STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 18, 2013

Alex Giannaras
HPC Development LLC
22 Shelter Rock Lane
Building C
Danbury, CT 06810

RE: **EM-T-MOBILE-045-130520** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at 93 Roxbury Road, East Lyme, Connecticut.

Dear Mr. Giannaras:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated May 16, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Paul M. Formica, First Selectman, Town of East Lyme
Gary Goeschel, Director of Planning, Town of East Lyme
Crown Castle

CSC
CONNECTICUT SITING COUNCIL

HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

HPC WIRELESS SERVICES

EM-T-MOBILE-045-130520

ORIGINAL

May 16, 2013

VIA OVERNIGHT COURIER

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

Re: T-Mobile Northeast LLC – exempt modification
93 Roxbury Road, East Lyme, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of East Lyme.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at 93 Roxbury Road in the Town of East Lyme (coordinates 41°-20'-8.35" N, 72°-13'-18.28" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration.. Also included is a power density report reflecting the modification to T-Mobile's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. T-Mobile will replace six (6) of its existing panel antennas with six (6) new

antennas, and remove three (3) existing antennas at a center line of approximately 103'. T-Mobile will also remove six (6) of nine (9) TMAs. A hybrid cable will be run from the equipment to the antennas along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 151.292' structure.

2. T-Mobile's proposed changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, T-Mobile's operations at the site will result in a power density of approximately 1.108%; the combined site operations will result in a total power density of approximately 28.548%.

Please feel free to contact me by phone at (617) 281-0084 or by e-mail at agiannaras@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Alex Giannaras

Alex Giannaras

cc: Honorable Paul Formica, First Selectman, Town of East Lyme
Metro Mobile CTS of N L Inc. c/o Crown Atlantic Co (underlying property owner)

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **April 18, 2013**

David Grimes
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
704-405-6548

Paul J Ford and Company
250 E. Broad St Suite 1500
Columbus, OH 43215
614-221-6679
chedges@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11037B
	Carrier Site Name:	CT11037B
Crown Castle Designation:	**Crown Castle BU Number:**	806384
	Crown Castle Site Name:	NLN 136 943455
	Crown Castle JDE Job Number:	232399
	Crown Castle Work Order Number:	600858
	Crown Castle Application Number:	186713 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1269
Site Data:	**93 ROXBURY ROAD, EAST LYME, New London County, CT** **Latitude *41° 20' 8.35"*, Longitude *-72° 13' 18.28"*** **151.292 Foot - Self Support Tower**	

Dear David Grimes,

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 539171, in accordance with application 186713, revision 2.

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

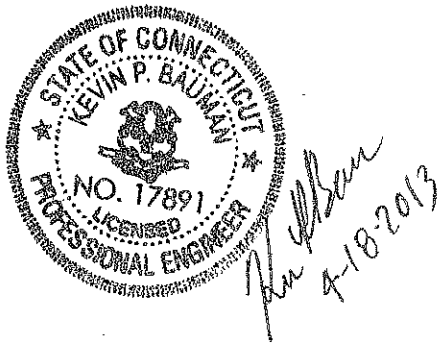
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and an importance factor of 1.15 based upon a wind speed of 91.2 mph fastest mile with no ice, 37.6 mph with 0.9375 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Christina Hedges, E.I.T
Structural Designer



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **April 18, 2013**

David Grimes
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
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Respectfully submitted by:

Christina Hedges, E.I.T
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 151.292 ft Self Support tower designed by ROHN in March of 1990. The tower was originally designed for a wind speed of 85 mph per EIA-222-D.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 91.2 mph with no ice, 37.6 mph with 0.9375 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
103.0	103.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1 5/8	
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			

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
150.0	157.0	1	telewave	ANT150F2	1 1	7/8 5/16	1
	152.0	1	motorola	WB2618			
	150.0	1	tower mounts	Side Arm Mount [SO 304-1]			
148.0	149.0	3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe			2
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe	6 6	1 5/8 7/8	1
		4	antel	LPA-80063/6CF w/ Mount Pipe			
		2	decibel	DB846H80E-SX w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	148.0	1	tower mounts	Sector Mount [SM 510-3]			
143.0	143.0	1	andrew	PL6-59W	1	EW52	1
		1	tower mounts	Pipe Mount [PM 601-1]			
133.0	133.0	3	kathrein	800 10504 w/ Mount Pipe	6	1 5/8	1
		1	tower mounts	Sector Mount [SM 104-3]			
128.0	130.0	1	til-tek	TA-2450	1	7/8	1
	128.0	1	tower mounts	Side Arm Mount [SO 305-1]			
126.0	126.0	1	motorola	WB2618	1	5/16	1
		1	tower mounts	Side Arm Mount [SO 305-1]			
121.0	122.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	3	1 1/4	2
		2	rfs celwave	APXVSPP18-C-A20 w/			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
				Mount Pipe			
	121.0	3	alcatel lucent	1900MHz RRH (65MHz)			
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
		1	tower mounts	Sector Mount [SM 505-3]			1
112.0	112.0	9	decibel	DB844H90E-XY w/Mount Pipe	9	7/8	1
		1	tower mounts	Sector Mount [SM 510-3]			
103.0	103.0	6	ems wireless	RR90-17-02DP w/ Mount Pipe	6 3	1 5/8 5/16	3
		6	ericsson	KRY 112 71			
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Sector Mount [SM 701-3]	12	1 5/8	
95.0	94.0	1	motorola	WB2618	1	5/16	1
90.0	96.0	1	sinclair	SRL-217 Ground Plane 10.67' x 4.83'	1	7/8	1
	90.0	1	tower mounts	Side Arm Mount [SO 302-1]			
85.0	90.0	1	telewave	ANT150D3	1	7/8	1
	85.0	1	tower mounts	Side Arm Mount [SO 305-1]			
61.0	61.0	1	bluewave	BW246Y	1	1/4	1
50.0	52.0	1	lucent	KS24019-L112A	1	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 305-1]			

Notes:
1) Existing Equipment
2) Future Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Drawings	March 5, 1990, Rohn	24792JC	258359
Foundation Drawings	March 5, 1990, Rohn	24792JC	958525
Geotechnical Report	July 19, 1989, Dr. Clarence Welti	-	258373
Modification Drawings	January 16, 2003, All Points Technology	CT105761	801526
Modification Drawings	February 26, 2008, (Revised July 9, 2008) Vertical Structures	2008-004-030	2215933
Modification Drawings	May 14, 2009, PJF	41709-0057	2457486
Modification Drawings	May 10, 2011, PJF	37511-0187Mod	2883931
Structural Analysis	May 10, 2011, PJF	37511-0187Mod	2883926

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	151.292 - 146.229	Leg	ROHN 2.5 STD	1	-2289.09	37965.40	14.8	Pass
T2	146.229 - 141.167	Leg	ROHN 2.5 STD	14	-7391.75	50607.87	18.5	Pass
T3	141.167 - 121.042	Leg	ROHN 2.5 EH	23	-29394.00	52977.02	55.5	Pass
T4	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	47	-34279.10	61869.99	55.4	Pass
T5	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	56	-45114.40	61867.72	72.9	Pass
T6	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	65	-62689.60	91492.98	68.5	Pass
T7	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	77	-68179.10	102414.52	66.6	Pass
T8	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	86	-79960.70	132155.48	60.5	Pass
T9	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	98	-98496.20	132524.46	74.3	Pass
T10	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	110	-106920.00	136793.79	78.2	Pass
T11	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	119	-124235.00	193618.24	64.2 75.3 (b)	Pass
T12	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	131	-151578.00	194567.34	77.9	Pass
T13	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	143	-168937.00	194647.32	86.8	Pass
T14	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	155	-177058.00	231920.66	76.3	Pass
T15	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	163	172992.00	244417.54	70.8 84.5 (b)	Pass
T16	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	175	179318.00	244417.54	73.4	Pass
T17	10.1041 - 0	Leg	ROHN 5 EH (GR)	187	200652.00	244417.54	82.1	Pass
T1	151.292 - 146.229	Diagonal	L 1.5 x 1.5 x 3/16	12	-853.88	2936.81	29.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T2	146.229 - 141.167	Diagonal	L 2 x 2 x 3/16	18	-3127.34	7183.02	43.5 47.3 (b)	Pass
T3	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	30	-4548.35	8577.46	53.0 82.8 (b)	Pass
T4	121.042 - 114.313	Diagonal	L2 1/2x2 1/2x3/16	51	-5702.63	7802.10	73.1	Pass
T5	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	60	-6310.03	7121.94	88.6	Pass
T6	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	69	-7495.23	27668.41	27.1 68.2 (b)	Pass
T7	100.917 - 94.2014	Diagonal	L3x3x3/16	81	-7939.43	10656.04	74.5	Pass
T8	94.2014 - 87.4861	Diagonal	L3x3x3/16	90	-8167.12	9740.18	83.8	Pass
T9	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	102	-8751.42	35614.03	24.6 79.6 (b)	Pass
T10	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	114	-9914.83	29260.28	33.9 86.3 (b)	Pass
T11	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	123	-10499.80	26882.74	39.1 87.7 (b)	Pass
T12	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	135	-10713.60	32676.90	32.8 91.9 (b)	Pass
T13	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	147	-11316.00	29874.53	37.9 65.9 (b)	Pass
T14	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	159	-11519.00	43629.75	26.4 67.1 (b)	Pass
T15	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	168	-12432.10	40231.14	30.9 72.4 (b)	Pass
T16	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	180	-12321.50	55366.02	22.3 71.7 (b)	Pass
T17	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	192	-13617.00	51311.17	26.5 79.3 (b)	Pass
T6	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	73	-1087.20	4253.63	25.6	Pass
T8	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	94	-1386.83	3443.41	40.3	Pass
T9	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	106	-1708.30	3111.40	54.9	Pass
T11	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	127	-2154.45	4890.70	44.1	Pass
T12	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	139	-2628.86	9857.64	26.7 47.8 (b)	Pass
T13	50.5104 - 40.4166	Secondary Horizontal	L3x3x1/4	152	-2929.92	8745.97	33.5 53.3 (b)	Pass
T15	30.3125 - 20.2083	Secondary Horizontal	L 3 x 3 x 3/16	172	-3532.47	5467.17	64.6	Pass
T16	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	184	-3670.59	4943.07	74.3	Pass
T17	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	196	-4134.38	9469.10	43.7 48.1 (b)	Pass
T1	151.292 - 146.229	Top Girt	L2 1/2x2 1/2x3/16	6	-139.71	4410.47	3.2	Pass
T3	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	25	-554.43	4403.90	12.6	Pass
							Summary	
						Leg (T13)	86.8	Pass
						Diagonal (T12)	91.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
						Secondary Horizontal (T16)	74.3	Pass
						Top Girt (T3)	12.6	Pass
						Bolt Checks	91.9	Pass
						Rating =	91.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		77.4	Pass
1	Base Foundation		40.0	Pass
1	Base Foundation Soil Interaction		93.3	Pass

Structure Rating (max from all components) =	93.3%

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

APPENDIX A

TNXTOWER OUTPUT

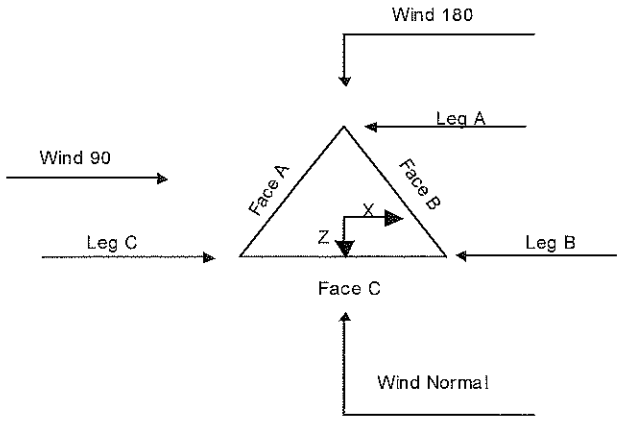
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 151.29 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 8.56 ft at the top and 22.78 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

4) Tower is located in New London County, Connecticut.
5) Basic wind speed of 91 mph.
6) Nominal ice thickness of 0.9375 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Grouted pipe f'_c is 7 ksi.
13) Pressures are calculated at each section.
14) Stress ratio used in tower member design is 1.333.
15) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	151.29-146.23			8.56	1	5.06
T2	146.23-141.17			8.56	1	5.06
T3	141.17-121.04			8.56	1	20.13
T4	121.04-114.31			10.56	1	6.73
T5	114.31-107.65			11.24	1	6.67
T6	107.65-100.92			11.92	1	6.73
T7	100.92-94.20			12.60	1	6.72
T8	94.20-87.49			13.30	1	6.72
T9	87.49-80.77			14.00	1	6.72
T10	80.77-70.69			14.70	1	10.08
T11	70.69-60.60			15.70	1	10.08
T12	60.60-50.51			16.70	1	10.09
T13	50.51-40.42			17.73	1	10.09
T14	40.42-30.31			18.77	1	10.10
T15	30.31-20.21			19.78	1	10.10
T16	20.21-10.10			20.78	1	10.10
T17	10.10-0.00			21.78	1	10.10

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	151.29-146.23	4.94	X Brace	No	No	0.7500	0.7500
T2	146.23-141.17	4.94	X Brace	No	No	0.7500	0.7500
T3	141.17-121.04	6.67	X Brace	No	No	0.7500	0.7500
T4	121.04-114.31	6.67	X Brace	No	No	0.7500	0.0000
T5	114.31-107.65	6.67	X Brace	No	No	0.0000	0.0000
T6	107.65-100.92	6.67	X Brace	No	Yes	0.0000	0.7500

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
T7	100.92-94.20	6.65	X Brace	No	No	0.7500	0.0000
T8	94.20-87.49	6.72	X Brace	No	Yes	0.0000	0.0000
T9	87.49-80.77	6.63	X Brace	No	Yes	0.0000	1.0000
T10	80.77-70.69	10.00	X Brace	No	No	1.0000	0.0000
T11	70.69-60.60	10.08	X Brace	No	Yes	0.0000	0.0000
T12	60.60-50.51	9.91	X Brace	No	Yes	1.0000	1.2500
T13	50.51-40.42	9.91	X Brace	No	Yes	1.0000	1.2500
T14	40.42-30.31	10.00	X Brace	No	No	1.2500	0.0000
T15	30.31-20.21	10.00	X Brace	No	Yes	0.0000	1.2500
T16	20.21-10.10	10.00	X Brace	No	Yes	1.2500	0.0000
T17	10.10-0.00	10.00	X Brace	No	Yes	0.0000	1.2500

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 151.29-146.23	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 3/16	A36 (36 ksi)
T2 146.23-141.17	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T3 141.17-121.04	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 121.04-114.31	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 114.31-107.65	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 107.65-100.92	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Double Angle	2L 2.5 x 2.5 x 3/16 (3/16)	A36 (36 ksi)
T7 100.92-94.20	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T8 94.20-87.49	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T9 87.49-80.77	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T10 80.77-70.69	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T11 70.69-60.60	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T12 60.60-50.51	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T13 50.51-40.42	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T14 40.42-30.31	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T15 30.31-20.21	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T16 20.21-10.10	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 ksi)
T17 10.10-0.00	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 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 151.29-146.23	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 141.17-	Single Angle	L2 1/2x2 1/2x3/16	A36	Single Angle		A36

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
121.04			(36 ksi)			(36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 107.65-100.92	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 94.20-87.49	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 87.49-80.77	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T11 70.69-60.60	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T12 60.60-50.51	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T13 50.51-40.42	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T15 30.31-20.21	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 20.21-10.10	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T17 10.10-0.00	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 151.29-146.23	0.30	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T2 146.23-141.17	0.30	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T3 141.17-121.04	0.80	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T4 121.04-114.31	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T5 114.31-107.65	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T6 107.65-100.92	1.25	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T7 100.92-94.20	0.93	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T8 94.20-87.49	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T9 87.49-80.77	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T10 80.77-70.69	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T11 70.69-60.60	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T12 60.60-50.51	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T13 50.51-40.42	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T14 40.42-30.31	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T15 30.31-20.21	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T16 20.21-10.10	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T17 10.10-0.00	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 151.29-146.23	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T2 146.23-141.17	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T3 141.17-121.04	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T4 121.04-114.31	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T5 114.31-107.65	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T6 107.65-100.92	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T7 100.92-94.20	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T8 94.20-87.49	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T9 87.49-80.77	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T10 80.77-70.69	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T11 70.69-60.60	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T12 60.60-50.51	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T13 50.51-40.42	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T14 40.42-30.31	No	No	1	1		1		1		1		1		1		1	
					1		1		1		1		1		1		1
T15 30.31-20.21	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T16 20.21-10.10	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		1
T17 10.10-0.00	No	No	1	1		1		1		1		1		0.5		1	
					1		1		1		1		1		0.5		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 151.29-146.23	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 146.23-141.17	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 141.17-121.04	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 121.04-114.31	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 114.31-107.65	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 107.65-100.92	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 100.92-94.20	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 94.20-87.49	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 87.49-80.77	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 80.77-70.69	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 70.69-60.60	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 60.60-50.51	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
T13 50.51-40.42	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
T14 40.42-30.31	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
T15 30.31-20.21	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
T16 20.21-10.10	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
T17 10.10-0.00	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 151.29-146.23	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 146.23-141.17	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 141.17-121.04	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 121.04-114.31	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 114.31-107.65	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 107.65-100.92	2.5000	3.0000	2.5000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 100.92-94.20	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000
T8 94.20-87.49	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000

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
T9 87.49-80.77	2.5000	3.8438	2.5000	3.8438	0.0000	0.0000	0.0000	0.0000
T10 80.77-70.69	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T11 70.69-60.60	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T12 60.60-50.51	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T13 50.51-40.42	2.5000	4.3438	2.5000	4.3438	0.0000	0.0000	0.0000	0.0000
T14 40.42-30.31	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T15 30.31-20.21	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T16 20.21-10.10	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000
T17 10.10-0.00	2.5000	4.8750	2.5000	4.8750	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 151.29-146.23	Flange	0.6250 A325N	0	0.5000 A325N	1	0.5000 A325N	1	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T2 146.23-141.17	Flange	0.6250 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T3 141.17-121.04	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	1
T4 121.04-114.31	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T5 114.31-107.65	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T6 107.65-100.92	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	1
T7 100.92-94.20	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T8 94.20-87.49	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T9 87.49-80.77	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T10 80.77-70.69	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T11 70.69-60.60	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T12 60.60-50.51	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T13 50.51-40.42	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T14 40.42-30.31	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T15 30.31-20.21	Flange	1.0625 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T16 20.21-10.10	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T17 10.10-0.00	Flange	1.0000 A354-BC	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1

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 2.5 EH (GR)	50	2.2535	4.2383	16.498	4769	36175	61
ROHN 3 EH (GR)	50	3.0159	6.6052	24.023	4769	37356	63
ROHN 4 EH (GR)	50	4.4074	11.4969	38.949	4769	38952	66
ROHN 5 EH (GR)	50	6.1120	18.1937	58.701	4769	40357	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
**												
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	103.00 - 8.00	0.0000	0.45	2	2	12.0000 1.5000	1.5000	6.0000	1.80
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	103.00 - 8.00	0.0000	0.45	13	7	0.2700	1.9800		0.82
LDF4P-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	50.00 - 8.00	-1.0000	0.49	1	1	0.6300	0.6300		0.15
**												
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	90.00 - 8.00	-1.0000	-0.4	17	10	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	112.00 - 90.00	-1.0000	-0.4	16	9	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 112.00	-1.0000	-0.4	8	8	1.0000	1.0900		0.33
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 8.00	2.0000	-0.45	3	2	0.2700 1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 8.00	2.0000	-0.35	3	2	0.2700 1.0000	1.9800		0.82
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	148.00 - 8.00	0.0000	-0.4	2	2	30.0000 1.5000	1.5000	6.0000	1.80
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	121.00 - 8.00	-1.0000	-0.35	1	1	30.0000 1.5000	1.5000	6.0000	1.80
HB114-1-08U4-M5J(1 1/4")	B	Yes	Ar (CfAe)	121.00 - 8.00	-2.0000	-0.35	3	3	0.7600 1.5400	1.5400		1.08
**												
1.5" flat Cable Ladder Rail	A	Yes	Af (CfAe)	133.00 - 8.00	0.0000	0.4	2	2	12.0000 1.5000	1.5000	6.0000	1.80
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	85.00 - 8.00	0.0000	0.45	2	2	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	128.00 - 85.00	0.0000	0.45	1	1	1.0000	1.0900		0.33
9207 (5/16")	A	Yes	Ar (CfAe)	95.00 - 8.00	0.0000	0.4	3	3	0.3300	0.3300		0.60
9207 (5/16")	A	Yes	Ar (CfAe)	126.00 - 8.00	0.0000	0.4	2	2	0.3300	0.3300		0.60
9207 (5/16")	A	Yes	Ar (CfAe)	151.29 - 8.00	0.0000	0.4	1	1	0.3300	0.3300		0.60
FXL 1873 PE(1 5/8")	A	Yes	Ar (CfAe)	133.00 - 8.00	0.0000	0.4	6	6	0.2700	1.9800		0.01
**												

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
EW52	B	No	CaAa (In Face)	143.00 - 8.00	0.0000	-0.35	1	No Ice	0.00	0.59
								1/2" Ice	0.00	1.95
								1" Ice	0.00	3.93
								2" Ice	0.00	9.71
								4" Ice	0.00	28.60
**										

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Side Arm Mount [SO 304-1]	A	From Leg	1.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.63 1.00 1.37 2.11 3.59	0.94 1.45 1.96 2.98 5.02	23.00 31.92 40.83 58.66 94.32
WB2618	A	From Leg	2.00 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.04 2.24 2.44 2.87 3.82	0.53 0.65 0.78 1.07 1.75	12.10 23.53 37.28 72.51 179.32
ANT150F2	A	From Leg	2.00 0.00 7.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.60 1.91 2.57 4.06	1.29 1.60 1.91 2.57 4.06	13.00 23.28 37.06 75.67 201.46
**									
Sector Mount [SM 510-3]	B	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	40.10 57.33 74.56 109.02 177.94	40.10 57.33 74.56 109.02 177.94	2396.40 3089.00 3781.60 5166.80 7937.20
(2) LPA-80063/6CF w/ Mount Pipe	B	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	52.22 141.85 243.93 476.26 1087.66
(2) DB846H80E-SX w/ Mount Pipe	C	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.33 5.89 6.41 7.48 9.83	7.74 8.93 9.84 11.71 15.89	40.70 95.98 163.04 323.19 782.09
(2) LPA-80063/6CF w/ Mount Pipe	A	From Face	4.00 0.00 1.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	52.22 141.85 243.93 476.26 1087.66
BXA-70063-6CF-2 w/ Mount Pipe	B	From Face	4.00 0.00	0.0000	148.00	No Ice 1/2"	7.97 8.61	5.80 6.95	42.25 100.22

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 lb
			1.00			Ice	9.22	7.82	169.88
						1" Ice	10.46	9.60	335.13
						2" Ice	13.07	13.37	803.42
						4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	C	From Face	4.00	0.0000	148.00	No Ice	7.97	5.80	42.25
			0.00			1/2"	8.61	6.95	100.22
			1.00			Ice	9.22	7.82	169.88
						1" Ice	10.46	9.60	335.13
						2" Ice	13.07	13.37	803.42
						4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	A	From Face	4.00	0.0000	148.00	No Ice	7.97	5.80	42.25
			0.00			1/2"	8.61	6.95	100.22
			1.00			Ice	9.22	7.82	169.88
						1" Ice	10.46	9.60	335.13
						2" Ice	13.07	13.37	803.42
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.00	0.0000	148.00	No Ice	0.37	0.08	3.10
			0.00			1/2"	0.45	0.14	5.40
			1.00			Ice	0.54	0.20	8.79
						1" Ice	0.75	0.34	19.61
						2" Ice	1.28	0.74	62.87
						4" Ice			
(4) FD9R6004/2C-3L	C	From Face	4.00	0.0000	148.00	No Ice	0.37	0.08	3.10
			0.00			1/2"	0.45	0.14	5.40
			1.00			Ice	0.54	0.20	8.79
						1" Ice	0.75	0.34	19.61
						2" Ice	1.28	0.74	62.87
						4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Face	4.00	0.0000	148.00	No Ice	3.18	3.35	28.93
			0.00			1/2"	3.56	3.97	59.07
			1.00			Ice	3.97	4.60	97.61
						1" Ice	4.86	5.90	193.45
						2" Ice	6.77	8.89	487.78
						4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Face	4.00	0.0000	148.00	No Ice	3.18	3.35	28.93
			0.00			1/2"	3.56	3.97	59.07
			1.00			Ice	3.97	4.60	97.61
						1" Ice	4.86	5.90	193.45
						2" Ice	6.77	8.89	487.78
						4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	C	From Face	4.00	0.0000	148.00	No Ice	3.18	3.35	28.93
			0.00			1/2"	3.56	3.97	59.07
			1.00			Ice	3.97	4.60	97.61
						1" Ice	4.86	5.90	193.45
						2" Ice	6.77	8.89	487.78
						4" Ice			
**									
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.0000	143.00	No Ice	3.00	0.90	65.00
			0.00			1/2"	3.74	1.12	79.14
			0.00			Ice	4.48	1.34	93.27
						1" Ice	5.96	1.78	121.55
						2" Ice	8.92	2.66	178.10
						4" Ice			
**									
Sector Mount [SM 104-3]	A	None		0.0000	133.00	No Ice	30.02	30.02	952.50
						1/2"	40.48	40.48	1404.60
						Ice	50.94	50.94	1856.70
						1" Ice	71.86	71.86	2760.90
						2" Ice	113.70	113.70	4569.30
						4" Ice			
800 10504 w/ Mount Pipe	A	From Leg	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
			3.50			1/2"	4.01	3.91	68.19
			0.00			Ice	4.42	4.58	107.66
						1" Ice	5.34	5.98	206.58
						2" Ice	7.38	8.98	513.48

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
							4" Ice			
800 10504 w/ Mount Pipe	B	From Leg	3.50	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
							1/2" Ice	4.01	3.91	68.19
			0.00				1" Ice	4.42	4.58	107.66
							2" Ice	5.34	5.98	206.58
							4" Ice	7.38	8.98	513.48
800 10504 w/ Mount Pipe	C	From Leg	3.50	3.50	44.0000	133.00	No Ice	3.59	3.18	37.75
							1/2" Ice	4.01	3.91	68.19
			0.00				1" Ice	4.42	4.58	107.66
							2" Ice	5.34	5.98	206.58
							4" Ice	7.38	8.98	513.48
**										
Side Arm Mount [SO 305-1]	C	From Leg	1.50	0.00	0.0000	128.00	No Ice	0.94	1.41	30.00
							1/2" Ice	1.48	2.17	43.27
			0.00				1" Ice	2.02	2.93	56.54
							2" Ice	3.10	4.45	83.07
							4" Ice	5.26	7.49	136.14
TA-2450	C	From Leg	3.00	0.00	0.0000	128.00	No Ice	0.84	0.84	15.00
							1/2" Ice	1.08	1.08	21.99
			2.00				1" Ice	1.34	1.34	31.80
							2" Ice	1.87	1.87	60.52
							4" Ice	3.19	3.19	158.57
Side Arm Mount [SO 305-1]	A	From Leg	1.50	0.00	0.0000	126.00	No Ice	0.94	1.41	30.00
							1/2" Ice	1.48	2.17	43.27
			0.00				1" Ice	2.02	2.93	56.54
							2" Ice	3.10	4.45	83.07
							4" Ice	5.26	7.49	136.14
WB2618	A	From Leg	3.00	0.00	0.0000	126.00	No Ice	2.04	0.53	12.10
							1/2" Ice	2.24	0.65	23.53
			0.00				1" Ice	2.44	0.78	37.28
							2" Ice	2.87	1.07	72.51
							4" Ice	3.82	1.75	179.32
**										
Sector Mount [SM 505-3]	A	None			0.0000	121.00	No Ice	34.86	34.86	1725.30
							1/2" Ice	49.79	49.79	2316.90
							1" Ice	64.72	64.72	2908.50
							2" Ice	94.58	94.58	4091.70
							4" Ice	154.30	154.30	6458.10
1900MHz RRH (65MHz)	A	From Leg	1.00	0.00	0.0000	121.00	No Ice	2.70	2.77	60.00
							1/2" Ice	2.94	3.01	83.90
			0.00				1" Ice	3.18	3.26	111.08
							2" Ice	3.70	3.78	176.02
							4" Ice	4.85	4.93	353.75
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00	0.00	0.0000	121.00	No Ice	2.40	2.25	64.00
							1/2" Ice	2.61	2.46	86.12
			0.00				1" Ice	2.83	2.68	111.30
							2" Ice	3.30	3.13	171.62
							4" Ice	4.34	4.15	337.52
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	121.00	No Ice	8.50	6.95	82.55
							1/2" Ice	9.15	8.13	147.74
			1.00				1" Ice	9.77	9.02	224.90
							2" Ice	11.03	10.84	405.88
							4" Ice	13.68	14.85	908.85
1900MHz RRH (65MHz)	B	From Leg	1.00	0.00	0.0000	121.00	No Ice	2.70	2.77	60.00
							1/2" Ice	2.94	3.01	83.90

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 lb
			0.00			Ice	3.18	3.26	111.08
						1" Ice	3.70	3.78	176.02
						2" Ice	4.85	4.93	353.75
						4" Ice			
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00	0.0000	121.00	No Ice	2.40	2.25	64.00
			0.00			1/2"	2.61	2.46	86.12
			0.00			Ice	2.83	2.68	111.30
						1" Ice	3.30	3.13	171.62
						2" Ice	4.34	4.15	337.52
						4" Ice			
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	121.00	No Ice	8.50	7.47	87.55
			0.00			1/2"	9.15	8.66	155.21
			1.00			Ice	9.77	9.56	234.90
						1" Ice	11.03	11.39	421.12
						2" Ice	13.68	15.53	935.27
						4" Ice			
1900MHz RRH (65MHz)	C	From Leg	1.00	0.0000	121.00	No Ice	2.70	2.77	60.00
			0.00			1/2"	2.94	3.01	83.90
			0.00			Ice	3.18	3.26	111.08
						1" Ice	3.70	3.78	176.02
						2" Ice	4.85	4.93	353.75
						4" Ice			
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00	0.0000	121.00	No Ice	2.40	2.25	64.00
			0.00			1/2"	2.61	2.46	86.12
			0.00			Ice	2.83	2.68	111.30
						1" Ice	3.30	3.13	171.62
						2" Ice	4.34	4.15	337.52
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	121.00	No Ice	8.50	6.95	82.55
			0.00			1/2"	9.15	8.13	147.74
			1.00			Ice	9.77	9.02	224.90
						1" Ice	11.03	10.84	405.88
						2" Ice	13.68	14.85	908.85
						4" Ice			
**									
Sector Mount [SM 510-3]	B	None		0.0000	112.00	No Ice	40.10	40.10	2396.40
						1/2"	57.33	57.33	3089.00
						Ice	74.56	74.56	3781.60
						1" Ice	109.02	109.02	5166.80
						2" Ice	177.94	177.94	7937.20
						4" Ice			
(3) DB844H90E-XY w/Mount Pipe	A	From Face	4.00	-16.0000	112.00	No Ice	3.58	5.40	35.55
			0.00			1/2"	4.20	6.49	76.59
			0.00			Ice	4.73	7.30	127.74
						1" Ice	5.86	8.96	251.11
						2" Ice	8.27	12.49	616.43
						4" Ice			
(3) DB844H90E-XY w/Mount Pipe	B	From Face	4.00	-16.0000	112.00	No Ice	3.58	5.40	35.55
			0.00			1/2"	4.20	6.49	76.59
			0.00			Ice	4.73	7.30	127.74
						1" Ice	5.86	8.96	251.11
						2" Ice	8.27	12.49	616.43
						4" Ice			
(3) DB844H90E-XY w/Mount Pipe	C	From Face	4.00	-16.0000	112.00	No Ice	3.58	5.40	35.55
			0.00			1/2"	4.20	6.49	76.59
			0.00			Ice	4.73	7.30	127.74
						1" Ice	5.86	8.96	251.11
						2" Ice	8.27	12.49	616.43
						4" Ice			
**									
Sector Mount [SM 701-3]	A	None		0.0000	103.00	No Ice	19.73	19.73	825.00
						1/2"	27.41	27.41	1165.99
						Ice	35.09	35.09	1506.98
						1" Ice	50.45	50.45	2188.96
						2" Ice	81.17	81.17	3552.92

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 lb
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
KRY 112 144/1	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
KRY 112 144/1	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.18 166.73 231.26 382.99 806.74
KRY 112 144/1	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	11.00 14.18 18.58 31.87 81.78
**									
3'x2" Pipe Mount	A	From Leg	1.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.52 0.71 0.90 1.33 2.44	0.52 0.71 0.90 1.33 2.44	27.00 31.81 38.81 59.99 135.33
WB2618	A	From Leg	3.00 0.00 -1.00	0.0000	95.00	No Ice 1/2" Ice	2.04 2.24 2.44	0.53 0.65 0.78	12.10 23.53 37.28

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	2.87	1.07	72.51
						2" Ice	3.82	1.75	179.32
						4" Ice			
10'x2" Pipe Mount	A	From Leg	3.00	0.0000	95.00 - 85.00	No Ice	2.00	2.00	70.00
			0.00			1/2" Ice	3.02	3.02	85.50
			0.00			1" Ice	4.07	4.07	107.47
						2" Ice	5.70	5.70	171.40
						4" Ice	8.26	8.26	383.58
Side Arm Mount [SO 305-1]	A	From Leg	1.50	0.0000	85.00	No Ice	0.94	1.41	30.00
			0.00			1/2" Ice	1.48	2.17	43.27
			0.00			1" Ice	2.02	2.93	56.54
						2" Ice	3.10	4.45	83.07
						4" Ice	5.26	7.49	136.14
ANT150D3	A	From Leg	3.00	0.0000	85.00	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			5.00			1" Ice	4.16	4.16	28.80
						2" Ice	6.72	6.72	39.60
						4" Ice	11.84	11.84	61.20
**									
Side Arm Mount [SO 302-1]	B	From Leg	2.00	0.0000	90.00	No Ice	1.67	3.27	55.00
			0.00			1/2" Ice	2.51	4.99	88.07
			0.00			1" Ice	3.35	6.71	121.14
						2" Ice	5.03	10.15	187.28
						4" Ice	8.39	17.03	319.57
SRL-217 Ground Plane 10.67' x 4.83'	B	From Leg	4.00	0.0000	90.00	No Ice	2.21	2.21	6.50
			0.00			1/2" Ice	3.30	3.30	23.49
			6.00			1" Ice	4.41	4.41	47.35
						2" Ice	6.27	6.27	116.33
						4" Ice	8.98	8.98	343.56
BW246Y	A	From Leg	1.50	0.0000	61.00	No Ice	1.35	0.39	7.00
			0.00			1/2" Ice	2.73	0.88	24.00
			0.00			1" Ice	4.11	1.36	41.00
						2" Ice	6.88	2.32	75.00
						4" Ice	12.41	4.25	143.00
**									
Side Arm Mount [SO 305-1]	B	From Leg	1.50	0.0000	50.00	No Ice	0.94	1.41	30.00
			0.00			1/2" Ice	1.48	2.17	43.27
			0.00			1" Ice	2.02	2.93	56.54
						2" Ice	3.10	4.45	83.07
						4" Ice	5.26	7.49	136.14
KS24019-L112A	B	From Leg	3.00	0.0000	50.00	No Ice	0.16	0.16	5.00
			0.00			1/2" Ice	0.22	0.22	6.59
			2.00			1" Ice	0.30	0.30	9.15
						2" Ice	0.48	0.48	17.96
						4" Ice	0.95	0.95	55.81
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft^2	Weight lb

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
PL6-59W	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	-90.0000		143.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.27 29.05 29.83 31.39 34.51	143.00 292.13 441.25 739.50 1336.01

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	10	234109.33	25569.53	-16280.38
	Max. H_x	10	234109.33	25569.53	-16280.38
	Max. H_z	4	-199459.62	-22086.23	14167.08
	Min. Vert	4	-199459.62	-22086.23	14167.08
	Min. H_x	4	-199459.62	-22086.23	14167.08
	Min. H_z	10	234109.33	25569.53	-16280.38
Leg B	Max. Vert	6	237078.65	-25345.04	-17005.65

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Max. H_x	12	-195844.85	21573.95	14560.14
	Max. H_z	12	-195844.85	21573.95	14560.14
	Min. Vert	12	-195844.85	21573.95	14560.14
	Min. H_x	6	237078.65	-25345.04	-17005.65
	Min. H_z	6	237078.65	-25345.04	-17005.65
Leg A	Max. Vert	2	235396.10	646.35	30248.11
	Max. H_x	11	15186.68	5656.75	1209.72
	Max. H_z	2	235396.10	646.35	30248.11
	Min. Vert	8	-193914.35	-625.87	-25898.01
	Min. H_x	5	15560.34	-5661.33	1251.86
	Min. H_z	8	-193914.35	-625.87	-25898.01

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	151.292 - 146.229	3.418	27	0.1885	0.0401
T2	146.229 - 141.167	3.223	27	0.1882	0.0400
T3	141.167 - 121.042	3.023	27	0.1868	0.0385
T4	121.042 - 114.313	2.251	27	0.1716	0.0301
T5	114.313 - 107.646	2.008	27	0.1639	0.0271
T6	107.646 - 100.917	1.779	27	0.1545	0.0241
T7	100.917 - 94.2014	1.567	27	0.1431	0.0223
T8	94.2014 - 87.4861	1.361	27	0.1336	0.0194
T9	87.4861 - 80.7708	1.171	27	0.1230	0.0164
T10	80.7708 - 70.6875	1.001	27	0.1110	0.0147
T11	70.6875 - 60.6041	0.767	27	0.0980	0.0124
T12	60.6041 - 50.5104	0.565	27	0.0837	0.0101
T13	50.5104 - 40.4166	0.393	27	0.0682	0.0082
T14	40.4166 - 30.3125	0.258	27	0.0518	0.0063
T15	30.3125 - 20.2083	0.152	27	0.0395	0.0046
T16	20.2083 - 10.1041	0.074	27	0.0269	0.0029
T17	10.1041 - 0	0.020	31	0.0135	0.0015

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Side Arm Mount [SO 304-1]	27	3.369	0.1885	0.0401	51144
148.00	Sector Mount [SM 510-3]	27	3.292	0.1884	0.0401	51144
143.00	PL6-59W	27	3.096	0.1874	0.0391	137128
133.00	Sector Mount [SM 104-3]	27	2.703	0.1822	0.0353	83906
128.00	Side Arm Mount [SO 305-1]	27	2.511	0.1783	0.0331	72167

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
126.00	Side Arm Mount [SO 305-1]	27	2.435	0.1765	0.0323	68343
121.00	Sector Mount [SM 505-3]	27	2.250	0.1716	0.0301	63661
112.00	Sector Mount [SM 510-3]	27	1.927	0.1609	0.0260	36183
103.00	Sector Mount [SM 701-3]	27	1.631	0.1465	0.0229	67980
95.00	3'x2" Pipe Mount	27	1.385	0.1347	0.0198	37350
90.00	10'x2" Pipe Mount	27	1.239	0.1273	0.0174	25299
85.00	10'x2" Pipe Mount	27	1.106	0.1185	0.0157	31007
61.00	BW246Y	27	0.572	0.0843	0.0102	42893
50.00	Side Arm Mount [SO 305-1]	27	0.385	0.0673	0.0081	30843

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	151.292 - 146.229	11.295	6	0.6194	0.1332
T2	146.229 - 141.167	10.654	6	0.6188	0.1328
T3	141.167 - 121.042	9.994	6	0.6145	0.1279
T4	121.042 - 114.313	7.445	6	0.5663	0.1001
T5	114.313 - 107.646	6.643	6	0.5410	0.0902
T6	107.646 - 100.917	5.883	6	0.5099	0.0800
T7	100.917 - 94.2014	5.183	6	0.4722	0.0742
T8	94.2014 - 87.4861	4.502	6	0.4411	0.0645
T9	87.4861 - 80.7708	3.873	6	0.4061	0.0545
T10	80.7708 - 70.6875	3.310	6	0.3666	0.0490
T11	70.6875 - 60.6041	2.537	6	0.3236	0.0414
T12	60.6041 - 50.5104	1.869	6	0.2765	0.0336
T13	50.5104 - 40.4166	1.302	6	0.2251	0.0273
T14	40.4166 - 30.3125	0.856	6	0.1709	0.0208
T15	30.3125 - 20.2083	0.505	6	0.1305	0.0153
T16	20.2083 - 10.1041	0.246	6	0.0887	0.0098
T17	10.1041 - 0	0.067	6	0.0447	0.0049

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Side Arm Mount [SO 304-1]	6	11.132	0.6194	0.1334	15554
148.00	Sector Mount [SM 510-3]	6	10.880	0.6193	0.1333	15554
143.00	PL6-59W	6	10.234	0.6165	0.1301	42233
133.00	Sector Mount [SM 104-3]	6	8.936	0.6004	0.1172	25856
128.00	Side Arm Mount [SO 305-1]	6	8.303	0.5879	0.1101	22330
126.00	Side Arm Mount [SO 305-1]	6	8.053	0.5822	0.1072	21057
121.00	Sector Mount [SM 505-3]	6	7.440	0.5661	0.1001	19401

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
112.00	Sector Mount [SM 510-3]	6	6.373	0.5311	0.0863	10927
103.00	Sector Mount [SM 701-3]	6	5.396	0.4835	0.0760	21018
95.00	3'x2" Pipe Mount	6	4.581	0.4448	0.0658	11234
90.00	10'x2" Pipe Mount	6	4.100	0.4202	0.0578	7631
85.00	10'x2" Pipe Mount	6	3.658	0.3912	0.0521	9357
61.00	BW246Y	6	1.893	0.2785	0.0339	12799
50.00	Side Arm Mount [SO 305-1]	6	1.276	0.2223	0.0270	9444

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	151.292	Diagonal	A325N	0.5000	1	888.65	3126.56	0.284 ✓	1.333	Member Block Shear
		Top Girt	A325N	0.5000	1	139.71	4123.34	0.034 ✓	1.333	Bolt Shear
T2	146.229	Leg	A325N	0.6250	4	1285.43	13337.20	0.096 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	3002.49	4757.81	0.631 ✓	1.333	Gusset Bearing
T3	141.167	Leg	A325N	0.6250	4	6220.36	13260.00	0.469 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4548.35	4123.34	1.103 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	647.05	4078.13	0.159 ✓	1.333	Member Bearing
T4	121.042	Diagonal	A325N	0.5000	2	2851.31	4123.34	0.692 ✓	1.333	Bolt Shear
T5	114.313	Diagonal	A325N	0.5000	2	3155.01	4123.34	0.765 ✓	1.333	Bolt Shear
T6	107.646	Leg	A325N	0.7500	4	12851.50	18863.70	0.681 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	7495.23	8246.68	0.909 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1087.20	4553.91	0.239 ✓	1.333	Member Block Shear
T7	100.917	Diagonal	A325N	0.5000	2	3995.91	4123.34	0.969 ✓	1.333	Bolt Shear
T8	94.2014	Diagonal	A325N	0.5000	2	4083.56	4123.34	0.990 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1386.83	4553.91	0.305 ✓	1.333	Member Block Shear
T9	87.4861	Leg	A325N	0.8750	4	20893.60	25926.20	0.806 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	8751.42	8246.68	1.061 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1708.30	4553.91	0.375 ✓	1.333	Member Block Shear
T10	80.7708	Diagonal	A325N	0.6250	1	9901.93	8609.38	1.150 ✓	1.333	Gusset Bearing
T11	70.6875	Leg	A325N	0.8750	4	26554.80	26457.90	1.004 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10061.90	8609.38	1.169 ✓	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	2154.45	5097.66	0.423 ✓	1.333	Member Bearing
T12	60.6041	Diagonal	A325N	0.6250	1	10546.10	8609.38	1.225 ✓	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.5000	1	2628.86	4123.34	0.638 ✓	1.333	Bolt Shear
T13	50.5104	Leg	A325N	1.0000	4	36094.50	33967.60	1.063 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	11316.00	12885.40	0.878 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.5000	1	2929.92	4123.34	0.711 ✓	1.333	Bolt Shear
T14	40.4166	Diagonal	A325N	0.6250	1	11519.00	12885.40	0.894 ✓	1.333	Bolt Shear
T15	30.3125	Leg	A325N	1.0625	4	43247.90	38381.90	1.127 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	12432.10	12885.40	0.965 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3532.47	5097.66	0.693 ✓	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T16	20.2083	Diagonal	A325N	0.6250	1	12321.50	12885.40	0.956 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3670.59	5097.66	0.720 ✔	1.333	Member Bearing
T17	10.1041	Leg	A354-BC	1.0000	6	33442.10	32397.70	1.032 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	13617.00	12885.40	1.057 ✔	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	4134.38	6442.72	0.642 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	151.292 - 146.229	ROHN 2.5 STD	5.06	4.94	62.5 K=1.00	22.279	1.7040	-2775.70	37965.40	0.073* ✔
T2	146.229 - 141.167	ROHN 2.5 STD	5.06	4.94	62.5 K=1.00	22.279	1.7040	-7649.90	37965.40	0.201 ✔
T3	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7 K=1.00	17.636	2.2535	-29394.00	39742.70	0.740 ✔
T4	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7 K=1.00	20.596	2.2535	-34279.10	46414.10	0.739 ✔
T5	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7 K=1.00	20.595	2.2535	-45114.40	46412.40	0.972 ✔
T6	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6 K=1.00	30.457	2.2535	-62689.60	68636.90	0.913 ✔
T7	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4 K=1.00	25.475	3.0159	-68179.10	76830.10	0.887 ✔
T8	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4 K=1.00	32.873	3.0159	-79960.70	99141.40	0.807 ✔
T9	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9 K=1.00	32.964	3.0159	-98496.20	99418.20	0.991 ✔
T10	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4 K=1.00	23.284	4.4074	-106920.00	102621.00	1.042 ✔
T11	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3 K=1.00	32.956	4.4074	-124235.00	145250.00	0.855 ✔
T12	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5 K=1.00	33.117	4.4074	-151578.00	145962.00	1.038 ✔
T13	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4 K=1.00	33.131	4.4074	-168937.00	146022.00	1.157 ✔
T14	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4 K=1.00	28.466	6.1120	-177058.00	173984.00	1.018 ✔
T15	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5 K=1.00	35.792	6.1120	-203695.00	218759.00	0.931 ✔
T16	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.800	6.1120	-211663.00	218809.00	0.967 ✔
T17	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.807	6.1120	-238407.00	218848.00	1.089 ✔

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L 1.5 x 1.5 x 3/16	9.24	4.62	189.1 K=1.00	4.178	0.5273	-853.88	2203.16	0.388 ✓
T2	146.229 - 141.167	L 2 x 2 x 3/16	9.24	4.62	140.8 K=1.00	7.537	0.7150	-3127.34	5388.61	0.580 ✓
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	144.7 K=1.00	7.134	0.9020	-4548.35	6434.70	0.707 ✓
T4	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	151.7 K=1.00	6.489	0.9020	-5702.63	5853.04	0.974 ✓
T5	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	158.8 K=1.00	5.923	0.9020	-6310.03	5342.79	1.181 ✓
T6	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	111.3 K=1.00	11.501	1.8047	-7495.23	20756.50	0.361 ✓
T7	100.917 - 94.2014	2L 'a' > 39.1618 in - 69 L3x3x3/16	13.81	7.09	142.7 K=1.00	7.334	1.0900	-7939.43	7994.03	0.993 ✓
T8	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	149.3 K=1.00	6.704	1.0900	-8167.12	7306.96	1.118 ✓
T9	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	104.1 K=1.00	12.257	2.1797	-8751.42	26717.20	0.328 ✓
T10	80.7708 - 70.6875	2L 'a' > 44.0220 in - 102 2L3x3x3/16x1/4	17.36	8.97	121.1 K=1.00	10.071	2.1797	-9914.83	21950.70	0.452 ✓
T11	70.6875 - 60.6041	2L 'a' > 51.2231 in - 114 2L3x3x3/16x1/4	18.25	9.41	127.0 K=1.00	9.252	2.1797	-10499.80	20167.10	0.521 ✓
T12	60.6041 - 50.5104	2L 'a' > 53.7356 in - 123 2L3x3x1/4x1/4	19.03	9.80	132.3 K=1.00	8.527	2.8750	-10713.60	24513.80	0.437 ✓
T13	50.5104 - 40.4166	2L 'a' > 56.1325 in - 135 2L3x3x1/4x1/4	19.93	10.24	138.4 K=1.00	7.795	2.8750	-11316.00	22411.50	0.505 ✓
T14	40.4166 - 30.3125	2L 'a' > 58.7062 in - 147 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	124.1 K=1.00	9.698	3.3750	-11519.00	32730.50	0.352 ✓
T15	30.3125 - 20.2083	2L 'a' > 61.0427 in - 159 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	129.2 K=1.00	8.942	3.3750	-12432.10	30180.90	0.412 ✓
T16	20.2083 - 10.1041	2L 'a' > 63.5688 in - 168 2L 4 x 4 x 1/4 (1/4)	22.61	11.57	118.0 K=1.00	10.719	3.8750	-12321.50	41534.90	0.297 ✓
T17	10.1041 - 0	2L 'a' > 66.0834 in - 180 2L 4 x 4 x 1/4 (1/4)	23.51	12.01	122.6 K=1.00	9.934	3.8750	-13617.00	38493.00	0.354 ✓
		2L 'a' > 68.6449 in - 192								

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	182.9 K=0.50	4.463	0.7150	-1087.20	3191.02	0.341 ✓
T8	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	203.3 K=0.50	3.613	0.7150	-1386.83	2583.20	0.537 ✓
T9	87.4861 -	L 2 x 2 x 3/16	14.34	14.04	213.9	3.265	0.7150	-1708.30	2334.13	0.732

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
	80.7708				K=0.50					✓
T11	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	191.6 K=0.50	4.068	0.9020	-2154.45	3668.94	0.587 ✓
T12	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	170.5 K=0.50	5.135	1.4400	-2628.86	7395.08	0.355 ✓
T13	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	181.0 K=0.50	4.556	1.4400	-2929.92	6561.12	0.447 ✓
T15	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	199.2 K=0.50	3.763	1.0898	-3532.47	4101.40	0.861 ✓
T16	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	209.5 K=0.50	3.402	1.0900	-3670.59	3708.23	0.990 ✓
T17	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	188.5 K=0.50	4.203	1.6900	-4134.38	7103.60	0.582 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L2 1/2x2 1/2x3/16 KL/R > 200 (C) - 6	8.56	8.32	201.8 K=1.00	3.668	0.9020	-139.71	3308.68	0.042 ✓
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16 KL/R > 200 (C) - 25	8.57	8.33	201.9 K=1.00	3.663	0.9020	-554.43	3303.75	0.168 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	ROHN 2.5 STD	5.06	4.94	62.5	30.000	1.7040	541.45	51121.50	0.011 ✓
T2	146.229 - 141.167	ROHN 2.5 STD	5.06	4.94	62.5	30.000	1.7040	5141.70	51121.50	0.101 ✓
T3	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7	30.000	2.2535	24881.40	67606.20	0.368 ✓
T4	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7	30.000	2.2535	27920.40	67606.20	0.413 ✓
T5	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7	30.000	2.2535	37138.20	67606.20	0.549 ✓
T6	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6	30.000	2.2535	51405.80	67606.20	0.760 ✓
T7	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4	30.000	3.0159	56272.80	90477.90	0.622 ✓
T8	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4	30.000	3.0159	67050.80	90477.90	0.741 ✓
T9	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9	30.000	3.0159	83574.20	90477.90	0.924 ✓
T10	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4	30.000	4.4074	90886.80	132223.00	0.687 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3	30.000	4.4074	106355.00	132223.00	0.804 ✔
T12	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5	30.000	4.4074	129758.00	132223.00	0.981 ✔
T13	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4	30.000	4.4074	144378.00	132223.00	1.092 ✔
T14	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4	30.000	6.1120	151077.00	183359.00	0.824 ✔
T15	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5	30.000	6.1120	172992.00	183359.00	0.943 ✔
T16	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	179318.00	183359.00	0.978 ✔
T17	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	200652.00	183359.00	1.094 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L 1.5 x 1.5 x 3/16	9.24	4.62	121.4	29.000	0.3076	888.65	8920.90	0.100 ✔
T2	146.229 - 141.167	L 2 x 2 x 3/16	9.24	4.62	89.9	29.000	0.4484	3002.49	13002.40	0.231 ✔
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	92.1	29.000	0.5886	4342.31	17069.70	0.254 ✔
T4	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	96.5	29.000	0.5886	5394.29	17069.70	0.316 ✔
T5	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	101.0	29.000	0.5886	6224.54	17069.70	0.365 ✔
T6	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	105.5	29.000	1.1777	7139.15	34154.30	0.209 ✔
T7	100.917 - 94.2014	2L 'a' > 39.1618 in - 70 L3x3x3/16	13.81	7.09	90.6	29.000	0.7296	7991.82	21158.70	0.378 ✔
T8	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	94.7	29.000	0.7296	7985.00	21158.70	0.377 ✔
T9	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	98.4	29.000	1.4590	8643.51	42310.50	0.204 ✔
T10	80.7708 - 70.6875	2L 'a' > 44.0220 in - 103 2L3x3x3/16x1/4	17.36	8.97	114.5	29.000	1.4238	9901.93	41291.00	0.240 ✔
T11	70.6875 - 60.6041	2L 'a' > 51.2231 in - 115 2L3x3x3/16x1/4	18.25	9.41	120.2	29.000	1.4238	10061.90	41291.00	0.244 ✔
T12	60.6041 - 50.5104	2L 'a' > 53.7356 in - 124 2L3x3x1/4x1/4	19.03	9.80	126.3	32.500	1.8750	10546.10	60937.50	0.173 ✔
T13	50.5104 - 40.4166	2L 'a' > 56.1325 in - 136 2L3x3x1/4x1/4	19.93	10.24	132.1	32.500	1.8750	10966.80	60937.50	0.180 ✔
T14	40.4166 - 30.3125	2L 'a' > 58.7062 in - 148 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	117.3	32.500	2.2500	11417.50	73125.00	0.156 ✔
T15	30.3125 - 20.2083	2L 'a' > 61.0427 in - 160 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	122.2	32.500	2.2500	11715.50	73125.00	0.160 ✔
		2L 'a' > 63.5688 in - 169								

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T16	20.2083 - 10.1041	2L 4 x 4 x 1/4 (1/4)	22.61	11.57	110.8	32.500	2.6250	12270.80	85312.50	0.144 ✔
T17	10.1041 - 0	2L 'a' > 66.0834 in - 181 2L 4 x 4 x 1/4 (1/4) 2L 'a' > 68.6449 in - 193	23.51	12.01	115.1	32.500	2.6250	12491.40	85312.50	0.146 ✔

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T6	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	233.6	29.000	0.4308	1087.20	12492.70	0.087 ✔
T8	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	259.7	29.000	0.4308	1386.83	12492.70	0.111 ✔
T9	87.4861 - 80.7708	L 2 x 2 x 3/16	14.34	14.04	273.2	29.000	0.4308	1708.30	12492.70	0.137 ✔
T11	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	243.8	29.000	0.5710	2154.45	16559.90	0.130 ✔
T12	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	217.1	29.000	0.9628	2628.86	27921.60	0.094 ✔
T13	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	230.5	29.000	0.9628	2929.92	27921.60	0.105 ✔
T15	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	252.9	29.000	0.7119	3532.47	20645.50	0.171 ✔
T16	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	266.0	29.000	0.7120	3670.59	20648.90	0.178 ✔
T17	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	239.9	29.000	1.1269	4134.38	32679.40	0.127 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 146.229	L2 1/2x2 1/2x3/16	8.56	8.32	128.4	29.000	0.5886	101.53	17069.70	0.006 ✔
T3	141.167 - 121.042	L2 1/2x2 1/2x3/16	8.57	8.33	128.5	29.000	0.5886	647.05	17069.70	0.038 ✔

Section Capacity Table

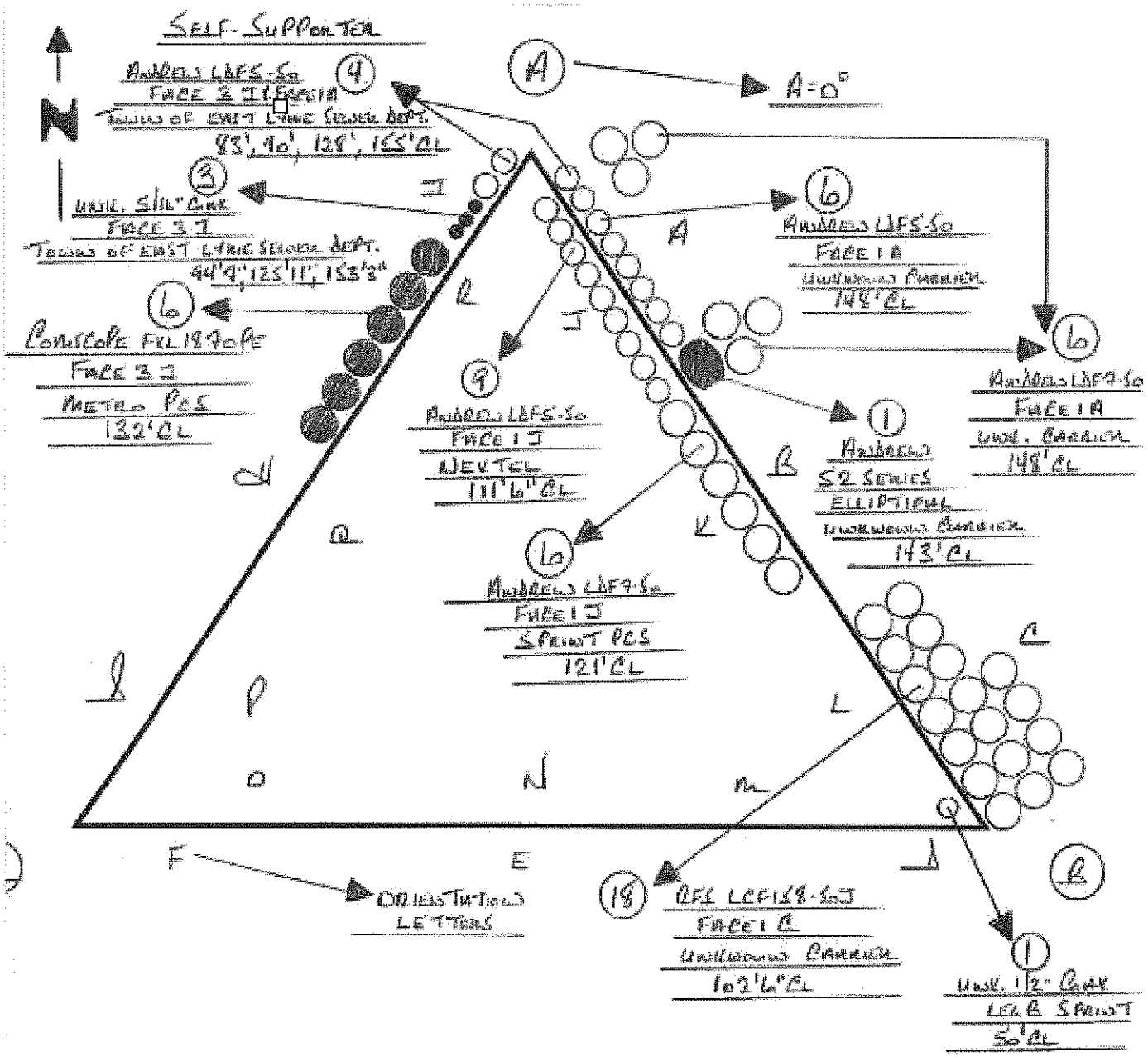
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	151.292 - 146.229	Leg	ROHN 2.5 STD	1	-2289.09	37965.40	14.8	Pass
T2	146.229 - 141.167	Leg	ROHN 2.5 STD	14	-7391.75	50607.87	18.5	Pass
T3	141.167 - 121.042	Leg	ROHN 2.5 EH	23	-29394.00	52977.02	55.5	Pass
T4	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	47	-34279.10	61869.99	55.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
T5	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	56	-45114.40	61867.72	72.9	Pass
T6	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	65	-62689.60	91492.98	68.5	Pass
T7	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	77	-68179.10	102414.52	66.6	Pass
T8	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	86	-79960.70	132155.48	60.5	Pass
T9	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	98	-98496.20	132524.46	74.3	Pass
T10	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	110	-106920.00	136793.79	78.2	Pass
T11	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	119	-124235.00	193618.24	64.2 75.3 (b)	Pass
T12	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	131	-151578.00	194567.34	77.9	Pass
T13	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	143	-168937.00	194647.32	86.8	Pass
T14	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	155	-177058.00	231920.66	76.3	Pass
T15	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	163	172992.00	244417.54	70.8 84.5 (b)	Pass
T16	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	175	179318.00	244417.54	73.4	Pass
T17	10.1041 - 0	Leg	ROHN 5 EH (GR)	187	200652.00	244417.54	82.1	Pass
T1	151.292 - 146.229	Diagonal	L 1.5 x 1.5 x 3/16	12	-853.88	2936.81	29.1	Pass
T2	146.229 - 141.167	Diagonal	L 2 x 2 x 3/16	18	-3127.34	7183.02	43.5 47.3 (b)	Pass
T3	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	30	-4548.35	8577.46	53.0 82.8 (b)	Pass
T4	121.042 - 114.313	Diagonal	L2 1/2x2 1/2x3/16	51	-5702.63	7802.10	73.1	Pass
T5	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	60	-6310.03	7121.94	88.6	Pass
T6	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	69	-7495.23	27668.41	27.1 68.2 (b)	Pass
T7	100.917 - 94.2014	Diagonal	L3x3x3/16	81	-7939.43	10656.04	74.5	Pass
T8	94.2014 - 87.4861	Diagonal	L3x3x3/16	90	-8167.12	9740.18	83.8	Pass
T9	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	102	-8751.42	35614.03	24.6 79.6 (b)	Pass
T10	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	114	-9914.83	29260.28	33.9 86.3 (b)	Pass
T11	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	123	-10499.80	26882.74	39.1 87.7 (b)	Pass
T12	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	135	-10713.60	32676.90	32.8 91.9 (b)	Pass
T13	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	147	-11316.00	29874.53	37.9 65.9 (b)	Pass
T14	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	159	-11519.00	43629.75	26.4 67.1 (b)	Pass
T15	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	168	-12432.10	40231.14	30.9 72.4 (b)	Pass
T16	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	180	-12321.50	55366.02	22.3 71.7 (b)	Pass
T17	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	192	-13617.00	51311.17	26.5 79.3 (b)	Pass
T6	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	73	-1087.20	4253.63	25.6	Pass
T8	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	94	-1386.83	3443.41	40.3	Pass
T9	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	106	-1708.30	3111.40	54.9	Pass
T11	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	127	-2154.45	4890.70	44.1	Pass
T12	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	139	-2628.86	9857.64	26.7 47.8 (b)	Pass
T13	50.5104 -	Secondary	L3x3x1/4	152	-2929.92	8745.97	33.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
	40.4166	Horizontal					53.3 (b)	
T15	30.3125 - 20.2083	Secondary Horizontal	L 3 x 3 x 3/16	172	-3532.47	5467.17	64.6	Pass
T16	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	184	-3670.59	4943.07	74.3	Pass
T17	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	196	-4134.38	9469.10	43.7	Pass
T1	151.292 - 146.229	Top Girt	L2 1/2x2 1/2x3/16	6	-139.71	4410.47	48.1 (b) 3.2	Pass
T3	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	25	-554.43	4403.90	12.6	Pass
							Summary	
							Leg (T13) 86.8	Pass
							Diagonal (T12) 91.9	Pass
							Secondary Horizontal (T16) 74.3	Pass
							Top Girt (T3) 12.6	Pass
							Bolt Checks 91.9	Pass
							RATING = **91.9**	**Pass**

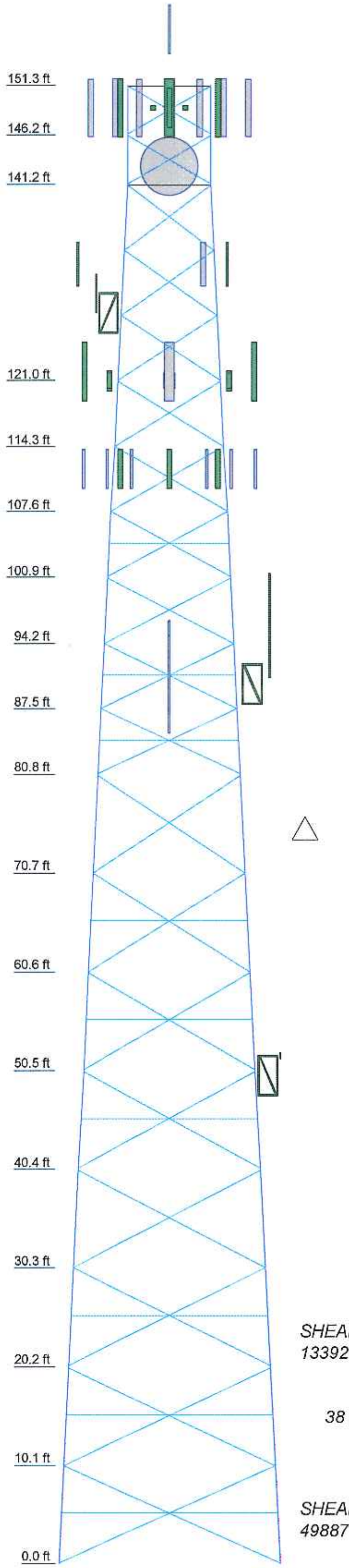
APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS



Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Sec. Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (lb)
T1	ROHN 2.5 STD	A572-50	A	A36	E		8.5625	2 @ 4.9375	273.3
T2	ROHN 2.5 STD	A572-50	B	A36	N.A.			2 @ 4.9375	229.9
T3	ROHN 2.5 EH	A572-50	L2 1/2x2 1/2x3/16	A36	L2 1/2x2 1/2x3/16	N.A.		6 @ 6.66667	1169.5
T4	ROHN 2.5 EH (GR)	A572-50	L2 1/2x2 1/2x3/16	A36	N.A.		10.5625	6 @ 6.66667	482.2
T5	ROHN 2.5 EH (GR)	A572-50	C	A36	N.A.		11.243	6 @ 6.66667	490.7
T6	ROHN 2.5 EH (GR)	A572-50	C	A36	N.A.	B	11.9236	6 @ 6.66667	851.5
T7	ROHN 3 EH (GR)	A572-50	L3x3x3/16	A36	N.A.	N.A.	12.6041	1 @ 6.65278	703.2
T8	ROHN 3 EH (GR)	A572-50	L3x3x3/16	A36	N.A.	L 2 x 2 x 3/16	13.302	1 @ 6.71528	792.3
T9	ROHN 3 EH (GR)	A572-50	D	A36	N.A.	L 2 x 2 x 3/16	14	1 @ 6.63194	1145.3
T10	ROHN 4 EH (GR)	A572-50	2L3x3x3/16x1/4	A36	N.A.	N.A.	14.6979	1 @ 10	1603.8
T11	ROHN 4 EH (GR)	A572-50	2L3x3x3/16x1/4	A36	N.A.	E	15.6979	1 @ 10.0833	1792.1
T12	ROHN 4 EH (GR)	A572-50	2L3x3x1/4x1/4	A36	N.A.	L3x3x1/4	16.6979	2 @ 9.90625	2201.8
T13	ROHN 4 EH (GR)	A572-50	2L3x3x1/4x1/4	A36	N.A.	L3x3x1/4	17.7343	2 @ 9.90625	2283.9
T14	ROHN 5 EH (GR)	A572-50	2L3 1/2x3 1/2x1/4x1/4	A572-50	N.A.	N.A.	18.7708	3 @ 10	2668.2
T15	ROHN 5 EH (GR)	A572-50	2L3 1/2x3 1/2x1/4x1/4	A572-50	N.A.	L 3 x 3 x 3/16	19.7761	3 @ 10	2954.8
T16	ROHN 5 EH (GR)	A572-50	2L 4 x 4 x 1/4 (1/4)	A572-50	N.A.	L3x3x3/16	20.7813	3 @ 10	3324.1
T17	ROHN 5 EH (GR)	A572-50	2L 4 x 4 x 1/4 (1/4)	A572-50	N.A.	L 3.5 x 3.5 x 1/4	21.7813	1 @ 9.99997	3542.7
Total/base							22.7813		26549.4

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount [SO 304-1]	150	1900MHz RRH (65MHz)	121
WB2618	150	800MHz 2X50W RRH W/FILTER	121
ANT150F2	150	APXVSPP18-C-A20 w/ Mount Pipe	121
Sector Mount [SM 510-3]	148	Sector Mount [SM 505-3]	121
(2) LPA-80063/6CF w/ Mount Pipe	148	(3) DB844H90E-XY w/Mount Pipe	112
(2) DB846H80E-SX w/ Mount Pipe	148	(3) DB844H90E-XY w/Mount Pipe	112
(2) LPA-80063/6CF w/ Mount Pipe	148	(3) DB844H90E-XY w/Mount Pipe	112
BXA-70063-6CF-2 w/ Mount Pipe	148	Sector Mount [SM 510-3]	112
BXA-70063-6CF-2 w/ Mount Pipe	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
BXA-70063-6CF-2 w/ Mount Pipe	148	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
(2) FD9R6004/2C-3L	148	KRY 112 144/1	103
(4) FD9R6004/2C-3L	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	148	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	148	KRY 112 144/1	103
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	148	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	103
Pipe Mount [PM 601-1]	143	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	103
PL6-59W	143	KRY 112 144/1	103
800 10504 w/ Mount Pipe	133	Sector Mount [SM 701-3]	103
800 10504 w/ Mount Pipe	133	WB2618	95
800 10504 w/ Mount Pipe	133	10'x2" Pipe Mount	95 - 85
Sector Mount [SM 104-3]	133	3'x2" Pipe Mount	95
TA-2450	128	Side Arm Mount [SO 302-1]	90
Side Arm Mount [SO 305-1]	128	SRL-217 Ground Plane 10.67' x 4.83'	90
WB2618	126	ANT150D3	85
Side Arm Mount [SO 305-1]	126	Side Arm Mount [SO 305-1]	85
1900MHz RRH (65MHz)	121	BW246Y	61
800MHz 2X50W RRH W/FILTER	121	KS24019-L112A	50
APXVSPP18-C-A20 w/ Mount Pipe	121	Side Arm Mount [SO 305-1]	50
1900MHz RRH (65MHz)	121		
800MHz 2X50W RRH W/FILTER	121		
APXV9ERR18-C-A20 w/ Mount Pipe	121		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L 1.5 x 1.5 x 3/16	D	2L 3 x 3 x 3/16 (1/4)
B	L 2 x 2 x 3/16	E	L2 1/2x2 1/2x3/16
C	2L 2.5 x 2.5 x 3/16 (3/16)		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 91 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.94 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. Grouted pipe f'c is 7 ksi
6. TOWER RATING: 91.9%

MAX. TOWER REACTIONS AT BASE:
DOWN: [illegible]
SHEAR: 30822 lb
UPLIFT: -199460 lb
SHEAR: 26239 lb

AXIAL 91886 lb
SHEAR 13392 lb
MOMENT 1303631 lb-ft
TORQUE 15632 lb-ft
38 mph WIND - 0.9375 in ICE

AXIAL 42514 lb
SHEAR 49887 lb
MOMENT 4397871 lb-ft
TORQUE 80822 lb-ft
REACTIONS - 91 mph WIND

Paul J Ford and Company
250 E. Broad St Suite 1500
Columbus, OH 43215
Phone: 614-221-6679
FAX: 614-448-4105

Job: **Modified 152-ft S/S Tower; East Lyme, CT**			
Project: **BU #806384 (PJF #37513-1269)**			
Client: Crown Castle	Drawn by: chedges	App'd:	
Code: TIA/EIA-222-F	Date: 04/18/13	Scale: NTS	
Path: T:\375 Crown Castle\2013\37513-1269 BU 806384\37513-1269.eri		Dwg No. E-1	

Foundation Loads:

Tower leg compression =	237.08	(kips)
Tower leg tension =	199.46	(kips)
Horizontal load at top of pier =	0	(kips)
Overturning moment at top of pier=	0	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	
Uplift safety factor: conc. weight =	1.25	
Uplift safety factor for soil weight =	2	

Soil Properties:

Soil density =	125	(pcf)
Allowable soil bearing =	6	(ksf)
Soil cone of uplift =	31	(degrees)
Uplift cone from top or bottom of ftg	B	("T" or "B")
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	R	("R" or "S")
Pier width =	3	(ft)
Pier height above grade =	0.5	(ft)
depth to bottom of footing =	12	(ft)
Footing thickness =	2	(ft)
Footing width =	8.25	(ft)
Footing length =	8.25	(ft)

Concrete:

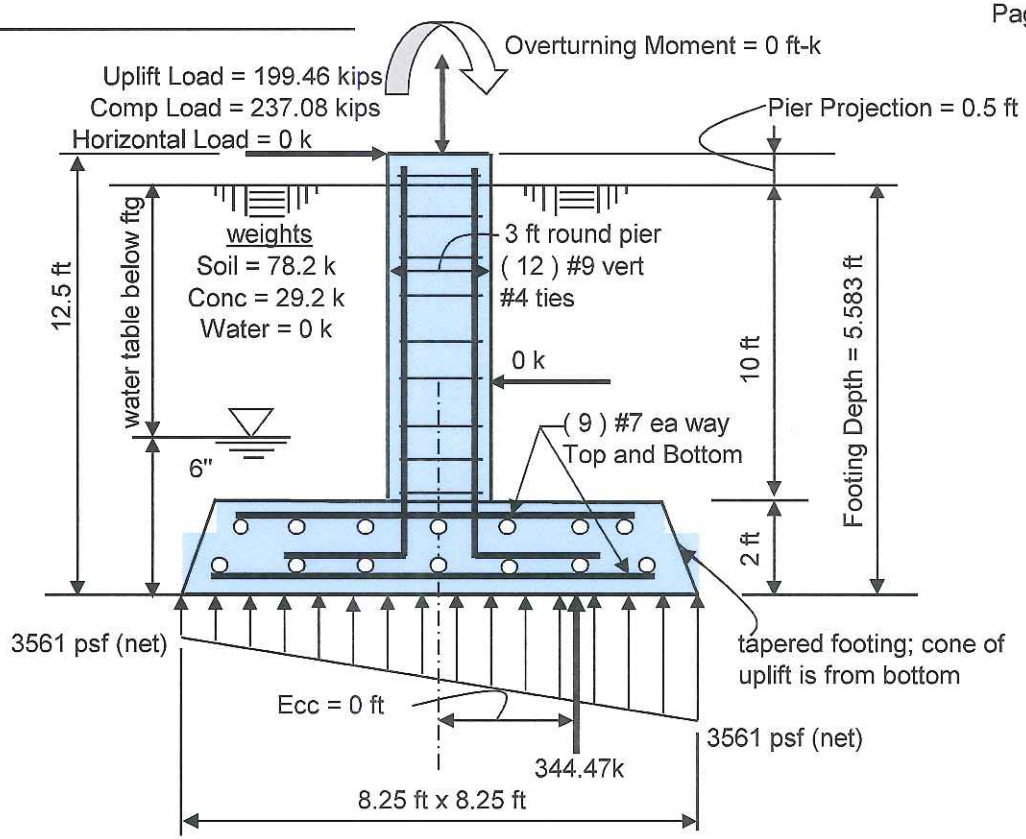
Concrete strength =	3	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

Reinforcing Steel:

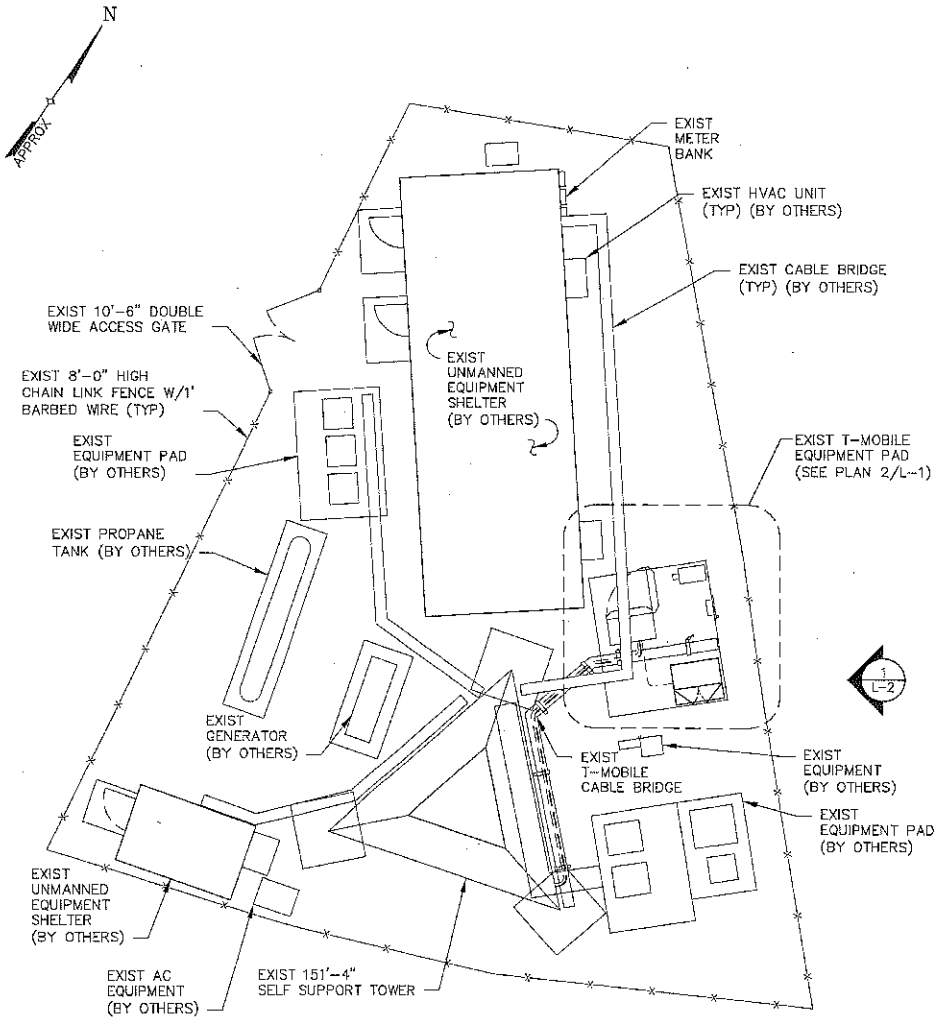
	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#7	bar
quantity of pad rebar =	9	(ea direction)
	Pier	
size of vert rebar in pier=	#9	bar
vertical rebar quantity =	12	
size of pier ties =	#4	bar
minimum cover over rebar =	3	inches

Total volume of concrete = 7.2 cu yd each

(Total volume of concrete = 21.6 cu yd for 3)

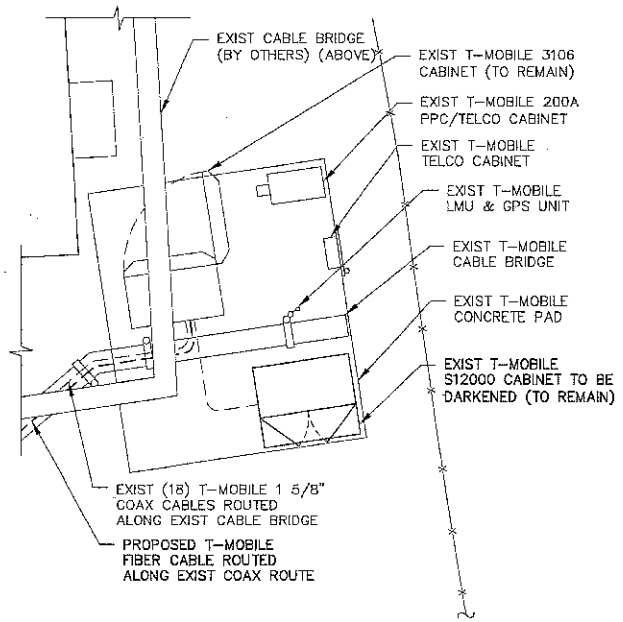


Summary of analysis results	
Maximum Net Soil Bearing = 3.561 ksf Allowable Net Soil Bearing = 6 ksf **Soil Bearing Stress Ratio = 0.59 Okay**	Ult Punching Shear Capacity = 641 kips Ult Punching Shear Force = 119 kips **Punching Shear Stress Ratio = 0.19 OK**
Net Ftg Uplift Resistance = 213.8 kips Uplift Force = 199.46 kips Net Uplift Safety Factor = 1.98 **Ratio to Required Safety factor = 0.93 OK**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 41 psi **Bending Shear Stress Ratio = 0.37 Okay**
Ftg Overturning Resistance = 1421 ft-kips Overturning Moment = 0 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 999 **Ratio = 0 Okay**	Pad Bending Moment Capacity= 463 ft-k Pad Bending Moment = 130 ft-k **Bending Moment Stress Ratio = 0.28 OK**
	Allow Tension in Pier Rebar = 41.54 ksi Calc Vert Rebar Tension = 16.62 ksi **Ratio = 0.4 Okay**



1 L-1 SITE PLAN

SCALE: 3/32" = 1'-0"



2 L-1 EQUIPMENT PLAN

SCALE: 3/16" = 1'-0"

STRUCTUAL NOTE:
EXIST MOUNTS AND TOWER STRUCTURE TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF PROPOSED INSTALLATION BY A STATE LICENSED P.E.

CONFIGURATION
2C

0 1 2 3
ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • SURVEYING
• ENGINEERING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-0656
Fax: (845) 567-0703

T-Mobile
NORTHEAST LLC.
T-MOBILE NORTHEAST, LLC.
4 SYLVAN GROVE
PARSIPPANY, NJ 07054
PHONE (973) 884-6590

APPROVALS
T-MOBILE
LANDLORD
RF
CONSTRUCTION

PROJECT NUMBER	DESIGNED BY
0844.CT11037B	TN

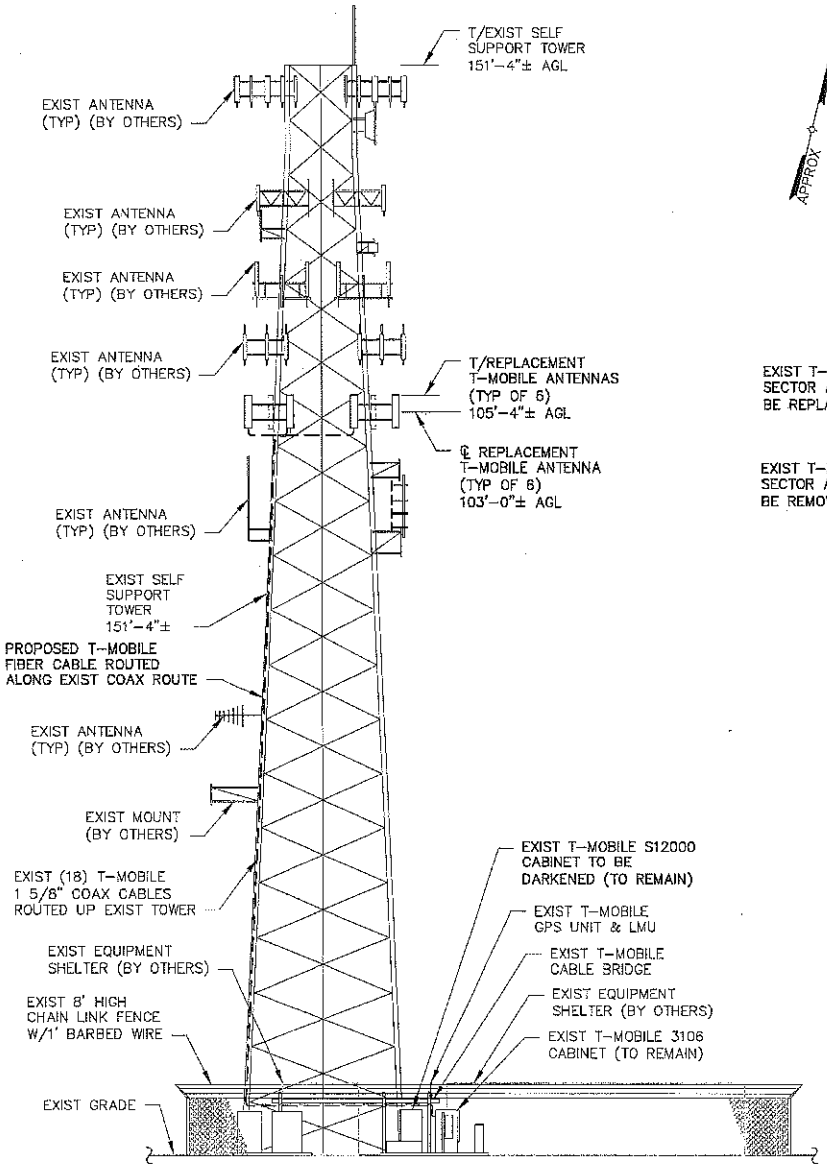
REV	DATE	REVISION	DRAWN BY
1	4/22/13	FOR COMMENT	WY

ISSUED BY	DATE

SITE INFORMATION
CT11037B
NIANTIC/I-95/RT 156_1
93 ROXBURY RD.
EAST LYME, CT 06357

SHEET TITLE
SITE PLAN & EQUIPMENT PLAN

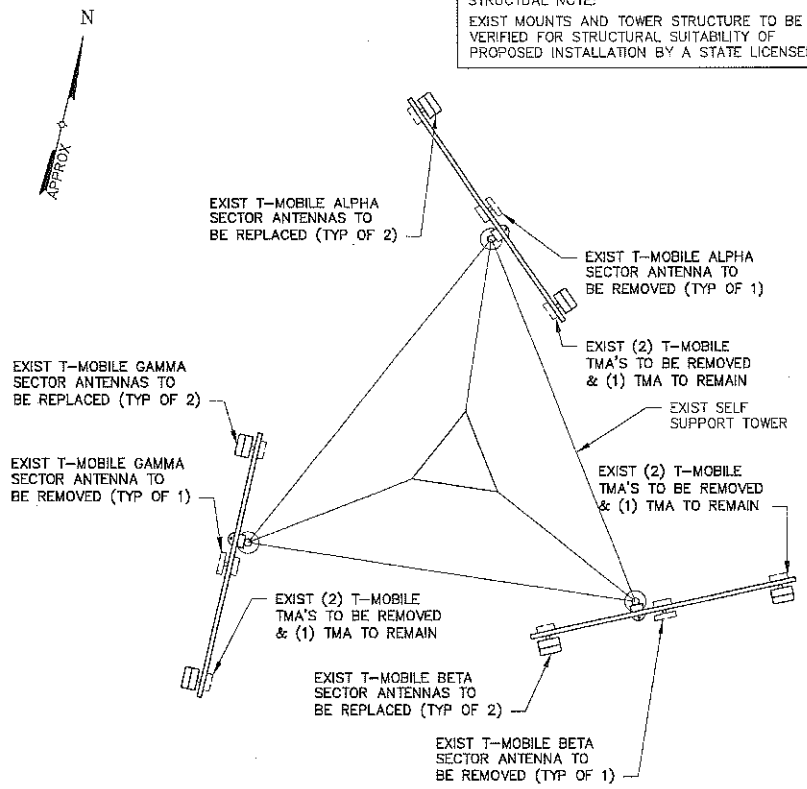
SHEET NUMBER
L-1



1 / L-2 ELEVATION

SCALE: 1/16" = 1'-0"

STRUCTUAL NOTE:
EXIST MOUNTS AND TOWER STRUCTURE TO BE VERIFIED FOR STRUCTURAL SUITABILITY OF PROPOSED INSTALLATION BY A STATE LICENSED P.E.



2 / L-2 ANTENNA PLAN

SCALE: 3/16" = 1'-0"

CONFIGURATION
2C

0 1 2 3
ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • SURVEYING
• ENGINEERING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-5656
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T-Mobile
NORTHEAST LLC.

T-MOBILE NORTHEAST, LLC.
4 SYLVAN DRIVE
PARSIPPANY, NJ 07054
PHONE: (973) 633-6500

APPROVALS
T-MOBILE
LANDLORD
RF
CONSTRUCTION

PROJECT NUMBER	DESIGNED BY
6544.CT11037B	TN

REV	DATE	REVISION	DRAWN BY
0	4/22/13	FOR COMMENT	WY

ISSUED BY	DATE

SITE INFORMATION
CT11037B
NIANTIC/I-95/RT 156_1
93 ROXBURY RD.
EAST LYME, CT 06357

SHEET TITLE
ELEVATION & ANTENNA PLAN

SHEET NUMBER
L-2

EBI CONSULTING
www.ebiconsulting.com

21 B Street
Burlington, MA 01803
Tel: (781) 273.2500

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11037B

Niantic / I-95 / RT156_1
93 Roxbury Road
East Lyme, CT 06357

May 14, 2013

EBI Project Number: 62136253

EBI CONSULTING
www.ebiconsulting.com

21 B Street

Burlington, MA 01803

Tel: (781) 273.2500

May 14, 2013

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Re: Emissions Values for Site: **CT11037B - Niantic / I-95 / RT156_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 93 Roxbury Road, East Lyme, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS band is 1000 μW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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Burlington, MA 01803
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Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 93 Roxbury Road, East Lyme, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (1935.000 MHz to 1945.000 MHz / 1983.000 MHz to 1984.000 MHz) were considered for each sector of the proposed installation.
2) 4 UMTS channels (1935.000 MHz to 1945.000 MHz / 1983.000 MHz to 1984.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications

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6) The antenna mounting height centerline of the proposed antennas is **103 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT11037B - Niantic / I-95 / RT156_1
Site Addresss	93 Roxbury Road, East Lyme, CT 06357
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	103	97	None	0	0	48.326044	1.846476	0.18465%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	103	97	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
														Sector total Power Density Value:		0.369%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	103	97	None	0	0	48.326044	1.846476	0.18465%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	103	97	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
28	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
														Sector total Power Density Value:		0.369%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	103	97	None	0	0	48.326044	1.846476	0.18465%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	103	97	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
28	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	103	97	1-5/8"	0	0	24.163022	0.923238	0.09232%
														Sector total Power Density Value:		0.369%	

Site Composite MPE %	
Carrier	MPE %
T-Mobile	1.108%
Verizon Wireless	13.110%
MetroPCS	4.370%
Sprint	6.690%
Nextel	2.520%
Town	0.750%
Total Site MPE %	**28.548%**

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Tel: (781) 273.2500

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the T-Mobile facility are **1.108% (0.369% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **28.548%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

May 20, 2013

The Honorable Paul M. Formica
First Selectman
East Lyme Town Hall
108 Pennsylvania Avenue
P. O. Box 519
Niantic, CT 06357

RE: **EM-T-MOBILE-045-130520** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at 93 Roxbury Road, East Lyme, Connecticut.

Dear First Selectman Formica:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by June 3, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

LR/laf

c: Gary Goeschel, Director of Planning, Town of East Lyme