

January 16, 2018

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification
Kaechele Place, Bridgeport, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 99-foot level of an existing 150-foot tower off Kaechele Place in Bridgeport, Connecticut (the “Property”). The tower is owned by Crown Atlantic Company LLC (“Crown”). Cellco’s use of the tower was approved by the Council in 2001. Cellco now intends to replace six (6) of its existing antennas with three (3) model X7CQAP-465-V, 700 MHz antennas and three (3) model X7CQAP-465-V, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to install nine (9) remote radio heads (“RRHs”) and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

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 Joseph Ganim, Mayor for the City of Bridgeport; Dennis Buckley, Bridgeport’s Zoning Administrator; Crown, the tower owner; and SNET, 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. Cellco’s replacement antennas and RRHs will be installed at the same 99-foot level of the 150-foot tower.

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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 replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included behind Attachment 2.
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 described in the Structural Analysis Report included in Attachment 3, can support Cellco's proposed modifications.

A copy of the parcel map and owner information for the Property is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

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:

Joseph Ganim, Bridgeport Mayor
Dennis Buckley, Bridgeport Zoning Administrator
Crown Atlantic Company LLC
SNET
Tim Parks

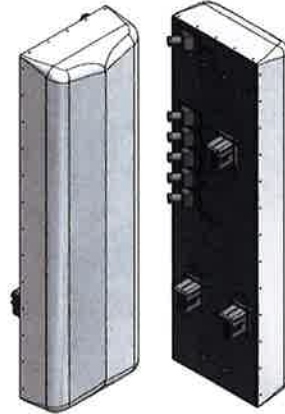
ATTACHMENT 1

X7CQAP-465-V

1 Xpol Low Band (698-896 MHz) & 2 Xpol High Band (1695-2180 MHz, 50.5", 65° H-Beam

Variable E-Tilt, RET

- **6 Port Antenna:**
 - 1 Low Band with separate tilt & 2 High Band Antennas, all with separate tilts in a single radome
- Suitable for LTE/CDMA/UMTS/GSM
- AISG 2.0 RET tilt control



ELECTRICAL SPECIFICATIONS

Frequency Band, MHz	698-824	824-896	1695-1880	1850-1990	1920-2180
Horizontal Beam Width, 3dB points	63°	60°	61°	62°	67°
Gain, dBi	13.6	14.2	15.8	15.9	16.2
Vertical Beam Width, 3dB points	17.4°	15.0°	7.4°	7.0°	6.9°
Upper Side Lobe Suppression, Typical, dB	<-18	<-18	<-18	<-18	<-18
Cross Polar Ratio (CPR) at Bore Sight, dB	>20	>20	>20	>20	>20
Cross Polar Ratio (CPR) at Sector +/- 60°, dB	>10	>5	>8	>10	>10
Front-to-Back at 180°, dB	> 28		> 28		
Polarization	+/- 45°		2x +/- 45°		
Electrical Down Tilt	0°-12° or 4°-16°		0°-6° or 4°-10°		
VSWR/Return Loss, dB, Maximum	1.5:1/-14.0		1.5:1/-14.0		
Isolation Between Ports, dB, Minimum	> 28		> 28		
Co - Polar Isolation Inter Antenna	N/A		> 28		
Intermodulation (2x20w), IM3, dBc, Maximum	-153		-153		
Impedance, ohms	50		50		
Maximum Power Per Connector, CW (w)	500		250		

All Specifications are subject to change.
Refer to www.jmawireless.com for the most current information

www.jmawireless.com
+1 315-431-7100 | customerservice@jmawireless.com

MECHANICAL SPECIFICATIONS

Dimensions, Length/Width/Depth	50.5/14.6/7.1 in. (1282/371/180mm)
Connector Quantity Type	(6 total: 2 low, 4 high band) 7-16 DIN Female
Connector Torque	220-265 lbf-in (23-30 N-m)
Connector Location	Back
Antenna Weight	34.0 lbs (15.4 kg)
Bracket Weight	13.2 lb.
Standard Bracket Kit	919061 (Included)
Mechanical Downtilt Range	0°-12°
Radome Material	High Strength Luran, UV Stabilized, ASTM D1925
Wind Survival	150 mph (241 km/h)
Front Wind Load @100mph	127.2 lbf (566.0 N) @100mph
Equivalent Flat Plate @ 100mph	2.53 sq-ft (c=2) @ 100mph

RET INFORMATION

Model	CSS-RET-200
Mounting Location	Rear of Antenna
Weight	1.2 lb (0.54 kg)
Communication Standard	AISG 2.0
Control System	CSS-PCU-220



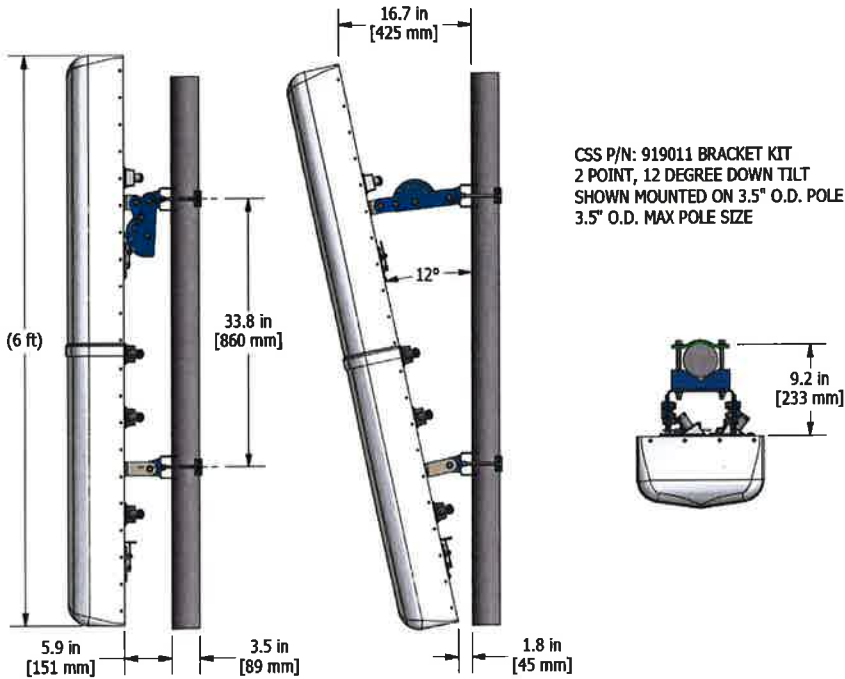
ORDER INFORMATION

MODEL	DESCRIPTION
X7CQAP-465-VR0	Remote motor adjust variable e-tilt (RET), EDT 0-12° low band and 0-6° high band
X7CQAP-465-VR4	Remote motor adjust variable e-tilt (RET), EDT 4-16° low band and 4-10° high band

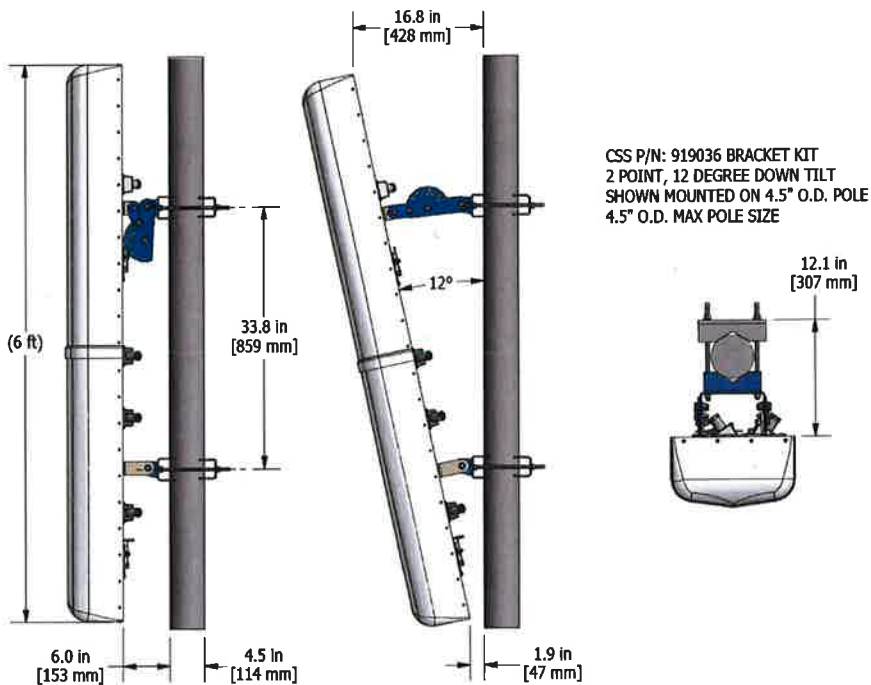
RET Ordering Information

MODEL	DESCRIPTION
992100-CA005-SC	AISG Jumper Cable, M/F, 0.5 meters

Standard Bracket Kit



Optional Bracket Kit



ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

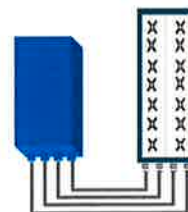


FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between
modes via SW w/o site
visit

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

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ALCATEL-LUCENT B25 RRH4X30

Alcatel-Lucent Band 25 Remote Radio Head 4x30W is the new addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B25 RRH4x30 allows operators to have a compact radio solution to deploy LTE in the PCS band (1.9 GHz, 3GPP band 25), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B25 RRH4x30 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity, LTE carriers from 3 MHz up to 20 MHz and up to 65 MHz instantaneous bandwidth.

The Alcatel-Lucent B25 RRH4x30 is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

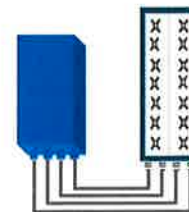


FEATURES

- Supporting LTE in 1.9 GHz band (PCS, 3GPP band 2 & 25)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- Ready for 3, 5, 10, 15 or 20MHz LTE carrier operation with 4Rx Diversity
- Ready to support up to 4 carriers anywhere in 65MHz instantaneous bandwidth
- Convection-cooled (fan-less)
- Supports AISG 2.0 devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in PCS band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Full flexibility for multiple carriers operation over entire PCS spectrum
- Improves downlink spectral efficiency and cell edge throughput through MIMO4
- Increases LTE coverage thanks to 4-way Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options (Pole or Wall)



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2)	2.0 dB typ. (<2.5 dB max)
RX Diversity scheme	2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.)	538 x 304 x 182 (21.2" x 12.0" x 7.2")
Volume (w/ solar shield) in L	30
Weight (w/ solar shield) in kg (lb)	24 (53)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	580W typical @100% RF load
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5 (> 14dB)
CPRI ports	2 CPRI ports (HW ready for Rate7 / 9.8 Gbps)
AISG interfaces	1 AISG2.0 output (RS485), +24V/2A DC power Integrated Smart Bias Tees (x2)
Misc. Interfaces	1 external alarms connector (4 alarms) 4 RF Tx & 4 RF Rx monitor ports 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

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ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.



The Alcatel-Lucent B66a RRH4x45 is a compact (near zero-footprint) solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

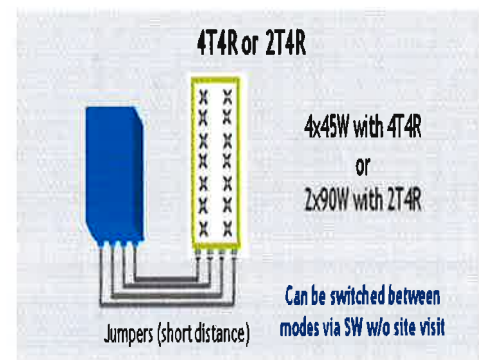
Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



TECHNICAL SPECIFICATIONS

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz – 4 LTE MIMO carriers (In 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure – RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield)
Volume in Liters	35.5 (with solar shield) 29.7 (without solar shield)
Weight in kg (lb) (w/o mounting HW)	25.8kg (56.8lb) (with solar shield)
DC voltage range	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	750W typical @100% RF load (In 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions	-40°C (-40°F) /+55°C (+131°F) UL50E Type 4 Enclosure
Wind load (@150km/h or 93mph)	250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.3-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

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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.

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



Figure 1: HYBRIFLEX Series

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)]	0.68 (0.205)
DC-Resistance Power Cable, 8.4mm ² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Optical 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)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (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-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental Properties			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

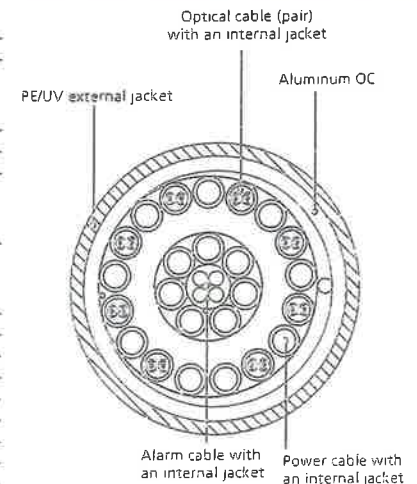


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

ATTACHMENT 2

Site Name: Trumbull SW (Bridgeport) Tower Height: 150'		General		Power		Density					
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total			
*Clearwire	2	153	110	2496	0.0102	1.0000	0.10%				
*Clearwire	1	211	110	18 GHz	0.0070	1.0000	0.07%				
*T-Mobile	2	2334	120	2100	0.1292	1.0000	1.29%				
*T-Mobile	2	2334	120	1900	0.1292	1.0000	1.29%				
*T-Mobile	2	1167	120	2100	0.0646	1.0000	0.65%				
*T-Mobile	2	1167	120	1950	0.0646	1.0000	0.65%				
*T-Mobile	2	1167	120	1950	0.0646	1.0000	0.65%				
*T-Mobile	1	865	120	700	0.0239	0.4667	0.51%				
*AT&T	2	414	154	850	0.0136	0.5667	0.24%				
*AT&T	2	656	154	1900	0.0215	1.0000	0.22%				
*AT&T	2	409	154	850	0.0134	0.5667	0.24%				
*AT&T	2	1833	154	2300	0.0602	1.0000	0.60%				
*AT&T	2	1456	154	1900	0.0478	1.0000	0.48%				
*AT&T	2	1117	154	700	0.0367	0.4667	0.79%				
Verizon PCS	0	5062	99	0.0000	1970	1.0000	0.00%				
Verizon Cellular	3	377	99	0.0415	869	0.5793	7.16%				
Verizon Cellular	0	3709	99	0.0000	880	0.5866	0.00%				
Verizon AWS	1	4575	99	0.1678	2145	1.0000	16.78%				
Verizon 700	1	1676	99	0.0615	746	0.4973	12.36%				44.1%
* Source: Siting Council											

ATTACHMENT 3



Date: April 11, 2017

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
585.899.3445

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation:	Verizon Wireless Co-Locate	
	Carrier Site Number:	N/A
	Carrier Site Name:	Trumbull SW, CT
Crown Castle Designation:	Crown Castle BU Number:	841288
	Crown Castle Site Name:	BRIDGEPORT NORTH
	Crown Castle JDE Job Number:	405782
	Crown Castle Work Order Number:	1382220
	Crown Castle Application Number:	367137 Rev. 0
Engineering Firm Designation:	Paul J Ford and Company Project Number:	37517-0750.004.7805

Site Data: 2 Kaechele Place, BRIDGEPORT, Fairfield County, CT
Latitude 41° 13' 24.04", Longitude -73° 13' 0.38"
150 Foot - Monopole Tower

Dear Steve Tuttle,

Paul J Ford and Company is pleased to submit this "Structural 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 1016787, in accordance with application 367137, 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: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the proposed modifications drawings, referenced in Table 4 of this report, for the determined available structural capacity to be effective.

We at Paul J Ford and Company 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.

Respectfully submitted by:


Seth Tschanen, E.I.
Structural Designer



4-13-17

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1) INTRODUCTION

This tower is a 150 ft Monopole tower. All information on the monopole was obtained from the mapping referenced in Table 4 of this report.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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
99.0	99.0	3	alcatel lucent	B13 RRH 4X30	2	1 1/4	--
		3	alcatel lucent	B25 RRH2x60 PCS			
		3	alcatel lucent	B66A RRH4X45			
		2	commscope	RC2DC-3315-PF-48			
		6	css	X7CQAP-465-VR0 w/ Mount Pipe			

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
150.0	154.0	6	cci antennas	TPX-070821	1 2	3/8 3/4	2
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		3	kathrein	782 10253			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
	3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe	2 1 12	3/4 3/8 1 5/8	1	
	3	powerwave technologies	TT19-08BP111-001				
	150.0	1	tower mounts				Platform Mount (LP 101-1)
	150.0	1	tower mounts				Side Arm Mount [SO 201-3]
147.0	147.0	3	ericsson	RRUS 11	--	--	1
		1	raycap	TME-DC6-48-60-18-8F			
		1	tower mounts	Pipe Mount [PM 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
138.0	143.0	1	andrew	VHLP2-18	6 2	5/16 1/2	1
		1	andrew	VHLP2-23			
		1	clearwire	CW JUNCTION BOX			
		2	dragonwave	Horizon Compact			
	140.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		3	samsung	RAS SPI-2213 RRH			
138.0	1	tower mounts	Platform Mount [LP 713-1]				
120.0	120.0	3	commscope	LNx-6515DS-A1M w/ Mount Pipe	1 13	1/2 1 5/8	2
		3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe			
		3	ericsson	AIR 21 B2A/B4P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 301-1]			
99.0	103.0	1	gps	GPS_A	1 12	1/2 1 5/8	1
	100.0	6	rfs celwave	FD9R6004/2C-3L			
	99.0	3	antel	BXA-171063/8CF w/ Mount Pipe			
		3	antel	BXA-70063/4CF w/ Mount Pipe			
		1	tower mounts	T-Arm Mount [TA 602-3]			
		3	antel	BXA-171063/8CF w/ Mount Pipe			
		3	antel	BXA-70063/4CF w/ Mount Pipe			
6	kmw communications	KDXCV0012017	--	--	3		

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) Equipment To Be Removed

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)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 08-09065E G1, 9/23/08	5110784	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH, 08-09065E NA, 09/23/08	5110783	CCISITES
4-TOWER MAPPING	GPD, 2014777.841288.02, 04/11/08	4710143	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25567.42283, 10/22/14	5401472	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25567_26102, 06/05/15	5739992	CCISITES
PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD, 2017777.841288.07, 10/09/16	6650617	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37517-0750.004.7700, 03/31/17	6801057	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures 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 the referenced drawings.
- 4) At the time of the analysis, proof test information for the rock anchors was not available. We have assumed that the rock anchors were properly installed and are fully effective.
- 5) The monopole manufacturer drawings are not available at the time of this analysis. Therefore, we have assumed pole shaft and base plate steel yield strength(s) (Fy) as shown in the attached calculations. Anchor rods are assumed to be ASTM A615 #18J, 2.25" diam, (Fu = 100 ksi, Fy = 75 ksi).
- 6) Monopole was modified in conformance with the referenced modification drawings.
- 7) Monopole will be modified in conformance with the referenced proposed modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company 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	150 - 128.5	Pole	TP18.1463x15x0.2188	1	-6.28	716.15	98.4	Pass
L2	128.5 - 109	Pole	TP21x18.1463x0.5837	2	-12.33	1529.92	99.5	Pass
L3	109 - 104.167	Pole	TP21.7298x21x0.661	3	-13.38	1959.85	89.0	Pass
L4	104.167 - 100.92	Pole	TP22.2201x21.7298x1.5958	4	-14.85	4632.85	44.4	Pass
L5	100.92 - 95.25	Pole	TP23.0763x22.2201x1.4985	5	-19.36	4350.86	53.6	Pass
L6	95.25 - 80.5	Pole	TP25.3035x23.0763x0.8972	6	-24.35	3126.48	94.5	Pass
L7	80.5 - 73.5833	Pole	TP26.3479x25.3035x1.1822	7	-27.43	3860.85	87.1	Pass
L8	73.5833 - 72	Pole	TP26.587x26.3479x1.1696	8	-28.14	3860.07	89.0	Pass
L9	72 - 66.75	Pole	TP26.992x26.587x1.266	9	-30.72	4228.89	89.1	Pass
L10	66.75 - 48.25	Pole	TP29.9611x26.992x1.2042	10	-40.06	4944.24	92.5	Pass
L11	48.25 - 44.25	Pole	TP30.603x29.9611x1.5876	11	-42.73	5855.07	83.1	Pass
L12	44.25 - 43.0833	Pole	TP30.7903x30.603x1.6684	12	-43.55	6182.99	80.0	Pass
L13	43.0833 - 30	Pole	TP32.89x30.7903x1.5728	13	-49.82	6195.76	85.5	Pass
L14	30 - 23.75	Pole	TP33.3525x29.1025x1.6275	14	-55.07	6130.65	96.2	Pass
L15	23.75 - 11	Pole	TP35.5039x33.3525x1.5179	15	-68.96	6743.53	93.1	Pass
L16	11 - 6	Pole	TP36.3476x35.5039x1.3615	16	-72.48	7430.47	86.2	Pass
L17	6 - 3.25	Pole	TP36.8116x36.3476x1.493	17	-74.59	8096.73	80.9	Pass
L18	3.25 - 0	Pole	TP37.36x36.8116x1.1317	18	-76.63	6573.67	99.4	Pass
							Summary	
						Pole (L2)	99.5	Pass
						Rating =	99.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.2	Pass
1	Base Plate	0	71.5	Pass
1	Base Foundation Steel	0	52.6	Pass
1	Base Foundation Soil Interaction	0	69.2	Pass
1	Flange Connection	109	99.6	Pass

Structure Rating (max from all components) =	99.6%
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Notes:

- See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed.

- Install the modifications as per the proposed modification drawings referenced in Table 4.

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 1) Tower is located in Fairfield County, Connecticut.
- 2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- 3) Basic wind speed of 97.00 mph.
- 4) Structure Class II.
- 5) Exposure Category C.
- 6) Topographic Category 1.
- 7) Crest Height 0.0000 ft.
- 8) Nominal ice thickness of 0.7500 in.
- 9) Ice thickness is considered to increase with height.
- 10) Ice density of 56.00 pcf.
- 11) A wind speed of 50.00 mph is used in combination with ice.
- 12) Temperature drop of 50.00 °F.
- 13) Deflections calculated using a wind speed of 60.00 mph.
- 14) A non-linear (P-delta) analysis was used.
- 15) Pressures are calculated at each section.
- 16) Stress ratio used in pole design is 1.
- 17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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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	150.0000- 128.5000	21.5000	0.00	12	15.0000	18.1463	0.2188	0.8752	A572-50 (50 ksi)
L2	128.5000- 109.0000	19.5000	0.00	12	18.1463	21.0000	0.5837	2.3347	Reinf 35.16 ksi (35 ksi)
L3	109.0000- 104.1667	4.8333	0.00	12	21.0000	21.7298	0.6610	2.6440	Reinf 38.54 ksi (39 ksi)
L4	104.1667- 100.9200	3.2467	0.00	12	21.7298	22.2201	1.5958	6.3832	Reinf 38.55 ksi (39 ksi)
L5	100.9200- 95.2500	5.6700	0.00	12	22.2201	23.0763	1.4985	5.9941	Reinf 36.85 ksi (37 ksi)
L6	95.2500- 80.5000	14.7500	0.00	12	23.0763	25.3035	0.8972	3.5890	Reinf 39.10 ksi (39 ksi)
L7	80.5000-	6.9167	0.00	12	25.3035	26.3479	1.1822	4.7288	Reinf 35.54 ksi

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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
	73.5833								(36 ksi)
L8	73.5833- 72.0000	1.5833	0.00	12	26.3479	26.5870	1.1696	4.6784	Reinf 35.56 ksi (36 ksi)
L9	72.0000- 66.7500	5.2500	0.00	12	26.5870	26.9920	1.2660	5.0639	Reinf 35.56 ksi (36 ksi)
L10	66.7500- 48.2500	18.5000	0.00	12	26.9920	29.9611	1.2042	4.8170	Reinf 39.10 ksi (39 ksi)
L11	48.2500- 44.2500	4.0000	0.00	12	29.9611	30.6030	1.5876	6.3502	Reinf 34.81 ksi (35 ksi)
L12	44.2500- 43.0833	1.1667	0.00	12	30.6030	30.7903	1.6684	6.6737	Reinf 34.85 ksi (35 ksi)
L13	43.0833- 30.0000	13.0833	4.00	12	30.7903	32.8900	1.5728	6.2911	Reinf 35.17 ksi (35 ksi)
L14	30.0000- 23.7500	10.2500	0.00	12	29.1025	33.3525	1.6275	6.5100	Reinf 35.41 ksi (35 ksi)
L15	23.7500- 11.0000	12.7500	0.00	12	33.3525	35.5039	1.5179	6.0715	Reinf 35.80 ksi (36 ksi)
L16	11.0000- 6.0000	5.0000	0.00	12	35.5039	36.3476	1.3615	5.4460	Reinf 42.72 ksi (43 ksi)
L17	6.0000-3.2500	2.7500	0.00	12	36.3476	36.8116	1.4930	5.9722	Reinf 42.05 ksi (42 ksi)
L18	3.2500-0.0000	3.2500		12	36.8116	37.3600	1.1317	4.5268	Reinf 43.91 ksi (44 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	I/Q in ²	w in	w/t
L1	15.5291	10.4139	290.4144	5.2917	7.7700	37.3764	588.4584	5.1254	3.4336	15.693
	18.7865	12.6306	518.1449	6.4181	9.3998	55.1229	1049.9021	6.2164	4.2768	19.547
L2	18.7865	33.0081	1299.5336	6.2874	9.3998	138.2511	2633.2074	16.2456	3.2990	5.652
	21.7408	38.3714	2041.4983	7.3090	10.8780	187.6722	4136.6291	18.8853	4.0637	6.962
L3	21.7408	43.2899	2285.7676	7.2814	10.8780	210.1276	4631.5848	21.3060	3.8565	5.834
	22.4964	44.8433	2540.7652	7.5426	11.2561	225.7244	5148.2792	22.0705	4.0521	6.13
L4	22.4964	103.4576	5353.1615	7.2080	11.2561	475.5807	10846.956	50.9187	1.5469	0.969
	23.0039	105.9768	5753.7976	7.3835	11.5100	499.8955	11658.753	52.1585	1.6783	1.052
L5	23.0039	99.9864	5479.8883	7.4183	11.5100	476.0980	11103.739	49.2103	1.9389	1.294
	23.8903	104.1176	6187.5914	7.7248	11.9535	517.6386	12537.737	51.2435	2.1684	1.447
L6	23.8903	64.0777	4023.2491	7.9401	11.9535	336.5751	8152.1934	31.5371	3.7798	4.213
	26.1961	70.5124	5361.1030	8.7374	13.1072	409.0193	10863.048	34.7041	4.3767	4.878
L7	26.1961	91.8214	6819.1740	8.6354	13.1072	520.2612	13817.495	45.1917	3.6131	3.056
	27.2774	95.7972	7743.8637	9.0093	13.6482	567.3899	15691.167	47.1485	3.8930	3.293
L8	27.2774	94.8236	7672.8416	9.0138	13.6482	562.1861	15547.257	46.6693	3.9267	3.357
	27.5249	95.7240	7893.4952	9.0994	13.7721	573.1526	15994.361	47.1124	3.9908	3.412
L9	27.5249	103.2192	8447.1331	9.0649	13.7721	613.3526	17116.181	50.8014	3.7325	2.948
	27.9442	104.8701	8858.9559	9.2099	13.9818	633.6042	17950.646	51.6139	3.8411	3.034
L10	27.9442	99.9959	8487.7918	9.2320	13.9818	607.0580	17198.567	49.2149	4.0065	3.327
	31.0180	111.5089	11770.014	10.2949	15.5198	758.3858	23849.240	54.8813	4.8022	3.988
L11	31.0180	145.0437	14904.254	10.1577	15.5198	960.3365	30200.059	71.3861	3.7749	2.378
	31.6826	148.3253	15938.957	10.3875	15.8524	1005.4628	32296.648	73.0012	3.9469	2.486
L12	31.6826	155.4465	16611.213	10.3586	15.8524	1047.8701	33658.822	76.5061	3.7302	2.236

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Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
	31.8764	156.4525	16935.785	10.4256	15.9493	1061.8481	34316.493	77.0011	3.7804	2.266
L13	31.8764	147.9667	16122.608	10.4599	15.9493	1010.8631	32668.775	72.8247	4.0368	2.567
	34.0502	158.6005	19854.413	11.2116	17.0370	1165.3689	40230.424	78.0583	4.5995	2.924
L14	31.8462	143.9833	13873.102	9.8361	15.0751	920.2664	28110.666	70.8642	3.4378	2.112
	34.5291	166.2557	21358.320	11.3576	17.2766	1236.2560	43277.747	81.8260	4.5768	2.812
L15	34.5291	155.5933	20126.926	11.3968	17.2766	1164.9808	40782.609	76.5783	4.8706	3.209
	36.7564	166.1082	24489.397	12.1670	18.3910	1331.5950	49622.157	81.7534	5.4472	3.589
L16	36.7564	149.6824	22271.260	12.2230	18.3910	1210.9852	45127.611	73.6691	5.8662	4.309
	37.6298	153.3812	23963.404	12.5250	18.8281	1272.7501	48556.353	75.4895	6.0923	4.475
L17	37.6298	167.5663	25983.144	12.4779	18.8281	1380.0230	52648.894	82.4711	5.7398	3.844
	38.1102	169.7972	27034.765	12.6440	19.0684	1417.7773	54779.763	83.5690	5.8642	3.928
L18	38.1102	130.0191	21127.150	12.7734	19.0684	1107.9658	42809.333	63.9915	6.8326	6.038
	38.6779	132.0175	22116.353	12.9697	19.3525	1142.8175	44813.728	64.9750	6.9796	6.167

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 150.0000-128.5000				1	1	1			
L2 128.5000-109.0000				1	1	1			
L3 109.0000-104.1667				1	1	1			
L4 104.1667-100.9200				1	1	1			
L5 100.9200-95.2500				1	1	1			
L6 95.2500-80.5000				1	1	1			
L7 80.5000-73.5833				1	1	1			
L8 73.5833-72.0000				1	1	1			
L9 72.0000-66.7500				1	1	1			
L10 66.7500-48.2500				1	1	1			
L11 48.2500-44.2500				1	1	1			
L12 44.2500-43.0833				1	1	1			
L13 43.0833-30.0000				1	1	1			
L14 30.0000-23.7500				1	1	1			
L15 23.7500-11.0000				1	1	1			
L16 11.0000-6.0000				1	1	1			
L17 6.0000-3.2500				1	1	1			
L18 3.2500-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
FXL-1873(1-5/8")	C	No	Inside Pole	150.0000 - 0.0000	12	No Ice	0.0000	0.67
						1/2" Ice	0.0000	0.67
						1" Ice	0.0000	0.67
FB-L98B-034-XXXXXX(3/8")	C	No	Inside Pole	150.0000 - 0.0000	1	No Ice	0.0000	0.05
						1/2" Ice	0.0000	0.05
						1" Ice	0.0000	0.05
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	150.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58
FB-L98B-034-XXXXXX(3/8")	C	No	Inside Pole	150.0000 - 0.0000	1	No Ice	0.0000	0.05
						1/2" Ice	0.0000	0.05
						1" Ice	0.0000	0.05
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	150.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58
2" (Nominal) Conduit	C	No	Inside Pole	150.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72

9207(5/16")	C	No	Inside Pole	138.0000 - 0.0000	6	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
EC4-50(1/2")	C	No	Inside Pole	138.0000 - 0.0000	2	No Ice	0.0000	0.16
						1/2" Ice	0.0000	0.16
						1" Ice	0.0000	0.16
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	138.0000 - 120.0000	1	No Ice	0.2375	0.72
						1/2" Ice	0.3375	2.48
						1" Ice	0.4375	4.84
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	2.48
						1" Ice	0.0000	4.84
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	2.48
						1" Ice	0.0000	4.84

AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	2	No Ice	0.1960	0.52
						1/2" Ice	0.2960	2.02
						1" Ice	0.3960	4.14
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	10	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14
MLC HYBRID 6x12 6AWGx6(1-1/2)	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.0000	0.59
						1/2" Ice	0.0000	1.83
						1" Ice	0.0000	3.68
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.0000	1.07
						1/2" Ice	0.0000	2.37
						1" Ice	0.0000	4.28

HB114-U6S12-xxx-LI(1-1/4)	C	No	Inside Pole	99.0000 - 0.0000	2	No Ice	0.0000	1.70
						1/2" Ice	0.0000	1.70
						1" Ice	0.0000	1.70
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	99.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	99.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
LDF7-50A(1-5/8")	C	No	Inside Pole	99.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
LDF4-50A(1/2")	C	No	Inside Pole	99.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15

2.5" Solid Rod Reinforcing	C	No	CaAa (Out Of Face)	51.0000 - 0.0000	1	No Ice	0.2500	0.00
						1/2" Ice	0.3500	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight plf
						No Ice	ft ² /ft	
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	130.0000 - 106.7500	2	1" Ice	0.4500	0.00
						No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
2" Flat Reinforcement	C	No	CaAa (Out Of Face)	108.6700 - 0.0000	2	1" Ice	0.4306	0.00
						No Ice	0.3333	0.00
						1/2" Ice	0.4444	0.00
2" flat Climb Ladder Rail	C	No	CaAa (Out Of Face)	150.0000 - 0.0000	1	1" Ice	0.5556	0.00
						No Ice	0.3333	1.65
						1/2" Ice	0.4333	3.43
						1" Ice	0.5556	4.05

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA}		Weight K
					In Face ft ²	Out Face ft ²	
L1	150.0000-128.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.048	0.30
L2	128.5000-109.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	20.956	0.38
L3	109.0000-104.1667	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.445	0.11
L4	104.1667-100.9200	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.519	0.07
L5	100.9200-95.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.635	0.18
L6	95.2500-80.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.453	0.54
L7	80.5000-73.5833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.998	0.25
L8	73.5833-72.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.517	0.06
L9	72.0000-66.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.348	0.19
L10	66.7500-48.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	30.103	0.67
L11	48.2500-44.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.360	0.15
L12	44.2500-43.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.147	0.04
L13	43.0833-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	24.073	0.47
L14	30.0000-23.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.500	0.23
L15	23.7500-11.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.460	0.46
L16	11.0000-6.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.200	0.18
L17	6.0000-3.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.060	0.10

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L18	3.2500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.980	0.12

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.0000-128.5000	A	1.732	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.767	0.57
L2	128.5000-109.0000	A	1.705	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	53.513	2.01
L3	109.0000-104.1667	A	1.687	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.580	0.74
L4	104.1667-100.9200	A	1.680	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.338	0.49
L5	100.9200-95.2500	A	1.673	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	20.005	1.08
L6	95.2500-80.5000	A	1.654	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	54.357	3.07
L7	80.5000-73.5833	A	1.633	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	25.302	1.42
L8	73.5833-72.0000	A	1.623	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.773	0.32
L9	72.0000-66.7500	A	1.616	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.092	1.07
L10	66.7500-48.2500	A	1.585	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	68.121	3.68
L11	48.2500-44.2500	A	1.551	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.462	0.78
L12	44.2500-43.0833	A	1.543	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.786	0.23
L13	43.0833-30.0000	A	1.515	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	53.146	2.47
L14	30.0000-23.7500	A	1.469	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	25.388	1.18
L15	23.7500-11.0000	A	1.406	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	49.757	2.22
L16	11.0000-6.0000	A	1.310	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.804	0.80
L17	6.0000-3.2500	A	1.232	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.030	0.41
L18	3.2500-0.0000	A	1.110	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.270	0.43

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	150.0000-	-0.4496	0.2596	-0.6976	0.4028
	128.5000				
L2	128.5000-	-0.8262	0.4770	-1.2367	0.7140
	109.0000				
L3	109.0000-	-1.0522	0.6075	-1.4587	0.8422
	104.1667				
L4	104.1667-	-1.0072	0.5815	-1.4132	0.8159
	100.9200				
L5	100.9200-95.2500	-1.0745	0.6204	-1.5025	0.8675
L6	95.2500-80.5000	-1.1324	0.6538	-1.5957	0.9212
L7	80.5000-73.5833	-1.1643	0.6722	-1.6607	0.9588
L8	73.5833-72.0000	-1.1761	0.6790	-1.6850	0.9728
L9	72.0000-66.7500	-1.1820	0.6824	-1.6963	0.9794
L10	66.7500-48.2500	-1.2295	0.7098	-1.7745	1.0245
L11	48.2500-44.2500	-1.3547	0.7821	-1.9310	1.1149
L12	44.2500-43.0833	-1.3623	0.7865	-1.9453	1.1231
L13	43.0833-30.0000	-1.3826	0.7983	-1.9827	1.1447
L14	30.0000-23.7500	-1.3864	0.8004	-1.9910	1.1495
L15	23.7500-11.0000	-1.4256	0.8231	-2.0465	1.1815
L16	11.0000-6.0000	-1.4487	0.8364	-2.0662	1.1929
L17	6.0000-3.2500	-1.4584	0.8420	-2.0608	1.1898
L18	3.2500-0.0000	-1.4658	0.8463	-2.0317	1.1730

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft	C _A A _A Front	C _A A _A Side	Weight K	
						ft ²	ft ²	K	
QS66512-2 w/ Mount Pipe	A	From Leg	4.0000	0.00	150.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2"	8.9314	9.6573	0.21
			4.00			Ice	9.4571	10.5478	0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.0000	0.00	150.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2"	8.9314	9.6573	0.21
			4.00			Ice	9.4571	10.5478	0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.0000	0.00	150.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2"	8.9314	9.6573	0.21
			4.00			Ice	9.4571	10.5478	0.30
(2) TPX-070821	A	From Leg	4.0000	0.00	150.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2"	0.5585	0.1471	0.01
			4.00			Ice	0.6556	0.2020	0.02
(2) TPX-070821	B	From Leg	4.0000	0.00	150.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2"	0.5585	0.1471	0.01
			4.00			Ice	0.6556	0.2020	0.02
(2) TPX-070821	C	From Leg	4.0000	0.00	150.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2"	0.5585	0.1471	0.01
			4.00			Ice	0.6556	0.2020	0.02
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RRUS 32	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.8571	1.7766	0.06
						1/2" Ice	3.0830	1.9677	0.08
						Ice	3.3163	2.1658	0.10
						1" Ice			
RRUS 32	B	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.8571	1.7766	0.06
						1/2" Ice	3.0830	1.9677	0.08
						Ice	3.3163	2.1658	0.10
						1" Ice			
RRUS 32	C	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.8571	1.7766	0.06
						1/2" Ice	3.0830	1.9677	0.08
						Ice	3.3163	2.1658	0.10
						1" Ice			
RRUS 32 B2	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.7313	1.6681	0.05
						1/2" Ice	2.9531	1.8552	0.07
						Ice	3.1823	2.0493	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.7313	1.6681	0.05
						1/2" Ice	2.9531	1.8552	0.07
						Ice	3.1823	2.0493	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	2.7313	1.6681	0.05
						1/2" Ice	2.9531	1.8552	0.07
						Ice	3.1823	2.0493	0.10
						1" Ice			
782 10253	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	0.1075	0.0610	0.00
						1/2" Ice	0.1518	0.0980	0.00
						Ice	0.2034	0.1424	0.01
						1" Ice			
782 10253	B	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	0.1075	0.0610	0.00
						1/2" Ice	0.1518	0.0980	0.00
						Ice	0.2034	0.1424	0.01
						1" Ice			
782 10253	C	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	0.1075	0.0610	0.00
						1/2" Ice	0.1518	0.0980	0.00
						Ice	0.2034	0.1424	0.01
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	0.9167	0.9167	0.02
						1/2" Ice	1.4583	1.4583	0.04
						Ice	1.6431	1.6431	0.06
						1" Ice			
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	8.3708	6.3625	0.08
						1/2" Ice	8.9314	7.5378	0.14
						Ice	9.4571	8.4270	0.22
						1" Ice			
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	8.3708	6.3625	0.08
						1/2" Ice	8.9314	7.5378	0.14
						Ice	9.4571	8.4270	0.22
						1" Ice			
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	8.3708	6.3625	0.08
						1/2" Ice	8.9314	7.5378	0.14
						Ice	9.4571	8.4270	0.22
						1" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	5.8054	4.5859	0.09
						1/2" Ice	6.2677	5.5082	0.14
						Ice	6.6966	6.2127	0.21
						1" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	5.8054	4.5859	0.09
						1/2" Ice	6.2677	5.5082	0.14
						Ice	6.6966	6.2127	0.21
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.00	150.0000	No Ice	5.8054	4.5859	0.09
						1/2" Ice	6.2677	5.5082	0.14
						Ice	6.6966	6.2127	0.21
						1" Ice			
TT19-08BP111-001	A	From Leg	4.0000	0.00	150.0000	No Ice	0.5527	0.4455	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} _{Front} ft ²	C _{AA} _{Side} ft ²	Weight K
			0.00			1/2"	0.6487	0.5342	0.02
			4.00			Ice	0.7520	0.6303	0.03
TT19-08BP111-001	B	From Leg	4.0000	0.00	150.0000	1" Ice	0.5527	0.4455	0.02
			0.00			No Ice	0.6487	0.5342	0.02
			4.00			1/2"	0.7520	0.6303	0.03
						Ice			
						1" Ice			
TT19-08BP111-001	C	From Leg	4.0000	0.00	150.0000	No Ice	0.5527	0.4455	0.02
			0.00			1/2"	0.6487	0.5342	0.02
			4.00			Ice	0.7520	0.6303	0.03
						1" Ice			
Platform Mount (LP 101-1)	C	None		0.00	150.0000	No Ice	36.2100	36.2100	1.50
						1/2"	42.8200	42.8200	2.30
						Ice	49.4300	49.4300	3.10
						1" Ice			
Side Arm Mount [SO 201-3]	C	None		0.00	150.0000	No Ice	5.7100	5.7100	0.29
						1/2"	7.9100	7.9100	0.35
						Ice	10.1100	10.1100	0.41
						1" Ice			
Top Hat 20" Diameter x 3'-6" Tall	C	None		0.00	150.0000	No Ice	2.9167	2.9167	0.20
						1/2"	4.3896	4.3896	0.26
						Ice	4.7056	4.7056	0.31
						1" Ice			

RRUS 11	A	From Leg	4.0000	0.00	147.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	B	From Leg	4.0000	0.00	147.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	C	From Leg	4.0000	0.00	147.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
TME-DC6-48-60-18-8F	B	From Leg	4.0000	0.00	147.0000	No Ice	0.9167	0.9167	0.02
			0.00			1/2"	1.4583	1.4583	0.04
			0.00			Ice	1.6431	1.6431	0.06
						1" Ice			
Pipe Mount [PM 601-3]	C	None		0.00	147.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice			

LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.0000	0.00	138.0000	No Ice	4.5378	2.9834	0.05
			0.00			1/2"	4.8914	3.5263	0.08
			2.00			Ice	5.2539	4.0859	0.13
						1" Ice			
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.0000	0.00	138.0000	No Ice	4.5378	2.9834	0.05
			0.00			1/2"	4.8914	3.5263	0.08
			2.00			Ice	5.2539	4.0859	0.13
						1" Ice			
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.0000	0.00	138.0000	No Ice	4.5378	2.9834	0.05
			0.00			1/2"	4.8914	3.5263	0.08
			2.00			Ice	5.2539	4.0859	0.13
						1" Ice			
RAS SPI-2213 RRH	A	From Leg	4.0000	0.00	138.0000	No Ice	1.5617	0.7292	0.03
			0.00			1/2"	1.7196	0.8475	0.05
			2.00			Ice	1.8849	0.9728	0.06
						1" Ice			
RAS SPI-2213 RRH	B	From Leg	4.0000	0.00	138.0000	No Ice	1.5617	0.7292	0.03
			0.00			1/2"	1.7196	0.8475	0.05
			2.00			Ice	1.8849	0.9728	0.06
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft ²	CAAA Side ft ²	Weight K	
RAS SPI-2213 RRH	C	From Leg	4.0000	0.00	138.0000	No Ice	1.5617	0.7292	0.03
			0.00			1/2"	1.7196	0.8475	0.05
			2.00			Ice	1.8849	0.9728	0.06
						1" Ice			
Horizon Compact	B	From Leg	4.0000	0.00	138.0000	No Ice	0.7208	0.3681	0.01
			0.00			1/2"	0.8278	0.4499	0.02
			5.00			Ice	0.9422	0.5391	0.03
						1" Ice			
Horizon Compact	C	From Leg	4.0000	0.00	138.0000	No Ice	0.7208	0.3681	0.01
			0.00			1/2"	0.8278	0.4499	0.02
			5.00			Ice	0.9422	0.5391	0.03
						1" Ice			
CW JUNCTION BOX	A	From Leg	4.0000	0.00	138.0000	No Ice	1.2000	0.6000	0.00
			0.00			1/2"	1.3370	0.7037	0.01
			5.00			Ice	1.4815	0.8148	0.02
						1" Ice			
Platform Mount [LP 713-1]	C	None		0.00	138.0000	No Ice	31.2700	31.2700	1.51
						1/2"	39.6800	39.6800	1.93
						Ice	48.0900	48.0900	2.35
						1" Ice			
*** LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.0000	0.00	120.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.0000	0.00	120.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.0000	0.00	120.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2"	12.4043	11.3657	0.17
			0.00			Ice	13.1351	12.9138	0.27
						1" Ice			
RRUS 11 B12	A	From Leg	4.0000	0.00	120.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.0000	0.00	120.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.0000	0.00	120.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			0.00			Ice	3.2593	1.4848	0.10
						1" Ice			
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.0000	0.00	120.0000	No Ice	6.7474	6.0700	0.15
			0.00			1/2"	7.2017	6.8671	0.21
			0.00			Ice	7.6475	7.5828	0.28
						1" Ice			
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.0000	0.00	120.0000	No Ice	6.7474	6.0700	0.15
			0.00			1/2"	7.2017	6.8671	0.21
			0.00			Ice	7.6475	7.5828	0.28
						1" Ice			
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.0000	0.00	120.0000	No Ice	6.7474	6.0700	0.15
			0.00			1/2"	7.2017	6.8671	0.21
			0.00			Ice	7.6475	7.5828	0.28
						1" Ice			
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	4.0000	0.00	120.0000	No Ice	6.1619	5.5453	0.10
			0.00			1/2"	6.6000	6.3031	0.16
			0.00			Ice	7.0327	6.9984	0.22
						1" Ice			
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	4.0000	0.00	120.0000	No Ice	6.1619	5.5453	0.10
			0.00			1/2"	6.6000	6.3031	0.16
			0.00			Ice	7.0327	6.9984	0.22
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft ²	CAAA Side ft ²	Weight K		
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	4.0000	0.00	120.0000	No Ice	6.1619	5.5453	0.10	
			0.00			1/2"	6.6000	6.3031	0.16	
			0.00			Ice	7.0327	6.9984	0.22	
KRY 112 144/1	A	From Leg	4.0000	0.00	120.0000	1" Ice	0.3500	0.1750	0.01	
			0.00			1/2"	0.4259	0.2343	0.01	
			0.00			Ice	0.5093	0.3009	0.02	
KRY 112 144/1	B	From Leg	4.0000	0.00	120.0000	1" Ice	0.3500	0.1750	0.01	
			0.00			1/2"	0.4259	0.2343	0.01	
			0.00			Ice	0.5093	0.3009	0.02	
KRY 112 144/1	C	From Leg	4.0000	0.00	120.0000	1" Ice	0.3500	0.1750	0.01	
			0.00			1/2"	0.4259	0.2343	0.01	
			0.00			Ice	0.5093	0.3009	0.02	
Platform Mount [LP 301-1]	C	None		0.00	120.0000	1" Ice	No Ice	30.1000	30.1000	1.59
						1/2"	40.8000	40.8000	2.03	
						Ice	51.5000	51.5000	2.47	

(2) X7CQAP-465-VR0 w/ Mount Pipe	A	From Leg	4.0000	0.00	99.0000	No Ice	6.5999	4.7322	0.06	
			0.00			1/2"	7.0185	5.3944	0.11	
			0.00			Ice	7.4400	6.0396	0.17	
(2) X7CQAP-465-VR0 w/ Mount Pipe	B	From Leg	4.0000	0.00	99.0000	1" Ice	6.5999	4.7322	0.06	
			0.00			1/2"	7.0185	5.3944	0.11	
			0.00			Ice	7.4400	6.0396	0.17	
(2) X7CQAP-465-VR0 w/ Mount Pipe	C	From Leg	4.0000	0.00	99.0000	1" Ice	6.5999	4.7322	0.06	
			0.00			1/2"	7.0185	5.3944	0.11	
			0.00			Ice	7.4400	6.0396	0.17	
B13 RRH 4X30	A	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.0552	1.3201	0.06
			0.00			1/2"	2.2405	1.4754	0.07	
			0.00			Ice	2.4333	1.6376	0.09	
B13 RRH 4X30	B	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.0552	1.3201	0.06
			0.00			1/2"	2.2405	1.4754	0.07	
			0.00			Ice	2.4333	1.6376	0.09	
B13 RRH 4X30	C	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.0552	1.3201	0.06
			0.00			1/2"	2.2405	1.4754	0.07	
			0.00			Ice	2.4333	1.6376	0.09	
B25 RRH2x60 PCS	A	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.1400	1.3065	0.05
			0.00			1/2"	2.3293	1.4629	0.07	
			0.00			Ice	2.5259	1.6264	0.09	
B25 RRH2x60 PCS	B	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.1400	1.3065	0.05
			0.00			1/2"	2.3293	1.4629	0.07	
			0.00			Ice	2.5259	1.6264	0.09	
B25 RRH2x60 PCS	C	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.1400	1.3065	0.05
			0.00			1/2"	2.3293	1.4629	0.07	
			0.00			Ice	2.5259	1.6264	0.09	
B66A RRH4X45	A	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.5800	1.6296	0.07
			0.00			1/2"	2.7937	1.8106	0.09	
			0.00			Ice	3.0148	1.9986	0.11	
B66A RRH4X45	B	From Leg	4.0000	0.00	99.0000	1" Ice	No Ice	2.5800	1.6296	0.07
			0.00			1/2"	2.7937	1.8106	0.09	
			0.00			Ice	3.0148	1.9986	0.11	

150 Ft Monopole Tower Structural Analysis
 Project Number 37517-0750.004.7805, Application 367137, Revision 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
B66A RRH4X45	C	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	2.5800	1.6296	0.07
						1/2"	2.7937	1.8106	0.09
						Ice	3.0148	1.9986	0.11
						1" Ice			
RC2DC-3315-PF-48	A	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	3.7922	2.5116	0.03
						1/2"	4.0441	2.7247	0.06
						Ice	4.3033	2.9449	0.10
						1" Ice			
RC2DC-3315-PF-48	C	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	3.7922	2.5116	0.03
						1/2"	4.0441	2.7247	0.06
						Ice	4.3033	2.9449	0.10
						1" Ice			
BXA-171063/8CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	3.1574	3.3303	0.03
						1/2"	3.5312	3.9423	0.06
						Ice	3.9033	4.5633	0.10
						1" Ice			
BXA-171063/8CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	3.1574	3.3303	0.03
						1/2"	3.5312	3.9423	0.06
						Ice	3.9033	4.5633	0.10
						1" Ice			
BXA-171063/8CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	3.1574	3.3303	0.03
						1/2"	3.5312	3.9423	0.06
						Ice	3.9033	4.5633	0.10
						1" Ice			
BXA-70063/4CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	4.9453	3.6158	0.03
						1/2"	5.3243	4.2169	0.07
						Ice	5.7120	4.8343	0.12
						1" Ice			
BXA-70063/4CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	4.9453	3.6158	0.03
						1/2"	5.3243	4.2169	0.07
						Ice	5.7120	4.8343	0.12
						1" Ice			
BXA-70063/4CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice	4.9453	3.6158	0.03
						1/2"	5.3243	4.2169	0.07
						Ice	5.7120	4.8343	0.12
						1" Ice			
GPS_A	A	From Leg	4.0000 0.00 4.00	0.00	99.0000	No Ice	0.2550	0.2550	0.00
						1/2"	0.3205	0.3205	0.00
						Ice	0.3934	0.3934	0.01
						1" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
						1" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
						1" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
						1" Ice			
T-Arm Mount [TA 602-3]	C	None		0.00	99.0000	No Ice	11.5900	11.5900	0.77
						1/2"	15.4400	15.4400	0.99
						Ice	19.2900	19.2900	1.21
						1" Ice			

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 K
VHLP2-23	B	Paraboloid w/o Radome	From Leg	4.0000 0.00 5.00	0.00		138.0000	2.1750	No Ice 3.7200 1/2" Ice 4.0100 1" Ice 4.3000	0.03 0.05 0.07
VHLP2-18	C	Paraboloid w/o Radome	From Leg	4.0000 0.00 5.00	0.00		138.0000	2.1750	No Ice 3.7200 1/2" Ice 4.0100 1" Ice 4.3000	0.03 0.05 0.07

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 150.0000-128.5000	138.9099	1.356	31.036	30.741	A	0.000	30.741	30.741	100.00	0.000	0.000
					B	0.000	30.741		100.00	0.000	0.000
					C	0.000	30.741		100.00	0.000	10.048
L2 128.5000-109.0000	118.5131	1.312	30.015	32.928	A	0.000	32.928	32.928	100.00	0.000	0.000
					B	0.000	32.928		100.00	0.000	0.000
					C	0.000	32.928		100.00	0.000	20.956
L3 109.0000-104.1667	106.5696	1.283	29.351	8.909	A	0.000	8.909	8.909	100.00	0.000	0.000
					B	0.000	8.909		100.00	0.000	0.000
					C	0.000	8.909		100.00	0.000	7.445
L4 104.1667-100.9200	102.5373	1.272	29.114	6.155	A	0.000	6.155	6.155	100.00	0.000	0.000
					B	0.000	6.155		100.00	0.000	0.000
					C	0.000	6.155		100.00	0.000	4.519
L5 100.9200-95.2500	98.0671	1.26	28.842	11.079	A	0.000	11.079	11.079	100.00	0.000	0.000
					B	0.000	11.079		100.00	0.000	0.000
					C	0.000	11.079		100.00	0.000	8.635
L6 95.2500-80.5000	87.7618	1.231	28.176	30.782	A	0.000	30.782	30.782	100.00	0.000	0.000
					B	0.000	30.782		100.00	0.000	0.000
					C	0.000	30.782		100.00	0.000	23.453
L7 80.5000-73.5833	77.0183	1.198	27.412	15.411	A	0.000	15.411	15.411	100.00	0.000	0.000
					B	0.000	15.411		100.00	0.000	0.000
					C	0.000	15.411		100.00	0.000	10.998
L8 73.5833-72.0000	72.7905	1.184	27.088	3.615	A	0.000	3.615	3.615	100.00	0.000	0.000
					B	0.000	3.615		100.00	0.000	0.000
					C	0.000	3.615		100.00	0.000	2.517
L9 72.0000-66.7500	69.3684	1.172	26.815	12.134	A	0.000	12.134	12.134	100.00	0.000	0.000
					B	0.000	12.134		100.00	0.000	0.000
					C	0.000	12.134		100.00	0.000	8.348
L10 66.7500-48.2500	57.3393	1.126	25.761	45.450	A	0.000	45.450	45.450	100.00	0.000	0.000
					B	0.000	45.450		100.00	0.000	0.000
					C	0.000	45.450		100.00	0.000	30.103
L11 48.2500-44.2500	46.2429	1.076	24.620	10.450	A	0.000	10.450	10.450	100.00	0.000	0.000
					B	0.000	10.450		100.00	0.000	0.000
					C	0.000	10.450		100.00	0.000	7.360
L12 44.2500-43.0833	43.6661	1.063	24.325	3.090	A	0.000	3.090	3.090	100.00	0.000	0.000
					B	0.000	3.090		100.00	0.000	0.000
					C	0.000	3.090		100.00	0.000	2.147
L13 43.0833-30.0000	36.4698	1.023	23.420	35.939	A	0.000	35.939	35.939	100.00	0.000	0.000
					B	0.000	35.939		100.00	0.000	0.000
					C	0.000	35.939		100.00	0.000	24.073
L14 30.0000-23.7500	26.8329	0.959	21.955	17.285	A	0.000	17.285	17.285	100.00	0.000	0.000
					B	0.000	17.285		100.00	0.000	0.000
					C	0.000	17.285		100.00	0.000	11.500
L15 23.7500-11.0000	17.3086	0.875	20.019	37.870	A	0.000	37.870	37.870	100.00	0.000	0.000
					B	0.000	37.870		100.00	0.000	0.000
					C	0.000	37.870		100.00	0.000	23.460
L16 11.0000-	8.4902	0.85	19.45	15.497	A	0.000	15.497	15.497	100.00	0.000	0.000

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
6.0000			0		B	0.000	15.497		100.00	0.000	0.000
L17 6.0000-3.2500	4.6221	0.85	19.45	8.679	C	0.000	15.497	8.679	100.00	0.000	9.200
					A	0.000	8.679		100.00	0.000	0.000
					B	0.000	8.679		100.00	0.000	0.000
L18 3.2500-0.0000	1.6210	0.85	19.45	10.398	C	0.000	8.679	10.398	100.00	0.000	5.060
					A	0.000	10.398		100.00	0.000	0.000
					B	0.000	10.398		100.00	0.000	0.000
					C	0.000	10.398		100.00	0.000	5.980

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K _z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 150.0000-128.5000	138.9099	1.356	8.246	1.7319	36.947	A	0.000	36.947	36.947	100.00	0.000	0.000
						B	0.000	36.947		100.00	0.000	0.000
						C	0.000	36.947		100.00	0.000	22.767
L2 128.5000-109.0000	118.5131	1.312	7.975	1.7046	38.468	A	0.000	38.468	38.468	100.00	0.000	0.000
						B	0.000	38.468		100.00	0.000	0.000
						C	0.000	38.468		100.00	0.000	53.513
L3 109.0000-104.1667	106.5696	1.283	7.799	1.6866	10.267	A	0.000	10.267	10.267	100.00	0.000	0.000
						B	0.000	10.267		100.00	0.000	0.000
						C	0.000	10.267		100.00	0.000	17.580
L4 104.1667-100.9200	102.5373	1.272	7.736	1.6801	7.064	A	0.000	7.064	7.064	100.00	0.000	0.000
						B	0.000	7.064		100.00	0.000	0.000
						C	0.000	7.064		100.00	0.000	10.338
L5 100.9200-95.2500	98.0671	1.26	7.663	1.6726	12.659	A	0.000	12.659	12.659	100.00	0.000	0.000
						B	0.000	12.659		100.00	0.000	0.000
						C	0.000	12.659		100.00	0.000	20.005
L6 95.2500-80.5000	87.7618	1.231	7.486	1.6541	34.849	A	0.000	34.849	34.849	100.00	0.000	0.000
						B	0.000	34.849		100.00	0.000	0.000
						C	0.000	34.849		100.00	0.000	54.357
L7 80.5000-73.5833	77.0183	1.198	7.283	1.6327	17.293	A	0.000	17.293	17.293	100.00	0.000	0.000
						B	0.000	17.293		100.00	0.000	0.000
						C	0.000	17.293		100.00	0.000	25.302
L8 73.5833-72.0000	72.7905	1.184	7.197	1.6235	4.044	A	0.000	4.044	4.044	100.00	0.000	0.000
						B	0.000	4.044		100.00	0.000	0.000
						C	0.000	4.044		100.00	0.000	5.773
L9 72.0000-66.7500	69.3684	1.172	7.125	1.6157	13.548	A	0.000	13.548	13.548	100.00	0.000	0.000
						B	0.000	13.548		100.00	0.000	0.000
						C	0.000	13.548		100.00	0.000	19.092
L10 66.7500-48.2500	57.3393	1.126	6.845	1.5852	50.338	A	0.000	50.338	50.338	100.00	0.000	0.000
						B	0.000	50.338		100.00	0.000	0.000
						C	0.000	50.338		100.00	0.000	68.121
L11 48.2500-44.2500	46.2429	1.076	6.542	1.5515	11.484	A	0.000	11.484	11.484	100.00	0.000	0.000
						B	0.000	11.484		100.00	0.000	0.000
						C	0.000	11.484		100.00	0.000	16.462
L12 44.2500-43.0833	43.6661	1.063	6.463	1.5426	3.390	A	0.000	3.390	3.390	100.00	0.000	0.000
						B	0.000	3.390		100.00	0.000	0.000
						C	0.000	3.390		100.00	0.000	4.786
L13 43.0833-30.0000	36.4698	1.023	6.223	1.5151	39.243	A	0.000	39.243	39.243	100.00	0.000	0.000
						B	0.000	39.243		100.00	0.000	0.000
						C	0.000	39.243		100.00	0.000	53.146
L14 30.0000-23.7500	26.8329	0.959	5.833	1.4693	18.863	A	0.000	18.863	18.863	100.00	0.000	0.000
						B	0.000	18.863		100.00	0.000	0.000
						C	0.000	18.863		100.00	0.000	25.388
L15 23.7500-11.0000	17.3086	0.875	5.319	1.4063	40.859	A	0.000	40.859	40.859	100.00	0.000	0.000
						B	0.000	40.859		100.00	0.000	0.000
						C	0.000	40.859		100.00	0.000	49.757
L16 11.0000-6.0000	8.4902	0.85	5.168	1.3096	16.588	A	0.000	16.588	16.588	100.00	0.000	0.000
						B	0.000	16.588		100.00	0.000	0.000
						C	0.000	16.588		100.00	0.000	18.804
L17 6.0000-	4.6221	0.85	5.168	1.2323	9.243	A	0.000	9.243	9.243	100.00	0.000	0.000

Section Elevation	z	K _z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
3.2500						B	0.000	9.243		100.00	0.000	0.000
L18 3.2500-0.0000	1.6210	0.85	5.168	1.1097	10.999	C	0.000	9.243		100.00	0.000	10.030
						A	0.000	10.999	10.999	100.00	0.000	0.000
						B	0.000	10.999		100.00	0.000	0.000
						C	0.000	10.999		100.00	0.000	11.270

Tower Pressure - Service

G_H = 1.100

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 150.0000-128.5000	138.9099	1.356	10.625	30.741	A	0.000	30.741	30.741	100.00	0.000	0.000
					B	0.000	30.741		100.00	0.000	0.000
					C	0.000	30.741		100.00	0.000	10.048
L2 128.5000-109.0000	118.5131	1.312	10.275	32.928	A	0.000	32.928	32.928	100.00	0.000	0.000
					B	0.000	32.928		100.00	0.000	0.000
					C	0.000	32.928		100.00	0.000	20.956
L3 109.0000-104.1667	106.5696	1.283	10.048	8.909	A	0.000	8.909	8.909	100.00	0.000	0.000
					B	0.000	8.909		100.00	0.000	0.000
					C	0.000	8.909		100.00	0.000	7.445
L4 104.1667-100.9200	102.5373	1.272	9.967	6.155	A	0.000	6.155	6.155	100.00	0.000	0.000
					B	0.000	6.155		100.00	0.000	0.000
					C	0.000	6.155		100.00	0.000	4.519
L5 100.9200-95.2500	98.0671	1.26	9.874	11.079	A	0.000	11.079	11.079	100.00	0.000	0.000
					B	0.000	11.079		100.00	0.000	0.000
					C	0.000	11.079		100.00	0.000	8.635
L6 95.2500-80.5000	87.7618	1.231	9.646	30.782	A	0.000	30.782	30.782	100.00	0.000	0.000
					B	0.000	30.782		100.00	0.000	0.000
					C	0.000	30.782		100.00	0.000	23.453
L7 80.5000-73.5833	77.0183	1.198	9.384	15.411	A	0.000	15.411	15.411	100.00	0.000	0.000
					B	0.000	15.411		100.00	0.000	0.000
					C	0.000	15.411		100.00	0.000	10.998
L8 73.5833-72.0000	72.7905	1.184	9.273	3.615	A	0.000	3.615	3.615	100.00	0.000	0.000
					B	0.000	3.615		100.00	0.000	0.000
					C	0.000	3.615		100.00	0.000	2.517
L9 72.0000-66.7500	69.3684	1.172	9.180	12.134	A	0.000	12.134	12.134	100.00	0.000	0.000
					B	0.000	12.134		100.00	0.000	0.000
					C	0.000	12.134		100.00	0.000	8.348
L10 66.7500-48.2500	57.3393	1.126	8.819	45.450	A	0.000	45.450	45.450	100.00	0.000	0.000
					B	0.000	45.450		100.00	0.000	0.000
					C	0.000	45.450		100.00	0.000	30.103
L11 48.2500-44.2500	46.2429	1.076	8.428	10.450	A	0.000	10.450	10.450	100.00	0.000	0.000
					B	0.000	10.450		100.00	0.000	0.000
					C	0.000	10.450		100.00	0.000	7.360
L12 44.2500-43.0833	43.6661	1.063	8.327	3.090	A	0.000	3.090	3.090	100.00	0.000	0.000
					B	0.000	3.090		100.00	0.000	0.000
					C	0.000	3.090		100.00	0.000	2.147
L13 43.0833-30.0000	36.4698	1.023	8.018	35.939	A	0.000	35.939	35.939	100.00	0.000	0.000
					B	0.000	35.939		100.00	0.000	0.000
					C	0.000	35.939		100.00	0.000	24.073
L14 30.0000-23.7500	26.8329	0.959	7.516	17.285	A	0.000	17.285	17.285	100.00	0.000	0.000
					B	0.000	17.285		100.00	0.000	0.000
					C	0.000	17.285		100.00	0.000	11.500
L15 23.7500-11.0000	17.3086	0.875	6.853	37.870	A	0.000	37.870	37.870	100.00	0.000	0.000
					B	0.000	37.870		100.00	0.000	0.000
					C	0.000	37.870		100.00	0.000	23.460
L16 11.0000-6.0000	8.4902	0.85	6.659	15.497	A	0.000	15.497	15.497	100.00	0.000	0.000
					B	0.000	15.497		100.00	0.000	0.000
					C	0.000	15.497		100.00	0.000	9.200
L17 6.0000-3.2500	4.6221	0.85	6.659	8.679	A	0.000	8.679	8.679	100.00	0.000	0.000
					B	0.000	8.679		100.00	0.000	0.000
					C	0.000	8.679		100.00	0.000	5.060
L18 3.2500-	1.6210	0.85	6.659	10.398	A	0.000	10.398	10.398	100.00	0.000	0.000

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
0.0000					B	0.000	10.398		100.00	0.000	0.000
					C	0.000	10.398		100.00	0.000	5.980

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 128.5	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-18.45	-0.01	-0.50
			Max. Mx	8	-6.28	-253.70	2.17
			Max. My	2	-6.28	-0.01	253.23
			Max. Vy	20	-13.94	253.58	2.16
			Max. Vx	2	-13.93	-0.01	253.23
			Max. Torque	23			0.55
L2	128.5 - 109	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.88	1.56	-1.40
			Max. Mx	20	-12.33	614.60	5.25
			Max. My	2	-12.33	0.13	613.74
			Max. Vy	20	-22.45	614.60	5.25
			Max. Vx	2	-22.44	0.13	613.74
			Max. Torque	25			1.44
L3	109 - 104.167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.74	2.17	-1.75
			Max. Mx	20	-13.38	725.41	6.01
			Max. My	2	-13.38	0.18	724.41
			Max. Vy	20	-23.41	725.41	6.01
			Max. Vx	2	-23.39	0.18	724.41
			Max. Torque	25			1.77
L4	104.167 - 100.92	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.80	2.59	-2.00
			Max. Mx	20	-14.85	802.56	6.52
			Max. My	2	-14.85	0.21	801.46
			Max. Vy	20	-24.12	802.56	6.52
			Max. Vx	2	-24.11	0.21	801.46
			Max. Torque	25			1.98
L5	100.92 - 95.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.76	4.20	-2.03
			Max. Mx	20	-19.36	958.52	7.39
			Max. My	2	-19.36	0.32	957.23
			Max. Vy	20	-29.48	958.52	7.39
			Max. Vx	2	-29.49	0.32	957.23
			Max. Torque	25			2.62
L6	95.25 - 80.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.78	6.97	-3.62
			Max. Mx	20	-24.35	1415.26	9.36
			Max. My	2	-24.35	0.23	1413.74
			Max. Vy	20	-32.46	1415.26	9.36
			Max. Vx	2	-32.47	0.23	1413.74
			Max. Torque	25			3.77
L7	80.5 - 73.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.28	8.32	-4.39
			Max. Mx	20	-27.43	1644.77	10.27
			Max. My	2	-27.43	0.20	1643.14
			Max. Vy	20	-33.91	1644.77	10.27
			Max. Vx	2	-33.92	0.20	1643.14
			Max. Torque	25			4.34
L8	73.5833 - 72	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.33	8.64	-4.57
			Max. Mx	20	-28.14	1698.71	10.48
			Max. My	2	-28.14	0.19	1697.05
			Max. Vy	20	-34.24	1698.71	10.48
			Max. Vx	2	-34.25	0.19	1697.05
			Max. Torque	25			4.47
L9	72 - 66.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.96	9.68	-5.18
			Max. Mx	20	-30.72	1881.27	11.17
			Max. My	2	-30.72	0.17	1879.51
			Max. Vy	20	-35.31	1881.27	11.17

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L10	66.75 - 48.25	Pole	Max. Vx	2	-35.32	0.17	1879.51
			Max. Torque	25			4.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.86	13.46	-7.35
			Max. Mx	20	-40.06	2567.33	13.57
			Max. My	2	-40.06	0.11	2565.20
			Max. Vy	20	-38.88	2567.33	13.57
			Max. Vx	2	-38.89	0.11	2565.20
			Max. Torque	25			6.51
			Max Tension	1	0.00	0.00	0.00
L11	48.25 - 44.25	Pole	Max. Compression	26	-79.31	14.29	-7.83
			Max. Mx	20	-42.73	2724.47	14.08
			Max. My	2	-42.73	0.10	2722.26
			Max. Vy	20	-39.69	2724.47	14.08
			Max. Vx	2	-39.71	0.10	2722.26
			Max. Torque	25			6.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-80.36	14.54	-7.97
			Max. Mx	20	-43.55	2770.93	14.23
			Max. My	2	-43.55	0.10	2768.68
L12	44.25 - 43.0833	Pole	Max. Vy	20	-39.94	2770.93	14.23
			Max. Vx	2	-39.95	0.10	2768.68
			Max. Torque	25			7.03
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.35	16.45	-9.07
			Max. Mx	20	-49.82	3141.58	15.39
			Max. My	2	-49.82	0.08	3139.13
			Max. Vy	20	-41.68	3141.58	15.39
			Max. Vx	2	-41.69	0.08	3139.13
			Max. Torque	25			7.93
L13	43.0833 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-100.30	18.60	-10.31
			Max. Mx	20	-59.59	3579.45	16.68
			Max. My	2	-59.59	0.07	3576.75
			Max. Vy	20	-43.62	3579.45	16.68
			Max. Vx	2	-43.63	0.07	3576.75
			Max. Torque	25			8.93
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-111.79	21.13	-11.77
			Max. Mx	20	-68.96	4147.43	18.26
L14	30 - 23.75	Pole	Max. My	2	-68.96	0.06	4144.40
			Max. Vy	20	-45.49	4147.43	18.26
			Max. Vx	2	-45.50	0.06	4144.40
			Max. Torque	25			10.11
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-116.03	22.05	-12.30
			Max. Mx	20	-72.48	4376.46	18.86
			Max. My	2	-72.48	0.06	4373.30
			Max. Vy	20	-46.14	4376.46	18.86
			Max. Vx	2	-46.15	0.06	4373.30
L15	23.75 - 11	Pole	Max. Torque	25			10.58
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-118.52	22.53	-12.58
			Max. Mx	20	-74.59	4503.83	19.19
			Max. My	2	-74.59	0.07	4500.60
			Max. Vy	20	-46.52	4503.83	19.19
			Max. Vx	2	-46.53	0.07	4500.60
			Max. Torque	25			10.84
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-120.89	23.04	-12.87
L16	11 - 6	Pole	Max. Mx	20	-76.63	4655.58	19.58
			Max. My	2	-76.63	0.07	4652.26
			Max. Vy	20	-46.90	4655.58	19.58
			Max. Vx	2	-46.91	0.07	4652.26
			Max. Torque	25			11.16
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-120.89	23.04	-12.87
			Max. Mx	20	-76.63	4655.58	19.58
			Max. My	2	-76.63	0.07	4652.26
			Max. Vy	20	-46.90	4655.58	19.58
L17	6 - 3.25	Pole	Max. Vx	2	-46.91	0.07	4652.26
			Max. Torque	25			11.16
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-120.89	23.04	-12.87
			Max. Mx	20	-76.63	4655.58	19.58
			Max. My	2	-76.63	0.07	4652.26
			Max. Vy	20	-46.90	4655.58	19.58
			Max. Vx	2	-46.91	0.07	4652.26
			Max. Torque	25			11.16
			Max Tension	1	0.00	0.00	0.00
L18	3.25 - 0	Pole	Max. Compression	26	-120.89	23.04	-12.87
			Max. Mx	20	-76.63	4655.58	19.58
			Max. My	2	-76.63	0.07	4652.26
			Max. Vy	20	-46.90	4655.58	19.58
			Max. Vx	2	-46.91	0.07	4652.26
			Max. Torque	25			11.16
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-120.89	23.04	-12.87
			Max. Mx	20	-76.63	4655.58	19.58
			Max. My	2	-76.63	0.07	4652.26

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	120.89	-0.00	0.00
	Max. H _x	21	57.49	46.86	0.13
	Max. H _z	3	57.49	-0.02	46.87
	Max. M _x	2	4652.26	-0.02	46.87
	Max. M _z	8	4650.70	-46.86	0.18
	Max. Torsion	25	11.16	23.50	40.43
	Min. Vert	21	57.49	46.86	0.13
	Min. H _x	9	57.49	-46.86	0.18
	Min. H _z	15	57.49	0.02	-46.70
	Min. M _x	14	-4630.04	0.02	-46.70
	Min. M _z	20	-4655.58	46.86	0.13
	Min. Torsion	13	-10.72	-23.32	-40.42

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	63.88	-0.00	0.00	1.17	1.96	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	76.65	0.02	-46.87	-4652.26	0.07	-9.60
0.9 Dead+1.6 Wind 0 deg - No Ice	57.49	0.02	-46.87	-4596.28	-0.53	-9.60
1.2 Dead+1.6 Wind 30 deg - No Ice	76.65	23.54	-40.45	-4007.02	-2340.16	-5.47
0.9 Dead+1.6 Wind 30 deg - No Ice	57.49	23.54	-40.45	-3958.86	-2312.34	-5.47
1.2 Dead+1.6 Wind 60 deg - No Ice	76.65	40.61	-23.44	-2324.67	-4030.79	-0.09
0.9 Dead+1.6 Wind 60 deg - No Ice	57.49	40.61	-23.44	-2296.86	-3982.51	-0.09
1.2 Dead+1.6 Wind 90 deg - No Ice	76.65	46.86	-0.18	-24.23	-4650.70	5.25
0.9 Dead+1.6 Wind 90 deg - No Ice	57.49	46.86	-0.18	-24.23	-4595.04	5.26
1.2 Dead+1.6 Wind 120 deg - No Ice	76.65	40.68	23.19	2291.74	-4043.79	9.24
0.9 Dead+1.6 Wind 120 deg - No Ice	57.49	40.68	23.19	2263.69	-3995.30	9.25
1.2 Dead+1.6 Wind 150 deg - No Ice	76.65	23.32	40.42	4007.27	-2308.18	10.71
0.9 Dead+1.6 Wind 150 deg - No Ice	57.49	23.32	40.42	3958.38	-2280.81	10.72
1.2 Dead+1.6 Wind 180 deg - No Ice	76.65	-0.02	46.70	4630.04	4.71	9.60
0.9 Dead+1.6 Wind 180 deg - No Ice	57.49	-0.02	46.70	4573.67	4.07	9.60
1.2 Dead+1.6 Wind 210 deg - No Ice	76.65	-23.35	40.45	4009.63	2317.01	5.91
0.9 Dead+1.6 Wind 210 deg - No Ice	57.49	-23.35	40.45	3960.71	2288.35	5.91
1.2 Dead+1.6 Wind 240 deg - No Ice	76.65	-40.71	23.22	2295.81	4050.96	0.36
0.9 Dead+1.6 Wind 240 deg - No Ice	57.49	-40.71	23.22	2267.70	4001.19	0.35
1.2 Dead+1.6 Wind 270 deg - No Ice	76.65	-46.86	-0.13	-19.58	4655.58	-5.25
0.9 Dead+1.6 Wind 270 deg - No Ice	57.49	-46.86	-0.13	-19.63	4598.66	-5.26
1.2 Dead+1.6 Wind 300 deg - No Ice	76.65	-40.58	-23.40	-2320.70	4033.34	-9.50
0.9 Dead+1.6 Wind 300 deg - No Ice	57.49	-40.58	-23.40	-2292.92	3983.83	-9.51

150 Ft Monopole Tower Structural Analysis
 Project Number 37517-0750.004.7805, Application 367137, Revision 0

Load Combination	Vertical	Shear _x	Shear _z	Overturing Moment, M _x	Overturing Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice						
1.2 Dead+1.6 Wind 330 deg	76.65	-23.50	-40.43	-4004.76	2340.94	-11.15
- No Ice						
0.9 Dead+1.6 Wind 330 deg	57.49	-23.50	-40.43	-3956.61	2311.93	-11.16
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	120.89	0.00	-0.00	12.87	23.04	0.00
1.2 Dead+1.0 Wind 0	120.89	0.00	-11.99	-1258.96	22.76	-3.54
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30	120.89	6.02	-10.36	-1083.56	-616.27	-2.04
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 60	120.89	10.39	-6.00	-622.74	-1079.03	-0.05
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90	120.89	11.99	-0.04	7.25	-1248.77	1.95
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120	120.89	10.41	5.94	640.73	-1082.04	3.43
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150	120.89	5.97	10.35	1108.95	-609.19	3.99
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180	120.89	-0.00	11.96	1279.18	23.64	3.54
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210	120.89	-5.98	10.36	1109.40	656.36	2.14
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	120.89	-10.41	5.95	641.50	1128.89	0.11
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	120.89	-11.99	-0.03	8.14	1295.18	-1.94
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	120.89	-10.39	-5.99	-621.98	1125.00	-3.49
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	120.89	-6.01	-10.35	-1083.12	661.91	-4.09
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	63.88	0.00	-10.03	-988.42	1.54	-0.06
Dead+Wind 30 deg - Service	63.88	5.04	-8.65	-851.17	-496.10	-0.01
Dead+Wind 60 deg - Service	63.88	8.69	-5.01	-493.43	-855.62	-0.02
Dead+Wind 90 deg - Service	63.88	10.02	-0.04	-4.24	-987.52	-0.03
Dead+Wind 120 deg - Service	63.88	8.70	4.96	488.25	-858.38	-0.02
Dead+Wind 150 deg - Service	63.88	4.99	8.65	853.02	-489.29	-0.01
Dead+Wind 180 deg - Service	63.88	-0.00	9.99	985.48	2.53	0.06
Dead+Wind 210 deg - Service	63.88	-5.00	8.65	853.51	494.21	0.11
Dead+Wind 240 deg - Service	63.88	-8.71	4.97	489.11	862.93	0.08
Dead+Wind 270 deg - Service	63.88	-10.02	-0.03	-3.25	991.58	0.03
Dead+Wind 300 deg - Service	63.88	-8.68	-5.00	-492.58	859.19	-0.04
Dead+Wind 330 deg - Service	63.88	-5.03	-8.65	-850.68	499.31	-0.09

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-63.88	0.00	0.00	63.88	-0.00	0.000%
2	0.02	-76.65	-46.87	-0.02	76.65	46.87	0.002%
3	0.02	-57.49	-46.87	-0.02	57.49	46.87	0.001%
4	23.54	-76.65	-40.45	-23.54	76.65	40.45	0.000%
5	23.54	-57.49	-40.45	-23.54	57.49	40.45	0.000%
6	40.61	-76.65	-23.44	-40.61	76.65	23.44	0.000%
7	40.61	-57.49	-23.44	-40.61	57.49	23.44	0.000%
8	46.86	-76.65	-0.18	-46.86	76.65	0.18	0.003%
9	46.86	-57.49	-0.18	-46.86	57.49	0.18	0.003%
10	40.68	-76.65	23.19	-40.68	76.65	-23.19	0.000%
11	40.68	-57.49	23.19	-40.68	57.49	-23.19	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
12	23.32	-76.65	40.42	-23.32	76.65	-40.42	0.000%
13	23.32	-57.49	40.42	-23.32	57.49	-40.42	0.000%
14	-0.02	-76.65	46.70	0.02	76.65	-46.70	0.002%
15	-0.02	-57.49	46.70	0.02	57.49	-46.70	0.001%
16	-23.35	-76.65	40.45	23.35	76.65	-40.45	0.000%
17	-23.35	-57.49	40.45	23.35	57.49	-40.45	0.000%
18	-40.71	-76.65	23.22	40.71	76.65	-23.22	0.000%
19	-40.71	-57.49	23.22	40.71	57.49	-23.22	0.000%
20	-46.86	-76.65	-0.13	46.86	76.65	0.13	0.003%
21	-46.86	-57.49	-0.13	46.86	57.49	0.13	0.003%
22	-40.58	-76.65	-23.40	40.58	76.65	23.40	0.000%
23	-40.58	-57.49	-23.40	40.58	57.49	23.40	0.000%
24	-23.50	-76.65	-40.43	23.50	76.65	40.43	0.000%
25	-23.50	-57.49	-40.43	23.50	57.49	40.43	0.000%
26	0.00	-120.89	0.00	-0.00	120.89	0.00	0.000%
27	0.00	-120.89	-11.99	-0.00	120.89	11.99	0.001%
28	6.02	-120.89	-10.36	-6.02	120.89	10.36	0.000%
29	10.39	-120.89	-6.00	-10.39	120.89	6.00	0.000%
30	11.99	-120.89	-0.04	-11.99	120.89	0.04	0.000%
31	10.41	-120.89	5.94	-10.41	120.89	-5.94	0.001%
32	5.97	-120.89	10.35	-5.97	120.89	-10.35	0.001%
33	-0.00	-120.89	11.96	0.00	120.89	-11.96	0.001%
34	-5.98	-120.89	10.36	5.98	120.89	-10.36	0.001%
35	-10.41	-120.89	5.95	10.41	120.89	-5.95	0.001%
36	-11.99	-120.89	-0.03	11.99	120.89	0.03	0.001%
37	-10.39	-120.89	-5.99	10.39	120.89	5.99	0.001%
38	-6.01	-120.89	-10.35	6.01	120.89	10.35	0.001%
39	0.00	-63.88	-10.03	-0.00	63.88	10.03	0.003%
40	5.04	-63.88	-8.65	-5.04	63.88	8.65	0.003%
41	8.69	-63.88	-5.01	-8.69	63.88	5.01	0.003%
42	10.03	-63.88	-0.04	-10.02	63.88	0.04	0.003%
43	8.70	-63.88	4.96	-8.70	63.88	-4.96	0.003%
44	4.99	-63.88	8.65	-4.99	63.88	-8.65	0.003%
45	-0.00	-63.88	9.99	0.00	63.88	-9.99	0.003%
46	-5.00	-63.88	8.65	5.00	63.88	-8.65	0.003%
47	-8.71	-63.88	4.97	8.71	63.88	-4.97	0.003%
48	-10.03	-63.88	-0.03	10.02	63.88	0.03	0.003%
49	-8.68	-63.88	-5.01	8.68	63.88	5.00	0.003%
50	-5.03	-63.88	-8.65	5.03	63.88	8.65	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	18	0.00002104	0.00013005
3	Yes	18	0.00000001	0.00010077
4	Yes	22	0.00000001	0.00009442
5	Yes	21	0.00000001	0.00013876
6	Yes	22	0.00000001	0.00009653
7	Yes	21	0.00000001	0.00014191
8	Yes	17	0.00004300	0.00009881
9	Yes	17	0.00002815	0.00007967
10	Yes	22	0.00000001	0.00009935
11	Yes	21	0.00000001	0.00014633
12	Yes	22	0.00000001	0.00009107
13	Yes	21	0.00000001	0.00013378
14	Yes	18	0.00002107	0.00013313
15	Yes	18	0.00000001	0.00010315
16	Yes	22	0.00000001	0.00009778
17	Yes	21	0.00000001	0.00014393
18	Yes	22	0.00000001	0.00009555
19	Yes	21	0.00000001	0.00014038
20	Yes	17	0.00004299	0.00010486
21	Yes	17	0.00002814	0.00008426
22	Yes	22	0.00000001	0.00009298
23	Yes	21	0.00000001	0.00013646

24	Yes	22	0.00000001	0.00010110
25	Yes	21	0.00000001	0.00014897
26	Yes	13	0.00000001	0.00004236
27	Yes	19	0.00000001	0.00008766
28	Yes	19	0.00000001	0.00011963
29	Yes	19	0.00000001	0.00012165
30	Yes	19	0.00000001	0.00008527
31	Yes	19	0.00000001	0.00012842
32	Yes	19	0.00000001	0.00012029
33	Yes	19	0.00000001	0.00008889
34	Yes	19	0.00000001	0.00013164
35	Yes	19	0.00000001	0.00012897
36	Yes	19	0.00000001	0.00008817
37	Yes	19	0.00000001	0.00012387
38	Yes	19	0.00000001	0.00013247
39	Yes	15	0.00014729	0.00004493
40	Yes	15	0.00014703	0.00012722
41	Yes	15	0.00014705	0.00012756
42	Yes	15	0.00014731	0.00004490
43	Yes	15	0.00014706	0.00012596
44	Yes	15	0.00014704	0.00012573
45	Yes	15	0.00014728	0.00004477
46	Yes	15	0.00014702	0.00012953
47	Yes	15	0.00014703	0.00012602
48	Yes	15	0.00014728	0.00004504
49	Yes	15	0.00014703	0.00012696
50	Yes	15	0.00014702	0.00013028

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 128.5	28.30	47	1.97	0.00
L2	128.5 - 109	20.05	47	1.60	0.00
L3	109 - 104.167	14.09	47	1.30	0.00
L4	104.167 - 100.92	12.81	47	1.22	0.00
L5	100.92 - 95.25	11.98	47	1.20	0.00
L6	95.25 - 80.5	10.59	47	1.14	0.00
L7	80.5 - 73.5833	7.40	47	0.92	0.00
L8	73.5833 - 72	6.13	47	0.83	0.00
L9	72 - 66.75	5.86	47	0.81	0.00
L10	66.75 - 48.25	5.00	47	0.74	0.00
L11	48.25 - 44.25	2.60	47	0.50	0.00
L12	44.25 - 43.0833	2.20	47	0.46	0.00
L13	43.0833 - 30	2.09	47	0.45	0.00
L14	34 - 23.75	1.33	47	0.35	0.00
L15	23.75 - 11	0.66	47	0.26	0.00
L16	11 - 6	0.15	47	0.13	0.00
L17	6 - 3.25	0.05	47	0.07	0.00
L18	3.25 - 0	0.01	47	0.04	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.0000	QS66512-2 w/ Mount Pipe	47	28.30	1.97	0.00	10310
147.0000	RRUS 11	47	27.10	1.92	0.00	10310
143.0000	VHLP2-23	47	25.50	1.84	0.00	7364
138.0000	LLPX310R-V1 w/ Mount Pipe	47	23.55	1.75	0.00	4295
120.0000	LNx-6515DS-A1M w/ Mount Pipe	47	17.27	1.48	0.00	2977
99.0000	(2) X7CQAP-465-VR0 w/ Mount Pipe	47	11.51	1.18	0.00	6068

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 128.5	132.69	20	9.26	0.02
L2	128.5 - 109	94.11	20	7.51	0.02
L3	109 - 104.167	66.12	20	6.13	0.02
L4	104.167 - 100.92	60.12	20	5.75	0.02
L5	100.92 - 95.25	56.26	20	5.62	0.02
L6	95.25 - 80.5	49.74	20	5.38	0.02
L7	80.5 - 73.5833	34.75	20	4.32	0.01
L8	73.5833 - 72	28.80	20	3.90	0.01
L9	72 - 66.75	27.52	20	3.81	0.01
L10	66.75 - 48.25	23.50	20	3.50	0.01
L11	48.25 - 44.25	12.20	20	2.34	0.01
L12	44.25 - 43.0833	10.32	20	2.14	0.01
L13	43.0833 - 30	9.80	20	2.09	0.01
L14	34 - 23.75	6.25	18	1.65	0.00
L15	23.75 - 11	3.10	18	1.22	0.00
L16	11 - 6	0.70	18	0.59	0.00
L17	6 - 3.25	0.22	18	0.33	0.00
L18	3.25 - 0	0.07	18	0.20	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.0000	QS66512-2 w/ Mount Pipe	20	132.69	9.26	0.03	2299
147.0000	RRUS 11	20	127.06	9.00	0.03	2299
143.0000	VHLP2-23	20	119.61	8.65	0.03	1642
138.0000	LLPX310R-V1 w/ Mount Pipe	20	110.47	8.23	0.02	956
120.0000	LNx-6515DS-A1M w/ Mount Pipe	20	81.05	6.94	0.02	653
99.0000	(2) X7CQAP-465-VR0 w/ Mount Pipe	20	54.02	5.55	0.02	1315

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	150 - 128.5 (1)	TP18.1463x15x0.2188	21.500	0.0000	0.0	12.630	-6.28	716.15	0.009
L2	128.5 - 109 (2)	TP21x18.1463x0.5837	19.500	0.0000	0.0	38.371	-12.33	1529.92	0.008
L3	109 - 104.167 (3)	TP21.7298x21x0.661	4.8333	0.0000	0.0	44.843	-13.38	1959.85	0.007
L4	104.167 - 100.92 (4)	TP22.2201x21.7298x1.59	3.2467	0.0000	0.0	105.97	-14.85	4632.85	0.003
L5	100.92 - 95.25 (5)	TP23.0763x22.2201x1.49	5.6700	0.0000	0.0	104.11	-19.36	4350.86	0.004
L6	95.25 - 80.5 (6)	TP25.3035x23.0763x0.89	14.750	0.0000	0.0	70.512	-24.35	3126.48	0.008
L7	80.5 - 73.5833 (7)	TP26.3479x25.3035x1.18	6.9167	0.0000	0.0	95.797	-27.43	3860.85	0.007
L8	73.5833 - 72 (8)	TP26.587x26.3479x1.169	1.5833	0.0000	0.0	95.724	-28.14	3860.07	0.007
L9	72 - 66.75 (9)	TP26.992x26.587x1.266	5.2500	0.0000	0.0	104.87	-30.72	4228.89	0.007
L10	66.75 - 48.25	TP29.9611x26.992x1.204	18.500	0.0000	0.0	111.50	-40.06	4944.24	0.008

150 Ft Monopole Tower Structural Analysis
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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L11	(10) 48.25 - 44.25	2 TP30.603x29.9611x1.587	0	0.0000	0.0	90 148.32	-42.73	5855.07	0.007
L12	(11) 44.25 -	6 TP30.7903x30.603x1.668	1.1667	0.0000	0.0	50 156.45	-43.55	6182.99	0.007
L13	(12) 43.0833 -	4 TP32.89x30.7903x1.5728	13.083	0.0000	0.0	20 155.34	-49.82	6195.76	0.008
L14	(13) 30 - 23.75	3 TP33.3525x29.1025x1.62	10.250	0.0000	0.0	90 152.67	-55.07	6130.65	0.009
L15	(14) 23.75 - 11	75 TP35.5039x33.3525x1.51	12.750	0.0000	0.0	50 166.10	-68.96	6743.53	0.010
L16	(15) 11 - 6 (16)	79 TP36.3476x35.5039x1.36	5.0000	0.0000	0.0	80 153.38	-72.48	7430.47	0.010
L17	(16) 6 - 3.25 (17)	15 TP36.8116x36.3476x1.49	2.7500	0.0000	0.0	10 169.79	-74.59	8096.73	0.009
L18	(17) 3.25 - 0 (18)	3 TP37.36x36.8116x1.1317	3.2500	0.0000	0.0	70 132.01	-76.63	6573.67	0.012
						70			

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	150 - 128.5 (1)	TP18.1463x15x0.2188	253.71	260.46	0.974	0.00	260.46	0.000
L2	128.5 - 109 (2)	TP21x18.1463x0.5837	614.62	623.56	0.986	0.00	623.56	0.000
L3	109 - 104.167 (3)	TP21.7298x21x0.661	725.43	822.10	0.882	0.00	822.10	0.000
L4	104.167 - 100.92 (4)	TP22.2201x21.7298x1.59 58	802.59	1821.11	0.441	0.00	1821.11	0.000
L5	100.92 - 95.25 (5)	TP23.0763x22.2201x1.49 85	958.54	1802.58	0.532	0.00	1802.58	0.000
L6	95.25 - 80.5 (6)	TP25.3035x23.0763x0.89 72	1415.29	1511.31	0.936	0.00	1511.31	0.000
L7	80.5 - 73.5833 (7)	TP26.3479x25.3035x1.18 22	1644.81	1905.60	0.863	0.00	1905.60	0.000
L8	73.5833 - 72 (8)	TP26.587x26.3479x1.169 6	1698.75	1926.03	0.882	0.00	1926.03	0.000
L9	72 - 66.75 (9)	TP26.992x26.587x1.266	1881.30	2129.18	0.884	0.00	2129.18	0.000
L10	66.75 - 48.25 (10)	TP29.9611x26.992x1.204 2	2567.37	2802.20	0.916	0.00	2802.20	0.000
L11	48.25 - 44.25 (11)	TP30.603x29.9611x1.587 6	2724.56	3307.52	0.824	0.00	3307.52	0.000
L12	44.25 - 43.0833 (12)	TP30.7903x30.603x1.668 4	2771.03	3497.01	0.792	0.00	3497.01	0.000
L13	43.0833 - 30 (13)	TP32.89x30.7903x1.5728	3141.81	3712.30	0.846	0.00	3712.30	0.000
L14	30 - 23.75 (14)	TP33.3525x29.1025x1.62 75	3310.40	3473.50	0.953	0.00	3473.50	0.000
L15	23.75 - 11 (15)	TP35.5039x33.3525x1.51 79	4147.98	4504.92	0.921	0.00	4504.92	0.000
L16	11 - 6 (16)	TP36.3476x35.5039x1.36 15	4377.07	5138.14	0.852	0.00	5138.14	0.000
L17	6 - 3.25 (17)	TP36.8116x36.3476x1.49 3	4504.49	5633.86	0.800	0.00	5633.86	0.000
L18	3.25 - 0 (18)	TP37.36x36.8116x1.1317	4656.29	4742.12	0.982	0.00	4742.12	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 128.5 (1)	TP18.1463x15x0.2188	13.94	358.08	0.039	0.36	528.12	0.001
L2	128.5 - 109 (2)	TP21x18.1463x0.5837	22.45	764.96	0.029	0.80	1264.39	0.001
L3	109 - 104.167 (3)	TP21.7298x21x0.661	23.41	979.92	0.024	0.97	1666.95	0.001
L4	104.167 - 100.92 (4)	TP22.2201x21.7298x1.59 58	24.12	2316.42	0.010	1.08	3692.63	0.000
L5	100.92 - 95.25 (5)	TP23.0763x22.2201x1.49 85	29.48	2175.43	0.014	0.98	3655.08	0.000
L6	95.25 - 80.5 (6)	TP25.3035x23.0763x0.89 72	32.46	1563.24	0.021	1.56	3064.46	0.001
L7	80.5 - 73.5833 (7)	TP26.3479x25.3035x1.18 22	33.91	1930.43	0.018	1.84	3863.95	0.000
L8	73.5833 - 72 (8)	TP26.587x26.3479x1.169 6	34.24	1930.04	0.018	1.91	3905.39	0.000
L9	72 - 66.75 (9)	TP26.992x26.587x1.266	35.31	2114.45	0.017	2.13	4317.31	0.000
L10	66.75 - 48.25 (10)	TP29.9611x26.992x1.204 2	38.88	2472.12	0.016	2.93	5681.98	0.001
L11	48.25 - 44.25 (11)	TP30.603x29.9611x1.587 6	39.71	2927.54	0.014	0.36	6706.61	0.000
L12	44.25 - 43.0833 (12)	TP30.7903x30.603x1.668 4	39.95	3091.49	0.013	0.36	7090.85	0.000
L13	43.0833 - 30 (13)	TP32.89x30.7903x1.5728	41.69	3097.88	0.013	0.36	7527.39	0.000
L14	30 - 23.75 (14)	TP33.3525x29.1025x1.62 75	42.77	3110.77	0.014	0.36	7043.18	0.000
L15	23.75 - 11 (15)	TP35.5039x33.3525x1.51 79	45.50	3371.76	0.013	0.36	9134.58	0.000
L16	11 - 6 (16)	TP36.3476x35.5039x1.36 15	46.15	3715.24	0.012	0.36	10418.58	0.000
L17	6 - 3.25 (17)	TP36.8116x36.3476x1.49 3	46.53	4048.36	0.011	0.36	11423.67	0.000
L18	3.25 - 0 (18)	TP37.36x36.8116x1.1317	46.91	3286.84	0.014	0.36	9615.50	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	150 - 128.5 (1)	0.009	0.974	0.000	0.039	0.001	0.984	1.000	4.8.2 ✓
L2	128.5 - 109 (2)	0.008	0.986	0.000	0.029	0.001	0.995	1.000	4.8.2 ✓
L3	109 - 104.167 (3)	0.007	0.882	0.000	0.024	0.001	0.890	1.000	4.8.2 ✓
L4	104.167 - 100.92 (4)	0.003	0.441	0.000	0.010	0.000	0.444	1.000	4.8.2 ✓
L5	100.92 - 95.25 (5)	0.004	0.532	0.000	0.014	0.000	0.536	1.000	4.8.2 ✓
L6	95.25 - 80.5 (6)	0.008	0.936	0.000	0.021	0.001	0.945	1.000	4.8.2 ✓
L7	80.5 - 73.5833 (7)	0.007	0.863	0.000	0.018	0.000	0.871	1.000	4.8.2 ✓
L8	73.5833 - 72 (8)	0.007	0.882	0.000	0.018	0.000	0.890	1.000	4.8.2 ✓
L9	72 - 66.75 (9)	0.007	0.884	0.000	0.017	0.000	0.891	1.000	4.8.2 ✓

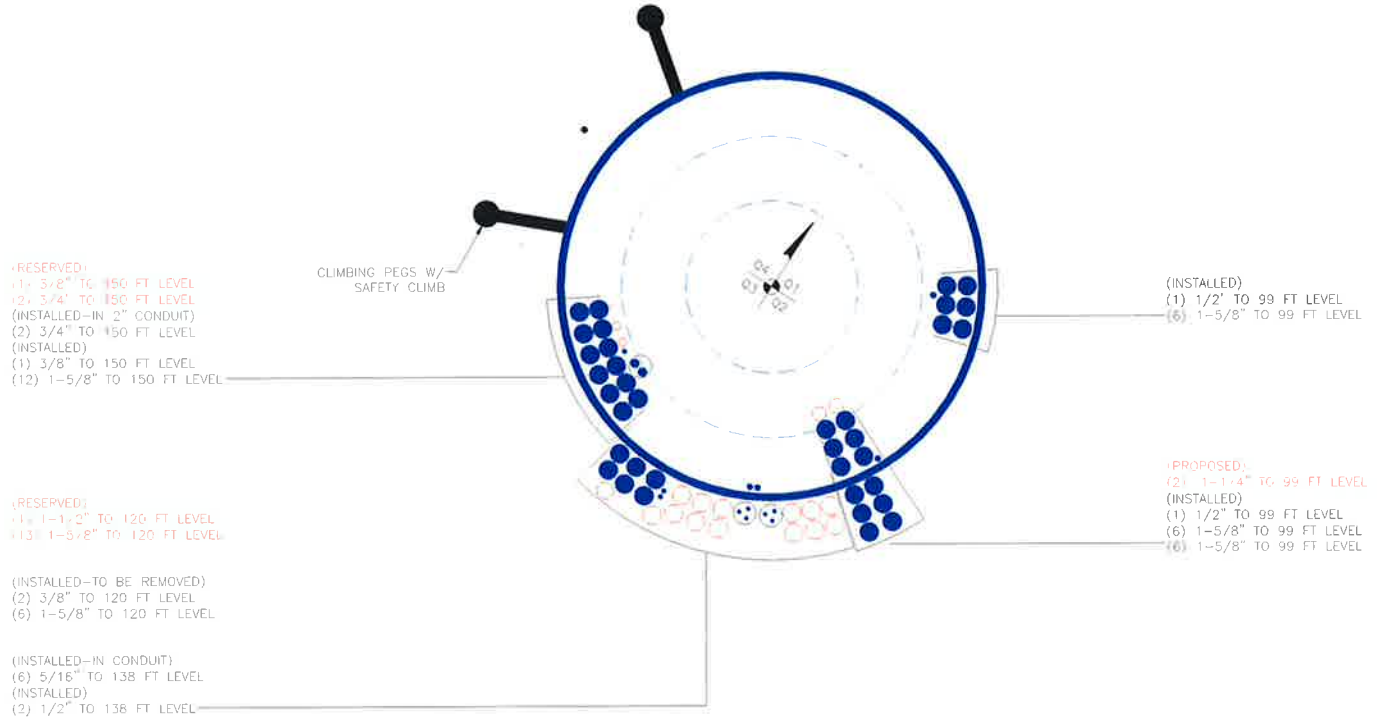
150 Ft Monopole Tower Structural Analysis
 Project Number 37517-0750.004.7805, Application 367137, Revision 0

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
L10	66.75 - 48.25 (10)	0.008	0.916	0.000	0.016	0.001	0.925	1.000	4.8.2 ✓
L11	48.25 - 44.25 (11)	0.007	0.824	0.000	0.014	0.000	0.831	1.000	4.8.2 ✓
L12	44.25 - 43.0833 (12)	0.007	0.792	0.000	0.013	0.000	0.800	1.000	4.8.2 ✓
L13	43.0833 - 30 (13)	0.008	0.846	0.000	0.013	0.000	0.855	1.000	4.8.2 ✓
L14	30 - 23.75 (14)	0.009	0.953	0.000	0.014	0.000	0.962	1.000	4.8.2 ✓
L15	23.75 - 11 (15)	0.010	0.921	0.000	0.013	0.000	0.931	1.000	4.8.2 ✓
L16	11 - 6 (16)	0.010	0.852	0.000	0.012	0.000	0.862	1.000	4.8.2 ✓
L17	6 - 3.25 (17)	0.009	0.800	0.000	0.011	0.000	0.809	1.000	4.8.2 ✓
L18	3.25 - 0 (18)	0.012	0.982	0.000	0.014	0.000	0.994	1.000	4.8.2 ✓

Section Capacity Table

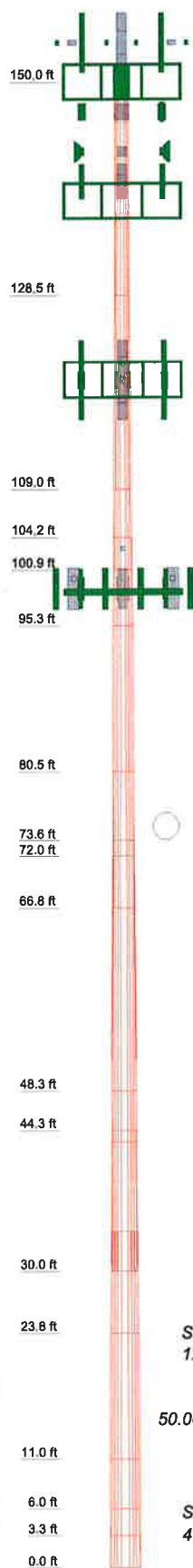
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	150 - 128.5	Pole	TP18.1463x15x0.2188	1	-6.28	716.15	98.4	Pass	
L2	128.5 - 109	Pole	TP21x18.1463x0.5837	2	-12.33	1529.92	99.5	Pass	
L3	109 - 104.167	Pole	TP21.7298x21x0.661	3	-13.38	1959.85	89.0	Pass	
L4	104.167 - 100.92	Pole	TP22.2201x21.7298x1.5958	4	-14.85	4632.85	44.4	Pass	
L5	100.92 - 95.25	Pole	TP23.0763x22.2201x1.4985	5	-19.36	4350.86	53.6	Pass	
L6	95.25 - 80.5	Pole	TP25.3035x23.0763x0.8972	6	-24.35	3126.48	94.5	Pass	
L7	80.5 - 73.5833	Pole	TP26.3479x25.3035x1.1822	7	-27.43	3860.85	87.1	Pass	
L8	73.5833 - 72	Pole	TP26.587x26.3479x1.1696	8	-28.14	3860.07	89.0	Pass	
L9	72 - 66.75	Pole	TP26.992x26.587x1.266	9	-30.72	4228.89	89.1	Pass	
L10	66.75 - 48.25	Pole	TP29.9611x26.992x1.2042	10	-40.06	4944.24	92.5	Pass	
L11	48.25 - 44.25	Pole	TP30.603x29.9611x1.5876	11	-42.73	5855.07	83.1	Pass	
L12	44.25 - 43.0833	Pole	TP30.7903x30.603x1.6684	12	-43.55	6182.99	80.0	Pass	
L13	43.0833 - 30	Pole	TP32.89x30.7903x1.5728	13	-49.82	6195.76	85.5	Pass	
L14	30 - 23.75	Pole	TP33.3525x29.1025x1.6275	14	-55.07	6130.65	96.2	Pass	
L15	23.75 - 11	Pole	TP35.5039x33.3525x1.5179	15	-68.96	6743.53	93.1	Pass	
L16	11 - 6	Pole	TP36.3476x35.5039x1.3615	16	-72.48	7430.47	86.2	Pass	
L17	6 - 3.25	Pole	TP36.8116x36.3476x1.493	17	-74.59	8096.73	80.9	Pass	
L18	3.25 - 0	Pole	TP37.36x36.8116x1.1317	18	-76.63	6573.67	99.4	Pass	
							Summary		
							Pole (L2)	99.5	Pass
							RATING =	99.5	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Length (ft)	21.5000	19.5000	5.6700	3.2467	4.8333	14.7500	5.2500	5.8333	6.9167	18.5000	1.1667	0.0000	13.0833	10.2500	12.7500	3.2500	7.5000	5.0000	0.0000	0.0000	
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
Thickness (in)	0.2188	0.5837	1.4985	1.5958	0.6610	0.8972	1.2660	1.6861	1.1822	1.2042	1.6666	1.6876	1.5728	1.6275	1.5179	1.1317	4.9301	3.615	0.0000	0.0000	
Socket Length (ft)	15.0000	18.1463	22.2200	21.7298	1.0000	23.0763	26.5935	34.7955	30.3035	26.9920	30.6030	30.6111	30.7903	29.1025	33.3525	33.3525	35.5039	35.5039	35.5039	35.5039	
Top Dia (in)	18.1463	21.0000	23.0763	22.2200	21.7298	25.3035	26.9920	34.7955	30.3035	26.9920	30.6030	30.6111	30.7903	29.1025	33.3525	33.3525	35.5039	35.5039	35.5039	35.5039	
Bot Dia (in)	18.1463	21.0000	23.0763	22.2200	21.7298	25.3035	26.9920	34.7955	30.3035	26.9920	30.6030	30.6111	30.7903	29.1025	33.3525	33.3525	35.5039	35.5039	35.5039	35.5039	
Grade	A572-50	Reinf 35.16 ksi	Reinf 36.85 ksi	Reinf 38.54 ksi	Reinf 39.10 ksi	Reinf 35.56 ksi	Reinf 35.54 ksi	Reinf 35.54 ksi	Reinf 39.10 ksi	Reinf 35.17 ksi	Reinf 35.41 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi	Reinf 35.17 ksi	Reinf 35.41 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi	Reinf 35.80 ksi
Weight (K)	0.8	2.4	2.0	1.2	0.7	3.4	1.9	0.5	2.2	6.7	0.6	2.0	6.8	5.4	7.0	1.4	1.6	2.6	0.0	0.0	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
QS66512-2 w/ Mount Pipe	150	VHLP2-23	138
QS66512-2 w/ Mount Pipe	150	VHLP2-18	138
QS66512-2 w/ Mount Pipe	150	LNx-6515DS-A1M w/ Mount Pipe	120
(2) TPX-070821	150	RRUS 11 B12	120
(2) TPX-070821	150	RRUS 11 B12	120
(2) TPX-070821	150	RRUS 11 B12	120
RRUS 32	150	AIR -32 B2A/B66AA w/ Mount Pipe	120
RRUS 32	150	AIR -32 B2A/B66AA w/ Mount Pipe	120
RRUS 32	150	AIR -32 B2A/B66AA w/ Mount Pipe	120
RRUS 32 B2	150	AIR 21 B2A/B4P w/ Mount Pipe	120
RRUS 32 B2	150	AIR 21 B2A/B4P w/ Mount Pipe	120
RRUS 32 B2	150	AIR 21 B2A/B4P w/ Mount Pipe	120
782 10253	150	KRY 112 144/1	120
782 10253	150	KRY 112 144/1	120
782 10253	150	KRY 112 144/1	120
DC6-48-60-18-8F	150	Platform Mount [LP 301-1]	120
P65-16-XLH-RR w/ Mount Pipe	150	LNx-6515DS-A1M w/ Mount Pipe	120
P65-16-XLH-RR w/ Mount Pipe	150	LNx-6515DS-A1M w/ Mount Pipe	120
P65-16-XLH-RR w/ Mount Pipe	150	(2) X7CQAP-465-VR0 w/ Mount Pipe	99
7770.00 w/ Mount Pipe	150	B13 RRH 4X30	99
7770.00 w/ Mount Pipe	150	B13 RRH 4X30	99
7770.00 w/ Mount Pipe	150	B13 RRH 4X30	99
TT19-08BP111-001	150	B25 RRH2x60 PCS	99
TT19-08BP111-001	150	B25 RRH2x60 PCS	99
TT19-08BP111-001	150	B25 RRH2x60 PCS	99
Platform Mount (LP 101-1)	150	B66A RRH4X45	99
Side Arm Mount [SO 201-3]	150	B66A RRH4X45	99
Top Hat 20" Diameter x 3'-6" Tall	150	B66A RRH4X45	99
RRUS 11	147	RC2DC-3315-PF-48	99
RRUS 11	147	RC2DC-3315-PF-48	99
RRUS 11	147	BXA-171063/8CF w/ Mount Pipe	99
TME-DC6-48-60-18-8F	147	BXA-171063/8CF w/ Mount Pipe	99
Pipe Mount [PM 601-3]	147	BXA-171063/8CF w/ Mount Pipe	99
LLPX310R-V1 w/ Mount Pipe	138	BXA-70063/4CF w/ Mount Pipe	99
LLPX310R-V1 w/ Mount Pipe	138	BXA-70063/4CF w/ Mount Pipe	99
LLPX310R-V1 w/ Mount Pipe	138	BXA-70063/4CF w/ Mount Pipe	99
RAS SPI-2213 RRH	138	GPS_A	99
RAS SPI-2213 RRH	138	(2) FD9R6004/2C-3L	99
RAS SPI-2213 RRH	138	(2) FD9R6004/2C-3L	99
Horizon Compact	138	(2) FD9R6004/2C-3L	99
Horizon Compact	138	T-Arm Mount [TA 602-3]	99
CW JUNCTION BOX	138	(2) X7CQAP-465-VR0 w/ Mount Pipe	99
Platform Mount [LP 713-1]	138	(2) X7CQAP-465-VR0 w/ Mount Pipe	99

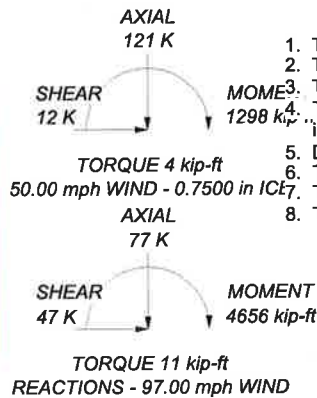
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	Reinf 34.81 ksi	35 ksi	44 ksi
Reinf 35.16 ksi	35 ksi	44 ksi	Reinf 34.85 ksi	35 ksi	44 ksi
Reinf 38.54 ksi	39 ksi	49 ksi	Reinf 35.17 ksi	35 ksi	44 ksi
Reinf 38.55 ksi	39 ksi	49 ksi	Reinf 35.41 ksi	35 ksi	45 ksi
Reinf 36.85 ksi	37 ksi	47 ksi	Reinf 35.80 ksi	36 ksi	45 ksi
Reinf 39.10 ksi	39 ksi	49 ksi	Reinf 42.72 ksi	43 ksi	54 ksi
Reinf 35.54 ksi	36 ksi	45 ksi	Reinf 42.05 ksi	42 ksi	53 ksi
Reinf 35.56 ksi	36 ksi	45 ksi	Reinf 43.91 ksi	44 ksi	55 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 99.5%

ALL REACTIONS ARE FACTORED



Paul J Ford and Company
 250 E. Broad Street, Suite 600
 Columbus, OH 43215
 Phone: 614.221.6679
 FAX: 614.448.4105

Job: **150' Monopole / Bridgeport, CT**
 Project: **BU 841268 / PJF# 37517-0750**
 Client: **Crown Castle** Drawn by: **Seth Tschanen** App'd:
 Code: **TIA-222-G** Date: **04/11/17** Scale: **N**
 Path: _____ Dwg No. _____

v4.4 - Effective 7-12-13

Asymmetric Anchor Rod Analysis

Moment =	4656	k-ft	TIA Ref.	G	Location =	Base Plate
Axial =	77.0	kips	ASIF =	N/A	η =	0.50 for BP, Rev. G Sect. 4.9.9
Shear =	47.0	kips	Max Ratio =	100.0%	Threads =	N/A for FP, Rev. G
Anchor Qty =	20					

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in ²	Area, in ²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	37.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
2	2.250	#18J A615 Gr 75	75	100	53.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
3	2.250	#18J A615 Gr 75	75	100	127.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
4	2.250	#18J A615 Gr 75	75	100	143.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
5	2.250	#18J A615 Gr 75	75	100	217.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
6	2.250	#18J A615 Gr 75	75	100	233.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
7	2.250	#18J A615 Gr 75	75	100	307.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
8	2.250	#18J A615 Gr 75	75	100	323.0	43.00	0.00	3.98	242.85	235.07	247.60	0.00	260.00	95.2%
9	2.500	Dywidag (150 ksi)	127.7	150	75.0	42.74	0.00	5.35	324.44	313.98	330.82	392.46	392.46	84.3%
10	2.500	Dywidag (150 ksi)	127.7	150	165.0	42.74	0.00	5.35	324.44	313.98	330.82	392.46	392.46	84.3%
11	2.500	Dywidag (150 ksi)	127.7	150	255.0	42.74	0.00	5.35	324.44	313.98	330.82	392.46	392.46	84.3%
12	2.500	Dywidag (150 ksi)	127.7	150	345.0	42.74	0.00	5.35	324.44	313.98	330.82	392.46	392.46	84.3%
13	2.250	A193 Gr B7	105	125	0.0	49.00	0.00	3.98	275.92	268.14	280.66	0.00	325.00	86.4%
14	2.250	A193 Gr B7	105	125	90.0	49.00	0.00	3.98	275.92	268.14	280.66	0.00	325.00	86.4%
15	2.250	A193 Gr B7	105	125	180.0	49.00	0.00	3.98	275.92	268.14	280.66	0.00	325.00	86.4%
16	2.250	A193 Gr B7	105	125	270.0	49.00	0.00	3.98	275.92	268.14	280.66	0.00	325.00	86.4%
17	1.750	A193 Gr B7	105	125	45.0	49.86	0.00	2.41	169.80	165.10	172.67	0.00	190.00	90.9%
18	1.750	A193 Gr B7	105	125	135.0	49.86	0.00	2.41	169.80	165.10	172.67	0.00	190.00	90.9%
19	1.750	A193 Gr B7	105	125	225.0	49.86	0.00	2.41	169.80	165.10	172.67	0.00	190.00	90.9%
20	1.750	A193 Gr B7	105	125	315.0	49.86	0.00	2.41	169.80	165.10	172.67	0.00	190.00	90.9%

78.76

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F / G

- Assumptions:**
- 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
 - 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
 - 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding $(1) \times (\text{Rod Diameter})$

Site Data

BU#: 841288		
Site Name: Bridgeport North		
App #:		
Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, F_y :	75	ksi
Strength, F_u :	100	ksi
Bolt Circle:	43	in
Anchor Spacing:	6	in

Base Reactions		
TIA Revision:	G	
Factored Moment, M_u :	1712.5	ft-kips
Factored Axial, P_u :	31.1	kips
Factored Shear, V_u :	19	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Results

TIA G --> Max Rod ($C_u + V_u/\eta$): 247.6 Kips
 Axial Design Strength, $\Phi * F_u * A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 95.2% **Pass**

Plate Data

W=Side:	41	in
Thick:	2.75	in
Grade:	50	ksi
Clip Distance:		in

Base Plate Results

Base Plate Stress: 32.2 ksi
 PL Design Bending Strength, $\Phi * F_y$: 45.0 ksi
 Base Plate Stress Ratio: 71.5% **Pass**

Flexural Check

PL Ref. Data

Yield Line (in):	20.62
Max PL Length:	20.62

Stiffener Data (Welding at both sides)

Configuration:	Unstiffened
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

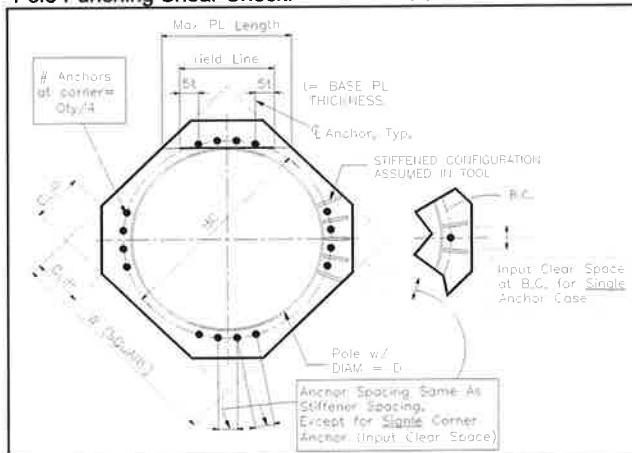
N/A - Unstiffened

Stiffener Results

Horizontal Weld : N/A
 Vertical Weld: N/A
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: N/A
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: N/A
 Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A



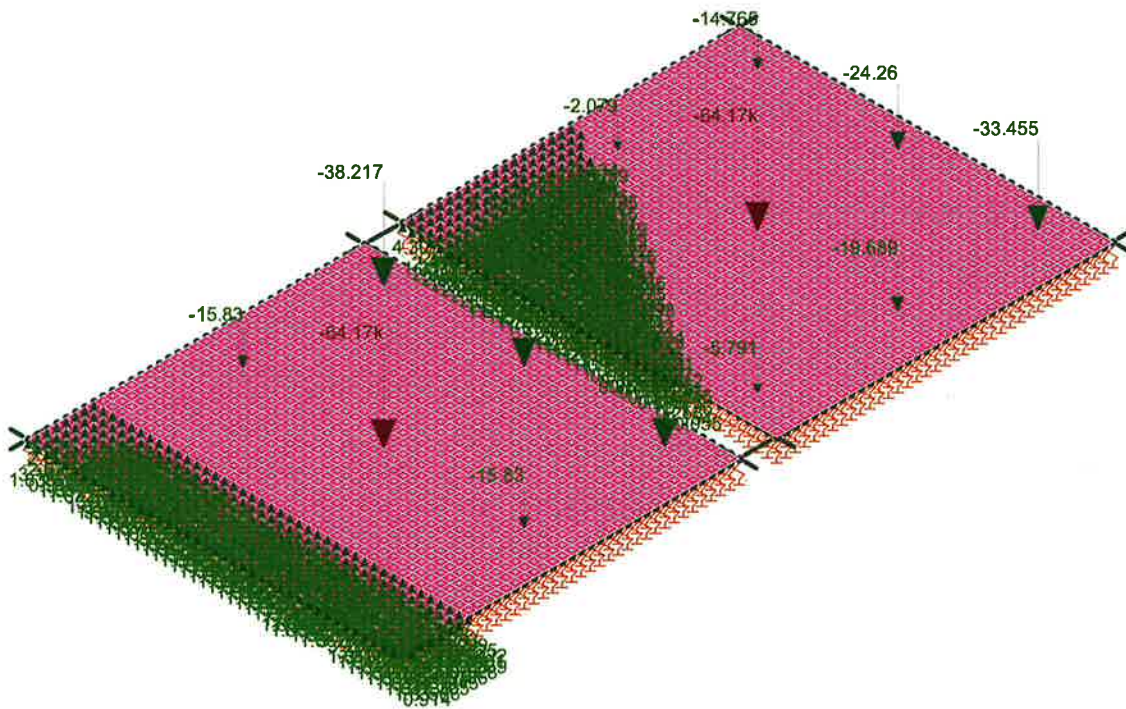
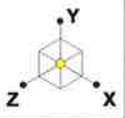
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

(W) RISA-3D Plate Forces:		(L) RISA-3D Plate Forces:	
Comp (1.2)	Tension (0.9)	Comp (1.2)	Tension (0.9)
46.987	25.532	59.395	31.948
47.533	25.499	60.694	31.135
48.085	25.314	61.868	30.346
48.77	24.951	63.142	29.449
49.69	24.398	64.695	28.308
50.944	23.633	66.692	26.752
52.634	22.583	69.333	24.56
54.894	21.111	72.913	21.431
57.923	19.011	77.891	16.905
62.035	15.988	85.021	10.229
67.724	11.583	95.566	0.132
75.773	5.041	111.692	-15.574
87.409	-4.916	137.019	-40.553
104.503	-20.483	177.614	-80.926
129.755	-45.328	240.493	-143.782
166.279	-85.581	326.503	-230.001
215.697	-148.335	418.528	-322.388
274.301	-234.475	480.639	-384.785
329.961	-326.807	480.639	-384.785
364.733	-389.177	418.528	-322.388
364.733	-389.177	326.503	-230.001
329.961	-326.807	240.493	-143.782
274.301	-234.475	177.614	-80.926
215.697	-148.335	137.019	-40.553
166.279	-85.581	111.692	-15.574
129.755	-45.328	95.566	0.132
104.503	-20.483	85.021	10.229
87.409	-4.916	77.891	16.905
75.773	5.041	72.913	21.431
67.724	11.583	69.333	24.56
62.035	15.988	66.692	26.752
57.923	19.011	64.695	28.308
54.894	21.111	63.142	29.449
52.634	22.583	61.868	30.346
50.944	23.633	60.694	31.135
49.69	24.398	59.395	31.948
48.77	24.951		
48.085	25.314		
47.533	25.499		
46.987	25.532		
4671.26	-2020.916	5339.396	-1933.628
2335.63	-1010.458	2669.698	-966.814

Anchor Spring Constant		Soil Weight	
Ag =	2.66 in ²	Height Above Grade =	ft
E =	29000 ksi	Soil Unit Weight =	pcf
Lu =	21.83333 ft	Apply Soil Weight =	Center Point
k = An * E / Lu = 294.43 k/in		Volume =	0.00 ft ³
Soil Spring Constant		Weight =	0.00 kips
Subgrade Modulus =	3000 lb/in ³	Weight per Sq. Ft =	0 psf
k =	5184 k/ft ³		

Foundation Weight		Pad/Mat Analysis	
Number Sides =	Round	Width	Length
Pier Width/Diameter =	ft	Thickness	4.83333 4.83333 ft
Pier Height =	ft	Width	20 18 ft
Pad Thickness =	6.83333 ft	f'c	3 3 ksi
Pad Width =	20 ft	Top Bar Quantity	11 11
Pad Length =	18 ft	Top Bar Size #	10 10
Concrete Density =	150 pcf	Top Clear Spacing	3 3 in
Volume =	0 ft ³	Bot Bar Quantity	11 11
Weight =	0 kips	Bot Bar Size #	10 10
Applied Reactions for RISA 3D		Bot Clear Spacing	3 3 in
TNX Moment =	4656 k-ft	As,min	25.0559827 22.55038 in ²
TNX Axial =	77 kips	As, compression	13.97 13.97 in ²
TNX Shear =	47 kips	d,compression	53.09496 53.09496 in
Total Unfactored Axial =	64.17 kips	a	16.4 18.3 in
Side Bending Moment =	4977.167 k-ft	c	22.4 22.0 in
Corner Bending Moment (Mx) =	3699.5 k-ft	c/d	0.423 0.414
Corner Bending Moment (Mz) =	3329.5 k-ft	Ø	0.825 0.837
Tension from Anchors (Tension side only)		ØMn,compression	3020 3060 k-ft
Load (kips)	Distance to Center (ft)	Mu	1010.5 966.8 k-ft
1	38.217 7.75	Ratio	33.5% 31.6%
2	38.537 7.75	As, Tension	13.97 13.97 in ²
3	38.217 7.75	d,tension	53.09496 53.09496 in
4		a	16.4 18.3 in
5		c	22.4 22.0 in
6		c/d	0.423 0.414
Pole/Pier Diameter =	60 inches	Ø	0.825 0.837
Bending Moment = Σ P*(D-d) =	7243.173 k-in	ØMn,tension	3020 3060 k-ft
Bending Moment (Tension) =	603.6 k-ft	Mu	2335.6 2669.7 k-ft
Anchor Capacity		Ratio	77.3% 87.2%
Max Tension from RISA =	38.537 kips	Bearing Check	
Anchor Type =	Rock Anchor	Max Bearing Load =	4.773 kip
Fu =	150 ksi	Plate Width =	0.5 ft
An =	2.6 in ²	Plate Length =	0.5 ft
Capacity (Kips) = 0.8 * Fu * An =	312	Ult. Bearing Capacity =	30 ksf
Ratio = 38.537 / 312 =	12.4%	Bearing Pressure =	19.092 ksf
		Ratio =	84.9%

(per linear ft of plate)
(Divide by 2 for a 0.5 ft plate)



Loads: BLC 1, Dead
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company

SJT/KAT

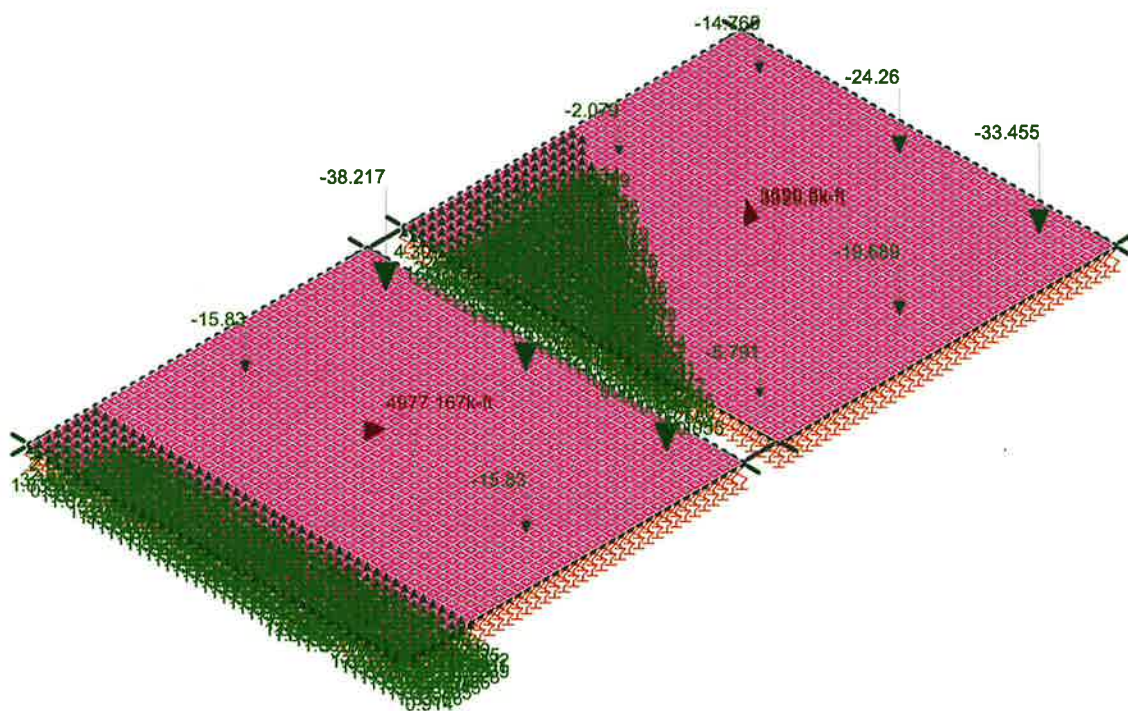
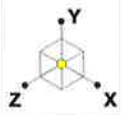
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BU 841288 / Bridgeport North

SK - 1

Apr 4, 2017 at 9:07 AM

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Loads: BLC 2, Moment
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company

SJT/KAT

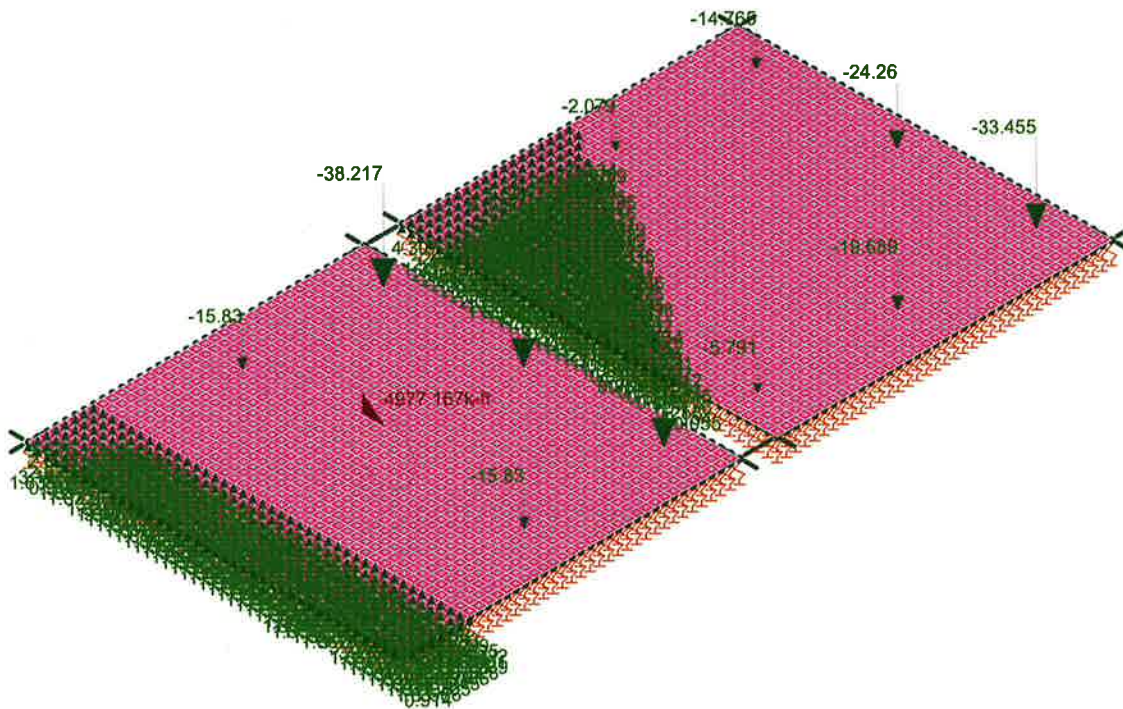
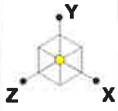
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BU 841288 / Bridgeport North

SK - 2

Apr 4, 2017 at 9:07 AM

37517-0750.004.7805 Composite ...



Loads: BLC 3, Moment side 2
Y-direction Reaction Units are k and k-ft

Paul J. Ford and Company

SJT/KAT

37517-0750.004.7805

BU 841288 / Bridgeport North

SK - 3

Apr 4, 2017 at 9:07 AM

37517-0750.004.7805 Composite ...



(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISACONNECTION Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	None
Aluminum Code	None - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parame Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8



(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Basic Load Cases

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(P...
1 Dead	None		-1		2			
2 Moment	None				3			
3 Moment side 2	None				1			

Load Combinations

Description	So...P...	S...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...
1 1.2 Dead + moment	Yes	Y	1	1.2	2	1						
2 0.9 Dead+moment	Yes	Y	1	.9	2	1						
3 1.2 Dead + moment	Yes	Y	1	1.2	3	1						
4 0.9 Dead+moment	Yes	Y	1	.9	3	1						

Joint Loads and Enforced Displacements (BLC 1 : Dead)

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1 SIDE	L	Y	-64.17
2 CORNER	L	Y	-64.17

Joint Loads and Enforced Displacements (BLC 2 : Moment)

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1 SIDE	L	Mx	4977.167
2 CORNER	L	Mx	3699.5
3 CORNER	L	Mz	3329.5

Joint Loads and Enforced Displacements (BLC 3 : Moment side 2)

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1 SIDE	L	Mz	4977.167



Company : Paul J. Ford and Company
 Designer : SJT/KAT
 Job Number : 37517-0750.004.7805
 Model Name : BU 841288 / Bridgeport North

Apr 4, 2017
 9:07 AM
 Checked By: _____

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (1/E...)	Density[k/ft...	fc[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	.145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	.145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	.11	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	.11	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	.11	4	.75	60	60

MODIFICATION OF AN EXISTING 150' MONOPOLE TOWER MAPPING CCI DOC ID #4710143 BU #841288; BRIDGEPORT NORTH

205 KAEICHELE PLACE
BRIDGEPORT, CONNECTICUT 06606
FAIRFIELD COUNTY
LAT: 41° 13' 24.04"; LONG: -73° 13' 0.38"
APP: 374828 REV. 2; WO: 1368682

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCastle.COM
PH: (618) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCastle.COM
PH: (680) 209-0104
ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

WIND DESIGN DATA

REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	125 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	97 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
	kzt
	1.0

THIS PROJECT INCLUDES THE FOLLOWING ITEMS

REMOVE EXISTING DYWIDAG SHAFT REINFORCING
REMOVE TERMINATION BOLTS FOR EXISTING REINFORCING
SHAFT REINFORCING
INSTALL NEW CLIMBING RAIL SYSTEM
REMOVE EXISTING STIFFENERS
FIELD WELDED STIFFENERS
FIELD WELDED ANCHOR BRACKETS
POST INSTALLED ANCHOR RODS
HIGH STRENGTH GROUT
PAINT MODIFICATIONS TO MATCH EXISTING POLE

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
T-2	MI CHECKLIST
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-2C	AJAX ONESIDE™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	SHAFT REINFORCING SECTIONS
S-5	BASE PLATE DETAILS
S-6	MISC DETAILS

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT RIGGING@PJFWEB.COM.

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1358541

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

MODIFICATION OF AN EXISTING 150'
MONOPOLE
BU #841288; BRIDGEPORT NORTH
BRIDGEPORT, CONNECTICUT

PJF
PAUL J. FORD
& COMPANY
250 E Broad St., Ste 600, Columbus, OH 43215
www.pjf.com
Phone 614.221.6678
PH: (680) 209-0104

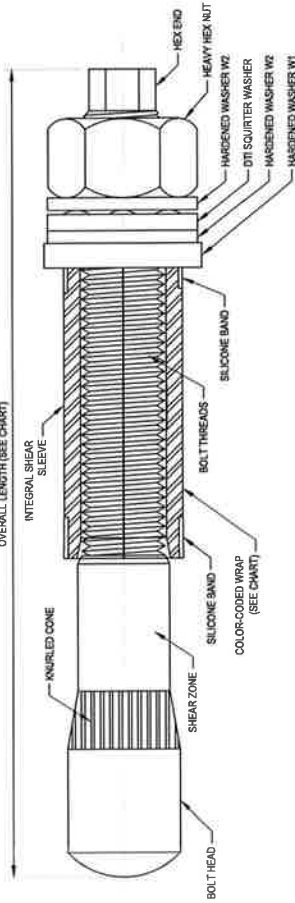
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534

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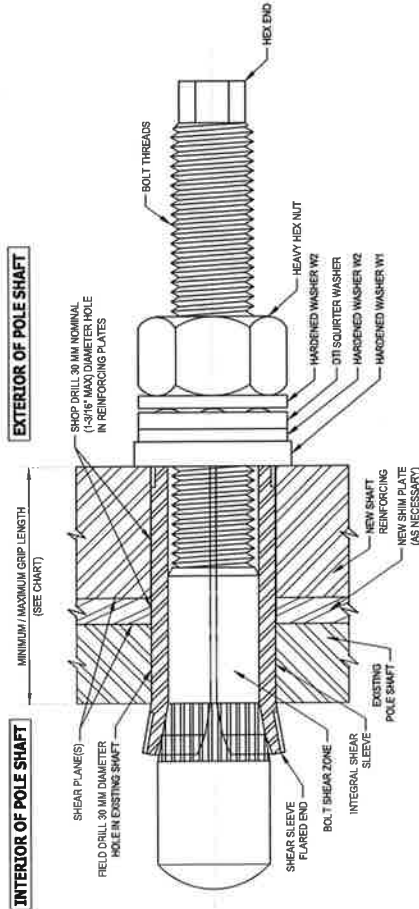
PROJECT No: 37517-0750.003.7700
DRAWN BY: B.M.S.
DESIGNED BY: S.J.T.
CHECKED BY:
DATE: 3-31-2017

TITLE SHEET

T-1



PRE-INSTALLED FORGBoIt™ ASSEMBLY DETAIL 1 S-2A



INSTALLED FORGBoIt™ ASSEMBLY DETAIL 2 S-2A

FORGBoIt®		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)			
GROUP A	FORGBoIt® Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Color Code
FORGBoIt® A325 - PC8.8	135	5.31	1.3	3/8" to 1"	RED
	160	6.30	1.6	3/4" to 1-1/2"	GREEN
	195	7.68	1.9	1-1/4" to 2-1/4"	BLUE
	260	10.24	2.6	2" to 3-1/2"	YELLOW
	365	14.37	3.6	3-1/2" to 5-1/2"	ORANGE
	440	17.32	4.3	5-1/2" to 8-1/2"	BLACK
DTI Note	Each Group A (A325/PC8.8) FORGBoIt® assembly shall have a 'Squirtler' DTI that is compatible with a M20-PC8.8 bolt.				

FOLLOW ALL MANUFACTURER /DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

INSTALLATION NOTES:

1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

BOLT HOLE NOTES:

1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.

**AISC GROUP A MATERIAL: ASTM A325 AND PC8.8
(Fu = 120 KSI MIN TENSILE STRESS)**

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

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MODIFICATION OF AN EXISTING 150' MONOPOLE
 BU #841288; BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

PROJECT No: 37574750.003.7700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.J.T.
 CHECKED BY:
 DATE: 3-31-2017

**FORGBoIt™
 DETAILS**

S-2A

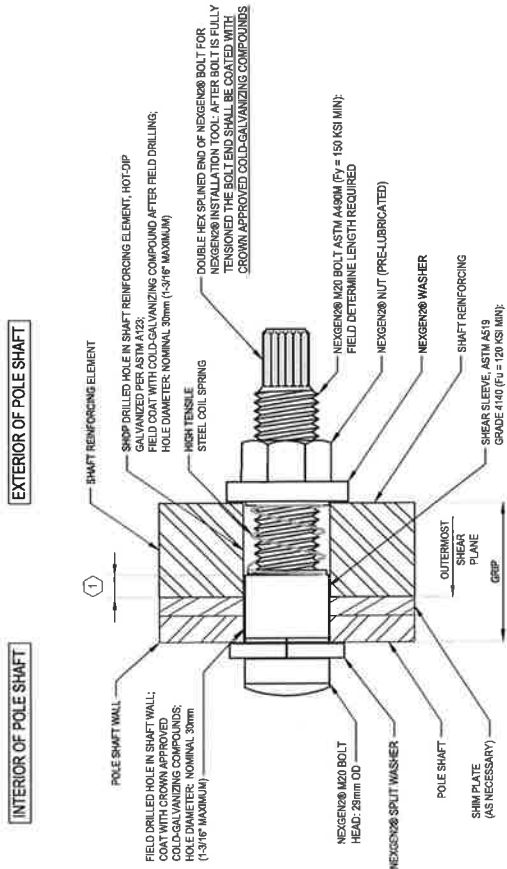
FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

- BOLT HOLE NOTES:**
1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
 2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2® BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009. PER SECTION 8.2.3, ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PILES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2® BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2® BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2® BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2 ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2® BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.

1. NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2® BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL 1 S-2B

NOTE: NEXGEN2® BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2® BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

DISTRIBUTOR CONTACT DETAILS:
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 PH: (609) 899-3445

MODIFICATION OF AN EXISTING 150' MONOPOLE
 BU #841288, BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

PROJECT No: 37517-9750-003.7700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.J.T.
 CHECKED BY:
 DATE: 3-31-2017

NEXGEN2™ BOLT DETAIL

S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

- BOLT HOLE NOTES:**
1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
 2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

- BOLT TIGHTENING AND INSPECTION NOTES:**
1. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.4 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009. PER SECTION 8.2.4: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PILES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
 2. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.4 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL AJAX ONESIDE™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
 3. ALL AJAX ONESIDE™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX ONESIDE™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DIRECT TENSION INDICATOR WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED.
 4. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX ONESIDE™ DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSON.
 5. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: MODIFICATION/INSPECTION SOW.

- BOLT ASSEMBLY AND INSTALLATION:**
1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
 2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

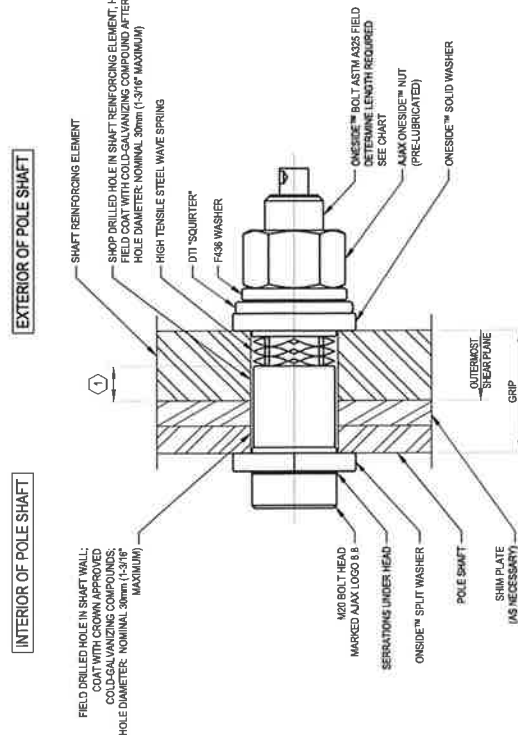
AJAX ONESIDE™ BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

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MANUFACTURER
 AJAX FASTENERS
 SALES + TECH: ONESIDE@AJAXFAST.COM.AU

NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING AJAX ONESIDE™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL AJAX ONESIDE™ BOLT DETAIL

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MODIFICATION OF AN EXISTING 150' MONOPOLE
 BU #841288; BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

PROJECT NO: 37517-050.003.7700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.J.T.
 CHECKED BY:
 DATE: 3-31-2017

AJAX ONESIDE™ BOLT DETAIL

S-2C

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MODIFICATION OF AN EXISTING 150' MONOPOLE
 BU #841288, BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

PROJECT No: 37517-07/00.003.7700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.A.T.
 CHECKED BY:
 DATE: 3-31-2017

MONOPOLE PROFILE

S-3

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	SECTION PLATE THICKNESS (IN)	UP SPlice (IN)	DIAMETER ACROSS FLATS		POLE SHAPE
				TOP	BOTTOM	
1	41.00	0.2188	36.00	15.000	21.000	12-SIDED
2	4.00	0.2188	36.00	21.000	21.040	12-SIDED
3	4.00	0.3125	48.00	21.149	22.880	12-SIDED
4	34.00	0.4663	31.623	21.360	30	12-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE TERMINATION BOLTS, THE REINFORCING MEMBER SHALL BE FULLY SUPPORTED BY AN INTERMEDIATE MEMBER FOR TERMINATION CONNECTIONS. A CONTIGUOUS SHIM PLATE PROCEEDED BY AN EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16" STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT ENGINEER OF RECORD APPROVAL.

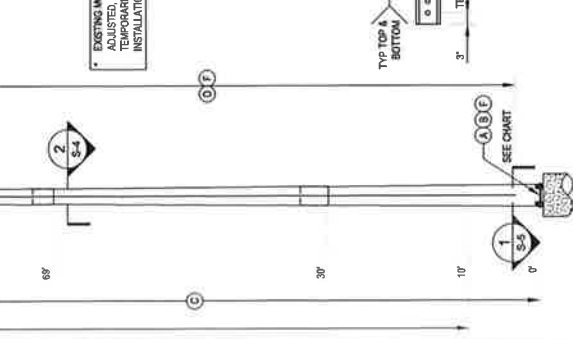
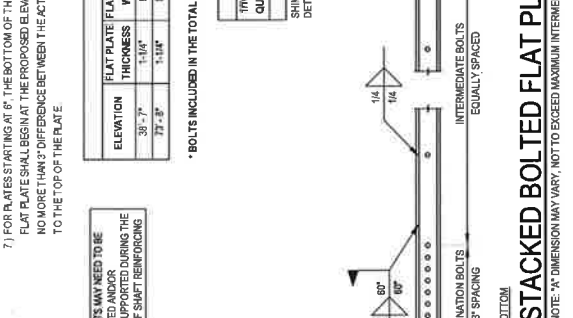
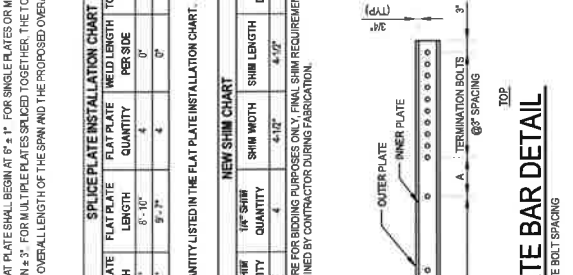
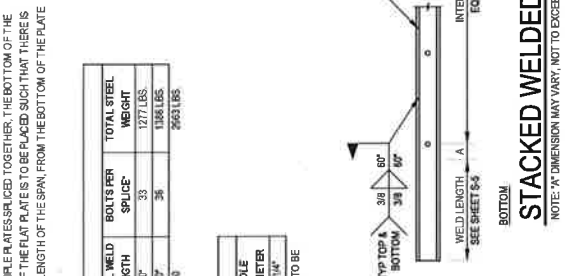
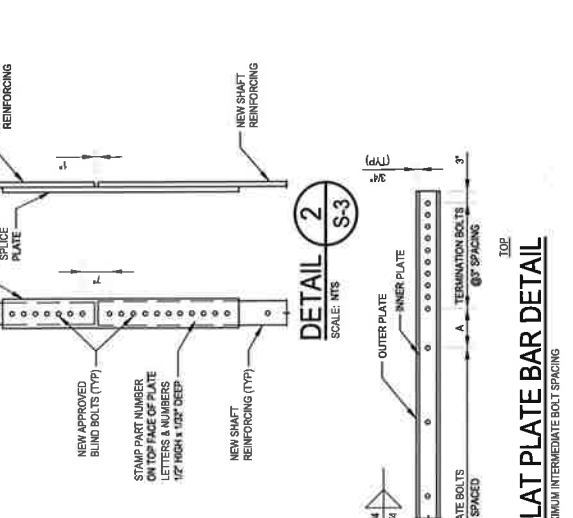
TOWER MODIFICATION SCHEDULE

ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	INSTALL NEW ANCHOR BOLTS AND BRACKETS AT BASE PLATE	S-5
B	INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE	S-5
C	REMOVE EXISTING OVERLAP SHAFT REINFORCING ON FLATS #1, 4, 7 & 10	S-3
D	3'-6" TO 108'-6" INSTALL NEW SHAFT REINFORCING	S-3 & S-4
E	10' TO 150' INSTALL NEW TUF-TUG STEP BOLT CUMBER RAIL STIFFENERS FOR COMPACTOR OR SMALL STEEL TUBES. ALL TUBES SHALL BE FULLY SUPPORTED TUF-TUG PRIOR TO FABRICATION OF SHAFT REINFORCING	S-3
F	0' TO 150' PAINT MODIFICATIONS TO MATCH EXISTING POLE	S-3

NEW STACKED FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION (OUTER PLATE)	TOP ELEVATION (INNER PLATE)	FLAT # / DEGREE SEPARATION	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE TOTAL BOLT QUANTITY STACKED	TERMINATION BOLTS (BOTTOM)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
3'-5" (OUTER PLATE)	38'-6" (INNER PLATE)	F1 & F7	35'-0"	2	36	0	20'	1428 LBS
3'-6" (OUTER PLATE)	38'-6" (INNER PLATE)	CO-WFP-06010035 #1	35'-0"	2	36	0	20'	1072 LBS
6'-5" (OUTER PLATE)	38'-6" (INNER PLATE)	F4 & F10	30'-0"	2	33	0	20'	1225 LBS
8'-5" (OUTER PLATE)	38'-6" (INNER PLATE)	F4 & F10	30'-0"	2	33	0	20'	916 LBS
38'-7" (OUTER PLATE)	73'-7" (INNER PLATE)	F1, F4, F7 & F10	35'-0"	4	204	18	20'	2538 LBS
38'-7" (OUTER PLATE)	73'-7" (INNER PLATE)	CO-WFP-06010035 #6	35'-0"	4	204	18	20'	2144 LBS
73'-8" (OUTER PLATE)	108'-8" (INNER PLATE)	F1, F4, F7 & F10	35'-0"	4	204	18	20'	2538 LBS
73'-8" (OUTER PLATE)	108'-8" (INNER PLATE)	CO-WFP-06010035 #7	35'-0"	4	204	18	20'	2144 LBS
108'-8" (OUTER PLATE)	108'-8" (INNER PLATE)	F1, F4, F7 & F10	35'-0"	4	204	18	20'	1446 LBS
108'-8" (OUTER PLATE)	108'-8" (INNER PLATE)	CO-WFP-06010035 #8	35'-0"	4	204	18	20'	1446 LBS

- NOTES:
- 1) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLORED GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZINC-BARIUM ZINC-HIGH-COOLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE MET 3.0 MILS DRY 1.5 MILS. APPLY PER ZINC MANUFACTURER'S RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-891-5275 FOR PRODUCT INFORMATION.
 - 2) ALL REINFORCING SHALL BE ASTM A572 OR 65.
 - 3) WELDS SHALL BE EX309 OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
 - 4) HOLES FOR BOLTS ARE 30mm UNLESS NOTED OTHERWISE.
 - 5) ALL SHIMS SHALL BE ASTM A36.
 - 6) ALL HOLES ARE TO BE DRILLED, DO NOT BURN OR PUNCH.
 - 7) FOR PLATES STARTING AT 6' FROM THE BOTTOM OF THE PLATE SHALL BEGIN AT 6' FROM THE BOTTOM OF THE PLATE. FOR MULTIPLE PLATES SPACED TOGETHER, THE TOP OF THE PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 2" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN FROM THE BOTTOM OF THE PLATE TO THE TOP OF THE PLATE.



SPlice PLATE INSTALLATION CHART

ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPlice	TOTAL WEIGHT
38'-7"	1/4"	5'-10"	6'-10"	4	0"	0"	33	1277 LBS
73'-8"	1/4"	5'-10"	9'-7"	4	0"	0"	36	1361 LBS
						0		2663 LBS

NEW SHIM CHART

1/4" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	SHIM DIAMETER	POLE DIAMETER
108	4	4'-10"	4'-10"	4'-10"	7'-10"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

STACKED WELDED FLAT PLATE BAR DETAIL

STACKED BOLTED FLAT PLATE BAR DETAIL

POLE ELEVATION 1 S-3

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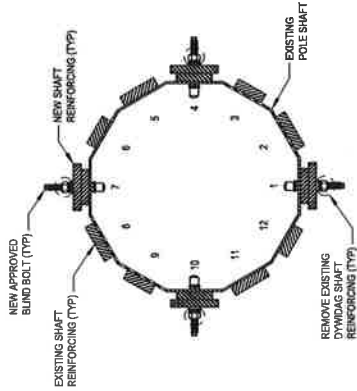
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 BU #841288; BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

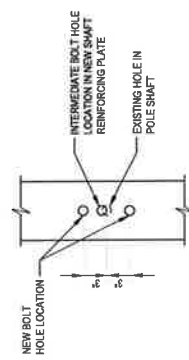
PROJECT No: 37517-0750-0037700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.J.T.
 CHECKED BY:
 DATE: 3-31-2017

SHAFT REINFORCING SECTIONS

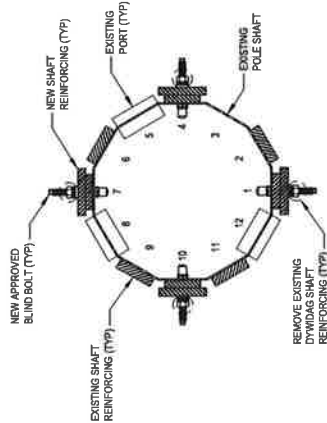
S-4



SECTION 2
 EL. 97' S-4

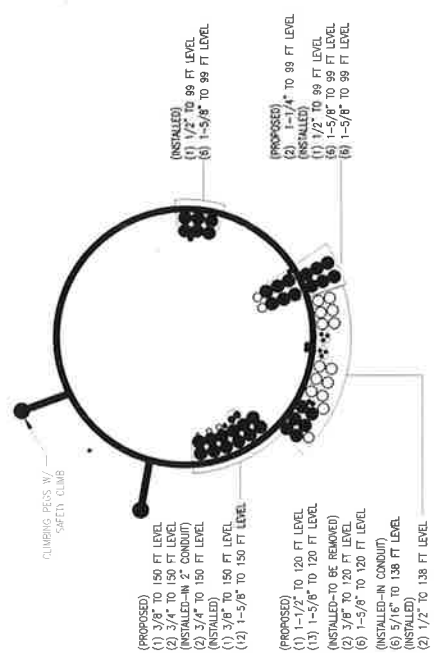


INTERMEDIATE BOLT HOLE FIX
 SCALE: NTS S-4

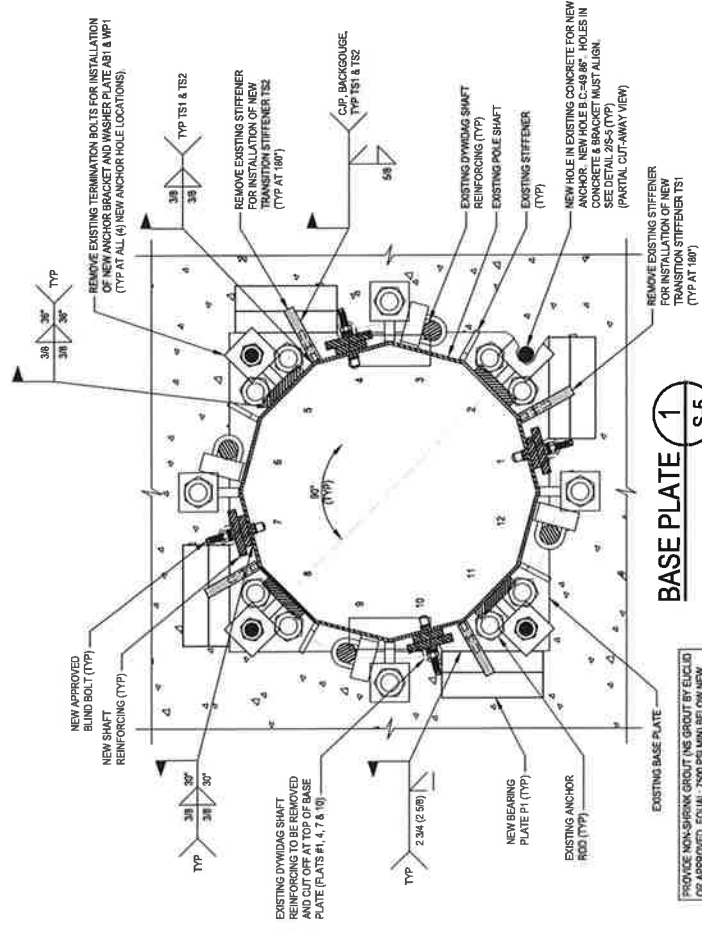


SECTION 1
 EL. 97' S-4

* CONTRACTOR SHALL COORDINATE INSTALLATION OF NEW STEP RAIL SYSTEM WITH TUFF-STUB



BASE SPECIFICATIONS	
BASE PLATE:	41" SQUARE, 2 3/4" THK, 1/4" G50 NSI
ANCHOR RODS:	Ø1 1/2" 1/4" 4815, GRADE 75, 47 D.C.

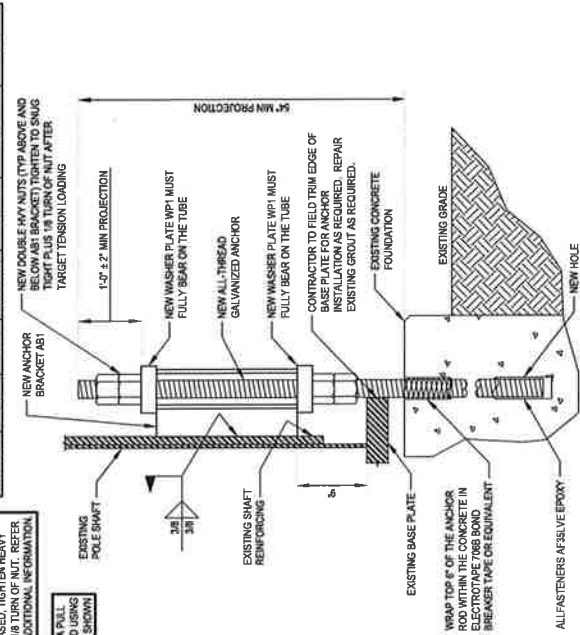


BASE PLATE 1
S-5

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND HOLE TO BE MECHANICALLY ROUGHENED. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE TESTED TO THE TARGET TENSION LOAD. ONCE THE TENSION LOAD HAS BEEN RELEASED, TIGHTEN HEAVY ANCHOR NUTS TO THE TARGET TENSION LOAD. REFER TO SHEET 28-S FOR ADDITIONAL INFORMATION.

CONTRACTOR TO VERIFY THAT A PULL TEST IS ABLE TO BE PERFORMED USING THE ANCHOR ROD PROJECTION SHOWN.

NEW ANCHOR RODS					
PART #	DIAMETER (IN)	LENGTH (IN)	EMBEDMENT DEPTH (IN)	TARGET TENSION LOAD (KIPS)	POLE DIAMETER (IN)
CG-AB1-0175	1.314	120	60	111	2



NEW ANCHOR & BRACKET DETAIL 2
S-5

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PF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600, Columbus, OH 43215
www.pauljford.com
Phone 614.221.6678
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (866) 899-3445

MODIFICATION OF AN EXISTING 150' MONOPOLE
BU #841288; BRIDGEPORT NORTH BRIDGEPORT, CONNECTICUT

PROJECT No: 37617-0750.003.7700
DRAWN BY: B.M.S.
DESIGNED BY: S.J.T.
CHECKED BY:
DATE: 3-31-2017

BASE PLATE DETAILS

S-5

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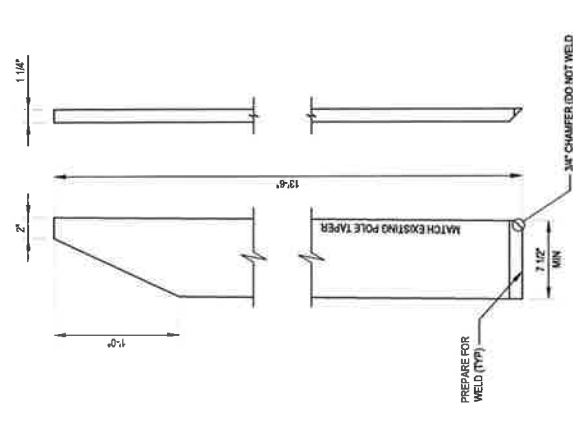
PJF PAUL J. FORD & COMPANY
 250 E Broad St, Ste 600- Columbus, OH 43215
 Phone 614.221.6879 www.pauljford.com
CROWN CASTLE
 8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
 PH: (565) 899-9445

**MODIFICATION OF AN EXISTING 150'
 MONOPOLE**
 BU #841288, BRIDGEPORT NORTH
 BRIDGEPORT, CONNECTICUT

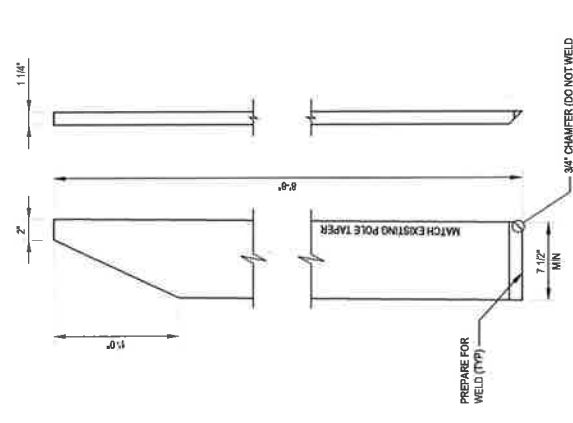
PROJECT No: 37517-0750.003.7700
 DRAWN BY: B.M.S.
 DESIGNED BY: S.J.T.
 CHECKED BY:
 DATE: 3-31-2017

MISC DETAILS

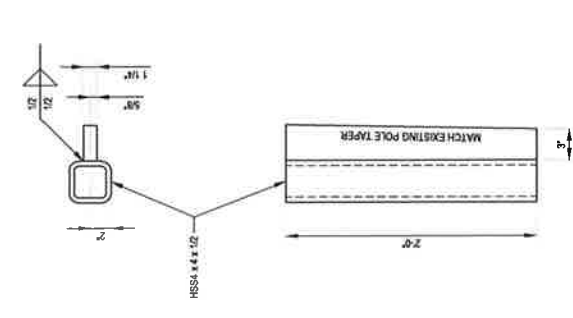
S-6



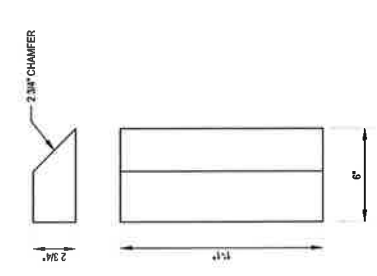
TRANSITION STIFFENER MK-TS2
 (2 REQUIRED) (Fy = 66 KSI)



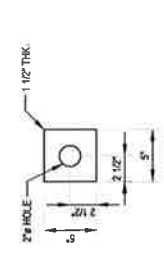
TRANSITION STIFFENER MK-TS1
 (2 REQUIRED) (Fy = 66 KSI)



ANCHOR BRACKET MK-AB1
 (4 REQUIRED) (TUBE Fy = 60 KSI) (STIFFENER Fy = 66 KSI)



BEARING PLATE MK-P1
 (4 REQUIRED) (Fy = 60 KSI)



WASHER PLATE MK-WP1
 (6 REQUIRED) (Fy = 60 KSI)

ATTACHMENT 4



Legend

- Parcels
- Streetname**
- Roadways**
 - Local
 - Collector
 - Minor Collector
 - Minor Arterial
 - Major Collector
 - PA Other
 - PA Other Expwy
 - PA Interstate



1:426



White Oak St



This map is a user generated static output from an internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

WGS_1984_Web_Mercator_Auxiliary_Sphere
 Created by Connecticut Metropolitan Council of Governments



205 KAECELE PL

Location 205 KAECELE PL

Mblu 81/ 2602/ 9/ /

Acct# R--0148640

Owner SOUTHERN NEW ENGLAND
TEL

Assessment \$104,120

Appraisal \$148,730

PID 29859

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$51,340	\$97,390	\$148,730

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$35,950	\$68,170	\$104,120

Owner of Record

Owner SOUTHERN NEW ENGLAND TEL
Co-Owner C/O FRONTIER COMMUNICATIONS - TAX DPMT
Address 401 MERRITT 7
NORWALK , CT 06851

Sale Price \$0
Certificate
Book & Page 0/ 0
Sale Date
Instrument

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
SOUTHERN NEW ENGLAND TEL	\$0		0/ 0		

Building Information

Building 1 : Section 1

Year Built:

Living Area: 0

Replacement Cost: \$0

Building Percent

Good:

Replacement Cost

Less Depreciation: \$0

Building Attributes

Field	Description
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy:	
Exterior Wall 1:	
Exterior Wall 2:	
Roof Structure:	
Roof Cover:	
Interior Wall 1:	
Interior Wall 2:	
Interior Flr 1:	
Interior Flr 2	
Heat Fuel:	
Heat Type:	
AC Type:	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs:	
Total Rooms	
Bath Style:	
Kitchen Style:	
Fireplaces	
Fin Bsmt Area	
Fin Bsmt Quality	
Bsmt Garages	
.	

Building Photo



(<http://images.vgsi.com/photos2/BridgeportCTPhotos//\00\03\0>)

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 499
Description Utility Vac Ln
Zone RA

Land Line Valuation

Size (Acres) 0.15
Frontage 0
Depth 0

Neighborhood 2080
Alt Land Appr No
Category

Assessed Value \$68,170
Appraised Value \$97,390

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD3	Shed w/ Lt	CM	Comm	384 SF	\$6,910	1
SHD3	Shed w/ Lt	CM	Comm	384 SF	\$6,910	1
SHD3	Shed w/ Lt	CM	Comm	576 SF	\$10,370	1
FN1	Fence, Chain	8	8 ft	350 LF	\$3,150	1
TWR	Tower			120 LF	\$24,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$51,340	\$97,390	\$148,730
2015	\$51,340	\$97,390	\$148,730
2014	\$51,340	\$106,880	\$158,220

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$35,950	\$68,170	\$104,120
2015	\$35,950	\$68,170	\$104,120
2014	\$35,950	\$74,820	\$110,770

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ATTACHMENT 5



Certificate of Mailing — Firm

Name and Address of Sender
Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

TOTAL NO. of Pieces Listed by Sender

3

TOTAL NO. of Pieces Received at Post Office™

3

neopost
01/16/2018
US POSTAGE \$002.38
ZIP 06108
041L1220838

Postmaster, per (name of receiving employee)

J.P.

USPS® Tracking Number
Firm-specific Identifier

Address
(Name, Street, City, State, and ZIP Code™)

Postage

Fee

Special Handling

Parcel Airlift

1.

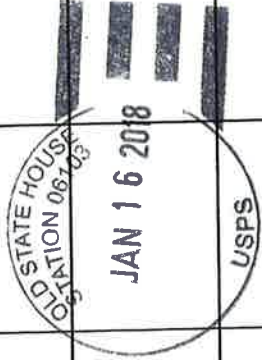
Joseph Ganim, Mayor
City of Bridgeport
Margaret E. Norton Government Center
999 Broad Street
Bridgeport, CT 06604

2.

Dennis Buckley, Zoning Administrator
City of Bridgeport
45 Lyon Terrace
Bridgeport, CT 06604

3.

SNET
c/o Frontier Communications
401 Merritt 7
Norwalk, CT 06851



4.

5.

6.