



Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 20, 2017

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

RE: Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 806368
AT&T Site ID: CT1100
374 Three Mile Road, Glastonbury, CT 06033
Latitude: 41° 41' 36.93"/ Longitude: -72° 32' 50.11"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 137-foot level of the existing 145-foot monopole at 374 Three Mile Road in Glastonbury, CT. The tower is owned by Crown Castle. The property is owned by John Flanagan. AT&T now intends to replace three (3) RRU12/A2s with three (3) RRU32s and install six (6) TMS's.

This facility was approved by the Connecticut Siting Council in Docket 174 on October 21, 1996. This approval included the conditions that:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwisch Cellular Limited Partnership and the Town of Glastonbury, and not to exceed a height of 150 feet above ground level (AGL).

This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mr. Richard J. Johnson, Town Manager, Town of Glastonbury, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.

Melanie A. Bachman

January 20, 2017

Page 2

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mr. Richard J. Johnson, Town Manager
Town Hall
2155 Main Street
Glastonbury, CT 06033

John R. Flanagan
366 Three Mile Road
Glastonbury, CT 06033



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Chairman

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Chairman

Melanie Bachman,
Acting Executive Director

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DOCKET NO. 174 - An application of Cellco Partnership d/b/a Bell Atlantic NYNEX Mobile for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telecommunications facility and associated equipment located within an approximately 30-acre parcel at 366 Three Mile Road, in the East Glastonbury section of the Town of Glastonbury, Connecticut. The proposed alternate one site is located within the same approximately 30-acre parcel at 366 Three Mile Road. The proposed alternate two site is located within an approximately 50-acre parcel at 1952 New London Turnpike, in the East Glastonbury section of the Town of Glastonbury, Connecticut.

Connecticut Siting Council

October 21, 1996

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed prime site in Glastonbury, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Bell Atlantic NYNEX Mobile (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed prime site, located within a 30-acre parcel at Three Mile Road, Glastonbury, Connecticut. We find the effects on scenic resources and adjacent land uses of the first alternate site and second alternate site to be significant, and therefore deny certification of these sites.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Glastonbury, and not to exceed a height of 150 feet above ground level (AGL).
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include relocation of the tower within the leased parcel to prevent the fall zone of the tower from crossing the nearby Connecticut Light and Power Company transmission lines; plans for the tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building and security fence; plans for the access road and utility line installation from Three Mile Road; plans for site clearing and tree trimming; plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and plans for the construction of an architecturally treated gate at the entrance to the access road from Three Mile Road; and plans for the installation of a propane tank to fuel the emergency generator.
3. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. If the facility does not initially provide, or permanently ceases to provide cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.
7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

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8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant and The Glastonbury Citizen.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

APPLICANT

Bell Atlantic NYNEX Mobile

ITS REPRESENTATIVE

Kenneth C. Baldwin, Esq.
Brian C. S. Freeman, Esq.
Robinson & Cole
One Commercial Plaza
Hartford, CT 06103-3597

Mr. David S. Malko, P.E.
Sandy M. Ranciato, Manager - Real Estate/Zoning
Bell Atlantic NYNEX Mobile
20 Alexander Drive
Wallingford, CT 06492

PARTY

Town of Glastonbury

ITS REPRESENTATIVE

William S. Fish, Jr., Esq.
Kevin S. Murphy, Esq.
Tyler, Cooper & Alcorn
CityPlace - 35th Floor
Hartford, CT 06103-3488

INTERVENOR

Springwich Cellular Limited Partnership

ITS REPRESENTATIVE

Peter J. Tyrrell, Esq.
Springwich Cellular Limited Partnership
500 Enterprise Drive
Rocky Hill, CT 06067-3900

Content Last Modified on 8/9/2002 11:48:22 AM

Ten Franklin Square New Britain, CT 06051 / 860- 827-2935

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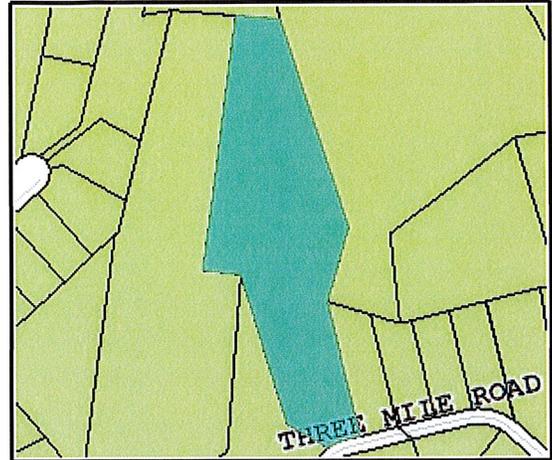


Owner of Record

Account Number: 70600374

Property Address: 374 THREE MILE RD

GIS ID: 70600374
 Owner: FLANAGAN JOSEPHINE I + JOHN R
 Co-Owner:
 Address: 366 THREE MILE RD
 City, State ZIP: GLASTONBURY, CT 06033



Property highlighted in blue

Parcel Information

Map/Street/Lot 18 / 7060 / S0035 Property ID: 13664
 Developer Lot ID: 72 Water: Well
 Parcel Acreage: 9.08 Sewer: Septic
 Zoning Code: RR Census: 5204

Valuation Summary

Item	Appraised Value	Assessed Value
Buildings	0	0
Land	804200	515600
Appurtenances	173300	121300
Total	977500	636900

**Building
 Picture
 Not
 Applicable**

Owner of Record

Owner of Record	Deed / Page	Sale Date	Sale Price
FLANAGAN JOSEPHINE I + JOHN R	2725/0212	12/31/2009	0
FLANAGAN JOSEPHINE I TRUSTEE	2725/0205	12/31/2009	0
FLANAGAN JOSEPHINE I TRUSTEE	2725/ 210	12/31/2009	0
FLANAGAN JOSEPHINE I TRUSTEE	1884/0085	07/30/2003	0
FLANAGAN JOSEPHINE I TR+JOSEPHINE I	1828/0149	06/02/2003	0
FLANAGAN JOSEPHINE I TR+JAMES F	1828/0145	06/02/2003	0
FLANAGAN JOSEPHINE+JAMES F	0251/1107	12/31/1980	0

Building Information

Building ID 0

Year Constructed :
 Building Type :
 Style :
 Occupany :
 Stories :
 Building Zone :
 Roof Type :
 Roof Material :
 Est. Gross S.F. :
 Est. Living S.F. :

Number of Rooms :
 Number of Bedrooms :
 Number of Bathrooms :
 Number of Half-Baths :
 Exterior Wall :
 Interior Wall :
 Interior Floor :
 Interior Floor #2 :
 Air Conditioning Type :
 Heat Type :
 Fuel Type :

**Building
 Sketch
 Not
 Applicable**

Subarea Type	Est. Gross S.F.	Est. Living S.F.	Outbuilding Type	Est. Gross S.F.	Comments
			Cell Shed	924.00	



Town of Glastonbury GIS

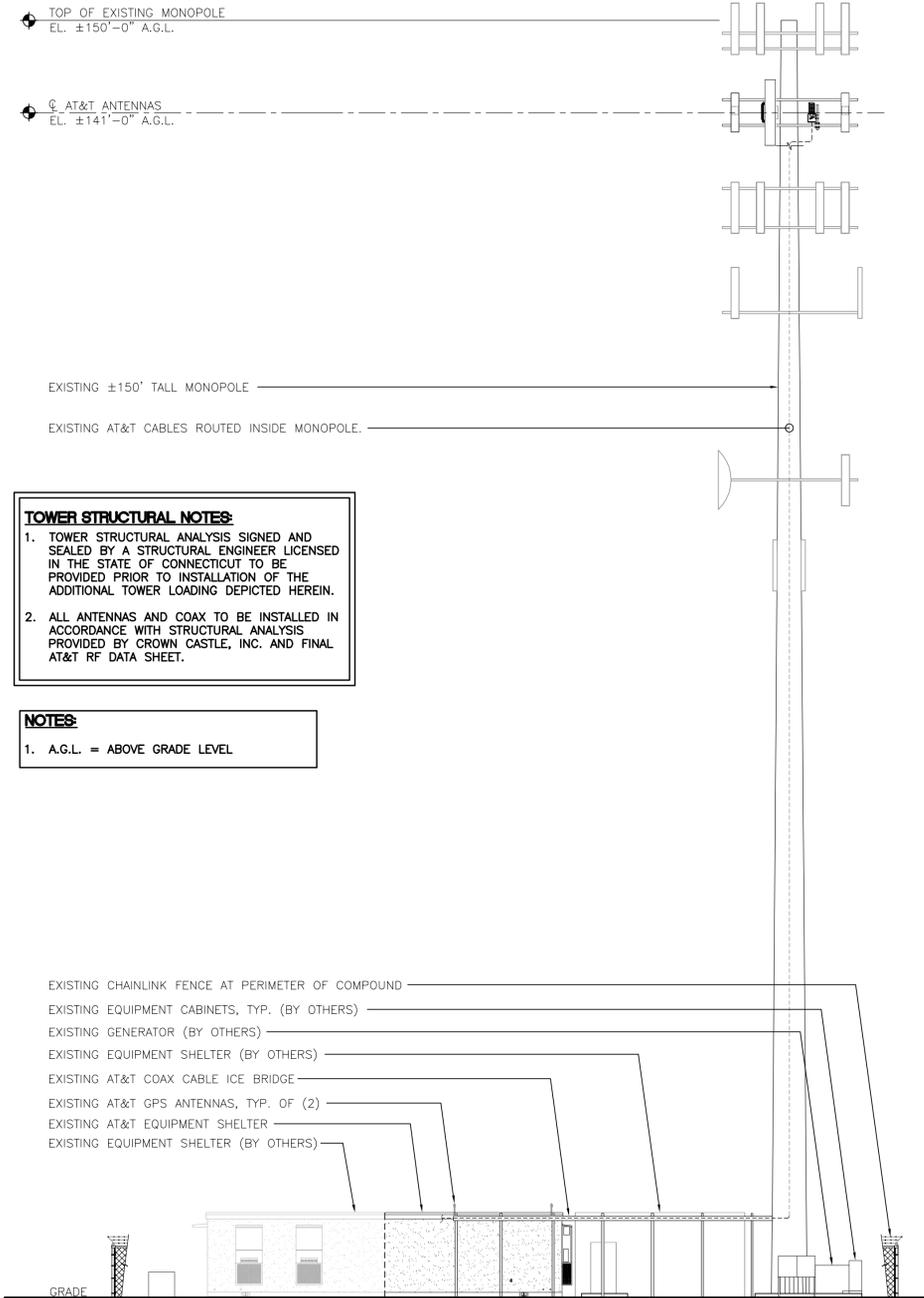


630 0 315 630 Feet

NAD_1983_StatePlane_Connecticut_FIPS_0600_Feet
© Town of Glastonbury GIS

This map is a user generated static output from an Internet mapping site and is for reference only.
Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



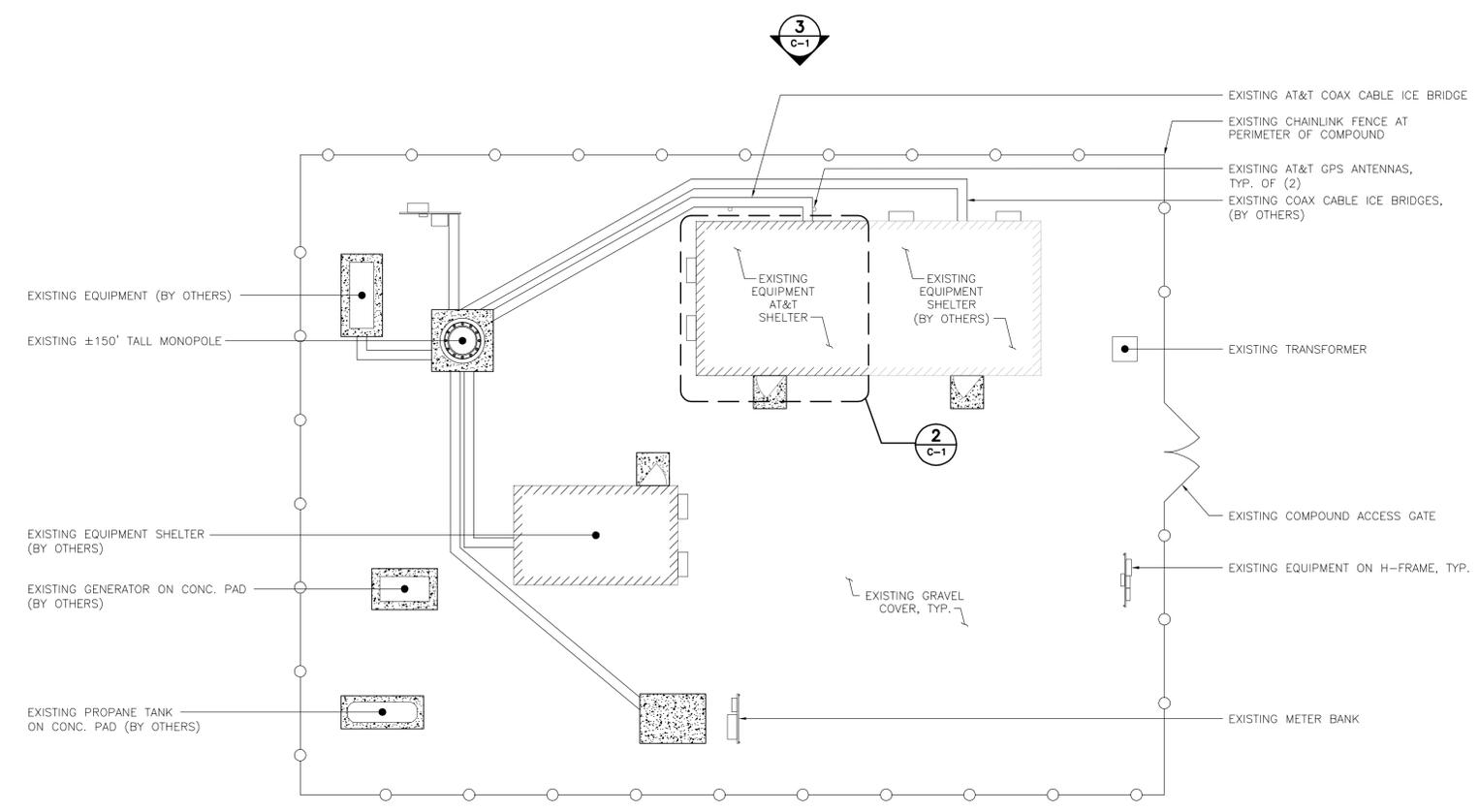
TOWER STRUCTURAL NOTES:

- TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
- ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

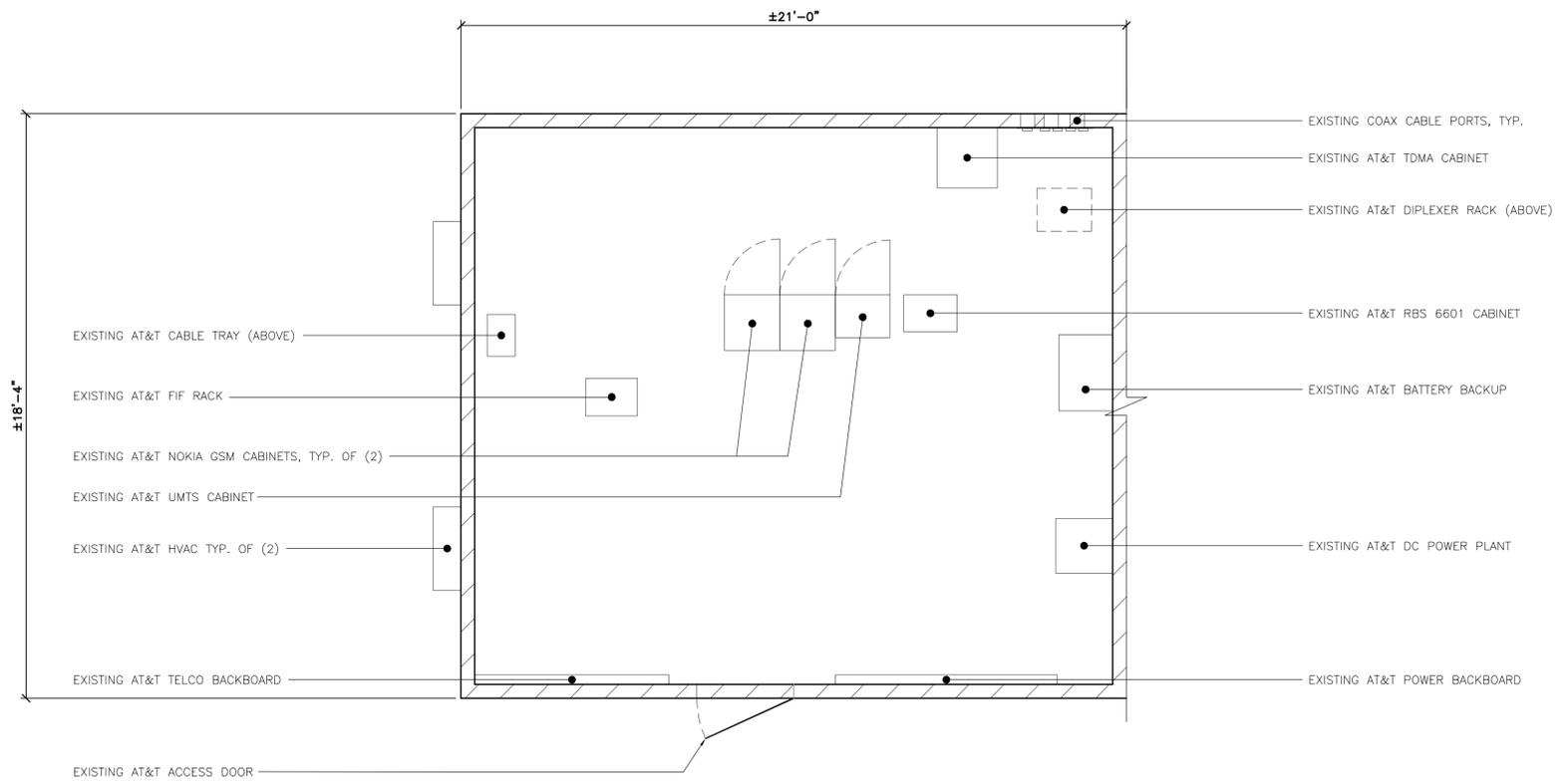
NOTES:

- A.G.L. = ABOVE GRADE LEVEL

3 WEST TOWER ELEVATION
 SCALE: 1" = 10'
 GRAPHIC SCALE (IN FEET) 1 inch = 10 ft.



1 COMPOUND PLAN
 SCALE: 1" = 10'
 TRUE NORTH
 GRAPHIC SCALE (IN FEET) 1 inch = 10 ft.



2 EQUIPMENT LAYOUT PLAN
 SCALE: 3/8" = 1'-0"
 TRUE NORTH

CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION	CAG	HMR	DATE	REV.
CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW	CAG	12/05/16	11/15/16	0
		11/15/16	KAWUR	
			DATE	BY
			CHK'D	DESCRIPTION

PROFESSIONAL ENGINEER SEAL

at&t
 EMPIRE telecom

CENTER engineering
 Centered on Solutions
 (203) 488-0360
 (203) 488-8387 Fax
 63-2 North Branford Road
 Branford, CT 06405
 www.CenterEng.com

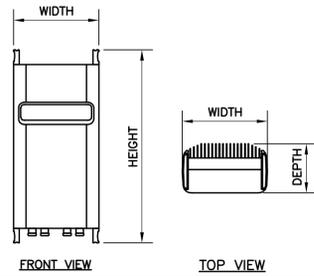
AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
GLASTONBURY THREE MILE
CT1100 - LTE BWE
 374 THREE MILE ROAD
 GLASTONBURY, CT 06033

DATE: 11/03/16
 SCALE: AS NOTED
 JOB NO. 16071.56

PLANS AND ELEVATION

C-1

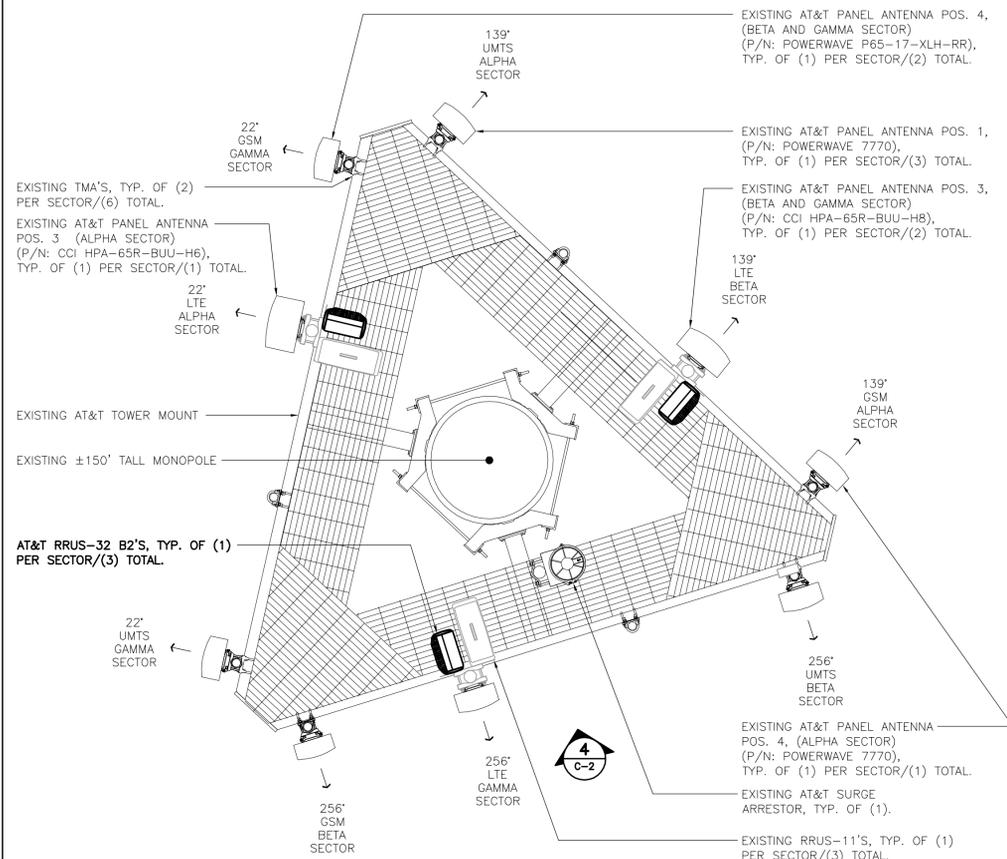
Sheet No. 3 of 5



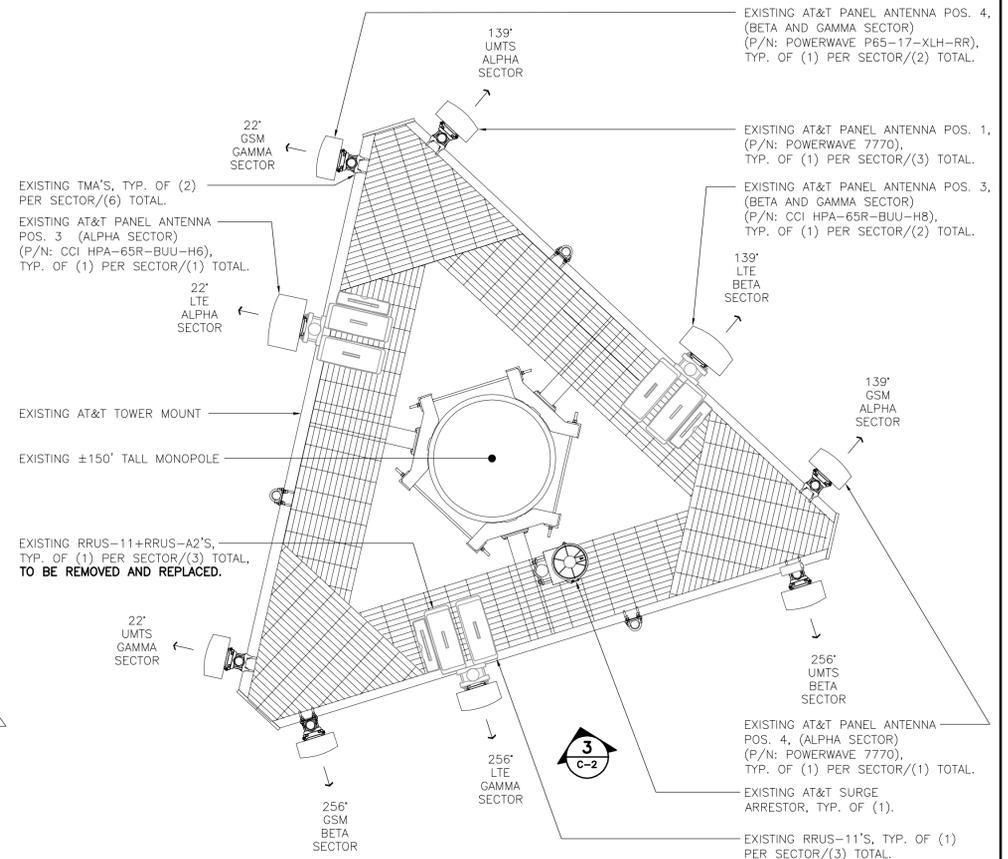
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B2	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

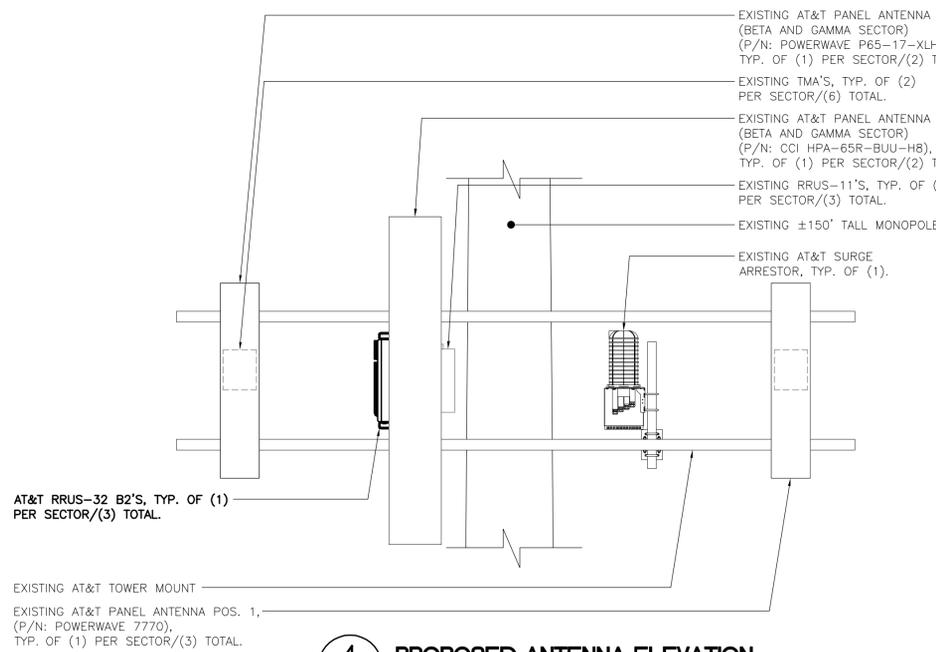
5 ERICSSON RRUS 32 B2 DETAIL
SCALE: 1" = 1'-0"



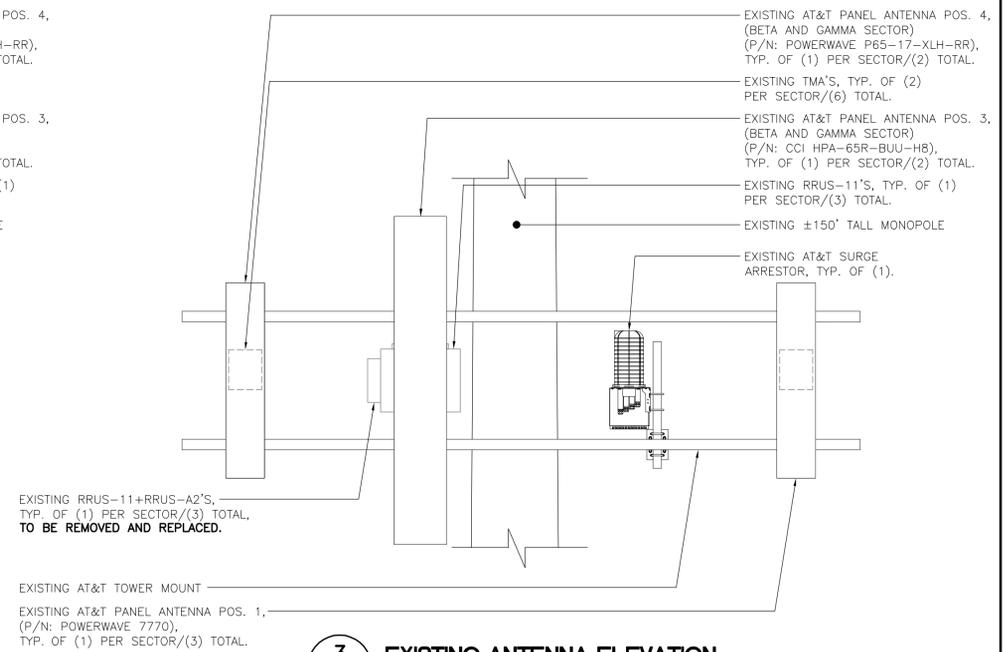
2 PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0" NORTH



1 EXISTING ANTENNA PLAN
SCALE: 1/2" = 1'-0" NORTH



4 PROPOSED ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"



3 EXISTING ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"

PROFESSIONAL ENGINEER SEAL

at&t

EMPIRE telecom

CENTER engineering
Centered on Solutions
(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CenterEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
GLASTONBURY THREE MILE
CT1100 - LTE BWE
374 THREE MILE ROAD
GLASTONBURY, CT 06033

DATE: 11/03/16
SCALE: AS NOTED
JOB NO. 16071.56

LTE BWE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 5

CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW

CAG
CAG
HMR
KAWJR
DATE
REV.

1 12/06/16
0 11/16/16

DRAWN BY/CHK'D BY/DESCRIPTION



Date: December 21, 2016

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
301.502.2226

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
jsmith@pjfweb.com
614.221.6679

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: CT1100
Carrier Site Name: Glastonbury Three Mile

Crown Castle Designation:
Crown Castle BU Number: 806368
Crown Castle Site Name: HRT 049B 943215
Crown Castle JDE Job Number: 408196
Crown Castle Work Order Number: 1339288
Crown Castle Application Number: 368318 Rev. 3

Engineering Firm Designation: Paul J Ford and Company Project Number: 37516-3904.001.7805

Site Data: 374 Three Mile Rd., GLASTONBURY, Hartford County, CT
Latitude 41° 41' 36.93", Longitude -72° 32' 50.11"
145 Foot - Monopole Tower

Dear Debra Elliott,

Paul J Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 982952, in accordance with application 368318, revision 3.

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.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second gust wind speed of 89 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:

Jared Smith, E.I.
Structural Designer *UKR*



12-21-16

Date: **December 21, 2016**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
301.502.2226

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
jsmith@pjfweb.com
614.221.6679

Subject: Structural Analysis Report

Carrier Designation:

AT&T Mobility Co-Locate

Carrier Site Number:

CT1100

Carrier Site Name:

Glastonbury Three Mile

Crown Castle Designation:

Crown Castle BU Number:

806368

Crown Castle Site Name:

HRT 049B 943215

Crown Castle JDE Job Number:

408196

Crown Castle Work Order Number:

1339288

Crown Castle Application Number:

368318 Rev. 3

Engineering Firm Designation:

Paul J Ford and Company Project Number: 37516-3904.001.7805

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LC7: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second gust wind speed of 89 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:

Jared Smith, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Components vs. Capacity

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 145 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in January of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second gust wind speed of 89 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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
137.0	138.0	3	ericsson	RRUS 32 B2	-	-	-
		6	powerwave technologies	7020.00			

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
147.0	148.0	3	alcatel lucent	RRH2X60-PCS	2	1-5/8	2
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	alcatel lucent	RRH2x60-AWS			
		9	andrew	SBNHH-1D65B w/ Mount Pipe			
	2	antel	LPA-80063/6CF w/ Mount Pipe	12	1-1/4 1-5/8	1	
	1	rfs celwave	DB-T1-6Z-8AB-0Z				
	6	rfs celwave	FD9R6004/2C-3L				
	4	swedcom	SC-E 6014 rev2 w/ Mount Pipe				
147.0	1	tower mounts	Platform Mount [LP 1001-1]				

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
137.0	138.0	3	ericsson	RRUS 12 B2/RRUS A2	-	-	3
		6	powerwave technologies	LGP13519			
		3	communication components inc.	DTMABP7819VG12A	12 1 1 2	1-1/4 1/2 3/8 3/4	1
		3	ericsson	RRUS-11			
		1	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe			
		2	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe			
		6	powerwave technologies	7020.00			
		4	powerwave technologies	7770.00 w/ Mount Pipe			
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		3	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
137.0	1	tower mounts	Platform Mount [LP 1001-1]				
126.0	130.0	2	gps	GPS_A	12 2	1-1/4 1/2	1
	128.0	12	decibel	DB844G65ZAXY w/ Mount Pipe			
	126.0	1	tower mounts	Platform Mount [LP 601-1]			
116.0	116.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 601-1]			
95.0	97.0	1	ems wireless	RR65-18-02DP w/ Mount Pipe	3	1-1/4	1
	96.0	1	repeater technologies	DA1900-39			
	95.0	2	tower mounts	Side Arm Mount [SO 701-1]			
87.0	87.0	3	allgon	7250.02 w/ Mount Pipe	6	1-1/4	1
		1	tower mounts	Pipe Mount [PM 601-3]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welty, 12/16/1996	262197	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEl, 2310, 03/25/1997	974245	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEl, 2310, 01/10/1997	262188	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B&T, 2005078.57, 03/08/2005	1037241	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) At the time of this analysis, sufficient foundation information was not available at CCI sites. However, we were able to obtain a copy of the original monopole design. This drawing contained the original foundation design reactions. Based on these reactions we were able to compare to the current analysis. By doing this we have assumed the existing foundation was properly designed to handle the loading from the original monopole design.
- 5) The existing monopole base plate has been reinforced using a Crown-approved system in accordance with the above referenced documents. However, in this analysis we found that the existing base plate without modifications has adequate capacity and therefore, we did not consider the existing base plate stiffeners in the strength calculations. This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	145 - 92.5	Pole	TP35.64x20.5x0.3438	1	-21.09	2649.41	55.8	Pass
L2	92.5 - 44.71	Pole	TP48.61x33.5106x0.4375	2	-36.42	4485.05	60.8	Pass
L3	44.71 - 0	Pole	TP60.5x45.8529x0.4688	3	-59.06	5701.25	67.1	Pass
							Summary	
						Pole (L3)	67.1	Pass
						Rating =	67.1	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	63.5	Pass
1	Base Plate	0	70.3	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	68.2	Pass

Structure Rating (max from all components) =	68.2%
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Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 89.00 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.0000 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56.00 pcf.

A wind speed of 50.00 mph is used in combination with ice.

Deflections calculated using a wind speed of 60.00 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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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	145.0000- 92.5000	52.5000	5.00	12	20.5000	35.6400	0.3438	1.3750	A572-65 (65 ksi)
L2	92.5000- 44.7100	52.7900	6.58	12	33.5106	48.6100	0.4375	1.7500	A572-65 (65 ksi)
L3	44.7100- 0.0000	51.2900		12	45.8529	60.5000	0.4688	1.8750	A572-65 (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/t
L1	21.2232	22.3104	1156.9477	7.2159	10.6190	108.9507	2344.2898	10.9805	4.5728	13.303
	36.8972	39.0685	6212.5548	12.6361	18.4615	336.5137	12588.320	19.2283	8.6303	25.106
L2	36.1733	46.5917	6504.9565	11.8402	17.3585	374.7421	13180.805	22.9310	7.8083	17.848
	50.3248	67.8630	20100.989	17.2458	25.1800	798.2925	40730.054	33.4001	11.8550	27.097
L3	49.4158	68.5018	18009.297	16.2475	23.7518	758.2281	36491.720	33.7145	11.0323	23.536
	62.6342	90.6097	41678.805	21.4912	31.3390	1329.9341	84452.559	44.5953	14.9578	31.91

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 145.0000- 92.5000				1	1	1			
L2 92.5000- 44.7100				1	1	1			
L3 44.7100- 0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
HJ7-50A(1-5/8)	C	No	Inside Pole	145.0000 - 0.0000	12	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
HB114-21U3M12- XXXF(1-1/4)	C	No	CaAa (Out Of Face)	145.0000 - 0.0000	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
HB158-1-08U8- S8J18(1-5/8)	C	No	CaAa (Out Of Face)	145.0000 - 0.0000	1	No Ice	0.1980
						1/2" Ice	0.2980
						1" Ice	0.3980
HB158-1-08U8- S8J18(1-5/8)	C	No	CaAa (Out Of Face)	145.0000 - 0.0000	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
2" (Nominal) Conduit	C	No	Inside Pole	137.0000 - 0.0000	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
LCF114-50J(1-1/4)	C	No	Inside Pole	137.0000 - 0.0000	12	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
LCF12-50J(1/2)	C	No	Inside Pole	137.0000 - 0.0000	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
FB-L98B-002- 75000(3/8)	C	No	Inside Pole	137.0000 - 0.0000	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	137.0000 - 0.0000	2	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
LDF4-50A(1/2)	C	No	Inside Pole	126.0000 - 0.0000	2	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
LDF6-50A(1-1/4)	C	No	Inside Pole	126.0000 - 0.0000	12	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
LDF7-50A(1-5/8)	C	No	Inside Pole	116.0000 - 0.0000	12	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	Inside Pole	116.0000 - 0.0000	1	1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						No Ice	0.0000	1.07
						1/2" Ice	0.0000	1.07
						1" Ice	0.0000	1.07
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	95.0000 - 0.0000	1	No Ice	0.1550	0.60
						1/2" Ice	0.2550	1.85
						1" Ice	0.3550	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	95.0000 - 0.0000	2	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	87.0000 - 0.0000	6	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	145.0000-92.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.783	1.83
L2	92.5000-44.7100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.870	2.40
L3	44.7100-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.783	2.26

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	145.0000-92.5000	A	2.269	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.744	3.80
L2	92.5000-44.7100	A	2.149	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	60.249	8.54
L3	44.7100-0.0000	A	1.924	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	54.218	7.75

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	145.0000-92.5000	-0.2398	0.1384	-0.6009	0.3469
L2	92.5000-44.7100	-0.4034	0.2329	-1.0874	0.6278
L3	44.7100-0.0000	-0.4118	0.2378	-1.1385	0.6573

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
Platform Mount [LP 1001-1]	C	None		0.0000	147.0000	No Ice	47.7000	47.7000	3.02
						1/2"	59.5000	59.5000	3.62
						Ice	71.3000	71.3000	4.22
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	4.8000	2.0000	0.04
						1/2"	5.0704	2.1926	0.08
						Ice	5.3481	2.3926	0.12
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
(2) SC-E 6014 rev2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	3.5639	4.2233	0.03
						1/2"	3.9054	4.7800	0.07
						Ice	4.2560	5.3529	0.12
(2) RRH2x60-AWS	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	1.8775	1.2359	0.04
						1/2"	2.0551	1.3858	0.06
						Ice	2.2401	1.5441	0.08
RRH2X60-PCS	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	2.2000	1.7233	0.06
						1/2"	2.3926	1.9015	0.08
						Ice	2.5926	2.0870	0.10
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	8.4186	7.4197	0.08
						1/2"	8.9558	8.4535	0.15
						Ice	9.4801	9.3468	0.23
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	4.8000	2.0000	0.04
						1/2"	5.0704	2.1926	0.08
						Ice	5.3481	2.3926	0.12
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
(2) SC-E 6014 rev2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	3.5639	4.2233	0.03
						1/2"	3.9054	4.7800	0.07
						Ice	4.2560	5.3529	0.12
(2) RRH2x60-AWS	B	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	1.8775	1.2359	0.04
						1/2"	2.0551	1.3858	0.06
						Ice	2.2401	1.5441	0.08
RRH2X60-PCS	B	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	2.2000	1.7233	0.06
						1/2"	2.3926	1.9015	0.08
						Ice	2.5926	2.0870	0.10
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	8.4186	7.4197	0.08
						1/2"	8.9558	8.4535	0.15
						Ice	9.4801	9.3468	0.23
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	147.0000	No Ice	9.8309	10.2155	0.05
						1/2"	10.3998	11.3844	0.14
						Ice	10.9334	12.2686	0.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 1.00	0.0000	147.0000	1" Ice			
						No Ice	0.3142	0.0762	0.00
						1/2" Ice	0.3862	0.1189	0.01
(2) RRH2x60-AWS	C	From Leg	4.0000 0.00 1.00	0.0000	147.0000	1" Ice			
						No Ice	1.8775	1.2359	0.04
						1/2" Ice	2.0551	1.3858	0.06
RRH2X60-PCS	C	From Leg	4.0000 0.00 1.00	0.0000	147.0000	1" Ice			
						No Ice	2.2000	1.7233	0.06
						1/2" Ice	2.3926	1.9015	0.08
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	147.0000	1" Ice			
						No Ice	8.4186	7.4197	0.08
						1/2" Ice	8.9558	8.4535	0.15
*** HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	9.8953	8.1125	0.08
						1/2" Ice	10.4700	9.3041	0.16
DTMABP7819VG12A	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.9762	0.3387	0.02
						1/2" Ice	1.1002	0.4192	0.03
RRUS-11	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	2.7908	1.1923	0.05
						1/2" Ice	2.9984	1.3395	0.07
(2) 7020.00	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.1021	0.1750	0.00
						1/2" Ice	0.1469	0.2393	0.01
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	5.8277	4.7104	0.09
						1/2" Ice	6.2677	5.5082	0.14
TT19-08BP111-001	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.5527	0.4455	0.02
						1/2" Ice	0.6487	0.5342	0.02
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.9167	0.9167	0.02
						1/2" Ice	1.4583	1.4583	0.04
RRUS 32 B2	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	2.7313	1.6681	0.05
						1/2" Ice	2.9531	1.8552	0.07
(2) 7020.00	A	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.1021	0.1750	0.00
						1/2" Ice	0.1469	0.2393	0.01
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	13.2134	9.5823	0.10
						1/2" Ice	13.8986	11.0517	0.20
DTMABP7819VG12A	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	0.9762	0.3387	0.02
						1/2" Ice	1.1002	0.4192	0.03
RRUS-11	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice			
						No Ice	2.7908	1.1923	0.05
						1/2" Ice	2.9984	1.3395	0.07
						1" Ice			
						No Ice	3.2134	1.4957	0.09
						1/2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(2) 7020.00	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 5.8277 6.2677 6.6966	4.7104 5.5082 6.2127	0.09 0.14 0.21
P65-17-XLH-RR w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 11.8229 12.5940 13.3752	9.0563 10.6186 12.2051	0.09 0.18 0.28
TT19-08BP111-001	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.5527 0.6487 0.7520	0.4455 0.5342 0.6303	0.02 0.02 0.03
RRUS 32 B2	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) 7020.00	B	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 13.2134 13.8986 14.5871	9.5823 11.0517 12.4963	0.10 0.20 0.30
DTMABP7819VG12A	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.9762 1.1002 1.2316	0.3387 0.4192 0.5098	0.02 0.03 0.04
RRUS-11	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
(2) 7020.00	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 5.8277 6.2677 6.6966	4.7104 5.5082 6.2127	0.09 0.14 0.21
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 11.8229 12.5940 13.3752	9.0563 10.6186 12.2051	0.09 0.18 0.28
TT19-08BP111-001	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.5527 0.6487 0.7520	0.4455 0.5342 0.6303	0.02 0.02 0.03
RRUS 32 B2	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) 7020.00	C	From Leg	4.0000 0.00 1.00	0.0000	137.0000	1" Ice No Ice 1/2" Ice 0.1021 0.1469 0.1991	0.1750 0.2393 0.3109	0.00 0.01 0.01
Platform Mount [LP 1001-1]	C	None		0.0000	137.0000	1" Ice No Ice 1/2" Ice 47.7000 59.5000 71.3000	47.7000 59.5000 71.3000	3.02 3.62 4.22

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K

(4) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	126.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
GPS_A	A	From Leg	4.0000 0.00 4.00	0.0000	126.0000	No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
(4) DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	126.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
(4) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	126.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
GPS_A	B	From Leg	4.0000 0.00 4.00	0.0000	126.0000	No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
Platform Mount [LP 601-1]	C	None		0.0000	126.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91
8-ft Ladder	C	None		0.0000	124.0000	No Ice 1/2" Ice 1" Ice	5.0000 9.7300 11.1900	7.0700 9.7300 11.1900	0.04 0.07 0.08

LNx-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	6.3186 6.7646 7.2032	5.6334 6.4160 7.1208	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
RRUS 11 B12	A	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
LNx-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice 1" Ice	6.3186 6.7646 7.2032	5.6334 6.4160 7.1208	0.11 0.17 0.23
KRY 112 144/1	B	From Leg	4.0000 0.00 0.00	0.0000	116.0000	No Ice 1/2" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft ²	ft ²	K
RRUS 11 B12	B	From Leg	4.0000	0.0000	116.0000	1" Ice				
			0.00	0.0000	116.0000	No Ice	2.8333	1.1821	0.05	
			0.00	0.0000	116.0000	1/2"	3.0426	1.3299	0.07	
LNx-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000	0.0000	116.0000	Ice	3.2593	1.4848	0.10	
			0.00	0.0000	116.0000	1" Ice	11.6828	9.8418	0.08	
			0.00	0.0000	116.0000	1/2"	12.4043	11.3657	0.17	
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000	0.0000	116.0000	Ice	13.1351	12.9138	0.27	
			0.00	0.0000	116.0000	1" Ice	6.3292	5.6424	0.11	
			0.00	0.0000	116.0000	1/2"	6.7751	6.4259	0.17	
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000	0.0000	116.0000	Ice	7.2137	7.1313	0.23	
			0.00	0.0000	116.0000	1" Ice	6.3186	5.6334	0.11	
			0.00	0.0000	116.0000	1/2"	6.7646	6.4160	0.17	
KRY 112 144/1	C	From Leg	4.0000	0.0000	116.0000	Ice	7.2032	7.1208	0.23	
			0.00	0.0000	116.0000	1" Ice	0.3500	0.1750	0.01	
			0.00	0.0000	116.0000	1/2"	0.4259	0.2343	0.01	
RRUS 11 B12	C	From Leg	4.0000	0.0000	116.0000	Ice	0.5093	0.3009	0.02	
			0.00	0.0000	116.0000	1" Ice	2.8333	1.1821	0.05	
			0.00	0.0000	116.0000	1/2"	3.0426	1.3299	0.07	
Platform Mount [LP 601-1]	C	None		0.0000	116.0000	Ice	3.2593	1.4848	0.10	
				0.0000	116.0000	1" Ice	28.4700	28.4700	1.12	
				0.0000	116.0000	1/2"	33.5900	33.5900	1.51	
8-ft Ladder	C	None		0.0000	114.0000	Ice	38.7100	38.7100	1.91	
				0.0000	114.0000	1" Ice	5.0000	7.0700	0.04	
				0.0000	114.0000	1/2"	9.7300	9.7300	0.07	
*** Side Arm Mount [SO 701-1]	B	From Leg	2.0000	0.0000	95.0000	Ice	11.1900	11.1900	0.08	
			0.00	0.0000	95.0000	1" Ice	0.8500	1.6700	0.07	
			0.00	0.0000	95.0000	1/2"	1.1400	2.3400	0.08	
Side Arm Mount [SO 701-1]	C	From Leg	2.0000	0.0000	95.0000	Ice	1.4300	3.0100	0.09	
			0.00	0.0000	95.0000	1" Ice	0.8500	1.6700	0.07	
			0.00	0.0000	95.0000	1/2"	1.1400	2.3400	0.08	
Ice Shield 1.5' x 2.0'	C	From Leg	4.0000	0.0000	99.0000	Ice	1.4300	3.0100	0.09	
			0.00	0.0000	99.0000	1" Ice	0.3000	0.4000	0.03	
			0.00	0.0000	99.0000	1/2"	0.4148	0.5481	0.04	
RR65-18-02DP w/ Mount Pipe	B	From Leg	4.0000	0.0000	95.0000	Ice	0.5370	0.7037	0.06	
			0.00	0.0000	95.0000	1" Ice	4.5931	3.3194	0.03	
			2.00	0.0000	95.0000	1/2"	5.0183	4.0888	0.07	
*** 7250.02 w/ Mount Pipe	A	From Leg	1.0000	0.0000	87.0000	Ice	5.4362	4.7844	0.12	
			0.00	0.0000	87.0000	1" Ice	4.2362	3.3238	0.04	
			0.00	0.0000	87.0000	1/2"	4.7096	4.3022	0.07	
7250.02 w/ Mount Pipe	B	From Leg	1.0000	0.0000	87.0000	Ice	5.1662	5.0504	0.12	
			0.00	0.0000	87.0000	1" Ice	4.2362	3.3238	0.04	
			0.00	0.0000	87.0000	1/2"	4.7096	4.3022	0.07	
7250.02 w/ Mount Pipe	C	From Leg	1.0000	0.0000	87.0000	Ice	5.1662	5.0504	0.12	
			0.00	0.0000	87.0000	1" Ice	4.2362	3.3238	0.04	
			0.00	0.0000	87.0000	1/2"	4.7096	4.3022	0.07	
Pipe Mount [PM 601-3]	C	None		0.0000	87.0000	Ice	5.1662	5.0504	0.12	
				0.0000	87.0000	1" Ice	4.3900	4.3900	0.20	
						1/2"	5.4800	5.4800	0.24	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						Ice 1" Ice	6.5700 6.5700	0.28

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
DA1900-39	C	Paraboloid w/o Radome	From Leg	4.0000 0.00 1.00	0.0000		95.0000	3.5417	No Ice 1/2" Ice 1" Ice	9.8500 10.3200 10.7900	0.05 0.10 0.15

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 145.0000-92.5000	116.6900	1.307	25.15	127.13	A	0.000	127.138	127.138	100.00	0.000	0.000
					B	0.000	127.138	100.00	0.000	0.000	
					C	0.000	127.138	100.00	0.000	10.783	
L2 92.5000-44.7100	67.7428	1.166	22.37	172.23	A	0.000	172.239	172.239	100.00	0.000	0.000
					B	0.000	172.239	100.00	0.000	0.000	
					C	0.000	172.239	100.00	0.000	16.870	
L3 44.7100-0.0000	22.4050	0.924	17.77	208.74	A	0.000	208.740	208.740	100.00	0.000	0.000
					B	0.000	208.740	100.00	0.000	0.000	
					C	0.000	208.740	100.00	0.000	15.783	

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 145.0000-92.5000	116.6900	1.307	7.94	2.2692	146.994	A	0.000	146.994	146.994	100.00	0.000	0.000
						B	0.000	146.994	100.00	0.000	0.000	
						C	0.000	146.994	100.00	0.000	35.744	
L2 92.5000-44.7100	67.7428	1.166	7.06	2.1491	190.314	A	0.000	190.314	190.314	100.00	0.000	0.000
						B	0.000	190.314	100.00	0.000	0.000	
						C	0.000	190.314	100.00	0.000	60.249	
L3 44.7100-0.0000	22.4050	0.924	5.61	1.9240	224.755	A	0.000	224.755	224.755	100.00	0.000	0.000
						B	0.000	224.755	100.00	0.000	0.000	
						C	0.000	224.755	100.00	0.000	54.218	

Tower Pressure - Service

$G_H = 1.100$

Section Elevation	z	K_z	q_z	A_G	F a c e	A_F	A_R	A_{leg}	Leg %	C_{AA} In Face ft ²	C_{AA} Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L1 145.0000- 92.5000	116.6900	1.307	10.23	127.138	A	0.000	127.138	127.138	100.00	0.000	0.000
					B	0.000	127.138	100.00	0.000	0.000	
					C	0.000	127.138	100.00	0.000	10.783	
L2 92.5000- 44.7100	67.7428	1.166	9.10	172.239	A	0.000	172.239	172.239	100.00	0.000	0.000
					B	0.000	172.239	100.00	0.000	0.000	
					C	0.000	172.239	100.00	0.000	16.870	
L3 44.7100- 0.0000	22.4050	0.924	7.23	208.740	A	0.000	208.740	208.740	100.00	0.000	0.000
					B	0.000	208.740	100.00	0.000	0.000	
					C	0.000	208.740	100.00	0.000	15.783	

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	29.65					
Bracing Weight	0.00					
Total Member Self-Weight	29.65			1.18	2.05	
Total Weight	49.24			1.18	2.05	
Wind 0 deg - No Ice		0.33	-27.29	-2778.56	-30.28	-2.87
Wind 30 deg - No Ice		13.82	-23.59	-2402.24	-1402.41	-1.11
Wind 60 deg - No Ice		23.68	-13.71	-1394.74	-2405.52	0.54
Wind 90 deg - No Ice		27.29	-0.20	-18.53	-2772.73	2.05
Wind 120 deg - No Ice		23.74	13.36	1363.06	-2411.20	3.41
Wind 150 deg - No Ice		13.52	23.48	2393.89	-1373.12	3.94
Wind 180 deg - No Ice		-0.03	27.18	2770.63	5.74	3.39
Wind 210 deg - No Ice		-13.59	23.59	2403.97	1384.20	1.85
Wind 240 deg - No Ice		-23.57	13.64	1390.87	2398.82	-0.54
Wind 270 deg - No Ice		-27.17	0.00	1.89	2765.13	-2.79
Wind 300 deg - No Ice		-23.50	-13.56	-1380.34	2392.06	-3.93
Wind 330 deg - No Ice		-13.53	-23.48	-2391.23	1377.74	-3.94
Member Ice	16.21					
Total Weight Ice	110.09			15.75	26.83	
Wind 0 deg - Ice		0.13	-14.35	-1490.54	15.01	-2.14
Wind 30 deg - Ice		7.22	-12.41	-1286.96	-728.70	-0.88
Wind 60 deg - Ice		12.40	-7.20	-739.23	-1272.76	0.46
Wind 90 deg - Ice		14.30	-0.08	8.76	-1472.13	1.67
Wind 120 deg - Ice		12.43	7.07	758.66	-1275.49	2.60
Wind 150 deg - Ice		7.10	12.37	1314.92	-718.45	2.85
Wind 180 deg - Ice		-0.01	14.31	1518.10	27.69	2.34
Wind 210 deg - Ice		-7.13	12.41	1318.22	773.82	1.16
Wind 240 deg - Ice		-12.36	7.17	768.35	1322.29	-0.46
Wind 270 deg - Ice		-14.25	-0.00	15.47	1521.31	-1.96
Wind 300 deg - Ice		-12.33	-7.14	-734.68	1320.26	-2.79
Wind 330 deg - Ice		-7.11	-12.37	-1283.31	772.31	-2.85
Total Weight	49.24			1.18	2.05	
Wind 0 deg - Service		0.14	-11.10	-1130.15	-12.75	-0.54
Wind 30 deg - Service		5.62	-9.59	-977.12	-570.72	-0.09
Wind 60 deg - Service		9.63	-5.57	-567.42	-978.63	0.22
Wind 90 deg - Service		11.10	-0.08	-7.79	-1127.96	0.47
Wind 120 deg - Service		9.65	5.43	554.03	-980.94	0.77
Wind 150 deg - Service		5.50	9.55	973.22	-558.81	0.88
Wind 180 deg - Service		-0.01	11.05	1126.42	1.90	0.76
Wind 210 deg - Service		-5.52	9.59	977.32	562.45	0.39
Wind 240 deg - Service		-9.58	5.55	565.34	975.04	-0.22
Wind 270 deg - Service		-11.05	0.00	0.52	1124.00	-0.77

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 300 deg - Service		-9.56	-5.51	-561.56	972.29	-0.98
Wind 330 deg - Service		-5.50	-9.55	-972.64	559.82	-0.88

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	145 - 92.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.36	6.06	-1.73
			Max. Mx	20	-21.11	994.63	-0.49
			Max. My	2	-21.09	-0.41	1001.80
			Max. Vy	8	28.49	-993.51	0.95
			Max. Vx	2	-28.62	-0.41	1001.80
L2	92.5 - 44.71	Pole	Max. Torque	13			-3.25
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.82	16.03	-9.44
			Max. Mx	8	-36.43	-2520.92	14.80
			Max. My	2	-36.43	-23.98	2529.63
			Max. Vy	8	36.64	-2520.92	14.80
L3	44.71 - 0	Pole	Max. Vx	2	-36.65	-23.98	2529.63
			Max. Torque	23			5.09
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-121.42	29.42	-17.18
			Max. Mx	8	-59.06	-4587.36	30.97
			Max. My	2	-59.06	-50.64	4596.86
			Max. Vy	8	43.70	-4587.36	30.97
			Max. Vx	2	-43.70	-50.64	4596.86
			Max. Torque	13			-6.27

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	121.42	-0.00	0.00
	Max. H _x	21	44.31	43.47	-0.01
	Max. H _z	3	44.31	-0.53	43.67
	Max. M _x	2	4596.86	-0.53	43.67
	Max. M _z	8	4587.36	-43.66	0.32
	Max. Torsion	25	6.22	21.64	37.57
	Min. Vert	3	44.31	-0.53	43.67
	Min. H _x	9	44.31	-43.66	0.32
	Min. H _z	15	44.31	0.06	-43.49
	Min. M _x	14	-4582.88	0.06	-43.49
	Min. M _z	20	-4573.24	43.47	-0.01
	Min. Torsion	13	-6.27	-21.63	-37.58

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	49.24	-0.00	0.00	1.18	2.05	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	59.08	0.53	-43.67	-4596.86	-50.64	-4.60
0.9 Dead+1.6 Wind 0 deg - No Ice	44.31	0.53	-43.67	-4557.15	-50.91	-4.60
1.2 Dead+1.6 Wind 30 deg - No Ice	59.08	22.11	-37.75	-3974.54	-2320.55	-1.84
0.9 Dead+1.6 Wind 30 deg - No Ice	44.31	22.11	-37.75	-3940.18	-2301.00	-1.83
1.2 Dead+1.6 Wind 60 deg - No Ice	59.08	37.88	-21.93	-2307.76	-3980.01	0.79
0.9 Dead+1.6 Wind 60 deg - No Ice	44.31	37.88	-21.93	-2287.99	-3945.96	0.80
1.2 Dead+1.6 Wind 90 deg - No Ice	59.08	43.66	-0.32	-30.97	-4587.36	3.22
0.9 Dead+1.6 Wind 90 deg - No Ice	44.31	43.66	-0.32	-31.11	-4548.06	3.23

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
No Ice						
1.2 Dead+1.6 Wind 120 deg - No Ice	59.08	37.99	21.37	2254.67	-3989.38	5.44
0.9 Dead+1.6 Wind 120 deg - No Ice	44.31	37.99	21.37	2234.55	-3955.26	5.45
1.2 Dead+1.6 Wind 150 deg - No Ice	59.08	21.63	37.58	3959.86	-2272.43	6.27
0.9 Dead+1.6 Wind 150 deg - No Ice	44.31	21.63	37.58	3924.89	-2253.21	6.27
1.2 Dead+1.6 Wind 180 deg - No Ice	59.08	-0.06	43.49	4582.88	8.61	5.40
0.9 Dead+1.6 Wind 180 deg - No Ice	44.31	-0.06	43.49	4542.53	7.91	5.40
1.2 Dead+1.6 Wind 210 deg - No Ice	59.08	-21.74	37.74	3976.45	2288.96	2.95
0.9 Dead+1.6 Wind 210 deg - No Ice	44.31	-21.74	37.74	3941.35	2268.36	2.94
1.2 Dead+1.6 Wind 240 deg - No Ice	59.08	-37.70	21.83	2300.44	3967.38	-0.84
0.9 Dead+1.6 Wind 240 deg - No Ice	44.31	-37.70	21.83	2279.99	3932.14	-0.85
1.2 Dead+1.6 Wind 270 deg - No Ice	59.08	-43.47	0.01	2.61	4573.24	-4.39
0.9 Dead+1.6 Wind 270 deg - No Ice	44.31	-43.47	0.01	2.23	4532.77	-4.40
1.2 Dead+1.6 Wind 300 deg - No Ice	59.08	-37.60	-21.70	-2284.11	3956.27	-6.19
0.9 Dead+1.6 Wind 300 deg - No Ice	44.31	-37.60	-21.70	-2264.50	3921.12	-6.20
1.2 Dead+1.6 Wind 330 deg - No Ice	59.08	-21.64	-37.57	-3956.49	2278.31	-6.22
0.9 Dead+1.6 Wind 330 deg - No Ice	44.31	-21.64	-37.57	-3922.26	2257.79	-6.22
1.2 Dead+1.0 Ice	121.42	0.00	-0.00	17.18	29.42	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	121.42	0.13	-14.35	-1629.33	17.07	-2.22
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	121.42	7.22	-12.41	-1406.81	-795.99	-0.98
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	121.42	12.40	-7.19	-807.95	-1390.80	0.37
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	121.42	14.30	-0.08	9.87	-1608.77	1.62
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	121.42	12.43	7.06	829.73	-1393.76	2.59
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	121.42	7.10	12.37	1437.71	-785.07	2.90
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	121.42	-0.01	14.31	1659.78	30.59	2.42
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	121.42	-7.13	12.41	1441.22	846.25	1.26
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	121.42	-12.36	7.17	840.05	1445.78	-0.37
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	121.42	-14.25	-0.00	17.00	1663.38	-1.90
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	121.42	-12.33	-7.14	-803.12	1443.63	-2.78
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	121.42	-7.11	-12.37	-1402.92	844.68	-2.89
Dead+Wind 0 deg - Service	49.24	0.14	-11.10	-1161.73	-11.34	-0.55
Dead+Wind 30 deg - Service	49.24	5.62	-9.59	-1004.30	-585.40	-0.10
Dead+Wind 60 deg - Service	49.24	9.63	-5.57	-582.78	-1005.06	0.21
Dead+Wind 90 deg - Service	49.24	11.10	-0.08	-6.99	-1158.69	0.46
Dead+Wind 120 deg - Service	49.24	9.65	5.43	571.03	-1007.42	0.76
Dead+Wind 150 deg - Service	49.24	5.50	9.55	1002.26	-573.21	0.88
Dead+Wind 180 deg - Service	49.24	-0.01	11.05	1159.87	3.65	0.76
Dead+Wind 210 deg - Service	49.24	-5.52	9.59	1006.46	580.34	0.40

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service						
Dead+Wind 240 deg - Service	49.24	-9.58	5.55	582.61	1004.80	-0.21
Dead+Wind 270 deg - Service	49.24	-11.05	0.00	1.51	1158.05	-0.76
Dead+Wind 300 deg - Service	49.24	-9.55	-5.51	-576.78	1001.98	-0.97
Dead+Wind 330 deg - Service	49.24	-5.50	-9.55	-999.71	577.64	-0.88

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-49.24	0.00	0.00	49.24	-0.00	0.000%
2	0.53	-59.08	-43.67	-0.53	59.08	43.67	0.002%
3	0.53	-44.31	-43.67	-0.53	44.31	43.67	0.002%
4	22.11	-59.08	-37.75	-22.11	59.08	37.75	0.000%
5	22.11	-44.31	-37.75	-22.11	44.31	37.75	0.000%
6	37.88	-59.08	-21.93	-37.88	59.08	21.93	0.000%
7	37.88	-44.31	-21.93	-37.88	44.31	21.93	0.000%
8	43.66	-59.08	-0.32	-43.66	59.08	0.32	0.002%
9	43.66	-44.31	-0.32	-43.66	44.31	0.32	0.002%
10	37.99	-59.08	21.37	-37.99	59.08	-21.37	0.000%
11	37.99	-44.31	21.37	-37.99	44.31	-21.37	0.000%
12	21.63	-59.08	37.58	-21.63	59.08	-37.58	0.000%
13	21.63	-44.31	37.58	-21.63	44.31	-37.58	0.000%
14	-0.06	-59.08	43.50	0.06	59.08	-43.49	0.002%
15	-0.06	-44.31	43.50	0.06	44.31	-43.49	0.002%
16	-21.74	-59.08	37.74	21.74	59.08	-37.74	0.000%
17	-21.74	-44.31	37.74	21.74	44.31	-37.74	0.000%
18	-37.70	-59.08	21.83	37.70	59.08	-21.83	0.000%
19	-37.70	-44.31	21.83	37.70	44.31	-21.83	0.000%
20	-43.47	-59.08	0.01	43.47	59.08	-0.01	0.002%
21	-43.47	-44.31	0.01	43.47	44.31	-0.01	0.002%
22	-37.60	-59.08	-21.70	37.60	59.08	21.70	0.000%
23	-37.60	-44.31	-21.70	37.60	44.31	21.70	0.000%
24	-21.64	-59.08	-37.57	21.64	59.08	37.57	0.000%
25	-21.64	-44.31	-37.57	21.64	44.31	37.57	0.000%
26	0.00	-121.42	0.00	-0.00	121.42	0.00	0.001%
27	0.13	-121.42	-14.35	-0.13	121.42	14.35	0.001%
28	7.22	-121.42	-12.41	-7.22	121.42	12.41	0.001%
29	12.40	-121.42	-7.20	-12.40	121.42	7.19	0.001%
30	14.30	-121.42	-0.08	-14.30	121.42	0.08	0.001%
31	12.43	-121.42	7.07	-12.43	121.42	-7.06	0.001%
32	7.10	-121.42	12.37	-7.10	121.42	-12.37	0.001%
33	-0.01	-121.42	14.31	0.01	121.42	-14.31	0.001%
34	-7.13	-121.42	12.41	7.13	121.42	-12.41	0.001%
35	-12.36	-121.42	7.17	12.36	121.42	-7.17	0.001%
36	-14.25	-121.42	-0.00	14.25	121.42	0.00	0.001%
37	-12.33	-121.42	-7.14	12.33	121.42	7.14	0.001%
38	-7.11	-121.42	-12.37	7.11	121.42	12.37	0.001%
39	0.14	-49.24	-11.10	-0.14	49.24	11.10	0.002%
40	5.62	-49.24	-9.59	-5.62	49.24	9.59	0.002%
41	9.63	-49.24	-5.57	-9.63	49.24	5.57	0.002%
42	11.10	-49.24	-0.08	-11.10	49.24	0.08	0.002%
43	9.65	-49.24	5.43	-9.65	49.24	-5.43	0.002%
44	5.50	-49.24	9.55	-5.50	49.24	-9.55	0.002%
45	-0.01	-49.24	11.05	0.01	49.24	-11.05	0.002%
46	-5.52	-49.24	9.59	5.52	49.24	-9.59	0.002%
47	-9.58	-49.24	5.55	9.58	49.24	-5.55	0.002%
48	-11.05	-49.24	0.00	11.05	49.24	-0.00	0.002%
49	-9.56	-49.24	-5.51	9.55	49.24	5.51	0.002%
50	-5.50	-49.24	-9.55	5.50	49.24	9.55	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	11	0.00000001	0.00008963
3	Yes	11	0.00000001	0.00007288
4	Yes	13	0.00000001	0.00008224
5	Yes	13	0.00000001	0.00005947
6	Yes	13	0.00000001	0.00008250
7	Yes	13	0.00000001	0.00005966
8	Yes	11	0.00000001	0.00007758
9	Yes	11	0.00000001	0.00006372
10	Yes	13	0.00000001	0.00008634
11	Yes	13	0.00000001	0.00006263
12	Yes	13	0.00000001	0.00007731
13	Yes	13	0.00000001	0.00005590
14	Yes	11	0.00000001	0.00012602
15	Yes	11	0.00000001	0.00010109
16	Yes	13	0.00000001	0.00008531
17	Yes	13	0.00000001	0.00006177
18	Yes	13	0.00000001	0.00008349
19	Yes	13	0.00000001	0.00006042
20	Yes	11	0.00000001	0.00010707
21	Yes	11	0.00000001	0.00008665
22	Yes	13	0.00000001	0.00007759
23	Yes	13	0.00000001	0.00005607
24	Yes	13	0.00000001	0.00008749
25	Yes	13	0.00000001	0.00006350
26	Yes	8	0.00000001	0.00002243
27	Yes	12	0.00000001	0.00001625
28	Yes	12	0.00000001	0.00003347
29	Yes	12	0.00000001	0.00003433
30	Yes	12	0.00000001	0.00001425
31	Yes	12	0.00000001	0.00004463
32	Yes	12	0.00000001	0.00003034
33	Yes	12	0.00000001	0.00001786
34	Yes	12	0.00000001	0.00004373
35	Yes	12	0.00000001	0.00004131
36	Yes	12	0.00000001	0.00001599
37	Yes	12	0.00000001	0.00003198
38	Yes	12	0.00000001	0.00004721
39	Yes	10	0.00000001	0.00007795
40	Yes	10	0.00000001	0.00006360
41	Yes	10	0.00000001	0.00006342
42	Yes	10	0.00000001	0.00007706
43	Yes	10	0.00000001	0.00007642
44	Yes	10	0.00000001	0.00005732
45	Yes	10	0.00000001	0.00007908
46	Yes	10	0.00000001	0.00007151
47	Yes	10	0.00000001	0.00006762
48	Yes	10	0.00000001	0.00007837
49	Yes	10	0.00000001	0.00005712
50	Yes	10	0.00000001	0.00007850

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5	20.460	39	1.3310	0.0064
L2	97.5 - 44.71	8.877	46	0.9055	0.0018
L3	51.29 - 0	2.353	40	0.4280	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	Platform Mount [LP 1001-1]	39	20.460	1.3310	0.0064	41878
137.0000	HPA-65R-BUU-H6 w/ Mount Pipe	39	18.341	1.2631	0.0055	26173
126.0000	(4) DB844G65ZAXY w/ Mount Pipe	39	15.482	1.1685	0.0043	11020
124.0000	8-ft Ladder	39	14.974	1.1510	0.0041	9970
116.0000	LNx-6515DS-VTM w/ Mount Pipe	39	12.995	1.0799	0.0033	7219
114.0000	8-ft Ladder	46	12.516	1.0618	0.0031	6754
99.0000	Ice Shield 1.5' x 2.0'	46	9.181	0.9203	0.0021	4584
96.0000	DA1900-39	46	8.579	0.8905	0.0019	4461
95.0000	Side Arm Mount [SO 701-1]	46	8.384	0.8804	0.0019	4457
87.0000	7250.02 w/ Mount Pipe	40	6.918	0.7982	0.0015	4573

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5	80.994	2	5.2701	0.0288
L2	97.5 - 44.71	35.166	4	3.5878	0.0098
L3	51.29 - 0	9.321	4	1.6960	0.0035

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	Platform Mount [LP 1001-1]	2	80.994	5.2701	0.0292	10712
137.0000	HPA-65R-BUU-H6 w/ Mount Pipe	2	72.610	5.0020	0.0254	6695
126.0000	(4) DB844G65ZAXY w/ Mount Pipe	2	61.296	4.6284	0.0204	2817
124.0000	8-ft Ladder	2	59.286	4.5594	0.0195	2548
116.0000	LNx-6515DS-VTM w/ Mount Pipe	4	51.459	4.2784	0.0161	1843
114.0000	8-ft Ladder	4	49.564	4.2067	0.0153	1724
99.0000	Ice Shield 1.5' x 2.0'	4	36.370	3.6466	0.0105	1168
96.0000	DA1900-39	4	33.987	3.5285	0.0098	1136
95.0000	Side Arm Mount [SO 701-1]	4	33.214	3.4887	0.0096	1134
87.0000	7250.02 w/ Mount Pipe	4	27.410	3.1629	0.0079	1162

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u φP _n
L1	145 - 92.5 (1)	TP35.64x20.5x0.3438	52.500 0	0.0000	0.0	37.472 5	-21.09	2649.41	0.008
L2	92.5 - 44.71 (2)	TP48.61x33.5106x0.4375	52.790 0	0.0000	0.0	65.211 7	-36.42	4485.05	0.008
L3	44.71 - 0 (3)	TP60.5x45.8529x0.4688	51.290 0	0.0000	0.0	90.609 7	-59.06	5701.25	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} φM _{ny}
L1	145 - 92.5 (1)	TP35.64x20.5x0.3438	1001.80	1823.28	0.549	0.00	1823.28	0.000
L2	92.5 - 44.71 (2)	TP48.61x33.5106x0.4375	2531.37	4223.27	0.599	0.00	4223.27	0.000
L3	44.71 - 0 (3)	TP60.5x45.8529x0.4688	4602.38	6973.40	0.660	0.00	6973.40	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio V _u φV _n	Actual T _u kip-ft	φT _n kip-ft	Ratio T _u φT _n
L1	145 - 92.5 (1)	TP35.64x20.5x0.3438	28.62	1306.61	0.022	2.82	3697.03	0.001
L2	92.5 - 44.71 (2)	TP48.61x33.5106x0.4375	36.73	2242.53	0.016	1.19	8563.50	0.000
L3	44.71 - 0 (3)	TP60.5x45.8529x0.4688	43.79	2850.62	0.015	1.84	14139.83	0.000

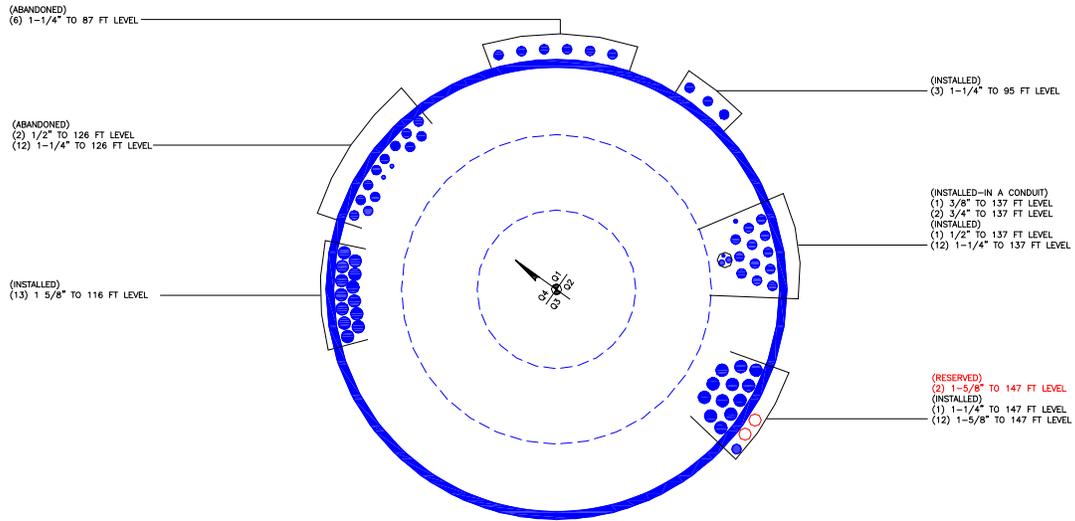
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P _u φP _n	Ratio M _{ux} φM _{nx}	Ratio M _{uy} φM _{ny}	Ratio V _u φV _n	Ratio T _u φT _n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	145 - 92.5 (1)	0.008	0.549	0.000	0.022	0.001	0.558	1.000	4.8.2 ✓
L2	92.5 - 44.71 (2)	0.008	0.599	0.000	0.016	0.000	0.608	1.000	4.8.2 ✓
L3	44.71 - 0 (3)	0.010	0.660	0.000	0.015	0.000	0.671	1.000	4.8.2 ✓

Section Capacity Table

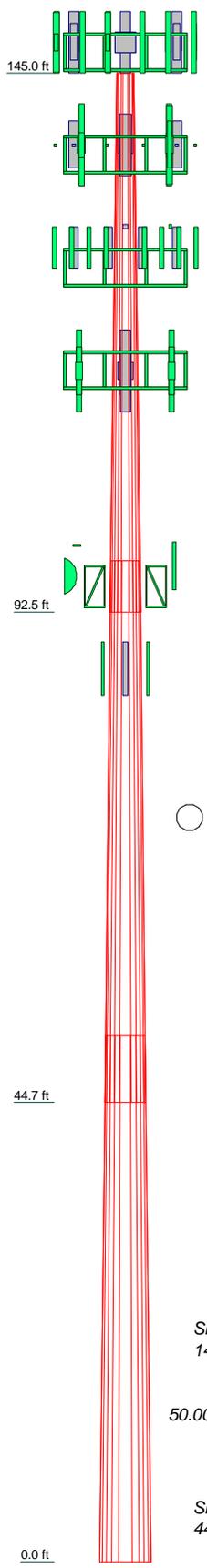
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	145 - 92.5	Pole	TP35.64x20.5x0.3438	1	-21.09	2649.41	55.8	Pass	
L2	92.5 - 44.71	Pole	TP48.61x33.5106x0.4375	2	-36.42	4485.05	60.8	Pass	
L3	44.71 - 0	Pole	TP60.5x45.8529x0.4688	3	-59.06	5701.25	67.1	Pass	
							Summary		
							Pole (L3)	67.1	Pass
							RATING =	67.1	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3
Length (ft)	52.5000	52.7900	51.2900
Number of Sides	12	12	12
Thickness (in)	0.3438	0.4375	0.4688
Socket Length (ft)	5.0000	6.5800	45.8529
Top Dia (in)	20.5000	33.5106	60.5000
Bot Dia (in)	35.6400	48.6100	13.9
Grade	5.5	A572-65	29.6
Weight (K)		10.3	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 1001-1]	147	RRUS 32 B2	137
DB-T1-6Z-8AB-0Z	147	(2) 7020.00	137
(2) FD9R6004/2C-3L	147	Platform Mount [LP 1001-1]	137
(2) SC-E 6014 rev2 w/ Mount Pipe	147	(4) DB844G65ZAXY w/ Mount Pipe	126
RRH2X60-AWS	147	GPS_A	126
RRH2X60-PCS	147	(4) DB844G65ZAXY w/ Mount Pipe	126
(3) SBNHH-1D65B w/ Mount Pipe	147	(4) DB844G65ZAXY w/ Mount Pipe	126
DB-T1-6Z-8AB-0Z	147	GPS_A	126
(2) FD9R6004/2C-3L	147	Platform Mount [LP 601-1]	126
(2) SC-E 6014 rev2 w/ Mount Pipe	147	8-ft Ladder	124
(2) RRH2X60-AWS	147	LNx-6515DS-VTM w/ Mount Pipe	116
RRH2X60-PCS	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
(3) SBNHH-1D65B w/ Mount Pipe	147	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
(2) LPA-80063/6CF w/ Mount Pipe	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
(2) FD9R6004/2C-3L	147	KRY 112 144/1	116
(2) RRH2X60-AWS	147	RRUS 11 B12	116
RRH2X60-PCS	147	LNx-6515DS-VTM w/ Mount Pipe	116
(3) SBNHH-1D65B w/ Mount Pipe	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
HPA-65R-BUU-H6 w/ Mount Pipe	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
DTMABP7819VG12A	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
RRUS-11	137	KRY 112 144/1	116
(2) 7020.00	137	RRUS 11 B12	116
(2) 7770.00 w/ Mount Pipe	137	LNx-6515DS-VTM w/ Mount Pipe	116
TT19-08BP111-001	137	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
DC6-48-60-18-8F	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
RRUS 32 B2	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
(2) 7020.00	137	KRY 112 144/1	116
HPA-65R-BUU-H8 w/ Mount Pipe	137	RRUS 11 B12	116
DTMABP7819VG12A	137	Platform Mount [LP 601-1]	116
RRUS-11	137	8-ft Ladder	114
(2) 7020.00	137	Ice Shield 1.5' x 2.0'	99
7770.00 w/ Mount Pipe	137	Side Arm Mount [SO 701-1]	95
P65-17-XLH-RR w/ Mount Pipe	137	Side Arm Mount [SO 701-1]	95
TT19-08BP111-001	137	RR65-18-02DP w/ Mount Pipe	95
RRUS 32 B2	137	DA1900-39	95
(2) 7020.00	137	7250.02 w/ Mount Pipe	87
7770.00 w/ Mount Pipe	137	7250.02 w/ Mount Pipe	87
P65-17-XLH-RR w/ Mount Pipe	137	Pipe Mount [PM 601-3]	87
TT19-08BP111-001	137	7250.02 w/ Mount Pipe	87

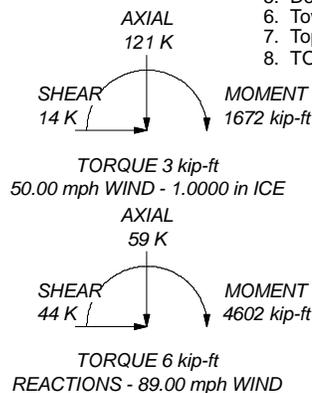
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 89.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 67.1%

ALL REACTIONS ARE FACTORED



TORQUE 6 kip-ft
REACTIONS - 89.00 mph WIND

Paul J Ford and Company
 250 E. Broad Street Suite 600
 Columbus, OH 43215
 Phone: 614.221.6679
 FAX: 614.448.4105

Job: **Ex. 145-ft Monopole in Hartford Co., CT**
 Project: **PJF: 375156-3904 (BU: 806368)**
 Client: Crown Castle
 Drawn by: Jared Smith
 App'd:
 Code: TIA-222-G
 Date: 12/21/16
 Scale: NTS
 Path:
 Dwg No. E-1

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

TIA Rev G

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	<i>Other</i>

Anchor Rod Data

Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	70	in

Plate Data

Diam:	76.5	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	9.73	in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	60.5	in
Thick:	0.46875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions

Mu:	4602	ft-kips
Axial, Pu:	59	kips
Shear, Vu:	44	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: **AISC LRFD** <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Max Rod ($C_u + V_u/r$): 165.1 Kips
 Allowable Axial, $\Phi * F_u * A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 63.5% **Pass**

Rigid
AISC LRFD
$\phi * T_n$

Base Plate Results

Base Plate Stress: 38.0 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 70.3% **Pass**

Flexural Check

Rigid
AISC LRFD
$\phi * F_y$
Y.L. Length:
35.21

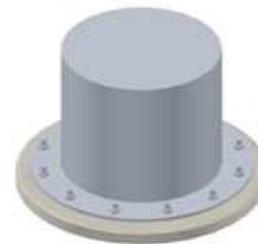
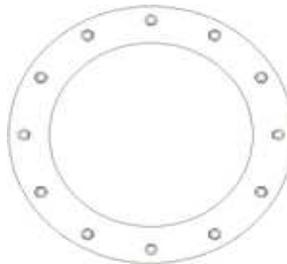
n/a

Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Foundation Reaction Comparison					
Foundation	Reaction	Design Reaction	Modified Design Reaction	Applied Load	Ratio (%)
Caisson	Compression (kips)	-	-	-	-
	Shear (kips)	44.60	60.21	44	73.1%
	OTM (kip-ft)	5001.40	6751.89	4602	68.2%

*Design reactions from EEI drawings dated 1/10/1997. Reactions are multiplied by 1.35 per TIA-G p.122, Sect.15.5.1

Although the shear capacity is 73.1%, the moment reaction is the governing criteria for a monopole drilled pier foundation. Therefore, the overall capacity for this foundation is 68.2%.

Manufacturer Information	
Manufacturer =	EEI
Drawing date =	1/10/1997



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

AT&T Existing Facility

Site ID: CT1100

Glastonbury Three Mile
366 Three Mile Road
Glastonbury, CT 06033

December 5, 2016

EBI Project Number: 6216005598

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	13.50 %



December 5, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT1100 – Glastonbury Three Mile**

EBI Consulting was directed to analyze the proposed AT&T facility located at **366 Three Mile Road, Glastonbury, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **366 Three Mile Road, Glastonbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 6) 2 GSM channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.



- 7) 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.
- 8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **Powerwave 7770, CCI HPA-65R-BUU-H6, CCI HPA-65R-BUU-H8 and the Powerwave P65-17-XLH-RR** for transmission in the 700 MHz, 850 MHz and 1900 MHz frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerlines of the proposed antennas are **141 feet** above ground level (AGL) for **Sector A**, **141 feet** above ground level (AGL) for **Sector B** and **141 feet** above ground level (AGL) for Sector C.
- 11) 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.



AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	141 feet	Height (AGL):	141 feet	Height (AGL):	141 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	0.55 %	Antenna B1 MPE%	0.55 %	Antenna C1 MPE%	0.55 %
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	CCI HPA-65R-BUU-H6	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8
Gain:	11.95 / 14.75 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	141 feet	Height (AGL):	141 feet	Height (AGL):	141 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	5,462.56	ERP (W):	6,229.75	ERP (W):	6,229.75
Antenna A2 MPE%	1.50 %	Antenna B2 MPE%	1.79 %	Antenna C2 MPE%	1.79 %
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Powerwave 7770	Make / Model:	Powerwave P65-17-XLH-RR	Make / Model:	Powerwave P65-17-XLH-RR
Gain:	11.4 / 13.4 dBd	Gain:	15.1 / 15.1 dBd	Gain:	15.1 / 15.1 dBd
Height (AGL):	141 feet	Height (AGL):	141 feet	Height (AGL):	141 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	3,883.12	ERP (W):	3,883.12
Antenna A3 MPE%	0.55 %	Antenna B3 MPE%	1.06 %	Antenna C3 MPE%	1.06 %

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	3.39 %
Nextel	0.40 %
T-Mobile	3.27 %
Verizon	2.61 %
Sprint	0.04 %
XM Sat Radio	3.79 %
Site Total MPE %:	13.50 %

AT&T Sector A Total:	2.59 %
AT&T Sector B Total:	3.39 %
AT&T Sector C Total:	3.39 %
Site Total:	13.50 %

AT&T _ Frequency Band / Technology Max Values (Sectors B&C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	141	1.63	850 MHz	567	0.29%
AT&T 1900 MHz (PCS) UMTS	2	656.33	141	2.59	1900 MHz (PCS)	1000	0.26%
AT&T 700 MHz LTE	2	1,239.23	141	4.89	700 MHz	467	1.05%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	141	7.40	1900 MHz (PCS)	1000	0.74%
AT&T 850 MHz GSM	2	970.78	141	3.83	850 MHz	567	0.68%
AT&T 1900 MHz (PCS) GSM	2	970.78	141	3.83	1900 MHz (PCS)	1000	0.38%
					Total*:		3.39%

*NOTE: Totals may vary by 0.01% due to summing of remainders



Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	2.59 %
Sector B:	3.39 %
Sector C:	3.39 %
AT&T Maximum Total (per sector):	3.39 %
Site Total:	13.50 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **13.50 %** 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.