Robinson+Cole

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Also admitted in Massachusetts

August 22, 2018

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

Re: **Notice of Exempt Modification – Facility Modification**
474 Main Street, Monroe, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) antennas at the 160-foot level of the existing 191.5-foot tower at 474 Main Street in Monroe, Connecticut (the "Property"). The tower is owned by Crown Atlantic Company ("Crown"). The Council approved Cellco's use of this tower in 2007. Cellco now intends to modify its facility by removing nine (9) of its antennas and installing six (6) new antennas (three (3) model JAHH-65B-R3B, 700 MHz antennas and three (3) model JAHH-65B-R3B, 2100 MHz antennas), all at the same level on the tower. Cellco also intends to install three (3) new remote radio heads ("RRHs") and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Kenneth Kellogg, First Selectman of the Town of Monroe; Scott Schatzlein, Monroe's Land Use Director/Town Engineer; Seven Forty Two Nursery LLC, the owner of the Property; and Crown, the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed at the 160-foot level of the 191.5-foot tower.

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

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

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Kenneth Kellogg, Monroe First Selectman
Scott Schatzlein, Land Use Director/Town Engineer
Seven Forty Two Nursery LLC
Crown Atlantic Company
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

JAHH-65B-R3B

8-port sector antenna, 2x 698–787, 2x 824-894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB(Port 1) and first HB (Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

Electrical Specifications

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	15.8	18.0	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2 ° | 14.3	2 ° | 15.0	0 ° | 17.2	0 ° | 17.6	0 ° | 17.7	0 ° | 17.9
	8 ° | 14.3	8 ° | 14.9	5 ° | 17.6	5 ° | 18.2	5 ° | 18.3	5 ° | 18.7
	14 ° | 14.3	14 ° | 15.4	10 ° | 17.6	10 ° | 18.2	10 ° | 18.3	10 ° | 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24
CPR at Sector, dB	11	12	11	11	11	8

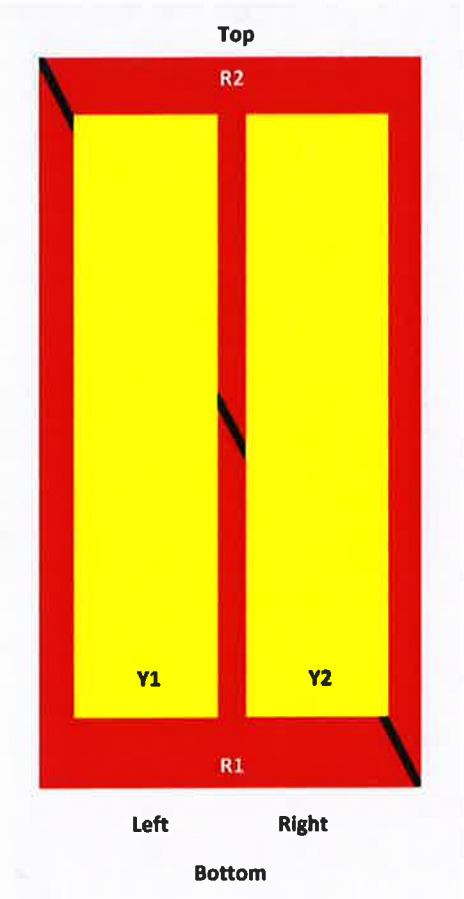
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

Product Specifications

JAHH-65B-R3B

Array Layout

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-798	1-2	1	ANxxxxxxxxxxxxxxx1
R2	824-894	3-4	2	ANxxxxxxxxxxxxxxx2
Y1	1695-2360	5-6	3	ANxxxxxxxxxxxxxxx3
Y2	1695-2360	7-8		

View from the front of the antenna

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

General Specifications

Operating Frequency Band	1695 – 2360 MHz | 698 – 787 MHz | 824 – 894 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	8
RF Connector Quantity, low band	4
RF Connector Quantity, high band	4
RF Connector Interface	4.3-10 Female

Product Specifications

JAHH-65B-R3B

Color	Light gray
Grounding Type	RF connector body grounded to reflector and mounting bracket
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	746.0 N @ 150 km/h 167.7 lbf @ 150 km/h
Wind Loading, lateral	243.0 N @ 150 km/h 54.6 lbf @ 150 km/h
Wind Loading, rear	776.0 N @ 150 km/h 174.5 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Length	1828.0 mm | 72.0 in
Width	350.0 mm | 13.8 in
Depth	208.0 mm | 8.2 in
Net Weight, without mounting kit	28.7 kg | 63.3 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 | Port 5
Internal RET	High band (1) | Low band (2)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	13 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	2 female | 2 male

Packed Dimensions

Length	1975.0 mm | 77.8 in
Width	456.0 mm | 18.0 in
Depth	357.0 mm | 14.1 in
Shipping Weight	42.0 kg | 92.6 lb

Regulatory Compliance/Certifications

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

Product Specifications

JAHH-65B-R3B

Included Products

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

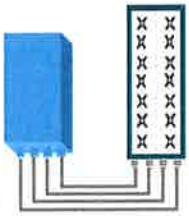
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

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

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

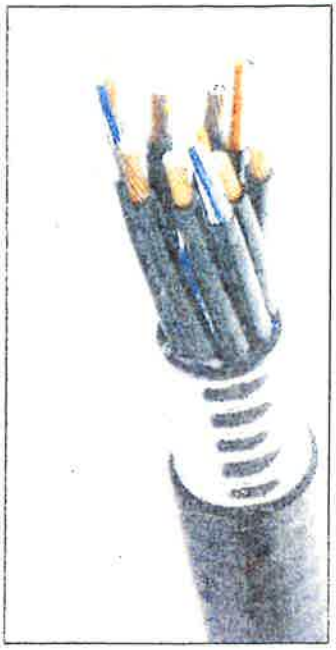


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mechanical Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Fiber Optic Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power and Alarm Properties			
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

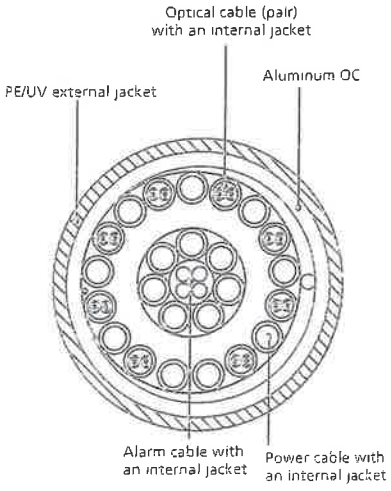


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Monroe W								
Tower Height: 191.5Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile	8	250	195	1935	0.0202	1.0000	0.20%	
*T-Mobile-AWS-LTE	2	2560	194	2100	0.0521	1.0000	0.52%	
*T-Mobile-PCS-LTE	2	2560	194	1900	0.0521	1.0000	0.52%	
*T-Mobile-PCS-GSM	2	1167	194	1900	0.0237	1.0000	0.24%	
*T-Mobile-LTE	1	679	194	700	0.0069	0.4667	0.15%	
*AT&T	1	296	140	880	0.0059	0.5867	0.10%	
*AT&T	6	427	140	1900	0.0513	1.0000	0.51%	
*AT&T	1	500	140	880	0.0100	0.5867	0.17%	
*AT&T	1	500	140	1900	0.0100	1.0000	0.10%	
*AT&T	1	500	140	740	0.0100	0.4933	0.20%	
*Sprint	1	438	152	850	0.0074	0.5667	0.13%	
*Sprint	2	438	152	850	0.0148	0.5667	0.26%	
*Sprint	5	623	152	1900	0.0526	1.0000	0.53%	
*Sprint	2	1556	152	1900	0.0525	1.0000	0.53%	
*Sprint	8	778	152	2500	0.1050	1.0000	1.05%	
VZW PCS	**0**	**5062**	**160**	**0.0000**	**1970**	**1.0000**	**0.00%**	
VZW Cellular	**3**	**477**	**160**	**0.0201**	**869**	**0.5793**	**3.47%**	
VZW Cellular	**0**	**3709**	**160**	**0.0000**	**880**	**0.5866**	**0.00%**	
VZW AWS	**1**	**7770**	**160**	**0.1091**	**2145**	**1.0000**	**10.91%**	
VZW 700	**1**	**2062**	**160**	**0.0290**	**746**	**0.4973**	**5.82%**	
								25.42%
* Source: Siting Council								

ATTACHMENT 3

Date: **August 25, 2017**

Marianne Dunst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	178702
	Carrier Site Name:	Monroe West CT
Crown Castle Designation:	**Crown Castle BU Number:**	876355
	Crown Castle Site Name:	UPPER STEPNEY - TLC
	Crown Castle JDE Job Number:	454366
	Crown Castle Work Order Number:	1447655
	Crown Castle Application Number:	402378 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1447655
Site Data:	**474-480 Main St., Monroe, Fairfield County, CT**	
	Latitude *41° 19' 31.99"*, Longitude *-73° 15' 57.05"*	
	191.5 Foot - Monopole Tower	

Dear Marianne Dunst,

Crown Castle 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 1447655, in accordance with application 402378, 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 I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

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

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

Structural analysis prepared by: Mishka Stueber / MJL

Respectfully submitted by:

STATE OF CONNECTICUT
TERRY P. STYRAN
31522
LICENSED PROFESSIONAL ENGINEER

8/25/2017

Terry P. Styran, P.E.
Senior Project Engineer
tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 191.5 ft Monopole tower designed by Engineered Endeavors, Inc. in October of 2000. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B.

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
160.0	160.0	3	alcatel lucent	RRH2x60-700	1	1-5/8	-
		6	commscope	JAHH-65B-R3B w/ Mount Pipe			
		1	rfs celwave	DB-B1-6C-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
192.0	194.0	12	ems wireless	RV65-18-02DPL2 w/ Mount Pipe	24	1-5/8	1
		6	ericsson	KRY 112 144/1			
	192.0	1	tower mounts	T-Arm Mount [TA 602-3]			
160.0	160.0	6	rfs celwave	FD9R6004/2C-3L	-	-	3
		3	kathrein	742 213 w/ Mount Pipe			
		2	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	antel	BXA-70063/4CF w/ Mount Pipe			
		4	antel	LPA-80063/6CF w/ Mount Pipe	13	1-5/8	1
		3	alcatel lucent	AWS4 (B66) 4x45 RRH			
		2	antel	BXA-171063-12BF w/ Mount Pipe			
		2	antel	LPA-80080/4CF w/ Mount Pipe			
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		1	rfs celwave	DB-B1-6C-8AB-0Z			
		1	tower mounts	Platform Mount [LP 303-1]			
154.0	154.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	tower mounts	Side Arm Mount [SO 102-3]			
	152.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ 2X50W RRH			
150.0	154.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
	152.0	1	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
	150.0	9	rfs celwave	ACU-A20-N			
		1	tower mounts	Platform Mount [LP 601-1]			
137.0	140.0	3	ericsson	RRUS-11	6 2 1 1	1-1/4 5/8 3/8 2" Conduit	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	139.0	6	powerwave technologies	LGP21401			
	137.0	1	tower mounts	Platform Mount [LP 303-1]			
50.0	52.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed; not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
191.5	191.5	12	dapa	48000	-	-
181.5	181.5	12	dapa	48000	-	-
171.5	171.5	12	dapa	48000	-	-
161.5	161.5	12	dapa	48000	-	-
150.0	150.0	12	dapa	48000	-	-
140.0	140.0	12	dapa	48000	-	-
50.0	50.0	1	generic	GPS Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Associates, Inc.	1531885	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors, Inc.	1631625	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	1631582	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	191.5 - 172.46	Pole	TP20.46x15.5x0.188	1	-2.253	852.683	15.2	Pass
L2	172.46 - 127.753	Pole	TP31.6x19.282x0.313	2	-15.672	2220.140	36.6	Pass
L3	127.753 - 83.0833	Pole	TP42.19x29.815x0.438	3	-27.238	4156.060	39.4	Pass
L4	83.0833 - 40.4567	Pole	TP52.59x39.847x0.5	4	-43.115	5916.280	37.9	Pass
L5	40.4567 - 0	Pole	TP62x49.727x0.5	5	-65.373	6834.140	41.3	Pass
							Summary	
						Pole (L5)	41.3	Pass
						Rating =	41.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	39.7	Pass
1	Base Plate	0	49.7	Pass
1	Base Foundation (Structure)	0	51.2	Pass
1	Base Foundation (Soil Interaction)	0	43.6	Pass

Structure Rating (max from all components) =	51.2%

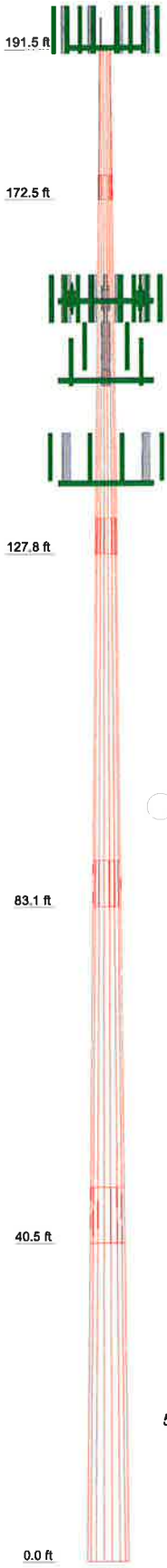
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5
Length (ft)	19.040	47.790	49.170	48.460	47.540
Number of Sides	18	18	18	18	18
Thickness (in)	0.188	0.313	0.438	0.500	0.500
Socket Length (ft)	3.083	4.500	5.833	7.083	
Top Dia (in)	15.500	19.282	29.815	39.847	49.727
Bot Dia (in)	20.460	31.600	42.190	52.590	62.000
Grade	A572-65				
Weight (K)	0.7	4.1	8.3	12.0	14.2

39.2

ALL REACTIONS ARE FACTORED

AXIAL 100 K

SHEAR 9 K *MOMENT 1174 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 0.750 in ICE

AXIAL 65 K

SHEAR 27 K *MOMENT 3485 kip-ft*

TORQUE 0 kip-ft

REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(4) RV65-18-02DPL2 w/ Mount Pipe	192	800MHZ 2X50W RRH	154
(4) RV65-18-02DPL2 w/ Mount Pipe	192	Side Arm Mount [SO 102-3]	154
(4) RV65-18-02DPL2 w/ Mount Pipe	192	APXVSPP18-C-A20 w/ Mount Pipe	150
(2) KRY 112 144/1	192	APXVSPP18-C-A20 w/ Mount Pipe	150
(2) KRY 112 144/1	192	APXVSPP18-C-A20 w/ Mount Pipe	150
(2) KRY 112 144/1	192	APXVTM14-C-120 w/ Mount Pipe	150
T-Arm Mount [TA 602-3]	192	TD-RRH8x20-25	150
Lightning Rod 5/8" x 5'	191.5	TD-RRH8x20-25	150
(2) LPA-80063/6CF w/ Mount Pipe	160	TD-RRH8x20-25	150
(2) LPA-80063/6CF w/ Mount Pipe	160	(3) ACU-A20-N	150
(2) LPA-80080/4CF w/ Mount Pipe	160	(3) ACU-A20-N	150
BXA-171063-12BF w/ Mount Pipe	160	(3) ACU-A20-N	150
BXA-171063-12BF w/ Mount Pipe	160	(2) 6' x 2" Mount Pipe	150
BXA-171063-8BF-2 w/ Mount Pipe	160	(2) 6' x 2" Mount Pipe	150
AWS4 (B66) 4x45 RRH	160	(2) 6' x 2" Mount Pipe	150
AWS4 (B66) 4x45 RRH	160	6' Climbing Ladder (Flat)	150
AWS4 (B66) 4x45 RRH	160	Platform Mount [LP 601-1]	150
DB-B1-6C-8AB-0Z	160	7770.00 w/ Mount Pipe	137
(2) JAHH-65B-R3B w/ Mount Pipe	160	7770.00 w/ Mount Pipe	137
(2) JAHH-65B-R3B w/ Mount Pipe	160	7770.00 w/ Mount Pipe	137
(2) JAHH-65B-R3B w/ Mount Pipe	160	P65-16-XLH-RR w/ Mount Pipe	137
RRH2x60-700	160	P65-16-XLH-RR w/ Mount Pipe	137
RRH2x60-700	160	P65-16-XLH-RR w/ Mount Pipe	137
RRH2x60-700	160	(2) LGP21401	137
DB-B1-6C-8AB-0Z	160	(2) LGP21401	137
Platform Mount [LP 303-1]	160	(2) LGP21401	137
PCS 1900MHz 4x45W-65MHz	154	RRUS-11	137
PCS 1900MHz 4x45W-65MHz	154	RRUS-11	137
PCS 1900MHz 4x45W-65MHz	154	RRUS-11	137
800 EXTERNAL NOTCH FILTER	154	DC6-48-60-18-8F	137
800 EXTERNAL NOTCH FILTER	154	Platform Mount [LP 303-1]	137
800 EXTERNAL NOTCH FILTER	154	OG-860/1920/GPS-A	50
800MHZ 2X50W RRH	154	Side Arm Mount [SO 701-1]	50
800MHZ 2X50W RRH	154		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 41.3%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg, PA
Phone: (724) 416-2000
FAX: (724) 416-4623

Job: *BU 876355*			
Project: *WO 1447655*			
Client: Crown Castle	Drawn by: Mishka Stueber	App'd:	
Code: TIA-222-G	Date: 08/23/17	Scale: N	
Path:		Dwg No.	

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 93 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.000 ft.
7) Nominal ice thickness of 0.750 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drop of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	191.500-172.460	19.040	3.083	18	15.500	20.460	0.188	0.750	A572-65 (65 ksi)
L2	172.460-127.753	47.790	4.500	18	19.282	31.600	0.313	1.250	A572-65 (65 ksi)
L3	127.753-83.083	49.170	5.833	18	29.815	42.190	0.438	1.750	A572-65 (65 ksi)
L4	83.083-40.457	48.460	7.083	18	39.847	52.590	0.500	2.000	A572-65 (65 ksi)
L5	40.457-0.000	47.540		18	49.727	62.000	0.500	2.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in²	I in⁴	r in	C in	I/C in³	J in⁴	It/Q in²	w in	w/ft
L1	15.739	9.113	269.950	5.436	7.874	34.284	540.256	4.557	2.398	12.789
	20.776	12.065	626.423	7.197	10.394	60.270	1253.670	6.033	3.271	17.445
L2	20.386	18.815	855.356	6.734	9.795	87.324	1711.837	9.409	2.844	9.099
	32.087	31.033	3838.018	11.107	16.053	239.087	7681.086	15.520	5.012	16.037
L3	31.425	40.794	4448.064	10.429	15.146	293.678	8901.981	20.401	4.477	10.234
	42.841	57.979	12769.382	14.822	21.433	595.795	25555.567	28.995	6.655	15.212
L4	42.019	62.444	12213.654	13.968	20.242	603.375	24443.379	31.228	6.133	12.266
	53.401	82.667	28338.539	18.492	26.716	1060.744	56714.366	41.341	8.376	16.752
L5	52.351	78.124	23918.500	17.476	25.261	946.836	47868.472	39.069	7.872	15.744
	62.956	97.600	46637.979	21.833	31.496	1480.759	93337.326	48.810	10.032	20.064

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 191.500-172.460				1	1	1			
L2 172.460-127.753				1	1	1			
L3 127.753-83.083				1	1	1			
L4 83.083-40.457				1	1	1			
L5 40.457-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
AVA7-50(1-5/8")	B	Surface Ar (CaAa)	160.000 - 0.000	1	1	0.350 0.370	2.010		0.001
HB158-1-08U8-S8J18(1-5/8") *	B	Surface Ar (CaAa)	160.000 - 0.000	1	1	0.300 0.320	1.980		0.001

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight klf
Climbing Ladder (Flat) *	A	No	CaAa (Out Of Face)	152.000 - 144.000	1	No Ice 1/2" Ice 1" Ice	0.584 1.030 1.476	0.005 0.007 0.010
LDF7-50A(1-5/8") *	A	No	Inside Pole	191.500 - 0.000	24	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
AVA7-50(1-5/8") *	B	No	Inside Pole	160.000 - 0.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
*								
HB114-1-0813U4-M5J(1-1/4)	A	No	Inside Pole	150.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB114-21U3M12-XXXF(1-1/4)	A	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
*								
LDF6-50A(1-1/4")	B	No	Inside Pole	137.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
FB-L98B-002-75000(3/8")	B	No	Inside Pole	137.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	137.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
2" Rigid Conduit	C	No	Inside Pole	137.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
*								
LDF4-50A(1/2")	A	No	Inside Pole	50.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
*								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	191.500-172.460	A	0.000	0.000	0.000	0.000	0.375
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	172.460-127.753	A	0.000	0.000	0.000	4.675	1.026
		B	0.000	0.000	12.866	0.000	0.373
		C	0.000	0.000	0.000	0.000	0.032
L3	127.753-83.083	A	0.000	0.000	0.000	0.000	1.094
		B	0.000	0.000	17.823	0.000	0.644
		C	0.000	0.000	0.000	0.000	0.153
L4	83.083-40.457	A	0.000	0.000	0.000	0.000	1.046
		B	0.000	0.000	17.008	0.000	0.615
		C	0.000	0.000	0.000	0.000	0.146
L5	40.457-0.000	A	0.000	0.000	0.000	0.000	0.997
		B	0.000	0.000	16.142	0.000	0.583
		C	0.000	0.000	0.000	0.000	0.138

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	191.500-172.460	A	1.779	0.000	0.000	0.000	0.000	0.375
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	172.460-127.753	A	1.744	0.000	0.000	0.000	17.366	1.127
		B		0.000	0.000	35.811	0.000	0.901
		C		0.000	0.000	0.000	0.000	0.032
L3	127.753-83.083	A	1.683	0.000	0.000	0.000	0.000	1.094
		B		0.000	0.000	48.979	0.000	1.356
		C		0.000	0.000	0.000	0.000	0.153
L4	83.083-40.457	A	1.596	0.000	0.000	0.000	0.000	1.046
		B		0.000	0.000	45.712	0.000	1.260

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		C		0.000	0.000	0.000	0.000	0.146
L5	40.457-0.000	A	1.424	0.000	0.000	0.000	0.000	0.997
		B		0.000	0.000	41.973	0.000	1.150
		C		0.000	0.000	0.000	0.000	0.138

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	191.500-172.460	0.000	0.000	0.000	0.000
L2	172.460-127.753	0.404	-0.061	0.789	-0.207
L3	127.753-83.083	0.541	0.098	1.159	0.209
L4	83.083-40.457	0.549	0.099	1.211	0.218
L5	40.457-0.000	0.554	0.100	1.226	0.221

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	7	AVA7-50(1-5/8")	172.46 - 160.00	1.0000	1.0000
L1	8	HB158-1-08U8-S8J18(1-5/8")	172.46 - 160.00	1.0000	1.0000
L2	7	AVA7-50(1-5/8")	127.75 - 160.00	1.0000	1.0000
L2	8	HB158-1-08U8-S8J18(1-5/8")	127.75 - 160.00	1.0000	1.0000
L3	7	AVA7-50(1-5/8")	83.08 - 127.75	1.0000	1.0000
L3	8	HB158-1-08U8-S8J18(1-5/8")	83.08 - 127.75	1.0000	1.0000
L4	7	AVA7-50(1-5/8")	40.46 - 83.08	1.0000	1.0000
L4	8	HB158-1-08U8-S8J18(1-5/8")	40.46 - 83.08	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Azimuth Adjustment ° / Vert ft	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
Lightning Rod 5/8" x 5'	C	From Leg	0.000 0.000 2.000	191.500	No Ice 1/2" Ice 1" Ice	0.313 0.826 1.322	0.313 0.826 1.322	0.006 0.010 0.016
***								
(4) RV65-18-02DPL2 w/	A	From Leg	4.000	192.000	No Ice	3.537	3.294	0.031

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000 2.000			1/2" Ice 1" Ice	3.954 4.368	4.020 4.696	0.064 0.103
(4) RV65-18-02DPL2 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	3.537 3.954 4.368	3.294 4.020 4.696	0.031 0.064 0.103
(4) RV65-18-02DPL2 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	3.537 3.954 4.368	3.294 4.020 4.696	0.031 0.064 0.103
(2) KRY 112 144/1	A	From Leg	4.000 0.000 2.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
(2) KRY 112 144/1	B	From Leg	4.000 0.000 2.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
(2) KRY 112 144/1	C	From Leg	4.000 0.000 2.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
T-Arm Mount [TA 602-3]	C	None		0.000	192.000	No Ice 1/2" Ice 1" Ice	11.590 15.440 19.290	11.590 15.440 19.290	0.774 0.990 1.206
***									
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	9.831 10.400 10.933	10.215 11.384 12.269	0.052 0.145 0.246
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	9.831 10.400 10.933	10.215 11.384 12.269	0.052 0.145 0.246
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.856 3.220 3.592	6.569 7.195 7.837	0.030 0.076 0.128
BXA-171063-12BF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	4.971 5.521 6.036	5.228 6.389 7.261	0.040 0.086 0.139
BXA-171063-12BF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	4.971 5.521 6.036	5.228 6.389 7.261	0.040 0.086 0.139
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	3.179 3.555 3.930	3.353 3.971 4.595	0.029 0.061 0.099
AWS4 (B66) 4x45 RRH	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
AWS4 (B66) 4x45 RRH	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
AWS4 (B66) 4x45 RRH	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
DB-B1-6C-8AB-0Z	C	From Leg	4.000	0.000	160.000	No Ice	4.800	2.000	0.044

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					1/2" Ice	5.070	2.193	0.080
			0.000					1" Ice	5.348	2.393	0.120
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.000		0.000	160.000		No Ice	9.351	7.646	0.086
			0.000					1/2" Ice	9.921	8.833	0.163
			0.000					1" Ice	10.455	9.734	0.247
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.000		0.000	160.000		No Ice	9.351	7.646	0.086
			0.000					1/2" Ice	9.921	8.833	0.163
			0.000					1" Ice	10.455	9.734	0.247
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.000		0.000	160.000		No Ice	9.351	7.646	0.086
			0.000					1/2" Ice	9.921	8.833	0.163
			0.000					1" Ice	10.455	9.734	0.247
RRH2x60-700	A	From Leg	4.000		0.000	160.000		No Ice	3.500	1.816	0.060
			0.000					1/2" Ice	3.761	2.052	0.083
			0.000					1" Ice	4.029	2.289	0.109
RRH2x60-700	B	From Leg	4.000		0.000	160.000		No Ice	3.500	1.816	0.060
			0.000					1/2" Ice	3.761	2.052	0.083
			0.000					1" Ice	4.029	2.289	0.109
RRH2x60-700	C	From Leg	4.000		0.000	160.000		No Ice	3.500	1.816	0.060
			0.000					1/2" Ice	3.761	2.052	0.083
			0.000					1" Ice	4.029	2.289	0.109
DB-B1-6C-8AB-0Z	B	From Leg	4.000		0.000	160.000		No Ice	4.800	2.000	0.044
			0.000					1/2" Ice	5.070	2.193	0.080
			0.000					1" Ice	5.348	2.393	0.120
Platform Mount [LP 303-1]	C	None			0.000	160.000		No Ice	14.660	14.660	1.250
								1/2" Ice	18.870	18.870	1.481
								1" Ice	23.080	23.080	1.713
***											
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.000		0.000	154.000		No Ice	2.322	2.238	0.060
			0.000					1/2" Ice	2.527	2.441	0.083
			0.000					1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.000		0.000	154.000		No Ice	2.322	2.238	0.060
			0.000					1/2" Ice	2.527	2.441	0.083
			0.000					1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.000		0.000	154.000		No Ice	2.322	2.238	0.060
			0.000					1/2" Ice	2.527	2.441	0.083
			0.000					1" Ice	2.739	2.651	0.110
800 EXTERNAL NOTCH FILTER	A	From Leg	2.000		0.000	154.000		No Ice	0.660	0.321	0.011
			0.000					1/2" Ice	0.763	0.398	0.017
			-2.000					1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	B	From Leg	2.000		0.000	154.000		No Ice	0.660	0.321	0.011
			0.000					1/2" Ice	0.763	0.398	0.017
			-2.000					1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	C	From Leg	2.000		0.000	154.000		No Ice	0.660	0.321	0.011
			0.000					1/2" Ice	0.763	0.398	0.017
			-2.000					1" Ice	0.873	0.483	0.024
800MHZ 2X50W RRH	A	From Leg	2.000		0.000	154.000		No Ice	2.134	1.773	0.053
			0.000					1/2" Ice	2.320	1.946	0.074
			-2.000					1" Ice	2.512	2.127	0.098
800MHZ 2X50W RRH	B	From Leg	2.000		0.000	154.000		No Ice	2.134	1.773	0.053

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 -2.000			1/2" Ice 1" Ice	2.320 2.512	1.946 2.127	0.074 0.098
800MHZ 2X50W RRH	C	From Leg	2.000 0.000 -2.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	2.134 2.320 2.512	1.773 1.946 2.127	0.053 0.074 0.098
Side Arm Mount [SO 102-3]	C	None		0.000	154.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0.081 0.111 0.141
*									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	6.580 7.031 7.473	4.959 5.754 6.472	0.074 0.128 0.190
TD-RRH8x20-25	A	From Leg	4.000 0.000 4.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8x20-25	B	From Leg	4.000 0.000 4.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8x20-25	C	From Leg	4.000 0.000 4.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
(3) ACU-A20-N	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
(3) ACU-A20-N	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
(3) ACU-A20-N	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' Climbing Ladder (Flat)	C	From Leg	2.000	0.000	150.000	No Ice	5.844	5.844	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 0.000			1/2" Ice 1" Ice	10.300 14.756	10.300 14.756	0.071 0.094
Platform Mount [LP 601-1]	C	None		0.000	150.000	No Ice 1/2" Ice 1" Ice	28.470 33.590 38.710	28.470 33.590 38.710	1.122 1.514 1.905
***									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
(2) LGP21401	A	From Leg	4.000 0.000 2.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
(2) LGP21401	B	From Leg	4.000 0.000 2.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
(2) LGP21401	C	From Leg	4.000 0.000 2.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
RRUS-11	A	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
RRUS-11	B	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
RRUS-11	C	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
DC6-48-60-18-8F	C	From Leg	4.000 0.000 3.000	0.000	137.000	No Ice 1/2" Ice 1" Ice	0.791 1.274 1.450	0.791 1.274 1.450	0.020 0.035 0.053
Platform Mount [LP 303-1]	C	None		0.000	137.000	No Ice 1/2" Ice 1" Ice	14.660 18.870 23.080	14.660 18.870 23.080	1.250 1.481 1.713
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
OG-860/1920/GPS-A	A	From Leg	2.000 0.000 2.000	0.000	50.000	No Ice 1/2" Ice 1" Ice	0.308 0.395 0.490	0.367 0.457 0.555	0.003 0.007 0.011
Side Arm Mount [SO 701-1] ******	A	From Leg	2.000 0.000 0.000	0.000	50.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.025	1	1	28.968	0.511	0.027	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968			
L2 172.460-127.753	1.430	4.053	A	1	0.65	0.023	1	1	97.747	1.902	0.043	C
			B	1	0.65		1	1	97.747			
			C	1	0.713		1	1	97.747			
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.021	1	1	138.227	2.077	0.046	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.018	1	1	169.477	2.180	0.051	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.015	1	1	194.374	2.049	0.051	C
			B	1	0.65		1	1	194.374			
			C	1	0.65		1	1	194.374			
Sum Weight:	7.220	39.180						OTM	766.863 kip-ft	8.718		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.025	1	1	28.968	0.511	0.027	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968			
L2 172.460-127.753	1.430	4.053	A	1	0.713	0.023	1	1	97.747	1.902	0.043	A
			B	1	0.65		1	1	97.747			
			C	1	0.65		1	1	97.747			
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.021	1	1	138.227	2.077	0.046	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.018	1	1	169.477	2.180	0.051	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.015	1	1	194.374	2.049	0.051	C
			B	1	0.65		1	1	194.374			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	1	0.65		1	1	194.374			
Sum Weight:	7.220	39.180						OTM	766.863 kip-ft	8.718		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.025	1	1	28.968	0.511	0.027	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968			
L2 172.460-127.753	1.430	4.053	A	1	0.65	0.023	1	1	97.747	1.745	0.039	C
			B	1	0.65		1	1	97.747			
			C	1	0.65		1	1	97.747			
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.021	1	1	138.227	2.077	0.046	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.018	1	1	169.477	2.180	0.051	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.015	1	1	194.374	2.049	0.051	C
			B	1	0.65		1	1	194.374			
			C	1	0.65		1	1	194.374			
Sum Weight:	7.220	39.180						OTM	743.522 kip-ft	8.561		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	1.512	A	1	1.2	0.007	1	1	34.613	0.326	0.017	C
			B	1	1.2		1	1	34.613			
			C	1	1.2		1	1	34.613			
L2 172.460-127.753	2.060	6.707	A	1	1.2	0.007	1	1	111.001	1.318	0.029	C
			B	1	1.2		1	1	111.001			
			C	1	1.2		1	1	111.001			
L3 127.753-83.083	2.603	11.814	A	1	1.2	0.006	1	1	151.209	1.212	0.027	C
			B	1	1.2		1	1	151.209			
			C	1	1.2		1	1	151.209			
L4 83.083-40.457	2.451	16.044	A	1	1.2	0.005	1	1	181.437	1.245	0.029	C
			B	1	1.2		1	1	181.437			
			C	1	1.2		1	1	181.437			
L5 40.457-0.000	2.285	18.352	A	1	1.2	0.004	1	1	205.137	1.154	0.029	C
			B	1	1.2		1	1	205.137			
			C	1	1.2		1	1	205.137			
Sum Weight:	9.774	54.430						OTM	481.051 kip-ft	5.255		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	1.512	A	1	1.2	0.007	1	1	34.613	0.326	0.017	C
			B	1	1.2		1	1	34.613			
			C	1	1.2		1	1	34.613			
L2 172.460-127.753	2.060	6.707	A	1	1.2	0.007	1	1	111.001	1.318	0.029	A
			B	1	1.2		1	1	111.001			
			C	1	1.2		1	1	111.001			
L3 127.753-83.083	2.603	11.814	A	1	1.2	0.006	1	1	151.209	1.212	0.027	C
			B	1	1.2		1	1	151.209			
			C	1	1.2		1	1	151.209			
L4 83.083-40.457	2.451	16.044	A	1	1.2	0.005	1	1	181.437	1.245	0.029	C
			B	1	1.2		1	1	181.437			
			C	1	1.2		1	1	181.437			
L5 40.457-0.000	2.285	18.352	A	1	1.2	0.004	1	1	205.137	1.154	0.029	C
			B	1	1.2		1	1	205.137			
			C	1	1.2		1	1	205.137			
Sum Weight:	9.774	54.430						OTM	481.051 kip-ft	5.255		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	1.512	A	1	1.2	0.007	1	1	34.613	0.326	0.017	C
			B	1	1.2		1	1	34.613			
			C	1	1.2		1	1	34.613			
L2 172.460-127.753	2.060	6.707	A	1	1.2	0.007	1	1	111.001	1.259	0.028	A
			B	1	1.2		1	1	111.001			
			C	1	1.2		1	1	111.001			
L3 127.753-83.083	2.603	11.814	A	1	1.2	0.006	1	1	151.209	1.212	0.027	C
			B	1	1.2		1	1	151.209			
			C	1	1.2		1	1	151.209			
L4 83.083-40.457	2.451	16.044	A	1	1.2	0.005	1	1	181.437	1.245	0.029	C
			B	1	1.2		1	1	181.437			
			C	1	1.2		1	1	181.437			
L5 40.457-0.000	2.285	18.352	A	1	1.2	0.004	1	1	205.137	1.154	0.029	C
			B	1	1.2		1	1	205.137			
			C	1	1.2		1	1	205.137			
Sum Weight:	9.774	54.430						OTM	472.267 kip-ft	5.196		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.009	1	1	28.968	0.190	0.010	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968			
L2 172.460-127.753	1.430	4.053	A	1	0.65	0.009	1	1	97.747	0.708	0.016	C
			B	1	0.65		1	1	97.747			
			C	1	0.713		1	1	97.747			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.008	1	1	138.227	0.773	0.017	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.007	1	1	169.477	0.812	0.019	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.005	1	1	194.374	0.763	0.019	C
			B	1	0.65		1	1	194.374			
			C	1	0.65		1	1	194.374			
Sum Weight:	7.220	39.180						OTM	285.594 kip-ft	3.247		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.009	1	1	28.968	0.190	0.010	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968,			
L2 172.460-127.753	1.430	4.053	A	1	0.713	0.009	1	1	97.747	0.708	0.016	A
			B	1	0.65		1	1	97.747			
			C	1	0.65		1	1	97.747			
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.008	1	1	138.227	0.773	0.017	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.007	1	1	169.477	0.812	0.019	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.005	1	1	194.374	0.763	0.019	C
			B	1	0.65		1	1	194.374			
			C	1	0.65		1	1	194.374			
Sum Weight:	7.220	39.180						OTM	285.594 kip-ft	3.247		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 191.500-172.460	0.375	0.686	A	1	0.65	0.009	1	1	28.968	0.190	0.010	C
			B	1	0.65		1	1	28.968			
			C	1	0.65		1	1	28.968			
L2 172.460-127.753	1.430	4.053	A	1	0.65	0.009	1	1	97.747	0.650	0.015	C
			B	1	0.65		1	1	97.747			
			C	1	0.65		1	1	97.747			
L3 127.753-83.083	1.891	8.263	A	1	0.65	0.008	1	1	138.227	0.773	0.017	C
			B	1	0.65		1	1	138.227			
			C	1	0.65		1	1	138.227			
L4 83.083-40.457	1.806	11.964	A	1	0.65	0.007	1	1	169.477	0.812	0.019	C
			B	1	0.65		1	1	169.477			
			C	1	0.65		1	1	169.477			
L5 40.457-0.000	1.719	14.213	A	1	0.65	0.005	1	1	194.374	0.763	0.019	C
			B	1	0.65		1	1	194.374			
			C	1	0.65		1	1	194.374			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
Sum Weight:	7.220	39.180						OTM	276.902 kip-ft	3.188		

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	191.5 - 172.46	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-5.910	0.006	-0.018
			Max. Mx	20	-2.256	50.996	0.007
			Max. My	14	-2.253	-0.008	-51.017
			Max. Vy	20	-3.269	50.996	0.007
			Max. Vx	14	3.271	-0.008	-51.017
			Max. Torque	32			-0.010
L2	172.46 - 127.753	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.063	-0.653	-1.102
			Max. Mx	20	-15.698	488.145	1.855
			Max. My	14	-15.672	-2.016	-492.701
			Max. Vy	20	-17.482	488.145	1.855
			Max. Vx	14	17.704	-2.016	-492.701
			Max. Torque	25			-1.389
L3	127.753 - 83.0833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.721	-1.866	-1.308
			Max. Mx	20	-27.255	1315.186	5.128
			Max. My	14	-27.238	-5.476	-1330.784
			Max. Vy	8	20.691	-1314.911	-6.097
			Max. Vx	14	20.943	-5.476	-1330.784
			Max. Torque	32			-0.430
L4	83.0833 - 40.4567	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-72.386	-3.285	-0.981
			Max. Mx	8	-43.124	-2237.611	-8.941
			Max. My	14	-43.115	-8.807	-2263.320
			Max. Vy	8	23.884	-2237.611	-8.941
			Max. Vx	14	24.107	-8.807	-2263.320
			Max. Torque	32			-0.430
L5	40.4567 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-100.429	-5.132	-1.309
			Max. Mx	8	-65.373	-3448.925	-12.500
			Max. My	14	-65.373	-12.590	-3484.843
			Max. Vy	8	26.989	-3448.925	-12.500
			Max. Vx	14	27.204	-12.590	-3484.843
			Max. Torque	33			-0.405

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	100.429	-0.011	-8.999
	Max. H_x	20	65.384	26.964	0.072
	Max. H_z	2	65.384	0.072	27.178
	Max. M_x	2	3484.368	0.072	27.178
	Max. M_z	8	3448.925	-26.964	-0.072
	Max. Torsion	27	0.404	0.011	8.999
	Min. Vert	5	49.038	-13.419	23.283
	Min. H_x	8	65.384	-26.964	-0.072
	Min. H_z	14	65.384	-0.072	-27.178
	Min. M_x	14	-3484.843	-0.072	-27.178
	Min. M_z	20	-3448.268	26.964	0.072
	Min. Torsion	33	-0.405	-0.011	-8.999

Tower Mast Reaction Summary

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 Only	54.486	0.000	0.000	0.174	-0.276	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	65.384	-0.072	-27.178	-3484.368	11.932	-0.196
0.9 Dead+1.6 Wind 0 deg - No Ice	49.038	-0.072	-27.178	-3447.955	11.872	-0.186
1.2 Dead+1.6 Wind 30 deg - No Ice	65.384	13.419	-23.283	-2977.760	-1714.027	-0.181
0.9 Dead+1.6 Wind 30 deg - No Ice	49.038	13.419	-23.283	-2946.654	-1696.020	-0.174
1.2 Dead+1.6 Wind 60 deg - No Ice	65.384	23.315	-13.401	-1712.030	-2980.801	-0.120
0.9 Dead+1.6 Wind 60 deg - No Ice	49.038	23.315	-13.401	-1694.181	-2949.530	-0.118
1.2 Dead+1.6 Wind 90 deg - No Ice	65.384	26.964	0.072	12.500	-3448.925	-0.026
0.9 Dead+1.6 Wind 90 deg - No Ice	49.038	26.964	0.072	12.292	-3412.759	-0.029
1.2 Dead+1.6 Wind 120 deg - No Ice	65.384	23.387	13.526	1733.725	-2993.029	0.078
0.9 Dead+1.6 Wind 120 deg - No Ice	49.038	23.387	13.526	1715.499	-2961.617	0.070
1.2 Dead+1.6 Wind 150 deg - No Ice	65.384	13.544	23.355	2990.464	-1735.245	0.164
0.9 Dead+1.6 Wind 150 deg - No Ice	49.038	13.544	23.355	2959.087	-1716.993	0.153
1.2 Dead+1.6 Wind 180 deg - No Ice	65.384	0.072	27.178	3484.843	-12.590	0.205
0.9 Dead+1.6 Wind 180 deg - No Ice	49.038	0.072	27.178	3448.299	-12.366	0.195
1.2 Dead+1.6 Wind 210 deg - No Ice	65.384	-13.419	23.283	2978.236	1713.369	0.187
0.9 Dead+1.6 Wind 210 deg - No Ice	49.038	-13.419	23.283	2946.999	1695.526	0.180
1.2 Dead+1.6 Wind 240 deg - No Ice	65.384	-23.315	13.401	1712.507	2980.144	0.118
0.9 Dead+1.6 Wind 240 deg - No Ice	49.038	-23.315	13.401	1694.526	2949.036	0.116
1.2 Dead+1.6 Wind 270 deg - No Ice	65.384	-26.964	-0.072	-12.023	3448.268	0.017
0.9 Dead+1.6 Wind 270 deg - No Ice	49.038	-26.964	-0.072	-11.947	3412.266	0.021
1.2 Dead+1.6 Wind 300 deg - No Ice	65.384	-23.387	-13.526	-1733.249	2992.372	-0.085
0.9 Dead+1.6 Wind 300 deg - No Ice	49.038	-23.387	-13.526	-1715.154	2961.125	-0.076
1.2 Dead+1.6 Wind 330 deg - No Ice	65.384	-13.544	-23.355	-2989.989	1734.588	-0.161
0.9 Dead+1.6 Wind 330 deg - No Ice	49.038	-13.544	-23.355	-2958.742	1716.500	-0.151
1.2 Dead+1.0 Ice+1.0 Temp	100.429	0.000	0.000	1.309	-5.132	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	100.429	-0.011	-8.999	-1171.586	-3.439	-0.404
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	100.429	4.469	-7.736	-1005.165	-586.204	-0.318
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	100.429	7.625	-4.387	-566.810	-992.976	-0.147
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	100.429	8.811	0.011	3.428	-1146.901	0.063
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	100.429	7.636	4.407	573.131	-994.972	0.256
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	100.429	4.415	7.622	989.648	-577.898	0.381
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	100.429	0.011	8.999	1174.449	-7.432	0.405
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	100.429	-4.469	7.736	1008.031	575.335	0.319

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
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	100.429	-7.625	4.387	569.676	982.110	0.147
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	100.429	-8.811	-0.011	-0.565	1136.036	-0.063
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	100.429	-7.636	-4.407	-570.270	984.105	-0.256
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	100.429	-4.415	-7.622	-986.788	567.028	-0.380
Dead+Wind 0 deg - Service	54.486	-0.017	-6.326	-805.793	2.560	-0.045
Dead+Wind 30 deg - Service	54.486	3.124	-5.419	-688.599	-396.645	-0.017
Dead+Wind 60 deg - Service	54.486	5.427	-3.119	-395.844	-689.643	0.015
Dead+Wind 90 deg - Service	54.486	6.276	0.017	3.030	-797.924	0.043
Dead+Wind 120 deg - Service	54.486	5.444	3.148	401.143	-692.476	0.060
Dead+Wind 150 deg - Service	54.486	3.153	5.436	691.824	-401.554	0.061
Dead+Wind 180 deg - Service	54.486	0.017	6.326	806.184	-3.109	0.045
Dead+Wind 210 deg - Service	54.486	-3.124	5.419	688.990	396.096	0.017
Dead+Wind 240 deg - Service	54.486	-5.427	3.119	396.234	689.093	-0.015
Dead+Wind 270 deg - Service	54.486	-6.276	-0.017	-2.639	797.375	-0.044
Dead+Wind 300 deg - Service	54.486	-5.444	-3.148	-400.753	691.927	-0.060
Dead+Wind 330 deg - Service	54.486	-3.153	-5.436	-691.433	401.005	-0.061

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-54.486	0.000	0.000	54.486	0.000	0.000%
2	-0.072	-65.384	-27.178	0.072	65.384	27.178	0.000%
3	-0.072	-49.038	-27.178	0.072	49.038	27.178	0.000%
4	13.419	-65.384	-23.283	-13.419	65.384	23.283	0.000%
5	13.419	-49.038	-23.283	-13.419	49.038	23.283	0.000%
6	23.315	-65.384	-13.401	-23.315	65.384	13.401	0.000%
7	23.315	-49.038	-13.401	-23.315	49.038	13.401	0.000%
8	26.964	-65.384	0.072	-26.964	65.384	-0.072	0.000%
9	26.964	-49.038	0.072	-26.964	49.038	-0.072	0.000%
10	23.387	-65.384	13.526	-23.387	65.384	-13.526	0.000%
11	23.387	-49.038	13.526	-23.387	49.038	-13.526	0.000%
12	13.544	-65.384	23.355	-13.544	65.384	-23.355	0.000%
13	13.544	-49.038	23.355	-13.544	49.038	-23.355	0.000%
14	0.072	-65.384	27.178	-0.072	65.384	-27.178	0.000%
15	0.072	-49.038	27.178	-0.072	49.038	-27.178	0.000%
16	-13.419	-65.384	23.283	13.419	65.384	-23.283	0.000%
17	-13.419	-49.038	23.283	13.419	49.038	-23.283	0.000%
18	-23.315	-65.384	13.401	23.315	65.384	-13.401	0.000%
19	-23.315	-49.038	13.401	23.315	49.038	-13.401	0.000%
20	-26.964	-65.384	-0.072	26.964	65.384	0.072	0.000%
21	-26.964	-49.038	-0.072	26.964	49.038	0.072	0.000%
22	-23.387	-65.384	-13.526	23.387	65.384	13.526	0.000%
23	-23.387	-49.038	-13.526	23.387	49.038	13.526	0.000%
24	-13.544	-65.384	-23.355	13.544	65.384	23.355	0.000%
25	-13.544	-49.038	-23.355	13.544	49.038	23.355	0.000%
26	0.000	-100.429	0.000	-0.000	100.429	-0.000	0.000%
27	-0.011	-100.429	-8.999	0.011	100.429	8.999	0.000%
28	4.468	-100.429	-7.736	-4.469	100.429	7.736	0.000%
29	7.625	-100.429	-4.387	-7.625	100.429	4.387	0.000%
30	8.811	-100.429	0.011	-8.811	100.429	-0.011	0.000%
31	7.636	-100.429	4.407	-7.636	100.429	-4.407	0.000%
32	4.415	-100.429	7.622	-4.415	100.429	-7.622	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.011	-100.429	8.999	-0.011	100.429	-8.999	0.000%
34	-4.468	-100.429	7.736	4.469	100.429	-7.736	0.000%
35	-7.625	-100.429	4.387	7.625	100.429	-4.387	0.000%
36	-8.811	-100.429	-0.011	8.811	100.429	0.011	0.000%
37	-7.636	-100.429	-4.407	7.636	100.429	4.407	0.000%
38	-4.415	-100.429	-7.622	4.415	100.429	7.622	0.000%
39	-0.017	-54.486	-6.326	0.017	54.486	6.326	0.000%
40	3.124	-54.486	-5.419	-3.124	54.486	5.419	0.000%
41	5.427	-54.486	-3.119	-5.427	54.486	3.119	0.000%
42	6.276	-54.486	0.017	-6.276	54.486	-0.017	0.000%
43	5.444	-54.486	3.148	-5.444	54.486	-3.148	0.000%
44	3.153	-54.486	5.436	-3.153	54.486	-5.436	0.000%
45	0.017	-54.486	6.326	-0.017	54.486	-6.326	0.000%
46	-3.124	-54.486	5.419	3.124	54.486	-5.419	0.000%
47	-5.427	-54.486	3.119	5.427	54.486	-3.119	0.000%
48	-6.276	-54.486	-0.017	6.276	54.486	0.017	0.000%
49	-5.444	-54.486	-3.148	5.444	54.486	3.148	0.000%
50	-3.153	-54.486	-5.436	3.153	54.486	5.436	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00026372
3	Yes	4	0.00000001	0.00012081
4	Yes	5	0.00000001	0.00044661
5	Yes	5	0.00000001	0.00021508
6	Yes	5	0.00000001	0.00044499
7	Yes	5	0.00000001	0.00021419
8	Yes	4	0.00000001	0.00026840
9	Yes	4	0.00000001	0.00012714
10	Yes	5	0.00000001	0.00045648
11	Yes	5	0.00000001	0.00021929
12	Yes	5	0.00000001	0.00045540
13	Yes	5	0.00000001	0.00021882
14	Yes	4	0.00000001	0.00026809
15	Yes	4	0.00000001	0.00012718
16	Yes	5	0.00000001	0.00044602
17	Yes	5	0.00000001	0.00021460
18	Yes	5	0.00000001	0.00044759
19	Yes	5	0.00000001	0.00021544
20	Yes	4	0.00000001	0.00024020
21	Yes	4	0.00000001	0.00009983
22	Yes	5	0.00000001	0.00045454
23	Yes	5	0.00000001	0.00021843
24	Yes	5	0.00000001	0.00045566
25	Yes	5	0.00000001	0.00021895
26	Yes	4	0.00000001	0.00001607
27	Yes	5	0.00000001	0.00033856
28	Yes	5	0.00000001	0.00041005
29	Yes	5	0.00000001	0.00039998
30	Yes	5	0.00000001	0.00033166
31	Yes	5	0.00000001	0.00040536
32	Yes	5	0.00000001	0.00040242
33	Yes	5	0.00000001	0.00034031
34	Yes	5	0.00000001	0.00041028
35	Yes	5	0.00000001	0.00039738
36	Yes	5	0.00000001	0.00032836
37	Yes	5	0.00000001	0.00039658
38	Yes	5	0.00000001	0.00039934
39	Yes	4	0.00000001	0.00002851
40	Yes	4	0.00000001	0.00013117
41	Yes	4	0.00000001	0.00012718
42	Yes	4	0.00000001	0.00002884

43	Yes	4	0.00000001	0.00013553
44	Yes	4	0.00000001	0.00013215
45	Yes	4	0.00000001	0.00002861
46	Yes	4	0.00000001	0.00012877
47	Yes	4	0.00000001	0.00013282
48	Yes	4	0.00000001	0.00002839
49	Yes	4	0.00000001	0.00013058
50	Yes	4	0.00000001	0.00013390

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.5 - 172.46	22.979	45	1.148	0.000
L2	175.543 - 127.753	19.233	45	1.082	0.001
L3	132.253 - 83.0833	10.423	45	0.813	0.000
L4	88.9167 - 40.4567	4.445	45	0.490	0.000
L5	47.54 - 0	1.243	45	0.241	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	(4) RV65-18-02DPL2 w/ Mount Pipe	45	22.979	1.148	0.000	39533
191.500	Lightning Rod 5/8" x 5'	45	22.979	1.148	0.000	39533
160.000	(2) LPA-80063/6CF w/ Mount Pipe	45	15.791	0.999	0.000	9800
154.000	PCS 1900MHz 4x45W-65MHz	45	14.538	0.962	0.000	9059
150.000	APXVSPP18-C-A20 w/ Mount Pipe	45	13.729	0.937	0.000	8625
137.000	7770.00 w/ Mount Pipe	45	11.259	0.847	0.000	7462
50.000	OG-860/1920/GPS-A	45	1.367	0.254	0.000	8542

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.5 - 172.46	99.354	14	4.965	0.002
L2	175.543 - 127.753	83.168	14	4.679	0.002
L3	132.253 - 83.0833	45.089	14	3.517	0.001
L4	88.9167 - 40.4567	19.231	14	2.120	0.001
L5	47.54 - 0	5.376	14	1.042	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	(4) RV65-18-02DPL2 w/ Mount Pipe	14	99.354	4.965	0.002	9286
191.500	Lightning Rod 5/8" x 5'	14	99.354	4.965	0.002	9286
160.000	(2) LPA-80063/6CF w/ Mount Pipe	14	68.294	4.322	0.002	2292
154.000	PCS 1900MHz 4x45W-65MHz	14	62.878	4.164	0.002	2118
150.000	APXVSPP18-C-A20 w/ Mount Pipe	14	59.382	4.053	0.002	2015
137.000	7770.00 w/ Mount Pipe	14	48.704	3.666	0.001	1741
50.000	OG-860/1920/GPS-A	14	5.911	1.100	0.000	1975

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	191.5 - 172.46 (1)	TP20.46x15.5x0.188	19.040	0.000	0.0	11.587	-2.253	852.683	0.003
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	47.790	0.000	0.0	29.883	-15.672	2220.140	0.007
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	49.170	0.000	0.0	55.940	-27.238	4156.060	0.007
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	48.460	0.000	0.0	79.711	-43.115	5916.280	0.007
L5	40.4567 - 0 (5)	TP62x49.727x0.5	47.540	0.000	0.0	97.601	-65.373	6834.140	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	191.5 - 172.46 (1)	TP20.46x15.5x0.188	51.017	340.775	0.150	0.000	340.775	0.000
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	492.705	1372.008	0.359	0.000	1372.008	0.000
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	1330.792	3432.575	0.388	0.000	3432.575	0.000
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	2263.333	6097.891	0.371	0.000	6097.891	0.000
L5	40.4567 - 0 (5)	TP62x49.727x0.5	3484.867	8640.417	0.403	0.000	8640.417	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	191.5 - 172.46 (1)	TP20.46x15.5x0.188	3.271	426.342	0.008	0.010	682.383	0.000
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	17.704	1110.070	0.016	0.206	2747.367	0.000
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	20.943	2078.030	0.010	0.205	6873.533	0.000
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	24.107	2958.140	0.008	0.205	12210.667	0.000
L5	40.4567 - 0 (5)	TP62x49.727x0.5	27.204	3417.070	0.008	0.205	17302.000	0.000

Pole Interaction Design Data

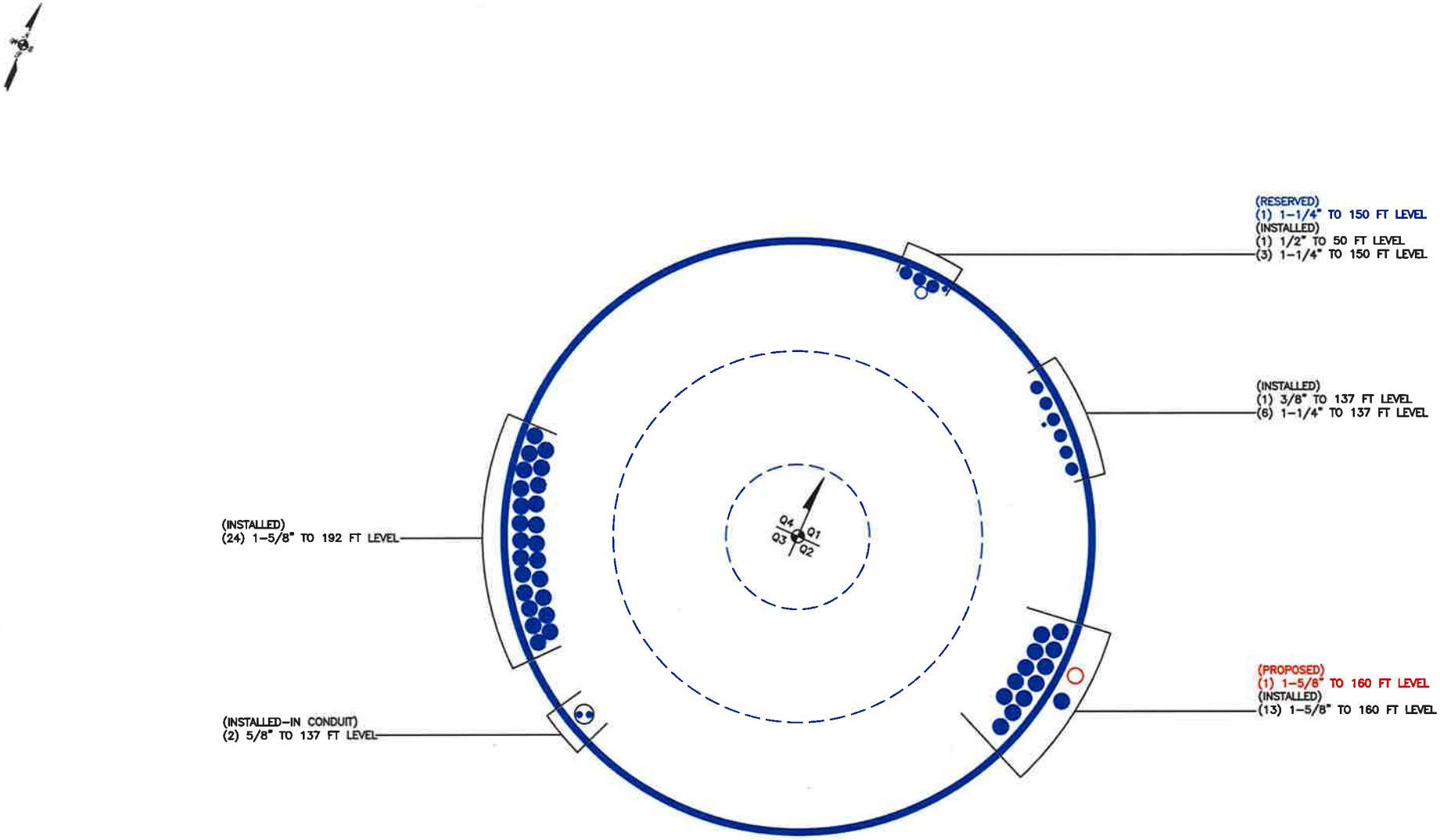
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	191.5 - 172.46 (1)	0.003	0.150	0.000	0.008	0.000	0.152	1.000	4.8.2
L2	172.46 - 127.753 (2)	0.007	0.359	0.000	0.016	0.000	0.366	1.000	4.8.2
L3	127.753 - 83.0833 (3)	0.007	0.388	0.000	0.010	0.000	0.394	1.000	4.8.2
L4	83.0833 - 40.4567 (4)	0.007	0.371	0.000	0.008	0.000	0.379	1.000	4.8.2
L5	40.4567 - 0 (5)	0.010	0.403	0.000	0.008	0.000	0.413	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	191.5 - 172.46	Pole	TP20.46x15.5x0.188	1	-2.253	852.683	15.2	Pass
L2	172.46 - 127.753	Pole	TP31.6x19.282x0.313	2	-15.672	2220.140	36.6	Pass
L3	127.753 - 83.0833	Pole	TP42.19x29.815x0.438	3	-27.238	4156.060	39.4	Pass
L4	83.0833 - 40.4567	Pole	TP52.59x39.847x0.5	4	-43.115	5916.280	37.9	Pass
L5	40.4567 - 0	Pole	TP62x49.727x0.5	5	-65.373	6834.140	41.3	Pass
						Summary		
						Pole (L5)	41.3	Pass
						RATING =	**41.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876355 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876355*
Site Name: *UPPER STEPNEY - TLC*
App #: *402378 Rev. 0*

Pole Manufacturer:	*Other*

Reactions		
Mu:	3485	ft-kips
Axial, Pu:	65	kips
Shear, Vu:	27	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	71	in

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ή):	103.2 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	39.7% **Pass**	

Plate Data		
Diam:	77	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	8.20	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	26.8 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	49.7% **Pass**	Y.L. Length: 34.60

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

n/a

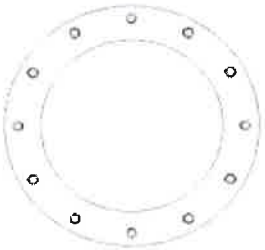
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	62	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

Pier and Pad Foundation

BU # :	876355
Site Name:	UPPER STEPNEY
App. Number:	402378 Rev. 0

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	65	kips
Base Shear, Vu_comp:	27	kips
Moment, M_u:	3485	ft-kips
Tower Height, **H**:	191.5	ft
BP Dist. Above Fdn, bp_{dist}:	2	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.5	ft
Ext. Above Grade, **E**:	1	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	51	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	8	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	5	in

Pad Properties

Depth, **D**:	5.0	ft
Pad Width, **W**:	30.0	ft
Pad Thickness, **T**:	3.0	ft
Pad Rebar Size, **Sp**:	8	
Pad Rebar Quantity, **mp**:	25	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	110	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.7	
Neglected Depth, **N**:	3.5	ft
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	362.65	27.00	**7.4%**	**Pass**
Bearing Pressure (ksf)	9.00	1.43	**15.9%**	**Pass**
*Overturning (kip*ft)*	8378.26	3651.50	**43.6%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6959.02	3566.00	**51.2%**	**Pass**
Pier Compression (kip)	28118.83	88.86	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	2756.54	1292.47	**46.9%**	**Pass**
Pad Shear - 1-way (kips)	1075.81	168.28	**15.6%**	**Pass**
Pad Shear - 2-way (kips)	2281.33	88.86	**3.9%**	**Pass**

Soil Rating:	**43.6%**
Structural Rating:	**51.2%**

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#: *876355*
Site Name: *UPPER STEPNEY - TLC*
App #: *402378 Rev. 0*

Loads Already Factored		
For M (WL):	1.00	
For P (DL):	1.00	

Pier Properties			
Concrete:			
Pier Diameter =	7.5	ft	
Concrete Area =	6361.7	in^2	
Reinforcement:			
Clear Cover to **Tie**=	4.50	in	
Horiz. **Tie** Bar Size=	4		
Vert. Cage Diameter =	6.58	ft	
Vert. Cage Diameter =	79.00	in	
Vertical Bar Size =	8		
Bar Diameter =	1.00	in	
Bar Area =	0.79	in^2	
Number of Bars =	51		
As Total=	40.29	in^2	
A s/ Aconc, Rho:	0.0063	0.63%	

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.63%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	12433.35	kips
at Mu=(ϕ=0.65)Mn=	8096.79	ft-kips
Max Tu, (φ=0.9) Tn =	2175.66	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	G	
Max. Factored Shaft Mu:	3566	ft-kips **(* Note)**
Max. Factored Shaft Pu:	65	kips
Max Axial Force Type:	Comp.	

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

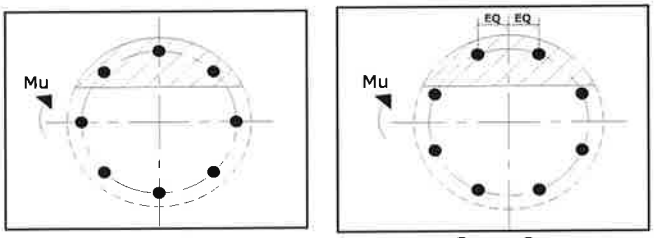
Load Factor	Shaft Factored Loads		
1.00	Mu:	3566	ft-kips
1.00	Pu:	65	kips

Material Properties		
Concrete Comp. strength, f'c =	4000	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	

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

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**13.45**	in
Extreme Steel Strain, εt:	**0.0158**	
εt > 0.0050, Tension Controlled		
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	58.50	kips
Drilled Shaft Moment Capacity, φMn:	**6959.02**	ft-kips
Drilled Shaft Superimposed Mu:	**3566.00**	ft-kips

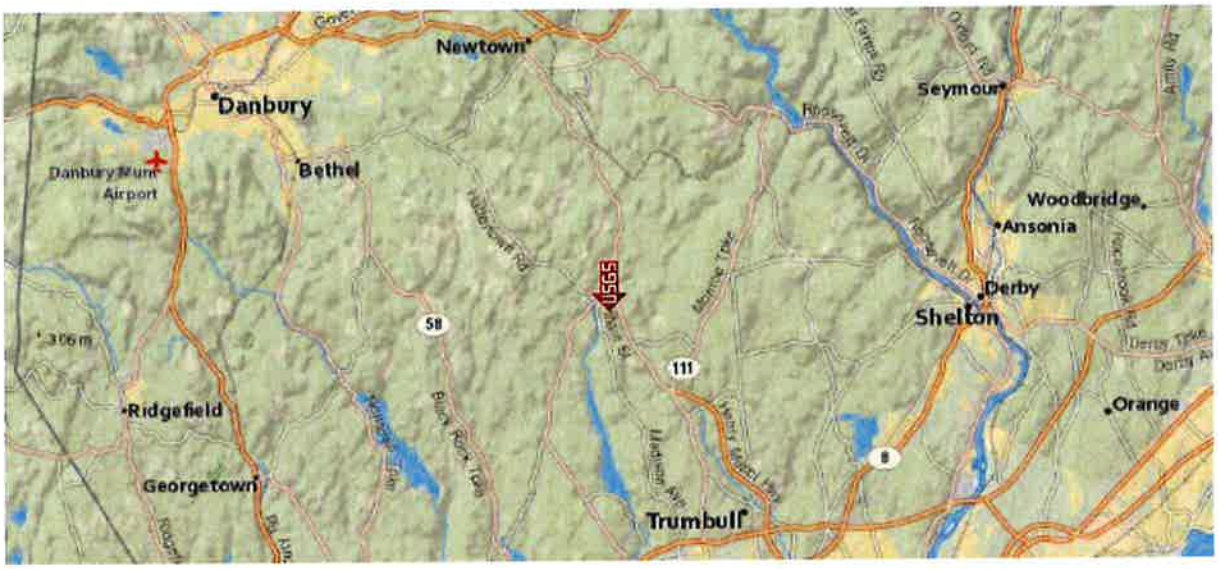
(Mu/φMn, Drilled Shaft Flexure CSR:	**51.2%**

Version 2.0.0

USGS Design Maps Summary Report

User–Specified Input

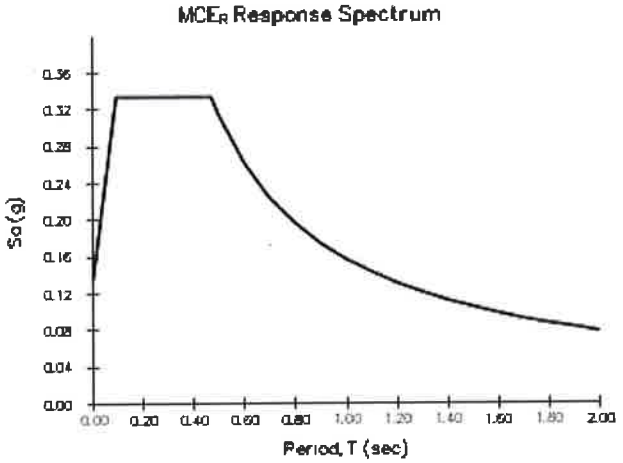
Report Title	876355 Mon July 31, 2017 20:42:23 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.32555°N, 73.26585°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

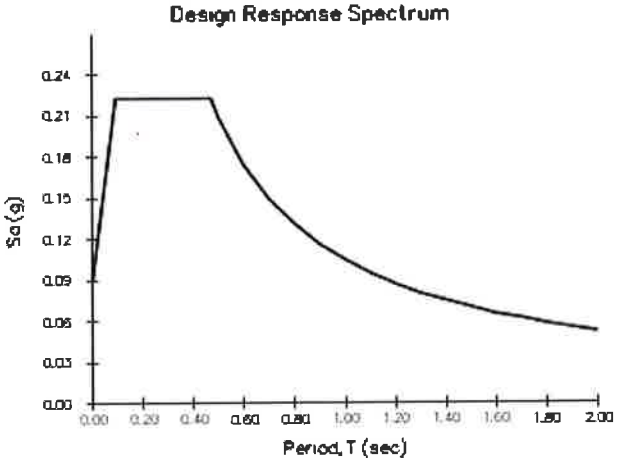


USGS–Provided Output

S_S =	0.209 g	S_{MS} =	0.334 g	S_{DS} =	0.223 g
S_1 =	0.065 g	S_{M1} =	0.157 g	S_{D1} =	0.105 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU: 876355
Work Order: 1447655
Application: 402378 Rev. 0

CROWN CASTLE

	Degrees	Minutes	Seconds		
Site Latitude =	41	19	31.99	41.3256	degrees
Site Longitude =	-73	15	57.04	-73.2658	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				*(Table 2-1)*
Site Class =	D - Stiff Soil				*(Table 2-11)*

Spectral response acceleration short periods, S_S =	0.205	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.065	

Importance Factor, I =	1.0	*(Table 2-3)*
Acceleration-based site coefficient, F_a =	1.6	*(Table 2-12)*
Velocity-based site coefficient, F_v =	2.4	*(Table 2-13)*

Design spectral response acceleration short period, S_{DS} =	0.219	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.104	*(2.7.6)*

Seismic Design Category - Short Period Response =	B	*ASCE 7-05 Table 11.6-1*
Seismic Design Category - 1s Period Response =	B	*ASCE 7-05 Table 11.6-2*

Worst Case Seismic Design Category =	B	*ASCE 7-05 Tables 11.6-1 and 6-2*

Applied Technology Council

WINDSPEED BY LOCATION

ASCE 7 Windspeed | ASCE 7 Ground Snow Load | Related Resources | Sponsors | About ATC | Contact

Search Results

Query Date: Tue Aug 22 2017
Latitude: 41.3256
Longitude: -73.2658

ASCE 7-10 Windspeeds (3-sec peak gust in mph*):

Risk Category I: 110
Risk Category II: 120
Risk Category III-IV: 129
MRI 10-Year:** 76
MRI 25-Year:** 86
MRI 50-Year:** 91
MRI 100-Year:** 97

ASCE 7-05 Windspeed:
104 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
80 (fastest mile in mph)

*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

WINDSPEED WEBSITE DISCLAIMER

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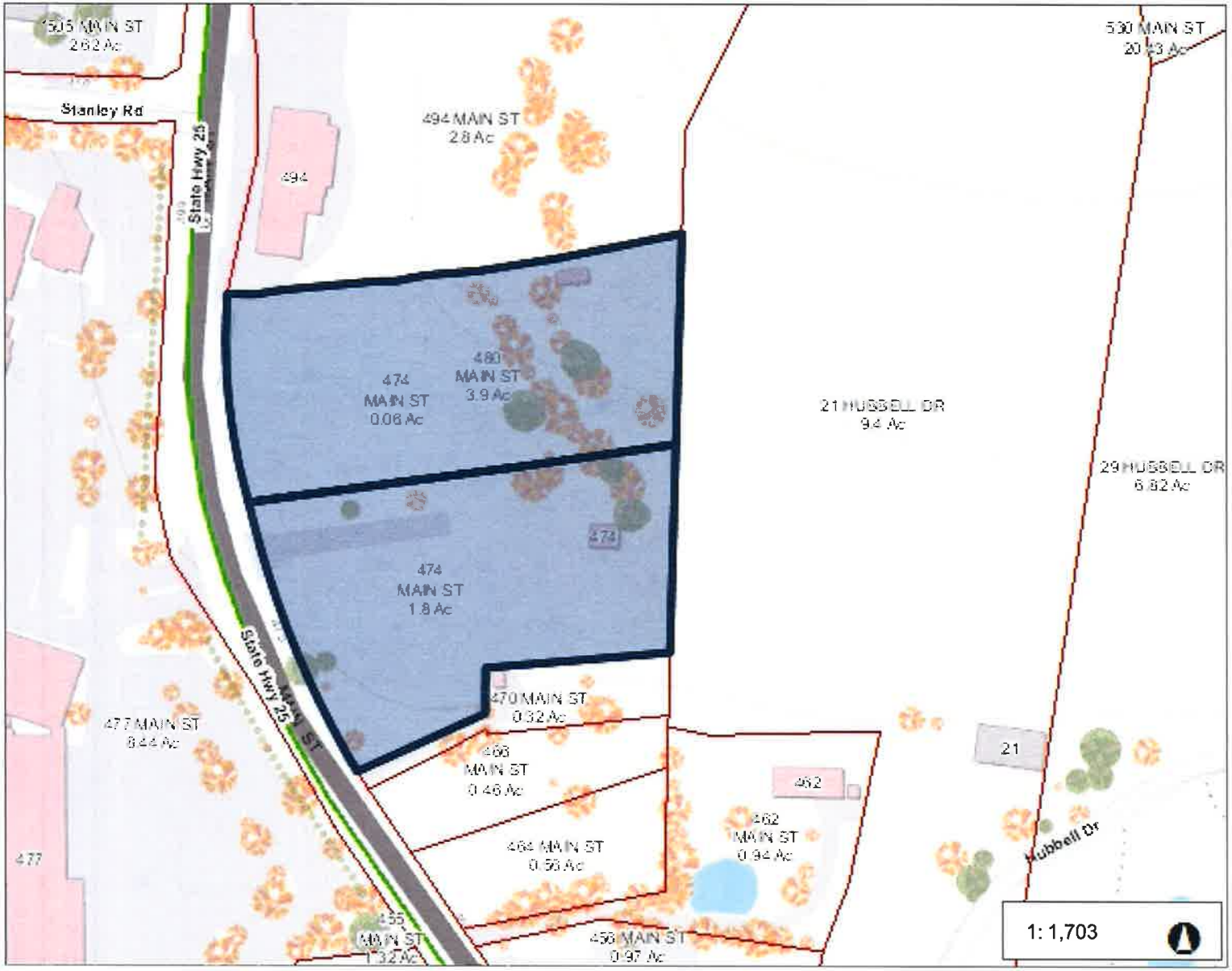
ATTACHMENT 4

Town of Monroe

Map Title



Legend

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

283.9 0 141.95 283.9 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG
Connecticut Metropolitan Council of Governments

474 MAIN ST

Location	474 MAIN ST	**Map/Lot**	045/ 022/ 00/ /
Acct#	04502200	**Owner**	SEVEN FORTY TWO NURSERY LLC
Assessment	$12,400	**Appraisal**	$27,300
PID	8020	**Building Count**	1
Survey	1676 B	**Affordable**	

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$13,400	$13,900	$27,300

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$9,400	$3,000	$12,400

Owner of Record

Owner	SEVEN FORTY TWO NURSERY LLC
Co-Owner	KEITH M BUNOVSKY JR MEMBER
Address	742 MAIN ST MONROE, CT 06468

Sale Price	$0
Certificate	1
Book & Page	1800/ 210
Sale Date	05/30/2013

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
SEVEN FORTY TWO NURSERY LLC	$0	1	1800/ 210	05/30/2013
BIRDSEYS PLAIN LLC	$0	2	1410/ 59	02/21/2006
FOUR 74 MAIN ST HOLDINGS INC	$0	3	943/ 187	04/27/2001
TREE LANDSCAPE CARE(TLC) INC	$0	4	735/ 54	03/14/1997
TREE LANDSCAPE CARE INC	$0	5	699/ 90	04/30/1996

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

Building Photo

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Stories:	
Occupancy	
Exterior Wall 1	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Rooms:	
Fireplaces	
Basement Gar.	
Basement	
In Law Apt	

(http://images.vgsi.com/photos/MonroeCTPhotos//\00\00\01/0

Building Layout

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

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	716
Description	Tillable A
Zone	B1
Neighborhood	
Alt Land Approved	No
Category	

Land Line Valuation

Size (Acres)	1.8
Appraised Value	$13,900

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
RG4	Garage Fin Attic			396 S.F.	$11,900	1
RS1	Frame Utility Shed			154 S.F.	$1,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$13,400	$13,900	$27,300
2009		$2,200	$14,490

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$9,400	$3,000	$12,400
2009		$1,540	$10,143

ATTACHMENT 5

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	6		neopost 08/22/2018 US POSTAGE $002.38 ZIP 06103 041L12203380
	Postmaster, per *(name of receiving employee)*		OLD STATE HOUSE STATION 06103 AUG 22 2018 USPS

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Kenneth Kellogg, First Selectman Town of Monroe 7 Fan Hill Road Monroe, CT 06468				
2.	Scott Schatzlein, Land Use Director/Town Engineer Town of Monroe 7 Fan Hill Road Monroe, CT 06468				
3.	Seven Forty Two Nursery LLC c/o Keith M. Bunovsky, Jr. – Member 742 Main Street Monroe, CT 06468				
4.					
5.					
6.					