Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

December 23, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
52 New Britain Avenue, Rocky Hill, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 90-foot level of the existing 182-foot tower at 52 New Britain Avenue in Rocky Hill, Connecticut (the "Property"). The tower is owned by Crown Castle. Cellco has been sharing the New Britain Avenue tower since 2001. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model BXA-70080-4BF, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 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 of the monopole tower. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Guy Scaife, Rocky Hill's Town Manager. The Town of Rocky Hill is the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 90-foot level.

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 can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Guy Scaife, Rocky Hill Mayor
Sandy M. Carter

ATTACHMENT 1

BXA-70080-4BF-EDIN-X

X-Pol | FET Panel | 80° | 12.0 dBd

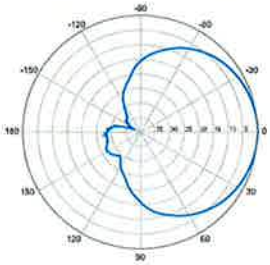
Replace "X" with desired electrical downtilt.

Antenna is also available with N connector(s). Replace "EDIN" with "N" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	82°	80°
Vertical beamwidth	17°	15°
Gain	11.5 dBd (13.6 dBi)	12.0 dBd (14.1 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-11.8 dB	-13.1 dB
Front-to-back ratio (+/-30°)	-30.3 dB	-36.7 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with N connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or N / Female / Bottom	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1125 x 204 x 150 mm	44.3 x 8.0 x 5.9 in
Depth with z-brackets	190 mm	7.5 in
Weight without mounting brackets	4.5 kg	9.8 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.23 m² Side: 0.17 m²	Front: 2.5 ft² Side: 1.8 ft²
Wind load @ 161 km/hr (100 mph)	Front: 330 N Side: 279 N	Front: 74 lbf Side: 63 lbf

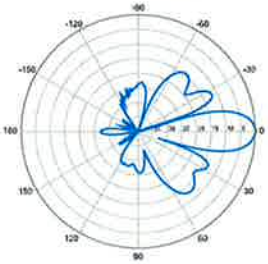
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-4BF-EDIN-X-FP		

BXA-70080-4BF-EDIN-X



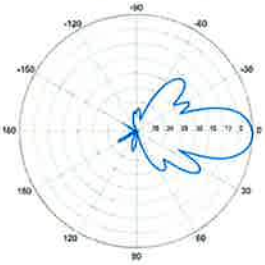
Horizontal | 750 MHz

BXA-70080-4BF-EDIN-0

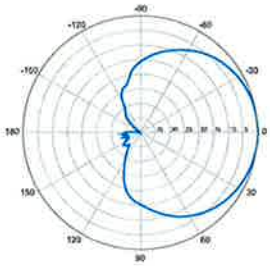


0° | Vertical | 750 MHz

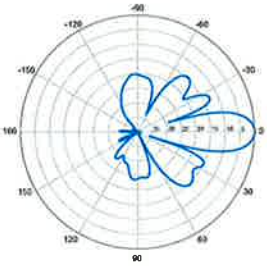
BXA-70080-4BF-EDIN-2



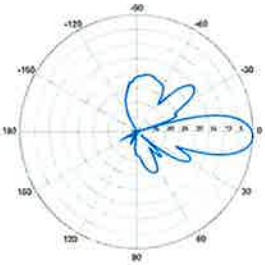
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



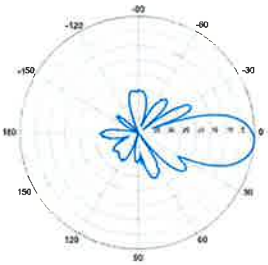
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70080-4BF-EDIN-X

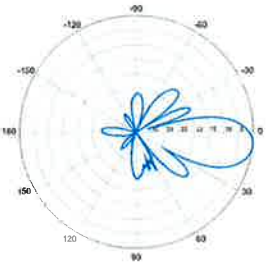
X-Pol | FET Panel | 80° | 12.0 dBd

BXA-70080-4BF-EDIN-4



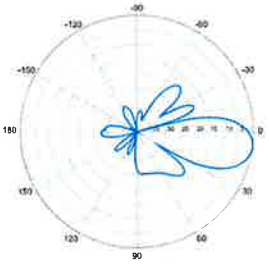
4° | Vertical | 750 MHz

BXA-70080-4BF-EDIN-6

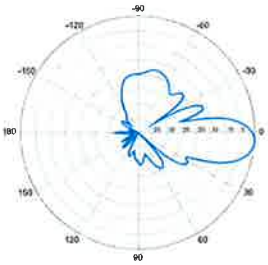


6° | Vertical | 750 MHz

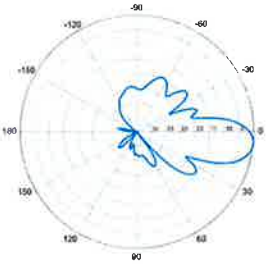
BXA-70080-4BF-EDIN-8



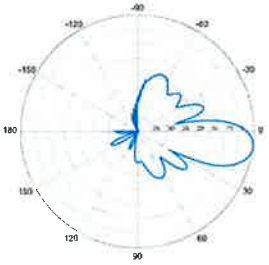
8° | Vertical | 750 MHz



4° | Vertical | 850 MHz

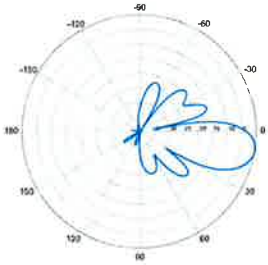


6° | Vertical | 850 MHz



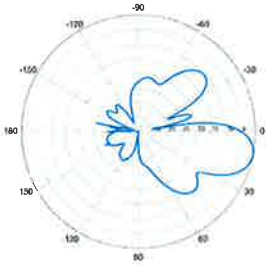
8° | Vertical | 850 MHz

BXA-70080-4BF-EDIN-10



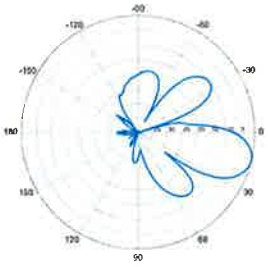
10° | Vertical | 750 MHz

BXA-70080-4BF-EDIN-12

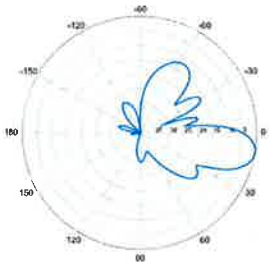


12° | Vertical | 750 MHz

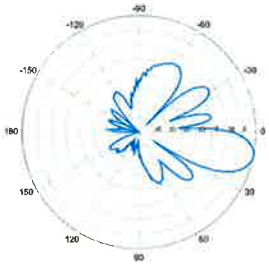
BXA-70080-4BF-EDIN-14



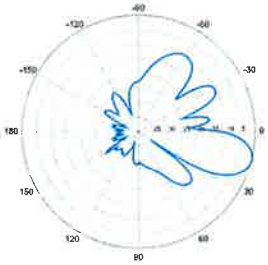
14° | Vertical | 750 MHz



10° | Vertical | 850 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

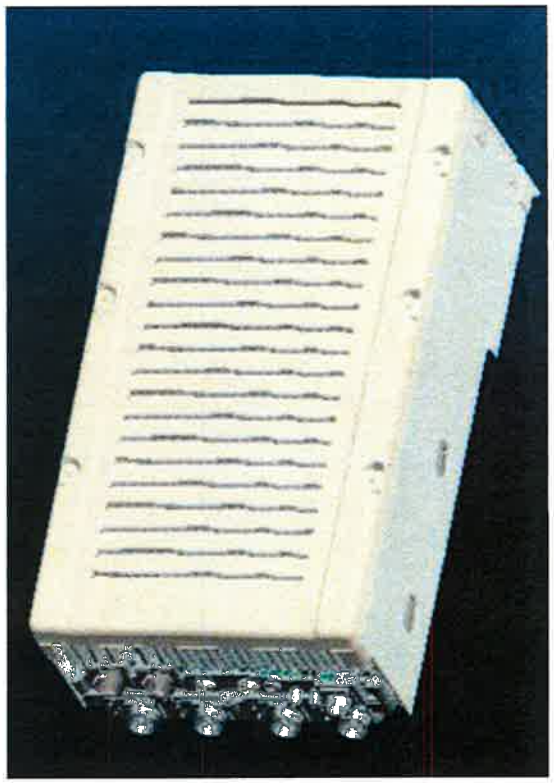
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
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.

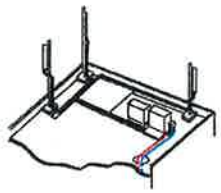
EASY INSTALLATION

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.

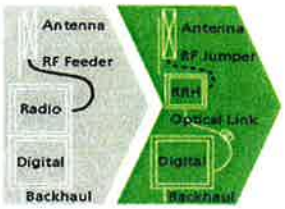
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

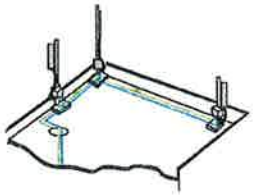
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

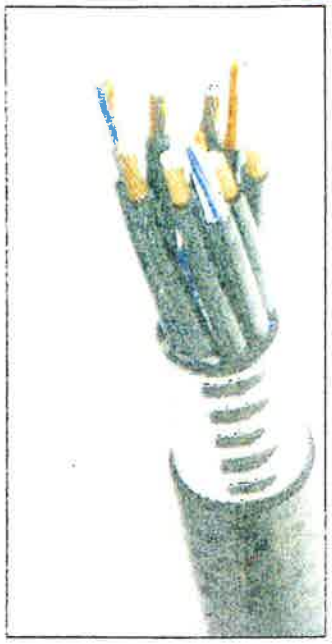


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

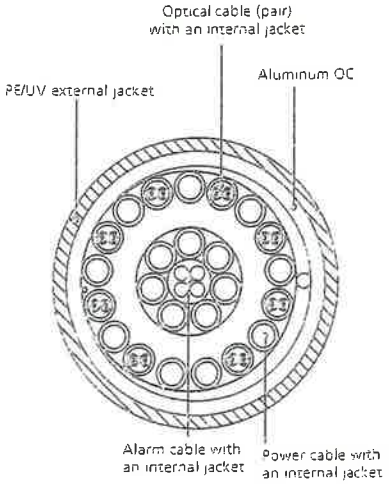


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Rocky Hill 3								
Tower Height: 182ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile LTE	2	24	160	0.0007	2100	1.0000	0.07%	
*T-Mobile GSM/UMTS	2	12	160	0.0003	1950	1.0000	0.03%	
*T-Mobile UMTS	2	12	160	0.0003	2100	1.0000	0.03%	
*AT&T UMTS	2	565	168	0.0144	880	0.5867	2.45%	
*AT&T UMTS	2	875	168	0.0223	1900	1.0000	2.23%	
*AT&T GSM	1	283	168	0.0036	880	0.5867	0.61%	
*AT&T GSM	4	525	168	0.0268	1900	1.0000	2.68%	
*AT&T LTE	1	1313	168	0.0167	734	0.4893	3.42%	
*Police			180				1.00%	
*Fire			180				1.00%	
*Sprint CDMA/LTE	2	693	140	0.0254	1900	1.0000	2.54%	
*Sprint CDMA/LTE	1	390	140	0.0072	850	0.5667	1.26%	
*Sprint CDMA/LTE	2	693	140	0.0254	2500	1.0000	2.54%	
*Clearwire	2	153	140	0.0056	2496	1.0000	0.56%	
*Clearwire	1	211	144	0.0037	11 GHz	1.0000	0.37%	
Verizon PCS	**11**	**470**	**90**	**0.2295**	**1970**	**1.0000**	**22.95%**	
Verizon Cellular	**9**	**422**	**90**	**0.1686**	**869**	**0.5793**	**29.10%**	
Verizon AWS	**1**	**1750**	**90**	**0.0777**	**2145**	**1.0000**	**7.77%**	
Verizon 700	**1**	**1050**	**90**	**0.0466**	**746**	**0.4973**	**9.37%**	
								90.01%
* Source: Siting Council								

ATTACHMENT 3

October 17, 2014

Susan Allen
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209-8234

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Rocky Hill 3, CT
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	842872 Rocky Hill 309332 938839 266636 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	95171.001.01
Site Data:	**52 New Britain Avenue, Rocky Hill, Hartford County, CT** **Latitude *41° 39' 36.89"*, Longitude *-72° 40' 50.58"*** **182 Foot - Monopole Tower**	

Dear Susan Allen,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 711950, in accordance with application 266636, revision 0.

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

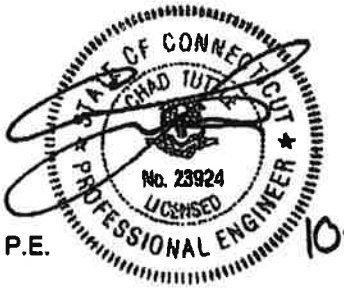
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

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

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

Respectfully submitted by:
B+T Engineering, Inc.



10-17-14

Leena Kantheti, E.I.T.
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 182 ft Monopole tower designed by Engineered Endeavors, Inc. in September of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This tower has been modified by B+T Group in June and May 2013, 2014 and those modifications are incorporated 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 80 mph with no ice, 37.6 mph with 1 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
88.0	90.0	3	Alcatel Lucent	RRH2X60-AWS	2	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-A2M			
		3	Antel	BXA-70080-4BF-EDIN-0			
		2	Rfs Celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	191.0	1	Austin Antenna Company	APC-1362	7	7/8	1
		1	Austin Antenna Company	APC-2163			
		1	Austin Antenna Company	APC-301			
		1	Austin Antenna Company	APC-4065			
		2	Rfs Celwave	PD458-3			
	180.0	1	--	Side Arm Mount [SO 702-3]			
	175.0	1	Telewave	ANT450D6-9			
	178.0	2	Radiowaves	HPD2-4.7	4	7/8	2
170.0	168.0	6	Ericsson	RRUS-11	12	1-5/8	1
		3	Kmw Comm.	AM-X-CD-16-65-00T-RET			
		3	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP21401			
		1	Raycap	DC6-48-60-18-8CF			
	170.0	1	--	Platform Mount [LP 712-1]			
160.0	160.0	3	Ems Wireless	RR90-17-02DP	12 1	1-5/8 1-1/4	1
		6	Ericsson	AIR21			
		3	Rfs Celwave	ATMAA1412D-1A20			
		1	--	Platform Mount [LP 305-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	144.0	2	Andrew	VHLP2.5-10W	3 4	1-1/4 1/2	1
		2	Dragonwave	Horizon Compact			
	140.0	3	Kathrein	840 10054			
		3	Samsung Telecom.	URAS-FLEXIBLE			
		3	Alcatel Lucent	1900MHz RRH			
		3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER			
		3	Alcatel Lucent	800MHZ RRH			
		3	Rfs Celwave	APXVSPP18-C-A20			
		1	--	Platform Mount [LP 1201-1]			
		3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	2
		3	Rfs Celwave	APXVTM14-C-120			
88.0	90.0	**6**	**Decibel**	**DB844H80-XY**	**1**	**1/2**	**3**
		3	**Rymsa Wireless**	**MG D3-900TX**			
		1	Andrew	LNX-6514DS-T6M	12	1-5/8	1
		2	Antel	BXA-70063/8CF-EDIN-4			
		6	Rfs	FD9R6004/2C-3L			
	88.0	1	--	Platform Mount [LP 1201-1]			
75.0	75.0	1	Gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180	180	6	Cellwave	Omni ANT.	--	--
		1	Generic	T-Mounts		
170	170	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		
160	160	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		
150	150	12	Allgon	7184.15	--	--
		1	Generic	STD. Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Rev # 0	266636	CCI Sites
Tower Manufacturer Drawing	EEI, Job No: 5554	4844402	CCI Sites
Tower Modification Drawing	B+T Group, Project No: 84446.002	4740398	CCI Sites
Tower Modification Drawing	B+T Group, Project No: 84502.004.01	4904956	CCI Sites
Post Modification inspection	B+T Group Project No: 84502.007.01	4904967	CCI Sites
Foundation Drawing	TEP, Job No:131650	4713252	CCI Sites
Geotech Report	TEP, Project No: 131650.10	4713251	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 09/29/2014	CCI Sites

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.

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	182 - 133.08	Pole	TP26.02x14.5x0.25	1	-9.427	1025.753	74.1	Pass
L2	133.08 - 87.46	Pole	TP36.15x24.616x0.375	2	-16.779	2140.225	82.8	Pass
L3	87.46 - 85	Pole	TP35.97x34.213x0.375	3	-21.860	2202.516	89.9	Pass
L4	85 - 74	Pole	TP38.529x35.97x0.501	4	-25.449	2689.927	84.0	Pass
L5	74 - 42.88	Pole	TP45.77x38.529x0.51	5	-33.568	2935.239	95.5	Pass
L6	42.88 - 0	Pole	TP55x43.566x0.438	6	-49.342	3900.971	95.2	Pass
							Summary	
						Pole (L6)	95.5	Pass
						Rating =	95.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	98.2	Pass
1	Base Plate	Base	82.1	Pass
1	Base Foundation	Base	90.8	Fail

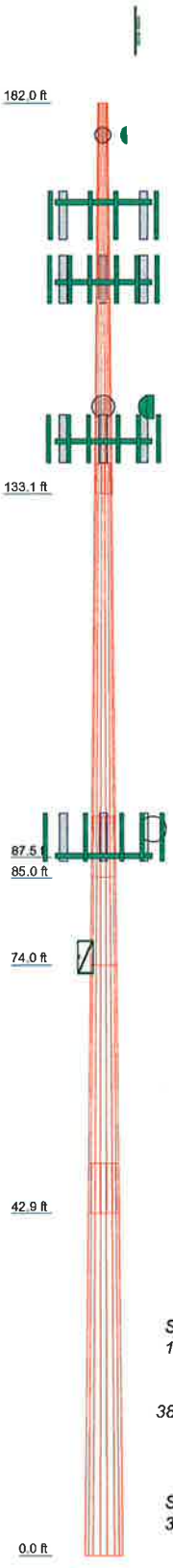
Structure Rating (max from all components) =	98.2%

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5	6
Length (ft)	48.920	49.460	7.550	11.000	31.120	49.130
Number of Sides	18	18	18	18	18	18
Thickness (in)	0.250	0.375	0.375	0.534	0.483	0.438
Socket Length (ft)	3.840	5.090			6.250	
Top Dia (in)	14.500	24.616	34.213	35.970	38.529	43.566
Bot Dia (in)	26.020	36.150	35.970	38.529	45.770	55.000
Grade	A572-65			52.272567ksi		54.641379ksi A572-65
Weight (K)	2.6	6.0	1.1	2.3	7.0	11.3

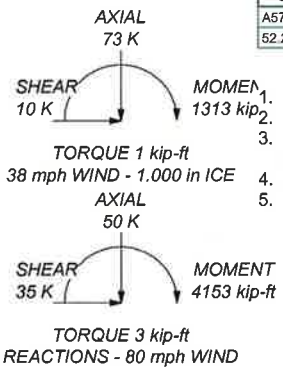
Total Weight (K) 30.3

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD458-3 (E)	180	800 EXTERNAL NOTCH FILTER (E)	140
APC-2163 (E)	180	800 EXTERNAL NOTCH FILTER (E)	140
PD458-3 (E)	180	800 EXTERNAL NOTCH FILTER (E)	140
APC-1362 (E)	180	APXVTM14-C-120 w/ Mount Pipe (R)	140
APC-301 (E)	180	APXVTM14-C-120 w/ Mount Pipe (R)	140
APC-4065 (E)	180	APXVTM14-C-120 w/ Mount Pipe (R)	140
ANT450D6-9 (E)	180	TD-RRH8x20-25 (R)	140
(2) 6' x 2" Mount Pipe (E)	180	TD-RRH8x20-25 (R)	140
(2) 6' x 2" Mount Pipe (E)	180	TD-RRH8x20-25 (R)	140
(2) 6' x 2" Mount Pipe (E)	180	Horizon Compact (E)	140
Side Arm Mount [SO 702-3] (E)	180	Horizon Compact (E)	140
HPD2-4.7 (R)	180	URAS-FLEXIBLE (E)	140
HPD2-4.7 (R)	180	URAS-FLEXIBLE (E)	140
7770.00 w/ Mount Pipe (E)	170	URAS-FLEXIBLE (E)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	6' x 2" Mount Pipe (E)	140
		6' x 2" Mount Pipe (E)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	6' x 2" Mount Pipe (E)	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	170	Platform Mount [LP 1201-1] (E)	140
		APXVSPP18-C-A20 w/ Mount Pipe (E)	140
(2) LGP21401 (E)	170	APXVSPP18-C-A20 w/ Mount Pipe (E)	140
(2) LGP21401 (E)	170	VHLP2.5-10W (E)	140
(2) LGP21401 (E)	170	VHLP2.5-10W (E)	140
(2) RRUS-11 (E)	170	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (P)	88
(2) RRUS-11 (E)	170	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (P)	88
(2) RRUS-11 (E)	170		
DC6-48-60-18-8CF (E)	170	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	88
6' x 2" Mount Pipe (E)	170		
6' x 2" Mount Pipe (E)	170	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	88
6' x 2" Mount Pipe (E)	170		
Platform Mount [LP 712-1] (E)	170	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	88
7770.00 w/ Mount Pipe (E)	170		
7770.00 w/ Mount Pipe (E)	170	(2) FD9R6004/2C-3L (E)	88
RR90-17-02DP w/ Mount Pipe (E)	160	(2) FD9R6004/2C-3L (E)	88
(2) AIR21 w/Mount Pipe (E)	160	(2) FD9R6004/2C-3L (E)	88
(2) AIR21 w/Mount Pipe (E)	160	DB-T1-6Z-8AB-0Z (P)	88
(2) AIR21 w/Mount Pipe (E)	160	DB-T1-6Z-8AB-0Z (P)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-AWS (P)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-AWS (P)	88
ATMAA1412D-1A20 (E)	160	RRH2X60-AWS (P)	88
Platform Mount [LP 305-1] (E)	160	RRH2X60-PCS (P)	88
RR90-17-02DP w/ Mount Pipe (E)	160	RRH2X60-PCS (P)	88
RR90-17-02DP w/ Mount Pipe (E)	160	RRH2X60-PCS (P)	88
APXVSPP18-C-A20 w/ Mount Pipe (E)	140	Platform Mount [LP 1201-1] (E)	88
840 10054 w/ Mount Pipe (E)	140	BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	88
840 10054 w/ Mount Pipe (E)	140		
840 10054 w/ Mount Pipe (E)	140	BXA-70063-6CF-EDIN-4 w/ Mount Pipe (E)	88
1900MHz RRH (E)	140	LNX-6514DS-T6M w/ Mount Pipe (E)	88
1900MHz RRH (E)	140	BXA-70080-4BF-EDIN-0 w/ Mount Pipe (P)	88
1900MHz RRH (E)	140		
800MHZ RRH (E)	140	GPS_A (E)	75
800MHZ RRH (E)	140	Side Arm Mount [SO 701-1] (E)	75
800MHZ RRH (E)	140		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	54.641379ksi	55 ksi	70 ksi
52.272567ksi	52 ksi	67 ksi			



TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.5%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

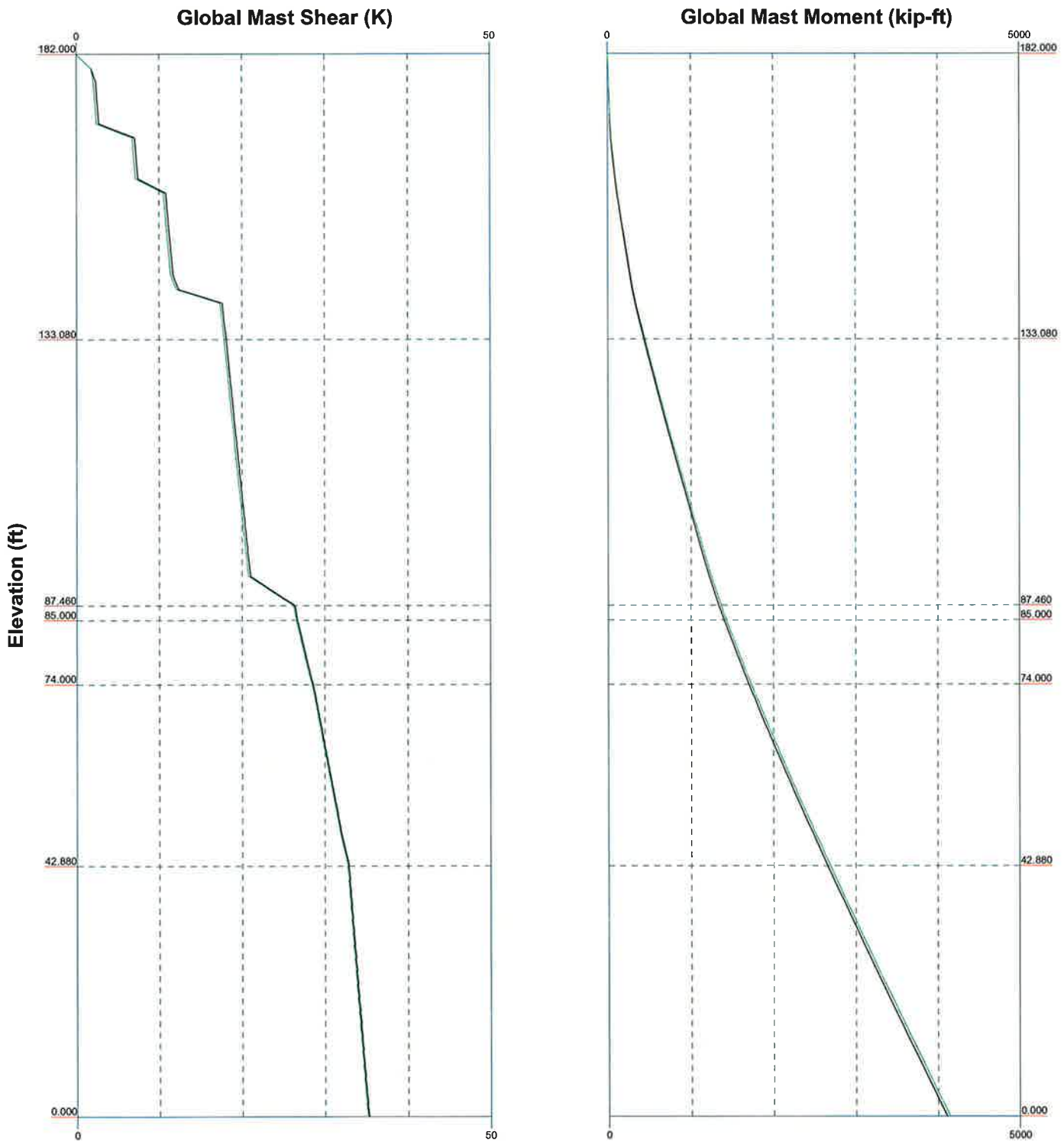
Job: 95171.001.01- Rocky Hill,CT (BU# 842872)			
Project:			
Client: Crown Castle	Drawn by: Lkantheti	App'd:	
Code: TIA/EIA-222-F	Date: 10/02/14	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx Vz

Maximum Values

Mx Mz

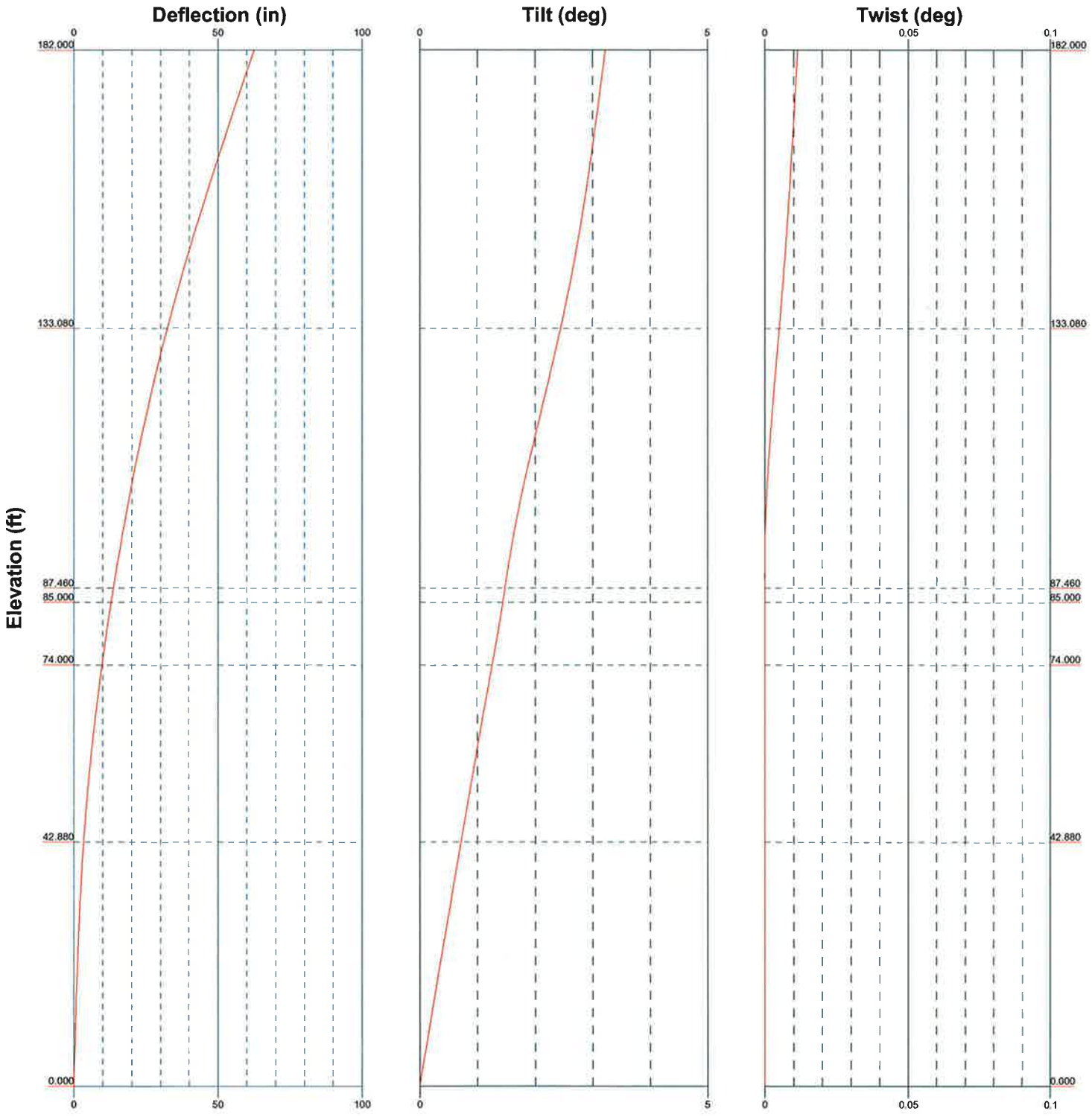


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 95171.001.01- Rocky Hill,CT (BU# 842872)			
Project:			
Client: Crown Castle	Drawn by: Lkantheti	App'd:	
Code: TIA/EIA-222-F	Date: 10/02/14	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values

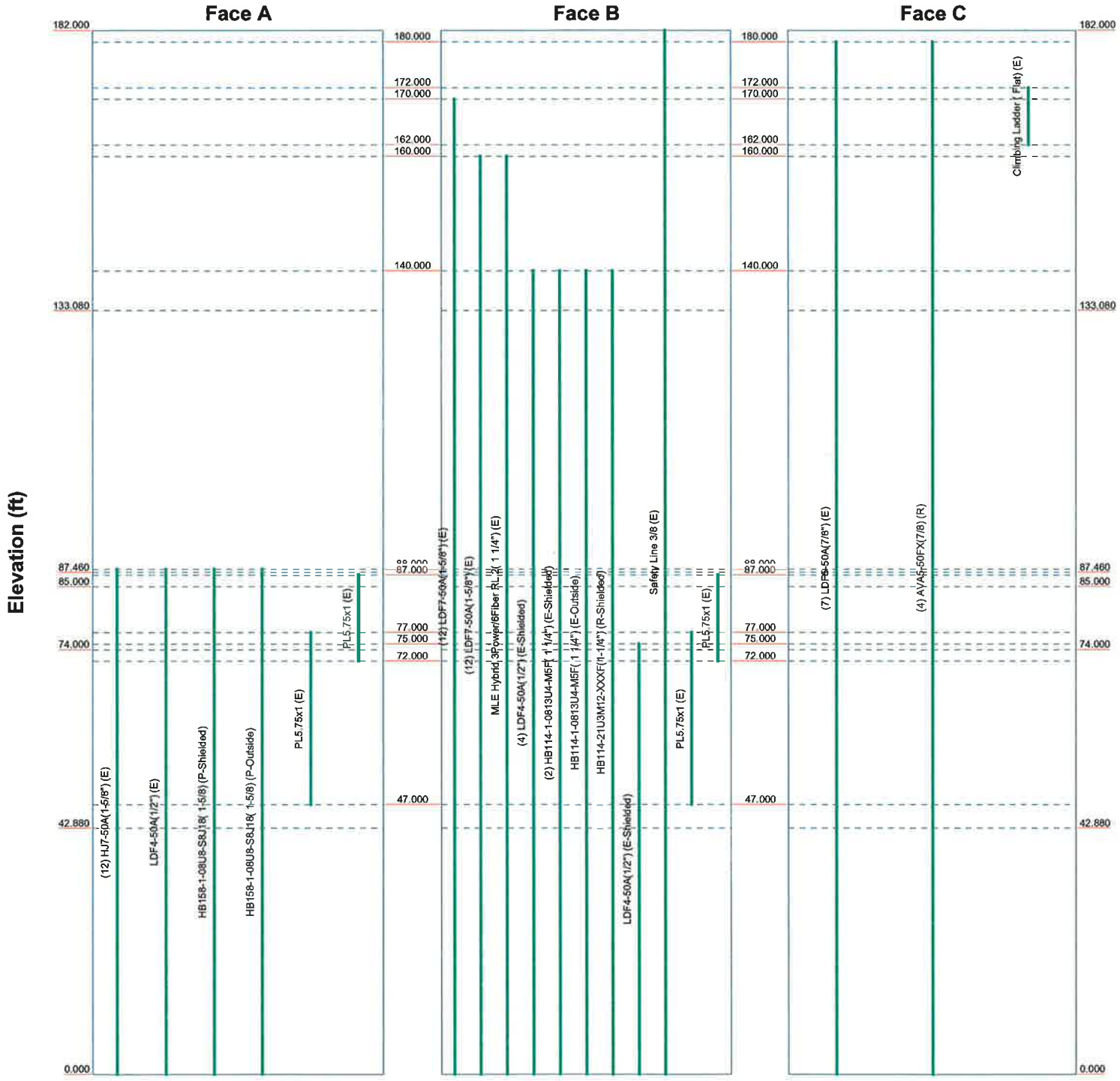


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 95171.001.01- Rocky Hill,CT (BU# 842872)			
Project:			
Client: Crown Castle	Drawn by: Lkantheti		App'd:
Code: TIA/EIA-222-F	Date: 10/02/14		Scale: NTS
Path:			Dwg No. E-5

Feed Line Distribution Chart
0' - 182'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***95171.001.01- Rocky Hill,CT (BU# 842872)***		
Project:			
Client: Crown Castle		Drawn by: Lkantheti	App'd:
Code: TIA/EIA-222-F		Date: 10/02/14	Scale: NTS
Path:			Dwg No. E-7

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

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	182.000-133.080	48.920	3.840	18	14.500	26.020	0.250	1.000	A572-65 (65 ksi)
L2	133.080-87.460	49.460	5.090	18	24.616	36.150	0.375	1.500	A572-65 (65 ksi)
L3	87.460-85.000	7.550	0.000	18	34.213	35.970	0.375	1.500	A572-65 (65 ksi)
L4	85.000-74.000	11.000	0.000	18	35.970	38.529	0.534	2.134	52.272567ksi (52 ksi)
L5	74.000-42.880	31.120	6.250	18	38.529	45.770	0.483	1.931	54.641379ksi (55 ksi)
L6	42.880-0.000	49.130		18	43.566	55.000	0.438	1.750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.724	11.307	290.087	5.059	7.366	39.382	580.557	5.655	2.112	8.448
	26.421	20.448	1715.646	9.148	13.218	129.795	3433.549	10.226	4.140	16.558
L2	25.905	28.853	2141.967	8.605	12.505	171.292	4286.753	14.429	3.672	9.793
	36.708	42.581	6885.168	12.700	18.364	374.923	13779.397	21.295	5.702	15.206
L3	35.943	40.276	5826.254	12.012	17.380	335.224	11660.174	20.142	5.361	14.297
	36.525	42.367	6781.588	12.636	18.273	371.134	13572.100	21.187	5.671	15.122
L4	36.525	60.007	9519.850	12.580	18.273	520.990	19052.227	30.009	5.392	10.106
	39.124	64.341	11735.182	13.488	19.573	599.566	23485.805	32.176	5.842	10.95
L5	39.124	58.298	10661.446	13.506	19.573	544.707	21336.921	29.154	5.931	12.287
	46.476	69.393	17980.596	16.077	23.251	773.320	35984.851	34.703	7.206	14.926

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
L6	45.715	59.889	14073.714	15.311	22.131	635.916	28165.947	29.950	6.898	15.766
	55.848	75.767	28497.398	19.370	27.940	1019.950	57032.294	37.891	8.910	20.366

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 182.000-133.080				1	1	1		
L2 133.080-87.460				1	1	1		
L3 87.460-85.000				1	1	1		
L4 85.000-74.000				1	1	0.974492		
L5 74.000-42.880				1	1	1.03619		
L6 42.880-0.000				1	1	1		

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 klf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
LDF5-50A(7/8") (E)	C	No	Inside Pole	180.000 - 0.000	0.000	0	7	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
AVA5-50FX(7/8) (R)	C	No	Inside Pole	180.000 - 0.000	0.000	0	4	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000 0.000
//										
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	170.000 - 0.000	0.000	0	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001 0.001
Climbing Ladder (Flat) (E)	C	No	CaAa (Out Of Face)	172.000 - 162.000	24.000	0	1	No Ice 1/2" Ice 1" Ice	0.584 1.030 1.476	0.005 0.007 0.010

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
								2" Ice	2.368	0.020
								4" Ice	4.151	0.049
//										
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	160.000 - 0.000	0.000	0	12	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
MLE Hybrid 3Power/6Fiber RL 2(1 1/4") (E)	B	No	Inside Pole	160.000 - 0.000	0.000	0	1	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
//										
LDF4-50A(1/2") (E-Shielded)	B	No	Inside Pole	140.000 - 0.000	0.000	0	4	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
HB114-1-081 3U4-M5F(1 1/4") (E-Shielded)	B	No	Inside Pole	140.000 - 0.000	0.000	0	2	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
HB114-1-081 3U4-M5F(1 1/4") (E-Outside)	B	No	CaAa (Out Of Face)	140.000 - 0.000	0.000	0	1	No Ice	0.154	0.001
								1/2" Ice	0.254	0.002
								1" Ice	0.354	0.004
								2" Ice	0.554	0.010
								4" Ice	0.954	0.028
HB114-21U3 M12-XXXF(1 -1/4") (R-Shielded)	B	No	Inside Pole	140.000 - 0.000	0.000	0	1	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
//										
HJ7-50A(1-5/8") (E)	A	No	Inside Pole	88.000 - 0.000	0.000	0	12	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
LDF4-50A(1/2") (E)	A	No	Inside Pole	88.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
HB158-1-08U 8-S8J18(1-5/8) (P-Shielded)	A	No	Inside Pole	88.000 - 0.000	0.000	0	1	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
HB158-1-08U 8-S8J18(1-5/8) (P-Outside)	A	No	CaAa (Out Of Face)	88.000 - 0.000	0.000	0	1	No Ice	0.198	0.001
								1/2" Ice	0.298	0.003
								1" Ice	0.398	0.005
								2" Ice	0.598	0.011
								4" Ice	0.998	0.031
//										
LDF4-50A(1/2") (E-Shielded)	B	No	Inside Pole	75.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
//										
Safety Line 3/8 (E)	B	No	CaAa (Out Of Face)	182.000 - 0.000	0.000	0	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
//										
PL5.75x1 (E)	A	No	CaAa (Out Of Face)	77.000 - 47.000	0.000	0	1	No Ice	0.917	0.023
								1/2" Ice	1.028	0.026
								1" Ice	1.139	0.029
								2" Ice	1.361	0.035
								4" Ice	1.806	0.053
PL5.75x1 (E)	B	No	CaAa (Out Of Face)	77.000 - 47.000	0.000	0	1	No Ice	0.917	0.023
								1/2" Ice	1.028	0.026
								1" Ice	1.139	0.029
								2" Ice	1.361	0.035
								4" Ice	1.806	0.053
*										
PL5.75x1 (E)	A	No	CaAa (Out Of Face)	87.000 - 72.000	0.000	0	1	No Ice	0.917	0.023
								1/2" Ice	1.028	0.026
								1" Ice	1.139	0.029
								2" Ice	1.361	0.035
								4" Ice	1.806	0.053
PL5.75x1 (E)	B	No	CaAa (Out Of Face)	87.000 - 72.000	0.000	0	1	No Ice	0.917	0.023
								1/2" Ice	1.028	0.026
								1" Ice	1.139	0.029
								2" Ice	1.361	0.035
								4" Ice	1.806	0.053
***										

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	182.000-133.080	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	2.900	0.695
		C	0.000	0.000	0.000	5.844	0.215
L2	133.080-87.460	A	0.000	0.000	0.000	0.107	0.008
		B	0.000	0.000	0.000	8.736	1.186
		C	0.000	0.000	0.000	0.000	0.162
L3	87.460-85.000	A	0.000	0.000	0.000	2.320	0.084
		B	0.000	0.000	0.000	2.304	0.111
		C	0.000	0.000	0.000	0.000	0.009
L4	85.000-74.000	A	0.000	0.000	0.000	15.011	0.495
		B	0.000	0.000	0.000	14.940	0.614
		C	0.000	0.000	0.000	0.000	0.039
L5	74.000-42.880	A	0.000	0.000	0.000	32.745	1.152
		B	0.000	0.000	0.000	32.543	1.492
		C	0.000	0.000	0.000	0.000	0.110
L6	42.880-0.000	A	0.000	0.000	0.000	8.490	0.653
		B	0.000	0.000	0.000	8.211	1.121
		C	0.000	0.000	0.000	0.000	0.152

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	182.000-133.080	A	1.204	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	16.351	0.787
		C		0.000	0.000	0.000	16.584	0.289
L2	133.080-87.460	A	1.155	0.000	0.000	0.000	0.237	0.011
		B		0.000	0.000	0.000	30.715	1.438
		C		0.000	0.000	0.000	0.000	0.162
L3	87.460-85.000	A	1.122	0.000	0.000	0.000	3.402	0.108
		B		0.000	0.000	0.000	3.954	0.136
		C		0.000	0.000	0.000	0.000	0.009
L4	85.000-74.000	A	1.111	0.000	0.000	0.000	20.913	0.627
		B		0.000	0.000	0.000	23.286	0.752
		C		0.000	0.000	0.000	0.000	0.039
L5	74.000-42.880	A	1.071	0.000	0.000	0.000	46.309	1.446
		B		0.000	0.000	0.000	52.770	1.804
		C		0.000	0.000	0.000	0.000	0.110
L6	42.880-0.000	A	1.000	0.000	0.000	0.000	17.672	0.828
		B		0.000	0.000	0.000	26.576	1.320
		C		0.000	0.000	0.000	0.000	0.152

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	182.000-133.080	-0.049	0.116	0.040	0.321
L2	133.080-87.460	0.231	0.130	0.652	0.369
L3	87.460-85.000	0.746	-0.437	1.009	-0.420
L4	85.000-74.000	0.944	-0.550	1.173	-0.539
L5	74.000-42.880	0.839	-0.491	1.114	-0.484
L6	42.880-0.000	0.227	-0.140	0.624	-0.119

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD458-3	A	From Leg	4.000	0.000	180.000	No Ice	3.492	3.492	0.021
(E)			0.000			1/2" Ice	4.794	4.794	0.047
			11.000			1" Ice	6.112	6.112	0.080
						2" Ice	8.499	8.499	0.173
						4" Ice	11.687	11.687	0.463
APC-2163	A	From Leg	4.000	0.000	180.000	No Ice	3.375	3.375	0.014
(E)			0.000			1/2" Ice	4.754	4.754	0.039
			11.000			1" Ice	6.150	6.150	0.073

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	8.992	8.992	0.167
						4" Ice	12.448	12.448	0.465
PD458-3	B	From Leg	4.000	0.000	180.000	No Ice	3.492	3.492	0.021
(E)			0.000			1/2" Ice	4.794	4.794	0.047
			11.000			1" Ice	6.112	6.112	0.080
						2" Ice	8.499	8.499	0.173
						4" Ice	11.687	11.687	0.463
APC-1362	B	From Leg	4.000	0.000	180.000	No Ice	3.500	3.500	0.015
(E)			0.000			1/2" Ice	4.929	4.929	0.041
			11.000			1" Ice	6.375	6.375	0.076
						2" Ice	9.317	9.317	0.173
						4" Ice	13.051	13.051	0.482
APC-301	C	From Leg	4.000	0.000	180.000	No Ice	3.000	3.000	0.013
(E)			0.000			1/2" Ice	4.229	4.229	0.035
			11.000			1" Ice	5.475	5.475	0.065
						2" Ice	7.685	7.685	0.149
						4" Ice	10.708	10.708	0.417
APC-4065	C	From Leg	4.000	0.000	180.000	No Ice	3.125	3.125	0.013
(E)			0.000			1/2" Ice	4.404	4.404	0.036
			11.000			1" Ice	5.700	5.700	0.067
						2" Ice	8.140	8.140	0.155
						4" Ice	11.277	11.277	0.433
ANT450D6-9	C	From Leg	4.000	0.000	180.000	No Ice	2.862	2.862	0.176
(E)			0.000			1/2" Ice	4.370	4.370	0.200
			-5.000			1" Ice	5.878	5.878	0.224
						2" Ice	8.893	8.893	0.272
						4" Ice	14.923	14.923	0.368
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Side Arm Mount [SO 702-3]	C	None		0.000	180.000	No Ice	3.220	3.220	0.081
(E)						1/2" Ice	4.150	4.150	0.114
						1" Ice	5.080	5.080	0.147
						2" Ice	6.940	6.940	0.213
						4" Ice	10.660	10.660	0.345
//									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	170.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			-2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	170.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			-2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	170.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			-2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
AM-X-CD-16-65-00T-RET	A	From Leg	4.000	0.000	170.000	No Ice	8.498	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	9.149	7.479	0.139
(E)			-2.000			1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET	B	From Leg	4.000	0.000	170.000	No Ice	8.498	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	9.149	7.479	0.139
(E)			-2.000			1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
AM-X-CD-16-65-00T-RET	C	From Leg	4.000	0.000	170.000	No Ice	8.498	6.304	0.074
w/ Mount Pipe			0.000			1/2" Ice	9.149	7.479	0.139
(E)			-2.000			1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(2) LGP21401	A	From Leg	4.000	0.000	170.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			-2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401	B	From Leg	4.000	0.000	170.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			-2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401	C	From Leg	4.000	0.000	170.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			-2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) RRUS-11	A	From Leg	4.000	0.000	170.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	B	From Leg	4.000	0.000	170.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	C	From Leg	4.000	0.000	170.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			-2.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
DC6-48-60-18-8CF	A	From Leg	4.000	0.000	170.000	No Ice	3.342	3.342	0.034
(E)			0.000			1/2" Ice	3.620	3.620	0.061
			-2.000			1" Ice	3.907	3.907	0.093
						2" Ice	4.507	4.507	0.168
						4" Ice	5.809	5.809	0.370
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	170.000	No Ice	1.425	1.425	0.022

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	170.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	170.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 712-1]	C	None		0.000	170.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
//									
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000	0.000	160.000	No Ice	4.593	3.319	0.034
			0.000			1/2" Ice	5.088	4.089	0.072
(E)			0.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000	0.000	160.000	No Ice	4.593	3.319	0.034
			0.000			1/2" Ice	5.088	4.089	0.072
(E)			0.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000	0.000	160.000	No Ice	4.593	3.319	0.034
			0.000			1/2" Ice	5.088	4.089	0.072
(E)			0.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
(2) AIR21 w/Mount Pipe	A	From Leg	4.000	0.000	160.000	No Ice	6.850	5.781	0.105
(E)			0.000			1/2" Ice	7.406	6.700	0.160
			0.000			1" Ice	7.942	7.496	0.226
						2" Ice	9.045	9.144	0.380
						4" Ice	11.381	12.653	0.811
(2) AIR21 w/Mount Pipe	B	From Leg	4.000	0.000	160.000	No Ice	6.850	5.781	0.105
(E)			0.000			1/2" Ice	7.406	6.700	0.160
			0.000			1" Ice	7.942	7.496	0.226
						2" Ice	9.045	9.144	0.380
						4" Ice	11.381	12.653	0.811
(2) AIR21 w/Mount Pipe	C	From Leg	4.000	0.000	160.000	No Ice	6.850	5.781	0.105
(E)			0.000			1/2" Ice	7.406	6.700	0.160
			0.000			1" Ice	7.942	7.496	0.226
						2" Ice	9.045	9.144	0.380
						4" Ice	11.381	12.653	0.811
ATMAA1412D-1A20	A	From Leg	4.000	0.000	160.000	No Ice	0.467	1.167	0.013
(E)			0.000			1/2" Ice	0.575	1.314	0.021
			0.000			1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
ATMAA1412D-1A20	B	From Leg	4.000	0.000	160.000	No Ice	0.467	1.167	0.013
(E)			0.000			1/2" Ice	0.575	1.314	0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
ATMAA1412D-1A20	C	From Leg	4.000	0.000	160.000	No Ice	0.467	1.167	0.013
(E)			0.000			1/2" Ice	0.575	1.314	0.021
			0.000			1" Ice	0.691	1.469	0.030
						2" Ice	0.951	1.806	0.056
						4" Ice	1.573	2.584	0.137
Platform Mount [LP 305-1]	C	None		0.000	160.000	No Ice	18.010	18.010	1.121
(E)						1/2" Ice	23.330	23.330	1.352
						1" Ice	28.650	28.650	1.584
						2" Ice	39.290	39.290	2.046
						4" Ice	60.570	60.570	2.972
//									
APXVSPP18-C-A20 w/	A	From Leg	4.000	0.000	140.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			0.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	140.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			0.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	C	From Leg	4.000	0.000	140.000	No Ice	8.498	6.946	0.083
Mount Pipe			0.000			1/2" Ice	9.149	8.127	0.151
(E)			0.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
840 10054 w/ Mount Pipe	A	From Leg	4.000	0.000	140.000	No Ice	5.413	2.385	0.051
(E)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe	B	From Leg	4.000	0.000	140.000	No Ice	5.413	2.385	0.051
(E)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe	C	From Leg	4.000	0.000	140.000	No Ice	5.413	2.385	0.051
(E)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
1900MHz RRH	A	From Leg	4.000	0.000	140.000	No Ice	2.907	3.801	0.044
(E)			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH	B	From Leg	4.000	0.000	140.000	No Ice	2.907	3.801	0.044
(E)			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH	C	From Leg	4.000	0.000	140.000	No Ice	2.907	3.801	0.044
(E)			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
800MHZ RRH	A	From Leg	4.000	0.000	140.000	No Ice	2.490	2.068	0.053
(E)			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
800MHZ RRH	B	From Leg	4.000	0.000	140.000	No Ice	2.490	2.068	0.053
(E)			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
800MHZ RRH	C	From Leg	4.000	0.000	140.000	No Ice	2.490	2.068	0.053
(E)			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
800 EXTERNAL NOTCH	A	From Leg	4.000	0.000	140.000	No Ice	0.770	0.375	0.011
FILTER			0.000			1/2" Ice	0.890	0.465	0.017
(E)			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH	B	From Leg	4.000	0.000	140.000	No Ice	0.770	0.375	0.011
FILTER			0.000			1/2" Ice	0.890	0.465	0.017
(E)			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH	C	From Leg	4.000	0.000	140.000	No Ice	0.770	0.375	0.011
FILTER			0.000			1/2" Ice	0.890	0.465	0.017
(E)			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
APXVTM14-C-120 w/	A	From Leg	4.000	0.000	140.000	No Ice	7.134	4.959	0.074
Mount Pipe			0.000			1/2" Ice	7.662	5.754	0.128
(R)			0.000			1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/	B	From Leg	4.000	0.000	140.000	No Ice	7.134	4.959	0.074
Mount Pipe			0.000			1/2" Ice	7.662	5.754	0.128
(R)			0.000			1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/	C	From Leg	4.000	0.000	140.000	No Ice	7.134	4.959	0.074
Mount Pipe			0.000			1/2" Ice	7.662	5.754	0.128
(R)			0.000			1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
TD-RRH8x20-25	A	From Leg	4.000	0.000	140.000	No Ice	4.720	1.703	0.070
(R)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	B	From Leg	4.000	0.000	140.000	No Ice	4.720	1.703	0.070
(R)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TD-RRH8x20-25	C	From Leg	4.000	0.000	140.000	No Ice	4.720	1.703	0.070
(R)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
Horizon Compact	A	From Leg	4.000	0.000	140.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			4.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
Horizon Compact	B	From Leg	4.000	0.000	140.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			4.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
URAS-FLEXIBLE	A	From Leg	4.000	0.000	140.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
URAS-FLEXIBLE	B	From Leg	4.000	0.000	140.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
URAS-FLEXIBLE	C	From Leg	4.000	0.000	140.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	140.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	140.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	140.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 1201-1]	C	None		0.000	140.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
//									
BXA-70063-6CF-EDIN-4 w/ Mount Pipe	A	From Leg	4.000	0.000	88.000	No Ice	7.969	5.398	0.042
(E)			0.000			1/2" Ice	8.609	6.546	0.101
			2.000			1" Ice	9.216	7.409	0.168
						2" Ice	10.459	9.184	0.327
						4" Ice	13.066	12.933	0.787
BXA-70063-6CF-EDIN-4 w/	B	From Leg	4.000	0.000	88.000	No Ice	7.969	5.398	0.042

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000			1/2" Ice	8.609	6.546	0.101
(E)			2.000			1" Ice	9.216	7.409	0.168
						2" Ice	10.459	9.184	0.327
						4" Ice	13.066	12.933	0.787
LNX-6514DS-T6M w/	C	From Leg	4.000	0.000	88.000	No Ice	8.568	7.004	0.058
Mount Pipe			0.000			1/2" Ice	9.220	8.185	0.127
(E)			2.000			1" Ice	9.838	9.081	0.203
						2" Ice	11.104	10.904	0.384
						4" Ice	13.754	14.926	0.889
BXA-70080-4BF-EDIN-0 w/	A	From Leg	4.000	0.000	88.000	No Ice	3.932	3.970	0.030
Mount Pipe			0.000			1/2" Ice	4.357	4.578	0.068
(P)			2.000			1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
BXA-70080-4BF-EDIN-0 w/	B	From Leg	4.000	0.000	88.000	No Ice	3.932	3.970	0.030
Mount Pipe			0.000			1/2" Ice	4.357	4.578	0.068
(P)			2.000			1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
BXA-70080-4BF-EDIN-0 w/	C	From Leg	4.000	0.000	88.000	No Ice	3.932	3.970	0.030
Mount Pipe			0.000			1/2" Ice	4.357	4.578	0.068
(P)			2.000			1" Ice	4.792	5.222	0.112
						2" Ice	5.693	6.612	0.219
						4" Ice	7.633	9.661	0.540
(2) HBXX-6517DS-A2M w/	A	From Leg	4.000	0.000	88.000	No Ice	8.976	6.963	0.067
Mount Pipe			0.000			1/2" Ice	9.647	8.182	0.137
(P)			2.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/	B	From Leg	4.000	0.000	88.000	No Ice	8.976	6.963	0.067
Mount Pipe			0.000			1/2" Ice	9.647	8.182	0.137
(P)			2.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/	C	From Leg	4.000	0.000	88.000	No Ice	8.976	6.963	0.067
Mount Pipe			0.000			1/2" Ice	9.647	8.182	0.137
(P)			2.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	88.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			2.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	88.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			2.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000	0.000	88.000	No Ice	0.367	0.085	0.003
(E)			0.000			1/2" Ice	0.451	0.136	0.005
			2.000			1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	88.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			2.000			1" Ice	6.240	2.791	0.120

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
DB-T1-6Z-8AB-0Z	C	From Leg	4.000	0.000	88.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			2.000			1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
RRH2X60-AWS	A	From Leg	4.000	0.000	88.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			2.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	B	From Leg	4.000	0.000	88.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			2.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	C	From Leg	4.000	0.000	88.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			2.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-PCS	A	From Leg	4.000	0.000	88.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			2.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS	B	From Leg	4.000	0.000	88.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			2.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS	C	From Leg	4.000	0.000	88.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			2.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
Platform Mount [LP 1201-1]	C	None		0.000	88.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
						4" Ice	52.700	52.700	5.300
//									
GPS_A	C	From Leg	2.000	0.000	75.000	No Ice	0.297	0.297	0.001
(E)			0.000			1/2" Ice	0.374	0.374	0.005
			0.000			1" Ice	0.459	0.459	0.010
						2" Ice	0.655	0.655	0.025
						4" Ice	1.151	1.151	0.079
Side Arm Mount [SO 701-1]	C	From Leg	1.000	0.000	75.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
//									

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)
HPD2-4.7 (R)	A	Paraboloid w/o Radome	From Leg	2.000 0.000 -2.000	75.000		180.000	2.042	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.270 3.550 3.820 4.360 5.460	0.027 0.050 0.060 0.100 0.170
HPD2-4.7 (R)	B	Paraboloid w/o Radome	From Leg	2.000 0.000 -2.000	-24.000		180.000	2.042	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.270 3.550 3.820 4.360 5.460	0.027 0.050 0.060 0.100 0.170
*****											
VHLP2.5-10W (E)	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	60.000		140.000	2.917	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.680 7.070 7.460 8.230 9.780	0.050 0.090 0.120 0.200 0.340
VHLP2.5-10W (E)	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	60.000		140.000	2.917	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.680 7.070 7.460 8.230 9.780	0.050 0.090 0.120 0.200 0.340
***											

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
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

Comb. No.	Description
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	182 - 133.08	Pole	Max Tension	30	0.000	0.000	-0.000
			Max. Compression	14	-21.358	-0.048	0.437
			Max. Mx	11	-9.427	383.259	-2.905
			Max. My	8	-9.494	6.208	-371.048
			Max. Vy	11	-17.838	383.259	-2.905
			Max. Vx	2	-17.579	0.195	370.330
			Max. Torque	12			-2.875
L2	133.08 - 87.46	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.567	-0.361	0.253
			Max. Mx	11	-16.779	1244.981	-11.045
			Max. My	2	-16.815	-4.080	1220.624
			Max. Vy	11	-21.041	1244.981	-11.045
			Max. Vx	2	-20.785	-4.080	1220.624
			Max. Torque	12			-2.868
L3	87.46 - 85	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.799	0.312	0.543
			Max. Mx	11	-21.860	1429.094	-12.508
			Max. My	2	-21.892	-4.812	1403.086
			Max. Vy	11	-26.735	1429.094	-12.508
			Max. Vx	2	-26.555	-4.812	1403.086
			Max. Torque	12			-2.593
L4	85 - 74	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-44.171	-0.088	0.761
			Max. Mx	11	-25.454	1732.939	-14.744
			Max. My	2	-25.481	-6.570	1705.465
			Max. Vy	11	-28.646	1732.939	-14.744
			Max. Vx	2	-28.481	-6.570	1705.465
			Max. Torque	12			-2.723
L5	74 - 42.88	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-53.778	-1.328	1.448
			Max. Mx	11	-33.571	2485.377	-19.422
			Max. My	2	-33.589	-10.395	2455.207
			Max. Vy	11	-31.947	2485.377	-19.422
			Max. Vx	2	-31.786	-10.395	2455.207
			Max. Torque	12			-2.807
L6	42.88 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-73.047	-2.108	1.830
			Max. Mx	11	-50.023	4147.923	-29.248

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-50.023	-16.453	4110.598
			Max. Vy	11	-35.315	4147.923	-29.248
			Max. Vx	2	-35.166	-16.453	4110.598
			Max. Torque	12			-2.938

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	73.047	10.482	-0.047
	Max. H_x	11	50.052	35.274	-0.198
	Max. H_z	2	50.052	-0.114	35.126
	Max. M_x	2	4110.598	-0.114	35.126
	Max. M_z	5	4109.693	-35.045	0.078
	Max. Torsion	6	2.366	-30.287	-17.514
	Min. Vert	1	50.052	0.000	0.000
	Min. H_x	5	50.052	-35.045	0.078
	Min. H_z	8	50.052	0.300	-35.096
	Min. M_x	8	-4105.260	0.300	-35.096
	Min. M_z	11	-4147.923	35.274	-0.198
	Min. Torsion	12	-2.938	30.566	17.387

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	50.052	0.000	0.000	-0.859	-1.004	0.000
Dead+Wind 0 deg - No Ice	50.052	0.114	-35.126	-4110.598	-16.453	0.515
Dead+Wind 30 deg - No Ice	50.052	17.583	-30.485	-3570.121	-2063.068	-0.090
Dead+Wind 60 deg - No Ice	50.052	30.310	-17.756	-2085.657	-3551.860	-0.764
Dead+Wind 90 deg - No Ice	50.052	35.045	-0.078	-11.516	-4109.693	-1.865
Dead+Wind 120 deg - No Ice	50.052	30.287	17.514	2049.140	-3548.946	-2.366
Dead+Wind 150 deg - No Ice	50.052	17.451	30.331	3545.476	-2045.509	-1.886
Dead+Wind 180 deg - No Ice	50.052	-0.300	35.096	4105.260	46.909	0.420
Dead+Wind 210 deg - No Ice	50.052	-17.940	30.423	3557.414	2126.753	1.130
Dead+Wind 240 deg - No Ice	50.052	-30.619	17.634	2061.984	3604.623	1.547
Dead+Wind 270 deg - No Ice	50.052	-35.274	0.198	29.248	4147.923	1.994
Dead+Wind 300 deg - No Ice	50.052	-30.566	-17.387	-2026.170	3598.320	2.938
Dead+Wind 330 deg - No Ice	50.052	-17.683	-30.385	-3553.392	2088.495	1.818
Dead+Ice+Temp	73.047	0.000	0.000	-1.830	-2.108	0.000
Dead+Wind 0 deg+Ice+Temp	73.047	0.025	-10.442	-1305.652	-5.966	0.137
Dead+Wind 30 deg+Ice+Temp	73.047	5.224	-9.058	-1133.611	-655.912	0.020
Dead+Wind 60 deg+Ice+Temp	73.047	9.014	-5.267	-661.604	-1129.263	-0.129
Dead+Wind 90 deg+Ice+Temp	73.047	10.422	-0.017	-4.526	-1306.075	-0.406
Dead+Wind 120 deg+Ice+Temp	73.047	9.011	5.212	648.919	-1128.696	-0.549
Dead+Wind 150 deg+Ice+Temp	73.047	5.196	9.022	1123.779	-651.782	-0.456
Dead+Wind 180 deg+Ice+Temp	73.047	-0.074	10.435	1300.802	10.388	0.104
Dead+Wind 210 deg+Ice+Temp	73.047	-5.318	9.042	1126.649	669.725	0.249
Dead+Wind 240 deg+Ice+Temp	73.047	-9.095	5.235	651.595	1139.938	0.334
Dead+Wind 270 deg+Ice+Temp	73.047	-10.482	0.047	5.745	1312.724	0.443
Dead+Wind 300 deg+Ice+Temp	73.047	-9.085	-5.178	-645.993	1138.552	0.699

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 330 deg+Ice+Temp	73.047	-5.258	-9.035	-1129.254	660.002	0.440
Dead+Wind 0 deg - Service	50.052	0.044	-13.721	-1609.148	-7.060	0.204
Dead+Wind 30 deg - Service	50.052	6.868	-11.908	-1397.676	-807.989	-0.036
Dead+Wind 60 deg - Service	50.052	11.840	-6.936	-816.751	-1390.620	-0.303
Dead+Wind 90 deg - Service	50.052	13.689	-0.031	-5.055	-1608.908	-0.740
Dead+Wind 120 deg - Service	50.052	11.831	6.841	801.352	-1389.459	-0.939
Dead+Wind 150 deg - Service	50.052	6.817	11.848	1386.905	-801.104	-0.749
Dead+Wind 180 deg - Service	50.052	-0.117	13.709	1605.973	17.745	0.165
Dead+Wind 210 deg - Service	50.052	-7.008	11.884	1391.656	831.724	0.445
Dead+Wind 240 deg - Service	50.052	-11.960	6.888	806.424	1410.111	0.612
Dead+Wind 270 deg - Service	50.052	-13.779	0.077	10.900	1622.719	0.793
Dead+Wind 300 deg - Service	50.052	-11.940	-6.792	-793.484	1407.607	1.170
Dead+Wind 330 deg - Service	50.052	-6.908	-11.869	-1391.137	816.720	0.726

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	0.000	-50.052	0.000	0.000	50.052	0.000	0.000%
2	0.114	-50.052	-35.126	-0.114	50.052	35.126	0.000%
3	17.583	-50.052	-30.485	-17.583	50.052	30.485	0.000%
4	30.310	-50.052	-17.756	-30.310	50.052	17.756	0.000%
5	35.045	-50.052	-0.078	-35.045	50.052	0.078	0.000%
6	30.287	-50.052	17.514	-30.287	50.052	-17.514	0.000%
7	17.451	-50.052	30.331	-17.451	50.052	-30.331	0.000%
8	-0.300	-50.052	35.096	0.300	50.052	-35.096	0.000%
9	-17.940	-50.052	30.423	17.940	50.052	-30.423	0.000%
10	-30.619	-50.052	17.634	30.619	50.052	-17.634	0.000%
11	-35.274	-50.052	0.198	35.274	50.052	-0.198	0.000%
12	-30.566	-50.052	-17.387	30.566	50.052	17.387	0.000%
13	-17.683	-50.052	-30.385	17.683	50.052	30.385	0.000%
14	0.000	-73.047	0.000	0.000	73.047	0.000	0.000%
15	0.025	-73.047	-10.442	-0.025	73.047	10.442	0.000%
16	5.224	-73.047	-9.058	-5.224	73.047	9.058	0.000%
17	9.014	-73.047	-5.267	-9.014	73.047	5.267	0.000%
18	10.422	-73.047	-0.017	-10.422	73.047	0.017	0.000%
19	9.011	-73.047	5.212	-9.011	73.047	-5.212	0.000%
20	5.196	-73.047	9.022	-5.196	73.047	-9.022	0.000%
21	-0.074	-73.047	10.435	0.074	73.047	-10.435	0.000%
22	-5.318	-73.047	9.042	5.318	73.047	-9.042	0.000%
23	-9.095	-73.047	5.235	9.095	73.047	-5.235	0.000%
24	-10.482	-73.047	0.047	10.482	73.047	-0.047	0.000%
25	-9.085	-73.047	-5.178	9.085	73.047	5.178	0.000%
26	-5.258	-73.047	-9.035	5.258	73.047	9.035	0.000%
27	0.044	-50.052	-13.721	-0.044	50.052	13.721	0.000%
28	6.868	-50.052	-11.908	-6.868	50.052	11.908	0.000%
29	11.840	-50.052	-6.936	-11.840	50.052	6.936	0.000%
30	13.689	-50.052	-0.031	-13.689	50.052	0.031	0.000%
31	11.831	-50.052	6.841	-11.831	50.052	-6.841	0.000%
32	6.817	-50.052	11.848	-6.817	50.052	-11.848	0.000%
33	-0.117	-50.052	13.709	0.117	50.052	-13.709	0.000%
34	-7.008	-50.052	11.884	7.008	50.052	-11.884	0.000%
35	-11.960	-50.052	6.888	11.960	50.052	-6.888	0.000%
36	-13.779	-50.052	0.077	13.779	50.052	-0.077	0.000%
37	-11.940	-50.052	-6.792	11.940	50.052	6.792	0.000%
38	-6.908	-50.052	-11.869	6.908	50.052	11.869	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	0.00006987
3	Yes	6	0.00000001	0.00016753
4	Yes	6	0.00000001	0.00017023
5	Yes	5	0.00000001	0.00015443
6	Yes	6	0.00000001	0.00016154
7	Yes	6	0.00000001	0.00016969
8	Yes	5	0.00000001	0.00014638
9	Yes	6	0.00000001	0.00017333
10	Yes	6	0.00000001	0.00016579
11	Yes	5	0.00000001	0.00008044
12	Yes	6	0.00000001	0.00017368
13	Yes	6	0.00000001	0.00016516
14	Yes	4	0.00000001	0.00000001
15	Yes	6	0.00000001	0.00016373
16	Yes	6	0.00000001	0.00022668
17	Yes	6	0.00000001	0.00022775
18	Yes	6	0.00000001	0.00016417
19	Yes	6	0.00000001	0.00022351
20	Yes	6	0.00000001	0.00022478
21	Yes	6	0.00000001	0.00016321
22	Yes	6	0.00000001	0.00023009
23	Yes	6	0.00000001	0.00022702
24	Yes	6	0.00000001	0.00016551
25	Yes	6	0.00000001	0.00022784
26	Yes	6	0.00000001	0.00022703
27	Yes	4	0.00000001	0.00042902
28	Yes	5	0.00000001	0.00035568
29	Yes	5	0.00000001	0.00036575
30	Yes	4	0.00000001	0.00069140
31	Yes	5	0.00000001	0.00033389
32	Yes	5	0.00000001	0.00036447
33	Yes	4	0.00000001	0.00050892
34	Yes	5	0.00000001	0.00037935
35	Yes	5	0.00000001	0.00035122
36	Yes	4	0.00000001	0.00062066
37	Yes	5	0.00000001	0.00038336
38	Yes	5	0.00000001	0.00034842

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	182 - 133.08	62.490	36	3.224	0.013
L2	136.92 - 87.46	34.363	35	2.524	0.008
L3	92.55 - 85	15.223	35	1.554	0.002
L4	85 - 74	12.841	35	1.438	0.002
L5	74 - 42.88	9.739	35	1.255	0.002
L6	49.13 - 0	4.353	35	0.818	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.000	PD458-3	36	61.160	3.199	0.013	19958
178.000	HPD2-4.7	36	59.831	3.173	0.012	19958
170.000	7770.00 w/ Mount Pipe	36	54.544	3.067	0.012	8315
160.000	RR90-17-02DP w/ Mount Pipe	36	48.072	2.927	0.010	4534
144.000	VHLP2.5-10W	35	38.329	2.663	0.009	2623
140.000	APXVSPP18-C-A20 w/ Mount Pipe	35	36.058	2.587	0.008	2376
88.000	BXA-70063-6CF-EDIN-4 w/ Mount Pipe	35	13.761	1.484	0.002	3154
75.000	GPS_A	35	10.004	1.273	0.002	3558

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	182 - 133.08	159.058	11	8.197	0.036
L2	136.92 - 87.46	87.606	11	6.435	0.020
L3	92.55 - 85	38.867	10	3.969	0.006
L4	85 - 74	32.791	10	3.673	0.006
L5	74 - 42.88	24.877	10	3.207	0.004
L6	49.13 - 0	11.124	10	2.089	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.000	PD458-3	11	155.682	8.132	0.036	8132
178.000	HPD2-4.7	11	152.309	8.067	0.035	8132
170.000	7770.00 w/ Mount Pipe	11	138.890	7.803	0.032	3386
160.000	RR90-17-02DP w/ Mount Pipe	11	122.463	7.450	0.029	1844
144.000	VHLP2.5-10W	11	97.695	6.786	0.023	1063
140.000	APXVSPP18-C-A20 w/ Mount Pipe	11	91.917	6.593	0.021	961
88.000	BXA-70063-6CF-EDIN-4 w/ Mount Pipe	10	35.139	3.789	0.006	1246
75.000	GPS_A	10	25.553	3.251	0.005	1404

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	182 - 133.08 (1)	TP26.02x14.5x0.25	48.920	0.000	0.0	39.000	19.731	-9.427	769.507	0.012
L2	133.08 - 87.46 (2)	TP36.15x24.616x0.375	49.460	0.000	0.0	39.000	41.168	-16.779	1605.570	0.010
L3	87.46 - 85 (3)	TP35.97x34.213x0.375	7.550	0.000	0.0	39.000	42.367	-21.860	1652.300	0.013
L4	85 - 74 (4)	TP38.529x35.97x0.534	11.000	0.000	0.0	31.363	64.341	-25.449	2017.950	0.013
L5	74 - 42.88 (5)	TP45.77x38.529x0.483	31.120	0.000	0.0	32.785	67.165	-33.568	2201.980	0.015
L6	42.88 - 0 (6)	TP55x43.566x0.438	49.130	0.000	0.0	39.000	75.037	-49.342	2926.460	0.017

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	182 - 133.08 (1)	TP26.02x14.5x0.25	383.270	38.072	39.000	0.976	0.000	0.000	39.000	0.000
L2	133.08 - 87.46 (2)	TP36.15x24.616x0.375	1245.033	42.646	39.000	1.094	0.000	0.000	39.000	0.000
L3	87.46 - 85 (3)	TP35.97x34.213x0.375	1429.150	46.209	39.000	1.185	0.000	0.000	39.000	0.000
L4	85 - 74 (4)	TP38.529x35.97x0.534	1733.492	34.695	31.363	1.106	0.000	0.000	31.363	0.000
L5	74 - 42.88 (5)	TP45.77x38.529x0.483	2487.283	41.214	32.785	1.257	0.000	0.000	32.785	0.000
L6	42.88 - 0 (6)	TP55x43.566x0.438	4073.133	48.861	39.000	1.253	0.000	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	182 - 133.08 (1)	TP26.02x14.5x0.25	17.839	0.904	26.000	0.070	1.757	0.085	26.000	0.003
L2	133.08 - 87.46 (2)	TP36.15x24.616x0.375	21.042	0.511	26.000	0.039	1.713	0.029	26.000	0.001
L3	87.46 - 85 (3)	TP35.97x34.213x0.375	26.736	0.631	26.000	0.049	1.793	0.028	26.000	0.001
L4	85 - 74 (4)	TP38.529x35.97x0.534	28.707	0.446	20.909	0.043	1.547	0.015	20.909	0.001
L5	74 - 42.88 (5)	TP45.77x38.529x0.483	32.008	0.477	21.857	0.044	1.546	0.012	21.857	0.001
L6	42.88 - 0 (6)	TP55x43.566x0.438	35.374	0.471	26.000	0.036	1.547	0.009	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	182 - 133.08 (1)	0.012	0.976	0.000	0.070	0.003	0.990 ✔	1.333	H1-3+VT ✔
L2	133.08 - 87.46 (2)	0.010	1.094	0.000	0.039	0.001	1.104 ✔	1.333	H1-3+VT ✔
L3	87.46 - 85 (3)	0.013	1.185	0.000	0.049	0.001	1.199 ✔	1.333	H1-3+VT ✔
L4	85 - 74 (4)	0.013	1.106	0.000	0.043	0.001	1.119 ✔	1.333	H1-3+VT ✔
L5	74 - 42.88 (5)	0.015	1.257	0.000	0.044	0.001	1.273 ✔	1.333	H1-3+VT ✔
L6	42.88 - 0 (6)	0.017	1.253	0.000	0.036	0.000	1.270 ✔	1.333	H1-3+VT ✔

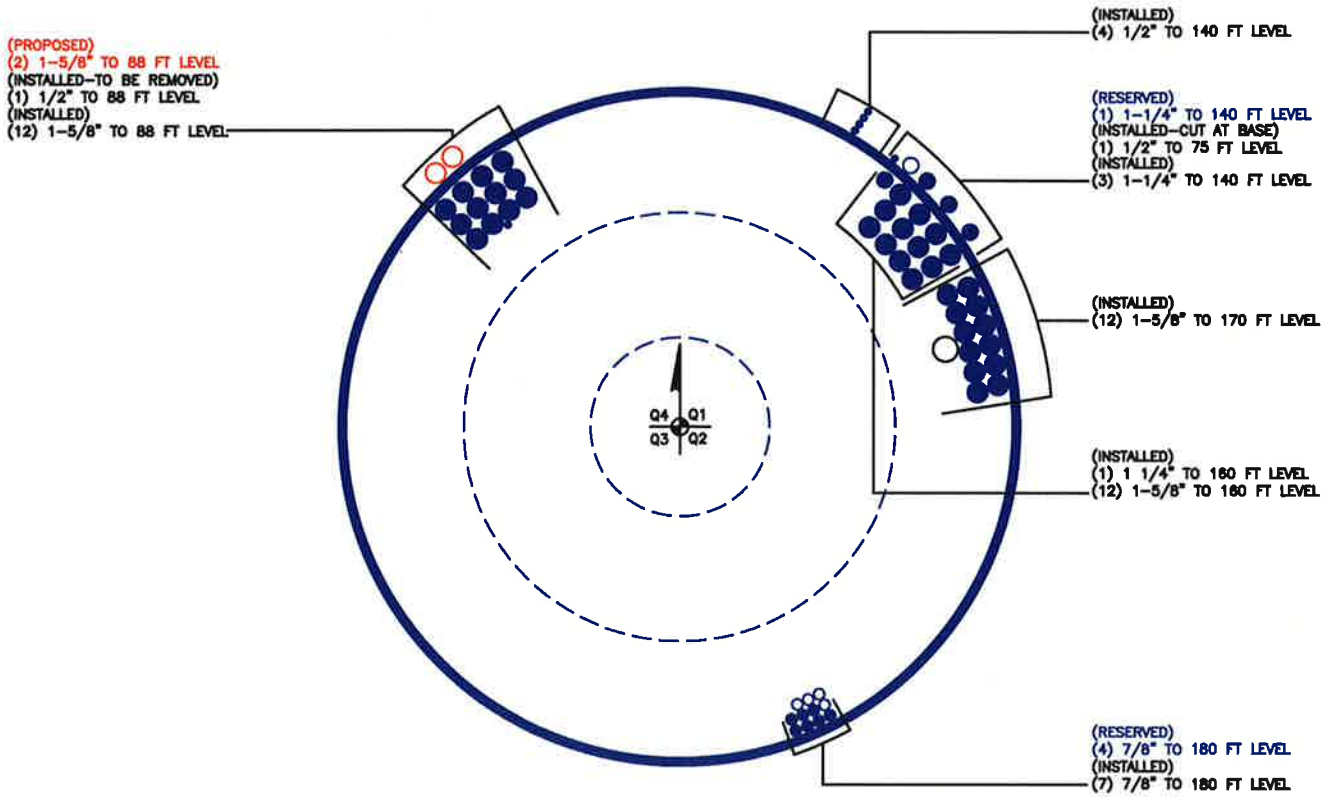
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	182 - 133.08	Pole	TP26.02x14.5x0.25	1	**	**	**	Pass
L2	133.08 - 87.46	Pole	TP36.15x24.616x0.375	2	**	**	**	Pass
L3	87.46 - 85	Pole	TP35.97x34.213x0.375	3	**	**	**	Pass
L4	85 - 74	Pole	TP38.529x35.97x0.534	4	**	**	**	Pass
L5	74 - 42.88	Pole	TP45.77x38.529x0.483	5	**	**	**	Pass
L6	42.88 - 0	Pole	TP55x43.566x0.438	6	**	**	**	Pass
							Summary	
						Pole (L5)	**	Pass
						RATING =	**	**Pass**

Program Version 6.1.4.1

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT:842872

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
49	74	3	PL1x5.75-14	F	0	T&C
74	85	3	PL1x5.75-14	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.		Bottom Elevation Failure	Top Elevation Failure	Section Failure %
133.0800	182.0000	0.2500	65	80	74.1%										**74.1%**	182.0000	48.9200	3.8400	18	14.5000	26.0200	0.2500	65.0	1.00	1			
87.4600	136.9200	0.3750	65	80	82.8%										**82.8%**	136.9200	49.4600	5.0900	18	24.6157	36.1500	0.3750	65.0	1.00	2			
85.0000	92.5500	0.3750	65	80	89.8%										**89.8%**	92.5500	7.5500	0.0000	18	34.2130	35.9697	0.3750	65.0	1.00	3			
74.0000	85.0000	0.3750	65	80	66.8%	3	PL1x5.75-14	84.0%							**84.0%**	85.0000	11.0000	0.0000	18	35.9697	38.5291	0.5335	50.9	0.97	4			
42.8800	74.0000	0.3750	65	80	82.4%	3	PL1x5.75-14	95.5%							**95.5%**	74.0000	31.1200	6.2500	18	38.5291	45.7700	0.4828	53.0	1.04	5			
0.0000	49.1300	0.4375	65	80	95.2%										**95.2%**	49.1300	49.1300	0.0000	18	43.5658	55.0000	0.4375	65.0	1.00	6			
																									7			
																									8			
																									9			
																									10			
																									11			
																									12			
																									13			
																									14			
																									15			
																									16			
																									17			
																									18			
																									19			
																									20			
																									21			
																									22			
																									23			
																									24			
																									25			
																									26			
																									27			
																									28			
																									29			
																									30			

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
	49	74	3 L1x5.75-14	F	T&C
	74	85	3 L1x5.75-14	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

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

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

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
	0			F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
	0			F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
PL1x5.75-14	19.6	5.75	0.48	15.84	0.5	0	1	5.75	0	0	1.1875	65	80	0.80	14	1.00	14	180.0	240.0	Rupture	270.0	Rupture

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

TIA Rev F

Site Data

BU#: *842872*
Site Name: *ROCKY HILL*
App #: *266636, Rev:0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	4152.7202	ft-kips
Axial:	50.0227	kips
Shear:	35.374597	kips

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	64	in

Plate Data		
Diam:	70	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.91	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	6.5	in
Height:	36	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	55	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	191.5 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	98.2% **Pass**	

Base Plate Results

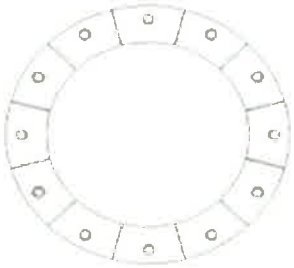
	Flexural Check	Stiffened
Base Plate Stress:	49.3 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	82.1% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	69.5% **Pass**
Vertical Weld:	23.4% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	2.5% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	36.5% **Pass**
Plate Comp. (AISC Bracket):	30.7% **Pass**

Pole Results

Pole Punching Shear Check:	3.7% **Pass**



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

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

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *814822*
Site Name: *Gardendale, AL*
App #: *266636 Revision # 0*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

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

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	6.32	ft
Vert. Cage Diameter =	75.84	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	24	
As Total=	37.44	in^2
A s/ Aconc, Rho:	0.0068	0.68%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.68%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8466.87	kips
at Mu=(ϕ=0.65)Mn=	5170.82	ft-kips
Max Tu, (φ=0.9) Tn =	2021.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4153	ft-kips **(* Note)**
Max. Service Shaft P:	50	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	5398.9	ft-kips
1.30	Pu:	65	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2005

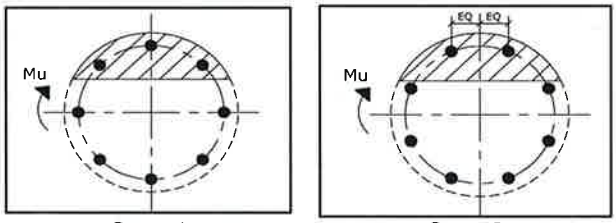
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **14.59** in
Extreme Steel Strain, εt: **0.0134**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	65.00	kips
Drilled Shaft Moment Capacity, φMn:	**5943.78**	ft-kips
Drilled Shaft Superimposed Mu:	**5398.90**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**90.8%**

==========

Pile Plus for Windows, Version 2012-06.029

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==========

This copy of LPile is licensed to:

B+T Group
Tulsa

Serial Number of Security Device: 297187845
Company Name Stored in Security Device: B & T Engineering, Inc.

Files Used for Analysis

Path to file locations: C:\Users\Lkantheti\Desktop
Name of input data file: 95171.001.01.lp6d
Name of output report file: 95171.001.01.lp6o
Name of plot output file: 95171.001.01.lp6p
Name of runtime messeage file: 95171.001.01.lp6r

Date and Time of Analysis

Date: October 17, 2014 Time: 16:21:03

Problem Title

Project Name: Rock Hill 3, CT

Job Number: 95171.001.01

Client: Crown Castle

Engineer: LeenA

Description:Monopole 182'

Program Options

Engineering units are US Customary Units: pounds, inches, feet

Basic Program Options:

This analysis computes pile response to lateral loading and will compute nonlinear moment-curvature and nominal moment capacity for section types with nonlinear properties.

Computation Options:
- **Analysis does not use p-y multipliers (individual pile or shaft only)**
- **Analysis assumes no shear resistance at pile tip**
- **Analysis for fixed-length pile or shaft only**
- **No computation of foundation stiffness matrix elements**
- **Output pile response for full length of pile**
- **Analysis assumes no soil movements acting on pile**
- **No p-y curves to be computed and output for user-specified depths**

Solution Control Parameters:
- **Number of pile increments = 100**
- **Maximum number of iterations allowed = 100**
- **Deflection tolerance for convergence = 1.0000E-05 in**
- **Maximum allowable deflection = 100.0000 in**

Pile Response Output Options:
- **Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.**
- **Printing Increment (nodal spacing of output points) = 1**

Pile Structural Properties and Geometry

Total Number of Sections = 1

Total Pile Length = 18.50 ft

Depth of ground surface below top of pile = 0.00 ft

Pile dimensions used for p-y curve computations defined using 2 points. p-y curves are computed using values of pile diameter interpolated over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	84.0000000
2	18.500000	84.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type = Drilled Shaft (Bored Pile)
Section Length = 18.500 ft
Section Diameter = 84.000 in

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians

Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 8 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer = 0.0000 ft
Distance from top of pile to bottom of layer = 1.00000 ft
Effective unit weight at top of layer = 130.00000 pcf
Effective unit weight at bottom of layer = 130.00000 pcf
Undrained cohesion at top of layer = 0.01000 psf
Undrained cohesion at bottom of layer = 0.01000 psf
Epsilon-50 at top of layer = 0.0000
Epsilon-50 at bottom of layer = 0.0000

NOTE: Internal default values for Epsilon-50 will be computed for the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 1.00000 ft
Distance from top of pile to bottom of layer = 3.00000 ft
Effective unit weight at top of layer = 109.00000 pcf
Effective unit weight at bottom of layer = 109.00000 pcf
Friction angle at top of layer = 33.00000 deg.
Friction angle at bottom of layer = 33.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 3.00000 ft
Distance from top of pile to bottom of layer = 5.00000 ft
Effective unit weight at top of layer = 112.00000 pcf
Effective unit weight at bottom of layer = 112.00000 pcf
Friction angle at top of layer = 34.00000 deg.
Friction angle at bottom of layer = 34.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 5.00000 ft
Distance from top of pile to bottom of layer = 7.00000 ft
Effective unit weight at top of layer = 109.00000 pcf
Effective unit weight at bottom of layer = 109.00000 pcf
Friction angle at top of layer = 33.00000 deg.
Friction angle at bottom of layer = 33.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 5 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 7.00000 ft
Distance from top of pile to bottom of layer = 8.50000 ft
Effective unit weight at top of layer = 122.00000 pcf
Effective unit weight at bottom of layer = 122.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 6 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 8.50000 ft
Distance from top of pile to bottom of layer = 10.00000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 7 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 10.00000 ft
Distance from top of pile to bottom of layer = 15.00000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 8 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 15.00000 ft
Distance from top of pile to bottom of layer = 18.50000 ft
Effective unit weight at top of layer = 60.00000 pcf
Effective unit weight at bottom of layer = 60.00000 pcf
Friction angle at top of layer = 35.00000 deg.
Friction angle at bottom of layer = 35.00000 deg.
Subgrade k at top of layer = 0.0000 pci
Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

(Depth of lowest soil layer extends 0.00 ft below pile tip)

Summary of Soil Properties

Layer	Layer	Effective	Undrained	Angle of	Uniaxial	RQD %
Strain	Rock Mass		In-situ	In-situ	Elastic	

Layer Num.	Soil Type (p-y Curve Criteria)	Depth ft	Unit Wt. pcf	Cohesion psf	Friction Test deg.	qu Test psi	or Subgrade GSI
Factor J	kpy Rock Emass	krm					
Epsilon 50	Factor pci	psi	Type	Property	Mod. pci		
1	Soft Clay	0.00	130.000	0.01000	--	--	-- default
--	-- -- --	--	--	--			
		1.000	130.000	0.01000	--	--	-- default --
--	-- --	--	--	--			
2	Sand (Reese, et al.)	1.000	109.000	--	33.000	--	-- --
--	default --	--	--	--	--		
		3.000	109.000	--	33.000	--	-- -- --
default	-- --	--	--	--			
3	Sand (Reese, et al.)	3.000	112.000	--	34.000	--	-- --
--	default --	--	--	--	--		
		5.000	112.000	--	34.000	--	-- -- --
default	-- --	--	--	--			
4	Sand (Reese, et al.)	5.000	109.000	--	33.000	--	-- --
--	default --	--	--	--	--		
		7.000	109.000	--	33.000	--	-- -- --
default	-- --	--	--	--			
5	Sand (Reese, et al.)	7.000	122.000	--	35.000	--	-- --
--	default --	--	--	--	--		
		8.500	122.000	--	35.000	--	-- -- --
default	-- --	--	--	--			
6	Sand (Reese, et al.)	8.500	60.000	--	35.000	--	-- --
--	default --	--	--	--	--		
		10.000	60.000	--	35.000	--	-- -- --
default	-- --	--	--	--			
7	Sand (Reese, et al.)	10.000	60.000	--	35.000	--	-- --
--	default --	--	--	--	--		
		15.000	60.000	--	35.000	--	-- -- --
default	-- --	--	--	--			
8	Sand (Reese, et al.)	15.000	60.000	--	35.000	--	-- --
--	default --	--	--	--	--		
		18.500	60.000	--	35.000	--	-- -- --
default	-- --	--	--	--			

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1		Condition 2		Axial Thrust Force, lbs
1	1	V = 35.00000 lbs		M = 49836000. in-lbs		50.00000000

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft:

Length of Section	=	18.50000000 ft
Shaft Diameter	=	84.00000000 in
Concrete Cover Thickness	=	3.00000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	60.00000000 ksi
Modulus of Elasticity of Reinforcing Bars	=	29000. ksi
Gross Area of Shaft	=	5541.76944093 sq. in.
Total Area of Reinforcing Steel	=	31.20000000 sq. in.

Area Ratio of Steel Reinforcement = 0.56 percent
Edge-to-Edge Bar Spacing = 10.57131568 in
Rebar Offset = 0.0000000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 15923.952 kips
Tensile Load for Cracking of Concrete = -2099.867 kips
Nominal Axial Tensile Capacity = -1872.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	38.29500	0.00000
2	1.41000	1.56000	36.42071	11.83381
3	1.41000	1.56000	30.98131	22.50924
4	1.41000	1.56000	22.50924	30.98131
5	1.41000	1.56000	11.83381	36.42071
6	1.41000	1.56000	0.00000	38.29500
7	1.41000	1.56000	-11.83381	36.42071
8	1.41000	1.56000	-22.50924	30.98131
9	1.41000	1.56000	-30.98131	22.50924
10	1.41000	1.56000	-36.42071	11.83381
11	1.41000	1.56000	-38.29500	0.00000
12	1.41000	1.56000	-36.42071	-11.83381
13	1.41000	1.56000	-30.98131	-22.50924
14	1.41000	1.56000	-22.50924	-30.98131
15	1.41000	1.56000	-11.83381	-36.42071
16	1.41000	1.56000	0.00000	-38.29500
17	1.41000	1.56000	11.83381	-36.42071
18	1.41000	1.56000	22.50924	-30.98131
19	1.41000	1.56000	30.98131	-22.50924
20	1.41000	1.56000	36.42071	-11.83381

Concrete Properties:

Compressive Strength of Concrete = 3.0000000 ksi
Modulus of Elasticity of Concrete = 3122.0185778 ksi

Modulus of Rupture of Concrete = -0.4107919 ksi
Compression Strain at Peak Stress = 0.0016336
Tensile Strain at Fracture of Concrete = -0.0001160
Maximum Coarse Aggregate Size = 0.7500000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	0.050

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 0.050 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000313	2979.0864257	9533076562.	42.0075802	0.0000131	-0.0000131	0.0475444	0.3768874	
0.000000625	5943.0281956	9508845113.	42.0037968	0.0000263	-0.0000262	0.0947005	0.7537063	
0.000000938	8891.8253096	9484613664.	42.0025357	0.0000394	-0.0000394	0.1414769	1.1305252	
0.000001250	11825.	9460382214.	42.0019052	0.0000525	-0.0000525	0.1878737	1.5073441	

0.000001563	14744.	9436150765.	42.0015269	0.0000656	-0.0000656	0.2338910
1.8841629						
0.000001875	17647.	9411919316.	42.0012747	0.0000788	-0.0000787	0.2795285
2.2609818						
0.000002188	20536.	9387687866.	42.0010945	0.0000919	-0.0000919	0.3247865
2.6378007						
0.000002500	23409.	9363456417.	42.0009595	0.0001050	-0.0001050	0.3696649
3.0146196						
0.000002813	23409.	8323072371.	17.6797959	0.0000497	-0.0001865	0.1756481
-5.3749854 C						
0.000003125	23409.	7490765134.	17.6848461	0.0000553	-0.0002072	0.1948936
-5.9717483 C						
0.000003438	23409.	6809786485.	17.6899893	0.0000608	-0.0002279	0.2140855
-6.5684104 C						
0.000003750	23409.	6242304278.	17.6952054	0.0000664	-0.0002486	0.2332239
-7.1649714 C						
0.000004063	23409.	5762127026.	17.7004802	0.0000719	-0.0002693	0.2523086
-7.7614309 C						
0.000004375	23409.	5350546524.	17.7058040	0.0000775	-0.0002900	0.2713396
-8.3577886 C						
0.000004688	23409.	4993843422.	17.7111693	0.0000830	-0.0003107	0.2903167
-8.9540442 C						
0.000005000	23409.	4681728209.	17.7165707	0.0000886	-0.0003314	0.3092399
-9.5501972 C						
0.000005313	23409.	4406332432.	17.7220040	0.0000941	-0.0003521	0.3281091
-10.1462475 C						
0.000005625	23409.	4161536185.	17.7274660	0.0000997	-0.0003728	0.3469242
-10.7421946 C						
0.000005938	23409.	3942507965.	17.7329541	0.0001053	-0.0003935	0.3656851
-11.3380382 C						
0.000006250	23409.	3745382567.	17.7384665	0.0001109	-0.0004141	0.3843917
-11.9337779 C						
0.000006563	23409.	3567031016.	17.7440013	0.0001164	-0.0004348	0.4030439
-12.5294135 C						
0.000006875	23409.	3404893243.	17.7495573	0.0001220	-0.0004555	0.4216416
-13.1249445 C						
0.000007188	23409.	3256854406.	17.7551335	0.0001276	-0.0004761	0.4401848
-13.7203706 C						
0.000007500	23409.	3121152139.	17.7607289	0.0001332	-0.0004968	0.4586734
-14.3156914 C						
0.000007813	23409.	2996306053.	17.7663429	0.0001388	-0.0005175	0.4771071
-14.9109067 C						
0.000008125	23409.	2881063513.	17.7719747	0.0001444	-0.0005381	0.4954861
-15.5060160 C						
0.000008438	23409.	2774357457.	17.7776239	0.0001500	-0.0005588	0.5138101

-16.1010189 C						
0.000008750	23409.	2675273262.	17.7832900	0.0001556	-0.0005794	0.5320791
-16.6959152 C						
0.000009063	23409.	2583022460.	17.7889727	0.0001612	-0.0006000	0.5502930
-17.2907043 C						
0.000009375	23409.	2496921711.	17.7946717	0.0001668	-0.0006207	0.5684517
-17.8853861 C						
0.000009688	23409.	2416375850.	17.8003868	0.0001724	-0.0006413	0.5865551
-18.4799601 C						
0.0000100	23409.	2340864104.	17.8061176	0.0001781	-0.0006619	0.6046030
-19.0744259 C						
0.0000103	23409.	2269928828.	17.8118640	0.0001837	-0.0006826	0.6225955
-19.6687832 C						
0.0000106	23409.	2203166216.	17.8176259	0.0001893	-0.0007032	0.6405324
-20.2630315 C						
0.0000109	23409.	2140218610.	17.8234031	0.0001949	-0.0007238	0.6584135
-20.8571706 C						
0.0000113	23409.	2080768093.	17.8291955	0.0002006	-0.0007444	0.6762389
-21.4512000 C						
0.0000116	23409.	2024531117.	17.8350031	0.0002062	-0.0007650	0.6940084
-22.0451193 C						
0.0000119	23409.	1971253983.	17.8408257	0.0002119	-0.0007856	0.7117220
-22.6389282 C						
0.0000122	23409.	1920709009.	17.8466633	0.0002175	-0.0008062	0.7293794
-23.2326262 C						
0.0000128	23409.	1827015886.	17.8583833	0.0002288	-0.0008474	0.7645256
-24.4196883 C						
0.0000134	23409.	1742038403.	17.8701629	0.0002401	-0.0008886	0.7994463
-25.6063023 C						
0.0000141	23409.	1664614474.	17.8820020	0.0002515	-0.0009298	0.8341407
-26.7924650 C						
0.0000147	23409.	1593779816.	17.8939005	0.0002628	-0.0009709	0.8686079
-27.9781732 C						
0.0000153	23409.	1528727578.	17.9058586	0.0002742	-0.0010121	0.9028471
-29.1634236 C						
0.0000159	23409.	1468777477.	17.9178765	0.0002856	-0.0010532	0.9368575
-30.3482129 C						
0.0000166	23409.	1413351912.	17.9299544	0.0002970	-0.0010943	0.9706382
-31.5325378 C						
0.0000172	24252.	1411039805.	17.9420926	0.0003084	-0.0011354	1.0041885
-32.7163947 C						
0.0000178	25124.	1410471106.	17.9542915	0.0003198	-0.0011764	1.0375074
-33.8997803 C						
0.0000184	25995.	1409900220.	17.9665514	0.0003313	-0.0012175	1.0705940
-35.0826911 C						

0.0000191	26865.	1409327107.	17.9788727	0.0003427	-0.0012585	1.1034475
-36.2651235 C						
0.0000197	27735.	1408751731.	17.9912559	0.0003542	-0.0012995	1.1360671
-37.4470739 C						
0.0000203	28604.	1408174057.	18.0037015	0.0003657	-0.0013405	1.1684517
-38.6285387 C						
0.0000209	29472.	1407594052.	18.0162100	0.0003772	-0.0013815	1.2006005
-39.8095142 C						
0.0000216	30339.	1407011681.	18.0287818	0.0003887	-0.0014225	1.2325126
-40.9899966 C						
0.0000222	31205.	1406426914.	18.0414176	0.0004003	-0.0014635	1.2641871
-42.1699822 C						
0.0000228	32071.	1405839719.	18.0541178	0.0004119	-0.0015044	1.2956230
-43.3494670 C						
0.0000234	32936.	1405250823.	18.0665035	0.0004234	-0.0015453	1.3267950
-44.5287046 C						
0.0000241	33800.	1404659966.	18.0786242	0.0004350	-0.0015862	1.3577039
-45.7076794 C						
0.0000247	34663.	1404066822.	18.0908041	0.0004466	-0.0016271	1.3883694
-46.8861718 C						
0.0000253	35525.	1403471283.	18.1030438	0.0004582	-0.0016680	1.4187906
-48.0641788 C						
0.0000259	36387.	1402873415.	18.1153437	0.0004699	-0.0017089	1.4489665
-49.2416961 C						
0.0000266	37248.	1402273008.	18.1277045	0.0004815	-0.0017497	1.4788961
-50.4187213 C						
0.0000272	38108.	1401670125.	18.1401267	0.0004932	-0.0017906	1.5085784
-51.5952500 C						
0.0000278	38967.	1401064738.	18.1526109	0.0005049	-0.0018314	1.5380125
-52.7712784 C						
0.0000284	39825.	1400456820.	18.1651577	0.0005166	-0.0018722	1.5671974
-53.9468026 C						
0.0000291	40683.	1399846345.	18.1777678	0.0005283	-0.0019130	1.5961321
-55.1218187 C						
0.0000297	41540.	1399233284.	18.1904417	0.0005400	-0.0019537	1.6248155
-56.2963227 C						
0.0000303	42396.	1398617610.	18.2031801	0.0005518	-0.0019945	1.6532467
-57.4703106 C						
0.0000309	43251.	1397999296.	18.2159837	0.0005636	-0.0020352	1.6814245
-58.6437783 C						
0.0000316	44105.	1397378312.	18.2288531	0.0005753	-0.0020759	1.7093481
-59.8167216 C						
0.0000322	44958.	1396754631.	18.2417889	0.0005872	-0.0021166	1.7370162
-60.0000000 CY						
0.0000328	45810.	1396128225.	18.2547919	0.0005990	-0.0021573	1.7644278

-60.0000000 CY						
0.0000334	46639.	1394824384.	18.2649202	0.0006107	-0.0021980	1.7913525
-60.0000000 CY						
0.0000341	47384.	1391101263.	18.2644065	0.0006221	-0.0022391	1.8171739
-60.0000000 CY						
0.0000347	48028.	1384586204.	18.2511821	0.0006331	-0.0022807	1.8417091
-60.0000000 CY						
0.0000353	48569.	1375398614.	18.2255881	0.0006436	-0.0023227	1.8649631
-60.0000000 CY						
0.0000359	49100.	1366267790.	18.2000890	0.0006541	-0.0023647	1.8879174
-60.0000000 CY						
0.0000366	49631.	1357435233.	18.1758115	0.0006646	-0.0024067	1.9106655
-60.0000000 CY						
0.0000372	50162.	1348885832.	18.1526962	0.0006751	-0.0024487	1.9332068
-60.0000000 CY						
0.0000397	51696.	1302587281.	17.9920489	0.0007141	-0.0026197	2.0147208
-60.0000000 CY						
0.0000422	53072.	1257998420.	17.8294710	0.0007522	-0.0027916	2.0912081
-60.0000000 CY						
0.0000447	54326.	1215687329.	17.6721764	0.0007897	-0.0029640	2.1634870
-60.0000000 CY						
0.0000472	55129.	1168291061.	17.4733567	0.0008245	-0.0031392	2.2276624
-60.0000000 CY						
0.0000497	55927.	1125578237.	17.2970661	0.0008594	-0.0033143	2.2895009
-60.0000000 CY						
0.0000522	56719.	1086831948.	17.1342333	0.0008942	-0.0034896	2.3484529
-60.0000000 CY						
0.0000547	57505.	1051515444.	16.9835527	0.0009288	-0.0036650	2.4046074
-60.0000000 CY						
0.0000572	58118.	1016267600.	16.8217918	0.0009620	-0.0038418	2.4560645
-60.0000000 CY						
0.0000597	58525.	980526051.	16.6445767	0.0009935	-0.0040203	2.5026107
-60.0000000 CY						
0.0000622	58930.	947622701.	16.4833656	0.0010251	-0.0041987	2.5472311
-60.0000000 CY						
0.0000647	59331.	917192059.	16.3326437	0.0010565	-0.0043772	2.5895816
-60.0000000 CY						
0.0000672	59724.	888916193.	16.1867628	0.0010875	-0.0045562	2.6293002
-60.0000000 CY						
0.0000697	60115.	862638905.	16.0529393	0.0011187	-0.0047351	2.6671335
-60.0000000 CY						
0.0000722	60504.	838152064.	15.9299438	0.0011499	-0.0049138	2.7030609
-60.0000000 CY						
0.0000747	60891.	815275377.	15.8167123	0.0011813	-0.0050924	2.7370615
-60.0000000 CY						

0.0000772	61275.	793851898.	15.7123195	0.0012128	-0.0052710	2.7691136
-60.0000000 CY						
0.0000797	61564.	772568372.	15.5992366	0.0012431	-0.0054507	2.7979271
-60.0000000 CY						
0.0000822	61737.	751177953.	15.4686468	0.0012713	-0.0056324	2.8230376
-60.0000000 CY						
0.0000847	61905.	730985940.	15.3414714	0.0012992	-0.0058145	2.8461802
-60.0000000 CY						
0.0000872	62072.	711937257.	15.2226743	0.0013272	-0.0059965	2.8677747
-60.0000000 CY						
0.0000897	62237.	693936044.	15.1115681	0.0013553	-0.0061784	2.8878047
-60.0000000 CY						
0.0000922	62401.	676896836.	15.0075400	0.0013835	-0.0063602	2.9062535
-60.0000000 CY						
0.0000947	62564.	660743190.	14.9100424	0.0014118	-0.0065420	2.9231040
-60.0000000 CY						
0.0000972	62725.	645406520.	14.8185848	0.0014402	-0.0067236	2.9383389
-60.0000000 CY						
0.0000997	62885.	630825119.	14.7327260	0.0014687	-0.0069051	2.9519405
-60.0000000 CY						
0.0001022	63040.	616909218.	14.6468139	0.0014967	-0.0070870	2.9636739
-60.0000000 CY						
0.0001047	63192.	603623659.	14.5625798	0.0015245	-0.0072692	2.9736806
-60.0000000 CY						
0.0001072	63342.	590945774.	14.4832314	0.0015524	-0.0074513	2.9821077
-60.0000000 CY						
0.0001097	63491.	578833856.	14.4084494	0.0015804	-0.0076333	2.9889368
-60.0000000 CY						
0.0001122	63638.	567249859.	14.3379433	0.0016085	-0.0078152	2.9941495
-60.0000000 CY						
0.0001147	63784.	556159049.	14.2714487	0.0016368	-0.0079970	2.9977264
-60.0000000 CY						
0.0001172	63929.	545529651.	14.2087242	0.0016651	-0.0081787	2.9996481
-60.0000000 CY						
0.0001197	64072.	535330894.	14.1496355	0.0016935	-0.0083602	2.9979837
-60.0000000 CY						
0.0001222	64214.	525535735.	14.0939968	0.0017221	-0.0085416	2.9951909
-60.0000000 CY						
0.0001247	64352.	516103540.	14.0408462	0.0017507	-0.0087230	2.9982060
-60.0000000 CY						
0.0001272	64454.	506762300.	13.9823452	0.0017784	-0.0089054	2.9997322
-60.0000000 CY						
0.0001297	64555.	497770389.	13.9270134	0.0018062	-0.0090876	2.9980901
-60.0000000 CY						
0.0001322	64616.	488817714.	13.8652632	0.0018328	-0.0092709	2.9932078

-60.0000000 CY						
0.0001347	64663.	480095277.	13.7968639	0.0018583	-0.0094555	2.9962002
-60.0000000 CY						
0.0001372	64709.	471683083.	13.7308102	0.0018837	-0.0096401	2.9983803
-60.0000000 CY						
0.0001522	64972.	426922746.	13.3918053	0.0020381	-0.0107457	2.9979286
-60.0000000 CY						
0.0001672	65216.	390076931.	13.1299589	0.0021952	-0.0118486	2.9944341
60.0000000 CY						
0.0001822	65435.	359165198.	12.9077306	0.0023516	-0.0129521	2.9938932
60.0000000 CY						
0.0001972	65635.	332854332.	12.7141984	0.0025071	-0.0140567	2.9984204
60.0000000 CY						
0.0002122	65825.	310221871.	12.5568203	0.0026644	-0.0151593	2.9895031
60.0000000 CY						
0.0002272	66003.	290522623.	12.4302508	0.0028240	-0.0162598	2.9971889
60.0000000 CY						
0.0002422	66173.	273228665.	12.3267990	0.0029854	-0.0173584	2.9938736
60.0000000 CY						
0.0002572	66311.	257832699.	12.2545454	0.0031517	-0.0184520	2.9882752
60.0000000 CYT						
0.0002722	66445.	244116380.	12.1945934	0.0033192	-0.0195445	2.9990464
60.0000000 CYT						
0.0002872	66504.	231570423.	12.1070097	0.0034770	-0.0206468	2.9929082
60.0000000 CYT						
0.0003022	66548.	220221450.	12.0223497	0.0036330	-0.0217507	2.9801293
60.0000000 CYT						
0.0003172	66558.	209839459.	11.9285087	0.0037836	-0.0228602	2.9852088
60.0000000 CYT						
0.0003322	66558.	200364112.	12.0016341	0.0039868	-0.0239170	2.9996117
60.0000000 CYT						

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	0.050	66184.753	0.00300000

Note note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are spirals or tied hoops.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

ERROR 2 in computing i_BottomNodeInLayer
Num_Nodes_To_Assign = 101
ilayer = 8
klayer = 9
jlayer = 9
i_Number_of_Layers = 8

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 35.000 lbs
Applied moment at pile head = 49836000.000 in-lbs
Axial thrust load on pile head = 50.000 lbs

Depth X inches	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	2.8717	49836000.	35.0000	-0.0187	0.000	1.354E+12	-0.007709	0.002980	0.000
2.220	2.8302	49836080.	34.9660	-0.0187	0.000	1.354E+12	-0.0230	0.0181	0.000
4.440	2.7889	49836159.	34.9149	-0.0186	0.000	1.354E+12	-0.0229	0.0182	0.000
6.660	2.7477	49836239.	34.8643	-0.0185	0.000	1.354E+12	-0.0228	0.0184	0.000
8.880	2.7068	49836318.	34.8137	-0.0184	0.000	1.354E+12	-0.0227	0.0186	0.000
11.100	2.6660	49836398.	34.7635	-0.0183	0.000	1.354E+12	-0.0226	0.0188	0.000
13.320	2.6254	49836477.	-40.4402	-0.0182	0.000	1.354E+12	-67.7286	57.2705	0.000
15.540	2.5850	49836222.	-313.6578	-0.0182	0.000	1.354E+12	-178.4136	153.2231	0.000
17.760	2.5447	49835088.	-830.7042	-0.0181	0.000	1.354E+12	-287.3938	250.7187	0.000

19.980	2.5047	49832538.	-1588.7700	-0.0180	0.000	1.354E+12	-395.5483	350.5895	0.000
22.200	2.4648	49828038.	-2586.5485	-0.0179	0.000	1.354E+12	-503.3514	453.3565	0.000
24.420	2.4251	49821057.	-3823.5428	-0.0178	0.000	1.354E+12	-611.0578	559.3726	0.000
26.640	2.3856	49811065.	-5299.6789	-0.0178	0.000	1.355E+12	-718.7946	668.8942	0.000
28.860	2.3463	49797531.	-7015.0786	-0.0177	0.000	1.355E+12	-826.6107	782.1190	0.000
31.080	2.3071	49779922.	-8969.9172	-0.0176	0.000	1.355E+12	-934.5052	899.2093	0.000
33.300	2.2682	49757708.	-11164.	-0.0175	0.000	1.355E+12	-1042.4449	1020.3044	0.000
35.520	2.2294	49730357.	-13598.	-0.0174	0.000	1.356E+12	-1150.3743	1145.5297	0.000
37.740	2.1908	49697335.	-16327.	-0.0173	0.000	1.356E+12	-1307.5988	1325.0367	0.000
39.960	2.1524	49657870.	-19359.	-0.0173	0.000	1.357E+12	-1424.3666	1469.1284	0.000
42.180	2.1141	49611384.	-22651.	-0.0172	0.000	1.358E+12	-1541.0845	1618.2679	0.000
44.400	2.0761	49557304.	-26201.	-0.0171	0.000	1.359E+12	-1657.6327	1772.5673	0.000
46.620	2.0382	49495054.	-30010.	-0.0170	0.000	1.360E+12	-1773.8898	1932.1428	0.000
48.840	2.0005	49424062.	-34077.	-0.0169	0.000	1.361E+12	-1889.7335	2097.1157	0.000
51.060	1.9629	49343756.	-38400.	-0.0169	0.000	1.362E+12	-2005.0408	2267.6135	0.000
53.280	1.9256	49253568.	-42979.	-0.0168	0.000	1.364E+12	-2119.6890	2443.7705	0.000
55.500	1.8884	49152934.	-47811.	-0.0167	0.000	1.365E+12	-2233.8023	2626.0193	0.000
57.720	1.8514	49041291.	-52896.	-0.0166	0.000	1.367E+12	-2347.4149	2814.7160	0.000
59.940	1.8146	48918079.	-58233.	-0.0165	0.000	1.369E+12	-2460.1957	3009.7959	0.000
62.160	1.7780	48782742.	-63685.	-0.0165	0.000	1.372E+12	-2451.4781	3060.9332	0.000
64.380	1.7415	48635323.	-69239.	-0.0164	0.000	1.374E+12	-2552.2649	3253.4997	0.000
66.600	1.7052	48475325.	-75015.	-0.0163	0.000	1.377E+12	-2651.8980	3452.4469	0.000
68.820	1.6691	48302258.	-81012.	-0.0162	0.000	1.380E+12	-2750.2983	3658.0259	

0.000								
71.040	1.6332	48115636.	-87225.	-0.0162	0.000	1.383E+12	-2847.3880	3870.5072
0.000								
73.260	1.5974	47914981.	-93653.	-0.0161	0.000	1.386E+12	-2943.0903	4090.1842
0.000								
75.480	1.5618	47699822.	-100291.	-0.0160	0.000	1.388E+12	-3037.3296	4317.3743
0.000								
77.700	1.5264	47469693.	-107137.	-0.0159	0.000	1.390E+12	-3130.0317	4552.4220
0.000								
79.920	1.4911	47224138.	-114187.	-0.0158	0.000	1.392E+12	-3221.1234	4795.7024
0.000								
82.140	1.4560	46962708.	-121437.	-0.0158	0.000	1.393E+12	-3310.5331	5047.6235
0.000								
84.360	1.4211	46684963.	-129072.	-0.0157	0.000	1.395E+12	-3568.0973	5574.0582
0.000								
86.580	1.3863	46389633.	-137119.	-0.0156	0.000	1.395E+12	-3681.7582	5895.8529
0.000								
88.800	1.3517	46076157.	-145416.	-0.0155	0.000	1.396E+12	-3793.1639	6229.7424
0.000								
91.020	1.3173	45743987.	-153958.	-0.0155	0.000	1.396E+12	-3902.0559	6576.1258
0.000								
93.240	1.2830	45392586.	-162739.	-0.0154	0.000	1.396E+12	-4008.2572	6935.5772
0.000								
95.460	1.2489	45021431.	-171752.	-0.0153	0.000	1.397E+12	-4111.5892	7308.7235
0.000								
97.680	1.2149	44630013.	-180991.	-0.0153	0.000	1.397E+12	-4211.8719	7696.2502
0.000								
99.900	1.1811	44217836.	-190449.	-0.0152	0.000	1.397E+12	-4308.9231	8098.9086
0.000								
102.120	1.1475	43784424.	-200072.	-0.0151	0.000	1.398E+12	-4360.7422	8436.6235
0.000								
104.340	1.1140	43329520.	-209800.	-0.0151	0.000	1.398E+12	-4403.3514	8775.1676
0.000								
106.560	1.0807	42852914.	-219619.	-0.0150	0.000	1.398E+12	-4442.7007	9126.7099
0.000								
108.780	1.0475	42354413.	-229522.	-0.0149	0.000	1.399E+12	-4478.7071	9492.1773
0.000								
111.000	1.0144	41833839.	-239501.	-0.0148	0.000	1.399E+12	-4511.2823	9872.5973
0.000								
113.220	0.9815	41291032.	-249548.	-0.0148	0.000	1.399E+12	-4540.3325	10269.
0.000								
115.440	0.9488	40725848.	-259656.	-0.0147	0.000	1.400E+12	-4565.7581	10683.
0.000								
117.660	0.9162	40138163.	-269816.	-0.0147	0.000	1.400E+12	-4587.4527	11116.
0.000								

119.880	0.8837	39527868.	-280020.	-0.0146	0.000	1.401E+12	-4605.3030	11569.
0.000								
122.100	0.8514	38894877.	-290421.	-0.0145	0.000	1.401E+12	-4764.8449	12424.
0.000								
124.320	0.8192	38238403.	-301005.	-0.0145	0.000	1.402E+12	-4770.1803	12927.
0.000								
126.540	0.7872	37558419.	-311596.	-0.0144	0.000	1.402E+12	-4771.2463	13456.
0.000								
128.760	0.7553	36854921.	-322184.	-0.0143	0.000	1.403E+12	-4767.8907	14015.
0.000								
130.980	0.7235	36127924.	-332760.	-0.0143	0.000	1.403E+12	-4759.9483	14606.
0.000								
133.200	0.6918	35377469.	-343313.	-0.0142	0.000	1.404E+12	-4747.2394	15234.
0.000								
135.420	0.6603	34603617.	-353832.	-0.0142	0.000	1.404E+12	-4729.5667	15902.
0.000								
137.640	0.6289	33806456.	-364307.	-0.0141	0.000	1.405E+12	-4706.7129	16615.
0.000								
139.860	0.5976	32986099.	-374724.	-0.0141	0.000	1.405E+12	-4678.4370	17381.
0.000								
142.080	0.5664	32142684.	-385081.	-0.0140	0.000	1.406E+12	-4651.6729	18233.
0.000								
144.300	0.5353	31276344.	-395374.	-0.0140	0.000	1.406E+12	-4621.4123	19165.
0.000								
146.520	0.5044	30387228.	-405593.	-0.0139	0.000	1.407E+12	-4584.8359	20181.
0.000								
148.740	0.4735	29475516.	-415723.	-0.0139	0.000	1.408E+12	-4541.5078	21292.
0.000								
150.960	0.4428	28541422.	-425749.	-0.0138	0.000	1.408E+12	-4490.9236	22517.
0.000								
153.180	0.4121	27585195.	-435498.	-0.0138	0.000	1.409E+12	-4291.8028	23119.
0.000								
155.400	0.3816	26607815.	-444743.	-0.0137	0.000	1.409E+12	-4037.2005	23489.
0.000								
157.620	0.3511	25610539.	-453413.	-0.0137	0.000	1.410E+12	-3773.4169	23859.
0.000								
159.840	0.3207	24594666.	-461487.	-0.0137	0.000	1.411E+12	-3500.4601	24229.
0.000								
162.060	0.2904	23561541.	-468945.	-0.0136	0.000	7.196E+12	-3218.3349	24599.
0.000								
164.280	0.2602	22512556.	-475765.	-0.0136	0.000	9.370E+12	-2926.2995	24969.
0.000								
166.500	0.2299	21449148.	-481926.	-0.0136	0.000	9.379E+12	-2624.3129	25339.
0.000								
168.720	0.1997	20372806.	-487406.	-0.0136	0.000	9.389E+12	-2312.3744	25709.

0.000									
170.940	0.1694	19285068.	-492182.	-0.0136	0.000	9.397E+12	-1990.4830	26079.	
0.000									
173.160	0.1392	18187520.	-496233.	-0.0136	0.000	9.407E+12	-1658.6369	26448.	
0.000									
175.380	0.1090	17081798.	-499535.	-0.0136	0.000	9.416E+12	-1316.8343	26818.	
0.000									
177.600	0.0788	15969586.	-502068.	-0.0136	0.000	9.425E+12	-965.0726	27188.	
0.000									
179.820	0.0486	14852618.	-503809.	-0.0136	0.000	9.435E+12	-603.3491	27558.	
0.000									
182.040	0.0184	13732676.	-505501.	-0.0136	0.000	9.443E+12	-920.7341	111000.	
0.000									
184.260	-0.0118	12608196.	-505870.	-0.0136	0.000	9.453E+12	588.3708	111000.	
0.000									
186.480	-0.0419	11486616.	-502889.	-0.0136	0.000	9.463E+12	2097.1471	111000.	
0.000									
188.700	-0.0721	10375372.	-496559.	-0.0136	0.000	9.471E+12	3605.6242	111000.	
0.000									
190.920	-0.1023	9281897.	-486880.	-0.0136	0.000	9.481E+12	5113.8314	111000.	
0.000									
193.140	-0.1324	8213626.	-473854.	-0.0136	0.000	9.489E+12	6621.7973	111000.	
0.000									
195.360	-0.1626	7177989.	-457480.	-0.0136	0.000	9.496E+12	8129.5500	111000.	
0.000									
197.580	-0.1927	6182419.	-437759.	-0.0136	0.000	9.506E+12	9637.1163	111000.	
0.000									
199.800	-0.2229	5234343.	-414691.	-0.0136	0.000	9.512E+12	11145.	111000.	0.000
202.020	-0.2530	4341193.	-388277.	-0.0136	0.000	9.518E+12	12652.	111000.	0.000
204.240	-0.2832	3510395.	-358517.	-0.0136	0.000	9.526E+12	14159.	111000.	0.000
206.460	-0.3133	2749379.	-325412.	-0.0136	0.000	9.533E+12	15666.	111000.	0.000
208.680	-0.3435	2065570.	-288960.	-0.0136	0.000	9.533E+12	17173.	111000.	0.000
210.900	-0.3736	1466398.	-249164.	-0.0136	0.000	9.533E+12	18680.	111000.	0.000
213.120	-0.4037	959287.	-206021.	-0.0136	0.000	9.533E+12	20187.	111000.	0.000
215.340	-0.4339	551666.	-159534.	-0.0136	0.000	9.533E+12	21694.	111000.	0.000
217.560	-0.4640	250960.	-109701.	-0.0136	0.000	9.533E+12	23201.	111000.	0.000
219.780	-0.4941	64596.	-56523.	-0.0136	0.000	9.533E+12	24707.	111000.	0.000
222.000	-0.5243	0.000	0.000	-0.0136	0.000	9.533E+12	26214.	55500.	0.000

*** This analysis makes computations of pile response using nonlinear moment-curvature relationships.**

The above values of total stress are computed for combined axial and bending stress and do not equal the actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 2.8716992 inches
Computed slope at pile head = -0.0187366 radians
Maximum bending moment = 49836477. inch-lbs
Maximum shear force = -505870. lbs
Depth of maximum bending moment = 13.3200000 inches below pile head
Depth of maximum shear force = 184.2600000 inches below pile head
Number of iterations = 48
Number of zero deflection points = 1

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs	Pile-head Rotation radians
1	1	V = 35.0000	M = 49836000.	50.00000000	2.87169922	49836477.	-505870.	-0.01873662

The analysis ended normally.