COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

December 22, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
T-Mobile equipment upgrade
Site ID CT11128E
1021 Straits Turnpike, Middlebury CT

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, the T-Mobile owns the existing lattice telecommunications tower and related facility at 1021 Straits Turnpike Middlebury, Connecticut (latitude 41. 535763/longitude -73.08921). T-Mobile intends to replace three antennas and add related equipment at this existing telecommunications facility in Middlebury ("Middlebury Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman Edward B. St. John and the property owner, the Town of Middlebury.

The existing Middlebury Facility consists of an approximately 195 foot tall lattice structure.[1] T-Mobile plans to replace three antennas at a centerline of 193 feet and remove three antennas at a centerline of 195 feet. T-Mobile will also install an equipment cabinet and three RRUs (remote radio units) on a proposed H-frame, install coax cable and reuse existing coax cable. All of these modifications will take place within the existing equipment compound. See the plans revised to November 13, 2014 attached hereto as Exhibit A. The existing Facility is structurally capable of supporting T-Mobile's proposed modification, as indicated in the structural analysis dated November 24, 2014 attached hereto as Exhibit B.

[1] The online CSC database does not include a Docket or Petition approval for this facility. T-Mobile's most recent modification to this facility is reflected in the notice of intent captioned EM-T-MOBILE-081-090409.

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

1. The proposed modification will not increase the height of the tower. T-Mobile's proposed antennas will be installed at the 193 foot level of the approximately 195 foot lattice tower. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The installation of the T-Mobile equipment in the existing compound, as reflected on Sheet 2 of Exhibit A, will not require an extension of the site boundaries. T-Mobile's proposed equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the proposed antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated December 10, 2014 T-Mobile's operations would add 3.66% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 28.88% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

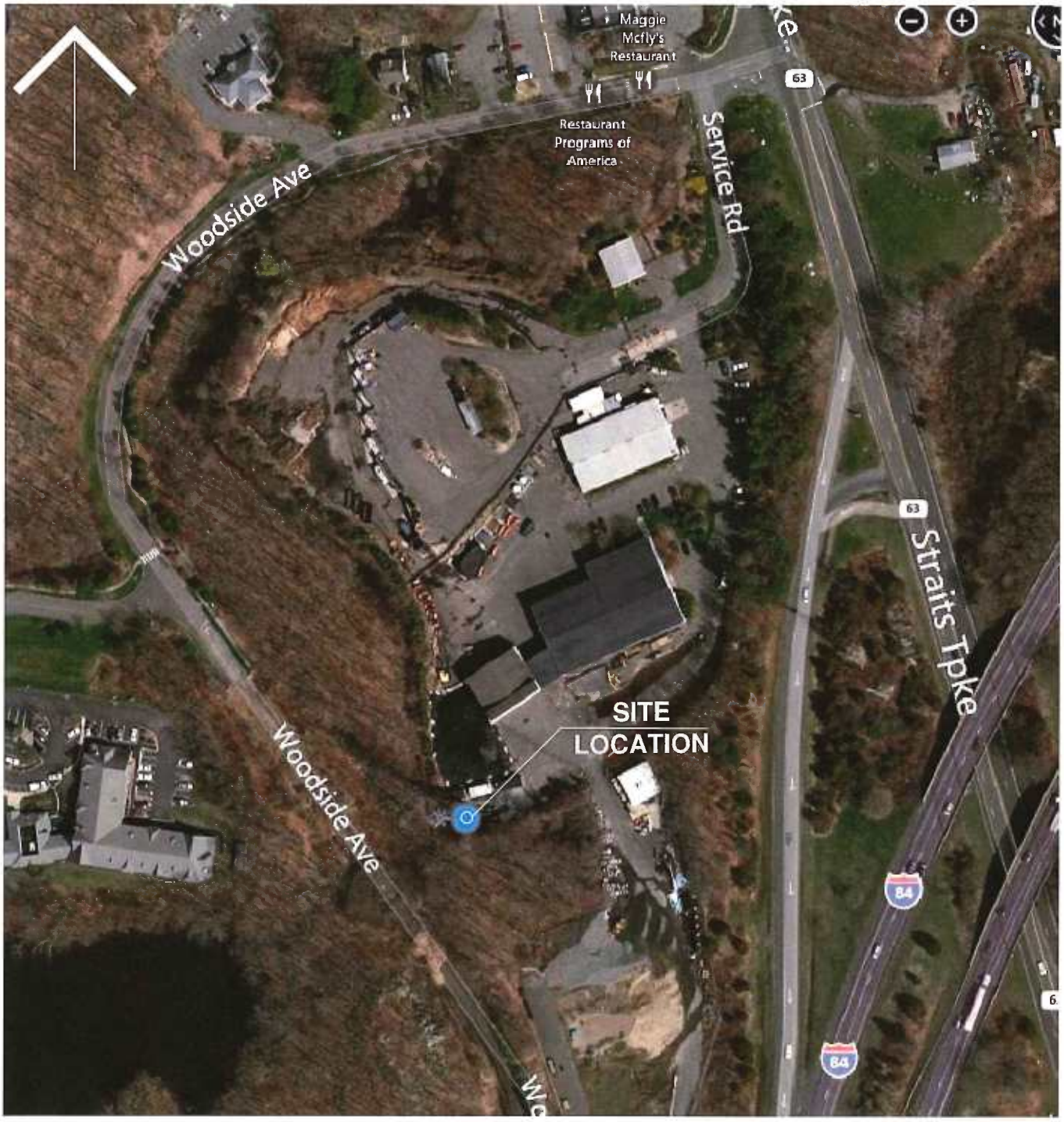
For the foregoing reasons, T-Mobile respectfully submits that the proposed antennas and equipment at the Middlebury Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Middlebury, First Selectman Edward B. St. John
T-Mobile Northeast, LLC
Sheldon Freincle, NSS

EXHIBIT A



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

KEY MAP
N.T.S.

1
LE-1

CONFIGURATION
704BU

SUBMITTALS	
LE REV A	08.11.14
LE REV 0	11.04.14
LE REV 1	11.13.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CT11128E

SITE NAME:
MIDDLEBURY/I-84 X17

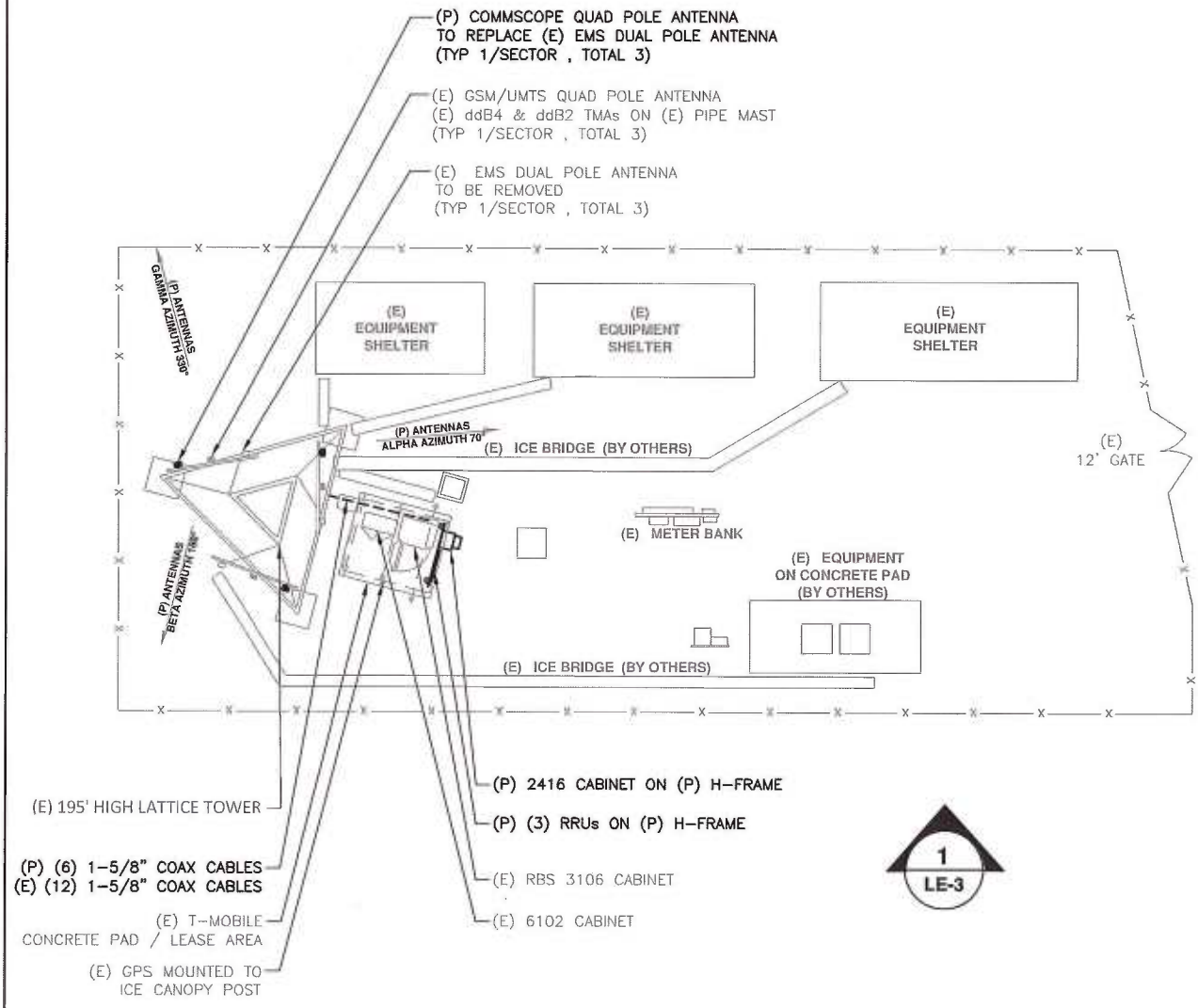
SITE ADDRESS:
1021 STRAITS TURNPIKE,
MIDDLEBURY , CT 06762

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: FG | CHECKED BY: SM



COMPOUND PLAN

1
LE2

SCALE: 1" = 20'-0" (8.5x11)

5 0 5 10 15

CONFIGURATION

704BU

SUBMITTALS	
LE REV A	08.11.14
LE REV 0	11.04.14
LE REV 1	11.13.14

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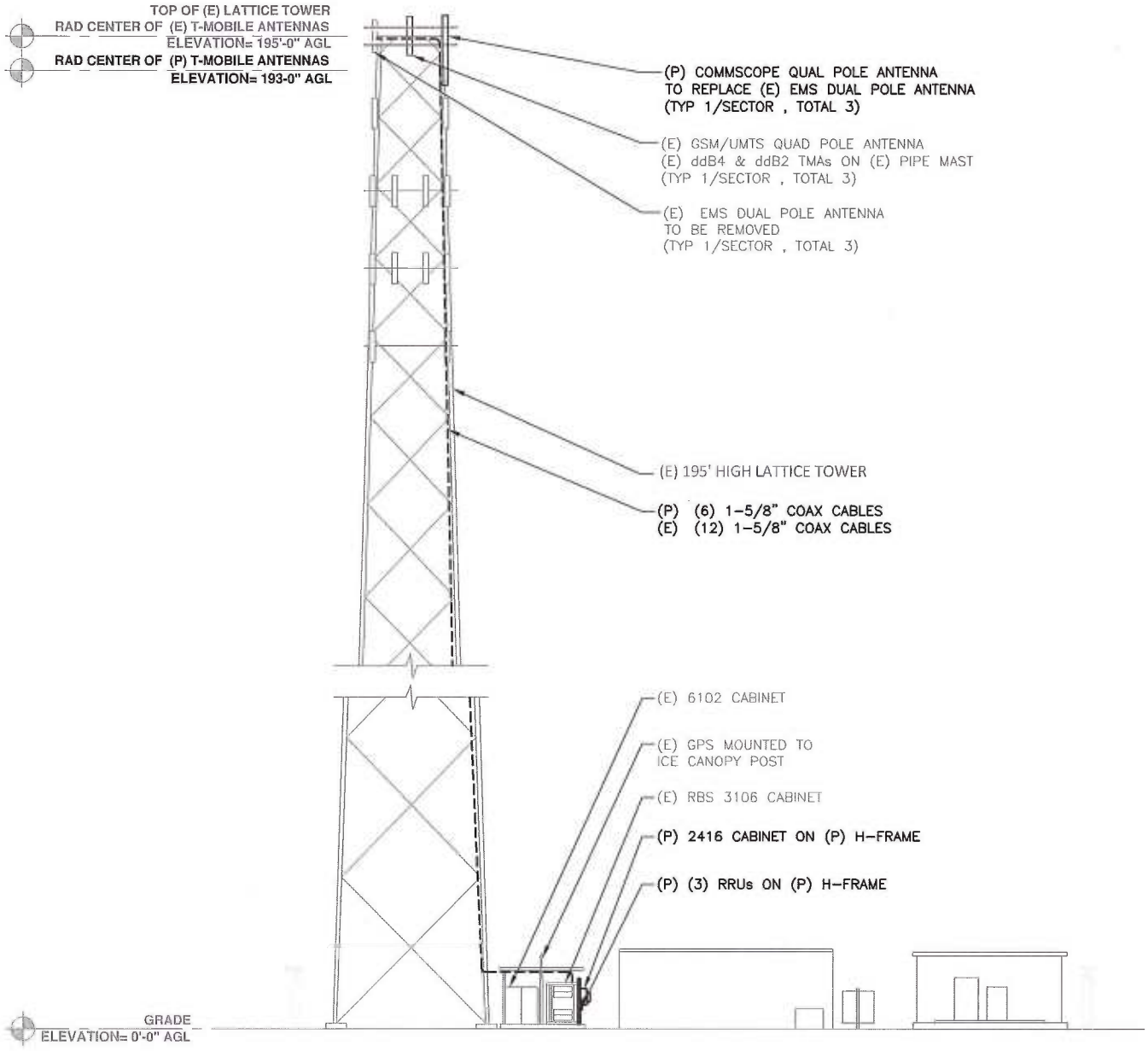

ELEVATION

SCALE: 1" = 20'-0" (8.5x11)

1
LE3

CONFIGURATION

704BU

SUBMITTALS	
LE REV A	08.11.14
LE REV 0	11.04.14
LE REV 1	11.13.14

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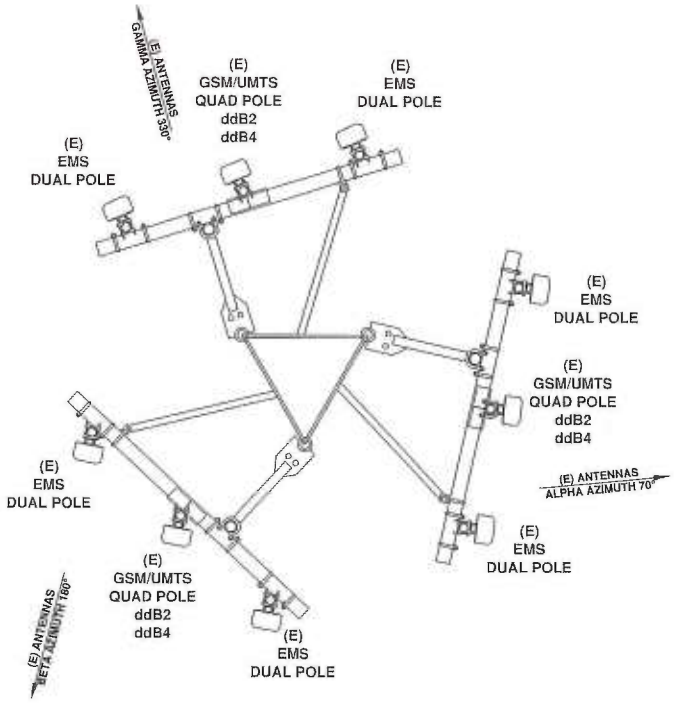
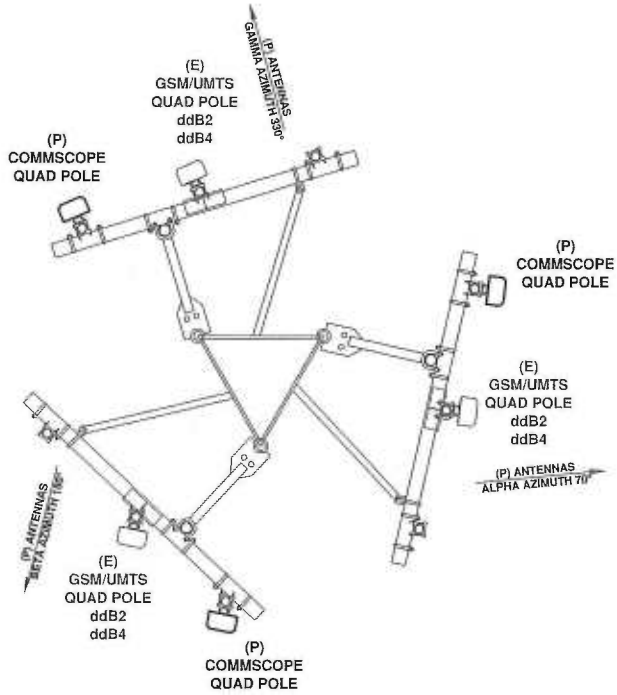


EXISTING



PROPOSED

ANTENNA PLAN

N.T.S.

1
LE-4

CONFIGURATION

704BU

SUBMITTALS	
LE REV A	08.11.14
LE REV 0	11.04.14
LE REV 1	11.13.14

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BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: FG | CHECKED BY: SM

EXHIBIT B

Date: **November 24, 2014**

Kenneth Fann
T-Mobile Towers
12920 SE 38th Street
Bellevue, WA 98006
(425) 383-3978

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
TMOStructural@tepgroup.net

Subject: **Structural Analysis Report – Revision 14**

T-Mobile Designation:	***T-Mobile 700 MHz Reconfiguration***	
	T-Mobile Site Name:	Middlebury I-84
	T-Mobile Site Number:	CT11128E
Engineering Firm Designation:	**TEP Project Number:**	25628_22635
Site Data:	**1021 Straits Turnpike, Middlebury, New Haven County, CT 06762** **Latitude *41° 32' 8.78"*, Longitude *-73° 05' 21.27"*** **195 Foot - Self Support Tower**	

Dear Mr. Fann,

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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:

LC1: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 for the existing and proposed loading

Structure Capacity	Controlling Component
93.0%	Diagonal T11 (106.7' – 113.3')

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *T-Mobile Towers*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Andrew T. Stutts, E.I.

Respectfully submitted by:

Graham M. Andres, P.E.

Revision #	Date Issued	Description
0	July 7, 2010	Original Structural Analysis (TEP #102056)
1	July 8, 2010	Revision includes removal of proposed Clearwire loading (TEP #102056)
2	July 22, 2010	Revision includes removal of proposed Clearwire loading and proposed Verizon loading (TEP #102056)
3	July 22, 2010	Revision includes Clearwire proposed loading and Verizon existing loading (TEP #102056)
4	April 11, 2012	Revised structural to include proposed AT&T loading and installed TEP modifications (TEP #102056)
5	April 18, 2013	Sprint Network Vision (TEP #102056)
6	May 2, 2013	Revised Sprint Network Vision (TEP #102056)
7	June 10, 2013	Verizon Reconfiguration
8	July 8, 2013	Revised Verizon Reconfiguration
9	July 16, 2013	Revised Verizon Reconfiguration
10	August 27, 2013	Revised Verizon Reconfiguration without Sprint Modifications
11	July 3, 2014	Revised Sprint Reconfiguration
12	August 15, 2014	T-Mobile 700 MHz Reconfiguration
13	October 23, 2014	Revision includes Clearwire and Nextel iDEN loading as removed
14	November 24, 2014	Revised T-Mobile Loading

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 195-ft self-support tower designed by Fred A. Nudd Corporation in May of 1998. The tower was originally designed for a fastest mile wind speed of 85 mph per ANSI/EIA/TIA-222-F for the appurtenances listed in Table 2. TEP visited the site in June of 2010 to gather existing steel and appurtenance information. This tower has been modified multiple times in the past to accommodate additional loading. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch escalating ice thickness, and 50 mph under service loads.

Table 1 - Existing and Proposed Antenna and Cable Information

Existing/ Proposed	Elevation (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size (in)	Coax Location[1]	Owner/ Tenant
Proposed	***195.0***	***3***	***RFS APX16DWV-16DWVS***	(3) 12.5' Sector Frames	***18[2]*** ***1***	***1-5/8[2]*** ***1-5/8 Hybrid***	***AB Face***	***T-Mobile***
		6	***Ericsson KRY-112-71***					
Proposed	***193.0***	***3***	***Commscope LNX-6515DS-VTM***					
Existing	188.0	6	Powerwave 7770	(3) 15.0' T-Frames with Catwalks	12 1 2	1-5/8 7/16"Ø Fiber 3/8"Ø Power	CA Face	AT&T
		3	Powerwave P65-17-XLH-RR					
		6	Powerwave LGP 13519 Diplexers					
		6	Powerwave LGP 21401 TMA					
		6	Ericsson RRUS-11					
		1	Raycap DC6-48-60-18-8F					
Existing	169.0	2	Antel BXA-70063-6CF	(3) 15.0' T-Frames with Catwalks	12	1-5/8	AB Face	Verizon
		4	Decibel DB844G65ZAXY					
		3	MGD3800TO					
		1	Antel BXA 70080/6CF					
		2	Decibel DB846F65ZAXY					
		6	RFS FD9R6004/2C-3L					
Proposed	***152.0***	***3***	***RFS APXVSPP18-C-A20***	(3) 12.0' Sector Frames	***3*** ***9***	***1-1/4"Ø Fiber*** ***1-5/8***	***BC Face***	***Sprint***
		3	***2x50W RRH 800 MHz***					
		3	***2x40W RRH 1900 MHz***					
		6	***Decibel DB980H65EM***					
		3	***Decibel DB980H90T3E-M***					
Existing	75.5	1	GPS Antenna	4.5' Standoff	1	5/8"Ø	BC Face	Unknown

Notes:
1) See "Appendix B – Coax Configuration" for assumed coax configuration.
2) Proposed (18) 1-5/8 feedlines are assumed to be stacked 6-on-6-on-6.

Table 2 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Qty Coax	Coax Size (in)	Coax Location
195.0	195.0	12	Swedcom	ALP 9011	12	1-5/8	Unknown
185.0	185.0	12	Swedcom	ALP 9011	12	1-5/8	Unknown
175.0	175.0	12	Swedcom	ALP 9011	12	1-5/8	Unknown
165.0	165.0	12	Swedcom	ALP 9011	12	1-5/8	Unknown
155.0	155.0	12	Swedcom	ALP 9011	12	1-5/8	Unknown

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower and Foundation Drawings	Fred A. Nudd Corporation, dated May 5, 1998 Drawing No. 98-5974-1	-	T-Mobile
Structural Modification Drawings	Fred A. Nudd Corporation, dated April 30, 1999 Drawing No. 99-6726-1	-	T-Mobile
Steel and Appurtenance Mapping	Tower Engineering Professionals, dated June 3, 2010	102056	TEP
Geotechnical Report	Dr. Clarence Welti, P.E., P.C., dated April 17, 1998	-	T-Mobile
Structural Modification Drawings	Tower Engineering Professionals, dated August 29, 2011	102056	TEP
Structural Modification Drawings	Tower Engineering Professionals, dated July 26, 2012	102056	TEP
Structural Modification Analysis	Tower Engineering Professionals, dated August 1, 2013	25628_4865	TEP
Correspondence	Correspondence with T-Mobile with regards to the existing and proposed loading, SAW dated October 14, 2014	-	T-Mobile

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 Table 1 and "Appendix B – Coax Configuration".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals 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	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	3	-29908.70	61065.26	49.0	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	45	-33120.40	66232.77	50.0	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	57	-41381.10	66319.28	62.4	Pass
T4	170 - 160	Leg	2.5SCH40 w/ 3SCH80 Half Sleeve	Note 3	Note 3	Note 3	66.9	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	90	-78888.60	109240.81	72.2	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	Note 3	Note 3	Note 3	62.1	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T10	120 - 113.333	Leg	PIPE 6 STD (SCH40)	159	-151468.00	232356.55	65.2	Pass
T11	113.333 - 106.667	Leg	PIPE 6 STD (SCH40)	171	-163716.00	232391.21	70.4	Pass
T12	106.667 - 100	Leg	PIPE 6 STD (SCH40)	183	-175173.00	232421.87	75.4	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	Note 3	Note 3	Note 3	54.7	Pass
T14	80 - 60	Leg	PIPE 8 STD (SCH40)	225	-243876.00	336506.51	72.5	Pass
T15	60 - 50	Leg	PIPE 8 STD (SCH40)	246	-256091.00	345717.53	74.1	Pass
T16	50 - 40	Leg	PIPE 8 STD (SCH40)	258	-272419.00	345770.85	78.8	Pass
T17	40 - 20	Leg	PIPE 8 X-STR (SCH80)	270	-304788.00	473586.89	64.4	Pass
T18	20 - 0	Leg	PIPE 8 X-STR (SCH80)	285	-344033.00	474086.76	72.6 82.0 (b)	Pass
T1	195 - 180	Diagonal	5/8	12	7360.45	8833.52	83.3	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	48	-3415.84	6385.59	53.5 69.7 (b)	Pass
T3	175 - 170	Diagonal	L2x2x3/16	60	-2603.33	12345.57	21.1 52.0 (b)	Pass
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	72	-4234.85	16655.43	25.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_{allow} (lb)	% Capacity	Pass / Fail
							59.5 (b)	
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	93	-5258.19	25694.51	20.5 68.7 (b)	Pass
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	123	-5927.96	25233.69	23.5 79.3 (b)	Pass
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	135	-6191.60	16497.61	37.5 56.1 (b)	Pass
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	144	-6351.08	14316.29	44.4 57.4 (b)	Pass
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	153	-6167.25	9979.96	61.8 89.8 (b)	Pass
T10	120 - 113.333	Diagonal	L3x3x3/16	162	-6853.46	15433.74	44.4 92.4 (b)	Pass
T11	113.333 - 106.667	Diagonal	L3x3x3/16	174	-6725.98	14812.43	45.4 93.0 (b)	Pass
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	186	-7166.76	10183.75	70.4	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	198	-7154.37	27501.12	26.0 42.5 (b)	Pass
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	228	-7731.23	23594.23	32.8 45.0 (b)	Pass
T15	60 - 50	Diagonal	L3x3x5/16	249	-9482.73	12260.08	77.3	Pass
T16	50 - 40	Diagonal	L3x3x5/16	261	-9506.89	11351.93	83.7	Pass
T17	40 - 20	Diagonal	L4x4x3/8	273	-9553.12	25488.16	37.5 55.6 (b)	Pass
T18	20 - 0	Diagonal	L5x5x5/16	288	-10667.10	34335.95	31.1 62.1 (b)	Pass
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	17	-4994.29	6723.25	74.3	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	53	574.38	16652.77	3.4 9.5 (b)	Pass
T3	175 - 170	Secondary Horizontal	L2x2x3/16	66	-717.64	16534.80	4.3 11.8 (b)	Pass
T4	170 - 160	Secondary Horizontal	L2x2x3/16	77	-1038.84	15123.02	6.9 17.1 (b)	Pass
T5	160 - 150	Secondary Horizontal	L2x2x3/16	98	-1368.10	13544.21	10.1 22.5 (b)	Pass
T6	150 - 140	Secondary Horizontal	L2x2x3/16	119	-1759.09	11810.53	14.9 29.0 (b)	Pass
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	167	-2626.78	19651.09	13.4 38.7 (b)	Pass
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	179	-2839.18	18513.50	15.3 34.8 (b)	Pass
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	191	-3037.88	6723.76	45.2	Pass
T13	100 - 80	Secondary Horizontal	L3x3x1/4	203	-3649.71	17795.55	20.5 42.5 (b)	Pass
T15	60 - 50	Secondary Horizontal	L4x4x1/4	254	-4441.17	10544.16	42.1	Pass
T16	50 - 40	Secondary Horizontal	L4x4x1/4	266	-4724.33	9490.00	49.8	Pass
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	5	-878.45	6723.25	13.1	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	8	-2460.57	6723.25	36.6	Pass
							Summary	
						Leg (T18)	82.0	Pass
						Diagonal (T11)	93.0	Pass
						Horizontal (T1)	74.3	Pass
						Secondary Horizontal (T16)	49.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_{allow} (lb)	% Capacity	Pass / Fail
						Top Girt (T1)	13.1	Pass
						Bottom Girt (T1)	36.6	Pass
						Bolt Checks	93.0	Pass
						RATING =	**93.0**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
-	Anchor Rods	-	82.0	Pass
3	Base Foundation - Soil Interaction	-	41.4	Pass
3	Base Foundation - Structural	-	58.4	Pass

Notes:
3) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

Structure Rating (max from all components) =	93.0%

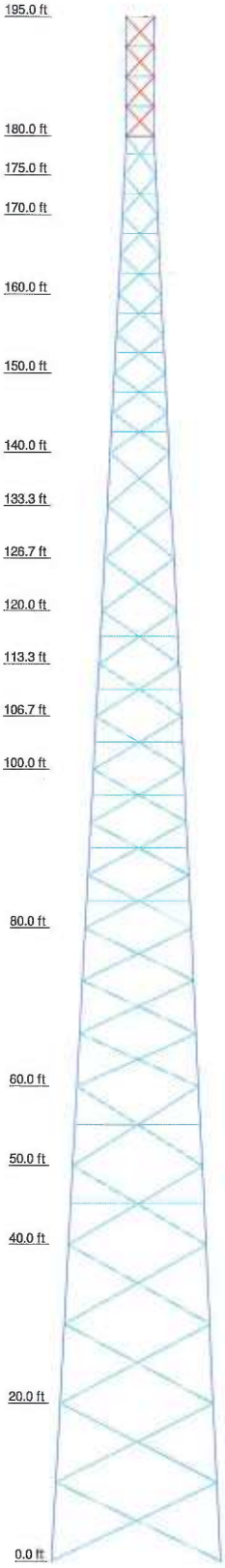
4.1) Recommendations

1) If the load differs from that described in Table 1 of this report, "Appendix B – Coax Configuration" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T16	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	PIPE 8 X-STR (SCH80)		PIPE 8 STD (SCH40)			E	PIPE 6 STD (SCH40)			D			C	B	A		PIPE 2.5 STD (SCH 40)	
Leg Grade	A572-55					A53-B-42	A572-55			A500-46			A500-50	A572-55	A53-B-35		A572-55	
Diagonals	L5x5x5/16	L4x4x3/8	L3x3x5/16			L3 1/2x3 1/2x1/4	J	L3x3x3/16		I	L2 1/2x2 1/2x1/4		2L2x2x3/16x1/4		H	G	F	SR 5/8
Diagonal Grade	A36																	
Top Girts	N.A.																	L1 1/2x1 1/2x3/16
Bottom Girts	N.A.																	L1 1/2x1 1/2x3/16
Horizontals	N.A.																	L1 1/2x1 1/2x3/16
Sec. Horizontals	N.A.		L4x4x1/4		N.A.	L3x3x1/4		L3x3x3/16		N.A.			L2x2x3/16				N.A.	
Face Width (ft) 21.5	19.5	17.5	16.5	15.5	13.5	11.5	10.8333	10.1667	9.5	8.83333	8.16667	7.5	6.5	5.5	4.5	4		3.5
# Panels @ (ft)	2 @ 9.95833		4 @ 10			12 @ 6.66667								8 @ 5				4 @ 3.75
Weight (lb) 30200.5	5481.4	5668.0	1912.1	1851.2	3370.0	4324.0	820.8	774.3	754.5	768.4	842.1	829.5	1040.7	817.6	705.9	214.0	181.8	464.2



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2.5SCH40 w/ 3SCH80 Half Sleeve	F	L1 1/2x1 1/2x3/16
B	Pipe 3.5 Std (SCH40)	G	L2x2x3/16
C	3.5SCH40 w/ 4SCH40 Half Sleeve	H	2L1 1/2x1 1/2x3/16x1/4
D	5 STD w/ 6 XH Half Sleeve	I	L2 1/2x2 1/2x3/16
E	6 STD w/ 7 XH Half Sleeve	J	L2 1/2x2 1/2x1/4

MATERIAL STRENGTH

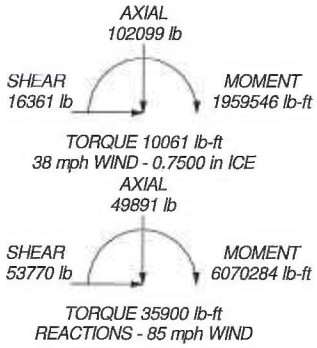
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A500-50	50 ksi	62 ksi
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi
A53-B-35	35 ksi	63 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93%

MAX. CORNER REACTIONS AT BASE:
DOWN: 342647 lb
SHEAR: 34138 lb

UPLIFT: -294528 lb
SHEAR: 29790 lb



Tower Engineering Professionals, Inc.
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-5350
Tower Engineering Professionals

Job: *Middlebury I-84 (CT11128E)*			
Project: *TEP No. 25628_22635, Revision 14*			
Client: T-Mobile Towers	Drawn by: astutts	App'd:	
Code: TIA/EIA-222-F	Date: 11/21/14	Scale: NTS	
Path: \\tep-vm-file01\...\Middlebury I-84 (CT11128E)\e		Dwg No. E-1	

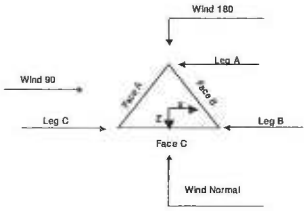
Tower Input Data

The main tower is a 3 x free standing tower with an overall height of 195.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.50 ft at the top and 21.50 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	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 KLr	√ 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	Use TIA-222-G Tension Splice Capacity Exemption	



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	195.00-180.00			3.50	1	15.00
T2	180.00-175.00			3.50	1	5.00
T3	175.00-170.00			4.00	1	5.00
T4	170.00-160.00			4.50	1	10.00
T5	160.00-150.00			5.50	1	10.00
T6	150.00-140.00			6.50	1	10.00
T7	140.00-133.33			7.50	1	6.67
T8	133.33-126.67			8.17	1	6.67
T9	126.67-120.00			8.83	1	6.67
T10	120.00-113.33			9.50	1	6.67
T11	113.33-106.67			10.17	1	6.67
T12	106.67-100.00			10.83	1	6.67
T13	100.00-80.00			11.50	1	20.00
T14	80.00-60.00			13.50	1	20.00
T15	60.00-50.00			15.50	1	10.00
T16	50.00-40.00			16.50	1	10.00
T17	40.00-20.00			17.50	1	20.00
T18	20.00-0.00			19.50	1	20.00

Tower Section Geometry *(cont'd)*

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
T1	195.00-180.00	3.75	TX Brace	No	Yes	0.0000	0.0000
T2	180.00-175.00	5.00	X Brace	No	Yes	0.0000	0.0000
T3	175.00-170.00	5.00	X Brace	No	Yes	0.0000	0.0000
T4	170.00-160.00	5.00	X Brace	No	Yes	0.0000	0.0000
T5	160.00-150.00	5.00	X Brace	No	Yes	0.0000	0.0000
T6	150.00-140.00	5.00	X Brace	No	Yes	0.0000	0.0000
T7	140.00-133.33	6.67	X Brace	No	No	0.0000	0.0000
T8	133.33-126.67	6.67	X Brace	No	No	0.0000	0.0000
T9	126.67-120.00	6.67	X Brace	No	No	0.0000	0.0000
T10	120.00-113.33	6.67	X Brace	No	Yes	0.0000	0.0000
T11	113.33-106.67	6.67	X Brace	No	Yes	0.0000	0.0000
T12	106.67-100.00	6.67	X Brace	No	Yes	0.0000	0.0000
T13	100.00-80.00	6.67	X Brace	No	Yes	0.0000	0.0000
T14	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T15	60.00-50.00	10.00	X Brace	No	Yes	0.0000	0.0000
T16	50.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T17	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T18	20.00-0.00	9.96	X Brace	No	No	0.0000	1.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 195.00-180.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 180.00-175.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 175.00-170.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 170.00-160.00	Arbitrary Shape	2.5SCH40 w/ 3SCH80 Half Sleeve	A53-B-35 (35 ksi)	Double Equal Angle	2L1 1/2x1 1/2x3/16x1/4	A36 (36 ksi)
T5 160.00-150.00	Pipe	Pipe 3.5 Std (SCH40)	A572-55 (55 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T6 150.00-140.00	Arbitrary Shape	3.5SCH40 w/ 4SCH40 Half Sleeve	A500-50 (50 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T7 140.00-133.33	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 133.33-126.67	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T9 126.67-120.00	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 120.00-113.33	Pipe	PIPE 6 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T11 113.33-106.67	Pipe	PIPE 6 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T12 106.67-100.00	Pipe	PIPE 6 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T13 100.00-80.00	Arbitrary Shape	6 STD w/ 7 XH Half Sleeve	A53-B-42 (42 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T14 80.00-60.00	Pipe	PIPE 8 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T15 60.00-50.00	Pipe	PIPE 8 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T16 50.00-40.00	Pipe	PIPE 8 STD (SCH40)	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T17 40.00-20.00	Pipe	PIPE 8 X-STR (SCH80)	A572-55	Equal Angle	L4x4x3/8	A36

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
			(55 ksi)			(36 ksi)
T18 20.00-0.00	Pipe	PIPE 8 X-STR (SCH80)	A572-55 (55 ksi)	Equal Angle	L5x5x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 195.00-180.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 195.00-180.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (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
T2 180.00-175.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 175.00-170.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 170.00-160.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 160.00-150.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 150.00-140.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T10 120.00-113.33	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T11 113.33-106.67	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T12 106.67-100.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T13 100.00-80.00	Equal Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T15 60.00-50.00	Equal Angle	L4x4x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T16 50.00-40.00	Equal Angle	[illegible]1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 195.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	0.0000
T2 180.00-175.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T3 175.00-170.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000
T4 170.00-160.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000
T5 160.00-150.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000
T6 150.00-140.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000
T7 140.00-133.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T8 133.33-126.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T9 126.67-120.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T10 120.00-113.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T11 113.33-106.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T12 106.67-100.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000
T13 100.00-80.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000
T14 80.00-60.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000
T15 60.00-50.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000
T16 50.00-40.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000
T17 40.00-20.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000
T18 20.00-0.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	K Factors[1]

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X y	K Brace Diags X y	Single Diags X y	Girts X y	Horiz. X y	Sec. Horiz. X y	Inner Brace X y
T1 195.00-180.00	Yes	Yes	1	1 1	1 1	1 1	0.96 0.96	0.96 0.96	1 1	1 1
T2 180.00-175.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 1	1 1
T3 175.00-170.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 1	1 1
T4 170.00-160.00	No	Yes	1	1.09 1.09	1 1	1 1	1 1	1 1	0.5 1	1 1
T5 160.00-150.00	No	Yes	1	1.15 1.15	1 1	1 1	1 1	1 1	0.5 1	1 1
T6 150.00-140.00	No	Yes	1	1.25 1.25	1 1	1 1	1 1	1 1	0.5 1	1 1
T7 140.00-133.33	Yes	Yes	1	1.22 1.22	1 1	1 1	1 1	1 1	0.5 1	1 1
T8 133.33-126.67	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 126.67-120.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 1	1 1
T10 120.00-113.33	No	Yes	1	1 1	1 1	1 1	1 1	1 1	0.5 1	1 1
T11 113.33-106.67	No	Yes	1	0.98 0.98	1 1	1 1	1 1	1 1	0.5 1	1 1
T12 106.67-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 100.00-80.00	No	Yes	1	0.85 0.85	1 1	1 1	1 1	1 1	0.5 1	1 1
T14 80.00-60.00	No	Yes	1	0.85 0.85	1 1	1 1	1 1	1 1	0.5 1	1 1
T15 60.00-50.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T16 50.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T17 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T18 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 195.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	1
T2 180.00-175.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 175.00-170.00	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 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
T4 170.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 160.00-150.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 150.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 140.00-133.33	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 133.33-126.67	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 126.67-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 120.00-113.33	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 113.33-106.67	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 106.67-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 60.00-50.00	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
T16 50.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T17 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T18 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation 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 195.00-180.00	Flange	0.7500 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T2 180.00-175.00	Flange	0.7500 A325N	0	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T3 175.00-170.00	Flange	0.7500 A325N	0	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T4 170.00-160.00	Flange	0.7500 A325N	6	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T5 160.00-150.00	Flange	1.0000 A325N	0	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T6 150.00-140.00	Flange	1.0000 A325N	6	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T7 140.00-133.33	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1

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.
T8 133.33-126.67	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T9 126.67-120.00	Flange	1.0000 A325N	8	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T10 120.00-113.33	Flange	1.0000 A325N	0	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T11 113.33-106.67	Flange	1.0000 A325N	0	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.7500 A325N	1
T12 106.67-100.00	Flange	1.0000 A325N	8	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T13 100.00-80.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T14 80.00-60.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.7500 A325X	1
T15 60.00-50.00	Flange	1.2500 A325N	0	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T16 50.00-40.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T17 40.00-20.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T18 20.00-0.00	Flange	1.5000 A36	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0

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
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CtAe)	169.00 - 7.00	-2.0000	-0.35	12	12	0.5000	1.9800		0.82
WG Rail 1.5x1.5x1/4 **** ****	B	Yes	Af (CtAe)	170.00 - 8.00	-2.0000	-0.35	2	2	36.5000	1.5000	6.0000	2.40
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CtAe)	195.00 - 7.00	0.0000	0	18	6	0.5000	1.9800		0.82
WG Rail 1.5x1.5x3/16 ****	B	Yes	Af (CtAe)	181.00 - 0.00	0.0000	0	2	2	36.0000	1.5000	6.0000	1.81
LDF4-50A (1/2 FOAM)	C	Yes	Ar (CtAe)	75.50 - 10.00	0.0000	0	1	1	0.5000 0.6300	0.6300		0.15
WG Rail 1.5x1.5x3/16 **** ****	C	Yes	Af (CtAe)	160.00 - 0.00	0.0000	0.1	2	2	35.0000	1.5000	6.0000	1.81
LDF7-50A (1-5/8 FOAM)	A	Yes	Ar (CtAe)	188.00 - 8.00	0.0000	0.3	12	6	0.5000	1.9800		0.82
7/16" Fiber Cable (24 fibers Max)	A	Yes	Ar (CtAe)	188.00 - 8.00	0.0000	0.375	1	1	0.5000	0.4375		0.03
8AWG7	A	Yes	Ar (CtAe)	188.00 - 8.00	0.0000	0.35	2	2	0.5000	0.3750		0.15
WG Rail 1.5x1.5x1/8 ****	A	Yes	Af (CtAe)	180.00 - 2.00	0.0000	0.3	2	2	36.0000	1.5000	6.0000	1.23

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (From FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
****												
***												
Safety Line 3/8	A	No	Ar (Leg)	195.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
Step Pegs (5/8" SR) 7-in. w/30" step	A	No	Ar (Leg)	195.00 - 0.00	0.0000	0	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step	B	No	Ar (Leg)	60.00 - 0.00	0.0000	0	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	Ar (Leg)	60.00 - 0.00	0.0000	0	1	1	0.3500	0.3500		0.49
****												
1 1/4" Fiber	C	Yes	Ar (CfAe)	152.00 - 10.00	0.0000	0.04	3	3	0.5000	1.2500		0.38
LDF7-50A(1-5/8")	C	Yes	Ar (CfAe)	152.00 - 10.00	0.0000	0.12	9	9	0.5000	1.9800		0.82
***												
1 5/8 Hybrid DC/Fiber	B	Yes	Ar (CfAe)	195.00 - 7.00	0.0000	0.07	1	1	0.5000 1.6250	1.6250		0.82
****												
Rung L1.5x1.5x1/8 (36.25"w, 34"s)	B	Yes	Ar (CfAe)	170.00 - 8.00	-2.0000	-0.35	1	1	0.5000	0.0001		1.31
Rung L1.5x1.5x1/8 (36"w, 34"s)	B	Yes	Ar (CfAe)	181.00 - 0.00	0.0000	0	1	1	0.5000	0.0001		1.29
Rung L2x1.5x1/8 (35"w, 48"s)	C	Yes	Ar (CfAe)	160.00 - 0.00	0.0000	0.1	1	1	0.5000	0.0001		1.05
Rung L1.5x1.5x1/8 (36"w, 34"s)	A	Yes	Ar (CfAe)	180.00 - 2.00	0.0000	0.3	1	1	0.5000	0.0001		1.29

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	195.00-180.00	A	9.618	0.000	0.000	0.000	91.97
		B	17.788	0.250	0.000	0.000	238.62
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	5.747	1.250	0.000	0.000	73.16
		B	5.929	1.250	0.000	0.000	102.47
		C	0.000	0.000	0.000	0.000	0.00
T3	175.00-170.00	A	5.747	1.250	0.000	0.000	73.16
		B	5.929	1.250	0.000	0.000	102.47
		C	0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	11.494	2.500	0.000	0.000	146.32
		B	29.679	5.000	0.000	0.000	354.64
		C	0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	11.494	2.500	0.000	0.000	146.32
		B	31.659	5.000	0.000	0.000	364.48
		C	3.595	2.500	0.000	0.000	63.70
T6	150.00-140.00	A	11.494	2.500	0.000	0.000	146.32
		B	31.659	5.000	0.000	0.000	364.48

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
		C	17.975	2.500	0.000	0.000	131.82
T7	140.00-133.33	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T8	133.33-126.67	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T9	126.67-120.00	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T10	120.00-113.33	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T11	113.33-106.67	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T12	106.67-100.00	A	7.663	1.667	0.000	0.000	97.55
		B	21.106	3.333	0.000	0.000	242.99
		C	11.983	1.667	0.000	0.000	87.88
T13	100.00-80.00	A	22.988	5.000	0.000	0.000	292.64
		B	63.317	10.000	0.000	0.000	728.96
		C	35.950	5.000	0.000	0.000	363.65
T14	80.00-60.00	A	22.988	5.000	0.000	0.000	292.64
		B	63.317	10.000	0.000	0.000	728.96
		C	36.764	5.000	0.000	0.000	365.97
T15	60.00-50.00	A	11.786	2.500	0.000	0.000	146.32
		B	31.950	5.000	0.000	0.000	369.35
		C	19.083	2.500	0.000	0.000	138.19
T16	50.00-40.00	A	11.786	2.500	0.000	0.000	146.32
		B	31.950	5.000	0.000	0.000	369.35
		C	19.083	2.500	0.000	0.000	138.19
T17	40.00-20.00	A	23.571	5.000	0.000	0.000	292.64
		B	63.900	10.000	0.000	0.000	738.70
		C	38.167	5.000	0.000	0.000	376.39
T18	20.00-0.00	A	14.859	4.500	0.000	0.000	203.77
		B	42.162	8.000	0.000	0.000	511.86
		C	19.667	5.000	0.000	0.000	189.73

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	195.00-180.00	A	0.924	11.083	8.850	0.000	0.000	358.97
		B		14.805	15.955	0.000	0.000	779.85
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	0.918	6.035	7.801	0.000	0.000	265.45
		B		5.628	7.436	0.000	0.000	318.55
		C		0.000	0.000	0.000	0.000	0.00
T3	175.00-170.00	A	0.915	6.039	7.798	0.000	0.000	264.82
		B		5.615	7.433	0.000	0.000	318.00
		C		0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	0.910	12.029	15.584	0.000	0.000	527.70
		B		15.556	39.837	0.000	0.000	1134.09
		C		0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	0.903	11.961	15.569	0.000	0.000	524.99
		B		15.793	42.080	0.000	0.000	1169.34
		C		2.645	8.397	0.000	0.000	196.59

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T6	150.00-140.00	A	0.896	11.889	15.553	0.000	0.000	522.13
		B		15.709	42.048	0.000	0.000	1164.13
		C		7.171	23.941	0.000	0.000	489.07
T7	140.00-133.33	A	0.889	7.864	10.359	0.000	0.000	346.42
		B		10.424	28.013	0.000	0.000	773.03
		C		4.759	15.951	0.000	0.000	324.42
T8	133.33-126.67	A	0.884	7.848	10.351	0.000	0.000	345.02
		B		10.382	27.997	0.000	0.000	770.47
		C		4.742	15.943	0.000	0.000	323.05
T9	126.67-120.00	A	0.879	7.811	10.343	0.000	0.000	343.56
		B		10.339	27.981	0.000	0.000	767.80
		C		4.723	15.935	0.000	0.000	321.63
T10	120.00-113.33	A	0.873	7.772	10.335	0.000	0.000	342.03
		B		10.293	27.964	0.000	0.000	765.00
		C		4.704	15.926	0.000	0.000	320.13
T11	113.33-106.67	A	0.867	7.731	10.325	0.000	0.000	340.43
		B		10.246	27.945	0.000	0.000	762.06
		C		4.683	15.917	0.000	0.000	318.57
T12	106.67-100.00	A	0.860	7.688	10.316	0.000	0.000	338.75
		B		10.195	27.926	0.000	0.000	758.97
		C		4.661	15.908	0.000	0.000	316.92
T13	100.00-80.00	A	0.846	22.782	30.885	0.000	0.000	1005.29
		B		30.256	83.653	0.000	0.000	2256.73
		C		13.843	47.660	0.000	0.000	940.00
T14	80.00-60.00	A	0.821	22.279	30.773	0.000	0.000	986.01
		B		29.670	83.430	0.000	0.000	2221.11
		C		16.526	47.548	0.000	0.000	945.88
T15	60.00-50.00	A	0.797	12.526	15.335	0.000	0.000	484.15
		B		16.182	41.611	0.000	0.000	1110.15
		C		11.774	23.722	0.000	0.000	483.19
T16	50.00-40.00	A	0.778	12.305	15.292	0.000	0.000	477.05
		B		15.929	41.526	0.000	0.000	1096.46
		C		11.584	23.680	0.000	0.000	475.17
T17	40.00-20.00	A	0.750	23.946	30.458	0.000	0.000	933.10
		B		31.100	82.800	0.000	0.000	2152.25
		C		22.600	47.233	0.000	0.000	926.57
T18	20.00-0.00	A	0.750	18.834	20.775	0.000	0.000	639.41
		B		24.217	56.320	0.000	0.000	1472.78
		C		15.633	27.783	0.000	0.000	583.34

Feed Line Shielding

Section	Elevation ft	Face	A_R ft²	A_R Ice ft²	A_F ft²	A_F Ice ft²
T1	195.00-180.00	A	0.355	3.060	0.363	0.600
		B	0.697	5.381	0.714	1.056
		C	0.000	0.000	0.000	0.000
T2	180.00-175.00	A	0.000	1.661	0.781	1.462
		B	0.000	1.556	0.802	1.370
		C	0.000	0.000	0.000	0.000
T3	175.00-170.00	A	0.000	1.560	0.912	1.705
		B	0.000	1.462	0.937	1.598
		C	0.000	0.000	0.000	0.000
T4	170.00-160.00	A	0.000	2.904	1.394	2.602
		B	0.000	6.250	3.548	5.600
		C	0.000	0.000	0.000	0.000

Section	Elevation ft	Face	A_R ft²	A_R Ice ft²	A_F ft²	A_F Ice ft²
T5	160.00-150.00	A	0.000	2.704	1.609	2.995
		B	0.000	6.106	4.333	6.762
		C	0.000	1.307	0.733	1.448
T6	150.00-140.00	A	0.000	2.566	1.544	2.865
		B	0.000	5.800	4.157	6.475
		C	0.000	3.316	2.361	3.702
T7	140.00-133.33	A	0.000	0.965	0.733	1.356
		B	0.000	2.182	1.972	3.067
		C	0.000	1.248	1.120	1.754
T8	133.33-126.67	A	0.000	0.926	0.709	1.309
		B	0.000	2.097	1.909	2.964
		C	0.000	1.199	1.084	1.695
T9	126.67-120.00	A	0.000	0.893	0.690	1.271
		B	0.000	2.024	1.857	2.880
		C	0.000	1.157	1.055	1.647
T10	120.00-113.33	A	0.000	1.223	1.144	2.102
		B	0.000	2.773	3.079	4.767
		C	0.000	1.586	1.749	2.726
T11	113.33-106.67	A	0.000	1.195	1.128	2.068
		B	0.000	2.711	3.037	4.693
		C	0.000	1.550	1.724	2.684
T12	106.67-100.00	A	0.000	1.169	0.984	1.801
		B	0.000	2.655	2.651	4.090
		C	0.000	1.518	1.505	2.339
T13	100.00-80.00	A	0.000	3.366	3.661	6.658
		B	0.000	7.659	9.859	15.152
		C	0.000	4.381	5.599	8.666
T14	80.00-60.00	A	0.000	2.178	2.589	4.643
		B	0.000	4.974	6.947	10.604
		C	0.000	2.978	4.023	6.348
T15	60.00-50.00	A	0.000	1.065	1.236	2.202
		B	0.000	2.441	3.328	5.047
		C	0.000	1.479	1.938	3.059
T16	50.00-40.00	A	0.000	1.020	1.223	2.162
		B	0.000	2.343	3.293	4.969
		C	0.000	1.419	1.918	3.010
T17	40.00-20.00	A	0.000	1.330	2.030	3.546
		B	0.000	3.068	5.466	8.182
		C	0.000	1.857	3.184	4.952
T18	20.00-0.00	A	0.000	0.884	1.628	2.948
		B	0.000	2.055	4.482	6.849
		C	0.000	1.082	2.178	3.606

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	195.00-180.00	2.7592	-4.7701	1.3082	-3.1195
T2	180.00-175.00	1.8618	-6.4692	1.1822	-4.7670
T3	175.00-170.00	1.9064	-6.6497	1.2397	-5.0221
T4	170.00-160.00	2.1477	-11.9831	1.5617	-9.1737
T5	160.00-150.00	1.7880	-11.0584	1.2527	-8.3640
T6	150.00-140.00	0.7850	-7.9284	0.7086	-6.8434
T7	140.00-133.33	0.8904	-8.5689	0.8924	-8.2847
T8	133.33-126.67	0.9914	-9.2604	0.9880	-8.9554
T9	126.67-120.00	1.0889	-9.9223	1.0795	-9.5938

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T10	120.00-113.33	1.0235	-9.1519	0.9756	-8.5484
T11	113.33-106.67	1.0977	-9.6422	1.0429	-9.0080
T12	106.67-100.00	1.2217	-10.5611	1.1474	-9.7832
T13	100.00-80.00	1.2092	-10.2039	1.1618	-9.7182
T14	80.00-60.00	1.5195	-12.3167	1.5079	-11.9942
T15	60.00-50.00	1.6682	-13.0532	1.6024	-11.6874
T16	50.00-40.00	1.7639	-13.6776	1.6927	-12.2814
T17	40.00-20.00	2.0166	-15.4516	1.9846	-14.3256
T18	20.00-0.00	2.1651	-12.6720	2.0825	-12.1935

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
1.75" Dia x 5-ft Pipe	C	From Leg	2.25		-30.0000	75.50	No Ice	0.88	0.88	12.00
			0.00				1/2" Ice	1.32	1.32	19.06
			0.00				1" Ice	1.63	1.63	29.51
							2" Ice	2.28	2.28	61.18
							4" Ice	3.68	3.68	171.86
GPS0015	C	From Leg	4.50		-30.0000	75.50	No Ice	0.10	0.10	0.50
			0.00				1/2" Ice	0.15	0.15	2.29
			0.75				1" Ice	0.22	0.22	4.89
							2" Ice	0.38	0.38	13.15
							4" Ice	0.83	0.83	46.16
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Sector Mount [SM 502-3]	C	None			0.0000	152.00	No Ice	33.02	33.02	1673.10
							1/2" Ice	47.36	47.36	2223.90
							1" Ice	61.70	61.70	2774.70
							2" Ice	90.38	90.38	3876.30
							4" Ice	147.74	147.74	6079.50
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	5.00		0.0000	152.00	No Ice	8.26	6.71	78.90
			0.00				1/2" Ice	8.81	7.66	144.31
			0.00				1" Ice	9.36	8.49	217.47
							2" Ice	10.50	10.20	390.34
							4" Ice	12.88	13.98	872.84
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	5.00		0.0000	152.00	No Ice	8.26	6.71	78.90
			0.00				1/2" Ice	8.81	7.66	144.31
			0.00				1" Ice	9.36	8.49	217.47
							2" Ice	10.50	10.20	390.34
							4" Ice	12.88	13.98	872.84
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	5.00		0.0000	152.00	No Ice	8.26	6.71	78.90
			0.00				1/2" Ice	8.81	7.66	144.31
			0.00				1" Ice	9.36	8.49	217.47
							2" Ice	10.50	10.20	390.34
							4" Ice	12.88	13.98	872.84
800MHZ 2X50W RRH	A	From Leg	5.00		0.0000	152.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77

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
800MHZ 2X50W RRH	B	From Leg	5.00		0.0000	152.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77
800MHZ 2X50W RRH	C	From Leg	5.00		0.0000	152.00	No Ice	2.49	2.07	53.00
			0.00				1/2" Ice	2.71	2.27	74.19
			0.00				1" Ice	2.93	2.48	98.39
							2" Ice	3.41	2.93	156.61
							4" Ice	4.46	3.93	317.77
1900MHz 2X40W RRH	A	From Leg	5.00		0.0000	152.00	No Ice	2.71	2.61	59.50
			0.00				1/2" Ice	2.95	2.84	82.62
			0.00				1" Ice	3.20	3.09	108.98
							2" Ice	3.72	3.61	172.17
							4" Ice	4.86	4.74	345.91
1900MHz 2X40W RRH	B	From Leg	5.00		0.0000	152.00	No Ice	2.71	2.61	59.50
			0.00				1/2" Ice	2.95	2.84	82.62
			0.00				1" Ice	3.20	3.09	108.98
							2" Ice	3.72	3.61	172.17
							4" Ice	4.86	4.74	345.91
1900MHz 2X40W RRH	C	From Leg	5.00		0.0000	152.00	No Ice	2.71	2.61	59.50
			0.00				1/2" Ice	2.95	2.84	82.62
			0.00				1" Ice	3.20	3.09	108.98
							2" Ice	3.72	3.61	172.17
							4" Ice	4.86	4.74	345.91
(2) DB980H65T2E-M w/ Mount Pipe	A	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
(2) DB980H65T2E-M w/ Mount Pipe	B	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
(2) DB980H65T2E-M w/ Mount Pipe	C	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
DB980H90T2E-M w/ Mount Pipe	A	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
DB980H90T2E-M w/ Mount Pipe	B	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
DB980H90T2E-M w/ Mount Pipe	C	From Leg	5.00		0.0000	152.00	No Ice	4.04	3.62	30.40
			0.00				1/2" Ice	4.50	4.48	66.41
			0.00				1" Ice	4.95	5.22	108.76
							2" Ice	5.87	6.74	215.74
							4" Ice	8.05	10.00	549.44
****										
(3) Sector Mounts 169-ft	C	None			0.0000	169.00	No Ice	21.56	21.56	1395.40

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
							2" Ice	54.40	54.40	4374.20
							4" Ice	87.24	87.24	7353.00
(2) BXA-70063/6CF w/ Mount Pipe	A	From Leg	5.00	0.00	0.0000	169.00	No Ice	7.75	5.18	38.90
			0.00				1/2" Ice	8.29	6.11	95.39
			0.00				1" Ice	8.85	6.92	159.37
							2" Ice	9.97	8.59	313.07
							4" Ice	12.34	12.13	754.05
(2) DB844G65ZAXY w/Mount Pipe	B	From Leg	5.00	0.00	0.0000	169.00	No Ice	5.38	5.40	40.00
			0.00				1/2" Ice	6.07	6.49	89.98
			0.00				1" Ice	6.65	7.30	148.78
							2" Ice	7.83	8.96	288.22
							4" Ice	10.34	12.49	688.80
(2) DB844G65ZAXY w/Mount Pipe	C	From Leg	5.00	0.00	0.0000	169.00	No Ice	5.38	5.40	40.00
			0.00				1/2" Ice	6.07	6.49	89.98
			0.00				1" Ice	6.65	7.30	148.78
							2" Ice	7.83	8.96	288.22
							4" Ice	10.34	12.49	688.80
MG D3-800TO w/ Mount Pipe	A	From Leg	5.00	0.00	0.0000	169.00	No Ice	3.57	3.42	37.28
			0.00				1/2" Ice	3.98	4.12	68.91
			0.00				1" Ice	4.39	4.78	109.44
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
MG D3-800TO w/ Mount Pipe	B	From Leg	5.00	0.00	0.0000	169.00	No Ice	3.57	3.42	37.28
			0.00				1/2" Ice	3.98	4.12	68.91
			0.00				1" Ice	4.39	4.78	109.44
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
MG D3-800TO w/ Mount Pipe	C	From Leg	5.00	0.00	0.0000	169.00	No Ice	3.57	3.42	37.28
			0.00				1/2" Ice	3.98	4.12	68.91
			0.00				1" Ice	4.39	4.78	109.44
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
BXA-70080/6CF w/ Mount Pipe	A	From Leg	5.00	0.00	0.0000	169.00	No Ice	7.70	5.54	42.90
			0.00				1/2" Ice	8.24	6.48	100.79
			0.00				1" Ice	8.79	7.30	166.25
							2" Ice	9.92	8.99	323.17
							4" Ice	12.28	12.56	771.61
DB846F65ZAXY w/Mount Pipe	B	From Leg	5.00	0.00	0.0000	169.00	No Ice	7.27	7.82	50.00
			0.00				1/2" Ice	7.88	9.01	111.10
			0.00				1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
DB846F65ZAXY w/Mount Pipe	C	From Leg	5.00	0.00	0.0000	169.00	No Ice	7.27	7.82	50.00
			0.00				1/2" Ice	7.88	9.01	111.10
			0.00				1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
(2) FD9R6004	A	From Leg	5.00	0.00	0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
							4" Ice	1.28	0.74	62.87
(2) FD9R6004	B	From Leg	5.00	0.00	0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
							2" Ice	0.75	0.34	19.61
							4" Ice	1.28	0.74	62.87
(2) FD9R6004	C	From Leg	5.00	0.00	0.0000	169.00	No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
							4" Ice	1.28	0.74	62.87
****										
****										
(3) Sector Mounts 191-ft	C	None			0.0000	188.00	No Ice	21.56	21.56	1395.40
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
							2" Ice	54.40	54.40	4374.20
							4" Ice	87.24	87.24	7353.00
(2) 7770.00 w/ Mount Pipe	A	From Leg	5.00	0.00	-30.0000	188.00	No Ice	6.22	4.35	56.90
			0.00				1/2" Ice	6.77	5.20	105.42
			3.00				1" Ice	7.30	5.92	160.42
							2" Ice	8.38	7.41	293.10
							4" Ice	10.69	10.76	679.83
(2) 7770.00 w/ Mount Pipe	B	From Leg	5.00	0.00	-30.0000	188.00	No Ice	6.22	4.35	56.90
			0.00				1/2" Ice	6.77	5.20	105.42
			3.00				1" Ice	7.30	5.92	160.42
							2" Ice	8.38	7.41	293.10
							4" Ice	10.69	10.76	679.83
(2) 7770.00 w/ Mount Pipe	C	From Leg	5.00	0.00	-30.0000	188.00	No Ice	6.22	4.35	56.90
			0.00				1/2" Ice	6.77	5.20	105.42
			3.00				1" Ice	7.30	5.92	160.42
							2" Ice	8.38	7.41	293.10
							4" Ice	10.69	10.76	679.83
P65-17-XLH-RR w/Mount Pipe	A	From Leg	5.00	0.00	-30.0000	188.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
							2" Ice	14.64	14.31	498.46
							4" Ice	17.91	19.14	1125.60
P65-17-XLH-RR w/Mount Pipe	B	From Leg	5.00	0.00	-30.0000	188.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
							2" Ice	14.64	14.31	498.46
							4" Ice	17.91	19.14	1125.60
P65-17-XLH-RR w/Mount Pipe	C	From Leg	5.00	0.00	-30.0000	188.00	No Ice	11.70	8.94	91.85
			0.00				1/2" Ice	12.42	10.45	177.61
			3.00				1" Ice	13.15	11.99	273.25
							2" Ice	14.64	14.31	498.46
							4" Ice	17.91	19.14	1125.60
(2) LGP13519	A	From Leg	5.00	0.00	-30.0000	188.00	No Ice	0.35	0.33	8.04
			0.00				1/2" Ice	0.44	0.47	12.97
			3.00				1" Ice	0.55	0.63	19.68
							2" Ice	0.78	1.01	39.83
							4" Ice	1.37	2.01	119.63
(2) LGP13519	B	From Leg	5.00	0.00	-30.0000	188.00	No Ice	0.35	0.33	8.04
			0.00				1/2" Ice	0.44	0.47	12.97
			3.00				1" Ice	0.55	0.63	19.68
							2" Ice	0.78	1.01	39.83
							4" Ice	1.37	2.01	119.63
(2) LGP13519	C	From Leg	5.00	0.00	-30.0000	188.00	No Ice	0.35	0.33	8.04
			0.00				1/2" Ice	0.44	0.47	12.97
			3.00				1" Ice	0.55	0.63	19.68

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
							2" Ice	0.78	1.01	39.83
							4" Ice	1.37	2.01	119.63
(2) LGP21401	A	From Leg	5.00		-30.0000	188.00	No Ice	0.00	0.36	10.00
			0.00				1/2" Ice	0.00	0.48	21.26
			3.00				1" Ice	0.00	0.60	30.32
							2" Ice	0.00	0.87	54.89
							4" Ice	0.00	1.52	135.29
(2) LGP21401	B	From Leg	5.00		-30.0000	188.00	No Ice	0.00	0.36	10.00
			0.00				1/2" Ice	0.00	0.48	21.26
			3.00				1" Ice	0.00	0.60	30.32
							2" Ice	0.00	0.87	54.89
							4" Ice	0.00	1.52	135.29
(2) LGP21401	C	From Leg	5.00		-30.0000	188.00	No Ice	0.00	0.36	10.00
			0.00				1/2" Ice	0.00	0.48	21.26
			3.00				1" Ice	0.00	0.60	30.32
							2" Ice	0.00	0.87	54.89
							4" Ice	0.00	1.52	135.29
(2) RRUS-11	A	From Leg	5.00		-30.0000	188.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			3.00				1" Ice	3.41	1.59	96.56
							2" Ice	3.91	1.96	150.56
							4" Ice	5.02	2.82	302.12
(2) RRUS-11	B	From Leg	5.00		-30.0000	188.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			3.00				1" Ice	3.41	1.59	96.56
							2" Ice	3.91	1.96	150.56
							4" Ice	5.02	2.82	302.12
(2) RRUS-11	C	From Leg	5.00		-30.0000	188.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			3.00				1" Ice	3.41	1.59	96.56
							2" Ice	3.91	1.96	150.56
							4" Ice	5.02	2.82	302.12
DC6-48-60-18-8F	A	From Leg	5.00		-30.0000	188.00	No Ice	1.27	1.27	20.00
			0.00				1/2" Ice	1.46	1.46	35.12
			3.00				1" Ice	1.66	1.66	52.57
							2" Ice	2.09	2.09	95.09
							4" Ice	3.10	3.10	214.90
****										
Sector Mount [SM 802-3]	C	None			0.0000	195.00	No Ice	24.41	24.41	930.00
							1/2" Ice	31.39	31.39	1362.00
							1" Ice	38.37	38.37	1794.00
							2" Ice	52.33	52.33	2658.00
							4" Ice	80.25	80.25	4386.00
HSS Top Mount	C	None			0.0000	195.00	No Ice	8.08	8.08	328.90
							1/2" Ice	9.70	9.70	415.20
							1" Ice	11.32	11.32	501.50
							2" Ice	14.56	14.56	674.10
							4" Ice	21.04	21.04	1019.30
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	3.00		25.0000	193.00	No Ice	11.21	9.36	75.35
			0.00				1/2" Ice	11.83	10.68	158.69
			0.00				1" Ice	12.45	11.71	251.57
							2" Ice	13.74	13.82	469.57
							4" Ice	16.75	18.22	1068.51
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	3.00		25.0000	193.00	No Ice	11.21	9.36	75.35
			0.00				1/2" Ice	11.83	10.68	158.69
			0.00				1" Ice	12.45	11.71	251.57
							2" Ice	13.74	13.82	469.57

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
							4" Ice	16.75	18.22	1068.51
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	3.00		25.0000	193.00	No Ice	11.21	9.36	75.35
			0.00				1/2" Ice	11.83	10.68	158.69
			0.00				1" Ice	12.45	11.71	251.57
							2" Ice	13.74	13.82	469.57
							4" Ice	16.75	18.22	1068.51
APXI16DWV-16DWVS-A	A	From Leg	3.00		25.0000	195.00	No Ice	7.07	2.15	40.70
			0.00				1/2" Ice	7.52	2.49	73.65
			0.00				1" Ice	7.98	2.84	111.47
							2" Ice	8.92	3.55	202.47
							4" Ice	10.91	5.08	451.40
APXI16DWV-16DWVS-A	B	From Leg	3.00		25.0000	195.00	No Ice	7.07	2.15	40.70
			0.00				1/2" Ice	7.52	2.49	73.65
			0.00				1" Ice	7.98	2.84	111.47
							2" Ice	8.92	3.55	202.47
							4" Ice	10.91	5.08	451.40
APXI16DWV-16DWVS-A	C	From Leg	3.00		25.0000	195.00	No Ice	7.07	2.15	40.70
			0.00				1/2" Ice	7.52	2.49	73.65
			0.00				1" Ice	7.98	2.84	111.47
							2" Ice	8.92	3.55	202.47
							4" Ice	10.91	5.08	451.40
(2) KRY 112 71	A	From Leg	3.00		25.0000	195.00	No Ice	0.73	0.66	18.07
			0.00				1/2" Ice	0.87	0.88	26.97
			0.00				1" Ice	1.03	1.11	38.22
							2" Ice	1.37	1.65	69.33
							4" Ice	2.20	2.95	180.58
(2) KRY 112 71	B	From Leg	3.00		25.0000	195.00	No Ice	0.73	0.66	18.07
			0.00				1/2" Ice	0.87	0.88	26.97
			0.00				1" Ice	1.03	1.11	38.22
							2" Ice	1.37	1.65	69.33
							4" Ice	2.20	2.95	180.58
(2) KRY 112 71	C	From Leg	3.00		25.0000	195.00	No Ice	0.73	0.66	18.07
			0.00				1/2" Ice	0.87	0.88	26.97
			0.00				1" Ice	1.03	1.11	38.22
							2" Ice	1.37	1.65	69.33
							4" Ice	2.20	2.95	180.58
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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

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	8.541	27	0.4989	0.0826
T2	180 - 175	6.913	27	0.4616	0.0445
T3	175 - 170	6.433	27	0.4322	0.0412
T4	170 - 160	5.996	27	0.4005	0.0391
T5	160 - 150	5.185	27	0.3626	0.0363
T6	150 - 140	4.472	27	0.3108	0.0336
T7	140 - 133.333	3.848	27	0.2748	0.0308
T8	133.333 - 126.667	3.464	27	0.2623	0.0285
T9	126.667 - 120	3.097	27	0.2494	0.0262
T10	120 - 113.333	2.745	27	0.2362	0.0234
T11	113.333 - 106.667	2.419	27	0.2156	0.0211
T12	106.667 - 100	2.121	27	0.1947	0.0188
T13	100 - 80	1.854	27	0.1737	0.0167
T14	80 - 60	1.166	27	0.1420	0.0123
T15	60 - 50	0.629	27	0.0991	0.0079
T16	50 - 40	0.429	27	0.0776	0.0061
T17	40 - 20	0.275	27	0.0562	0.0043
T18	20 - 0	0.078	27	0.0280	0.0021

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	27	8.541	0.4989	0.0826	22285
193.00	LNX-6515DS-VTM w/ Mount Pipe	27	8.316	0.4963	0.0757	22285
188.00	(3) Sector Mounts 191-ft	27	7.759	0.4881	0.0595	15918
169.00	(3) Sector Mounts 169-ft	27	5.912	0.3955	0.0387	15663
152.00	Sector Mount [SM 502-3]	27	4.607	0.3212	0.0342	12597
75.50	1.75" Dia x 5-ft Pipe	27	1.031	0.1340	0.0113	32190

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	24.451	2	1.4268	0.2251
T2	180 - 175	19.801	2	1.3207	0.1287
T3	175 - 170	18.427	2	1.2368	0.1191
T4	170 - 160	17.177	2	1.1462	0.1129
T5	160 - 150	14.857	2	1.0379	0.1049
T6	150 - 140	12.816	2	0.8896	0.0971
T7	140 - 133.333	11.027	2	0.7867	0.0889
T8	133.333 - 126.667	9.928	2	0.7510	0.0824
T9	126.667 - 120	8.877	2	0.7139	0.0758
T10	120 - 113.333	7.869	2	0.6764	0.0677
T11	113.333 - 106.667	6.935	2	0.6174	0.0609
T12	106.667 - 100	6.080	2	0.5575	0.0543
T13	100 - 80	5.315	2	0.4972	0.0483
T14	80 - 60	3.345	2	0.4065	0.0356
T15	60 - 50	1.806	2	0.2838	0.0230
T16	50 - 40	1.231	2	0.2224	0.0176
T17	40 - 20	0.789	2	0.1611	0.0125
T18	20 - 0	0.226	2	0.0803	0.0060

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	2	24.451	1.4268	0.2251	7948
193.00	LNX-6515DS-VTM w/ Mount Pipe	2	23.809	1.4195	0.2076	7948
188.00	(3) Sector Mounts 191-ft	2	22.219	1.3963	0.1665	5677
169.00	(3) Sector Mounts 169-ft	2	16.936	1.1318	0.1120	5487
152.00	Sector Mount [SM 502-3]	2	13.201	0.9194	0.0987	4411
75.50	1.75" Dia x 5-ft Pipe	2	2.959	0.3837	0.0328	11259

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	195	Leg	A325N	0.7500	4	4429.39	19438.60	0.228	1.333	Bolt Tension
T2	180	Diagonal	A325N	0.5000	1	2904.55	3126.56	0.929	1.333	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	574.38	4553.91	0.126	1.333	Member Block Shear
T3	175	Diagonal	A325X	0.5000	1	2825.87	4078.13	0.693	1.333	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	717.64	4553.91	0.158	1.333	Member Block Shear
T4	170	Leg	A325N	0.7500	6	8908.97	19438.20	0.458	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4309.82	5437.50	0.793	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1038.84	4553.91	0.228	1.333	Member Block Shear
T5	160	Diagonal	A325X	0.5000	1	4976.05	5437.50	0.915	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1368.10	4553.91	0.300	1.333	Member Block Shear
T6	150	Leg	A325N	1.0000	6	15020.60	34557.40	0.435	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	5749.59	5437.50	1.057	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1759.09	4553.91	0.386	1.333	Member Block Shear
T7	140	Diagonal	A325X	0.6250	1	6098.00	8156.25	0.748	1.333	Member Bearing
T8	133.333	Diagonal	A325X	0.6250	1	6243.31	8156.25	0.765	1.333	Member Bearing
T9	126.667	Leg	A325N	1.0000	8	15634.00	34557.50	0.452	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6103.90	5097.66	1.197	1.333	Member Bearing
T10	120	Diagonal	A325N	0.6250	1	6278.68	5097.66	1.232	1.333	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	2626.78	5097.66	0.515	1.333	Member Bearing
T11	113.333	Diagonal	A325N	0.6250	1	6322.54	5097.66	1.240	1.333	Member Bearing
		Secondary Horizontal	A325N	0.7500	1	2839.18	6117.19	0.464	1.333	Member Bearing
T12	106.667	Leg	A325N	1.0000	8	19494.00	34557.10	0.564	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	6520.01	8156.25	0.799	1.333	Member Bearing
T13	100	Leg	A325N	1.2500	8	23204.30	53996.10	0.430	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3652.40	6442.72	0.567	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3649.71	6442.72	0.566	1.333	Bolt Shear
T14	80	Leg	A325N	1.2500	8	26760.60	53996.10	0.496	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3865.62	6442.72	0.600	1.333	Bolt Shear
T15	60	Diagonal	A325N	0.6250	2	4741.36	6442.72	0.736	1.333	Bolt Shear
T16	50	Leg	A325N	1.2500	8	29740.40	53995.90	0.551	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	4753.45	6442.72	0.738	1.333	Bolt Shear
T17	40	Leg	A325N	1.2500	8	33052.10	53996.10	0.612	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	4776.56	6442.72	0.741	1.333	Bolt Shear
T18	20	Leg	A36	1.5000	8	36970.80	33823.20	1.093	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	5333.56	6442.72	0.828	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	K/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4 K=1.00	26833.100	1.7072	-29908.70	45810.40	0.653
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.67	33.8 K=1.00	29103.699	1.7072	-33120.40	49687.00	0.667
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.65	33.5 K=1.00	29141.699	1.7072	-41381.10	49751.90	0.832
T4	170 - 160	2.5SCH40 w/ 3SCH80 Half Sleeve	10.02	2.62	34.2 K=1.00	19124.000	3.2120	-59902.60	61426.70	0.975
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.60	23.4 K=1.00	30584.000	2.6795	-78888.60	81951.10	0.963
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.59	23.8 K=1.00	27885.500	4.2666	-101435.00	118976.00	0.853
T7	140 - 133.333	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	23299.900	8.5023	-113873.00	198103.00	0.575
T8	133.333 - 126.667	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	23299.900	8.5023	-127246.00	198103.00	0.642
T9	126.667 - 120	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	23299.900	8.5023	-140193.00	198103.00	0.708
T10	120 - 113.333	PIPE 6 STD (SCH40)	6.68	3.45	18.4 K=1.00	31206.400	5.5858	-151468.00	174311.00	0.869
T11	113.333 - 106.667	PIPE 6 STD (SCH40)	6.68	3.44	18.4 K=1.00	31211.000	5.5858	-163716.00	174337.00	0.939
T12	106.667 - 100	PIPE 6 STD (SCH40)	6.68	3.44	18.4 K=1.00	31215.100	5.5858	-175173.00	174360.00	1.005
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.42	19.5 K=1.00	23952.699	11.1800	-210453.00	267791.00	0.786
T14	80 - 60	PIPE 8 STD (SCH40)	20.03	6.68	27.3 K=1.00	30055.500	8.3993	-243876.00	252443.00	0.966
T15	60 - 50	PIPE 8 STD (SCH40)	10.02	5.16	21.1 K=1.00	30878.199	8.3993	-256091.00	259353.00	0.987
T16	50 - 40	PIPE 8 STD (SCH40)	10.02	5.16	21.1 K=1.00	30882.900	8.3993	-272419.00	259393.00	1.050
T17	40 - 20	PIPE 8 X-STR (SCH80)	20.03	10.02	41.7 K=1.00	27820.100	12.7706	-304788.00	355279.00	0.858
T18	20 - 0	PIPE 8 X-STR (SCH80)	20.03	9.97	41.6 K=1.00	27849.500	12.7706	-344033.00	355654.00	0.967

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	K/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.13	128.2 K=1.00	9084.010	0.5273	-3415.84	4790.39	0.713
T3	175 - 170	L2x2x3/16	6.56	3.29	100.2 K=1.00	12953.100	0.7150	-2603.33	9261.49	0.281
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4	7.25	3.60	108.7 K=1.15	11846.800	1.0547	-4234.85	12494.70	0.339
T5	160 - 150	2L2x2x3/16x1/4	8.01	3.95	96.0 K=1.25	13482.500	1.4297	-5258.19	19275.70	0.273
T6	150 - 140	2L2x2x3/16x1/4	8.40	4.13	97.9 K=1.22	13240.600	1.4297	-5927.96	18930.00	0.313
T7	140 - 133.333	L2 1/2x2 1/2x1/4	10.29	4.87	119.2 K=1.00	10400.300	1.1900	-6191.60	12376.30	0.500
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.26	128.6 K=1.00	9025.160	1.1900	-6351.08	10739.90	0.591

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.53	134.1 K=1.00	8300.260	0.9020	-6167.25	7486.84	0.824
T10	120 - 113.333	L3x3x3/16	11.88	5.81	116.9 K=1.00	10622.200	1.0900	-6853.46	11578.20	0.592
T11	113.333 - 106.667	L3x3x3/16	12.44	6.09	120.2 K=0.98	10194.600	1.0900	-6725.98	11112.10	0.605
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	152.5 K=1.00	6419.940	1.1900	-7166.76	7639.72	0.938
T13	100 - 80	L3 1/2x3 1/2x1/4	14.76	7.21	106.0 K=0.85	12207.700	1.6900	-7154.37	20631.00	0.347
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	8.07	118.7 K=0.85	10473.400	1.6900	-7731.23	17700.10	0.437
T15	60 - 50	L3x3x5/16	18.87	9.11	170.0 K=0.92	5167.060	1.7800	-9482.73	9197.36	1.031
T16	50 - 40	L3x3x5/16	19.73	9.54	176.7 K=0.91	4784.310	1.7800	-9506.89	8516.08	1.116
T17	40 - 20	L4x4x3/8	21.47	10.41	149.5 K=0.94	6685.630	2.8600	-9553.12	19120.90	0.500
T18	20 - 0	L5x5x5/16	23.24	11.30	132.5 K=0.97	8501.120	3.0300	-10667.10	25758.40	0.414

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	124.9 K=0.94	9564.350	0.5273	-4994.29	5043.70	0.990

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T2	180 - 175	L2x2x3/16	3.73	3.49	53.2 K=0.50	18064.801	0.7150	-574.38	12916.40	0.044
T3	175 - 170	L2x2x3/16	4.24	4.00	60.8 K=0.50	17348.500	0.7150	-717.64	12404.20	0.058
T4	170 - 160	L2x2x3/16	5.24	4.95	75.3 K=0.50	15867.200	0.7150	-1038.84	11345.10	0.092
T5	160 - 150	L2x2x3/16	6.24	5.91	89.9 K=0.50	14210.700	0.7150	-1368.10	10160.70	0.135
T6	150 - 140	L2x2x3/16	7.24	6.87	104.6 K=0.50	12391.800	0.7150	-1759.09	8860.11	0.199
T10	120 - 113.333	L3x3x3/16	9.82	9.27	93.3 K=0.50	13524.800	1.0900	-2626.78	14742.00	0.178
T11	113.333 - 106.667	L3x3x3/16	10.49	9.94	100.0 K=0.50	12741.900	1.0900	-2839.18	13888.60	0.204
T12	106.667 - 100	L3x3x3/16	11.16	10.60	179.6 K=0.84	4627.600	1.0900	-3037.88	5044.08	0.602
T13	100 - 80	L3x3x1/4	13.16	12.52	126.9 K=0.50	9270.800	1.4400	-3649.71	13350.00	0.273

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T15	60 - 50	L4x4x1/4	15.98	15.27	191.4 K=0.83	4077.370	1.9400	-4441.17	7910.10	0.561
T16	50 - 40	L4x4x1/4	16.99	16.27	201.7 K=0.82	3669.730	1.9400	-4724.33	7119.28	0.664

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	124.9 K=0.94	9564.350	0.5273	-878.45	5043.70	0.174

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	124.9 K=0.94	9564.350	0.5273	-2460.57	5043.70	0.488

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4	33000.000	1.7072	17717.60	56338.90	0.314
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.34	29.5	33000.000	1.7072	30404.70	56338.90	0.540
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.36	29.8	33000.000	1.7072	37340.60	56338.90	0.663
T4	170 - 160	2.5SCH40 w/ 3SCH80 Half Sleeve	10.02	2.38	31.1	21000.000	3.2120	53492.80	67452.30	0.793
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.40	21.6	33000.000	2.6795	70238.30	88424.80	0.794
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.42	22.2	30000.000	4.2666	90202.30	127998.00	0.705
T7	140 - 133.333	.5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	27600.000	8.5023	101500.00	234663.00	0.433
T8	133.333 - 126.667	.5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	27600.000	8.5023	113566.00	234663.00	0.484
T9	126.667 - 120	.5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	27600.000	8.5023	125072.00	234663.00	0.533
T10	120 - 113.333	PIPE 6 STD (SCH40)	6.68	3.23	17.2	33000.000	5.5858	135256.00	184330.00	0.734
T11	113.333 - 106.667	PIPE 6 STD (SCH40)	6.68	3.23	17.3	33000.000	5.5858	146033.00	184330.00	0.792
T12	106.667 - 100	PIPE 6 STD (SCH40)	6.68	3.24	17.3	33000.000	5.5858	156135.00	184330.00	0.847
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.25	18.6	25200.000	11.1800	185841.00	281736.00	0.660
T14	80 - 60	PIPE 8 STD (SCH40)	20.03	6.68	27.3	33000.000	8.3993	214085.00	277175.00	0.772

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T15	60 - 50	PIPE 8 STD (SCH40)	10.02	4.85	19.8	33000.000	8.3993	224514.00	277175.00	0.810
T16	50 - 40	PIPE 8 STD (SCH40)	10.02	4.86	19.9	33000.000	8.3993	238228.00	277175.00	0.859
T17	40 - 20	PIPE 8 X-STR (SCH80)	20.03	10.02	41.7	33000.000	12.7706	264417.00	421429.00	0.627
T18	20 - 0	PIPE 8 X-STR (SCH80)	20.03	0.08	0.3	33000.000	12.7706	295766.00	421429.00	0.702

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	5/8	5.13	4.78	366.9	21600.000	0.3068	7360.45	6626.80	1.111
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.13	82.4	29000.000	0.3076	2904.55	8920.90	0.326
T3	175 - 170	L2x2x3/16	6.56	3.29	64.0	29000.000	0.4484	2825.87	13002.40	0.217
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4	7.25	3.60	94.5	29000.000	0.6152	4309.82	17841.80	0.242
T5	160 - 150	2L2x2x3/16x1/4	8.01	3.95	76.8	29000.000	0.8965	4976.05	25998.00	0.191
T6	150 - 140	2L2x2x3/16x1/4	8.40	4.13	80.3	29000.000	0.8965	5749.59	25998.00	0.221
T7	140 - 133.333	L2 1/2x2 1/2x1/4	10.29	4.87	78.0	29000.000	0.7519	6098.00	21804.40	0.280
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.26	82.1	29000.000	0.7519	6243.31	21804.40	0.286
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.53	85.3	29000.000	0.5710	6103.90	16559.90	0.369
T10	120 - 113.333	L3x3x3/16	11.88	5.81	74.2	29000.000	0.7120	6278.68	20648.90	0.304
T11	113.333 - 106.667	L3x3x3/16	12.44	6.09	77.8	29000.000	0.7120	6322.54	20648.90	0.306
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	99.5	29000.000	0.7519	6520.01	21804.40	0.299
T13	100 - 80	L3 1/2x3 1/2x1/4	14.76	7.21	79.4	29000.000	1.1269	7010.20	32679.40	0.215
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	8.07	88.9	29000.000	1.1269	7597.76	32679.40	0.232
T15	60 - 50	L3x3x5/16	18.87	9.11	121.1	29000.000	1.1592	8618.50	33617.30	0.256
T16	50 - 40	L3x3x5/16	19.73	9.54	126.7	29000.000	1.1592	8682.80	33617.30	0.258
T17	40 - 20	L4x4x3/8	21.47	10.41	103.5	29000.000	1.9341	9279.92	56087.80	0.165
T18	20 - 0	L5x5x5/16	23.24	11.30	87.9	29000.000	2.0967	9922.18	60804.80	0.163

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21600.000	0.5273	518.03	11390.60	0.045

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T2	180 - 175	L2x2x3/16	3.73	3.49	67.9	29000.000	0.4308	574.38	12492.70	0.046
T3	175 - 170	L2x2x3/16	4.24	4.00	77.7	29000.000	0.4308	717.64	12492.70	0.057
T4	170 - 160	L2x2x3/16	5.24	4.95	96.2	29000.000	0.4308	1038.84	12492.70	0.083
T5	160 - 150	L2x2x3/16	6.24	5.91	114.9	29000.000	0.4308	1368.10	12492.70	0.110
T6	150 - 140	L2x2x3/16	7.24	6.87	133.5	29000.000	0.4308	1759.09	12492.70	0.141

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T10	120 - 113.333	L3x3x3/16	9.82	9.27	118.5	29000.000	0.7120	2626.78	20648.90	0.127
T11	113.333 - 106.667	L3x3x3/16	10.49	9.94	127.0	29000.000	0.6945	2839.18	20139.10	0.141
T12	106.667 - 100	L3x3x3/16	11.16	10.60	135.5	21600.000	1.0900	3037.88	23544.00	0.129
T13	100 - 80	L3x3x1/4	13.16	12.52	161.6	29000.000	0.9394	3649.71	27241.90	0.134
T15	60 - 50	L4x4x1/4	15.98	15.27	146.6	21600.000	1.9400	4441.17	41904.00	0.106
T16	50 - 40	L4x4x1/4	16.99	16.27	156.2	21600.000	1.9400	4724.33	41904.00	0.113

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	[illegible]	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21600.000	0.5273	415.20	11390.60	0.036

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a psi	A in²	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	21600.000	0.5273	21.10	11390.60	0.002

Section Capacity Table

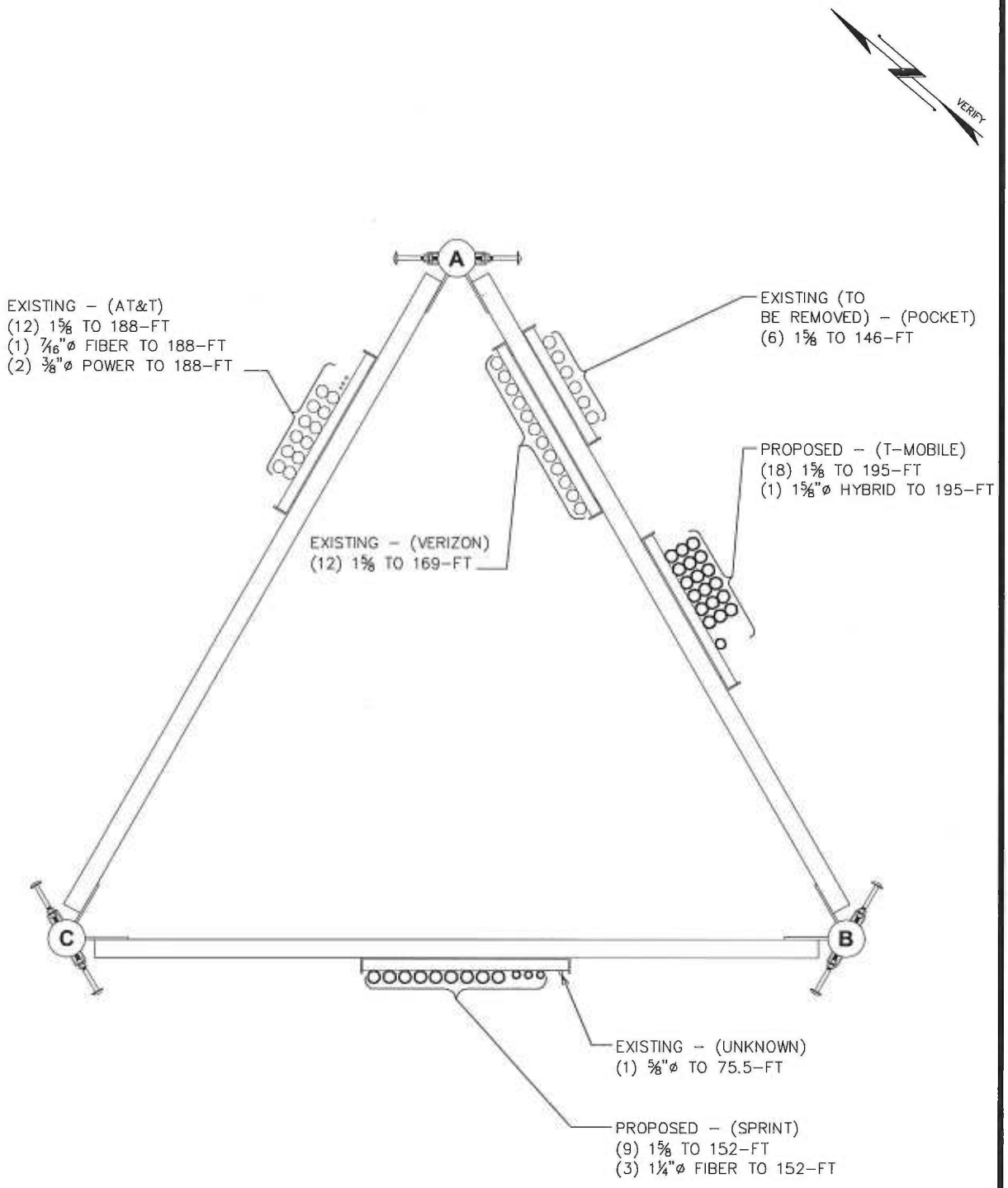
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass / Fail
T1	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	3	-29908.70	61065.36	49.0	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	45	-33120.40	66232.77	50.0	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	57	-41381.10	66319.28	62.4	Pass
T4	170 - 160	Leg	2.5SCH40 w/ 3SCH80 Half Sleeve	Note 3	Note 3	Note 3	66.9	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	90	-78888.60	109240.81	72.2	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	Note 3	Note 3	Note 3	62.1	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	Note 3	Note 3	Note 3	49.7	Pass
T10	120 - 113.333	Leg	PIPE 6 STD (SCH40)	159	-151468.00	232356.55	65.2	Pass
T11	113.333 - 106.667	Leg	PIPE 6 STD (SCH40)	171	-163716.00	232391.21	70.4	Pass
T12	106.667 - 100	Leg	PIPE 6 STD (SCH40)	183	-175173.00	232421.87	75.4	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	Note 3	Note 3	Note 3	54.7	Pass
T14	80 - 60	Leg	PIPE 8 STD (SCH40)	225	-243876.00	336506.51	72.5	Pass
T15	60 - 50	Leg	PIPE 8 STD (SCH40)	246	-256091.00	345717.53	74.1	Pass
T16	50 - 40	Leg	PIPE 8 STD (SCH40)	258	-272419.00	345770.85	78.8	Pass
T17	40 - 20	Leg	PIPE 8 X-STR (SCH80)	270	-304788.00	473586.89	64.4	Pass
T18	20 - 0	Leg	PIPE 8 X-STR (SCH80)	285	-344033.00	474086.76	72.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
							82.0 (b)	
T1	195 - 180	Diagonal	5/8	12	7360.45	8833.52	83.3	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	48	-3415.84	6385.59	53.5	Pass
							69.7 (b)	
T3	175 - 170	Diagonal	L2x2x3/16	60	-2603.33	12345.57	21.1	Pass
							52.0 (b)	
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	72	-4234.85	16655.43	25.4	Pass
							59.5 (b)	
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	93	-5258.19	25694.51	20.5	Pass
							68.7 (b)	
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	123	-5927.96	25233.69	23.5	Pass
							79.3 (b)	
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	135	-6191.60	16497.61	37.5	Pass
							56.1 (b)	
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	144	-6351.08	14316.29	44.4	Pass
							57.4 (b)	
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	153	-6167.25	9979.96	61.8	Pass
							89.8 (b)	
T10	120 - 113.333	Diagonal	L3x3x3/16	162	-6853.46	15433.74	44.4	Pass
							92.4 (b)	
T11	113.333 - 106.667	Diagonal	L3x3x3/16	174	-6725.98	14812.43	45.4	Pass
							93.0 (b)	
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	186	-7166.76	10183.75	70.4	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	198	-7154.37	27501.12	26.0	Pass
							42.5 (b)	
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	228	-7731.23	23594.23	32.8	Pass
							45.0 (b)	
T15	60 - 50	Diagonal	L3x3x5/16	249	-9482.73	12260.08	77.3	Pass
T16	50 - 40	Diagonal	L3x3x5/16	261	-9506.89	11351.93	83.7	Pass
T17	40 - 20	Diagonal	L4x4x3/8	273	-9553.12	25488.16	37.5	Pass
							55.6 (b)	
T18	20 - 0	Diagonal	L5x5x5/16	288	-10667.10	34335.95	31.1	Pass
							62.1 (b)	
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	17	-4994.29	6723.25	74.3	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	53	574.38	16652.77	3.4	Pass
							9.5 (b)	
T3	175 - 170	Secondary Horizontal	L2x2x3/16	66	-717.64	16534.80	4.3	Pass
							11.8 (b)	
T4	170 - 160	Secondary Horizontal	L2x2x3/16	77	-1038.84	15123.02	6.9	Pass
							17.1 (b)	
T5	160 - 150	Secondary Horizontal	L2x2x3/16	98	-1368.10	13544.21	10.1	Pass
							22.5 (b)	
T6	150 - 140	Secondary Horizontal	L2x2x3/16	119	-1759.09	11810.53	14.9	Pass
							29.0 (b)	
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	167	-2626.78	19651.09	13.4	Pass
							38.7 (b)	
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	179	-2839.18	18513.50	15.3	Pass
							34.8 (b)	
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	191	-3037.88	6723.76	45.2	Pass
T13	100 - 80	Secondary Horizontal	L3x3x1/4	203	-3649.71	17795.55	20.5	Pass
							42.5 (b)	
T15	60 - 50	Secondary Horizontal	L4x4x1/4	254	-4441.17	10544.16	42.1	Pass
T16	50 - 40	Secondary Horizontal	L4x4x1/4	266	-4724.33	9490.00	49.8	Pass
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	5	-878.45	6723.25	13.1	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	8	-2460.57	6723.25	36.6	Pass
							Summary	
							Leg (T18) 82.0	Pass
							Diagonal (T11) 93.0	Pass
							Horizontal (T1) 74.3	Pass

Section No.	Elevation ft	Component Type	[illegible]	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
						Secondary Horizontal (T16)	49.8	Pass
						Top Girt (T1)	13.1	Pass
						Bottom Girt (T1)	36.6	Pass
						Bolt Checks	93.0	Pass
						RATING =	**93.0**	**Pass**

APPENDIX B

COAX CONFIGURATION



COAX CONFIGURATION

SCALE: N.T.S.

PREPARED BY:	PREPARED FOR:	PROJECT INFORMATION:	REVISION: 14
TOWER ENGINEERING PROFESSIONALS 326 TRYON ROAD RALEIGH, NC 27603-3530 (919) 661-6351	T-Mobile TOWERS 12920 SE 38TH STREET BELLEVUE, WA 98006	MIDDLEBURY I-84 SITE#: CT11128E 1021 STRAITS TURNPIKE MIDDLEBURY, CT 06762 (NEW HAVEN COUNTY)	TEP #: 25628_22635 SHEET NUMBER: C-1

APPENDIX C

ADDITIONAL CALCULATIONS

Project Name:	Middlebury I-84	Engineer:	ATS
Project Number:	TEP#25628_22635, Revision 14	Check:	MAN
Client Site Number:	CT11128E	Date:	11/21/2014
Elevation:	160 - 170ft	CODE:	TIA-F

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

ASIF: 1.33 - allowable stress increase factor (typically 1.33)
Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$: 3.22046 kips - force from initial load (no wind)
P_{wind}: 59.9026 kips - force due to final loading including reinforcement
T_u: 53.5428 kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	24.3%
Crushing Check:	44.4%
Leg Comp. Check:	46.0%
Sleeve Check:	66.9%
Built-up Check:	59.4%
Slenderness Check:	OK
Leg Tension Check:	45.7%

Input - Tower Leg 2.5 STD

K: 1.00 - effective length factor for leg
L_u: 2.64 ft - unbraced length of tower leg
F_{y_leg}: 55.00 ksi - minimum specified yield strength of tower leg
F_{u_leg}: 70.00 ksi - minimum specified ultimate strength of tower leg
r: 0.95 in - minimum radius of gyration of tower leg
A_{leg}: 1.70 in^2 - area of tower leg
Dı: 2.47 in - inside diameter of tower leg
t_{leg}: 0.20 in - thickness of tower leg
$f`_c$: 0.00 ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 3 XS Gap Check: OK

F_{y_sleeve}: 35.00 ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}: 60.00 ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}: 0.50 in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}: 1.14 in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}: 1.51 in^2 - area of sleeve r/f
t_{sleeve}: 0.30 in - thickness of tower leg
Termination: Connected to Flange

Input - Sleeve Connection to Leg

a: 12.00 in - spacing of connectors connecting the sleeve to the leg
D: 3.00 - weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //: 12.00 in - length of weld on each side of the leg at the termination
Length ⊥: 5.50 in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No: 2.00 - number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}: 70.00 ksi - weld electrode classification
Width: 3.50 in - maximum width of the built-up leg
Gap: 0.00 in - length of leg considered for crushing

Input - Built-up Leg Section 2.5 STD w/3 XS Half Sleeve

r_{x_bu}: 0.92 in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}: 1.04 in - minimum radius of gyration of the built-up section about the y-axis

Project Name:	Middlebury I-84	Engineer:	ATS
Project Number:	TEP#25628_22635, Revision 14	Check:	MAN
Client Site Number:	CT11128E	Date:	11/21/2014
Elevation:	140 - 150ft	CODE:	TIA-F

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

ASIF: 1.33 - allowable stress increase factor (typically 1.33)
Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$: 5.2017 kips - force from initial load (no wind)
P_{wind}: 101.435 kips - force due to final loading including reinforcement
T_u: 90.2023 kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	31.0%
Crushing Check:	55.7%
Leg Comp. Check:	57.0%
Sleeve Check:	59.4%
Built-up Check:	62.1%
Slenderness Check:	OK
Leg Tension Check:	49.7%

Input - Tower Leg 3.5 STD

K: 1.00 - effective length factor for leg
L_u: 2.60 ft - unbraced length of tower leg
F_{y_leg}: 55.00 ksi - minimum specified yield strength of tower leg
F_{u_leg}: 70.00 ksi - minimum specified ultimate strength of tower leg
r: 1.34 in - minimum radius of gyration of tower leg
A_{leg}: 2.68 in^2 - area of tower leg
Di: 3.55 in - inside diameter of tower leg
t_{leg}: 0.23 in - thickness of tower leg
$f`_c$: 0.00 ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F 4 STD Gap Check: OK

F_{y_sleeve}: 50.00 ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}: 65.00 ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}: 0.66 in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}: 1.51 in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}: 1.59 in^2 - area of sleeve r/f
t_{sleeve}: 0.24 in - thickness of tower leg
Termination: Connected to Flange

Input - Sleeve Connection to Leg

a: 12.00 in - spacing of connectors connecting the sleeve to the leg
D: 3.00 - weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //: 12.00 in - length of weld on each side of the leg at the termination
Length ⊥: 7.07 in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No: 2.00 - number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}: 70.00 ksi - weld electrode classification
Width: 4.50 in - maximum width of the built-up leg
Gap: 0.00 in - length of leg considered for crushing

Input - Built-up Leg Section 3.5 STD w/4 STD Half Sleeve

r_{x_bu}: 1.31 in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}: 1.40 in - minimum radius of gyration of the built-up section about the y-axis

Project Name:	Middlebury I-84	Engineer:	ATS
Project Number:	TEP#25628_22635, Revision 14	Check:	MAN
Client Site Number:	CT11128E	Date:	11/21/2014
Elevation:	120 - 140ft	CODE:	TIA-F

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

ASIF: 1.33 - allowable stress increase factor (typically 1.33)
Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$: 6.66358 kips - force from initial load (no wind)
P_{wind}: 140.193 kips - force due to final loading including reinforcement
T_u: 125.072 kips - maximum load on leg

Input - Tower Leg

5 STD

K: 1.00 - effective length factor for leg
L_u: 6.68 ft - unbraced length of tower leg
F_{y_leg}: 55.00 ksi - minimum specified yield strength of tower leg
F_{u_leg}: 70.00 ksi - minimum specified ultimate strength of tower leg
r: 1.88 in - minimum radius of gyration of tower leg
A_{leg}: 4.30 in^2 - area of tower leg
Di: 5.05 in - inside diameter of tower leg
t_{leg}: 0.26 in - thickness of tower leg
$f`_c$: 0.00 ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

6 XH

Gap Check: OK

F_{y_sleeve}: 46.00 ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}: 62.00 ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}: 0.96 in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}: 2.19 in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}: 4.20 in^2 - area of sleeve r/f
t_{sleeve}: 0.43 in - thickness of tower leg
Termination: Connected to Flange

Input - Sleeve Connection to Leg

a: 15.50 in - spacing of connectors connecting the sleeve to the leg *MI Discrepancy, approved by EOR
D: 5.00 - weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //: 12.00 in - length of weld on each side of the leg at the termination
Length ⊥: 10.41 in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No: 2.00 - number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}: 70.00 ksi - weld electrode classification
Width: 6.63 in - maximum width of the built-up leg
Gap: 0.00 in - length of leg considered for crushing

Input - Built-up Leg Section

5 STD w/6 XH Half Sleeve

r_{x_bu}: 1.77 in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}: 2.04 in - minimum radius of gyration of the built-up section about the y-axis

Quick Check

Weld Size:	OK
Weld Connection:	31.0%
Crushing Check:	39.2%
Leg Comp. Check:	40.1%
Sleeve Check:	44.5%
Built-up Check:	49.7%
Slenderness Check:	OK
Leg Tension Check:	36.4%

Project Name:	Middlebury I-84	Engineer:	ATS
Project Number:	TEP#25628_22635, Revision 14	Check:	MAN
Client Site Number:	CT11128E	Date:	11/21/2014
Elevation:	80 - 100ft	CODE:	TIA-F

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

ASIF: 1.33 - allowable stress increase factor (typically 1.33)
Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$: 9.93059 kips - force from initial load (no wind)
P_{wind}: 210.453 kips - force due to final loading including reinforcement
T_u: 185.841 kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	45.1%
Crushing Check:	44.8%
Leg Comp. Check:	45.4%
Sleeve Check:	54.7%
Built-up Check:	51.9%
Slenderness Check:	OK
Leg Tension Check:	42.9%

Input - Tower Leg

6 STD

K: 1.00 - effective length factor for leg
L_u: 3.43 ft - unbraced length of tower leg
F_{y_leg}: 55.00 ksi - minimum specified yield strength of tower leg
F_{u_leg}: 70.00 ksi - minimum specified ultimate strength of tower leg
r: 2.25 in - minimum radius of gyration of tower leg
A_{leg}: 5.58 in^2 - area of tower leg
Di: 6.07 in - inside diameter of tower leg
t_{leg}: 0.28 in - thickness of tower leg
$f`_c$: 0.00 ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

7 XH Gap Check: OK

F_{y_sleeve}: 42.00 ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}: 60.00 ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}: 1.10 in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}: 2.53 in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}: 5.60 in^2 - area of sleeve r/f
t_{sleeve}: 0.50 in - thickness of tower leg
Termination: Connected to Flange

Input - Sleeve Connection to Leg

a: 12.00 in - spacing of connectors connecting the sleeve to the leg
D: 5.00 - weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //: 12.00 in - length of weld on each side of the leg at the termination
Length ⊥: 11.98 in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No: 2.00 - number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}: 70.00 ksi - weld electrode classification
Width: 7.63 in - maximum width of the built-up leg
Gap: 0.00 in - length of leg considered for crushing

Input - Built-up Leg Section

6 STD w/7 XH Half Sleeve

r_{x_bu}: 2.10 in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}: 2.39 in - minimum radius of gyration of the built-up section about the y-axis

TOWER ENGINEERING PROFESSIONALS

JOB:	Middlebury I-84 (CT11128E); TEP#25628_22635, Rev 14		
SHEET #:	1	OF	2
CALCULATED BY:	ATS	DATE	11/21/2014
CHECKED BY:	MAN	DATE	11/21/2014

Mat Foundation Design for Self Supporting Tower -TIA-222-F

Q_a, ALLOWABLE SOIL PRESS. (ksf)	6	F'c (ksi)	3
NET OR GROSS BEARING?	NET	F'y (ksi)	60
SOIL DENSITY (pcf)	125		
TOWER FACE WIDTH (ft.)	21.5		
Tower Eccentricity (ft)	0.00	Distance between tower centroid and the foundation centroid	

Base Reactions LC1: Maximum Wind		Base Reactions LC 2: Ice + Ice Wind	
M_u, MOMENT (k-ft)	6070.3	M, MOMENT (k-ft)	1959.5
P_t, AXIAL (k)	49.9	P_t, AXIAL (k)	102.1
H, SHEAR (k)	53.8	H, SHEAR (k)	16.4

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (ft.)	Pier Shape
	33	33	4	5.416	9.416	4.00	5.67	Square

W_f, WEIGHT OF FOUNDATION (k) =	694.2	Concrete Volume (cu yd)	171.4
W_s, WEIGHT OF SOIL (k) =	704.8		

CHECK BEARING CAPACITY:	LC1	LC2
$P = P_t + Wf + Ws =$	1448.9 k	1501.1 k
$e = (M_{ot} + P_t{*}e_t)/P =$	4.55 ft	1.46 ft
L/6 =	5.50 ft	5.50 ft
90 Axis: $q_{max} =$	1.25 ksf	0.57 ksf
Diag. Axis: $q_{max} =$	1.71 ksf	0.72 ksf

Capacity: 28.5%

CHECK OVERTURNING SF:	LC1	LC2
$M_{ot} = M+H{*}(t+h)$ =	6590.2 k-ft	2117.7 k-ft
$M_{st}=P{*}(L/2-e_t)+(W_{f+s}{*}L/2)$ =	23906.4 k-ft	24767.8 k-ft
$SF = M_{ot}/M_{st}$ =	3.63 > 1.5	11.70 > 1.5

Capacity: 41.35%

TOWER ENGINEERING PROFESSIONALS

JOB:	Middlebury I-84 (CT11128E); TEP#25628_22635, Rev 14		
SHEET #:	2	OF	2
CALCULATED BY:	ATS	DATE	11/21/2014
CHECKED BY:	MAN	DATE	11/21/2014

CHECK BEAM SHEAR

Vu = 177.1 k
φVc = 1415.3 k Vc > Vu **O.K** **Capacity:** **12.51%**

CHECK PUNCHING SHEAR

Vu = 313.8 k
φVc = 1404.0 k Vc > Vu **O.K** **Capacity:** **22.35%**

CALCULATE REINFORCING REQUIRED

F'c = 3.0 ksi F'y = 60.0 ksi

Temp & Shrinkage Reinforcement, As, temp = 0.39 in^2/ft (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Bar Size= 8
Bar Spacing = 11.8 in.
d = 43.5 in.
Mu= -662.8 in-k/ft

φMn=0.9*As*Fy*(d-1/2*As*Fy/(0.85*b*F'c))

Solution: As,req = 0.28 in^2/ft
Check, As= 0.80 in^2/ft **Capacity:** **35.35%**

TOP REINFORCING

Bar Size= 8
Bar Spacing = 11.8 in.
d= 43.5 in.
Mu= 617.7 in-k/ft

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.26 in^2/ft
Check, As= 0.80 in^2/ft **Capacity:** **32.93%**

		PASS	PASS			
	Results Summary:	LC1	LC2		Middlebury I-84 (CT11128E)	
	Soil Interaction:	N/A	N/A	TEP #:	25628_22635, Rev 14	
Pier Check	Foundation Structural:	29.9%	58.4%	Analysis:	ATS	11/21/2014
				Check:	MAN	11/21/2014

Code Revisions: TIA-222-F ACI 318-05

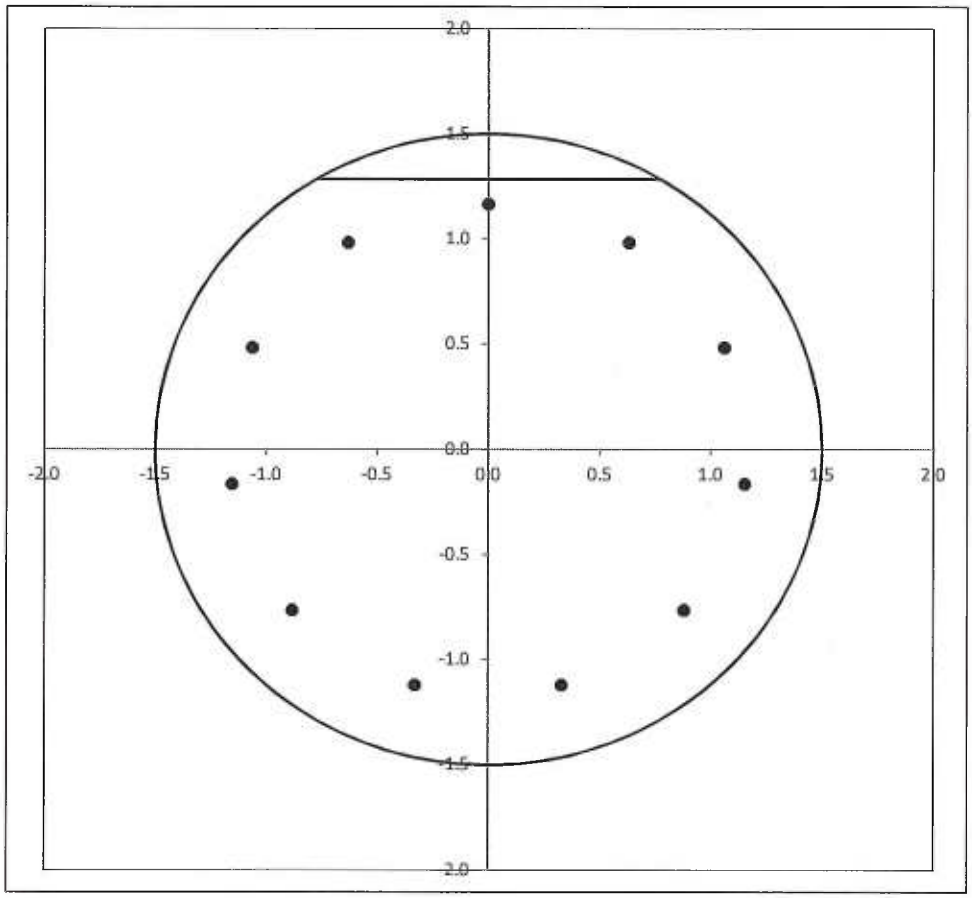
Tower Type: Self Support

	LC1	LC2	
Moment:	0.00	0.00	kip-ft
Axial (download):	342.65	0.00	kip
Shear:	34.14	29.79	kip
Axial (uplift):	0.00	294.53	kip

Shaft Information		
Diameter:	3.00	ft
Projection:	0.25	ft
Caisson Length:	5.67	ft
f'c:	4.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement		
Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 28.00in)*
Tie Bar Spacing:	16.00	in
Vertical Bar Size:	8	
Vertical Bar Quantity:	11	*(ρ =0.854%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	44.4	44.4	kip
	Vc =	150.4	54.2	kip
fy,tie = 60.0	Vs =	47.1	47.1	kip
	ϕVn =	148.2	76.0	kip
	Capacity =	**29.9%**	**58.4%**	
		PASS	**PASS**	

		LC1	LC2	
	Mu =	0.0	0.0	kip-ft
	ϕMn =	915.1	118.2	kip-ft
	Capacity =	**0.0%**	**0.0%**	
		PASS	**PASS**	

EXHIBIT C

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

T-Mobile Existing Facility

Site ID: CT11128E

Middlebury / I-84 / X17
1021 Straits Turnpike
Middlebury, CT 06762

December 10, 2014

EBI Project Number: 62145912

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	28.88 %

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EBI Consulting
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December 10, 2014

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

Emissions Analysis for Site: **CT11128E – Middlebury / I-84 / X17**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1021 Straits Turnpike, Middlebury, 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 $\mu W/cm^2$ 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 ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. 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.

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 **1021 Straits Turnpike, Middlebury, 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, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of 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 (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) 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.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerlines of the proposed antennas are **193 & 195 feet** above ground level (AGL).

9) 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 calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	195	Height (AGL):	195	Height (AGL):	195
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	3,833.82	ERP (W):	3,833.82	ERP (W):	3,833.82
Antenna A1 MPE%	1.03	Antenna B1 MPE%	1.03	Antenna C1 MPE%	1.03
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	193	Height (AGL):	193	Height (AGL):	193
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A23 MPE%	0.19	Antenna B2 MPE%	0.19	Antenna C2 MPE%	0.19

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**3.66**
AT&T	9.72 %
Verizon Wireless	3.24 %
Sprint / Nextel	12.26 %
Site Total MPE %:	**28.88 %**

T-Mobile Sector 1 Total:	1.22 %
T-Mobile Sector 2 Total:	1.22 %
T-Mobile Sector 3 Total:	1.22 %
Site Total:	28.88 %

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Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.22 %
Sector 2:	1.22 %
Sector 3 :	1.22 %
T-Mobile Total:	3.66 %
Site Total:	28.88 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **28.88%** 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

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