.24
LBX-9012DS-VTM w/ Mount Pipe	A	From Centroid-Leg	4.00 -6.00 0.00	30.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.44 5.91 6.39 7.37 9.45	4.00 4.67 5.33 6.71 9.86	45.16 89.01 138.90 259.81 614.17
LBX-9012DS-VTM w/ Mount Pipe	B	From Centroid-Leg	4.00 -6.00 0.00	30.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.44 5.91 6.39 7.37 9.45	4.00 4.67 5.33 6.71 9.86	45.16 89.01 138.90 259.81 614.17
LBX-9012DS-VTM w/ Mount Pipe	C	From Centroid-Leg	4.00 -6.00 0.00	30.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.44 5.91 6.39 7.37 9.45	4.00 4.67 5.33 6.71 9.86	45.16 89.01 138.90 259.81 614.17
FDD_R6_RRH	A	From Centroid-Leg	4.00 0.00 0.00	25.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	33.00 44.50 58.31 93.60 200.35
FDD_R6_RRH	B	From Centroid-Leg	4.00 0.00 0.00	35.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	33.00 44.50 58.31 93.60 200.35
FDD_R6_RRH	C	From Centroid-Leg	4.00 0.00 0.00	35.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.79 1.97 2.16 2.57 3.49	0.78 0.92 1.07 1.39 2.14	33.00 44.50 58.31 93.60 200.35
Platform Mount [LP 713-1]	C	None		0.0000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.27 39.68 48.09 64.91 98.55	31.27 39.68 48.09 64.91 98.55	1510.00 1929.00 2348.00 3186.00 4862.00
*** 50' ***									
Side Arm Mount [SO 701-1]	B	From Leg	1.50 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	65.00 79.00 93.00 121.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*****						4" Ice	3.17	7.03	177.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Face	2.00 0.00 1.00	-62.0000		93.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	47.60 83.89 120.17 192.74 337.88
VHLP1-23	A	Paraboloid w/o Radome	From Face	2.00 0.00 -1.00	90.0000		93.00	1.27	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.28 1.45 1.62 1.96 2.64	10.00 20.00 20.00 40.00 60.00
VHLP2-11	B	Paraboloid w/Shroud (HP)	From Face	2.00 0.00 1.00	-12.0000		93.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	30.00 50.00 70.00 110.00 190.00
VHLP1-23	C	Paraboloid w/Shroud (HP)	From Face	2.00 0.00 2.00	-90.0000		93.00	1.27	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.28 1.45 1.62 1.96 2.64	10.00 20.00 20.00 40.00 60.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice

Comb. No.	Description
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	117 - 110	Pole	Max Tension	14	0.00	0.00	-0.00
			Max. Compression	14	-1969.74	8.33	19.24
			Max. Mx	11	-779.37	14973.12	-354.73
			Max. My	2	-777.43	-367.96	15056.51
			Max. Vy	5	2611.90	-14969.31	380.04
			Max. Vx	8	2625.11	367.69	-15055.08
			Max. Torque	11			107.20
L2	110 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-3540.01	-4.73	38.66
			Max. Mx	5	-1531.12	-55336.82	954.02
			Max. My	8	-1529.78	926.53	-55554.20
			Max. Vy	5	4443.52	-55336.82	954.02
			Max. Vx	8	4456.76	926.53	-55554.20
			Max. Torque	5			-110.84
L3	100 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20542.36	-930.42	958.89
			Max. Mx	5	-10427.60	-484155.56	9191.76
			Max. My	2	-10426.54	-10795.24	484208.90
			Max. Vy	5	21381.64	-484155.56	9191.76
			Max. Vx	8	21422.36	9648.57	-484186.24
			Max. Torque	2			-1916.68
L4	70.75 - 63.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22203.94	-1053.20	971.50
			Max. Mx	5	-11682.87	-641902.88	11364.66
			Max. My	8	-11679.63	12187.69	-642222.25
			Max. Vy	5	22151.64	-641902.88	11364.66
			Max. Vx	8	22192.42	12187.69	-642222.25
			Max. Torque	6			1422.65

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L5	63.5 - 47.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25408.10	-1263.16	991.56
			Max. Mx	5	-14138.30	-903742.20	14799.59
			Max. My	8	-14135.52	16206.20	-904519.10
			Max. Vy	5	23403.15	-903742.20	14799.59
			Max. Vx	8	23443.99	16206.20	-904519.10
			Max. Torque	6			1436.42
L6	47.42 - 43.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28682.90	-1628.24	887.94
			Max. Mx	5	-16655.29	-1107381.81	17330.89
			Max. My	8	-16652.30	19107.79	-1108525.98
			Max. Vy	5	24432.24	-1107381.81	17330.89
			Max. Vx	8	24487.56	19107.79	-1108525.98
			Max. Torque	6			1449.21
L7	43.5 - 38.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30375.52	-1720.11	895.67
			Max. Mx	5	-18015.64	-1224646.12	18804.33
			Max. My	8	-18012.91	20823.77	-1226047.66
			Max. Vy	5	24952.71	-1224646.12	18804.33
			Max. Vx	8	25008.02	20823.77	-1226047.66
			Max. Torque	6			1457.48
L8	38.75 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31724.03	-1793.93	901.57
			Max. Mx	5	-19102.93	-1318960.64	19965.94
			Max. My	8	-19100.40	22176.97	-1320565.22
			Max. Vy	5	25356.90	-1318960.64	19965.94
			Max. Vx	8	25412.20	22176.97	-1320565.22
			Max. Torque	6			1464.01
L9	35 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33047.03	-1863.74	906.86
			Max. Mx	5	-20182.69	-1408345.01	21048.72
			Max. My	8	-20180.34	23438.58	-1410138.94
			Max. Vy	5	25728.39	-1408345.01	21048.72
			Max. Vx	8	25783.68	23438.58	-1410138.94
			Max. Torque	6			1470.11
L10	31.5 - 9	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40829.17	-2352.30	983.64
			Max. Mx	5	-26564.40	-2013171.87	27982.12
			Max. My	8	-26563.68	31485.04	-2016139.87
			Max. Vy	5	28077.27	-2013171.87	27982.12
			Max. Vx	8	28132.13	31485.04	-2016139.87

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Torque	6			1513.03
L11	9 - 2	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43446.47	-2518.47	1187.17
			Max. Mx	5	-28730.99	-2212289.75	30274.21
			Max. My	8	-28730.80	33958.59	-2215456.65
			Max. Vy	5	28829.54	-2212289.75	30274.21
			Max. Vx	8	28884.19	33958.59	-2215456.65
			Max. Torque	6			1527.88
L12	2 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44203.86	-2567.18	1246.83
			Max. Mx	5	-29358.37	-2270153.50	30927.52
			Max. My	8	-29358.33	34662.23	-2273375.58
			Max. Vy	5	29046.72	-2270153.50	30927.52
			Max. Vx	8	29101.31	34662.23	-2273375.58
			Max. Torque	6			1532.25

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	14	44203.86	-0.00	0.00
	Max. H_x	11	29369.50	29033.24	-361.13
	Max. H_z	2	29369.50	-365.88	29061.86
	Max. M_x	2	2271320.14	-365.88	29061.86
	Max. M_z	5	2270153.50	-29035.47	304.48
	Max. Torsion	6	1532.26	-25074.82	-14209.32
	Min. Vert	1	29369.50	-0.00	0.00
	Min. H_x	5	29369.50	-29035.47	304.48
	Min. H_z	8	29369.50	356.26	-29090.04
	Min. M_x	8	-2273375.58	356.26	-29090.04
	Min. M_z	11	-2268171.22	29033.24	-361.13
	Min. Torsion	13	-1300.24	14329.86	25041.14

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	29369.50	0.00	0.00	-291.65	-849.67	-0.02
Dead+Wind 0 deg - No Ice	29369.50	365.88	-29061.86	-2271320.14	-37419.83	927.74
Dead+Wind 30 deg - No Ice	29369.50	14762.19	-25270.22	-1977486.53	-1160170.38	495.42
Dead+Wind 60 deg - No Ice	29369.50	25249.27	-14715.43	-1154711.26	-1976747.40	-194.99
Dead+Wind 90 deg - No Ice	29369.50	29035.47	-304.48	-30927.42	-2270153.50	-955.63
Dead+Wind 120 deg - No Ice	29369.50	25074.82	14209.32	1103154.91	-1958715.42	-1532.26

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 150 deg - No Ice	29369.50	14231.36	25117.45	1960826.61	-1106920.83	-981.41
Dead+Wind 180 deg - No Ice	29369.50	-356.26	29090.04	2273375.58	34662.32	-795.83
Dead+Wind 210 deg - No Ice	29369.50	-14763.99	25269.78	1976796.45	1158591.87	-563.47
Dead+Wind 240 deg - No Ice	29369.50	-25236.47	14756.37	1157955.63	1973789.43	54.07
Dead+Wind 270 deg - No Ice	29369.50	-29033.24	361.13	35653.75	2268171.22	793.79
Dead+Wind 300 deg - No Ice	29369.50	-25052.58	-14246.34	-1107303.40	1954860.55	1162.54
Dead+Wind 330 deg - No Ice	29369.50	-14329.86	-25041.14	-1954189.95	1114579.12	1300.24
Dead+Ice+Temp	44203.86	0.00	-0.00	-1246.83	-2567.18	-0.05
Dead+Wind 0 deg+Ice+Temp	44203.86	79.52	-7311.68	-584521.97	-10536.86	198.65
Dead+Wind 30 deg+Ice+Temp	44203.86	3707.40	-6354.24	-508600.41	-299540.74	109.61
Dead+Wind 60 deg+Ice+Temp	44203.86	6351.60	-3695.71	-296901.60	-509942.29	-35.58
Dead+Wind 90 deg+Ice+Temp	44203.86	7307.83	-66.30	-7882.50	-585780.70	-197.52
Dead+Wind 120 deg+Ice+Temp	44203.86	6313.30	3585.66	283373.77	-506090.37	-322.18
Dead+Wind 150 deg+Ice+Temp	44203.86	3590.92	6321.97	502741.17	-287975.20	-200.17
Dead+Wind 180 deg+Ice+Temp	44203.86	-78.33	7318.52	582609.90	5115.20	-166.34
Dead+Wind 210 deg+Ice+Temp	44203.86	-3708.62	6354.82	506076.86	294376.31	-124.12
Dead+Wind 240 deg+Ice+Temp	44203.86	-6349.43	3705.95	295311.70	504452.29	5.90
Dead+Wind 270 deg+Ice+Temp	44203.86	-7308.42	80.12	6634.73	580550.11	165.30
Dead+Wind 300 deg+Ice+Temp	44203.86	-6308.88	-3593.62	-286721.10	500381.62	241.00
Dead+Wind 330 deg+Ice+Temp	44203.86	-3613.45	-6304.27	-503603.24	284880.27	273.63
Dead+Wind 0 deg - Service	29369.50	126.60	-10056.01	-786782.06	-13534.05	323.07
Dead+Wind 30 deg - Service	29369.50	5108.02	-8744.02	-685037.27	-402362.63	171.98
Dead+Wind 60 deg - Service	29369.50	8736.77	-5091.84	-400095.11	-685155.22	-68.80
Dead+Wind 90 deg - Service	29369.50	10046.87	-105.36	-10909.97	-786753.02	-333.39
Dead+Wind 120 deg - Service	29369.50	8676.41	4916.72	381828.41	-678884.79	-533.66
Dead+Wind 150 deg - Service	29369.50	4924.35	8691.16	678847.82	-383904.42	-341.74
Dead+Wind 180 deg - Service	29369.50	-123.27	10065.76	787101.91	11433.07	-277.35
Dead+Wind 210 deg - Service	29369.50	-5108.65	8743.87	684404.57	400670.09	-196.67
Dead+Wind 240 deg - Service	29369.50	-8732.34	5106.01	400824.82	682985.68	18.73
Dead+Wind 270 deg - Service	29369.50	-10046.10	124.96	12151.92	784920.54	277.09
Dead+Wind 300 deg - Service	29369.50	-8668.71	-4929.53	-383659.90	676403.24	405.77
Dead+Wind 330 deg - Service	29369.50	-4958.43	-8664.76	-676942.47	385409.80	453.64

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-29369.50	0.00	-0.00	29369.50	0.00	0.000%
2	365.88	-29369.50	-29061.85	-365.88	29369.50	29061.86	0.000%
3	14762.19	-29369.50	-25270.22	-14762.19	29369.50	25270.22	0.000%
4	25249.27	-29369.50	-14715.43	-25249.27	29369.50	14715.43	0.000%
5	29035.46	-29369.50	-304.48	-29035.47	29369.50	304.48	0.000%
6	25074.82	-29369.50	14209.32	-25074.82	29369.50	-14209.32	0.000%
7	14231.36	-29369.50	25117.45	-14231.36	29369.50	-25117.45	0.000%
8	-356.26	-29369.50	29090.04	356.26	29369.50	-29090.04	0.000%
9	-14763.99	-29369.50	25269.78	14763.99	29369.50	-25269.78	0.000%
10	-25236.47	-29369.50	14756.37	25236.47	29369.50	-14756.37	0.000%
11	-29033.24	-29369.50	361.13	29033.24	29369.50	-361.13	0.000%
12	-25052.58	-29369.50	-14246.34	25052.58	29369.50	14246.34	0.000%
13	-14329.86	-29369.50	-25041.14	14329.86	29369.50	25041.14	0.000%
14	0.00	-44203.86	0.00	-0.00	44203.86	0.00	0.000%
15	79.52	-44203.86	-7311.68	-79.52	44203.86	7311.68	0.000%
16	3707.40	-44203.86	-6354.23	-3707.40	44203.86	6354.24	0.000%
17	6351.59	-44203.86	-3695.71	-6351.60	44203.86	3695.71	0.000%
18	7307.83	-44203.86	-66.30	-7307.83	44203.86	66.30	0.000%
19	6313.29	-44203.86	3585.65	-6313.30	44203.86	-3585.66	0.000%
20	3590.92	-44203.86	6321.96	-3590.92	44203.86	-6321.97	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
21	-78.33	-44203.86	7318.51	78.33	44203.86	-7318.52	0.000%
22	-3708.62	-44203.86	6354.82	3708.62	44203.86	-6354.82	0.000%
23	-6349.42	-44203.86	3705.95	6349.43	44203.86	-3705.95	0.000%
24	-7308.42	-44203.86	80.12	7308.42	44203.86	-80.12	0.000%
25	-6308.87	-44203.86	-3593.62	6308.88	44203.86	3593.62	0.000%
26	-3613.45	-44203.86	-6304.27	3613.45	44203.86	6304.27	0.000%
27	126.60	-29369.50	-10056.00	-126.60	29369.50	10056.01	0.000%
28	5108.02	-29369.50	-8744.02	-5108.02	29369.50	8744.02	0.000%
29	8736.77	-29369.50	-5091.84	-8736.77	29369.50	5091.84	0.000%
30	10046.87	-29369.50	-105.36	-10046.87	29369.50	105.36	0.000%
31	8676.41	-29369.50	4916.72	-8676.41	29369.50	-4916.72	0.000%
32	4924.35	-29369.50	8691.16	-4924.35	29369.50	-8691.16	0.000%
33	-123.27	-29369.50	10065.76	123.27	29369.50	-10065.76	0.000%
34	-5108.65	-29369.50	8743.87	5108.65	29369.50	-8743.87	0.000%
35	-8732.34	-29369.50	5106.01	8732.34	29369.50	-5106.01	0.000%
36	-10046.10	-29369.50	124.96	10046.10	29369.50	-124.96	0.000%
37	-8668.71	-29369.50	-4929.53	8668.71	29369.50	4929.53	0.000%
38	-4958.43	-29369.50	-8664.75	4958.43	29369.50	8664.76	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00049649
3	Yes	5	0.00000001	0.00012669
4	Yes	5	0.00000001	0.00012532
5	Yes	4	0.00000001	0.00048249
6	Yes	5	0.00000001	0.00011232
7	Yes	5	0.00000001	0.00012328
8	Yes	4	0.00000001	0.00008947
9	Yes	5	0.00000001	0.00012248
10	Yes	5	0.00000001	0.00012395
11	Yes	4	0.00000001	0.00007070
12	Yes	5	0.00000001	0.00012394
13	Yes	5	0.00000001	0.00011413
14	Yes	4	0.00000001	0.00000546
15	Yes	5	0.00000001	0.00009178
16	Yes	5	0.00000001	0.00010439
17	Yes	5	0.00000001	0.00010420
18	Yes	5	0.00000001	0.00009197
19	Yes	5	0.00000001	0.00010082
20	Yes	5	0.00000001	0.00010132
21	Yes	5	0.00000001	0.00009102
22	Yes	5	0.00000001	0.00010234
23	Yes	5	0.00000001	0.00010229
24	Yes	5	0.00000001	0.00009075
25	Yes	5	0.00000001	0.00010086
26	Yes	5	0.00000001	0.00010068
27	Yes	4	0.00000001	0.00007784
28	Yes	4	0.00000001	0.00042648
29	Yes	4	0.00000001	0.00041738
30	Yes	4	0.00000001	0.00007898
31	Yes	4	0.00000001	0.00034291
32	Yes	4	0.00000001	0.00041149
33	Yes	4	0.00000001	0.00004694

34	Yes	4	0.00000001	0.00039481
35	Yes	4	0.00000001	0.00040462
36	Yes	4	0.00000001	0.00004688
37	Yes	4	0.00000001	0.00041532
38	Yes	4	0.00000001	0.00035019

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	23.539	28	1.8514	0.0056
L2	110 - 100	20.834	28	1.8342	0.0057
L3	100 - 70.75	17.076	28	1.7433	0.0058
L4	70.75 - 63.5	8.031	28	1.0969	0.0014
L5	63.5 - 47.42	6.473	28	0.9536	0.0011
L6	52 - 43.5	4.396	28	0.7695	0.0008
L7	43.5 - 38.75	3.103	28	0.6646	0.0006
L8	38.75 - 35	2.474	28	0.6004	0.0006
L9	35 - 31.5	2.023	28	0.5492	0.0005
L10	31.5 - 9	1.637	28	0.5041	0.0004
L11	9 - 2	0.131	28	0.1397	0.0001
L12	2 - 0	0.006	28	0.0307	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	800 EXTERNAL NOTCH FILTER	28	23.539	1.8514	0.0061	14785
115.00	TME-800MHZ RRH	28	22.764	1.8483	0.0061	14785
110.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	28	20.834	1.8342	0.0063	10704
98.00	LNX-6514DS-T4M w/ Mount Pipe	28	16.350	1.7127	0.0065	4251
95.00	VHLP1-23	28	15.284	1.6596	0.0062	3732
94.00	VHLP2.5-11	28	14.934	1.6401	0.0060	3587
93.00	2.9" DIA x 4' mount pipe	28	14.589	1.6199	0.0059	3453
92.00	VHLP1-23	28	14.246	1.5991	0.0057	3328
88.00	P65-17-XLH-RR w/ Mount Pipe	28	12.914	1.5096	0.0050	2908
81.00	800 10504 w/ Mount Pipe	28	10.747	1.3397	0.0035	2382
72.00	DB844H90E-XY w/ Mount Pipe	28	8.329	1.1244	0.0020	1992
50.00	Side Arm Mount [SO 701-1]	28	4.073	0.7439	0.0009	4345

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	67.734	3	5.3288	0.0156
L2	110 - 100	59.965	3	5.2792	0.0160
L3	100 - 70.75	49.171	3	5.0175	0.0165

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	70.75 - 63.5	23.158	3	3.1626	0.0041
L5	63.5 - 47.42	18.668	3	2.7502	0.0031
L6	52 - 43.5	12.680	3	2.2197	0.0022
L7	43.5 - 38.75	8.953	3	1.9173	0.0018
L8	38.75 - 35	7.138	3	1.7322	0.0016
L9	35 - 31.5	5.836	3	1.5846	0.0014
L10	31.5 - 9	4.722	3	1.4544	0.0013
L11	9 - 2	0.378	3	0.4032	0.0003
L12	2 - 0	0.019	3	0.0887	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	800 EXTERNAL NOTCH FILTER	3	67.734	5.3288	0.0175	5243
115.00	TME-800MHZ RRH	3	65.507	5.3198	0.0177	5243
110.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	3	59.965	5.2792	0.0183	3790
98.00	LNX-6514DS-T4M w/ Mount Pipe	3	47.087	4.9298	0.0187	1509
95.00	VHLP1-23	3	44.022	4.7772	0.0177	1322
94.00	VHLP2.5-11	3	43.019	4.7214	0.0174	1270
93.00	2.9" DIA x 4' mount pipe	3	42.024	4.6635	0.0169	1221
92.00	VHLP1-23	3	41.040	4.6036	0.0165	1176
88.00	P65-17-XLH-RR w/ Mount Pipe	3	37.209	4.3471	0.0143	1026
81.00	800 10504 w/ Mount Pipe	3	30.975	3.8598	0.0101	838
72.00	DB844H90E-XY w/ Mount Pipe	3	24.017	3.2415	0.0056	698
50.00	Side Arm Mount [SO 701-1]	3	11.751	2.1458	0.0026	1512

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	117 - 116	TP15.94x14.36x0.1875	7.00	0.00	0.0	39.000	8.6929	-270.34	339024.00	0.001
	116 - 115					39.000	8.8292	-295.33	344339.00	0.001
	115 - 114					39.000	8.9655	-664.27	349653.00	0.002
	114 - 113					39.000	9.1018	-690.22	354968.00	0.002
	113 - 112					39.000	9.2380	-716.66	360283.00	0.002
	112 - 111					39.000	9.3743	-743.60	365598.00	0.002
	111 - 110					39.000	9.5106	-771.03	370912.00	0.002
L2	110 - 109	TP18.2x15.94x0.1875	10.00	0.00	0.0	39.000	9.6470	-1164.71	376234.00	0.003
	109 - 108					39.000	9.7835	-1202.05	381555.00	0.003
	108 - 107					39.000	9.9199	-1239.22	386877.00	0.003
	107 - 106					39.000	10.0564	-1277.72	392198.00	0.003
	106 - 105					39.000	10.1928	-1316.82	397520.00	0.003
	105 - 104					39.000	10.3293	-1356.52	402841.00	0.003
	104 - 103					39.000	10.4657	-1396.81	408162.00	0.003

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
	103 - 102					39.000	10.6022	-1437.70	413484.00	0.003
	102 - 101					39.000	10.7386	-1479.18	418805.00	0.004
	101 - 100					39.000	10.8750	-1521.26	424127.00	0.004
L3	100 - 98.5375	TP24.8143x18.2x0.25	29.25	0.00	0.0	39.000	14.7160	-1618.97	573923.00	0.003
	98.5375 - 97.075					39.000	14.9822	-3639.12	584306.00	0.006
	97.075 - 95.6125					39.000	15.2484	-3744.53	594689.00	0.006
	95.6125 - 94.15					39.000	15.5147	-3859.07	605072.00	0.006
	94.15 - 92.6875					39.000	15.7809	-4135.60	615455.00	0.007
	92.6875 - 91.225					39.000	16.0471	-4254.71	625838.00	0.007
	91.225 - 89.7625					39.000	16.3133	-4371.06	636220.00	0.007
	89.7625 - 88.3					39.000	16.5796	-4489.86	646603.00	0.007
	88.3 - 86.8375					39.000	16.8458	-6812.24	656986.00	0.010
	86.8375 - 85.375					39.000	17.1120	-6943.78	667369.00	0.010
	85.375 - 83.9125					39.000	17.3783	-7078.71	677752.00	0.010
	83.9125 - 82.45					39.000	17.6445	-7216.90	688135.00	0.010
	82.45 - 80.9875					39.000	17.9107	-7514.19	698518.00	0.011
	80.9875 - 79.525					39.000	18.1769	-7659.67	708901.00	0.011
	79.525 - 78.0625					39.000	18.4432	-7808.23	719283.00	0.011
	78.0625 - 76.6					39.000	18.7094	-7959.79	729666.00	0.011
	76.6 - 75.1375					39.000	18.9756	-8114.26	740049.00	0.011
	75.1375 - 73.675					39.000	19.2418	-8271.57	750432.00	0.011
	73.675 - 72.2125					39.000	19.5081	-8431.66	760815.00	0.011
	72.2125 - 70.75					39.000	19.7743	-10402.70	771198.00	0.013
L4	70.75 - 69.7143	TP26.4538x24.8143x0.4322	7.25	0.00	0.0	39.000	34.2616	-10591.60	1336200.00	0.008
	69.7143 - 68.6786					39.000	34.5876	-10767.00	1348920.00	0.008
	68.6786 - 67.6429					39.000	34.9136	-10943.60	1361630.00	0.008
	67.6429 - 66.6071					39.000	35.2395	-11121.40	1374340.00	0.008
	66.6071 - 65.5714					39.000	35.5655	-11300.30	1387050.00	0.008
	65.5714 - 64.5357					39.000	35.8915	-11480.30	1399770.00	0.008
	64.5357 - 63.5					39.000	36.2175	-11661.30	1412480.00	0.008
L5	63.5 - 62.4545	TP30.09x26.4538x0.5821	16.08	0.00	0.0	39.000	48.9336	-11882.70	1908410.00	0.006
	62.4545 - 61.4091					39.000	49.3767	-12102.30	1925690.00	0.006
	61.4091 - 60.3636					39.000	49.8198	-12322.80	1942970.00	0.006
	60.3636 - 59.3182					39.000	50.2629	-12544.20	1960250.00	0.006
	59.3182 - 58.2727					39.000	50.7060	-12766.70	1977540.00	0.006
	58.2727 - 57.2273					39.000	51.1491	-12990.00	1994820.00	0.007
	57.2273 - 56.1818					39.000	51.5922	-13214.30	2012100.00	0.007
	56.1818 - 55.1364					39.000	52.0353	-13439.50	2029380.00	0.007

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
	55.1364 - 54.0909					39.000	52.4784	-13665.70	2046660.00	0.007
	54.0909 - 53.0455					39.000	52.9215	-13892.70	2063940.00	0.007
	53.0455 - 52					39.000	53.3646	-14120.70	2081220.00	0.007
	52 - 47.42					39.000	55.3057	-7904.51	2156920.00	0.004
L6	52 - 47.42	TP30.4738x27.8902x0.6076	8.50	0.00	0.0	39.000	56.1018	-7717.34	2187970.00	0.004
	47.42 - 46.1133					39.000	56.8788	-15965.80	2218280.00	0.007
	46.1133 - 44.8067					39.000	57.6559	-16301.40	2248580.00	0.007
	44.8067 - 43.5					39.000	58.4329	-16639.00	2278880.00	0.007
L7	43.5 - 42.3125	TP31.5467x30.4738x0.7557	4.75	0.00	0.0	39.000	72.9634	-16980.10	2845570.00	0.006
	42.3125 - 41.125					39.000	73.6161	-17318.90	2871030.00	0.006
	41.125 - 39.9375					39.000	74.2688	-17659.20	2896480.00	0.006
	39.9375 - 38.75					39.000	74.9215	-18000.80	2921940.00	0.006
L8	38.75 - 37.5	TP32.3938x31.5467x0.7424	3.75	0.00	0.0	39.000	74.3184	-18361.70	2898420.00	0.006
	37.5 - 36.25					39.000	74.9935	-18724.70	2924740.00	0.006
	36.25 - 35					39.000	75.6685	-19089.30	2951070.00	0.006
L9	35 - 33.8333	TP33.1845x32.3938x0.7824	3.50	0.00	0.0	39.000	80.3002	-19449.10	3131710.00	0.006
	33.8333 - 32.6667					39.000	80.9641	-19808.90	3157600.00	0.006
	32.6667 - 31.5					39.000	81.6280	-20170.10	3183490.00	0.006
L10	31.5 - 30.375	TP38.267x33.1845x0.5873	22.50	0.00	0.0	39.000	62.1274	-20475.70	2422970.00	0.008
	30.375 - 29.25					39.000	62.6080	-20785.00	2441710.00	0.009
	29.25 - 28.125					39.000	63.0886	-21095.60	2460460.00	0.009
	28.125 - 27					39.000	63.5692	-21407.40	2479200.00	0.009
	27 - 25.875					39.000	64.0498	-21720.50	2497940.00	0.009
	25.875 - 24.75					39.000	64.5304	-22034.70	2516680.00	0.009
	24.75 - 23.625					39.000	65.0110	-22350.20	2535430.00	0.009
	23.625 - 22.5					39.000	65.4916	-22666.80	2554170.00	0.009
	22.5 - 21.375					39.000	65.9722	-22984.70	2572910.00	0.009
	21.375 - 20.25					39.000	66.4528	-23303.70	2591660.00	0.009
	20.25 - 19.125					39.000	66.9334	-23624.00	2610400.00	0.009
	19.125 - 18					39.000	67.4140	-23945.50	2629140.00	0.009
	18 - 16.875					39.000	67.8946	-24268.20	2647890.00	0.009
	16.875 - 15.75					39.000	68.3752	-24592.10	2666630.00	0.009
	15.75 - 14.625					39.000	68.8558	-24917.20	2685370.00	0.009
	14.625 - 13.5					39.000	69.3363	-25243.40	2704120.00	0.009
	13.5 - 12.375					39.000	69.8169	-25570.90	2722860.00	0.009
	12.375 - 11.25					39.000	70.2975	-25899.60	2741600.00	0.009
	11.25 - 10.125					39.000	70.7781	-26229.50	2760350.00	0.010
	10.125 - 9					39.000	71.2587	-26560.60	2779090.00	0.010
L11	9 - 8	TP39.8482x38.267x0.5768	7.00	0.00	0.0	39.000	70.4271	-26868.70	2746660.00	0.010
	8 - 7					39.000	70.8466	-27176.60	2763020.00	0.010
	7 - 6					39.000	71.2662	-27485.40	2779380.00	0.010
	6 - 5					39.000	71.6858	-27795.10	2795750.00	0.010
	5 - 4					39.000	72.1054	-28105.80	2812110.00	0.010
	4 - 3					39.000	72.5249	-28417.40	2828470.00	0.010
	3 - 2					39.000	72.9445	-28730.00	2844840.00	0.010
L12	2 - 1	TP40.3x39.8482x0.5732	2.00	0.00	0.0	39.000	72.9109	-29043.60	2843530.00	0.010
	1 - 0					39.000	73.3279	-29358.20	2859790.00	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	117 - 116	TP15.94x14.36x0.1875	1394.67	0.550	39.000	0.014	0.00	0.000	39.000	0.000
	116 - 115		2853.28	1.090	39.000	0.028	0.00	0.000	39.000	0.000
	115 - 114		5218.82	1.933	39.000	0.050	0.00	0.000	39.000	0.000
	114 - 113		7650.28	2.749	39.000	0.070	0.00	0.000	39.000	0.000
	113 - 112		10148.67	3.539	39.000	0.091	0.00	0.000	39.000	0.000
	112 - 111		12714.83	4.306	39.000	0.110	0.00	0.000	39.000	0.000
	111 - 110		15349.75	5.049	39.000	0.129	0.00	0.000	39.000	0.000
L2	110 - 109	TP18.2x15.94x0.1875	19091.50	6.102	39.000	0.156	0.00	0.000	39.000	0.000
	109 - 108		22909.17	7.119	39.000	0.183	0.00	0.000	39.000	0.000
	108 - 107		26803.83	8.100	39.000	0.208	0.00	0.000	39.000	0.000
	107 - 106		30776.25	9.049	39.000	0.232	0.00	0.000	39.000	0.000
	106 - 105		34827.33	9.966	39.000	0.256	0.00	0.000	39.000	0.000
	105 - 104		38958.25	10.854	39.000	0.278	0.00	0.000	39.000	0.000
	104 - 103		43169.92	11.714	39.000	0.300	0.00	0.000	39.000	0.000
	103 - 102		47463.17	12.548	39.000	0.322	0.00	0.000	39.000	0.000
	102 - 101		51839.17	13.357	39.000	0.342	0.00	0.000	39.000	0.000
	101 - 100		56298.75	14.142	39.000	0.363	0.00	0.000	39.000	0.000
L3	100 - 98.5375	TP24.8143x18.2x0.25	62975.17	11.556	39.000	0.296	0.00	0.000	39.000	0.000
	98.5375 - 97.075		82713.75	14.640	39.000	0.375	0.00	0.000	39.000	0.000
	97.075 - 95.6125		97511.67	16.658	39.000	0.427	0.00	0.000	39.000	0.000
	95.6125 - 94.15		112510.83	18.562	39.000	0.476	0.00	0.000	39.000	0.000
	94.15 - 92.6875		128550.00	20.494	39.000	0.525	0.00	0.000	39.000	0.000
	92.6875 - 91.225		145131.67	22.372	39.000	0.574	0.00	0.000	39.000	0.000
	91.225 - 89.7625		161950.00	24.151	39.000	0.619	0.00	0.000	39.000	0.000
	89.7625 - 88.3		178969.17	25.834	39.000	0.662	0.00	0.000	39.000	0.000
	88.3 - 86.8375		203595.83	28.462	39.000	0.730	0.00	0.000	39.000	0.000
	86.8375 - 85.375		227825.00	30.860	39.000	0.791	0.00	0.000	39.000	0.000
	85.375 - 83.9125		252255.00	33.124	39.000	0.849	0.00	0.000	39.000	0.000
	83.9125 - 82.45		276888.33	35.264	39.000	0.904	0.00	0.000	39.000	0.000
	82.45 - 80.9875		301733.33	37.288	39.000	0.956	0.00	0.000	39.000	0.000
	80.9875 - 79.525		327572.50	39.298	39.000	1.008	0.00	0.000	39.000	0.000
	79.525 - 78.0625		353619.17	41.200	39.000	1.056	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	78.0625 - 76.6		379875.83	43.002	39.000	1.103	0.00	0.000	39.000	0.000
	76.6 - 75.1375		406344.17	44.710	39.000	1.146	0.00	0.000	39.000	0.000
	75.1375 - 73.675		433025.00	46.330	39.000	1.188	0.00	0.000	39.000	0.000
	73.675 - 72.2125		459920.83	47.867	39.000	1.227	0.00	0.000	39.000	0.000
	72.2125 - 70.75		490749.17	49.702	39.000	1.274	0.00	0.000	39.000	0.000
L4	70.75 - 69.7143	TP26.4538x24.8143x0.4322	513160.83	30.151	39.000	0.773	0.00	0.000	39.000	0.000
	69.7143 - 68.6786		535685.83	30.879	39.000	0.792	0.00	0.000	39.000	0.000
	68.6786 - 67.6429		558324.17	31.581	39.000	0.810	0.00	0.000	39.000	0.000
	67.6429 - 66.6071		581077.50	32.258	39.000	0.827	0.00	0.000	39.000	0.000
	66.6071 - 65.5714		603945.83	32.910	39.000	0.844	0.00	0.000	39.000	0.000
	65.5714 - 64.5357		626930.00	33.540	39.000	0.860	0.00	0.000	39.000	0.000
	64.5357 - 63.5		650030.00	34.148	39.000	0.876	0.00	0.000	39.000	0.000
L5	63.5 - 62.4545	TP30.09x26.4538x0.5821	673464.17	26.244	39.000	0.673	0.00	0.000	39.000	0.000
	62.4545 - 61.4091		697015.00	26.671	39.000	0.684	0.00	0.000	39.000	0.000
	61.4091 - 60.3636		720681.67	27.083	39.000	0.694	0.00	0.000	39.000	0.000
	60.3636 - 59.3182		744466.67	27.481	39.000	0.705	0.00	0.000	39.000	0.000
	59.3182 - 58.2727		768368.33	27.865	39.000	0.714	0.00	0.000	39.000	0.000
	58.2727 - 57.2273		792390.00	28.235	39.000	0.724	0.00	0.000	39.000	0.000
	57.2273 - 56.1818		816530.00	28.592	39.000	0.733	0.00	0.000	39.000	0.000
	56.1818 - 55.1364		840791.67	28.937	39.000	0.742	0.00	0.000	39.000	0.000
	55.1364 - 54.0909		865166.67	29.271	39.000	0.751	0.00	0.000	39.000	0.000
	54.0909 - 53.0455		889675.00	29.593	39.000	0.759	0.00	0.000	39.000	0.000
	53.0455 - 52		914300.00	29.904	39.000	0.767	0.00	0.000	39.000	0.000
	52 - 47.42		528101.67	16.070	39.000	0.412	0.00	0.000	39.000	0.000
L6	52 - 47.42	TP30.4738x27.8902x0.6076	495782.50	15.327	39.000	0.393	0.00	0.000	39.000	0.000
	47.42 - 46.1133		1055641.67	31.740	39.000	0.814	0.00	0.000	39.000	0.000
	46.1133 - 44.8067		1087591.67	31.816	39.000	0.816	0.00	0.000	39.000	0.000
	44.8067 - 43.5		1119716.67	31.882	39.000	0.817	0.00	0.000	39.000	0.000
L7	43.5 - 42.3125	TP31.5467x30.4738x0.7557	1149075.00	26.221	39.000	0.672	0.00	0.000	39.000	0.000
	42.3125 - 41.125		1178591.67	26.414	39.000	0.677	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	41.125 - 39.9375		1208258.33	26.600	39.000	0.682	0.00	0.000	39.000	0.000
	39.9375 - 38.75		1238083.33	26.778	39.000	0.687	0.00	0.000	39.000	0.000
L8	38.75 - 37.5	TP32.3938x31.5467x0.7424	1269641.67	27.402	39.000	0.703	0.00	0.000	39.000	0.000
	37.5 - 36.25		1301375.00	27.578	39.000	0.707	0.00	0.000	39.000	0.000
	36.25 - 35		1333266.67	27.746	39.000	0.711	0.00	0.000	39.000	0.000
L9	35 - 33.8333	TP33.1845x32.3938x0.7824	1363183.33	26.573	39.000	0.681	0.00	0.000	39.000	0.000
	33.8333 - 32.6667		1393250.00	26.711	39.000	0.685	0.00	0.000	39.000	0.000
	32.6667 - 31.5		1423458.33	26.842	39.000	0.688	0.00	0.000	39.000	0.000
L10	31.5 - 30.375	TP38.267x33.1845x0.5873	1452725.00	35.283	39.000	0.905	0.00	0.000	39.000	0.000
	30.375 - 29.25		1482116.67	35.442	39.000	0.909	0.00	0.000	39.000	0.000
	29.25 - 28.125		1511641.67	35.594	39.000	0.913	0.00	0.000	39.000	0.000
	28.125 - 27		1541283.33	35.741	39.000	0.916	0.00	0.000	39.000	0.000
	27 - 25.875		1571066.67	35.882	39.000	0.920	0.00	0.000	39.000	0.000
	25.875 - 24.75		1600966.67	36.018	39.000	0.924	0.00	0.000	39.000	0.000
	24.75 - 23.625		1631000.00	36.149	39.000	0.927	0.00	0.000	39.000	0.000
	23.625 - 22.5		1661166.67	36.275	39.000	0.930	0.00	0.000	39.000	0.000
	22.5 - 21.375		1691458.33	36.395	39.000	0.933	0.00	0.000	39.000	0.000
	21.375 - 20.25		1721883.33	36.512	39.000	0.936	0.00	0.000	39.000	0.000
	20.25 - 19.125		1752441.67	36.624	39.000	0.939	0.00	0.000	39.000	0.000
	19.125 - 18		1783133.33	36.731	39.000	0.942	0.00	0.000	39.000	0.000
	18 - 16.875		1813958.33	36.835	39.000	0.944	0.00	0.000	39.000	0.000
	16.875 - 15.75		1844916.67	36.935	39.000	0.947	0.00	0.000	39.000	0.000
	15.75 - 14.625		1876000.00	37.031	39.000	0.949	0.00	0.000	39.000	0.000
	14.625 - 13.5		1907225.00	37.123	39.000	0.952	0.00	0.000	39.000	0.000
	13.5 - 12.375		1938591.67	37.211	39.000	0.954	0.00	0.000	39.000	0.000
	12.375 - 11.25		1970083.33	37.297	39.000	0.956	0.00	0.000	39.000	0.000
	11.25 - 10.125		2001716.67	37.379	39.000	0.958	0.00	0.000	39.000	0.000
	10.125 - 9		2033483.33	37.457	39.000	0.960	0.00	0.000	39.000	0.000
L11	9 - 8	TP39.8482x38.267x0.5768	2061858.33	38.175	39.000	0.979	0.00	0.000	39.000	0.000
	8 - 7		2090333.33	38.242	39.000	0.981	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	7 - 6		2118916.67	38.306	39.000	0.982	0.00	0.000	39.000	0.000
	6 - 5		2147608.33	38.368	39.000	0.984	0.00	0.000	39.000	0.000
	5 - 4		2176408.33	38.429	39.000	0.985	0.00	0.000	39.000	0.000
	4 - 3		2205316.67	38.486	39.000	0.987	0.00	0.000	39.000	0.000
	3 - 2		2234333.33	38.542	39.000	0.988	0.00	0.000	39.000	0.000
L12	2 - 1	TP40.3x39.8482x0.5732	2263458.33	38.829	39.000	0.996	0.00	0.000	39.000	0.000
	1 - 0		2292691.67	38.881	39.000	0.997	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	117 - 116	TP15.94x14.36x0.1875	1426.45	0.164	26.000	0.013	54.65	0.010	26.000	0.000
	116 - 115		1490.95	0.169	26.000	0.013	54.65	0.010	26.000	0.000
	115 - 114		2398.38	0.268	26.000	0.021	70.30	0.012	26.000	0.000
	114 - 113		2464.79	0.271	26.000	0.021	69.82	0.012	26.000	0.000
	113 - 112		2532.17	0.274	26.000	0.021	69.34	0.011	26.000	0.000
	112 - 111		2600.50	0.277	26.000	0.022	68.85	0.011	26.000	0.000
	111 - 110		2669.78	0.281	26.000	0.022	68.35	0.011	26.000	0.000
L2	110 - 109	TP18.2x15.94x0.1875	3779.72	0.392	26.000	0.031	68.55	0.010	26.000	0.000
	109 - 108		3856.09	0.394	26.000	0.031	69.26	0.010	26.000	0.000
	108 - 107		3933.68	0.397	26.000	0.031	69.99	0.010	26.000	0.000
	107 - 106		4012.01	0.399	26.000	0.031	70.72	0.010	26.000	0.000
	106 - 105		4091.31	0.401	26.000	0.031	71.46	0.010	26.000	0.000
	105 - 104		4171.58	0.404	26.000	0.032	72.21	0.009	26.000	0.000
	104 - 103		4252.82	0.406	26.000	0.032	72.97	0.009	26.000	0.000
	103 - 102		4335.02	0.409	26.000	0.032	73.74	0.009	26.000	0.000
	102 - 101		4418.19	0.411	26.000	0.032	74.52	0.009	26.000	0.000
	101 - 100		4502.31	0.414	26.000	0.032	75.31	0.009	26.000	0.000
L3	100 - 98.5375	TP24.8143x18.2x0.25	4629.89	0.315	26.000	0.025	76.74	0.007	26.000	0.000
	98.5375 - 97.075		10056.00	0.671	26.000	0.052	1623.42	0.135	26.000	0.005
	97.075 - 95.6125		10186.00	0.668	26.000	0.052	1624.83	0.131	26.000	0.005
	95.6125 - 94.15		10358.20	0.668	26.000	0.052	1740.29	0.135	26.000	0.005
	94.15 - 92.6875		11243.70	0.712	26.000	0.056	1740.22	0.130	26.000	0.005
	92.6875 - 91.225		11435.70	0.713	26.000	0.056	1007.18	0.073	26.000	0.003
	91.225 - 89.7625		11572.10	0.709	26.000	0.055	851.69	0.060	26.000	0.002
	89.7625 - 88.3		11710.10	0.706	26.000	0.055	853.25	0.058	26.000	0.002
	88.3 - 86.8375		16504.50	0.980	26.000	0.077	853.13	0.056	26.000	0.002
	86.8375 - 85.375		16642.00	0.973	26.000	0.076	50.30	0.003	26.000	0.000

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	85.375 - 83.9125		16780.70	0.966	26.000	0.075	51.98	0.003	26.000	0.000
	83.9125 - 82.45		16920.50	0.959	26.000	0.075	53.70	0.003	26.000	0.000
	82.45 - 80.9875		17605.20	0.983	26.000	0.077	55.43	0.003	26.000	0.000
	80.9875 - 79.525		17747.10	0.976	26.000	0.076	57.19	0.003	26.000	0.000
	79.525 - 78.0625		17890.20	0.970	26.000	0.076	58.98	0.003	26.000	0.000
	78.0625 - 76.6		18034.50	0.964	26.000	0.075	60.79	0.003	26.000	0.000
	76.6 - 75.1375		18179.90	0.958	26.000	0.075	62.63	0.003	26.000	0.000
	75.1375 - 73.675		18326.60	0.952	26.000	0.074	64.49	0.003	26.000	0.000
	73.675 - 72.2125		18474.50	0.947	26.000	0.074	66.37	0.003	26.000	0.000
	72.2125 - 70.75		21597.00	1.092	26.000	0.085	141.74	0.007	26.000	0.000
L4	70.75 - 69.7143	TP26.4538x24.8143x0.4322	21699.20	0.633	26.000	0.049	144.54	0.004	26.000	0.000
	69.7143 - 68.6786		21809.00	0.631	26.000	0.049	147.34	0.004	26.000	0.000
	68.6786 - 67.6429		21919.40	0.628	26.000	0.049	150.17	0.004	26.000	0.000
	67.6429 - 66.6071		22030.30	0.625	26.000	0.049	153.03	0.004	26.000	0.000
	66.6071 - 65.5714		22141.90	0.623	26.000	0.049	155.91	0.004	26.000	0.000
	65.5714 - 64.5357		22254.00	0.620	26.000	0.048	158.82	0.004	26.000	0.000
	64.5357 - 63.5		22366.70	0.618	26.000	0.048	161.76	0.004	26.000	0.000
L5	63.5 - 62.4545	TP30.09x26.4538x0.5821	22476.20	0.459	26.000	0.036	164.53	0.003	26.000	0.000
	62.4545 - 61.4091		22587.60	0.457	26.000	0.036	167.33	0.003	26.000	0.000
	61.4091 - 60.3636		22699.70	0.456	26.000	0.036	170.16	0.003	26.000	0.000
	60.3636 - 59.3182		22812.40	0.454	26.000	0.035	173.01	0.003	26.000	0.000
	59.3182 - 58.2727		22925.70	0.452	26.000	0.035	175.88	0.003	26.000	0.000
	58.2727 - 57.2273		23039.50	0.450	26.000	0.035	178.78	0.003	26.000	0.000
	57.2273 - 56.1818		23154.00	0.449	26.000	0.035	181.71	0.003	26.000	0.000
	56.1818 - 55.1364		23269.10	0.447	26.000	0.035	184.65	0.003	26.000	0.000
	55.1364 - 54.0909		23384.80	0.446	26.000	0.035	187.63	0.003	26.000	0.000
	54.0909 - 53.0455		23501.10	0.444	26.000	0.035	190.63	0.003	26.000	0.000
	53.0455 - 52		23618.00	0.443	26.000	0.035	193.65	0.003	26.000	0.000
	52 - 47.42		12654.00	0.229	26.000	0.018	224.11	0.003	26.000	0.000
L6	52 - 47.42	TP30.4738x27.8902x0.6076	11598.90	0.207	26.000	0.016	140.26	0.002	26.000	0.000

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	47.42 - 46.1133		24385.60	0.429	26.000	0.034	367.65	0.005	26.000	0.000
	46.1133 - 44.8067		24526.40	0.425	26.000	0.033	370.97	0.005	26.000	0.000
	44.8067 - 43.5		24668.70	0.422	26.000	0.033	374.33	0.005	26.000	0.000
L7	43.5 - 42.3125	TP31.5467x30.4738x0.7557	24796.00	0.340	26.000	0.027	377.34	0.004	26.000	0.000
	42.3125 - 41.125		24926.30	0.339	26.000	0.026	380.37	0.004	26.000	0.000
	41.125 - 39.9375		25057.30	0.337	26.000	0.026	383.43	0.004	26.000	0.000
	39.9375 - 38.75		25189.00	0.336	26.000	0.026	386.52	0.004	26.000	0.000
L8	38.75 - 37.5	TP32.3938x31.5467x0.7424	25323.30	0.341	26.000	0.027	389.70	0.004	26.000	0.000
	37.5 - 36.25		25457.80	0.339	26.000	0.027	392.91	0.004	26.000	0.000
	36.25 - 35		25593.00	0.338	26.000	0.026	396.14	0.004	26.000	0.000
L9	35 - 33.8333	TP33.1845x32.3938x0.7824	25715.60	0.320	26.000	0.025	399.10	0.004	26.000	0.000
	33.8333 - 32.6667		25839.70	0.319	26.000	0.025	402.08	0.004	26.000	0.000
	32.6667 - 31.5		25964.30	0.318	26.000	0.025	405.09	0.004	26.000	0.000
L10	31.5 - 30.375	TP38.267x33.1845x0.5873	26078.90	0.420	26.000	0.033	408.00	0.005	26.000	0.000
	30.375 - 29.25		26192.00	0.418	26.000	0.033	410.94	0.005	26.000	0.000
	29.25 - 28.125		26305.50	0.417	26.000	0.033	413.90	0.005	26.000	0.000
	28.125 - 27		26419.50	0.416	26.000	0.032	416.88	0.005	26.000	0.000
	27 - 25.875		26534.00	0.414	26.000	0.032	419.88	0.004	26.000	0.000
	25.875 - 24.75		26649.00	0.413	26.000	0.032	422.91	0.004	26.000	0.000
	24.75 - 23.625		26764.40	0.412	26.000	0.032	425.96	0.004	26.000	0.000
	23.625 - 22.5		26880.40	0.410	26.000	0.032	429.04	0.004	26.000	0.000
	22.5 - 21.375		26996.80	0.409	26.000	0.032	432.14	0.004	26.000	0.000
	21.375 - 20.25		27113.70	0.408	26.000	0.032	435.26	0.004	26.000	0.000
	20.25 - 19.125		27231.10	0.407	26.000	0.032	438.40	0.004	26.000	0.000
	19.125 - 18		27349.00	0.406	26.000	0.032	441.57	0.004	26.000	0.000
	18 - 16.875		27467.40	0.405	26.000	0.032	444.76	0.004	26.000	0.000
	16.875 - 15.75		27586.20	0.403	26.000	0.032	447.97	0.004	26.000	0.000
	15.75 - 14.625		27705.60	0.402	26.000	0.031	451.21	0.004	26.000	0.000
	14.625 - 13.5		27825.50	0.401	26.000	0.031	454.47	0.004	26.000	0.000
	13.5 - 12.375		27945.80	0.400	26.000	0.031	457.75	0.004	26.000	0.000

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	12.375 - 11.25		28066.70	0.399	26.000	0.031	461.06	0.004	26.000	0.000
	11.25 - 10.125		28188.00	0.398	26.000	0.031	464.39	0.004	26.000	0.000
	10.125 - 9		28309.90	0.397	26.000	0.031	467.74	0.004	26.000	0.000
L11	9 - 8	TP39.8482x38.267x0.5768	28415.10	0.403	26.000	0.032	470.74	0.004	26.000	0.000
	8 - 7		28521.80	0.403	26.000	0.031	473.76	0.004	26.000	0.000
	7 - 6		28628.90	0.402	26.000	0.031	476.80	0.004	26.000	0.000
	6 - 5		28736.30	0.401	26.000	0.031	479.85	0.004	26.000	0.000
	5 - 4		28844.10	0.400	26.000	0.031	482.93	0.004	26.000	0.000
	4 - 3		28952.20	0.399	26.000	0.031	486.02	0.004	26.000	0.000
	3 - 2		29060.80	0.398	26.000	0.031	489.13	0.004	26.000	0.000
L12	2 - 1	TP40.3x39.8482x0.5732	29169.00	0.400	26.000	0.031	492.26	0.004	26.000	0.000
	1 - 0		29277.50	0.399	26.000	0.031	495.41	0.004	26.000	0.000

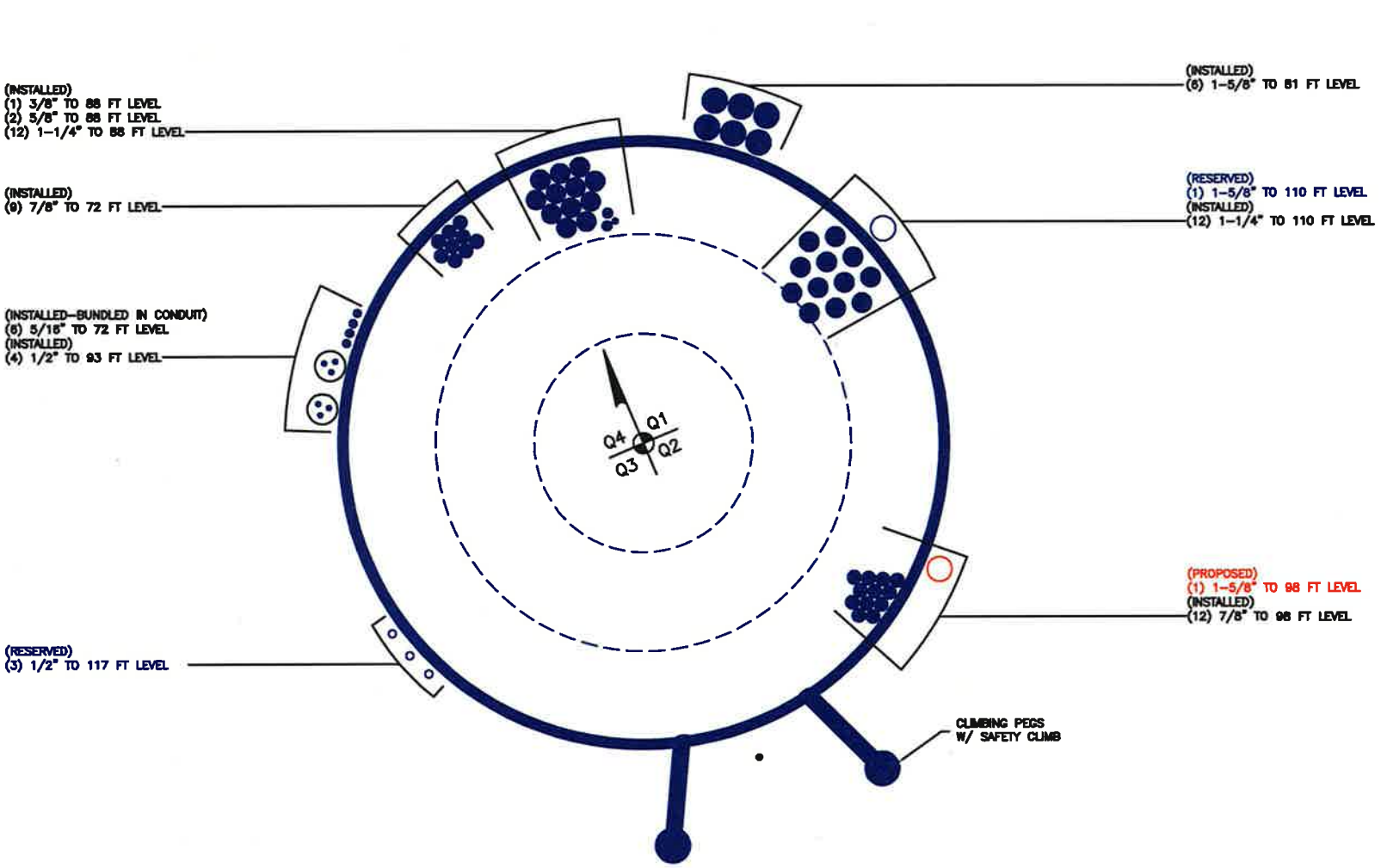
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	117.00-110.00	Pole	TP15.94x14.36x0.1875	1	Note 1	Note 1	9.8	Pass
L2	110.00-100.00	Pole	TP18.2x15.94x0.1875	2	Note 1	Note 1	27.4	Pass
L3	100.00-47.42	Pole	TP30.09x18.2x0.25	3	Note 1	Note 1	96.4	Pass
L4	52.00-0.00	Pole	TP40.3x28.5537x0.344	4	Note 1	Note 1	76.1	Pass
M1	35.00-0.00	Mod	(Sabre) MS-600	5	Note 1	Note 1	90.5	Pass
M2	65.00-35.00	Mod	(Sabre) MS-450	6	Note 1	Note 1	84.7	Pass
M3	5.50-0.00	Mod	(ts) 1.25x6.5-65 (ch)	7	Note 1	Note 1	63.2	Pass
M4	10.50-0.50	Mod	(Sabre) MS-450	8	Note 1	Note 1	85.4	Pass
M5	45.00-30.00	Mod	(Sabre) MS-450	9	Note 1	Note 1	73.6	Pass
M6	72.25-50.00	Mod	(Sabre) MS-450	10	Note 1	Note 1	91.2	Pass
M7	40.00-0.00	Mod	Shaft Reinforcement	11	Note 1	Note 1	88.5	Pass
M8	50.00-40.00	Mod	Shaft Reinforcement	12	Note 1	Note 1	72.5	Pass
							Summary	
						Pole (L3)	96.4	Pass
						Mod (M6)	91.2	Pass
						RATING =	**96.4**	**Pass**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806302 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Pole (L3)	96.4%
Mod (M6)	91.2%

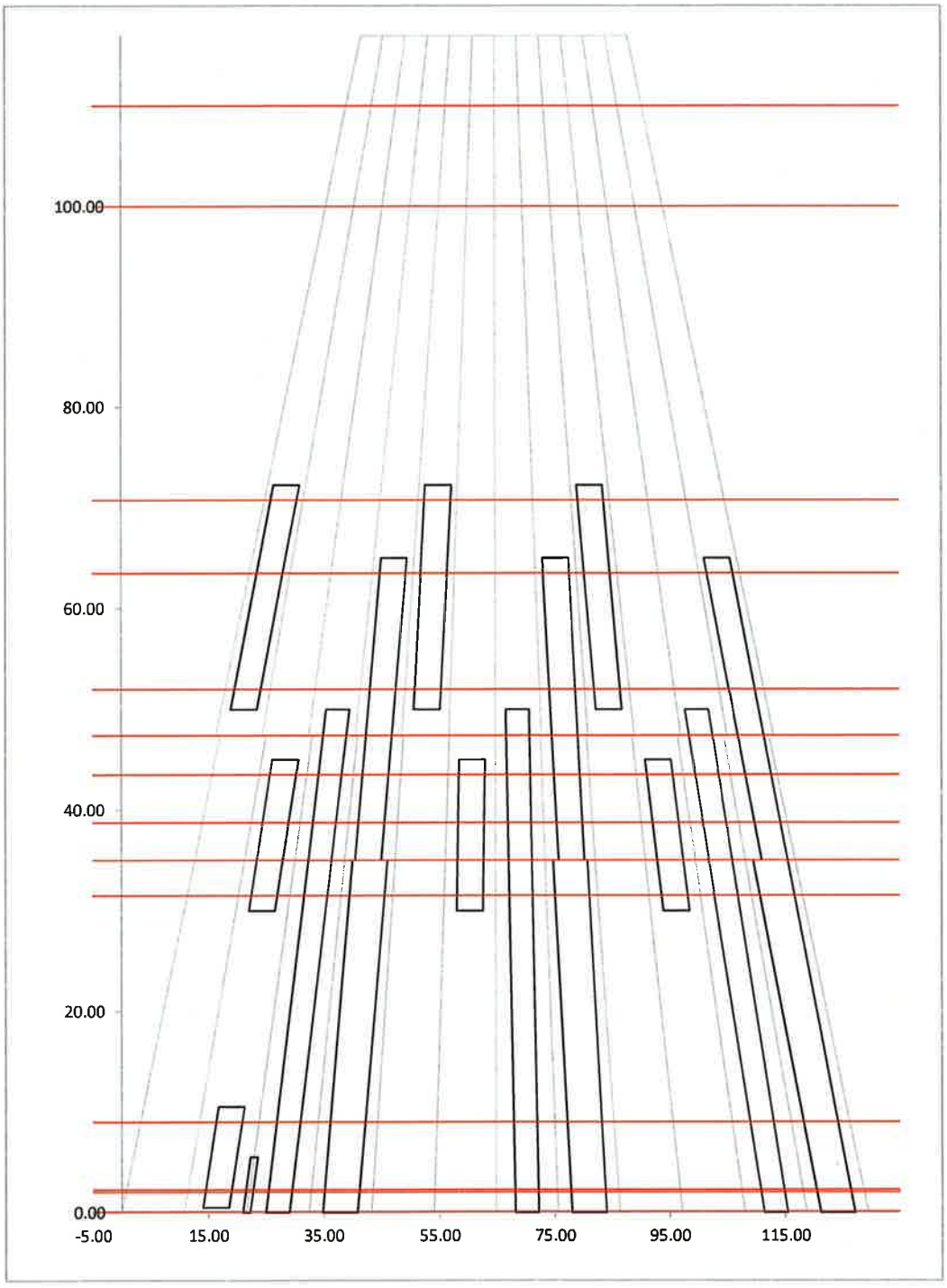
BRG 302 943052 (BU 806352)
TEP #: 25562.12516
Analysis: MHL 12/20/2013
Check: JSC 12/20/2013

Monopole Shaft Reinforcement

Modification	Type	Effective	From (ft)	To (ft)	Effective	Location (° or flat/point #)	Flats/Points	Lateral Offset (in)
1	(Sabre) MS-600	x	0.00	35.00	x	4 8 12	Flats	0.00
2	(Sabre) MS-450	x	35.00	65.00		4 8 12	Flats	0.00
3	(ts) 1.25x6.5-65 (ch)	x	0.00	5.50		2	Points	0.00
4	(Sabre) MS-450		0.50	10.50		2	Flats	0.00
5	(Sabre) MS-450		30.00	45.00		2 6 10	Flats	0.00
6	(Sabre) MS-450		50.00	72.25		1 5 9	Flats	0.00
7	(Aero) MP303	x	0.00	38.75	x	3 7 11	Flats	0.00
8	(Aero) MP303	x	38.75	50.00		3 7 11	Flats	0.00

Modification Properties									
Modification	Unbraced Length (in)	Bolt Cap (k)	Ixx (in^4)	Iyy (in^4)	k	Drill Hole (in)	A,gross (in^2)	A,net (in^2)	Termination Length (ft)
(Sabre) MS-600	16.375	30	0.500	18.000	0.8	1.25	6.000	4.688	2.000
(Sabre) MS-450	20.625	30	0.375	7.594	0.8	1.25	4.500	3.188	1.500
(ts) 1.25x6.5-65 (ch)	0.750	W	19.803	0.936	0.8	0.00	7.188	7.188	3.250
(Aero) MP303	18.000	30	0.660	6.570	0.8	1.22	2.920	2.411	1.250

Reinforcement Layout



Elevation: 0.00-ft

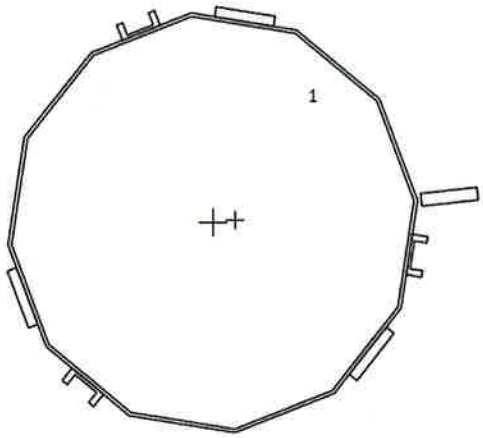
Loads		
Axial:	29,358.2	lb
Moment:	2,292,691.7	lb-ft
Shear:	29,277.5	lb
Torsion:	495.4	lb-ft

Equivalent Loads to Pole		
Axial:	16,604.1	lb
Moment:	1,379,045.6	lb-ft
Shear:	16,558.5	lb
Torsion:	495.4	lb-ft

Shear Flow		
Controlling Mod:	1	
q:	0.239	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	125.66	in
Capacity:	13.0%	

	(in^4)	Angle
$I_{comp,min}$:	14794.0	45.0°
$I_{comp,cont}$:	14836.6	39.0°

OD:	40.30 in
t:	0.3440 in
t_{eff}:	0.5732 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.376	39.202	52.000	52.000	59.0°	76.1%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.376	37.391	41.734	41.667	39.0°	90.5%
3	0.376	32.376	51.785	52.000	135.0°	63.2%
7	0.376	38.980	46.063	44.036	59.0°	88.5%

Elevation: 2.00-ft

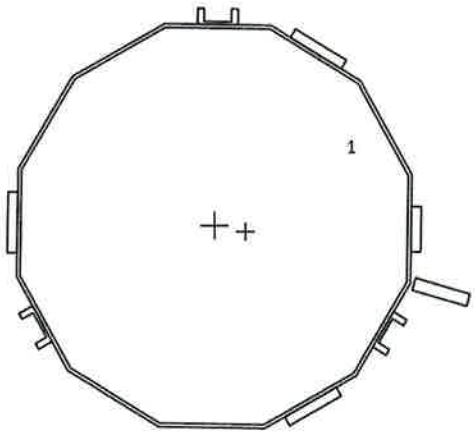
Loads		
Axial:	28,730.0	lb
Moment:	2,234,333.3	lb-ft
Shear:	29,060.8	lb
Torsion:	489.1	lb-ft

Equivalent Loads to Pole		
Axial:	15,282.7	lb
Moment:	1,339,494.3	lb-ft
Shear:	15,458.7	lb
Torsion:	489.1	lb-ft

Shear Flow		
Controlling Mod:	1	
q:	0.234	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	128.17	in
Capacity:	12.8%	

	(in^4)	Angle
$I_{comp,min}$:	14460.9	49.5°
$I_{comp,cont}$:	14655.9	61.0°

OD:	39.85 in
t:	0.3440 in
t_{eff}:	0.5802 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.350	38.804	52.000	52.000	41.5°	75.3%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.350	35.993	41.734	41.667	43.0°	87.1%
3	0.350	28.694	51.785	52.000	128.5°	56.1%
4	0.350	24.387	37.814	37.778	162.5°	65.4%
7	0.350	38.613	46.063	44.036	61.0°	87.7%

Elevation: 2.25-ft

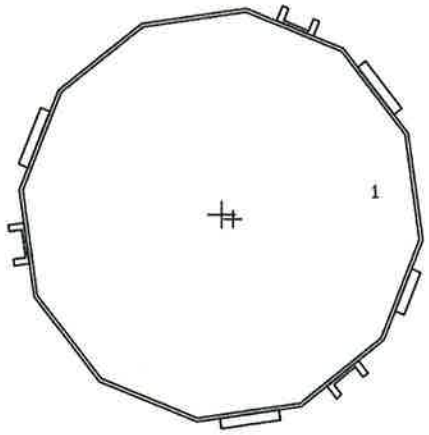
Loads		
Axial:	28,664.9	lb
Moment:	2,228,288.2	lb-ft
Shear:	29,038.2	lb
Torsion:	488.5	lb-ft

Equivalent Loads to Pole		
Axial:	16,700.3	lb
Moment:	1,342,154.0	lb-ft
Shear:	16,917.8	lb
Torsion:	488.5	lb-ft

Shear Flow		
Controlling Mod:	1	
q:	0.236	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	127.06	in
Capacity:	12.9%	

	(in^4)	Angle
$I_{comp,min}$:	14319.3	60.0°
$I_{comp,cont}$:	14565.2	82.0°

OD:	39.79 in
t:	0.3440 in
t_{eff}:	0.5768 In



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.383	38.738	52.000	52.000	74.5°	75.2%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.383	36.236	41.734	41.667	82.0°	87.7%
4	0.383	31.895	37.814	37.778	150.0°	85.4%
7	0.383	38.309	46.063	44.036	63.0°	87.0%

Elevation: 9.00-ft

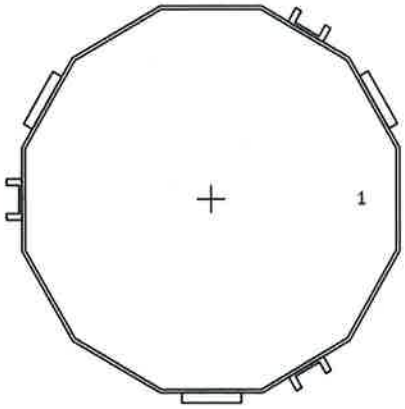
Loads		
Axial:	26,560.6	lb
Moment:	2,033,483.3	lb-ft
Shear:	28,309.9	lb
Torsion:	467.7	lb-ft

Equivalent Loads to Pole		
Axial:	16,215.7	lb
Moment:	1,214,060.8	lb-ft
Shear:	17,283.7	lb
Torsion:	467.7	lb-ft

Shear Flow		
Controlling Mod:	1	
q:	0.258	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	116.35	in
Capacity:	14.1%	

	(in^4)	Angle
$I_{comp,min}$:	12933.5	100.0°
$I_{comp,cont}$:	12933.5	90.0°

OD:	38.27 in
t:	0.3440 in
t_{eff}:	0.5873 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.387	37.371	52.000	52.000	59.5°	72.6%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.387	37.043	41.734	41.667	90.0°	89.7%
7	0.387	37.213	46.063	44.036	120.0°	84.5%

Elevation: 31.50-ft

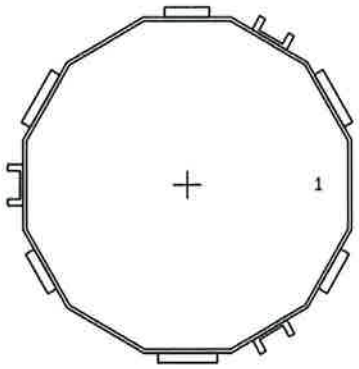
Loads		
Axial:	20,170.1	lb
Moment:	1,423,458.3	lb-ft
Shear:	25,964.3	lb
Torsion:	405.1	lb-ft

Equivalent Loads to Pole		
Axial:	9,566.8	lb
Moment:	651,322.1	lb-ft
Shear:	12,315.1	lb
Torsion:	405.1	lb-ft

Shear Flow		
Controlling Mod:	1	
q:	0.243	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	123.48	in
Capacity:	13.3%	

	(in^4)	Angle
$I_{comp,min}$:	10959.7	75.5°
$I_{comp,cont}$:	10959.7	90.0°

OD:	33.18 in
t:	0.3440 in
t_{eff}:	0.7824 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.263	26.772	52.000	52.000	14.5°	52.0%

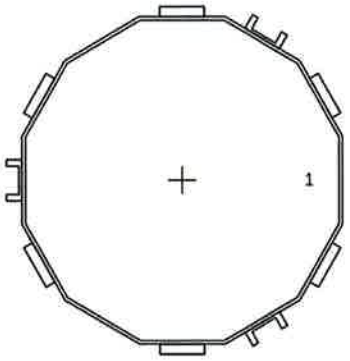
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.263	26.640	41.734	41.667	90.0°	64.5%
5	0.263	26.640	37.814	37.778	90.0°	71.1%
7	0.263	26.780	46.063	44.036	0.0°	60.8%

Elevation: 35.00-ft

Loads		
Axial:	19,089.3	lb
Moment:	1,333,266.7	lb-ft
Shear:	25,593.0	lb
Torsion:	396.1	lb-ft

OD:	32.39 in
t:	0.3440 in
t,eff:	0.7424 in

Equivalent Loads to Pole		
Axial:	9,503.1	lb
Moment:	641,090.4	lb-ft
Shear:	12,740.8	lb
Torsion:	396.1	lb-ft



Shear Flow		
Controlling Mod:	5	
q:	0.198	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	151.23	in
Capacity:	13.6%	

	(in^4)	Angle
$I_{comp,min}$:	9693.9	0.0°
$I_{comp,cont}$:	9693.9	90.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.268	27.674	52.000	52.000	104.5°	53.7%

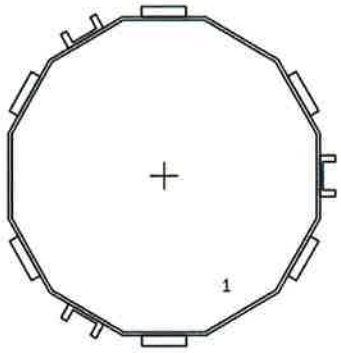
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
2	0.268	27.557	37.814	37.778	90.0°	73.6%
5	0.268	27.557	37.814	37.778	90.0°	73.6%
7	0.268	27.706	46.063	44.036	0.0°	62.9%

Elevation: 38.75-ft

Loads		
Axial:	18,000.8	lb
Moment:	1,238,083.3	lb-ft
Shear:	25,189.0	lb
Torsion:	386.5	lb-ft

OD:	31.55 in
t:	0.3440 in
t_{eff}:	0.7557 in

Equivalent Loads to Pole		
Axial:	8,840.7	lb
Moment:	586,242.7	lb-ft
Shear:	12,371.0	lb
Torsion:	386.5	lb-ft



Shear Flow		
Controlling Mod:	5	
q:	0.203	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	147.74	in
Capacity:	14.0%	

	(in^4)	Angle
$I_{comp,min}$:	9084.0	90.0°
$I_{comp,cont}$:	9084.0	150.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.256	26.707	52.000	52.000	104.5°	51.9%

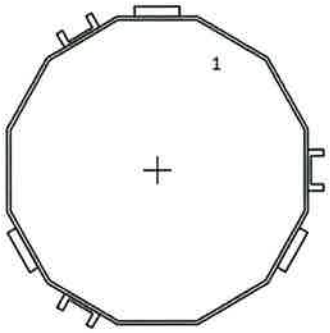
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
2	0.256	26.615	37.814	37.778	150.0°	71.1%
5	0.256	26.615	37.814	37.778	90.0°	71.1%
8	0.256	26.763	46.063	44.036	0.0°	60.8%

Elevation: 43.50-ft

Loads		
Axial:	16,639.0	lb
Moment:	1,119,716.7	lb-ft
Shear:	24,668.7	lb
Torsion:	374.3	lb-ft

OD:	30.47 in
t:	0.3440 in
t,eff:	0.6076 in

Equivalent Loads to Pole		
Axial:	9,975.8	lb
Moment:	650,684.0	lb-ft
Shear:	14,789.9	lb
Torsion:	374.3	lb-ft



Shear Flow		
Controlling Mod:	2	
q:	0.262	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	114.45	in
Capacity:	18.0%	

	(in^4)	Angle
$I_{comp,min}$:	6664.3	23.5°
$I_{comp,cont}$:	6664.3	30.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.299	31.803	52.000	52.000	14.5°	61.7%

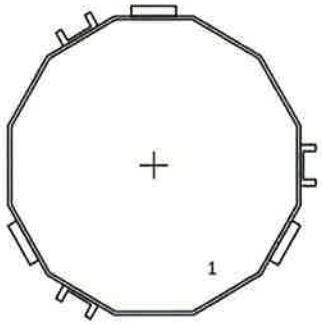
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
2	0.299	31.729	37.814	37.778	30.0°	84.7%
8	0.299	31.910	46.063	44.036	60.0°	72.5%

Elevation: 47.42-ft

Loads		
Axial:	15,621.9	lb
Moment:	1,023,884.2	lb-ft
Shear:	24,252.9	lb
Torsion:	364.4	lb-ft

OD:	29.59 in
t:	0.3440 in
t_{eff}:	0.6172 in

Equivalent Loads to Pole		
Axial:	9,253.7	lb
Moment:	586,744.5	lb-ft
Shear:	14,366.4	lb
Torsion:	364.4	lb-ft



Shear Flow		
Controlling Mod:	2	
q:	0.270	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	111.07	in
Capacity:	18.6%	

	(in^4)	Angle
$I_{comp,min}$:	6179.6	38.0°
$I_{comp,cont}$:	6179.6	150.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.286	30.451	52.000	52.000	14.5°	59.1%

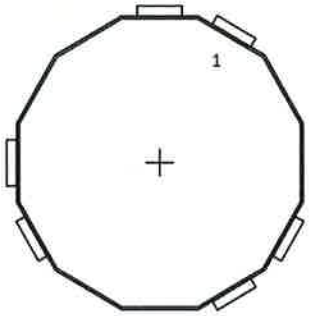
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
2	0.286	30.409	37.814	37.778	150.0°	81.2%
8	0.286	30.588	46.063	44.036	0.0°	69.5%

Elevation: 52.00-ft

Loads		
Axial:	14,120.7	lb
Moment:	914,300.0	lb-ft
Shear:	23,618.0	lb
Torsion:	193.7	lb-ft

OD:	29.05 in
t:	0.2500 in
t_{eff}:	0.5821 in

Equivalent Loads to Pole		
Axial:	6,519.0	lb
Moment:	406,454.4	lb-ft
Shear:	10,903.5	lb
Torsion:	193.6	lb-ft



Shear Flow		
Controlling Mod:	2	
q:	0.289	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	103.90	in
Capacity:	19.9%	

	(in^4)	Angle
$I_{comp,min}$:	5531.4	3.0°
$I_{comp,cont}$:	5531.4	30.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
3	0.282	29.830	52.000	52.000	104.5°	57.9%

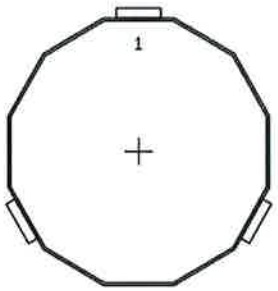
	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
2	0.282	29.806	37.814	37.778	30.0°	79.6%
6	0.282	29.806	37.814	37.778	0.0°	79.6%

Elevation: 63.50-ft

Loads		
Axial:	11,661.3	lb
Moment:	650,030.0	lb-ft
Shear:	22,366.7	lb
Torsion:	161.8	lb-ft

OD:	26.45 in
t:	0.2500 in
t_{eff}:	0.4322 in

Equivalent Loads to Pole		
Axial:	7,106.6	lb
Moment:	383,846.3	lb-ft
Shear:	13,630.7	lb
Torsion:	161.8	lb-ft



Shear Flow		
Controlling Mod:	6	
q:	0.441	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	68.08	in
Capacity:	30.3%	

	(in^4)	Angle
$I_{comp,min}$:	3135.2	161.0°
$I_{comp,cont}$:	3135.2	0.0°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
3	0.337	34.068	52.000	52.000	164.5°	66.2%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
6	0.337	34.153	37.814	37.778	0.0°	91.2%

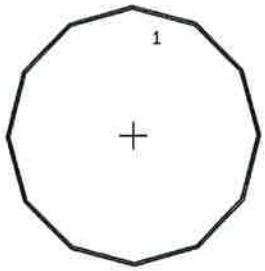
Elevation: 70.75-ft

Loads		
Axial:	10,402.7	lb
Moment:	490,749.2	lb-ft
Shear:	21,597.0	lb
Torsion:	141.7	lb-ft

OD:	24.81 in
t:	0.2500 in
t_{eff}:	0.2500 in

Equivalent Loads to Pole		
Axial:	10,402.7	lb
Moment:	490,749.2	lb-ft
Shear:	21,597.0	lb
Torsion:	141.7	lb-ft

Shear Flow N/A



	(in^4)	Angle
$I_{comp,min}$:	1525.2	0.0°
$I_{comp,cont}$:	1525.2	14.5°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
3	0.527	49.595	52.000	52.000	14.5°	96.4%

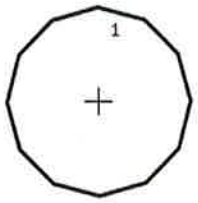
Elevation: 100.00-ft

Loads		
Axial:	1,521.3	lb
Moment:	56,298.8	lb-ft
Shear:	4,502.3	lb
Torsion:	75.3	lb-ft

Equivalent Loads to Pole		
Axial:	1,521.3	lb
Moment:	56,298.8	lb-ft
Shear:	4,502.3	lb
Torsion:	75.3	lb-ft

Shear Flow N/A

OD:	18.20 in
t:	0.1875 in
t_{eff}:	0.1875 in



	(in^4)	Angle
$I_{comp,min}$:	451.0	0.0°
$I_{comp,cont}$:	451.0	14.5°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
2	0.140	14.112	52.000	52.000	14.5°	**27.4%**

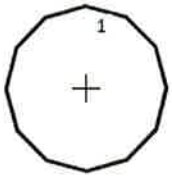
Elevation: 110.00-ft

Loads		
Axial:	771.0	lb
Moment:	15,349.8	lb-ft
Shear:	2,669.8	lb
Torsion:	68.4	lb-ft

OD:	15.94 in
t:	0.1875 in
t,eff:	0.1875 in

Equivalent Loads to Pole		
Axial:	771.0	lb
Moment:	15,349.8	lb-ft
Shear:	2,669.8	lb
Torsion:	68.3	lb-ft

Shear Flow N/A



	(in^4)	Angle
$I_{comp,min}$:	301.7	0.0°
$I_{comp,cont}$:	301.7	14.5°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
1	0.081	5.038	52.000	52.000	14.5°	**9.8%**

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *806352*
Site Name: *BRG 302 943052*
App #: *200733 Rev. 0*

Pole Manufacturer:	Other

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	22		

Plate Data		
Diam:	28	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.27	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.1875	in
Width:	6	in
Height:	12	in
Thick:	1	in
Notch:	1	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	15.94	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	15.35	ft-kips
Axial:	0.77	kips
Shear:	2.67	kips
Elevation:	110	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

		Stiffened
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	2.73 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened in	
T allowable	46.07 kips	<-- B, Stiffened
Prying Force, Q:	0.00 kips	Stiffened
Total Bolt Tension=T+Q:	2.73 kips	
Non-Prying Bolt Stress Ratio, T/B:	5.9% **Pass**	

Exterior Flange Plate Results Flexural Check

		Stiffened
Compression Side Plate Stress:	1.5 ksi	Service, ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	4.2% **Pass**	Comp. Y.L. Length:
Stiffened		N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A	

Stiffener Results

Horizontal Weld :	6.2% **Pass**
Vertical Weld:	3.9% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	0.6% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	1.8% **Pass**
Plate Comp. (AISC Bracket):	2.5% **Pass**

Pole Results

Pole Punching Shear Check:	1.4% **Pass**

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *806352*
Site Name: *BRG 302 943052*
App #: *200733 Rev. 0*

Pole Manufacturer:	Other

Reactions		
Moment:	56.30	ft-kips
Axial:	1.52	kips
Shear:	4.50	kips
Elevation:	100	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	22		

Plate Data		
Diam:	28	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.88	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.1875	in
Width:	6	in
Height:	12	in
Thick:	1	in
Notch:	1	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	18.2	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Stiffened
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	10.11	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	46.07	kips	<-- B, Stiffened
Prying Force, Q:	0.00	kips	Stiffened
Total Bolt Tension=T+Q:	10.11	kips	
Non-Prying Bolt Stress Ratio, T/B:	21.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

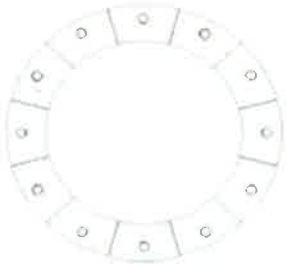
			Stiffened
Compression Side Plate Stress:	6.5	ksi	Service, ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	18.2%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

Stiffener Results

Horizontal Weld :	25.9%	**Pass**
Vertical Weld:	12.3%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	1.9%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	7.5%	**Pass**
Plate Comp. (AISC Bracket):	8.3%	**Pass**

Pole Results

Pole Punching Shear Check:	3.9%	**Pass**



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *806352*
Site Name: *BRG 302 943052*
App #: *200733 Rev. 0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2292.70	ft-kips
Axial:	29.37	kips
Shear:	29.27	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	48.22	in

Plate Data		
Diam:	54.22	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	10.80	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	40.3	in
Thick:	0.34375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	187.7 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	96.3% **Pass**	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	42.4 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	70.6% **Pass**	0.75*Fy*ASIF
		Y.L. Length: 26.48

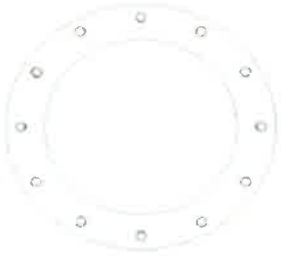
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

		PASS	PASS			
	Results Summary:	LC1	LC2		BRG 302 943052 (BU 806352)	
	Soil Interaction:	60.8%	15.6%	TEP #:	25562.12516	
Drilled Caisson Tool - Input	Foundation Structural:	78.8%	36.0%	Analysis:	MHL	12/20/2013
				Check:	JSC	12/20/2013

Code Revisions: TIA-222-F ACI 318-05 **Tower Type:** Monopole

	LC1	LC2	
Moment:	2,292.70	590.25	kip-ft
Axial (download):	29.37	44.20	kip
Shear:	29.27	7.36	kip
Axial (uplift):	0.00	0.00	kip

Shaft Information		
Diameter:	6.50	ft
Projection:	0.20	ft
Caisson Length:	16.50	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	6	*(fy = 60.0 ksi)*
Clear Cover to Tie:	5.00	*in (Cage Ø = 65.23in)*
Tie Bar Spacing:	12.00	in
Vertical Bar Size:	10	
Vertical Bar Quantity:	22	*(ρ =0.585%)*
fy:	60.0	ksi
E:	29,000	ksi

Design Parameters

Soil Layer	Soil Type	Depth (ft) from	Depth (ft) to	Eff. Unit Weight (pcf)	Cohesion (psf)	Friction Angle ϕ (°)	All. Skin Friction (psf) Download	All. Skin Friction (psf) Uplift
1	Clay	0.00	3.33	115.0	0			
2	Sand	3.33	4.00	115.0		30.0		
3	Sand	4.00	6.00	120.0		39.0		
4	Sand	6.00	11.00	135.0		45.0		
5	Clay	11.00	16.50	155.0	14000			

Notes: 1) Neglect lateral soil strength to a depth of:

i) ~~1/2 Pier Ø = 6.50ft / 2 = 3.25ft~~

ii) **Frost Depth = 40.0in / (12in/ft) = 3.33ft**

iii) ~~Geotech Recommendation = none~~

2) Groundwater = N/A

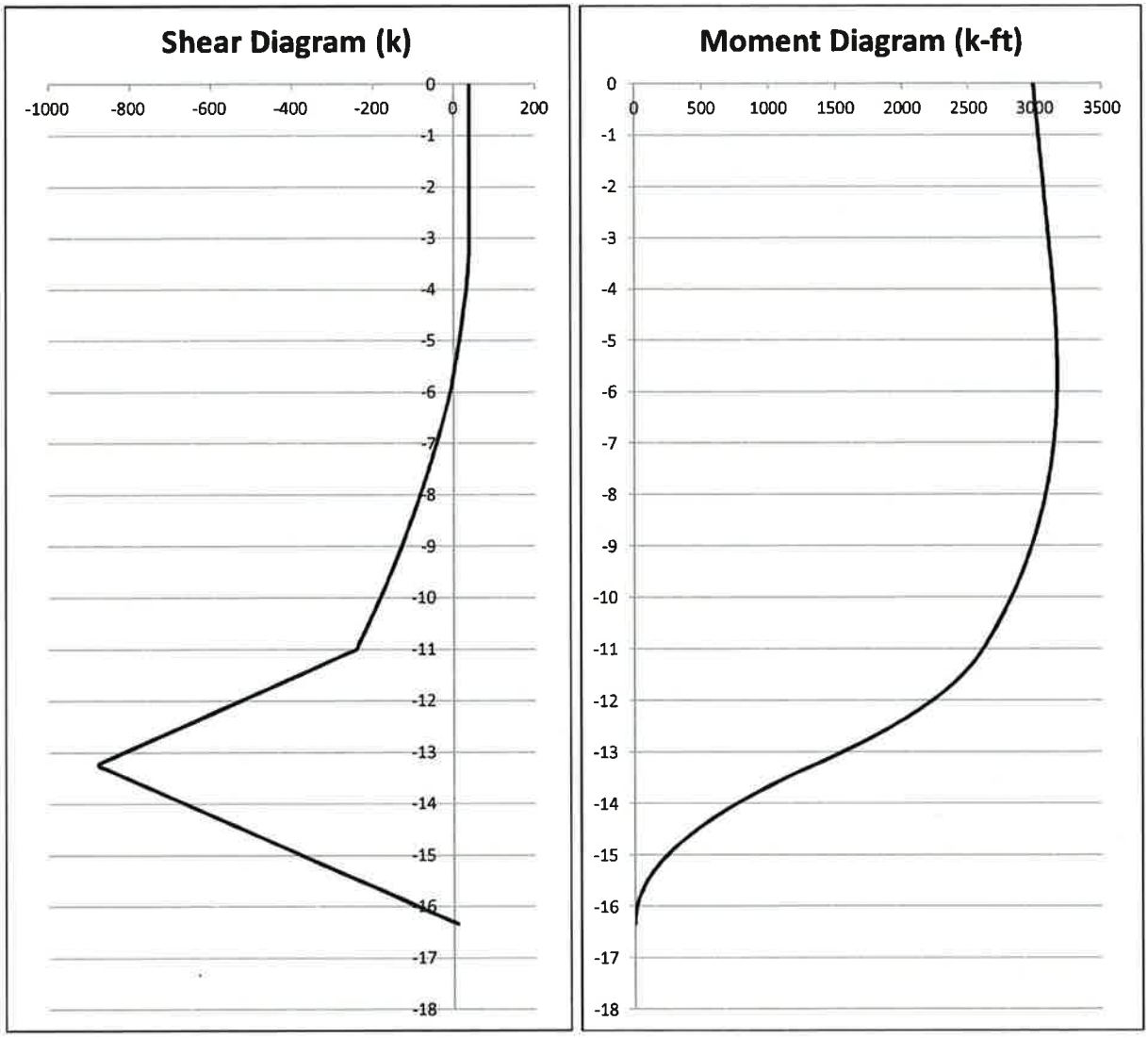
BRG 302 943052 (BU 806352)

TEP #: 25562.12516

Analysis: MHL 12/20/2013

Check: JSC 12/20/2013

Soil Interaction: LC1



Max Unfactored Moment: 3166.0 kip-ft

@ 5.66 ft below grade

Additional Factor of Safety: 3.29

Capacity = 60.8% **PASS**

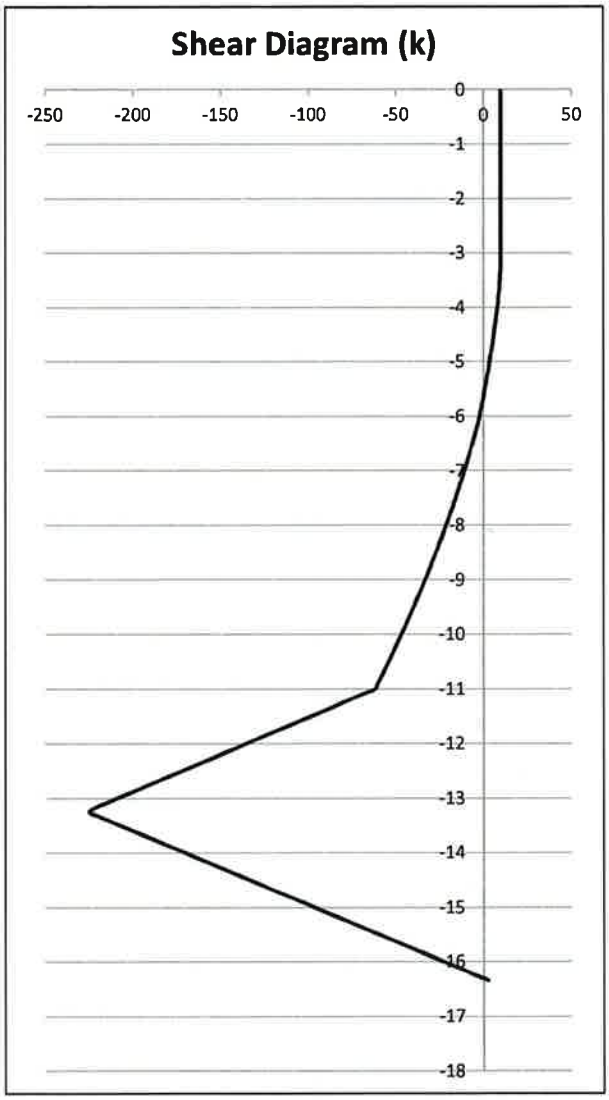
BRG 302 943052 (BU 806352)

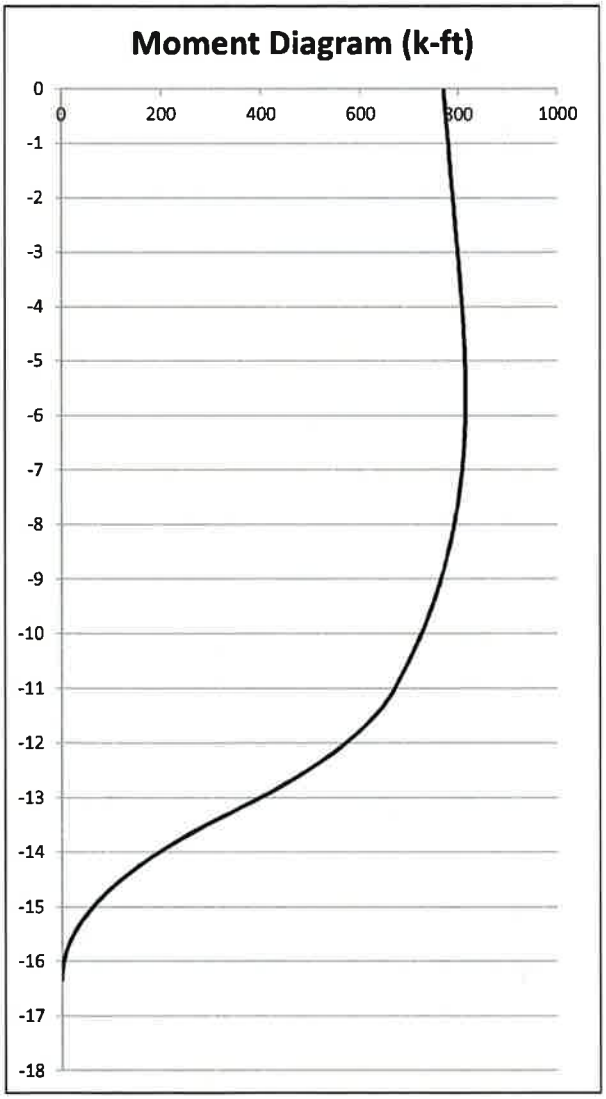
TEP #: 25562.12516

Analysis: MHL 12/20/2013

Check: JSC 12/20/2013

Soil Interaction: LC2





Max Unfactored Moment: 813.8 kip-ft

@ 5.63 ft below grade

Additional Factor of Safety: 12.83

Capacity = 15.6% **PASS**

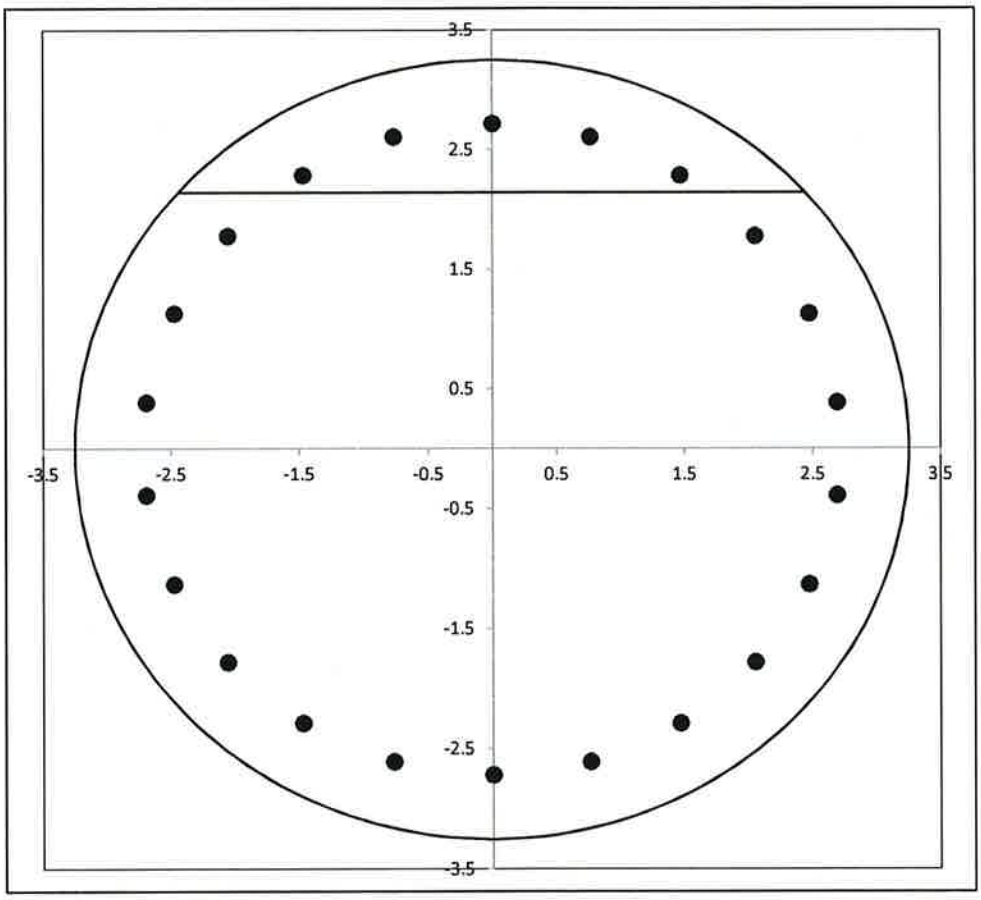
BRG 302 943052 (BU 806352)

TEP #: 25562.12516

Analysis: MHL 12/20/2013

Check: JSC 12/20/2013

Reinforcement Capacity



		LC1	LC2	
	Vu =	400.1	226.5	kip
	Vc =	525.1	525.9	kip
fy,tie = 60.0	Vs =	313.6	313.6	kip
	ϕVn =	629.0	629.6	kip
	Capacity =	63.6%	36.0%	
		PASS	PASS	

*Shear Value from RISA

	LC1	LC2	
Mu =	3166.0	813.8	kip-ft
ϕMn =	4016.1	4059.7	kip-ft
Capacity =	78.8%	20.0%	
	PASS	PASS	

APPENDIX D

STRUCTURAL MODIFICATION DRAWINGS

STRUCTURAL DESIGN DRAWINGS

SITE NAME:

BRG 302 943052

CROWN CASTLE BU NUMBER:

806352

APPLICATION NUMBER:

200733 REV. 0

SITE ADDRESS:

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)
N 41° 4' 20.75", W 73° 28' 41.4"

MODIFICATION PROVISIONS

THE MODIFICATIONS DEPICTED ON THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL MODIFICATION ANALYSIS REPORT COMPLETED BY TOWER ENGINEERING PROFESSIONALS (TEP), JOB#: 25562.12516 DATED DECEMBER 20, 2013 (REV 0). THIS REPORT IS BASED ON A SPECIFIC ANTENNA LOADING AND COAX CONFIGURATION. SEE THE REPORT FOR THE ANTENNA AND COAX LOADING INFORMATION. ANY OTHER ANTENNA OR COAX CONFIGURATION REQUIRES REVIEW BY TEP. SATISFACTORY COMPLETION OF THE MODIFICATIONS INDICATED ON THESE DRAWINGS WILL RESULT IN THE STRUCTURE MEETING THE REQUIREMENTS OF THE SPECIFICATIONS UNDER WHICH THE STRUCTURAL WAS COMPLETED.

CONTRACTOR SHALL FIELD VERIFY ALL: DIMENSIONS, QUANTITIES, PART NUMBERS AND COAX/ANTENNA PLACEMENTS PRIOR TO: BIDDING ORDERING MATERIALS, AND CONSTRUCTION.

INDEX OF SHEETS

NO.	SHEET TITLE	REV
T-1	TITLE SHEET	0
N-1	MI CHECKLIST AND NOTES	0
N-2	PROJECT NOTES I	0
N-3	PROJECT NOTES II	0
N-4	AJAX BOLT INSTALLATION DETAILS	0
S-1	TOWER ELEVATION AND MODIFICATION SCHEDULE	0
S-2	BASE SECTION DETAILS	0
S-3	CROWN REINFORCEMENT DETAILS	0
S-4	TYP. SHAFT REINFORCEMENT DETAILS I	0
S-5	TYP. SHAFT REINFORCEMENT DETAILS II	0
S-6	AEROSOLUTIONS REINFORCEMENT DETAILS	0

PROJECT TEAM

CCI TOWER STRUCTURAL ANALYST:

NAME	CROWN CASTLE
ADDRESS	8 PARKMEADOW DRIVE
CITY, STATE, ZIP	PITTSFORD, NY 14534
CONTACT	STEVE TUTTLE
PHONE	(585) 899-3445
EMAIL	STEVE.TUTTLE@CROWNCASTLE.COM

CCI MODIFICATION PROJECT MANAGER:

NAME	CROWN CASTLE
ADDRESS	3530 TORINGDON WAY, SUITE 300
CITY, STATE, ZIP	CHARLOTTE, NC 28277
CONTACT	EVA MORALES
PHONE	(704) 405-6612
EMAIL	EVA.MORALES@CROWNCASTLE.COM

CCI CONSTRUCTION MANAGER:

NAME	CROWN CASTLE
ADDRESS	3530 TORINGDON WAY, SUITE 300
CITY, STATE, ZIP	CHARLOTTE, NC 28277
CONTACT	EVA MORALES
PHONE	(704) 405-6612
EMAIL	EVA.MORALES@CROWNCASTLE.COM

ENGINEER OF RECORD (EOR):

NAME	TOWER ENGINEERING PROFESSIONALS, INC.
ADDRESS	3703 JUNCTION BOULEVARD
CITY, STATE, ZIP	RALEIGH, NC 27603
CONTACT	ENGINEERING DEPARTMENT
PHONE	(919) 661-6351
EMAIL	SDD@TEPGROUP.NET

PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PLANS PREPARED BY:

TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

SEAL:

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST CHECKED BY: RJR

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: T-1

REVISION: 0

TEP #: 25562.12516

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
NA	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	CONTINUOUS FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	GROUT COMP. STRENGTH (ASTM C109)
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	NON-TENSION CONTROLLED BOLT INSPECTION. SEE SHEET N-4 FOR DETAILS.
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"). THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION:
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL IN FIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-10007.

PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

BRG 302 943052
BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:

TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

SEAL:

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

MI CHECKLIST AND NOTES

SHEET NUMBER: **N-1**

REVISION: **0**

TEP #: 25562.12516

GENERAL NOTES:

1. ALL REFERENCES TO THE OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED CROWN CASTLE OR ITS DESIGNATED REPRESENTATIVE.
2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 2005 CONNECTICUT STATE BUILDING CODE.
4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
5. ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATIONS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES OR THE PROCEDURES.
8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
11. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
12. IF APPLICABLE, ALL CONCRETE WORK SHALL COMPLY TO LOCAL CODES AND THE ACI 318-05, "BUILDING REQUIREMENTS FOR STRUCTURAL CONCRETE".
13. 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
14. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
15. ALL TOWER DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.
16. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-1019-A STANDARD FOR INSTALLATION, ALTERATION AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.
17. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE TOWER OWNER OR ENGINEER OF RECORD.

PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

BRG 302 943052
BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
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PLANS PREPARED BY:

TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

SEAL:

STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED PROFESSIONAL ENGINEER
12/20/13

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

PROJECT NOTES I

SHEET NUMBER: **N-2**

REVISION: **0**

TEP #: 25562.12516

STRUCTURAL STEEL NOTES:

1. THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.
2. UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
   STRUCTURAL STEEL:
   - ANGLE: ASTM A36
   - PIPE/TUBE: ASTM A500-50
   - PLATE: ASTM A36 (SELF SUPPORTING AND GUYED TOWERS)
   - PLATE: ASTM A572-65 (MONOPOLE)

   A. ALL BOLTS, ASTM A325 TYPE I GALVANIZED HIGH STRENGTH BOLTS.
   B. ALL U-BOLTS, ASTM A193 GRADE B7
   C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
3. ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.
4. HOLES SHALL NOT BE FLAME CUT THROUGH STEEL UNLESS APPROVED BY THE ENGINEER.
5. HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM, A153/A153M OR ASTM A653/A653M, G90, AS APPLICABLE.
6. REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM A780 OR BY APPLICATION OF STICK OR THICK PASTED MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTED; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.
7. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
8. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
9. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
10. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

WELDING NOTES:

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M: 2008 "STRUCTURAL WELDING CODE-STEEL".
2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
3. CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON FIELD WELDS. A LETTER AND REPORT SHALL BE ISSUED TO THE CONTRACTOR. CONTRACTOR SHALL SUBMIT LETTER AND REPORT TO TOWER ENGINEERING PROFESSIONALS.
4. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. GRIND THE SURFACE OF THE ROD TO BE INSTALLED FOR A DISTANCE OF 2" MINIMUM ALL AROUND THE AREA TO BE WELDED. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING, SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING.
5. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0°F. THE MINIMUM PREHEAT AND INTERPASS TEMPERATURE REQUIREMENTS SHALL COMPLY WITH SECTION 3.5.1 AND TABLE 3.2 OF THE AWS D1.1/D1.1M: 2010.
6. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
7. FOR ALL WELDING, USE 80 KSI LOW HYDROGEN ELECTRODES. ELECTRODES SHALL BE APPROPRIATE FOR THE WELDING POSITION REQUIRED TO MAKE THE JOINT.
8. AFTER FINAL INSPECTION, THE AREA OF THE WELDS, THE INSTALLATION AND ALL SURFACES DAMAGED BY WELDING OR GRINDING SHALL RECEIVE A COLD-GALVANIZED COATING. THIS COATING SHALL BE APPLIED BY BRUSH. THE GALVANIZING COMPOUND SHALL CONTAIN A MINIMUM OF 95% ± PURE ZINC. THE FINISHED COATING SHALL BE A MINIMUM THICKNESS OF 3 MILS.
9. FOR MONOPOLE TOWERS FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY ULTRASONIC TESTING (UT) IN ACCORDANCE WITH AWS D1.1.
10. FOR MONOPOLE TOWERS PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MAGNETIC PARTICLE (MT) IN ACCORDANCE WITH AWS D1.1.

WORKABLE GAGES

LEG	4	3½	3	2½	2	1¾
G	2½	2	1¾	1⅜	1⅛	1

- WORKABLE GAGES GIVEN IN INCHES
- MATCH EXISTING WHEN APPLICABLE

BOLT TIGHTENING PROCEDURE:

1. TIGHTEN CONNECTION BOLTS BY AISC – "TURN OF THE NUT" METHOD, USING THE CHART BELOW.

BOLT LENGTHS UP TO AND INCLUDING FOUR DIA.

½"	BOLTS UP TO AND INCLUDING 2.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
⅝"	BOLTS UP TO AND INCLUDING 2.5 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
¾"	BOLTS UP TO AND INCLUDING 3.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
⅞"	BOLTS UP TO AND INCLUDING 3.5 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
1"	BOLTS UP TO AND INCLUDING 4.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT

BOLT LENGTHS OVER FOUR DIA. BUT NOT EXCEEDING EIGHT DIA.

½"	BOLTS 2.25 TO 4.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
⅝"	BOLTS 2.75 TO 5.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
¾"	BOLTS 3.25 TO 8.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
⅞"	BOLTS 3.75 TO 7.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
1"	BOLTS 4.25 TO 8.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT

2. CONNECTION BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS, LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:
3. FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.

8.2.1 TURN-OF-THE-NUT TIGHTENING

BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT IN A MANNER THAT WILL MINIMIZE RELAXATION OF PREVIOUSLY PRETENSIONED BOLTS.

4. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.

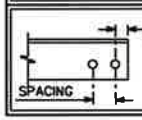
NOMINAL HOLE DIMENSIONS

BOLT DIAMETER	STANDARD HOLE	SHORT SLOT
½	9/16	9/16 X 1 1/16
⅝	11/16	11/16 X 7/8
¾	13/16	13/16 X 1
⅞	15/16	15/16 X 1 1/8
1	1 1/16	1 1/16 X 1 5/16

– DIMENSIONS GIVEN IN INCHES

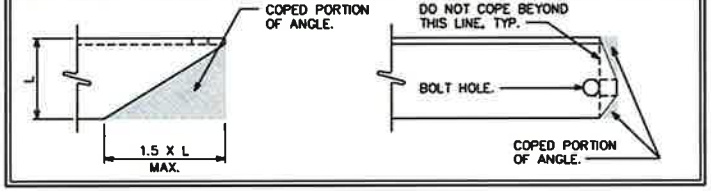
BOLT EDGE AND SPACING

BOLT DIAMETER	MIN. EDGE	SPACING
½	⅞	1½
⅝	1⅛	1⅞
¾	1¼	2¼
⅞	1½	2⅝
1	1¾	3



– DIMENSIONS GIVEN IN INCHES

ALLOWABLE ANGLE COPE



PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

BRG 302 943052
BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:

TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

SEAL:

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

PROJECT NOTES II

SHEET NUMBER: **N-3**

REVISION: 0

TEP #: 25562.12516

BOLTS AND COMPONENTS SPECIFICATIONS:

BOLT:
AJAX M20 "ONE SIDE" BLIND BOLT

SHEAR SLEEVE:
Fu = 120 KSI (MINIMUM)
29mm O.D. X 20 mm I.D.
LENGTH = NOMINAL [GRIP-6mm] = [GRIP - 0.25"] (TOLERANCE: -0", +1/32")
SLEEVE SHALL BE ROUND, WITH ENDS CUT SQUARE AND DEBURRED.

SPECIAL WASHER:
ASTM F959 SQUIRTER® DTI M20 (EQUIVALENT TO A325 BOLT)
MANUFACTURER:
APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOW FALLS, VERMONT, USA 05101
PHONE: (800) 552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

WASHER:
ASTM F436 HARDENED FLAT WASHER M20

BOLT ASSEMBLY FINISHING:
SHEAR SLEEVE: COLD GALVANIZED AS PER CROWN ENG-BUL-10149 OR CADMIUM PLATED
ALL OTHER PARTS: HOT DIP GALVANIZED

BOLT INSTALLATION ASSEMBLY:
AS SHOWN ON THE DRAWING

INSTALLATION NOTES:
DTI WASHERS MUST BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

TIGHTEN THE BOLT ASSEMBLY UNTIL THE ORANGE SILICONE APPEARS FROM UNDER THE DTI'S SQUIRT LOCATIONS, THEN STOP TIGHTENING.

FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING, AND INSPECTION.

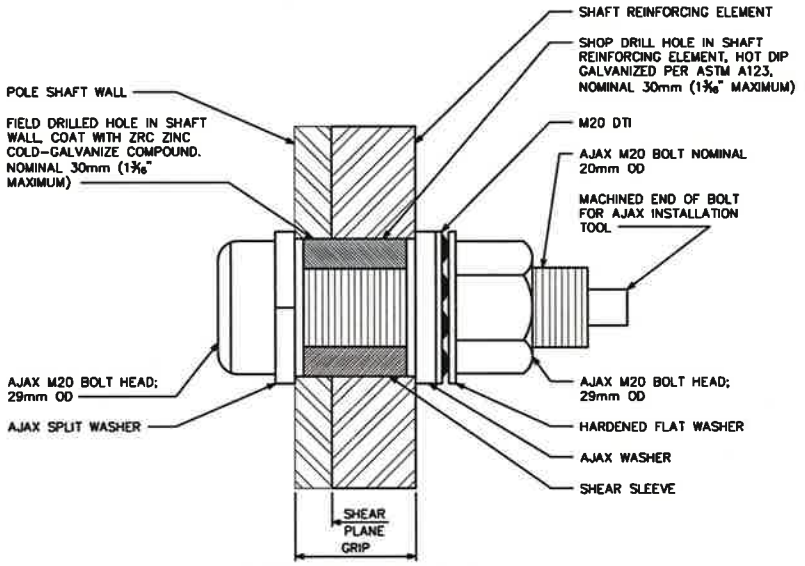
AS AN ALTERNATIVE TO USING THE DTI WASHER THE BOLTS MAY BE PRETENSIONED USING THE TURN-OF-NUT METHOD AS SPECIFIED IN SECTION 8.2.1 TURN-OF-NUT PRETENSIONING OF THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS. ALL FASTENERS SHALL BE INSPECTED PER SECTION 9.2.1 OF THE RCSC SPECIFICATION. THE BOLTS SHALL BE MATCH MARKED WITH A PERMANENT MARKER TO FACILITATE THE INSPECTION.

INSPECTION:
ALL AJAX BOLTS WITH DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTUER'S INSTRUCTIONS BOLT INSPECTOR SHALL PROVIDE PHOTO DOCUMENTATION OF BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

INSPECTION PROCEDURES:
- REVIEW MODIFICATION DESIGN DRAWINGS.
- ENSURE AISC PRE-TENSION REQUIREMENTS ARE INCLUDED.
- PHOTO (PREFERABLY VIDEO) OF THE FOLLOWING:
  - NOTE THE PRESENCE OF ANY LUBRICANT
  - NOTE THE PRESENCE OF ANY NUT/BOLT MARKINGS USED TO APPLY THE AISC "TURN OF THE NUT" METHOD PRIOR TO APPLYING NEW MARKINGS
  - BE SURE THAT ANY NEW MARKINGS MADE BY THE MI INSPECTOR ARE DISTINGUISHABLE (DIFFERENT COLOR) TO ANY ORIGINAL MARKINGS
  - MARK THE BOLT AND NUT WITH MARKER TO DOCUMENT POSITION UPON ARRIVAL. RUN THE MARK ONTO THE POLE AS WELL.
  - USE YOUR HAND TO FIRST ASSURE THE NUT IS TIGHT, TRYING TO TURN THE NUT IN ANY DIRECTION.
  - BOLT TYPES:
  - FOR AJAX, USING AJAX TOOL TO HOLD THE BOLT AND A SPUD WRENCH (OR SIMILAR) ON THE NUT. APPLY FIRM FORCE TO THE NUT IN THE CLOCKWISE DIRECTION (THIS IS NOT THE FULL EFFORT OF THE PERSON).
  - FOR OTHER STRUCTURAL BOLTS, ENSURE THE BOLT CAN BE HELD WHILECHECKING THE TIGHTNESS OF THE ASSEMBLY.
  - DOCUMENT BOLTS TESTED AND RESULTS, USE THE NUMBER CONVENTION BELOW AND WRITE ON THE POLE AND PHOTOGRAPH:
  - A THREE DIGIT CONVENTION SHALL BE USED (1, 3, 15)
  - THE FIRST DIGIT - THE FLAT NUMBER. ON ROUND POLES, THIS FIRST DIGIT SHALL BE REPLACED WITH THE HEADING (N, NE, E, SE, S, SW, W, N, NW)
  - THE SECOND DIGIT - THE NUMBER OF REINFORCING BARS ON THAT FLAT, STARTING WITH THE LOWEST BAR AS 1
  - THE THIRD DIGIT - THE NUMBER OF BOLTS ON THAT BAR STARTING WITH THE LOWEST BOLT AS 1
  - FLATS AND ROUND POLES ARE TO BE LABELED IN ACCORDANCE WITH THE MONOPOLE FLAT NUMBER PROCEDURE

INTERIOR OF POLE SHAFT

EXTERIOR OF POLE SHAFT



AJAX BOLT DETAILS

PLANS PREPARED FOR:
CROWN CASTLE
8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:
BRG 302 943052
BU #: 806352
126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:
TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

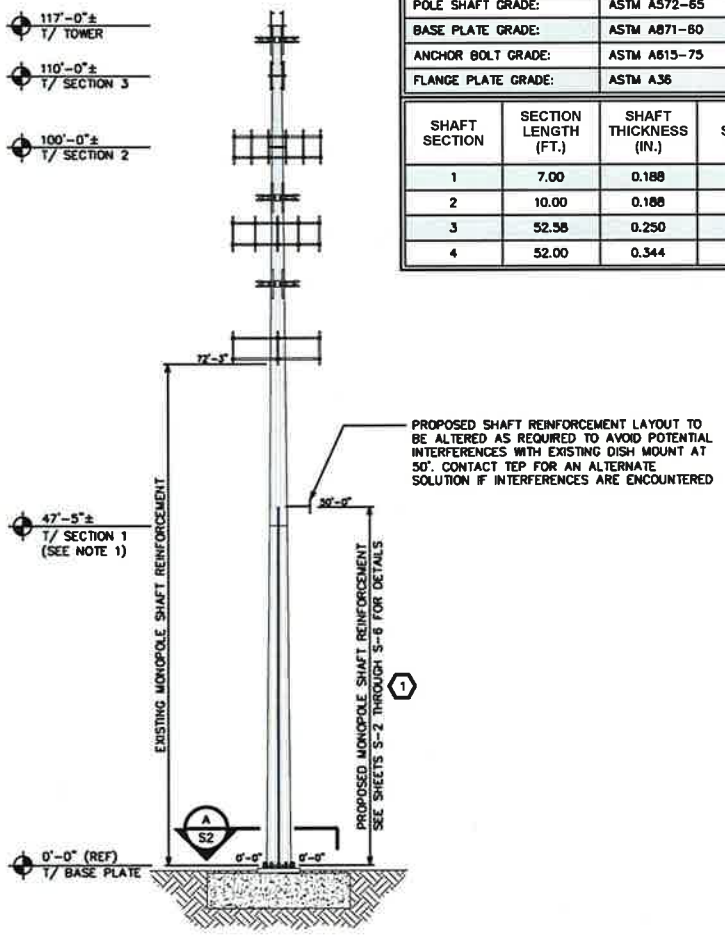
SEAL:
STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED PROFESSIONAL ENGINEER
12/20/13
December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:
AJAX BOLT INSTALLATION DETAILS

SHEET NUMBER: **N-4**
REVISION: 0
TEP #: 25562.12516



POLE SPECIFICATIONS

POLE SHAPE TYPE:	12-SIDED POLYGON
POLE SHAFT GRADE:	ASTM A572-65
BASE PLATE GRADE:	ASTM A871-60
ANCHOR BOLT GRADE:	ASTM A615-75
FLANGE PLATE GRADE:	ASTM A36

SHAFT SECTION	SECTION LENGTH (FT.)	SHAFT THICKNESS (IN.)	LAP SPLICE (FT.)	OUTER DIAMETER (IN.)	
				TOP	BOTTOM
1	7.00	0.188	-	14.360	15.940
2	10.00	0.188	-	15.940	18.200
3	52.58	0.250	4.58	18.200	30.090
4	52.00	0.344	-	28.554	40.300

MODIFICATION SCHEDULE

NO.	MODIFICATION DESCRIPTION	ELEVATION (FT.)
1	INSTALL PROPOSED MONOPOLE SHAFT REINFORCEMENT. SEE SHEETS S-2 THROUGH S-6 FOR DETAILS.	0 - 50
2	CROWN CASTLE WILL CONTRACT WITH A THIRD PARTY VENDOR TO PERFORM THE MODIFICATION INSPECTION. THE CONTRACTOR SHALL COORDINATE THE INSPECTION WITH THE MODIFICATION INSPECTOR AND CROWN CASTLE PROJECT MANAGER. SEE SHEET N-1 FOR DETAILS.	-

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY SPLICE ELEVATION PRIOR TO INSTALLATION. CONTACT TOWER OWNER AND ENGINEER OF RECORD IF SPLICE ELEVATIONS DIFFER FROM WHAT IS SHOWN. SHAFT REINFORCEMENT ELEVATIONS ARE DEPENDANT ON SPLICE ELEVATIONS AND MAY NEED TO BE ADJUSTED TO ACCOMMODATE ACTUAL SPLICE ELEVATION. CONTRACTOR IS REQUIRED TO ADD ASTM A36 SHIMS AT SPLICES AS REQUIRED TO ENSURE THE SHAFT REINFORCEMENT FITS FLUSH AGAINST THE TOWER SHAFT.
2. IT'S THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE THE MODIFICATION INSPECTOR/ ENGINEER OF RECORD WITH A SEALED CERTIFIED WELD INSPECTION REPORT. THIS REPORT SHALL DOCUMENT THE ENTIRE WELDING PROCESS (PRE/DURING/POST) WITH PROPER PHOTOS. WELDING SHALL CONFORM TO AWS D1.1/S1.1M: 2008 "STRUCTURAL WELDING CODE-STEEL", FOR ADDITIONAL NOTES, SEE WELDING NOTES.
3. ANTENNAS AND OTHER APPURTENANCES MAY NEED TO BE TEMPORARILY REMOVED OR MOVED DURING THE INSTALLATION OF THE MODIFICATIONS SHOWN ABOVE.
4. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-10033 : TOWER BASE PLATE NDE AND ENG-BUL-10051 : NDE REQUIREMENTS FOR MONOPOLE BASEPLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASEPLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.
5. DUE TO THE MODIFICATIONS REQUIRED, CONTINUOUS INSPECTIONS AND MATERIAL TESTING WILL NEED TO BE PERFORMED.
6. CONTRACTOR SHALL ORDER AND INSTALL A NEW TOWER TAG IF THE EXISTING TOWER TAG IS MOVED OR DAMAGED DUE TO THE INSTALLATION OF THE MODIFICATION SHOWN ABOVE.
7. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE TOWER OWNER OR ENGINEER OF RECORD.

ATTENTION

NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSION BEFORE FABRICATING MATERIALS AND PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO TOWER ENGINEERING PROFESSIONALS, INC., AND CROWN CASTLE CONSTRUCTION MANAGER IMMEDIATELY.

TOWER ELEVATION

SCALE: 1/8" = 1'-0"

0 1 2

SCALE IN FEET

PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

BRG 302 943052
BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:

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12/20/13

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

TOWER ELEVATION AND MODIFICATION SCHEDULE

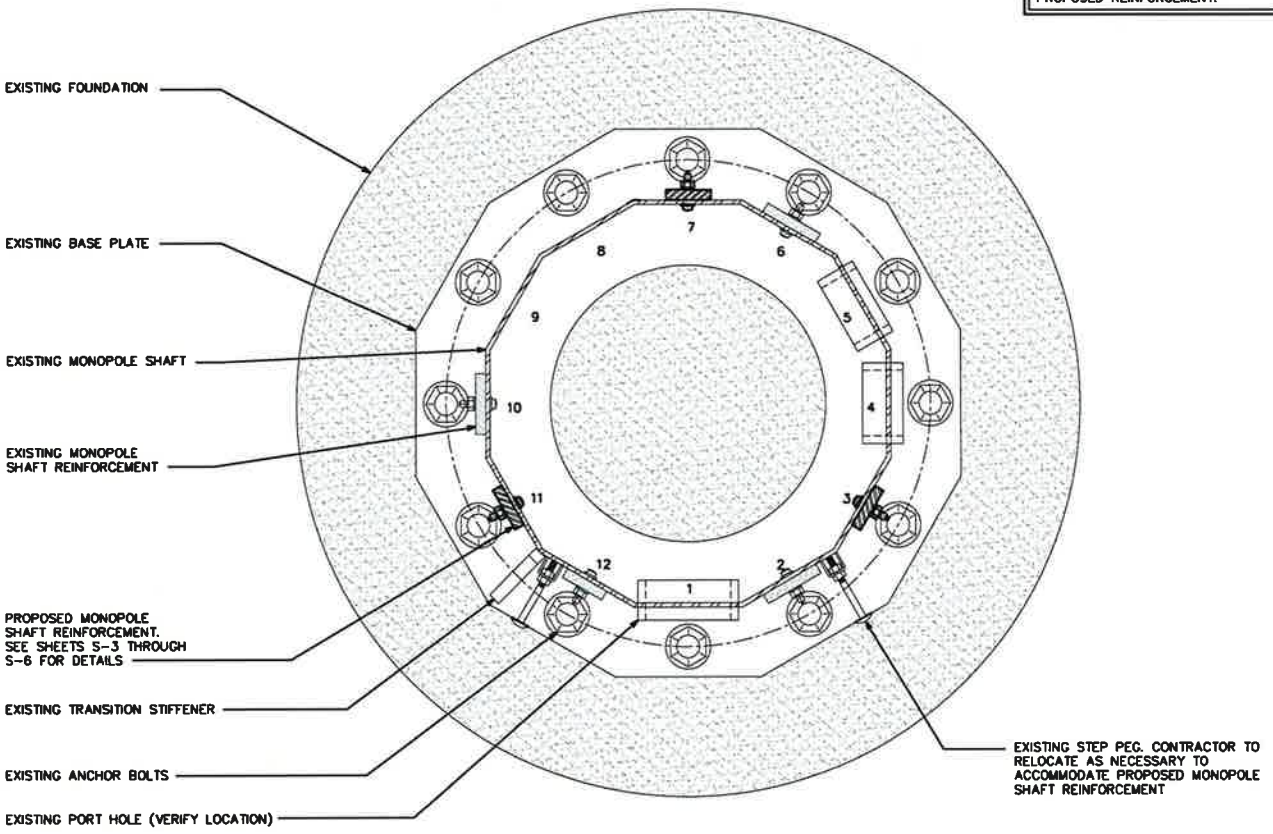
SHEET NUMBER: **S-1**

REVISION: 0

TEP #: 25562.12516

ATTENTION

THE TOWER SAFETY CLIMB WAS ASSUMED TO BE LOCATED OFF FLAT 1. FIELD VERIFY SAFETY CLIMB LOCATION PRIOR TO INSTALLATION. CONTACT TOWER OWNER AND ENGINEER OF RECORD SHOULD ANY DISCREPANCIES ARISE. CONTRACTOR TO REMOVE AND RE-ATTACH SAFETY CLIMB AS NECESSARY TO INSTALL PROPOSED REINFORCEMENT.



SECTION (A)
SCALE: 1½" = 1'-0"

0 1 2
SCALE IN FEET

PLANS PREPARED FOR:
CROWN CASTLE
6 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:
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DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:
BASE SECTION DETAILS

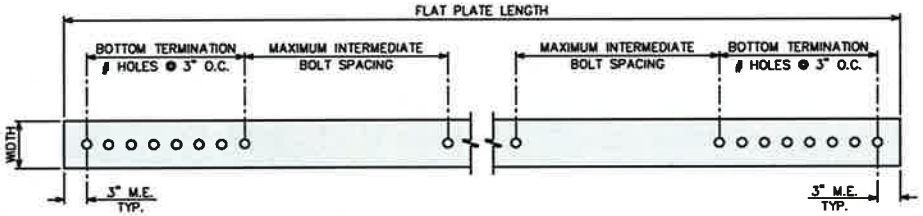
SHEET NUMBER: **S-2**
REVISION: 0
TEP #: 25562.12516

CROWN CASTLE 65KSI FLAT PLATE REINFORCEMENT SCHEDULE (OPTION 1)

PART NUMBER	FLATS / ANGLES	BOTTOM ELEVATION (FT)	TOP ELEVATION (FT)	FLAT PLATE LENGTH (FT)	FLAT PLATE QUANTITY	MAXIMUM INTERMEDIATE BOLT SPACING (IN)	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	TERMINATION DETAIL (BOTTOM)	TERMINATION DETAIL (TOP)	AUXILIARY PLATE SIZE (SEE DETAIL FOR GRADE)
CCI-65FP-04510035	3 7 11	0.00	35.00	35.00	3	20.00	6	6	1	4	0.75x4x37
CCI-65FP-04007515	3 7 11	35.00	50.00	15.00	3	18.00	4	4	4	3A	-

NOTES:

1. REFER TO SHEET N-4 FOR AJAX BOLT INSTALLATION DETAILS.
2. SEE SHEETS S-4 AND S-5 FOR TERMINATION DETAILS.
3. CCI PART NUMBER FORMAT: CCI-65FP-|XXX|XXX|



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CROWN CASTLE
8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
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12/12/13

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0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

CROWN REINFORCEMENT DETAILS

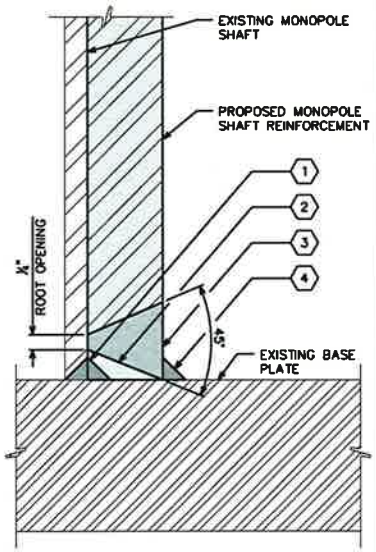
SHEET NUMBER: **S-3**

REVISION: **0**

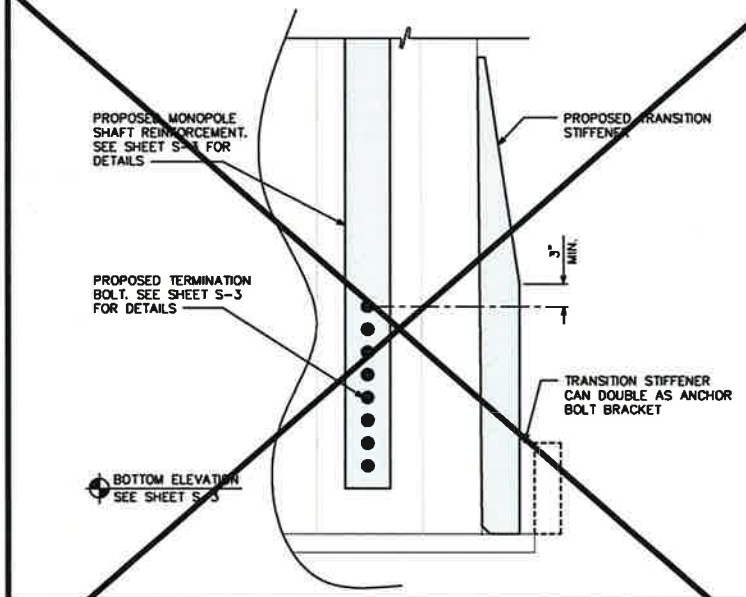
TEP #: 25562.12516

NOTES:

1. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. PLEASE SEE ENG-SOW-10033 : TOWER BASE PLATE NDE AND ENG-BUL-10051 : NDE REQUIREMENTS FOR MONOPOLE BASEPLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED ORHAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE. FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK. SEE AISC B-39.
2. UNEQUAL LEG FILLET WELD TO CREATE ACCEPTABLE JOINT GEOMETRY FOR A B-U2a OR B-U2A-GF PRE-QUALIFIED JOINT PER AWS D1.1
3. JOIN SHAFT REINFORCEMENT TO BASE PLATE WITH B-U2a OR B-U2A-GF PRE-QUALIFIED WELD. IT'S THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE THE MODIFICATION INSPECTOR/ ENGINEER OF RECORD WITH A SEALED CERTIFIED WELD INSPECTION REPORT. THIS REPORT SHALL DOCUMENT THE ENTIRE WELDING PROCESS (PRE/DURING/POST) WITH PROPER PHOTOS. WELDING SHALL CONFORM TO AWS D1.1/S1.1M: 2008 "STRUCTURAL WELDING CODE-STEEL", FOR ADDITIONAL NOTES, SEE WELDING NOTES.
4. OPTIONAL 5/16" REINFORCING FILLET WELD.



BASE WELD TERMINATION DETAILS (1)
SCALE: N.T.S.



TRANSITION STIFFENER TERMINATION DETAILS (2)
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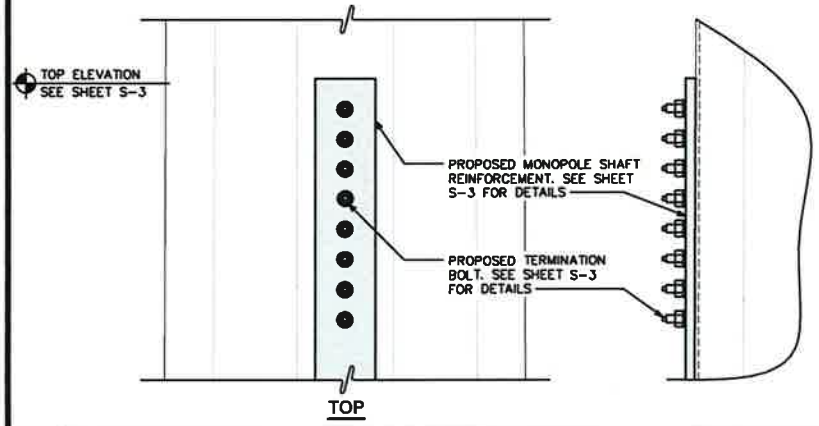
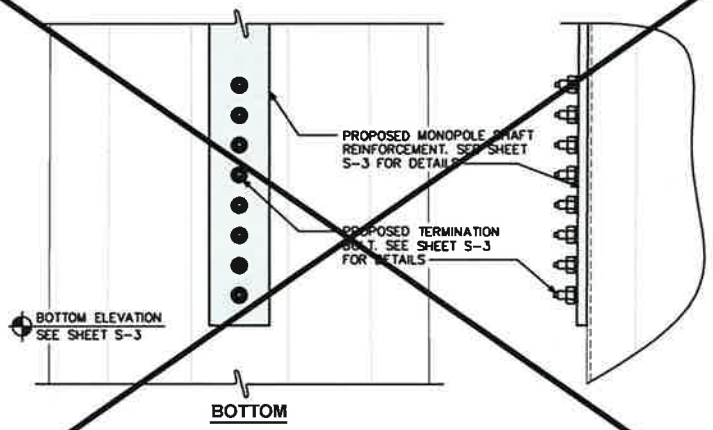


TOP TERMINATION DETAILS (3A)
SCALE: N.T.S.



BOTTOM TERMINATION DETAILS (3B)
SCALE: N.T.S.

PLANS PREPARED FOR:
CROWN CASTLE
6 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

BRG 302 943052
BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:
TOWER ENGINEERING PROFESSIONALS
3703 JUNCTION BOULEVARD
RALEIGH, NC 27603-5263
OFFICE: (919) 661-6351
www.tepgroup.net

SEAL:

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

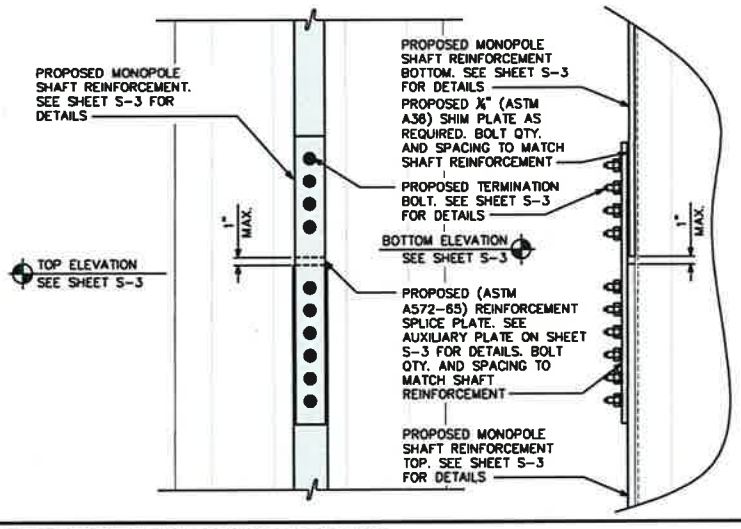
DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:
TYP. SHAFT REINFORCEMENT DETAILS I

SHEET NUMBER: **S-4**

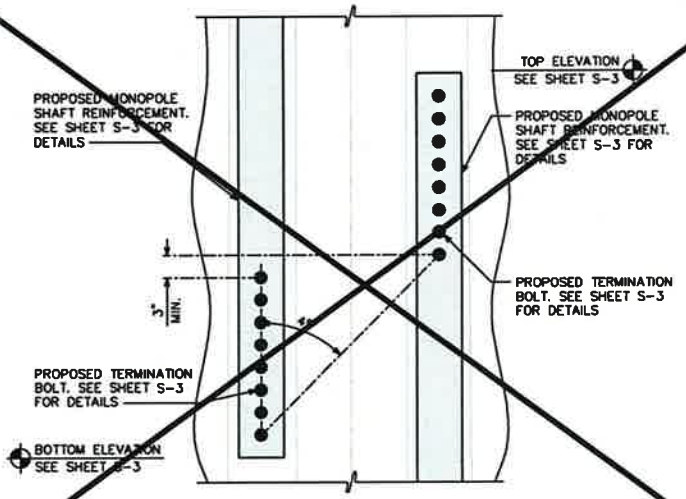
REVISION: **0**

TEP #: 25562.12516



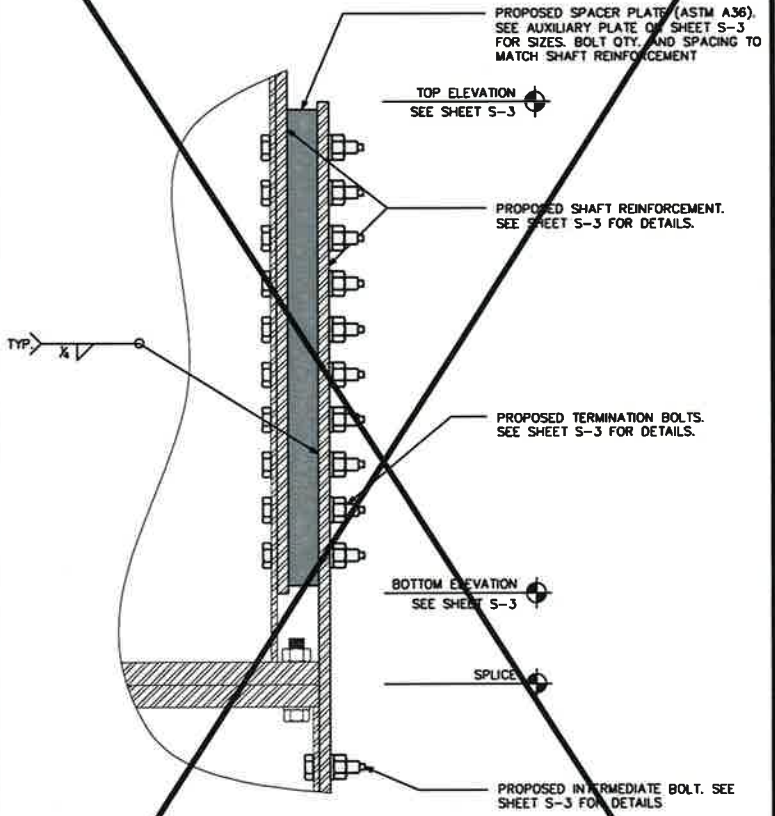
REINFORCEMENT SPLICE DETAILS (4)

SCALE: N.T.S.



OVERLAP SPLICE DETAILS (5)

SCALE: N.T.S.



PROPOSED FLANGE JUMP DETAILS (6)

SCALE: N.T.S.

PLANS PREPARED FOR:

CROWN CASTLE

8 PARKMEADOW DRIVE
PITTSFORD, NY 14534
OFFICE: (585) 899-3445

PROJECT INFORMATION:

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BU #: 806352

126 LEDGE ROAD
DARIEN, CT 06820
(FAIRFIELD COUNTY)

PLANS PREPARED BY:

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STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED
PROFESSIONAL ENGINEER
12/20/13

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

TYP. SHAFT REINFORCEMENT DETAILS II

SHEET NUMBER: **S-5**

REVISION: **0**

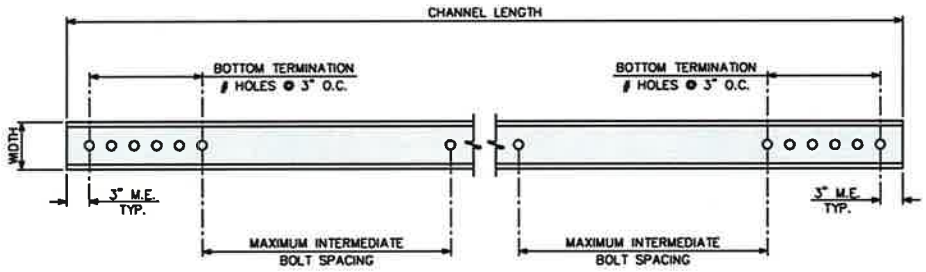
TEP #: 25562.125.16

AEROSOLUTIONS CHANNEL REINFORCEMENT SCHEDULE (OPTION 2)

PART NUMBER	FLATS / ANGLES	BOTTOM ELEVATION (FT)	TOP ELEVATION (FT)	CHANNEL LENGTH (FT)	CHANNEL QUANTITY	MAXIMUM INTERMEDIATE BOLT SPACING (IN)	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	TERMINATION DETAIL (BOTTOM)	TERMINATION DETAIL (TOP)	AUXILIARY PLATE SIZE (SEE DETAIL FOR GRADE)
MP303	3 7 11	0.00	40.00	40.00	3	18.00	5	5	1	4	Note 2
MP303	3 7 11	40.00	50.00	10.00	3	18.00	5	5	4	3A	-

NOTES:

1. REFER TO SHEET N-4 FOR AJAX BOLT INSTALLATION DETAILS.
2. CONNECTIONS AND SPLICE DETAILS BY AEROSOLUTIONS. REFERENCE SHEETS S-4 AND S-5 FOR SCHEMATIC DETAILS. TEP TO REVIEW INSTALLATION DRAWINGS PRIOR TO FABRICATION.



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SEAL:

STATE OF CONNECTICUT · WILLIAM H. MARTIN · 0029484 · LICENSED PROFESSIONAL ENGINEER · 12/20/13

December 20, 2013

REV	DATE	ISSUED FOR:
0	12-20-13	MODIFICATION DRAWINGS

DRAWN BY: RST | CHECKED BY: RJR

SHEET TITLE:

AEROSOLUTIONS REINFORCEMENT DETAILS

SHEET NUMBER: **S-6**

REVISION: **0**

TEP #: 25562.12516