Robinson+Cole

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Also admitted in Massachusetts

February 6, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
85 Quaker Farms Road, Oxford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 120-foot level on the existing 149-foot tower at 85 Quaker Farms Road in Oxford, Connecticut (the "Property"). The tower is owned by Crown Castle. Cellco's shared use of this tower was approved by the Council in 2007. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model HBXX-6517DS-VTM, 1900 MHz and three (3) model SBNHH-1D65B, dual band 700 MHz/2100 MHz antennas, all at the same 120-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and two (2) HYBRIFLEX™ antenna cables attached to the outside the monopole tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent George R. Temple, First Selectman of the Town of Oxford. A copy of this letter is also being sent to William and Elaine Schiavi the owners of the Property.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 120-foot level of the 149-foot tower.

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
George R. Temple, Oxford First Selectman
William and Elaine Schiavi
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

**Values calculated using NGMN Alliance N-P-BASTA v9.6*

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

Product Specifications

COMMSCOPE®

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	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, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
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°

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	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, 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.

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph
Antenna Dimensions, L x W x D	1828.0 mm x 301.0 mm x 181.0 mm | 72.0 in x 11.9 in x 7.1 in
Net Weight	18.4 kg | 40.6 lb

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

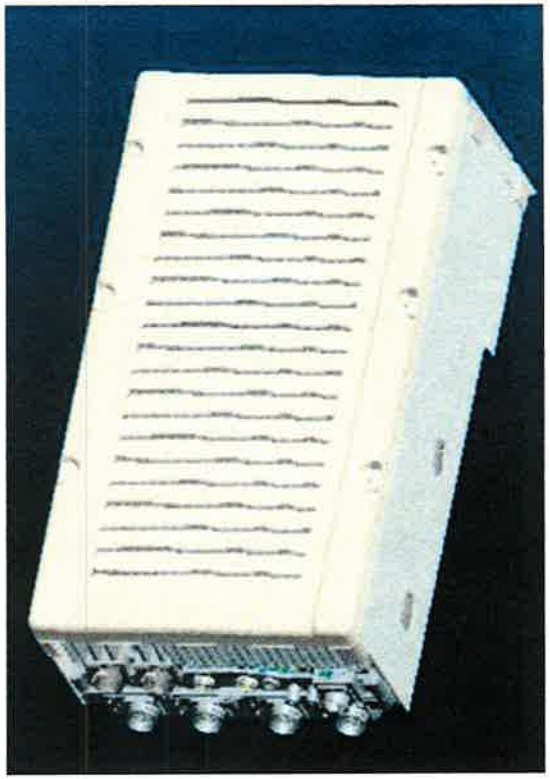
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



**- Includes solar shield but not mounting brackets (8 lbs.)

Alcatel·Lucent

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.

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

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

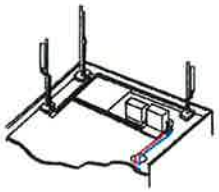
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

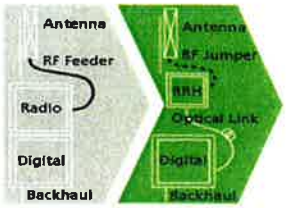
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

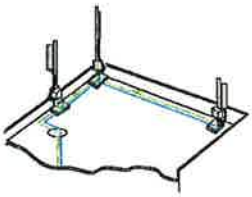
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

AT THE SPEED OF IDEAS™

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 CELLFLEX³ 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)

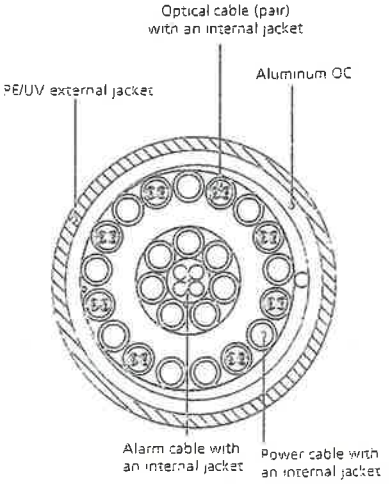


Figure 2: Construction Detail

¹ This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Seymour W (Oxford)								
Tower Height: 149ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	150	0.0181	880	0.5867	3.08%	
*AT&T UMTS	2	875	150	0.0280	1900	1.0000	2.80%	
*AT&T GSM	1	283	140	0.0052	880	0.5867	0.88%	
*AT&T GSM	4	525	140	0.0385	1900	1.0000	3.85%	
*AT&T LTE	1	1313	150	0.0210	734	0.4893	4.29%	
*T-Mobile	8	113	129	0.0195	1945	1.0000	1.95%	
Verizon PCS	**7**	**421**	**120**	**0.0736**	**1970**	**1.0000**	**7.36%**	
Verizon Cellular	**9**	**320**	**120**	**0.0719**	**869**	**0.5793**	**12.41%**	
Verizon AWS	**1**	**2306**	**120**	**0.0576**	**2145**	**1.0000**	**5.76%**	
Verizon 700	**1**	**511**	**120**	**0.0128**	**746**	**0.4973**	**2.57%**	
								44.95%
* Source: Siting Council								

ATTACHMENT 3

Date: **October 29, 2014**

James Williams
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Modification Report

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	OXFORD-QUAKER FARMS
	Carrier Site Name:	Seymour West, CT
Crown Castle Designation:	**Crown Castle BU Number:**	845455
	Crown Castle Site Name:	OXFORD-QUAKER FARMS
	Crown Castle JDE Job Number:	305601
	Crown Castle Work Order Number:	933260
	Crown Castle Application Number:	263999 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	933260
Site Data:	**85 QUAKER FARMS ROAD, OXFORD, New Haven County, CT**	
	Latitude *41° 23' 2.36"*, Longitude *-73° 8' 14.54"*	
	149 Foot - Monopole Tower	

Dear James Williams,

Crown Castle 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 933260, in accordance with application 263999, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level including the proposed modifications as outlined in the attached drawings, "Appendix D". Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4: Modified Structure w/ Existing + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

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

Structural analysis prepared by: Randall Ashworth, Associate Design Engineer / TS

Respectfully submitted by:

STATE OF CONNECTICUT
JAMAL A HUWEL
28893
LICENSED
PROFESSIONAL ENGINEER
10/29/2014

Jamal A Huwel, P.E.
Manger Engineering

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by PAUL J FORD in April of 2005. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The modification drawings designed by CCI and attached in Appendix D, have been considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	3	alcatel lucent	RRH2X60-AWS	2	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		3	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		3	andrew	SBNHH-1D65B w/ Mount Pipe			
		2	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
149.0	150.0	2	andrew	SBNH-1D6565C w/ Mount Pipe	3 6	1/2 1-5/8	1
		6	ericsson	RBS 6102			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	149.0	1	tower mounts	Side Arm Mount [SO 103-3]			
139.0	140.0	3	powerwave technologies	7770.00 w/ Mount Pipe	6	1-5/8	1
		6	powerwave technologies	TMA DD 1900 with 850 BYPASS			
	139.0	1	tower mounts	Side Arm Mount [SO 104-3]			
129.0	132.0	3	powerwave technologies	LGP 13901	6	1-5/8	1
		3	rfs celwave	APXV18-209014-C w/ Mount Pipe			
	129.0	1	tower mounts	Side Arm Mount [SO 104-3]			
120.0	120.0	6	andrew	850/1900 dual band TMA	18	1-5/8	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	antel	BXA-185085/12CF w/ Mount Pipe			
		3	antel	BXA-70063/4CF w/ Mount Pipe			
		3	antel	BXA-80080/6CF w/ Mount Pipe	-	-	1
		1	tower mounts	Sector Mount [SM 104-3]			
109.0	109.0	1	tower mounts	Side Arm Mount [SO 104-3]	-	-	3
99.0	99.0	1	tower mounts	Side Arm Mount [SO 104-3]	-	-	3
80.0	80.0	1	antenna systems and solutions inc	FO150-3	3	1/2	1
		1	pctel	MPRD2449			
		1	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed, Not Considered in Analysis
3) Abandoned Equipment To Be Removed, Not Considered in Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148.5	148.5	6	allgon	7920 Panel	-	-
139	139	9	generic	48"x12"x3" Panel Antenna	-	-
129	129	9	generic	48"x12"x3" Panel Antenna	-	-
119	119	9	generic	48"x12"x3" Panel Antenna	-	-
109	109	6	generic	48"x12"x3" Panel Antenna	-	-
99	99	6	generic	48"x12"x3" Panel Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI Geotechnical Engineers	4911888	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PennSummit Tubular, LLC/PJF	5113082	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
149 - 144	Pole	TP23.865x23x0.1875	Pole	17.1%	Pass
144 - 139	Pole	TP24.73x23.865x0.1875	Pole	29.6%	Pass
139 - 134	Pole	TP25.595x24.73x0.1875	Pole	42.5%	Pass
134 - 129	Pole	TP26.46x25.595x0.1875	Pole	53.7%	Pass
129 - 124	Pole	TP27.325x26.46x0.1875	Pole	65.2%	Pass
124 - 119	Pole	TP28.19x27.325x0.1875	Pole	76.5%	Pass
119 - 115.25	Pole	TP29.487x28.19x0.1875	Pole	88.4%	Pass
115.25 - 110.25	Pole	TP29.328x28.463x0.2188	Pole	89.3%	Pass
110.25 - 108	Pole	TP29.717x29.328x0.2188	Pole	94.3%	Pass
108 - 107.75	Pole + Reinf.	TP29.761x29.717x0.2313	Pole	96.0%	Pass
107.75 - 107.5	Pole + Reinf.	TP29.804x29.761x0.2313	Pole	96.6%	Pass
107.5 - 107.25	Pole + Reinf.	TP29.847x29.804x0.4375	Reinf. 5 Compression	61.9%	Pass
107.25 - 102.25	Pole + Reinf.	TP30.712x29.847x0.4313	Reinf. 5 Compression	69.2%	Pass
102.25 - 97.25	Pole + Reinf.	TP31.577x30.712x0.4188	Reinf. 5 Compression	76.3%	Pass
97.25 - 92.25	Pole + Reinf.	TP32.442x31.577x0.4188	Reinf. 5 Compression	83.3%	Pass
92.25 - 90.5	Pole + Reinf.	TP32.745x32.442x0.4125	Reinf. 5 Compression	85.2%	Pass
90.5 - 90.25	Pole + Reinf.	TP32.788x32.745x0.4125	Reinf. 4 Compression	85.6%	Pass
90.25 - 88	Pole + Reinf.	TP33.177x32.788x0.4125	Reinf. 4 Compression	88.4%	Pass
88 - 87.75	Pole + Reinf.	TP33.221x33.177x0.5313	Reinf. 4 Compression	76.2%	Pass
87.75 - 87.5	Pole + Reinf.	TP33.264x33.221x0.5188	Reinf. 4 Compression	76.3%	Pass
87.5 - 87.25	Pole + Reinf.	TP33.307x33.264x0.4563	Reinf. 3 Compression	77.6%	Pass
87.25 - 82.25	Pole + Reinf.	TP34.172x33.307x0.4688	Reinf. 3 Compression	82.9%	Pass
82.25 - 79.75	Pole + Reinf.	TP35.383x34.172x0.4563	Reinf. 3 Compression	85.8%	Pass
79.75 - 74.75	Pole + Reinf.	TP35.032x34.167x0.5063	Reinf. 3 Compression	80.9%	Pass
74.75 - 70.5	Pole + Reinf.	TP35.767x35.032x0.5063	Reinf. 3 Compression	84.4%	Pass
70.5 - 70.25	Pole + Reinf.	TP35.81x35.767x0.6063	Reinf. 2 Compression	72.1%	Pass
70.25 - 65.25	Pole + Reinf.	TP36.675x35.81x0.5813	Reinf. 2 Compression	75.6%	Pass
65.25 - 60.25	Pole + Reinf.	TP37.54x36.675x0.5813	Reinf. 2 Compression	79.2%	Pass
60.25 - 55.25	Pole + Reinf.	TP38.405x37.54x0.5813	Reinf. 2 Compression	82.1%	Pass
55.25 - 50.25	Pole + Reinf.	TP39.27x38.405x0.5813	Reinf. 2 Compression	85.1%	Pass
50.25 - 45.25	Pole + Reinf.	TP40.135x39.27x0.5563	Reinf. 2 Compression	88.3%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
45.25 - 45	Pole + Reinf.	TP41.086x40.135x0.5563	Reinf. 2 Compression	88.4%	Pass
45 - 38.75	Pole + Reinf.	TP40.697x39.615x0.65	Reinf. 2 Compression	80.4%	Pass
38.75 - 35.5	Pole + Reinf.	TP41.259x40.697x0.6625	Reinf. 2 Compression	81.0%	Pass
35.5 - 35.25	Pole + Reinf.	TP41.302x41.259x0.6625	Reinf. 1 Compression	81.1%	Pass
35.25 - 30.25	Pole + Reinf.	TP42.167x41.302x0.6375	Reinf. 1 Compression	83.8%	Pass
30.25 - 25.25	Pole + Reinf.	TP43.032x42.167x0.65	Reinf. 1 Compression	85.0%	Pass
25.25 - 20.25	Pole + Reinf.	TP43.897x43.032x0.6375	Reinf. 1 Compression	87.5%	Pass
20.25 - 15.25	Pole + Reinf.	TP44.762x43.897x0.6375	Reinf. 1 Compression	88.5%	Pass
15.25 - 10.25	Pole + Reinf.	TP45.627x44.762x0.625	Reinf. 1 Compression	90.8%	Pass
10.25 - 5.25	Pole + Reinf.	TP46.492x45.627x0.6125	Reinf. 1 Compression	91.6%	Pass
5.25 - 0.25	Pole + Reinf.	TP47.357x46.492x0.625	Reinf. 1 Compression	93.1%	Pass
0.25 - 0	Pole + Reinf.	TP47.4x47.357x0.625	Reinf. 1 Compression	93.2%	Pass
				Summary	
			Pole	96.6%	Pass
			Reinforcement	93.9%	Pass
			Overall	96.6%	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.4	Pass
1	Base Plate	0	76.4	Pass
1	Base Foundation	0	95.4	Pass

Structure Rating (max from all components) =	96.6%

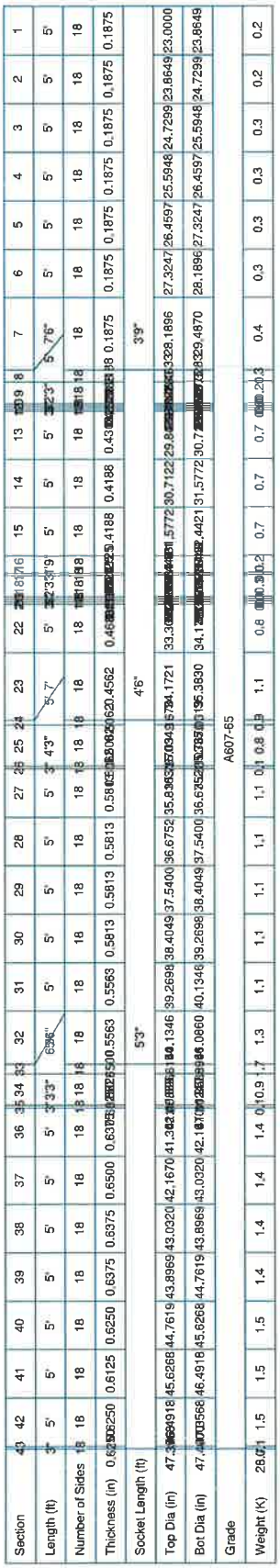
Notes:
1) See additional documentation in "Appendix C -- Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

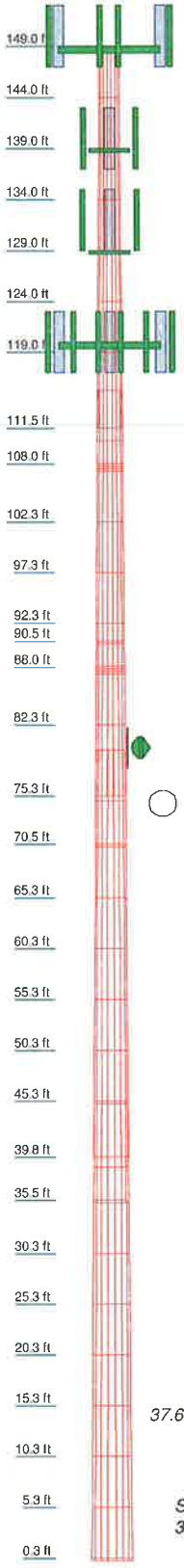
Perform the modifications detailed in "Appendix D" to remedy the deficiencies identified in Crown Castle Work Order No. 922666.

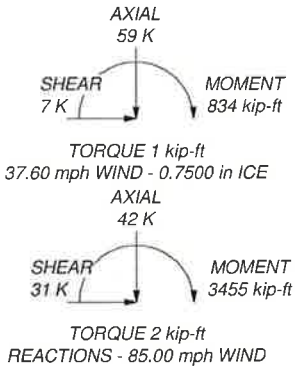
APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5	6	7	8	9	13	14	15	16	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Length (ft)	5'	5'	5'	5'	5'	5'	5' 7 6/8"	5' 3"	5' 3"	5'	5'	5'	5' 3 7/8"	5'	5' 7"	4' 3"	3'	5'	5'	5'	5'	5'	5'	6 3/8"	3' 3 3/8"	3'	5'	5'	5'	5'	5'	5'	5'	3'
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.2500	0.2500	0.4375	0.4188	0.4188	0.2500	0.4562	0.4562	0.2500	0.2500	0.5813	0.5813	0.5813	0.5813	0.5813	0.5813	0.5563	0.5563	0.5563	0.5563	0.6375	0.6500	0.6375	0.6375	0.6250	0.6125	0.6250
Socket Length (ft)	3'9"													4'6"						5'3"														
Top Dia (in)	23.0000	23.8649	24.7299	25.5948	26.4597	27.3247	28.1896	29.0545	29.4870	30.7722	31.5772	32.4421	32.8746	33.3070	34.1721	34.6045	35.0370	35.8963	36.6752	37.5400	38.4049	39.2698	40.1346	41.0860	41.5187	42.1670	43.0320	43.8969	44.7619	45.6268	46.4918	47.3568	48.2217	49.0867
Bot Dia (in)	23.8649	24.7299	25.5948	26.4597	27.3247	28.1896	29.0545	29.4870	30.7722	31.5772	32.4421	32.8746	33.3070	34.1721	35.0370	35.4695	35.9019	36.7668	37.5400	38.4049	39.2698	40.1346	41.0860	41.5187	42.1670	43.0320	43.8969	44.7619	45.6268	46.4918	47.3568	48.2217	49.0867	49.5191
Grade	A607-65																																	
Weight (K)	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.7	0.7	0.7	0.2	0.8	1.1	0.3	0.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.7	10.9	1.4	1.4	1.4	1.4	1.5	1.5	1.5	28.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SBNH-1D6565C w/ Mount Pipe	149	LGP 13901	129
SBNH-1D6565C w/ Mount Pipe	149	LGP 13901	129
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	Side Arm Mount [SO 104-3]	129
		4' x 2" Pipe Mount	129
7770.00 w/ Mount Pipe	149	4' x 2" Pipe Mount	129
7770.00 w/ Mount Pipe	149	4' x 2" Pipe Mount	129
7770.00 w/ Mount Pipe	149	BXA-80080/6CF w/ Mount Pipe	120
(2) LGP21401	149	BXA-80080/6CF w/ Mount Pipe	120
(2) LGP21401	149	BXA-80080/6CF w/ Mount Pipe	120
(2) LGP21401	149	HBXX-6517DS-A2M w/ Mount Pipe	120
(2) RBS 6102	149	HBXX-6517DS-A2M w/ Mount Pipe	120
(2) RBS 6102	149	HBXX-6517DS-A2M w/ Mount Pipe	120
(2) RBS 6102	149	SBNHH-1D65B w/ Mount Pipe	120
DC6-48-60-18-8F	149	SBNHH-1D65B w/ Mount Pipe	120
Side Arm Mount [SO 103-3]	149	SBNHH-1D65B w/ Mount Pipe	120
Side Arm Mount [SO 102-3]	147	RRH2X60-AWS	120
4' x 2" Pipe Mount	147	RRH2X60-AWS	120
4' x 2" Pipe Mount	147	RRH2X60-AWS	120
4' x 2" Pipe Mount	147	RRH2X60-PCS	120
7770.00 w/ Mount Pipe	139	RRH2X60-PCS	120
7770.00 w/ Mount Pipe	139	RRH2X60-PCS	120
7770.00 w/ Mount Pipe	139	DB-T1-6Z-8AB-0Z	120
(2) TMA DD 1900 with 850 BYPASS	139	DB-T1-6Z-8AB-0Z	120
(2) TMA DD 1900 with 850 BYPASS	139	Sector Mount [SM 104-3]	120
(2) TMA DD 1900 with 850 BYPASS	139	(2) 6' x 2" Horizontal Mount Pipe	120
Side Arm Mount [SO 104-3]	139	(2) 6' x 2" Horizontal Mount Pipe	120
4' x 2" Pipe Mount	139	(2) 6' x 2" Horizontal Mount Pipe	120
4' x 2" Pipe Mount	139	(2) 4' x 2" Pipe Mount	120
4' x 2" Pipe Mount	139	(2) 4' x 2" Pipe Mount	120
APXV18-209014-C w/ Mount Pipe	129	(2) 4' x 2" Pipe Mount	120
APXV18-209014-C w/ Mount Pipe	129	FO150-3	80
APXV18-209014-C w/ Mount Pipe	129	Pipe Mount [PM 601-1]	80
LGP 13901	129	MPRD2449	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 96.6%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2257

Job: **BU# 845455**			
Project:			
Client: Crown Castle	Drawn by: RAshworth	App'd:	
Code: TIA/EIA-222-F	Date: 10/29/14	Scale: NTS	
Path: C:\Users\RAshworth\Desktop\845455-new\845455.mod.er		Dwg No. E-1	

Tower Input Data

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

4) Tower is located in New Haven County, Connecticut.
5) Basic wind speed of 85.00 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 37.60 mph is used in combination with ice.
10) Temperature drop of 50.00 °F.
11) Deflections calculated using a wind speed of 50.00 mph.
12) TOWER RATING: 96.6%.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.333.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149'-144'	5'	0'	18	23.0000	23.8649	0.1875	0.7500	A607-65 (65 ksi)
L2	144'-139'	5'	0'	18	23.8649	24.7299	0.1875	0.7500	A607-65 (65 ksi)
L3	139'-134'	5'	0'	18	24.7299	25.5948	0.1875	0.7500	A607-65 (65 ksi)
L4	134'-129'	5'	0'	18	25.5948	26.4597	0.1875	0.7500	A607-65 (65 ksi)
L5	129'-124'	5'	0'	18	26.4597	27.3247	0.1875	0.7500	A607-65 (65 ksi)
L6	124'-119'	5'	0'	18	27.3247	28.1896	0.1875	0.7500	A607-65 (65 ksi)
L7	119'-111'6"	7'6"	3'9"	18	28.1896	29.4870	0.1875	0.7500	A607-65 (65 ksi)
L8	111'6"-110'3"	5'	0'	18	28.4633	29.3283	0.2188	0.8750	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L9	110'3"-108'	2'3"	0'	18	29.3283	29.7175	0.2188	0.8750	A607-65 (65 ksi)
L10	108'-107'9"	3"	0'	18	29.7175	29.7607	0.2313	0.9250	A607-65 (65 ksi)
L11	107'9"-107'6"	3"	0'	18	29.7607	29.8040	0.2313	0.9250	A607-65 (65 ksi)
L12	107'6"-107'3"	3"	0'	18	29.8040	29.8472	0.4375	1.7500	A607-65 (65 ksi)
L13	107'3"-102'3"	5'	0'	18	29.8472	30.7122	0.4313	1.7250	A607-65 (65 ksi)
L14	102'3"-97'3"	5'	0'	18	30.7122	31.5772	0.4188	1.6750	A607-65 (65 ksi)
L15	97'3"-92'3"	5'	0'	18	31.5772	32.4421	0.4188	1.6750	A607-65 (65 ksi)
L16	92'3"-90'6"	1'9"	0'	18	32.4421	32.7449	0.4125	1.6500	A607-65 (65 ksi)
L17	90'6"-90'3"	3"	0'	18	32.7449	32.7881	0.4125	1.6500	A607-65 (65 ksi)
L18	90'3"-88'	2'3"	0'	18	32.7881	33.1773	0.4125	1.6500	A607-65 (65 ksi)
L19	88'-87'9"	3"	0'	18	33.1773	33.2206	0.5313	2.1250	A607-65 (65 ksi)
L20	87'9"-87'6"	3"	0'	18	33.2206	33.2638	0.5188	2.0750	A607-65 (65 ksi)
L21	87'6"-87'3"	3"	0'	18	33.2638	33.3071	0.4562	1.8250	A607-65 (65 ksi)
L22	87'3"-82'3"	5'	0'	18	33.3071	34.1721	0.4688	1.8750	A607-65 (65 ksi)
L23	82'3"-75'3"	7'	4'6"	18	34.1721	35.3830	0.4562	1.8250	A607-65 (65 ksi)
L24	75'3"-74'9"	5'	0'	18	34.1670	35.0319	0.5062	2.0250	A607-65 (65 ksi)
L25	74'9"-70'6"	4'3"	0'	18	35.0319	35.7670	0.5062	2.0250	A607-65 (65 ksi)
L26	70'6"-70'3"	3"	0'	18	35.7670	35.8103	0.6062	2.4250	A607-65 (65 ksi)
L27	70'3"-65'3"	5'	0'	18	35.8103	36.6752	0.5813	2.3250	A607-65 (65 ksi)
L28	65'3"-60'3"	5'	0'	18	36.6752	37.5400	0.5813	2.3250	A607-65 (65 ksi)
L29	60'3"-55'3"	5'	0'	18	37.5400	38.4049	0.5813	2.3250	A607-65 (65 ksi)
L30	55'3"-50'3"	5'	0'	18	38.4049	39.2698	0.5813	2.3250	A607-65 (65 ksi)
L31	50'3"-45'3"	5'	0'	18	39.2698	40.1346	0.5563	2.2250	A607-65 (65 ksi)
L32	45'3"-39'9"	5'6"	5'3"	18	40.1346	41.0860	0.5563	2.2250	A607-65 (65 ksi)
L33	39'9"-38'9"	6'3"	0'	18	39.6154	40.6966	0.6500	2.6000	A607-65 (65 ksi)
L34	38'9"-35'6"	3'3"	0'	18	40.6966	41.2588	0.6625	2.6500	A607-65 (65 ksi)
L35	35'6"-35'3"	3"	0'	18	41.2588	41.3021	0.6625	2.6500	A607-65 (65 ksi)
L36	35'3"-30'3"	5'	0'	18	41.3021	42.1670	0.6375	2.5500	A607-65 (65 ksi)
L37	30'3"-25'3"	5'	0'	18	42.1670	43.0320	0.6500	2.6000	A607-65 (65 ksi)
L38	25'3"-20'3"	5'	0'	18	43.0320	43.8969	0.6375	2.5500	A607-65 (65 ksi)
L39	20'3"-15'3"	5'	0'	18	43.8969	44.7619	0.6375	2.5500	A607-65 (65 ksi)
L40	15'3"-10'3"	5'	0'	18	44.7619	45.6268	0.6250	2.5000	A607-65 (65 ksi)
L41	10'3"-5'3"	5'	0'	18	45.6268	46.4918	0.6125	2.4500	A607-65 (65 ksi)
L42	5'3"-3"	5'	0'	18	46.4918	47.3568	0.6250	2.5000	A607-65 (65 ksi)
L43	3"-0'	3"		18	47.3568	47.4000	0.6250	2.5000	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)

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	23.3548	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	24.2331	14.0910	998.0436	8.4055	12.1234	82.3238	1997.4004	7.0469	3.8702	20.641
L2	24.2331	14.0910	998.0436	8.4055	12.1234	82.3238	1997.4004	7.0469	3.8702	20.641
	25.1114	14.6058	1111.4629	8.7125	12.5628	88.4727	2224.3883	7.3043	4.0225	21.453
L3	25.1114	14.6058	1111.4629	8.7125	12.5628	88.4727	2224.3883	7.3043	4.0225	21.453
	25.9896	15.1205	1233.1650	9.0196	13.0022	94.8431	2467.9526	7.5617	4.1747	22.265
L4	25.9896	15.1205	1233.1650	9.0196	13.0022	94.8431	2467.9526	7.5617	4.1747	22.265
	26.8679	15.6353	1363.4419	9.3266	13.4415	101.4349	2728.6778	7.8191	4.3269	23.077
L5	26.8679	15.6353	1363.4419	9.3266	13.4415	101.4349	2728.6778	7.8191	4.3269	23.077
	27.7462	16.1500	1502.5854	9.6337	13.8809	108.2482	3007.1478	8.0765	4.4791	23.889
L6	27.7462	16.1500	1502.5854	9.6337	13.8809	108.2482	3007.1478	8.0765	4.4791	23.889
	28.6245	16.6647	1650.8874	9.9407	14.3203	115.2829	3303.9471	8.3340	4.6314	24.701
L7	28.6245	16.6647	1650.8874	9.9407	14.3203	115.2829	3303.9471	8.3340	4.6314	24.701
	29.9419	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L8	29.5611	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	29.7807	20.2111	2163.7009	10.3339	14.8988	145.2269	4330.2489	10.1075	4.7768	21.837
L9	29.7807	20.2111	2163.7009	10.3339	14.8988	145.2269	4330.2489	10.1075	4.7768	21.837
	30.1759	20.4813	2251.6614	10.4721	15.0965	149.1513	4506.2856	10.2426	4.8453	22.15
L10	30.1759	21.6425	2377.3031	10.4676	15.0965	157.4739	4757.7343	10.8233	4.8233	20.857
	30.2199	21.6743	2387.7789	10.4830	15.1185	157.9380	4778.6998	10.8392	4.8309	20.89
L11	30.2199	21.6743	2387.7789	10.4830	15.1185	157.9380	4778.6998	10.8392	4.8309	20.89
	30.2638	21.7060	2398.2856	10.4983	15.1404	158.4028	4799.7268	10.8551	4.8385	20.923
L12	30.2638	40.7790	4443.0238	10.4251	15.1404	293.4543	8891.8938	20.3934	4.4755	10.23
	30.3077	40.8391	4462.6825	10.4405	15.1624	294.3256	8931.2370	20.4234	4.4831	10.247
L13	30.3077	40.2642	4401.7350	10.4427	15.1624	290.3060	8809.2618	20.1359	4.4941	10.421
	31.1860	41.4482	4801.5569	10.7497	15.6018	307.7566	9609.4317	20.7280	4.6463	10.774
L14	31.1860	40.2634	4668.1576	10.7542	15.6018	299.2064	9342.4577	20.1355	4.6683	11.148
	32.0643	41.4130	5079.5503	11.0612	16.0412	316.6565	10165.7844	20.7105	4.8206	11.512
L15	32.0643	41.4130	5079.5503	11.0612	16.0412	316.6565	10165.7844	20.7105	4.8206	11.512
	32.9426	42.5627	5514.4296	11.3683	16.4806	334.6012	11036.1153	21.2854	4.9728	11.875
L16	32.9426	41.9356	5435.3059	11.3705	16.4806	329.8002	10877.7637	20.9718	4.9838	12.082
	33.2500	42.3320	5590.8871	11.4780	16.6344	336.1041	11189.1307	21.1700	5.0371	12.211
L17	33.2500	42.3320	5590.8871	11.4780	16.6344	336.1041	11189.1307	21.1700	5.0371	12.211
	33.2939	42.3886	5613.3524	11.4933	16.6564	337.0095	11234.0909	21.1983	5.0447	12.23
L18	33.2939	42.3886	5613.3524	11.4933	16.6564	337.0095	11234.0909	21.1983	5.0447	12.23
	33.6892	42.8982	5818.2544	11.6315	16.8541	345.2132	11644.1645	21.4532	5.1132	12.396
L19	33.6892	55.0474	7412.0282	11.5894	16.8541	439.7762	14833.8093	27.5289	4.9042	9.231
	33.7331	55.1204	7441.5246	11.6047	16.8761	440.9515	14892.8410	27.5654	4.9118	9.246
L20	33.7331	53.8440	7274.7689	11.6092	16.8761	431.0703	14559.1101	26.9271	4.9338	9.511
	33.7770	53.9152	7303.6697	11.6245	16.8980	432.2201	14616.9497	26.9627	4.9414	9.526
L21	33.7770	47.5099	6460.5622	11.6467	16.8980	382.3263	12929.6253	23.7595	5.0514	11.072
	33.8209	47.5725	6486.1455	11.6620	16.9200	383.3419	12980.8256	23.7908	5.0590	11.088
L22	33.8209	48.8573	6656.2441	11.6576	16.9200	393.3950	13321.2466	24.4333	5.0370	10.746

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
	34.6992	50.1442	7196.1967	11.9647	17.3594	414.5417	14401.8624	25.0769	5.1893	11.07
L23	34.6992	48.8251	7012.0944	11.9691	17.3594	403.9364	14033.4155	24.4172	5.2113	11.422
	35.9288	50.5787	7795.1015	12.3990	17.9746	433.6740	15600.4601	25.2942	5.4244	11.889
L24	35.4845	54.0874	7742.5154	11.9496	17.3569	446.0783	15495.2187	27.0488	5.1224	10.118
	35.5723	55.4771	8354.7829	12.2566	17.7962	469.4699	16720.5593	27.7438	5.2746	10.419
L25	35.5723	55.4771	8354.7829	12.2566	17.7962	469.4699	16720.5593	27.7438	5.2746	10.419
	36.3188	56.6584	8899.9117	12.5176	18.1697	489.8227	17811.5341	28.3346	5.4040	10.675
L26	36.3188	67.6577	10567.4979	12.4821	18.1697	581.6013	21148.9008	33.8353	5.2280	8.624
	36.3627	67.7409	10606.5361	12.4974	18.1916	583.0450	21227.0286	33.8769	5.2356	8.636
L27	36.3627	64.9936	10190.8333	12.5063	18.1916	560.1936	20395.0760	32.5030	5.2796	9.083
	37.2409	66.5892	10959.9632	12.8133	18.6310	588.2655	21934.3478	33.3009	5.4318	9.345
L28	37.2409	66.5892	10959.9632	12.8133	18.6310	588.2655	21934.3478	33.3009	5.4318	9.345
	38.1191	68.1848	11766.8499	13.1204	19.0703	617.0238	23549.1828	34.0989	5.5840	9.607
L29	38.1191	68.1848	11766.8499	13.1204	19.0703	617.0238	23549.1828	34.0989	5.5840	9.607
	38.9974	69.7804	12612.3980	13.4274	19.5097	646.4684	25241.3917	34.8968	5.7363	9.869
L30	38.9974	69.7804	12612.3980	13.4274	19.5097	646.4684	25241.3917	34.8968	5.7363	9.869
	39.8756	71.3760	13497.5124	13.7344	19.9490	676.5995	27012.7851	35.6948	5.8885	10.131
L31	39.8756	68.3502	12942.0307	13.7433	19.9490	648.7544	25901.0908	34.1816	5.9325	10.665
	40.7538	69.8771	13828.9383	14.0503	20.3884	678.2749	27676.0730	34.9452	6.0847	10.939
L32	40.7538	69.8771	13828.9383	14.0503	20.3884	678.2749	27676.0730	34.9452	6.0847	10.939
	41.7198	71.5568	14850.3323	14.3881	20.8717	711.5060	29720.2050	35.7852	6.2521	11.24
L33	41.1487	80.3895	15420.3655	13.8327	20.1246	766.2440	30861.0215	40.2024	5.8283	8.967
	41.3244	82.6201	16739.9477	14.2165	20.6739	809.7155	33501.9223	41.3179	6.0186	9.259
L34	41.3244	84.1827	17045.8979	14.2121	20.6739	824.5144	34114.2252	42.0993	5.9966	9.051
	41.8953	85.3649	17774.1873	14.4117	20.9595	848.0265	35571.7623	42.6906	6.0955	9.201
L35	41.8953	85.3649	17774.1873	14.4117	20.9595	848.0265	35571.7623	42.6906	6.0955	9.201
	41.9392	85.4558	17831.0531	14.4270	20.9814	849.8488	35685.5688	42.7360	6.1032	9.212
L36	41.9392	82.2817	17189.8680	14.4359	20.9814	819.2891	34402.3549	41.1487	6.1472	9.643
	42.8175	84.0318	18310.2789	14.7430	21.4208	854.7881	36644.6509	42.0239	6.2994	9.881
L37	42.8175	85.6537	18652.4512	14.7385	21.4208	870.7619	37329.4457	42.8350	6.2774	9.658
	43.6958	87.4382	19842.7124	15.0456	21.8602	907.7079	39711.5344	43.7274	6.4296	9.892
L38	43.6958	85.7820	19478.3463	15.0500	21.8602	891.0400	38982.3227	42.8992	6.4516	10.12
	44.5741	87.5322	20695.0627	15.3571	22.2996	928.0448	41417.3564	43.7744	6.6039	10.359
L39	44.5741	87.5322	20695.0627	15.3571	22.2996	928.0448	41417.3564	43.7744	6.6039	10.359
	45.4524	89.2824	21961.4207	15.6642	22.7390	965.8027	43951.7387	44.6497	6.7561	10.598

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
L40	45.4524	87.5565	21549.1081	15.6686	22.7390	947.6703	43126.5712	43.7866	6.7781	10.845
	46.3307	89.2724	22841.0015	15.9757	23.1784	985.4420	45712.0577	44.6447	6.9303	11.089
L41	46.3307	87.5112	22402.8393	15.9801	23.1784	966.5381	44835.1569	43.7639	6.9523	11.351
	47.2090	89.1928	23719.2347	16.2871	23.6178	1004.2935	47469.6798	44.6049	7.1046	11.599
L42	47.2090	90.9883	24183.5233	16.2827	23.6178	1023.9519	48398.8678	45.5028	7.0826	11.332
	48.0873	92.7041	25577.6467	16.5898	24.0572	1063.2000	51188.9491	46.3609	7.2348	11.576
L43	48.0873	92.7041	25577.6467	16.5898	24.0572	1063.2000	51188.9491	46.3609	7.2348	11.576
	48.1312	92.7899	25648.7248	16.6051	24.0792	1065.1818	51331.1989	46.4038	7.2424	11.588

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 149'-144'				1	1	1		
L2 144'-139'				1	1	1		
L3 139'-134'				1	1	1		
L4 134'-129'				1	1	1		
L5 129'-124'				1	1	1		
L6 124'-119'				1	1	1		
L7 119'-111'6"				1	1	1		
L8 111'6"-110'3"				1	1	1		
L9 110'3"-108'				1	1	1		
L10 108'-107'9"				1	1	1.22318		
L11 107'9"-107'6"				1	1	1.22278		
L12 107'6"-107'3"				1	1	0.944489		
L13 107'3"-102'3"				1	1	0.945099		
L14 102'3"-97'3"				1	1	0.960403		
L15 97'3"-92'3"				1	1	0.948572		
L16 92'3"-90'6"				1	1	0.958707		
L17 90'6"-90'3"				1	1	0.958135		
L18 90'3"-88'				1	1	0.953052		
L19 88'-87'9"				1	1	1.06884		
L20 87'9"-87'6"				1	1	1.09329		
L21 87'6"-87'3"				1	1	0.987429		
L22 87'3"-82'3"				1	1	0.948765		
L23 82'3"-75'3"				1	1	0.968129		
L24 75'3"-74'9"				1	1	0.991802		
L25 74'9"-70'6"				1	1	0.982707		
L26 70'6"-70'3"				1	1	0.947987		
L27 70'3"-65'3"				1	1	0.975977		
L28 65'3"-				1	1	0.964462		

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
60'3"								
L29 60'3"-55'3"				1	1	0.953473		
L30 55'3"-50'3"				1	1	0.942975		
L31 50'3"-45'3"				1	1	0.97425		
L32 45'3"-39'9"				1	1	0.973738		
L33 39'9"-38'9"				1	1	0.974266		
L34 38'9"-35'6"				1	1	0.950779		
L35 35'6"-35'3"				1	1	0.950369		
L36 35'3"-30'3"				1	1	0.978725		
L37 30'3"-25'3"				1	1	0.952371		
L38 25'3"-20'3"				1	1	0.96311		
L39 20'3"-15'3"				1	1	0.955761		
L40 15'3"-10'3"				1	1	0.967401		
L41 10'3"-5'3"				1	1	0.979807		
L42 5'3"-3"				1	1	0.9538		
L43 3"-0'				1	1	0.953473		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF4-50A(1/2")	A	No	Inside Pole	80' - 0'	3	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
LDF7-50A(1-5/8")	B	No	Inside Pole	129' - 0'	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	120' - 0'	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
2" Rigid Conduit	B	No	Inside Pole	120' - 0'	1	No Ice	0.0000	2.80
						1/2" Ice	0.0000	2.80
						1" Ice	0.0000	2.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.0000	2.80
						4" Ice	0.0000	2.80
***								
LDF4-50A(1/2")	C	No	Inside Pole	149' - 0'	3	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	149' - 0'	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	139' - 0'	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	120' - 0'	2	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	120' - 0'	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
***								
CCI-65FP-085125	A	No	CaAa (Out Of Face)	35'6" - 0'	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
CCI-65FP-085125	B	No	CaAa (Out Of Face)	35'6" - 0'	1	No Ice	0.2083	0.00
						1/2" Ice	0.2917	0.00
						1" Ice	0.3750	0.00
						2" Ice	0.5417	0.00
						4" Ice	0.8750	0.00
CCI-65FP-085125	C	No	CaAa (Out Of Face)	35'6" - 0'	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
CCI-65FP-065125	A	No	CaAa (Out Of Face)	70'6" - 35'6"	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
CCI-65FP-065125	B	No	CaAa (Out Of Face)	70'6" - 35'6"	1	No Ice	0.2083	0.00
						1/2" Ice	0.2917	0.00
						1" Ice	0.3750	0.00
						2" Ice	0.5417	0.00
						4" Ice	0.8750	0.00
CCI-65FP-065125	C	No	CaAa (Out Of Face)	70'6" - 35'6"	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
CCI-65FP-060100	A	No	CaAa (Out Of Face)	90'6" - 70'6"	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
CCI-65FP-060100	B	No	CaAa (Out Of Face)	90'6" - 70'6"	1	No Ice	0.1667	0.00
						1/2" Ice	0.2500	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.3333	0.00
						2" Ice	0.5000	0.00
						4" Ice	0.8333	0.00
CCI-65FP-060100	C	No	CaAa (Out Of Face)	90'6" - 70'6"	2	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								
CCI-65FP-060100	A	No	CaAa (Out Of Face)	110' - 85'	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
CCI-65FP-060100	B	No	CaAa (Out Of Face)	110' - 85'	1	No Ice	0.1667	0.00
						1/2" Ice	0.2500	0.00
						1" Ice	0.3333	0.00
						2" Ice	0.5000	0.00
						4" Ice	0.8333	0.00
CCI-65FP-060100	C	No	CaAa (Out Of Face)	110' - 85'	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00
***								

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	149'-144'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L2	144'-139'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L3	139'-134'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.05
L4	134'-129'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.05
L5	129'-124'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.05
L6	124'-119'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.396	0.04
		C	0.000	0.000	0.000	0.000	0.05
L7	119'-111'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.970	0.18
		C	0.000	0.000	0.000	0.000	0.08
L8	111'6"-110'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.495	0.03
		C	0.000	0.000	0.000	0.000	0.01
L9	110'3"-108'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.224	0.05
		C	0.000	0.000	0.000	0.000	0.02
L10	108'-107'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.141	0.01
		C	0.000	0.000	0.000	0.000	0.00
L11	107'9"-107'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.141	0.01
		C	0.000	0.000	0.000	0.000	0.00
L12	107'6"-107'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.141	0.01

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
		C	0.000	0.000	0.000	0.000	0.00
L13	107'3"-102'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.813	0.12
		C	0.000	0.000	0.000	0.000	0.05
L14	102'3"-97'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.813	0.12
		C	0.000	0.000	0.000	0.000	0.05
L15	97'3"-92'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.813	0.12
		C	0.000	0.000	0.000	0.000	0.05
L16	92'3"-90'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.985	0.04
		C	0.000	0.000	0.000	0.000	0.02
L17	90'6"-90'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.182	0.01
		C	0.000	0.000	0.000	0.000	0.00
L18	90'3"-88'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.641	0.05
		C	0.000	0.000	0.000	0.000	0.02
L19	88'-87'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.182	0.01
		C	0.000	0.000	0.000	0.000	0.00
L20	87'9"-87'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.182	0.01
		C	0.000	0.000	0.000	0.000	0.00
L21	87'6"-87'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.182	0.01
		C	0.000	0.000	0.000	0.000	0.00
L22	87'3"-82'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.188	0.12
		C	0.000	0.000	0.000	0.000	0.05
L23	82'3"-75'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.939	0.17
		C	0.000	0.000	0.000	0.000	0.07
L24	75'3"-74'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.281	0.01
		C	0.000	0.000	0.000	0.000	0.01
L25	74'9"-70'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.391	0.10
		C	0.000	0.000	0.000	0.000	0.04
L26	70'6"-70'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.151	0.01
		C	0.000	0.000	0.000	0.000	0.00
L27	70'3"-65'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L28	65'3"-60'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L29	60'3"-55'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L30	55'3"-50'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L31	50'3"-45'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L32	45'3"-39'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.324	0.13
		C	0.000	0.000	0.000	0.000	0.06
L33	39'9"-38'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.604	0.02
		C	0.000	0.000	0.000	0.000	0.01
L34	38'9"-35'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.964	0.08
		C	0.000	0.000	0.000	0.000	0.03
L35	35'6"-35'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.151	0.01

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
		C	0.000	0.000	0.000	0.000	0.00
L36	35'3"-30'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L37	30'3"-25'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L38	25'3"-20'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L39	20'3"-15'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L40	15'3"-10'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L41	10'3"-5'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L42	5'3"-3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.022	0.12
		C	0.000	0.000	0.000	0.000	0.05
L43	3"-0'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.151	0.01
		C	0.000	0.000	0.000	0.000	0.00

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	149'-144'	A	0.897	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.03
L2	144'-139'	A	0.893	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.03
L3	139'-134'	A	0.889	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.05
L4	134'-129'	A	0.885	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.05
L5	129'-124'	A	0.881	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.05
L6	124'-119'	A	0.877	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.747	0.07
		C		0.000	0.000	0.000	0.000	0.05
L7	119'-111'6"	A	0.871	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.584	0.37
		C		0.000	0.000	0.000	0.000	0.08
L8	111'6"-110'3"	A	0.867	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.931	0.06
		C		0.000	0.000	0.000	0.000	0.01
L9	110'3"-108'	A	0.866	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	2.292	0.11
		C		0.000	0.000	0.000	0.000	0.02
L10	108'-107'9"	A	0.865	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.263	0.01
		C		0.000	0.000	0.000	0.000	0.00
L11	107'9"-107'6"	A	0.864	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.263	0.01
		C		0.000	0.000	0.000	0.000	0.00
L12	107'6"-107'3"	A	0.864	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.263	0.01

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	0.000	0.000	0.00
L13	107'3"-102'3"	A	0.861	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.254	0.24
		C		0.000	0.000	0.000	0.000	0.05
L14	102'3"-97'3"	A	0.856	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.240	0.24
		C		0.000	0.000	0.000	0.000	0.05
L15	97'3"-92'3"	A	0.851	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.225	0.24
		C		0.000	0.000	0.000	0.000	0.05
L16	92'3"-90'6"	A	0.847	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.825	0.08
		C		0.000	0.000	0.000	0.000	0.02
L17	90'6"-90'3"	A	0.846	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.338	0.01
		C		0.000	0.000	0.000	0.000	0.00
L18	90'3"-88'	A	0.845	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	3.035	0.11
		C		0.000	0.000	0.000	0.000	0.02
L19	88'-87'9"	A	0.844	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.337	0.01
		C		0.000	0.000	0.000	0.000	0.00
L20	87'9"-87'6"	A	0.843	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.337	0.01
		C		0.000	0.000	0.000	0.000	0.00
L21	87'6"-87'3"	A	0.843	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.337	0.01
		C		0.000	0.000	0.000	0.000	0.00
L22	87'3"-82'3"	A	0.840	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.883	0.24
		C		0.000	0.000	0.000	0.000	0.05
L23	82'3"-75'3"	A	0.832	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	7.241	0.33
		C		0.000	0.000	0.000	0.000	0.07
L24	75'3"-74'9"	A	0.828	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.517	0.02
		C		0.000	0.000	0.000	0.000	0.01
L25	74'9"-70'6"	A	0.824	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	4.377	0.20
		C		0.000	0.000	0.000	0.000	0.04
L26	70'6"-70'3"	A	0.821	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.267	0.01
		C		0.000	0.000	0.000	0.000	0.00
L27	70'3"-65'3"	A	0.818	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.338	0.24
		C		0.000	0.000	0.000	0.000	0.05
L28	65'3"-60'3"	A	0.810	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.317	0.23
		C		0.000	0.000	0.000	0.000	0.05
L29	60'3"-55'3"	A	0.802	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.294	0.23
		C		0.000	0.000	0.000	0.000	0.05
L30	55'3"-50'3"	A	0.793	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.270	0.23
		C		0.000	0.000	0.000	0.000	0.05
L31	50'3"-45'3"	A	0.784	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.243	0.23
		C		0.000	0.000	0.000	0.000	0.05
L32	45'3"-39'9"	A	0.773	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.733	0.25
		C		0.000	0.000	0.000	0.000	0.06
L33	39'9"-38'9"	A	0.766	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.042	0.05
		C		0.000	0.000	0.000	0.000	0.01
L34	38'9"-35'6"	A	0.761	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	3.365	0.15
		C		0.000	0.000	0.000	0.000	0.03
L35	35'6"-35'3"	A	0.756	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.258	0.01

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	0.000	0.000	0.00
L36	35'3"-30'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L37	30'3"-25'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L38	25'3"-20'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L39	20'3"-15'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L40	15'3"-10'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L41	10'3"-5'3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L42	5'3"-3"	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	5.147	0.22
		C		0.000	0.000	0.000	0.000	0.05
L43	3"-0'	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.257	0.01
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	149'-144'	0.0000	0.0000	0.0000	0.0000
L2	144'-139'	0.0000	0.0000	0.0000	0.0000
L3	139'-134'	0.0000	0.0000	0.0000	0.0000
L4	134'-129'	0.0000	0.0000	0.0000	0.0000
L5	129'-124'	0.0000	0.0000	0.0000	0.0000
L6	124'-119'	0.1007	0.0581	0.1742	0.1006
L7	119'-111'6"	0.4416	0.2550	0.7059	0.4075
L8	111'6"-110'3"	0.4425	0.2555	0.7084	0.4090
L9	110'3"-108'	0.5790	0.3343	0.8987	0.5189
L10	108'-107'9"	0.5957	0.3439	0.9221	0.5324
L11	107'9"-107'6"	0.5958	0.3440	0.9225	0.5326
L12	107'6"-107'3"	0.5960	0.3441	0.9228	0.5328
L13	107'3"-102'3"	0.5977	0.3451	0.9265	0.5349
L14	102'3"-97'3"	0.6007	0.3468	0.9332	0.5388
L15	97'3"-92'3"	0.6036	0.3485	0.9395	0.5424
L16	92'3"-90'6"	0.6055	0.3496	0.9435	0.5447
L17	90'6"-90'3"	0.7477	0.4317	1.1343	0.6549
L18	90'3"-88'	0.7488	0.4323	1.1364	0.6561
L19	88'-87'9"	0.7498	0.4329	1.1385	0.6573
L20	87'9"-87'6"	0.7500	0.4330	1.1389	0.6575
L21	87'6"-87'3"	0.7502	0.4331	1.1393	0.6578
L22	87'3"-82'3"	0.6747	0.3895	1.0401	0.6005
L23	82'3"-75'3"	0.6121	0.3534	0.9565	0.5523
L24	75'3"-74'9"	0.6127	0.3537	0.9582	0.5532
L25	74'9"-70'6"	0.6138	0.3544	0.9585	0.5534
L26	70'6"-70'3"	0.6528	0.3769	0.9894	0.5712
L27	70'3"-65'3"	0.6542	0.3777	0.9916	0.5725
L28	65'3"-60'3"	0.6567	0.3792	0.9956	0.5748
L29	60'3"-55'3"	0.6592	0.3806	0.9990	0.5768
L30	55'3"-50'3"	0.6615	0.3819	1.0019	0.5784
L31	50'3"-45'3"	0.6638	0.3832	1.0042	0.5798
L32	45'3"-39'9"	0.6661	0.3846	1.0060	0.5808
L33	39'9"-38'9"	0.6661	0.3846	1.0060	0.5808
L34	38'9"-35'6"	0.6670	0.3851	1.0035	0.5794

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L35	35'6"-35'3"	0.6677	0.3855	1.0036	0.5795
L36	35'3"-30'3"	0.6688	0.3862	1.0039	0.5796
L37	30'3"-25'3"	0.6708	0.3873	1.0090	0.5826
L38	25'3"-20'3"	0.6728	0.3884	1.0140	0.5854
L39	20'3"-15'3"	0.6747	0.3895	1.0188	0.5882
L40	15'3"-10'3"	0.6765	0.3906	1.0235	0.5909
L41	10'3"-5'3"	0.6783	0.3916	1.0280	0.5935
L42	5'3"-3"	0.6800	0.3926	1.0324	0.5960
L43	3"-0'	0.6808	0.3931	1.0346	0.5974

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
SBNH-1D6565C w/ Mount Pipe	A	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.09 0.18 0.28 0.52 1.16
SBNH-1D6565C w/ Mount Pipe	B	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.6828 12.4043 13.1351 14.6007 17.8748	9.8418 11.3657 12.9138 15.2672 20.1392	0.09 0.18 0.28 0.52 1.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
7770.00 w/ Mount Pipe	A	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	B	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
7770.00 w/ Mount Pipe	C	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
(2) LGP21401	A	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.2326 0.3134 0.4028 0.6076 1.1210	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice	1.2880 1.4453 1.6112 1.9690	0.2326 0.3134 0.4028 0.6076	0.01 0.02 0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	2.7882	1.1210	0.14
(2) LGP21401	C	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.2326 0.3134 0.4028 0.6076 1.1210	0.01 0.02 0.03 0.05 0.14
(2) RBS 6102	A	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.4021 29.1081 29.8227 31.2779 34.2921	15.2887 15.8416 16.4031 17.5520 19.9535	0.73 0.92 1.13 1.57 2.56
(2) RBS 6102	B	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.4021 29.1081 29.8227 31.2779 34.2921	15.2887 15.8416 16.4031 17.5520 19.9535	0.73 0.92 1.13 1.57 2.56
(2) RBS 6102	C	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.4021 29.1081 29.8227 31.2779 34.2921	15.2887 15.8416 16.4031 17.5520 19.9535	0.73 0.92 1.13 1.57 2.56
DC6-48-60-18-8F	A	From Leg	3.0000 0' 1'	0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2664 1.4564 1.6575 2.0931 3.0975	1.2664 1.4564 1.6575 2.0931 3.0975	0.02 0.04 0.05 0.10 0.21
Side Arm Mount [SO 103-3]	C	None		0.0000	149'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.5000 11.8000 14.1000 18.7000 27.9000	9.5000 11.8000 14.1000 18.7000 27.9000	0.22 0.32 0.41 0.60 0.97
***									
Side Arm Mount [SO 102-3]	C	None		0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.0000 3.4800 3.9600 4.9200 6.8400	3.0000 3.4800 3.9600 4.9200 6.8400	0.08 0.11 0.14 0.20 0.32
4' x 2" Pipe Mount	A	From Leg	1.0000 0' 0'	0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	B	From Leg	1.0000 0' 0'	0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	C	From Leg	1.0000 0' 0'	0.0000	147'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
***									
7770.00 w/ Mount Pipe	A	From Leg	2.0000	0.0000	139'	No Ice	6.1194	4.2543	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0' 1'			1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
7770.00 w/ Mount Pipe	B	From Leg	2.0000 0' 1'	0.0000	139'	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
7770.00 w/ Mount Pipe	C	From Leg	2.0000 0' 1'	0.0000	139'	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
(2) TMA DD 1900 with 850 BYPASS	A	From Leg	2.0000 0' 1'	0.0000	139'	No Ice	0.3632	0.1749	0.02
						1/2" Ice	0.4776	0.2409	0.02
						1" Ice	0.6005	0.3156	0.03
						2" Ice	0.8723	0.4909	0.05
						4" Ice	1.5197	0.9451	0.12
(2) TMA DD 1900 with 850 BYPASS	B	From Leg	2.0000 0' 1'	0.0000	139'	No Ice	0.3632	0.1749	0.02
						1/2" Ice	0.4776	0.2409	0.02
						1" Ice	0.6005	0.3156	0.03
						2" Ice	0.8723	0.4909	0.05
						4" Ice	1.5197	0.9451	0.12
(2) TMA DD 1900 with 850 BYPASS	C	From Leg	2.0000 0' 1'	0.0000	139'	No Ice	0.3632	0.1749	0.02
						1/2" Ice	0.4776	0.2409	0.02
						1" Ice	0.6005	0.3156	0.03
						2" Ice	0.8723	0.4909	0.05
						4" Ice	1.5197	0.9451	0.12
Side Arm Mount [SO 104-3]	C	None		0.0000	139'	No Ice	3.3000	3.3000	0.29
						1/2" Ice	4.1300	4.1300	0.32
						1" Ice	4.9600	4.9600	0.35
						2" Ice	6.6200	6.6200	0.41
						4" Ice	9.9400	9.9400	0.53
4' x 2" Pipe Mount	A	From Leg	2.0000 0' 0'	0.0000	139'	No Ice	0.7852	0.7852	0.03
						1/2" Ice	1.0284	1.0284	0.04
						1" Ice	1.2809	1.2809	0.04
						2" Ice	1.8136	1.8136	0.07
						4" Ice	3.1111	3.1111	0.17
4' x 2" Pipe Mount	B	From Leg	2.0000 0' 0'	0.0000	139'	No Ice	0.7852	0.7852	0.03
						1/2" Ice	1.0284	1.0284	0.04
						1" Ice	1.2809	1.2809	0.04
						2" Ice	1.8136	1.8136	0.07
						4" Ice	3.1111	3.1111	0.17
4' x 2" Pipe Mount	C	From Leg	2.0000 0' 0'	0.0000	139'	No Ice	0.7852	0.7852	0.03
						1/2" Ice	1.0284	1.0284	0.04
						1" Ice	1.2809	1.2809	0.04
						2" Ice	1.8136	1.8136	0.07
						4" Ice	3.1111	3.1111	0.17
***									
APXV18-209014-C w/ Mount Pipe	A	From Leg	2.0000 0' 3'	0.0000	129'	No Ice	3.7218	3.3108	0.04
						1/2" Ice	4.1344	4.0170	0.07
						1" Ice	4.5608	4.6835	0.11
						2" Ice	5.5142	6.0665	0.21
							7.5453	9.0514	0.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
APXV18-209014-C w/ Mount Pipe	B	From Leg	2.0000 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.7218 4.1344 4.5608 5.5142 7.5453	3.3108 4.0170 4.6835 6.0665 9.0514	0.04 0.07 0.11 0.21 0.52
APXV18-209014-C w/ Mount Pipe	C	From Leg	2.0000 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.7218 4.1344 4.5608 5.5142 7.5453	3.3108 4.0170 4.6835 6.0665 9.0514	0.04 0.07 0.11 0.21 0.52
LGP 13901	A	From Leg	2.0000 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.5863 0.6923 0.8071 1.0624 1.6769	0.2800 0.3634 0.4554 0.6654 1.1891	0.01 0.01 0.02 0.04 0.09
LGP 13901	B	From Leg	2.0000 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.5863 0.6923 0.8071 1.0624 1.6769	0.2800 0.3634 0.4554 0.6654 1.1891	0.01 0.01 0.02 0.04 0.09
LGP 13901	C	From Leg	2.0000 0' 3'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.5863 0.6923 0.8071 1.0624 1.6769	0.2800 0.3634 0.4554 0.6654 1.1891	0.01 0.01 0.02 0.04 0.09
Side Arm Mount [SO 104-3]	C	None		0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3000 4.1300 4.9600 6.6200 9.9400	3.3000 4.1300 4.9600 6.6200 9.9400	0.29 0.32 0.35 0.41 0.53
4' x 2" Pipe Mount	A	From Leg	2.0000 0' 0'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	B	From Leg	2.0000 0' 0'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
4' x 2" Pipe Mount	C	From Leg	2.0000 0' 0'	0.0000	129'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.04 0.04 0.07 0.17
***									
BXA-80080/6CF w/ Mount Pipe	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.1428 8.7943 9.4136 10.6774 13.3246	5.6002 6.7764 7.6723 9.4817 13.3007	0.05 0.11 0.18 0.34 0.81
BXA-80080/6CF w/ Mount Pipe	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice 1/2" Ice	8.1428 8.7943 9.4136	5.6002 6.7764 7.6723	0.05 0.11 0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	10.6774	9.4817	0.34
						2" Ice	13.3246	13.3007	0.81
						4" Ice			
BXA-80080/6CF w/ Mount Pipe	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.1428	5.6002	0.05
						1/2" Ice	8.7943	6.7764	0.11
							9.4136	7.6723	0.18
						1" Ice	10.6774	9.4817	0.34
						2" Ice	13.3246	13.3007	0.81
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.9758	6.9629	0.07
						1/2" Ice	9.6473	8.1817	0.14
							10.2909	9.1436	0.21
						1" Ice	11.5946	11.0219	0.40
						2" Ice	14.3212	15.0267	0.91
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.9758	6.9629	0.07
						1/2" Ice	9.6473	8.1817	0.14
							10.2909	9.1436	0.21
						1" Ice	11.5946	11.0219	0.40
						2" Ice	14.3212	15.0267	0.91
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.9758	6.9629	0.07
						1/2" Ice	9.6473	8.1817	0.14
							10.2909	9.1436	0.21
						1" Ice	11.5946	11.0219	0.40
						2" Ice	14.3212	15.0267	0.91
						4" Ice			
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.6154	7.0840	0.08
						1/2" Ice	9.2719	8.2754	0.15
							9.8964	9.1876	0.22
						1" Ice	11.1702	11.0266	0.40
						2" Ice	13.8373	15.0669	0.91
						4" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.6154	7.0840	0.08
						1/2" Ice	9.2719	8.2754	0.15
							9.8964	9.1876	0.22
						1" Ice	11.1702	11.0266	0.40
						2" Ice	13.8373	15.0669	0.91
						4" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	8.6154	7.0840	0.08
						1/2" Ice	9.2719	8.2754	0.15
							9.8964	9.1876	0.22
						1" Ice	11.1702	11.0266	0.40
						2" Ice	13.8373	15.0669	0.91
						4" Ice			
RRH2X60-AWS	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
							4.5965	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2X60-AWS	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
							4.5965	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2X60-AWS	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	3.9569	1.8157	0.06
						1/2" Ice	4.2724	2.0752	0.08
							4.5965	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2X60-PCS	A	From Leg	3.0000 0'	0.0000	120'	No Ice	2.5667	2.0106	0.06
						1/2" Ice	2.7914	2.2184	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	3.0247	2.4349	0.10
						1" Ice	3.5173	2.8938	0.16
						2" Ice	4.6062	3.9152	0.31
						4" Ice			
RRH2X60-PCS	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	2.5667	2.0106	0.06
						1/2"	2.7914	2.2184	0.08
						Ice	3.0247	2.4349	0.10
						1" Ice	3.5173	2.8938	0.16
						2" Ice	4.6062	3.9152	0.31
						4" Ice			
RRH2X60-PCS	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	2.5667	2.0106	0.06
						1/2"	2.7914	2.2184	0.08
						Ice	3.0247	2.4349	0.10
						1" Ice	3.5173	2.8938	0.16
						2" Ice	4.6062	3.9152	0.31
						4" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	5.6000	2.3333	0.04
						1/2"	5.9154	2.5580	0.08
						Ice	6.2395	2.7914	0.12
						1" Ice	6.9136	3.2840	0.21
						2" Ice	8.3654	4.3728	0.45
						4" Ice			
DB-T1-6Z-8AB-0Z	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	5.6000	2.3333	0.04
						1/2"	5.9154	2.5580	0.08
						Ice	6.2395	2.7914	0.12
						1" Ice	6.9136	3.2840	0.21
						2" Ice	8.3654	4.3728	0.45
						4" Ice			
Sector Mount [SM 104-3]	C	None		0.0000	120'	No Ice	30.0200	30.0200	0.95
						1/2"	40.4800	40.4800	1.40
						Ice	50.9400	50.9400	1.86
						1" Ice	71.8600	71.8600	2.76
						2" Ice	113.7000	113.7000	4.57
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	0.8000	0.8000	0.03
						1/2"	1.2167	1.2167	0.17
						Ice	1.6444	1.6444	0.32
						1" Ice	2.5333	2.5333	0.65
						2" Ice	4.4444	4.4444	1.39
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	0.8000	0.8000	0.03
						1/2"	1.2167	1.2167	0.17
						Ice	1.6444	1.6444	0.32
						1" Ice	2.5333	2.5333	0.65
						2" Ice	4.4444	4.4444	1.39
						4" Ice			
(2) 6' x 2" Horizontal Mount Pipe	C	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	0.8000	0.8000	0.03
						1/2"	1.2167	1.2167	0.17
						Ice	1.6444	1.6444	0.32
						1" Ice	2.5333	2.5333	0.65
						2" Ice	4.4444	4.4444	1.39
						4" Ice			
(2) 4' x 2" Pipe Mount	A	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	0.7852	0.7852	0.03
						1/2"	1.0284	1.0284	0.04
						Ice	1.2809	1.2809	0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.17
						4" Ice			
(2) 4' x 2" Pipe Mount	B	From Leg	3.0000 0' 0'	0.0000	120'	No Ice	0.7852	0.7852	0.03
						1/2"	1.0284	1.0284	0.04
						Ice	1.2809	1.2809	0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.17
						4" Ice			
(2) 4' x 2" Pipe Mount	C	From Leg	3.0000	0.0000	120'	No Ice	0.7852	0.7852	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0' 0'			1/2" Ice	1.0284 1.2809	1.0284 1.2809	0.04 0.04
						1" Ice	1.8136	1.8136	0.07
						2" Ice	3.1111	3.1111	0.17
						4" Ice			
***									
***									
***									
FO150-3	B	From Leg	1.0000 0' 0'	0.0000	80'	No Ice	1.0896	1.0896	0.00
						1/2" Ice	1.3522	1.3522	0.01
						1" Ice	1.6241	1.6241	0.02
						2" Ice	2.1956	2.1956	0.06
						4" Ice	3.6129	3.6129	0.17
Pipe Mount [PM 601-1]	B	From Leg	0.5000 0' 0'	0.0000	80'	No Ice	3.0000	0.9000	0.07
						1/2" Ice	3.7400	1.1200	0.08
						1" Ice	4.4800	1.3400	0.09
						2" Ice	5.9600	1.7800	0.12
						4" Ice	8.9200	2.6600	0.18
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
MPRD2449	B	Paraboloid w/Radome	From Leg	1.0000 0' 0'	0.0000		80'	2.1667	No Ice	3.6870	0.04
									1/2" Ice	3.9761	0.06
									1" Ice	4.2651	0.08
									2" Ice	4.8433	0.12
									4" Ice	5.9996	0.20
***											

Load Combinations

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 144	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	14	-8.95	-0.23	0.32
			Max. Mx	5	-4.48	-58.92	0.10
			Max. My	2	-4.48	-0.06	58.92
			Max. Vy	5	10.30	-58.92	0.10
			Max. Vx	2	-10.29	-0.06	58.92
			Max. Torque	6			0.81
L2	144 - 139	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-9.36	-0.24	0.33
			Max. Mx	5	-4.73	-111.21	0.14
			Max. My	2	-4.73	-0.10	111.17
			Max. Vy	5	10.62	-111.21	0.14
			Max. Vx	2	-10.62	-0.10	111.17
			Max. Torque	6			0.81
L3	139 - 134	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-10.89	-0.25	0.33
			Max. Mx	5	-5.60	-171.69	0.18
			Max. My	2	-5.60	-0.14	171.61
			Max. Vy	5	12.10	-171.69	0.18
			Max. Vx	2	-12.09	-0.14	171.61
			Max. Torque	6			0.81
L4	134 - 129	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-11.35	-0.26	0.33
			Max. Mx	5	-5.92	-233.02	0.22
			Max. My	2	-5.92	-0.18	232.90
			Max. Vy	5	12.44	-233.02	0.22
			Max. Vx	2	-12.43	-0.18	232.90
			Max. Torque	6			0.80
L5	129 - 124	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-12.67	-0.27	0.32
			Max. Mx	5	-6.74	-301.97	0.25
			Max. My	2	-6.74	-0.22	301.81
			Max. Vy	5	13.63	-301.97	0.25
			Max. Vx	2	-13.62	-0.22	301.81
			Max. Torque	6			0.80
L6	124 - 119	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.41	-0.71	0.53
			Max. Mx	5	-8.98	-377.21	0.28
			Max. My	2	-8.97	-0.31	377.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	20.06	-377.21	0.28
			Max. Vx	2	-20.12	-0.31	377.02
			Max. Torque	13			-1.26
L7	119 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.97	-0.85	0.46
			Max. Mx	5	-9.38	-453.02	0.05
			Max. My	2	-9.37	-0.13	453.03
			Max. Vy	5	20.37	-453.02	0.05
			Max. Vx	2	-20.44	-0.13	453.03
			Max. Torque	13			-1.26
L8	111.5 - 110.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.11	-1.03	0.37
			Max. Mx	5	-10.15	-556.05	-0.26
			Max. My	2	-10.15	0.12	556.34
			Max. Vy	5	20.83	-556.05	-0.26
			Max. Vx	2	-20.90	0.12	556.34
			Max. Torque	13			-1.27
L9	110.25 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.47	-1.11	0.32
			Max. Mx	5	-10.43	-603.15	-0.40
			Max. My	2	-10.43	0.24	603.56
			Max. Vy	5	21.03	-603.15	-0.40
			Max. Vx	2	-21.10	0.24	603.56
			Max. Torque	13			-1.28
L10	108 - 107.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.51	-1.12	0.32
			Max. Mx	5	-10.48	-608.41	-0.41
			Max. My	2	-10.47	0.25	608.83
			Max. Vy	5	21.05	-608.41	-0.41
			Max. Vx	2	-21.11	0.25	608.83
			Max. Torque	13			-1.28
L11	107.75 - 107.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.56	-1.13	0.31
			Max. Mx	5	-10.52	-613.67	-0.43
			Max. My	2	-10.51	0.26	614.11
			Max. Vy	5	21.07	-613.67	-0.43
			Max. Vx	2	-21.14	0.26	614.11
			Max. Torque	13			-1.28
L12	107.5 - 107.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.61	-1.13	0.31
			Max. Mx	5	-10.56	-618.95	-0.44
			Max. My	2	-10.55	0.27	619.40
			Max. Vy	5	21.10	-618.95	-0.44
			Max. Vx	2	-21.16	0.27	619.40
			Max. Torque	13			-1.28
L13	107.25 - 102.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.73	-1.32	0.20
			Max. Mx	5	-11.42	-725.70	-0.75
			Max. My	2	-11.42	0.52	726.42
			Max. Vy	5	21.60	-725.70	-0.75
			Max. Vx	2	-21.66	0.52	726.42
			Max. Torque	13			-1.29
L14	102.25 - 97.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23.86	-1.51	0.10
			Max. Mx	5	-12.31	-834.93	-1.07
			Max. My	2	-12.31	0.77	835.93
			Max. Vy	5	22.09	-834.93	-1.07
			Max. Vx	2	-22.16	0.77	835.93
			Max. Torque	13			-1.30
L15	97.25 - 92.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.00	-1.70	-0.01
			Max. Mx	5	-13.22	-946.61	-1.38
			Max. My	2	-13.22	1.02	947.88

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	22.58	-946.61	-1.38
			Max. Vx	2	-22.64	1.02	947.88
			Max. Torque	13			-1.32
L16	92.25 - 90.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.41	-1.77	-0.04
			Max. Mx	5	-13.54	-986.27	-1.49
			Max. My	2	-13.53	1.11	987.64
			Max. Vy	5	22.75	-986.27	-1.49
			Max. Vx	2	-22.82	1.11	987.64
			Max. Torque	13			-1.32
L17	90.5 - 90.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.46	-1.78	-0.05
			Max. Mx	5	-13.60	-991.96	-1.50
			Max. My	2	-13.59	1.12	993.34
			Max. Vy	5	22.77	-991.96	-1.50
			Max. Vx	2	-22.83	1.12	993.34
			Max. Torque	13			-1.32
L18	90.25 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.99	-1.86	-0.10
			Max. Mx	5	-14.01	-1043.47	-1.65
			Max. My	2	-14.00	1.23	1044.97
			Max. Vy	5	23.00	-1043.47	-1.65
			Max. Vx	2	-23.07	1.23	1044.97
			Max. Torque	13			-1.33
L19	88 - 87.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.06	-1.87	-0.10
			Max. Mx	5	-14.08	-1049.22	-1.66
			Max. My	2	-14.07	1.25	1050.73
			Max. Vy	5	23.03	-1049.22	-1.66
			Max. Vx	2	-23.09	1.25	1050.73
			Max. Torque	13			-1.33
L20	87.75 - 87.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.13	-1.88	-0.11
			Max. Mx	5	-14.14	-1054.98	-1.68
			Max. My	2	-14.14	1.26	1056.51
			Max. Vy	5	23.05	-1054.98	-1.68
			Max. Vx	2	-23.12	1.26	1056.51
			Max. Torque	13			-1.33
L21	87.5 - 87.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.20	-1.89	-0.11
			Max. Mx	5	-14.19	-1060.75	-1.69
			Max. My	2	-14.19	1.27	1062.29
			Max. Vy	5	23.08	-1060.75	-1.69
			Max. Vx	2	-23.15	1.27	1062.29
			Max. Torque	13			-1.33
L22	87.25 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.47	-2.09	-0.22
			Max. Mx	5	-15.22	-1177.43	-2.01
			Max. My	2	-15.21	1.52	1179.24
			Max. Vy	5	23.58	-1177.43	-2.01
			Max. Vx	2	-23.65	1.52	1179.24
			Max. Torque	13			-1.35
L23	82.25 - 75.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.29	-2.54	-0.48
			Max. Mx	5	-15.84	-1236.95	-2.28
			Max. My	8	-15.84	-2.89	-1238.71
			Max. Vy	11	-24.10	1235.52	2.08
			Max. Vx	2	-24.09	1.48	1238.57
			Max. Torque	7			1.56
L24	75.25 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.59	-2.74	-0.59
			Max. Mx	5	-17.71	-1358.64	-2.80
			Max. My	2	-17.71	1.99	1360.35
			Max. Vy	11	-24.65	1357.33	2.56
			Max. Vx	2	-24.64	1.99	1360.35
			Max. Torque	7			1.57

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L25	74.75 - 70.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.79	-2.90	-0.69
			Max. Mx	5	-18.71	-1464.07	-3.24
			Max. My	2	-18.71	2.43	1465.86
			Max. Vy	11	-25.05	1462.86	2.96
			Max. Vx	2	-25.04	2.43	1465.86
			Max. Torque	7			1.59
L26	70.5 - 70.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.87	-2.91	-0.69
			Max. Mx	5	-18.79	-1470.32	-3.26
			Max. My	2	-18.79	2.46	1472.12
			Max. Vy	11	-25.06	1469.13	2.98
			Max. Vx	2	-25.06	2.46	1472.12
			Max. Torque	7			1.59
L27	70.25 - 65.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.44	-3.10	-0.80
			Max. Mx	5	-20.12	-1596.67	-3.78
			Max. My	2	-20.11	2.97	1598.56
			Max. Vy	11	-25.55	1595.59	3.46
			Max. Vx	2	-25.54	2.97	1598.56
			Max. Torque	7			1.60
L28	65.25 - 60.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.02	-3.30	-0.92
			Max. Mx	5	-21.47	-1725.39	-4.30
			Max. My	2	-21.47	3.49	1727.38
			Max. Vy	11	-26.02	1724.43	3.93
			Max. Vx	2	-26.01	3.49	1727.38
			Max. Torque	7			1.62
L29	60.25 - 55.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.62	-3.50	-1.03
			Max. Mx	5	-22.84	-1856.43	-4.82
			Max. My	2	-22.83	4.00	1858.50
			Max. Vy	11	-26.48	1855.58	4.40
			Max. Vx	2	-26.47	4.00	1858.50
			Max. Torque	7			1.63
L30	55.25 - 50.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.23	-3.70	-1.15
			Max. Mx	5	-24.22	-1989.71	-5.35
			Max. My	2	-24.22	4.51	1991.88
			Max. Vy	11	-26.92	1988.98	4.87
			Max. Vx	2	-26.91	4.51	1991.88
			Max. Torque	2			-1.65
L31	50.25 - 45.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.86	-3.90	-1.26
			Max. Mx	5	-25.63	-2125.17	-5.87
			Max. My	2	-25.63	5.02	2127.42
			Max. Vy	11	-27.34	2124.55	5.34
			Max. Vx	2	-27.34	5.02	2127.42
			Max. Torque	2			-1.68
L32	45.25 - 39.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.94	-3.91	-1.27
			Max. Mx	5	-25.71	-2132.00	-5.89
			Max. My	2	-25.71	5.05	2134.25
			Max. Vy	11	-27.36	2131.38	5.36
			Max. Vx	2	-27.35	5.05	2134.25
			Max. Torque	2			-1.68
L33	39.75 - 38.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.66	-4.17	-1.42
			Max. Mx	5	-28.89	-2304.70	-6.54
			Max. My	2	-28.89	5.69	2307.06
			Max. Vy	11	-27.97	2304.23	5.95
			Max. Vx	2	-27.96	5.69	2307.06

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	2			-1.71
L34	38.75 - 35.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.86	-4.30	-1.49
			Max. Mx	5	-29.95	-2395.89	-6.88
			Max. My	2	-29.95	6.02	2398.30
			Max. Vy	11	-28.23	2395.48	6.25
			Max. Vx	2	-28.22	6.02	2398.30
			Max. Torque	2			-1.73
L35	35.5 - 35.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.95	-4.31	-1.50
			Max. Mx	5	-30.04	-2402.93	-6.91
			Max. My	2	-30.04	6.04	2405.35
			Max. Vy	11	-28.24	2402.54	6.28
			Max. Vx	2	-28.23	6.04	2405.35
			Max. Torque	2			-1.73
L36	35.25 - 30.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.81	-4.51	-1.62
			Max. Mx	5	-31.68	-2544.90	-7.43
			Max. My	2	-31.68	6.55	2547.39
			Max. Vy	11	-28.62	2544.60	6.74
			Max. Vx	2	-28.61	6.55	2547.39
			Max. Torque	2			-1.75
L37	30.25 - 25.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.69	-4.72	-1.74
			Max. Mx	5	-33.35	-2688.73	-7.95
			Max. My	2	-33.34	7.06	2691.31
			Max. Vy	11	-29.00	2688.55	7.21
			Max. Vx	2	-28.99	7.06	2691.31
			Max. Torque	2			-1.78
L38	25.25 - 20.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.60	-4.94	-1.86
			Max. Mx	5	-35.03	-2834.44	-8.47
			Max. My	2	-35.03	7.57	2837.09
			Max. Vy	11	-29.37	2834.35	7.67
			Max. Vx	2	-29.36	7.57	2837.09
			Max. Torque	2			-1.80
L39	20.25 - 15.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.52	-5.15	-1.99
			Max. Mx	11	-36.74	2982.00	8.13
			Max. My	2	-36.74	8.07	2984.71
			Max. Vy	11	-29.74	2982.00	8.13
			Max. Vx	2	-29.73	8.07	2984.71
			Max. Torque	2			-1.83
L40	15.25 - 10.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.46	-5.38	-2.12
			Max. Mx	11	-38.46	3131.48	8.59
			Max. My	2	-38.46	8.57	3134.16
			Max. Vy	11	-30.10	3131.48	8.59
			Max. Vx	2	-30.09	8.57	3134.16
			Max. Torque	2			-1.86
L41	10.25 - 5.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-56.43	-5.60	-2.25
			Max. Mx	11	-40.21	3282.75	9.04
			Max. My	2	-40.21	9.07	3285.41
			Max. Vy	11	-30.46	3282.75	9.04
			Max. Vx	2	-30.45	9.07	3285.41
			Max. Torque	2			-1.88
L42	5.25 - 0.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-58.42	-5.83	-2.38
			Max. Mx	11	-41.98	3435.81	9.50
			Max. My	2	-41.98	9.57	3438.44
			Max. Vy	11	-30.81	3435.81	9.50
			Max. Vx	2	-30.80	9.57	3438.44
			Max. Torque	2			-1.91

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L43	0.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-58.52	-5.84	-2.39
			Max. Mx	11	-42.08	3443.51	9.52
			Max. My	2	-42.08	9.59	3446.14
			Max. Vy	11	-30.82	3443.51	9.52
			Max. Vx	2	-30.81	9.59	3446.14
			Max. Torque	2			-1.91

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	58.52	-0.00	-0.00
	Max. H_x	11	42.08	30.82	0.10
	Max. H_z	2	42.08	0.11	30.81
	Max. M_x	2	3446.14	0.11	30.81
	Max. M_z	5	3443.19	-30.78	-0.10
	Max. Torsion	8	1.90	-0.09	-30.77
	Min. Vert	2	42.08	0.11	30.81
	Min. H_x	5	42.08	-30.78	-0.10
	Min. H_z	8	42.08	-0.09	-30.77
	Min. M_x	8	-3444.08	-0.09	-30.77
	Min. M_z	11	-3443.51	30.82	0.10
	Min. Torsion	2	-1.91	0.11	30.81

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	42.08	0.00	0.00	0.53	-1.48	0.00
Dead+Wind 0 deg - No Ice	42.08	-0.11	-30.81	-3446.14	9.59	1.91
Dead+Wind 30 deg - No Ice	42.08	15.28	-26.61	-2977.85	-1711.43	1.51
Dead+Wind 60 deg - No Ice	42.08	26.58	-15.31	-1713.13	-2974.91	0.72
Dead+Wind 90 deg - No Ice	42.08	30.78	0.10	10.57	-3443.19	-0.26
Dead+Wind 120 deg - No Ice	42.08	26.71	15.49	1732.62	-2988.05	-1.19
Dead+Wind 150 deg - No Ice	42.08	15.47	26.72	2989.59	-1731.02	-1.80
Dead+Wind 180 deg - No Ice	42.08	0.09	30.77	3444.08	-10.89	-1.90
Dead+Wind 210 deg - No Ice	42.08	-15.31	26.59	2977.31	1711.17	-1.51
Dead+Wind 240 deg - No Ice	42.08	-26.62	15.31	1714.27	2975.44	-0.72
Dead+Wind 270 deg - No Ice	42.08	-30.82	-0.10	-9.52	3443.51	0.25
Dead+Wind 300 deg - No Ice	42.08	-26.74	-15.50	-1732.57	2986.81	1.18
Dead+Wind 330 deg - No Ice	42.08	-15.49	-26.75	-2991.41	1729.70	1.80
Dead+Ice+Temp	58.52	0.00	0.00	2.39	-5.84	-0.00
Dead+Wind 0 deg+Ice+Temp	58.52	-0.02	-7.26	-823.82	-3.87	0.55
Dead+Wind 30 deg+Ice+Temp	58.52	3.60	-6.27	-711.85	-416.85	0.45
Dead+Wind 60 deg+Ice+Temp	58.52	6.27	-3.61	-408.86	-719.87	0.24
Dead+Wind 90 deg+Ice+Temp	58.52	7.25	0.02	4.30	-831.95	-0.03
Dead+Wind 120 deg+Ice+Temp	58.52	6.30	3.64	417.19	-722.43	-0.30
Dead+Wind 150 deg+Ice+Temp	58.52	3.64	6.29	718.73	-420.57	-0.49
Dead+Wind 180 deg+Ice+Temp	58.52	0.02	7.25	827.99	-7.69	-0.54
Dead+Wind 210 deg+Ice+Temp	58.52	-3.61	6.26	716.36	405.52	-0.45

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 240 deg+Ice+Temp	58.52	-6.28	3.61	413.74	708.72	-0.25
Dead+Wind 270 deg+Ice+Temp	58.52	-7.26	-0.02	0.57	820.75	0.03
Dead+Wind 300 deg+Ice+Temp	58.52	-6.30	-3.65	-412.55	710.88	0.30
Dead+Wind 330 deg+Ice+Temp	58.52	-3.65	-6.30	-714.52	409.00	0.49
Dead+Wind 0 deg - Service	42.08	-0.04	-10.66	-1193.62	2.32	0.67
Dead+Wind 30 deg - Service	42.08	5.29	-9.21	-1031.37	-593.95	0.53
Dead+Wind 60 deg - Service	42.08	9.20	-5.30	-593.19	-1031.70	0.25
Dead+Wind 90 deg - Service	42.08	10.65	0.03	4.01	-1193.95	-0.09
Dead+Wind 120 deg - Service	42.08	9.24	5.36	600.64	-1036.26	-0.42
Dead+Wind 150 deg - Service	42.08	5.35	9.25	1036.15	-600.75	-0.63
Dead+Wind 180 deg - Service	42.08	0.03	10.65	1193.61	-4.77	-0.66
Dead+Wind 210 deg - Service	42.08	-5.30	9.20	1031.88	591.86	-0.52
Dead+Wind 240 deg - Service	42.08	-9.21	5.30	594.28	1029.88	-0.25
Dead+Wind 270 deg - Service	42.08	-10.66	-0.03	-2.95	1192.05	0.09
Dead+Wind 300 deg - Service	42.08	-9.25	-5.36	-599.93	1033.82	0.41
Dead+Wind 330 deg - Service	42.08	-5.36	-9.26	-1036.07	598.28	0.63

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-42.08	0.00	0.00	42.08	0.00	0.000%
2	-0.11	-42.08	-30.81	0.11	42.08	30.81	0.000%
3	15.28	-42.08	-26.61	-15.28	42.08	26.61	0.000%
4	26.58	-42.08	-15.31	-26.58	42.08	15.31	0.000%
5	30.78	-42.08	0.10	-30.78	42.08	-0.10	0.000%
6	26.71	-42.08	15.49	-26.71	42.08	-15.49	0.000%
7	15.47	-42.08	26.72	-15.47	42.08	-26.72	0.000%
8	0.09	-42.08	30.77	-0.09	42.08	-30.77	0.000%
9	-15.31	-42.08	26.59	15.31	42.08	-26.59	0.000%
10	-26.62	-42.08	15.31	26.62	42.08	-15.31	0.000%
11	-30.82	-42.08	-0.10	30.82	42.08	0.10	0.000%
12	-26.74	-42.08	-15.50	26.74	42.08	15.50	0.000%
13	-15.49	-42.08	-26.75	15.49	42.08	26.75	0.000%
14	0.00	-58.52	0.00	-0.00	58.52	-0.00	0.000%
15	-0.02	-58.52	-7.26	0.02	58.52	7.26	0.000%
16	3.60	-58.52	-6.27	-3.60	58.52	6.27	0.000%
17	6.27	-58.52	-3.61	-6.27	58.52	3.61	0.000%
18	7.25	-58.52	0.02	-7.25	58.52	-0.02	0.000%
19	6.30	-58.52	3.64	-6.30	58.52	-3.64	0.000%
20	3.64	-58.52	6.29	-3.64	58.52	-6.29	0.000%
21	0.02	-58.52	7.25	-0.02	58.52	-7.25	0.000%
22	-3.61	-58.52	6.26	3.61	58.52	-6.26	0.000%
23	-6.28	-58.52	3.61	6.28	58.52	-3.61	0.000%
24	-7.26	-58.52	-0.02	7.26	58.52	0.02	0.000%
25	-6.30	-58.52	-3.65	6.30	58.52	3.65	0.000%
26	-3.65	-58.52	-6.30	3.65	58.52	6.30	0.000%
27	-0.04	-42.08	-10.66	0.04	42.08	10.66	0.000%
28	5.29	-42.08	-9.21	-5.29	42.08	9.21	0.000%
29	9.20	-42.08	-5.30	-9.20	42.08	5.30	0.000%
30	10.65	-42.08	0.03	-10.65	42.08	-0.03	0.000%
31	9.24	-42.08	5.36	-9.24	42.08	-5.36	0.000%
32	5.35	-42.08	9.25	-5.35	42.08	-9.25	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.03	-42.08	10.65	-0.03	42.08	-10.65	0.000%
34	-5.30	-42.08	9.20	5.30	42.08	-9.20	0.000%
35	-9.21	-42.08	5.30	9.21	42.08	-5.30	0.000%
36	-10.66	-42.08	-0.03	10.66	42.08	0.03	0.000%
37	-9.25	-42.08	-5.36	9.25	42.08	5.36	0.000%
38	-5.36	-42.08	-9.26	5.36	42.08	9.26	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00030920
3	Yes	6	0.00000001	0.00028628
4	Yes	6	0.00000001	0.00027923
5	Yes	5	0.00000001	0.00008934
6	Yes	6	0.00000001	0.00027741
7	Yes	6	0.00000001	0.00029170
8	Yes	5	0.00000001	0.00041641
9	Yes	6	0.00000001	0.00027539
10	Yes	6	0.00000001	0.00028214
11	Yes	5	0.00000001	0.00018020
12	Yes	6	0.00000001	0.00028927
13	Yes	6	0.00000001	0.00027537
14	Yes	4	0.00000001	0.00040252
15	Yes	6	0.00000001	0.00016829
16	Yes	6	0.00000001	0.00020400
17	Yes	6	0.00000001	0.00020307
18	Yes	6	0.00000001	0.00016950
19	Yes	6	0.00000001	0.00020435
20	Yes	6	0.00000001	0.00020580
21	Yes	6	0.00000001	0.00016871
22	Yes	6	0.00000001	0.00020046
23	Yes	6	0.00000001	0.00020129
24	Yes	6	0.00000001	0.00016707
25	Yes	6	0.00000001	0.00020193
26	Yes	6	0.00000001	0.00020066
27	Yes	5	0.00000001	0.00007930
28	Yes	5	0.00000001	0.00066531
29	Yes	5	0.00000001	0.00063264
30	Yes	5	0.00000001	0.00004362
31	Yes	5	0.00000001	0.00062493
32	Yes	5	0.00000001	0.00068901
33	Yes	5	0.00000001	0.00008592
34	Yes	5	0.00000001	0.00061473
35	Yes	5	0.00000001	0.00064455
36	Yes	5	0.00000001	0.00004738
37	Yes	5	0.00000001	0.00067515
38	Yes	5	0.00000001	0.00061448

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	32.898	32	2.1398	0.0053
L2	144 - 139	30.665	32	2.1225	0.0047
L3	139 - 134	28.463	32	2.0829	0.0043
L4	134 - 129	26.312	32	2.0234	0.0038
L5	129 - 124	24.233	32	1.9465	0.0034

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L6	124 - 119	22.243	32	1.8541	0.0031
L7	119 - 111.5	20.356	32	1.7486	0.0027
L8	115.25 - 110.25	19.018	32	1.6588	0.0024
L9	110.25 - 108	17.315	32	1.5804	0.0021
L10	108 - 107.75	16.584	32	1.5220	0.0020
L11	107.75 - 107.5	16.505	32	1.5157	0.0019
L12	107.5 - 107.25	16.426	32	1.5094	0.0019
L13	107.25 - 102.25	16.347	32	1.5060	0.0019
L14	102.25 - 97.25	14.807	32	1.4337	0.0017
L15	97.25 - 92.25	13.347	32	1.3545	0.0016
L16	92.25 - 90.5	11.972	32	1.2713	0.0014
L17	90.5 - 90.25	11.512	32	1.2413	0.0014
L18	90.25 - 88	11.447	32	1.2370	0.0013
L19	88 - 87.75	10.874	32	1.1973	0.0013
L20	87.75 - 87.5	10.811	32	1.1938	0.0013
L21	87.5 - 87.25	10.749	32	1.1903	0.0013
L22	87.25 - 82.25	10.686	32	1.1862	0.0013
L23	82.25 - 75.25	9.486	32	1.1062	0.0011
L24	79.75 - 74.75	8.918	32	1.0644	0.0011
L25	74.75 - 70.5	7.825	32	1.0194	0.0010
L26	70.5 - 70.25	6.948	32	0.9505	0.0009
L27	70.25 - 65.25	6.898	32	0.9471	0.0009
L28	65.25 - 60.25	5.944	32	0.8752	0.0008
L29	60.25 - 55.25	5.065	32	0.8028	0.0007
L30	55.25 - 50.25	4.263	32	0.7301	0.0006
L31	50.25 - 45.25	3.537	32	0.6571	0.0006
L32	45.25 - 39.75	2.888	31	0.5810	0.0005
L33	45 - 38.75	2.858	31	0.5772	0.0005
L34	38.75 - 35.5	2.132	31	0.5258	0.0004
L35	35.5 - 35.25	1.789	31	0.4823	0.0004
L36	35.25 - 30.25	1.764	31	0.4790	0.0004
L37	30.25 - 25.25	1.299	31	0.4100	0.0003
L38	25.25 - 20.25	0.905	31	0.3427	0.0003
L39	20.25 - 15.25	0.581	31	0.2746	0.0002
L40	15.25 - 10.25	0.329	31	0.2071	0.0002
L41	10.25 - 5.25	0.148	31	0.1390	0.0001
L42	5.25 - 0.25	0.038	31	0.0701	0.0001
L43	0.25 - 0	0.000	1	0.0000	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	SBNH-1D6565C w/ Mount Pipe	32	32.898	2.1398	0.0053	9913
147'	Side Arm Mount [SO 102-3]	32	32.003	2.1345	0.0051	9913
139'	7770.00 w/ Mount Pipe	32	28.463	2.0829	0.0043	5758
129'	APXV18-209014-C w/ Mount Pipe	32	24.233	1.9465	0.0035	3382
120'	BXA-80080/6CF w/ Mount Pipe	32	20.724	1.7723	0.0028	2589
80'	MPRD2449	32	8.974	1.0679	0.0011	4558

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	94.661	13	6.1636	0.0151
L2	144 - 139	88.248	7	6.1137	0.0135
L3	139 - 134	81.921	7	5.9997	0.0121
L4	134 - 129	75.742	7	5.8283	0.0109

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	129 - 124	69.768	7	5.6074	0.0098
L6	124 - 119	64.047	7	5.3417	0.0088
L7	119 - 111.5	58.622	7	5.0383	0.0077
L8	115.25 - 110.25	54.773	13	4.7796	0.0067
L9	110.25 - 108	49.877	13	4.5540	0.0060
L10	108 - 107.75	47.774	13	4.3858	0.0055
L11	107.75 - 107.5	47.545	13	4.3678	0.0055
L12	107.5 - 107.25	47.317	13	4.3496	0.0055
L13	107.25 - 102.25	47.090	13	4.3398	0.0054
L14	102.25 - 97.25	42.661	13	4.1318	0.0049
L15	97.25 - 92.25	38.458	13	3.9037	0.0044
L16	92.25 - 90.5	34.501	13	3.6640	0.0040
L17	90.5 - 90.25	33.175	13	3.5777	0.0038
L18	90.25 - 88	32.988	13	3.5652	0.0038
L19	88 - 87.75	31.337	13	3.4509	0.0036
L20	87.75 - 87.5	31.157	13	3.4409	0.0036
L21	87.5 - 87.25	30.977	13	3.4306	0.0036
L22	87.25 - 82.25	30.798	13	3.4190	0.0036
L23	82.25 - 75.25	27.341	13	3.1886	0.0032
L24	79.75 - 74.75	25.704	13	3.0681	0.0031
L25	74.75 - 70.5	22.556	13	2.9384	0.0029
L26	70.5 - 70.25	20.030	13	2.7401	0.0026
L27	70.25 - 65.25	19.887	13	2.7302	0.0026
L28	65.25 - 60.25	17.138	13	2.5234	0.0023
L29	60.25 - 55.25	14.606	13	2.3148	0.0021
L30	55.25 - 50.25	12.293	13	2.1052	0.0019
L31	50.25 - 45.25	10.199	13	1.8950	0.0016
L32	45.25 - 39.75	8.330	13	1.6756	0.0014
L33	45 - 38.75	8.242	13	1.6646	0.0014
L34	38.75 - 35.5	6.150	13	1.5164	0.0012
L35	35.5 - 35.25	5.161	13	1.3912	0.0011
L36	35.25 - 30.25	5.088	13	1.3816	0.0011
L37	30.25 - 25.25	3.746	13	1.1826	0.0009
L38	25.25 - 20.25	2.609	13	0.9885	0.0008
L39	20.25 - 15.25	1.677	13	0.7922	0.0006
L40	15.25 - 10.25	0.949	13	0.5975	0.0004
L41	10.25 - 5.25	0.427	13	0.4009	0.0003
L42	5.25 - 0.25	0.111	13	0.2023	0.0001
L43	0.25 - 0	0.000	13	0.0096	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	SBNH-1D6565C w/ Mount Pipe	13	94.661	6.1636	0.0153	3531
147'	Side Arm Mount [SO 102-3]	13	92.090	6.1483	0.0147	3531
139'	7770.00 w/ Mount Pipe	7	81.921	5.9997	0.0124	2045
129'	APXV18-209014-C w/ Mount Pipe	7	69.768	5.6074	0.0100	1197
120'	BXA-80080/6CF w/ Mount Pipe	7	59.680	5.1064	0.0082	913
80'	MPRD2449	13	25.866	3.0781	0.0031	1592

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	149 - 148	TP23.8649x23x0.1875	5'	0'	0.0	39.000	13.6792	-4.14	533.49	0.008
	148 - 147					39.000	13.7822	-4.19	537.51	0.008
	147 - 146					39.000	13.8851	-4.38	541.52	0.008
	146 - 145					39.000	13.9881	-4.43	545.53	0.008
	145 - 144					39.000	14.0910	-4.48	549.55	0.008
L2	144 - 143	TP24.7299x23.8649x0.1875	5'	0'	0.0	39.000	14.1940	-4.53	553.57	0.008
	143 - 142					39.000	14.2969	-4.58	557.58	0.008
	142 - 141					39.000	14.3999	-4.63	561.60	0.008
	141 - 140					39.000	14.5028	-4.68	565.61	0.008
	140 - 139					39.000	14.6058	-4.73	569.63	0.008
L3	139 - 138	TP25.5948x24.7299x0.1875	5'	0'	0.0	39.000	14.7087	-5.35	573.64	0.009
	138 - 137					39.000	14.8117	-5.41	577.65	0.009
	137 - 136					39.000	14.9146	-5.47	581.67	0.009
	136 - 135					39.000	15.0176	-5.54	585.68	0.009
	135 - 134					39.000	15.1205	-5.60	589.70	0.009
L4	134 - 133	TP26.4597x25.5948x0.1875	5'	0'	0.0	39.000	15.2235	-5.66	593.72	0.010
	133 - 132					39.000	15.3264	-5.73	597.73	0.010
	132 - 131					39.000	15.4294	-5.79	601.75	0.010
	131 - 130					39.000	15.5323	-5.86	605.76	0.010
	130 - 129					39.000	15.6353	-5.92	609.77	0.010
L5	129 - 128	TP27.3247x26.4597x0.1875	5'	0'	0.0	39.000	15.7382	-6.44	613.79	0.010
	128 - 127					39.000	15.8412	-6.52	617.80	0.011
	127 - 126					39.000	15.9441	-6.59	621.82	0.011
	126 - 125					39.000	16.0471	-6.67	625.84	0.011
	125 - 124					39.000	16.1500	-6.74	629.85	0.011
L6	124 - 123	TP28.1896x27.3247x0.1875	5'	0'	0.0	39.000	16.2530	-6.82	633.87	0.011
	123 - 122					39.000	16.3559	-6.91	637.88	0.011
	122 - 121					39.000	16.4589	-6.99	641.89	0.011
	121 - 120					39.000	16.5618	-7.07	645.91	0.011
	120 - 119					39.000	16.6647	-8.99	649.92	0.014
L7	119 - 117.75	TP29.487x28.1896x0.1875	7'6"	0'	0.0	38.953	16.7934	-9.12	654.15	0.014
	117.75 - 116.5					38.823	16.9221	-9.25	656.98	0.014
	116.5 - 115.25					38.694	17.0508	-9.37	659.77	0.014
	115.25 - 111.5					38.307	17.4369	-4.67	667.95	0.007
L8	115.25 - 111.5	TP29.3283x28.4633x0.2188	5'	0'	0.0	39.000	20.0610	-5.31	782.38	0.007
	111.5 - 110.25					39.000	20.2111	-10.14	788.23	0.013
L9	110.25 - 109.125	TP29.7175x29.3283x0.2188	2'3"	0'	0.0	39.000	20.3462	-10.28	793.50	0.013
	109.125 - 108					39.000	20.4813	-10.42	798.77	0.013
L10	108 - 107.75 (10)	TP29.7607x29.7175x0.2313	3"	0'	0.0	39.000	21.6743	-10.47	845.30	0.012
L11	107.75 - 107.5 (11)	TP29.804x29.7607x0.2313	3"	0'	0.0	39.000	21.7060	-10.50	846.53	0.012
L12	107.5 - 107.25 (12)	TP29.8472x29.804x0.4375	3"	0'	0.0	39.000	40.8391	-10.55	1592.72	0.007
L13	107.25 - 106.25	TP30.7122x29.8472x0.4313	5'	0'	0.0	39.000	40.5010	-10.72	1579.54	0.007
	106.25 - 105.25					39.000	40.7378	-10.89	1588.78	0.007
	105.25 - 104.25					39.000	40.9746	-11.06	1598.01	0.007
	104.25 - 103.25					39.000	41.2114	-11.24	1607.24	0.007
	103.25 - 102.25					39.000	41.4482	-11.41	1616.48	0.007
L14	102.25 - 101.25	TP31.5772x30.7122x0.4188	5'	0'	0.0	39.000	40.4933	-11.59	1579.24	0.007
	101.25 - 100.25					39.000	40.7233	-11.76	1588.21	0.007
	100.25 - 99.25					39.000	40.9532	-11.94	1597.17	0.007
	99.25 - 98.25					39.000	41.1831	-12.12	1606.14	0.008
	98.25 - 97.25					39.000	41.4130	-12.30	1615.11	0.008
L15	97.25 - 96.25	TP32.4421x31.5772x0.418	5'	0'	0.0	39.000	41.6430	-12.48	1624.08	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
		8								
	96.25 - 95.25					39.000	41.8729	-12.66	1633.04	0.008
	95.25 - 94.25					39.000	42.1028	-12.84	1642.01	0.008
	94.25 - 93.25					39.000	42.3327	-13.03	1650.98	0.008
	93.25 - 92.25					39.000	42.5627	-13.21	1659.94	0.008
L16	92.25 - 90.5 (16)	TP32.7449x32.4421x0.4125	1'9"	0'	0.0	39.000	42.3320	-13.53	1650.95	0.008
L17	90.5 - 90.25 (17)	TP32.7881x32.7449x0.4125	3"	0'	0.0	39.000	42.3886	-13.59	1653.15	0.008
L18	90.25 - 89.125	TP33.1773x32.7881x0.4125	2'3"	0'	0.0	39.000	42.6434	-13.79	1663.09	0.008
	89.125 - 88					39.000	42.8982	-14.00	1673.03	0.008
L19	88 - 87.75 (19)	TP33.2206x33.1773x0.5313	3"	0'	0.0	39.000	55.1204	-14.07	2149.69	0.007
L20	87.75 - 87.5 (20)	TP33.2638x33.2206x0.5188	3"	0'	0.0	39.000	53.9152	-14.13	2102.69	0.007
L21	87.5 - 87.25 (21)	TP33.3071x33.2638x0.4563	3"	0'	0.0	39.000	47.5725	-14.18	1855.33	0.008
L22	87.25 - 86.25	TP34.1721x33.3071x0.4688	5'	0'	0.0	39.000	49.1147	-14.38	1915.47	0.008
	86.25 - 85.25					39.000	49.3721	-14.59	1925.51	0.008
	85.25 - 84.25					39.000	49.6294	-14.79	1935.55	0.008
	84.25 - 83.25					39.000	49.8868	-15.00	1945.59	0.008
	83.25 - 82.25					39.000	50.1442	-15.21	1955.62	0.008
L23	82.25 - 81	TP35.383x34.1721x0.4563	7'	0'	0.0	39.000	49.1383	-15.47	1916.39	0.008
	81 - 79.75					39.000	49.4514	-15.83	1928.61	0.008
	79.75 - 75.25					39.000	50.5787	-8.42	1972.57	0.004
L24	79.75 - 75.25	TP35.0319x34.167x0.5063	5'	0'	0.0	39.000	55.3381	-17.70	2158.19	0.008
	75.25 - 74.75					39.000	55.4771	-17.70	2163.61	0.008
L25	74.75 - 73.6875	TP35.767x35.0319x0.5063	4'3"	0'	0.0	39.000	55.7724	-17.95	2175.12	0.008
	73.6875 - 72.625					39.000	56.0677	-18.20	2186.64	0.008
	72.625 - 71.5625					39.000	56.3631	-18.45	2198.16	0.008
	71.5625 - 70.5					39.000	56.6584	-18.71	2209.68	0.008
L26	70.5 - 70.25 (26)	TP35.8103x35.767x0.6063	3"	0'	0.0	39.000	67.7409	-18.78	2641.90	0.007
L27	70.25 - 69.25	TP36.6752x35.8103x0.5813	5'	0'	0.0	39.000	65.3127	-19.04	2547.20	0.007
	69.25 - 68.25					39.000	65.6319	-19.30	2559.64	0.008
	68.25 - 67.25					39.000	65.9510	-19.57	2572.09	0.008
	67.25 - 66.25					39.000	66.2701	-19.84	2584.53	0.008
	66.25 - 65.25					39.000	66.5892	-20.11	2596.98	0.008
L28	65.25 - 64.25	TP37.54x36.6752x0.5813	5'	0'	0.0	39.000	66.9083	-20.38	2609.42	0.008
	64.25 - 63.25					39.000	67.2274	-20.65	2621.87	0.008
	63.25 - 62.25					39.000	67.5466	-20.92	2634.32	0.008
	62.25 - 61.25					39.000	67.8657	-21.19	2646.76	0.008
	61.25 - 60.25					39.000	68.1848	-21.46	2659.21	0.008
L29	60.25 - 59.25	TP38.4049x37.54x0.5813	5'	0'	0.0	39.000	68.5039	-21.73	2671.65	0.008
	59.25 - 58.25					39.000	68.8230	-22.00	2684.10	0.008
	58.25 - 57.25					39.000	69.1421	-22.28	2696.54	0.008
	57.25 - 56.25					39.000	69.4613	-22.55	2708.99	0.008
	56.25 - 55.25					39.000	69.7804	-22.83	2721.43	0.008
L30	55.25 - 54.25	TP39.2698x38.4049x0.5813	5'	0'	0.0	39.000	70.0995	-23.11	2733.88	0.008
	54.25 - 53.25					39.000	70.4186	-23.38	2746.33	0.009
	53.25 - 52.25					39.000	70.7377	-23.66	2758.77	0.009
	52.25 - 51.25					39.000	71.0569	-23.94	2771.22	0.009
	51.25 - 50.25					39.000	71.3760	-24.22	2783.66	0.009
L31	50.25 - 49.25	TP40.1346x39.2698x0.5563	5'	0'	0.0	39.000	68.6556	-24.50	2677.57	0.009
	49.25 - 48.25					39.000	68.9610	-24.78	2689.48	0.009
	48.25 - 47.25					39.000	69.2663	-25.06	2701.39	0.009
	47.25 - 46.25					39.000	69.5717	-25.34	2713.30	0.009
	46.25 - 45.25					39.000	69.8771	-25.63	2725.21	0.009
L32	45.25 - 45	TP41.086x40.1346x0.5563	5'6"	0'	0.0	39.000	69.9535	-25.70	2728.19	0.009
	45 - 39.75					39.000	71.5568	-13.33	2790.72	0.005
L33	45 - 39.75	TP40.6966x39.6154x0.65	6'3"	0'	0.0	39.000	82.2632	-15.22	3208.27	0.005

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	39.75 - 38.75					39.000	82.6201	-28.89	3222.18	0.009
L34	38.75 - 37.6667	TP41.2588x40.6966x0.6625	3'3"	0'	0.0	39.000	84.5767	-29.24	3298.49	0.009
	37.6667 - 36.5833					39.000	84.9708	-29.59	3313.86	0.009
	36.5833 - 35.5					39.000	85.3649	-29.95	3329.23	0.009
L35	35.5 - 35.25 (35)	TP41.3021x41.2588x0.6625	3"	0'	0.0	39.000	85.4558	-30.04	3332.78	0.009
L36	35.25 - 34.25	TP42.167x41.3021x0.6375	5'	0'	0.0	39.000	82.6317	-30.35	3222.64	0.009
	34.25 - 33.25					39.000	82.9817	-30.68	3236.29	0.009
	33.25 - 32.25					39.000	83.3318	-31.01	3249.94	0.010
	32.25 - 31.25					39.000	83.6818	-31.34	3263.59	0.010
	31.25 - 30.25					39.000	84.0318	-31.68	3277.24	0.010
L37	30.25 - 29.25	TP43.032x42.167x0.65	5'	0'	0.0	39.000	86.0106	-32.01	3354.42	0.010
	29.25 - 28.25					39.000	86.3675	-32.34	3368.33	0.010
	28.25 - 27.25					39.000	86.7244	-32.67	3382.25	0.010
	27.25 - 26.25					39.000	87.0813	-33.01	3396.17	0.010
	26.25 - 25.25					39.000	87.4382	-33.34	3410.09	0.010
L38	25.25 - 24.25	TP43.8969x43.032x0.6375	5'	0'	0.0	39.000	86.1321	-33.68	3359.15	0.010
	24.25 - 23.25					39.000	86.4821	-34.01	3372.80	0.010
	23.25 - 22.25					39.000	86.8321	-34.35	3386.45	0.010
	22.25 - 21.25					39.000	87.1822	-34.69	3400.10	0.010
	21.25 - 20.25					39.000	87.5322	-35.03	3413.76	0.010
L39	20.25 - 19.25	TP44.7619x43.8969x0.6375	5'	0'	0.0	39.000	87.8822	-35.37	3427.41	0.010
	19.25 - 18.25					39.000	88.2323	-35.71	3441.06	0.010
	18.25 - 17.25					39.000	88.5823	-36.05	3454.71	0.010
	17.25 - 16.25					39.000	88.9323	-36.39	3468.36	0.010
	16.25 - 15.25					39.000	89.2824	-36.73	3482.01	0.011
L40	15.25 - 14.25	TP45.6268x44.7619x0.625	5'	0'	0.0	39.000	87.8997	-37.08	3428.09	0.011
	14.25 - 13.25					39.000	88.2429	-37.42	3441.47	0.011
	13.25 - 12.25					39.000	88.5861	-37.77	3454.86	0.011
	12.25 - 11.25					39.000	88.9292	-38.11	3468.24	0.011
	11.25 - 10.25					39.000	89.2724	-38.46	3481.62	0.011
L41	10.25 - 9.25	TP46.4918x45.6268x0.6125	5'	0'	0.0	39.000	87.8476	-38.81	3426.05	0.011
	9.25 - 8.25					39.000	88.1839	-39.16	3439.17	0.011
	8.25 - 7.25					39.000	88.5202	-39.51	3452.29	0.011
	7.25 - 6.25					39.000	88.8565	-39.86	3465.40	0.012
	6.25 - 5.25					39.000	89.1928	-40.21	3478.52	0.012
L42	5.25 - 4.25	TP47.3568x46.4918x0.625	5'	0'	0.0	39.000	91.3314	-40.56	3561.93	0.011
	4.25 - 3.25					39.000	91.6746	-40.92	3575.31	0.011
	3.25 - 2.25					39.000	92.0178	-41.27	3588.69	0.011
	2.25 - 1.25					39.000	92.3609	-41.62	3602.08	0.012
	1.25 - 0.25					39.000	92.7041	-41.98	3615.46	0.012
L43	0.25 - 0 (43)	TP47.4x47.3568x0.625	3"	0'	0.0	39.000	92.7899	-42.08	3618.81	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	149 - 148	TP23.8649x23x0.1875	18.61	2.879	39.000	0.074	0.00	0.000	39.000	0.000
	148 - 147		28.40	4.328	39.000	0.111	0.00	0.000	39.000	0.000
	147 - 146		38.53	5.785	39.000	0.148	0.00	0.000	39.000	0.000
	146 - 145		48.73	7.208	39.000	0.185	0.00	0.000	39.000	0.000
	145 - 144		58.99	8.599	39.000	0.220	0.00	0.000	39.000	0.000
L2	144 - 143	TP24.7299x23.8649x0.1875	69.32	9.958	39.000	0.255	0.00	0.000	39.000	0.000
	143 - 142		79.72	11.287	39.000	0.289	0.00	0.000	39.000	0.000
	142 - 141		90.18	12.585	39.000	0.323	0.00	0.000	39.000	0.000
	141 - 140		100.71	13.855	39.000	0.355	0.00	0.000	39.000	0.000
	140 - 139		111.30	15.097	39.000	0.387	0.00	0.000	39.000	0.000
L3	139 - 138	TP25.5948x24.7299x0.1875	123.92	16.572	39.000	0.425	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	138 - 137		135.79	17.907	39.000	0.459	0.00	0.000	39.000	0.000
	137 - 136		147.72	19.212	39.000	0.493	0.00	0.000	39.000	0.000
	136 - 135		159.72	20.488	39.000	0.525	0.00	0.000	39.000	0.000
	135 - 134		171.79	21.736	39.000	0.557	0.00	0.000	39.000	0.000
L4	134 - 133	TP26.4597x25.5948x0.1875	183.93	22.957	39.000	0.589	0.00	0.000	39.000	0.000
	133 - 132		196.13	24.151	39.000	0.619	0.00	0.000	39.000	0.000
	132 - 131		208.40	25.319	39.000	0.649	0.00	0.000	39.000	0.000
	131 - 130		220.74	26.462	39.000	0.679	0.00	0.000	39.000	0.000
	130 - 129		233.14	27.581	39.000	0.707	0.00	0.000	39.000	0.000
L5	129 - 128	TP27.3247x26.4597x0.1875	248.12	28.969	39.000	0.743	0.00	0.000	39.000	0.000
	128 - 127		261.52	30.136	39.000	0.773	0.00	0.000	39.000	0.000
	127 - 126		274.98	31.279	39.000	0.802	0.00	0.000	39.000	0.000
	126 - 125		288.51	32.396	39.000	0.831	0.00	0.000	39.000	0.000
	125 - 124		302.11	33.490	39.000	0.859	0.00	0.000	39.000	0.000
L6	124 - 123	TP28.1896x27.3247x0.1875	315.77	34.562	39.000	0.886	0.00	0.000	39.000	0.000
	123 - 122		329.51	35.611	39.000	0.913	0.00	0.000	39.000	0.000
	122 - 121		343.32	36.640	39.000	0.939	0.00	0.000	39.000	0.000
	121 - 120		357.20	37.647	39.000	0.965	0.00	0.000	39.000	0.000
	120 - 119		377.35	39.279	39.000	1.007	0.00	0.000	39.000	0.000
L7	119 - 117.75	TP29.487x28.1896x0.1875	402.44	41.250	38.953	1.059	0.00	0.000	38.953	0.000
	117.75 - 116.5		427.67	43.169	38.823	1.112	0.00	0.000	38.823	0.000
	116.5 - 115.25		453.03	45.039	38.694	1.164	0.00	0.000	38.694	0.000
	115.25 - 111.5		250.41	23.801	38.307	0.621	0.00	0.000	38.307	0.000
L8	115.25 - 111.5	TP29.3283x28.4633x0.2188	279.91	23.478	39.000	0.602	0.00	0.000	39.000	0.000
	111.5 - 110.25		556.40	45.975	39.000	1.179	0.00	0.000	39.000	0.000
L9	110.25 - 109.125	TP29.7175x29.3283x0.2188	580.00	47.288	39.000	1.213	0.00	0.000	39.000	0.000
	109.125 - 108		603.72	48.572	39.000	1.245	0.00	0.000	39.000	0.000
L10	108 - 107.75 (10)	TP29.7607x29.7175x0.2313	609.00	46.271	39.000	1.186	0.00	0.000	39.000	0.000
L11	107.75 - 107.5 (11)	TP29.804x29.7607x0.2313	614.29	46.536	39.000	1.193	0.00	0.000	39.000	0.000
L12	107.5 - 107.25 (12)	TP29.8472x29.804x0.4375	619.59	25.261	39.000	0.648	0.00	0.000	39.000	0.000
L13	107.25 - 106.25	TP30.7122x29.8472x0.4313	640.84	26.179	39.000	0.671	0.00	0.000	39.000	0.000
	106.25 - 105.25		662.19	26.735	39.000	0.686	0.00	0.000	39.000	0.000
	105.25 - 104.25		683.64	27.281	39.000	0.700	0.00	0.000	39.000	0.000
	104.25 - 103.25		705.19	27.816	39.000	0.713	0.00	0.000	39.000	0.000
	103.25 - 102.25		726.84	28.341	39.000	0.727	0.00	0.000	39.000	0.000
L14	102.25 - 101.25	TP31.5772x30.7122x0.4188	748.59	29.681	39.000	0.761	0.00	0.000	39.000	0.000
	101.25 - 100.25		770.44	30.201	39.000	0.774	0.00	0.000	39.000	0.000
	100.25 - 99.25		792.39	30.711	39.000	0.787	0.00	0.000	39.000	0.000
	99.25 - 98.25		814.43	31.212	39.000	0.800	0.00	0.000	39.000	0.000
	98.25 - 97.25		836.58	31.703	39.000	0.813	0.00	0.000	39.000	0.000
L15	97.25 - 96.25	TP32.4421x31.5772x0.4188	858.82	32.185	39.000	0.825	0.00	0.000	39.000	0.000
	96.25 - 95.25		881.16	32.658	39.000	0.837	0.00	0.000	39.000	0.000
	95.25 - 94.25		903.59	33.123	39.000	0.849	0.00	0.000	39.000	0.000
	94.25 - 93.25		926.13	33.578	39.000	0.861	0.00	0.000	39.000	0.000
	93.25 - 92.25		948.76	34.026	39.000	0.872	0.00	0.000	39.000	0.000
L16	92.25 - 90.5 (16)	TP32.7449x32.4421x0.4125	988.60	35.296	39.000	0.905	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L17	90.5 - 90.25 (17)	TP32.7881x32.7449x0.4125	994.31	35.405	39.000	0.908	0.00	0.000	39.000	0.000
L18	90.25 - 89.125	TP33.1773x32.7881x0.4125	1020.11	35.888	39.000	0.920	0.00	0.000	39.000	0.000
	89.125 - 88		1046.04	36.362	39.000	0.932	0.00	0.000	39.000	0.000
L19	88 - 87.75 (19)	TP33.2206x33.1773x0.5313	1051.82	28.624	39.000	0.734	0.00	0.000	39.000	0.000
L20	87.75 - 87.5 (20)	TP33.2638x33.2206x0.5188	1057.61	29.363	39.000	0.753	0.00	0.000	39.000	0.000
L21	87.5 - 87.25 (21)	TP33.3071x33.2638x0.4563	1063.40	33.288	39.000	0.854	0.00	0.000	39.000	0.000
L22	87.25 - 86.25	TP34.1721x33.3071x0.4688	1086.63	32.797	39.000	0.841	0.00	0.000	39.000	0.000
	86.25 - 85.25		1109.97	33.151	39.000	0.850	0.00	0.000	39.000	0.000
	85.25 - 84.25		1133.41	33.498	39.000	0.859	0.00	0.000	39.000	0.000
	84.25 - 83.25		1156.94	33.840	39.000	0.868	0.00	0.000	39.000	0.000
	83.25 - 82.25		1180.58	34.175	39.000	0.876	0.00	0.000	39.000	0.000
L23	82.25 - 81	TP35.383x34.1721x0.4563	1210.27	35.494	39.000	0.910	0.00	0.000	39.000	0.000
	81 - 79.75		1240.35	35.914	39.000	0.921	0.00	0.000	39.000	0.000
	79.75 - 75.25		654.49	18.110	39.000	0.464	0.00	0.000	39.000	0.000
L24	79.75 - 75.25	TP35.0319x34.167x0.5063	695.72	17.873	39.000	0.458	0.00	0.000	39.000	0.000
	75.25 - 74.75		1362.55	34.828	39.000	0.893	0.00	0.000	39.000	0.000
L25	74.75 - 73.6875	TP35.767x35.0319x0.5063	1388.85	35.123	39.000	0.901	0.00	0.000	39.000	0.000
	73.6875 - 72.625		1415.27	35.412	39.000	0.908	0.00	0.000	39.000	0.000
	72.625 - 71.5625		1441.78	35.696	39.000	0.915	0.00	0.000	39.000	0.000
	71.5625 - 70.5		1468.40	35.974	39.000	0.922	0.00	0.000	39.000	0.000
L26	70.5 - 70.25 (26)	TP35.8103x35.767x0.6063	1474.68	30.351	39.000	0.778	0.00	0.000	39.000	0.000
L27	70.25 - 69.25	TP36.6752x35.8103x0.5813	1499.86	31.813	39.000	0.816	0.00	0.000	39.000	0.000
	69.25 - 68.25		1525.13	32.033	39.000	0.821	0.00	0.000	39.000	0.000
	68.25 - 67.25		1550.51	32.249	39.000	0.827	0.00	0.000	39.000	0.000
	67.25 - 66.25		1575.97	32.461	39.000	0.832	0.00	0.000	39.000	0.000
	66.25 - 65.25		1601.53	32.670	39.000	0.838	0.00	0.000	39.000	0.000
L28	65.25 - 64.25	TP37.54x36.6752x0.5813	1627.19	32.875	39.000	0.843	0.00	0.000	39.000	0.000
	64.25 - 63.25		1652.94	33.076	39.000	0.848	0.00	0.000	39.000	0.000
	63.25 - 62.25		1678.79	33.274	39.000	0.853	0.00	0.000	39.000	0.000
	62.25 - 61.25		1704.72	33.469	39.000	0.858	0.00	0.000	39.000	0.000
	61.25 - 60.25		1730.76	33.660	39.000	0.863	0.00	0.000	39.000	0.000
L29	60.25 - 59.25	TP38.4049x37.54x0.5813	1756.88	33.848	39.000	0.868	0.00	0.000	39.000	0.000
	59.25 - 58.25		1783.10	34.033	39.000	0.873	0.00	0.000	39.000	0.000
	58.25 - 57.25		1809.41	34.215	39.000	0.877	0.00	0.000	39.000	0.000
	57.25 - 56.25		1835.81	34.393	39.000	0.882	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	56.25 - 55.25		1862.30	34.569	39.000	0.886	0.00	0.000	39.000	0.000
L30	55.25 - 54.25	TP39.2698x38.4049x0.5813	1888.88	34.741	39.000	0.891	0.00	0.000	39.000	0.000
	54.25 - 53.25		1915.55	34.911	39.000	0.895	0.00	0.000	39.000	0.000
	53.25 - 52.25		1942.31	35.077	39.000	0.899	0.00	0.000	39.000	0.000
	52.25 - 51.25		1969.15	35.241	39.000	0.904	0.00	0.000	39.000	0.000
	51.25 - 50.25		1996.09	35.402	39.000	0.908	0.00	0.000	39.000	0.000
L31	50.25 - 49.25	TP40.1346x39.2698x0.5563	2023.11	37.087	39.000	0.951	0.00	0.000	39.000	0.000
	49.25 - 48.25		2050.22	37.249	39.000	0.955	0.00	0.000	39.000	0.000
	48.25 - 47.25		2077.41	37.409	39.000	0.959	0.00	0.000	39.000	0.000
	47.25 - 46.25		2104.68	37.566	39.000	0.963	0.00	0.000	39.000	0.000
	46.25 - 45.25		2132.04	37.720	39.000	0.967	0.00	0.000	39.000	0.000
L32	45.25 - 45	TP41.086x40.1346x0.5563	2138.90	37.758	39.000	0.968	0.00	0.000	39.000	0.000
	45 - 39.75		1081.68	18.243	39.000	0.468	0.00	0.000	39.000	0.000
L33	45 - 39.75	TP40.6966x39.6154x0.65	1202.68	17.980	39.000	0.461	0.00	0.000	39.000	0.000
	39.75 - 38.75		2312.35	34.269	39.000	0.879	0.00	0.000	39.000	0.000
L34	38.75 - 37.6667	TP41.2588x40.6966x0.6625	2342.78	33.777	39.000	0.866	0.00	0.000	39.000	0.000
	37.6667 - 36.5833		2373.31	33.898	39.000	0.869	0.00	0.000	39.000	0.000
	36.5833 - 35.5		2403.93	34.017	39.000	0.872	0.00	0.000	39.000	0.000
L35	35.5 - 35.25 (35)	TP41.3021x41.2588x0.6625	2411.01	34.044	39.000	0.873	0.00	0.000	39.000	0.000
L36	35.25 - 34.25	TP42.167x41.3021x0.6375	2439.38	35.425	39.000	0.908	0.00	0.000	39.000	0.000
	34.25 - 33.25		2467.82	35.534	39.000	0.911	0.00	0.000	39.000	0.000
	33.25 - 32.25		2496.32	35.641	39.000	0.914	0.00	0.000	39.000	0.000
	32.25 - 31.25		2524.92	35.746	39.000	0.917	0.00	0.000	39.000	0.000
	31.25 - 30.25		2553.58	35.849	39.000	0.919	0.00	0.000	39.000	0.000
L37	30.25 - 29.25	TP43.032x42.167x0.65	2582.32	35.290	39.000	0.905	0.00	0.000	39.000	0.000
	29.25 - 28.25		2611.13	35.387	39.000	0.907	0.00	0.000	39.000	0.000
	28.25 - 27.25		2640.03	35.483	39.000	0.910	0.00	0.000	39.000	0.000
	27.25 - 26.25		2668.98	35.576	39.000	0.912	0.00	0.000	39.000	0.000
	26.25 - 25.25		2698.03	35.668	39.000	0.915	0.00	0.000	39.000	0.000
L38	25.25 - 24.25	TP43.8969x43.032x0.6375	2727.14	36.427	39.000	0.934	0.00	0.000	39.000	0.000
	24.25 - 23.25		2756.32	36.518	39.000	0.936	0.00	0.000	39.000	0.000
	23.25 - 22.25		2785.58	36.606	39.000	0.939	0.00	0.000	39.000	0.000
	22.25 - 21.25		2814.93	36.693	39.000	0.941	0.00	0.000	39.000	0.000
	21.25 - 20.25		2844.33	36.778	39.000	0.943	0.00	0.000	39.000	0.000
L39	20.25 - 19.25	TP44.7619x43.8969x0.63	2873.8	36.862	39.000	0.945	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
		75	2							
	19.25 - 18.25		2903.37	36.944	39.000	0.947	0.00	0.000	39.000	0.000
	18.25 - 17.25		2933.00	37.025	39.000	0.949	0.00	0.000	39.000	0.000
	17.25 - 16.25		2962.70	37.104	39.000	0.951	0.00	0.000	39.000	0.000
	16.25 - 15.25		2992.47	37.181	39.000	0.953	0.00	0.000	39.000	0.000
L40	15.25 - 14.25	TP45.6268x44.7619x0.625	3022.32	37.970	39.000	0.974	0.00	0.000	39.000	0.000
	14.25 - 13.25		3052.25	38.047	39.000	0.976	0.00	0.000	39.000	0.000
	13.25 - 12.25		3082.24	38.121	39.000	0.977	0.00	0.000	39.000	0.000
	12.25 - 11.25		3112.31	38.194	39.000	0.979	0.00	0.000	39.000	0.000
	11.25 - 10.25		3142.45	38.267	39.000	0.981	0.00	0.000	39.000	0.000
L41	10.25 - 9.25	TP46.4918x45.6268x0.6125	3172.66	39.087	39.000	1.002	0.00	0.000	39.000	0.000
	9.25 - 8.25		3202.94	39.158	39.000	1.004	0.00	0.000	39.000	0.000
	8.25 - 7.25		3233.29	39.227	39.000	1.006	0.00	0.000	39.000	0.000
	7.25 - 6.25		3263.72	39.295	39.000	1.008	0.00	0.000	39.000	0.000
	6.25 - 5.25		3294.22	39.362	39.000	1.009	0.00	0.000	39.000	0.000
L42	5.25 - 4.25	TP47.3568x46.4918x0.625	3324.78	38.670	39.000	0.992	0.00	0.000	39.000	0.000
	4.25 - 3.25		3355.42	38.733	39.000	0.993	0.00	0.000	39.000	0.000
	3.25 - 2.25		3386.13	38.794	39.000	0.995	0.00	0.000	39.000	0.000
	2.25 - 1.25		3416.91	38.855	39.000	0.996	0.00	0.000	39.000	0.000
	1.25 - 0.25		3447.77	38.914	39.000	0.998	0.00	0.000	39.000	0.000
L43	0.25 - 0 (43)	TP47.4x47.3568x0.625	3455.48	38.928	39.000	0.998	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	149 - 148	TP23.8649x23x0.1875	9.76	0.713	26.000	0.055	0.22	0.016	26.000	0.001
	148 - 147		9.82	0.713	26.000	0.055	0.22	0.016	26.000	0.001
	147 - 146		10.16	0.732	26.000	0.056	0.22	0.016	26.000	0.001
	146 - 145		10.23	0.732	26.000	0.056	0.22	0.016	26.000	0.001
	145 - 144		10.30	0.731	26.000	0.056	0.22	0.015	26.000	0.001
L2	144 - 143	TP24.7299x23.8649x0.1875	10.36	0.730	26.000	0.056	0.22	0.015	26.000	0.001
	143 - 142		10.43	0.730	26.000	0.056	0.22	0.015	26.000	0.001
	142 - 141		10.50	0.729	26.000	0.056	0.22	0.015	26.000	0.001
	141 - 140		10.56	0.728	26.000	0.056	0.22	0.014	26.000	0.001
	140 - 139		10.63	0.728	26.000	0.056	0.22	0.014	26.000	0.001
L3	139 - 138	TP25.5948x24.7299x0.1875	11.84	0.805	26.000	0.062	0.22	0.014	26.000	0.001
	138 - 137		11.90	0.804	26.000	0.062	0.22	0.014	26.000	0.001
	137 - 136		11.97	0.803	26.000	0.062	0.22	0.014	26.000	0.001
	136 - 135		12.04	0.802	26.000	0.062	0.22	0.014	26.000	0.001
	135 - 134		12.10	0.801	26.000	0.062	0.22	0.013	26.000	0.001
L4	134 - 133	TP26.4597x25.5948x0.18	12.17	0.800	26.000	0.061	0.22	0.013	26.000	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
		75								
	133 - 132		12.24	0.798	26.000	0.061	0.22	0.013	26.000	0.000
	132 - 131		12.31	0.798	26.000	0.061	0.22	0.013	26.000	0.000
	131 - 130		12.37	0.797	26.000	0.061	0.22	0.013	26.000	0.000
	130 - 129		12.44	0.796	26.000	0.061	0.22	0.012	26.000	0.000
L5	129 - 128	TP27.3247x26.4597x0.18 75	13.37	0.849	26.000	0.065	0.22	0.012	26.000	0.000
	128 - 127		13.43	0.848	26.000	0.065	0.22	0.012	26.000	0.000
	127 - 126		13.50	0.847	26.000	0.065	0.22	0.012	26.000	0.000
	126 - 125		13.57	0.845	26.000	0.065	0.22	0.012	26.000	0.000
	125 - 124		13.63	0.844	26.000	0.065	0.22	0.012	26.000	0.000
L6	124 - 123	TP28.1896x27.3247x0.18 75	13.71	0.843	26.000	0.065	0.22	0.012	26.000	0.000
	123 - 122		13.78	0.842	26.000	0.065	0.22	0.011	26.000	0.000
	122 - 121		13.85	0.841	26.000	0.065	0.21	0.011	26.000	0.000
	121 - 120		13.92	0.840	26.000	0.065	0.21	0.011	26.000	0.000
	120 - 119		20.02	1.202	26.000	0.092	0.21	0.011	26.000	0.000
L7	119 - 117.75	TP29.487x28.1896x0.187 5	20.13	1.199	26.000	0.092	0.21	0.011	26.000	0.000
	117.75 - 116.5		20.23	1.196	26.000	0.092	0.21	0.010	26.000	0.000
	116.5 - 115.25		20.44	1.199	26.000	0.092	1.00	0.048	26.000	0.002
	115.25 - 111.5		9.93	0.569	26.000	0.044	0.60	0.028	26.000	0.001
L8	115.25 - 111.5	TP29.3283x28.4633x0.21 88	10.90	0.544	26.000	0.042	0.67	0.027	26.000	0.001
	111.5 - 110.25		20.93	1.036	26.000	0.080	1.27	0.051	26.000	0.002
L9	110.25 - 109.125	TP29.7175x29.3283x0.21 88	21.03	1.034	26.000	0.079	1.27	0.051	26.000	0.002
	109.125 - 108		21.13	1.032	26.000	0.079	1.28	0.050	26.000	0.002
L10	108 - 107.75 (10)	TP29.7607x29.7175x0.23 13	21.15	0.976	26.000	0.075	1.28	0.047	26.000	0.002
L11	107.75 - 107.5 (11)	TP29.804x29.7607x0.231 3	21.17	0.975	26.000	0.075	1.28	0.047	26.000	0.002
L12	107.5 - 107.25 (12)	TP29.8472x29.804x0.437 5	21.20	0.519	26.000	0.040	1.28	0.025	26.000	0.001
L13	107.25 - 106.25	TP30.7122x29.8472x0.43 13	21.30	0.526	26.000	0.040	1.28	0.025	26.000	0.001
	106.25 - 105.25		21.40	0.525	26.000	0.040	1.28	0.025	26.000	0.001
	105.25 - 104.25		21.50	0.525	26.000	0.040	1.29	0.025	26.000	0.001
	104.25 - 103.25		21.60	0.524	26.000	0.040	1.29	0.025	26.000	0.001
	103.25 - 102.25		21.70	0.523	26.000	0.040	1.29	0.024	26.000	0.001
L14	102.25 - 101.25	TP31.5772x30.7122x0.41 88	21.80	0.538	26.000	0.041	1.29	0.025	26.000	0.001
	101.25 - 100.25		21.89	0.538	26.000	0.041	1.30	0.025	26.000	0.001
	100.25 - 99.25		21.99	0.537	26.000	0.041	1.30	0.024	26.000	0.001
	99.25 - 98.25		22.09	0.536	26.000	0.041	1.30	0.024	26.000	0.001
	98.25 - 97.25		22.19	0.536	26.000	0.041	1.30	0.024	26.000	0.001
L15	97.25 - 96.25	TP32.4421x31.5772x0.41 88	22.29	0.535	26.000	0.041	1.31	0.024	26.000	0.001
	96.25 - 95.25		22.39	0.535	26.000	0.041	1.31	0.024	26.000	0.001
	95.25 - 94.25		22.48	0.534	26.000	0.041	1.31	0.023	26.000	0.001
	94.25 - 93.25		22.58	0.533	26.000	0.041	1.31	0.023	26.000	0.001
	93.25 - 92.25		22.68	0.533	26.000	0.041	1.32	0.023	26.000	0.001
L16	92.25 - 90.5 (16)	TP32.7449x32.4421x0.41 25	22.85	0.540	26.000	0.042	1.32	0.023	26.000	0.001
L17	90.5 - 90.25 (17)	TP32.7881x32.7449x0.41 25	22.87	0.540	26.000	0.041	1.32	0.023	26.000	0.001
L18	90.25 - 89.125	TP33.1773x32.7881x0.41 25	22.99	0.539	26.000	0.041	1.33	0.023	26.000	0.001
	89.125 - 88		23.11	0.539	26.000	0.041	1.33	0.022	26.000	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L19	88 - 87.75 (19)	TP33.2206x33.1773x0.5313	23.13	0.420	26.000	0.032	1.33	0.018	26.000	0.001
L20	87.75 - 87.5 (20)	TP33.2638x33.2206x0.5188	23.15	0.429	26.000	0.033	1.33	0.018	26.000	0.001
L21	87.5 - 87.25 (21)	TP33.3071x33.2638x0.4563	23.18	0.487	26.000	0.037	1.33	0.020	26.000	0.001
L22	87.25 - 86.25	TP34.1721x33.3071x0.4688	23.28	0.474	26.000	0.036	1.34	0.020	26.000	0.001
	86.25 - 85.25		23.38	0.474	26.000	0.036	1.34	0.019	26.000	0.001
	85.25 - 84.25		23.48	0.473	26.000	0.036	1.34	0.019	26.000	0.001
	84.25 - 83.25		23.58	0.473	26.000	0.036	1.35	0.019	26.000	0.001
	83.25 - 82.25		23.69	0.472	26.000	0.036	1.35	0.019	26.000	0.001
L23	82.25 - 81	TP35.383x34.1721x0.4563	23.81	0.484	26.000	0.037	1.35	0.019	26.000	0.001
	81 - 79.75		24.16	0.489	26.000	0.038	1.56	0.022	26.000	0.001
	79.75 - 75.25		12.07	0.239	26.000	0.018	0.77	0.010	26.000	0.000
L24	79.75 - 75.25	TP35.0319x34.167x0.5063	12.60	0.228	26.000	0.018	0.81	0.010	26.000	0.000
	75.25 - 74.75		24.71	0.445	26.000	0.034	1.57	0.020	26.000	0.001
L25	74.75 - 73.6875	TP35.767x35.0319x0.5063	24.81	0.445	26.000	0.034	1.58	0.019	26.000	0.001
	73.6875 - 72.625		24.91	0.444	26.000	0.034	1.58	0.019	26.000	0.001
	72.625 - 71.5625		25.01	0.444	26.000	0.034	1.58	0.019	26.000	0.001
	71.5625 - 70.5		25.11	0.443	26.000	0.034	1.59	0.019	26.000	0.001
L26	70.5 - 70.25 (26)	TP35.8103x35.767x0.6063	25.12	0.371	26.000	0.029	1.59	0.016	26.000	0.001
L27	70.25 - 69.25	TP36.6752x35.8103x0.5813	25.22	0.386	26.000	0.030	1.59	0.016	26.000	0.001
	69.25 - 68.25		25.32	0.386	26.000	0.030	1.59	0.016	26.000	0.001
	68.25 - 67.25		25.42	0.385	26.000	0.030	1.60	0.016	26.000	0.001
	67.25 - 66.25		25.51	0.385	26.000	0.030	1.60	0.016	26.000	0.001
	66.25 - 65.25		25.61	0.385	26.000	0.030	1.60	0.016	26.000	0.001
L28	65.25 - 64.25	TP37.54x36.6752x0.5813	25.70	0.384	26.000	0.030	1.61	0.016	26.000	0.001
	64.25 - 63.25		25.80	0.384	26.000	0.030	1.61	0.016	26.000	0.001
	63.25 - 62.25		25.89	0.383	26.000	0.029	1.61	0.015	26.000	0.001
	62.25 - 61.25		25.98	0.383	26.000	0.029	1.61	0.015	26.000	0.001
	61.25 - 60.25		26.08	0.382	26.000	0.029	1.62	0.015	26.000	0.001
L29	60.25 - 59.25	TP38.4049x37.54x0.5813	26.17	0.382	26.000	0.029	1.62	0.015	26.000	0.001
	59.25 - 58.25		26.26	0.382	26.000	0.029	1.62	0.015	26.000	0.001
	58.25 - 57.25		26.35	0.381	26.000	0.029	1.63	0.015	26.000	0.001
	57.25 - 56.25		26.44	0.381	26.000	0.029	1.63	0.015	26.000	0.001
	56.25 - 55.25		26.54	0.380	26.000	0.029	1.63	0.015	26.000	0.001
L30	55.25 - 54.25	TP39.2698x38.4049x0.5813	26.62	0.380	26.000	0.029	1.64	0.015	26.000	0.001
	54.25 - 53.25		26.71	0.379	26.000	0.029	1.64	0.014	26.000	0.001
	53.25 - 52.25		26.80	0.379	26.000	0.029	1.64	0.014	26.000	0.001
	52.25 - 51.25		26.89	0.378	26.000	0.029	1.64	0.014	26.000	0.001
	51.25 - 50.25		26.98	0.378	26.000	0.029	1.65	0.014	26.000	0.001
L31	50.25 - 49.25	TP40.1346x39.2698x0.5563	27.06	0.394	26.000	0.030	1.65	0.015	26.000	0.001
	49.25 - 48.25		27.15	0.394	26.000	0.030	1.65	0.015	26.000	0.001
	48.25 - 47.25		27.23	0.393	26.000	0.030	1.66	0.014	26.000	0.001
	47.25 - 46.25		27.32	0.393	26.000	0.030	1.66	0.014	26.000	0.001
	46.25 - 45.25		27.40	0.392	26.000	0.030	1.66	0.014	26.000	0.001
L32	45.25 - 45	TP41.086x40.1346x0.5563	27.42	0.392	26.000	0.030	1.66	0.014	26.000	0.001
	45 - 39.75		13.40	0.187	26.000	0.014	0.80	0.007	26.000	0.000
L33	45 - 39.75	TP40.6966x39.6154x0.65	14.61	0.178	26.000	0.014	0.88	0.006	26.000	0.000
	39.75 - 38.75		28.07	0.340	26.000	0.026	1.68	0.012	26.000	0.000
L34	38.75 - 37.6667	TP41.2588x40.6966x0.6625	28.16	0.333	26.000	0.026	1.68	0.012	26.000	0.000
	37.6667 - 36.5833		28.24	0.332	26.000	0.026	1.69	0.012	26.000	0.000
	36.5833 - 35.5		28.33	0.332	26.000	0.026	1.69	0.012	26.000	0.000
L35	35.5 - 35.25	TP41.3021x41.2588x0.66	28.34	0.332	26.000	0.026	1.69	0.012	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	(35)	25								
L36	35.25 - 34.25	TP42.167x41.3021x0.6375	28.42	0.344	26.000	0.026	1.69	0.012	26.000	0.000
	34.25 - 33.25		28.50	0.343	26.000	0.026	1.70	0.012	26.000	0.000
	33.25 - 32.25		28.57	0.343	26.000	0.026	1.70	0.012	26.000	0.000
	32.25 - 31.25		28.65	0.342	26.000	0.026	1.70	0.012	26.000	0.000
	31.25 - 30.25		28.72	0.342	26.000	0.026	1.70	0.012	26.000	0.000
L37	30.25 - 29.25	TP43.032x42.167x0.65	28.80	0.335	26.000	0.026	1.71	0.011	26.000	0.000
	29.25 - 28.25		28.87	0.334	26.000	0.026	1.71	0.011	26.000	0.000
	28.25 - 27.25		28.95	0.334	26.000	0.026	1.71	0.011	26.000	0.000
	27.25 - 26.25		29.02	0.333	26.000	0.026	1.72	0.011	26.000	0.000
	26.25 - 25.25		29.10	0.333	26.000	0.026	1.72	0.011	26.000	0.000
L38	25.25 - 24.25	TP43.8969x43.032x0.6375	29.17	0.339	26.000	0.026	1.72	0.011	26.000	0.000
	24.25 - 23.25		29.25	0.338	26.000	0.026	1.72	0.011	26.000	0.000
	23.25 - 22.25		29.32	0.338	26.000	0.026	1.73	0.011	26.000	0.000
	22.25 - 21.25		29.39	0.337	26.000	0.026	1.73	0.011	26.000	0.000
	21.25 - 20.25		29.47	0.337	26.000	0.026	1.73	0.011	26.000	0.000
L39	20.25 - 19.25	TP44.7619x43.8969x0.6375	29.54	0.336	26.000	0.026	1.74	0.011	26.000	0.000
	19.25 - 18.25		29.62	0.336	26.000	0.026	1.74	0.011	26.000	0.000
	18.25 - 17.25		29.69	0.335	26.000	0.026	1.74	0.011	26.000	0.000
	17.25 - 16.25		29.76	0.335	26.000	0.026	1.75	0.011	26.000	0.000
	16.25 - 15.25		29.84	0.334	26.000	0.026	1.75	0.011	26.000	0.000
L40	15.25 - 14.25	TP45.6268x44.7619x0.625	29.91	0.340	26.000	0.026	1.75	0.011	26.000	0.000
	14.25 - 13.25		29.98	0.340	26.000	0.026	1.75	0.011	26.000	0.000
	13.25 - 12.25		30.05	0.339	26.000	0.026	1.76	0.011	26.000	0.000
	12.25 - 11.25		30.13	0.339	26.000	0.026	1.76	0.010	26.000	0.000
	11.25 - 10.25		30.20	0.338	26.000	0.026	1.76	0.010	26.000	0.000
L41	10.25 - 9.25	TP46.4918x45.6268x0.6125	30.27	0.345	26.000	0.027	1.77	0.011	26.000	0.000
	9.25 - 8.25		30.34	0.344	26.000	0.026	1.77	0.011	26.000	0.000
	8.25 - 7.25		30.41	0.344	26.000	0.026	1.77	0.010	26.000	0.000
	7.25 - 6.25		30.48	0.343	26.000	0.026	1.78	0.010	26.000	0.000
	6.25 - 5.25		30.56	0.343	26.000	0.026	1.78	0.010	26.000	0.000
L42	5.25 - 4.25	TP47.3568x46.4918x0.625	30.63	0.335	26.000	0.026	1.78	0.010	26.000	0.000
	4.25 - 3.25		30.70	0.335	26.000	0.026	1.79	0.010	26.000	0.000
	3.25 - 2.25		30.77	0.334	26.000	0.026	1.79	0.010	26.000	0.000
	2.25 - 1.25		30.84	0.334	26.000	0.026	1.79	0.010	26.000	0.000
	1.25 - 0.25		30.91	0.333	26.000	0.026	1.80	0.010	26.000	0.000
L43	0.25 - 0 (43)	TP47.4x47.3568x0.625	30.92	0.333	26.000	0.026	1.80	0.010	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 148	0.008	0.074	0.000	0.055	0.001	0.082 ✔	1.333	H1-3+VT ✔
	148 - 147	0.008	0.111	0.000	0.055	0.001	0.120 ✔	1.333	H1-3+VT ✔
	147 - 146	0.008	0.148	0.000	0.056	0.001	0.157 ✔	1.333	H1-3+VT ✔
	146 - 145	0.008	0.185	0.000	0.056	0.001	0.194 ✔	1.333	H1-3+VT ✔
	145 - 144	0.008	0.220	0.000	0.056	0.001	0.229 ✔	1.333	H1-3+VT ✔
L2	144 - 143	0.008	0.255	0.000	0.056	0.001	0.264 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	143 - 142	0.008	0.289	0.000	0.056	0.001	0.298 ✔	1.333	H1-3+VT ✔
	142 - 141	0.008	0.323	0.000	0.056	0.001	0.332 ✔	1.333	H1-3+VT ✔
	141 - 140	0.008	0.355	0.000	0.056	0.001	0.364 ✔	1.333	H1-3+VT ✔
	140 - 139	0.008	0.387	0.000	0.056	0.001	0.396 ✔	1.333	H1-3+VT ✔
L3	139 - 138	0.009	0.425	0.000	0.062	0.001	0.435 ✔	1.333	H1-3+VT ✔
	138 - 137	0.009	0.459	0.000	0.062	0.001	0.470 ✔	1.333	H1-3+VT ✔
	137 - 136	0.009	0.493	0.000	0.062	0.001	0.503 ✔	1.333	H1-3+VT ✔
	136 - 135	0.009	0.525	0.000	0.062	0.001	0.536 ✔	1.333	H1-3+VT ✔
	135 - 134	0.009	0.557	0.000	0.062	0.001	0.568 ✔	1.333	H1-3+VT ✔
L4	134 - 133	0.010	0.589	0.000	0.061	0.001	0.599 ✔	1.333	H1-3+VT ✔
	133 - 132	0.010	0.619	0.000	0.061	0.000	0.630 ✔	1.333	H1-3+VT ✔
	132 - 131	0.010	0.649	0.000	0.061	0.000	0.660 ✔	1.333	H1-3+VT ✔
	131 - 130	0.010	0.679	0.000	0.061	0.000	0.689 ✔	1.333	H1-3+VT ✔
	130 - 129	0.010	0.707	0.000	0.061	0.000	0.718 ✔	1.333	H1-3+VT ✔
L5	129 - 128	0.010	0.743	0.000	0.065	0.000	0.754 ✔	1.333	H1-3+VT ✔
	128 - 127	0.011	0.773	0.000	0.065	0.000	0.784 ✔	1.333	H1-3+VT ✔
	127 - 126	0.011	0.802	0.000	0.065	0.000	0.814 ✔	1.333	H1-3+VT ✔
	126 - 125	0.011	0.831	0.000	0.065	0.000	0.842 ✔	1.333	H1-3+VT ✔
	125 - 124	0.011	0.859	0.000	0.065	0.000	0.871 ✔	1.333	H1-3+VT ✔
L6	124 - 123	0.011	0.886	0.000	0.065	0.000	0.898 ✔	1.333	H1-3+VT ✔
	123 - 122	0.011	0.913	0.000	0.065	0.000	0.925 ✔	1.333	H1-3+VT ✔
	122 - 121	0.011	0.939	0.000	0.065	0.000	0.951 ✔	1.333	H1-3+VT ✔
	121 - 120	0.011	0.965	0.000	0.065	0.000	0.977 ✔	1.333	H1-3+VT ✔
	120 - 119	0.014	1.007	0.000	0.092	0.000	1.023 ✔	1.333	H1-3+VT ✔
L7	119 - 117.75	0.014	1.059	0.000	0.092	0.000	1.075 ✔	1.333	H1-3+VT ✔
	117.75 - 116.5	0.014	1.112	0.000	0.092	0.000	1.128 ✔	1.333	H1-3+VT ✔
	116.5 - 115.25	0.014	1.164	0.000	0.092	0.002	1.180 ✔	1.333	H1-3+VT ✔
	115.25 - 111.5	0.007	0.621	0.000	0.044	0.001	0.629 ✔	1.333	H1-3+VT ✔
L8	115.25 - 111.5	0.007	0.602	0.000	0.042	0.001	0.609 ✔	1.333	H1-3+VT ✔
	111.5 - 110.25	0.013	1.179	0.000	0.080	0.002	1.193 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L9	110.25 - 109.125	0.013	1.213	0.000	0.079	0.002	1.227 ✔	1.333	H1-3+VT ✔
	109.125 - 108	0.013	1.245	0.000	0.079	0.002	1.260 ✔	1.333	H1-3+VT ✔
L10	108 - 107.75 (10)	0.012	1.186	0.000	0.075	0.002	1.200 ✔	1.333	H1-3+VT ✔
L11	107.75 - 107.5 (11)	0.012	1.193	0.000	0.075	0.002	1.207 ✔	1.333	H1-3+VT ✔
L12	107.5 - 107.25 (12)	0.007	0.648	0.000	0.040	0.001	0.655 ✔	1.333	H1-3+VT ✔
L13	107.25 - 106.25	0.007	0.671	0.000	0.040	0.001	0.678 ✔	1.333	H1-3+VT ✔
	106.25 - 105.25	0.007	0.686	0.000	0.040	0.001	0.693 ✔	1.333	H1-3+VT ✔
	105.25 - 104.25	0.007	0.700	0.000	0.040	0.001	0.707 ✔	1.333	H1-3+VT ✔
	104.25 - 103.25	0.007	0.713	0.000	0.040	0.001	0.721 ✔	1.333	H1-3+VT ✔
	103.25 - 102.25	0.007	0.727	0.000	0.040	0.001	0.734 ✔	1.333	H1-3+VT ✔
L14	102.25 - 101.25	0.007	0.761	0.000	0.041	0.001	0.769 ✔	1.333	H1-3+VT ✔
	101.25 - 100.25	0.007	0.774	0.000	0.041	0.001	0.782 ✔	1.333	H1-3+VT ✔
	100.25 - 99.25	0.007	0.787	0.000	0.041	0.001	0.795 ✔	1.333	H1-3+VT ✔
	99.25 - 98.25	0.008	0.800	0.000	0.041	0.001	0.808 ✔	1.333	H1-3+VT ✔
	98.25 - 97.25	0.008	0.813	0.000	0.041	0.001	0.821 ✔	1.333	H1-3+VT ✔
L15	97.25 - 96.25	0.008	0.825	0.000	0.041	0.001	0.833 ✔	1.333	H1-3+VT ✔
	96.25 - 95.25	0.008	0.837	0.000	0.041	0.001	0.846 ✔	1.333	H1-3+VT ✔
	95.25 - 94.25	0.008	0.849	0.000	0.041	0.001	0.858 ✔	1.333	H1-3+VT ✔
	94.25 - 93.25	0.008	0.861	0.000	0.041	0.001	0.869 ✔	1.333	H1-3+VT ✔
	93.25 - 92.25	0.008	0.872	0.000	0.041	0.001	0.881 ✔	1.333	H1-3+VT ✔
L16	92.25 - 90.5 (16)	0.008	0.905	0.000	0.042	0.001	0.914 ✔	1.333	H1-3+VT ✔
L17	90.5 - 90.25 (17)	0.008	0.908	0.000	0.041	0.001	0.917 ✔	1.333	H1-3+VT ✔
L18	90.25 - 89.125	0.008	0.920	0.000	0.041	0.001	0.929 ✔	1.333	H1-3+VT ✔
	89.125 - 88	0.008	0.932	0.000	0.041	0.001	0.941 ✔	1.333	H1-3+VT ✔
L19	88 - 87.75 (19)	0.007	0.734	0.000	0.032	0.001	0.741 ✔	1.333	H1-3+VT ✔
L20	87.75 - 87.5 (20)	0.007	0.753	0.000	0.033	0.001	0.760 ✔	1.333	H1-3+VT ✔
L21	87.5 - 87.25 (21)	0.008	0.854	0.000	0.037	0.001	0.862 ✔	1.333	H1-3+VT ✔
L22	87.25 - 86.25	0.008	0.841	0.000	0.036	0.001	0.849 ✔	1.333	H1-3+VT ✔
	86.25 - 85.25	0.008	0.850	0.000	0.036	0.001	0.858 ✔	1.333	H1-3+VT ✔
	85.25 - 84.25	0.008	0.859	0.000	0.036	0.001	0.867 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	84.25 - 83.25	0.008	0.868	0.000	0.036	0.001	0.876 ✔	1.333	H1-3+VT ✔
	83.25 - 82.25	0.008	0.876	0.000	0.036	0.001	0.884 ✔	1.333	H1-3+VT ✔
L23	82.25 - 81	0.008	0.910	0.000	0.037	0.001	0.919 ✔	1.333	H1-3+VT ✔
	81 - 79.75	0.008	0.921	0.000	0.038	0.001	0.929 ✔	1.333	H1-3+VT ✔
	79.75 - 75.25	0.004	0.464	0.000	0.018	0.000	0.469 ✔	1.333	H1-3+VT ✔
L24	79.75 - 75.25	0.008	0.458	0.000	0.018	0.000	0.467 ✔	1.333	H1-3+VT ✔
	75.25 - 74.75	0.008	0.893	0.000	0.034	0.001	0.902 ✔	1.333	H1-3+VT ✔
L25	74.75 - 73.6875	0.008	0.901	0.000	0.034	0.001	0.909 ✔	1.333	H1-3+VT ✔
	73.6875 - 72.625	0.008	0.908	0.000	0.034	0.001	0.917 ✔	1.333	H1-3+VT ✔
	72.625 - 71.5625	0.008	0.915	0.000	0.034	0.001	0.924 ✔	1.333	H1-3+VT ✔
	71.5625 - 70.5	0.008	0.922	0.000	0.034	0.001	0.931 ✔	1.333	H1-3+VT ✔
L26	70.5 - 70.25 (26)	0.007	0.778	0.000	0.029	0.001	0.786 ✔	1.333	H1-3+VT ✔
L27	70.25 - 69.25	0.007	0.816	0.000	0.030	0.001	0.823 ✔	1.333	H1-3+VT ✔
	69.25 - 68.25	0.008	0.821	0.000	0.030	0.001	0.829 ✔	1.333	H1-3+VT ✔
	68.25 - 67.25	0.008	0.827	0.000	0.030	0.001	0.835 ✔	1.333	H1-3+VT ✔
	67.25 - 66.25	0.008	0.832	0.000	0.030	0.001	0.840 ✔	1.333	H1-3+VT ✔
	66.25 - 65.25	0.008	0.838	0.000	0.030	0.001	0.846 ✔	1.333	H1-3+VT ✔
L28	65.25 - 64.25	0.008	0.843	0.000	0.030	0.001	0.851 ✔	1.333	H1-3+VT ✔
	64.25 - 63.25	0.008	0.848	0.000	0.030	0.001	0.856 ✔	1.333	H1-3+VT ✔
	63.25 - 62.25	0.008	0.853	0.000	0.029	0.001	0.861 ✔	1.333	H1-3+VT ✔
	62.25 - 61.25	0.008	0.858	0.000	0.029	0.001	0.866 ✔	1.333	H1-3+VT ✔
	61.25 - 60.25	0.008	0.863	0.000	0.029	0.001	0.871 ✔	1.333	H1-3+VT ✔
L29	60.25 - 59.25	0.008	0.868	0.000	0.029	0.001	0.876 ✔	1.333	H1-3+VT ✔
	59.25 - 58.25	0.008	0.873	0.000	0.029	0.001	0.881 ✔	1.333	H1-3+VT ✔
	58.25 - 57.25	0.008	0.877	0.000	0.029	0.001	0.886 ✔	1.333	H1-3+VT ✔
	57.25 - 56.25	0.008	0.882	0.000	0.029	0.001	0.890 ✔	1.333	H1-3+VT ✔
	56.25 - 55.25	0.008	0.886	0.000	0.029	0.001	0.895 ✔	1.333	H1-3+VT ✔
L30	55.25 - 54.25	0.008	0.891	0.000	0.029	0.001	0.899 ✔	1.333	H1-3+VT ✔
	54.25 - 53.25	0.009	0.895	0.000	0.029	0.001	0.904 ✔	1.333	H1-3+VT ✔
	53.25 - 52.25	0.009	0.899	0.000	0.029	0.001	0.908 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	52.25 - 51.25	0.009	0.904	0.000	0.029	0.001	0.912 ✔	1.333	H1-3+VT ✔
	51.25 - 50.25	0.009	0.908	0.000	0.029	0.001	0.917 ✔	1.333	H1-3+VT ✔
L31	50.25 - 49.25	0.009	0.951	0.000	0.030	0.001	0.960 ✔	1.333	H1-3+VT ✔
	49.25 - 48.25	0.009	0.955	0.000	0.030	0.001	0.965 ✔	1.333	H1-3+VT ✔
	48.25 - 47.25	0.009	0.959	0.000	0.030	0.001	0.969 ✔	1.333	H1-3+VT ✔
	47.25 - 46.25	0.009	0.963	0.000	0.030	0.001	0.973 ✔	1.333	H1-3+VT ✔
	46.25 - 45.25	0.009	0.967	0.000	0.030	0.001	0.977 ✔	1.333	H1-3+VT ✔
L32	45.25 - 45	0.009	0.968	0.000	0.030	0.001	0.978 ✔	1.333	H1-3+VT ✔
	45 - 39.75	0.005	0.468	0.000	0.014	0.000	0.473 ✔	1.333	H1-3+VT ✔
L33	45 - 39.75	0.005	0.461	0.000	0.014	0.000	0.466 ✔	1.333	H1-3+VT ✔
	39.75 - 38.75	0.009	0.879	0.000	0.026	0.000	0.888 ✔	1.333	H1-3+VT ✔
L34	38.75 - 37.6667	0.009	0.866	0.000	0.026	0.000	0.875 ✔	1.333	H1-3+VT ✔
	37.6667 - 36.5833	0.009	0.869	0.000	0.026	0.000	0.878 ✔	1.333	H1-3+VT ✔
	36.5833 - 35.5	0.009	0.872	0.000	0.026	0.000	0.881 ✔	1.333	H1-3+VT ✔
L35	35.5 - 35.25 (35)	0.009	0.873	0.000	0.026	0.000	0.882 ✔	1.333	H1-3+VT ✔
L36	35.25 - 34.25	0.009	0.908	0.000	0.026	0.000	0.918 ✔	1.333	H1-3+VT ✔
	34.25 - 33.25	0.009	0.911	0.000	0.026	0.000	0.921 ✔	1.333	H1-3+VT ✔
	33.25 - 32.25	0.010	0.914	0.000	0.026	0.000	0.924 ✔	1.333	H1-3+VT ✔
	32.25 - 31.25	0.010	0.917	0.000	0.026	0.000	0.926 ✔	1.333	H1-3+VT ✔
	31.25 - 30.25	0.010	0.919	0.000	0.026	0.000	0.929 ✔	1.333	H1-3+VT ✔
L37	30.25 - 29.25	0.010	0.905	0.000	0.026	0.000	0.915 ✔	1.333	H1-3+VT ✔
	29.25 - 28.25	0.010	0.907	0.000	0.026	0.000	0.917 ✔	1.333	H1-3+VT ✔
	28.25 - 27.25	0.010	0.910	0.000	0.026	0.000	0.920 ✔	1.333	H1-3+VT ✔
	27.25 - 26.25	0.010	0.912	0.000	0.026	0.000	0.922 ✔	1.333	H1-3+VT ✔
	26.25 - 25.25	0.010	0.915	0.000	0.026	0.000	0.925 ✔	1.333	H1-3+VT ✔
L38	25.25 - 24.25	0.010	0.934	0.000	0.026	0.000	0.944 ✔	1.333	H1-3+VT ✔
	24.25 - 23.25	0.010	0.936	0.000	0.026	0.000	0.947 ✔	1.333	H1-3+VT ✔
	23.25 - 22.25	0.010	0.939	0.000	0.026	0.000	0.949 ✔	1.333	H1-3+VT ✔
	22.25 - 21.25	0.010	0.941	0.000	0.026	0.000	0.951 ✔	1.333	H1-3+VT ✔
	21.25 - 20.25	0.010	0.943	0.000	0.026	0.000	0.953 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L39	20.25 - 19.25	0.010	0.945	0.000	0.026	0.000	0.956 ✔	1.333	H1-3+VT ✔
	19.25 - 18.25	0.010	0.947	0.000	0.026	0.000	0.958 ✔	1.333	H1-3+VT ✔
	18.25 - 17.25	0.010	0.949	0.000	0.026	0.000	0.960 ✔	1.333	H1-3+VT ✔
	17.25 - 16.25	0.010	0.951	0.000	0.026	0.000	0.962 ✔	1.333	H1-3+VT ✔
	16.25 - 15.25	0.011	0.953	0.000	0.026	0.000	0.964 ✔	1.333	H1-3+VT ✔
L40	15.25 - 14.25	0.011	0.974	0.000	0.026	0.000	0.985 ✔	1.333	H1-3+VT ✔
	14.25 - 13.25	0.011	0.976	0.000	0.026	0.000	0.987 ✔	1.333	H1-3+VT ✔
	13.25 - 12.25	0.011	0.977	0.000	0.026	0.000	0.989 ✔	1.333	H1-3+VT ✔
	12.25 - 11.25	0.011	0.979	0.000	0.026	0.000	0.991 ✔	1.333	H1-3+VT ✔
	11.25 - 10.25	0.011	0.981	0.000	0.026	0.000	0.992 ✔	1.333	H1-3+VT ✔
L41	10.25 - 9.25	0.011	1.002	0.000	0.027	0.000	1.014 ✔	1.333	H1-3+VT ✔
	9.25 - 8.25	0.011	1.004	0.000	0.026	0.000	1.016 ✔	1.333	H1-3+VT ✔
	8.25 - 7.25	0.011	1.006	0.000	0.026	0.000	1.017 ✔	1.333	H1-3+VT ✔
	7.25 - 6.25	0.012	1.008	0.000	0.026	0.000	1.019 ✔	1.333	H1-3+VT ✔
	6.25 - 5.25	0.012	1.009	0.000	0.026	0.000	1.021 ✔	1.333	H1-3+VT ✔
L42	5.25 - 4.25	0.011	0.992	0.000	0.026	0.000	1.003 ✔	1.333	H1-3+VT ✔
	4.25 - 3.25	0.011	0.993	0.000	0.026	0.000	1.005 ✔	1.333	H1-3+VT ✔
	3.25 - 2.25	0.011	0.995	0.000	0.026	0.000	1.006 ✔	1.333	H1-3+VT ✔
	2.25 - 1.25	0.012	0.996	0.000	0.026	0.000	1.008 ✔	1.333	H1-3+VT ✔
	1.25 - 0.25	0.012	0.998	0.000	0.026	0.000	1.010 ✔	1.333	H1-3+VT ✔
L43	0.25 - 0 (43)	0.012	0.998	0.000	0.026	0.000	1.010 ✔	1.333	H1-3+VT ✔

Section Capacity Table

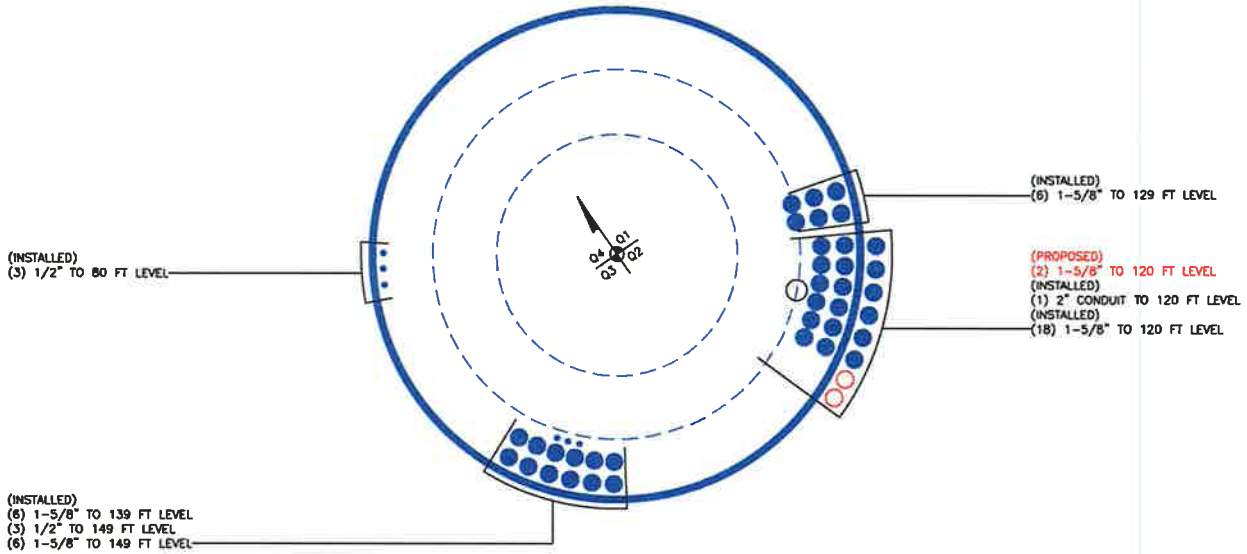
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	149 - 144	Pole	TP23.8649x23x0.1875	1	-4.48	732.55	17.2	Pass
L2	144 - 139	Pole	TP24.7299x23.8649x0.1875	2	-4.73	759.31	29.7	Pass
L3	139 - 134	Pole	TP25.5948x24.7299x0.1875	3	-5.60	786.07	42.6	Pass
L4	134 - 129	Pole	TP26.4597x25.5948x0.1875	4	-5.92	812.83	53.9	Pass
L5	129 - 124	Pole	TP27.3247x26.4597x0.1875	5	-6.74	839.59	65.3	Pass
L6	124 - 119	Pole	TP28.1896x27.3247x0.1875	6	-8.99	866.35	76.8	Pass
L7	119 - 111.5	Pole	TP29.487x28.1896x0.1875	7	-9.37	879.47	88.6	Pass
L8	111.5 - 110.25	Pole	TP29.3283x28.4633x0.2188	8	-10.14	1050.71	89.5	Pass
L9	110.25 - 108	Pole	TP29.7175x29.3283x0.2188	9	-10.42	1064.76	94.5	Pass
L10	108 - 107.75	Pole	TP29.7607x29.7175x0.2313	10	-10.47	1126.78	90.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L11	107.75 - 107.5	Pole	TP29.804x29.7607x0.2313	11	-10.50	1128.43	90.6	Pass
L12	107.5 - 107.25	Pole	TP29.8472x29.804x0.4375	12	-10.55	2123.10	49.1	Pass
L13	107.25 - 102.25	Pole	TP30.7122x29.8472x0.4313	13	-11.41	2154.77	55.1	Pass
L14	102.25 - 97.25	Pole	TP31.5772x30.7122x0.4188	14	-12.30	2152.94	61.6	Pass
L15	97.25 - 92.25	Pole	TP32.4421x31.5772x0.4188	15	-13.21	2212.70	66.1	Pass
L16	92.25 - 90.5	Pole	TP32.7449x32.4421x0.4125	16	-13.53	2200.72	68.5	Pass
L17	90.5 - 90.25	Pole	TP32.7881x32.7449x0.4125	17	-13.59	2203.65	68.8	Pass
L18	90.25 - 88	Pole	TP33.1773x32.7881x0.4125	18	-14.00	2230.15	70.6	Pass
L19	88 - 87.75	Pole	TP33.2206x33.1773x0.5313	19	-14.07	2865.54	55.6	Pass
L20	87.75 - 87.5	Pole	TP33.2638x33.2206x0.5188	20	-14.13	2802.89	57.0	Pass
L21	87.5 - 87.25	Pole	TP33.3071x33.2638x0.4563	21	-14.18	2473.15	64.6	Pass
L22	87.25 - 82.25	Pole	TP34.1721x33.3071x0.4688	22	-15.21	2606.84	66.3	Pass
L23	82.25 - 75.25	Pole	TP35.383x34.1721x0.4563	23	-15.83	2570.84	69.7	Pass
L24	75.25 - 74.75	Pole	TP35.0319x34.167x0.5063	24	-17.70	2884.09	67.6	Pass
L25	74.75 - 70.5	Pole	TP35.767x35.0319x0.5063	25	-18.71	2945.50	69.9	Pass
L26	70.5 - 70.25	Pole	TP35.8103x35.767x0.6063	26	-18.78	3521.65	58.9	Pass
L27	70.25 - 65.25	Pole	TP36.6752x35.8103x0.5813	27	-20.11	3461.77	63.4	Pass
L28	65.25 - 60.25	Pole	TP37.54x36.6752x0.5813	28	-21.46	3544.73	65.4	Pass
L29	60.25 - 55.25	Pole	TP38.4049x37.54x0.5813	29	-22.83	3627.67	67.1	Pass
L30	55.25 - 50.25	Pole	TP39.2698x38.4049x0.5813	30	-24.22	3710.62	68.8	Pass
L31	50.25 - 45.25	Pole	TP40.1346x39.2698x0.5563	31	-25.63	3632.70	73.3	Pass
L32	45.25 - 39.75	Pole	TP41.086x40.1346x0.5563	32	-25.70	3636.68	73.4	Pass
L33	39.75 - 38.75	Pole	TP40.6966x39.6154x0.65	33	-28.89	4295.17	66.6	Pass
L34	38.75 - 35.5	Pole	TP41.2588x40.6966x0.6625	34	-29.95	4437.86	66.1	Pass
L35	35.5 - 35.25	Pole	TP41.3021x41.2588x0.6625	35	-30.04	4442.60	66.2	Pass
L36	35.25 - 30.25	Pole	TP42.167x41.3021x0.6375	36	-31.68	4368.56	69.7	Pass
L37	30.25 - 25.25	Pole	TP43.032x42.167x0.65	37	-33.34	4545.65	69.4	Pass
L38	25.25 - 20.25	Pole	TP43.8969x43.032x0.6375	38	-35.03	4550.54	71.5	Pass
L39	20.25 - 15.25	Pole	TP44.7619x43.8969x0.6375	39	-36.73	4641.52	72.3	Pass
L40	15.25 - 10.25	Pole	TP45.6268x44.7619x0.625	40	-38.46	4641.00	74.5	Pass
L41	10.25 - 5.25	Pole	TP46.4918x45.6268x0.6125	41	-40.21	4636.87	76.6	Pass
L42	5.25 - 0.25	Pole	TP47.3568x46.4918x0.625	42	-41.98	4819.41	75.7	Pass
L43	0.25 - 0	Pole	TP47.4x47.3568x0.625	43	-42.08	4823.87	75.8	Pass
							Summary	
						Pole (L9)	94.5	Pass
						RATING =	**94.5**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 845455 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

BU # 845455	WO # 933260	Done By:	RAA	10/8/2014
Anchor Rod Reinforcement				

	Number of Anchor Rods	Anchor Rod Size	Anchor Rod Grade	Bolt Circle (in)
Original Anchor Rods	12	2.25	A615-J	54
Proposed A.R.	4	2.25	A193 Gr. B7	65.4

	Moment of Inertia (in^4)	Area(in^2)
Original A.R.	14215.50	39.00
Proposed A.R.	6950.39	13.00
Total	21165.89	52.00

$I=N/8*(A_t)*(BC)^2$

Loads From TNX Tower:

Moment	3455	k-ft
Axial	42	k
Shear	31	k

	Moment (k-ft)	Axial (k)	Shear (k)
Original A.R. Portion	**2320.5**	**42.0**	**31.0**
Proposed A.R. Portion	**1134.5**	**0.0**	**0.0**

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#: *845455*
Site Name: *OXFORD-QUAKER FARMS*
App #: *263999 Rev. 1*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	2.75	in
Grade:	60	ksi
Clip Distance:	10	in

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

Pole Data		
Diam:	47.4	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2321	ft-kips
Unfactored Axial, P:	42	kips
Unfactored Shear, V:	31	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	168.4 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.4% Pass

Base Plate Results Flexural Check

Base Plate Stress:	45.8 ksi
Allowable PL Bending Stress:	60.0 ksi
Base Plate Stress Ratio:	76.4% Pass

PL Ref. Data	
Yield Line (in):	25.87
Max PL Length:	27.55

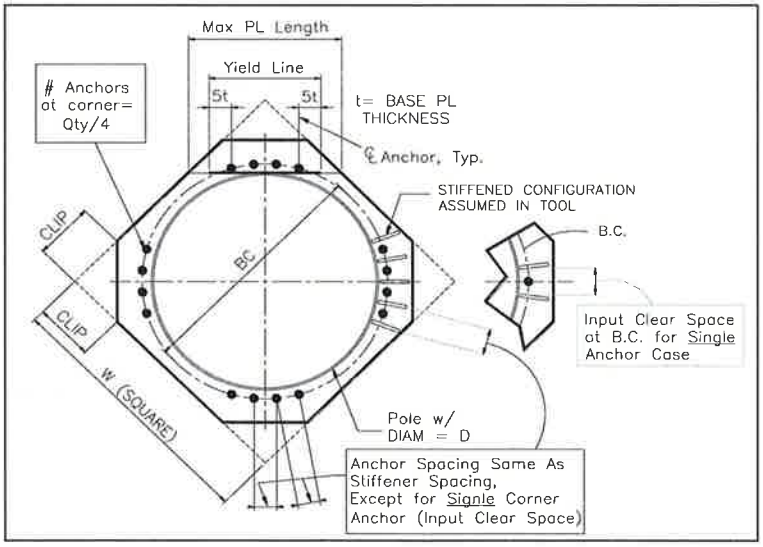
N/A - Unstiffened

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

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#: *845455*
Site Name: *OXFORD-QUAKER FARMS*
App #: *263999 Rev. 1*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	4	
Diam:	2.25	in
Rod Material:	Other	
Yield, Fy:	105	ksi
Strength, Fu:	125	ksi
Bolt Circle:	65.4	in

Plate Data		
W=Side:	53	in
Thick:	2.75	in
Grade:	60	ksi
Clip Distance:	10	in

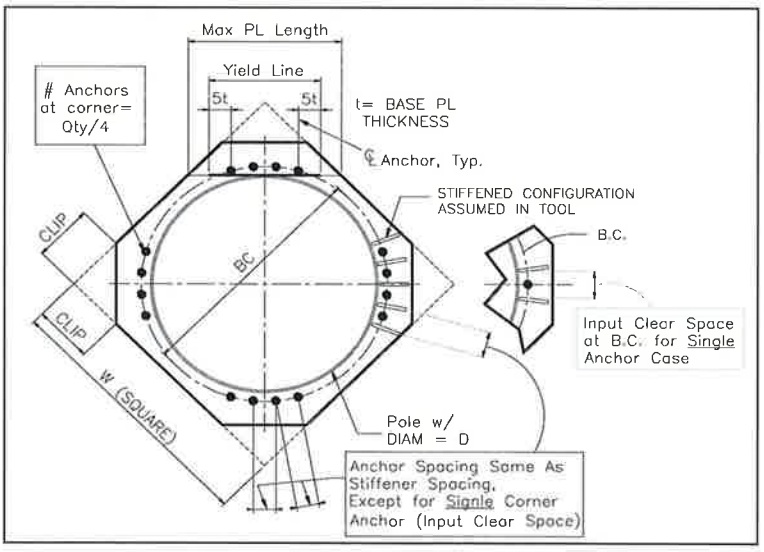
Pole Data		
Diam:	47.4	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1135	ft-kips
Unfactored Axial, P:	0	kips
Unfactored Shear, V:	0	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	188.6 Kips
Allowable Tension:	218.6 Kips
Anchor Rod Stress Ratio:	86.3% **Pass**



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

Monopole Pier and Pad Foundation

BU # : 845455
Site Name: OXFORD-QUAKER FARMS
App. Number: 263999 Rev. 1

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	31	kips
Moment, **M**:	3455	ft-kips
Tower Height, **H**:	149	ft
Tower Weight, **Wt**:	42	kips
Base Diameter, **BD**:	0.38	ft

Foundation Dimensions		
Depth, **D**:	7	ft
Pad Width, **W**:	21.5	ft
Neglected Depth, **N**:	3	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.125	kcf
Ult. Bearing Capacity, Bc:	30.0	ksf
Angle of Friction, **Φ**:	36	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.55	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	24	18
Pad Rebar Size, **Spad**:	10	
Pad Rebar Quanity, **mpad**:	21	9
Pier Tie Size, **St**:	5	4
Tie Quanity, **mt**:	10	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	1.875	**OK**
Overturning (ft-kips)	3620.00	3455.00	**95.4%**
Shear Capacity (kips)	152.90	31.00	**20.3%**
Bearing (ksf)	22.50	6.37	**28.3%**
Pad Shear - 1-way (kips)	686.04	434.61	**63.4%**
Pad Shear - 2-way (kips)	1944.15	110.88	**5.7%**
Pad Moment Capacity (k-ft)	3738.33	1657.04	**44.3%**
Pier Moment Capacity (k-ft)	4575.77	3594.50	**78.6%**

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -42.00 kips

Pier Properties

Concrete:

Pier Diameter = 7.0 ft
Concrete Area = 5541.8 in^2

Reinforcement:

Clear Cover = 3.00 in
Cage Diameter = 6.38 ft
Bar Size = 11
Bar Diameter = 1.41 in
Bar Area = 1.56 in^2
Number of Bars = 24

Material Properties

Concrete compressive strength = 3000 psi
Reinforcement yield strength = 60000 psi
Modulus of elasticity = 29000 ksi
Reinforcement yield strain = 0.00207
Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 27.71 in^2
Provided area of steel = 37.44 in^2 **OK**

Axial Loading

Load factor = 1.3
Reduction factor = 0.9
Factored axial load = -60.6667 kips

Neutral Axis

Distance from extreme edge to neutral axis =	14.42	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	12.26	in
Distance from centroid to neutral axis =	27.58	in

Compression Zone

Area of steel in compression zone =	7.80	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	44.91	deg
Area of concrete in compression =	500.76	in^2
Force in concrete = 0.85 * f`c * Acc =	1276.93	kips
Total reinforcement forces =	-1216.26	kips
Factored axial load =	-60.67	kips
Force in concrete =	-1276.93	kips
Sum of the forces in concrete =	0.00	kips **OK**

Maximum Moment

First moment of the concrete area in compression about the centoid =	17382.88	in^3
Distance between centroid of concrete in compression and centroid of pier =	34.71	in
Moment of concrete in compression =	44326.35	in-kips
Total reinforcement moment =	34986.95	in-kips
Nominal moment strength of column =	79313.30	in-kips
Factored moment strength of column =	54909.21	in-kips

Maximum Allowable Moment = 4575.77 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compressi on (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-27.58	-29.74	-0.005738	0.00	-60.00	-93.60
2	15.00	9.91	-17.67	-19.83	-0.003676	0.00	-60.00	-93.60
3	30.00	19.15	-8.43	-10.60	-0.001755	0.00	-50.88	-79.38
4	45.00	27.08	-0.50	-2.67	-0.000104	0.00	-3.03	-4.73
5	60.00	33.16	5.58	3.42	0.0011617	1.56	33.69	48.58
6	75.00	36.99	9.41	7.25	0.0019577	1.56	56.77	84.59
7	90.00	38.30	10.71	8.55	0.0022291	1.56	60.00	89.62
8	105.00	36.99	9.41	7.25	0.0019577	1.56	56.77	84.59
9	120.00	33.16	5.58	3.42	0.0011617	1.56	33.69	48.58
10	135.00	27.08	-0.50	-2.67	-0.000104	0.00	-3.03	-4.73
11	150.00	19.15	-8.43	-10.60	-0.001755	0.00	-50.88	-79.38
12	165.00	9.91	-17.67	-19.83	-0.003676	0.00	-60.00	-93.60
13	180.00	0.00	-27.58	-29.74	-0.005738	0.00	-60.00	-93.60
14	195.00	-9.91	-37.49	-39.66	-0.007801	0.00	-60.00	-93.60
15	210.00	-19.15	-46.73	-48.89	-0.009722	0.00	-60.00	-93.60
16	225.00	-27.08	-54.66	-56.82	-0.011372	0.00	-60.00	-93.60
17	240.00	-33.16	-60.75	-62.91	-0.012638	0.00	-60.00	-93.60
18	255.00	-36.99	-64.57	-66.73	-0.013434	0.00	-60.00	-93.60
19	270.00	-38.30	-65.88	-68.04	-0.013706	0.00	-60.00	-93.60
20	285.00	-36.99	-64.57	-66.73	-0.013434	0.00	-60.00	-93.60
21	300.00	-33.16	-60.75	-62.91	-0.012638	0.00	-60.00	-93.60
22	315.00	-27.08	-54.66	-56.82	-0.011372	0.00	-60.00	-93.60
23	330.00	-19.15	-46.73	-48.89	-0.009722	0.00	-60.00	-93.60
24	345.00	-9.91	-37.49	-39.66	-0.007801	0.00	-60.00	-93.60

CCIpole

per TIA-222- F

Site BU: 845455

Work Order: 933260

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	149	37.5	3.75	18	23	29.487	0.1875	0.75	A607-65
2	115.25	40	4.5	18	28.46	35.383	0.21875	0.875	A607-65
3	79.75	40	5.25	18	34.17	41.086	0.28125	1.125	A607-65
4	45	45	0	18	39.62	47.4	0.375	1.5	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	35.5	plate	CCI-SFP-065125	4			x					x				x					x	
2	35.5	70.5	plate	CCI-SFP-065125	4			x					x				x					x	
3	70.5	88	plate	CCI-AFP-060100	3			x					x									x	
4	70.5	90.5	plate	CCI-AFP-060100	1												x						
5	90.5	108	plate	CCI-AFP-060100	1												x						
6	87.5	107.5	plate	CCI-AFP-060100	2						x												x
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	I_x (in^4)	I_y (in^4)	L_u (in)	Connection Length (in)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	1.058	28.607	19.000	n/a	1.1875	A572-65
2	6.5	1.25	8.125	0.625	1.058	28.607	19.000	n/a	1.1875	A572-65
3	6	1	6	0.5	0.500	18.000	16.000	n/a	1.1875	A572-65
4	6	1	6	0.5	0.500	18.000	16.000	n/a	1.1875	A572-65
5	6	1	6	0.5	0.500	18.000	16.000	n/a	1.1875	A572-65
6	6	1	6	0.5	0.500	18.000	16.000	n/a	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	149 - 144	5		18	23.000	23.865	0.1875	A607-65	1.000
2	144 - 139	5		18	23.865	24.730	0.1875	A607-65	1.000
3	139 - 134	5		18	24.730	25.595	0.1875	A607-65	1.000
4	134 - 129	5		18	25.595	26.460	0.1875	A607-65	1.000
5	129 - 124	5		18	26.460	27.325	0.1875	A607-65	1.000
6	124 - 119	5		18	27.325	28.190	0.1875	A607-65	1.000
7	119 - 115.25	7.5	3.75	18	28.190	29.487	0.1875	A607-65	1.000
8	115.25 - 110.25	5		18	28.463	29.328	0.21875	A607-65	1.000
9	110.25 - 108	2.25		18	29.328	29.717	0.21875	A607-65	1.000
10	108 - 107.75	0.25		18	29.717	29.761	0.23125	A607-65	1.223
11	107.75 - 107.5	0.25		18	29.761	29.804	0.23125	A607-65	1.223
12	107.5 - 107.25	0.25		18	29.804	29.847	0.4375	A607-65	0.944
13	107.25 - 102.25	5		18	29.847	30.712	0.43125	A607-65	0.945
14	102.25 - 97.25	5		18	30.712	31.577	0.41875	A607-65	0.960
15	97.25 - 92.25	5		18	31.577	32.442	0.41875	A607-65	0.949
16	92.25 - 90.5	1.75		18	32.442	32.745	0.4125	A607-65	0.959
17	90.5 - 90.25	0.25		18	32.745	32.788	0.4125	A607-65	0.958
18	90.25 - 88	2.25		18	32.788	33.177	0.4125	A607-65	0.953
19	88 - 87.75	0.25		18	33.177	33.221	0.53125	A607-65	1.069
20	87.75 - 87.5	0.25		18	33.221	33.264	0.51875	A607-65	1.093
21	87.5 - 87.25	0.25		18	33.264	33.307	0.45625	A607-65	0.987
22	87.25 - 82.25	5		18	33.307	34.172	0.46875	A607-65	0.949
23	82.25 - 79.75	7	4.5	18	34.172	35.383	0.45625	A607-65	0.968
24	79.75 - 74.75	5		18	34.167	35.032	0.50625	A607-65	0.992
25	74.75 - 70.5	4.25		18	35.032	35.767	0.50625	A607-65	0.983
26	70.5 - 70.25	0.25		18	35.767	35.810	0.60625	A607-65	0.948
27	70.25 - 65.25	5		18	35.810	36.675	0.58125	A607-65	0.976
28	65.25 - 60.25	5		18	36.675	37.540	0.58125	A607-65	0.964
29	60.25 - 55.25	5		18	37.540	38.405	0.58125	A607-65	0.953
30	55.25 - 50.25	5		18	38.405	39.270	0.58125	A607-65	0.943
31	50.25 - 45.25	5		18	39.270	40.135	0.55625	A607-65	0.974
32	45.25 - 45	5.5	5.25	18	40.135	41.086	0.55625	A607-65	0.974
33	45 - 38.75	6.25		18	39.615	40.697	0.65	A607-65	0.974
34	38.75 - 35.5	3.25		18	40.697	41.259	0.6625	A607-65	0.951
35	35.5 - 35.25	0.25		18	41.259	41.302	0.6625	A607-65	0.950
36	35.25 - 30.25	5		18	41.302	42.167	0.6375	A607-65	0.979
37	30.25 - 25.25	5		18	42.167	43.032	0.65	A607-65	0.952
38	25.25 - 20.25	5		18	43.032	43.897	0.6375	A607-65	0.963
39	20.25 - 15.25	5		18	43.897	44.762	0.6375	A607-65	0.956
40	15.25 - 10.25	5		18	44.762	45.627	0.625	A607-65	0.967
41	10.25 - 5.25	5		18	45.627	46.492	0.6125	A607-65	0.980
42	5.25 - 0.25	5		18	46.492	47.357	0.625	A607-65	0.954
43	0.25 - 0	0.25		18	47.357	47.400	0.625	A607-65	0.953

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	149 - 144	4.4777	58.991	10.299
2	144 - 139	4.7341	111.3	10.629
3	139 - 134	5.5992	171.79	12.105
4	134 - 129	5.9246	233.14	12.44
5	129 - 124	6.744	302.11	13.634
6	124 - 119	8.9851	377.35	20.024
7	119 - 115.25	9.383	453.04	20.37
8	115.25 - 110.25	10.142	556.4	20.932
9	110.25 - 108	10.42	603.72	21.131
10	108 - 107.75	10.469	609	21.149
11	107.75 - 107.5	10.505	614.29	21.172
12	107.5 - 107.25	10.549	619.59	21.197
13	107.25 - 102.25	11.412	726.84	21.698
14	102.25 - 97.25	12.302	836.57	22.191
15	97.25 - 92.25	13.211	948.76	22.678
16	92.25 - 90.5	13.527	988.6	22.852
17	90.5 - 90.25	13.588	994.31	22.87
18	90.25 - 88	13.999	1046	23.105
19	88 - 87.75	14.069	1051.8	23.128
20	87.75 - 87.5	14.13	1057.6	23.155
21	87.5 - 87.25	14.182	1063.4	23.181
22	87.25 - 82.25	15.209	1180.6	23.685
23	82.25 - 79.75	15.828	1240.4	24.16
24	79.75 - 74.75	17.702	1362.5	24.705
25	74.75 - 70.5	18.706	1468.4	25.106
26	70.5 - 70.25	18.781	1474.7	25.124
27	70.25 - 65.25	20.108	1601.5	25.609
28	65.25 - 60.25	21.461	1730.8	26.079
29	60.25 - 55.25	22.83	1862.3	26.536
30	55.25 - 50.25	24.217	1996.1	26.979
31	50.25 - 45.25	25.625	2132	27.404
32	45.25 - 45	25.704	2138.9	27.417
33	45 - 38.75	28.887	2312.4	28.069
34	38.75 - 35.5	29.945	2403.9	28.328
35	35.5 - 35.25	30.035	2411	28.339
36	35.25 - 30.25	31.675	2553.6	28.723
37	30.25 - 25.25	33.341	2698	29.098
38	25.25 - 20.25	35.028	2844.3	29.468
39	20.25 - 15.25	36.7	2992.5	29.8
40	15.25 - 10.25	38.5	3142.4	30.2
41	10.25 - 5.25	40.2	3294.2	30.6
42	5.25 - 0.25	42.0	3447.8	30.9
43	0.25 - 0	42.1	3455.5	30.9

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
149 - 144	Pole	TP23.865x23x0.1875	Pole	17.1%	Pass
144 - 139	Pole	TP24.73x23.865x0.1875	Pole	29.6%	Pass
139 - 134	Pole	TP25.595x24.73x0.1875	Pole	42.5%	Pass
134 - 129	Pole	TP26.46x25.595x0.1875	Pole	53.7%	Pass
129 - 124	Pole	TP27.325x26.46x0.1875	Pole	65.2%	Pass
124 - 119	Pole	TP28.19x27.325x0.1875	Pole	76.5%	Pass
119 - 115.25	Pole	TP29.487x28.19x0.1875	Pole	88.4%	Pass
115.25 - 110.25	Pole	TP29.328x28.463x0.2188	Pole	89.3%	Pass
110.25 - 108	Pole	TP29.717x29.328x0.2188	Pole	94.3%	Pass
108 - 107.75	Pole + Reinf.	TP29.761x29.717x0.2313	Pole	96.0%	Pass
107.75 - 107.5	Pole + Reinf.	TP29.804x29.761x0.2313	Pole	96.6%	Pass
107.5 - 107.25	Pole + Reinf.	TP29.847x29.804x0.4375	Reinf. 5 Compression	61.9%	Pass
107.25 - 102.25	Pole + Reinf.	TP30.712x29.847x0.4313	Reinf. 5 Compression	69.2%	Pass
102.25 - 97.25	Pole + Reinf.	TP31.577x30.712x0.4188	Reinf. 5 Compression	76.3%	Pass
97.25 - 92.25	Pole + Reinf.	TP32.442x31.577x0.4188	Reinf. 5 Compression	83.3%	Pass
92.25 - 90.5	Pole + Reinf.	TP32.745x32.442x0.4125	Reinf. 5 Compression	85.2%	Pass
90.5 - 90.25	Pole + Reinf.	TP32.788x32.745x0.4125	Reinf. 4 Compression	85.6%	Pass
90.25 - 88	Pole + Reinf.	TP33.177x32.788x0.4125	Reinf. 4 Compression	88.4%	Pass
88 - 87.75	Pole + Reinf.	TP33.221x33.177x0.5313	Reinf. 4 Compression	76.2%	Pass
87.75 - 87.5	Pole + Reinf.	TP33.264x33.221x0.5188	Reinf. 4 Compression	76.3%	Pass
87.5 - 87.25	Pole + Reinf.	TP33.307x33.264x0.4563	Reinf. 3 Compression	77.6%	Pass
87.25 - 82.25	Pole + Reinf.	TP34.172x33.307x0.4688	Reinf. 3 Compression	82.9%	Pass
82.25 - 79.75	Pole + Reinf.	TP35.383x34.172x0.4563	Reinf. 3 Compression	85.8%	Pass
79.75 - 74.75	Pole + Reinf.	TP35.032x34.167x0.5063	Reinf. 3 Compression	80.9%	Pass
74.75 - 70.5	Pole + Reinf.	TP35.767x35.032x0.5063	Reinf. 3 Compression	84.4%	Pass
70.5 - 70.25	Pole + Reinf.	TP35.81x35.767x0.6063	Reinf. 2 Compression	72.1%	Pass
70.25 - 65.25	Pole + Reinf.	TP36.675x35.81x0.5813	Reinf. 2 Compression	75.6%	Pass
65.25 - 60.25	Pole + Reinf.	TP37.54x36.675x0.5813	Reinf. 2 Compression	79.2%	Pass
60.25 - 55.25	Pole + Reinf.	TP38.405x37.54x0.5813	Reinf. 2 Compression	82.1%	Pass
55.25 - 50.25	Pole + Reinf.	TP39.27x38.405x0.5813	Reinf. 2 Compression	85.1%	Pass
50.25 - 45.25	Pole + Reinf.	TP40.135x39.27x0.5563	Reinf. 2 Compression	88.3%	Pass
45.25 - 45	Pole + Reinf.	TP41.086x40.135x0.5563	Reinf. 2 Compression	88.4%	Pass
45 - 38.75	Pole + Reinf.	TP40.697x39.615x0.65	Reinf. 2 Compression	80.4%	Pass
38.75 - 35.5	Pole + Reinf.	TP41.259x40.697x0.6625	Reinf. 2 Compression	81.0%	Pass
35.5 - 35.25	Pole + Reinf.	TP41.302x41.259x0.6625	Reinf. 1 Compression	81.1%	Pass
35.25 - 30.25	Pole + Reinf.	TP42.167x41.302x0.6375	Reinf. 1 Compression	83.8%	Pass
30.25 - 25.25	Pole + Reinf.	TP43.032x42.167x0.65	Reinf. 1 Compression	85.0%	Pass
25.25 - 20.25	Pole + Reinf.	TP43.897x43.032x0.6375	Reinf. 1 Compression	87.5%	Pass
20.25 - 15.25	Pole + Reinf.	TP44.762x43.897x0.6375	Reinf. 1 Compression	88.5%	Pass
15.25 - 10.25	Pole + Reinf.	TP45.627x44.762x0.625	Reinf. 1 Compression	90.8%	Pass
10.25 - 5.25	Pole + Reinf.	TP46.492x45.627x0.6125	Reinf. 1 Compression	91.6%	Pass
5.25 - 0.25	Pole + Reinf.	TP47.357x46.492x0.625	Reinf. 1 Compression	93.1%	Pass
0.25 - 0	Pole + Reinf.	TP47.4x47.357x0.625	Reinf. 1 Compression	93.2%	Pass
				Summary	
			Pole	96.6%	Pass
			Reinforcement	93.9%	Pass
			Overall	96.6%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity						
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6
149 - 144	998	n/a	998	14.09	n/a	14.09	17.1%						
144 - 139	1111	n/a	1111	14.61	n/a	14.61	29.6%						
139 - 134	1233	n/a	1233	15.12	n/a	15.12	42.5%						
134 - 129	1363	n/a	1363	15.63	n/a	15.63	53.7%						
129 - 124	1502	n/a	1502	16.15	n/a	16.15	65.2%						
124 - 119	1650	n/a	1650	16.66	n/a	16.66	76.5%						
119 - 115.25	1768	n/a	1768	17.05	n/a	17.05	88.4%						
115.25 - 110.25	2163	n/a	2163	20.21	n/a	20.21	89.3%						
110.25 - 108	2251	n/a	2251	20.48	n/a	20.48	94.3%						
108 - 107.75	2290	115	2405	20.51	6.00	26.51	96.0%					62.3%	
107.75 - 107.5	2300	116	2416	20.54	6.00	26.54	96.6%					62.7%	
107.5 - 107.25	2281	2169	4449	20.57	18.00	38.57	48.5%					61.9%	61.9%
107.25 - 102.25	2486	2290	4777	21.17	18.00	39.17	55.2%					69.5%	69.5%
102.25 - 97.25	2704	2416	5120	21.77	18.00	39.77	60.9%					76.6%	76.6%
97.25 - 92.25	2934	2544	5478	22.37	18.00	40.37	65.5%					83.3%	83.3%
92.25 - 90.5	3017	2590	5607	22.58	18.00	40.58	68.1%					85.6%	85.6%
90.5 - 90.25	3029	2596	5626	22.61	18.00	40.61	68.3%				85.9%		85.9%
90.25 - 88	3139	2656	5795	22.88	18.00	40.88	70.8%				88.7%		88.7%
88 - 87.75	3221	4222	7443	22.91	36.00	58.91	61.2%			62.2%	76.2%		59.9%
87.75 - 87.5	3232	4173	7404	22.94	36.00	58.94	62.1%			62.5%	76.5%		60.1%
87.5 - 87.25	3177	3360	6537	22.97	24.00	46.97	64.2%			77.8%	77.8%		
87.25 - 82.25	3432	3748	7180	23.57	24.00	47.57	67.3%			83.2%	83.2%		
82.25 - 79.75	3565	3726	7292	23.87	24.00	47.87	71.2%			85.8%	85.8%		
79.75 - 74.75	4731	3703	8434	31.02	24.00	55.02	66.7%			81.4%	81.4%		
74.75 - 70.5	5038	3854	8892	31.68	24.00	55.68	69.6%			84.9%	84.9%		
70.5 - 70.25	5056	5639	10695	31.72	32.50	64.22	58.2%		72.4%				
70.25 - 65.25	5435	5559	10993	32.49	32.50	64.99	63.0%		75.9%				
65.25 - 60.25	5831	5989	11821	33.26	32.50	65.76	65.1%		79.2%				
60.25 - 55.25	6247	6448	12695	34.03	32.50	66.53	66.5%		82.4%				
55.25 - 50.25	6682	6729	13411	34.80	32.50	67.30	69.0%		85.4%				
50.25 - 45.25	7136	6809	13945	35.58	32.50	68.08	72.7%		88.3%				
45.25 - 45	7160	6823	13983	35.61	32.50	68.11	72.8%		88.4%				
45 - 38.75	9855	6993	16848	47.99	32.50	80.49	66.2%		80.3%				
38.75 - 35.5	10273	7620	17892	48.66	32.50	81.16	64.7%		81.7%				
35.5 - 35.25	10305	7635	17940	48.71	32.50	81.21	64.8%	81.8%					
35.25 - 30.25	10972	7488	18460	49.74	32.50	82.24	69.1%	83.8%					
30.25 - 25.25	11668	8264	19932	50.77	32.50	83.27	68.0%	85.7%					
25.25 - 20.25	12392	8340	20732	51.80	32.50	84.30	71.1%	87.5%					
20.25 - 15.25	13146	8918	22063	52.83	32.50	85.33	70.9%	89.2%					
15.25 - 10.25	13929	8986	22916	53.86	32.50	86.36	73.9%	90.8%					
10.25 - 5.25	14743	8772	23516	54.89	32.50	87.39	77.0%	92.4%					
5.25 - 0.25	15589	9945	25534	55.92	32.50	88.42	74.8%	93.8%					
0.25 - 0	15632	9963	25595	55.97	32.50	88.47	74.8%	93.9%					

Note: Section capacity checked in 5 degree increments.

BU: 845455 WO: 933260	Done By: RAA Checked By: TS Date: 10/15/2014	CROWN CASTLE

Additional Anchor Rods: Division of Forces

Base Reactions from tnxTower:

$Moment := 3455 \cdot kip \cdot ft$

$Axial := 42 \cdot kip$

$Shear := 31 \cdot kip$

Existing Anchor Rod Group Moment of Inertia:

$N_{existing} := 12$ $D_{existing} := 2.25 \cdot in$

$BC_{existing} := 54 \cdot in$ $A_{existing} := 3.25 in^2$

$$I_{existing} := \left(\frac{N_{existing}}{8}\right) \cdot \left(BC_{existing}^{2}\right) \cdot \left(A_{existing}\right) = 14215.5 \cdot in^4$$

Additonal (New) Anchor Rod Group Moment of Inertia:

$N_{new} := 4$ $D_{new} := 2.25 \cdot in$ $Fu_{rod} := 125 ksi$

$BC_{new} := 65.4 \cdot in$ $A_{new} := 3.25 \cdot in^2$

$$I_{new} := \left(\frac{N_{new}}{8}\right) \cdot \left(BC_{new}^{2}\right) \cdot \left(A_{new}\right) = 6950.38 \cdot in^4$$

Division of Forces:

$$I_{total} := \left(I_{existing}\right) + \left(I_{new}\right) = 21165.88 \cdot in^4$$

$$Percentage_{existing} := \left(\frac{I_{existing}}{I_{total}}\right) = 67.16 \cdot \%$$

$$Percentage_{new} := \left(\frac{I_{new}}{I_{total}}\right) = 32.84 \cdot \%$$

Forces Remaining in Existing Anchor Rods:

$$M_{existing} := Moment \cdot \left(Percentage_{existing}\right) = 2320.46 \cdot kip \cdot ft$$

$$Ax_{existing} := Axial = 42 \cdot kip$$

$$S_{existing} := Shear = 31 \cdot kip$$

Forces to New Anchor Rods:

$$M_{new} := Moment \cdot \left(Percentage_{new}\right) = 1134.54 \cdot kip \cdot ft$$

$$Ax_{new} := 0 \cdot kip$$

$$S_{new} := 0 \cdot kip$$

(It is assumed that all of the Axial and Shear loads will go to the existing anchor rods)

--See attached CCIplate output for additional anchor rod group capacity and structural rating values--

Anchor Rod Bracket Calculations

Design the anchor rod bracket and all components to resist the full capacity of the additional anchors.

Bracket Design Load (Anchor Tensile Capacity):

$\phi := 0.8$

$\phi P_n := \phi \cdot Fu_{rod} \cdot A_{new} = 325 \cdot kip$

Tube Design (Square HSS)

Member Size: HSS 5" x 5" x 1/2"

Member Properties (AISC 13th Ed., Table 1-12):

Outside Length: $OD_{HSS} := 5 \cdot in$

Area: $A_{HSS} := 7.88 \cdot in^2$ $A_{e\_HSS} := 0.75 \cdot A_{HSS} = 5.91 \cdot in^2$

Thickness: $t_{HSS} := 0.5 \cdot in$

Yield Strength: $F_{y\_HSS} := 46 \cdot ksi$ $F_{u\_HSS} := 58 \cdot ksi$

Length: $L_{HSS} := 33 \cdot in$

Moment of Inertia: $I_{HSS} := 26.0 \cdot in^4$

Radius of Gyration: $r_{HSS} := 1.82 \cdot in$

Inside Dimension: $ID_{HSS} := OD_{HSS} - 2 \cdot t_{HSS} = 4 \cdot in$

Bearing Check (AISC 13th Ed., Equation J7-1):

$\phi_b := .75$

$\phi P_n = \phi_b \cdot R_n = \phi_b \cdot 1.8 \cdot F_{ypipe} \cdot A_{pb}$

$$A_{pb} := \frac{\phi P_n}{\phi_b \cdot 1.8 \cdot F_{y\_HSS}} = 5.23 \cdot in^2$$

$$Check_{bear} := \begin{cases} \text{"OK"} & \text{if } A_{HSS} \geq A_{pb} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bear} = \text{"OK"}$

Compression Check
(AISC 13th Ed., Eqs. E3-1 to E3-4):

$\phi_c := 0.9$

$K := 1$

$\phi P_{n\_comp} = \phi_c \cdot F_{cr} \cdot A_g$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L_{HSS}}{r_{HSS}}\right)^2} = 870.59 \cdot ksi$$

$$\frac{K \cdot L_{HSS}}{r_{HSS}} = 18.13 < 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_{y\_HSS}}} = 118.26$$

$$\therefore \quad F_{cr} := 0.658^{\frac{F_{y\_HSS}}{F_e}} \cdot F_{y\_HSS} = 44.99 \cdot ksi$$

(AISC 13th Ed., Equation J4-6):

$$\phi P_{n\_comp} := \begin{cases} \phi_c \cdot F_{y\_HSS} \cdot A_{HSS} & \text{if } \frac{K \cdot L_{HSS}}{r_{HSS}} \le 25 \\ \phi_c \cdot F_{cr} \cdot A_{HSS} & \text{otherwise} \end{cases}$$

$\phi P_{n\_comp} = 326.23 \cdot kip$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } \phi P_{n\_comp} \ge \phi P_n \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

Gusset Plate Design

Gusset Plate width: $w_{plate} := 6.5 \cdot in$

Gusset Plate thickness: $t_{plate} := 1.25in$

$L_{plate1} := 36in$

$L_{plate2} := 30in$

Gusset Plate Strength: $Fy_{plate} := 65ksi$

$Fu_{plate} := 80ksi$

Pole thickness: $t_{pole} := 0.375in$

Shear Check (AISC 13th Ed., Equation J4-3 and J4-4):

$A_g := t_{plate} \cdot L_{plate2} = 37.5 \cdot in^2$

$A_{nv} := A_g = 37.5 \cdot in^2$

Shear Yielding

$\phi_v := 1$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_g \cdot Fy_{plate} = 1462.5 \cdot kip$

$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } \phi V_{plate} \geq \phi P_n \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{shear} = \text{"OK"}$

Shear Rupture

$\phi_{nv} := 0.75$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_{nv} \cdot Fu_{plate} = 1350 \cdot kip$

$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } \phi V_{plate} \geq \phi P_n \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{shear} = \text{"OK"}$

Gusset Plate to Pole and Base Plate Weld Design (Horizontal and Vertical Weld)

Gusset plate thickness: $t_{plate} = 1.25 \cdot in$

Pole Grade: $Fy_{pole} := 65ksi$ $Fu_{pole} := 80ksi$

Base Plate Grade: $Fy_{base} := 60ksi$ $Fu_{base} := 75ksi$

Gussett Plate Grade: $Fy_{plate} = 65 \cdot ksi$ $Fu_{plate} = 80 \cdot ksi$

Height of vertical weld from base plate: $H := L_{plate1} = 36 \cdot in$

$Notch := 0.75 \cdot in$

Gap between Base Plate and HSS: $Gap := 1.623in$

Vertical fillet weld size to pole: (in sixteenths of an inch) $D_{vpole} := 5$

$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{5}{16}$

Weld Material Grade: $F_{EXX} := 80ksi$

Case 1: Vertical Fillet Weld Controls

$\phi_{wg} := .75$

Fillet weld (gusset plate to pole) *2 weld groups, so muliply by 2*

effective throat $et_{vf} := 2\frac{D_{vpole}}{16}\cdot in\cdot\frac{\sqrt{2}}{2} = 0.442\cdot in$

CJP weld (gusset platet to base plate)

effective throat $et_{cjp} := t_{plate} = 1.25\cdot in$

Length of Vertical Weld to pole $L_v := H - Notch = 35.25\cdot in$

Area of Vertical Weld to pole $A_v := et_{vf}\cdot L_v = 15.58\cdot in^2$

Length of Horizontal Weld to BP $L_h := w_{plate} - Notch - Gap = 4.13\cdot in$

Area of Horizontal Weld $A_h := et_{cjp}\cdot L_h = 5.16\cdot in^2$

Group Centroid

Vertical Weld $x_v := 0$

$y_v := \frac{L_v}{2} + Notch = 18.38\cdot in$

$A_w := A_v = 15.58\cdot in^2$

$xA_v := x_v\cdot A_v = 0\cdot in^3$

$yA_v := y_v\cdot A_v = 286.25\cdot in^3$

Horizontal Weld $x_h := \frac{L_h}{2} + Notch = 2.81\cdot in$

$y_h := 0\cdot in$

$A_w := A_h = 5.16\cdot in^2$

$xA_h := x_h\cdot A_h = 14.51\cdot in^3$

$yA_h := y_h\cdot A_h = 0$

Sum $A_{sum} := A_v + A_h = 20.74 \cdot in^2$

$xA_{sum} := xA_v + xA_h = 14.51 \cdot in^3$

$yA_{sum} := yA_v + yA_h = 286.25 \cdot in^3$

$x_{prime} := \frac{xA_{sum}}{A_{sum}} = 0.7 \cdot in$

$y_{prime} := \frac{yA_{sum}}{A_{sum}} = 13.8 \cdot in$

$I_v := \frac{L_v^3 \cdot et_{vf}}{12} + (L_v \cdot et_{vf}) \cdot (y_v - y_{prime})^2 + A_h \cdot y_{prime}^2 = 2921.6 \cdot in^4$

$I_h := \frac{L_h^3 \cdot et_{cjp}}{12} + A_h \cdot (x_h - x_{prime})^2 + A_v \cdot x_{prime}^2 = 38 \cdot in^4$

$I_p := I_v + I_h = 2959.6 \cdot in^4$

Total Area of Weld $Aw_{total} := A_{sum} = 20.74 \cdot in^2$

Total Ip $Ip_{total} := I_p = 2959.6 \cdot in^4$

eccentricity $e := w_{plate} + \frac{OD_{HSS}}{2} - x_{prime} = 8.3 \cdot in$

Design Moment $M_d := \phi P_n \cdot e = 2697.53 \cdot kip \cdot in$

Check extreme fiber 1 $c_{x1} := -1 \cdot x_{prime} = -0.7 \cdot in$

$c_{y1} := H - y_{prime} = 22.2 \cdot in$

$rpx_1 := 0ksi$

$rpy_1 := \frac{\phi P_n}{Aw_{total}} = 15.672 \cdot ksi$

$$rmx_1 := M_d \cdot \frac{c_{y1}}{Ip_{total}} = 20.231 \cdot ksi$$

$$rmy_1 := M_d \cdot \frac{c_{x1}}{Ip_{total}} = -0.638 \cdot ksi$$

$$ra_1 := \sqrt{(rpx_1 + rmx_1)^2 + (rpy_1 + rmy_1)^2} = 25.21 \cdot ksi$$

$$R_{nweld} := \phi_{wg} \cdot 0.6 F_{EXX} = 36 \cdot ksi$$

$$Cap_1 := \frac{ra_1}{R_{nweld}} = 70.02 \cdot \%$$

Check extreme fiber 2

$$c_{x2} := w_{plate} - Gap - x_{prime} = 4.18 \cdot in$$

$$c_{y2} := -1 \cdot y_{prime} = -13.8 \cdot in$$

$$rpx_2 := 0ksi$$

$$rpy_2 := \frac{\phi P_n}{Aw_{total}} = 15.672 \cdot ksi$$

$$rmx_2 := M_d \cdot \frac{c_{y2}}{Ip_{total}} = -12.582 \cdot ksi$$

$$rmy_2 := M_d \cdot \frac{c_{x2}}{Ip_{total}} = 3.807 \cdot ksi$$

$$ra_2 := \sqrt{(rpx_2 + rmx_2)^2 + (rpy_2 + rmy_2)^2} = 23.19 \cdot ksi$$

$$Fu := \min(Fu_{plate}, Fu_{base}) = 75 \cdot ksi$$

$$R_{nplate} := \phi_{wg} \cdot 0.6 \cdot Fu = 33.75 \cdot ksi$$

$$Cap_2 := \frac{ra_2}{R_{nplate}} = 68.71 \cdot \%$$

Case 2: Vertical Fillet Base Material Controls

$\phi_{weld} := .75$

Fillet weld (gusset plate to pole) *2 weld groups, so muliply by 2*

effective throat $et_{weld} := 2 \frac{D_{vpole}}{16} \cdot in = 0.625 \cdot in$

CJP weld (gusset plate to base plate)

effective throat $et_{cjp} := t_{plate} = 1.25 \cdot in$

Length of Vertical Weld to pole $L_v := H - Notch = 35.25 \cdot in$

Area of Vertical Weld to pole $A_{vw} := et_{vf} \cdot L_v = 22.03 \cdot in^2$

Length of Horizontal Weld to BP $L_h := w_{plate} - Notch - Gap = 4.13 \cdot in$

Area of Horizontal Weld $A_{hw} := et_{cjp} \cdot L_h = 5.16 \cdot in^2$

Group Centroid

Vertical Weld $x_{vw} := 0$

$$y_{vw} := \frac{L_v}{2} + Notch = 18.38 \cdot in$$

$A_{vw} := A_v = 22.03 \cdot in^2$

$xA_{vw} := x_v \cdot A_v = 0 \cdot in^3$

$yA_{vw} := y_v \cdot A_v = 404.82 \cdot in^3$

Horizontal Weld $x_{hw} := \frac{L_h}{2} + Notch = 2.81 \cdot in$

$y_{hw} := 0 \cdot in$

$A_{hw} := A_h = 5.16 \cdot in^2$

$xA_{hw} := x_h \cdot A_h = 14.51 \cdot in^3$

$yA_{hw} := y_h \cdot A_h = 0$

Sum $A_{sum} := A_v + A_h = 27.19 \cdot in^2$

$xA_{sum} := xA_v + xA_h = 14.51 \cdot in^3$

$yA_{sum} := yA_v + yA_h = 404.82 \cdot in^3$

$$x_{prime} := \frac{xA_{sum}}{A_{sum}} = 0.53 \cdot in$$

$$y_{prime} := \frac{yA_{sum}}{A_{sum}} = 14.89 \cdot in$$

$$I_v := \frac{L_v^{\,3} \cdot et_{vf}}{12} + \left(L_v \cdot et_{vf}\right) \cdot \left(y_v - y_{prime}\right)^2 + A_h \cdot y_{prime}^{\,2} = 3692.6 \cdot in^4$$

$$I_h := \frac{L_h^{\,3} \cdot et_{cjp}}{12} + A_h \cdot \left(x_h - x_{prime}\right)^2 + A_v \cdot x_{prime}^{\,2} = 40.41 \cdot in^4$$

$$I_p := I_v + I_h = 3733.01 \cdot in^4$$

Total Area of Weld $\quad Aw_{total} := A_{sum} = 27.19 \cdot in^2$

Total Ip $\quad Ip_{total} := I_p = 3733.01 \cdot in^4$

eccentricity $\quad e := w_{plate} + \frac{OD_{HSS}}{2} - x_{prime} = 8.47 \cdot in$

Design Moment $\quad M_d := \phi P_n \cdot e = 2751.51 \cdot kip \cdot in$

Check extreme fiber 1

$$c_{x1} := -1 \cdot x_{prime} = -0.53 \cdot in$$

$$c_{y1} := H - y_{prime} = 21.11 \cdot in$$

$$rpx_1 := 0ksi$$

$$rpy_1 := \frac{\phi P_n}{Aw_{total}} = 11.953 \cdot ksi$$

$$rmx_1 := M_d \cdot \frac{c_{y1}}{Ip_{total}} = 15.561 \cdot ksi$$

$$rmy_1 := M_d \cdot \frac{c_{x1}}{Ip_{total}} = -0.393 \cdot ksi$$

$$ra_1 := \sqrt{\left(rpx_1 + rmx_1\right)^2 + \left(rpy_1 + rmy_1\right)^2} = 19.38 \cdot ksi$$

$$R_{nweld} := \phi_{wg} \cdot 0.6Fu_{pole} = 36 \cdot ksi$$

$$Cap_3 := \frac{ra_1}{R_{nweld}} = 53.85 \cdot \%$$

Check extreme fiber 2

$ex_2 := w_{plate} - Gap - x_{prime} = 4.34 \cdot in$

$ey_2 := -1 \cdot y_{prime} = -14.89 \cdot in$

$rpx_2 := 0ksi$

$$rpy_2 := \frac{\phi P_n}{Aw_{total}} = 11.953 \cdot ksi$$

$$rmx_2 := M_d \cdot \frac{c_{y2}}{Ip_{total}} = -10.974 \cdot ksi$$

$$rmy_2 := M_d \cdot \frac{c_{x2}}{Ip_{total}} = 3.201 \cdot ksi$$

$$ra_2 := \sqrt{\left(rpx_2 + rmx_2\right)^2 + \left(rpy_2 + rmy_2\right)^2} = 18.71 \cdot ksi$$

$Fu := \min\left(Fu_{plate}, Fu_{base}\right) = 75 \cdot ksi$

$R_{nplate} := \phi_{wg} \cdot 0.6 \cdot Fu = 33.75 \cdot ksi$

$$Cap_4 := \frac{ra_2}{R_{nplate}} = 55.44 \cdot \%$$

$Check := \begin{cases} \text{"OK"} & \text{if Capacity} < 100\% \\ \text{"INSUFFICIENT"} & \text{otherwise} \end{cases}$

$Check = \text{"OK"}$

Gusset Plate to HSS Weld Design
(AISC 13th Ed., Table 8-4)

Electrode Strength: $F_{EXX} := 70ksi$

Weld Size (in sixteenths of an inch): $D_1 := 6$ $\quad weldsize_1 := \frac{D_1}{16} = \frac{3}{8}$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.38 \cdot in$$

Load not in plane with weld group: $k := 0$

$$a := \frac{ecc_2}{L_{plate2}} = 0.11$$

$C_1 := 1.00$

$Coeff_1 := 3.71$

$\phi_w := 0.75$

$$D_{min1} := ceil\left(\frac{\phi P_n \cdot in}{\phi_w \cdot Coeff_1\, C_1 \cdot L_{plate2} \cdot kip}\right) = 4$$

$$minweldsize := \frac{D_{min1}}{16} = \frac{1}{4}$$

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } D_1 \geq D_{min1} \wedge D_1 \geq Min_{weldsize} \wedge D_1 \leq Max_{weldsize} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld} = \text{"OK"}$

$$\phi Rn_{weld1} := \phi_w \cdot Coeff_1\, ksi \cdot in \cdot C_1 \cdot D_1 \cdot L_{plate2} = 500.85 \cdot kip$$

$$Check_{weld1} := \begin{cases} \text{"OK"} & \text{if } \phi Rn_{weld1} \geq \phi P_n \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld1} = \text{"OK"}$

Gusset Plate to Pole Punching Shear Check (max per unit length):

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_1 := w_{plate} + OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 9.88 \cdot in$$

$$M_1 := \phi P_n \cdot ecc_1 = 3209.38 \cdot kip \cdot in$$

$$S_1 := \frac{t_{plate} \cdot L_{plate1}^2}{6} = 270 \cdot in^3$$

$$f_v := \frac{M_1}{S_1} \cdot t_{plate} \cdot 1in = 14.86 \cdot kip$$

$$\phi F_v := \phi_v \cdot 0.6 \cdot Fy_{pole} \cdot 2 \cdot t_{pole} \cdot 1in = 26.32 \cdot kip$$

$$Check_{PS1} := \begin{cases} \text{"OK"} & \text{if } \phi F_v \geq f_v \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS1} = \text{"OK"}$

Gusset Plate to HSS Punching Shear Check (max per unit length):

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.38 \cdot in$$

$$\phi_v := 0.90$$

$$M_2 := \phi P_n \cdot ecc_2 = 1096.88 \cdot kip \cdot in$$

$$S_2 := \frac{t_{plate} \cdot L_{plate2}^2}{6} = 187.5 \cdot in^3$$

$$f_v := \frac{M_2}{S_2} \cdot t_{plate} \cdot 1in = 7.31 \cdot kip$$

$$\phi F_v := \phi_v \cdot 0.6 \cdot F_{y\_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 24.84 \cdot kip$$

$$Check_{PS2} := \begin{cases} \text{"OK"} & \text{if } \phi F_v \geq f_v \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS2} = \text{"OK"}$

Embedment Depth Calculations

Projected Embedment Depth:	$L_{em} := 5.5 \cdot ft$	
Yield Strength of Rebar:	$f_y := 60ksi$	
Concrete Strength:	$f'_c := 3000psi$	
Transverse Reinforcement Index:	$k_{rt} := 0$	k_{rt} can be taken as 0 for design per ACI 318
Rebar Location Factor:	$\psi_t := 1$	
Rebar Coating Factor:	$\psi_e := 1$	1.0 non coated rebar
Rebar Size Factor:	$\psi_s := 1$	0.8 for No. 6 and smaller bars, 1.0 for No. 7 and larger bars
Concrete Weight Factor:	$\lambda := 1 \cdot \sqrt{psi}$	1.0 for normal weight concrete
Pier Diameter:	$D_{pier} := 7ft$	
Cover:	$c_c := 3in$	
Rebar Size:	$d_s := 11$	$d_b := \frac{d_s}{8}in = 1.38 \cdot in$
Tie Size:	$Tie := 5$	
Number of Vertical Rebar:	$n := 24$	

Development Length (ACI 318-08 Chapter 12):

$$BC_{rebar} := D_{pier} - 2 \cdot c_c - \frac{Tie \cdot in}{4} - d_b = 75.38 \cdot in$$

$$S_{rebar} := \frac{\pi \cdot BC_{rebar}}{n} = 9.867 \cdot in$$

$$c_b := \min\left(c_c + \frac{Tie}{8}in + \frac{d_b}{2}, S_{rebar} \cdot 0.5\right) = 4.31 \cdot in$$

$$l_d := \left[\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s}{\min\left[\left(\frac{c_b + k_{rt}}{d_b}\right), 2.5\right]}\right] \cdot d_b = 45.19 \cdot in$$

Calculate Max Distance Between Rebar and New Anchor Rods:

$$A := \frac{1}{2}\cdot S_{rebar} = 4.933\cdot in$$

$$B := \frac{BC_{rebar}}{2} - \frac{BC_{new}}{2} = 4.987\cdot in$$

$$G := \sqrt{A^2 + B^2} = 7.015\cdot in$$

$$l'_d := l_d + \frac{G}{1.5} + 3in = 4.41\,ft$$

Epoxy Development Length:

Bond Strength: $S_b := 1800psi$

$\phi_{bond} := 0.50$

$$L_{be} := \frac{\phi P_n}{\pi\cdot D_{new}\cdot S_b\cdot \phi_{bond}} = 51.09\cdot in$$

Required Embedment Length:

$$L_{min} := \max\left(L_{be}, l'_d + 0.25\cdot L_{be}\right) = 5.47\,ft$$

$$L_{min} := ceil\left(\frac{L_{min}}{0.5ft}\right)\cdot 0.5ft$$

$L_{min} = 5.5\,ft$

$$Check := \begin{cases} \text{"OK"} & \text{if } L_{min} \le L_{em} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

Check = "OK"

Anchor Rod Pullout Test:

$\phi_p := 0.75$

$$Pullout := \frac{\phi_p\cdot Fu_{rod}\cdot A_{new}}{1.6} = 190\cdot kip$$

BU: 845455
WO: 933260

Done By: RAA
Checked By: TS
Date: 10/15/2014

CROWN CASTLE

Transition Stiffeners - Rev F.

Flat Plate at Base

Size :=
- 65FP-040075
- 65FP-045100
- 65FP-060100
- 65FP-065125
- 65FP-085125

Conrtrolling Axial Capacity of Plate

$P_n := Size \cdot kip = 260.42 \cdot kip$

Vertical Weld to Pole Check

QTY of stiffeners per flat plate	$n := 1$	
Stiffener thickness	$T := 1.25 \cdot in$	
Pole Grade	$Fy_{pole} := 65ksi$	$Fu_{pole} := 80ksi$
Base Plate Grade	$Fy_{base} := 60ksi$	$Fu_{base} := 75ksi$
Stiffener Grade	$Fy_{stiffener} := 65ksi$	$Fu_{stiffener} := 80ksi$
Stiffener height	$H := 48 \cdot in$	
	$Notch := .75 \cdot in$	
Stiffener width	$W := 6 \cdot in$	
Vertical fillet weld size (Stiffener to pole) in sixteenths of an inch	$D_{vpole} := 4$	$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{1}{4}$
Weld Material Grade	$F_{EXX} := 80ksi$	
Electrode Strength Coefficient	$C_1 := 1.03$	
Coefficient for eccentrically Loaded Weld Groups	$C := 3.73$	

Available Strength

$R_n = C \cdot C_1 \cdot D \cdot l$

$\frac{R_n}{\Omega_w} = P_n$

AISC 13th Edition Table 8-4

$\Omega_w := 2$

$ex := \frac{W}{2} = 3 \cdot in$

$l_{vweldpipe} := H - Notch = 47.25 \cdot in$

$a := \frac{ex}{H - Notch} = 0.06$

$k := 0$

$D_{min} := ceil\left[\frac{P_n \cdot \Omega_w}{C \cdot C_1 \cdot l_{vweldpipe} \cdot \left(\frac{kip}{in}\right)}\right] = 3$

$minweldsize := \frac{D_{min}}{16} = \frac{3}{16}$

$Check_{weld} := \begin{cases} "OK" & \text{if } D_{vpole} \geq D_{min} \\ "N/G" & \text{otherwise} \end{cases}$

$Check_{weld} = "OK"$

Stiffener Check

Local Lateral Torional Buckling Check

$\frac{W}{T} = 4.8$

$S := 0.56\sqrt{\frac{29000 \cdot ksi}{Fy_{stiffener}}} = 11.83$

AISC 13th Edition Section B4

$Check_{nonslender} := \begin{cases} "OK" & \text{if } S \geq \frac{W}{T} \\ "N/G" & \text{otherwise} \end{cases}$

Available Compression Strength

$A_{stiffener} := T \cdot W = 7.5 \cdot in^2$ $I_{stiffener} := \frac{W \cdot T^3}{12} = 0.98 \cdot in^4$ $r_{stiffener} := \sqrt{\frac{I_{stiffener}}{A_{stiffener}}} = 0.36 \cdot in$

$\Omega_c := 1.67$ $K := 1$ $L := 0.1in$

$$\frac{P_{n.c}}{\Omega_c} = \frac{F_{cr} \cdot A_g}{\Omega_c}$$

AISC 13th Edition E3-1/J4-6

$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{K \cdot L}{r_{stiffener}}\right)^2} = 3.73 \times 10^6 \cdot ksi$ $\frac{K \cdot L}{r_{stiffener}} = 0.28$

$$F_{ow} := \begin{cases} 0.658^{\frac{Fy_{stiffener}}{F_e}} \cdot Fy_{stiffener} & \text{if } \frac{K \cdot L}{r_{stiffener}} \le 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{Fy_{stiffener}}} \\ .877 \cdot F_e & \text{otherwise} \end{cases}$$

$F_{cr} = 65 \cdot ksi$

$$\Omega P_{nww} := \begin{cases} \frac{Fy_{stiffener} \cdot A_{stiffener}}{\Omega_c} & \text{if } \frac{K \cdot L}{r_{stiffener}} \le 25 \\ \frac{F_{cr} \cdot A_{stiffener}}{\Omega_c} & \text{otherwise} \end{cases}$$

$\Omega P_{n.c} = 291.91 \cdot kip$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } \Omega P_{n.c} \ge P_n \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{nonslender} = \text{"OK"}$ $Check_{comp} = \text{"OK"}$

APPENDIX D

REQUIRED MODIFICATION DRAWINGS

CROWN CASTLE

TOWER MODIFICATION DRAWINGS

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 845455

SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

FROM I-84 WEST: 9. TAKE EXIT 16 FOR CT-188 TOWARD SOUTHBURY 0.2 MI 10. TURN LEFT ONTO CT-188 S 2.3 MI 11. TURN LEFT ONTO CT-188 S/CT-67 S 0.1 MI 12. TAKE THE 1ST RIGHT ONTO CT-188 S DESTINATION WILL BE ON THE RIGHT. LANDLORED HAS UNLOCKED ACCESS ROAD GATE BEHIND HOUSE.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
JAMES WILLIAMS
(704) 405-6521
JAMES.WILLIAMS2@CROWNCASTLE.COM
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

2. CROWN PROJECT MANAGER
JERRY BRUNO
(781) 970-0069
JERRY.BRUNO.CONTRACTOR@CROWNCASTLE.COM
500 WEST CUMMINGS PARK, SUITE 3600
WOBURN, MA 01801

3. CROWN CONSTRUCTION MANAGER
JASON D'AMICO
(860) 209-0104
JASON.D'AMICO.VENDOR@CROWNCASTLE.COM
1200 MACARTHUR BLVD., SUITE 200
MAHWAH, NJ 07430

4. CROWN DESIGN ENGINEER (EOR)
JAMAL A. HUWEL, P.E.
(724) 416-2337
JAMAL.HUWEL@CROWNCASTLE.COM
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

TOWER INFORMATION

TOWER MANUFACTURER / DESIGN #:	PENNSUMMIT / DESIGN # 21533-R2
TOWER HEIGHT / TYPE:	149 FT MONOPOLE TOWER
TOWER LOCATION:	LAT 41° 23' 2.35"
DATUM: (NAD 1983)	LONG -73° 8' 14.54"
	ELEV 611 FT AMSL
STRUCTURAL DESIGN DRAWING:	CCI / WO # 933260
STRUCTURAL ANALYSIS REPORT:	PAUL J. FORD / WO # 922666
STRUCTURAL ANALYSIS DATE:	09/10/14
APPLICATION ID:	263999 REV # 1
CCISITES DOCUMENT ID:	5289775

CODE COMPLIANCE

THIS MODIFICATION DESIGN IS BASED ON THE REQUIREMENTS OF TIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES AND 2005 CT STATE BUILDING CODE WITH 2009 AMENDMENT USING A FASTEST MILE WIND SPEED OF 85 MPH WITH NO ICE, 37.6 MPH WITH .75 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

NO.	DATE	DESCRIPTION	BY
1	10/29/14	REVISED S-5 & S-6	BF

REVISIONS

STATE OF CONNECTICUT · JAMAL A. HUWEL · 28893 · LICENSED PROFESSIONAL ENGINEER · 10/29/14

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 845455
WO NUMBER: 933260
SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/10/14
DFT BY: TDG DATE: 10/10/14
DFT/QA BY: BF DATE: 10/29/14
APRVD BY: RAA DATE: 10/29/14
SCALE: N.T.S

TITLE PAGE

S-1 REV 1

MODIFICATION INSPECTION NOTES

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR APPROVAL
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10030
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK, LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS	

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

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 CROWN ENG-BUL-10173, "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 PURCHASE ORDER (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 CROWN 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 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 CROWN ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN 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 THE 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, NOR 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 AN 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 CROWN 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
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT · JAMIE A. DANIEL · 25893 · LICENSED PROFESSIONAL ENGINEER · 10/10/14

CROWN CASTLE

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 848456
WO NUMBER: 933280
SITE ADDRESS:
88 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/10/14
DFT BY: TDG DATE: 10/10/14
DFT/QA BY: BF DATE: 10/10/14
APRVD BY: RDA DATE: 10/30/14
SCALE: N.T.S.

MODIFICATION INSPECTION CHECKLIST

S-2 REV 0

GENERAL NOTES

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
2. THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
5. ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE CROWN CASTLE ENGINEER OF RECORD (EOR) AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
7. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
8. USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.
9. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
10. STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
11. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
12. ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
14. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
16. STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
17. DO NOT SCALE DRAWINGS.
18. THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE. THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE.
19. FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
20. MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
21. 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.

STRUCTURAL STEEL NOTES

1. DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO)
   - A. TIA-222, STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   - B. TIA-1019-A, INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   - C. AISC MANUAL OF STEEL CONSTRUCTION
2. ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO
   - A. STRUCTURAL STEEL: ASTM A572 GRADE 65 (FY = 65KSI)
   - B. ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS
   - C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS
   - D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
3. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
4. ALL FASTENERS SHALL NOT BE REUSED.
5. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.
6. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
7. HOT-DIP GALVANIZE ALL ITEMS, UNO.
   GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.
8. FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".
9. AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL".
2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
3. ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN ENG-PLN-10015, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.
4. FOR ALL WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.
5. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.
6. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.
7. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
8. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
9. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.

DETAIL DRAWINGS SHALL GOVERN OVER ANY VARIANCE FROM THIS SHEET

NO.	DATE	DESCRIPTION	BY

REVISIONS

CROWN CASTLE

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 845465
WO NUMBER: 933260
SITE ADDRESS:
86 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/DA BY: TS	DATE: 10/10/14
DFT BY: TDG	DATE: 10/10/14
DFT/QA BY: TDG	DATE: 10/30/14
APRVD BY: RAA	DATE: 10/30/14
SCALE: N.T.S	

NOTES

S-3 | REV 0

AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

M20 AJAX/DTI BOLT ASSEMBLY COMPONENT SPECIFICATIONS:

BOLT:
AJAX ONESIDE™ BLIND BOLT (M8.8, EQUIVALENT TO A325)
FINISH: HOT DIP GALVANIZED PER ASTM A153

SPLIT WASHER:
AJAX ONESIDE™ SPLIT WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153

SHEAR SLEEVE:
F_u = 120 KSI MIN. (ASTM A519)
29MM O.D. x 20MM I.D.
LENGTH = NOMINAL [GRIP-6MM] = [GRIP-0.25"] (TOL -0", +1/32")
SLEEVES SHALL BE ROUND, WITH ENDS CUT SQUARE AND DEBURRED.
FINISH: GALVANIZED (COLD GALVANIZED AS PER CROWN ENG-BUL-10149, HOT DIP GALVANIZED PER ASTM A123, MECHANICALLY GALVANIZED AND SPUN) OR CADMIUM PLATED.

SOLID WASHER:
AJAX ONESIDE™ SOLID WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153

DIRECT TENSION INDICATOR WASHER:
SQUIRTER® DTI, ASTM F959M
FINISH: COLD MECHANICALLY GALVANIZED (TO ASTM B695) AND EPOXY COATED

MANUFACTURER:
APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD, BELLOWS FALLS, VERMONT, USA 05101
PHONE: 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
http://www.appliedbolting.com/applied-bolting-distributors.html

FLAT WASHER:
HARDENED FLAT WASHER, ASTM F436M (MINIMUM HARDNESS RC38)
FINISH: COLD MECHANICALLY GALVANIZED

HEX NUT:
AJAX ONESIDE™ HEAVY HEX NUT
FINISH: HOT DIP GALVANIZED PER ASTM A153

BOLT ASSEMBLY AND INSTALLATION:
BOLT ASSEMBLY SHALL ADHERE TO THE REQUIREMENTS OF DETAIL 1.
NON-PETROLEUM BASED, WATER SOLUBLE, INERT BOLT LUBRICANT SHALL BE USED ON ALL AJAX BOLTS TO ENSURE PROPER TENSIONING OF THE ASSEMBLY. CARE SHOULD BE TAKEN TO ENSURE THE BOLT HEAD AND SPLIT WASHER ARE NOT LUBRICATED AS THIS MAY CAUSE EXCESSIVE BOLT SLIPPAGE UPON APPLYING TORQUE, WHICH MAY LEAD TO DIFFICULTIES IN ENGAGING THE SQUIRTER® DTI WASHER PROPERLY. **NOTE:** ONLY LUBRICATING THE THREADS OF THE NUT MAY ACHIEVE BETTER RESULTS.
THE TYPICAL RULE OF THUMB WHEN USING AN IMPACT WRENCH IS TO ENGAGE FOR NO MORE THAN 10 SECONDS. IF THE BOLT IS NOT SPINNING AND THE SQUIRTER ® DTI "BUMPS" HAVE NOT ENGAGED AFTER 10 SECONDS USING AN IMPACT WRENCH, REMOVE THE NUT AND REAPPLY LUBRICANT. **NOTE:** PROLONGED USE OF THE IMPACT WRENCH TENDS TO HEAT THE BOLT THREAD/NUT, THEREBY, INCREASING FRICTION ON THE THREADS WHICH WOULD REQUIRE ADDITIONAL TORQUE. HOLDING FOR LONGER THAN 10 SECONDS CAN BE COUNTERPRODUCTIVE.

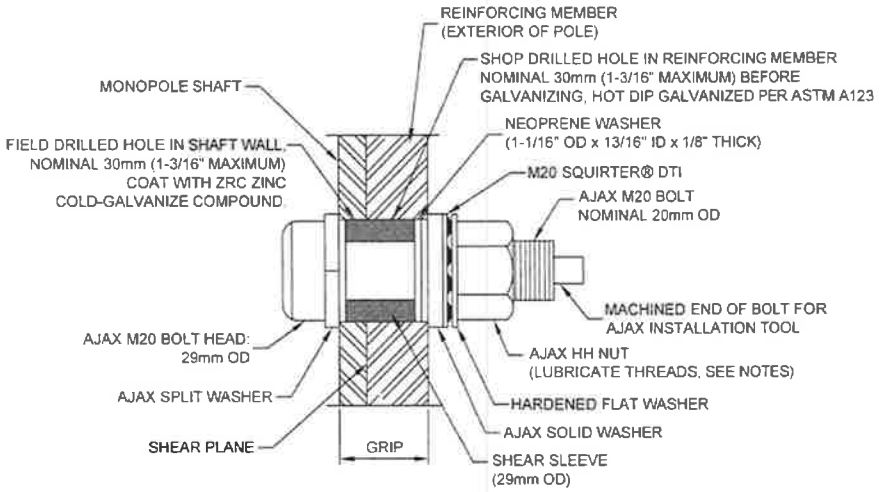
A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI "BUMPS" SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE END CONNECTION OF REINFORCING MEMBERS. INTERMEDIATE BOLTS SHALL ENGAGE A MINIMUM OF 3 OUT OF 5 SQUIRTER® DTI "BUMPS".

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

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

INSPECTION:
VISUALLY INSPECT ALL BOLT ASSEMBLIES TO ENSURE THE MINIMUM "BUMP" ENGAGEMENT AS DEFINED IN THE SECTION "BOLT ASSEMBLY AND INSTALLATION" HAS BEEN ACHIEVED. FOR MORE INFORMATION ON INSPECTION, SEE THE MANUFACTURER'S GUIDELINES.
WHERE FEASIBLE, CHECK A SAMPLE OF THE END CONNECTION DTI WASHERS WITH THE APPROPRIATE FEELER GAGE. IF THE FEELER GAGE CANNOT BE INSERTED TO THE BOLT SHANK HALF WAY AROUND THE BOLT, THE INSTALLATION IS OKAY. IF YOU CAN INSERT THE FEELER GAGE TO THE SHANK ALL THE WAY AROUND THE BOLT, THE INSTALLATION IS NOT OKAY. IF YOU FIND MORE THAN ONE SUCH "NOT OKAY" BOLT IN ANY ONE END CONNECTION, CHECK ALL BOLTS IN THAT END CONNECTION. A MINIMUM OF THREE BOLTS SHALL BE CHECKED IN EACH END CONNECTION. PHOTOS SHALL BE TAKEN TO INDICATE THE BOLTS TESTED.

ALL BOLT ASSEMBLIES AND DTI WASHERS SHALL BE VISUALLY INSPECTED. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI WASHERS.



DETAIL 1: M20 AJAX/DTI BOLT ASSEMBLY

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

CROWN CASTLE

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 846488
WO NUMBER: 933260
SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/10/14
DFT BY: TDG DATE: 10/10/14
DFT/QA BY: BF DATE: 10/30/14
APRV'D BY: RAA DATE: 10/30/14
SCALE: N.T.S.

STATE OF CONNECTICUT
RAUL A. PINIEL
28863
LICENSED
PROFESSIONAL ENGINEER
10/30/14

AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

S-4 | REV 0

POLE ELEVATION

POLE SPECIFICATIONS

POLE SHAPE TYPE	18-SIDED POLYGON
TAPER	0.172987 IN/FT
SHAFT STEEL	ASTM A607 GRADE 65
BASE PL STEEL	ASTM A572 (60 KSI)
ANCHOR RODS	2 1/4"Ø #18 / ASTM A615 GRADE 75

POLE MODIFICATION SCHEDULE

		ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
1	A	0.5 - 110.5	INSTALL NEW FLAT PLATE REINFORCEMENT	S-5
	B	0	ADD (4) 2 1/4"Ø A193 GR. B7 ANCHOR RODS EMBEDDED 5'-6" W/ ANCHOR ROD BRACKETS	S-6
	C	0	ADD (4) 1 1/4" THK TRANSITION STIFFENERS	S-6
	D	99.0	ABANDONED MOUNT TO BE REMOVED	S-5
	E	109.0	ABANDONED MOUNT TO BE REMOVED	S-5

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	37.50	0.1875	45	23.000	29.487
2	40.00	0.2188	54	29.463	35.393
3	40.00	0.2813	63	34.167	41.086
4	45.00	0.3750		39.616	47.400

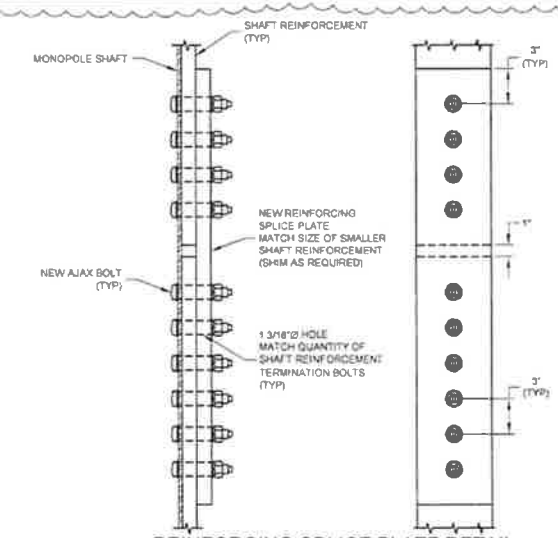
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

NOTES FOR CROWN REINFORCING (65 KSI) MATERIAL:

1. DO NOT WELD WITHOUT APPROVAL FROM THE EOR
2. 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.
3. ALL FLAT PLATE REINFORCEMENT IS TO BE INSTALLED CENTERED ON ITS DESIGNATED FLAT, UNO.
4. SEE CMRP 65 KSI PARTS CATALOG 2nd EDITION FOR PART DETAILS
5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER THE AISC TURN-OF-NUT METHOD
6. ON MULTISIDED POLES, EXISTING SAFETY CLIMB IS CONSIDERED FLAT 1 THEN FLATS ARE NUMBERED COUNTER CLOCKWISE
7. CLIMBING PEGS TO BE RELOCATED AS REQUIRED

CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	PART NUMBER	FLAT / DEGREES (°)	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAX INTERMEDIATE BOLT SPACING	AJAX BOLT QUANTITY PER PLATE	STEEL WEIGHT PER PLATE (BLACK)	TOTAL AJAX BOLT QUANTITY	TOTAL STEEL WEIGHT (BLACK)
0'-6"	35'-6"	CCI-SFP-06512535	3, 8, 12, & 17	11	11	1'-7"	40	966.9	160	3867.6
35'-6"	70'-6"	CCI-SFP-06512535	3, 8, 12, & 17	11	11	1'-7"	40	966.9	160	3867.6
70'-6"	90'-6"	CCI-AFP-06010020	3, 8, 12, & 17	10	10	1'-4"	31	408.0	124	1632.0
85'-0"	110'-0"	CCI-AFP-06010025	6 & 18	10	10	1'-4"	34	510.0	68	1020.0
90'-6"	110'-6"	CCI-AFP-06010020	12	10	10	1'-4"	31	408.0	31	408.0
								TOTAL	543	10795.2



REINFORCING SPLICE PLATE DETAIL

(STEEL GRADE A572-65)

NO.	DATE	DESCRIPTION	BY
1	10/29/14	REVISED DESIGN	BF

REVISIONS

CROWN CASTLE

SITE NAME: OXFORD-QUAKER FARMS

BU NUMBER: 845456

WO NUMBER: 933260

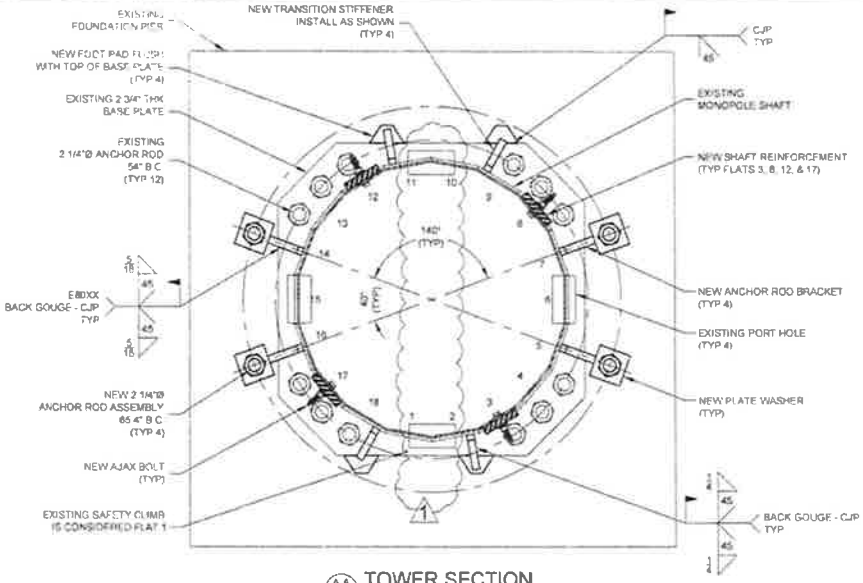
SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/QA BY	TS	DATE 10/10/14
DFT BY	TDG	DATE 10/10/14
DFT/QA BY	BF	DATE 10/29/14
APRV'D BY	RAA	DATE 10/29/14

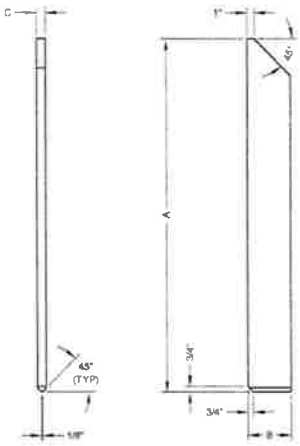
SCALE: N.T.S.

POLE MODIFICATION SCHEDULE

S-5 REV 1

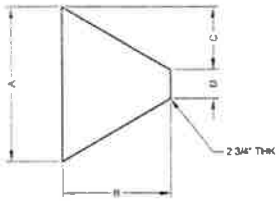


TOWER SECTION



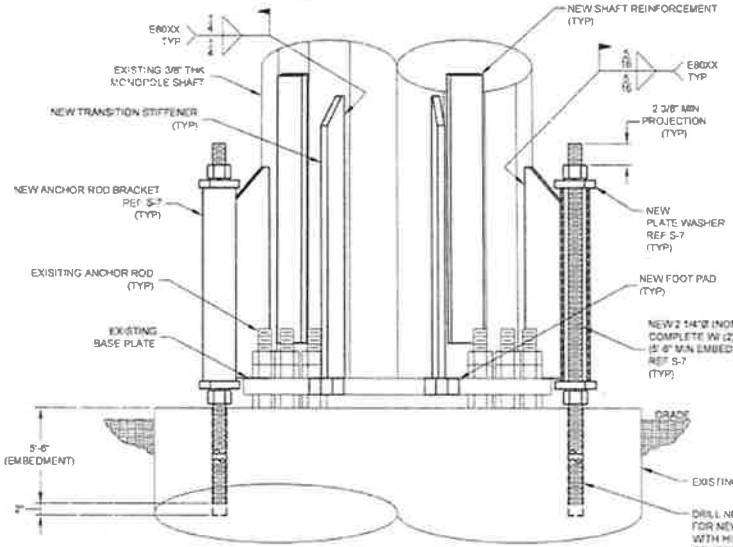
TRANSITION STIFFENER

WEIGHT (#)	A (in)	B (in)	C (in)	STEEL GRADE
97.5	48"	8"	1 1/4"	A572-65



FOOT PAD

WEIGHT (#)	A (in)	B (in)	C (in)	D (in)	STEEL GRADE
9.3	8"	3"	2"	2"	A572-50



ELEVATION VIEW

NOTES

1. TAKE ALL MEASUREMENTS NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY CROWN CASTLE IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENTS TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.
2. NEW 2 1/4"Ø ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN & GROUT HAVE CURED, NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 190.0 KIPS. SEE ENG-PRC-10119 PULL-OUT TESTING POST-INSTALLED ANCHOR RODS. FOR SPECIFICATIONS. TIGHTEN ALL HEAVY HEX NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

NO.	DATE	DESCRIPTION	BY
1	10/29/14	REVISED PORT HOLE LOCATIONS	BF

REVISIONS

CROWN CASTLE

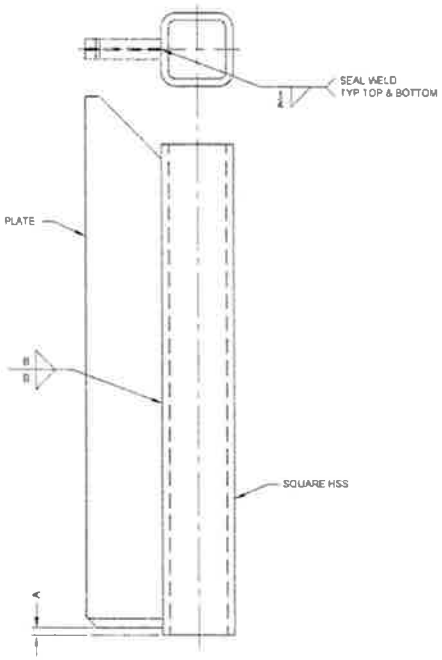
SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 846466
WO NUMBER: 933260
SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/DA BY: TS	DATE	10/10/14
DFT BY: TDG	DATE	10/10/14
DFT/DA BY: BF	DATE	10/29/14
APRV'D BY: RAA	DATE	10/29/14

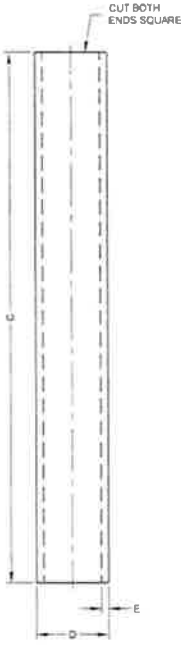
SCALE: N.T.S.

TOWER SECTION

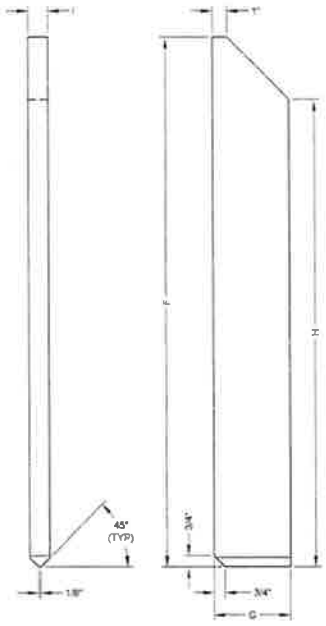
S-6 REV 1



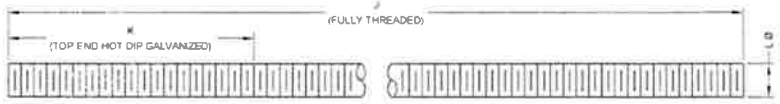
ANCHOR ROD BRACKET ASSEMBLY



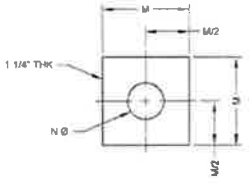
SQUARE HSS



PLATE



ANCHOR ROD



WASHER

	ASSEMBLY		SQUARE HSS			PLATE				ANCHOR ROD			WASHER	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	1/2"	3/8"	2'-9"	5"	1/2"	3'-0"	8 1/2"	2'-8"	1 1/4"	9'-6"	4'-3"	2 1/4"	5 1/2"	2 1/2"
QUANTITY	4		4			4				4			8	
WEIGHT (#)	155.1		78.2			76.9				118.3			9.0	
MATERIAL			A500 GRADE B (46 KSI)			A572-65				A193 GRADE B7			A572-65	

NOTE
1 ALL HOLES TO BE SHOP FABRICATED, UNLESS NOTED OTHERWISE.

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

CROWN CASTLE

SITE NAME: OXFORD-QUAKER FARMS
BU NUMBER: 846456
WO NUMBER: 833280
SITE ADDRESS:
85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/10/14
DFT BY: TDG DATE: 10/10/14
DFT/QA BY: BF DATE: 10/20/14
APRVD BY: RAA DATE: 10/20/14
SCALE: N.T.S

DETAILS

S-7 REV 0