Robinson+Cole

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Also admitted in Massachusetts

September 27, 2017

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**
219 New Park Road, Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 105-foot level of the existing 108-foot tower at 219 New Park Road in Hartford, Connecticut (the "Property"). The Property is owned by CL&P. The tower is owned by Crown Castle ("Crown"). Cellco's use of this tower was approved by the Council in 2009 (Petition No. 889). Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D65C, 700/2100 MHz antennas and three (3) model SBNHH-1D65C, 1900 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs"), install six (6) new RRHs and install one (1) HYBRIFLEX™ fiber optic antenna cable, attached to the outside the monopole tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Luke Bronin, Mayor for the City of Hartford; Jamie Bratt, Hartford Director of Planning and Economic Development; CL&P, the Property owner; and Crown, the tower owner.

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 on Cellco's existing platform at the 105-foot level on the existing tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the 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. Far Field Approximation tables for each of Cellco's operating frequencies at the modified facility are included in Attachment 2. These tables indicate that Cellco's modified facility will operate well within the FCC standards for RF emissions.

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

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

A copy of the parcel map and property owner information is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the Property owner 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:
Luke Bronin, Hartford Mayor
Jamie Bratt, Hartford Planning and Economic Development Director
CL&P
Crown
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

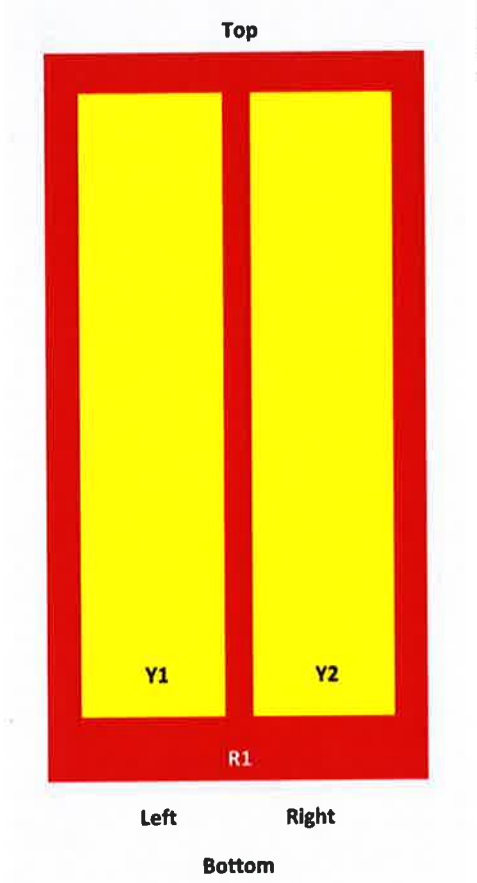
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

Array Layout

Product Specifications

SBNHH-1D65B

SBNHH 6S



Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxxxx.1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxxxx.2
Y2	1695-2360	5-6		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	6
RF Connector Quantity, low band	2
RF Connector Quantity, high band	4
RF Connector Interface	7-16 DIN Female

Product Specifications

SBNHH-1D65B

Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Depth	180.0 mm | 7.1 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (1) | Low band (1)
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Packed Dimensions

Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Depth	296.0 mm | 11.7 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Product Specifications

SBNHH-1D65B

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

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.

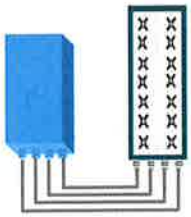
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

Alcatel·Lucent

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.) **Volume in L** **Weight in kg (lb) (w/o mounting HW)**	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range **DC power consumption**	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions **Wind load (@150km/h or 93mph)**	-40°C (-40°F) /+55°C (+131°F) IP65 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

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.

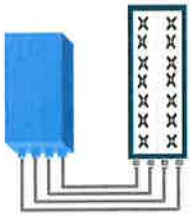
Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

Alcatel·Lucent

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) **RX Diversity scheme**	2.0 dB typ. (<2.5 dB max) 2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.) **Volume (w/ solar shield) in L** **Weight (w/ solar shield) in kg (lb)**	538 x 304 x 182 (21.2" x 12.0" x 7.2") 30 24 (53)
DC voltage range **DC power consumption**	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 580W typical @100% RF load
Environmental conditions **Wind load (@150km/h or 93mph)**	-40°C (-40°F) /+55°C (+131°F) IP65 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

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.

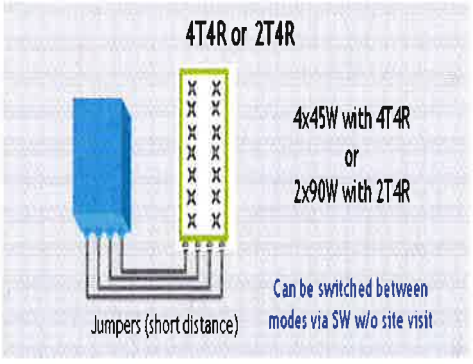
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

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

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.) **Volume in Liters** **Weight in kg (lb) (w/o mounting HW)**	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield) 35.5 (with solar shield) 29.7 (without solar shield) 25.8kg (56.8lb) (with solar shield)
DC voltage range **DC power consumption**	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions **Wind load (@150km/h or 93mph)**	-40°C (-40°F) /+55°C (+131°F) UL50E Type 4 Enclosure 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

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

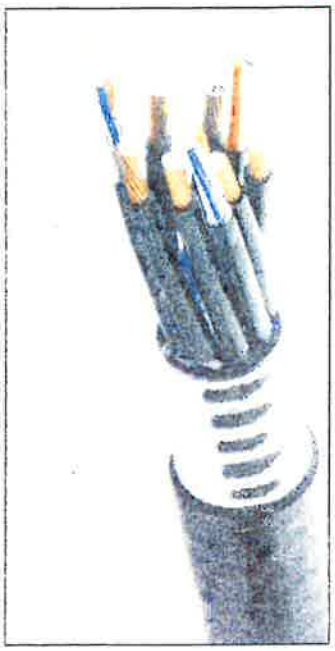


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
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)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
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
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

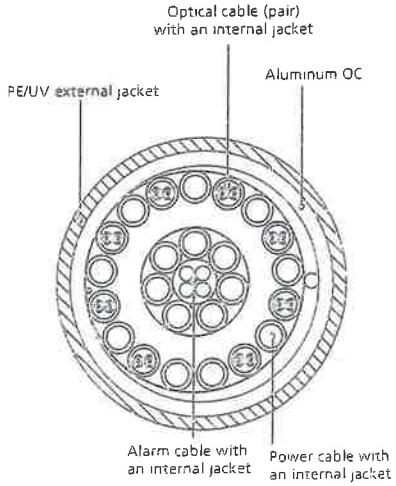


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

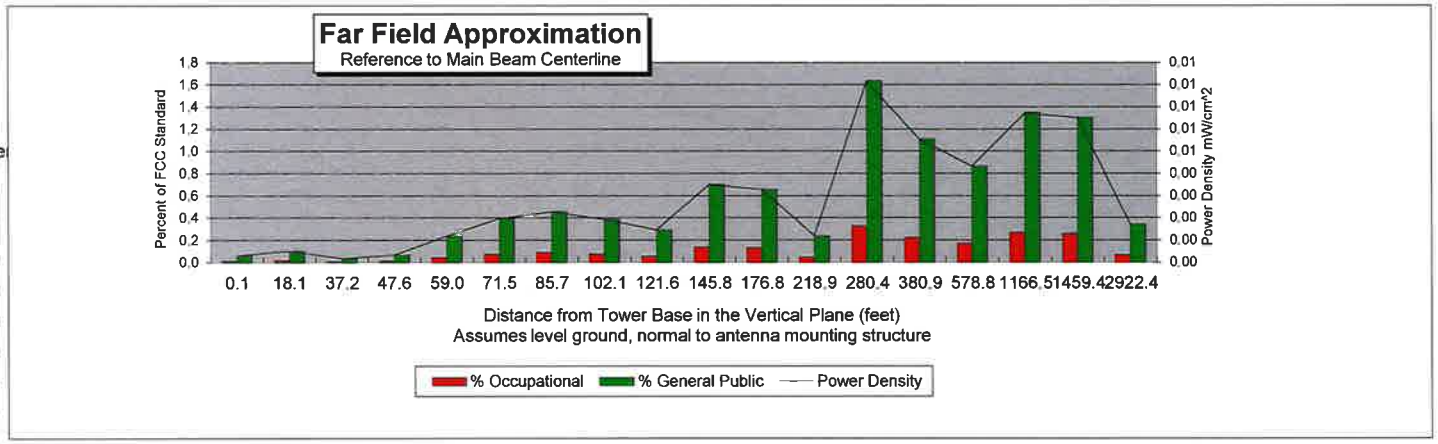
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	West Hartford 4, CT
Site #:	
Date:	09/26/17
Name:	Mark Brauer
File Name:	West Hartford 4, CT - FF Powe

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**14.8**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2200.0**
Number of Channels	**1**



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.3	0.3	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.2	0.4	0.5	0.4	0.3	0.7	0.7	0.2	1.6	1.1	0.9	1.3	1.3	0.3	

Antenna Type SBNHH-1D65B
Max% 1.64%

Instructions:

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

Far Field Approximation
with downtilt variation

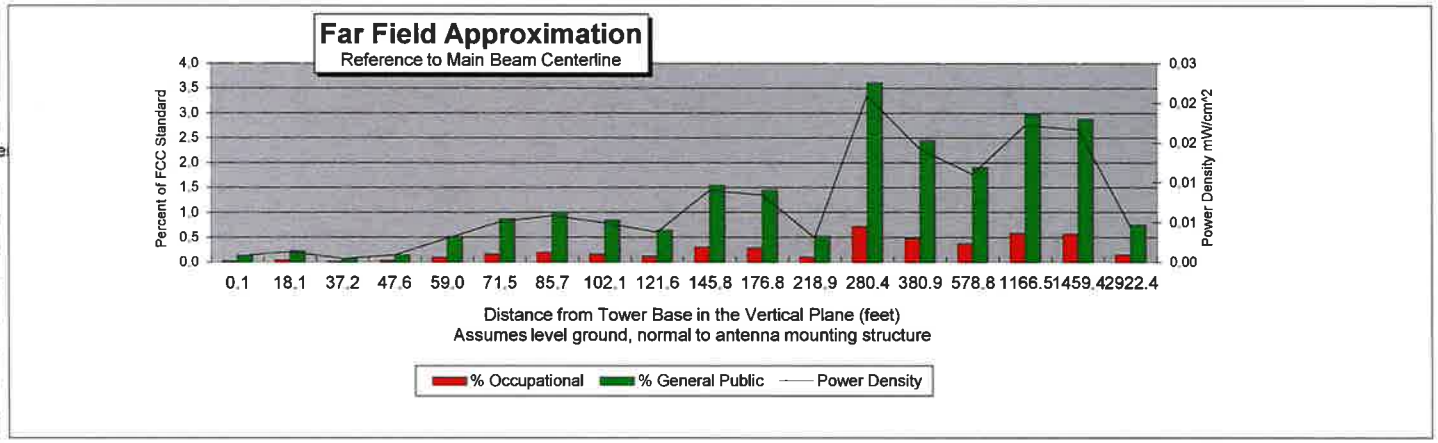
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	West Hartford 4, CT
Site #:	
Date:	09/26/17
Name:	Mark Brauer
File Name:	West Hartford 4, CT - FF Powe

Operating Freq. (MHz)	869.0
Antenna Height (ft):	105.0
Antenna Gain (dBi):	16.7
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	3690.0
Number of Channels	9



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.02	0.02	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.7	0.5	0.4	0.6	0.6	0.2	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.5	0.9	1.0	0.8	0.6	1.5	1.5	0.5	3.6	2.4	1.9	3.0	2.9	0.8	

Antenna Type BXA-70063-6
Max% 3.61%

Instructions:

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

Far Field Approximation
with downtilt variation

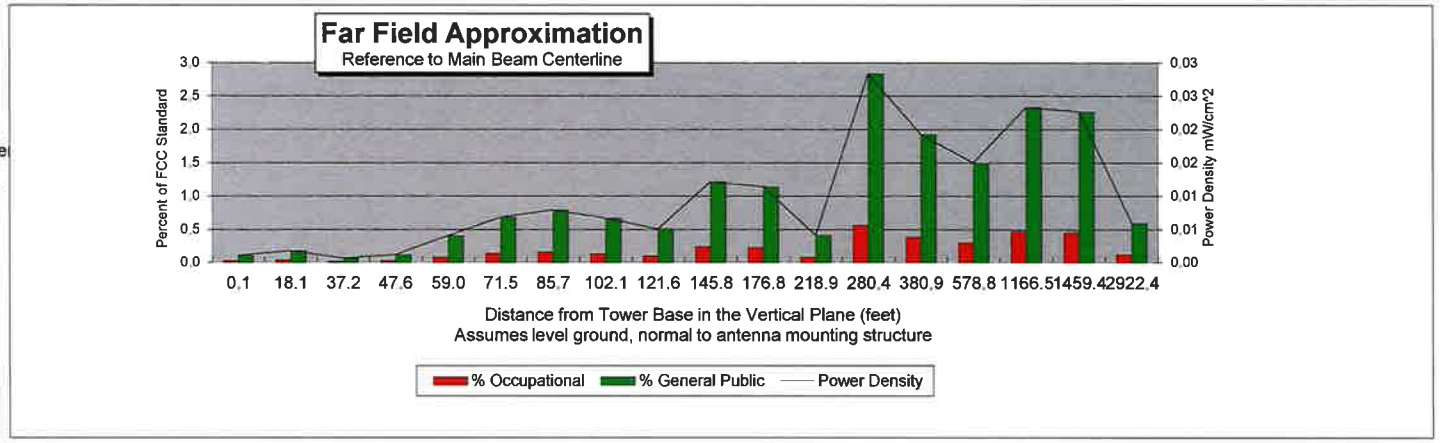
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	West Hartford 4, CT
Site #:	
Date:	09/26/17
Name:	Mark Brauer
File Name:	West Hartford 4, CT - FF Powe

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**18.3**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**5000.0**
Number of Channels	**1**



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.01	0.02	0.02	0.01	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.6	0.4	0.3	0.5	0.5	0.1	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.7	0.5	1.2	1.1	0.4	2.8	1.9	1.5	2.3	2.3	0.6	

Antenna Type SBNHH-1D65B
Max% 2.84%

Instructions:

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

Far Field Approximation
with downtilt variation

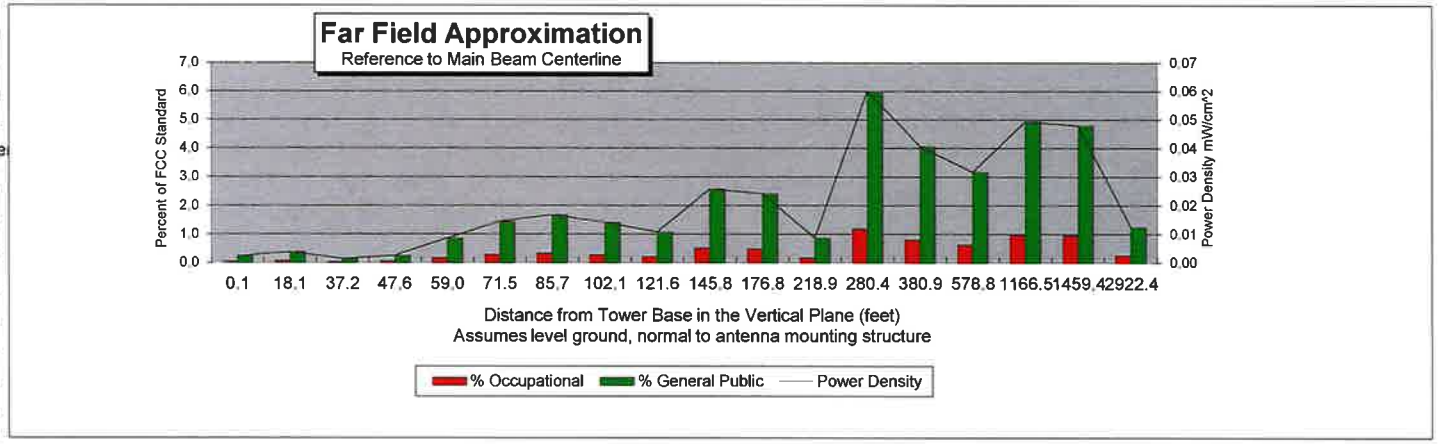
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	West Hartford 4, CT
Site #:	
Date:	09/26/17
Name:	Mark Brauer
File Name:	West Hartford 4, CT - FF Powe

Operating Freq. (MHz)	**2110.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**18.2**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**7400.0**
Number of Channels	**1**



Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	102.0	103.6	108.6	112.6	117.8	124.6	133.2	144.3	158.8	177.9	204.1	241.5	298.4	394.3	587.7	1170.9	1463.0	2924.2	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.1	37.2	47.6	59.0	71.5	85.7	102.1	121.6	145.8	176.8	218.9	280.4	380.9	578.8	1166.5	1459.4	2922.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.03	0.02	0.01	0.06	0.04	0.03	0.05	0.05	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	1.0	0.3	
Percent of General Population Standard	0.2	0.4	0.1	0.2	0.9	1.4	1.7	1.4	1.1	2.6	2.4	0.9	6.0	4.1	3.2	4.9	4.8	1.3	

Antenna Type SBNHH-1D65B
Max% 6.00%

Instructions:

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

ATTACHMENT 3

May 16, 2017

Mr. Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209 - 8242

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ModDwgs@btgrp.com

Subject:	**Structural Modification Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	118004
	Carrier Site Name:	West Hartford 4
Crown Castle Designation:	**Crown Castle BU Number:**	876363
	Crown Castle Site Name:	Hartford - NU (SSUSA)
	Crown Castle JDE Job Number:	428941
	Crown Castle Work Order Number:	1385488
	Crown Castle Application Number:	382014 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	85565.006.01
Site Data:	**219 New Park Rd., Hartford, CT, Hartford County**	
	Latitude *41° 45' 2.79"*, Longitude *-72° 42' 49.23"*	
	108 Ft - Monopole	

Dear Mr. Howell,

B+T Group is pleased to submit this **"Structural Modification 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 1019805, in accordance with application 382014, revision 1.

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:

LC4.5: TSA specified load case with proposed modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing 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 TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

We at *B+T Group* 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:
B+T Engineering, Inc.
PEC.0001564; Exp: 02/10/18

Robert M. Frazier, P.E.
Project Engineer

Scott S. Vance, P.E.
Engineer of Record

STATE OF CONNECTICUT
SCOTT S. VANCE
31627
LICENSED
PROFESSIONAL ENGINEER

5/16/17

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This is a 108 ft. monopole designed by Summit in October of 2000. The monopole was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. This monopole has been modified by Vertical Solutions in January of 2009, PJF in May of 2010 and B+T group in October of 2012 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this monopole in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 1 inch ice thickness and 60 mph under service loads, exposure category C.

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
105.0	105.0	3	Alcatel Lucent	B13 RRH 4X30	1	1-5/8	--
		3	Alcatel Lucent	B25 RRH4X30			
		3	Alcatel Lucent	RRH4X45-AWS4 B66			
		6	Commscope	SBNHH-1D65B			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing 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
105.0	105.0	**3**	**Alcatel Lucent**	**RRH2X40-AWS**	**6**	**1-1/4**	**3**
		3	**Antel**	**BXA-171063-12BF**			
		3	**Antel**	**BXA-70063/6CF**			
		3	Antel	BXA-171063-12BF	1 12	1-5/8 1-1/4	1
		3	Antel	BXA-70063/6CF			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	--	Sector Mount [SM 402-3]			
98.0	102.0	1	Dragonwave	A-ANT-18G-2-C	3 2 1 1	5/16 1/2 5/8 1-1/4	1
		1	Dragonwave	A-ANT-23G-1-C			
		2	Dragonwave	HORIZON COMPACT			
	99.0	3	Alcatel Lucent	TD-RRH8x20-25			
		3	Argus	LLPX310R			
		1	RFS Celwave	APXV9ERR18-C-A20			
		2	RFS Celwave	APXVSPP18-C-A20			
		3	RFS Celwave	APXVTM14-C-120			
		3	RFS Celwave	IBC1900BB-1			
		3	RFS Celwave	IBC1900HG-2A			
		3	Samsung	WIMAX DAP HEAD			
	98.0	1	--	Platform Mount [LP 1201-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
96.0	96.0	3	Alcatel Lucent	800MHz 2X50W RRH W/Filter	--	--	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		1	--	Side Arm Mount [SO 102-3]			
	95.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
88.0	**88.0**	**12**	**Decibel**	**844G65VTZAS**	--	--	**2**
		1	**--**	**Platform Mount [LP 304-1]**			
81.0	81.0	1	--	T-Arm Mount [TA 602-3]	6	7/8	1
	80.0	3	Andrew	HBX-6516DS-VTM	1	5/16	
74.0	76.0	1	Lucent	KS24019-L112A	1	1/2	1
	74.0	1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Abandoned Equipment To Be Removed.
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)
98.0	98.0	1	--	14' Low Profile Platform	--	--
		12	Dapa	48000 PCS Panel		
88.0	88.0	1	--	14' Low Profile Platform	--	--
		12	Dapa	48000 PCS Panel		
76.0	76.0	1	GPS	Antenna w/ Mount	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Rev#1	382014	CCI Sites
Tower Manufacturer Drawing	Summit, Job No. 11049	1947570	CCI Sites
Foundation Drawings	Summit, Job No. 11049	1613616	CCI Sites
Geotech Report	FDH, Project No. 08-10012E G1	2337384	CCI Sites
Tower Modification Drawings	VSI, Date: 01/28/09	2445632	CCI Sites
	PJF, Project No. 67310-0013	2445631	CCI Sites
	B+T Group, Project No. 85565.001	3348853	CCI Sites
Modification Inspection Report	PJF, Project No. 67309-0057	2445632	CCI Sites
	PJF, Project No. 67310-0013	2445631	CCI Sites
	TEP, Project No. 128633	4424435	CCI Sites
Antenna Configuration	Previous SA by TEP, Project No. 25682.110529	6732835	CCI Sites

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) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) - LC4.5

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	108 - 98.5	Pole	TP8.625x8.625x0.313	1	-1.998	-	71.8	Pass[1]
L2	98.5 - 98	Pole	TP16.5x8.625x0.313	2	-2.008	-	22.8	Pass[1]
L3	98 - 82.33	Pole	TP19.008x16.5x0.188	3	-7.228	-	77.5	Pass[1]
L4	82.33 - 76.25	Pole	TP19.981x19.008x0.323	4	-8.953	-	83.2	Pass[1]
L5	76.25 - 74.5	Pole	TP20.261x19.981x0.462	5	-9.239	-	69.9	Pass[1]
L6	74.5 - 58.08	Pole	TP22.89x20.261x0.537	6	-12.282	-	92.1	Pass[1]
L7	58.08 - 57.75	Pole	TP22.942x22.89x0.698	7	-12.365	-	73.3	Pass[1]
L8	57.75 - 47	Pole	TP24.663x22.942x0.683	8	-14.026	-	78.1	Pass[1]
L9	47 - 40.5	Pole	TP25.328x23.768x0.723	9	-17.079	-	84.2	Pass[1]
L10	40.5 - 27.75	Pole	TP27.369x25.328x0.677	10	-20.428	-	97.4	Pass[1]
L11	27.75 - 19.5	Pole	TP28.689x27.369x0.689	11	-22.796	-	92.1	Pass[1]
L12	19.5 - 14	Pole	TP29.569x28.689x0.799	12	-24.493	-	90.5	Pass[1]
L13	14 - 13.08	Pole	TP29.717x29.569x0.787	13	-24.800	-	91.0	Pass[1]
L14	13.08 - 13	Pole	TP29.729x29.717x0.752	14	-24.837	-	94.1	Pass[1]
L15	13 - 0	Pole	TP31.81x29.729x0.762	15	-29.247	-	94.9	Pass[1]
							Summary	
						Pole (L10)	97.4	Pass[1]
						RATING =	**97.4**	**Pass[1]**

Table 6 - Tower Component Stresses vs. Capacity - LC4.5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	98.0	49.2	Pass
1	Flange Plate	98.0	71.6	Pass
1	Anchor Rods	Base	81.5	Pass
1	Base Plate	Base	58.1	Pass
1	Base Foundation (Soil Interaction)	Base	52.5	Pass
1	Base Foundation (Steel)	Base	92.1	Pass

Structure Rating (max from all components) =	**97.4%**

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

4.1) Recommendations

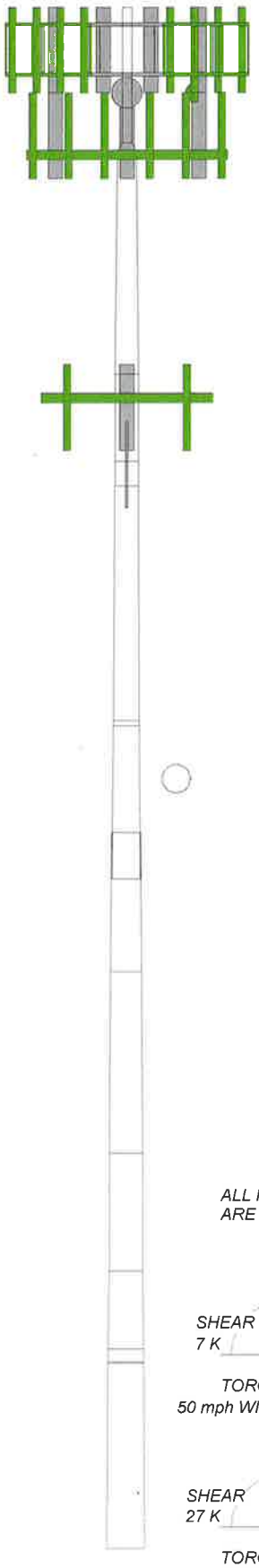
1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A

tnxTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Length (ft)	9.500	0.500	15.670	6.080	1.750	16.420	0.330	10.750	9.750	12.750	8.250	5.500	0.0600	0.0787	13.000
Number of Sides	1	1	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.313	0.313	0.188	0.323	0.462	0.537	0.698	0.683	0.723	0.677	0.689	0.799	0.787	0.787	0.762
Socket Length (ft)								3.250							
Top Dia (in)	8.625	8.625	16.500	19.008	19.981	20.261	22.890	22.942	23.768	25.328	27.369	28.689	29.569	29.737	29.729
Bot Dia (in)	8.625	8.625	16.500	19.008	19.981	20.261	22.890	24.663	25.328	27.369	28.689	29.569	29.737	29.747	31.810
Grade	A53-B-35		A607-65	43.351692ksi	38.234343ksi	35.199151ksi	34.946983ksi	36.657402ksi	36.593546ksi	36.688841ksi	39.884621ksi	39.613462ksi	38.758558ksi	37.349432ksi	37.631626ksi
Weight (K)	0.3	0.0	0.6	0.4	0.2	2.0	0.1	1.7	1.7	2.3	1.6	1.2	0.2	0.1	3.1

108.0 ft
98.5 ft
82.3 ft
76.3 ft
74.5 ft
58.1 ft
47.0 ft
40.5 ft
27.8 ft
19.5 ft
14.0 ft
0.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-171063-12BF w/Mount Pipe (E)	105	IBC1900HG-2A (E)	98
BXA-171063-12BF w/Mount Pipe (E)	105	IBC1900HG-2A (E)	98
BXA-171063-12BF w/Mount Pipe (E)	105	IBC1900HG-2A (E)	98
BXA-70063/6CF w/ Mount Pipe (E)	105	HORIZON COMPACT (E-Clearwire)	98
BXA-70063/6CF w/ Mount Pipe (E)	105	HORIZON COMPACT (E-Clearwire)	98
BXA-70063/6CF w/ Mount Pipe (E)	105	WiMAX DAP HEAD (E-Clearwire)	98
DB-T1-6Z-8AB-0Z (E)	105	WiMAX DAP HEAD (E-Clearwire)	98
(2) SBNHH-1D65B (P)	105	WiMAX DAP HEAD (E-Clearwire)	98
(2) SBNHH-1D65B (P)	105	TD-RRH8x20-25 (E)	98
(2) SBNHH-1D65B (P)	105	TD-RRH8x20-25 (E)	98
B13 RRH 4X30 (P)	105	TD-RRH8x20-25 (E)	98
B13 RRH 4X30 (P)	105	Platform Mount [LP 1201-1] (E)	98
B13 RRH 4X30 (P)	105	A-ANT-18G-2-C (E)	98
DB-T1-6Z-8AB-0Z (P)	105	A-ANT-23G-1-C (E)	98
RRH4X45-AWS4 B66 (P)	105	PCS 1900MHz 4x45W-65MHz (E)	96
RRH4X45-AWS4 B66 (P)	105	PCS 1900MHz 4x45W-65MHz (E)	96
RRH4X45-AWS4 B66 (P)	105	PCS 1900MHz 4x45W-65MHz (E)	96
B25 RRH4X30 (P)	105	PCS 1900MHz 4x45W-65MHz (E)	96
B25 RRH4X30 (P)	105	800MHz 2X50W RRH W/FILTER (E)	96
B25 RRH4X30 (P)	105	800MHz 2X50W RRH W/FILTER (E)	96
Sector Mount [SM 402-3] (E)	105	800MHz 2X50W RRH W/FILTER (E)	96
APXV9ERR18-C-A20 w/ Mount Pipe (E)	98	4' x 2" Pipe Mount (E)	96
		4' x 2" Pipe Mount (E)	96
APXVSPP18-C-A20 w/ Mount Pipe (E)	98	4' x 2" Pipe Mount (E)	96
APXVSPP18-C-A20 w/ Mount Pipe (E)	98	Side Arm Mount [SO 102-3] (E)	96
LLPX310R w/ Mount Pipe (E-Clearwire)	98	PCS 1900MHz 4x45W-65MHz (E)	96
		PCS 1900MHz 4x45W-65MHz (E)	96
LLPX310R w/ Mount Pipe (E-Clearwire)	98	HBX-6516DS-VTM w/ Mount Pipe (E)	81
		6' x 2" Mount Pipe (E)	81
LLPX310R w/ Mount Pipe (E-Clearwire)	98	6' x 2" Mount Pipe (E)	81
		6' x 2" Mount Pipe (E)	81
APXVTM14-C-120 w/ Mount Pipe (E)	98	T-Arm Mount [TA 602-3] (E)	81
APXVTM14-C-120 w/ Mount Pipe (E)	98	HBX-6516DS-VTM w/ Mount Pipe (E)	81
APXVTM14-C-120 w/ Mount Pipe (E)	98	HBX-6516DS-VTM w/ Mount Pipe (E)	81
IBC1900BB-1 (E)	98	KS24019-L112A (E)	74
IBC1900BB-1 (E)	98	Side Arm Mount [SO 701-1] (E)	74
IBC1900BB-1 (E)	98		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	36.593546ksi	37 ksi	52 ksi
A607-65	65 ksi	80 ksi	36.688841ksi	37 ksi	52 ksi
43.351692ksi	43 ksi	58 ksi	39.884621ksi	40 ksi	55 ksi
38.234343ksi	38 ksi	53 ksi	39.613462ksi	40 ksi	55 ksi
35.199151ksi	35 ksi	50 ksi	38.758558ksi	39 ksi	54 ksi
34.946983ksi	35 ksi	50 ksi	37.349432ksi	37 ksi	52 ksi
36.657402ksi	37 ksi	52 ksi	37.631626ksi	38 ksi	53 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Tower Rating: 97.4%

ALL REACTI
ARE FACT

AXIA
68 K

SHEAR
7 K

MOMENT
586 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL
29 K

SHEAR
27 K

MOMENT
1976 kip-ft

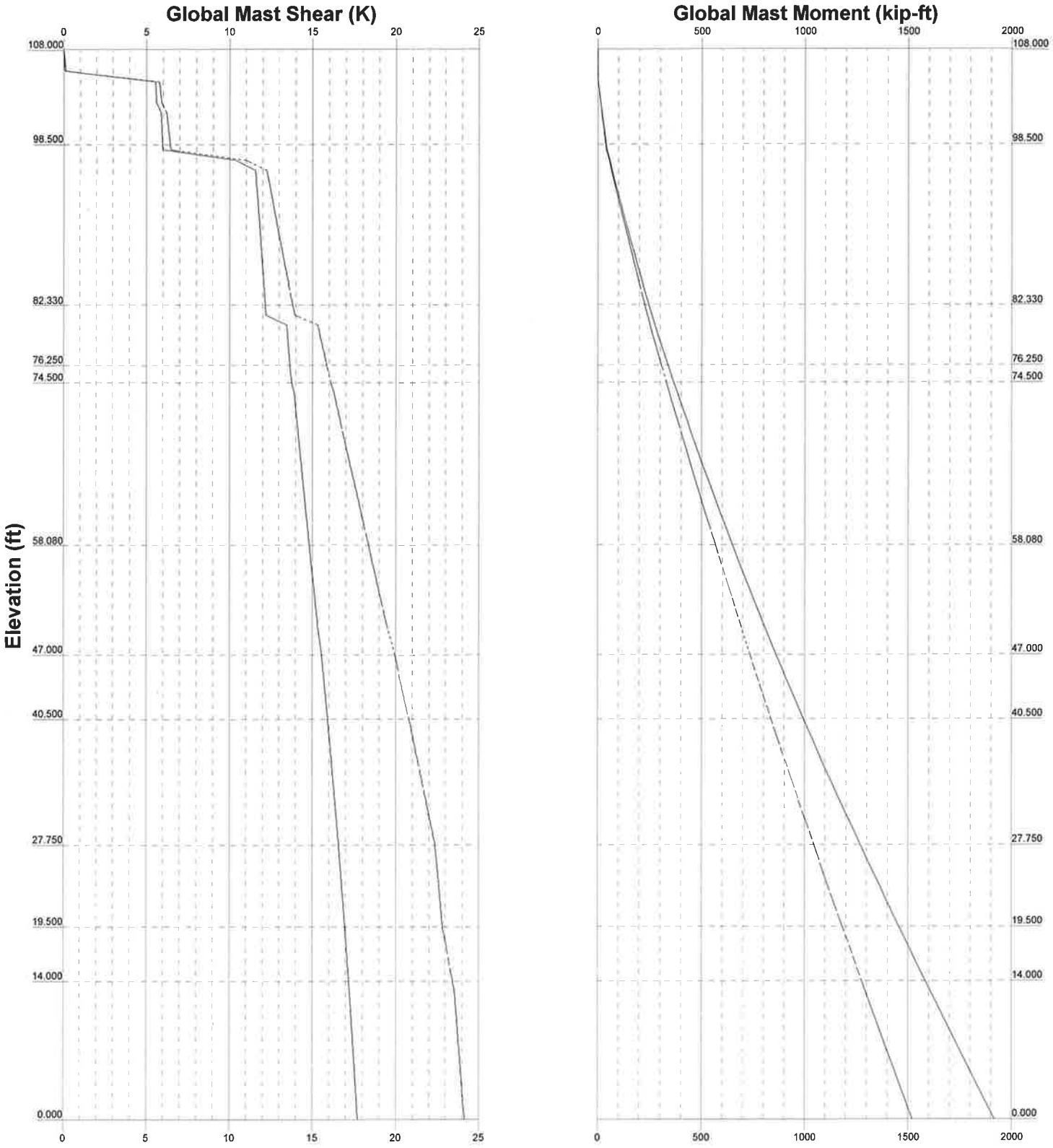
TORQUE 1 kip-ft
REACTIONS - 97 mph WIND

B+T Group
1717 S Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587-4630

Job: 85565.006.01 - HARTFORD - NU (SSUSA),CT (BU# 8763
Project:
Client: Crown Castle | Drawn by: CJangonda | App'd:
Code: TIA-222-G | Date: 05/02/17 | Scale: NTS
Path: | Dwg No. E-1

Vx Vz

Mx Mz



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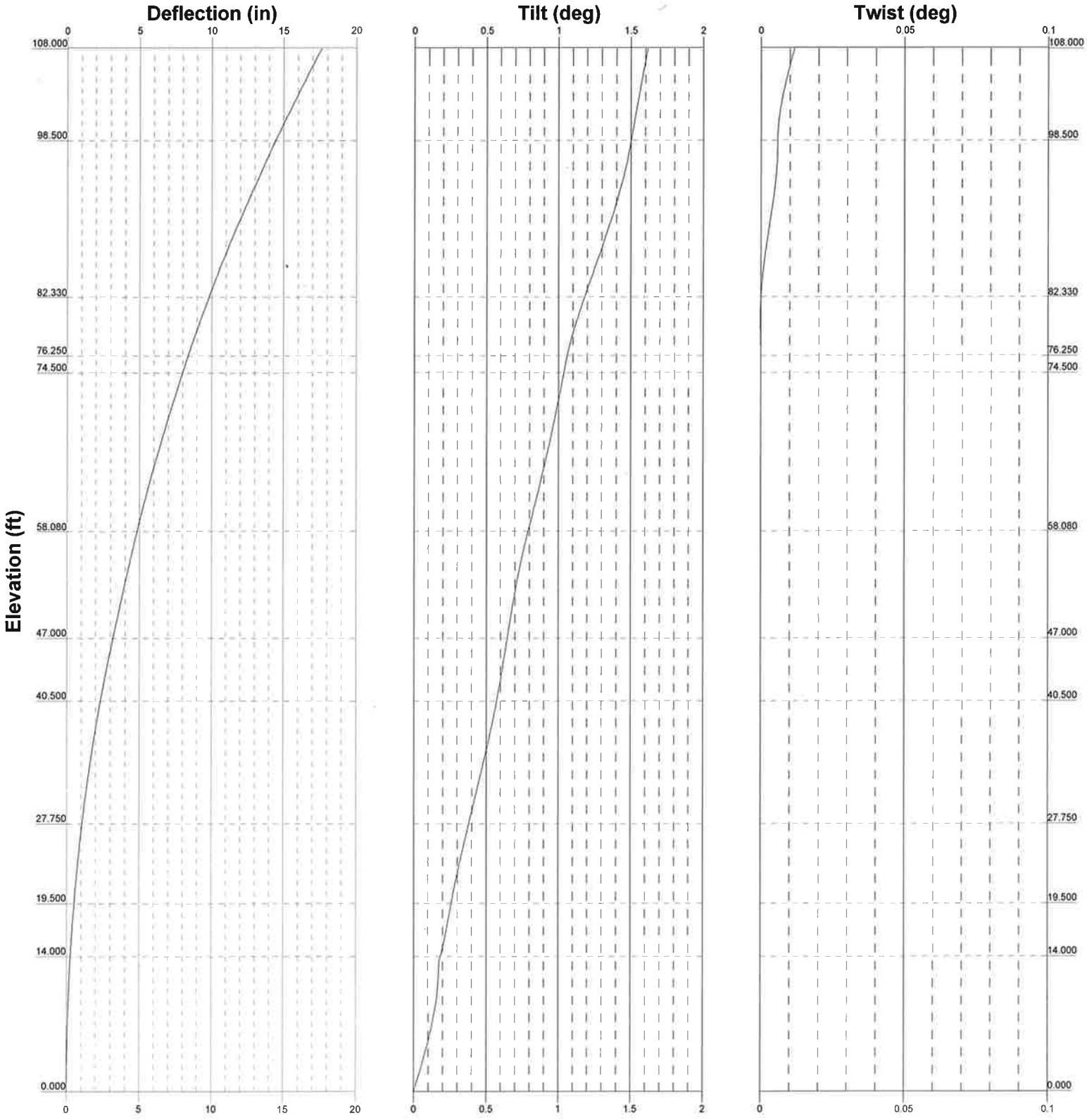
Project:			
Client: Crown Castle	Drawn by: CJangonda	App'd:	
Code: TIA-222-G	Date: 05/02/17	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values



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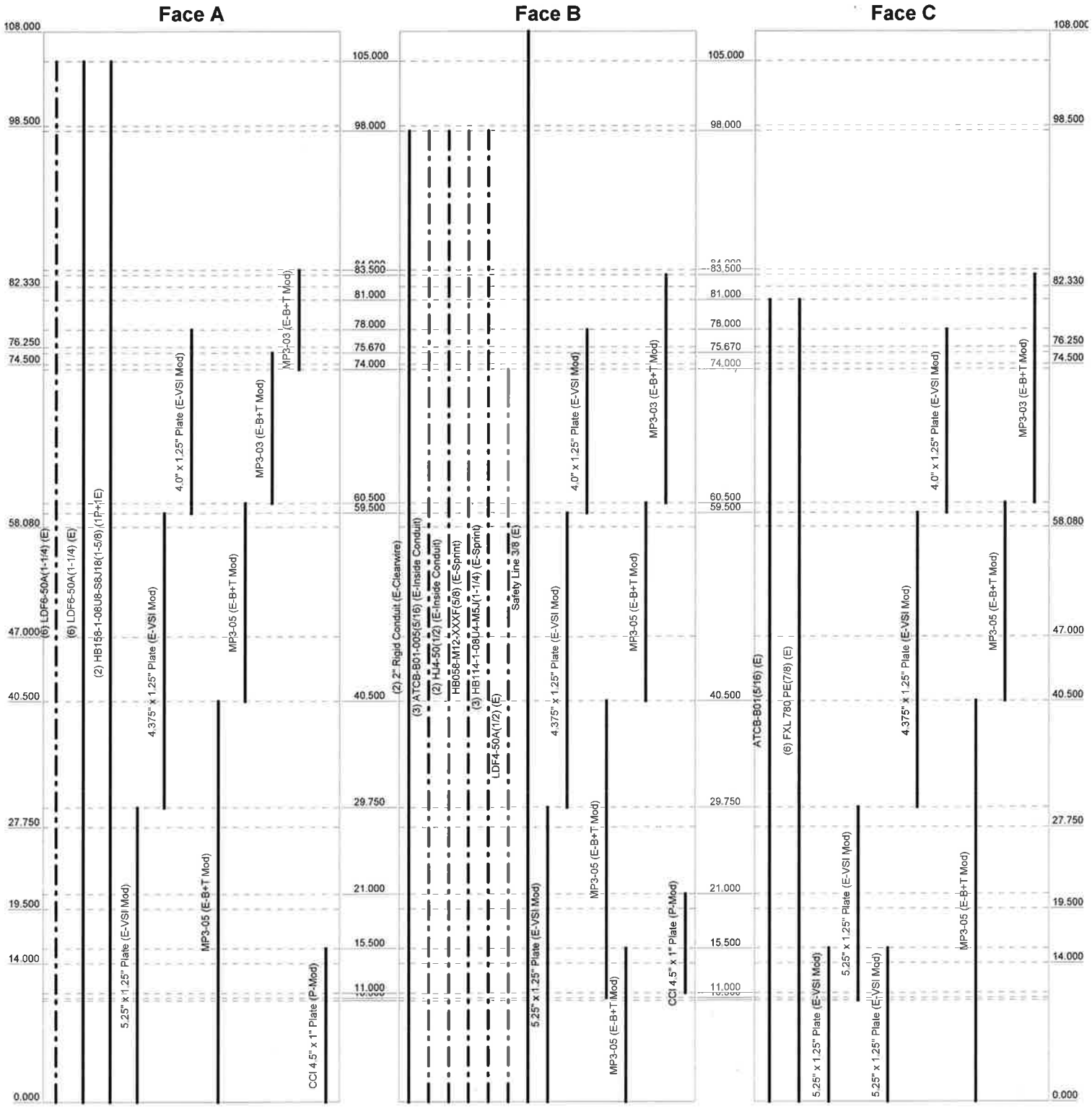
FAX: (918) 587-4630

Job: 85565.006.01 - HARTFORD - NU (SSUSA),CT (BU# 8763			
Project:			
Client: Crown Castle	Drawn by: CJangonda	App'd:	
Code: TIA-222-G	Date: 05/02/17	Scale: NTS	
Path:		Dwg No. E-5	

0' - 108'

Round Flat App In Face App Out Face Truss Leg



B+T Group 1717 S Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	Job: 85565.006.01 - HARTFORD - NU (SSUSA),CT (BU# 8763		
	Project:		
	Client: Crown Castle	Drawn by: CJangonda	App'd:
	Code: TIA-222-G	Date: 05/02/17	Scale: NTS
	Path:		Dwg No. E-7

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	108.000-98.500	9.500	0.000	Round	8.625	8.625	0.313		A53-B-35 (35 ksi)
L2	98.500-98.000	0.500	0.000	Round	8.625	16.500	0.313		A53-B-35 (35 ksi)
L3	98.000-82.330	15.670	0.000	18	16.500	19.008	0.188	0.750	A607-65

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
									(65 ksi)
L4	82.330-76.250	6.080	0.000	18	19.008	19.981	0.323	1.292	43.351692ksi (43 ksi)
L5	76.250-74.500	1.750	0.000	18	19.981	20.261	0.462	1.847	38.234343ksi (38 ksi)
L6	74.500-58.080	16.420	0.000	18	20.261	22.890	0.537	2.148	35.199151ksi (35 ksi)
L7	58.080-57.750	0.330	0.000	18	22.890	22.942	0.698	2.791	34.946983ksi (35 ksi)
L8	57.750-47.000	10.750	3.250	18	22.942	24.663	0.683	2.733	36.657402ksi (37 ksi)
L9	47.000-40.500	9.750	0.000	18	23.768	25.328	0.723	2.891	36.593546ksi (37 ksi)
L10	40.500-27.750	12.750	0.000	18	25.328	27.369	0.677	2.707	36.688841ksi (37 ksi)
L11	27.750-19.500	8.250	0.000	18	27.369	28.689	0.689	2.755	39.884621ksi (40 ksi)
L12	19.500-14.000	5.500	0.000	18	28.689	29.569	0.799	3.196	39.613462ksi (40 ksi)
L13	14.000-13.080	0.920	0.000	18	29.569	29.717	0.787	3.150	38.758558ksi (39 ksi)
L14	13.080-13.000	0.080	0.000	18	29.717	29.729	0.752	3.009	37.349432ksi (37 ksi)
L15	13.000-0.000	13.000		18	29.729	31.810	0.762	3.047	37.631626ksi (38 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
L2	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
	16.500	15.892	520.728	5.724	8.250	63.119	1041.456	7.941	0.000	0
L3	16.755	9.708	326.368	5.791	8.382	38.937	653.165	4.855	2.574	13.728
	19.301	11.201	501.242	6.681	9.656	51.909	1003.144	5.601	3.015	16.082
L4	19.301	19.162	845.200	6.633	9.656	87.530	1691.513	9.583	2.777	8.594
	20.290	20.160	984.257	6.979	10.150	96.966	1969.810	10.082	2.948	9.124
L5	20.290	28.603	1376.878	6.929	10.150	135.646	2755.568	14.304	2.704	5.857
	20.574	29.014	1437.007	7.029	10.293	139.613	2875.904	14.510	2.753	5.964
L6	20.574	33.615	1652.283	7.002	10.293	160.528	3306.739	16.811	2.621	4.881
	23.243	38.094	2404.666	7.935	11.628	206.802	4812.496	19.051	3.084	5.743
L7	23.243	49.142	3057.563	7.878	11.628	262.951	6119.150	24.575	2.801	4.014
	23.296	49.259	3079.448	7.897	11.655	264.223	6162.947	24.634	2.810	4.028
L8	23.296	48.270	3021.563	7.902	11.655	259.257	6047.103	24.140	2.835	4.15
	25.043	52.001	3777.824	8.513	12.529	301.531	7560.618	26.006	3.138	4.593
L9	24.663	52.868	3547.208	8.181	12.074	293.788	7099.083	26.439	2.911	4.027
	25.719	56.448	4317.666	8.735	12.867	335.568	8641.013	28.229	3.186	4.407
L10	25.719	52.956	4065.728	8.751	12.867	315.987	8136.806	26.483	3.267	4.826
	27.791	57.340	5161.248	9.476	13.903	371.223	10329.287	28.675	3.626	5.357
L11	27.791	58.317	5244.531	9.471	13.903	377.214	10495.963	29.164	3.605	5.235
	29.132	61.203	6062.332	9.940	14.574	415.966	12132.641	30.607	3.837	5.572
L12	29.132	70.730	6950.927	9.901	14.574	476.937	13911.000	35.372	3.643	4.56
	30.026	72.962	7630.050	10.213	15.021	507.950	15270.140	36.488	3.798	4.753
L13	30.026	71.932	7528.419	10.218	15.021	501.185	15066.743	35.973	3.818	4.849
	30.175	72.300	7644.550	10.270	15.096	506.394	15299.159	36.157	3.844	4.882
L14	30.175	69.154	7329.687	10.282	15.096	485.537	14669.019	34.584	3.906	5.193
	30.188	69.185	7339.411	10.287	15.103	485.972	14688.480	34.599	3.908	5.196

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L15	30.188	70.029	7424.139	10.284	15.103	491.582	14858.048	35.021	3.892	5.11
	32.301	75.059	9141.468	11.022	16.159	565.703	18294.964	37.537	4.258	5.591

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 108.000-98.500				1	1	1			
L2 98.500-98.000				1	1	1			
L3 98.000-82.330				1	1	1			
L4 82.330-76.250				1	1	1.01961			
L5 76.250-74.500				1	1	1.13109			
L6 74.500-58.080				1	1	0.979328			
L7 58.080-57.750				1	1	0.924481			
L8 57.750-47.000				1	1	0.936878			
L9 47.000-40.500				1	1	0.944304			
L10 40.500-27.750				1	1	0.957892			
L11 27.750-19.500				1	1	0.968253			
L12 19.500-14.000				1	1	0.883534			
L13 14.000-13.080				1	1	0.95556			
L14 13.080-13.000				1	1	0.998738			
L15 13.000-0.000				1	1	0.970114			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
LDF6-50A(1-1/4) (E) HB158-1-08U8-S8J18(1-5/8) (1P+1E) **%**	A	Surface Ar (CaAa)	105.000 - 0.000	6	6	-0.500 -0.200	1.550		0.001
	A	Surface Ar (CaAa)	105.000 - 0.000	2	2	-0.300 -0.200	1.980		0.001
2" Rigid Conduit (E-Clearwire) **%**	B	Surface Ar (CaAa)	98.000 - 0.000	2	2	-0.170 0.000	2.000		0.003
ATCB-B01(5/16) (E)	C	Surface Ar (CaAa)	81.000 - 0.000	1	1	-0.360 -0.350	0.315		0.000
FXL 780 PE(7/8) (E) **%**	C	Surface Ar (CaAa)	81.000 - 0.000	6	3	-0.500 -0.350	1.090		0.000

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	klf
Safety Line 3/8	B	Surface Ar	108.000 - 0.000	1	1	0.000	0.375		0.000
(E)		(CaAa)				0.000			
@									
5.25" x 1.25" Plate	A	Surface Af	29.750 - 0.000	1	1	0.200	5.250	13.000	0.000
(E-VSI Mod)		(CaAa)				0.200			
5.25" x 1.25" Plate	B	Surface Af	29.750 - 0.000	1	1	0.000	5.250	13.000	0.000
(E-VSI Mod)		(CaAa)				0.000			
5.25" x 1.25" Plate	C	Surface Af	15.500 - 0.000	1	1	-0.300	5.250	13.000	0.000
(E-VSI Mod)		(CaAa)				-0.300			
5.25" x 1.25" Plate	C	Surface Af	29.750 - 10.250	1	1	0.000	5.250	13.000	0.000
(E-VSI Mod)		(CaAa)				0.000			
5.25" x 1.25" Plate	C	Surface Af	15.500 - 0.000	1	1	0.300	5.250	13.000	0.000
(E-VSI Mod)		(CaAa)				0.300			
**									
4.375" x 1.25" Plate	A	Surface Af	59.500 - 29.750	1	1	0.200	4.375	11.250	0.000
(E-VSI Mod)		(CaAa)				0.200			
4.375" x 1.25" Plate	B	Surface Af	59.500 - 29.750	1	1	0.000	4.375	11.250	0.000
(E-VSI Mod)		(CaAa)				0.000			
4.375" x 1.25" Plate	C	Surface Af	59.500 - 29.750	1	1	0.000	4.375	11.250	0.000
(E-VSI Mod)		(CaAa)				0.000			
**									
4.0" x 1.25" Plate	A	Surface Af	78.000 - 59.500	1	1	0.200	4.000	10.500	0.000
(E-VSI Mod)		(CaAa)				0.200			
4.0" x 1.25" Plate	B	Surface Af	78.000 - 59.500	1	1	0.000	4.000	10.500	0.000
(E-VSI Mod)		(CaAa)				0.000			
4.0" x 1.25" Plate	C	Surface Af	78.000 - 59.500	1	1	0.000	4.000	10.500	0.000
(E-VSI Mod)		(CaAa)				0.000			
@									
MP3-05	A	Surface Af	40.500 - 0.000	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-05	B	Surface Af	40.500 - 10.500	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-05	B	Surface Af	15.500 - 0.000	1	1	-0.200	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.200			
MP3-05	C	Surface Af	40.500 - 0.000	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
**									
MP3-05	A	Surface Af	60.500 - 40.500	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-05	B	Surface Af	60.500 - 40.500	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-05	C	Surface Af	60.500 - 40.500	1	1	-0.500	5.330	14.840	0.000
(E-B+T Mod)		(CaAa)				-0.500			
**									
MP3-03	A	Surface Af	75.670 - 60.500	1	1	-0.500	4.060	11.260	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-03	A	Surface Af	84.000 - 74.000	1	1	-0.300	4.060	11.260	0.000
(E-B+T Mod)		(CaAa)				-0.300			
MP3-03	B	Surface Af	83.500 - 60.500	1	1	-0.500	4.060	11.260	0.000
(E-B+T Mod)		(CaAa)				-0.500			
MP3-03	C	Surface Af	83.500 - 60.500	1	1	-0.500	4.060	11.260	0.000
(E-B+T Mod)		(CaAa)				-0.500			
@									
CCI 4.5" x 1" Plate	A	Surface Af	15.500 - 0.000	1	1	0.000	4.500	11.000	0.000
(P-Mod)		(CaAa)				0.000			
**									
CCI 4.5" x 1" Plate	B	Surface Af	21.000 - 11.000	1	1	0.300	4.500	11.000	0.000
(P-Mod)		(CaAa)				0.300			
@									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF6-50A(1-1/4) (E)	A	No	Inside Pole	105.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
ATCB-B01-005(5/16) (E-Inside Conduit)	B	No	Inside Pole	98.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
HJ4-50(1/2) (E-Inside Conduit)	B	No	Inside Pole	98.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
%								
HB058-M12-XXXF(5/8) (E-Sprint)	B	No	Inside Pole	98.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
HB114-1-08U4-M5J(1-1/4) (E-Sprint)	B	No	Inside Pole	98.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
%								
LDF4-50A(1/2) (E)	B	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
@								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	108.000-98.500	A	0.000	0.000	8.619	0.000	0.064
		B	0.000	0.000	0.356	0.000	0.002
		C	0.000	0.000	0.000	0.000	0.000
L2	98.500-98.000	A	0.000	0.000	0.663	0.000	0.005
		B	0.000	0.000	0.019	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L3	98.000-82.330	A	0.000	0.000	21.908	0.000	0.154
		B	0.000	0.000	7.647	0.000	0.157
		C	0.000	0.000	0.792	0.000	0.000
L4	82.330-76.250	A	0.000	0.000	13.343	0.000	0.060
		B	0.000	0.000	7.941	0.000	0.061
		C	0.000	0.000	6.984	0.000	0.007
L5	76.250-74.500	A	0.000	0.000	5.463	0.000	0.017
		B	0.000	0.000	3.116	0.000	0.018
		C	0.000	0.000	2.978	0.000	0.003
L6	74.500-58.080	A	0.000	0.000	44.770	0.000	0.161
		B	0.000	0.000	29.842	0.000	0.167
		C	0.000	0.000	28.545	0.000	0.026
L7	58.080-57.750	A	0.000	0.000	0.971	0.000	0.003
		B	0.000	0.000	0.678	0.000	0.003
		C	0.000	0.000	0.652	0.000	0.001
L8	57.750-47.000	A	0.000	0.000	31.643	0.000	0.105
		B	0.000	0.000	22.091	0.000	0.109
		C	0.000	0.000	21.242	0.000	0.017
L9	47.000-40.500	A	0.000	0.000	19.133	0.000	0.064
		B	0.000	0.000	13.358	0.000	0.066
		C	0.000	0.000	12.844	0.000	0.010
L10	40.500-27.750	A	0.000	0.000	37.821	0.000	0.125

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	26.493	0.000	0.130
		C	0.000	0.000	25.486	0.000	0.020
L11	27.750-19.500	A	0.000	0.000	25.487	0.000	0.081
		B	0.000	0.000	19.282	0.000	0.084
		C	0.000	0.000	17.505	0.000	0.013
L12	19.500-14.000	A	0.000	0.000	18.116	0.000	0.054
		B	0.000	0.000	17.562	0.000	0.056
		C	0.000	0.000	14.295	0.000	0.009
L13	14.000-13.080	A	0.000	0.000	3.532	0.000	0.009
		B	0.000	0.000	3.532	0.000	0.009
		C	0.000	0.000	3.562	0.000	0.001
L14	13.080-13.000	A	0.000	0.000	0.307	0.000	0.001
		B	0.000	0.000	0.307	0.000	0.001
		C	0.000	0.000	0.310	0.000	0.000
L15	13.000-0.000	A	0.000	0.000	49.911	0.000	0.127
		B	0.000	0.000	32.332	0.000	0.132
		C	0.000	0.000	41.365	0.000	0.020

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	108.000-98.500	A	2.242	0.000	0.000	18.059	0.000	0.325
		B		0.000	0.000	4.615	0.000	0.070
		C		0.000	0.000	0.000	0.000	0.000
L2	98.500-98.000	A	2.230	0.000	0.000	1.386	0.000	0.025
		B		0.000	0.000	0.242	0.000	0.004
		C		0.000	0.000	0.000	0.000	0.000
L3	98.000-82.330	A	2.211	0.000	0.000	44.883	0.000	0.801
		B		0.000	0.000	25.323	0.000	0.524
		C		0.000	0.000	1.309	0.000	0.020
L4	82.330-76.250	A	2.183	0.000	0.000	24.405	0.000	0.425
		B		0.000	0.000	17.941	0.000	0.322
		C		0.000	0.000	15.457	0.000	0.249
L5	76.250-74.500	A	2.172	0.000	0.000	9.658	0.000	0.161
		B		0.000	0.000	6.523	0.000	0.112
		C		0.000	0.000	6.352	0.000	0.100
L6	74.500-58.080	A	2.144	0.000	0.000	81.732	0.000	1.322
		B		0.000	0.000	61.407	0.000	1.042
		C		0.000	0.000	59.810	0.000	0.933
L7	58.080-57.750	A	2.116	0.000	0.000	1.709	0.000	0.027
		B		0.000	0.000	1.305	0.000	0.022
		C		0.000	0.000	1.273	0.000	0.019
L8	57.750-47.000	A	2.094	0.000	0.000	55.469	0.000	0.870
		B		0.000	0.000	42.303	0.000	0.696
		C		0.000	0.000	41.257	0.000	0.624
L9	47.000-40.500	A	2.057	0.000	0.000	33.539	0.000	0.526
		B		0.000	0.000	25.578	0.000	0.421
		C		0.000	0.000	24.946	0.000	0.377
L10	40.500-27.750	A	2.006	0.000	0.000	65.069	0.000	0.985
		B		0.000	0.000	49.510	0.000	0.787
		C		0.000	0.000	48.271	0.000	0.701
L11	27.750-19.500	A	1.934	0.000	0.000	42.582	0.000	0.620
		B		0.000	0.000	33.996	0.000	0.517
		C		0.000	0.000	31.742	0.000	0.441
L12	19.500-14.000	A	1.869	0.000	0.000	29.730	0.000	0.418
		B		0.000	0.000	28.508	0.000	0.415

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	24.493	0.000	0.325
L13	14.000-13.080	A	1.830	0.000	0.000	5.678	0.000	0.077
		B		0.000	0.000	5.548	0.000	0.078
		C		0.000	0.000	5.682	0.000	0.072
L14	13.080-13.000	A	1.823	0.000	0.000	0.493	0.000	0.007
		B		0.000	0.000	0.482	0.000	0.007
		C		0.000	0.000	0.493	0.000	0.006
L15	13.000-0.000	A	1.698	0.000	0.000	78.422	0.000	0.998
		B		0.000	0.000	53.324	0.000	0.734
		C		0.000	0.000	66.036	0.000	0.789

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	108.000-98.500	-0.711	0.088	-0.469	0.008
L2	98.500-98.000	-0.984	0.129	-0.717	0.038
L3	98.000-82.330	-0.745	-0.076	-0.469	-0.167
L4	82.330-76.250	-0.430	-0.183	-0.188	-0.146
L5	76.250-74.500	-0.286	-0.014	-0.096	-0.007
L6	74.500-58.080	-0.123	-0.067	0.013	-0.030
L7	58.080-57.750	-0.100	-0.079	0.021	-0.035
L8	57.750-47.000	-0.103	-0.082	0.022	-0.036
L9	47.000-40.500	-0.105	-0.084	0.023	-0.038
L10	40.500-27.750	-0.103	-0.093	0.024	-0.043
L11	27.750-19.500	-0.028	-0.082	0.068	-0.034
L12	19.500-14.000	0.127	0.019	0.165	0.030
L13	14.000-13.080	0.030	-0.081	0.073	-0.055
L14	13.080-13.000	0.030	-0.081	0.073	-0.056
L15	13.000-0.000	0.070	-0.225	0.122	-0.160

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	LDF6-50A(1-1/4)	98.50 - 105.00	1.0000	1.0000
L1	3	HB158-1-08U8-S8J18(1-5/8)	98.50 - 105.00	1.0000	1.0000
L1	17	Safety Line 3/8	98.50 - 108.00	1.0000	1.0000
L2	2	LDF6-50A(1-1/4)	98.00 - 98.50	1.0000	1.0000
L2	3	HB158-1-08U8-S8J18(1-5/8)	98.00 - 98.50	1.0000	1.0000
L2	17	Safety Line 3/8	98.00 - 98.50	1.0000	1.0000
L3	2	LDF6-50A(1-1/4)	82.33 - 98.00	1.0000	1.0000
L3	3	HB158-1-08U8-S8J18(1-5/8)	82.33 - 98.00	1.0000	1.0000
L3	5	2" Rigid Conduit	82.33 - 98.00	1.0000	1.0000
L3	17	Safety Line 3/8	82.33 - 98.00	1.0000	1.0000
L3	43	MP3-03	82.33 - 84.00	1.0000	1.0000
L3	44	MP3-03	82.33 - 83.50	1.0000	1.0000
L3	45	MP3-03	82.33 - 83.50	1.0000	1.0000
L4	2	LDF6-50A(1-1/4)	76.25 - 82.33	1.0000	1.0000
L4	3	HB158-1-08U8-S8J18(1-5/8)	76.25 - 82.33	1.0000	1.0000
L4	5	2" Rigid Conduit	76.25 - 82.33	1.0000	1.0000
L4	12	ATCB-B01(5/16)	76.25 - 81.00	1.0000	1.0000
L4	13	FXL 780 PE(7/8)	76.25 - 81.00	1.0000	1.0000
L4	17	Safety Line 3/8	76.25 - 82.33	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L4	29	4.0" x 1.25" Plate	76.25 - 78.00	1.0000	1.0000
L4	30	4.0" x 1.25" Plate	76.25 - 78.00	1.0000	1.0000
L4	31	4.0" x 1.25" Plate	76.25 - 78.00	1.0000	1.0000
L4	43	MP3-03	76.25 - 82.33	1.0000	1.0000
L4	44	MP3-03	76.25 - 82.33	1.0000	1.0000
L4	45	MP3-03	76.25 - 82.33	1.0000	1.0000
L5	2	LDF6-50A(1-1/4)	74.50 - 76.25	1.0000	1.0000
L5	3	HB158-1-08U8-S8J18(1-5/8)	74.50 - 76.25	1.0000	1.0000
L5	5	2" Rigid Conduit	74.50 - 76.25	1.0000	1.0000
L5	12	ATCB-B01(5/16)	74.50 - 76.25	1.0000	1.0000
L5	13	FXL 780 PE(7/8)	74.50 - 76.25	1.0000	1.0000
L5	17	Safety Line 3/8	74.50 - 76.25	1.0000	1.0000
L5	29	4.0" x 1.25" Plate	74.50 - 76.25	1.0000	1.0000
L5	30	4.0" x 1.25" Plate	74.50 - 76.25	1.0000	1.0000
L5	31	4.0" x 1.25" Plate	74.50 - 76.25	1.0000	1.0000
L5	42	MP3-03	74.50 - 75.67	1.0000	1.0000
L5	43	MP3-03	74.50 - 76.25	1.0000	1.0000
L5	44	MP3-03	74.50 - 76.25	1.0000	1.0000
L5	45	MP3-03	74.50 - 76.25	1.0000	1.0000
L6	2	LDF6-50A(1-1/4)	58.08 - 74.50	1.0000	1.0000
L6	3	HB158-1-08U8-S8J18(1-5/8)	58.08 - 74.50	1.0000	1.0000
L6	5	2" Rigid Conduit	58.08 - 74.50	1.0000	1.0000
L6	12	ATCB-B01(5/16)	58.08 - 74.50	1.0000	1.0000
L6	13	FXL 780 PE(7/8)	58.08 - 74.50	1.0000	1.0000
L6	17	Safety Line 3/8	58.08 - 74.50	1.0000	1.0000
L6	25	4.375" x 1.25" Plate	58.08 - 59.50	1.0000	1.0000
L6	26	4.375" x 1.25" Plate	58.08 - 59.50	1.0000	1.0000
L6	27	4.375" x 1.25" Plate	58.08 - 59.50	1.0000	1.0000
L6	29	4.0" x 1.25" Plate	59.50 - 74.50	1.0000	1.0000
L6	30	4.0" x 1.25" Plate	59.50 - 74.50	1.0000	1.0000
L6	31	4.0" x 1.25" Plate	59.50 - 74.50	1.0000	1.0000
L6	38	MP3-05	58.08 - 60.50	1.0000	1.0000
L6	39	MP3-05	58.08 - 60.50	1.0000	1.0000
L6	40	MP3-05	58.08 - 60.50	1.0000	1.0000
L6	42	MP3-03	60.50 - 74.50	1.0000	1.0000
L6	43	MP3-03	74.00 - 74.50	1.0000	1.0000
L6	44	MP3-03	60.50 - 74.50	1.0000	1.0000
L6	45	MP3-03	60.50 - 74.50	1.0000	1.0000
L7	2	LDF6-50A(1-1/4)	57.75 - 58.08	1.0000	1.0000
L7	3	HB158-1-08U8-S8J18(1-5/8)	57.75 - 58.08	1.0000	1.0000
L7	5	2" Rigid Conduit	57.75 - 58.08	1.0000	1.0000
L7	12	ATCB-B01(5/16)	57.75 - 58.08	1.0000	1.0000
L7	13	FXL 780 PE(7/8)	57.75 - 58.08	1.0000	1.0000
L7	17	Safety Line 3/8	57.75 - 58.08	1.0000	1.0000
L7	25	4.375" x 1.25" Plate	57.75 - 58.08	1.0000	1.0000
L7	26	4.375" x 1.25" Plate	57.75 - 58.08	1.0000	1.0000
L7	27	4.375" x 1.25" Plate	57.75 - 58.08	1.0000	1.0000
L7	38	MP3-05	57.75 - 58.08	1.0000	1.0000
L7	39	MP3-05	57.75 - 58.08	1.0000	1.0000
L7	40	MP3-05	57.75 - 58.08	1.0000	1.0000
L8	2	LDF6-50A(1-1/4)	47.00 - 57.75	1.0000	1.0000
L8	3	HB158-1-08U8-S8J18(1-5/8)	47.00 - 57.75	1.0000	1.0000
L8	5	2" Rigid Conduit	47.00 - 57.75	1.0000	1.0000
L8	12	ATCB-B01(5/16)	47.00 - 57.75	1.0000	1.0000
L8	13	FXL 780 PE(7/8)	47.00 - 57.75	1.0000	1.0000
L8	17	Safety Line 3/8	47.00 - 57.75	1.0000	1.0000
L8	25	4.375" x 1.25" Plate	47.00 - 57.75	1.0000	1.0000
L8	26	4.375" x 1.25" Plate	47.00 - 57.75	1.0000	1.0000
L8	27	4.375" x 1.25" Plate	47.00 - 57.75	1.0000	1.0000
L8	38	MP3-05	47.00 - 57.75	1.0000	1.0000
L8	39	MP3-05	47.00 - 57.75	1.0000	1.0000
L8	40	MP3-05	47.00 - 57.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L10	2	LDF6-50A(1-1/4)	27.75 - 40.50	1.0000	1.0000
L10	3	HB158-1-08U8-S8J18(1-5/8)	27.75 - 40.50	1.0000	1.0000
L10	5	2" Rigid Conduit	27.75 - 40.50	1.0000	1.0000
L10	12	ATCB-B01(5/16)	27.75 - 40.50	1.0000	1.0000
L10	13	FXL 780 PE(7/8)	27.75 - 40.50	1.0000	1.0000
L10	17	Safety Line 3/8	27.75 - 40.50	1.0000	1.0000
L10	19	5.25" x 1.25" Plate	27.75 - 29.75	1.0000	1.0000
L10	20	5.25" x 1.25" Plate	27.75 - 29.75	1.0000	1.0000
L10	22	5.25" x 1.25" Plate	27.75 - 29.75	1.0000	1.0000
L10	25	4.375" x 1.25" Plate	29.75 - 40.50	1.0000	1.0000
L10	26	4.375" x 1.25" Plate	29.75 - 40.50	1.0000	1.0000
L10	27	4.375" x 1.25" Plate	29.75 - 40.50	1.0000	1.0000
L10	33	MP3-05	27.75 - 40.50	1.0000	1.0000
L10	34	MP3-05	27.75 - 40.50	1.0000	1.0000
L10	36	MP3-05	27.75 - 40.50	1.0000	1.0000
L11	2	LDF6-50A(1-1/4)	19.50 - 27.75	1.0000	1.0000
L11	3	HB158-1-08U8-S8J18(1-5/8)	19.50 - 27.75	1.0000	1.0000
L11	5	2" Rigid Conduit	19.50 - 27.75	1.0000	1.0000
L11	12	ATCB-B01(5/16)	19.50 - 27.75	1.0000	1.0000
L11	13	FXL 780 PE(7/8)	19.50 - 27.75	1.0000	1.0000
L11	17	Safety Line 3/8	19.50 - 27.75	1.0000	1.0000
L11	19	5.25" x 1.25" Plate	19.50 - 27.75	1.0000	1.0000
L11	20	5.25" x 1.25" Plate	19.50 - 27.75	1.0000	1.0000
L11	22	5.25" x 1.25" Plate	19.50 - 27.75	1.0000	1.0000
L11	33	MP3-05	19.50 - 27.75	1.0000	1.0000
L11	34	MP3-05	19.50 - 27.75	1.0000	1.0000
L11	36	MP3-05	19.50 - 27.75	1.0000	1.0000
L11	49	CCI 4.5" x 1" Plate	19.50 - 21.00	1.0000	1.0000
L12	2	LDF6-50A(1-1/4)	14.00 - 19.50	1.0000	1.0000
L12	3	HB158-1-08U8-S8J18(1-5/8)	14.00 - 19.50	1.0000	1.0000
L12	5	2" Rigid Conduit	14.00 - 19.50	1.0000	1.0000
L12	12	ATCB-B01(5/16)	14.00 - 19.50	1.0000	1.0000
L12	13	FXL 780 PE(7/8)	14.00 - 19.50	1.0000	1.0000
L12	17	Safety Line 3/8	14.00 - 19.50	1.0000	1.0000
L12	19	5.25" x 1.25" Plate	14.00 - 19.50	1.0000	1.0000
L12	20	5.25" x 1.25" Plate	14.00 - 19.50	1.0000	1.0000
L12	21	5.25" x 1.25" Plate	14.00 - 15.50	1.0000	1.0000
L12	22	5.25" x 1.25" Plate	14.00 - 19.50	1.0000	1.0000
L12	23	5.25" x 1.25" Plate	14.00 - 15.50	1.0000	1.0000
L12	33	MP3-05	14.00 - 19.50	1.0000	1.0000
L12	34	MP3-05	14.00 - 19.50	1.0000	1.0000
L12	35	MP3-05	14.00 - 15.50	1.0000	1.0000
L12	36	MP3-05	14.00 - 19.50	1.0000	1.0000
L12	47	CCI 4.5" x 1" Plate	14.00 - 15.50	1.0000	1.0000
L12	49	CCI 4.5" x 1" Plate	14.00 - 19.50	1.0000	1.0000
L13	2	LDF6-50A(1-1/4)	13.08 - 14.00	1.0000	1.0000
L13	3	HB158-1-08U8-S8J18(1-5/8)	13.08 - 14.00	1.0000	1.0000
L13	5	2" Rigid Conduit	13.08 - 14.00	1.0000	1.0000
L13	12	ATCB-B01(5/16)	13.08 - 14.00	1.0000	1.0000
L13	13	FXL 780 PE(7/8)	13.08 - 14.00	1.0000	1.0000
L13	17	Safety Line 3/8	13.08 - 14.00	1.0000	1.0000
L13	19	5.25" x 1.25" Plate	13.08 - 14.00	1.0000	1.0000
L13	20	5.25" x 1.25" Plate	13.08 - 14.00	1.0000	1.0000
L13	21	5.25" x 1.25" Plate	13.08 - 14.00	1.0000	1.0000
L13	22	5.25" x 1.25" Plate	13.08 - 14.00	1.0000	1.0000
L13	23	5.25" x 1.25" Plate	13.08 - 14.00	1.0000	1.0000
L13	33	MP3-05	13.08 - 14.00	1.0000	1.0000
L13	34	MP3-05	13.08 - 14.00	1.0000	1.0000
L13	35	MP3-05	13.08 - 14.00	1.0000	1.0000
L13	36	MP3-05	13.08 - 14.00	1.0000	1.0000
L13	47	CCI 4.5" x 1" Plate	13.08 - 14.00	1.0000	1.0000
L13	49	CCI 4.5" x 1" Plate	13.08 - 14.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L14	2	LDF6-50A(1-1/4)	13.00 - 13.08	1.0000	1.0000
L14	3	HB158-1-08U8-S8J18(1-5/8)	13.00 - 13.08	1.0000	1.0000
L14	5	2" Rigid Conduit	13.00 - 13.08	1.0000	1.0000
L14	12	ATCB-B01(5/16)	13.00 - 13.08	1.0000	1.0000
L14	13	FXL 780 PE(7/8)	13.00 - 13.08	1.0000	1.0000
L14	17	Safety Line 3/8	13.00 - 13.08	1.0000	1.0000
L14	19	5.25" x 1.25" Plate	13.00 - 13.08	1.0000	1.0000
L14	20	5.25" x 1.25" Plate	13.00 - 13.08	1.0000	1.0000
L14	21	5.25" x 1.25" Plate	13.00 - 13.08	1.0000	1.0000
L14	22	5.25" x 1.25" Plate	13.00 - 13.08	1.0000	1.0000
L14	23	5.25" x 1.25" Plate	13.00 - 13.08	1.0000	1.0000
L14	33	MP3-05	13.00 - 13.08	1.0000	1.0000
L14	34	MP3-05	13.00 - 13.08	1.0000	1.0000
L14	35	MP3-05	13.00 - 13.08	1.0000	1.0000
L14	36	MP3-05	13.00 - 13.08	1.0000	1.0000
L14	47	CCI 4.5" x 1" Plate	13.00 - 13.08	1.0000	1.0000
L14	49	CCI 4.5" x 1" Plate	13.00 - 13.08	1.0000	1.0000
L15	2	LDF6-50A(1-1/4)	0.00 - 13.00	1.0000	1.0000
L15	3	HB158-1-08U8-S8J18(1-5/8)	0.00 - 13.00	1.0000	1.0000
L15	5	2" Rigid Conduit	0.00 - 13.00	1.0000	1.0000
L15	12	ATCB-B01(5/16)	0.00 - 13.00	1.0000	1.0000
L15	13	FXL 780 PE(7/8)	0.00 - 13.00	1.0000	1.0000
L15	17	Safety Line 3/8	0.00 - 13.00	1.0000	1.0000
L15	19	5.25" x 1.25" Plate	0.00 - 13.00	1.0000	1.0000
L15	20	5.25" x 1.25" Plate	0.00 - 13.00	1.0000	1.0000
L15	21	5.25" x 1.25" Plate	0.00 - 13.00	1.0000	1.0000
L15	22	5.25" x 1.25" Plate	10.25 - 13.00	1.0000	1.0000
L15	23	5.25" x 1.25" Plate	0.00 - 13.00	1.0000	1.0000
L15	33	MP3-05	0.00 - 13.00	1.0000	1.0000
L15	34	MP3-05	10.50 - 13.00	1.0000	1.0000
L15	35	MP3-05	0.00 - 13.00	1.0000	1.0000
L15	36	MP3-05	0.00 - 13.00	1.0000	1.0000
L15	47	CCI 4.5" x 1" Plate	0.00 - 13.00	1.0000	1.0000
L15	49	CCI 4.5" x 1" Plate	11.00 - 13.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-171063-12BF w/Mount Pipe	A	From Leg	4.000	0.000	0.000	105.000	No Ice	4.963	5.220	0.040
			0.000				1/2" Ice	5.510	6.377	0.086
(E)			0.000				1" Ice	6.022	7.243	0.139
BXA-171063-12BF w/Mount Pipe	B	From Leg	4.000	0.000	0.000	105.000	No Ice	4.963	5.220	0.040
			0.000				1/2" Ice	5.510	6.377	0.086
(E)			0.000				1" Ice	6.022	7.243	0.139
BXA-171063-12BF w/Mount Pipe	C	From Leg	4.000	0.000	0.000	105.000	No Ice	4.963	5.220	0.040
			0.000				1/2" Ice	5.510	6.377	0.086
(E)			0.000				1" Ice	6.022	7.243	0.139
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	105.000	No Ice	7.819	5.407	0.042
			0.000				1/2" Ice	8.370	6.558	0.101
(E)			0.000				1" Ice	8.886	7.422	0.168
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	105.000	No Ice	7.819	5.407	0.042
			0.000				1/2" Ice	8.370	6.558	0.101
(E)			0.000				1" Ice	8.886	7.422	0.168

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	7.819 8.370	5.407 6.558	0.042 0.101
(E)			0.000			1" Ice	8.886	7.422	0.168
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	105.000	No Ice	4.800	2.000	0.044
(E)			0.000 0.000			1/2" Ice 1" Ice	5.070 5.348	2.193 2.393	0.080 0.120
(2) SBNHH-1D65B	A	From Leg	4.000	0.000	105.000	No Ice	8.160	5.396	0.041
(P)			0.000 0.000			1/2" Ice 1" Ice	8.619 9.085	5.853 6.317	0.091 0.148
(2) SBNHH-1D65B	B	From Leg	4.000	0.000	105.000	No Ice	8.160	5.396	0.041
(P)			0.000 0.000			1/2" Ice 1" Ice	8.619 9.085	5.853 6.317	0.091 0.148
(2) SBNHH-1D65B	C	From Leg	4.000	0.000	105.000	No Ice	8.160	5.396	0.041
(P)			0.000 0.000			1/2" Ice 1" Ice	8.619 9.085	5.853 6.317	0.091 0.148
B13 RRH 4X30	A	From Leg	4.000	0.000	105.000	No Ice	2.055	1.320	0.056
(P)			0.000 0.000			1/2" Ice 1" Ice	2.241 2.433	1.475 1.638	0.073 0.093
B13 RRH 4X30	B	From Leg	4.000	0.000	105.000	No Ice	2.055	1.320	0.056
(P)			0.000 0.000			1/2" Ice 1" Ice	2.241 2.433	1.475 1.638	0.073 0.093
B13 RRH 4X30	C	From Leg	4.000	0.000	105.000	No Ice	2.055	1.320	0.056
(P)			0.000 0.000			1/2" Ice 1" Ice	2.241 2.433	1.475 1.638	0.073 0.093
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	105.000	No Ice	4.800	2.000	0.044
(P)			0.000 0.000			1/2" Ice 1" Ice	5.070 5.348	2.193 2.393	0.080 0.120
RRH4X45-AWS4 B66	A	From Leg	4.000	0.000	105.000	No Ice	2.660	1.586	0.064
(P)			0.000 0.000			1/2" Ice 1" Ice	2.878 3.104	1.769 1.959	0.084 0.108
RRH4X45-AWS4 B66	B	From Leg	4.000	0.000	105.000	No Ice	2.660	1.586	0.064
(P)			0.000 0.000			1/2" Ice 1" Ice	2.878 3.104	1.769 1.959	0.084 0.108
RRH4X45-AWS4 B66	C	From Leg	4.000	0.000	105.000	No Ice	2.660	1.586	0.064
(P)			0.000 0.000			1/2" Ice 1" Ice	2.878 3.104	1.769 1.959	0.084 0.108
B25 RRH4X30	A	From Leg	4.000	0.000	105.000	No Ice	2.120	1.293	0.053
(P)			0.000 0.000			1/2" Ice 1" Ice	2.308 2.504	1.448 1.611	0.070 0.090
B25 RRH4X30	B	From Leg	4.000	0.000	105.000	No Ice	2.120	1.293	0.053
(P)			0.000 0.000			1/2" Ice 1" Ice	2.308 2.504	1.448 1.611	0.070 0.090
B25 RRH4X30	C	From Leg	4.000	0.000	105.000	No Ice	2.120	1.293	0.053
(P)			0.000 0.000			1/2" Ice 1" Ice	2.308 2.504	1.448 1.611	0.070 0.090
Sector Mount [SM 402-3]	C	None		0.000	105.000	No Ice	18.910	18.910	0.851
(E)						1/2" Ice 1" Ice	26.780 34.650	26.780 34.650	1.233 1.616
%									
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	98.000	No Ice 1/2" Ice	8.262 8.822	7.471 8.656	0.088 0.158
(E)			1.000			1" Ice	9.346	9.556	0.237
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	98.000	No Ice 1/2" Ice	8.262 8.822	6.946 8.127	0.083 0.151
(E)			1.000			1" Ice	9.346	9.021	0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	98.000	No Ice 1/2" Ice	8.262 8.822	6.946 8.127	0.083 0.151

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			1.000			1" Ice	9.346	9.021	0.227
LLPX310R w/ Mount Pipe	A	From Leg	4.000	0.000	98.000	No Ice	4.538	2.985	0.045
(E-Clearwire)			0.000			1/2" Ice	4.892	3.528	0.083
			1.000			1" Ice	5.254	4.087	0.126
LLPX310R w/ Mount Pipe	B	From Leg	4.000	0.000	98.000	No Ice	4.538	2.985	0.045
(E-Clearwire)			0.000			1/2" Ice	4.892	3.528	0.083
			1.000			1" Ice	5.254	4.087	0.126
LLPX310R w/ Mount Pipe	C	From Leg	4.000	0.000	98.000	No Ice	4.538	2.985	0.045
(E-Clearwire)			0.000			1/2" Ice	4.892	3.528	0.083
			1.000			1" Ice	5.254	4.087	0.126
APXVTM14-C-120 w/	A	From Leg	4.000	0.000	98.000	No Ice	6.580	4.959	0.077
Mount Pipe			0.000			1/2" Ice	7.031	5.754	0.132
(E)			1.000			1" Ice	7.473	6.472	0.193
APXVTM14-C-120 w/	B	From Leg	4.000	0.000	98.000	No Ice	6.580	4.959	0.077
Mount Pipe			0.000			1/2" Ice	7.031	5.754	0.132
(E)			1.000			1" Ice	7.473	6.472	0.193
APXVTM14-C-120 w/	C	From Leg	4.000	0.000	98.000	No Ice	6.580	4.959	0.077
Mount Pipe			0.000			1/2" Ice	7.031	5.754	0.132
(E)			1.000			1" Ice	7.473	6.472	0.193
IBC1900BB-1	A	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
IBC1900BB-1	B	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
IBC1900BB-1	C	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	A	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	B	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
IBC1900HG-2A	C	From Leg	4.000	0.000	98.000	No Ice	0.966	0.463	0.022
(E)			0.000			1/2" Ice	1.091	0.558	0.030
			1.000			1" Ice	1.223	0.660	0.039
HORIZON COMPACT	A	From Leg	4.000	0.000	98.000	No Ice	0.721	0.368	0.012
(E-Clearwire)			0.000			1/2" Ice	0.828	0.450	0.018
			4.000			1" Ice	0.942	0.539	0.026
HORIZON COMPACT	B	From Leg	4.000	0.000	98.000	No Ice	0.721	0.368	0.012
(E-Clearwire)			0.000			1/2" Ice	0.828	0.450	0.018
			4.000			1" Ice	0.942	0.539	0.026
WIMAX DAP HEAD	A	From Leg	4.000	0.000	98.000	No Ice	1.547	0.684	0.033
(E-Clearwire)			0.000			1/2" Ice	1.704	0.800	0.045
			1.000			1" Ice	1.868	0.923	0.058
WIMAX DAP HEAD	B	From Leg	4.000	0.000	98.000	No Ice	1.547	0.684	0.033
(E-Clearwire)			0.000			1/2" Ice	1.704	0.800	0.045
			1.000			1" Ice	1.868	0.923	0.058
WIMAX DAP HEAD	C	From Leg	4.000	0.000	98.000	No Ice	1.547	0.684	0.033
(E-Clearwire)			0.000			1/2" Ice	1.704	0.800	0.045
			1.000			1" Ice	1.868	0.923	0.058
TD-RRH8x20-25	A	From Leg	4.000	0.000	98.000	No Ice	3.704	1.294	0.066
(E)			0.000			1/2" Ice	3.946	1.465	0.090
			1.000			1" Ice	4.196	1.642	0.117
TD-RRH8x20-25	B	From Leg	4.000	0.000	98.000	No Ice	3.704	1.294	0.066
(E)			0.000			1/2" Ice	3.946	1.465	0.090

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.000			1" Ice	4.196	1.642	0.117
TD-RRH8x20-25	C	From Leg	4.000	0.000	98.000	No Ice	3.704	1.294	0.066
(E)			0.000			1/2" Ice	3.946	1.465	0.090
			1.000			1" Ice	4.196	1.642	0.117
Platform Mount [LP 1201-1]	C	None		0.000	98.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
%									
PCS 1900MHz	A	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	B	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	C	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	A	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			-1.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	B	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			-1.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz	C	From Leg	2.000	0.000	96.000	No Ice	2.322	2.238	0.060
4x45W-65MHz			0.000			1/2" Ice	2.527	2.441	0.083
(E)			-1.000			1" Ice	2.739	2.651	0.110
800MHz 2X50W RRH	A	From Leg	2.000	0.000	96.000	No Ice	2.058	1.932	0.064
W/FILTER			0.000			1/2" Ice	2.240	2.109	0.086
(E)			0.000			1" Ice	2.429	2.293	0.111
800MHz 2X50W RRH	B	From Leg	2.000	0.000	96.000	No Ice	2.058	1.932	0.064
W/FILTER			0.000			1/2" Ice	2.240	2.109	0.086
(E)			0.000			1" Ice	2.429	2.293	0.111
800MHz 2X50W RRH	C	From Leg	2.000	0.000	96.000	No Ice	2.058	1.932	0.064
W/FILTER			0.000			1/2" Ice	2.240	2.109	0.086
(E)			0.000			1" Ice	2.429	2.293	0.111
4' x 2" Pipe Mount	A	From Leg	1.000	0.000	96.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	B	From Leg	1.000	0.000	96.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	C	From Leg	1.000	0.000	96.000	No Ice	0.785	0.785	0.029
(E)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Side Arm Mount [SO 102-3]	C	None		0.000	96.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
%									
%									
HBX-6516DS-VTM w/	A	From Leg	4.000	0.000	81.000	No Ice	3.598	3.241	0.029
Mount Pipe			0.000			1/2" Ice	3.998	3.914	0.062
(E)			-1.000			1" Ice	4.389	4.564	0.101
HBX-6516DS-VTM w/	B	From Leg	4.000	0.000	81.000	No Ice	3.598	3.241	0.029
Mount Pipe			0.000			1/2" Ice	3.998	3.914	0.062
(E)			-1.000			1" Ice	4.389	4.564	0.101
HBX-6516DS-VTM w/	C	From Leg	4.000	0.000	81.000	No Ice	3.598	3.241	0.029
Mount Pipe			0.000			1/2" Ice	3.998	3.914	0.062

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			-1.000			1" Ice	4.389	4.564	0.101
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			-1.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			-1.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			-1.000			1" Ice	2.294	2.294	0.048
T-Arm Mount [TA 602-3]	C	None		0.000	81.000	No Ice	11.590	11.590	0.774
(E)						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
%									
KS24019-L112A	A	From Leg	3.000	0.000	74.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			2.000			1" Ice	0.262	0.262	0.009
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	74.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
%									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-18G-2-C	A	Paraboloid	From	4.000	52.000		98.000	2.175	No Ice	3.720	0.027
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	4.010	0.048
				4.000					1" Ice	4.300	0.068
A-ANT-23G-1-C	B	Paraboloid	From	4.000	81.000		98.000	1.275	No Ice	1.280	0.007
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	1.450	0.010
				4.000					1" Ice	1.620	0.012
%											

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

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	108 - 98.5	17.607	50	1.615	0.010
L2	98.5 - 98	14.449	50	1.500	0.006
L3	98 - 82.33	14.292	50	1.498	0.006
L4	82.33 - 76.25	9.810	50	1.179	0.002
L5	76.25 - 74.5	8.382	50	1.062	0.002
L6	74.5 - 58.08	7.997	50	1.036	0.002
L7	58.08 - 57.75	4.845	50	0.789	0.001
L8	57.75 - 47	4.791	50	0.784	0.001
L9	50.25 - 40.5	3.638	50	0.683	0.001
L10	40.5 - 27.75	2.342	50	0.570	0.001
L11	27.75 - 19.5	1.074	50	0.379	0.000
L12	19.5 - 14	0.526	50	0.256	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L13	14 - 13.08	0.271	50	0.185	0.000
L14	13.08 - 13	0.237	50	0.174	0.000
L15	13 - 0	0.234	50	0.172	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.000	BXA-171063-12BF w/Mount Pipe	50	16.586	1.569	0.008	4114
102.000	A-ANT-18G-2-C	50	15.581	1.529	0.007	3536
98.000	APXV9ERR18-C-A20 w/ Mount Pipe	50	14.292	1.498	0.006	3319
96.000	PCS 1900MHz 4x45W-65MHz	50	13.671	1.480	0.005	3704
81.000	HBX-6516DS-VTM w/ Mount Pipe	50	9.483	1.149	0.002	2383
74.000	KS24019-L112A	50	7.889	1.029	0.002	3868

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	108 - 98.5	82.319	24	7.541	0.046
L2	98.5 - 98	67.622	24	7.024	0.027
L3	98 - 82.33	66.891	24	7.012	0.026
L4	82.33 - 76.25	45.965	24	5.527	0.012
L5	76.25 - 74.5	39.280	24	4.982	0.009
L6	74.5 - 58.08	37.480	24	4.860	0.009
L7	58.08 - 57.75	22.719	24	3.700	0.005
L8	57.75 - 47	22.465	24	3.680	0.005
L9	50.25 - 40.5	17.059	24	3.207	0.004
L10	40.5 - 27.75	10.983	24	2.676	0.003
L11	27.75 - 19.5	5.039	24	1.776	0.002
L12	19.5 - 14	2.466	24	1.202	0.001
L13	14 - 13.08	1.273	24	0.870	0.001
L14	13.08 - 13	1.111	24	0.814	0.001
L15	13 - 0	1.097	24	0.809	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.000	BXA-171063-12BF w/Mount Pipe	24	77.572	7.335	0.038	928
102.000	A-ANT-18G-2-C	24	72.895	7.157	0.031	797
98.000	APXV9ERR18-C-A20 w/ Mount Pipe	24	66.891	7.012	0.026	743
96.000	PCS 1900MHz 4x45W-65MHz	24	63.993	6.933	0.025	823
81.000	HBX-6516DS-VTM w/ Mount Pipe	24	44.433	5.390	0.011	518
74.000	KS24019-L112A	24	36.974	4.826	0.009	837

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	108 - 98.5 (1)	TP8.625x8.625x0.313	9.500	0.000	0.0	8.161	-1.998	257.065	0.008
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	0.500	0.000	0.0	8.161	-2.008	257.065	0.008
L3	98 - 82.33 (3)	TP19.008x16.5x0.188	15.670	0.000	0.0	11.201	-7.228	831.494	0.009
L4	82.33 - 76.25 (4)	TP19.981x19.008x0.323	6.080	0.000	0.0	20.160	-8.953	998.934	0.009
L5	76.25 - 74.5 (5)	TP20.261x19.981x0.462	1.750	0.000	0.0	29.014	-9.239	1267.950	0.007
L6	74.5 - 58.08 (6)	TP22.89x20.261x0.537	16.420	0.000	0.0	38.094	-12.282	1532.640	0.008
L7	58.08 - 57.75 (7)	TP22.942x22.89x0.698	0.330	0.000	0.0	49.259	-12.365	1967.610	0.006
L8	57.75 - 47 (8)	TP24.663x22.942x0.683	10.750	0.000	0.0	50.873	-14.026	2131.560	0.007
L9	47 - 40.5 (9)	TP25.328x23.768x0.723	9.750	0.000	0.0	56.448	-17.079	2361.020	0.007
L10	40.5 - 27.75 (10)	TP27.369x25.328x0.677	12.750	0.000	0.0	57.340	-20.428	2404.560	0.008
L11	27.75 - 19.5 (11)	TP28.689x27.369x0.689	8.250	0.000	0.0	61.203	-22.796	2790.120	0.008
L12	19.5 - 14 (12)	TP29.569x28.689x0.799	5.500	0.000	0.0	72.962	-24.493	3303.600	0.007
L13	14 - 13.08 (13)	TP29.717x29.569x0.787	0.920	0.000	0.0	72.300	-24.800	3202.980	0.008
L14	13.08 - 13 (14)	TP29.729x29.717x0.752	0.080	0.000	0.0	69.185	-24.837	2953.530	0.008
L15	13 - 0 (15)	TP31.81x29.729x0.762	13.000	0.000	0.0	75.059	-29.247	3228.500	0.009

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uv}}{\phi M_{nv}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	108 - 98.5 (1)	TP8.625x8.625x0.313	40.250	56.708	0.710	0.000	56.708	0.000
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	40.250	56.708	0.710	0.000	56.708	0.000
L3	98 - 82.33 (3)	TP19.008x16.5x0.188	246.313	321.129	0.767	0.000	321.129	0.000
L4	82.33 - 76.25 (4)	TP19.981x19.008x0.323	338.078	400.398	0.844	0.000	400.398	0.000
L5	76.25 - 74.5 (5)	TP20.261x19.981x0.462	366.051	508.446	0.720	0.000	508.446	0.000
L6	74.5 - 58.08 (6)	TP22.89x20.261x0.537	649.468	693.347	0.937	0.000	693.347	0.000
L7	58.08 - 57.75 (7)	TP22.942x22.89x0.698	655.534	879.517	0.745	0.000	879.517	0.000
L8	57.75 - 47 (8)	TP24.663x22.942x0.683	799.727	1007.033	0.794	0.000	1007.033	0.000
L9	47 - 40.5 (9)	TP25.328x23.768x0.723	1000.875	1169.633	0.856	0.000	1169.633	0.000
L10	40.5 - 27.75 (10)	TP27.369x25.328x0.677	1284.742	1297.283	0.990	0.000	1297.283	0.000
L11	27.75 - 19.5 (11)	TP28.689x27.369x0.689	1480.233	1580.258	0.937	0.000	1580.258	0.000
L12	19.5 - 14 (12)	TP29.569x28.689x0.799	1615.383	1916.592	0.843	0.000	1916.592	0.000
L13	14 - 13.08 (13)	TP29.717x29.569x0.787	1638.350	1869.483	0.876	0.000	1869.483	0.000
L14	13.08 - 13 (14)	TP29.729x29.717x0.752	1640.358	1728.858	0.949	0.000	1728.858	0.000
L15	13 - 0 (15)	TP31.81x29.729x0.762	1975.983	2027.717	0.974	0.000	2027.717	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	108 - 98.5 (1)	TP8.625x8.625x0.313	6.431	128.532	0.050	0.375	85.931	0.004
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	6.478	250.300	0.026	0.384	85.931	0.004
L3	98 - 82.33 (3)	TP19.008x16.5x0.188	13.827	415.747	0.033	0.526	643.044	0.001
L4	82.33 - 76.25 (4)	TP19.981x19.008x0.323	15.866	499.467	0.032	0.574	801.777	0.001
L5	76.25 - 74.5 (5)	TP20.261x19.981x0.462	16.116	633.977	0.025	0.583	1018.133	0.001
L6	74.5 - 58.08 (6)	TP22.89x20.261x0.537	18.364	766.319	0.024	0.609	1388.392	0.000
L7	58.08 - 57.75 (7)	TP22.942x22.89x0.698	18.403	983.803	0.019	0.610	1761.192	0.000
L8	57.75 - 47 (8)	TP24.663x22.942x0.683	19.837	1065.780	0.019	0.154	2016.525	0.000
L9	47 - 40.5 (9)	TP25.328x23.768x0.723	21.382	1180.510	0.018	0.144	2342.125	0.000
L10	40.5 - 27.75 (10)	TP27.369x25.328x0.677	23.174	1202.280	0.019	0.132	2597.733	0.000
L11	27.75 - 19.5 (11)	TP28.689x27.369x0.689	24.244	1395.060	0.017	0.134	3164.383	0.000
L12	19.5 - 14 (12)	TP29.569x28.689x0.799	24.924	1651.800	0.015	0.143	3837.867	0.000
L13	14 - 13.08 (13)	TP29.717x29.569x0.787	25.034	1601.490	0.016	0.144	3743.533	0.000
L14	13.08 - 13 (14)	TP29.729x29.717x0.752	25.033	1476.760	0.017	0.144	3461.950	0.000
L15	13 - 0 (15)	TP31.81x29.729x0.762	26.616	1614.250	0.016	0.183	4060.383	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	108 - 98.5 (1)	0.008	0.710	0.000	0.050	0.004	0.721 ✔	1.000	4.8.2 ✔
L2	98.5 - 98 (2)	0.008	0.710	0.000	0.026	0.004	0.719 ✔	1.000	4.8.2 ✔
L3	98 - 82.33 (3)	0.009	0.767	0.000	0.033	0.001	0.777 ✔	1.000	4.8.2 ✔
L4	82.33 - 76.25 (4)	0.009	0.844	0.000	0.032	0.001	0.854 ✔	1.000	4.8.2 ✔
L5	76.25 - 74.5 (5)	0.007	0.720	0.000	0.025	0.001	0.728 ✔	1.000	4.8.2 ✔
L6	74.5 - 58.08 (6)	0.008	0.937	0.000	0.024	0.000	0.945 ✔	1.000	4.8.2 ✔
L7	58.08 - 57.75 (7)	0.006	0.745	0.000	0.019	0.000	0.752 ✔	1.000	4.8.2 ✔
L8	57.75 - 47 (8)	0.007	0.794	0.000	0.019	0.000	0.801 ✔	1.000	4.8.2 ✔
L9	47 - 40.5 (9)	0.007	0.856	0.000	0.018	0.000	0.863 ✔	1.000	4.8.2 ✔
L10	40.5 - 27.75 (10)	0.008	0.990	0.000	0.019	0.000	0.999 ✔	1.000	4.8.2 ✔
L11	27.75 - 19.5 (11)	0.008	0.937	0.000	0.017	0.000	0.945 ✔	1.000	4.8.2 ✔
L12	19.5 - 14 (12)	0.007	0.843	0.000	0.015	0.000	0.850 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L13	14 - 13.08 (13)	0.008	0.876	0.000	0.016	0.000	0.884 ✔	1.000	4.8.2 ✔
L14	13.08 - 13 (14)	0.008	0.949	0.000	0.017	0.000	0.958 ✔	1.000	4.8.2 ✔
L15	13 - 0 (15)	0.009	0.974	0.000	0.016	0.000	0.984 ✔	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	108 - 98.5	Pole	TP8.625x8.625x0.313	1	-1.998	257.065	71.8	Pass
L2	98.5 - 98	Pole	TP16.5x8.625x0.313	2	-2.008	257.065	22.8	Pass
L3	98 - 82.33	Pole	TP19.008x16.5x0.188	3	-7.228	831.494	77.5	Pass
L4	82.33 - 76.25	Pole	TP19.981x19.008x0.323	4	-8.953	998.934	83.2	Pass
L5	76.25 - 74.5	Pole	TP20.261x19.981x0.462	5	-9.239	1267.950	69.9	Pass
L6	74.5 - 58.08	Pole	TP22.89x20.261x0.537	6	-12.282	1532.640	92.1	Pass
L7	58.08 - 57.75	Pole	TP22.942x22.89x0.698	7	-12.365	1967.610	73.3	Pass
L8	57.75 - 47	Pole	TP24.663x22.942x0.683	8	-14.026	2131.560	78.1	Pass
L9	47 - 40.5	Pole	TP25.328x23.768x0.723	9	-17.079	2361.020	84.2	Pass
L10	40.5 - 27.75	Pole	TP27.369x25.328x0.677	10	-20.428	2404.560	97.4	Pass
L11	27.75 - 19.5	Pole	TP28.689x27.369x0.689	11	-22.796	2790.120	92.1	Pass
L12	19.5 - 14	Pole	TP29.569x28.689x0.799	12	-24.493	3303.600	90.5	Pass
L13	14 - 13.08	Pole	TP29.717x29.569x0.787	13	-24.800	3202.980	91.0	Pass
L14	13.08 - 13	Pole	TP29.729x29.717x0.752	14	-24.837	2953.530	94.1	Pass
L15	13 - 0	Pole	TP31.81x29.729x0.762	15	-29.247	3228.500	94.9	Pass
							Summary	
						Pole (L10)	97.4	Pass
						RATING =	**97.4**	**Pass**

APPENDIX B

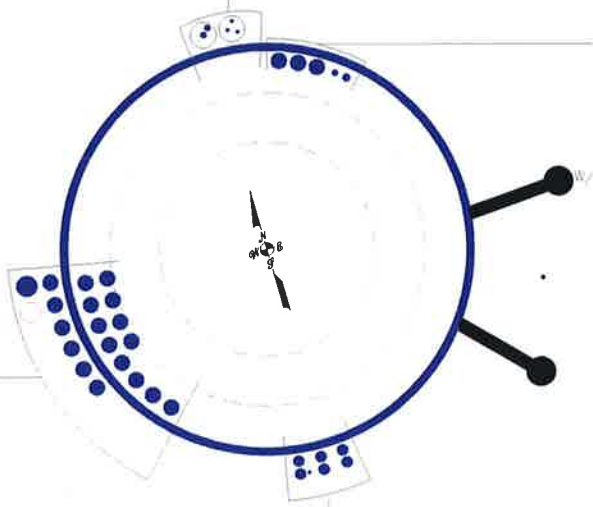
BASE LEVEL DRAWING

(INSTALLED–IN 2" CONDUIT)
(3) 5/16" TO 98 FT LEVEL
(2) 1/2" TO 98 FT LEVEL

(INSTALLED)
(1) 1/2" TO 74 FT LEVEL
(1) 5/8" TO 98 FT LEVEL
(3) 1–1/4" TO 98 FT LEVEL

CLIMBING PEGS
W/ SAFETY CLIMB

(PROPOSED)
(1) 1–5/8" TO 105 FT LEVEL
(INSTALLED–TO BE REMOVED)
(6) 1–1/4" TO 105 FT LEVEL
(INSTALLED)
(12) 1–1/4" TO 105 FT LEVEL
(1) 1–5/8" TO 105 FT LEVEL



(INSTALLED)
(1) 5/16" TO 81 FT LEVEL
(6) 7/8" TO 81 FT LEVEL

BUSINESS UNIT:876363

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforced Pole Stress
and Effective Thickness Check

Section	Loads	Pole	Unreinforced Pole	Reinforced Pole	Reinforcement 1	Reinforcement 2	Reinforcement 3	Lateral Loads
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	13	4	VS-1.25x5.25	F	T&C
13	27.75	3	VS-1.25x5.25	F	T&C
27.75	57.75	3	VS-1.25x4.375	F	T&C
57.75	76.25	3	VS-1.25x4	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1					1					1				1	
		1					1							1			
		1					1							1			
		1					1							1			

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0	13.08	3	MP305	F	T&C
13.08	40.5	3	MP305	F	T&C
40.5	58.08	3	MP305	F	T&C
58.08	74.5	3	MP303	F	T&C
74.5	76.25	2	MP303	F	T&C
76.25	82.33	3	MP303	F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			1								1						1
					1						1						1
					1						1						1
					1						1						1
					1												1
					1					1							1

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0	13	1	CCI-1x4.5	F	T&C
13	14	2	CCI-1x4.5	F	T&C
14	19.5	1	CCI-1x4.5	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
								1									
1								1									
1																	

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
MP303	9.9	2.92	0.66	6.57	0.59	0	0.30	4.06	1.57	0.64	1.21875	65	80	0.80	18	1.00	18	96.4	128.6	Rupture	144.7	Rupture
MP305	19.2	5.65	2.15	20.79	0.79	0	0.5	5.33	2.09	0.91	1.21875	65	80	0.80	18	1.00	18	194.5	259.3	Rupture	291.8	Rupture
VS-1.25X4	17.0	5.00	0.65	6.67	0.625	0	1.25	4	0	0	1.21875	65	80	0.80	21	1.00	21	135.9	181.3	Rupture	200.8	Rupture
VS-1.25X4.375	18.6	5.47	0.71	8.72	0.625	0	1.25	4.375	0	0	1.21875	65	80	0.80	21	1.00	21	154.7	206.3	Rupture	229.4	Rupture
VS-1.25X5.25	22.3	6.56	0.85	15.07	0.625	0	1.25	5.25	0	0	1.21875	65	80	0.80	18	1.00	18	198.4	264.6	Rupture	297.7	Rupture
CCI-1x4.5	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.21875	65	80	0.80	20	1.00	20	128.8	171.7	Rupture	193.1	Rupture

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

Site Data

BU#: *876363*
Site Name: *HARTFORD - NU (SSUS*
App #: *382014 Rev. 1*

Reactions		
Mu	40.25	ft-kips
Axial, Pu:	2.008	kips
Shear, Vu:	6.478	kips
Elevation:	98	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	9		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	
N/A:	55	<-- Disregard	
Circle (in.):	19.5		

Plate Data		
Diam:	24	in
Thick, t:	1	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	3.01	in

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

Pole Data		
Diam:	8.625	in
Thick:	0.3125	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Non-Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.04	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	10.79	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.858	in	
Min PL "treq" for actual **T w/ Pry**:	0.846	in	
Min PL "t1" for actual **T w/o Pry**:	1.113	in	
T allowable with Prying:	15.06	kips	α'>1 case
Prying Force, q:	4.01	kips	
Total Bolt Tension=Tu+q:	14.80	kips	
Prying Bolt Stress Ratio=(Tu+q)/(B):	49.2%	Pass	

Exterior Flange Plate Results Flexural Check

			Non-Rigid
Compression Side Plate Stress:	26.5	ksi	TIA G
Allowable Plate Stress:	45.0	ksi	φ*Fy
Compression Plate Stress Ratio:	58.8%	Pass	Comp. Y.L. Length:
Prying Occurs, PL Check:			17.49
Tension Side Stress Ratio, (treq/t)^2:	71.6%	Pass	

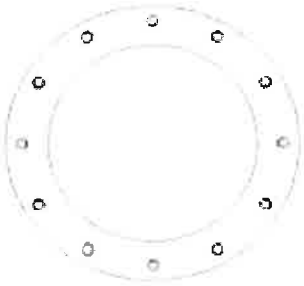
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#: *876363*
Site Name: *HARTFORD - NU (SSUS*
App #: *382014 Rev. 1*

Reactions		
Mu	40.25	ft-kips
Axial, Pu:	2.008	kips
Shear, Vu:	6.478	kips
Elevation:	98	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	9		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	
N/A:	55	<-- Disregard	
Circle (in.):	19.5		

Plate Data		
Diam:	24	in
Thick, t:	1	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	5.82	in

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

Pole Data		
Diam:	16.5	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.04	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	10.79	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.633	in	
Min PL "treq" for actual **T w/ Pry**:	0.278	in	
Min PL "t1" for actual **T w/o Pry**:	0.379	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	10.79	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	35.9%	Pass	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	7.4	ksi	TIA G
Allowable Plate Stress:	45.0	ksi	φ*Fy
Compression Plate Stress Ratio:	16.5%	Pass	Comp. Y.L. Length:
No Prying			10.39
Tension Side Stress Ratio, (treq/t)^2:	7.7%	Pass	

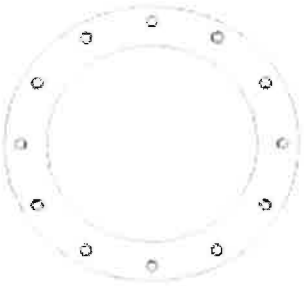
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	876363
Name:	HARTFORD - NU -SSUSA-
App. #:	382014; Rev.1

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	1976	ft-kip
Axial:	29	kip
Shear:	27	kip
Base Plate Type:	Square	

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	8	
Diameter:	2.25	in
Material:	A615 GR 75	
Bolt Circle:	38.0	in
Bolt Spacing:	6	in
Bolt Group Area:	31.81	in^2
Bolt Group MOIx:	5741	in^4

Reactions Seen by Original AR Group		
Moment:	1162.4	kip-ft
Axial:	29.2	kip
Shear:	26.6	kip

Original AR Capacity Check		
Combined Load:	159.0	kip
Allowable load:	259.8	kip
AR Capacity:	61.2%	Pass

First Added Anchor Rod Data		
Quantity:	3	
Diameter:	2.25	in
Material:	A615 GR 75	
Bolt Circle:	43.8	in
Bolt Group Area:	11.93	in^2
Bolt Group MOIx:	2023	in^4

Reactions Seen by First Added AR Group		
Moment:	409.7	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Combined Load:	211.7	kip
Allowable load:	259.8	kip
AR Capacity:	81.5%	Pass

Second Added Anchor Rod Data		
Quantity:	3	
Diameter:	2.25	in
Material:	A193 B7	
Bolt Circle:	43.5	in
Bolt Group Area:	11.93	in^2
Bolt Group MOIx:	1995	in^4

Reactions Seen by Second Added AR Group		
Moment:	403.9	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Combined Load:	210.1	kip
Allowable load:	324.8	kip
AR Capacity:	64.7%	Pass

Third Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Rev.4.1

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)*(Rod Diameter)

Site Data

BU#: *876363*
Site Name: *HARTFORD - NU -SSUSA*
App #: *382014; Rev.1*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	38	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	36	in
Thick:	2.5	in
Grade:	55	ksi
Clip Distance:	4	in

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

Pole Data		
Diam:	31.81	in
Thick:	0.25	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	941	ft-kips
Factored Axial, Pu:	29	kips
Factored Shear, Vu:	27	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	159.0 Kips
Axial Design Strength, Φ*Fu*Anet:	260.0 Kips
Anchor Rod Stress Ratio:	61.1% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	28.8 ksi
PL Design Bending Strength, Φ*Fy:	49.5 ksi
Base Plate Stress Ratio:	58.1% **Pass**

PL Ref. Data
Yield Line (in): 19.10
Max PL Length: 19.10

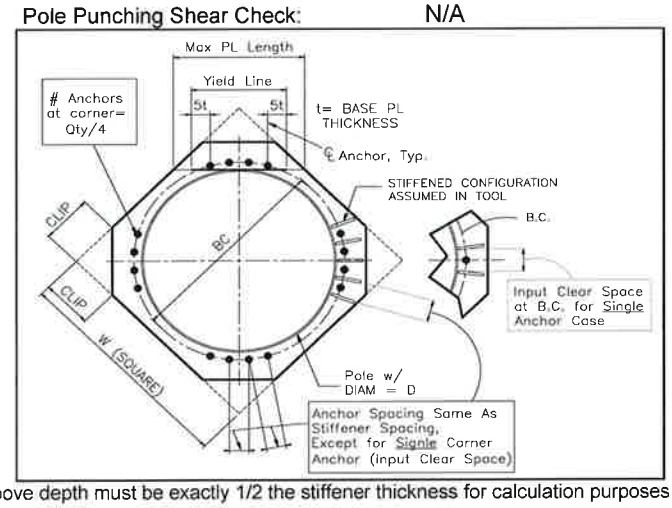
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Proj. Number	85565.006.01
Proj. Name	HARTFORD - NU (SSUSA), C
Code	Rev. G

Proposed Anchor Rods

Diameter	2.25	in
Grade	A615-75	
Quantity	3	
Bolt Circle	43.81	in
AR Capacity	260	kips

Existing Mfg Anchor Rods

Diameter	2.25	in
Quantity	8	
Bolt Circle	38	in

Summary Output

- Anchor Rod Checks

Min. Embedment Length:	6.5	ft
Min. Pull Test Value:	152	kips

- Anchor Rod Bracket Checks

Tube Stress:	96.0%
Bracket Plate Check:	OK
Max. Weld Stress:	62.8%

Tower Properties

Fy_{pole} =	65	ksi
Fu_{pole} =	80	ksi
Fy_{base} =	55	ksi
Fu_{base} =	70	ksi

Foundation Properties

Type	Pier	
Pier Diameter	5	ft
f'_c	3000	psi
Clear Cover	4	inch
Pad Width	7	ft
Vert.Rebar Size	11	
Vert. Quantity	12	
Tie Size	5	
$f_{y\ rebar}$	60	ksi

Anchor Rod Bracket Properties

Gusset Properties

Thickness	1.25	inch
Pole to Tube CL	6	inch
Height	32	inch
Width at Tube	4	inch
Fy_{plate} =	65	ksi
Fu_{plate} =	80	ksi
Gap =	0	inch
Notch =	0.75	inch

Pipe /Tube Properties

Size	HSS4x4x1/2	
L_{pipe} =	10.5	inch
F_{ypipe} =	50	ksi
D_{pipe} =	4	inch
t_{pipe} =	0.5	inch
A_{pipe} =	6.02	$inch^2$
I_{pipe} =	11.9	$inch^4$
r_{pipe} =	1.41	inch

Weld Properties

F_{EXX} =	70	ksi	Weld Material Grade
- Bracket to Tube Weld			
D_{vpipe} =	7		Vertical fillet weld size *in sixteenths*
$l_{vweldpipe}$ =	10.5	inch	Length of Vertical Weld to Pipe
- Bracket to Pole Weld			
Weld Type	Double Fillet		
Fillet Size	5		Vertical fillet weld size in sixteenths
H =	32	inch	Height of vertical weld from base plate
- Base Plate Welds			
D_{Hbp} =	0.5625	inch	Gusset Bevel Size

Additional Variables

C_1 =	1.00		Electrode Strength Coefficient
k_n =	0		Transverse Reinforcement Index :
ψ_t =	1		Rebar Location Factor :
ψ_e =	1		Rebar Coatig Factor :
ψ_s =	1		Rebar Size Factor :
λ =	1	vpsi	Concrete Weight Factor :

Proj. Number	85565.006.01
Proj. Name	HARTFORD - NU (SSUSA), C
Code	Rev. G

Proposed Anchor Rods

Diameter	2.25	in
Grade	A193 Gr B7	
Quantity	3	
Bolt Circle	43.51	in
AR Capacity	325	kips

Existing Mfg Anchor Rods

Diameter	2.25	in
Quantity	8	
Bolt Circle	38	in

Summary Output

- Anchor Rod Checks

Min. Embedment Length:	6.5	ft
Min. Pull Test Value:	190	kips

- Anchor Rod Bracket Checks

Tube Stress:	91.7%
Bracket Plate Check:	OK
Max. Weld Stress:	82.4%

Tower Properties

Fy_{pole} =	65	ksi
Fu_{pole} =	80	ksi
Fy_{base} =	55	ksi
Fu_{base} =	70	ksi

Foundation Properties

Type	Pier	
Pier Diameter	5	ft
f'_c	3000	psi
Clear Cover	4	inch
Pad Width	7	ft
Vert.Rebar Size	11	
Vert. Quantity	12	
Tie Size	5	
$f_{y\ rebar}$	60	ksi

Anchor Rod Bracket Properties

Gusset Properties

Thickness	1.25	inch
Pole to Tube CL	5.875	inch
Height	32	inch
Width at Tube	3.375	inch
Fy_{plate} =	65	ksi
Fu_{plate} =	80	ksi
Gap =	0	inch
Notch =	0.75	inch

Pipe /Tube Properties

Size	HSS5x5x1/2	
L_{pipe} =	10.5	inch
F_{ypipe} =	50	ksi
D_{pipe} =	5	inch
t_{pipe} =	0.5	inch
A_{pipe} =	7.88	$inch^2$
I_{pipe} =	26	$inch^4$
r_{pipe} =	1.82	inch

Weld Properties

F_{EXX} =	70	ksi	Weld Material Grade
- Bracket to Tube Weld			
D_{vpipe} =	7		Vertical fillet weld size *in sixteenths*
$l_{vweldpipe}$ =	10.5	inch	Length of Vertical Weld to Pipe
- Bracket to Pole Weld			
Weld Type	Double Fillet		
Fillet Size	5		Vertical fillet weld size in sixteenths
H =	32	inch	Height of vertical weld from base plate
- Base Plate Welds			
D_{Hbp} =	0.5625	inch	Gusset Bevel Size

Additional Variables

C_1 =	1.00		Electrode Strength Coefficient
k_{rt} =	0		Transverse Reinforcement Index :
ψ_t =	1		Rebar Location Factor :
ψ_e =	1		Rebar Coatig Factor :
ψ_s =	1		Rebar Size Factor :
λ =	1	vpsi	Concrete Weight Factor :

PROJECT	**876363 - HARTFORD - NU (SSUSA), CT**				
SUBJECT	**Foundation Analysis**				
DATE	**05/16/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

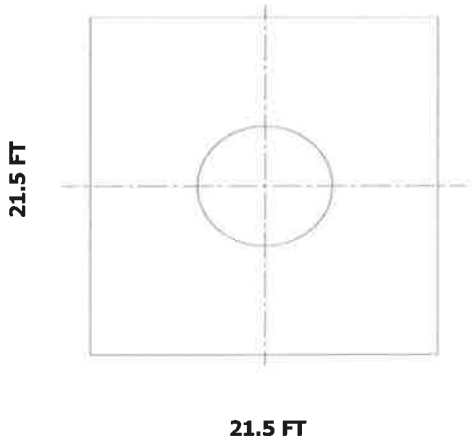
Rev. Type: G

Design Loads:

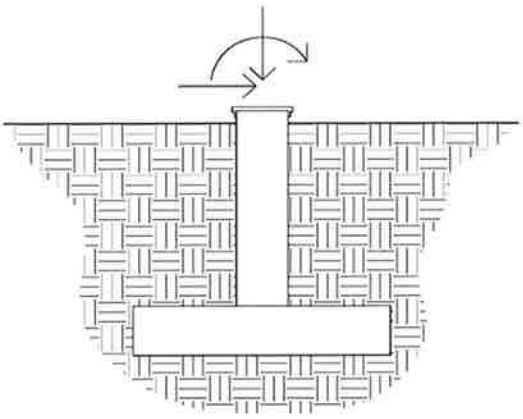
	Input factored loads	
Shear:	27.0	kips
Moment:	1,976.0	ft-kips
Tower Height:	108.0	ft
Tower Weight:	29.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	31.81	in
Bearing Depth:	7.0	ft
Pad Width:	21.5	ft
Neglected Depth:	3.3	ft
Thickness:	3.0	ft
Pier Diameter:	5.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	4.0	in
Pier Rebar Size:	11	
Pier Rebar Quanity:	12	
Pad Rebar Size:	8	
Pad Rebar Quanity:	22	
Pier Tie Size:	5	
Tie Quanity:	12	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.111	kcf
Ult. Bearing Capacity:	6.900	ksf
Angle of Friction:	32.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.350	

Summary of Results

Req'd Pier Diam.	OK
Overturning	52.5%
Shear Capacity	20.7%
Bearing	41.1%
Pad Shear - 1-way	37.4%
Pad Shear - 2-way	3.4%
Pad Moment Capacity	32.3%
Pier Moment Capacity	92.1%

** Notes:

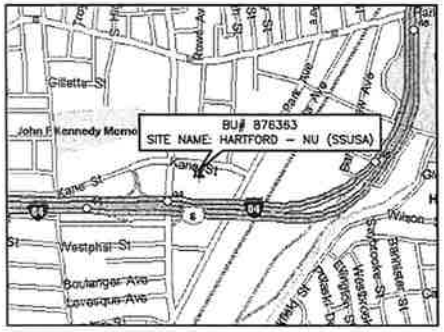
APPENDIX D

TOWER MODIFICATION DRAWINGS

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: HARTFORD - NU (SSUSA)
BU NUMBER: 876363

SITE ADDRESS:
219 NEW PARK RD.
HARTFORD, CT 06106-2949
HARTFORD COUNTY, USA



MAP

DIRECTIONS

84 WEST TO EXIT 44. TURN RIGHT OFF RAMP AND CONTINUE STRAIGHT THROUGH LIGHT. TURN RIGHT ON NEW PARK AVENUE AND GO TO ADDRESS.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER

DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCASTLE.COM

2. CROWN CONSTRUCTION MANAGER

JAMES ANDREWS
(860) 716-3032
JAMES.ANDREWS.VENDOR@CROWNCASTLE.COM

3. B+T GROUP RFI CONTACT

ROBERT M. FRAZIER, P.E.
(918) 587-4630
RFRAZIER@BTGRP.COM
MODDWGS@BTGRP.COM
1717 S BOULDER AVENUE, SUITE 300
TULSA, OK 74119

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM B+T GROUP TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT B+T GROUP AT MODDWGS@BTGRP.COM.

TOWER INFORMATION

TOWER MANUFACTURER / JOB #:	SUMMIT MANUFACTURING, LLC / 11049
TOWER HEIGHT / TYPE:	108' MONOPOLE
TOWER LOCATION: DATUM: (NAD 1983)	LAT. 41° 45' 2.79" LONG. -72° 42' 49.23" ELEV. 117 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 1385488
STRUCTURAL ANALYSIS REPORT:	TEP / WO. # 1371815
STRUCTURAL ANALYSIS DATE:	03/09/17
APPLICATION ID / REVISION #:	382014 / 1
CCISITES DOCUMENT ID:	6732835

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN 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 TIA-222-G STANDARD PER EXCEPTION #5 OF SECTION 1609.1.1. EXPOSURE CATEGORY C AND RISK CATEGORY II WERE USED IN THIS REINFORCEMENT DESIGN.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES
S4	NG2 BOLT NOTES AND DETAILS
S5	FORGBOLT NOTES AND DETAILS
S6	AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S7	TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAGRAM
S8	TOWER SECTION (0'–21')
S9	EXISTING FLAT PLATE MODIFICATION DETAILS
D1	TRANSITION STIFFENER DETAILS
D2	ANCHOR ROD BRACKET DETAILS
D3	ANCHOR ROD BRACKET DETAILS

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.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	05/16/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	85565.006.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UUJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001554
Expires 02/10/18

STATE OF CONNECTICUT
SCOTT S. CHRISTIANCE
31627
LICENSED
PROFESSIONAL ENGINEER
5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER: S1
REVISION: 0

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
		PRE-CONSTRUCTION
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION (PERFORMED BY CONTRACTOR)
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
N/A	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
X	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10159. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
N/A	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
		POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		
NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT		

MODIFICATION INSPECTION NOTES:

GENERAL

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

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

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

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

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

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

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

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS IN SCHEDULED MI

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

CORRECTION OF FAILING MI'S

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

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

MI VERIFICATION INSPECTIONS

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

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

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

REQUIRED PHOTOS

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

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

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

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

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	05/16/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	85565.006.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UUJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18

STATE OF CONNECTICUT * 31627 LICENSED PROFESSIONAL ENGINEER
5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER: S2
REVISION: 0

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA-222-G STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.
1.6 ALL CONSTRUCTION MEANS AND METHODS: INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
1.7 ALL THE PARTS STARTING WITH "CCI-" DESIGNATION - REFER TO "CROWN CASTLE APPROVED REINFORCEMENT COMPONENTS CATALOGUE EDITION 1" FOR PART DETAILS.
1.8 BLIND BOLTS ARE TO BE 20MM DIAMETER WITH CORRESPONDING 29MM DIAMETER SLEEVE WITH SPECIFIED STEEL GRADE.
1.9 ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATOR IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS. 1-800-831-3275 FOR PRODUCT INFORMATION.
1.10 ALL SHIMS SHALL BE ASTM A36.
1.11 HOLES FOR BOLTS AND SHEAR SLEEVES ARE 30MM, U.N.O.
1.12 SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
1.13 IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
1.14 THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
1.15 WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
1.16 ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572
B. STEEL PIPE (HSS TUBING)	50ksi	A500 GR. C

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

FIELD NDE MINIMUM REQUIREMENTS

3.1 ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
3.2 FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
3.3 FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".
3.4 FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: TOWER BASE PLATE NDE, AND ENG-BUL-10051: NDE REQUIREMENTS FOR MONOPOLE TO PREVENT CONNECTION FAILURE. NOTIFY THE E.O.R. AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
3.5 ALL TESTING LIMITATIONS SHALL BE NOTED IN THE NDE REPORT.

KEY NOTES

(#) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	05/16/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	85565.006.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UJJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

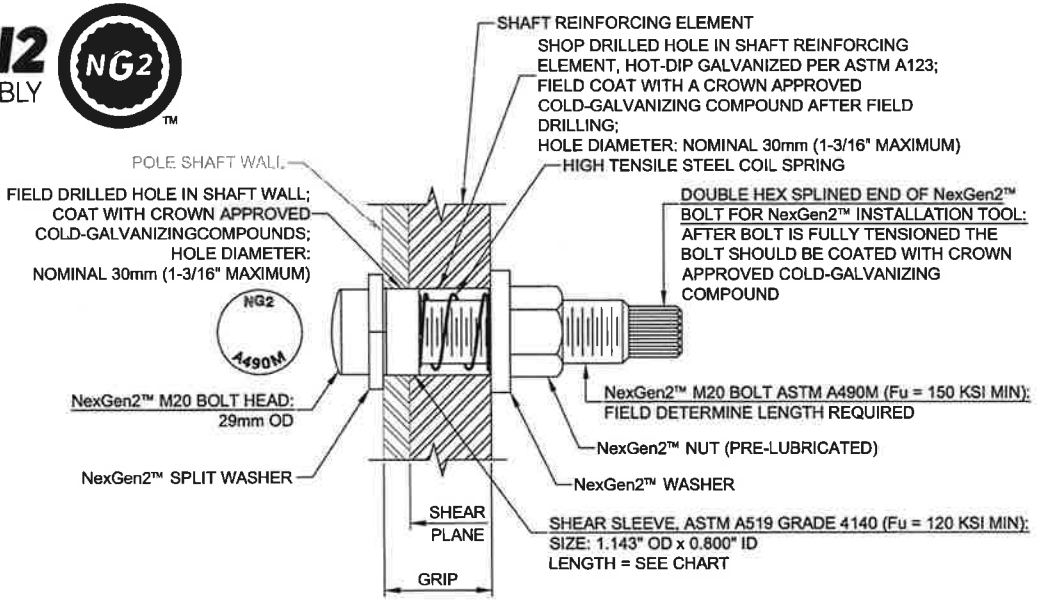
SHEET TITLE
GENERAL NOTES

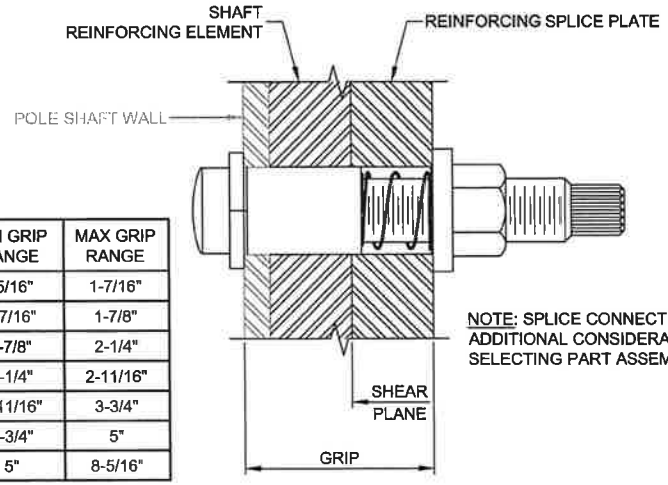
SHEET NUMBER: S3
REVISION: 0

INTERIOR OF POLE SHAFT | EXTERIOR OF POLE SHAFT

NEXGEN2 BLIND BOLT ASSEMBLY

- PATENT PENDING -





NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTES:

1. ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
2. NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.
3. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER:

ALLFASTENERS
959 LAKE ROAD
MEDINA, OHIO, USA 44256
PHONE: 440-232-6060
WEBSITES: WWW.ALLFASTENERS.COM WWW.AFTOWER.COM

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

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STATE OF CONNECTICUT SCOTT STANCE 31627 LICENSED PROFESSIONAL ENGINEER
5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

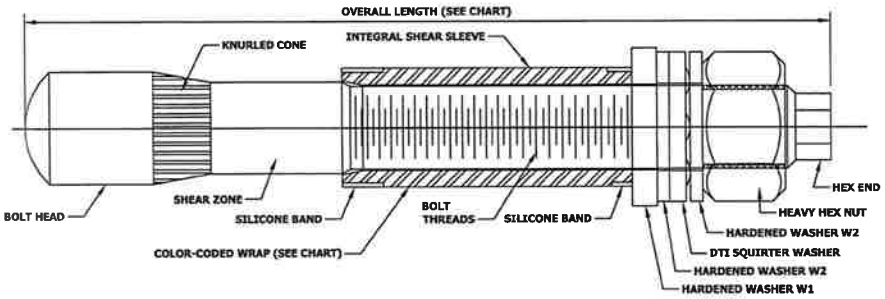
SHEET TITLE
NG2 BOLT NOTES AND DETAILS

SHEET NUMBER: S4

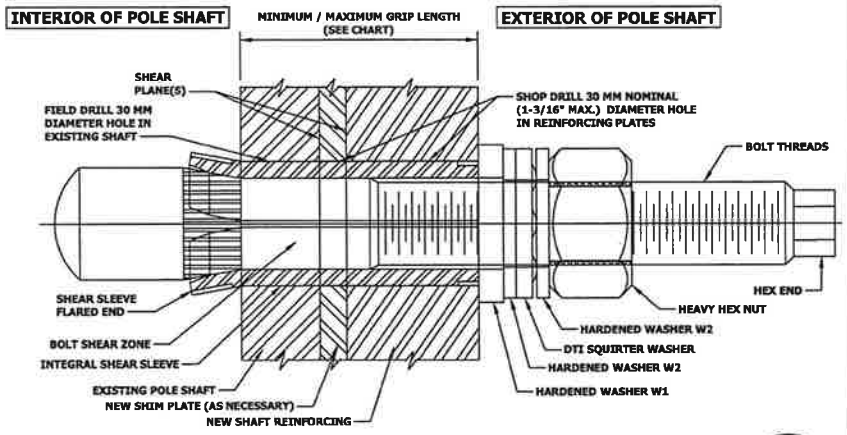
REVISION: 0

FORGBolt™ NOTE SHEET: A325/PC8.8 LANDSCAPE VERSION DATE 01/29/2015; Rev. 1.0 04/23/2015

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.**



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2

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.**

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: **888-926-4857**
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

CONTAINS PROPRIETARY INFORMATION
PATENT PENDING

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)					
GROUP A		FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8	1	**135**	5.31	1.3	3/8" to 1"	--	**RED**
	2	**160**	6.30	1.6	3/4" to 1-1/2"	--	**GREEN**
	3	**195**	7.68	1.9	1-1/4" to 2-1/4"	--	**BLUE**
	4	**260**	10.24	2.6	2" to 3-1/2"	Splice Bolt	**YELLOW**
	5	**365**	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	**ORANGE**
	6	**440**	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	**BLACK**
DTI Note		Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORGBolt™ Installation

Follow all Manufacturer/Distributer Recommendations for Installation, Tightening, and Inspection.

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.

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CROWN CASTLE

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5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

SHEET TITLE
FORGBOLT NOTES AND DETAILS

SHEET NUMBER: S5

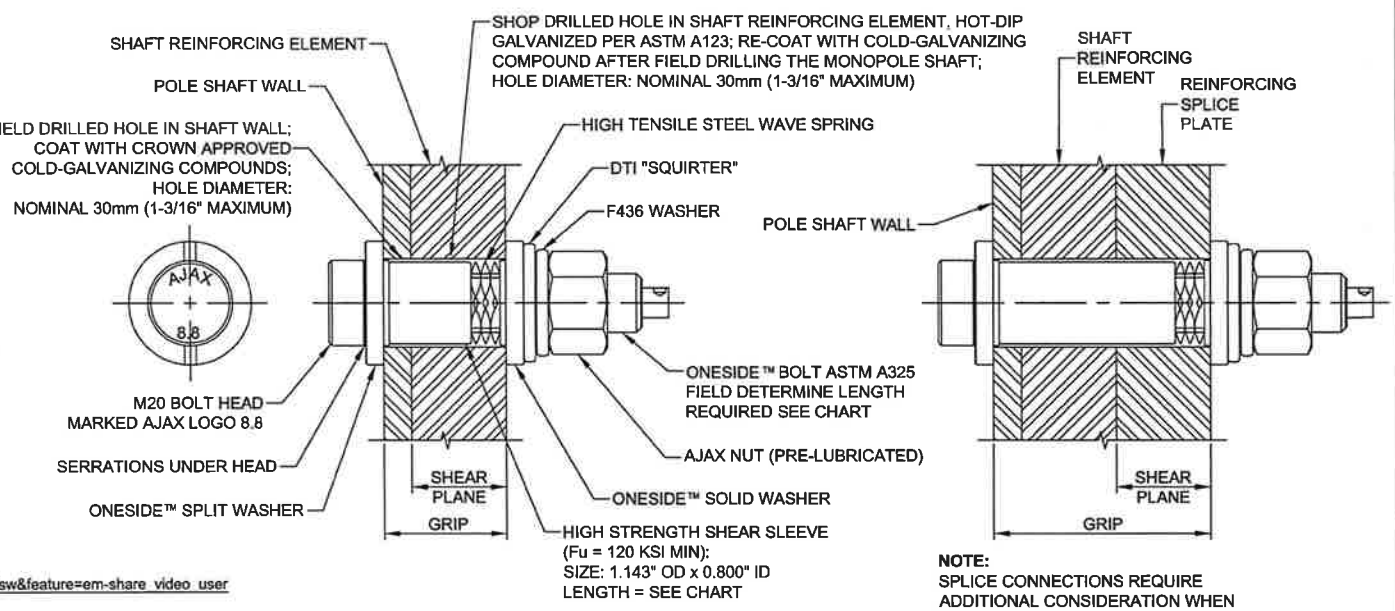
REVISION: 0

INTERIOR OF POLE SHAFT | EXTERIOR OF POLE SHAFT

AJAX FASTENERS

ONESIDE™

PATENT US 7,373,709B2



MANUFACTURER INSTALLATION VIDEO

https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user

NOTE:
SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

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"

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

DISTRIBUTOR
IRA SVENSGAARD AND ASSOCIATES
PETER SVENDSGAARD - PETERS@IRASVENS.COM
JOHN KILLAM - JOHN@IRASVENS.COM
PHONE (530) 647-8225
FAX (530) 647-8229

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

INSPECTION:
1. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
2. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW*.

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5/16/17

HARTFORD - NU (SSUSA)
876363

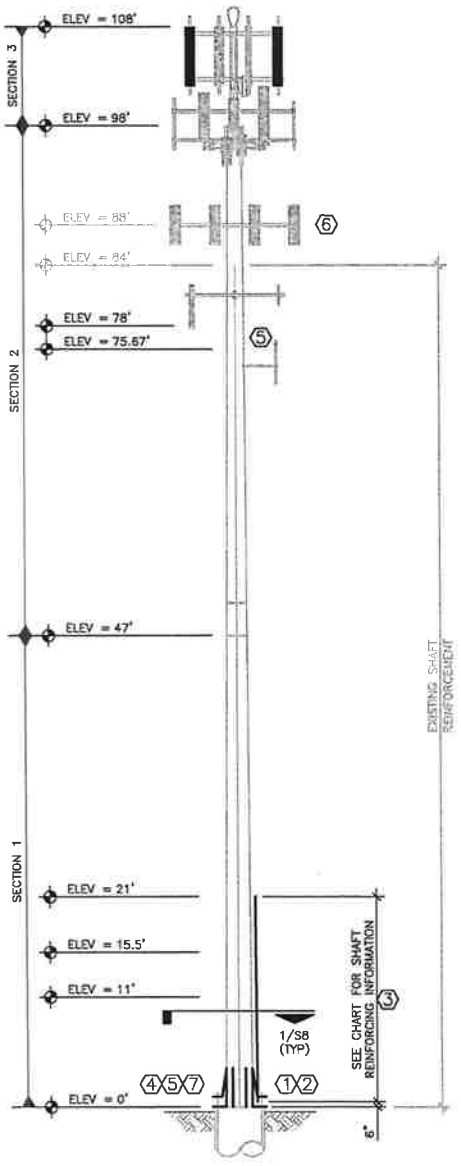
219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

SHEET TITLE
AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

SHEET NUMBER: S6

REVISION: 0



① TOWER ELEVATION
SCALE: N.T.S.

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	FLAT #	BOLTS PER PLATE	TOTAL BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
0'-6"	15'-6"	CCI-SFP-04510015	15'-0"	1	9	19	19	6	6	20"	230	LBS.
11'-0"	21'-0"	CCI-SFP-04510010	10'-0"	1	1	16	16	6	6	20"	153	LBS.
							35				383	LBS.

ALL BOLTS SHALL BE PRE-APPROVED BLIND M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS 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 E.O.R. APPROVAL.
2. FOR PLATES STARTING AT 6", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" +/- 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE RUN SHALL BEGIN AT THE PROPOSED ELEVATION +/- 3". FOR MULTIPLE PLATE SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE BOTTOM PLATE TO THE TOP OF THE TOP PLATE.

TOWER MODIFICATIONS:

① REMOVE EXISTING TRANSITION STIFFENER AT 0'
RE: SHEET S8.

② REMOVE EXISTING ANCHOR ROD BRACKET AND INSTALL NEW ANCHOR ROD BRACKET AT 0'
RE: SHEET S8.

③ INSTALL NEW REINFORCING ELEMENTS FROM 0' TO 21'
RE: SHEET S8.

④ INSTALL NEW TRANSITION STIFFENERS WITH FOOT PAD AT 0'
RE: SHEET S8.

⑤ INSTALL ADDITIONAL TERMINATION BOLTS TO EXISTING FLAT PLATE REINFORCEMENT AT 0', 75.67' AND 78'.
RE: SHEET S9.

⑥ REMOVE EXISTING EQUIPMENT AND MOUNT FROM 88' LEVEL.

⑦ INSTALL SIGNAGE NOTING OBSTRUCTION IN CLIMBING PATH.

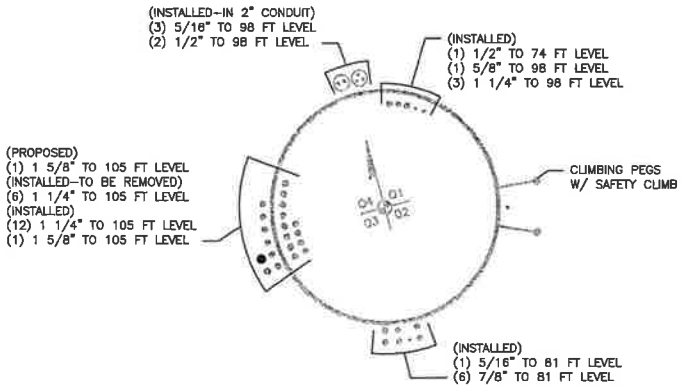
A. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR FABRICATOR.
B. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S7.
C. MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.

EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	ASTM STEEL GRADE	Fy (ksi)	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	12	0.2500"	A607	65	31.810"	23.767"	39"
2	12	0.1875"	A607	65	24.663"	16.500"	---
3	ROUND	0.3125"	A53-E	35	8.625"	8.625"	---
EXISTING BASE PLATE GRADE = 55 ksi (ASTM GRADE = A572)							

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED

REFERENCE DRAWINGS BY:	DATE
VERTICAL SOLUTION	01/28/09
PAUL J. FORD & COMPANY	05/21/10
B+T GROUP	10/15/12



② TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

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STATE OF CONNECTICUT DEPARTMENT OF CONSUMER PROTECTION
31627 LICENSED PROFESSIONAL ENGINEER
5/16/17

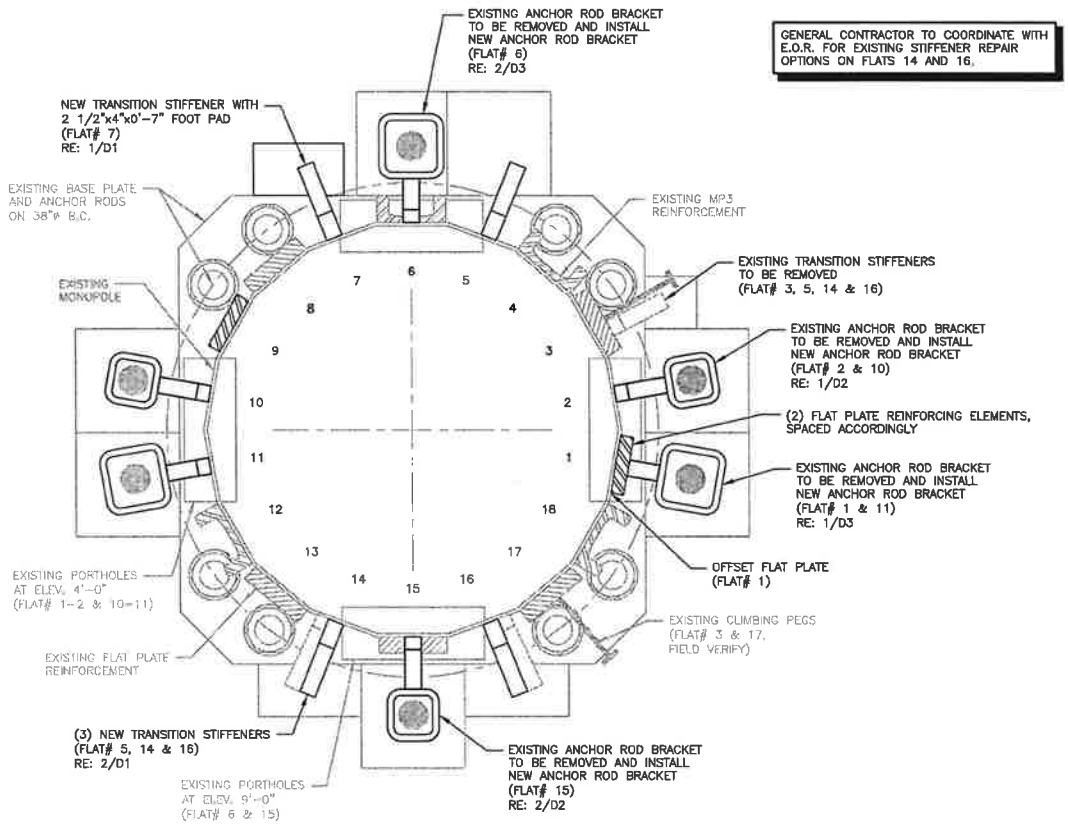
HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

EXISTING 108' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAGRAM

SHEET NUMBER:	REVISION:
S7	0



1 TOWER SECTION (0'-21')
SCALE: N.T.S.

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5/16/17

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876363

219 NEW PARK RD.
HARTFORD, CT

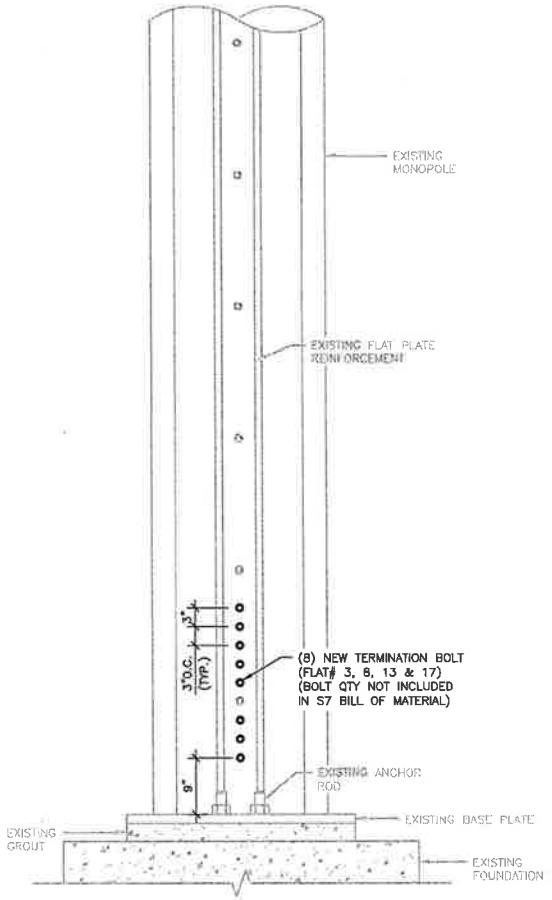
EXISTING 108' MONOPOLE

SHEET TITLE
TOWER SECTION
(0'-21')

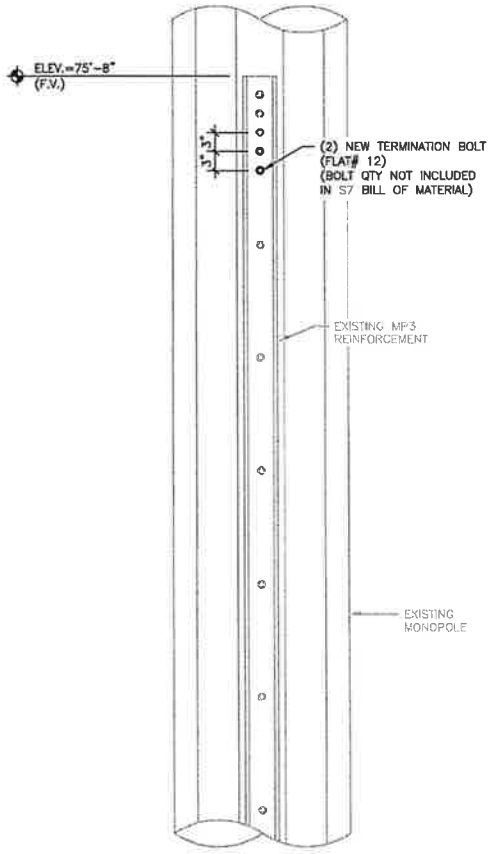
SHEET NUMBER:	REVISION:
S8	0

NOTE: SOME EXISTING REINFORCEMENT PLATES ARE NOT SHOW FOR CLARITY

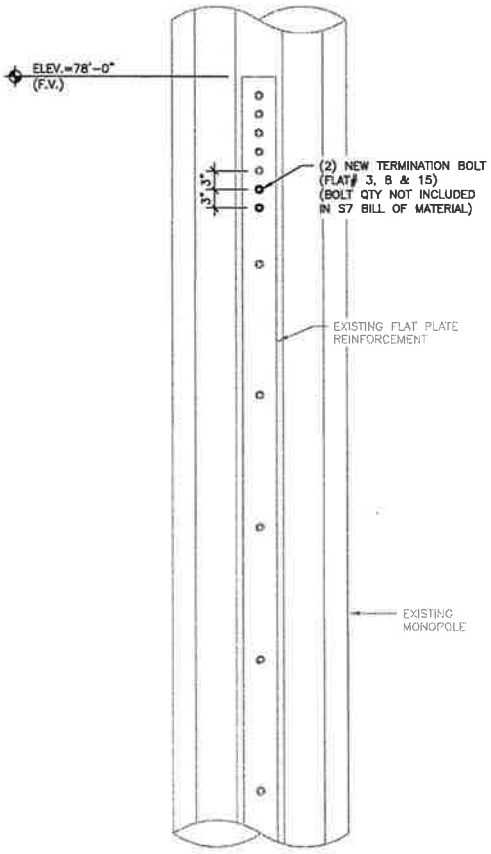
CONTRACTOR NOTE:
FIELD VERIFY EXISTING BOLT LOCATIONS.
CONTACT B+T GROUP FOR ANY DISCREPANCIES.



1 EXISTING FLAT PLATE MODIFICATION DETAIL (0')
SCALE: N.T.S.



2 EXISTING FLAT PLATE MODIFICATION DETAIL (75.67')
SCALE: N.T.S.



3 EXISTING FLAT PLATE MODIFICATION DETAIL (78')
SCALE: N.T.S.

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876363

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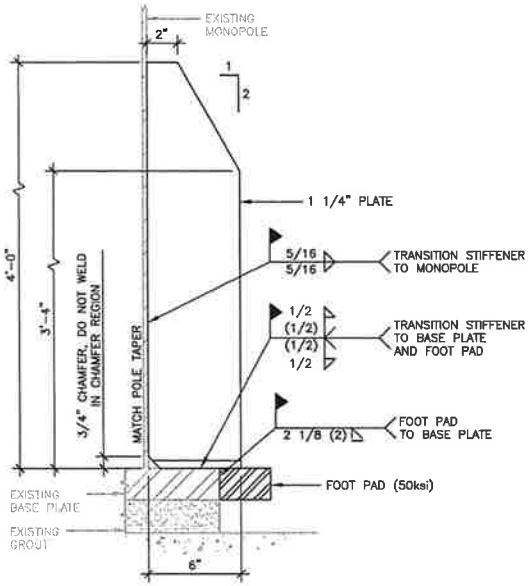
HARTFORD, CT

EXISTING 108' MONOPOLE

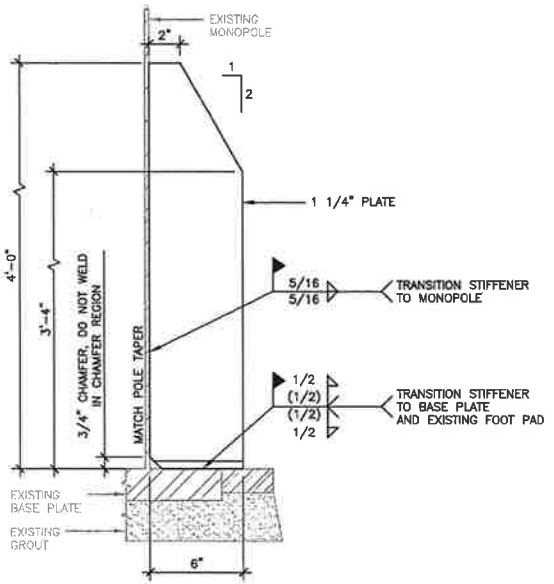
SHEET TITLE
EXISTING FLAT PLATE MODIFICATION DETAILS

SHEET NUMBER: S9

REVISION: 0



1 TRANSITION STIFFENER DETAIL
SCALE: N.T.S.



2 TRANSITION STIFFENER DETAIL
SCALE: N.T.S.

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PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UUJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18

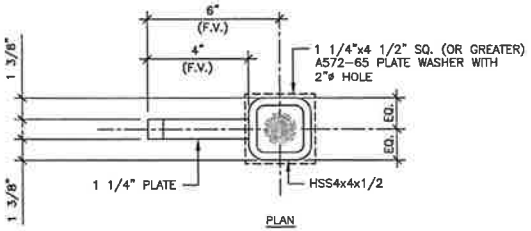
HARTFORD - NU (SSUSA)
876363

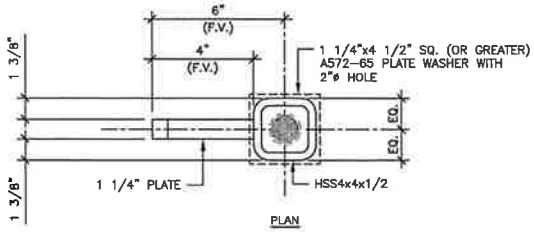
219 NEW PARK RD.
HARTFORD, CT

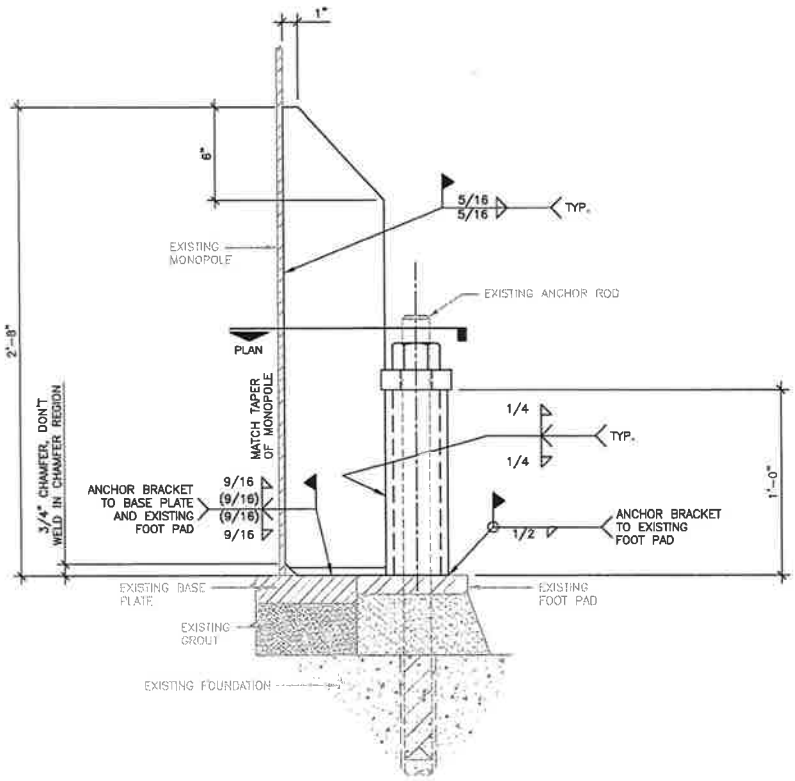
EXISTING 108' MONOPOLE

SHEET TITLE
TRANSITION STIFFENER DETAILS

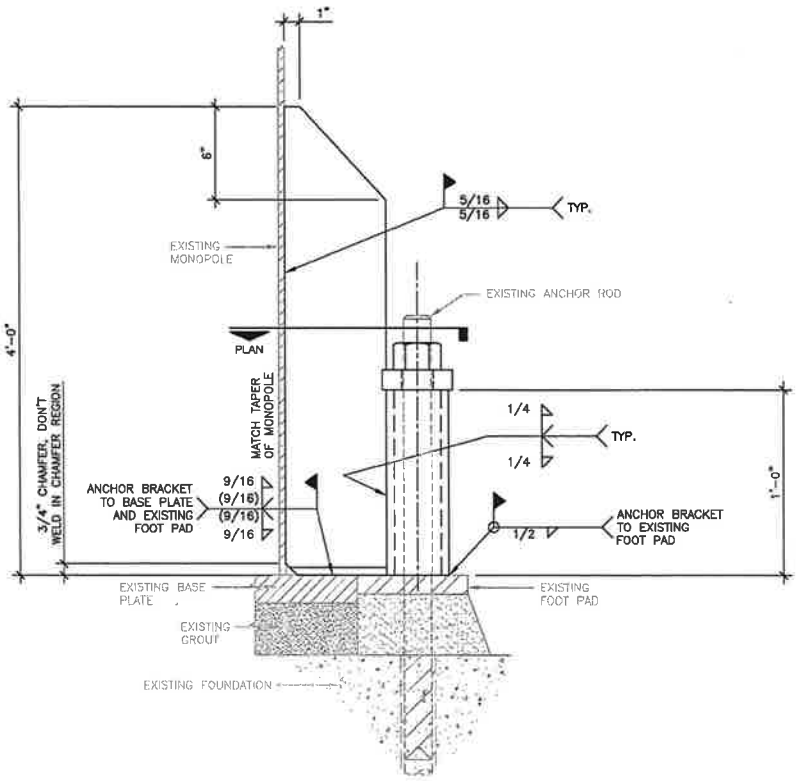
SHEET NUMBER:	REVISION:
D1	0







1 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.



2 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	05/16/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	85565.006.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UUJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18

HARTFORD - NU (SSUSA)
876363

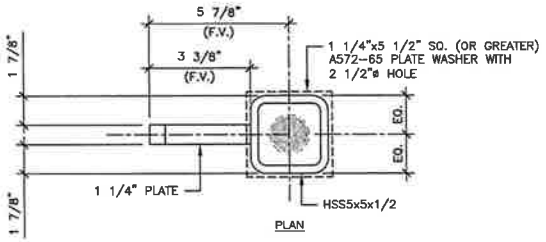
219 NEW PARK RD.
HARTFORD, CT

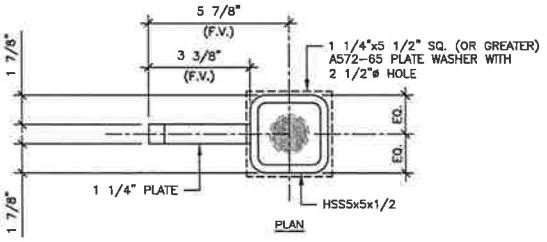
EXISTING 108' MONOPOLE

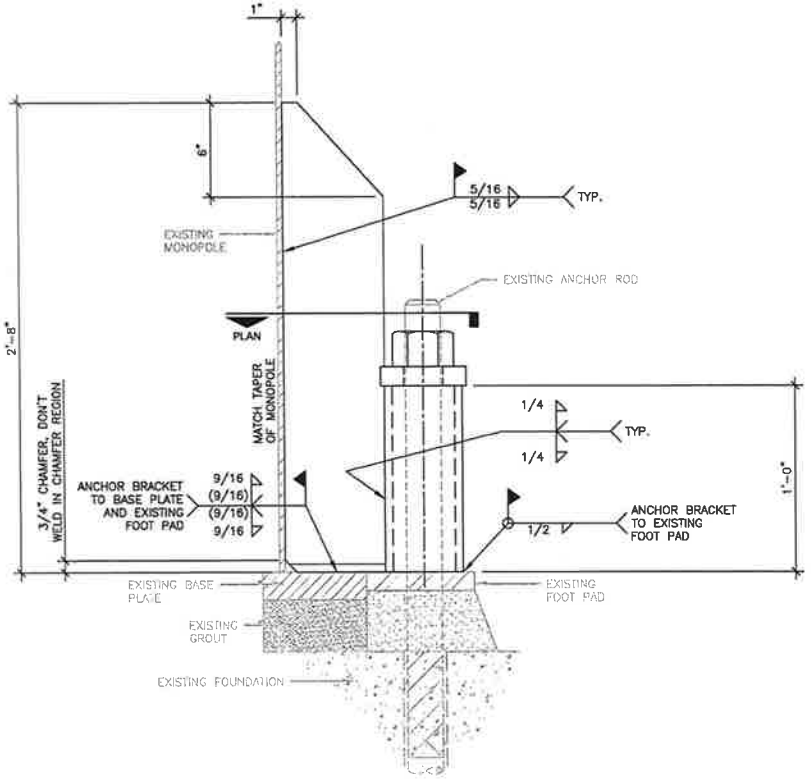
SHEET TITLE
ANCHOR ROD BRACKET DETAILS

SHEET NUMBER: D2

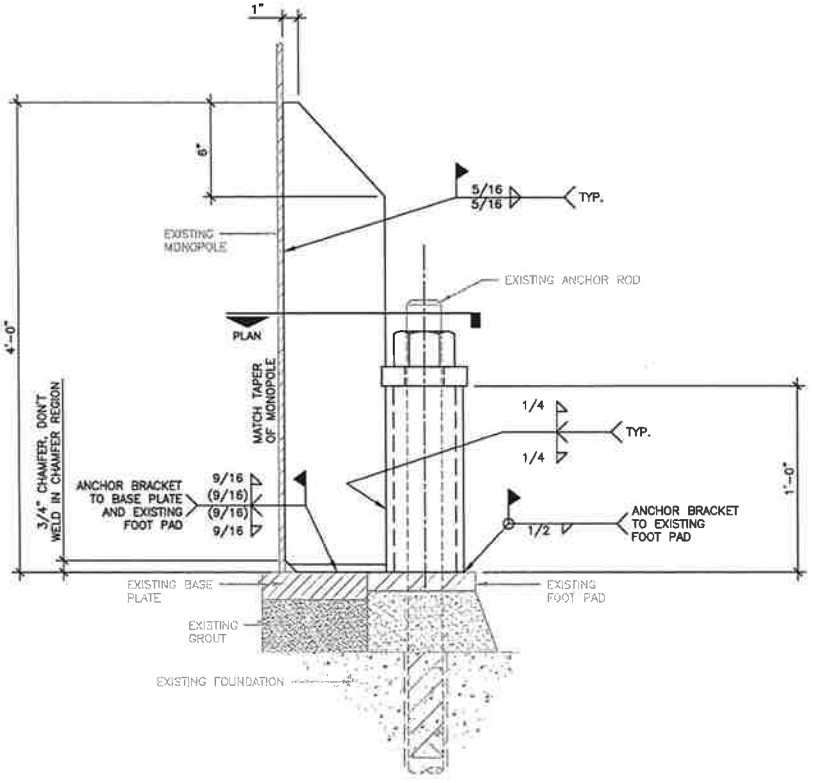
REVISION: 0







1 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.



2 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE,
SUITE 300
TULSA, OK 74119
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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	05/16/17	ISSUED FOR CONSTRUCTION

PROJECT NO:	85565.006.01
PROJECT ENG:	ROBERT M. FRAZIER
DRAWN BY:	UUJ / GLS
CHECKED BY:	SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/18

STATE OF CONNECTICUT
SCOTT S. BLAKE
31627
LICENSED
PROFESSIONAL ENGINEER
5/16/17

HARTFORD - NU (SSUSA)
876363

219 NEW PARK RD.
HARTFORD, CT

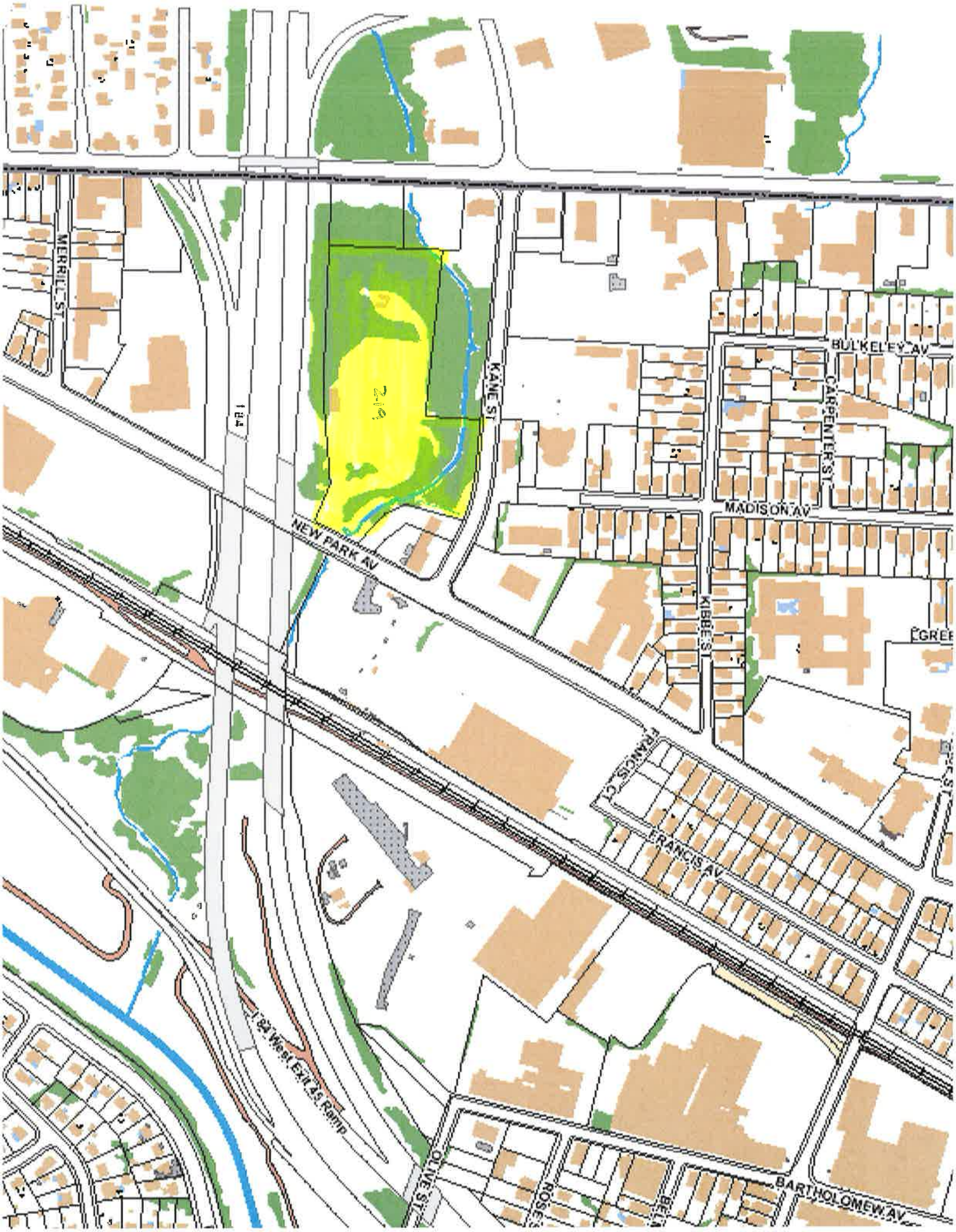
EXISTING 108' MONOPOLE

SHEET TITLE
ANCHOR ROD BRACKET DETAILS

SHEET NUMBER: D3

REVISION: 0

ATTACHMENT 4


MERRILL ST
KANE ST
BULKELEY AV
CARPENTER ST
MADISON AV
NEW PARK AV
KIBBE ST
FRANCIS CT
FRANCIS AV
I-84 West Exit 45 Ramp
OLIVE ST
BARTHOLOMEW AV

Unofficial Property Record Card - City of Hartford, CT

General Property Data

Parcel Identification 138-472-001
Property Owner CONN LIGHT & POWER CO

Mailing Address PO BOX 270

City HARTFORD
Mailing State CT Zip 06141-0270
ParcelZoning MS-3

Property Location 0219 NEW PARK AV HARTFORD
Property Use OTHER UTILTY
Most Recent Sale Date 7/2/1982
Legal Reference 01977 0129
Grantor
Sale Price 0
Land Area 7.140 acres

Current Property Assessment

Fiscal Year 2016
Land Value 1,094,870

Total Value 1,117,900
Building Value 12,460

Building Description

Building Style WAREHSE
# of Living Units 0
Year Built 1978
Building Grade Economy
Building Condition Average
Finished Area (SF) 1632
Number Rooms 0
# of 3/4 Baths 0

Foundation Type Concrete
Frame Type Steel Light
Roof Structure GABLE/HIP
Roof Cover Metal
Siding Metal
Interior Walls DRYWALL
Number Beds 0
# of 1/2 Baths 0

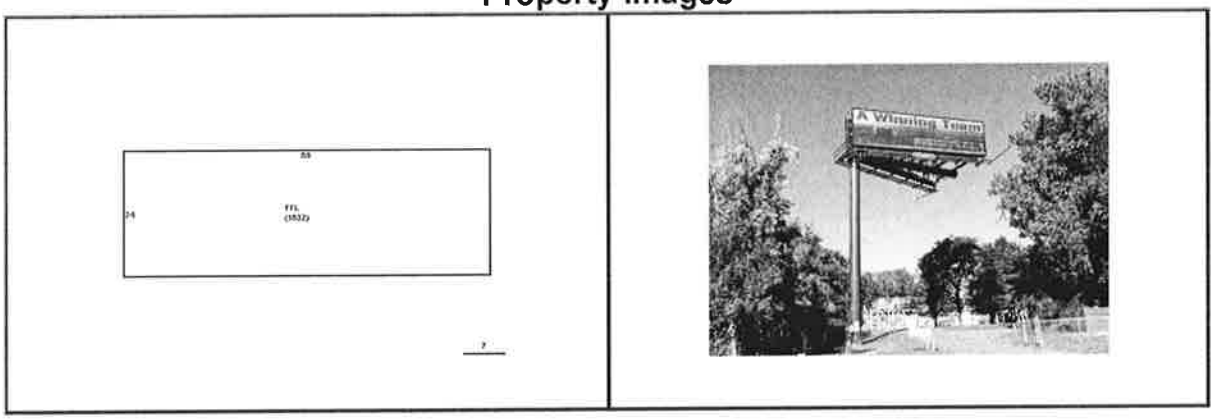
Flooring Type COMBINATION
Basement Floor N/A
Heating Type Electric
Heating Fuel Electric
Air Conditioning 0%
# of Bsmt Garages 0
# of Full Baths 0
# of Other Fixtures 0

Legal Description

Narrative Description of Property

This property contains 7.140 acres of land mainly classified as OTHER UTILTY with a(n) WAREHSE style building, built about 1978 , having Metal exterior and Metal roof cover, with 0 unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 0 half bath(s).

Property Images



Disclaimer: This information is believed to be correct but is subject to change and is not warranteed.

ATTACHMENT 5

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	3	3	neopost 09/27/2017 US POSTAGE $002.38 ZIP 06103 041L1220336
	Postmaster, per *(name of receiving employee)*		ANN STREET STATION 06103 SEP 27 2017 U.S.P.S.

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Luke Bronin, Mayor City of Hartford 550 Main Street Hartford, CT 06103				
2.	Jamie Bratt, AICP, Director of Planning and Economic Development City of Hartford 250 Constitution Plaza Hartford, CT 06103				
3.	CL&P P.O. Box 270 Hartford, CT 06141-0270				
4.					
5.					
6.					