Robinson+Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

August 22, 2018

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

Re: **EM-VER-070-180205 – #14 Route 80, Killingworth, Connecticut**

Dear Ms. Bachman:

In preparation for installation of the facility modifications approved in EM-VER-070-180205, the Cellco Partnership construction team discovered that the platform mounting system at this facility needed to be reinforced. Attached is an updated Structural Analysis Report, including the Platform Reinforcement Plans, confirming that the tower can support the previously approved equipment modifications and the newly designed platform reinforcement system.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks, Verizon Wireless
Magali Black, SAI Communications LLC

PJF PAUL J. FORD & COMPANY | 50 years 1965 - 2015

Date: **August 07, 2018**

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
1-704-405-6607

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679
jjacobs@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119720
	Carrier Site Name:	Killingworth CT
Crown Castle Designation:	**Crown Castle BU Number:**	806387
	Crown Castle Site Name:	HRT 088 943629
	Crown Castle JDE Job Number:	443602
	Crown Castle Work Order Number:	1612689
	Crown Castle Order Number:	394728 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-2158-003-8700
Site Data:	**#14 Route 80, KILLINGWORTH, Middlesex County, CT**	
	Latitude *41° 21' 26.43"*, Longitude *-72° 31' 11.83"*	
	160 Foot - Self Support Tower	

Dear Mr. McGuirt,

Paul J. Ford and Company 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 1231865, in accordance with order 394728, revision 1.

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

LC4.7: Modified Structure: 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 130 mph converted to a nominal 3-second gust wind speed of 101 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 with a topographic category 1 and crest height of 0 feet, and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the drawings stated in Table 3, for the determined available structural capacity to be effective.

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

Respectfully submitted by:

Joseph Jacobs, PE., SE
Project Manager

tnxTower Report - version 8.0.

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 07 2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Self Support tower designed by ROHN
The tower was originally designed for a wind speed of 85 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 100.7 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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)
157.0	157.0 3	3	alcatel lucent	B13 RRH 4X30	2	1 5/8
		3	alcatel lucent	B66A RRH4X45		
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		3	nokia	B5 4T4R RRH4X40 AIRSCALE		
		2	raycap	RC3DC-3315-PF-48		
		3	Site pro	VFA 12-HD WITH (2) STIFF ARMS		

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
157.0	157.0						
		3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	4	1 5/8	3
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe	10	1 5/8	1
		6	rfs celwave	FD9R6004/2C-3L			3
144.0	144.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	3 1	1 ¼ 7/8	2
		6	alcatel lucent	RRH2X50-800			
		3	alcatel lucent	TD-RRH8X20-25			
		3	commscope	NNVV-65B-R4 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
		1	tower mounts	Sector Mount [SM 506-3]			1
118.0	118.0	12	decibel	DB844H90E-XY w/ Mount	-	-	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
				Pipe			
		1	tower mounts	Sector Mount [SM 404-3]			
109.0	115.0	1	celwave	PD1110	1	1 1/4	1
	109.0	1	tower mounts	Side Arm Mount [SO 308-1]			
90.0	90.0	6	ericsson	RRUS-11	12 1 2	7/8 3/8 7/16	1
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		1	powerwave technologies	P45-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Pipe Mount [PM 601-3]			
		1	tower mounts	Sector Mount [SM 802-3]			
50.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 306-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	JGI Eastern 05204G March 25, 2005	1237256	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn/ HEB Civil Engineers	821498	CCISITES
Tower manufacturer drawing	PJF 41706-0238 Dec 18, 2006 As built Drawing Phase 1	2281721	CCISITES
Partial PMI	PJF 41706-0238 Dec 18, 2006 As built Drawing Phase 1	1296500	CCISITES
PMI	PJF 37518-0397 Dated June 22, 2009	2340021	CCISITES
Reinforcement Drawing	PJF 37517-3262-003-8800 12-4-2017	7235023	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.2.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked. Refer to crown document PRC-10012, Base Plate Grout Inspection & Classification

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	160 - 156	Leg	Rohn 2.375" x 0.218" (2 EH)	2	-4.37	49.90	8.7	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	10	-1.03	4.36	23.6 28.5 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	5	-0.49	3.21	15.3	Pass
T2	156 - 152	Leg	Rohn 2.375" x 0.218" (2 EH)	14	-5.81	49.90	11.6	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	16	-2.80	4.35	64.3 81.8 (b)	Pass
T3	152 - 148	Leg	Rohn 2.375" x 0.218" (2 EH)	23	-9.90	49.90	19.8	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	25	-2.79	4.34	64.3 79.2 (b)	Pass
T4	148 - 144	Leg	Rohn 2.375" x 0.218" (2 EH)	31	-14.64	49.90	29.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	34	-3.01	4.33	69.3 88.5 (b)	Pass
T5	144 - 140	Leg	Rohn 2.375" x 0.218" (2 EH)	40	-22.26	49.90	44.6	Pass
		Diagonal	L 2 x 2 x 1/4	44	-4.57	16.48	27.7 59.4 (b)	Pass
T6	140 - 120	Leg	Rohn 2.875" x 0.276" (2.5 EH)	49	-52.92	74.43	71.1	Pass
		Diagonal	2L 1.5 x 1.5 x 1/8 (3/16)	61	-3.90	10.20	38.2 62.8 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	53	-0.26	3.17	8.2	Pass
T7	120 - 100	Leg	Rohn 4" x 0.318" (3.5 EH)	79	-81.39	125.73	64.7	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
		Diagonal	2L 2 x 2 x 3/16 (3/16)	82	-4.94	21.96	22.5 65.8 (b)	Pass
T8	100 - 80	Leg	Rohn 4" x 0.318" (3.5 EH) (GR)	100	-111.13	148.29	74.9	Pass
		Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	103	-6.19	27.16	22.8 49.4 (b)	Pass
T9	80 - 60	Leg	ROHN 4 EH (GR)	121	-141.13	192.91	73.2	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	124	-6.34	38.73	16.4 50.9 (b)	Pass
T10	60 - 40	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	142	-167.57	246.97	67.9	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	145	-7.48	28.70	26.1 49.3 (b)	Pass
T11	40 - 20	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	157	-194.91	246.94	78.9	Pass
		Diagonal	2L 3 x 3 x 1/4 (1/4)	160	-7.61	35.24	21.6 49.9 (b)	Pass
T12	20 - 0	Leg	Rohn 6.625" x 0.432" (6 EH) (GR)	172	-221.57	381.11	58.1 58.7 (b)	Pass
		Diagonal	2L 3.5 x 3.5 x 1/4 (1/4)	175	-8.66	50.21	17.2 54.3 (b)	Pass
							Summary	
						Leg (T11)	78.9	Pass
						Diagonal (T4)	88.5	Pass
						Top Girt (T1)	15.3	Pass
						Bolt Checks	88.5	Pass
						Rating =	88.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	% Capacity	Pass / Fail
1	Anchor Rods	68.9	Pass
1	Base Foundation	31.5	Pass
1	Base Foundation Soil Interaction	69.5	Pass

Structure Rating (max from all components) =	88.5%

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

4.1) Recommendations

Please see cci doc 7235023

APPENDIX A

TNXTOWER OUTPUT

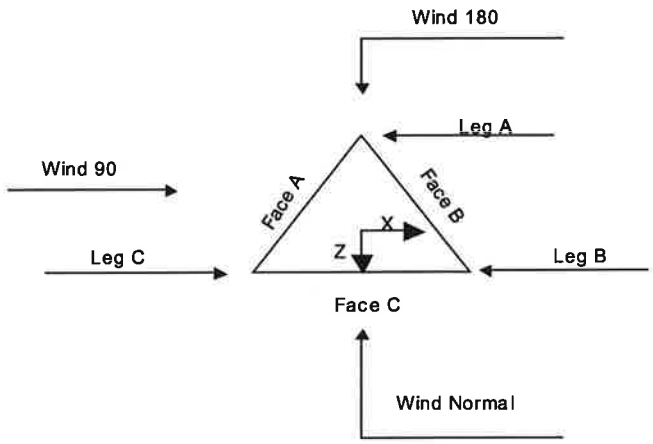
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.52 ft at the top and 20.86 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

4) Tower is located in Middlesex County, Connecticut.
5) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
6) Basic wind speed of 101 mph.
7) Structure Class II.
8) Exposure Category B.
9) Topographic Category 1.
10) Crest Height 0.00 ft.
11) Nominal ice thickness of 0.7500 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Deflections calculated using a wind speed of 60 mph.
16) Grouted pipe f'_c is 7 ksi.
17) Pressures are calculated at each section.
18) Stress ratio used in tower member design is 1.

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		Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	160.00-156.00			6.52	1	4.00
T2	156.00-152.00			6.53	1	4.00
T3	152.00-148.00			6.54	1	4.00
T4	148.00-144.00			6.55	1	4.00
T5	144.00-140.00			6.55	1	4.00
T6	140.00-120.00			6.56	1	20.00
T7	120.00-100.00			8.60	1	20.00
T8	100.00-80.00			10.64	1	20.00
T9	80.00-60.00			12.68	1	20.00
T10	60.00-40.00			14.77	1	20.00
T11	40.00-20.00			16.77	1	20.00
T12	20.00-0.00			18.85	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	160.00-156.00	4.00	X Brace	No	No	0.0000	0.0000
T2	156.00-152.00	4.00	X Brace	No	No	0.0000	0.0000
T3	152.00-148.00	4.00	X Brace	No	No	0.0000	0.0000
T4	148.00-144.00	4.00	X Brace	No	No	0.0000	0.0000
T5	144.00-140.00	4.00	X Brace	No	No	0.0000	0.0000
T6	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T7	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000
T8	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T9	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T10	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T11	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T12	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-156.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T2 156.00-152.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T3 152.00-148.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T4 148.00-144.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T5 144.00-140.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T6 140.00-120.00	Pipe	Rohn 2.875" x 0.276" (2.5 EH)	A572-50 (50 ksi)	Double Angle	2L 1.5 x 1.5 x 1/8 (3/16)	A36 (36 ksi)
T7 120.00-100.00	Pipe	Rohn 4" x 0.318" (3.5 EH)	A572-50 (50 ksi)	Double Angle	2L 2 x 2 x 3/16 (3/16)	A36 (36 ksi)
T8 100.00-80.00	Grouted Pipe	Rohn 4" x 0.318" (3.5 EH)	A572-50 (50 ksi)	Double Angle	2L 2.5 x 2.5 x 3/16 (3/16)	A36 (36 ksi)
T9 80.00-60.00	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T10 60.00-40.00	Grouted Pipe	Rohn 5.563" x 0.375" (5 EH)	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T11 40.00-20.00	Grouted Pipe	Rohn 5.563" x 0.375" (5 EH)	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 1/4 (1/4)	A36 (36 ksi)
T12 20.00-0.00	Grouted Pipe	Rohn 6.625" x 0.432" (6 EH)	A572-50 (50 ksi)	Double Angle	2L 3.5 x 3.5 x 1/4 (1/4)	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 160.00-156.00	Equal Angle	L 2 x 2 x 1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 140.00-120.00	Equal Angle	L 2 x 2 x 1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

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
T1 160.00-156.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T2 156.00-152.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T3 152.00-148.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T4 148.00-	0.00	0.1875	A36	1.03	1	1.05	30.0000	30.0000	36.0000

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
T5 144.00-140.00	0.00	0.1875	(36 ksi) A36	1.03	1	1.05	30.0000	30.0000	36.0000
T6 140.00-120.00	0.00	0.1875	(36 ksi) A36	1.03	1	1.05	30.0000	30.0000	36.0000
T7 120.00-100.00	0.00	0.1875	(36 ksi) A36	1.03	1	1.05	36.0000	30.0000	36.0000
T8 100.00-80.00	0.00	0.4375	(36 ksi) A36	1.03	1	1.05	48.0000	30.0000	36.0000
T9 80.00-60.00	0.00	0.4375	(36 ksi) A36	1.03	1	1.05	48.0000	30.0000	36.0000
T10 60.00-40.00	0.00	0.2500	(36 ksi) A36	1.03	1	1.05	60.0000	30.0000	36.0000
T11 40.00-20.00	0.00	0.2500	(36 ksi) A36	1.03	1	1.05	60.0000	30.0000	36.0000
T12 20.00-0.00	0.00	0.2500	(36 ksi) A36	1.03	1	1.05	60.0000	30.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 160.00-156.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 156.00-152.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 152.00-148.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 148.00-144.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 144.00-140.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 140.00-120.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 120.00-100.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 100.00-80.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 80.00-60.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 60.00-40.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 40.00-20.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 20.00-0.00	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 160.00-156.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 156.00-152.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 152.00-148.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 148.00-144.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 144.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 160.00-156.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T2 156.00-152.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T3 152.00-148.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T4 148.00-144.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T5 144.00-140.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T6 140.00-120.00	2.5000	4.4000	2.5000	4.4000	0.0000	0.0000	0.0000	0.0000
T7 120.00-100.00	2.5000	4.9000	2.5000	4.9000	0.0000	0.0000	0.0000	0.0000
T8 100.00-80.00	2.5000	4.9000	2.5000	4.9000	0.0000	0.0000	0.0000	0.0000
T9 80.00-60.00	2.5000	4.8000	2.5000	4.8000	0.0000	0.0000	0.0000	0.0000
T10 60.00-40.00	2.5000	5.3000	2.5000	5.3000	0.0000	0.0000	0.0000	0.0000
T11 40.00-20.00	2.5000	5.4000	2.5000	5.4000	0.0000	0.0000	0.0000	0.0000
T12 20.00-0.00	2.5000	5.4000	2.5000	5.4000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 160.00-156.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 156.00-152.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 152.00-148.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 148.00-144.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 144.00-140.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 140.00-120.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 120.00-100.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 100.00-80.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T9 80.00-60.00	Flange	1.0000 A325N	6	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T10 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 40.00-20.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T12 20.00-0.00	Flange	1.0000 A449	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Grouted Pipe Properties

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
Rohn 4" x 0.318" (3.5 EH) (GR)	50	3.6784	8.8880	31.033	4769	38218	64
ROHN 4 EH (GR)	50	4.4074	11.4969	38.949	4769	38952	66
Rohn 5.563" x 0.375" (5 EH) (GR)	50	6.1120	18.1937	58.701	4769	40357	68
Rohn 6.625" x 0.432" (6 EH) (GR)	50	8.4049	26.0667	82.906	4769	40832	68

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
FACE C LDF4-50A(1/2")	A	No	Ar (CaAa)	50.00 - 0.00	0.0000	0.42	1	1	0.6300	0.6300		0.15
1.5" flat Cable Ladder Rail	A	No	Af (CaAa)	150.00 - 0.00	0.0000	0.42	2	2	12.0000 1.5000	1.5000		1.80
FACE B LDF7-50A(1-5/8") (INCLUDING	B	No	Ar (CaAa)	157.00 - 0.00	0.0000	0.4	12	12	1.0000 0.5200	1.9800		0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
PROPOSED) 1.5" flat Cable Ladder Rail **FACE C** **LEG C**	B	No	Af (CaAa)	160.00 - 0.00	0.0000	0.42	2	2	12.0000 1.5000	1.5000		1.80
LDF5-50A(7/8")	C	No	Ar (CaAa)	90.00 - 5.00	-2.0000	0.45	12	4	1.0900	1.0900		0.33
T-Brackets (Af)	C	No	Af (CaAa)	90.00 - 5.00	-2.0000	0.45	1	1	1.0000	1.0000		8.40
2" (Nominal) Conduit	C	No	Ar (CaAa)	90.00 - 5.00	-2.0000	0.45	1	1	2.3750	2.3750		0.72
FB-L98B-002-75000(3/8) (Installed)	C	No	Ar (CaAa)	90.00 - 0.00	-2.0000	0.45	1	1	0.3937	0.3937		0.06
WR-VG122ST-BRDA(7/16) (Installed)	C	No	Ar (CaAa)	90.00 - 0.00	-2.0000	0.45	2	2	0.4600	0.4600		0.14
Safety Line 3/8	B	No	Ar (CaAa)	160.00 - 0.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
HB114-08U3M12-xxxF(7/8) (Proposed)	A	No	Ar (CaAa)	144.00 - 0.00	0.0000	0.42	1	1	1.1100	1.1100		0.68
HB114-1-08U4-M5F(1-1/4) (Proposed)	A	No	Ar (CaAa)	144.00 - 0.00	0.0000	0.42	3	3	1.5400	1.5400		1.08
HB114-1-08U4-M5F(1-1/4) (Proposed)	C	No	Ar (CaAa)	109.00 - 0.00	0.0000	-0.42	1	1	1.5400	1.5400		1.08

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 12' x 2.375" Pipe Mount	A	From Leg	2.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.85 4.08 5.32	2.85 4.08 5.32	0.10 0.12 0.15
(2) 12' x 2.375" Pipe Mount	B	From Leg	2.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.85 4.08 5.32	2.85 4.08 5.32	0.10 0.12 0.15
(2) 12' x 2.375" Pipe Mount	C	From Leg	2.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.85 4.08 5.32	2.85 4.08 5.32	0.10 0.12 0.15
Site pro VFA 12-HD	C	None		0.0000	157.00	No Ice 1/2" Ice 1" Ice	36.69 52.22 67.75	36.69 52.22 67.75	1.78 2.41 3.04
Sector Mount [SM 506-3]	C	None		0.0000	144.00	No Ice 1/2" Ice	35.47 50.60 65.73	35.47 50.60 65.73	1.74 2.35 2.95

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(3) 4' x 2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
(3) 4' x 2" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
(3) 4' x 2" Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
*									
*									
*									
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice	3.30 3.67 4.03	4.80 5.42 6.04	0.03 0.07 0.12
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice	3.30 3.67 4.03	4.80 5.42 6.04	0.03 0.07 0.12
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice	3.30 3.67 4.03	4.80 5.42 6.04	0.03 0.07 0.12
Sector Mount [SM 404-3] (ABANDONED)	C	None		0.0000	118.00	No Ice 1/2" Ice 1" Ice	20.47 28.97 37.47	20.47 28.97 37.47	0.92 1.34 1.75
*									
*									
*									
(2) 7770.00 w/ Mount Pipe (x)	A	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21901	A	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) 7770.00 w/ Mount Pipe (x)	B	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21901	B	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) 7770.00 w/ Mount Pipe (x)	C	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) LGP21401	C	From Leg	4.00 0.00	0.0000	90.00	No Ice 1/2"	1.10 1.24	0.35 0.44	0.01 0.02

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
			0.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21901	C	From Leg	4.00	0.0000	90.00	No Ice	0.23	0.16	0.01
			0.00			1/2"	0.29	0.21	0.01
			0.00			Ice	0.36	0.28	0.01
						1" Ice			
Sector Mount [SM 802-3]	C	None		0.0000	90.00	No Ice	24.41	24.41	0.93
						1/2"	31.39	31.39	1.36
						Ice	38.37	38.37	1.79
						1" Ice			
*									
*									
KS24019-L112A (x)	B	From Leg	4.00	0.0000	50.00	No Ice	0.14	0.14	0.01
			0.00			1/2"	0.20	0.20	0.01
			0.00			Ice	0.26	0.26	0.01
						1" Ice			
Side Arm Mount [SO 306-1] (x)	B	From Leg	2.00	0.0000	50.00	No Ice	0.98	2.18	0.04
			0.00			1/2"	1.70	3.80	0.06
			0.00			Ice	2.42	5.42	0.08
						1" Ice			
(2) RRUS-11 (Proposed)	A	From Leg	4.00	0.0000	90.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			0.00			Ice	3.21	1.50	0.09
						1" Ice			
P45-16-XLH-RR w/ Mount Pipe (Proposed)	A	From Leg	4.00	0.0000	90.00	No Ice	8.24	4.83	0.04
			0.00			1/2"	8.70	5.57	0.10
			0.00			Ice	9.16	6.27	0.17
						1" Ice			
(2) RRUS-11 (Proposed)	B	From Leg	4.00	0.0000	90.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			0.00			Ice	3.21	1.50	0.09
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	B	From Leg	4.00	0.0000	90.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
DC6-48-60-18-8F (Proposed)	B	From Leg	4.00	0.0000	90.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.64	1.64	0.06
						1" Ice			
Pipe Mount [PM 601-3] (x)	B	None		0.0000	90.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice			
(2) RRUS-11 (Proposed)	C	From Leg	4.00	0.0000	90.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			0.00			Ice	3.21	1.50	0.09
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	C	From Leg	4.00	0.0000	90.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
***									
*									
PCS 1900MHZ 4X45W-65MHZ (Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	2.32	2.24	0.06
			0.00			1/2"	2.53	2.44	0.08
			0.00			Ice	2.74	2.65	0.11
						1" Ice			
(2) RRH2X50-800 (Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	1.70	1.28	0.05
			0.00			1/2"	1.86	1.43	0.07
			0.00			Ice	2.03	1.58	0.09
						1" Ice			
TD-RRH8X20-25 (Proposed)	A	From Leg	4.00	0.0000	144.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
NNVV-65B-R4 w/ Mount Pipe (Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
PCS 1900MHZ 4X45W-65MHZ (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
(2) RRH2X50-800 (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
TD-RRH8X20-25 (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
NNVV-65B-R4 w/ Mount Pipe (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
PCS 1900MHZ 4X45W-65MHZ (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
(2) RRH2X50-800 (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
TD-RRH8X20-25 (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
NNVV-65B-R4 w/ Mount Pipe (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
**									
PD1110	C	From Leg	0.00 0.00 6.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice	2.50 3.84 5.20	2.50 3.84 5.20	0.02 0.04 0.07
Side Arm Mount [SO 308-1]	C	From Leg	0.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	3.03 5.22 7.41	0.05 0.08 0.10
***									
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
B13 RRH 4X30 (Proposed)	A	From Leg	4.00 0.00	0.0000	157.00	No Ice 1/2"	2.06 2.24	1.32 1.48	0.06 0.07

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
			0.00			Ice	2.43	1.64	0.09
						1" Ice			
B66A RRH4X45 (Proposed)	A	From Leg	4.00	0.0000	157.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	A	From Leg	4.00	0.0000	157.00	No Ice	9.47	7.76	0.09
			0.00			1/2"	10.09	9.00	0.17
			0.00			Ice	10.67	10.02	0.25
						1" Ice			
B5 4T4R RRH4X40 AIRSCALE (Proposed)	A	From Leg	4.00	0.0000	157.00	No Ice	1.32	0.75	0.05
			0.00			1/2"	1.47	0.86	0.06
			0.00			Ice	1.62	0.98	0.07
						1" Ice			
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	B	From Leg	4.00	0.0000	157.00	No Ice	4.56	10.26	0.05
			0.00			1/2"	5.11	11.43	0.11
			0.00			Ice	5.61	12.31	0.19
						1" Ice			
B13 RRH 4X30 (Proposed)	B	From Leg	4.00	0.0000	157.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			0.00			Ice	2.43	1.64	0.09
						1" Ice			
B66A RRH4X45 (Proposed)	B	From Leg	4.00	0.0000	157.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	B	From Leg	4.00	0.0000	157.00	No Ice	9.47	7.76	0.09
			0.00			1/2"	10.09	9.00	0.17
			0.00			Ice	10.67	10.02	0.25
						1" Ice			
B5 4T4R RRH4X40 AIRSCALE (Proposed)	B	From Leg	4.00	0.0000	157.00	No Ice	1.32	0.75	0.05
			0.00			1/2"	1.47	0.86	0.06
			0.00			Ice	1.62	0.98	0.07
						1" Ice			
RC3DC-3315-PF-48 (Proposed)	B	From Leg	4.00	0.0000	157.00	No Ice	3.79	2.51	0.03
			0.00			1/2"	4.04	2.72	0.06
			0.00			Ice	4.30	2.94	0.10
						1" Ice			
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	C	From Leg	4.00	0.0000	157.00	No Ice	4.56	10.26	0.05
			0.00			1/2"	5.11	11.43	0.11
			0.00			Ice	5.61	12.31	0.19
						1" Ice			
B13 RRH 4X30 (Proposed)	C	From Leg	4.00	0.0000	157.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			0.00			Ice	2.43	1.64	0.09
						1" Ice			
B66A RRH4X45 (Proposed)	C	From Leg	4.00	0.0000	157.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	C	From Leg	4.00	0.0000	157.00	No Ice	9.47	7.76	0.09
			0.00			1/2"	10.09	9.00	0.17
			0.00			Ice	10.67	10.02	0.25
						1" Ice			
B5 4T4R RRH4X40 AIRSCALE (Proposed)	C	From Leg	4.00	0.0000	157.00	No Ice	1.32	0.75	0.05
			0.00			1/2"	1.47	0.86	0.06
			0.00			Ice	1.62	0.98	0.07
						1" Ice			
RC3DC-3315-PF-48 (Proposed)	C	From Leg	4.00	0.0000	157.00	No Ice	3.79	2.51	0.03
			0.00			1/2"	4.04	2.72	0.06
			0.00			Ice	4.30	2.94	0.10
						1" Ice			

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 156	3.001	47	0.1821	0.0204
T2	156 - 152	2.850	47	0.1821	0.0203
T3	152 - 148	2.690	47	0.1811	0.0197
T4	148 - 144	2.536	47	0.1785	0.0187
T5	144 - 140	2.382	47	0.1744	0.0173
T6	140 - 120	2.236	47	0.1683	0.0167
T7	120 - 100	1.576	47	0.1355	0.0116
T8	100 - 80	1.052	47	0.1079	0.0087
T9	80 - 60	0.646	47	0.0799	0.0064
T10	60 - 40	0.353	47	0.0542	0.0043
T11	40 - 20	0.154	47	0.0349	0.0025
T12	20 - 0	0.040	47	0.0148	0.0011

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	(2) 12' x 2.375" Pipe Mount	47	2.888	0.1822	0.0204	45561
144.00	Sector Mount [SM 506-3]	47	2.382	0.1744	0.0173	27659
118.00	(4) DB844H90E-XY w/ Mount Pipe	47	1.517	0.1325	0.0111	31762
109.00	PD1110	47	1.272	0.1200	0.0097	36441
90.00	(2) 7770.00 w/ Mount Pipe	47	0.835	0.0940	0.0076	41853
50.00	KS24019-L112A	47	0.242	0.0443	0.0033	55028

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 156	13.680	19	0.8270	0.0925
T2	156 - 152	12.988	19	0.8273	0.0921
T3	152 - 148	12.260	19	0.8225	0.0895
T4	148 - 144	11.556	19	0.8112	0.0850
T5	144 - 140	10.853	19	0.7929	0.0786
T6	140 - 120	10.185	19	0.7659	0.0755
T7	120 - 100	7.173	19	0.6181	0.0524
T8	100 - 80	4.784	19	0.4916	0.0396
T9	80 - 60	2.937	19	0.3635	0.0288
T10	60 - 40	1.602	19	0.2464	0.0194
T11	40 - 20	0.697	19	0.1587	0.0112
T12	20 - 0	0.181	19	0.0672	0.0051

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	(2) 12' x 2.375" Pipe Mount	19	13.165	0.8275	0.0924	10082
144.00	Sector Mount [SM 506-3]	19	10.853	0.7929	0.0786	6172
118.00	(4) DB844H90E-XY w/ Mount Pipe	19	6.906	0.6045	0.0504	7043

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.00	PD1110	19	5.785	0.5469	0.0440	8069
90.00	(2) 7770.00 w/ Mount Pipe	19	3.795	0.4280	0.0343	9227
50.00	KS24019-L112A	19	1.100	0.2013	0.0151	12094

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	160	Leg	A325N	0.6250	4	0.36	20.71	0.018 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	0.99	3.47	0.285 ✔	1	Member Block Shear
		Top Girt	A325N	0.5000	1	0.51	4.13	0.123 ✔	1	Member Bearing
T2	156	Diagonal	A325N	0.5000	1	2.84	3.47	0.818 ✔	1	Member Block Shear
T3	152	Diagonal	A325N	0.5000	1	2.75	3.47	0.792 ✔	1	Member Block Shear
T4	148	Diagonal	A325N	0.5000	1	3.07	3.47	0.885 ✔	1	Member Block Shear
T5	144	Diagonal	A325N	0.5000	1	4.46	7.50	0.594 ✔	1	Gusset Bearing
T6	140	Leg	A325N	0.6250	4	11.43	20.71	0.552 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	3.93	6.25	0.628 ✔	1	Member Block Shear
		Top Girt	A325N	0.5000	1	0.26	4.13	0.062 ✔	1	Member Bearing
T7	120	Leg	A325N	0.7500	4	17.80	29.82	0.597 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	4.94	7.50	0.658 ✔	1	Gusset Bearing
T8	100	Leg	A325N	0.8750	4	24.08	40.59	0.593 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	6.13	12.40	0.494 ✔	1	Member Bearing
T9	80	Leg	A325N	1.0000	6	20.34	53.01	0.384 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	6.31	12.40	0.509 ✔	1	Member Bearing
T10	60	Leg	A325N	1.0000	6	24.04	53.01	0.453 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.29	14.79	0.493 ✔	1	Gusset Bearing
T11	40	Leg	A325N	1.0000	6	27.72	53.01	0.523 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.37	14.79	0.499 ✔	1	Gusset Bearing
T12	20	Leg	A449	1.0000	6	31.14	53.01	0.587 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	8.03	14.79	0.543 ✔	1	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	Rohn 2.375" x 0.218" (2	4.00	4.00	62.6	1.4773	-4.37	49.90	0.087 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		EH)			K=1.00				✔
T2	156 - 152	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-5.81	49.90	0.116 [1] ✔
T3	152 - 148	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-9.90	49.90	0.198 [1] ✔
T4	148 - 144	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-14.64	49.90	0.293 [1] ✔
T5	144 - 140	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-22.26	49.90	0.446 [1] ✔
T6	140 - 120	Rohn 2.875" x 0.276" (2.5 EH)	20.03	5.01	65.0 K=1.00	2.2535	-52.92	74.43	0.711 [1] ✔
T7	120 - 100	Rohn 4" x 0.318" (3.5 EH)	20.03	6.68	61.3 K=1.00	3.6784	-81.39	125.73	0.647 [1] ✔
T8	100 - 80	Rohn 4" x 0.318" (3.5 EH) (GR)	20.03	6.68	61.3 K=1.00	3.6784	-111.13	148.29	0.749 [1] ✔
T9	80 - 60	ROHN 4 EH (GR)	20.04	6.68	54.3 K=1.00	4.4074	-141.13	192.91	0.732 [1] ✔
T10	60 - 40	Rohn 5.563" x 0.375" (5 EH) (GR)	20.03	10.02	65.4 K=1.00	6.1120	-167.57	246.97	0.679 [1] ✔
T11	40 - 20	Rohn 5.563" x 0.375" (5 EH) (GR)	20.04	10.02	65.4 K=1.00	6.1120	-194.91	246.94	0.789 [1] ✔
T12	20 - 0	Rohn 6.625" x 0.432" (6 EH) (GR)	20.03	10.02	54.8 K=1.00	8.4049	-221.57	381.11	0.581 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 1.5 x 1.5 x 1/8	6.94	3.37	136.4 K=1.00	0.3594	-1.03	4.36	0.236 [1] ✔
T2	156 - 152	L 1.5 x 1.5 x 1/8	6.95	3.37	136.6 K=1.00	0.3594	-2.80	4.35	0.643 [1] ✔
T3	152 - 148	L 1.5 x 1.5 x 1/8	6.95	3.37	136.7 K=1.00	0.3594	-2.79	4.34	0.643 [1] ✔
T4	148 - 144	L 1.5 x 1.5 x 1/8	6.96	3.38	136.9 K=1.00	0.3594	-3.01	4.33	0.693 [1] ✔
T5	144 - 140	L 2 x 2 x 1/4	6.97	3.38	107.8 K=1.04	0.9380	-4.57	16.48	0.277 [1] ✔
T6	140 - 120	2L 1.5 x 1.5 x 1/8 (3/16)	8.46	4.26	125.3 K=1.00	0.7188	-3.90	10.20	0.382 [1] ✔
T7	120 - 100	2L 'a' > 24.4215 in - 61 2L 2 x 2 x 3/16 (3/16)	11.36	5.76	119.1 K=1.00	1.4297	-4.94	21.96	0.225 [1] ✔
T8	100 - 80	2L 'a' > 33.0734 in - 82 2L 2.5 x 2.5 x 3/16 (3/16)	13.11	6.63	120.7 K=1.00	1.8047	-6.19	27.16	0.228 [1] ✔
T9	80 - 60	2L 'a' > 37.9460 in - 103 2L 3 x 3 x 3/16 (1/4)	14.99	7.57	105.5 K=1.00	2.1797	-6.34	38.73	0.164 [1] ✔
T10	60 - 40	2L 'a' > 43.2580 in - 124 2L 3 x 3 x 3/16 (1/4)	18.13	9.22	130.5 K=1.00	2.1797	-7.48	28.70	0.261 [1] ✔
T11	40 - 20	2L 'a' > 52.6982 in - 145 2L 3 x 3 x 1/4 (1/4)	19.90	10.11	135.8	2.8750	-7.61	35.24	0.216 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔
T12	20 - 0	2L 'a' > 57.9396 in - 160 2L 3.5 x 3.5 x 1/4 (1/4)	21.70	11.00	121.6 K=1.00	3.3750	-8.66	50.21	0.172 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 2 x 2 x 1/8	6.52	6.11	184.6 K=1.00	0.4844	-0.49	3.21	0.153 [1] ✔
T6	140 - 120	L 2 x 2 x 1/8	6.56	6.16	185.8 K=1.00	0.4844	-0.26	3.17	0.082 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	0.03	66.48	0.001 [1] ✔
T2	156 - 152	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	1.83	66.48	0.028 [1] ✔
T3	152 - 148	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	6.86	66.48	0.103 [1] ✔
T4	148 - 144	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	11.37	66.48	0.171 [1] ✔
T5	144 - 140	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	16.66	66.48	0.251 [1] ✔
T6	140 - 120	Rohn 2.875" x 0.276" (2.5 EH)	20.03	5.01	65.0	2.2535	45.73	101.41	0.451 [1] ✔
T7	120 - 100	Rohn 4" x 0.318" (3.5 EH)	20.03	6.68	61.3	3.6784	71.21	165.53	0.430 [1] ✔
T8	100 - 80	Rohn 4" x 0.318" (3.5 EH) (GR)	20.03	6.68	61.3	3.6784	96.31	165.53	0.582 [1] ✔
T9	80 - 60	ROHN 4 EH (GR)	20.04	6.68	54.3	4.4074	122.05	198.34	0.615 [1] ✔
T10	60 - 40	Rohn 5.563" x 0.375" (5 EH) (GR)	20.03	10.02	65.4	6.1120	144.25	275.04	0.524 [1] ✔
T11	40 - 20	Rohn 5.563" x 0.375" (5 EH) (GR)	20.04	10.02	65.4	6.1120	166.31	275.04	0.605 [1] ✔
T12	20 - 0	Rohn 6.625" x 0.432" (6 EH) (GR)	20.03	10.02	54.8	8.4049	186.83	378.22	0.494 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 1.5 x 1.5 x 1/8	6.94	3.37	89.6	0.2109	0.99	9.18	0.108 [1] ✔
T2	156 - 152	L 1.5 x 1.5 x 1/8	6.95	3.37	89.6	0.2109	2.84	9.18	0.309 [1] ✔
T3	152 - 148	L 1.5 x 1.5 x 1/8	6.95	3.37	89.7	0.2109	2.75	9.18	0.299 [1] ✔
T4	148 - 144	L 1.5 x 1.5 x 1/8	6.96	3.38	89.8	0.2109	3.07	9.18	0.334 [1] ✔
T5	144 - 140	L 2 x 2 x 1/4	6.97	3.38	68.7	0.5863	4.46	25.50	0.175 [1] ✔
T6	140 - 120	2L 1.5 x 1.5 x 1/8 (3/16)	7.62	3.85	101.9	0.4219	3.93	18.35	0.214 [1] ✔
T7	120 - 100	2L 'a' > 22.0500 in - 74 2L 2 x 2 x 3/16 (3/16)	10.80	5.48	108.6	0.8965	4.94	39.00	0.127 [1] ✔
T8	100 - 80	2L 'a' > 31.4884 in - 89 2L 2.5 x 2.5 x 3/16 (3/16)	13.11	6.63	103.8	1.1777	6.13	51.23	0.120 [1] ✔
T9	80 - 60	2L 'a' > 37.9460 in - 104 2L 3 x 3 x 3/16 (1/4)	14.99	7.57	98.1	1.4590	6.31	63.47	0.099 [1] ✔
T10	60 - 40	2L 'a' > 43.2580 in - 125 2L 3 x 3 x 3/16 (1/4)	18.13	9.22	119.4	1.4238	7.29	61.94	0.118 [1] ✔
T11	40 - 20	2L 'a' > 52.6982 in - 146 2L 3 x 3 x 1/4 (1/4)	19.90	10.11	132.0	1.8750	7.37	81.56	0.090 [1] ✔
T12	20 - 0	2L 'a' > 57.9396 in - 161 2L 3.5 x 3.5 x 1/4 (1/4)	21.70	11.00	122.2	2.2500	8.03	97.88	0.082 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 2 x 2 x 1/8	6.52	6.11	121.2	0.3047	0.51	13.25	0.038 [1] ✔
T6	140 - 120	L 2 x 2 x 1/8	6.56	6.16	122.0	0.3047	0.26	13.25	0.019 [1] ✔

[1] P_u / ϕP_n controls

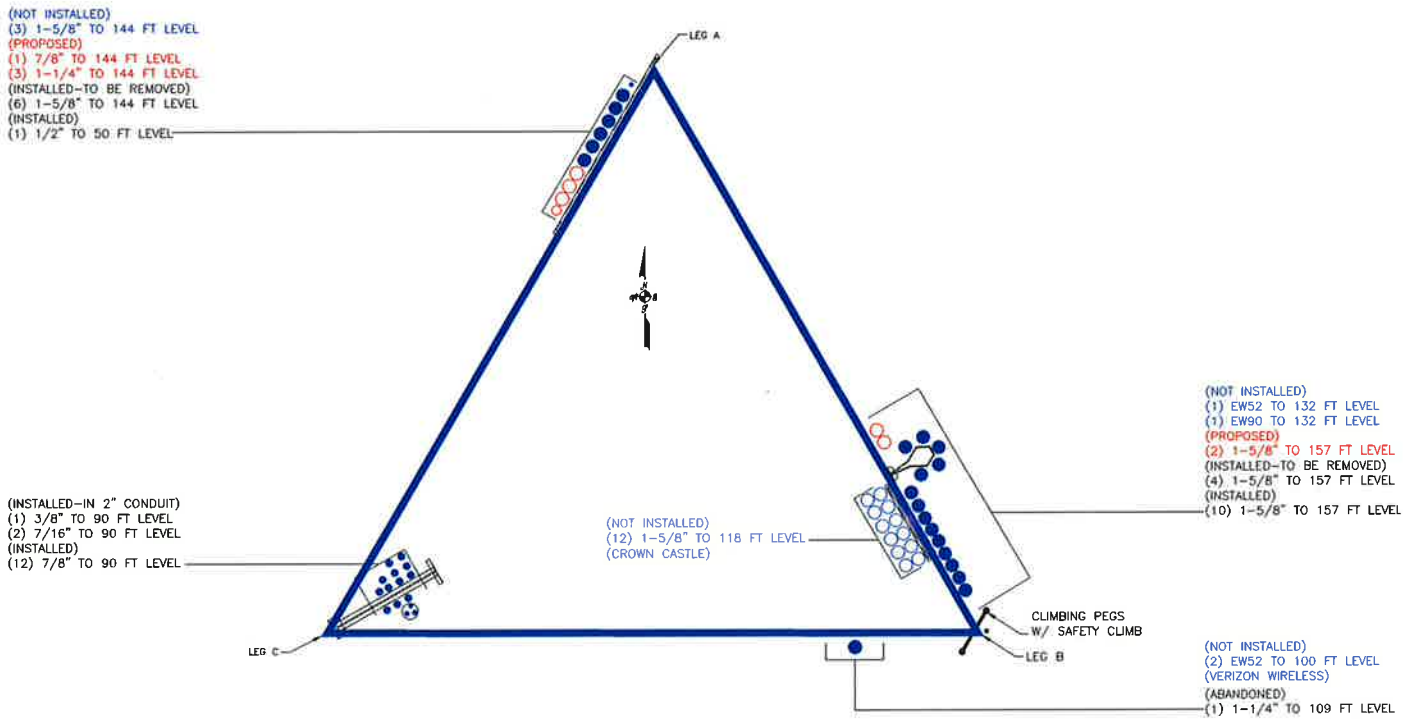
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	160 - 156	Leg	Rohn 2.375" x 0.218" (2 EH)	2	-4.37	49.90	8.7	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	10	-1.03	4.36	23.6	Pass
							28.5 (b)	
		Top Girt	L 2 x 2 x 1/8	5	-0.49	3.21	15.3	Pass
T2	156 - 152	Leg	Rohn 2.375" x 0.218" (2 EH)	14	-5.81	49.90	11.6	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	16	-2.80	4.35	64.3	Pass
							81.8 (b)	
T3	152 - 148	Leg	Rohn 2.375" x 0.218" (2 EH)	23	-9.90	49.90	19.8	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	25	-2.79	4.34	64.3	Pass
							79.2 (b)	
T4	148 - 144	Leg	Rohn 2.375" x 0.218" (2 EH)	31	-14.64	49.90	29.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	34	-3.01	4.33	69.3	Pass
							88.5 (b)	
T5	144 - 140	Leg	Rohn 2.375" x 0.218" (2 EH)	40	-22.26	49.90	44.6	Pass
		Diagonal	L 2 x 2 x 1/4	44	-4.57	16.48	27.7	Pass
							59.4 (b)	
T6	140 - 120	Leg	Rohn 2.875" x 0.276" (2.5 EH)	49	-52.92	74.43	71.1	Pass
		Diagonal	2L 1.5 x 1.5 x 1/8 (3/16)	61	-3.90	10.20	38.2	Pass
							62.8 (b)	
		Top Girt	L 2 x 2 x 1/8	53	-0.26	3.17	8.2	Pass
T7	120 - 100	Leg	Rohn 4" x 0.318" (3.5 EH)	79	-81.39	125.73	64.7	Pass
		Diagonal	2L 2 x 2 x 3/16 (3/16)	82	-4.94	21.96	22.5	Pass
							65.8 (b)	
T8	100 - 80	Leg	Rohn 4" x 0.318" (3.5 EH) (GR)	100	-111.13	148.29	74.9	Pass
		Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	103	-6.19	27.16	22.8	Pass
							49.4 (b)	
T9	80 - 60	Leg	ROHN 4 EH (GR)	121	-141.13	192.91	73.2	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	124	-6.34	38.73	16.4	Pass
							50.9 (b)	
T10	60 - 40	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	142	-167.57	246.97	67.9	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	145	-7.48	28.70	26.1	Pass
							49.3 (b)	
T11	40 - 20	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	157	-194.91	246.94	78.9	Pass
		Diagonal	2L 3 x 3 x 1/4 (1/4)	160	-7.61	35.24	21.6	Pass
							49.9 (b)	
T12	20 - 0	Leg	Rohn 6.625" x 0.432" (6 EH) (GR)	172	-221.57	381.11	58.1	Pass
							58.7 (b)	
		Diagonal	2L 3.5 x 3.5 x 1/4 (1/4)	175	-8.66	50.21	17.2	Pass
							54.3 (b)	
							Summary	
						Leg (T11)	78.9	Pass
						Diagonal (T4)	88.5	Pass
						Top Girt (T1)	15.3	Pass
						Bolt Checks	88.5	Pass
						RATING =	**88.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Anchor Rod Check for Self Supporting Towers

TIA-222-G, Section 4.9.9

Site Data	
BU#:	806387
Site Name:	
App #:	

Anchor Rod Data		
Qty:	6	
Diam:	1	in
Rod Material:	A449 (1/4 to 1 Incl.)	
Strength (Fu):	120	ksi
Yield (Fy):	92	ksi

* Rod Circle:		in
* e:		in
* # of Rods		1 or 2

Mu= Pu x e:		ft-kips

** Enter rod circle, offset (e) and number of anchor rods at the extreme fiber to consider if eccentric load due to leg reinforcement exists.*

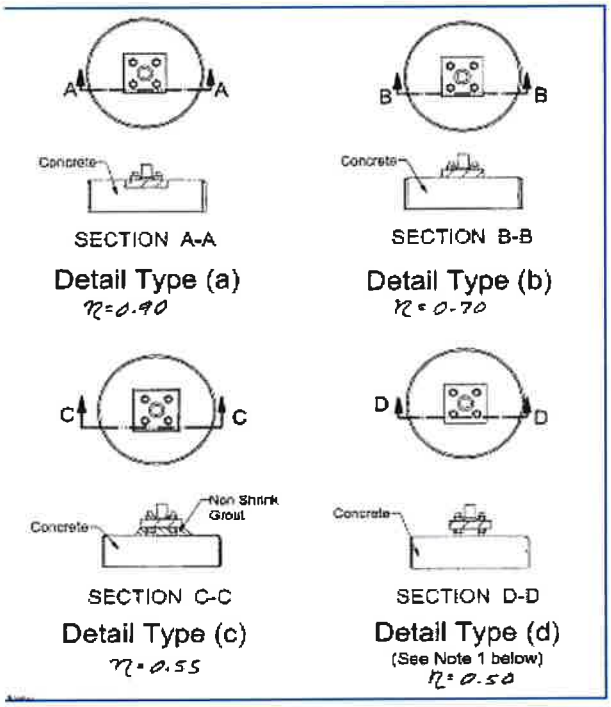


Figure 4-4 of TIA-222-G

Reactions		
Eta Factor, η	0.55	Detail Type
Uplift, Pu:	195	kips
Shear, Vu:	25	kips

l_{ar}:	0	in
$Mu = 0.65*l_{ar}*V_u$		ft-kips

Anchor Rod Results:

Max Rod (Cu+ Vu/ń):	40.1	Kips
Allowable Axial, Φ*Fu*Anet:	58.2	Kips
Anchor Rod Stress Ratio:	68.9%	

If Applicable;

Anchor Rod Results with Bending Considered:

When the clear distance from the top of concrete to the bottom of level nut excceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied (see Figure 4-4 of Rev. G):

$$(V_u/\phi R_{nv})^2 + [(P_u/\phi R_{nt}) + (M_u/\phi R_{nm})]^2 <= 1$$

$\phi R_{nv}=\phi*0.45*F_{ub}*A_b=$		kips
$\phi R_{nt}=\phi*F_u*A_{net}=$		kips
$\phi R_{nm}=\phi*F_y*Z=$		ft-kips

Maximum Acceptable Ratio:	105	%
Governing Stress Ratio:	68.9%	**Pass**

Pier and Pad Foundation

BU # :	806387
Site Name:	
App. Number:	

TIA-222 Revision:	G
Tower Type:	Self Support

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	228	kips
Compression Shear, Vu_comp:	25	kips
Uplift, P_{uplift}:	192	kips
Uplift Shear, V_{u_uplift}:	21	kips
Tower Height, **H**:	162	ft
Base Face Width, **BW**:	21	ft
BP Dist. Above Fdn, bp_{dist}:	0	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	3.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	16	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	12.0	ft
Pad Width, **W**:	9.4	ft
Pad Thickness, **T**:	2.0	ft
Pad Rebar Size, **Sp**:	7	
Pad Rebar Quantity, **mp**:	11	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	3000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

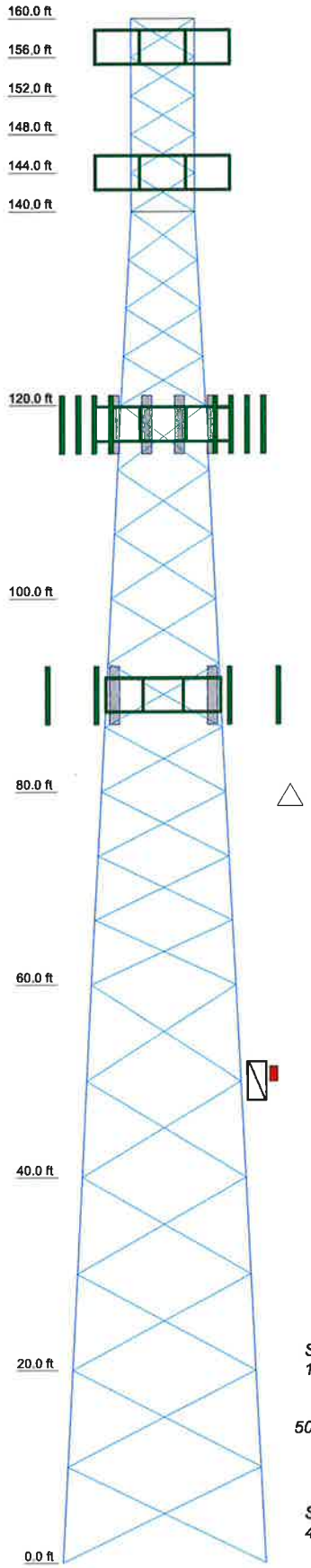
Total Soil Unit Weight, γ:	115	pcf
Ultimate Net Bearing, Qnet:	16.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	0	
Base Friction, μ:	0	
Neglected Depth, **N**:	4.0	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Uplift (kips)	276.24	192.00	**69.5%**	**Pass**
Lateral (Sliding) (kips)	91.37	25.00	**27.4%**	**Pass**
Bearing Pressure (ksf)	13.04	4.39	**33.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	1102.75	262.50	**23.8%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	701.04	220.50	**31.5%**	**Pass**
Pier Compression (kip)	2214.70	246.18	**11.1%**	**Pass**
*Pad Flexure (kip*ft)*	564.21	107.06	**19.0%**	**Pass**
Pad Shear - 1-way (kips)	181.87	32.17	**17.7%**	**Pass**
Pad Shear - 2-way (ksi)	0.16	0.05	**29.0%**	**Pass**

Soil Rating:	**69.5%**
Structural Rating:	**31.5%**



Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
Legs						Rohn 2.875" x 0.276" (2.5 EH)	Rohn 4" x 0.318" (3.5 EH)	Rohn 4" x 0.318" (3.5 EH) (GR)	ROHN 4 EH (GR)		Rohn 5.563" x 0.375" (5 EH) (GR)	A	20.8646
Leg Grade						A572-50							
Diagonals						2L 1.5 x 1.5 x 1/8 (3/16)	2L 2 x 2 x 3/16 (3/16)	2L 2.5 x 2.5 x 3/16 (3/16)	2L 3 x 3 x 3/16 (1/4)		2L 3 x 3 x 1/4 (1/4)	2L 3.5 x 3.5 x 1/4 (1/4)	
Diagonal Grade						A36							
Top Girts	C					L 2 x 2 x 1/8			N.A.				
Face Width (ft)	5.2083	5.2918	5.5378	5.5836	5.5418	6.5626	8.6041	10.6354	12.6771	14.7708	16.7706	18.8542	
# Panels @ (ft)	0.2	0.1	0.1	0.1	0.2	4 @ 5	1.8	2.8	3.7	4.2	4.9	5.6	25.7
Weight (K)						1.0		9 @ 6.66667			6 @ 10		

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 12' x 2.375" Pipe Mount	157	PCS 1900MHZ 4X45W-65MHZ (Proposed)	144
(2) 12' x 2.375" Pipe Mount	157		
(2) 12' x 2.375" Pipe Mount	157	(2) RRH2X50-800 (Proposed)	144
Site pro VFA 12-HD	157	TD-RRH8X20-25 (Proposed)	144
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	157	NNVV-65B-R4 w/ Mount Pipe (Proposed)	144
B13 RRH 4X30 (Proposed)	157	APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144
B66A RRH4X45 (Proposed)	157		
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	Sector Mount [SM 506-3]	144
B5 4T4R RRH4X40 AIRSCALE (Proposed)	157	(3) 4' x 2" Pipe Mount	144
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	157	(3) 4' x 2" Pipe Mount	144
B13 RRH 4X30 (Proposed)	157	(3) 4' x 2" Pipe Mount	144
B66A RRH4X45 (Proposed)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
B5 4T4R RRH4X40 AIRSCALE (Proposed)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
RC3DC-3315-PF-48 (Proposed)	157	Sector Mount [SM 404-3] (ABANDONED)	118
(2) LPA-80080/6CF w/ Mount Pipe (Installed)	157	PD1110	109
B13 RRH 4X30 (Proposed)	157	Side Arm Mount [SO 308-1]	109
B66A RRH4X45 (Proposed)	157	(2) RRUS-11 (Proposed)	90
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	P45-16-XLH-RR w/ Mount Pipe (Proposed)	90
B5 4T4R RRH4X40 AIRSCALE (Proposed)	157	(2) RRUS-11 (Proposed)	90
RC3DC-3315-PF-48 (Proposed)	157	AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	90
PCS 1900MHZ 4X45W-65MHZ (Proposed)	144	DC6-48-60-18-8F (Proposed)	90
(2) RRH2X50-800 (Proposed)	144	Pipe Mount [PM 601-3] (x)	90
TD-RRH8X20-25 (Proposed)	144	(2) RRUS-11 (Proposed)	90
NNVV-65B-R4 w/ Mount Pipe (Proposed)	144	AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	90
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144	Sector Mount [SM 802-3]	90
PCS 1900MHZ 4X45W-65MHZ (Proposed)	144	(2) 7770.00 w/ Mount Pipe (x)	90
(2) RRH2X50-800 (Proposed)	144	(2) LGP21401	90
TD-RRH8X20-25 (Proposed)	144	(2) LGP21901	90
NNVV-65B-R4 w/ Mount Pipe (Proposed)	144	(2) 7770.00 w/ Mount Pipe (x)	90
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144	(2) LGP21401	90
		(2) LGP21901	90
		(2) 7770.00 w/ Mount Pipe (x)	90
		(2) LGP21401	90
		(2) LGP21901	90
		Side Arm Mount [SO 306-1] (x)	50
		KS24019-L112A (x)	50

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Rohn 6.625" x 0.432" (6 EH) (GR)	C	L 2 x 2 x 1/8
B	L 2 x 2 x 1/4		

ALL REA
ARE FA

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

MAX. C
DOW
SHEA

UPLI
SHEA

AX
122 K

SHEAR
11 K

TORQU
50 mph WIND - 0.7500 in ICE

AXIAL
49 K

SHEAR
40 K

MOMENT
3831 kip-ft

TORQUE 35 kip-ft
REACTIONS - 101 mph WIND

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 101 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 0.00 ft
8. Grouted pipe f'c is 7 ksi
9. TOWER RATING: 88.5%

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

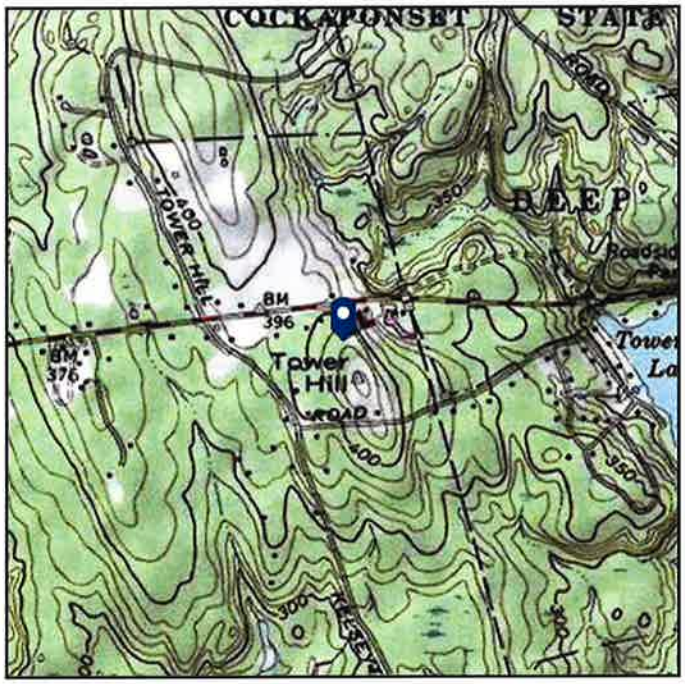
Job: HRT 088, CT BU#806387		
Project: PJF JOB #37518-2158-003-8700		
Client: Crown Castle	Drawn by: jjacobs	App'd:
Code: TIA-222-G	Date: 08/07/18	Scale: N
Path:		Dwg No.

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 416.51 ft (NAVD 88)
Latitude: 41.357342
Longitude: -72.519953



Wind

Results:

Wind Speed:	129 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	96 Vmph
100-year MRI	106 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Tue Aug 07 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

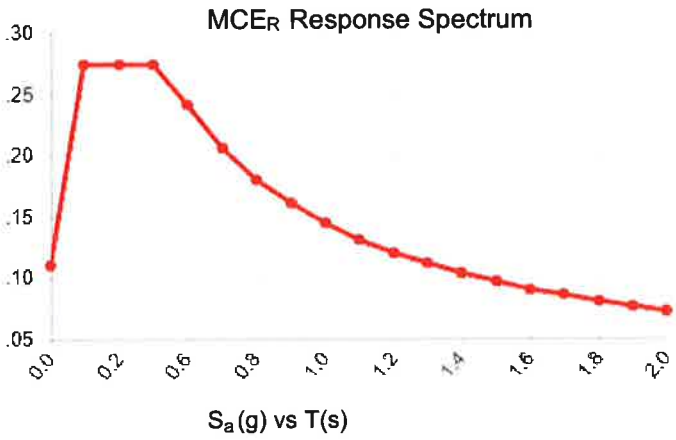
Seismic

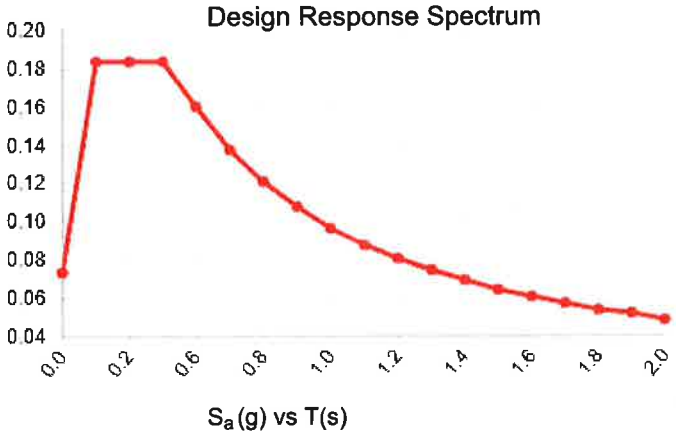
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.171	S_{DS} :	0.183
S_1 :	0.060	S_{D1} :	0.096
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.087
S_{MS} :	0.274	PGA_M :	0.138
S_{M1} :	0.144	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Aug 07 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Aug 07 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

MODIFIED 160' SELF SUPPORT TOWER

BU #806387; HRT 088 943629

#14 ROUTE 80
KILLINGWORTH, CONNECTICUT 06419
MIDDLESEX COUNTY
LAT: 41° 21' 26.43"; LONG: -72° 31' 11.83"
APP: 396862 REV. 0; WO: 1493848

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (516) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST AND NOTES
N-1	GENERAL NOTES
S-1	TOWER ELEVATION
S-2	DIAGONAL REPLACEMENT

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	130 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	101 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

TOWER MANUFACTURER: ROHN
TOWER MANUFACTURER #: 2281721

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD AND COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT US AT RIGGING@PJFWEB.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416 2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3282.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

TITLE SHEET

T-1

37517-3282.003.DWG

POST-MODIFICATION CHECKLIST

REQUIRED	SECTION	REPORT ITEM	BRIEF DESCRIPTION (SEE ENG-SOW-10007)
		PRE-CONSTRUCTION	
X	6.1.1	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT
X	6.1.2	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE THE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.3	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.4	FABRICATOR CERTIFIED WELD INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10009) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE TESTING AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.5	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL WITH A YIELD STRENGTH GREATER THAN 36 KSI AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.6	FABRICATOR NDE INSPECTION	A VISUAL OBSERVATION OF A PORTION OF THE EXISTING STRUCTURE (AS NOTED ON THESE DRAWINGS) IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.7	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)	A VISUAL OBSERVATION OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.8	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION	
X	6.2.1	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.2	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.3	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.4	POST INSTALLED ANCHOR ROD VERIFICATION	ANCHOR ROD INSTALLATION SHALL INCLUDE VERIFICATION BY LETTER AND PHOTOGRAPHIC DOCUMENTATION.
NA	6.2.5	BASE PLATE GROUT VERIFICATION	A LETTER FROM THE GENERAL CONTRACTOR SHALL BE PROVIDED TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
NA	6.2.6	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. PRE, DURING AND POST WELD INSPECTION IS REQUIRED PER CROWN SOW AND DOCUMENT #ENG-SOW-10007.
NA	6.2.7	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.2.8	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
NA	6.2.9	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE FOR INCLUSION IN THE MI REPORT.
X	6.2.10	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
NA	"	MAGNI 565 COATING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY MAGNI 565 COATING WAS APPLIED IN ACCORDANCE PER ASTM F1136.
NA	"	MICROPILE / ROCK ANCHOR	THE GENERAL CONTRACTOR SHALL PROVIDE INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTATION TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		POST-CONSTRUCTION	
X	6.3.1	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
NA	6.3.2	POST INSTALLED ANCHOR ROD PULL TESTING	POST INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.3.3	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	"	POST INSTALLED MICROPILE / ROCK ANCHOR TESTING	POST INSTALLED ANCHORS SHALL BE TESTED AND INSPECTED IN ACCORDANCE WITH SPECIFICATION STATED ON MICROPILE/ROCK ANCHOR NOTES.

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

MODIFICATION INSPECTION NOTES:

GENERAL

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

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

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

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

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

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

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

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS IN SCHEDULED MI

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

CORRECTION OF FAILING MIS

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

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

MI VERIFICATION INSPECTIONS

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

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

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

PHOTOGRAPHS

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

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

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

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

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

MI CHECKLIST AND NOTES

MI-1

37517-3262.003.0000

GENERAL NOTES:

1. THIS TOWER MODIFICATION DRAWING IS BASED UPON A STRUCTURAL ANALYSIS PERFORMED BY PAUL J. FORD AND COMPANY DATED 12-4-2017.
2. PAUL J. FORD AND COMPANY HAS NOT PERFORMED A FIELD VISIT TO VERIFY THE EXISTING TOWER MEMBER SIZES AND DIMENSIONS. THE MODIFICATIONS SHOWN ON THESE PAGES WERE DEVELOPED USING INFORMATION PROVIDED TO US BY CROWN-CASTLE.
3. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT AS REPRESENTED ON THESE DRAWINGS, PAUL J. FORD AND COMPANY SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE STRUCTURAL SIGNIFICANCE OF THE DEVIATION.
4. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED ON THESE DRAWINGS. BY ACCEPTANCE OF THIS PROJECT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED TO DO THIS WORK IN THE JURISDICTION IN WHICH THE WORK IS TO BE PERFORMED.
5. THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE A PRIMARY STRUCTURAL MEMBER. THESE MEMBERS ARE CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS MEMBER CHANGE OUT.
6. INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH LOCAL BUILDING CODES.
7. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
8. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
9. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

CONSTRUCTION NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION.
2. THESE DRAWINGS REQUIRE THE REMOVAL OF EXISTING ASTM A325 BOLTS. THE EXISTING ASTM A325 BOLTS THAT ARE REMOVED MUST BE REPLACED WITH NEW BOLTS.
3. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH (704)-416-2800

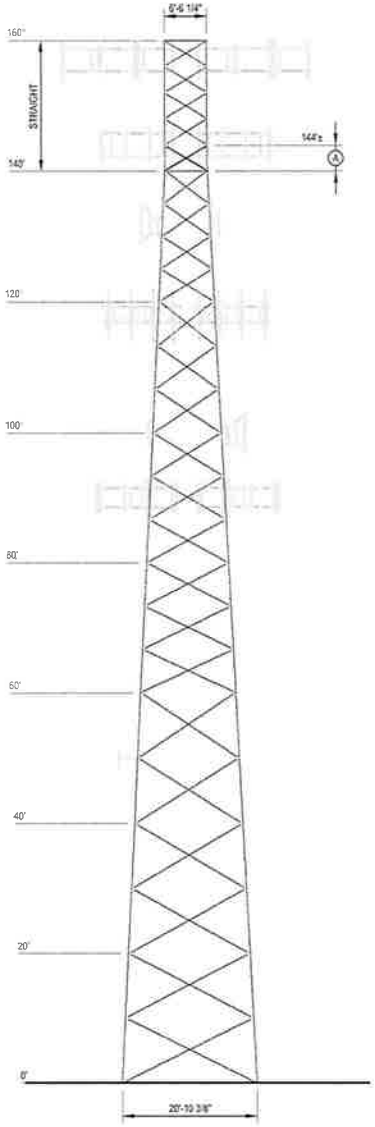
BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262 003.6800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

GENERAL NOTES

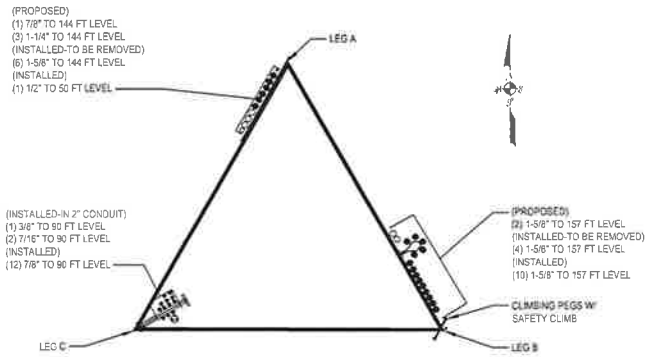
N-1

37517-3262 003.DWG



TOWER ELEVATION 1 S-1

TOWER MODIFICATION SCHEDULE			
	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	140'± TO 144'±	REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS	S-2



COAX LAYOUT 2 S-1

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

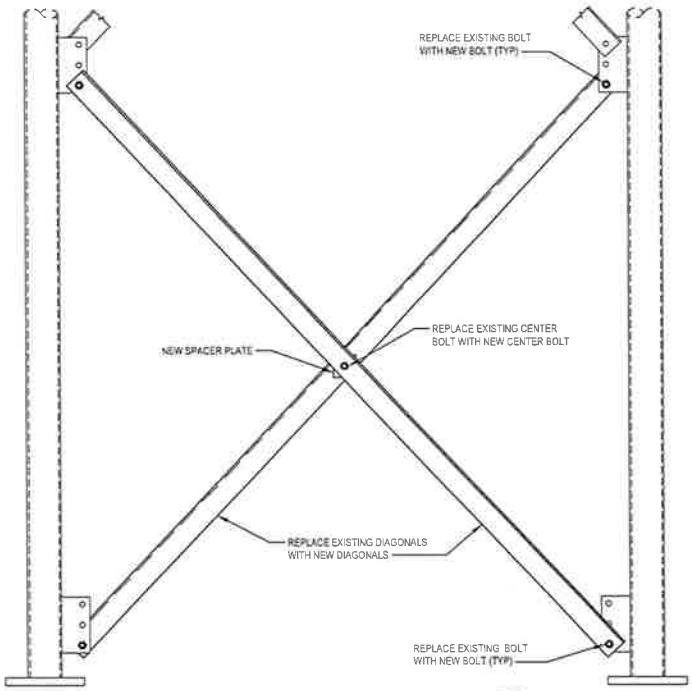
PROJECT No:	37517-3262.003.8400
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

TOWER ELEVATION

S-1

37517.3262.003.DWG

THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE THE MAIN DIAGONAL TO THE TOWER GUSSET PLATE. THESE DIAGONALS ARE LOAD CARRYING PRIMARY MEMBERS CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS DIAGONAL CHANGE OUT.



A DIAGONAL REPLACEMENT 1/S-2

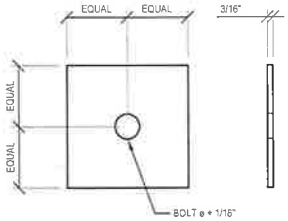
NOTES:
1. EXISTING BOLTS THAT ARE REMOVED CAN NOT BE REUSED.

ELEVATION	K (in)	N (in)
140'± TO 144'±	3/4	9/16

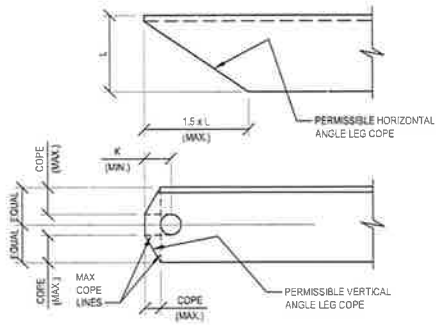
DIAGONAL

DIAGONAL NOTES:

1. FIELD FABRICATION OF THESE PARTS IS PERMITTED.
2. USE BEARING TYPE CONNECTION TO A SNUG TIGHT CONDITION, UNO.



SPACER PLATE



CRITERIA FOR PERMISSIBLE ANGLE COPING

(IF REQUIRED)

REV	DATE	DESCRIPTION

MATERIAL LIST			
ELEVATION	QTY	MATERIAL	LENGTH
140'± TO 144'±	6	DIAGONAL L2 x 2 x 1/4	7'-5"±
	3	SPACER PLATE 3/16" x 2"	0'-2"±
	12	1/2"ø BOLTS	1 1/2"
	3	1/2"ø BOLTS	1 3/4"

MATERIAL NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE OF THE REINFORCING MATERIAL IN THE FIELD. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL.
2. ALL STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O.):
   A. ANGLES, PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)
3. ALL MATERIAL GRADES GREATER THAN 36 KSI WILL REQUIRE MATERIAL TEST REPORTS.
4. ALL NEW STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE "SPECIFICATION FOR ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES BAR, AND STRIP" ASTM A123.
5. ALL BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325. USE BEARING TYPE CONNECTIONS, TIGHTEN TO A SNUG TIGHT CONNECTION, UNO.
6. ALL BOLTS SHALL BE PROVIDED WITH LOCK-WASHERS, OR LOCK-NUTS, OR PAL-NUTS AND SHALL BE GALVANIZED ACCORDING TO ASTM A153/ASTM153M.
7. ALL HOLES IN THE NEW STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED, UNO.
8. FIELD DRILLED OR CUT MATERIAL OR ANY GALVANIZED SURFACE THAT IS SCRATCHED OR DAMAGED DUE TO THE CONTRACTORS EFFORTS, TO BE COATED WITH TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT IN ACCORDANCE WITH ENG-BUL-10149.
9. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600 - Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

DIAGONAL REPLACEMENT

S-2

37517-3262.003.DWG

MODIFIED 160' SELF SUPPORT TOWER

BU #806387; HRT 088 943629

#14 ROUTE 80
KILLINGWORTH, CONNECTICUT 06419
MIDDLESEX COUNTY
LAT: 41° 21' 26.43"; LONG: -72° 31' 11.83"
APP: 396862 REV. 0; WO: 1493848

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST AND NOTES
N-1	GENERAL NOTES
S-1	TOWER ELEVATION
S-2	DIAGONAL REPLACEMENT

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	130 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	101 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

TOWER MANUFACTURER: ROHN
TOWER MANUFACTURER #: 2281721

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD AND COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT US AT RIGGING@PJFWEB.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

STATE OF CONNECTICUT
JOSEPH PACHECARAN JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 400 - Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORRINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH (704) 496-2600

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8600
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.E.
DATE:	12-4-2017

TITLE SHEET

T-1

37517-3262.003.DWG

POST-MODIFICATION CHECKLIST

REQUIRED	SECTION	REPORT ITEM	BRIEF DESCRIPTION (SEE ENG-SOW-10007)
			PRE-CONSTRUCTION
X	6.1.1	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT
X	6.1.2	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE THE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.3	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.4	FABRICATOR CERTIFIED WELD INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE TESTING AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.5	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL WITH A YIELD STRENGTH GREATER THAN 36 KSI AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.6	FABRICATOR NDE INSPECTION	A VISUAL OBSERVATION OF A PORTION OF THE EXISTING STRUCTURE (AS NOTED ON THESE DRAWINGS) IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.7	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)	A VISUAL OBSERVATION OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.8	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
			CONSTRUCTION
X	6.2.1	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.2	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.3	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.4	POST INSTALLED ANCHOR ROD VERIFICATION	ANCHOR ROD INSTALLATION SHALL INCLUDE VERIFICATION BY LETTER AND PHOTOGRAPHIC DOCUMENTATION.
NA	6.2.5	BASE PLATE GROUT VERIFICATION	A LETTER FROM THE GENERAL CONTRACTOR SHALL BE PROVIDED TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
NA	6.2.6	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. PRE, DURING AND POST WELD INSPECTION IS REQUIRED PER CROWN SOW AND DOCUMENT #ENG-SOW-10007.
NA	6.2.7	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.2.8	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
NA	6.2.9	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE FOR INCLUSION IN THE MI REPORT.
X	6.2.10	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
NA	"	MAGNI 565 COATING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY MAGNI 565 COATING WAS APPLIED IN ACCORDANCE PER ASTM F1136.
NA	"	MICROPILE / ROCK ANCHOR	THE GENERAL CONTRACTOR SHALL PROVIDE INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTATION TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
			POST-CONSTRUCTION
X	6.3.1	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
NA	6.3.2	POST INSTALLED ANCHOR ROD PULL TESTING	POST INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.3.3	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	"	POST INSTALLED MICROPILE / ROCK ANCHOR TESTING	POST INSTALLED ANCHORS SHALL BE TESTED AND INSPECTED IN ACCORDANCE WITH SPECIFICATION STATED ON MICROPILE/ROCK ANCHOR NOTES.

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

MODIFICATION INSPECTION NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH (704) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517.3262.003.8600
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

MI CHECKLIST AND NOTES

MI-1

37517.3262.003.DWG

GENERAL NOTES:

1. THIS TOWER MODIFICATION DRAWING IS BASED UPON A STRUCTURAL ANALYSIS PERFORMED BY PAUL J. FORD AND COMPANY DATED 12-4-2017.
2. PAUL J. FORD AND COMPANY HAS NOT PERFORMED A FIELD VISIT TO VERIFY THE EXISTING TOWER MEMBER SIZES AND DIMENSIONS. THE MODIFICATIONS SHOWN ON THESE PAGES WERE DEVELOPED USING INFORMATION PROVIDED TO US BY CROWN-CASTLE.
3. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT AS REPRESENTED ON THESE DRAWINGS, PAUL J. FORD AND COMPANY SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE STRUCTURAL SIGNIFICANCE OF THE DEVIATION.
4. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED ON THESE DRAWINGS. BY ACCEPTANCE OF THIS PROJECT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED TO DO THIS WORK IN THE JURISDICTION IN WHICH THE WORK IS TO BE PERFORMED.
5. THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE A PRIMARY STRUCTURAL MEMBER. THESE MEMBERS ARE CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS MEMBER CHANGE OUT.
6. INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH LOCAL BUILDING CODES.
7. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
8. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
9. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

CONSTRUCTION NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION.
2. THESE DRAWINGS REQUIRE THE REMOVAL OF EXISTING ASTM A325 BOLTS. THE EXISTING ASTM A325 BOLTS THAT ARE REMOVED MUST BE REPLACED WITH NEW BOLTS.
3. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

DEC 04 2017

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

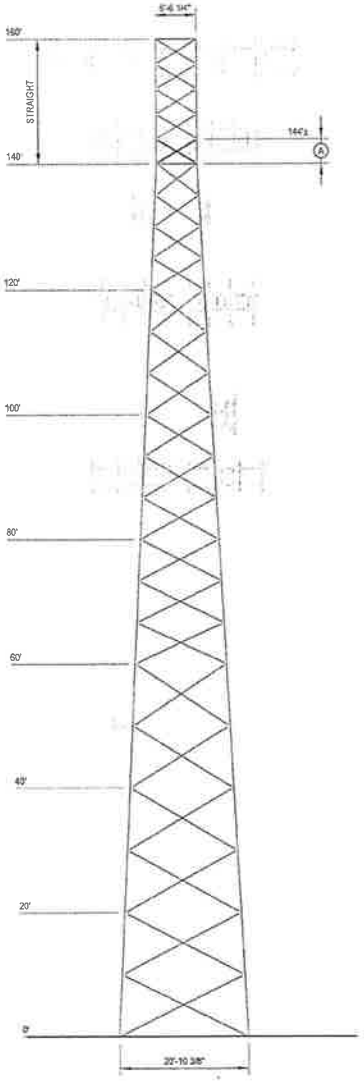
PROJECT NR:	37517-3262.003.5800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

GENERAL NOTES

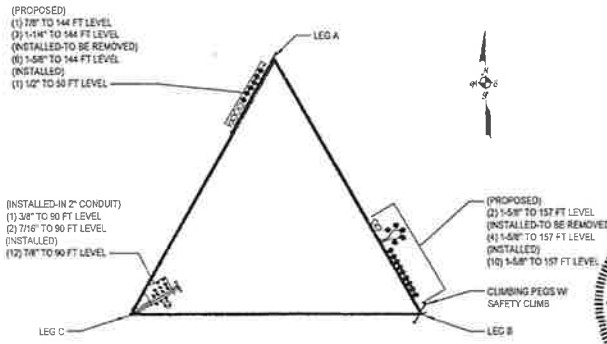
N-1

37517-3262.003.DWG

TOWER MODIFICATION SCHEDULE			
	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
(A)	140'± TO 144'±	REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS	S-2



TOWER ELEVATION 1 / S-1



COAX LAYOUT 2 / S-1

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

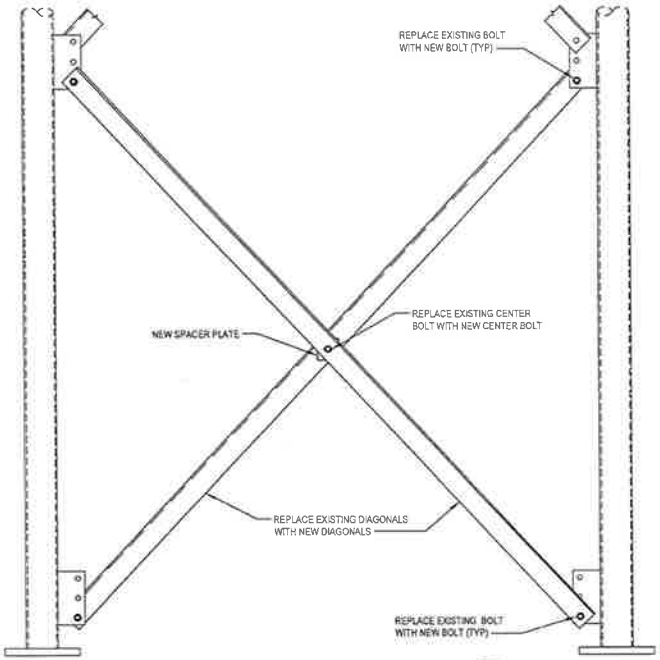
PROJECT No:	37517-3262.003.8900
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

TOWER ELEVATION

S-1

37517.3262.003.0045

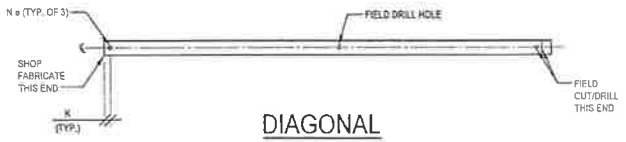
THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE THE MAIN DIAGONAL TO THE TOWER GUSSET PLATE. THESE DIAGONALS ARE LOAD CARRYING PRIMARY MEMBERS CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS DIAGONAL CHANGE OUT.



A DIAGONAL REPLACEMENT 1 S-2

NOTES:
1. EXISTING BOLTS THAT ARE REMOVED CAN NOT BE REUSED.

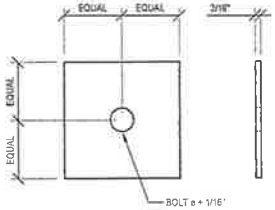
ELEVATION	K (in)	N (in)
140'± TO 144'±	3/4	9/16



DIAGONAL

DIAGONAL NOTES:

1. FIELD FABRICATION OF THESE PARTS IS PERMITTED.
2. USE BEARING TYPE CONNECTION TO A SNUG TIGHT CONDITION, UNO.

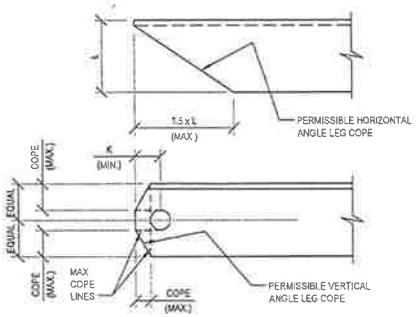


SPACER PLATE

MATERIAL LIST			
ELEVATION	QTY	MATERIAL	LENGTH
140 ± TO 144'±	6	DIAGONAL L2 x 2 x 1/4	7'-5"±
	3	SPACER PLATE 3/16" x 2"	0'-2 ½
	12	1/2"ø BOLTS	1 1/2"
	3	1/2"ø BOLTS	† 3/4"

MATERIAL NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE OF THE REINFORCING MATERIAL IN THE FIELD. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL.
2. ALL STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O.):
   A. ANGLES, PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)
3. ALL MATERIAL GRADES GREATER THAN 36 KSI WILL REQUIRE MATERIAL TEST REPORTS.
4. ALL NEW STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE "SPECIFICATION FOR ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES BAR, AND STRIP" ASTM A123.
5. ALL BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325, USE BEARING TYPE CONNECTIONS, TIGHTEN TO A SNUG TIGHT CONNECTION, UNO.
6. ALL BOLTS SHALL BE PROVIDED WITH LOCK-WASHERS, OR LOCK-NUTS, OR PAL-NUTS AND SHALL BE GALVANIZED ACCORDING TO ASTM A153/ASTM153M.
7. ALL HOLES IN THE NEW STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED, UNO.
8. FIELD DRILLED OR CUT MATERIAL OR ANY GALVANIZED SURFACE THAT IS SCRATCHED OR DAMAGED DUE TO THE CONTRACTORS EFFORTS, TO BE COATED WITH TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT IN ACCORDANCE WITH ENG-BUL-10149.
9. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.



CRITERIA FOR PERMISSIBLE ANGLE COPING

(IF REQUIRED)

STATE OF CONNECTICUT
JOSEPH PACHICARAN JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 · Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

DIAGONAL REPLACEMENT

S-2

37517-3262.003.(M5)