

July 27, 2016

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

**Re: Notice of Exempt Modification – Facility Modification
North Main Street, Marlborough, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the top of an existing 155.5-foot tower at North Main Street in Marlborough, Connecticut (the “Property”). The tower is owned by Crown Castle (“Crown”). Cellco’s use of the tower was approved by the Council in 1995 (Docket No. 169). Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D65B, 700/2100 MHz antennas; and three (3) model SBNHH-1D65B, 1900 MHz antennas, all at the same 159-foot level on the tower. Cellco also intends to install three (3) remote radio heads (“RRHs”) behind its 700/2100 MHz antennas. Included in Attachment 1 are specifications for Cellco’s replacement antennas and RRHs.

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 notice is being sent to Amy Traversa, First Selectman of the Town of Marlborough. A copy of this letter is also being sent to Village Properties 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).

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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on Cellco's existing platform at the top of the tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report included in Attachment 3*).

A copy of the Town Assessor's Parcel Map and property owner information is included in Attachment 4.

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:

Amy Traversa, Marlborough First Selectman
Village Properties LLC
Crown Castle
Tim Parks

ATTACHMENT 1



SBNHH-1D65B

Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

Antenna Type	Sector with internal RET
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

SBNHH-1D65B

Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

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

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

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

Regulatory Compliance/Certifications

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



SBNHH-1D65B

Included Products

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

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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



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

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

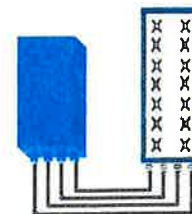
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F)
Wind load (@150km/h or 93mph)	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

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ATTACHMENT 2

Site Name: Marlborough Tower Height: 155.5Ft.	General		Power	Density	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
	CARRIER	# OF CHAN.	WATTS ERP	HEIGHT					
*AT&T	2	2010	144	1900	0.0759	1.0000	0.76%		
*AT&T	4	414	144	850	0.0313	0.5667	0.55%		
*AT&T	4	656	144	1900	0.0496	1.0000	0.50%		
*AT&T	2	1298	144	734	0.0490	0.4893	1.00%		
*Pocket (now MetroPCS)	3	631	135	2130	0.0409	1.0000	0.41%		
*T-Mobile	6	1102	100	1900/2100	0.2691	1.0000	2.69%		
*T-Mobile	1	865	100	700	0.0351	0.4667	0.75%		
*Town			130				6.03%		
*Sprint	12	100	168	851	0.0164	0.5673	0.29%		
*Sprint	11	411	164	1962	0.0651	1.0000	0.65%		
Verizon PCS	11	470	159	0.0735	1970	1.0000	7.35%		
Verizon Cellular	9	422	159	0.0540	869	0.5793	9.32%		
Verizon AWS	1	6070	159	0.0863	2145	1.0000	8.63%		
Verizon 700	1	2780	159	0.0395	746	0.4973	7.95%	46.89%	
* Source: Siting Council									

ATTACHMENT 3

Date: **September 29, 2015**

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589



SSOE Group
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
(615) 661-7585
kbhegani@ssoe.com

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Name: Marlborough CT

Crown Castle Designation: **Crown Castle BU Number:** 806366
Crown Castle Site Name: HRT 107(C) 943204
Crown Castle JDE Job Number: 348972
Crown Castle Work Order Number: 1127434
Crown Castle Application Number: 312923 Rev. 1

Engineering Firm Designation: **SSOE Group Project Number:** 016-00010-00 BC 1011

Site Data: **North Main Street, Marlborough, CT 06447, Hartford County**
Latitude 41° 37' 47.30", Longitude -72° 27' 59.40"
155.5 Foot – FWT Monopole Tower

Dear Ms. Darcy Tarr,

SSOE 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 830014, in accordance with application 312923, revision 1.

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

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 TIA/EIA-222-F standard and the 2005 Connecticut State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

We at SSOE 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.

Structural analysis prepared by: Kassam A. Bhegani, EI

Respectfully submitted by:

Barry W. Burgess, PE
Section Manager



making clients successful by saving them time, trouble, and money



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1) INTRODUCTION

The existing 155.5' monopole has twelve sides and is evenly tapered from 76.50" (flat-flat) at the base to 58.60" (flat-flat) at the top. It has four major sections, connected with slip joints. The structure is galvanized and has no tower lighting.

The tower was originally designed for Bell Atlantic Nynex Mobile by Fort Worth Tower, Inc. of Fort Worth, Texas for a 90 mph wind speed with 0.5" radial ice in accordance with TIA/EIA-222-F 1996.

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, 38 mph with 1.25" 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
156.0	159.0	3	Alcatel Lucent	RRH2x60-700	-	-	-
		6	Andrew	SBNHH-1D65B w/ Mount Pipe			

Table 2 – Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	159.0	6	Commscope	HBXX-6517DS-A2M	17	1-5/8	1
		6	RFS/Celwave	FD9R6004/2C-3L			
		3	Alcatel Lucent	RRH2X60-AWS			
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Commscope	LNx-6514DS-A1M w/ Mount Pipe			
		2	Commscope	LNx-6514DS-AIM w/ Mount Pipe			
		1	Commscope	LNx-8513DS-VTM w/ Mount Pipe			
		3	Decibel	DB809K-Y			
		2	RFS Celwave	DB-T1-6Z-8AB-0Z			
	156.0	1		Platform Mount [LP 1001-1]			
144.0	144.0	6	Ericsson	RRUS-11	12	3/8 3/4 12	
		3	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	Powerwave Technologies	7770.00 w/ Mount Pipe			
		1	Raycap	DC6-48-60-18-8F			
		1		Platform Mount [LP 1001-1]			
	142.0	6	Powerwave Technologies	LGP 17201			
		6	Powerwave Technologies	LGP21903			
135.0	135.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-1/4	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
126.0	128.0	6	Decibel	DB980H90E-M w/ Mount Pipe	6	1-1/4	
	127.0	1		T-Arm Mount [TA 602-3]			
	125.0	1		T-Arm Mount [TA 602-3]			
	120.0	3	Decibel	DB809K-Y			
100.0	100.0	3	Commscope	LNX-6515DS-VTM w/ Mount Pipe	6	1-1/4	2
		3	Commscope	ATBT-BOTTOM-24V			
		6	Andrew	ETM19V2S12UB			
		3	EMS Wireless	RV90-17-00DP w/ Mount Pipe	6	1-1/4	
		1		Side Arm Mount [SO 104-3]			

- Notes:
 1) Existing equipment to be removed; not considered in this analysis.
 2) Reserved Loading

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)
157.75	157.75	12	Swedcom	ALP-9212-N	-	-
		1		16-FT Platform		
144.25	144.25	9	Swedcom	ALP-9212-N	-	-
		1		16-FT Platform		
132.0	132.0	2	Celwave	PD220	-	-
		1	Celwave	PD201		
		2	Celwave	PD1142		
		9	Decibel	DB980		
		3		T-Arm Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Original Tower Drawings	Fort Worth Tower, Inc. Job #: 15829, dated 1/2/98	Doc ID#: 823126	Crown DMZ
Foundation Drawings	Fort Worth Tower, Inc. Job #: 15829, dated 12/31/97	Doc ID#: 823125	Crown DMZ
Geotechnical Report	FDH Engineering, Inc. Project #: 08-02029G, dated 2/7/08	Doc ID#: 2208816	Crown DMZ

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) The tower and foundation were constructed in accordance with their original design and maintained per the manufacturer's specifications, are in good condition, and the tower is twist free and plumb.
- 2) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 3) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package, dated 11/14/14 with any adjustments as noted below.

This analysis may be affected if any assumptions are not valid or have been made in error. SSOE 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	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-20.98	3194.44	17.4	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-36.85	4260.83	32.4	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-55.02	5424.19	42.7	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-78.80	5547.27	64.2	Pass
							Summary	
						Pole (L4)	64.2	Pass
						Rating =	64.2	Pass

Table 6 – Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		63.7%	Pass
1	Base Plate		31.6%	Pass
1	Foundation (Structural)		59.2%	Pass
1	Foundation (Soil Interaction)		40.0%	Pass

Structure Rating (max from all components) =	64.2%
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Notes:

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

4.1) Recommendations

The existing tower and its foundations are sufficient for the proposed loads and do not require modifications.

5) DISCLAIMER OF WARRANTIES

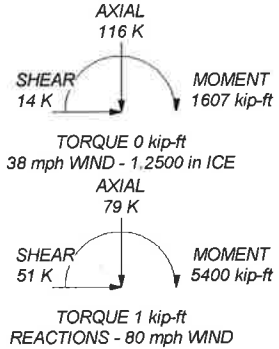
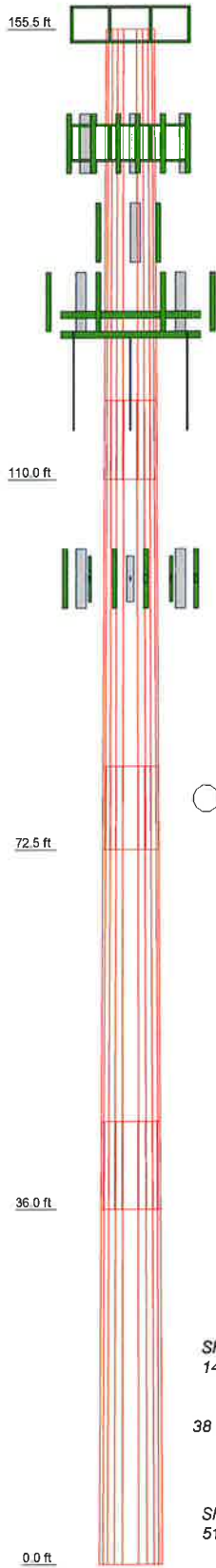
SSOE Group has not performed a site visit to the tower to verify member sizes or antenna/coax loading. SSOE Group shall be contacted immediately if the existing conditions are not as represented on the tower elevation contained in this report in order to evaluate the significance of the discrepancy. SSOE Group has not performed a condition assessment of the tower foundation. This report does not replace a full tower inspection

The engineering services rendered by SSOE Group in connection with this structural analysis are limited to an analysis of the tower structure and theoretical capacity of its main structural members. Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable tower manufacturer.

SSOE Group makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. SSOE Group will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data contained in this report. The maximum liability of SSOE Group pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	45.50	45.50	45.00	45.00
Number of Sides	12	12	12	12
Thickness (in)	0.3750	0.4375	0.5000	0.5000
Socket Length (ft)	8.00	8.50	9.00	70.5600
Top Dia (in)	58.6000	62.8000	66.8082	76.5000
Bot Dia (in)	64.6060	68.8050	72.7480	18.0
Grade		A572-65		
Weight (K)	11.4	14.3	17.1	18.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB809K-Y	156	(2) 7770.00 w/ Mount Pipe	144
LNX-6514DS-A1M w/ Mount Pipe	156	(2) LGP 17201	144
LNX-6513DS-VTM w/ Mount Pipe	156	(2) LGP21903	144
RRH2X60-AWS	156	(2) RRUS-11	144
RRH2X60-PCS	156	AM-X-CD-16-65-00T-RET w/ Mount Pipe	144
(2) DB-T1-6Z-8AB-0Z	156	(2) 6' x 2" Mount Pipe	144
(2) SBNHH-1D65B w/ Mount Pipe	156	(2) 6' x 2" Mount Pipe	144
RRH2x60-700	156	(2) 6' x 2" Mount Pipe	144
(2) 6' x 2" Mount Pipe	156	(2) 6' x 2" Mount Pipe	144
DB809K-Y	156	Platform Mount [LP 1001-1]	144
LNX-6514DS-A1M w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
LNX-6514DS-AIM w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
RRH2X60-AWS	156	742 213 w/ Mount Pipe	135
RRH2X60-PCS	156	DB809K-Y	126
(2) SBNHH-1D65B w/ Mount Pipe	156	DB809K-Y	126
RRH2x60-700	156	DB809K-Y	126
(2) 6' x 2" Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
DB809K-Y	156	(2) DB980H90E-M w/ Mount Pipe	126
LNX-6514DS-A1M w/ Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
LNX-6514DS-AIM w/ Mount Pipe	156	6' x 2" Mount Pipe	126
RRH2X60-AWS	156	6' x 2" Mount Pipe	126
RRH2X60-PCS	156	6' x 2" Mount Pipe	126
(2) SBNHH-1D65B w/ Mount Pipe	156	T-Arm Mount [TA 602-3]	126
RRH2x60-700	156	T-Arm Mount [TA 602-3]	126
(2) 6' x 2" Mount Pipe	156	(2) ETM19V2S12UB	100
Platform Mount [LP 1001-1]	156	RV90-17-00DP w/ Mount Pipe	100
(2) 7770.00 w/ Mount Pipe	144	ATBT-BOTTOM-24V	100
(2) LGP 17201	144	LNX-6515DS-VTM w/ Mount Pipe	100
(2) LGP21903	144	(2) ETM19V2S12UB	100
(2) RRUS-11	144	RV90-17-00DP w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	ATBT-BOTTOM-24V	100
DC6-48-60-18-8F	144	LNX-6515DS-VTM w/ Mount Pipe	100
(2) 7770.00 w/ Mount Pipe	144	(2) ETM19V2S12UB	100
(2) LGP 17201	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP21903	144	ATBT-BOTTOM-24V	100
(2) RRUS-11	144	LNX-6515DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	Side Arm Mount [SO 104-3]	100

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 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 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 64.2%

SSOE Group
320 Seven Springs Way
Brentwood, TN
Phone: (615) 661-7585
FAX: (615) 661-7569

Job: **BU 806366**

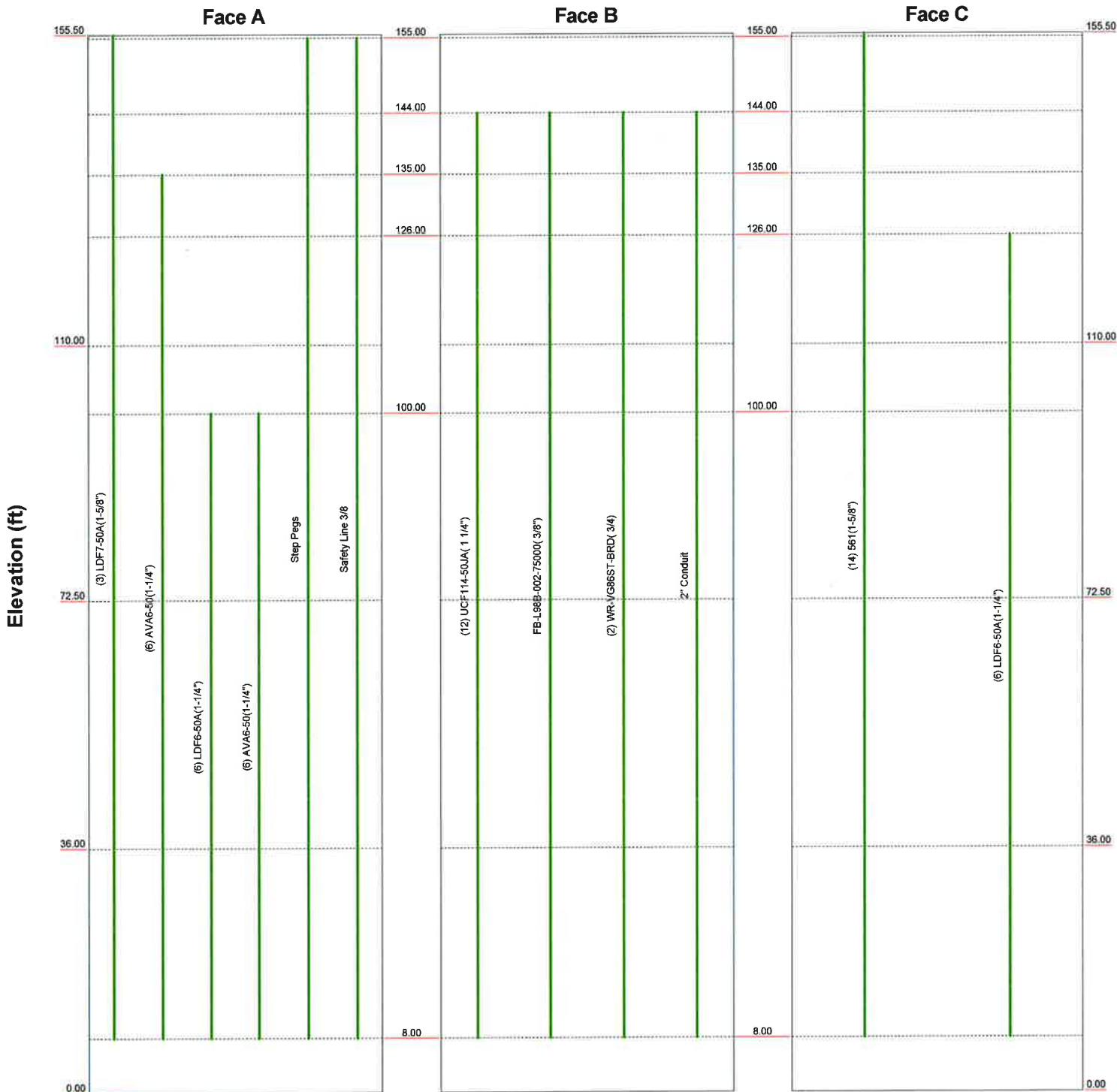
Project: **016-00010-00**

Client: CCI	Drawn by: 15333	App'd:
Code: TIA/EIA-222-F	Date: 09/29/15	Scale: NTS
Path: #:\Towers\Town\Projects\Drawings\016-00010-00\Drawings\016-00010-00\Structural\016-00010-00-01.dwg		Dwg No. E-1

making clients successful by saving them time, trouble, and money

Feed Line Distribution Chart 0' - 155'6"

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



<p>SSOETM</p> <p>making clients successful by saving them time, trouble, and money</p>	<p>SSOE Group</p> <p>320 Seven Springs Way Brentwood, TN</p> <p>Phone: (615) 661-7585 FAX: (615) 661-7569</p>	<p>Job: BU 806366</p> <p>Project: 016-00010-00</p>	<p>Client: CCI</p> <p>Code: TIA/EIA-222-F</p> <p>Path: F:\Projects\Team\Projects\Crown Castle\016-00010-00\Drawings\WT-800366\Structural\016-00010-00-0001.dwg</p>	<p>Drawn by: 15333</p> <p>Date: 09/29/15</p>	<p>App'd:</p> <p>Scale: NTS</p> <p>Dwg No: E-7</p>
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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 1.2500 in.
 Ice thickness is considered to increase with height.
 Ice density of 56 pcf.
 A wind speed of 38 mph is used in combination with ice.
 Temperature drop of 50 °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.

Options

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

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	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	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
---------	----------------	-------------------------	----------------------	---------	---------	------------------------	----------------------	-------------------------	---------	-----

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	60.6672	70.3067	30422.968 0	20.8446	30.3548	1002.2457	61645.181 3	34.6028	14.6998	39.199
	66.8851	77.5589	40842.013 1	22.9947	33.4659	1220.4065	82756.991 3	38.1721	16.3094	43.492
L2	66.1084	87.8532	43610.436 1	22.3258	32.5304	1340.6056	88366.567 0	43.2387	15.6579	35.789
	71.2322	96.3127	57460.444 0	24.4756	35.6410	1612.2011	116430.43 78	47.4022	17.2672	39.468
L3	70.3265	106.7562	59911.926 3	23.7383	34.6066	1731.2263	121397.80 56	52.5421	16.5646	33.129
	75.3143	116.3193	77497.789 3	25.8648	37.6835	2056.5463	157031.53 18	57.2488	18.1565	36.313
L4	74.2790	112.7967	70668.019 5	25.0815	36.5501	1933.4563	143192.56 65	55.5151	17.5701	35.14
	79.1986	122.3600	90209.568 0	27.2080	39.6270	2276.4673	182789.04 18	60.2219	19.1620	38.324

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 155.50- 110.00				1	1	1		
L2 110.00- 72.50				1	1	1		
L3 72.50- 36.00				1	1	1		
L4 36.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA}	Weight
							ft ² /ft	p/lf
561(1-5/8")	C	No	Inside Pole	155.50 - 8.00	14	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
LDF7-50A(1-5/8")	A	No	Inside Pole	155.50 - 8.00	3	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
UCF114-50JA(1 1/4")	B	No	Inside Pole	144.00 - 8.00	12	No Ice	0.00	0.55
						1/2" Ice	0.00	0.55
						1" Ice	0.00	0.55
						2" Ice	0.00	0.55
						4" Ice	0.00	0.55
FB-L98B-002-75000(3/8")	B	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	144.00 - 8.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
2" Conduit	B	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
AVA6-50(1-1/4")	A	No	Inside Pole	135.00 - 8.00	6	No Ice	0.00	0.45

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} A _A ft ² /ft	Weight plf
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45
LDF6-50A(1-1/4")	C	No	Inside Pole	126.00 - 8.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF6-50A(1-1/4")	A	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
AVA6-50(1-1/4")	A	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45
Step Pegs	A	No	CaAa (Out Of Face)	155.00 - 8.00	1	No Ice	0.08	2.72
						1/2" Ice	0.18	3.51
						1" Ice	0.28	4.92
						2" Ice	0.48	9.56
						4" Ice	0.88	26.18
Safety Line 3/8	A	No	CaAa (Out Of Face)	155.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} A _A In Face ft ²	C _{AA} A _A Out Face ft ²	Weight K
L1	155.50-110.00	A	0.000	0.000	0.000	5.287	0.31
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	0.000	0.92
L2	110.00-72.50	A	0.000	0.000	0.000	4.406	0.49
		B	0.000	0.000	0.000	0.000	0.40
		C	0.000	0.000	0.000	0.000	0.86
L3	72.50-36.00	A	0.000	0.000	0.000	4.289	0.54
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.83
L4	36.00-0.00	A	0.000	0.000	0.000	3.290	0.41
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.64

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} A _A In Face ft ²	C _{AA} A _A Out Face ft ²	Weight K
L1	155.50-110.00	A	1.477	0.000	0.000	0.000	31.876	0.58
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	0.000	0.92
L2	110.00-72.50	A	1.412	0.000	0.000	0.000	26.563	0.71
		B		0.000	0.000	0.000	0.000	0.40
		C		0.000	0.000	0.000	0.000	0.86
L3	72.50-36.00	A	1.328	0.000	0.000	0.000	24.909	0.74
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	0.000	0.000	0.83
L4	36.00-0.00	A	1.250	0.000	0.000	0.000	18.158	0.56

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	0.000	0.000	0.64

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	155.50-110.00	0.0000	-0.1705	0.0000	-0.8877
L2	110.00-72.50	0.0000	-0.1726	0.0000	-0.9061
L3	72.50-36.00	0.0000	-0.1728	0.0000	-0.8851
L4	36.00-0.00	0.0000	-0.1341	0.0000	-0.6722

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
DB809K-Y	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	2.85	2.85	0.03
						1/2" Ice	4.03	4.03	0.05
						Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice	10.06	10.06	0.42
LNx-6514DS-A1M w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	8.65	7.08	0.06
						1/2" Ice	9.31	8.27	0.13
						Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
LNx-8513DS-VTM w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	8.41	6.83	0.06
						1/2" Ice	8.96	7.79	0.13
						Ice	9.52	8.62	0.20
						1" Ice	10.67	10.34	0.38
						2" Ice	13.07	14.13	0.86
RRH2X60-AWS	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
RRH2X60-PCS	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	2.57	2.01	0.06
						1/2" Ice	2.79	2.22	0.08
						Ice	3.02	2.43	0.10
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31
(2) DB-T1-6Z-8AB-0Z	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	5.60	2.33	0.04
						1/2" Ice	5.92	2.56	0.08
						Ice	6.24	2.79	0.12
						1" Ice	6.91	3.28	0.21
						2" Ice	8.37	4.37	0.45
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	8.40	6.82	0.06
						1/2" Ice	8.95	7.78	0.13
						Ice	9.51	8.61	0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
						1" Ice	10.66	10.33	0.38
						2" Ice	13.06	14.12	0.86
						4" Ice			
RRH2x60-700	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	156.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
DB809K-Y	B	From Centroid-Leg	4.00 0.00 3.00	30.0000	156.00	No Ice	2.85	2.85	0.03
						1/2" Ice	4.03	4.03	0.05
						Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice	10.06	10.06	0.42
						4" Ice			
LNx-6514DS-A1M w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	8.65	7.08	0.06
						1/2" Ice	9.31	8.27	0.13
						Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
LNx-6514DS-AIM w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	8.65	7.08	0.06
						1/2" Ice	9.31	8.27	0.13
						Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
RRH2X60-AWS	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
RRH2X60-PCS	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	2.57	2.01	0.06
						1/2" Ice	2.79	2.22	0.08
						Ice	3.02	2.43	0.10
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31
						4" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	8.40	6.82	0.06
						1/2" Ice	8.95	7.78	0.13
						Ice	9.51	8.61	0.20
						1" Ice	10.66	10.33	0.38
						2" Ice	13.06	14.12	0.86
						4" Ice			
RRH2x60-700	B	From Centroid-Leg	4.00 0.00 3.00	20.0000	156.00	No Ice	3.96	1.82	0.06
						1/2" Ice	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
(2) 6' x 2" Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
DB809K-Y	C	From Centroid-	4.00 0.00	30.0000	156.00	No Ice	2.85	2.85	0.03
						1/2" Ice	4.03	4.03	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
		Leg	3.00			Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice	10.06	10.06	0.42
						4" Ice			
LNx-6514DS-A1M w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	8.65	7.08	0.06
						1/2"	9.31	8.27	0.13
						Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
LNx-6514DS-AIM w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	8.65	7.08	0.06
						1/2"	9.31	8.27	0.13
						Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
RRH2X60-AWS	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	3.96	1.82	0.06
						1/2"	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
RRH2X60-PCS	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	2.57	2.01	0.06
						1/2"	2.79	2.22	0.08
						Ice	3.02	2.43	0.10
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31
						4" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	8.40	6.82	0.06
						1/2"	8.95	7.78	0.13
						Ice	9.51	8.61	0.20
						1" Ice	10.66	10.33	0.38
						2" Ice	13.06	14.12	0.86
						4" Ice			
RRH2x60-700	C	From Centroid-Leg	4.00 0.00 3.00	10.0000	156.00	No Ice	3.96	1.82	0.06
						1/2"	4.27	2.08	0.08
						Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
(2) 6' x 2" Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
Platform Mount [LP 1001-1]	C	None		0.0000	156.00	No Ice	47.70	47.70	3.02
						1/2"	59.50	59.50	3.62
						Ice	71.30	71.30	4.22
						1" Ice	94.90	94.90	5.43
						2" Ice	142.10	142.10	7.85
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	3.98 0.42 0.00	6.0000	144.00	No Ice	6.22	4.35	0.06
						1/2"	6.77	5.20	0.11
						Ice	7.30	5.92	0.16
						1" Ice	8.38	7.41	0.29
						2" Ice	10.69	10.76	0.68
						4" Ice			
(2) LGP 17201	A	From Centroid-Leg	3.98 0.42 -2.00	6.0000	144.00	No Ice	1.95	0.52	0.03
						1/2"	2.13	0.64	0.04
						Ice	2.33	0.77	0.06
						1" Ice	2.75	1.06	0.09
						2" Ice	3.69	1.73	0.19
						4" Ice			
(2) LGP21903	A	From	3.98	6.0000	144.00	No Ice	0.27	0.18	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
		Centroid-Leg	0.42 -2.00		1/2" Ice	0.34 0.43	0.25 0.32	0.01 0.02	
					1" Ice	0.62	0.49	0.03	
					2" Ice	1.10	0.94	0.07	
					4" Ice				
(2) RRUS-11	A	From Centroid-Leg	3.98 0.42 0.00	6.0000	144.00	No Ice 1/2" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Leg	3.98 0.42 0.00	6.0000	144.00	No Ice 1/2" Ice	8.50 9.15 9.77	6.30 7.48 8.37	0.07 0.14 0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
DC6-48-60-18-8F	A	From Centroid-Leg	3.98 0.42 0.00	6.0000	144.00	No Ice 1/2" Ice	2.22 2.44 2.66	2.22 2.44 2.66	0.02 0.04 0.06
						1" Ice	3.15	3.15	0.12
						2" Ice	4.21	4.21	0.27
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Leg	3.98 0.42 0.00	-1.0000	144.00	No Ice 1/2" Ice	6.22 6.77 7.30	4.35 5.20 5.92	0.06 0.11 0.16
						1" Ice	8.38	7.41	0.29
						2" Ice	10.69	10.76	0.68
						4" Ice			
(2) LGP 17201	B	From Centroid-Leg	3.98 0.42 -2.00	-1.0000	144.00	No Ice 1/2" Ice	1.95 2.13 2.33	0.52 0.64 0.77	0.03 0.04 0.06
						1" Ice	2.75	1.06	0.09
						2" Ice	3.69	1.73	0.19
						4" Ice			
(2) LGP21903	B	From Centroid-Leg	3.98 0.42 -2.00	-1.0000	144.00	No Ice 1/2" Ice	0.27 0.34 0.43	0.18 0.25 0.32	0.01 0.01 0.02
						1" Ice	0.62	0.49	0.03
						2" Ice	1.10	0.94	0.07
						4" Ice			
(2) RRUS-11	B	From Centroid-Leg	3.98 0.42 0.00	-1.0000	144.00	No Ice 1/2" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Centroid-Leg	3.98 0.42 0.00	-1.0000	144.00	No Ice 1/2" Ice	8.50 9.15 9.77	6.30 7.48 8.37	0.07 0.14 0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	3.98 0.42 0.00	-10.0000	144.00	No Ice 1/2" Ice	6.22 6.77 7.30	4.35 5.20 5.92	0.06 0.11 0.16
						1" Ice	8.38	7.41	0.29
						2" Ice	10.69	10.76	0.68
						4" Ice			
(2) LGP 17201	C	From Centroid-Leg	3.98 0.42 -2.00	-10.0000	144.00	No Ice 1/2" Ice	1.95 2.13 2.33	0.52 0.64 0.77	0.03 0.04 0.06
						1" Ice	2.75	1.06	0.09
						2" Ice	3.69	1.73	0.19
						4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
(2) LGP21903	C	From Centroid-Leg	3.98	-10.0000	144.00	No Ice	0.27	0.18	0.01
			0.42	1/2"		0.34	0.25	0.01	
			-2.00	Ice		0.43	0.32	0.02	
				1" Ice		0.62	0.49	0.03	
				2" Ice		1.10	0.94	0.07	
(2) RRUS-11	C	From Centroid-Leg	3.98	-10.0000	144.00	No Ice	3.25	1.37	0.05
			0.42	1/2"		3.49	1.55	0.07	
			0.00	Ice		3.74	1.74	0.09	
				1" Ice		4.27	2.14	0.15	
				2" Ice		5.43	3.04	0.31	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	3.98	-10.0000	144.00	No Ice	8.50	6.30	0.07
			0.42	1/2"		9.15	7.48	0.14	
			0.00	Ice		9.77	8.37	0.21	
				1" Ice		11.03	10.18	0.38	
				2" Ice		13.68	14.02	0.87	
(2) 6' x 2" Mount Pipe	A	From Centroid-Leg	3.98	0.0000	144.00	No Ice	1.43	1.43	0.02
			0.42	1/2"		1.92	1.92	0.03	
			0.00	Ice		2.29	2.29	0.05	
				1" Ice		3.06	3.06	0.09	
				2" Ice		4.70	4.70	0.23	
(2) 6' x 2" Mount Pipe	B	From Centroid-Leg	3.98	0.0000	144.00	No Ice	1.43	1.43	0.02
			0.42	1/2"		1.92	1.92	0.03	
			0.00	Ice		2.29	2.29	0.05	
				1" Ice		3.06	3.06	0.09	
				2" Ice		4.70	4.70	0.23	
(2) 6' x 2" Mount Pipe	C	From Centroid-Leg	3.98	0.0000	144.00	No Ice	1.43	1.43	0.02
			0.42	1/2"		1.92	1.92	0.03	
			0.00	Ice		2.29	2.29	0.05	
				1" Ice		3.06	3.06	0.09	
				2" Ice		4.70	4.70	0.23	
Platform Mount [LP 1001-1]	C	None		0.0000	144.00	No Ice	47.70	47.70	3.02
				1/2"		59.50	59.50	3.62	
				Ice		71.30	71.30	4.22	
				1" Ice		94.90	94.90	5.43	
				2" Ice		142.10	142.10	7.85	
742 213 w/ Mount Pipe	A	From Leg	0.87	30.0000	135.00	No Ice	5.37	4.62	0.05
			0.50	1/2"		5.95	6.00	0.09	
			0.00	Ice		6.50	6.98	0.15	
				1" Ice		7.61	8.85	0.28	
				2" Ice		9.93	12.79	0.68	
742 213 w/ Mount Pipe	B	From Leg	0.87	30.0000	135.00	No Ice	5.37	4.62	0.05
			0.50	1/2"		5.95	6.00	0.09	
			0.00	Ice		6.50	6.98	0.15	
				1" Ice		7.61	8.85	0.28	
				2" Ice		9.93	12.79	0.68	
742 213 w/ Mount Pipe	C	From Leg	0.87	30.0000	135.00	No Ice	5.37	4.62	0.05
			0.50	1/2"		5.95	6.00	0.09	
			0.00	Ice		6.50	6.98	0.15	
				1" Ice		7.61	8.85	0.28	
				2" Ice		9.93	12.79	0.68	
DB809K-Y	A	From Leg	4.00	0.0000	126.00	No Ice	2.85	2.85	0.03
			0.00	1/2"		4.03	4.03	0.05	
			-6.00	Ice		5.21	5.21	0.08	
				1" Ice		7.17	7.17	0.16	
				2" Ice		10.06	10.06	0.42	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
DB809K-Y	B	From Leg	4.00 0.00 -6.00	0.0000	126.00	4" Ice			
						No Ice	2.85	2.85	0.03
						1/2" Ice	4.03	4.03	0.05
						1" Ice	5.21	5.21	0.08
						2" Ice	7.17	7.17	0.16
DB809K-Y	C	From Leg	4.00 0.00 -6.00	0.0000	126.00	4" Ice			
						No Ice	2.85	2.85	0.03
						1/2" Ice	4.03	4.03	0.05
						1" Ice	5.21	5.21	0.08
						2" Ice	7.17	7.17	0.16
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	126.00	4" Ice			
						No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.07
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	126.00	4" Ice			
						No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.07
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	126.00	4" Ice			
						No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.07
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	126.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	126.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	126.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
T-Arm Mount [TA 602-3]	C	From Face	0.00 0.00 1.00	0.0000	126.00	4" Ice			
						No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
T-Arm Mount [TA 602-3]	C	From Face	0.00 0.00 -1.00	0.0000	126.00	4" Ice			
						No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
						2" Ice	26.99	26.99	1.64
(2) ETM19V2S12UB	A	From Leg	2.00 0.00 0.00	10.0000	100.00	4" Ice			
						No Ice	0.78	0.21	0.01
						1/2" Ice	0.90	0.30	0.02
						1" Ice	1.03	0.39	0.02
						1" Ice	1.31	0.60	0.04

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
						2" Ice	1.99	1.12	0.10
						4" Ice			
RV90-17-00DP w/ Mount Pipe	A	From Leg	2.00	10.0000	100.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						Ice	5.58	4.78	0.12
						1" Ice	6.59	6.23	0.23
						2" Ice	8.73	9.31	0.56
					4" Ice				
ATBT-BOTTOM-24V	A	From Leg	2.00	10.0000	100.00	No Ice	0.12	0.08	0.00
						1/2" Ice	0.17	0.12	0.00
						Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
					4" Ice				
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	2.00	10.0000	100.00	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						Ice	13.14	12.91	0.27
						1" Ice	14.60	15.27	0.51
						2" Ice	17.87	20.14	1.15
					4" Ice				
(2) ETM19V2S12UB	B	From Leg	2.00	0.0000	100.00	No Ice	0.78	0.21	0.01
						1/2" Ice	0.90	0.30	0.02
						Ice	1.03	0.39	0.02
						1" Ice	1.31	0.60	0.04
						2" Ice	1.99	1.12	0.10
					4" Ice				
RV90-17-00DP w/ Mount Pipe	B	From Leg	2.00	0.0000	100.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						Ice	5.58	4.78	0.12
						1" Ice	6.59	6.23	0.23
						2" Ice	8.73	9.31	0.56
					4" Ice				
ATBT-BOTTOM-24V	B	From Leg	2.00	0.0000	100.00	No Ice	0.12	0.08	0.00
						1/2" Ice	0.17	0.12	0.00
						Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
					4" Ice				
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	2.00	0.0000	100.00	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						Ice	13.14	12.91	0.27
						1" Ice	14.60	15.27	0.51
						2" Ice	17.87	20.14	1.15
					4" Ice				
(2) ETM19V2S12UB	C	From Leg	2.00	10.0000	100.00	No Ice	0.78	0.21	0.01
						1/2" Ice	0.90	0.30	0.02
						Ice	1.03	0.39	0.02
						1" Ice	1.31	0.60	0.04
						2" Ice	1.99	1.12	0.10
					4" Ice				
RV90-17-00DP w/ Mount Pipe	C	From Leg	2.00	10.0000	100.00	No Ice	4.59	3.32	0.04
						1/2" Ice	5.09	4.09	0.08
						Ice	5.58	4.78	0.12
						1" Ice	6.59	6.23	0.23
						2" Ice	8.73	9.31	0.56
					4" Ice				
ATBT-BOTTOM-24V	C	From Leg	2.00	10.0000	100.00	No Ice	0.12	0.08	0.00
						1/2" Ice	0.17	0.12	0.00
						Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
					4" Ice				
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	2.00	0.0000	100.00	No Ice	11.68	9.84	0.08
						1/2" Ice	12.40	11.37	0.17
						Ice	13.14	12.91	0.27

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
Side Arm Mount [SO 104-3]	C	None			0.0000	100.00	1" Ice	14.60	15.27	0.51
							2" Ice	17.87	20.14	1.15
							4" Ice			
							No Ice	3.30	3.30	0.29
							1/2"	4.13	4.13	0.32
							Ice	4.96	4.96	0.35
							1" Ice	6.62	6.62	0.41
							2" Ice	9.94	9.94	0.53

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
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	155.5 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.80	-0.04	-4.85
			Max. Mx	5	-21.01	-660.52	-4.38
			Max. My	8	-20.98	-1.04	-687.59
			Max. Vy	5	25.37	-660.52	-4.38
			Max. Vx	8	26.01	-1.04	-687.59
			Max. Torque	11			-1.57
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-62.79	-0.04	-3.95
			Max. Mx	5	-36.87	-1790.53	-3.42
			Max. My	8	-36.85	-0.35	-1840.34
			Max. Vy	5	35.53	-1790.53	-3.42
			Max. Vx	8	36.13	-0.35	-1840.34
			Max. Torque	5			-0.91
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-86.34	-0.04	-3.05
			Max. Mx	5	-55.04	-3203.78	-2.16
			Max. My	8	-55.02	0.64	-3275.13
			Max. Vy	5	42.75	-3203.78	-2.16
			Max. Vx	8	43.36	0.64	-3275.13
			Max. Torque	5			-0.83
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-116.24	-0.04	-2.14
			Max. Mx	5	-78.80	-5302.04	-0.61
			Max. My	8	-78.80	1.87	-5400.10
			Max. Vy	5	50.32	-5302.04	-0.61
			Max. Vx	8	50.91	1.87	-5400.10
			Max. Torque	5			-0.72

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	116.24	0.00	0.00
	Max. H _x	11	78.82	50.30	-0.03
	Max. H _z	2	78.82	-0.03	50.89
	Max. M _x	2	5395.13	-0.03	50.89
	Max. M _z	5	5302.04	-50.30	0.03
	Max. Torsion	11	0.64	50.30	-0.03
	Min. Vert	1	78.82	0.00	0.00
	Min. H _x	5	78.82	-50.30	0.03
	Min. H _z	8	78.82	0.03	-50.89
	Min. M _x	8	-5400.10	0.03	-50.89
	Min. M _z	11	-5302.02	50.30	-0.03
	Min. Torsion	5	-0.65	-50.30	0.03

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	78.82	0.00	0.00	2.42	-0.01	0.00
Dead+Wind 0 deg - No Ice	78.82	0.03	-50.89	-5395.13	-1.88	0.04
Dead+Wind 30 deg - No Ice	78.82	25.17	-44.08	-4672.93	-2652.64	0.35
Dead+Wind 60 deg - No Ice	78.82	43.57	-25.47	-2697.96	-4592.63	0.57
Dead+Wind 90 deg - No Ice	78.82	50.30	-0.03	0.61	-5302.04	0.65
Dead+Wind 120 deg - No Ice	78.82	43.54	25.42	2699.67	-4590.76	0.55
Dead+Wind 150 deg - No Ice	78.82	25.12	44.06	4676.02	-2649.39	0.29
Dead+Wind 180 deg - No Ice	78.82	-0.03	50.89	5400.10	1.87	-0.05
Dead+Wind 210 deg - No Ice	78.82	-25.17	44.08	4677.89	2652.62	-0.38

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 240 deg - No Ice	78.82	-43.57	25.47	2702.92	4592.62	-0.59
Dead+Wind 270 deg - No Ice	78.82	-50.30	0.03	4.36	5302.02	-0.64
Dead+Wind 300 deg - No Ice	78.82	-43.54	-25.42	-2694.71	4590.74	-0.52
Dead+Wind 330 deg - No Ice	78.82	-25.12	-44.06	-4671.06	2649.37	-0.27
Dead+Ice+Temp	116.24	0.00	0.00	2.14	-0.04	0.00
Dead+Wind 0 deg+Ice+Temp	116.24	0.01	-14.36	-1602.19	-0.78	-0.00
Dead+Wind 30 deg+Ice+Temp	116.24	7.12	-12.44	-1387.60	-793.10	0.08
Dead+Wind 60 deg+Ice+Temp	116.24	12.33	-7.19	-800.61	-1372.92	0.14
Dead+Wind 90 deg+Ice+Temp	116.24	14.24	-0.01	1.51	-1584.87	0.16
Dead+Wind 120 deg+Ice+Temp	116.24	12.33	7.17	803.83	-1372.17	0.15
Dead+Wind 150 deg+Ice+Temp	116.24	7.11	12.43	1391.37	-791.81	0.09
Dead+Wind 180 deg+Ice+Temp	116.24	-0.01	14.36	1606.69	0.70	0.00
Dead+Wind 210 deg+Ice+Temp	116.24	-7.12	12.44	1392.11	793.02	-0.08
Dead+Wind 240 deg+Ice+Temp	116.24	-12.33	7.19	805.12	1372.84	-0.14
Dead+Wind 270 deg+Ice+Temp	116.24	-14.24	0.01	3.00	1584.80	-0.16
Dead+Wind 300 deg+Ice+Temp	116.24	-12.33	-7.17	-799.32	1372.10	-0.14
Dead+Wind 330 deg+Ice+Temp	116.24	-7.11	-12.43	-1386.86	791.74	-0.09
Dead+Wind 0 deg - Service	78.82	0.01	-19.88	-2106.15	-0.74	0.02
Dead+Wind 30 deg - Service	78.82	9.83	-17.22	-1824.02	-1036.28	0.14
Dead+Wind 60 deg - Service	78.82	17.02	-9.95	-1052.47	-1794.16	0.23
Dead+Wind 90 deg - Service	78.82	19.65	-0.01	1.75	-2071.29	0.25
Dead+Wind 120 deg - Service	78.82	17.01	9.93	1056.17	-1793.43	0.21
Dead+Wind 150 deg - Service	78.82	9.81	17.21	1828.25	-1035.02	0.11
Dead+Wind 180 deg - Service	78.82	-0.01	19.88	2111.12	0.72	-0.02
Dead+Wind 210 deg - Service	78.82	-9.83	17.22	1828.98	1036.27	-0.14
Dead+Wind 240 deg - Service	78.82	-17.02	9.95	1057.43	1794.14	-0.23
Dead+Wind 270 deg - Service	78.82	-19.65	0.01	3.21	2071.28	-0.25
Dead+Wind 300 deg - Service	78.82	-17.01	-9.93	-1051.20	1793.41	-0.21
Dead+Wind 330 deg - Service	78.82	-9.81	-17.21	-1823.28	1035.00	-0.11

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-78.82	0.00	0.00	78.82	0.00	0.000%
2	0.03	-78.82	-50.89	-0.03	78.82	50.89	0.000%
3	25.17	-78.82	-44.08	-25.17	78.82	44.08	0.000%
4	43.57	-78.82	-25.47	-43.57	78.82	25.47	0.000%
5	50.30	-78.82	-0.03	-50.30	78.82	0.03	0.000%
6	43.54	-78.82	25.42	-43.54	78.82	-25.42	0.000%
7	25.12	-78.82	44.06	-25.12	78.82	-44.06	0.000%
8	-0.03	-78.82	50.89	0.03	78.82	-50.89	0.000%
9	-25.17	-78.82	44.08	25.17	78.82	-44.08	0.000%
10	-43.57	-78.82	25.47	43.57	78.82	-25.47	0.000%
11	-50.30	-78.82	0.03	50.30	78.82	-0.03	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
12	-43.54	-78.82	-25.42	43.54	78.82	25.42	0.000%
13	-25.12	-78.82	-44.06	25.12	78.82	44.06	0.000%
14	0.00	-116.24	0.00	0.00	116.24	0.00	0.000%
15	0.01	-116.24	-14.36	-0.01	116.24	14.36	0.000%
16	7.12	-116.24	-12.44	-7.12	116.24	12.44	0.000%
17	12.33	-116.24	-7.19	-12.33	116.24	7.19	0.000%
18	14.24	-116.24	-0.01	-14.24	116.24	0.01	0.000%
19	12.33	-116.24	7.17	-12.33	116.24	-7.17	0.000%
20	7.11	-116.24	12.43	-7.11	116.24	-12.43	0.000%
21	-0.01	-116.24	14.36	0.01	116.24	-14.36	0.000%
22	-7.12	-116.24	12.44	7.12	116.24	-12.44	0.000%
23	-12.33	-116.24	7.19	12.33	116.24	-7.19	0.000%
24	-14.24	-116.24	0.01	14.24	116.24	-0.01	0.000%
25	-12.33	-116.24	-7.17	12.33	116.24	7.17	0.000%
26	-7.11	-116.24	-12.43	7.11	116.24	12.43	0.000%
27	0.01	-78.82	-19.88	-0.01	78.82	19.88	0.000%
28	9.83	-78.82	-17.22	-9.83	78.82	17.22	0.000%
29	17.02	-78.82	-9.95	-17.02	78.82	9.95	0.000%
30	19.65	-78.82	-0.01	-19.65	78.82	0.01	0.000%
31	17.01	-78.82	9.93	-17.01	78.82	-9.93	0.000%
32	9.81	-78.82	17.21	-9.81	78.82	-17.21	0.000%
33	-0.01	-78.82	19.88	0.01	78.82	-19.88	0.000%
34	-9.83	-78.82	17.22	9.83	78.82	-17.22	0.000%
35	-17.02	-78.82	9.95	17.02	78.82	-9.95	0.000%
36	-19.65	-78.82	0.01	19.65	78.82	-0.01	0.000%
37	-17.01	-78.82	-9.93	17.01	78.82	9.93	0.000%
38	-9.81	-78.82	-17.21	9.81	78.82	17.21	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	0.00003749
3	Yes	4	0.00000001	0.00042444
4	Yes	4	0.00000001	0.00041109
5	Yes	4	0.00000001	0.00004009
6	Yes	4	0.00000001	0.00042428
7	Yes	4	0.00000001	0.00041863
8	Yes	4	0.00000001	0.00003755
9	Yes	4	0.00000001	0.00041753
10	Yes	4	0.00000001	0.00042513
11	Yes	4	0.00000001	0.00004017
12	Yes	4	0.00000001	0.00041158
13	Yes	4	0.00000001	0.00042298
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00071468
16	Yes	4	0.00000001	0.00073317
17	Yes	4	0.00000001	0.00072901
18	Yes	4	0.00000001	0.00070727
19	Yes	4	0.00000001	0.00073160
20	Yes	4	0.00000001	0.00073709
21	Yes	4	0.00000001	0.00071970
22	Yes	4	0.00000001	0.00073762
23	Yes	4	0.00000001	0.00073211
24	Yes	4	0.00000001	0.00070722
25	Yes	4	0.00000001	0.00072839
26	Yes	4	0.00000001	0.00073257
27	Yes	4	0.00000001	0.00001817
28	Yes	4	0.00000001	0.00004409
29	Yes	4	0.00000001	0.00004245
30	Yes	4	0.00000001	0.00001809
31	Yes	4	0.00000001	0.00004433
32	Yes	4	0.00000001	0.00004342
33	Yes	4	0.00000001	0.00001825

34	Yes	4	0.00000001	0.00004328
35	Yes	4	0.00000001	0.00004445
36	Yes	4	0.00000001	0.00001810
37	Yes	4	0.00000001	0.00004250
38	Yes	4	0.00000001	0.00004388

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 P/P _a
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	45.50	0.00	0.0	31.415	76.2838	-20.98	2396.43	0.009
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	45.50	0.00	0.0	33.742	94.7324	-36.85	3196.42	0.012
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	45.00	0.00	0.0	35.568	114.407	-55.02	4069.16	0.014
L4	36 - 0 (4)	TP76.5x70.56x0.5	45.00	0.00	0.0	34.010	122.360	-78.80	4161.49	0.019

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	687.59	6.989	31.415	0.222	0.00	0.000	31.415	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	1840.3	14.160	33.742	0.420	0.00	0.000	33.742	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	3275.1	19.757	35.568	0.555	0.00	0.000	35.568	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	5400.0	28.466	34.010	0.837	0.00	0.000	34.010	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v /F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} /F _{vt}
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	26.01	0.341	26.000	0.027	0.16	0.001	26.000	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	36.13	0.381	26.000	0.030	0.05	0.000	26.000	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	43.36	0.379	26.000	0.030	0.05	0.000	26.000	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	50.91	0.416	26.000	0.033	0.05	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P/P _a	Ratio f _{bx} /F _{bx}	Ratio f _{by} /F _{by}	Ratio f _v /F _v	Ratio f _{vt} /F _{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155.5 - 110 (1)	0.009	0.222	0.000	0.027	0.000	0.231	1.333	H1-3+VT ✓

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	110 - 72.5 (2)	0.012	0.420	0.000	0.030	0.000	0.431	1.333	H1-3+VT ✓
L3	72.5 - 36 (3)	0.014	0.555	0.000	0.030	0.000	0.569	1.333	H1-3+VT ✓
L4	36 - 0 (4)	0.019	0.837	0.000	0.033	0.000	0.856	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	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-20.98	3194.44	17.4	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-36.85	4260.83	32.4	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-55.02	5424.19	42.7	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-78.80	5547.27	64.2	Pass
Summary							ELC:	Existing/Proposed/Reserved (LC7)
Pole (L4)							64.2	Pass
Rating =							64.2	Pass

APPENDIX B
BASE LEVEL DRAWING



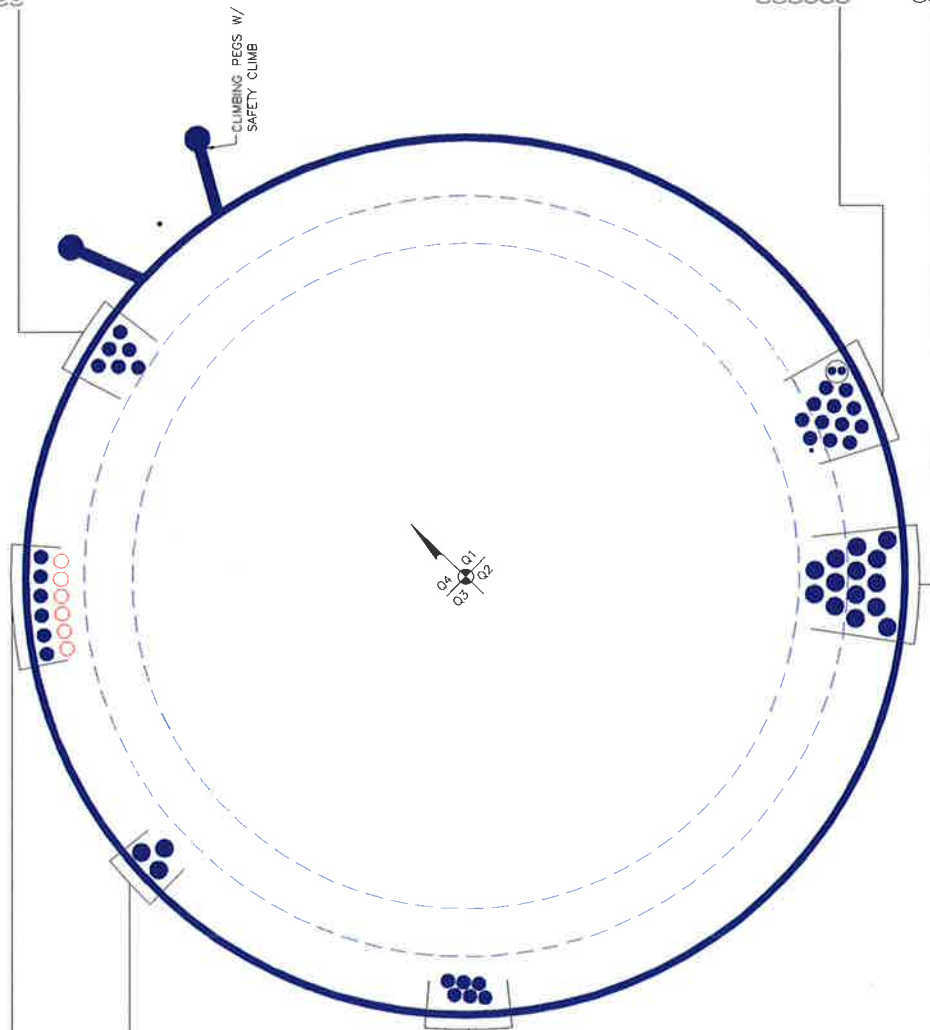
(PROPOSED)
(6) 1-1/8" TO 100 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 100 FT LEVEL

(ABANDONED)
(3) 1-5/8" TO 156 FT LEVEL

(INSTALLED)
(6) 1-1/4" TO 126 FT LEVEL

(INSTALLED)
(6) 1-1/4" TO 135 FT LEVEL

CLIMBING PEGS W/
SAFETY CLIMB



(INSTALLED)
(1) 3/8" TO 144 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(2) 3/4" TO 144 FT LEVEL
(INSTALLED)
(12) 1 1/4" TO 144 FT LEVEL

(INSTALLED)
(14) 1-5/8" TO 156 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: 806366
Site Name: HRT 107(C) 943204
App #: 312923 Rev. 1
Pole Manufacturer: <i>Other</i>

Reactions		
Moment:	5400.1	ft-kips
Axial:	78.82	kips
Shear:	50.89	kips

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84.75	in

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

Anchor Rod Results

Maximum Rod Tension: 124.2 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 63.7% **Pass**

Rigid
Service ASD
Fty*ASIF

Plate Data

Diam:	91	in
Thick:	3.25	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Base Plate Results

Base Plate Stress: 19.0 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 31.6% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length: 36.47

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

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:	76.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
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* 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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: 806366
Site Name: HRT 107(C) 943204
App #: 312923 Rev. 1

Enter Load Factors Below:

For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data

Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	4.5	ft
Pad Width=Length, L:	33.25	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	9	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	81.00	ft^2
Pier Height:	3.50	ft
Soil (above pad) Height:	3.00	ft

Soil Parameters

Unit Weight, γ :	130.0	pcf
Ultimate Bearing Capacity, q_n :	21.00	ksf
Strength Reduct. factor, ϕ :	0.75	
Angle of Friction, Φ :	40.0	degrees
Undrained Shear Strength, C_u :	0.00	ksf
Allowable Bearing: $\phi * q_n$:	15.75	ksf
Passive Pres. Coeff., K_p	4.60	

Forces/Moments due to Wind and Lateral Soil

Minimum of ($\phi * \text{Ultimate Pad Passive Force, } V_u$):	68.7	kips
Pad Force Location Above D:	1.93	ft
ϕ (Passive Pressure Moment):	132.50	ft-kips
Factored O.T. M(WL), "1.6W":	7856.9	ft-kips
Factored OT (MW-Msoil), M1	7724.43	ft-kips

Resistance due to Foundation Gravity

Soil Wedge Projection grade, a:	2.52	ft
Sum of Soil Wedges Wt:	30.29	kips
Soil Wedges ecc, K1:	14.58	ft
Ftg+Soil above Pad wt:	1188.4	kips
Unfactored (Total ftg-soil Wt):	1218.65	kips
1.2D. No Soil Wedges :	1520.61	kips
0.9D. With Soil Wedges :	1167.72	kips

Resistance due to Cohesion (Vertical)

$\phi * (1/2 * C_u) (\text{Total Vert. Planes})$	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces

TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	78.82	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	50.89	kips
Unfactored WL Moment, M:	5400.1	ft-kips

Load Factor Shaft Factored Loads

1.20	1.2D+1.6W, Pu:	94.584	kips
0.90	0.9D+1.6W, Pu:	70.938	kips
1.35	Vu:	68.7015	kips
	Mu:	7290.135	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	1520.61	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	7724.43	ft-kips

Orthogonal Direction:

$ecc1 = M1/P1 = 5.08 \text{ ft}$
 $Orthogonal qu = 2.22 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 14.07\% \text{ Pass}$

Diagonal Direction:

$ecc2 = (0.707M1)/P1 = 3.59 \text{ ft}$
 $Diagonal qu = 2.24 \text{ ksf}$
 $qu/\phi * q_n \text{ Ratio} = 14.21\% \text{ Pass}$

<-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

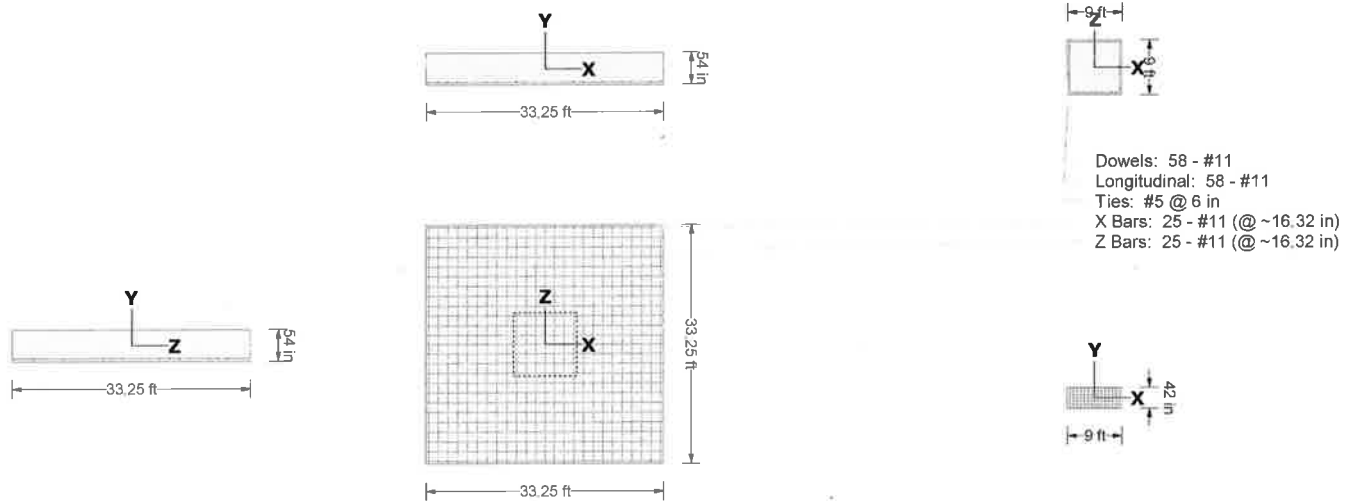
(w/ Soil Wedges) [Reaction+Conc+Soil]	1167.72	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	7327.07	ft-kips

$Orthogonal ecc3 = M2/P2 = 6.27 \text{ ft}$
 $Ortho Non Bearing Length, NBL = 12.55 \text{ ft}$
 $Orthogonal qu = 1.85 \text{ ksf}$
 $Diagonal qu = 1.97 \text{ ksf}$

Max Reaction Moment (ft-kips) so that $qu = \phi * q_n = 100\%$
Capacity Rating

Actual M:	5400.10		
M Orthogonal:	13500.01	40.00%	Pass
M Diagonal:	13500.01	40.00%	Pass

Design Detail



Check Summary

Ratio	Check	Provided	Required	Combination
--- Footing ---				
✓ 0.339	X Flexure (-Z)	101135 in-k	34243 in-k	
✓ 0.339	X Flexure (+Z)	101135 in-k	34243 in-k	
✓ 0.592	Z Flexure (-X)	104105 in-k	61619 in-k	
✓ 0.592	Z Flexure (+X)	104105 in-k	61619 in-k	
✓ 0.169	Shear (-Z)	1850 k	312.6 k	
✓ 0.169	Shear (+Z)	1850 k	312.6 k	
✓ 0.032	Shear (-X)	1904 k	60.84 k	
✓ 0.292	Shear (+X)	1904 k	555.7 k	
--- Pedestal ---				
✓ 0.119	Punching Shear	189.7 psi	22.49 psi	
✓ 0.006	Axial	23285 k	144.9 k	
✓ 0.348	Biaxial Bending	0.348	1.000	
✓ 0.043	Shear X	1551 k	66.16 k	
✓ 0.000	Shear Z	1551 k	0 k	

Criteria

Building Code	IBC 2003
Strength Load Combinations	IBC 2003 (Strength)
Concrete Weight	150 lb/ft ³
Param beta (for biaxial)	0.65
Include footing weight in strength bearing pressure	Yes
Include overburden in strength bearing pressure	Yes

Loads Summary (Prefactored Loads)

Load Set	Combination	Type	P	Mx	Mz	Vx	Vz	Overburden	Footing Weight
Tower Reactions		Strength	144.9 k	0 in-k	84240 in-k	66.16 k	0 k	390 psf	746.3 k

ATTACHMENT 4

CURRENT OWNER LLAGE PROPERTIES LLC BORAH LEONARD MAPLEHURST DR	UTILITIES	STRT./ROAD	LOCATION	CURRENT ASSESSMENT Code 2-1	Assessed Value 110,740
GHLANDS RANCH, CO 80126 ditional Owners:	SUPPLEMENTAL DATA EXEMPT CO			Appraised Value 158,200	
Other ID:	Census 5241000 Dev. Lot Dev. Map			Total 110,740	110,740
GIS ID: 6/26/65	Lake Area Photo Retake CB Letter			PREVIOUS ASSESSMENTS (HISTORY)	
	ASSOC PID#			Yr. Code	Assessed Value
				110,740/2014	2-1
				Total:	110,740

RECORD OF OWNERSHIP LLAGE PROPERTIES LLC	BK-VOL/PAGE 127/ 9	SALE DATE 02/03/1999	q/lu Q	v/i V	SALE PRICE 125,450	V.C. 00
OTHER ASSESSMENTS						
Year	Type	Description	Code	Number	Amount	Comm. Int.
TOTAL: 110,740						

This signature acknowledges a visit by a Data Collector or Assessor

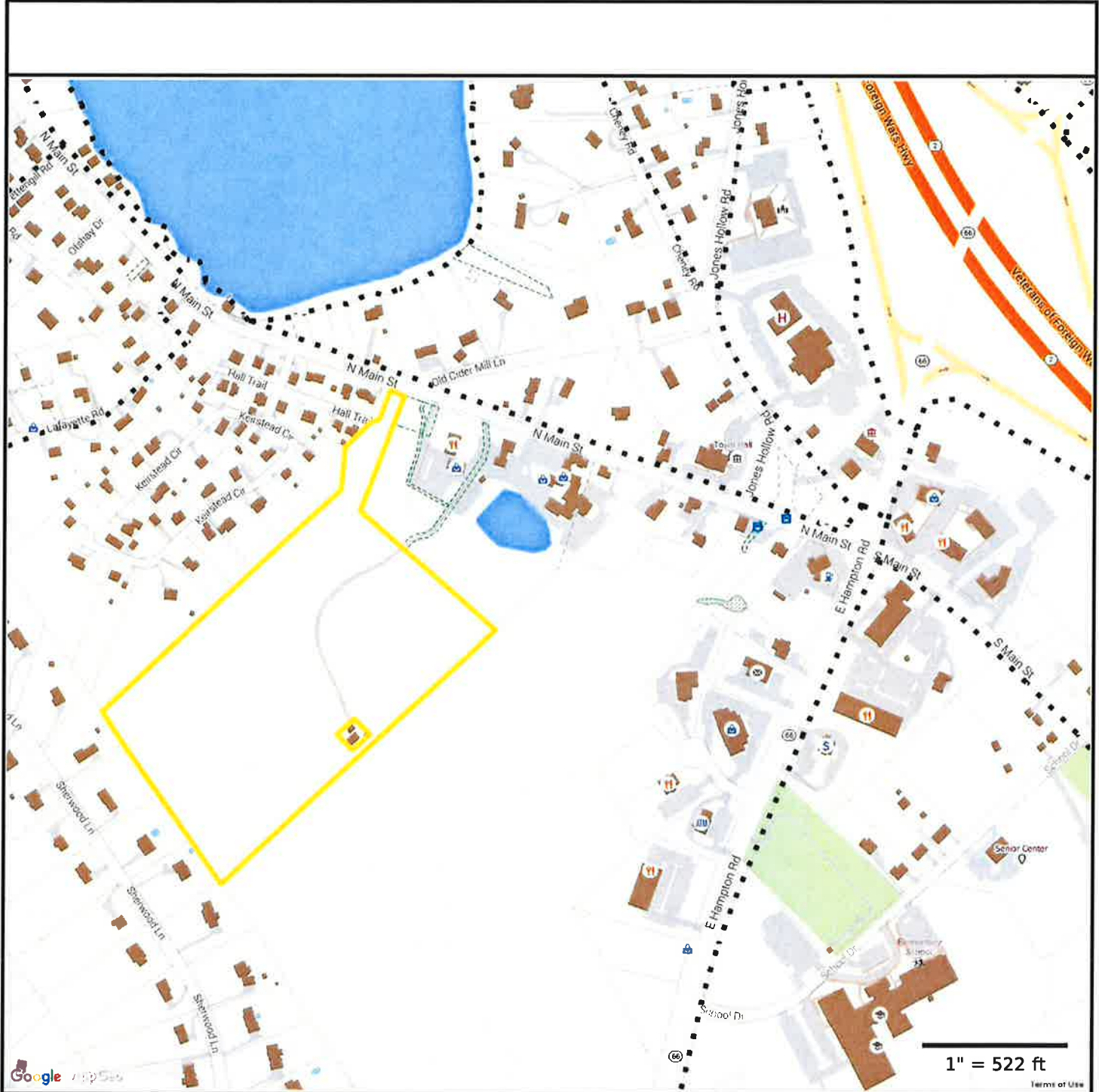
APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	158,2
Appraised XF (B) Value (Bldg)	
Appraised OB (L) Value (Bldg)	
Appraised Land Value (Bldg)	
Special Land Value	
Total Appraised Parcel Value	158,2
Valuation Method:	
Adjustment:	
Net Total Appraised Parcel Value	158,2

BUILDING PERMIT RECORD						
Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.
96-068	05/14/1996	BP		0		100
Comments: ADD CONC UTILITY P 07/27/2015						
Date: 01/19/2006						
Date: 11/18/2005						
Date: 01/31/2005						
Date: 11/21/2001						

VISIT/ CHANGE HISTORY						
Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.
96-068	05/14/1996	BP		0		100
Comments: ADD CONC UTILITY P 07/27/2015						
Date: 01/19/2006						
Date: 11/18/2005						
Date: 01/31/2005						
Date: 11/21/2001						

LAND LINE VALUATION SECTION						
Use Code	Use Description	Zone	D	Front	Depth	Units
201	Comm Land	R	A	181		20.54 AC
Unit Price: 7,000.00						
Factor S.A. Disc: 1.00000 0						
Factor Idx Adj. D: 1.00						
Notes- Adj. 1.10						
Special Pricing Spec Use Spec Calc						
S Adj Fact Adj. Unit Price Land Value						
1.00 158,2						
Total Card Land Units: 20.54 AC Parcel Total Land Area: 20.54 AC Total Land Value: 158,2						



Property Information

Property ID 6/26/65
Location NO MAIN ST
Owner VILLAGE PROPERTIES LLC



**MAP FOR REFERENCE ONLY
 NOT A LEGAL DOCUMENT**

Town of Marlborough, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 10/1/2015
 Properties updated 1/12/2016