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

April 23, 2014

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

Re: Notice of Exempt Modification
Southern New England Telephone Company/T-Mobile co-location
Site ID CTHA130A
419 Broad Street, Windsor

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 Southern New England Telephone Company c/o SBC ("SBC") owns the monopole tower and related facility at 419 Broad Street, Windsor, Connecticut (latitude 41.84778 / longitude -72.645261). T-Mobile intends to replace six antennas and related equipment at this existing telecommunications facility in Windsor ("Windsor 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 Mayor Donald Trinks. SBC is also the property owner.

The existing Windsor Facility consists of a 101 foot tall monopole facility.[1] The facility currently supports the equipment of T-Mobile at a centerline of 94 feet.

T-Mobile plans to replace six antennas and replace them with six antennas at an elevation of 94 feet. (See the plans revised to January 25, 2014 attached hereto as Exhibit A). T-Mobile will also install fiber cable and reuse existing coax cable. The existing Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated April 4, 2014 and attached hereto as Exhibit B.

[1] The online Connecticut Siting Council database does not include an approval by docket or petition for this facility so there are no specific limitation on the antenna configuration, however there has been several notices of intent filed, the most recent being EM-AT&T-164-120716 and EM-METROPCS-164-121228B-MA.

The planned modifications to the Windsor 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 replacement antennas will be installed at the 94 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The installation of the T-Mobile replacement equipment in the existing compound, as reflected on the attached site plan, will not require an extension of the site boundaries. T-Mobile's proposed equipment will be located entirely within the existing compound (leased and fenced area) as shown on Sheet 2 of Exhibit A.

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 replacement 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 April 21, 2014 T-Mobile's operations would add 1.346% 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 63.496% 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 replacement antennas and equipment at the Windsor Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Windsor, Mayor Donald Trinks
Southern New England Telephone Company c/o SBC
Sheldon Freincle, NSS

EXHIBIT A

SITE PLAN

SCALE: 1"=100'-0"

50 0 50 100 150

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.

CONFIGURATION

2C

SUBMITTALS	
LE REV A	01.25.14

ATLANTIS GROUP
1340 Centre Street
Suite 203
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTHA130A

SITE NAME:
CTHA130/SNET TOWER_MP

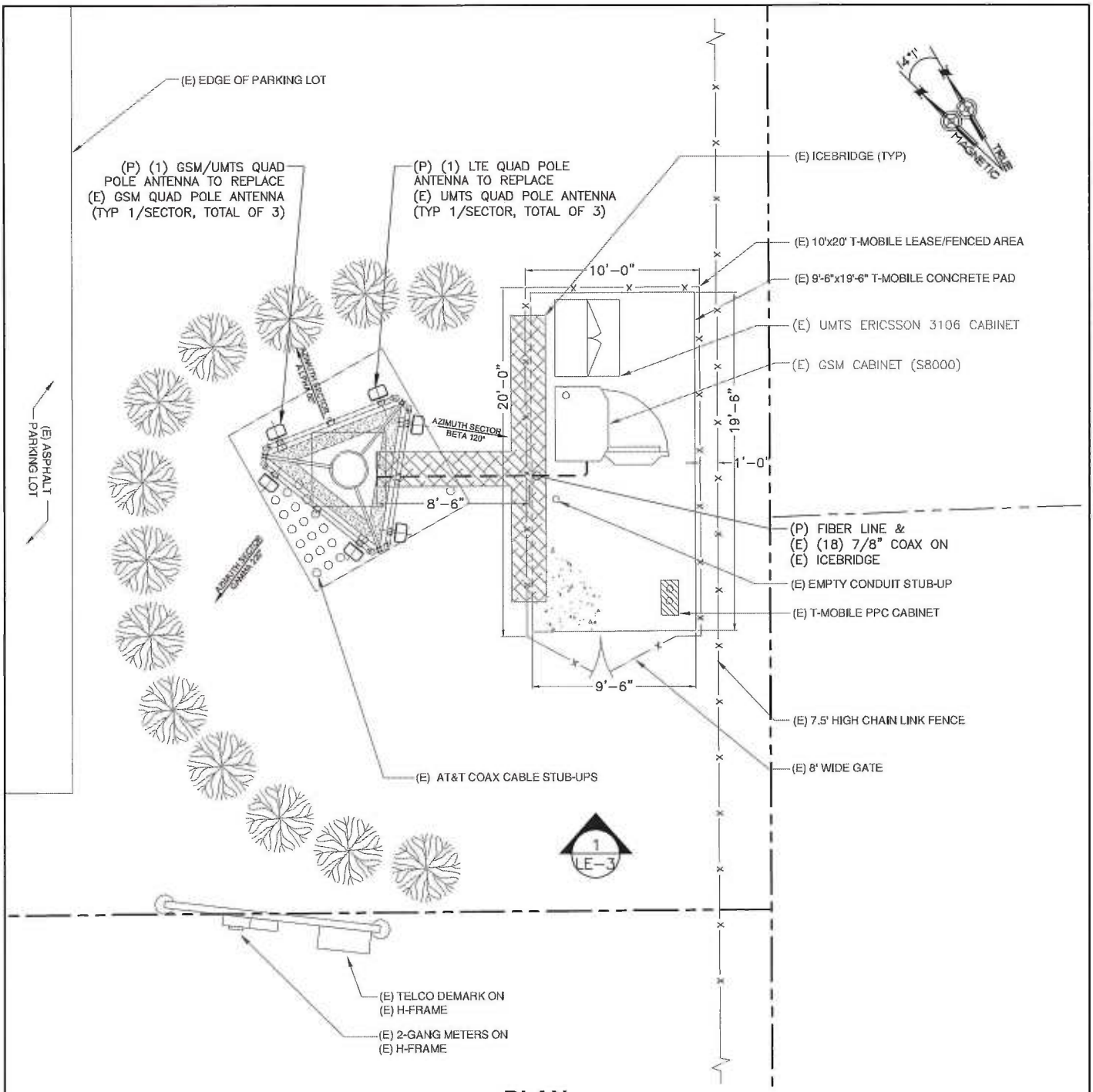
SITE ADDRESS:
419 BROAD STREET
WINDSOR, CT, 06095

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: MB | CHECKED BY: SM



PLAN

SCALE: 1" = 8'-0"

4 0 4 8 12

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.

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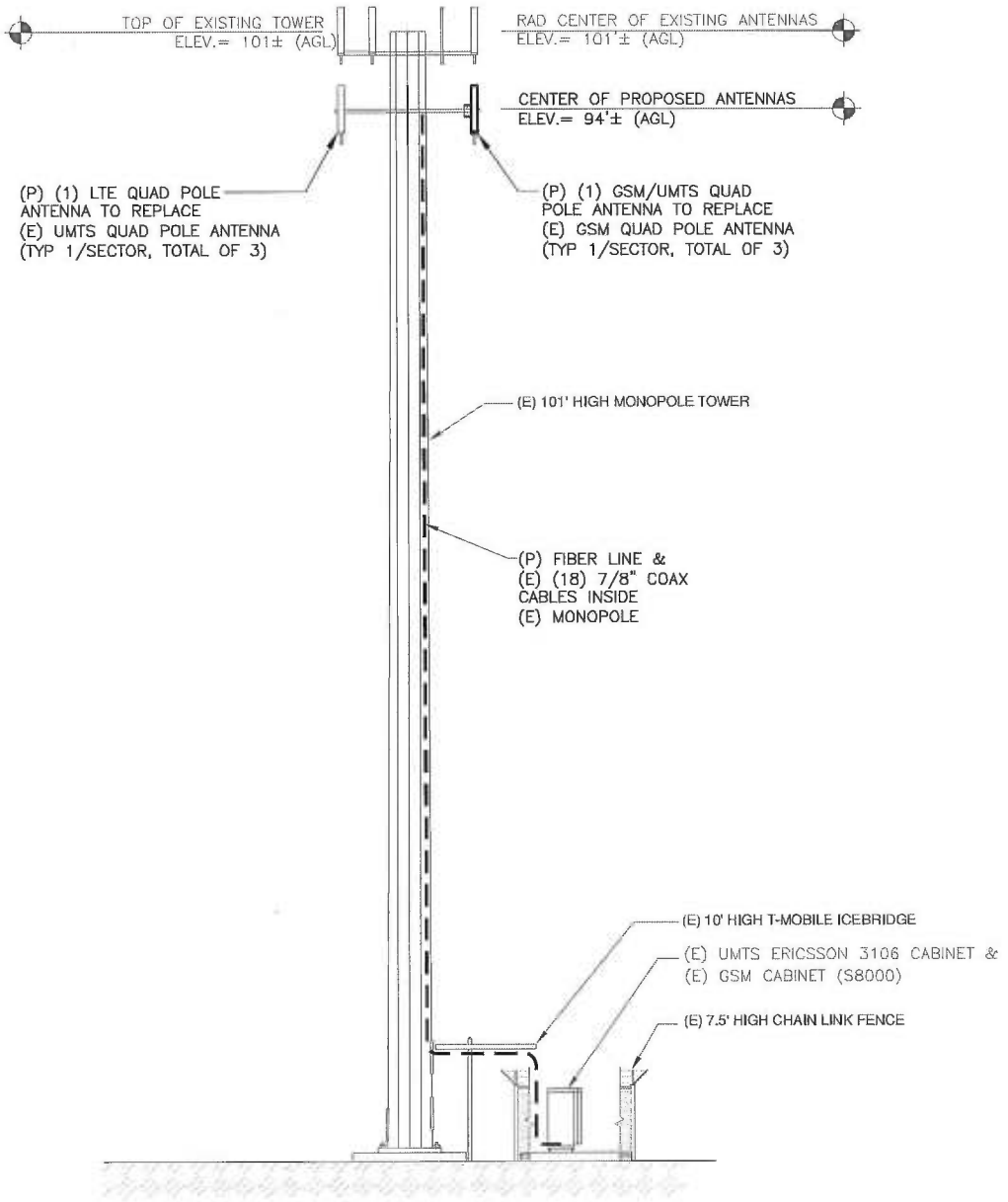

ELEVATION

SCALE: 1" = 16'-0"

8 0 8 16 24

CONFIGURATION

2C

SUBMITTALS	
LE REV A	01.25.14

ATLANTIS GROUP
1340 Centre Street
Suite 203
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

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CTHA130A

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CTHA130/SNET TOWER_MP

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

DRAWN BY: MB | CHECKED BY: SM

EXHIBIT B

April 04, 2014

Mr. Thomas Wilson
Northeast Site Solutions
54 Main Street Unit 3
Sturbridge, MA 01566
(678) 602-2779

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	CTHA130A
	Site Name:	CTHA130/SNET Tower_MP
Northeast Site Solutions Designation:	**Site Number:**	CTHA130A
	Site Name:	Windsor
Engineering Firm Designation:	**B+T Group Project Number:**	91595.001.01
Site Data:	**419 Broad Street, Windsor, CT 06095, Hartford County** **Latitude *41° 50' 52.008"*, Longitude *-72° 38' 42.9396"*** **101 Foot - Monopole Tower**	

Dear Mr. Wilson,

B+T Group 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:

Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 80 mph fastest mile.

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

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Northeast Site Solutions. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

Zach Smith
Project Engineer

Chad E. Tuttle, P.E.
President

TnxTower Report - version 6.1.4.1

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Table 4 - Documents Provided
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Table 6 – Tower Components vs. Capacity
4.1) Recommendations

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6) APPENDIX B
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7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 101 ft. mapped Monopole tower. The original design wind speed and code are unknown. This tower has been modified in 2009 by GPD and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft.)	Center Line Elevation (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Carrier/ Note
94.0	94.0	6	Ericsson	AIR 21	1	1 5/8 Hybrid	T-Mobile
		3	Ericsson	KRY 112 71			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft.)	Center Line Elevation (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Carrier/ Note
101.0	103.0	3	Communication Components Inc.	DTMABP7819VG12A	3	0.5	AT&T Reserved
		6	Ericsson	RRU-11			
		6	KMW Comm.	AM-X-CD-16-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			
		3	Powerwave Tech.	RA21.7770.00	12	1 1/4	AT&T Existing
		3	Powerwave Tech.	TT19-08BP111-001			
		6	ADC	CG-1900W800-FULL-DIN			
	101.0	1	--	Platform Mount			
94.0	94.0	**6**	**RFS Celwave**	**APX16DW-16DWVS-A20**	--	--	**T-Mobile To Be Removed**
		6	**RFS Celwave**	**ATMAA1412D-1A20**			
		1	--	Platform Mount	18	7/8	T-Mobile Existing
75.5	75.5	3	RFS Celwave	APXV18-206517S	6	1 5/8	Metro PCS Existing
		3	--	Pipe Mount			
9.0	11.0	1	Unknown	GPS	1	1/2	Existing
	9.0	1	--	Side Arm Mount			

Table 3 - Design Antenna and Cable Information

Mounting Level (ft.)	Center Line Elevation (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
Information Not Available						

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Tower Data	Tower Mapping by BTE Management, Job no. 15085	Date: 04/27/2012	On File
Tower Modification Drawings	GPD Job No.2009262.22	Date:05/12/2009	On File
Foundation Mapping	WEI Geotechnical Engineers, Project No. 2009-758	Date: 03/12/2009	On File
Geotech Report	WEI Geotechnical Engineers, Project No. 2009-758	Date: 03/12/2009	On File
Existing/Reserved Loading	Previous SA by B+T Group, Project No. 84425.001	Date: 06/22/2012	On File
Proposed Loading	Site Lease Application	Date:01/27/2014	AT&T

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	% Capacity	Pass / Fail
L1	101 - 87.54	Pole	TP16.17x14.65x0.188	47.7	Pass
L2	87.54 - 77.583	Pole	TP16.989x15.567x0.25	71.8	Pass
L3	77.583 - 46.08	Pole	TP20.73x16.989x0.53	72.2	Pass
L4	46.08 - 45.333	Pole	TP20.325x19.922x0.601	70.8	Pass
L5	45.333 - 0	Pole	TP25.8x20.325x0.642	84.6	Pass
				Summary	
			Pole Rating	84.6	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft.)	% Capacity	Pass / Fail
1	Anchor Rods	Base	61.8	Pass
1	Base Plate	Base	90.9	Pass
1	Base Foundation	Base	94.6	Pass

Structure Rating (max from all components) =	94.6%

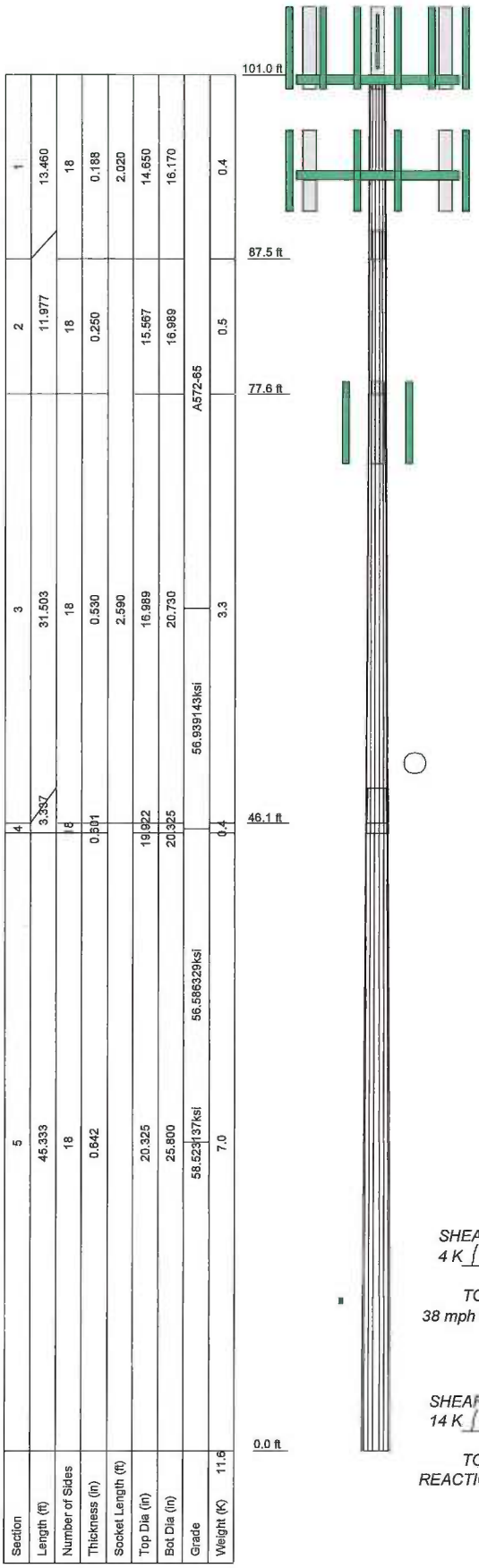
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 100% are considered acceptable based on analysis methods used.

4.1) Recommendations

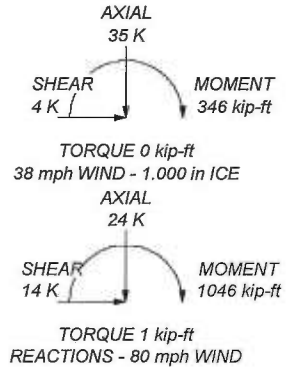
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5
Length (ft)	13.460	11.977	31.503	3.337	45.333
Number of Sides	18	18	18	18	18
Thickness (in)	0.188	0.250	0.530	0.501	0.642
Socket Length (ft)	2.020		2.590		
Top Dia (in)	14.650	15.567	16.989	19.922	20.325
Bot Dia (in)	16.170	16.989	20.730	20.325	25.800
Grade	0.4	0.5	3.3	0.4	7.0
Weight (K)					11.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 3/4" x 5' (E)	103.5	Platform Mount [LP 712-1] (E)	101
RA21.7770.00 W/ Mount Pipe (E)	101	6' x 2" Mount Pipe (E)	101
RA21.7770.00 W/ Mount Pipe (E)	101	6' x 2" Mount Pipe (E)	101
RA21.7770.00 W/ Mount Pipe (E)	101	6' x 2" Mount Pipe (E)	101
TT19-08BP111-001 (E)	101	(2) AIR 21 w/ Mount Pipe (P)	94
TT19-08BP111-001 (E)	101	(2) AIR 21 w/ Mount Pipe (P)	94
TT19-08BP111-001 (E)	101	(2) AIR 21 w/ Mount Pipe (P)	94
(2) CG-1900W800-FULL-DIN (E)	101	KRY 112 71 (P)	94
(2) CG-1900W800-FULL-DIN (E)	101	KRY 112 71 (P)	94
(2) CG-1900W800-FULL-DIN (E)	101	KRY 112 71 (P)	94
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe (R)	101	Platform Mount [LP 303-1] (E)	94
		6' x 2" Mount Pipe (E)	94
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe (R)	101	6' x 2" Mount Pipe (E)	94
		6' x 2" Mount Pipe (E)	94
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe (R)	101	APXV18-206517S w/ Mount Pipe (E)	75.5
DTMABP7819VG12A (R)	101	APXV18-206517S w/ Mount Pipe (E)	75.5
DTMABP7819VG12A (R)	101		
DTMABP7819VG12A (R)	101	APXV18-206517S w/ Mount Pipe (E)	75.5
(2) RRU-11 (R)	101		
(2) RRU-11 (R)	101	GPS_A (E)	11
(2) RRU-11 (R)	101	Side Arm Mount [SO 701-1] (E)	9
DC6-48-60-18-8F (R)	101		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	56.586329ksi	57 ksi	72 ksi
56.939143ksi	57 ksi	72 ksi	58.523137ksi	59 ksi	74 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

B+T Group
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

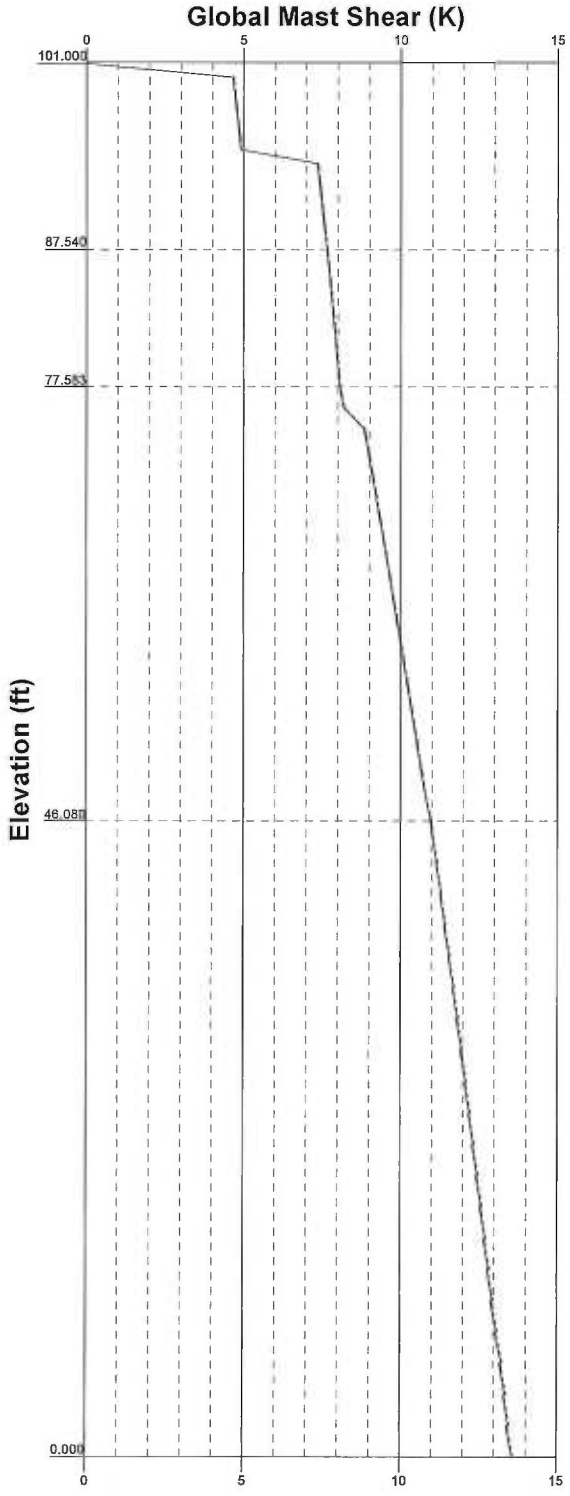
Job: 91595.001.01 - Windsor, CT (Site# CTHA130A			
Project:			
Client: Northeast Site Solutions	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 04/04/14	Scale: NTS	
Path:		Dwg No. E-1	

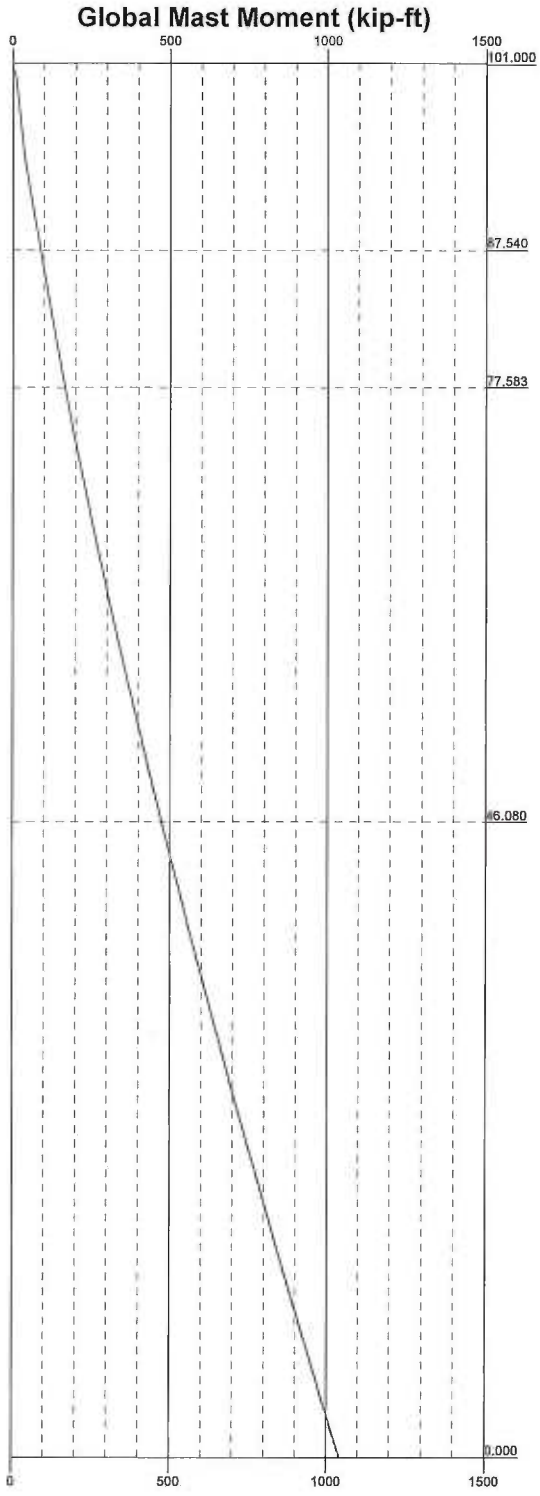
TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx Vz

Maximum Values

Mx Mz





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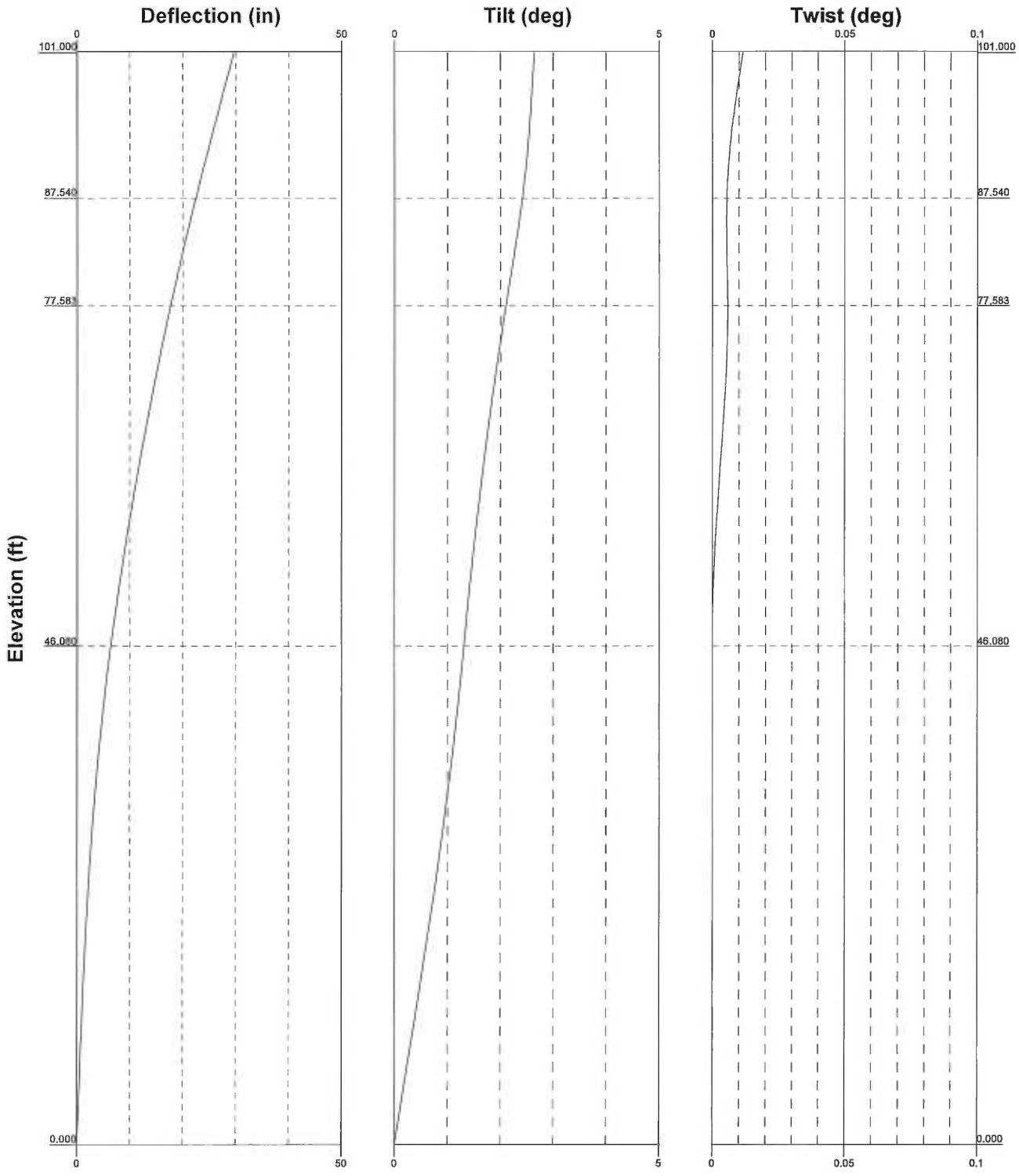
FAX: (918) 295-0265

Job: 91595.001.01 - Windsor, CT (Site# CTHA130A			
Project:			
Client: Northeast Site Solutions	Drawn by: zsmith		App'd:
Code: TIA/EIA-222-F	Date: 04/04/14		Scale: NTS
Path:			Dwg No. E-4

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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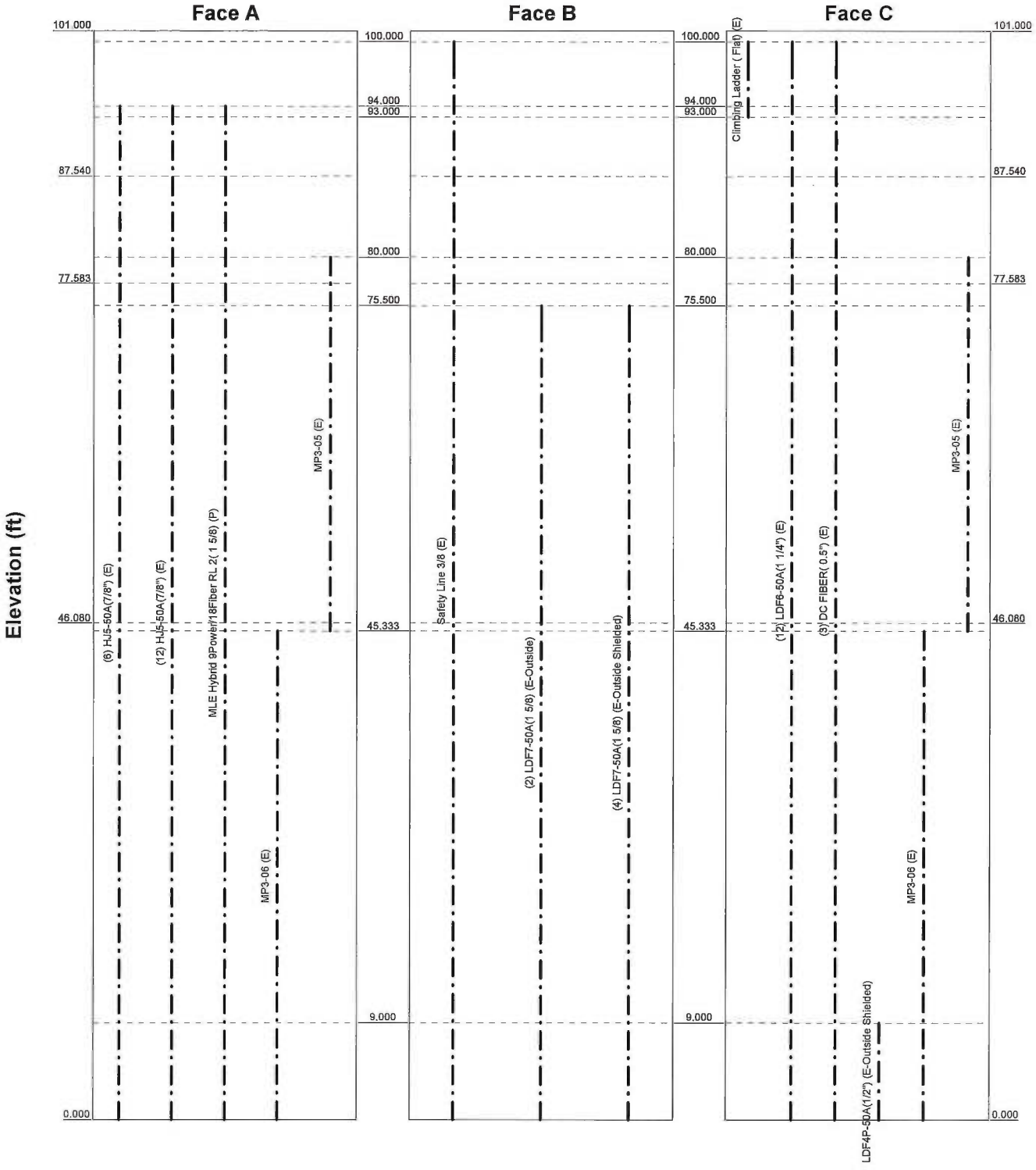
FAX: (918) 295-0265

Job: 91595.001.01 - Windsor, CT (Site# CTHA130A			
Project:			
Client: Northeast Site Solutions	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 04/04/14	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 101'

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



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FAX: (918) 295-0265

Job: 91595.001.01 - Windsor, CT (Site# CTHA130A			
Project:			
Client: Northeast Site Solutions	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 04/04/14	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	101.000-87.540	13.460	2.020	18	14.650	16.170	0.188	0.750	A572-65 (65 ksi)
L2	87.540-77.583	11.977	0.000	18	15.567	16.989	0.250	1.000	A572-65 (65 ksi)
L3	77.583-46.080	31.503	2.590	18	16.989	20.730	0.530	2.122	56.939143ksi (57 ksi)
L4	46.080-45.333	3.337	0.000	18	19.922	20.325	0.601	2.403	56.586329ksi (57 ksi)
L5	45.333-0.000	45.333		18	20.325	25.800	0.642	2.567	58.523137ksi (59 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.876	8.607	227.445	5.134	7.442	30.561	455.189	4.304	2.248	11.991
	16.419	9.512	306.959	5.674	8.214	37.369	614.321	4.757	2.516	13.418
L2	16.051	12.154	360.243	5.437	7.908	45.554	720.961	6.078	2.300	9.199
	17.251	13.282	470.199	5.942	8.630	54.481	941.018	6.643	2.550	10.2
L3	17.251	27.708	948.287	5.843	8.630	109.877	1897.821	13.857	2.057	3.877
	21.050	34.006	1752.992	7.171	10.531	166.463	3508.291	17.006	2.715	5.119
L4	20.547	36.849	1737.987	6.859	10.121	171.728	3478.262	18.428	2.449	4.076
	20.639	37.617	1849.018	7.002	10.325	179.076	3700.469	18.812	2.520	4.194
L5	20.639	40.092	1962.490	6.988	10.325	190.066	3927.561	20.050	2.448	3.815
	26.198	51.242	4097.595	8.931	13.106	312.641	8200.582	25.626	3.411	5.316

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 101.000-87.540				1	1	1		
L2 87.540-77.583				1	1	1		
L3 77.583-46.080				1	1	0.98481		
L4 46.080-45.333				1	1	0.978739		
L5 45.333-0.000				1	1	0.989904		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
Climbing Ladder (Flat) (E)	C	No	CaAa (Out Of Face)	100.000 - 93.000	36.000	0	1	No Ice	0.584	0.005
								1/2" Ice	1.030	0.007
								1" Ice	1.476	0.010
								2" Ice	2.368	0.020
								4" Ice	4.151	0.049
Safety Line 3/8 (E)	B	No	CaAa (Out Of Face)	100.000 - 0.000	0.000	0	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
***										
LDF6-50A(1 1/4") (E)	C	No	Inside Pole	100.000 - 0.000	0.000	0	12	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
DC FIBER(0.5") (E)	C	No	Inside Pole	100.000 - 0.000	0.000	0	3	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
								4" Ice	0.000	0.001
***										
HJ5-50A(7/8") (E)	A	No	Inside Pole	94.000 - 0.000	0.000	0	6	No Ice	0.000	0.002
								1/2" Ice	0.000	0.002
								1" Ice	0.000	0.002
								2" Ice	0.000	0.002
								4" Ice	0.000	0.002
HJ5-50A(7/8") (E)	A	No	Inside Pole	94.000 - 0.000	0.000	0	12	No Ice	0.000	0.002
								1/2" Ice	0.000	0.002
								1" Ice	0.000	0.002
								2" Ice	0.000	0.002
								4" Ice	0.000	0.002
MLE Hybrid 9Power/18Fiber RL 2(1 5/8) (P)	A	No	Inside Pole	94.000 - 0.000	0.000	0	1	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
***										
LDF7-50A(1 5/8) (E-Outside)	B	No	CaAa (Out Of Face)	75.500 - 0.000	0.000	0	2	No Ice	0.198	0.001
								1/2" Ice	0.298	0.002
								1" Ice	0.398	0.004
								2" Ice	0.598	0.011
								4" Ice	0.998	0.030
LDF7-50A(1 5/8) (E-Outside Shielded)	B	No	CaAa (Out Of Face)	75.500 - 0.000	0.000	0	4	No Ice	0.000	0.001
								1/2" Ice	0.000	0.002
								1" Ice	0.000	0.004
								2" Ice	0.000	0.011
								4" Ice	0.000	0.030
***										
LDF4P-50A(1 /2") (E-Outside Shielded)	C	No	Inside Pole	9.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
***										
MP3-06 (E)	A	No	CaAa (Out Of Face)	45.333 - 0.000	0.000	0	1	No Ice	0.434	0.029
								1/2" Ice	0.518	0.031
								1" Ice	0.601	0.034
								2" Ice	0.768	0.040
								4" Ice	1.101	0.057
MP3-06 (E)	C	No	CaAa (Out Of Face)	45.333 - 0.000	0.000	0	1	No Ice	0.434	0.029
								1/2" Ice	0.518	0.031
								1" Ice	0.601	0.034
								2" Ice	0.768	0.040
								4" Ice	1.101	0.057
MP3-05 (E)	A	No	CaAa (Out Of Face)	80.000 - 45.333	0.000	0	1	No Ice	0.348	0.019
								1/2" Ice	0.432	0.021
								1" Ice	0.515	0.023
								2" Ice	0.682	0.029
								4" Ice	1.015	0.044
MP3-05 (E)	C	No	CaAa (Out Of Face)	80.000 - 45.333	0.000	0	1	No Ice	0.348	0.019
								1/2" Ice	0.432	0.021
								1" Ice	0.515	0.023
								2" Ice	0.682	0.029
								4" Ice	1.015	0.044

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	101.000-87.540	A	0.000	0.000	0.000	0.000	0.186
		B	0.000	0.000	0.000	0.467	0.003
		C	0.000	0.000	0.000	4.091	0.151
L2	87.540-77.583	A	0.000	0.000	0.000	0.842	0.333
		B	0.000	0.000	0.000	0.373	0.002
		C	0.000	0.000	0.000	0.842	0.140
L3	77.583-46.080	A	0.000	0.000	0.000	10.974	1.512
		B	0.000	0.000	0.000	12.832	0.152
		C	0.000	0.000	0.000	10.974	0.902
L4	46.080-45.333	A	0.000	0.000	0.000	0.260	0.036
		B	0.000	0.000	0.000	0.324	0.004
		C	0.000	0.000	0.000	0.260	0.021
L5	45.333-0.000	A	0.000	0.000	0.000	19.690	2.612
		B	0.000	0.000	0.000	19.652	0.233
		C	0.000	0.000	0.000	19.690	1.735

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	101.000-87.540	A	1.134	0.000	0.000	0.000	0.000	0.186
		B		0.000	0.000	0.000	3.293	0.018
		C		0.000	0.000	0.000	11.169	0.198
L2	87.540-77.583	A	1.116	0.000	0.000	0.000	1.299	0.345
		B		0.000	0.000	0.000	2.632	0.014
		C		0.000	0.000	0.000	1.299	0.152
L3	77.583-46.080	A	1.078	0.000	0.000	0.000	16.632	1.655
		B		0.000	0.000	0.000	32.306	0.914
		C		0.000	0.000	0.000	16.632	1.045
L4	46.080-45.333	A	1.040	0.000	0.000	0.000	0.394	0.039
		B		0.000	0.000	0.000	0.807	0.023
		C		0.000	0.000	0.000	0.394	0.025
L5	45.333-0.000	A	1.000	0.000	0.000	0.000	27.245	2.839
		B		0.000	0.000	0.000	46.852	1.271
		C		0.000	0.000	0.000	27.245	1.962

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	101.000-87.540	-0.272	0.198	-0.374	0.401
L2	87.540-77.583	-0.056	-0.032	0.111	0.064
L3	77.583-46.080	0.047	0.027	0.268	0.155
L4	46.080-45.333	0.066	0.038	0.303	0.175
L5	45.333-0.000	-0.001	-0.000	0.250	0.144

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 3/4" x 5' (E)	C	None		0.000	103.500	No Ice	0.375	0.375	0.030
						1/2" Ice	0.890	0.890	0.034
						1" Ice	1.356	1.356	0.041
						2" Ice	1.993	1.993	0.066
						4" Ice	3.376	3.376	0.162
***									
RA21.7770.00 W/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	7.031	5.002	0.060
						1/2" Ice	7.608	5.960	0.114
						1" Ice	8.165	6.747	0.175
						2" Ice	9.310	8.370	0.322
						4" Ice	11.721	11.872	0.746
RA21.7770.00 W/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	7.031	5.002	0.060
						1/2" Ice	7.608	5.960	0.114
						1" Ice	8.165	6.747	0.175
						2" Ice	9.310	8.370	0.322
						4" Ice	11.721	11.872	0.746
RA21.7770.00 W/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	7.031	5.002	0.060
						1/2" Ice	7.608	5.960	0.114
						1" Ice	8.165	6.747	0.175
						2" Ice	9.310	8.370	0.322
						4" Ice	11.721	11.872	0.746
TT19-08BP111-001 (E)	A	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	0.636	0.516	0.016
						1/2" Ice	0.747	0.619	0.022
						1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
TT19-08BP111-001 (E)	B	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	0.636	0.516	0.016
						1/2" Ice	0.747	0.619	0.022
						1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
TT19-08BP111-001 (E)	C	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	0.636	0.516	0.016
						1/2" Ice	0.747	0.619	0.022
						1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
(2) CG-1900W800-FULL-DIN (E)	A	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	1.284	0.313	0.012
						1/2" Ice	1.438	0.410	0.019
						1" Ice	1.600	0.517	0.028
						2" Ice	1.949	0.756	0.053
						4" Ice	2.753	1.338	0.133
(2) CG-1900W800-FULL-DIN (E)	B	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	1.284	0.313	0.012
						1/2" Ice	1.438	0.410	0.019
						1" Ice	1.600	0.517	0.028
						2" Ice	1.949	0.756	0.053
						4" Ice	2.753	1.338	0.133
(2) CG-1900W800-FULL-DIN (E)	C	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	1.284	0.313	0.012
						1/2" Ice	1.438	0.410	0.019
						1" Ice	1.600	0.517	0.028
						2" Ice	1.949	0.756	0.053
						4" Ice	2.753	1.338	0.133
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	101.000	No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(2)	B	From Leg	4.000	0.000	101.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(R)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
(2)	C	From Leg	4.000	0.000	101.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(R)						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874
DTMABP7819VG12A	A	From Leg	4.000	0.000	101.000	No Ice	1.139	0.391	0.019
(R)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
DTMABP7819VG12A	B	From Leg	4.000	0.000	101.000	No Ice	1.139	0.391	0.019
(R)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
DTMABP7819VG12A	C	From Leg	4.000	0.000	101.000	No Ice	1.139	0.391	0.019
(R)			0.000			1/2" Ice	1.284	0.488	0.026
			2.000			1" Ice	1.437	0.595	0.036
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
(2) RRU-11	A	From Leg	4.000	0.000	101.000	No Ice	1.912	1.472	0.044
(R)			0.000			1/2" Ice	2.102	1.645	0.060
			2.000			1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
(2) RRU-11	B	From Leg	4.000	0.000	101.000	No Ice	1.912	1.472	0.044
(R)			0.000			1/2" Ice	2.102	1.645	0.060
			2.000			1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
(2) RRU-11	C	From Leg	4.000	0.000	101.000	No Ice	1.912	1.472	0.044
(R)			0.000			1/2" Ice	2.102	1.645	0.060
			2.000			1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
DC6-48-60-18-8F	C	From Leg	4.000	0.000	101.000	No Ice	2.567	4.317	0.019
(R)			0.000			1/2" Ice	2.798	4.596	0.050
			2.000			1" Ice	3.038	4.885	0.085
						2" Ice	3.543	5.488	0.167
						4" Ice	4.658	6.797	0.383
Platform Mount [LP 712-1]	C	None		0.000	101.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	101.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	101.000	No Ice		1.425	1.425	0.022
(E)			0.000			1/2" Ice		1.925	1.925	0.033
			0.000			1" Ice		2.294	2.294	0.048
						2" Ice		3.060	3.060	0.090
						4" Ice		4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	101.000	No Ice		1.425	1.425	0.022
(E)			0.000			1/2" Ice		1.925	1.925	0.033
			0.000			1" Ice		2.294	2.294	0.048
						2" Ice		3.060	3.060	0.090
						4" Ice		4.702	4.702	0.231
***										
(2) AIR 21 w/ Mount Pipe	A	From Leg	4.000	0.000	94.000	No Ice		6.771	5.701	0.112
(P)			0.000			1/2" Ice		7.292	6.552	0.169
			0.000			1" Ice		7.807	7.329	0.232
						2" Ice		8.869	8.938	0.383
						4" Ice		11.116	12.371	0.807
(2) AIR 21 w/ Mount Pipe	B	From Leg	4.000	0.000	94.000	No Ice		6.771	5.701	0.112
(P)			0.000			1/2" Ice		7.292	6.552	0.169
			0.000			1" Ice		7.807	7.329	0.232
						2" Ice		8.869	8.938	0.383
						4" Ice		11.116	12.371	0.807
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.000	0.000	94.000	No Ice		6.771	5.701	0.112
(P)			0.000			1/2" Ice		7.292	6.552	0.169
			0.000			1" Ice		7.807	7.329	0.232
						2" Ice		8.869	8.938	0.383
						4" Ice		11.116	12.371	0.807
KRY 112 71	A	From Leg	4.000	0.000	94.000	No Ice		0.681	0.450	0.013
(P)			0.000			1/2" Ice		0.802	0.559	0.018
			0.000			1" Ice		0.932	0.677	0.025
						2" Ice		1.219	0.939	0.044
						4" Ice		1.896	1.566	0.111
KRY 112 71	B	From Leg	4.000	0.000	94.000	No Ice		0.681	0.450	0.013
(P)			0.000			1/2" Ice		0.802	0.559	0.018
			0.000			1" Ice		0.932	0.677	0.025
						2" Ice		1.219	0.939	0.044
						4" Ice		1.896	1.566	0.111
KRY 112 71	C	From Leg	4.000	0.000	94.000	No Ice		0.681	0.450	0.013
(P)			0.000			1/2" Ice		0.802	0.559	0.018
			0.000			1" Ice		0.932	0.677	0.025
						2" Ice		1.219	0.939	0.044
						4" Ice		1.896	1.566	0.111
Platform Mount [LP 303-1]	C	None		0.000	94.000	No Ice		14.660	14.660	1.250
(E)						1/2" Ice		18.870	18.870	1.481
						1" Ice		23.080	23.080	1.713
						2" Ice		31.500	31.500	2.175
						4" Ice		48.340	48.340	3.101
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	94.000	No Ice		1.425	1.425	0.022
(E)			0.000			1/2" Ice		1.925	1.925	0.033
			0.000			1" Ice		2.294	2.294	0.048
						2" Ice		3.060	3.060	0.090
						4" Ice		4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	94.000	No Ice		1.425	1.425	0.022
(E)			0.000			1/2" Ice		1.925	1.925	0.033
			0.000			1" Ice		2.294	2.294	0.048
						2" Ice		3.060	3.060	0.090
						4" Ice		4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	94.000	No Ice		1.425	1.425	0.022

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
***									
APXV18-206517S w/ Mount Pipe	A	From Leg	2.000	0.000	75.500	No Ice	5.286	4.667	0.053
			0.000			1/2" Ice	5.839	5.822	0.097
(E)			0.000			1" Ice	6.357	6.687	0.149
						2" Ice	7.417	8.461	0.279
						4" Ice	9.765	12.208	0.674
APXV18-206517S w/ Mount Pipe	B	From Leg	2.000	0.000	75.500	No Ice	5.286	4.667	0.053
			0.000			1/2" Ice	5.839	5.822	0.097
(E)			0.000			1" Ice	6.357	6.687	0.149
						2" Ice	7.417	8.461	0.279
						4" Ice	9.765	12.208	0.674
APXV18-206517S w/ Mount Pipe	C	From Leg	2.000	0.000	75.500	No Ice	5.286	4.667	0.053
			0.000			1/2" Ice	5.839	5.822	0.097
(E)			0.000			1" Ice	6.357	6.687	0.149
						2" Ice	7.417	8.461	0.279
						4" Ice	9.765	12.208	0.674
***									
GPS_A	C	From Leg	2.000	0.000	11.000	No Ice	0.297	0.297	0.001
(E)			0.000			1/2" Ice	0.374	0.374	0.005
			0.000			1" Ice	0.459	0.459	0.010
						2" Ice	0.655	0.655	0.025
						4" Ice	1.151	1.151	0.079
***									
Side Arm Mount [SO 701-1]	C	None		0.000	9.000	No Ice	0.850	1.670	0.065
(E)						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
***									

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	101 - 87.54	Pole	Max Tension	14	0.000	-0.000	0.000
			Max. Compression	14	-9.759	0.431	-0.259
			Max. Mx	11	-4.383	73.046	0.386
			Max. My	8	-4.377	-0.366	-73.470
			Max. Vy	11	-7.538	73.046	0.386
			Max. Vx	2	-7.573	0.447	73.365
			Max. Torque	13			0.781
L2	87.54 - 77.583	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-11.250	0.479	-0.258
			Max. Mx	11	-5.560	166.550	0.764
			Max. My	8	-5.555	-0.685	-167.348
			Max. Vy	11	-8.055	166.550	0.764
			Max. Vx	2	-8.090	0.873	167.274
			Max. Torque	13			0.783
L3	77.583 - 46.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.787	0.373	-0.320
			Max. Mx	11	-11.135	445.549	1.830
			Max. My	2	-11.131	2.108	447.182
			Max. Vy	11	-10.741	445.549	1.830
			Max. Vx	2	-10.777	2.108	447.182
			Max. Torque	7			-0.783
L4	46.08 - 45.333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.038	0.360	-0.328
			Max. Mx	11	-12.132	481.852	1.954
			Max. My	2	-12.128	2.251	483.590
			Max. Vy	11	-11.002	481.852	1.954
			Max. Vx	2	-11.037	2.251	483.590
			Max. Torque	7			-0.774

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	45.333 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.533	0.604	-0.217
			Max. Mx	11	-24.348	1040.637	3.865
			Max. My	2	-24.348	4.563	1043.577
			Max. Vy	11	-13.584	1040.637	3.865
			Max. Vx	2	-13.617	4.563	1043.577
			Max. Torque	7			-0.797

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	34.533	-0.007	-4.336
	Max. H_x	11	24.367	13.548	0.029
	Max. H_z	2	24.367	0.029	13.582
	Max. M_x	2	1043.577	0.029	13.582
	Max. M_z	5	1037.855	-13.548	-0.029
	Max. Torsion	13	0.796	6.799	11.777
	Min. Vert	1	24.367	0.000	0.000
	Min. H_x	5	24.367	-13.548	-0.029
	Min. H_z	8	24.367	-0.029	-13.582
	Min. M_x	8	-1042.214	-0.029	-13.582
	Min. M_z	11	-1040.637	13.548	0.029
	Min. Torsion	7	-0.796	-6.799	-11.777

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	24.367	0.000	0.000	-0.662	1.349	-0.000
Dead+Wind 0 deg - No Ice	24.367	-0.029	-13.582	-1043.577	4.562	-0.689
Dead+Wind 30 deg - No Ice	24.367	6.749	-11.748	-902.283	-515.482	-0.394
Dead+Wind 60 deg - No Ice	24.367	11.719	-6.766	-519.396	-897.041	0.009
Dead+Wind 90 deg - No Ice	24.367	13.548	0.029	2.487	-1037.855	0.410
Dead+Wind 120 deg - No Ice	24.367	11.748	6.816	523.509	-900.200	0.698
Dead+Wind 150 deg - No Ice	24.367	6.799	11.777	904.069	-520.976	0.796
Dead+Wind 180 deg - No Ice	24.367	0.029	13.582	1042.214	-1.790	0.681
Dead+Wind 210 deg - No Ice	24.367	-6.749	11.748	900.921	518.264	0.387
Dead+Wind 240 deg - No Ice	24.367	-11.719	6.766	518.026	899.827	-0.009
Dead+Wind 270 deg - No Ice	24.367	-13.548	-0.029	-3.865	1040.637	-0.403
Dead+Wind 300 deg - No Ice	24.367	-11.748	-6.816	-524.887	902.973	-0.691
Dead+Wind 330 deg - No Ice	24.367	-6.799	-11.777	-905.440	523.744	-0.796
Dead+Ice+Temp	34.533	-0.000	0.000	0.217	0.604	-0.000
Dead+Wind 0 deg+Ice+Temp	34.533	-0.007	-4.336	-345.617	1.435	-0.160
Dead+Wind 30 deg+Ice+Temp	34.533	2.158	-3.752	-298.893	-171.152	-0.068
Dead+Wind 60 deg+Ice+Temp	34.533	3.745	-2.162	-172.011	-297.704	0.043
Dead+Wind 90 deg+Ice+Temp	34.533	4.328	0.007	1.028	-344.307	0.142
Dead+Wind 120 deg+Ice+Temp	34.533	3.752	2.174	173.856	-298.485	0.203
Dead+Wind 150 deg+Ice+Temp	34.533	2.170	3.758	300.167	-172.506	0.209
Dead+Wind 180 deg+Ice+Temp	34.533	0.007	4.336	346.110	-0.129	0.159
Dead+Wind 210 deg+Ice+Temp	34.533	-2.158	3.752	299.386	172.459	0.067

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 240 deg+Ice+Temp	34.533	-3.745	2.162	172.504	299.012	-0.043
Dead+Wind 270 deg+Ice+Temp	34.533	-4.328	-0.007	-0.536	345.615	-0.141
Dead+Wind 300 deg+Ice+Temp	34.533	-3.752	-2.174	-173.365	299.793	-0.202
Dead+Wind 330 deg+Ice+Temp	34.533	-2.170	-3.758	-299.675	173.813	-0.209
Dead+Wind 0 deg - Service	24.367	-0.011	-5.305	-408.789	2.640	-0.272
Dead+Wind 30 deg - Service	24.367	2.636	-4.589	-353.497	-200.864	-0.155
Dead+Wind 60 deg - Service	24.367	4.578	-2.643	-203.664	-350.173	0.004
Dead+Wind 90 deg - Service	24.367	5.292	0.011	0.559	-405.274	0.161
Dead+Wind 120 deg - Service	24.367	4.589	2.663	204.447	-351.416	0.276
Dead+Wind 150 deg - Service	24.367	2.656	4.600	353.371	-203.018	0.315
Dead+Wind 180 deg - Service	24.367	0.011	5.305	407.422	0.153	0.271
Dead+Wind 210 deg - Service	24.367	-2.636	4.589	352.130	203.658	0.154
Dead+Wind 240 deg - Service	24.367	-4.578	2.643	202.295	352.968	-0.004
Dead+Wind 270 deg - Service	24.367	-5.292	-0.011	-1.928	408.068	-0.160
Dead+Wind 300 deg - Service	24.367	-4.589	-2.663	-205.817	354.209	-0.274
Dead+Wind 330 deg - Service	24.367	-2.656	-4.600	-354.740	205.810	-0.316

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-24.367	0.000	0.000	24.367	0.000	0.000%
2	-0.029	-24.367	-13.582	0.029	24.367	13.582	0.000%
3	6.749	-24.367	-11.748	-6.749	24.367	11.748	0.000%
4	11.719	-24.367	-6.766	-11.719	24.367	6.766	0.000%
5	13.548	-24.367	0.029	-13.548	24.367	-0.029	0.000%
6	11.748	-24.367	6.816	-11.748	24.367	-6.816	0.000%
7	6.799	-24.367	11.777	-6.799	24.367	-11.777	0.000%
8	0.029	-24.367	13.582	-0.029	24.367	-13.582	0.000%
9	-6.749	-24.367	11.748	6.749	24.367	-11.748	0.000%
10	-11.719	-24.367	6.766	11.719	24.367	-6.766	0.000%
11	-13.548	-24.367	-0.029	13.548	24.367	0.029	0.000%
12	-11.748	-24.367	-6.816	11.748	24.367	6.816	0.000%
13	-6.799	-24.367	-11.777	6.799	24.367	11.777	0.000%
14	0.000	-34.533	0.000	0.000	34.533	-0.000	0.000%
15	-0.007	-34.533	-4.336	0.007	34.533	4.336	0.000%
16	2.158	-34.533	-3.752	-2.158	34.533	3.752	0.000%
17	3.745	-34.533	-2.162	-3.745	34.533	2.162	0.000%
18	4.328	-34.533	0.007	-4.328	34.533	-0.007	0.000%
19	3.752	-34.533	2.174	-3.752	34.533	-2.174	0.000%
20	2.170	-34.533	3.758	-2.170	34.533	-3.758	0.000%
21	0.007	-34.533	4.336	-0.007	34.533	-4.336	0.000%
22	-2.158	-34.533	3.752	2.158	34.533	-3.752	0.000%
23	-3.745	-34.533	2.162	3.745	34.533	-2.162	0.000%
24	-4.328	-34.533	-0.007	4.328	34.533	0.007	0.000%
25	-3.752	-34.533	-2.174	3.752	34.533	2.174	0.000%
26	-2.170	-34.533	-3.758	2.170	34.533	3.758	0.000%
27	-0.011	-24.367	-5.305	0.011	24.367	5.305	0.000%
28	2.636	-24.367	-4.589	-2.636	24.367	4.589	0.000%
29	4.578	-24.367	-2.643	-4.578	24.367	2.643	0.000%
30	5.292	-24.367	0.011	-5.292	24.367	-0.011	0.000%
31	4.589	-24.367	2.663	-4.589	24.367	-2.663	0.000%
32	2.656	-24.367	4.600	-2.656	24.367	-4.600	0.000%
33	0.011	-24.367	5.305	-0.011	24.367	-5.305	0.000%
34	-2.636	-24.367	4.589	2.636	24.367	-4.589	0.000%
35	-4.578	-24.367	2.643	4.578	24.367	-2.643	0.000%
36	-5.292	-24.367	-0.011	5.292	24.367	0.011	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
37	-4.589	-24.367	-2.663	4.589	24.367	2.663	0.000%
38	-2.656	-24.367	-4.600	2.656	24.367	4.600	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00023526
3	Yes	6	0.00000001	0.00017851
4	Yes	6	0.00000001	0.00018221
5	Yes	5	0.00000001	0.00014001
6	Yes	6	0.00000001	0.00019141
7	Yes	6	0.00000001	0.00017725
8	Yes	5	0.00000001	0.00017711
9	Yes	6	0.00000001	0.00018686
10	Yes	6	0.00000001	0.00018263
11	Yes	5	0.00000001	0.00008280
12	Yes	6	0.00000001	0.00017900
13	Yes	6	0.00000001	0.00019370
14	Yes	4	0.00000001	0.00001049
15	Yes	5	0.00000001	0.00062389
16	Yes	6	0.00000001	0.00012712
17	Yes	6	0.00000001	0.00012801
18	Yes	5	0.00000001	0.00061792
19	Yes	6	0.00000001	0.00013345
20	Yes	6	0.00000001	0.00012794
21	Yes	5	0.00000001	0.00062512
22	Yes	6	0.00000001	0.00013171
23	Yes	6	0.00000001	0.00013044
24	Yes	5	0.00000001	0.00062095
25	Yes	6	0.00000001	0.00012853
26	Yes	6	0.00000001	0.00013443
27	Yes	4	0.00000001	0.00083767
28	Yes	5	0.00000001	0.00029317
29	Yes	5	0.00000001	0.00030507
30	Yes	4	0.00000001	0.00054846
31	Yes	5	0.00000001	0.00033431
32	Yes	5	0.00000001	0.00028889
33	Yes	4	0.00000001	0.00076523
34	Yes	5	0.00000001	0.00032176
35	Yes	5	0.00000001	0.00030724
36	Yes	4	0.00000001	0.00049543
37	Yes	5	0.00000001	0.00029635
38	Yes	5	0.00000001	0.00034465

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	101 - 87.54	29.679	38	2.636	0.012
L2	89.56 - 77.583	23.518	38	2.463	0.008
L3	77.583 - 46.08	17.730	38	2.101	0.005
L4	48.67 - 45.333	7.114	38	1.357	0.002
L5	45.333 - 0	6.184	38	1.297	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
103.500	Lightning Rod 3/4" x 5'	38	29.679	2.636	0.012	4937
101.000	RA21.7770.00 W/ Mount Pipe	38	29.679	2.636	0.012	4937
94.000	(2) AIR 21 w/ Mount Pipe	38	25.863	2.548	0.009	3527
75.500	APXV18-206517S w/ Mount Pipe	38	16.808	2.034	0.004	2064
11.000	GPS_A	38	0.828	0.367	0.000	5750
9.000	Side Arm Mount [SO 701-1]	38	0.666	0.301	0.000	7028

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	101 - 87.54	75.510	13	6.719	0.032
L2	89.56 - 77.583	59.859	13	6.278	0.019
L3	77.583 - 46.08	45.146	13	5.356	0.012
L4	48.67 - 45.333	18.130	13	3.460	0.005
L5	45.333 - 0	15.760	13	3.307	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
103.500	Lightning Rod 3/4" x 5'	13	75.510	6.719	0.032	1984
101.000	RA21.7770.00 W/ Mount Pipe	13	75.510	6.719	0.032	1984
94.000	(2) AIR 21 w/ Mount Pipe	13	65.816	6.492	0.024	1417
75.500	APXV18-206517S w/ Mount Pipe	13	42.802	5.185	0.011	824
11.000	GPS_A	13	2.112	0.937	0.001	2260
9.000	Side Arm Mount [SO 701-1]	13	1.699	0.769	0.001	2762

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	101 - 87.54 (1)	TP16.17x14.65x0.188	13.460	0.000	0.0	39.000	9.376	-4.373	365.657	0.012
L2	87.54 - 77.583 (2)	TP16.989x15.567x0.25	11.977	0.000	0.0	39.000	13.283	-5.551	518.017	0.011
L3	77.583 - 46.08 (3)	TP20.73x16.989x0.53	31.503	0.000	0.0	34.163	33.488	-11.128	1144.080	0.010
L4	46.08 - 45.333 (4)	TP20.325x19.922x0.601	3.337	0.000	0.0	33.952	37.617	-12.126	1277.180	0.009
L5	45.333 - 0 (5)	TP25.8x20.325x0.642	45.333	0.000	0.0	35.114	51.242	-24.348	1799.320	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	101 - 87.54 (1)	TP16.17x14.65x0.188	73.652	24.345	39.000	0.624	0.000	0.000	39.000	0.000
L2	87.54 - 77.583 (2)	TP16.989x15.567x0.25	167.790	36.957	39.000	0.948	0.000	0.000	39.000	0.000
L3	77.583 - 46.08 (3)	TP20.73x16.989x0.53	448.347	33.341	34.163	0.976	0.000	0.000	34.163	0.000
L4	46.08 - 45.333 (4)	TP20.325x19.922x0.601	484.830	32.489	33.952	0.957	0.000	0.000	33.952	0.000
L5	45.333 - 0 (5)	TP25.8x20.325x0.642	1046.008	40.149	35.114	1.143	0.000	0.000	35.114	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	101 - 87.54 (1)	TP16.17x14.65x0.188	7.591	0.810	26.000	0.062	0.781	0.125	26.000	0.005
L2	87.54 - 77.583 (2)	TP16.989x15.567x0.25	8.108	0.610	26.000	0.047	0.783	0.084	26.000	0.003
L3	77.583 - 46.08 (3)	TP20.73x16.989x0.53	10.796	0.322	22.776	0.028	0.775	0.028	22.776	0.001
L4	46.08 - 45.333 (4)	TP20.325x19.922x0.601	11.056	0.294	22.634	0.026	0.774	0.025	22.634	0.001
L5	45.333 - 0 (5)	TP25.8x20.325x0.642	13.634	0.266	23.409	0.023	0.796	0.015	23.409	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	101 - 87.54 (1)	0.012	0.624	0.000	0.062	0.005	0.637 ✔	1.333	H1-3+VT ✔
L2	87.54 - 77.583 (2)	0.011	0.948	0.000	0.047	0.003	0.959 ✔	1.333	H1-3+VT ✔
L3	77.583 - 46.08 (3)	0.010	0.976	0.000	0.028	0.001	0.986 ✔	1.333	H1-3+VT ✔
L4	46.08 - 45.333 (4)	0.009	0.957	0.000	0.026	0.001	0.967 ✔	1.333	H1-3+VT ✔
L5	45.333 - 0 (5)	0.014	1.143	0.000	0.023	0.001	1.157 ✔	1.333	H1-3+VT ✔

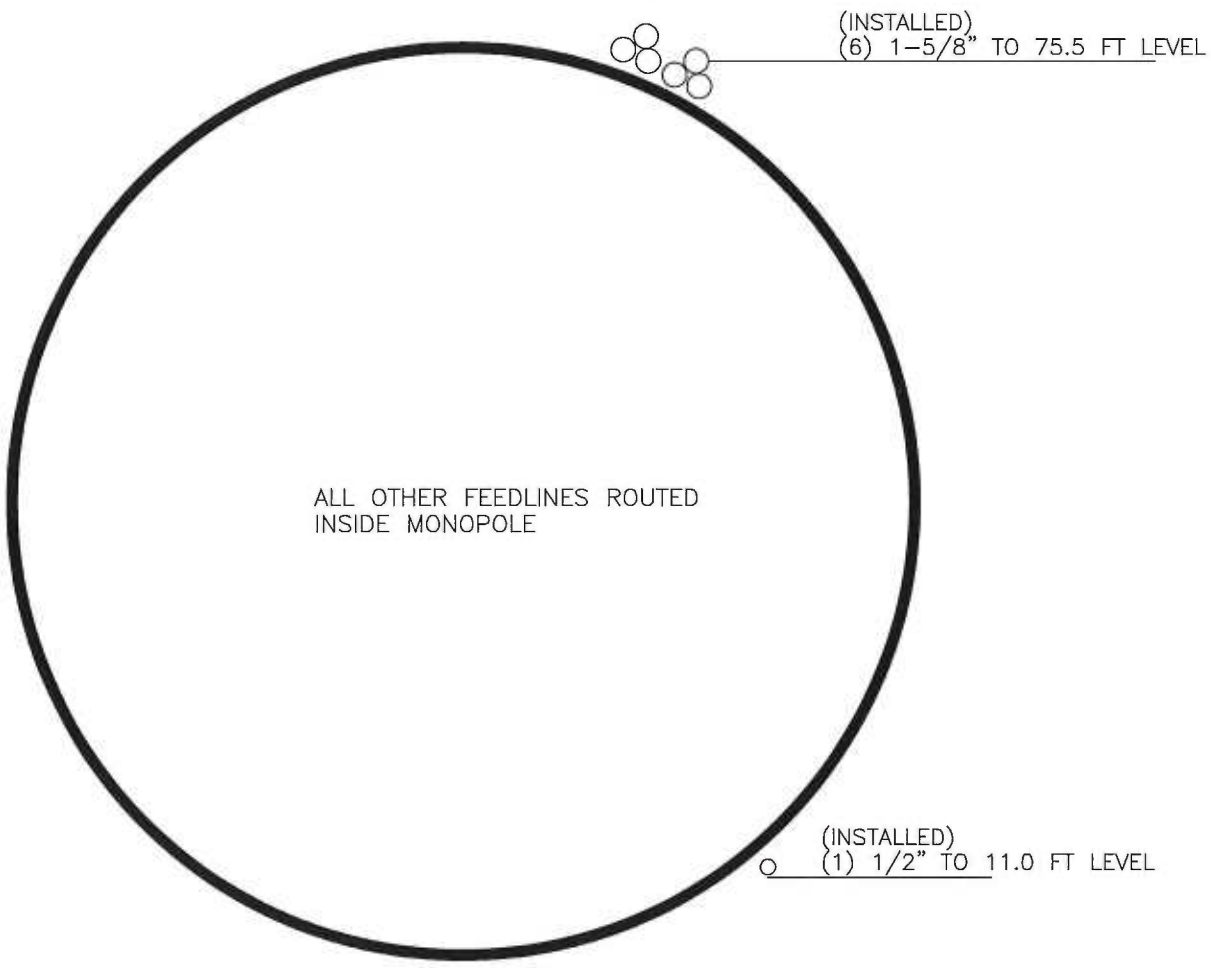
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	101 - 87.54	Pole	TP16.17x14.65x0.188	1	-4.373	487.421	**	Pass
L2	87.54 - 77.583	Pole	TP16.989x15.567x0.25	2	-5.551	690.517	**	Pass
L3	77.583 - 46.08	Pole	TP20.73x16.989x0.53	3	-11.128	1525.059	**	Pass
L4	46.08 - 45.333	Pole	TP20.325x19.922x0.601	4	-12.126	1702.481	**	Pass
L5	45.333 - 0	Pole	TP25.8x20.325x0.642	5	-24.348	2398.493	**	Pass
						Summary		
						Pole (L5)	**	Pass
						RATING =	**	**Pass**

**See additional calculations for pole capacities

APPENDIX B

BASE LEVEL DRAWING


(INSTALLED)
(6) 1-5/8" TO 75.5 FT LEVEL
ALL OTHER FEEDLINES ROUTED
INSIDE MONOPOLE
(INSTALLED)
(1) 1/2" TO 11.0 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	45.333	3	MP306	F	0	T&C
45.333	77.583	3	MP305	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3						
Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.
87.5400	101.0000	0.1875	65	80	47.7%										47.7%	101.0000	13.4600	2.0200	18	14.6500	16.1700	0.1875	65.0	1.00
77.5830	89.5600	0.2500	65	80	71.8%										71.8%	89.5600	11.9770	0.0000	18	15.5669	16.9891	0.2500	65.0	1.00
46.0800	77.5830	0.2500	65	80	68.8%	3	MP305	72.2%							72.2%	77.5830	31.5030	2.5900	18	16.9891	20.7300	0.5304	56.9	0.98
45.3330	48.6700	0.3125	65	80	66.5%	3	MP305	70.8%							70.8%	48.6700	3.3370	0.0000	18	19.9224	20.3254	0.6009	56.6	0.98
0.0000	45.3330	0.3125	65	80	83.0%	3	MP306	84.6%							84.6%	45.3330	45.3330	0.0000	18	20.3254	25.8000	0.6417	58.5	0.99

Bottom Elevation Failure	Top Elevation Failure	Section Failure %

Reinforced Pole Stress
and Effective Thickness Check

AeroSolutions LLC
[illegible]

Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	[illegible]	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in²)	Moment of Inertia (in⁴)	Percent of Composite Moment of Inertia
[illegible]	[illegible]	0.0	0.0	[illegible]	0.0	18	14.6600	0.1875	65	2.25	8.6	227	100%
[illegible]	[illegible]	73.7	4.4	[illegible]	0.0	18	15.9419	0.1875	65	2.48	9.4	294	100%
[illegible]	87.54	89.1	4.6	7.7	0.0	18	16.1700	0.4375	65	2.08	21.8	641	100%
[illegible]	77.583	167.0	5.6	8.1	0.0	18	16.9491	0.2500	65	2.55	13.3	469	100%
[illegible]	48.67	448.3	11.1	10.8	0.0	18	20.4274	0.2500	65	3.16	16.0	827	49%
[illegible]	46.08	476.6	12.0	11.0	0.0	18	20.7300	0.5625	65	2.66	35.9	1850	68%
[illegible]	45.333	464.9	12.1	11.1	0.0	18	20.1254	0.3125	[illegible]	3.03	19.8	1008	54%
[illegible]	0	1046.0	24.3	13.6	0.0	18	25.8000	0.3125	65	4.00	25.3	2064	51%

Section	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)	Section Modulus (in³)	Torsion Constant (in⁴)	Polygonal Compact Criterion	Allowable Bending Stress (ksi)	Allowable Bending Moment Strength (ft-kip)	Allowable Axial Stress (ksi)	Allowable Shear Stress (ksi)	Unreinforced Pole: Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Stress Ratio
[illegible]	TRUE	7.42	31	450	97	52.0	132.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TRUE	8.08	36	582	107	52.0	157.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TRUE	8.18	83	1353	38	52.0	361.0	52.0	34.7	12.8	0.21	0.00	0.06	0.251
[illegible]	TRUE	8.61	55	931	82	52.0	236.3	52.0	34.7	36.9	0.42	0.00	0.09	0.718
[illegible]	10	10.92	76	1630	102	52.0	328.1	52.0	34.7	71.0	0.70	0.00	0.06	[illegible]
[illegible]	10	10.84	171	3446	38	52.0	739.2	52.0	34.7	33.5	0.33	0.00	0.03	0.652
[illegible]	10	10.80	93	1990	78	52.0	404.2	52.0	34.7	[illegible]	0.61	0.00	0.05	[illegible]
[illegible]	10	13.77	151	4109	103	52.0	655.6	52.0	34.7	82.9	0.96	0.00	0.03	[illegible]
														[illegible]

Section	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Reinforced Pole Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Reinf. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	Stress Ratio
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	89.1	[illegible]	0.21	0.00	0.00	0.251								
[illegible]	167.0	[illegible]	0.42	0.00	0.01	0.718								
[illegible]	[illegible]	[illegible]	0.70	0.00	0.01	[illegible]	[illegible]	MP308	[illegible]	[illegible]	T&C	847	187.3	0.722
[illegible]	323.5	22.8	0.33	0.00	0.00	0.444	[illegible]	MP305	[illegible]	[illegible]	T&C	875	126.6	0.488
[illegible]	264.2	34.0	0.61	0.00	0.00	0.665	3	[illegible]	[illegible]	[illegible]	T&C	[illegible]	183.6	0.708
[illegible]	532.0	42.2	0.96	0.00	0.00	0.630	[illegible]	MP308	[illegible]	[illegible]	T&C	2014	336.8	0.846
						[illegible]								[illegible]

Section	Centroid Offset (in)	Area (in²)	Moment of Inertia (in⁴)	Controlling Stress Ratio	Thickness (in)	Weight Multiplier	Derated Yield Stress (ksi)	[illegible]
[illegible]	0.000	8.6	227	0.000	0.1875	1.00	65.0	[illegible]
[illegible]	0.000	9.4	294	0.477	0.1875	1.00	65.0	[illegible]
[illegible]	0.000	21.8	641	0.251	0.4375	1.00	65.0	[illegible]
[illegible]	0.000	13.3	469	0.718	0.2500	1.00	65.0	[illegible]
[illegible]	0.560	32.9	1674	0.722	[illegible]	0.88	56.0	2.0%
[illegible]	0.339	52.9	2724	0.488	[illegible]	0.97	[illegible]	[illegible]
[illegible]	0.506	36.9	1849	0.708	[illegible]	0.90	58.4	[illegible]
[illegible]	0.695	50.7	[illegible]	0.846	0.6437	0.89	58.5	[illegible]
				[illegible]				

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	45.333	3	MP306	F	T&C
45.333	77.583	3	MP305	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
				1					1							1	
				1					1							1	

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforcement Capacity

AeroSolutions LLC
Connecting Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-104-6882

Dimensions and Properties													Compression				Axial					
																	ASD-9			LRFD		
Model	Weight (lb/ft)	Area (in²)	Moment of Inertia (in⁴)	Moment of Inertia (in⁴)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ Increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
MP203	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	1	1.21875	65	80	0.80	16	1.00	16	81.8	108.8	Rupture	111.7	Rupture
MP204	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	1	1.21875	65	80	0.80	20	1.00	20	124.8	171.7	Rupture	193.1	Rupture
MP205	20.4	6.00	0.50	18.00	0.5	0	1	6	0	1	1.21875	65	80	0.80	16	1.00	16	184.8	251.7	Rupture	283.1	Rupture
MP206	27.6	8.13	1.06	28.81	0.625	0	1.13	6.5	0	1	1.21875	65	80	0.80	18	1.00	18	260.9	347.9	Rupture	391.4	Rupture
MP208	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	1	1.21875	65	80	0.80	14	1.00	14	360.9	481.3	Rupture	541.4	Rupture
MP303	9.9	2.92	0.66	6.57	0.59	0	0.30	4.06	1.57	0.64	1.21875	65	80	0.80	18	1.00	18	98.4	128.6	Rupture	144.7	Rupture
MP304	14.1	4.13	0.93	11.66	0.81	0	0.43	4.78	1.61	0.84	1.21875	65	80	0.80	18	1.00	18	137.3	183.1	Rupture	206.0	Rupture
MP305	19.2	5.65	2.15	20.79	0.79	0	0.5	5.31	2.09	0.91	1.21875	65	80	0.80	18	1.00	18	194.5	259.3	Rupture	291.8	Rupture
MP306	28.8	8.47	4.85	51.50	0.93	0	0.64	6.89	2.61	1.01	1.21875	65	80	0.80	24	1.00	24	298.7	398.3	Rupture	448.1	Rupture
MP308	35.1	10.32	6.48	82.29	0.85	0	0.76	7.93	2.8	1.01	1.21875	65	80	0.80	24	1.00	24	366.0	487.9	Rupture	548.9	Rupture
MP404	12.1	3.56	0.17	6.70	0.375	0	0.75	4.75	0	1	1.21875	100	110	0.80	14	1.00	14	143.1	190.8	Rupture	214.6	Rupture
MP405	16.6	4.88	0.41	9.65	0.5	0	1	4.875	0	1	1.21875	100	110	0.80	18	1.00	18	197.7	263.5	Rupture	296.5	Rupture
MP406	20.7	6.09	0.79	12.07	0.625	0	1.25	4.875	0	1	1.21875	100	110	0.80	11	1.00	11	247.1	329.4	Rupture	370.6	Rupture
MP408	29.8	8.75	2.23	28.23	0.875	0	1.75	5	0	1	1.21875	100	110	0.80	32	1.00	32	357.9	477.2	Rupture	536.9	Rupture
MP303	8.1	2.38	0.69	13.10	0.512	0	0.2	6	1.92	0.343	1.21875	65	80	0.80	22	1.00	22	81.4	108.5	Compress.	121.5	Rupture
MP308.5	16.9	4.96	3.16	6.15	0.98		0.76	3.84	2.8	1.01	1.21875	65	80	0.80	18	1.00	18	151.8	202.9	Rupture	228.2	Rupture
MP1-303	17.1	5.02	0.42	48.88	-0.39	0	0.5	10	0	1	1.21875	65	80	0.80	18	1.00	18	151.8	202.4	Compress.	232.0	Compress.
MP1-758	25.5	7.50	0.82	60.71	-0.06	0	0.75	10	0	1	1.21875	65	80	0.80	18	1.00	18	238.0	317.3	Compress.	366.4	Compress.
MP4C0750400	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	1	1.21875	100	110	0.80	15	1.00	15	132.1	149.5	Rupture	168.2	Rupture
MP4C1000400	13.6	4.00	0.33	5.33	0.5	0	1	4	0	1	1.21875	100	110	0.80	20	1.00	20	149.5	199.4	Rupture	224.3	Rupture
MP4C1000500	17.0	5.00	0.42	10.42	0.5	0	1	5	0	1	1.21875	100	110	0.80	18	1.00	18	204.5	272.7	Rupture	306.8	Rupture
MP4C1000600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	1	1.21875	100	110	0.80	17	1.00	17	258.7	344.9	Compress.	388.1	Rupture
MP4C1000700	23.8	7.00	0.58	28.58	0.5	0	1	7	0	1	1.21875	100	110	0.80	16	1.00	16	311.5	415.3	Compress.	471.8	Rupture
MP4C1500700	35.7	10.50	1.97	42.88	0.75	0	1.5	7	0	1	1.21875	100	110	0.80	24	1.00	24	407.3	623.0	Compress.	707.7	Rupture
MP4C1000800	27.2	8.00	0.67	42.67	0.5	0	1	8	0	1	1.21875	100	110	0.80	15	1.00	15	366.8	468.0	Compress.	554.3	Rupture
MP4C1500800	40.8	12.00	2.25	64.00	0.75	0	1.5	8	0	1	1.21875	100	110	0.80	22	1.00	22	554.3	739.1	Rupture	831.4	Rupture
MP4C1500900	45.9	13.50	2.53	91.13	0.75	0	1.5	9	0	1	1.21875	100	110	0.80	21	1.00	21	636.5	848.7	Compress.	955.2	Rupture
MP4C1501000	51.0	15.00	2.81	125.00	0.75	0	1.5	10	0	1	1.21875	100	110	0.80	20	1.00	20	715.3	998.1	Rupture	1078.9	Rupture
MP4C1501100	56.1	16.50	3.09	166.38	0.75	0	1.5	11	0	1	1.21875	100	110	0.80	19	1.00	19	801.8	1069.1	Rupture	1202.7	Rupture
MP4C1501200	61.2	18.00	3.38	216.00	0.75	0	1.5	12	0	1	1.21875	100	110	0.80	18	1.00	18	884.3	1179.1	Rupture	1326.4	Rupture
MS-400	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	1	1.21875	65	80	0.80	16.875	1.00	16.875	80.9	107.8	Compress.	121.3	Compress.
MS-450	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	1	1.21875	65	80	0.80	20.625	1.00	20.625	127.6	170.2	Compress.	193.0	Compress.
MS-600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	1	1.21875	65	80	0.80	16.375	1.00	16.375	187.6	250.4	Compress.	283.1	Rupture
MS-650	27.6	8.13	1.06	28.81	0.625	0	1.13	6.5	0	1	1.21875	65	80	0.80	19.25	1.00	19.25	259.4	345.9	Compress.	391.4	Rupture
MS-850	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	1	1.21875	65	80	0.80	17.25	1.00	17.25	349.7	466.2	Compress.	540.9	Compress.
CCI-XFP-040075	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	1	1.1875	65	80	0.80	16	1.00	16	82.5	110.0	Rupture	123.8	Rupture
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	1	1.1875	65	80	0.80	20	1.00	20	129.7	172.9	Compress.	195.0	Rupture
CCI-XFP-060100	20.4	6.00	0.50	18.00	0.5	0	1	6	0	1	1.1875	65	80	0.80	16	1.00	16	188.3	251.1	Compress.	283.0	Rupture
CCI-XFP-065125	27.6	8.13	1.06	28.81	0.625	0	1.13	6.5	0	1	1.1875	65	80	0.80	19	1.00	19	266.4	247.2	Compress.	392.8	Compress.
CCI-XFP-085125	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	1	1.1875	65	80	0.80	17	1.00	17	350.9	467.9	Compress.	543.1	Compress.
ISP-UR-0754	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	1	1.21875	100	110	0.80	15	1.00	15	112.1	149.5	Rupture	168.2	Rupture
ISP-UR-1004	13.6	4.00	0.33	5.33	0.5	0	1	4	0	1	1.21875	100	110	0.80	20	1.00	20	149.5	199.4	Rupture	224.3	Rupture
ISP-UR-1005	17.0	5.00	0.42	10.42	0.5	0	1	5	0	1	1.21875	100	110	0.80	18	1.00	18	204.5	272.7	Rupture	306.8	Rupture
ISP-UR-1006	20.4	6.00	0.50	18.00	0.5	0	1	6	0	1	1.21875	100	110	0.80	17	1.00	17	258.7	344.9	Compress.	388.1	Rupture
ISP-UR-1007	23.8	7.00	0.58	28.58	0.5	0	1	7	0	1	1.21875	100	110	0.80	16	1.00	16	311.5	415.3	Compress.	471.8	Rupture
ISP-UR-1507	35.7	10.50	1.97	42.88	0.75	0	1.5	7	0	1	1.21875	100	110	0.80	24	1.00	24	407.3	623.0	Compress.	707.7	Rupture
ISP-UR-1008	27.2	8.00	0.67	42.67	0.5	0	1	8	0	1	1.21875	100	110	0.80	15	1.00	15	366.8	489.0	Compress.	554.3	Rupture
ISP-UR-1508	40.8	12.00	2.25	64.00	0.75	0	1.5	8	0	1	1.21875	100	110	0.80	22	1.00	22	554.3	739.1	Rupture	831.4	Rupture
ISP-UR-1509	45.9	13.50	2.53	91.13	0.75	0	1.5	9	0	1	1.21875	100	110	0.80	21	1.00	21	636.5	848.7	Compress.	955.2	Rupture
ISP-UR-1510	51.0	15.00	2.81	125.00	0.75	0	1.5	10	0	1	1.21875	100	110	0.80	20	1.00	20	719.3	959.1	Rupture	1078.9	Rupture
ISP-UR-1511	56.1	16.50	3.09	166.38	0.75	0	1.5	11	0	1	1.21875	100	110	0.80	19	1.00	19	801.8	1069.1	Rupture	1202.7	Rupture
ISP-UR-1512	61.2	18.00	3.38	216.00	0.75	0	1.5	12	0	1	1.21875	100	110	0.80	18	1.00	18	884.3	1179.1	Rupture	1326.4	Rupture
PL1.25x3-18	12.8	3.75	0.49	2.81	0.625	0	1.25	3	0	1	1.21875	65	80	0.80	18	1.00	18	85.9	114.6	Rupture	124.9	Rupture
PL1.25x3.25-18	13.8	4.06	0.53	3.58	0.625	0	1.25	3.25	0	1	1.21875	65	80	0.80	18	1.00	18	98.4	131.3	Rupture	147.7	Rupture
PL1.25x3.5-18	14.9	4.38	0.57	4.47	0.625	0	1.25	3.5	0	1	1.21875	65	80	0.80	18	1.00	18	110.9	147.9	Rupture	165.4	Rupture
PL1.25x3.75-18	16.0	4.69	0.61	5.49	0.625	0	1.25	3.75	0	1	1.21875	65	80	0.80	18	1.00	18	123.4	164.6	Rupture	185.2	Rupture
PL1.25x4-18	17.0	5.00	0.65	6.67	0.625	0	1.25	4	0	1	1.21875	65	80	0.80	18	1.00	18	135.9	181.3	Rupture	203.9	Rupture
PL1.25x4.25-18	18.1	5.31	0.69	8.00	0.625	0	1.25	4.25	0	1	1.21875	65	80	0.80	18	1.00	18	148.4	197.9	Rupture	222.7	Rupture
PL1.25x4.5-18	19.1	5.63	0.73	9.49	0.625	0	1.25	4.5	0	1	1.21875	65	80	0.80	18	1.00	18	160.9	214.5	Rupture	241.4	Rupture
PL1.25x4.75-18	20.2	5.94	0.77	11.16	0.625	0	1.25	4.75	0	1	1.21875	65	80	0.80	18	1.00	18	173.4	231.3	Rupture	260.2	Rupture
PL1.25x5-18	21.3	6.25	0.81	13.02	0.625	0	1.25	5	0	0	1.21875	65	80	0.80	18	1.00	18	185.9	247.9	Rupture	278.9	Rupture
PL1.25x5.25-18	22.3	6.56	0.85	15.07	0.625	0	1.25	5.25	0	0	1.21875	65	80	0.80	18	1.00	18	198.4	264.6	Rupture	297.7	Rupture
PL1.25x5.5-18	23.4	6.88	0.90	17.33	0.625	0	1.25	5.5	0	0	1.21875	65	80	0.80	18	1.00	18	210.9	281.3	Rupture	316.4	Rupture
PL1.25x5.75-18	24.5	7.19	0.94	19.88	0.625	0	1.25	5.75	0	0	1.21875	65	80	0.80	18	1.00	18	223.4	297.9	Rupture	335.2	Rupture
PL1.25x6-18	25.5	7.50	0.98	22.50	0.625	0	1.25	6	0	0	1.21875	65	80	0.80	18	1.00	18	235.9	314.6	Rupture	353.9	Rupture
PL1.25x6.25-18	26.6	7.81	1.02	25.43	0.625	0	1.25	6.25	0	0	1.21875	65	80	0.80	18	1.00	18	248.4	331.3	Rupture	372.7	Rupture
PL1.25x6.5-18	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.21875	65	80	0.80	18	1.00	18	260.9	347.9	Rupture	391.4	Rupture
PL1.25x6.75-18	28.7	8.44	1.10	32.04	0.625	0	1.25	6.75	0	0	1.21875	65	80	0.80	18	1.00	18	273.4	364.6	Rupture	410.2	Rupture
PL1.25x7-18	29.8	8.75	1.14	35.73	0.625	0	1.25	7	0	0	1.21875	65	80	0.80	18	1.00	18	284.8	379.7	Compress.	428.9	Rupture
PL1.25x7.25-18	30.8	9.06	1.18	39.70	0.625	0	1.25	7.25	0	0	1.21875	65	80	0.80	18	1.00	18	295.0	393.3	Compress.	447.7	Rupture
PL1.25x7.5-18	31.9	9.38	1.22	43.95	0.625	0	1.25	7.5	0	0	1.21875	65	80	0.80	18	1.00	18	305.1	406.8	Compress.	466.4	Rupture
PL1.25x7.75-18	33.0	9.69	1.26	48.49	0.625	0	1.25	7.75	0	0	1.21875	65	80	0.80	18	1.00	18	315.3	420.4	Compress.	485.2	Rupture
PL1.25x8-18	34.0	10.00	1.30	53.33	0.625	0	1.25	8	0	0	1.21875	65	80	0.80	18	1.00	18	325.5	434.0	Compress.	502.8	Compress.
PL1.25x8.25-18	35.1	10.31	1.34	58.49	0.625	0	1.25	8.25	0	0	1.21875	65	80	0.80	18	1.00	18	335.8	447.5	Compress.	516.5	Compress.
PL1.25x8.5-18	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.21875	65	80	0.80	18	1.00	18	345.8	461.1	Compress.	534.2	Compress.
PL1.25x8.75-18	37.2	10.94	1.42	69.76	0.625	0	1.25	8.75	0	0	1.21875	65	80	0.80	18	1.00	18	356.0	474.6	Compress.	550.0	Compress.
PL1.25x9-18	38.3	11.25	1.46	75.94	0.625	0	1.25	9	0	0	1.21875	65	80	0.80	18	1.00	18	366.2	488.2	Compress.	565.7	Compress.
HSS4x3x1/4-12	9.9	2.91	3.91	6.15	1.5	0	0.233	4						62	0.80	12	1.00	12	85.6	114.1	Compress.	130.3	Compress.
HSS5x4x5/16-12	15.9	4.68	11.1	15.8	2.0	0	0.291	5						50	0.80	12	1.00	12	137.2	164.5	Compress.	209.9	Compress.
HSS6x5x3/8-12	23.4	6.88	25.5	33.9	2.5	0	0.349	6						50	62	0.80	12	1.00	12	203.8	271.8	Compress.	308.9	Compress.
HSS6x6x3/8-120	25.8	7.58	39.5	39.5	3.0	0	0.349	6						46	18	1.00	120	1.00	120	169.4	225.8	Compress.	280.6	Compress.
HSS6x6x1/2-120	33.1	9.74	48.3	48.3	3.0	0	0.465	6						46	18	1.00	120	1.00	120	215.8	287.8	Compress.	331.7	Compress.
HSS7x7x1/2-120	39.5	11.6	80.5	80.5	3.5	0	0.465	7						46	18	1.00	120	1.00	120	270.0	360.0	Compress.	417.7	Compress.
HSS8x8x1/2-120	45.9	13.5	125	125	4.0	0	0.465	8						46	18	1.00	120	1.00	120	324.6	432.8	Compress.	503.4	Compress.

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

Site #: *CTHA130A*
Site Name: *Windsor*

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1046	ft-kips
Unfactored Axial, P:	24	kips
Unfactored Shear, V:	14	kips

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	50.8	in
Anchor Spacing:	6	in

Anchor Rod Results

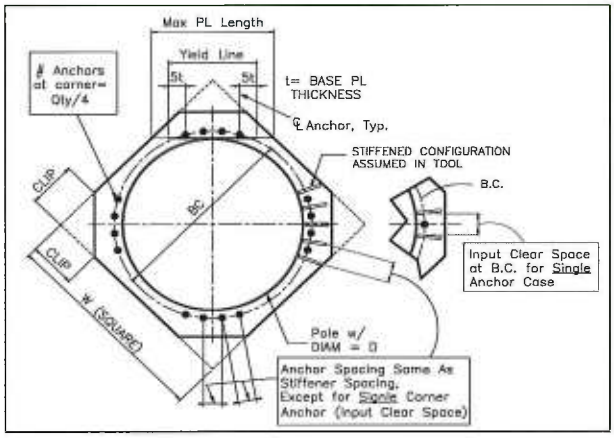
TIA F --> Maximum Rod Tension	120.5 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	61.8% **Pass**

Plate Data		
W=Side:	48	in
Thick:	2.5	in
Grade:	60	ksi
Clip Distance:	16	in

PL Ref. Data
Yield Line (in): N/A, Roark
Max PL Length: 42.08

Stiffener Data (Welding at both sides)		
Configuration:	Stiffened	
Weld Type:	Fillet	**
Groove Depth:		<--- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.4375	in
Fillet V. Weld:	0.25	in
Width:	11.5	in
Height:	48	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	25.8	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



Stress Increase Factor		
ASD ASIF:	1.333	

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Analysis date: 4/4/2014

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

Site #: *CTHA130A*
Site Name: *Windsor*

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1046	ft-kips
Unfactored Axial, P:	24	kips
Unfactored Shear, V:	14	kips

Anchor Rod Data		
Qty:	4	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	50.8	in

Plate Data		
W=Side:	48	in
Thick:	2.5	in
Grade:	60	ksi
Clip Distance:	16	in

Base Plate Results Shear Check Only

Base Plate Stress:	5.2 ksi	
Allowable PL Bending Stress:	32.0 ksi	
Base Plate Stress Ratio:	16.3%	Pass

PL Ref. Data
Yield Line (in):
N/A, Roark
Max PL Length:
42.08

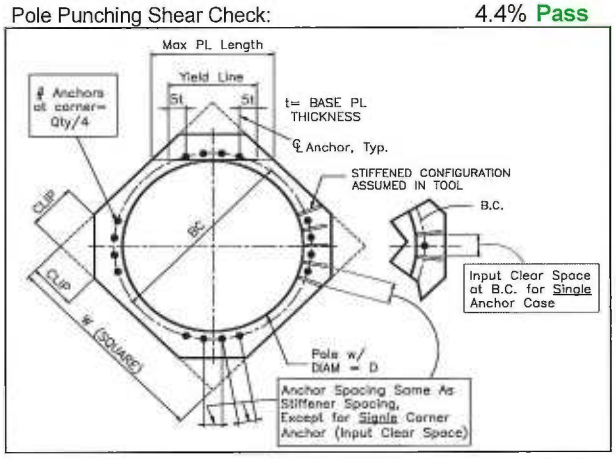
Stiffener Data (Welding at both sides)		
Configuration:	Stiffened	
Weld Type:	Fillet	**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.4375	in
Fillet V. Weld:	0.25	in
Width:	11.5	in
Height:	48	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi
Clear Space between Stiffeners at B.C.		in

Stiffener Results

Horizontal Weld :	90.9%	Pass
Vertical Weld:	31.4%	Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	2.7%	Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	31.7%	Pass
Plate Comp. (AISC Bracket):	26.0%	Pass

Pole Results

Pole Punching Shear Check:	4.4%	Pass

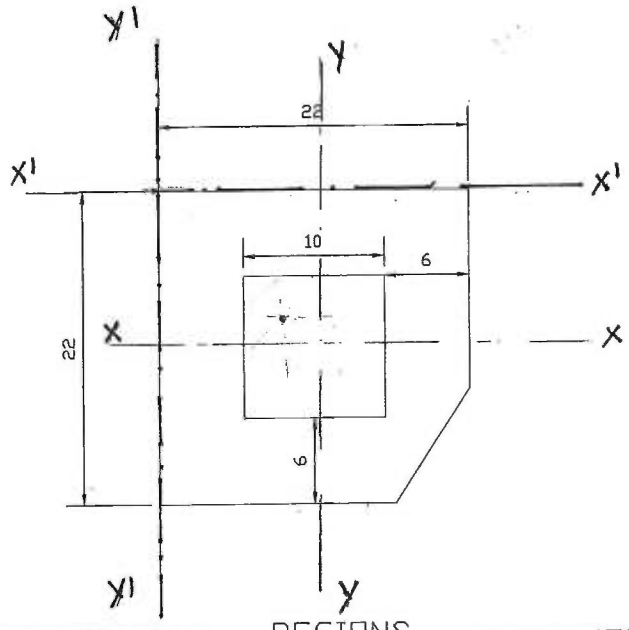


Pole Data		
Diam:	25.8	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Analysis date: 4/4/2014

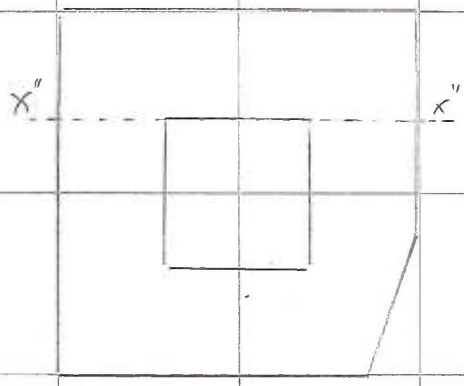


---------- REGIONS ----------

Area: 363
Perimeter: 124.3188
Bounding Box:
Lower Bound: X= -11 Y= -11
Upper Bound: X= 11 Y= 11
Centroid: X= -0.5351 Y= 0.4821
Moments of inertia: X= 17155 Y= 16859.0313
Products of inertia:
XY: 1594.25
Radii of gyration: X= 6.8745 Y= 6.815

PROJECT	91595.001.01
SUBJECT	Windsor foundat... check
DATE	4/4/14
PAGE	1 OF 1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630



About the x" axis

Over turning moment = 1046 kft + 14×10 = 1186 kft

Weight of original concrete block = 1000 × 0.15 = 150k
Resisting moment = 150k × 5 = 750 kft

Weight of collar = 363 × 3 × 0.15 = 163.35k
Resisting moment = 163.35k × (5 − 0.535) = 729.34 kft

Axial resisting moment = 21 × 5 = 105 kft

Collar bearing resisting moment = 22 × 6 × 3 × 1 ksf (assumed) = 396 kft

Total Resisting Moment = $\frac{750 + 729.34 + 105}{1.5} + \frac{396}{2}$ = 1254.2 kft

1186 / 1254.2 = 94.6 %

EXHIBIT C

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTHA130A
SNET Tower_MP

419 Broad Street
Windsor, CT 06095

April 21, 2014

EBI Project Number: 62142562

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

April 21, 2014

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

Re: Emissions Values for Site: **CTHA130A – SNET Tower_MP**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 419 Broad Street, Windsor, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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 419 Broad Street, Windsor, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower.

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

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) 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.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications.

7) The antenna mounting height centerline of the proposed antennas is **94 feet** above ground level (AGL).
8) 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.

Site ID	CTHA130A-SNET Tower_MP
Site Addresss	419 Broad Street, Windsor, CT 06095
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	94	88	None	0	0	48.326044	2.243478	0.22435%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	94	88	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
														Sector total Power Density Value:		0.449%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	94	88	None	0	0	48.326044	2.243478	0.22435%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	94	88	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
														Sector total Power Density Value:		0.449%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	94	88	None	0	0	48.326044	2.243478	0.22435%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	94	88	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	94	88	1-5/8"	0	0	24.163022	1.121739	0.11217%
														Sector total Power Density Value:		0.449%	

Site Composite MPE %	
Carrier	MPE %
T-Mobile	1.340%
AT&T	35.410%
Clearwire	4.540%
MPCS	22.200%
Total Site MPE %	63.496%

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Summary

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

The anticipated Maximum Composite contributions from the T-Mobile facility are **1.346% (.449% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **63.496%** 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.

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