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

September 15, 2014

Rachel A. Schwartzman, Esq.
Cohen and Wolf P.C.
1115 Broad Street
P.O. Box 1821
Bridgeport, CT 06601

RE: **EM-T-MOBILE-085-140825** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at 88 Main Street, Monroe, Connecticut.

Dear Attorney Schwartzman:

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

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by T-Mobile Northeast LLC shall be removed within 60 days of the date the antenna ceased to function;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 22, 2014. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and Environmental Protection pursuant to Connecticut General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below state and federal standards applicable to the frequencies now used on this tower.

CSC
CONNECTICUT SITING COUNCIL

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

Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/RM/lm

c: The Honorable Stephen Vavrek, First Selectman, Town of Monroe
William Agresta, AICP, Planning and Zoning Administrator, Town of Monroe
Crown

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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August 26, 2014

The Honorable Stephen Vavrek
First Selectman
Town of Monroe
Town Hall
7 Fan Hill Road
Monroe, CT 06468-1800

RE: **EM-T-MOBILE-085-140825** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at 88 Main Street, Monroe, Connecticut.

Dear First Selectman Vavrek:

Pursuant to the Regulations of Connecticut State Agencies Section 16-50j-72, the Connecticut Siting Council (Council) is in receipt of a request to modify an existing telecommunications facility located in the Town of Monroe.

In accordance with Section 16-50j-73 of the Regulations of Connecticut State Agencies, on August 22, 2014, written notice of the intent to modify the existing telecommunications facility was provided to the Council, the property owner of record and the chief elected official of the municipality in which the existing telecommunications facility is located.

Should you have any questions or comments regarding the above-referenced request, please feel free to call me at 860-827-2951 or submit written comments to the Council by September 9, 2014.

Thank you for your consideration.

Sincerely,

Melanie Bachman/cmw

Melanie Bachman
Acting Executive Director

MB/RM/lm

c: William Agresta, AICP, Planning and Zoning Administrator, Town of Monroe

COHEN and WOLF P.C.
ATTORNEYS AT LAW

RACHEL A. SCHWARTZMAN

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4110
E-Mail: rschwartzman@cohenandwolf.com

EM-T-MOBILE-085-140825

August 22, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: Notice of Exempt Modification
Crown/T-Mobile co-location
CT11215A
88 Main Street, Monroe, CT 06468

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, Crown owns the existing monopole telecommunications tower and related facility at 88 Main Street, Monroe, Connecticut (41.301756/-73.25074200). T-Mobile intends to replace 6 existing antennas with 6 new antennas and 3 TMAs (tower mounted amplifiers) and related equipment at this existing telecommunications facility in Monroe ("Monroe 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, Steve Vavrek, and the property owner, Stepney Volunteer Fire Company.

The existing Monroe Facility consists of a 195 foot monopole tower.[1] T-Mobile plans to replace 6 existing antennas with 6 new antennas and 3 TMAs (tower mounted amplifiers) at centerline of 195 feet. (See the plans revised to August 7, 2014 attached hereto as **Exhibit A**). T-Mobile will also reuse existing fiber cables and coax cables which will be consolidated onto an existing ice bridge. The existing Monroe Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated August 1, 2014, and attached hereto as **Exhibit B**.

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

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for approval of this structure, it does reference this structure in connection with a notices of intent captioned EM-AT&T-085-020422, EM-VER-085-030114, EM-VER-014-015-043-064-085-097-040116, EM-CING-008-014-054-085-110-137-070622, EM-CING-085-080530, EM-CING-085-111107, EM-VER-085-111130, EM-VER-085-130808, EM-VER-085-140224.

1. The proposed modification will not increase the height of the tower. T-Mobile's existing antennas are at a centerline of 195 feet; the replacement antennas will be installed at the same 195 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet 2 of Exhibit A. T-Mobile's 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 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 August 12, 2014. T-Mobile's operations would add 0.292% 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 23.632% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit C.**

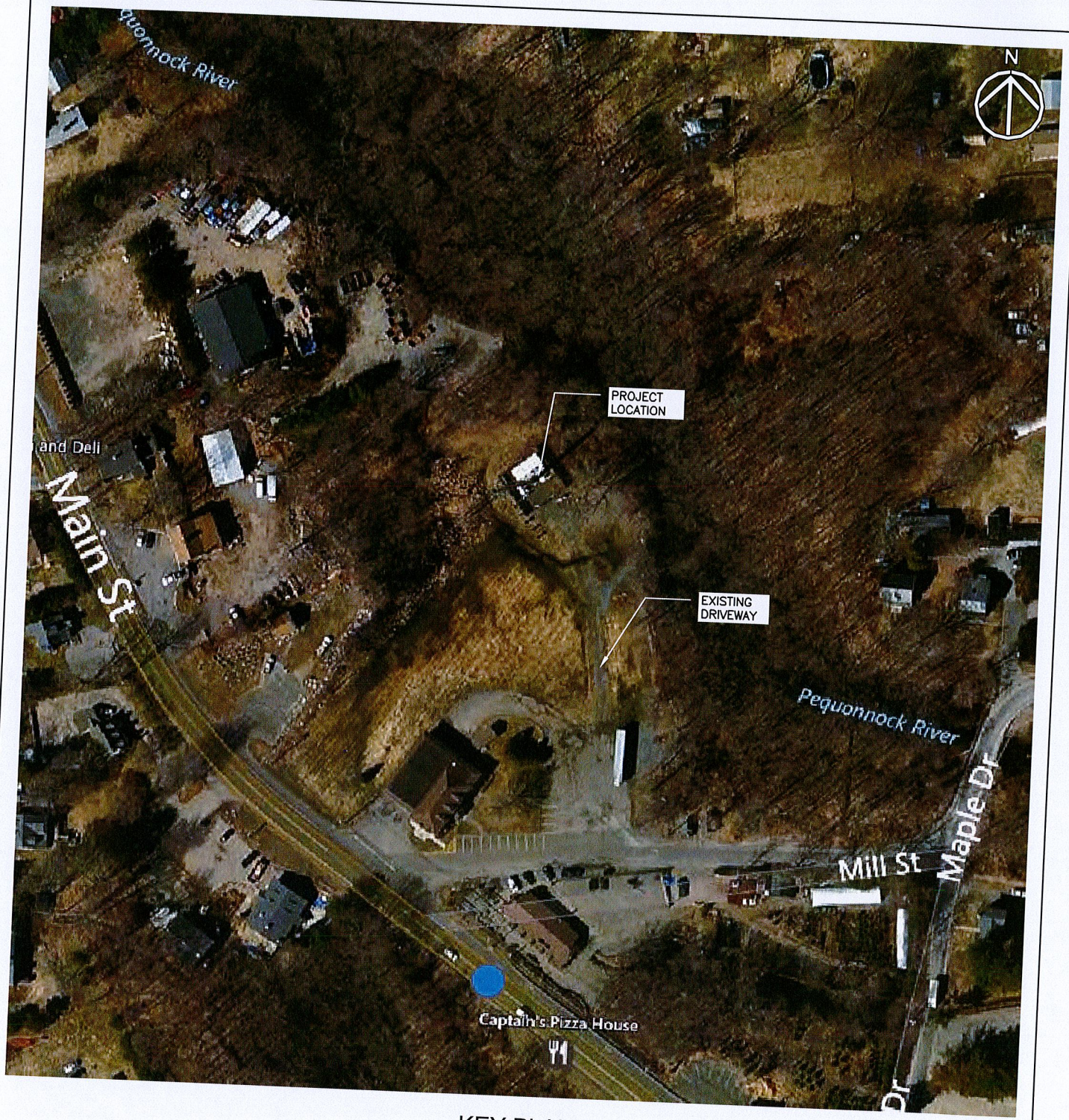
For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Monroe Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, T-Mobile shall commence construction approximately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

Sincerely,

Rachel A. Schwartzman, Esq.

cc: Town of Monroe, First Selectman Steve Vavrek
Crown
Stepney Volunteer Fire Company, President Glenn Squires
Sheldon J. Freincle, Northeast Site Solutions

EXHIBIT A



KEY PLAN

N.T.S.

CONFIGURATION

2C

SUBMITTALS	
LE REV A	08.07.14

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

LEASE EXHIBIT

SITE NUMBER:
CT11215A

SITE NAME:
MONROE -1/RT 25

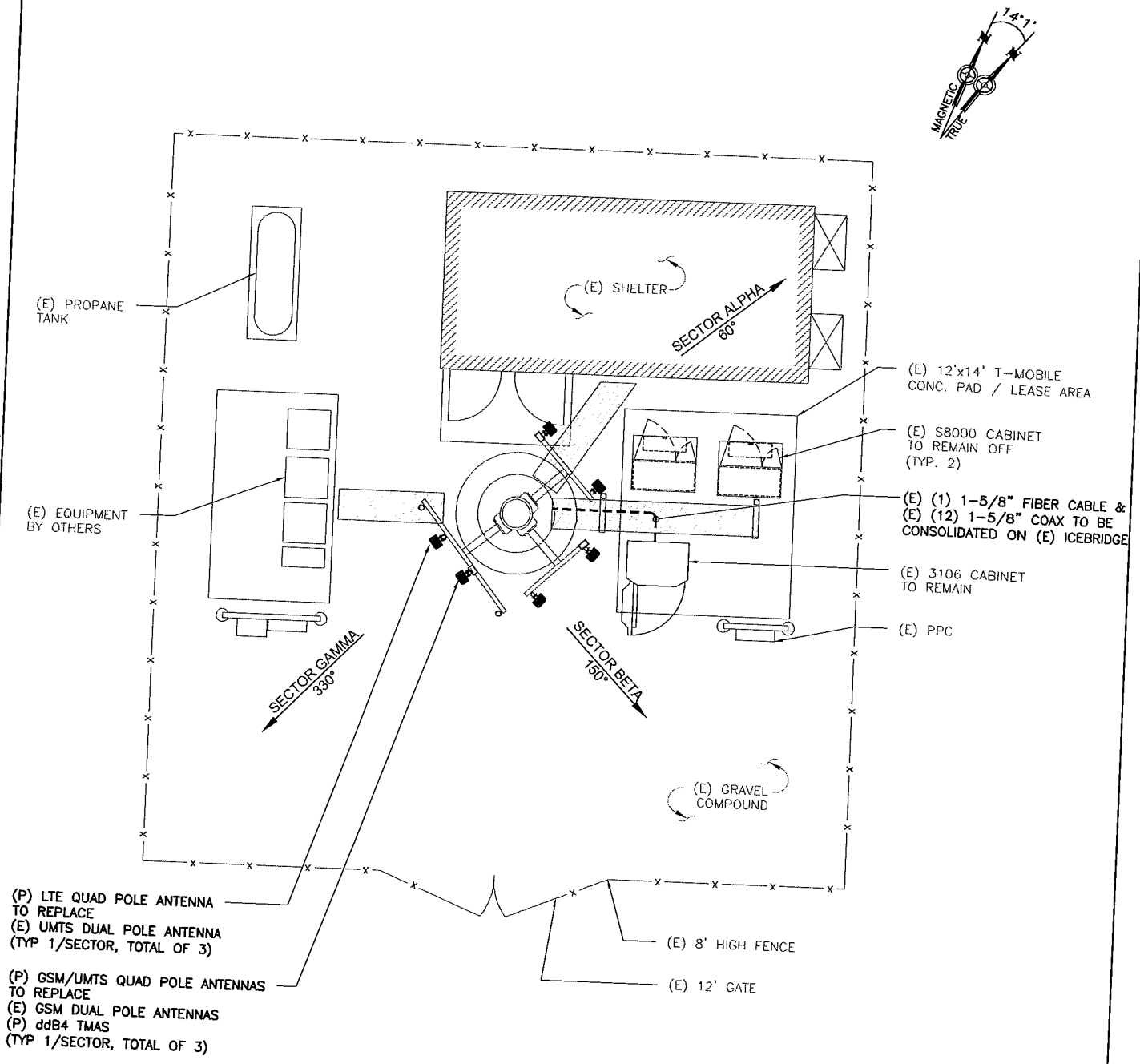
SITE ADDRESS:
88 MAIN STREET
MONROE, CT 06468

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: EB | CHECKED BY: SM



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.

SITE PLAN

N.T.S.

1 / LE-2

1 / LE-3

CONFIGURATION

2C

SUBMITTALS	
LE REV A	08.07.14

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

LEASE EXHIBIT

SITE NUMBER:
CT11215A

SITE NAME:
MONROE -1/RT 25

SITE ADDRESS:
88 MAIN STREET
MONROE, CT 06468

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

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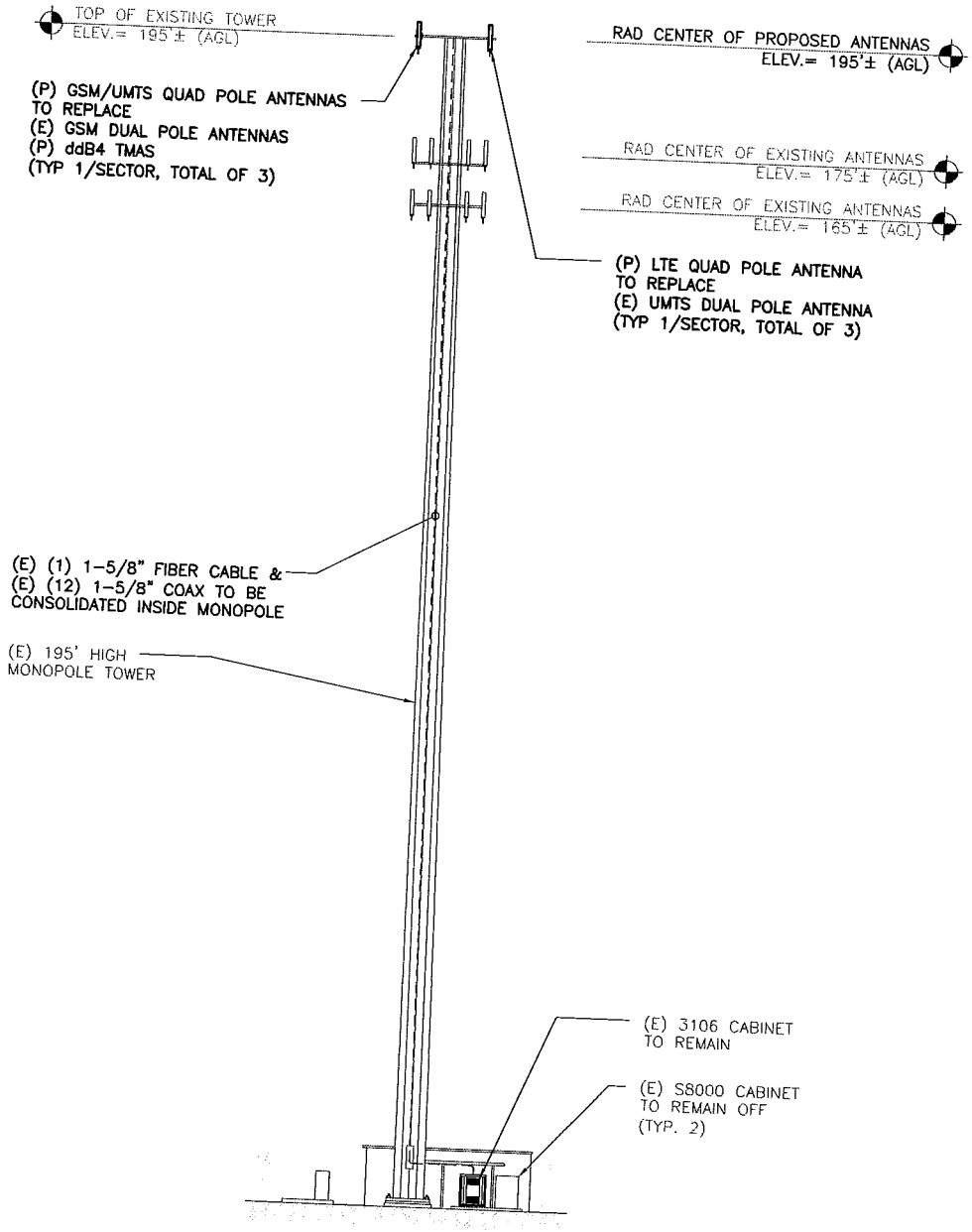

ELEVATION

N.T.S.

1
LE-3

CONFIGURATION

2C

SUBMITTALS	
LE REV A	08.07.14

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

LEASE EXHIBIT

SITE NUMBER:
CT11215A

SITE NAME:
MONROE -1/RT 25

SITE ADDRESS:
88 MAIN STREET
MONROE, CT 06468

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: EB | CHECKED BY: SM

EXHIBIT B

Date: **August 1, 2014**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6565

SMBH
STRUCTURAL ENGINEERING

SMBH, Inc.
1166 Dublin Rd, Suite 200
Columbus, OH 43215
(614) 481-9800

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11215A
	Carrier Site Name:	Monroe-1/Rt 25
Crown Castle Designation:	**Crown Castle BU Number:**	826053
	Crown Castle Site Name:	Monroe-1/Rt 25
	Crown Castle JDE Job Number:	301099
	Crown Castle Work Order Number:	903018
	Crown Castle Application Number:	259685 Rev. 1
Engineering Firm Designation:	**SMBH, Inc. Project Number:**	T14-007.826053.001
Site Data:	**88 Main Street, Monroe, Fairfield County, CT**	
	Latitude *41° 18' 6.06"*, Longitude *-73° 15' 2.92"*	
	195 Foot - Monopole Tower	

Dear Sean Dempsey,

SMBH, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 676220, in accordance with application 259685, revision 1.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

Structural analysis prepared by: Scott DeGan / Christopher M. Cullinan, PE

Respectfully submitted by:

Stephen Metz, PE
President

STATE OF CONNECTICUT
STEPHEN J. METZ
No. 0028008
LICENSED PROFESSIONAL ENGINEER

8/1/14

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1) INTRODUCTION

This tower is a 195 ft Monopole tower designed by Paul J. Ford and Company in May of 2001 and manufactured by Summit Manufacturing LLC. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
195.0	195.0	3	ericsson	AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	1
		3	ericsson	AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 71			

Notes:
1) MLA loading controlled over this proposed loading

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
195.0	195.0	6	andrew	ETW190VS12UB	25	1-5/8	4
		1	andrew	HP4-102			
		12	andrew	TMBXX-6516-R2M w/ Mount Pipe			
		2	andrew	TMBXX-6516-R2M w/ Mount Pipe	-	-	3
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
		3	ems wireless	RV90-17-02DPL2 w/ Mount Pipe			
		6	andrew	ETW190VS12UB			
		1	tower mounts	Side Arm Mount [SM 901-3]	12	1-5/8	1
175.0	175.0	6	ericsson	RRUS-11	12 2 1	1-5/8 7/8 3/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
165.0	165.0	3	antel	BXA-171085-12BF w/ Mount Pipe	18	1-5/8	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 403-1]			
		3	alcatel lucent	RRH2x40-AWS	1	1-5/8	2
		3	kathrein	742 213 w/ Mount Pipe			
		1	rfs celwave	DB-B1-6C-8AB-0Z			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Existing Equipment to be Removed (Not Considered in Analysis)
4) MLA loading (controls over proposed loading)

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
195	195	12	ems wireless	RR90-17-00DP PCS	-	-
		3	-	14' T-ARM MOUNT		
185	185	12	ems wireless	RR90-17-00DP PCS	-	-
		1	-	14' LOW PROFILE MOUNT		
175	175	12	ems wireless	RR90-17-00DP PCS	-	-
		1	-	14' LOW PROFILE MOUNT		
165	165	12	ems wireless	RR90-17-00DP PCS	-	-
		1	-	14' LOW PROFILE MOUNT		
155	155	12	ems wireless	RR90-17-00DP PCS	-	-
		1	-	14' LOW PROFILE MOUNT		
140	140	2	-	10' WHIP ANTENNA	-	-
	135	1	-	6-FT SIDE ARM MOUNT		
120	120	2	-	10' WHIP ANTENNA	-	-
	115	1	-	6-FT SIDE ARM MOUNT		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Jaworski Geotech, Inc. (Proj No. 01129G, 2/15/2001)	3488965	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF/Summit Manufacturing, Inc. (Job No. 29201-0505/13880, 5/10/2001)	3950063	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF/Summit Manufacturing, Inc. (Job No. 29201-0505/13380, 5/4/2001)	3488966	CCISITES

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.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	195 - 157.5	Pole	TP33.351x26x0.25	1	-8.22	1331.10	34.6	Pass
L2	157.5 - 116.75	Pole	TP40.839x32.0179x0.3125	2	-15.37	2036.66	69.1	Pass
L3	116.75 - 77	Pole	TP48.006x39.1849x0.375	3	-25.13	2874.51	78.2	Pass
L4	77 - 38	Pole	TP54.901x46.0798x0.375	4	-36.38	3289.03	91.4	Pass
L5	38 - 0	Pole	TP61.6x52.7788x0.4375	5	-53.05	4415.35	86.7	Pass
							Summary	
						Pole (L4)	91.4	Pass
						Rating =	91.4	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	83.4	Pass
1	Base Plate	0	76.7	Pass
1	Base Foundation	0	82.6	Pass

Structure Rating (max from all components) =	91.4%

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

Table 7 – Twist and Sway Results

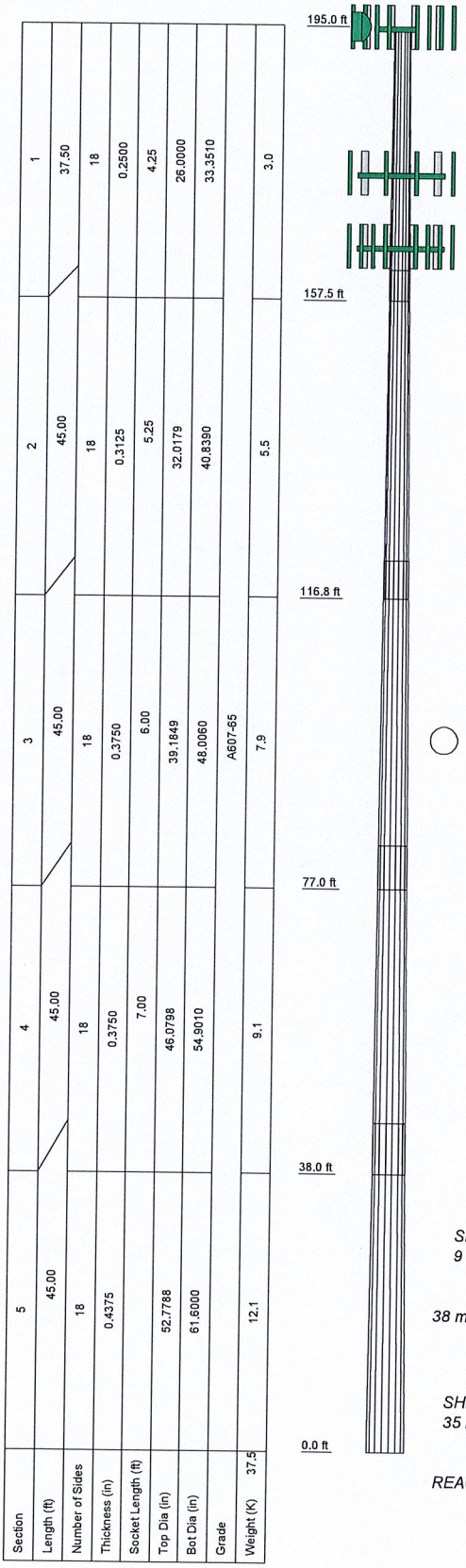
Centerline Elevation (ft)	Antenna Manufacturer	Antenna Model	Service Wind Tilt (°)	Service Wind Twist (°)
195.0	Andrew	HP4-102	2.094	0.021

4.1) Recommendations

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

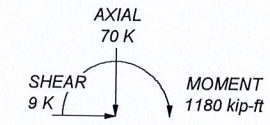
APPENDIX A

TNXTOWER OUTPUT

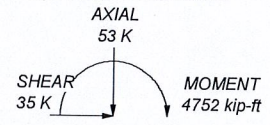


Section	1	2	3	4	5
Length (ft)	37.50	45.00	45.00	45.00	45.00
Number of Sides	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.3750	0.4375
Socket Length (ft)	4.25	5.25	6.00	7.00	
Top Dia (in)	26.0000	32.0179	39.1849	46.0798	52.7788
Bot Dia (in)	33.3510	40.8390	48.0060	54.9010	61.6000
Grade			A607-65		
Weight (K)	3.0	5.5	7.9	9.1	12.1

Total Weight (K) 37.5



TORQUE 2 kip-ft
38 mph WIND - 0.7500 in ICE



TORQUE 6 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(4) TMBXX-6516-R2M w/ Mount Pipe	195	Platform Mount [LP 303-1]	175
(2) ETW190VS12UB	195	7770.00 w/ Mount Pipe	175
(4) TMBXX-6516-R2M w/ Mount Pipe	195	BXA-70063/6CF w/ Mount Pipe	165
(2) ETW190VS12UB	195	(2) LPA-80080/6CF w/ Mount Pipe	165
(4) TMBXX-6516-R2M w/ Mount Pipe	195	742 213 w/ Mount Pipe	165
(2) ETW190VS12UB	195	RRH2x40-AWS	165
Sector Mount [SM 901-3]	195	BXA-171085-12BF w/ Mount Pipe	165
HP4-102	195	BXA-70063/6CF w/ Mount Pipe	165
P65-16-XLH-RR w/ Mount Pipe	175	(2) LPA-80080/6CF w/ Mount Pipe	165
(2) LGP21401	175	742 213 w/ Mount Pipe	165
DC6-48-60-18-8F	175	RRH2x40-AWS	165
(2) RRUS-11	175	BXA-171085-12BF w/ Mount Pipe	165
7770.00 w/ Mount Pipe	175	BXA-70063/6CF w/ Mount Pipe	165
P65-16-XLH-RR w/ Mount Pipe	175	(2) LPA-80080/6CF w/ Mount Pipe	165
(2) LGP21401	175	742 213 w/ Mount Pipe	165
(2) RRUS-11	175	RRH2x40-AWS	165
7770.00 w/ Mount Pipe	175	DB-B1-6C-8AB-0Z	165
P65-16-XLH-RR w/ Mount Pipe	175	Platform Mount [LP 403-1]	165
(2) LGP21401	175	BXA-171085-12BF w/ Mount Pipe	165
(2) RRUS-11	175		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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: 91.4%

SMBH
STRUCTURAL ENGINEERING

SMBH, Inc.
1166 Dublin Road, Suite 200
Columbus, OH 43215
Phone: (614) 481-9800
FAX: (614) 643-4515

Job: *BU# 826053*			
Project: *T14-007.826053.001*			
Client: Crown Castle	Drawn by: CMC		App'd:
Code: TIA/EIA-222-F	Date: 08/02/14		Scale: NTS
Path: K:\Jobs\2014\T14-007_Crown Castle - CCIT\T14-007.826053\T14-007.826053.001\Trnx Tower\T14-007.826053.001.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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	195.00-157.50	37.50	4.25	18	26.0000	33.3510	0.2500	1.0000	A607-65 (65 ksi)
L2	157.50-116.75	45.00	5.25	18	32.0179	40.8390	0.3125	1.2500	A607-65 (65 ksi)
L3	116.75-77.00	45.00	6.00	18	39.1849	48.0060	0.3750	1.5000	A607-65 (65 ksi)
L4	77.00-38.00	45.00	7.00	18	46.0798	54.9010	0.3750	1.5000	A607-65 (65 ksi)
L5	38.00-0.00	45.00		18	52.7788	61.6000	0.4375	1.7500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/ft
L1	26.4011	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
	33.8655	26.2656	3635.8648	11.7509	16.9423	214.6027	7276.5137	13.1353	5.4298	21.719
L2	33.3578	31.4478	3993.8666	11.2554	16.2651	245.5484	7992.9885	15.7269	5.0851	16.272
	41.4690	40.1972	8340.8765	14.3869	20.7462	402.0433	16692.728 1	20.1024	6.6377	21.241
L3	40.8344	46.1934	8790.2699	13.7775	19.9059	441.5909	17592.106 2	23.1011	6.2365	16.631
	48.7466	56.6928	16249.677 2	16.9090	24.3870	666.3241	32520.736 2	28.3518	7.7891	20.771
L4	47.9850	54.4002	14356.959 8	16.2252	23.4086	613.3208	28732.810 9	27.2053	7.4501	19.867
	55.7479	64.8996	24377.353 7	19.3567	27.8897	874.0627	48786.783 7	32.4560	9.0026	24.007
L5	54.9864	72.6825	25156.862 0	18.5812	26.8116	938.2813	50346.826 1	36.3481	8.5191	19.472
	62.5503	84.9318	40140.069 1	21.7127	31.2928	1282.7254	80332.955 6	42.4740	10.0716	23.021

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 195.00-157.50				1	1	1		
L2 157.50-116.75				1	1	1		
L3 116.75-77.00				1	1	1		
L4 77.00-38.00				1	1	1		
L5 38.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
5/8 rod/step	C	No	CaAa (Out Of Face)	195.00 - 0.00	1	No Ice	0.02	0.00
						1/2" Ice	0.12	0.00
						1" Ice	0.22	0.00
						2" Ice	0.42	0.01
						4" Ice	0.82	0.02
Safety Line 3/8	C	No	CaAa (Out Of Face)	195.00 - 0.00	1	No Ice	0.04	0.00
						1/2" Ice	0.14	0.00
						1" Ice	0.24	0.00
						2" Ice	0.44	0.00
						4" Ice	0.84	0.00
* LDF7-50A(1-5/8")	B	No	Inside Pole	195.00 - 0.00	25	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
* LDF5-50A(7/8")	C	No	Inside Pole	175.00 - 0.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	175.00 - 0.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
9776(3/4")	C	No	Inside Pole	175.00 - 0.00	1	No Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
2" Rigid Conduit	C	No	Inside Pole	175.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
*								
LDF7-50A(1-5/8")	A	No	Inside Pole	165.00 - 0.00	18	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	165.00 - 0.00	1	No Ice	0.20	0.00
						1/2" Ice	0.30	0.00
						1" Ice	0.40	0.00
						2" Ice	0.60	0.01
						4" Ice	1.00	0.03

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	195.00-157.50	A	0.000	0.000	0.000	1.485	0.12
		B	0.000	0.000	0.000	0.000	0.77
		C	0.000	0.000	0.000	2.156	0.26
L2	157.50-116.75	A	0.000	0.000	0.000	8.069	0.65
		B	0.000	0.000	0.000	0.000	0.84
		C	0.000	0.000	0.000	2.343	0.57
L3	116.75-77.00	A	0.000	0.000	0.000	7.871	0.64
		B	0.000	0.000	0.000	0.000	0.81
		C	0.000	0.000	0.000	2.286	0.56
L4	77.00-38.00	A	0.000	0.000	0.000	7.722	0.63
		B	0.000	0.000	0.000	0.000	0.80
		C	0.000	0.000	0.000	2.243	0.55
L5	38.00-0.00	A	0.000	0.000	0.000	7.524	0.61
		B	0.000	0.000	0.000	0.000	0.78
		C	0.000	0.000	0.000	2.185	0.54

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	195.00-157.50	A	0.917	0.000	0.000	0.000	2.860	0.15
		B		0.000	0.000	0.000	0.000	0.77
		C		0.000	0.000	0.000	15.905	0.34
L2	157.50-116.75	A	0.889	0.000	0.000	0.000	15.539	0.79
		B		0.000	0.000	0.000	0.000	0.84
		C		0.000	0.000	0.000	17.284	0.67
L3	116.75-77.00	A	0.853	0.000	0.000	0.000	14.941	0.76
		B		0.000	0.000	0.000	0.000	0.81
		C		0.000	0.000	0.000	16.427	0.65
L4	77.00-38.00	A	0.802	0.000	0.000	0.000	14.377	0.74
		B		0.000	0.000	0.000	0.000	0.80
		C		0.000	0.000	0.000	15.552	0.63
L5	38.00-0.00	A	0.750	0.000	0.000	0.000	13.617	0.72
		B		0.000	0.000	0.000	0.000	0.78
		C		0.000	0.000	0.000	14.370	0.61

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	195.00-157.50	-0.0719	-0.0213	-0.4359	0.1522
L2	157.50-116.75	-0.0690	-0.2344	-0.4199	-0.1935
L3	116.75-77.00	-0.0698	-0.2374	-0.4278	-0.2023
L4	77.00-38.00	-0.0705	-0.2395	-0.4268	-0.2092
L5	38.00-0.00	-0.0709	-0.2411	-0.4162	-0.2151

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
*									
(4) TMBXX-6516-R2M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	-20.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.18 6.65 7.14 8.13 10.26	4.53 5.20 5.90 7.37 10.56	0.05 0.10 0.16 0.29 0.67
(2) ETW190VS12UB	A	From Leg	4.00 0.00 0.00	-20.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.37 0.46 0.56 0.80 1.36	0.01 0.02 0.03 0.04 0.11
(4) TMBXX-6516-R2M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	-30.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.18 6.65 7.14 8.13 10.26	4.53 5.20 5.90 7.37 10.56	0.05 0.10 0.16 0.29 0.67
(2) ETW190VS12UB	B	From Leg	4.00 0.00 0.00	-20.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.37 0.46 0.56 0.80 1.36	0.01 0.02 0.03 0.04 0.11
(4) TMBXX-6516-R2M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	-60.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.18 6.65 7.14 8.13 10.26	4.53 5.20 5.90 7.37 10.56	0.05 0.10 0.16 0.29 0.67
(2) ETW190VS12UB	B	From Leg	4.00 0.00 0.00	-20.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.37 0.46 0.56 0.80 1.36	0.01 0.02 0.03 0.04 0.11
Sector Mount [SM 901-3]	C	From Leg	0.00 0.00 0.00	-20.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.90 12.90 12.90 12.90 12.90	12.90 12.90 12.90 12.90 12.90	1.26 1.43 1.61 1.96 2.65
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	8.64	6.36	0.08
						1/2" Ice	9.29	7.54	0.14
						1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
(2) LGP21401	A	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	1.29	0.36	0.01
						1/2" Ice	1.45	0.48	0.02
						1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
						4" Ice	2.79	1.52	0.14
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	2.57	2.57	0.02
						1/2" Ice	2.80	2.80	0.04
						1" Ice	3.04	3.04	0.07
						2" Ice	3.54	3.54	0.13
						4" Ice	4.66	4.66	0.30
(2) RRUS-11	A	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	8.64	6.36	0.08
						1/2" Ice	9.29	7.54	0.14
						1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
(2) LGP21401	B	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	1.29	0.36	0.01
						1/2" Ice	1.45	0.48	0.02
						1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
						4" Ice	2.79	1.52	0.14
(2) RRUS-11	B	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	175.00	No Ice	8.64	6.36	0.08
						1/2" Ice	9.29	7.54	0.14
						1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LGP21401	C	From Leg	4.00 0.00 0.00	60.0000	175.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.36 0.48 0.60 0.87 1.52	0.01 0.02 0.03 0.05 0.14
(2) RRUS-11	C	From Leg	4.00 0.00 0.00	60.0000	175.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
Platform Mount [LP 303-1]	C	From Leg	0.00 0.00 0.00	60.0000	175.00	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
***									
BXA-171085-12BF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.09 0.14 0.27 0.67
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.41 6.56 7.42 9.20 12.95	0.04 0.10 0.17 0.33 0.79
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
742 213 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.37 5.95 6.50 7.61 9.93	4.62 6.00 6.98 8.85 12.79	0.05 0.09 0.15 0.28 0.68
RRH2x40-AWS	A	From Leg	4.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0.04 0.06 0.08 0.13 0.28
BXA-171085-12BF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.09 0.14 0.27 0.67
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.41 6.56 7.42 9.20 12.95	0.04 0.10 0.17 0.33 0.79
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice 1/2" Ice	4.56 5.11 5.61	10.73 11.99 12.97	0.05 0.11 0.19

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
						1" Ice	6.65	14.98	0.36
						2" Ice	8.83	19.22	0.86
						4" Ice			
742 213 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
RRH2x40-AWS	B	From Leg	4.00 0.00 0.00	0.0000	165.00	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
BXA-171085-12BF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice	4.97	5.23	0.04
						1/2" Ice	5.52	6.39	0.09
						1" Ice	6.04	7.26	0.14
						2" Ice	7.09	9.05	0.27
						4" Ice	9.36	12.82	0.67
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice	7.98	5.41	0.04
						1/2" Ice	8.62	6.56	0.10
						1" Ice	9.23	7.42	0.17
						2" Ice	10.47	9.20	0.33
						4" Ice	13.08	12.95	0.79
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice	4.56	10.73	0.05
						1/2" Ice	5.11	11.99	0.11
						1" Ice	5.61	12.97	0.19
						2" Ice	6.65	14.98	0.36
						4" Ice	8.83	19.22	0.86
742 213 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	60.0000	165.00	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
RRH2x40-AWS	C	From Leg	4.00 0.00 0.00	0.0000	165.00	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
DB-B1-6C-8AB-0Z	C	From Leg	4.00 0.00 0.00	0.0000	165.00	No Ice	5.60	2.33	0.04
						1/2" Ice	5.92	2.56	0.08
						1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21
						4" Ice	8.37	4.37	0.45
Platform Mount [LP 403-1]	C	None		0.0000	165.00	No Ice	18.85	18.85	1.50
						1/2" Ice	24.30	24.30	1.80
						1" Ice	29.75	29.75	2.09
						2" Ice	40.65	40.65	2.69
						4" Ice	62.45	62.45	3.87
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
HP4-102	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 0.00	-60.0000		195.00	4.00	No Ice	12.57	0.08
									1/2" Ice	13.09	0.15
									1" Ice	13.61	0.21
									2" Ice	14.65	0.35
									4" Ice	16.72	0.62

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	195 - 157.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.80	4.46	-2.45
			Max. Mx	11	-8.32	280.81	0.24
			Max. My	2	-8.21	6.67	297.73

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-18.13	280.81	0.24
			Max. Vx	2	-18.72	6.67	297.73
			Max. Torque	13			6.61
L2	157.5 - 116.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.88	4.80	-2.36
			Max. Mx	11	-15.46	1088.97	-0.23
			Max. My	2	-15.37	9.62	1129.45
			Max. Vy	11	-22.57	1088.97	-0.23
			Max. Vx	2	-23.16	9.62	1129.45
			Max. Torque	13			6.61
L3	116.75 - 77	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.58	5.09	-2.19
			Max. Mx	11	-25.19	2057.17	-0.63
			Max. My	2	-25.13	12.41	2120.99
			Max. Vy	11	-27.01	2057.17	-0.63
			Max. Vx	2	-27.60	12.41	2120.99
			Max. Torque	13			6.57
L4	77 - 38	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.68	5.27	-1.95
			Max. Mx	11	-36.42	3159.98	-0.99
			Max. My	2	-36.38	15.00	3246.41
			Max. Vy	11	-30.87	3159.98	-0.99
			Max. Vx	2	-31.46	15.00	3246.41
			Max. Torque	13			6.53
L5	38 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-69.57	5.49	-1.64
			Max. Mx	11	-53.05	4639.09	-1.37
			Max. My	2	-53.04	17.87	4751.55
			Max. Vy	11	-34.76	4639.09	-1.37
			Max. Vx	2	-35.32	17.87	4751.55
			Max. Torque	13			6.50

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	69.57	0.01	8.52
	Max. H_x	11	53.07	34.73	-0.01
	Max. H_z	2	53.07	0.06	35.29
	Max. M_x	2	4751.55	0.06	35.29
	Max. M_z	5	4632.59	-34.73	-0.13
	Max. Torsion	13	6.47	17.37	30.67
	Min. Vert	1	53.07	0.00	0.00
	Min. H_x	5	53.07	-34.73	-0.13
	Min. H_z	8	53.07	-0.06	-35.13
	Min. M_x	8	-4721.75	-0.06	-35.13
	Min. M_z	11	-4639.09	34.73	-0.01
	Min. Torsion	7	-5.96	-17.33	-30.50

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	53.07	-0.00	0.00	1.40	3.17	-0.00
Dead+Wind 0 deg - No Ice	53.07	-0.06	-35.29	-4751.55	17.87	-6.28
Dead+Wind 30 deg - No Ice	53.07	17.26	-30.61	-4123.33	-2291.41	-5.08
Dead+Wind 60 deg - No Ice	53.07	29.93	-17.80	-2404.51	-3980.90	-2.67
Dead+Wind 90 deg - No Ice	53.07	34.73	0.13	30.68	-4632.59	2.50

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 120 deg - No Ice	53.07	30.04	17.75	2401.46	-4004.87	5.15
Dead+Wind 150 deg - No Ice	53.07	17.33	30.50	4107.02	-2308.99	5.96
Dead+Wind 180 deg - No Ice	53.07	0.06	35.13	4721.75	-11.44	5.58
Dead+Wind 210 deg - No Ice	53.07	-17.22	30.44	4092.50	2290.11	4.15
Dead+Wind 240 deg - No Ice	53.07	-29.98	17.64	2376.17	3996.79	1.59
Dead+Wind 270 deg - No Ice	53.07	-34.73	0.01	1.37	4639.09	-1.87
Dead+Wind 300 deg - No Ice	53.07	-29.99	-17.90	-2429.88	4001.93	-5.39
Dead+Wind 330 deg - No Ice	53.07	-17.37	-30.67	-4137.91	2323.17	-6.47
Dead+Ice+Temp	69.57	-0.00	0.00	1.64	5.49	-0.00
Dead+Wind 0 deg+Ice+Temp	69.57	-0.01	-8.52	-1179.41	7.54	-1.49
Dead+Wind 30 deg+Ice+Temp	69.57	4.19	-7.39	-1023.64	-569.93	-1.20
Dead+Wind 60 deg+Ice+Temp	69.57	7.26	-4.30	-596.30	-992.05	-0.63
Dead+Wind 90 deg+Ice+Temp	69.57	8.42	0.02	6.75	-1153.29	0.55
Dead+Wind 120 deg+Ice+Temp	69.57	7.28	4.28	596.20	-995.97	1.19
Dead+Wind 150 deg+Ice+Temp	69.57	4.20	7.36	1021.60	-571.51	1.41
Dead+Wind 180 deg+Ice+Temp	69.57	0.01	8.49	1175.71	3.76	1.34
Dead+Wind 210 deg+Ice+Temp	69.57	-4.18	7.36	1019.72	579.54	1.01
Dead+Wind 240 deg+Ice+Temp	69.57	-7.27	4.27	592.94	1005.39	0.40
Dead+Wind 270 deg+Ice+Temp	69.57	-8.42	0.01	2.97	1164.60	-0.42
Dead+Wind 300 deg+Ice+Temp	69.57	-7.27	-4.31	-599.57	1005.25	-1.24
Dead+Wind 330 deg+Ice+Temp	69.57	-4.20	-7.40	-1025.53	584.51	-1.52
Dead+Wind 0 deg - Service	53.07	-0.02	-12.21	-1645.66	8.36	-2.20
Dead+Wind 30 deg - Service	53.07	5.97	-10.59	-1427.93	-791.87	-1.78
Dead+Wind 60 deg - Service	53.07	10.36	-6.16	-832.25	-1377.27	-0.93
Dead+Wind 90 deg - Service	53.07	12.02	0.05	11.60	-1603.06	0.88
Dead+Wind 120 deg - Service	53.07	10.39	6.14	833.13	-1385.60	1.80
Dead+Wind 150 deg - Service	53.07	6.00	10.56	1424.18	-797.97	2.09
Dead+Wind 180 deg - Service	53.07	0.02	12.16	1637.20	-1.81	1.96
Dead+Wind 210 deg - Service	53.07	-5.96	10.53	1419.11	795.72	1.45
Dead+Wind 240 deg - Service	53.07	-10.37	6.11	824.33	1387.08	0.56
Dead+Wind 270 deg - Service	53.07	-12.02	0.00	1.43	1609.62	-0.66
Dead+Wind 300 deg - Service	53.07	-10.38	-6.19	-841.06	1388.90	-1.89
Dead+Wind 330 deg - Service	53.07	-6.01	-10.61	-1433.01	807.23	-2.27

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-53.07	0.00	0.00	53.07	0.00	0.000%
2	-0.06	-53.07	-35.29	0.06	53.07	35.29	0.000%
3	17.26	-53.07	-30.61	-17.26	53.07	30.61	0.000%
4	29.93	-53.07	-17.80	-29.93	53.07	17.80	0.000%
5	34.73	-53.07	0.13	-34.73	53.07	-0.13	0.000%
6	30.04	-53.07	17.75	-30.04	53.07	-17.75	0.000%
7	17.33	-53.07	30.50	-17.33	53.07	-30.50	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
8	0.06	-53.07	35.13	-0.06	53.07	-35.13	0.000%
9	-17.22	-53.07	30.44	17.22	53.07	-30.44	0.000%
10	-29.98	-53.07	17.64	29.98	53.07	-17.64	0.000%
11	-34.73	-53.07	0.01	34.73	53.07	-0.01	0.000%
12	-29.99	-53.07	-17.90	29.99	53.07	17.90	0.000%
13	-17.37	-53.07	-30.67	17.37	53.07	30.67	0.000%
14	0.00	-69.57	0.00	0.00	69.57	-0.00	0.000%
15	-0.01	-69.57	-8.52	0.01	69.57	8.52	0.000%
16	4.19	-69.57	-7.39	-4.19	69.57	7.39	0.000%
17	7.26	-69.57	-4.30	-7.26	69.57	4.30	0.000%
18	8.42	-69.57	0.02	-8.42	69.57	-0.02	0.000%
19	7.28	-69.57	4.28	-7.28	69.57	-4.28	0.000%
20	4.20	-69.57	7.36	-4.20	69.57	-7.36	0.000%
21	0.01	-69.57	8.49	-0.01	69.57	-8.49	0.000%
22	-4.18	-69.57	7.36	4.18	69.57	-7.36	0.000%
23	-7.27	-69.57	4.27	7.27	69.57	-4.27	0.000%
24	-8.42	-69.57	0.01	8.42	69.57	-0.01	0.000%
25	-7.27	-69.57	-4.31	7.27	69.57	4.31	0.000%
26	-4.20	-69.57	-7.40	4.20	69.57	7.40	0.000%
27	-0.02	-53.07	-12.21	0.02	53.07	12.21	0.000%
28	5.97	-53.07	-10.59	-5.97	53.07	10.59	0.000%
29	10.36	-53.07	-6.16	-10.36	53.07	6.16	0.000%
30	12.02	-53.07	0.05	-12.02	53.07	-0.05	0.000%
31	10.39	-53.07	6.14	-10.39	53.07	-6.14	0.000%
32	6.00	-53.07	10.56	-6.00	53.07	-10.56	0.000%
33	0.02	-53.07	12.16	-0.02	53.07	-12.16	0.000%
34	-5.96	-53.07	10.53	5.96	53.07	-10.53	0.000%
35	-10.37	-53.07	6.11	10.37	53.07	-6.11	0.000%
36	-12.02	-53.07	0.00	12.02	53.07	-0.00	0.000%
37	-10.38	-53.07	-6.19	10.38	53.07	6.19	0.000%
38	-6.01	-53.07	-10.61	6.01	53.07	10.61	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	0.00026409
3	Yes	6	0.00000001	0.00006871
4	Yes	6	0.00000001	0.00007596
5	Yes	5	0.00000001	0.00014039
6	Yes	6	0.00000001	0.00007972
7	Yes	6	0.00000001	0.00006826
8	Yes	5	0.00000001	0.00020275
9	Yes	6	0.00000001	0.00007785
10	Yes	6	0.00000001	0.00007212
11	Yes	5	0.00000001	0.00008392
12	Yes	6	0.00000001	0.00007052
13	Yes	6	0.00000001	0.00008283
14	Yes	4	0.00000001	0.00004130
15	Yes	5	0.00000001	0.00031514
16	Yes	5	0.00000001	0.00038712
17	Yes	5	0.00000001	0.00039302
18	Yes	5	0.00000001	0.00030203
19	Yes	5	0.00000001	0.00040244
20	Yes	5	0.00000001	0.00038923
21	Yes	5	0.00000001	0.00031424
22	Yes	5	0.00000001	0.00040643
23	Yes	5	0.00000001	0.00039827
24	Yes	5	0.00000001	0.00030754
25	Yes	5	0.00000001	0.00039740
26	Yes	5	0.00000001	0.00041515
27	Yes	4	0.00000001	0.00096315
28	Yes	5	0.00000001	0.00010650
29	Yes	5	0.00000001	0.00012880

30	Yes	4	0.00000001	0.00045941
31	Yes	5	0.00000001	0.00014390
32	Yes	5	0.00000001	0.00010690
33	Yes	4	0.00000001	0.00081447
34	Yes	5	0.00000001	0.00013895
35	Yes	5	0.00000001	0.00011789
36	Yes	4	0.00000001	0.00034109
37	Yes	5	0.00000001	0.00011442
38	Yes	5	0.00000001	0.00015667

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	195 - 157.5	48.033	38	2.0943	0.0187
L2	161.75 - 116.75	33.779	38	1.9558	0.0098
L3	122 - 77	19.130	27	1.5058	0.0048
L4	83 - 38	8.708	27	1.0116	0.0025
L5	45 - 0	2.523	27	0.5077	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	HP4-102	38	48.033	2.0943	0.0210	46769
175.00	7770.00 w/ Mount Pipe	38	39.338	2.0325	0.0145	11691
165.00	BXA-171085-12BF w/ Mount Pipe	38	35.119	1.9788	0.0118	7798

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	195 - 157.5	138.441	2	6.0345	0.0525
L2	161.75 - 116.75	97.414	2	5.6393	0.0276
L3	122 - 77	55.194	2	4.3451	0.0136
L4	83 - 38	25.134	2	2.9198	0.0070
L5	45 - 0	7.282	2	1.4658	0.0028

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	HP4-102	2	138.441	6.0345	0.0618	16636
175.00	7770.00 w/ Mount Pipe	2	113.418	5.8590	0.0427	4156
165.00	BXA-171085-12BF w/ Mount Pipe	2	101.273	5.7051	0.0346	2770

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	195 - 157.5 (1)	TP33.351x26x0.25	37.50	0.00	0.0	39.000	25.6046	-8.22	998.58	0.008
L2	157.5 - 116.75 (2)	TP40.839x32.0179x0.3125	45.00	0.00	0.0	39.000	39.1765	-15.37	1527.88	0.010
L3	116.75 - 77 (3)	TP48.006x39.1849x0.375	45.00	0.00	0.0	39.000	55.2929	-25.13	2156.42	0.012
L4	77 - 38 (4)	TP54.901x46.0798x0.375	45.00	0.00	0.0	39.000	63.2663	-36.38	2467.39	0.015
L5	38 - 0 (5)	TP61.6x52.7788x0.4375	45.00	0.00	0.0	39.000	84.9318	-53.05	3312.34	0.016

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	195 - 157.5 (1)	TP33.351x26x0.25	299.13	17.605	39.000	0.451	0.00	0.000	39.000	0.000
L2	157.5 - 116.75 (2)	TP40.839x32.0179x0.3125	1129.49	35.499	39.000	0.910	0.00	0.000	39.000	0.000
L3	116.75 - 77 (3)	TP48.006x39.1849x0.375	2121.03	40.165	39.000	1.030	0.00	0.000	39.000	0.000
L4	77 - 38 (4)	TP54.901x46.0798x0.375	3246.44	46.910	39.000	1.203	0.00	0.000	39.000	0.000
L5	38 - 0 (5)	TP61.6x52.7788x0.4375	4751.58	44.451	39.000	1.140	0.00	0.000	39.000	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	195 - 157.5 (1)	TP33.351x26x0.25	18.67	0.729	26.000	0.056	6.61	0.190	26.000	0.007
L2	157.5 - 116.75 (2)	TP40.839x32.0179x0.3125	23.16	0.591	26.000	0.045	6.24	0.096	26.000	0.004
L3	116.75 - 77 (3)	TP48.006x39.1849x0.375	27.60	0.499	26.000	0.038	6.25	0.058	26.000	0.002
L4	77 - 38 (4)	TP54.901x46.0798x0.375	31.46	0.497	26.000	0.038	6.26	0.044	26.000	0.002
L5	38 - 0 (5)	TP61.6x52.7788x0.4375	35.32	0.416	26.000	0.032	6.28	0.029	26.000	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	195 - 157.5 (1)	0.008	0.451	0.000	0.056	0.007	0.461 ✔	1.333	H1-3+VT ✔
L2	157.5 - 116.75 (2)	0.010	0.910	0.000	0.045	0.004	0.921 ✔	1.333	H1-3+VT ✔
L3	116.75 - 77	0.012	1.030	0.000	0.038	0.002	1.042 ✔	1.333	H1-3+VT ✔

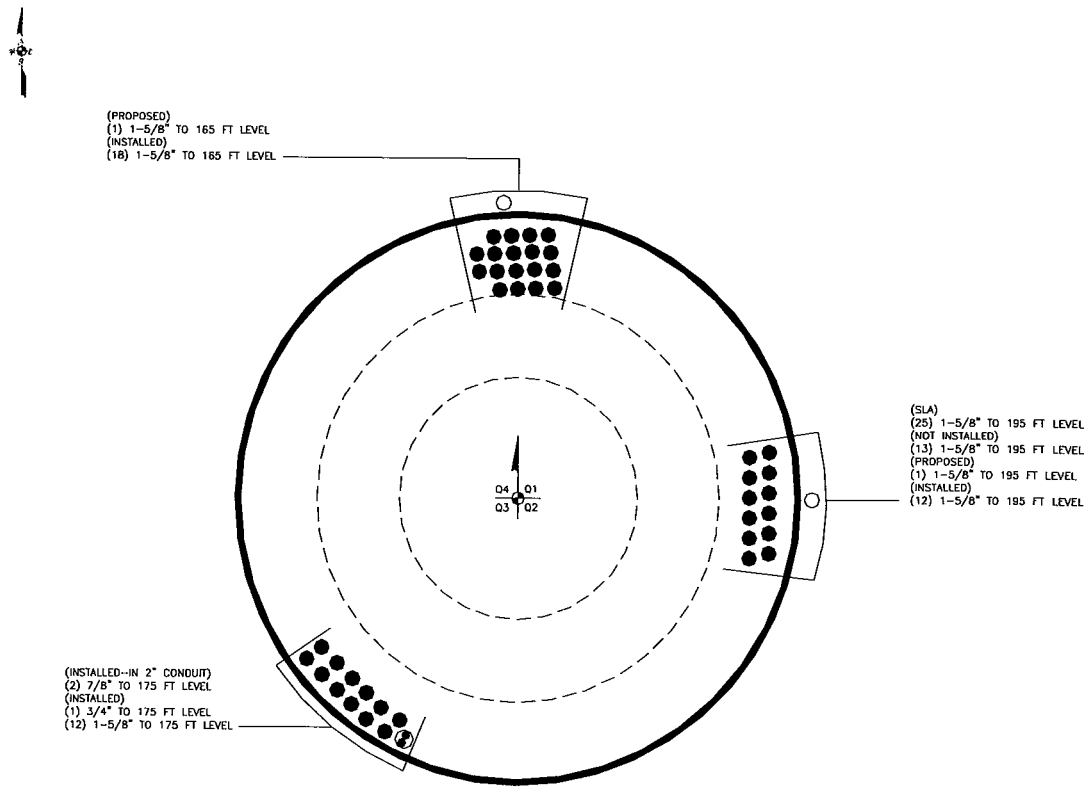
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(3)						✔		
L4	77 - 38 (4)	0.015	1.203	0.000	0.038	0.002	1.218	1.333	H1-3+VT ✔
							✔		
L5	38 - 0 (5)	0.016	1.140	0.000	0.032	0.001	1.156	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	195 - 157.5	Pole	TP33.351x26x0.25	1	-8.22	1331.10	34.6	Pass
L2	157.5 - 116.75	Pole	TP40.839x32.0179x0.3125	2	-15.37	2036.66	69.1	Pass
L3	116.75 - 77	Pole	TP48.006x39.1849x0.375	3	-25.13	2874.51	78.2	Pass
L4	77 - 38	Pole	TP54.901x46.0798x0.375	4	-36.38	3289.03	91.4	Pass
L5	38 - 0	Pole	TP61.6x52.7788x0.4375	5	-53.05	4415.35	86.7	Pass
							Summary	
						Pole (L4)	91.4	Pass
						RATING =	**91.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED)
(1) 1-5/8" TO 165 FT LEVEL
(INSTALLED)
(18) 1-5/8" TO 165 FT LEVEL
(SLA)
(25) 1-5/8" TO 195 FT LEVEL
(NOT INSTALLED)
(13) 1-5/8" TO 195 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 195 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 195 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED--IN 2" CONDUIT)
(2) 7/8" TO 175 FT LEVEL
(INSTALLED)
(1) 3/4" TO 175 FT LEVEL
(12) 1-5/8" TO 175 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	69	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	68	in
Thick:	3	in
Grade:	55	ksi
Clip Distance:	13	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:	[illegible]	**
Groove Depth:	[illegible]	<-- Disregard
Groove Angle:	[illegible]	<-- Disregard
Fillet H. Weld:	[illegible]	in
Fillet V. Weld:	[illegible]	in
Width:	[illegible]	in
Height:	[illegible]	in
Thick:	[illegible]	in
Notch:	[illegible]	in
Grade:	[illegible]	ksi
Weld str.:	[illegible]	ksi

Pole Data		
Diam:	61.6	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Unfactored Shear, V:	35	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	162.6 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	83.4% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	42.2 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	76.7% **Pass**

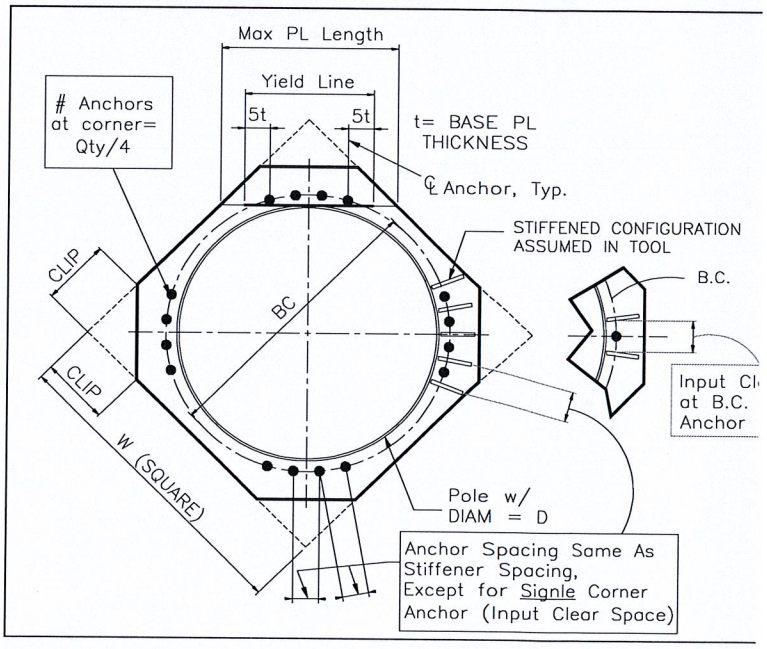
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A



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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.1.103.14128 - Phase 1

Date: 8/2/2014

BU:	826053
Site Name:	Monroe-1/Rt 25
App Number:	259685 Rev. 1
Work Order:	903018

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	D

Forces

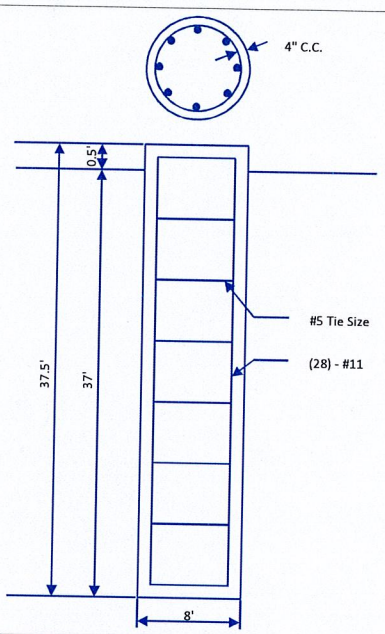
Compression	53 kips
Shear	35 kips
Moment	4752 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	8 ft
Ext. above grade:	0.5 ft
Depth below grade:	37 ft

Material Properties

Number of Rebar:	28
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	4500 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	4 in



Soil Profile: 826053SoilProfile

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3	0	3	115	0	0	0	0	0	
2	10	3	13	52.6	0	0	0	0	0	
3	24	13	37	52.6	0	34	1.5	1.5	30	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	14.38 ft
Max Moment, Mu:	5219.24 k-ft
Soil Safety Factor:	3.12
Safety Factor Req'd:	2
RATING:	64.1%

Soil Axial Capacity

Skin Friction (k):	452.39 kips
End Bearing (k):	753.98 kips
Comp. Capacity (k), ϕCn:	1206.37 kips
Comp. (k), Cu:	68.90 kips
RATING:	5.7%

Concrete/Steel Check

Mu (from soil analysis)	6785.01 k-ft
ϕMn	8211.98 k-ft
RATING:	82.6%

rho provided	0.60
rho required	0.50 OK
Rebar Spacing	8.17
Spacing required	22.56 OK
Dev. Length required	22.29
Dev. Length provided	50.45 OK

Overall Foundation Rating: 82.6%

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: CT11215A

Monroe-1/ Rt 25

88 Main Street
Monroe, CT 06468

August 12, 2014

EBI Project Number: 62144221

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

EBI Consulting
environmental | engineering | due diligence

August 12, 2014

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

Re: Emissions Values for Site: **CT11215A - Monroe-1/ Rt 25**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 88 Main Street, Monroe, 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 88 Main Street, Monroe, 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 (1940.000 MHz—to 1950.000 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 **195 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	CT11215A - Monroe-1/ Rt 25
Site Addresss	88 Main Street, Monroe, CT 06468
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	195	189	None	0	0	48.326044	0.486366	0.04864%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	195	189	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
														Sector total Power Density Value:		0.097%	

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	195	189	None	0	0	48.326044	0.486366	0.04864%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	195	189	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
														Sector total Power Density Value:		0.097%	

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	195	189	None	0	0	48.326044	0.486366	0.04864%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	195	189	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	195	189	1-5/8"	0	0	24.163022	0.243183	0.02432%
														Sector total Power Density Value:		0.097%	

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.292%
AT&T	5.700%
Verizon Wireless	17.640%
Total Site MPE %	**23.632%**

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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 **0.292% (0.097% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously.

The anticipated composite MPE value for this site assuming all carriers present is **23.632%** of the allowable FCC established general public limit. 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 within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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Burlington, MA 01803