Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055

April 19, 2017

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

Notice of Exempt Modification
53 Slater Street, Manchester, CT 06042
Latitude- 41.80497100
Longitude- -72.53358500

Dear Ms. Bachman,

T-Mobile currently maintains (6) existing antennas 133' level of the existing 155' monopole at 53 Slater Street in Manchester, CT. The tower is owned by Crown Castle. The property is owned by One Hundred Twenty One Connecticut Avenue Associates LLC. T-Mobile now intends to replace (3) of its existing antennas with (3) new 1900/2100 MHz antennas. These antennas would be installed at the same 133' level of the tower. T-Mobile also intends to install (1) new hybrid cable.

This facility was approved by the Town of Manchester Planning and Zoning Commission on August 17, 1998. This approval did not come with conditions that could be violated by this modification.

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.C.S.A. 16-50j-73, a copy of this letter is being sent to The Honorable Jay Moran, Mayor of the Town of Manchester, as well as the property owner and tower owner.

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

1. The proposed modification will not result in an increase in the height of the existing structure

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications 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 Communications Commission safety standard.

5. The proposed modification 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, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. 16-50j-72(b)(2).

Sincerely,

Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Jay Moran- as elected official
Gary Anderson- as zoning official
Crown Castle- as tower owner
One Hundred Twenty One Connecticut Avenue Associates- as property owner

VOL 2013 PG 259

TOWN OF MANCHESTER

PLANNING AND ZONING COMMISSION

CERTIFICATE OF APPROVAL OF SPECIAL EXCEPTION

Owner of record: Raglin Associates, c/o Sullivan Tile Dist.

Property Address: 53 Slater Street

Applicant: Sprint Spectrum LP

Regulation(s) cited: Article IV, Section 19.05

SPECIAL EXCEPTION GRANTED:

with modifications and the condition that a caveat addressing co-location requirements be submitted for staff review and filed on the land records by the applicant prior to any construction.

* ALL SITE WORK APPROVED BY THIS SPECIAL EXCEPTION MUST BE COMPLETED BY AUGUST 17, 2003 (5 yrs. From approval date). FAILURE TO COMPLETE ALL WORK WITHIN THE SPECIFIED TIME PERIOD WILL RESULT IN AUTOMATIC EXPIRATION OF THE APPROVAL.

* THIS CERTIFICATE MUST BE RECORDED IN THE LAND RECORDS IN THE OFFICE OF THE TOWN CLERK BEFORE THE SPECIAL EXCEPTION IS LAWFULLY EFFECTIVE.

CERTIFIED:

Frank Daversa

Secretary
Planning and Zoning Commission

*DATE ADOPTED: August 17, 1998

FILE NO. S-147

Received for Record on
SEP 11 1998 at 2:43 P.M.
Joseph V. Camposeo

Joseph V. Camposeo, Town Clerk

TOWN OF MANCHESTER
41 CENTER STREET - P.O. BOX 191
MANCHESTER, CT 06045-0191
(860) 647-3052 FAX: (860) 647-3144

ZONING PERMIT

CERTIFICATION OF ZONING COMPLIANCE REQUEST

PERMIT/APPLICATION NBR: 99 00000638 DATE APPLIED: 10/08/98
PERMIT TYPE: ZONE APP TYPE: DISH PREPARED BY: PAT21
DATE ISSUED: 11/03/98

PROPERTY ADDRESS:
3 SLATER STREET
TENANT:

LEGAL DESCRIPTION:

OWNER NAME/ADDRESS:
AGLIN ASSOCIATES
C/O SULLIVAN TILE DIST
5 RAILROAD AVE
EST HAVEN CT 06516

CONTRACTOR NAME/ADDRESS:

OTHER:
PRINT PCS

VALUATION:
OCCUPANCY TYPE: COMMERCIAL BUIL Certificate of O-C-U-P-T: C
Dimensions of structure: 150' Plans for building: YES

DESCRIPTION OF OTHER BUILDINGS NOT SHOWN:
CONDITIONS: REMARKS:
ADDTNL APPROVAL: ADDTNL PERMITS:

MISCELLANEOUS INFO: SITE DEVELOPMENT AND COLORS OF TOWER AND EQUIPMENT CABINETS TO BE AS APPRVD BY PZC ON 8/17/98

THIS IS TO CERTIFY THAT THE ABOVE STATED INFORMATION IS A PERMITTED AND LAWFUL USE AS CONTROLLED BY THE ZONING REGULATIONS OF THE TOWN OF MANCHESTER, CONNECTICUT, UPON AUTHORIZED SIGNATURE OF THE ZONING ENFORCEMENT OFFICER.

Thomas R. O'Meara
APPROVAL SIGNATURE

11/3/98
DATE

ORIGINAL

Town of Manchester, CT

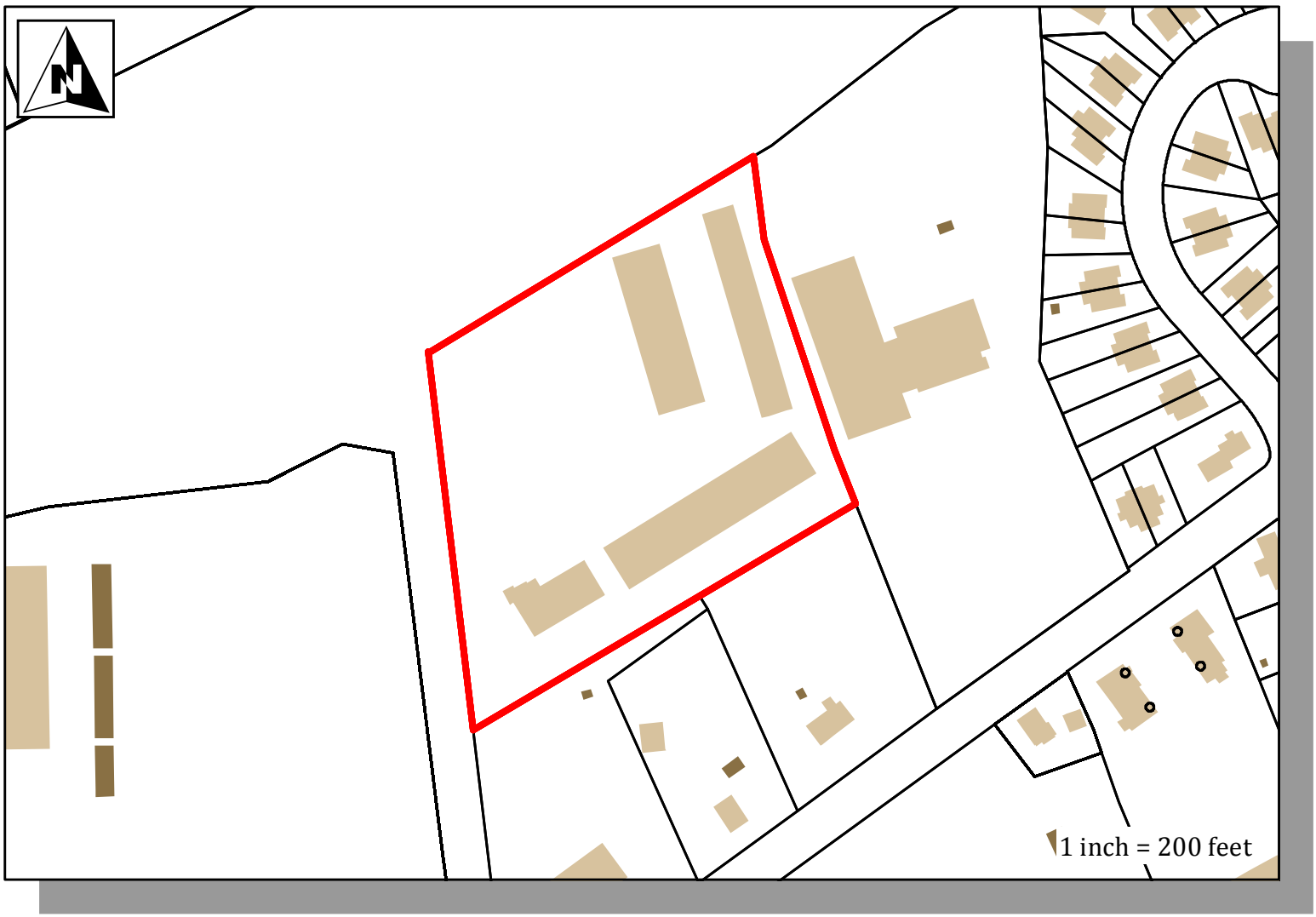
Address: 53 SLATER STREET

RPKEY: 514000053

Property Information:

Mailing Address:	63 SLATER ST MANCHESTER, CT
Owner Name:	ONE HUNDRED TWENTY ONE CONNECTICUT AVENUE ASSOCIATES LLC
Owner Address:	9 LAKE LN ELLINGTON, CT 06029
Land Class:	Industrial 96
Land Use Code:	300
Zoning:	Industrial

Acreage:	4.96
Year Built:	1987
Appraisal:	2710000
Assessment:	1897100
Sale Price:	$1180000.00
Sale Date:	07/17/2003
Book/Page:	2683 /224



Report Created: 1/24/2017

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11377C

Sprint Manchester/slater
55 Slater Street
Manchester, CT 06042

April 11, 2017

EBI Project Number: 6217001437

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	9.35 %

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

EBI Consulting
environmental | engineering | due diligence

April 11, 2017

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

Emissions Analysis for Site: **CT11377C – Sprint Manchester/slater**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **55 Slater Street, Manchester, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **55 Slater Street, Manchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

3) 2 LTE channels (PCS Band - 1900 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 (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) 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.

7) 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.

8) The antennas used in this modeling are the **Ericsson AIR21 B4A/B12P** & **Ericsson AIR32 B2A/B66AA**. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B12P** has a maximum gain of **15.5 dBd** at its main lobe at and 2100 MHz and a maximum gain of **11.5 dBd** at its main lobe at and 700 MHz. The **Ericsson AIR32 B2A/B66AA** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. 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.

9) The antenna mounting height centerline of the proposed antennas is **133 feet** above ground level (AGL).

10) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P
Gain:	15.5 dBd	Gain:	15.5 dBd	Gain:	15.5 dBd
Height (AGL):	133	Height (AGL):	133	Height (AGL):	133
Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	90	Total TX Power(W):	90	Total TX Power(W):	90
ERP (W):	2,552.64	ERP (W):	2,552.64	ERP (W):	2,552.64
Antenna A1 MPE%	0.68	Antenna B1 MPE%	0.68	Antenna C1 MPE%	0.68
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	133	Height (AGL):	133	Height (AGL):	133
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	300	Total TX Power(W):	300	Total TX Power(W):	300
ERP (W):	11,671.35	ERP (W):	11,671.35	ERP (W):	11,671.35
Antenna A2 MPE%	2.60	Antenna B2 MPE%	2.60	Antenna C2 MPE%	2.60

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.28 %**
Sprint	0.34 %
Clearwire	0.09 %
AT&T	0.90 %
Verizon Wireless	4.74 %
Site Total MPE %:	**9.35 %**

T-Mobile Sector A Total:	3.28 %
T-Mobile Sector B Total:	3.28 %
T-Mobile Sector C Total:	3.28 %
Site Total:	9.35 %

T-Mobile _Max Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz UMTS	**2**	**1,064.44**	**133**	**4.75**	**AWS - 2100 MHz**	**1000**	**0.47%**
T-Mobile 700 MHz LTE	**1**	**423.76**	**133**	**0.94**	**700 MHz**	**467**	**0.20%**
T-Mobile AWS - 2100 MHz LTE	**2**	**2,334.27**	**133**	**10.41**	**AWS - 2100 MHz**	**1000**	**1.04%**
T-Mobile PCS - 1950 MHz LTE	**2**	**2,334.27**	**133**	**10.41**	**PCS - 1950 MHz**	**1000**	**1.04%**
T-Mobile PCS - 1950 MHz GSM	**2**	**1,167.14**	**133**	**5.20**	**PCS - 1950 MHz**	**1000**	**0.52%**
						Total:	**3.28%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	3.28 %
Sector B:	3.28 %
Sector C:	3.28 %
T-Mobile Per Sector Maximum:	3.28 %
Site Total:	9.35 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.35%** 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.

PJF PAUL J. FORD & COMPANY

Date: **March 30, 2017**

Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
980.209.8228

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
(614) 221-6679
mclopez@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11377C
	Carrier Site Name:	Sprint Manchester/slater
Crown Castle Designation:	**Crown Castle BU Number:**	876347
	Crown Castle Site Name:	BUCKLAND MALL
	Crown Castle JDE Job Number:	433342
	Crown Castle Work Order Number:	1386352
	Crown Castle Application Number:	386436 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37517-1326.002.7805
Site Data:	**53 Slater Street, MANCHESTER, Hartford County, CT** **Latitude *41° 48' 18"*, Longitude *-72° 32' 1"*** **155 Foot - Monopole Tower**	

Dear Charles Trask,

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 1020514, in accordance with application 386436, 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.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 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 and Exposure Category C 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:

Maria C. Lopez, P.E., P.Eng.
Project Manager

STATE OF CONNECTICUT
No. 30301
LICENSED PROFESSIONAL ENGINEER

3/31/17

Date: **March 30, 2017**

Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
980.209.8228

Paul J. Ford and Company
250 East Broad St., Suite 600
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Subject: **Structural Analysis Report**

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Respectfully submitted by:

Maria C. Lopez, P.E., P.Eng.
Project Manager

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 155 ft Monopole tower designed by SUMMIT in February of 2002. The tower was originally designed for a wind speed of 80 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 125 mph converted to a nominal 3-second gust wind speed of 97 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 and Exposure Category C were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (m)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (mm)	Note
133.0	133.0	3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	1	1-5/8	-

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (m)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (mm)	Note
155.0	155.0	3	alcatel lucent	TD-RRH8x20-25	2 3 5 3 1	5/8 5/16 1/2 1-1/4 Conduit	1
		3	argus technologies	LPX310R w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Miscellaneous [NA 510-1]			
		1	tower mounts	Platform Mount [LP 1201-1]			
	151.0	1	andrew	VHLP1-23			
		1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-18			
		3	dragonwave	HORIZON COMPACT			
153.0	153.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Pipe Mount [PM 601-3]			

Mounting Level (m)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (mm)	Note
145.0	147.0	3	ericsson	RRUS 11	-	-	1
	145.0	1	tower mounts	Pipe Mount [PM 601-3]			
143.0	145.0	3	ericsson	RRUS 11	6 1 2 1	1-1/4 3/8 3/4 Conduit	1
		3	kathrein	800 10121			
		6	kathrein	860 10025			
		1	raycap	DC6-48-60-18-8F			
		3	cci antennas	DTMABP7819VG12A	1 2	3/8 3/4	2
		3	ericcson	RRUS 32 B30			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 32 B2			
		3	quintel technology	QS66512-2			
		1	raycap	DC6-48-60-18-8F			
	143.0	1	tower mounts	Platform Mount [LP 1301-1]			
133.0	133.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	6	1-5/8	3
		3	ericsson	KRY 112 144/1			
		3	ericsson	KRC 118 057/1 w/ Mount Pipe	1	1-1/4	1
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 403-1]			
113.0	113.0	3	alcatel lucent	RRH2X60-AWS	14	1-5/8	1
		3	alcatel lucent	RRH2x60-700			
		3	andrew	LNX-6512DS-T0M w/ Mount Pipe			
		3	antel	BXA-70063/6CFx2 w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 1201-1]			
60.0	60.0	1	tower mounts	Side Arm Mount [SO 701-1]	1	1/2	3

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

Table 3 - Design Antenna and Cable Information

Mounting Level (m)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (mm)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1204605EG1, 06/12/2012	1533476	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 329298-597, 09/11/1998	1615406	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, A02-T0021, 02/18/2002	2068033	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.

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 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155 - 115.5	Pole	TP29.31x22x0.25	1	-13.05	1507.55	60.3	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-22.90	2469.71	87.0	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-32.28	3485.55	91.9	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-49.28	4858.33	91.1	Pass
							Summary	
						Pole (L3)	91.9	Pass
						Rating =	91.9	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	92.5	Pass
1	Base Plate	0	74.9	Pass
1	Base Foundation Steel	0	55.7	Pass
1	Base Foundation Soil Interaction	0	11.4	Pass

Structure Rating (max from all components) =	**92.5%**

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

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:

1) Tower is located in Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.0 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 1.00 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50.0 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60.0 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

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	155.00-115.50	39.50	3.75	18	22.00	29.31	0.25	1.00	A607-60 (60 ksi)
L2	115.50-79.25	40.00	4.50	18	28.11	35.51	0.31	1.25	A607-65 (65 ksi)
L3	79.25-43.75	40.00	5.25	18	34.06	41.46	0.38	1.50	A607-65 (65 ksi)
L4	43.75-0.00	49.00		18	39.73	48.80	0.44	1.75	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/t
L1	22.34	17.26	1031.48	7.72	11.18	92.29	2064.32	8.63	3.43	13.728
	29.76	23.06	2459.70	10.32	14.89	165.21	4922.63	11.53	4.72	18.873
L2	29.25	27.58	2692.83	9.87	14.28	188.55	5389.20	13.79	4.40	14.074
	36.06	34.92	5466.10	12.50	18.04	302.98	10939.40	17.46	5.70	18.241
L3	35.43	40.09	5745.80	11.96	17.30	332.11	11499.17	20.05	5.33	14.224
	42.10	48.90	10425.54	14.58	21.06	495.05	20864.80	24.45	6.64	17.697
L4	41.33	54.57	10646.61	13.95	20.19	527.44	21307.22	27.29	6.22	14.225
	49.55	67.16	19844.89	17.17	24.79	800.51	39715.89	33.59	7.82	17.872

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	Double Angle Stitch Bolt Spacing Redundants in
L1 155.00-115.50				1	1	1			
L2 115.50-79.25				1	1	1			
L3 79.25-43.75				1	1	1			
L4 43.75-0.00				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 plf
**								
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	0.24	0.72
						1/2" Ice	0.34	2.48
						1" Ice	0.44	4.84
ATCB-B01-005(5/16)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
FSJ4-50B(1/2)	C	No	CaAa (Out Of Face)	155.00 - 0.00	5	No Ice	0.00	0.14
						1/2" Ice	0.00	0.77
						1" Ice	0.00	2.01
9776(5/8)	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.28
						1/2" Ice	0.00	0.28
						1" Ice	0.00	0.28
HB058-M12-XXXF(5/8)	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	0.24
						1/2" Ice	0.00	0.24
						1" Ice	0.00	0.24
HB114-1-08U4-M5J(1-1/4)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
**								
LDF6-50A(1-1/4)	C	No	Inside Pole	143.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
FB-L98B-002-75000(3/8)	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	143.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
FB-L98B-034-XXX(3/8)	C	No	CaAa (Out Of Face)	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.60
						1" Ice	0.00	1.76
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of	143.00 - 0.00	1	No Ice	0.00	0.58

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.00	1.38
						1" Ice	0.00	2.78
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	143.00 - 0.00	1	No Ice	0.08	0.58
						1/2" Ice	0.18	1.38
						1" Ice	0.28	2.78
2" (Nominal) Conduit	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
**								
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
HCS 6X12 4AWG(1-5/8)	C	No	Inside Pole	133.00 - 0.00	1	No Ice	0.00	2.40
						1/2" Ice	0.00	2.40
						1" Ice	0.00	2.40
**								
561(1-5/8)	C	No	Inside Pole	113.00 - 0.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	113.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
**								

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	155.00-115.50	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	11.568	0.46
L2	115.50-79.25	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	11.491	1.21
L3	79.25-43.75	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	11.254	1.23
L4	43.75-0.00	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	13.869	1.51

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	155.00-115.50	A	2.302	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	42.409	3.44
L2	115.50-79.25	A	2.228	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	44.865	4.24
L3	79.25-43.75	A	2.128	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	42.884	4.00
L4	43.75-0.00	A	1.921	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	51.102	4.60

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	155.00-115.50	-0.33	0.19	-0.83	0.48
L2	115.50-79.25	-0.36	0.21	-0.99	0.57
L3	79.25-43.75	-0.37	0.21	-1.04	0.60
L4	43.75-0.00	-0.37	0.22	-1.07	0.62

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

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
LPX310R w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.31 2.64 2.97	2.34 2.87 3.41	0.03 0.05 0.08
LPX310R w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.31 2.64 2.97	2.34 2.87 3.41	0.03 0.05 0.08
LPX310R w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.31 2.64 2.97	2.34 2.87 3.41	0.03 0.05 0.08
HORIZON COMPACT	A	From Leg	4.00 0.00 -4.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
HORIZON COMPACT	B	From Leg	4.00 0.00 -4.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
HORIZON COMPACT	C	From Leg	4.00 0.00 -4.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
WIMAX DAP HEAD	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23

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
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
Miscellaneous [NA 510-1]	C	None		0.000	155.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Platform Mount [LP 1201-1]	C	None		0.000	155.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 0.00	0.000	153.00	No Ice 1/2" Ice Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice			
Pipe Mount [PM 601-3]	C	None			0.000	153.00	No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
							1" Ice	6.57	6.57	0.28
***										
RRUS 11	A	From Leg	1.00	0.00	0.000	145.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
RRUS 11	B	From Leg	1.00	0.00	0.000	145.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
RRUS 11	C	From Leg	1.00	0.00	0.000	145.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
Pipe Mount [PM 601-3]	C	None			0.000	145.00	No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
							1" Ice	6.57	6.57	0.28
***										
800 10121	A	From Leg	4.00	0.00	0.000	143.00	No Ice	5.15	3.29	0.05
			0.00	2.00			1/2" Ice	5.50	3.63	0.08
							1" Ice	5.86	3.99	0.12
800 10121	B	From Leg	4.00	0.00	0.000	143.00	No Ice	5.15	3.29	0.05
			0.00	2.00			1/2" Ice	5.50	3.63	0.08
							1" Ice	5.86	3.99	0.12
800 10121	C	From Leg	4.00	0.00	0.000	143.00	No Ice	5.15	3.29	0.05
			0.00	2.00			1/2" Ice	5.50	3.63	0.08
							1" Ice	5.86	3.99	0.12
(2) 860 10025	A	From Leg	4.00	0.00	0.000	143.00	No Ice	0.14	0.12	0.00
			0.00	2.00			1/2" Ice	0.19	0.17	0.00
							1" Ice	0.25	0.23	0.01
(2) 860 10025	B	From Leg	4.00	0.00	0.000	143.00	No Ice	0.14	0.12	0.00
			0.00	2.00			1/2" Ice	0.19	0.17	0.00
							1" Ice	0.25	0.23	0.01
(2) 860 10025	C	From Leg	4.00	0.00	0.000	143.00	No Ice	0.14	0.12	0.00
			0.00	2.00			1/2" Ice	0.19	0.17	0.00
							1" Ice	0.25	0.23	0.01
RRUS 11	A	From Leg	4.00	0.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
RRUS 11	B	From Leg	4.00	0.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
RRUS 11	C	From Leg	4.00	0.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00	2.00			1/2" Ice	3.00	1.34	0.07
							1" Ice	3.21	1.50	0.10
DC6-48-60-18-8F	A	From Leg	4.00	0.00	0.000	143.00	No Ice	0.92	0.92	0.02
			0.00	2.00			1/2" Ice	1.46	1.46	0.04
							1" Ice	1.64	1.64	0.06
QS66512-2	A	From Leg	4.00	0.00	0.000	143.00	No Ice	8.13	6.80	0.11
			0.00				1/2"	8.59	7.27	0.17

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
			2.00			Ice	9.05	7.72	0.23
						1" Ice			
QS66512-2	B	From Leg	4.00	0.000	143.00	No Ice	8.13	6.80	0.11
			0.00			1/2"	8.59	7.27	0.17
			2.00			Ice	9.05	7.72	0.23
						1" Ice			
QS66512-2	C	From Leg	4.00	0.000	143.00	No Ice	8.13	6.80	0.11
			0.00			1/2"	8.59	7.27	0.17
			2.00			Ice	9.05	7.72	0.23
						1" Ice			
DTMABP7819VG12A	A	From Leg	4.00	0.000	143.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			2.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	B	From Leg	4.00	0.000	143.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			2.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	C	From Leg	4.00	0.000	143.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			2.00			Ice	1.23	0.51	0.04
						1" Ice			
RRUS 32 B30	A	From Leg	4.00	0.000	143.00	No Ice	0.00	1.85	0.05
			0.00			1/2"	3.46	2.08	0.07
			2.00			Ice	3.73	2.31	0.10
						1" Ice			
RRUS 32 B30	B	From Leg	4.00	0.000	143.00	No Ice	0.00	1.85	0.05
			0.00			1/2"	3.46	2.08	0.07
			2.00			Ice	3.73	2.31	0.10
						1" Ice			
RRUS 32 B30	C	From Leg	4.00	0.000	143.00	No Ice	0.00	1.85	0.05
			0.00			1/2"	3.46	2.08	0.07
			2.00			Ice	3.73	2.31	0.10
						1" Ice			
RRUS 32 B2	A	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	4.00	0.000	143.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			2.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 11	A	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
RRUS 11	B	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
RRUS 11	C	From Leg	4.00	0.000	143.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			2.00			Ice	3.21	1.50	0.10
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.000	143.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			2.00			Ice	1.64	1.64	0.06
						1" Ice			
Platform Mount [LP 1301-1]	C	None		0.000	143.00	No Ice	51.70	51.70	2.26
						1/2"	62.70	62.70	2.94
						Ice	73.70	73.70	3.61

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			
***									
KRC 118 057/1 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	8.75 9.20 9.66	7.61 8.42 9.16	0.16 0.24 0.33
KRC 118 057/1 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	8.75 9.20 9.66	7.61 8.42 9.16	0.16 0.24 0.33
KRC 118 057/1 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	8.75 9.20 9.66	7.61 8.42 9.16	0.16 0.24 0.33
RRUS 11 B12	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
(2) 2.375" OD x 4' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.87 1.11 1.36	0.87 1.11 1.36	0.02 0.03 0.04
(2) 2.375" OD x 4' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.87 1.11 1.36	0.87 1.11 1.36	0.02 0.03 0.04
(2) 2.375" OD x 4' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	0.87 1.11 1.36	0.87 1.11 1.36	0.02 0.03 0.04
Platform Mount [LP 403-1]	C	None		0.000	133.00	No Ice 1/2" Ice 1" Ice	18.85 24.30 29.75	18.85 24.30 29.75	1.50 1.80 2.09
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	133.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
***									
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.40 6.55 7.41	0.04 0.10 0.17
BXA-70063/6CFx2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	7.81 8.36 8.87	5.40 6.55 7.41	0.04 0.10 0.17
BXA-70063/6CFx2 w/ Mount Pipe	C	From Leg	4.00 0.00	0.000	113.00	No Ice 1/2"	7.81 8.36	5.40 6.55	0.04 0.10

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
			0.00			Ice	8.87	7.41	0.17
						1" Ice			
LNX-6512DS-T0M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
LNX-6512DS-T0M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
LNX-6512DS-T0M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	5.33 5.72 6.12	4.53 5.15 5.77	0.05 0.09 0.15
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
RRH2X60-AWS	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2x60-700	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	B	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 0.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
Platform Mount [LP 1201-1]	C	None		0.000	113.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
*** **									

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 ft^2	Weight K
VHLP1-23	A	Paraboloid w/o Radome	From Leg	4.00	0.000		155.00	1.27	No Ice	1.28	0.01
				0.00					1/2" Ice	1.45	0.02
				-4.00					1" Ice	1.62	0.03
VHLP2.5-18	B	Paraboloid w/Shroud (HP)	From Leg	4.00	0.000		155.00	2.92	No Ice	6.68	0.05
				0.00					1/2" Ice	7.07	0.08
				-4.00					1" Ice	7.46	0.12
VHLP2-11	C	Paraboloid w/o Radome	From Leg	4.00	0.000		155.00	2.17	No Ice	3.72	0.03
				0.00					1/2" Ice	4.01	0.05
				-4.00					1" Ice	4.30	0.07

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 155.00-115.50	134.46	1.347	31	85.747	A	0.000	85.747	85.747	100.00	0.000	0.000
					B	0.000	85.747		100.00	0.000	0.000
					C	0.000	85.747		100.00	0.000	11.568
L2 115.50-79.25	96.92	1.257	29	98.652	A	0.000	98.652	98.652	100.00	0.000	0.000
					B	0.000	98.652		100.00	0.000	0.000
					C	0.000	98.652		100.00	0.000	11.491
L3 79.25-43.75	61.26	1.142	26	114.669	A	0.000	114.669	114.669	100.00	0.000	0.000
					B	0.000	114.669		100.00	0.000	0.000
					C	0.000	114.669		100.00	0.000	11.254
L4 43.75-0.00	22.10	0.921	21	165.679	A	0.000	165.679	165.679	100.00	0.000	0.000
					B	0.000	165.679		100.00	0.000	0.000
					C	0.000	165.679		100.00	0.000	13.869

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	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 155.00-115.50	134.46	1.347	8	2.30	100.900	A	0.000	100.900	100.900	100.00	0.000	0.000
						B	0.000	100.900		100.00	0.000	0.000
						C	0.000	100.900		100.00	0.000	42.409
L2 115.50-79.25	96.92	1.257	8	2.23	112.557	A	0.000	112.557	112.557	100.00	0.000	0.000
						B	0.000	112.557		100.00	0.000	0.000
						C	0.000	112.557		100.00	0.000	44.865
L3 79.25-43.75	61.26	1.142	7	2.13	127.848	A	0.000	127.848	127.848	100.00	0.000	0.000
						B	0.000	127.848		100.00	0.000	0.000
						C	0.000	127.848		100.00	0.000	42.884
L4 43.75-0.00	22.10	0.921	6	1.92	181.193	A	0.000	181.193	181.193	100.00	0.000	0.000
						B	0.000	181.193		100.00	0.000	0.000
						C	0.000	181.193		100.00	0.000	51.102

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 155.00-115.50	134.46	1.347	11	85.747	A	0.000	85.747	85.747	100.00	0.000	0.000
					B	0.000	85.747		100.00	0.000	0.000
					C	0.000	85.747		100.00	0.000	11.568
L2 115.50-79.25	96.92	1.257	10	98.652	A	0.000	98.652	98.652	100.00	0.000	0.000
					B	0.000	98.652		100.00	0.000	0.000
					C	0.000	98.652		100.00	0.000	11.491
L3 79.25-43.75	61.26	1.142	9	114.669	A	0.000	114.669	114.669	100.00	0.000	0.000
					B	0.000	114.669		100.00	0.000	0.000
					C	0.000	114.669		100.00	0.000	11.254
L4 43.75-0.00	22.10	0.921	7	165.679	A	0.000	165.679	165.679	100.00	0.000	0.000
					B	0.000	165.679		100.00	0.000	0.000
					C	0.000	165.679		100.00	0.000	13.869

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+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
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

Comb. No.	Description
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	155 - 115.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-40.44	3	-1
			Max. Mx	8	-13.06	-521	2
			Max. My	2	-13.07	-1	519
			Max. Vy	8	20.96	-521	2
			Max. Vx	2	-20.90	-1	519
			Max. Torque	4			-1
L2	115.5 - 79.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-63.88	7	-2
			Max. Mx	8	-22.91	-1496	4
			Max. My	2	-22.91	-2	1496
			Max. Vy	8	30.24	-1496	4
			Max. Vx	2	-30.30	-2	1496
			Max. Torque	12			-1
L3	79.25 - 43.75	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-79.02	12	-5
			Max. Mx	20	-32.29	2606	16
			Max. My	2	-32.28	-4	2608
			Max. Vy	8	33.49	-2605	5
			Max. Vx	2	-33.56	-4	2608
			Max. Torque	12			-2
L4	43.75 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-103.75	18	-8
			Max. Mx	20	-49.28	4338	23
			Max. My	2	-49.28	-5	4343
			Max. Vy	8	36.85	-4338	7
			Max. Vx	2	-36.91	-5	4343
			Max. Torque	12			-3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	103.75	-0.00	0.00
	Max. H_x	20	49.32	36.78	0.14
	Max. H_z	2	49.32	-0.03	36.85
	Max. M_x	2	4343	-0.03	36.85
	Max. M_z	8	4338	-36.79	0.05
	Max. Torsion	24	3	18.49	31.82
	Min. Vert	3	36.99	-0.03	36.85
	Min. H_x	8	49.32	-36.79	0.05
	Min. H_z	14	49.32	-0.11	-36.78
	Min. M_x	14	-4331	-0.11	-36.78
	Min. M_z	20	-4338	36.78	0.14
	Min. Torsion	12	-3	-18.38	-31.82

Tower Mast Reaction Summary

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
Dead Only	41.10	-0.00	-0.00	0	0	0
1.2 Dead+1.6 Wind 0 deg - No Ice	49.32	0.03	-36.85	-4343	-5	-2
0.9 Dead+1.6 Wind 0 deg - No Ice	36.99	0.03	-36.85	-4268	-5	-2
1.2 Dead+1.6 Wind 30 deg - No Ice	49.32	18.54	-31.80	-3743	-2192	-1
0.9 Dead+1.6 Wind 30 deg - No Ice	36.99	18.54	-31.80	-3678	-2154	-1
1.2 Dead+1.6 Wind 60 deg - No Ice	49.32	31.93	-18.34	-2157	-3767	0
0.9 Dead+1.6 Wind 60 deg - No Ice	36.99	31.93	-18.34	-2120	-3703	0
1.2 Dead+1.6 Wind 90 deg - No Ice	49.32	36.79	-0.05	-7	-4338	1
0.9 Dead+1.6 Wind 90 deg - No Ice	36.99	36.79	-0.05	-7	-4263	1
1.2 Dead+1.6 Wind 120 deg - No Ice	49.32	31.97	18.31	2153	-3775	2
0.9 Dead+1.6 Wind 120 deg - No Ice	36.99	31.97	18.31	2116	-3710	2
1.2 Dead+1.6 Wind 150 deg - No Ice	49.32	18.38	31.82	3746	-2167	3
0.9 Dead+1.6 Wind 150 deg - No Ice	36.99	18.38	31.82	3681	-2129	3
1.2 Dead+1.6 Wind 180 deg - No Ice	49.32	0.11	36.78	4331	-18	2
0.9 Dead+1.6 Wind 180 deg - No Ice	36.99	0.11	36.78	4257	-18	2
1.2 Dead+1.6 Wind 210 deg - No Ice	49.32	-18.25	31.89	3758	2147	1
0.9 Dead+1.6 Wind 210 deg - No Ice	36.99	-18.25	31.89	3693	2110	1
1.2 Dead+1.6 Wind 240 deg - No Ice	49.32	-31.89	18.30	2152	3762	0
0.9 Dead+1.6 Wind 240 deg - No Ice	36.99	-31.89	18.30	2115	3697	0
1.2 Dead+1.6 Wind 270 deg - No Ice	49.32	-36.78	-0.14	-23	4338	-1
0.9 Dead+1.6 Wind 270 deg - No Ice	36.99	-36.78	-0.14	-22	4263	-1
1.2 Dead+1.6 Wind 300 deg - No Ice	49.32	-31.87	-18.44	-2173	3760	-2
0.9 Dead+1.6 Wind 300 deg - No Ice	36.99	-31.87	-18.44	-2136	3695	-2
1.2 Dead+1.6 Wind 330 deg - No Ice	49.32	-18.49	-31.82	-3747	2185	-3
0.9 Dead+1.6 Wind 330 deg - No Ice	36.99	-18.49	-31.82	-3682	2147	-3
1.2 Dead+1.0 Ice+1.0 Temp	103.75	0.00	-0.00	8	18	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	103.75	0.01	-12.62	-1622	16	-2
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	103.75	6.34	-10.91	-1399	-802	-1
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	103.75	10.93	-6.29	-804	-1395	0
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	103.75	12.60	-0.01	6	-1610	1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	103.75	10.94	6.29	819	-1396	2
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	103.75	6.30	10.91	1417	-795	2
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	103.75	0.02	12.61	1636	14	2
1.2 Dead+1.0 Wind 210	103.75	-6.27	10.93	1420	827	1

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
deg+1.0 Ice+1.0 Temp 1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	103.75	-10.92	6.29	820	1430	0
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	103.75	-12.60	-0.03	3	1646	-1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	103.75	-10.92	-6.31	-807	1429	-2
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	103.75	-6.32	-10.91	-1400	836	-2
Dead+Wind 0 deg - Service	41.10	0.01	-7.88	-922	-1	0
Dead+Wind 30 deg - Service	41.10	3.97	-6.80	-794	-465	0
Dead+Wind 60 deg - Service	41.10	6.83	-3.92	-458	-799	0
Dead+Wind 90 deg - Service	41.10	7.87	-0.01	-2	-920	0
Dead+Wind 120 deg - Service	41.10	6.84	3.92	457	-801	0
Dead+Wind 150 deg - Service	41.10	3.93	6.81	795	-460	0
Dead+Wind 180 deg - Service	41.10	0.02	7.87	919	-3	0
Dead+Wind 210 deg - Service	41.10	-3.90	6.82	798	456	0
Dead+Wind 240 deg - Service	41.10	-6.82	3.92	457	799	0
Dead+Wind 270 deg - Service	41.10	-7.87	-0.03	-5	921	0
Dead+Wind 300 deg - Service	41.10	-6.82	-3.94	-461	798	0
Dead+Wind 330 deg - Service	41.10	-3.95	-6.81	-795	464	0

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-41.10	0.00	0.00	41.10	0.00	0.000%
2	0.03	-49.32	-36.85	-0.03	49.32	36.85	0.005%
3	0.03	-36.99	-36.85	-0.03	36.99	36.85	0.009%
4	18.54	-49.32	-31.80	-18.54	49.32	31.80	0.000%
5	18.54	-36.99	-31.80	-18.54	36.99	31.80	0.000%
6	31.93	-49.32	-18.34	-31.93	49.32	18.34	0.000%
7	31.93	-36.99	-18.34	-31.93	36.99	18.34	0.000%
8	36.79	-49.32	-0.05	-36.79	49.32	0.05	0.005%
9	36.79	-36.99	-0.05	-36.79	36.99	0.05	0.009%
10	31.97	-49.32	18.31	-31.97	49.32	-18.31	0.000%
11	31.97	-36.99	18.31	-31.97	36.99	-18.31	0.000%
12	18.38	-49.32	31.82	-18.38	49.32	-31.82	0.000%
13	18.38	-36.99	31.82	-18.38	36.99	-31.82	0.000%
14	0.11	-49.32	36.78	-0.11	49.32	-36.78	0.005%
15	0.11	-36.99	36.78	-0.11	36.99	-36.78	0.009%
16	-18.25	-49.32	31.89	18.25	49.32	-31.89	0.000%
17	-18.25	-36.99	31.89	18.25	36.99	-31.89	0.000%
18	-31.89	-49.32	18.30	31.89	49.32	-18.30	0.000%
19	-31.89	-36.99	18.30	31.89	36.99	-18.30	0.000%
20	-36.79	-49.32	-0.14	36.78	49.32	0.14	0.005%
21	-36.79	-36.99	-0.14	36.78	36.99	0.14	0.009%
22	-31.87	-49.32	-18.44	31.87	49.32	18.44	0.000%
23	-31.87	-36.99	-18.44	31.87	36.99	18.44	0.000%
24	-18.49	-49.32	-31.82	18.49	49.32	31.82	0.000%
25	-18.49	-36.99	-31.82	18.49	36.99	31.82	0.000%
26	0.00	-103.75	0.00	-0.00	103.75	0.00	0.001%
27	0.01	-103.75	-12.62	-0.01	103.75	12.62	0.002%
28	6.34	-103.75	-10.91	-6.34	103.75	10.91	0.001%
29	10.93	-103.75	-6.29	-10.93	103.75	6.29	0.001%
30	12.61	-103.75	-0.01	-12.60	103.75	0.01	0.002%
31	10.94	-103.75	6.29	-10.94	103.75	-6.29	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
32	6.30	-103.75	10.91	-6.30	103.75	-10.91	0.001%
33	0.02	-103.75	12.61	-0.02	103.75	-12.61	0.002%
34	-6.27	-103.75	10.93	6.27	103.75	-10.93	0.001%
35	-10.92	-103.75	6.29	10.92	103.75	-6.29	0.001%
36	-12.60	-103.75	-0.03	12.60	103.75	0.03	0.002%
37	-10.92	-103.75	-6.31	10.92	103.75	6.31	0.001%
38	-6.32	-103.75	-10.91	6.32	103.75	10.91	0.001%
39	0.01	-41.10	-7.88	-0.01	41.10	7.88	0.003%
40	3.97	-41.10	-6.80	-3.97	41.10	6.80	0.003%
41	6.83	-41.10	-3.92	-6.83	41.10	3.92	0.003%
42	7.87	-41.10	-0.01	-7.87	41.10	0.01	0.003%
43	6.84	-41.10	3.92	-6.84	41.10	-3.92	0.003%
44	3.93	-41.10	6.81	-3.93	41.10	-6.81	0.003%
45	0.02	-41.10	7.87	-0.02	41.10	-7.87	0.003%
46	-3.91	-41.10	6.82	3.90	41.10	-6.82	0.003%
47	-6.82	-41.10	3.92	6.82	41.10	-3.92	0.003%
48	-7.87	-41.10	-0.03	7.87	41.10	0.03	0.003%
49	-6.82	-41.10	-3.94	6.82	41.10	3.94	0.003%
50	-3.96	-41.10	-6.81	3.95	41.10	6.81	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00005687	0.00008733
3	Yes	15	0.00007789	0.00014333
4	Yes	21	0.00000001	0.00009978
5	Yes	20	0.00000001	0.00014113
6	Yes	21	0.00000001	0.00009901
7	Yes	20	0.00000001	0.00014004
8	Yes	16	0.00005688	0.00007036
9	Yes	15	0.00007790	0.00011853
10	Yes	21	0.00000001	0.00009987
11	Yes	20	0.00000001	0.00014129
12	Yes	21	0.00000001	0.00009770
13	Yes	20	0.00000001	0.00013817
14	Yes	16	0.00005694	0.00007430
15	Yes	15	0.00007797	0.00012476
16	Yes	21	0.00000001	0.00009838
17	Yes	20	0.00000001	0.00013922
18	Yes	21	0.00000001	0.00009857
19	Yes	20	0.00000001	0.00013942
20	Yes	16	0.00005688	0.00007248
21	Yes	15	0.00007789	0.00012044
22	Yes	21	0.00000001	0.00009877
23	Yes	20	0.00000001	0.00013963
24	Yes	21	0.00000001	0.00010046
25	Yes	20	0.00000001	0.00014215
26	Yes	13	0.00000001	0.00002061
27	Yes	18	0.00013187	0.00011581
28	Yes	20	0.00000001	0.00010258
29	Yes	20	0.00000001	0.00010348
30	Yes	18	0.00013191	0.00011226
31	Yes	20	0.00000001	0.00010730
32	Yes	20	0.00000001	0.00010170
33	Yes	18	0.00013182	0.00011647
34	Yes	20	0.00000001	0.00011029
35	Yes	20	0.00000001	0.00010892
36	Yes	18	0.00013181	0.00011503
37	Yes	20	0.00000001	0.00010576
38	Yes	20	0.00000001	0.00011096
39	Yes	15	0.00010490	0.00004382
40	Yes	15	0.00010466	0.00012066
41	Yes	15	0.00010467	0.00011555

42	Yes	15	0.00010491	0.00004388
43	Yes	15	0.00010467	0.00011363
44	Yes	15	0.00010465	0.00011653
45	Yes	15	0.00010489	0.00004370
46	Yes	15	0.00010465	0.00011213
47	Yes	15	0.00010466	0.00011498
48	Yes	15	0.00010491	0.00004365
49	Yes	15	0.00010467	0.00011829
50	Yes	15	0.00010465	0.00011428

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	155 - 115.5	35.16	43	1.946	0.003
L2	119.25 - 79.25	21.17	43	1.703	0.001
L3	83.75 - 43.75	10.24	43	1.182	0.000
L4	49 - 0	3.45	43	0.653	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
155.00	LPX310R w/ Mount Pipe	43	35.16	1.946	0.003	31631
153.00	800MHz 2X50W RRH W/FILTER	43	34.34	1.937	0.002	31631
151.00	VHLP1-23	43	33.53	1.927	0.002	31631
145.00	RRUS 11	43	31.10	1.897	0.002	15815
143.00	800 10121	43	30.29	1.886	0.002	13179
133.00	KRC 118 057/1 w/ Mount Pipe	43	26.33	1.824	0.001	7188
113.00	BXA-70063/6CFx2 w/ Mount Pipe	43	18.98	1.628	0.001	4296

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	155 - 115.5	165.27	2	9.183	0.009
L2	119.25 - 79.25	99.65	2	8.037	0.007
L3	83.75 - 43.75	48.27	10	5.577	0.005
L4	49 - 0	16.28	10	3.080	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
155.00	LPX310R w/ Mount Pipe	2	165.27	9.183	0.009	7033
153.00	800MHz 2X50W RRH W/FILTER	2	161.45	9.138	0.009	7033
151.00	VHLP1-23	2	157.63	9.093	0.009	7033
145.00	RRUS 11	2	146.22	8.952	0.009	3515
143.00	800 10121	2	142.44	8.902	0.009	2928
133.00	KRC 118 057/1 w/ Mount Pipe	2	123.86	8.611	0.008	1594
113.00	BXA-70063/6CFx2 w/ Mount	2	89.37	7.686	0.007	944

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	39.50	0.00	0.0	22.51	-13.05	1507.55	0.009
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	40.00	0.00	0.0	34.09	-22.90	2469.71	0.009
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	40.00	0.00	0.0	47.74	-32.28	3485.55	0.009
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	49.00	0.00	0.0	67.16	-49.28	4858.33	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	522	878	0.594	0	878	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	1499	1743	0.860	0	1743	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	2610	2871	0.909	0	2871	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	4346	4826	0.900	0	4826	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	155 - 115.5 (1)	TP29.31x22x0.25	20.99	753.77	0.028	0	1759	0.000
L2	115.5 - 79.25 (2)	TP35.51x28.11x0.31	30.30	1234.85	0.025	1	3491	0.000
L3	79.25 - 43.75 (3)	TP41.46x34.06x0.38	33.55	1742.77	0.019	1	5748	0.000
L4	43.75 - 0 (4)	TP48.8x39.73x0.44	36.91	2429.16	0.015	2	9664	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

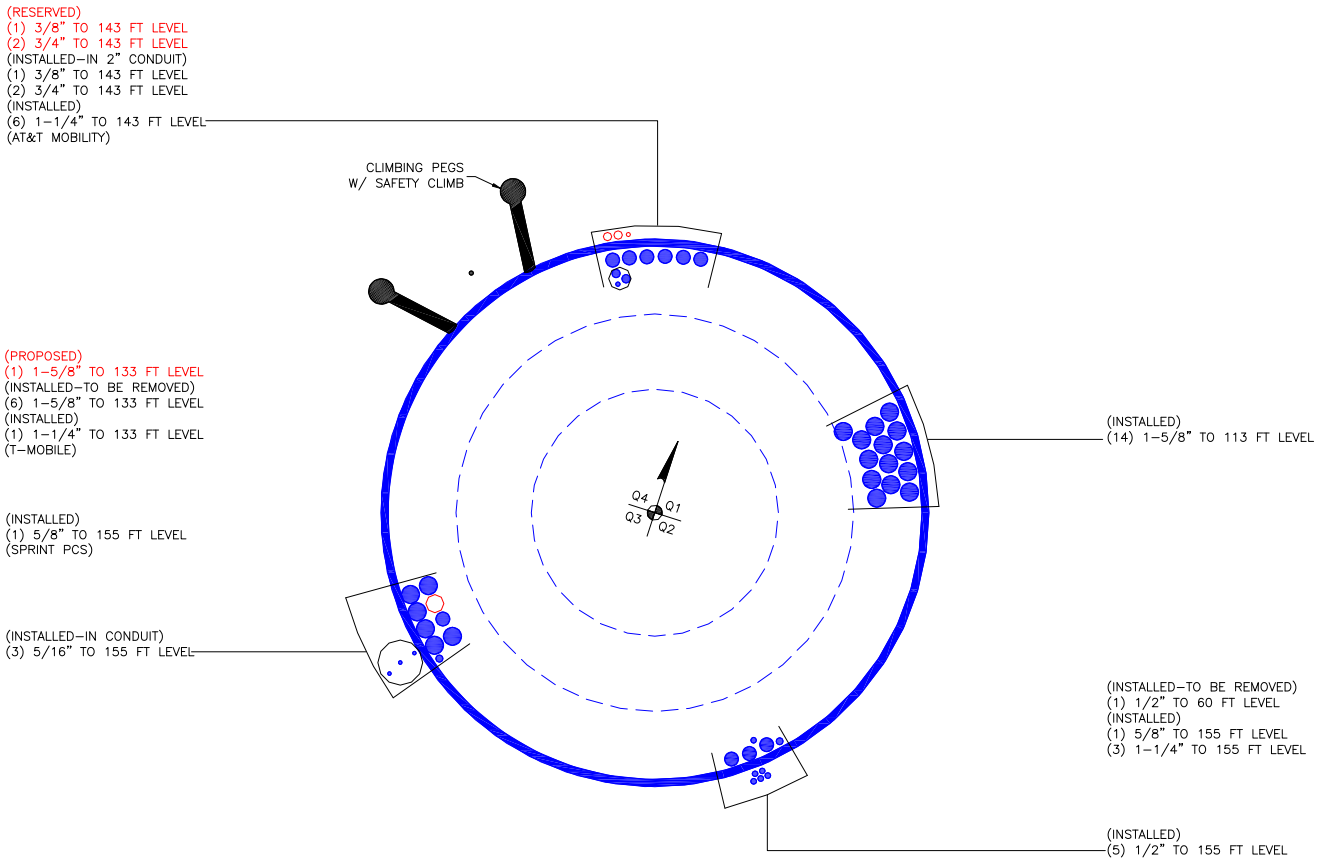
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155 - 115.5 (1)	0.009	0.594	0.000	0.028	0.000	0.603 ✔	1.000	4.8.2 ✔
L2	115.5 - 79.25 (2)	0.009	0.860	0.000	0.025	0.000	0.870 ✔	1.000	4.8.2 ✔
L3	79.25 - 43.75 (3)	0.009	0.909	0.000	0.019	0.000	0.919 ✔	1.000	4.8.2 ✔
L4	43.75 - 0 (4)	0.010	0.900	0.000	0.015	0.000	0.911 ✔	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	155 - 115.5	Pole	TP29.31x22x0.25	1	-13.05	1507.55	60.3	Pass
L2	115.5 - 79.25	Pole	TP35.51x28.11x0.31	2	-22.90	2469.71	87.0	Pass
L3	79.25 - 43.75	Pole	TP41.46x34.06x0.38	3	-32.28	3485.55	91.9	Pass
L4	43.75 - 0	Pole	TP48.8x39.73x0.44	4	-49.28	4858.33	91.1	Pass
							Summary	
						Pole (L3)	91.9	Pass
						RATING =	**91.9**	**Pass**

APPENDIX B

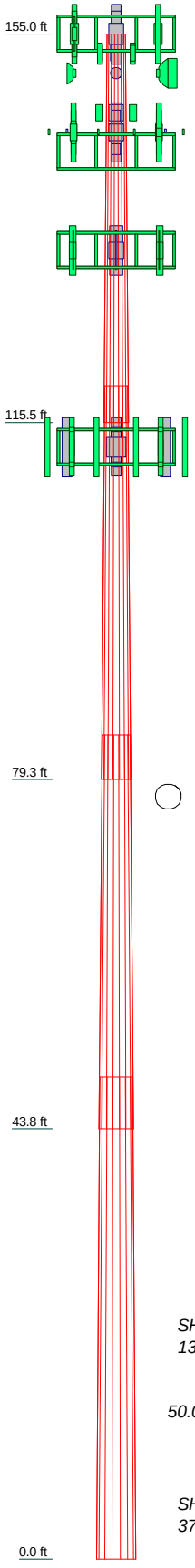
BASE LEVEL DRAWING


(RESERVED)
(1) 3/8" TO 143 FT LEVEL
(2) 3/4" TO 143 FT LEVEL
(INSTALLED–IN 2" CONDUIT)
(1) 3/8" TO 143 FT LEVEL
(2) 3/4" TO 143 FT LEVEL
(INSTALLED)
(6) 1–1/4" TO 143 FT LEVEL
(AT&T MOBILITY)
CLIMBING PEGS
W/ SAFETY CLIMB
(PROPOSED)
(1) 1–5/8" TO 133 FT LEVEL
(INSTALLED–TO BE REMOVED)
(6) 1–5/8" TO 133 FT LEVEL
(INSTALLED)
(1) 1–1/4" TO 133 FT LEVEL
(T–MOBILE)
(INSTALLED)
(1) 5/8" TO 155 FT LEVEL
(SPRINT PCS)
(INSTALLED–IN CONDUIT)
(3) 5/16" TO 155 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED)
(14) 1–5/8" TO 113 FT LEVEL
(INSTALLED–TO BE REMOVED)
(1) 1/2" TO 60 FT LEVEL
(INSTALLED)
(1) 5/8" TO 155 FT LEVEL
(3) 1–1/4" TO 155 FT LEVEL
(INSTALLED)
(5) 1/2" TO 155 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	39.50	18	0.25	3.75	22.00	29.31	A607-60	2.7
2	40.00	18	0.31	4.50	28.11	35.51	A607-60	4.3
3	40.00	18	0.38	5.25	34.06	41.46	A607-65	6.1
4	49.00	18	0.44		39.73	48.80		10.1
								23.2



ALL REACTIONS ARE FACTORED

AXIAL 104 K

SHEAR 13 K

MOMENT 1648 k-ft

TORQUE 2 kip-ft

50.0 mph WIND - 1.00 in ICE

AXIAL 49 K

SHEAR 37 K

MOMENT 4346 kip-ft

TORQUE 3 kip-ft

REACTIONS - 97.0 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPX310R w/ Mount Pipe	155	DTMABP7819VG12A	143
LPX310R w/ Mount Pipe	155	RRUS 32 B30	143
LPX310R w/ Mount Pipe	155	RRUS 32 B30	143
HORIZON COMPACT	155	RRUS 32 B30	143
HORIZON COMPACT	155	RRUS 32 B2	143
HORIZON COMPACT	155	RRUS 32 B2	143
WIMAX DAP HEAD	155	RRUS 32 B2	143
WIMAX DAP HEAD	155	RRUS 11	143
WIMAX DAP HEAD	155	RRUS 11	143
APXVSPP18-C-A20 w/ Mount Pipe	155	RRUS 11	143
APXVSPP18-C-A20 w/ Mount Pipe	155	DC6-48-60-18-8F	143
APXVSPP18-C-A20 w/ Mount Pipe	155	Platform Mount [LP 1301-1]	143
APXVTM14-C-120 w/ Mount Pipe	155	800 10121	143
APXVTM14-C-120 w/ Mount Pipe	155	800 10121	143
APXVTM14-C-120 w/ Mount Pipe	155	800 10121	143
TD-RRH8x20-25	155	RRUS 11 B12	133
TD-RRH8x20-25	155	RRUS 11 B12	133
TD-RRH8x20-25	155	RRUS 11 B12	133
Miscellaneous [NA 510-1]	155	(2) 2.375" OD x 4' Mount Pipe	133
Platform Mount [LP 1201-1]	155	(2) 2.375" OD x 4' Mount Pipe	133
VHLP1-23	155	(2) 2.375" OD x 4' Mount Pipe	133
VHLP2.5-18	155	Platform Mount [LP 403-1]	133
VHLP2-11	155	AIR -32 B2A/B66AA w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	AIR -32 B2A/B66AA w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	AIR -32 B2A/B66AA w/ Mount Pipe	133
PCS 1900MHz 4x45W-65MHz	153	KRC 118 057/1 w/ Mount Pipe	133
Pipe Mount [PM 601-3]	153	KRC 118 057/1 w/ Mount Pipe	133
800MHz 2X50W RRH W/FILTER	153	KRC 118 057/1 w/ Mount Pipe	133
800MHz 2X50W RRH W/FILTER	153	LNX-6512DS-T0M w/ Mount Pipe	113
800MHz 2X50W RRH W/FILTER	153	LNX-6512DS-T0M w/ Mount Pipe	113
Pipe Mount [PM 601-3]	145	LNX-6512DS-T0M w/ Mount Pipe	113
RRUS 11	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	(2) SBNHH-1D65B w/ Mount Pipe	113
RRUS 11	145	(2) SBNHH-1D65B w/ Mount Pipe	113
(2) 860 10025	143	RRH2X60-AWS	113
(2) 860 10025	143	RRH2X60-AWS	113
(2) 860 10025	143	RRH2X60-AWS	113
RRUS 11	143	RRH2x60-700	113
RRUS 11	143	RRH2x60-700	113
RRUS 11	143	RRH2x60-700	113
DC6-48-60-18-8F	143	DB-T1-6Z-8AB-0Z	113
QS66512-2	143	Platform Mount [LP 1201-1]	113
QS66512-2	143	BXA-70063/6CFx2 w/ Mount Pipe	113
QS66512-2	143	BXA-70063/6CFx2 w/ Mount Pipe	113
DTMABP7819VG12A	143	BXA-70063/6CFx2 w/ Mount Pipe	113
DTMABP7819VG12A	143		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	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 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 91.9%

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX: (614) 448-4105

Job: **155 ft Monopole / Buckland Mall**		
Project: **PJF 37517-1326 / BU 876347**		
Client: Crown Castle	Drawn by: Maria C Lopez	App'd:
Code: TIA-222-G	Date: 03/30/17	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2017\37517-1326_876347_Buckland Mall\37517-1326.002.7805_SA_1386352\37517-1326.002.7805.eri		Dwg No. E-1

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

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

Site Data

BU#: *876347*
Site Name: *Buckland Mall*
App #:

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	56	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	55	in
Thick:	3.25	in
Grade:	50	ksi
Clip Distance:	10	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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:	48.8	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	4346	ft-kips
Factored Axial, Pu:	49	kips
Factored Shear, Vu:	37	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	240.5	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	92.5%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	33.7	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	74.9%	**Pass**

PL Ref. Data
Yield Line (in):
28.98
Max PL Length:
28.98

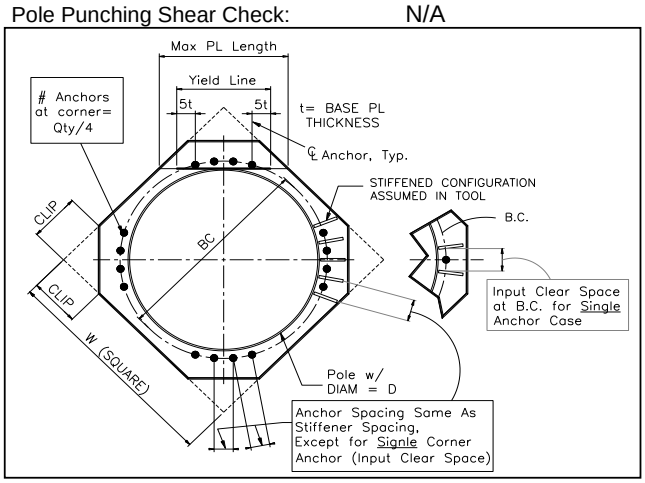
N/A - Unstiffened

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

Structure Type:

Type = Pole

Factored Foundation Loads:

Load Combo 1 = LC1 = 1.2D + 1.6Wo

Load Combo 2 = LC2 = 0.9D + 1.6Wo

	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	49	36.8	kips
Factored Horiz. Load at Top of Pier =	37	37.0	kips
Factored OTM at Top of Pier =	4346	4346	k-ft

LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	0.75		
Soil Weight =	0.75	1.2	0.9
Concrete Weight =	0.75	1.2	0.9

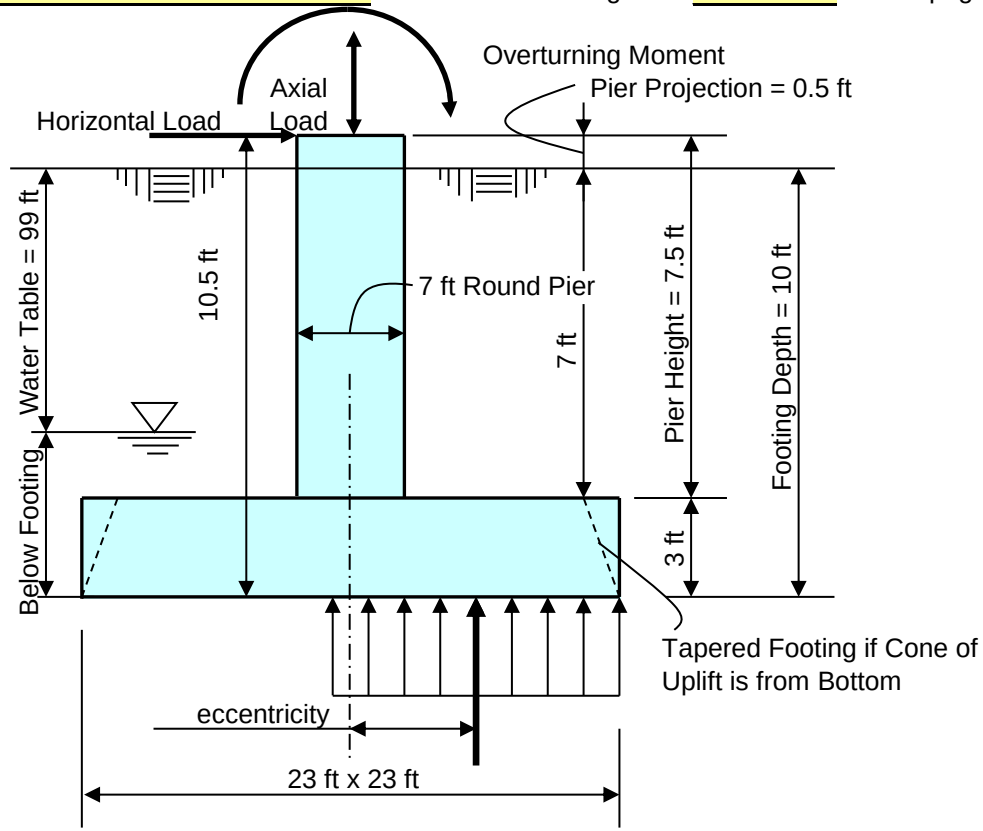
Soil Properties:

Depth to Water Table =	99	ft
Use? (Cohesion or Soil Cone)	S	
Soil Cone of Uplift =	30	degrees
Cohesion (for Uplift) =	0	ksf
Depth to Ignore for Uplift and PP?	3.5	ft
Include Side Friction? (Yes or No)	N	
Include Passive Pressure On?	N	(Not Included)
Include Soil Wedges? (Yes or No)	N	(For LC2 LC Only)
Treat Conc as Load or Resistance?	R	for Uplift Calc

Layer Thk	Soil Density	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
10	115	0	30	30	10.00

Dimensions:

Pier Shape (Round or Square)	R	
Pier Width =	7	ft
Pier Height above Grade =	0.5	ft
Depth to Bottom of Footing =	10	ft
Footing Thickness =	3	ft
Footing Width, B =	23	ft
Footing Length, L =	23	ft



Concrete:

Concrete Strength =	3	ksi
Rebar Strength =	60	ksi

Reinforcing Steel:

	Pad	
Minimum Cover over Rebar =	3	inches
Size of Pad Rebar =	# 9	bar
Quantity of Pad Rebar, Parallel to Width =	34	#9 bars @ 8.2" oc
Quantity of Pad Rebar, Parallel to Length =	34	#9 bars @ 8.2" oc

Pad rebar area exceeds minimum steel requirements.

	Pier	
Minimum Cover over Rebar =	3	inches
Size of Pier Rebar =	# 11	bar
Rebar Qty (Multiples of 2 or 4 Only) =	32	(Min = 4, Max = 40)
Size Of Pier Ties =	# 5	bar
Bar Layout (Round or Square)	S	
Column (Spiral or Tied)	T	

Pier rebar area exceeds minimum steel requirements.

Factored Foundation Loads:

	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	**49**	**36.75**	kips
Factored Horiz. Load at Top of Pier =	**37**	**37**	kips
Factored OTM at Top of Pier =	**4346**	**4346**	kips

LRFD Resistance and Load Factors:

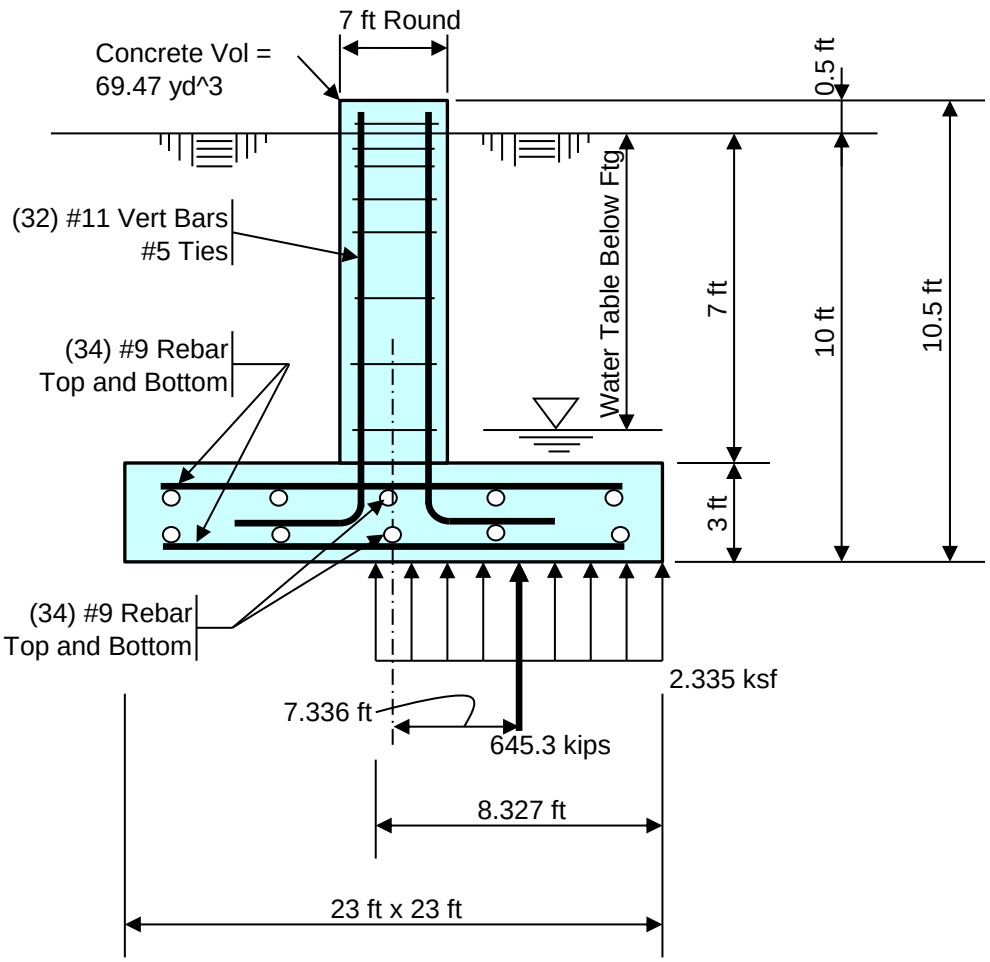
	Φ	Dead Load Factors	
Soil Bearing =	**0.75**		
Soil Weight =	**0.75**	1.2	0.9
Concrete Weight =	**0.75**	1.2	0.9

Soil Properties:

Depth to Water Table = **99** ft

Uplift Cone from **Top** of footing

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
10	**115**	**0**	**30**	**30**	**10.00**



Dimensions:

Pier Shape =	**Round**	
Pier Width =	**7**	ft Diameter
Pier Height above Grade =	**0.5**	ft
Depth to Bottom of Footing =	**10**	ft
Footing Thickness =	**3**	ft
Footing Width, B =	**23**	ft
Footing Length, L =	**23**	ft

Concrete:

Concrete Strength =	**3**	ksi
Rebar Strength =	**60**	ksi

Total Pad Reinf Stl = **68.00** in^2 >= 17.88 in^2 = Min Stl, OK

Total Pier Reinf Stl = **49.92** in^2 >= 27.71 in^2 = Min Stl, OK

Footing Thickness = **3.00** ft >= 2.05 ft = Min Ftg Thk, OK

Summary Results:

	Required		Available		
Maximum Net Soil Bearing =	**2.564**	ksf	**22.500**	ksf	Stress Ratio = **11.4%** in Soil Bearing
Uplift =	**0.0**	kips	**632.5**	kips	Stress Ratio = **0.0%** in Uplift
Punching Shear Stress =	**0.054**	ksi	**0.164**	ksi	Stress Ratio = **32.6%** in Punching Shear
Bending Shear Stress =	**296.8**	kips	**709.9**	kips	Stress Ratio = **41.8%** in Bending Shear
Bending Moment =	**1769.4**	k-ft	**4568.4**	k-ft	Stress Ratio = **38.7%** in Bending Moment
Conc Pier Reinforcing Steel =	**4623.5**	k-ft	**8294.8**	k-ft	Stress Ratio = **55.7%** in Pier Rebar

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

SPRINT MANCHESTER/SLATER
SITE ID: CT11377C - L1900
CROWN CASTLE BU No.: 876347
55 SLATER STREET
MANCHESTER, CT 06042

T-MOBILE RF CONFIGURATION
792DBE_2xAIR

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

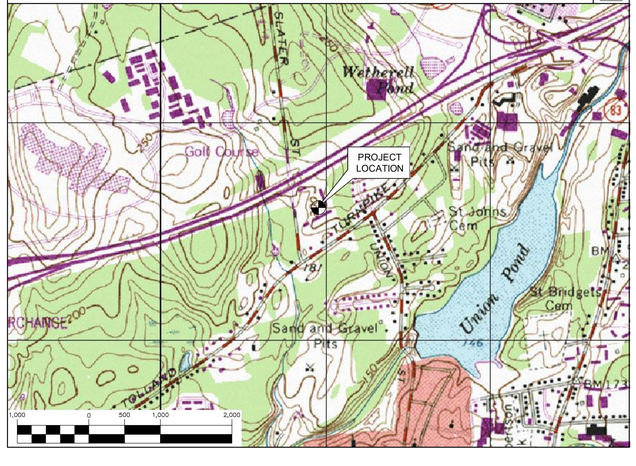
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 55 SLATER STREET, MANCHESTER, CT 06042

1.	HEAD NORTHEAST ON GRIFFIN ROAD S. TOWARD W. NEWBERRY RD	0.60 MI.
2.	TURN RIGHT ONTO DAY HILL RD.	3.60 MI.
3.	USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD	0.40 MI.
4.	MERGE ONTO I-91 S	3.60 MI.
5.	TAKE EXIT 35A FOR I-291 TOWARD MANCHESTER	0.60 MI.
6.	CONTINUE ONTO I-291 E	5.00 MI.
7.	TAKE EXIT 5 FOR TOLLAND TURNPIKE	0.30 MI.
8.	USE ANY LANE TO TURN LEFT ONTO TOLLAND TURNPIKE	1.40 MI.
9.	TURN LEFT TO STAY ON TOLLAND TURNPIKE	0.80 MI.
10.	TURN LEFT ONTO SLATER ST	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE AND REPLACE EXISTING POSITION 2 ANTENNA, TYPICAL OF (3)/(1) PER SECTOR, WITH (3) NEW AIR 32 ANTENNAS.
   - B. REMOVE (3) EXISTING TWIN AWS TMA'S LOCATED BEHIND POSITION 2 ANTENNAS.
   - C. REMOVE AND REPLACE EXISTING BREAKER FOR PROPOSED 100 AMP BREAKER
   - D. REMOVE (6) EXISTING 1-5/8"ø COAX CABLES AND REPLACE WITH NEW HYBRID CABLE SYSTEM.

PROJECT INFORMATION

SITE NAME:	SPRINT MANCHESTER/SLATER
SITE ID:	CT11377C-L1900
SITE ADDRESS:	CROWN CASTLE BU No.: 876347 55 SLATER STREET MANCHESTER, CT 06042
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	BRIAN PAUL (PROJECT MANAGER) (860) 550-5971 TRANSCEND WIRELESS, LLC
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-48'-18.14" N LONGITUDE: 72°-32'-00.74" W GROUND ELEVATION: 216'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0
E-1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/20/17	LGL	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-Mobile

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
SPRINT MANCHESTER/SLATER
SITE ID: CT11377C - L1900
55 SLATER STREET
MANCHESTER, CT 06042

DATE: 04/11/17
SCALE: AS NOTED
JOB NO. 17012.31

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/20/17	LGL	CAG	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

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WIRELESS COMMUNICATIONS FACILITY
SPRINT MANCHESTER/SLATER
SITE ID: CT11377C – L1900
55 SLATER STREET
MANCHESTER, CT 06042

DATE: 04/11/17
SCALE: AS NOTED
JOB NO. 17012.31

DESIGN BASIS AND SITE NOTES

N–1

1 / C-1 SITE LOCATION PLAN
SCALE: 1" = 50'

APPROX. NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

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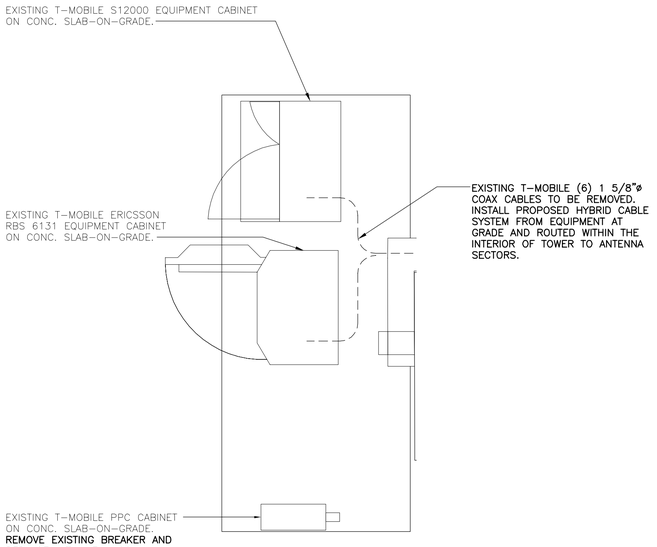
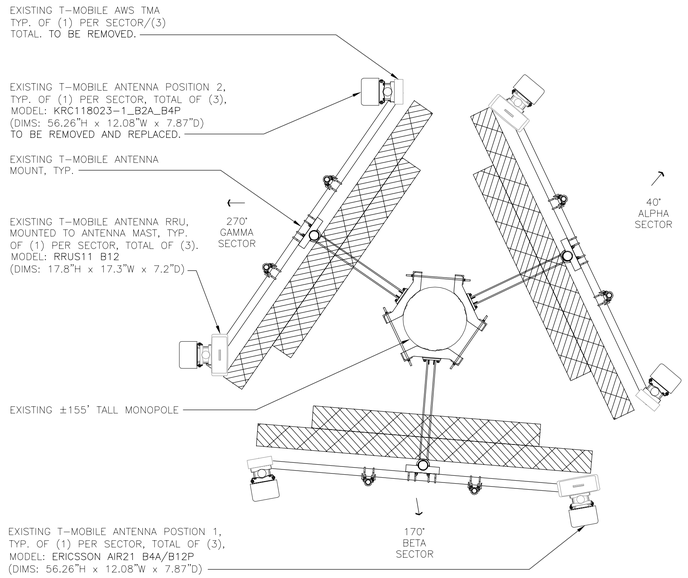
SITE LOCATION PLAN

C-1

Sheet No. 3 of 5



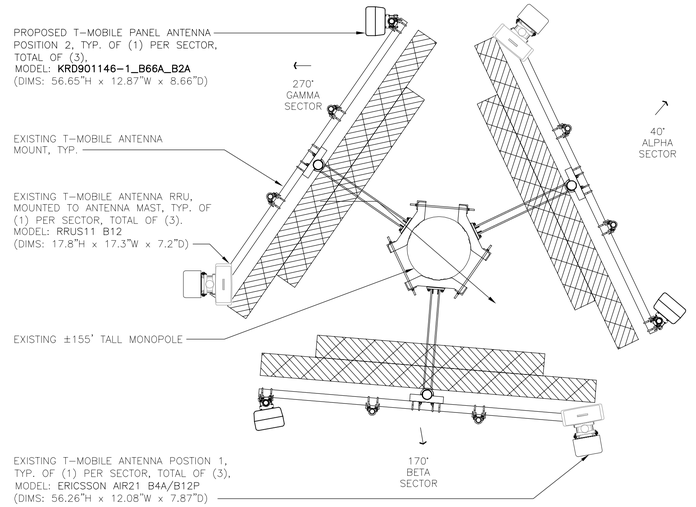
3 / C-2 **EQUIPMENT PLAN**
SCALE: 3/8" = 1'
TRUE NORTH



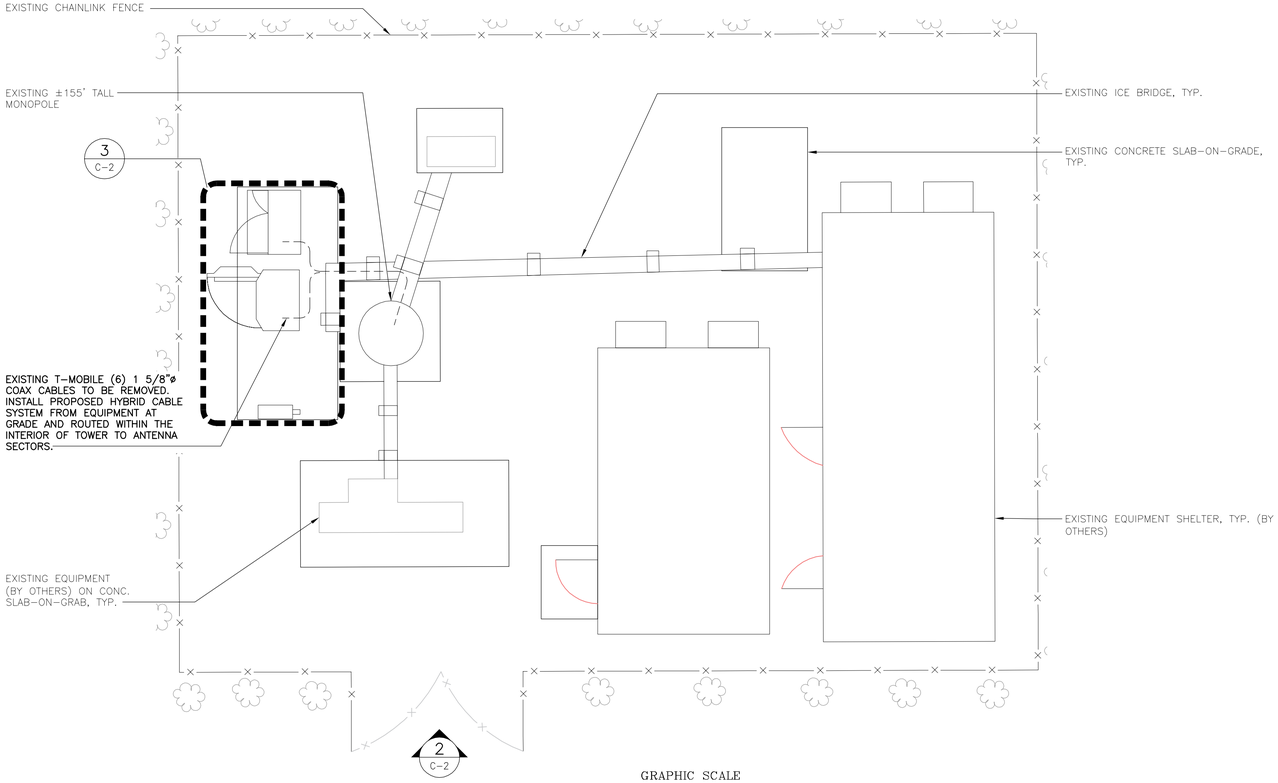
4 / C-2 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1'
133' ELEVATION
TRUE NORTH

T-MOBILE RAN TEMPLATE: 792DBE OUTDOOR

T-MOBILE RF CONFIGURATION: 792DBE_2xAIR



5 / C-2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1'
133' ELEVATION
TRUE NORTH

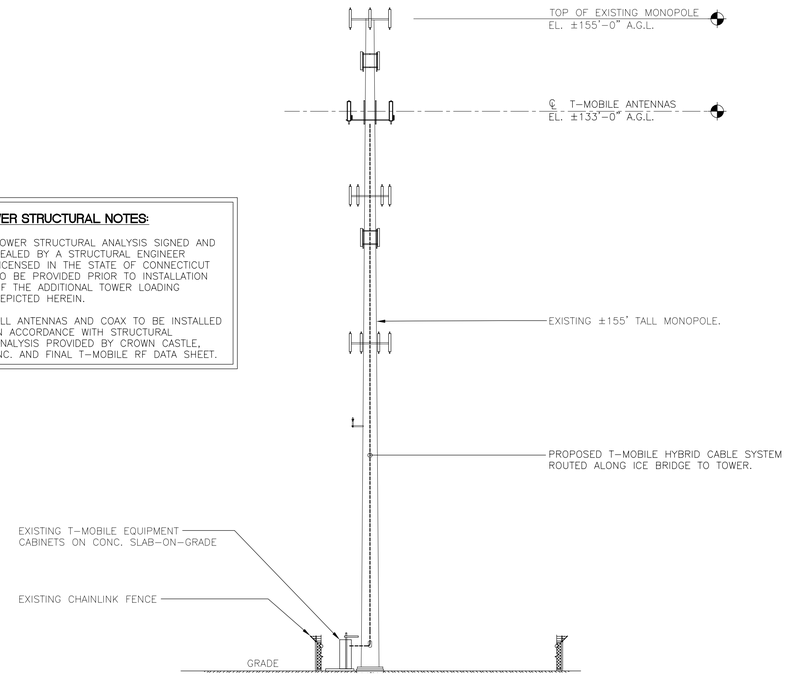


1 / C-2 **COMPOUND PLAN**
SCALE: 1" = 5'
TRUE NORTH

GRAPHIC SCALE
5 0 2.5 5 10 20
(IN FEET)
1 inch = 5 ft.

TOWER STRUCTURAL NOTES:

1. 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.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL T-MOBILE RF DATA SHEET.



2 / C-2 **NORTH TOWER ELEVATION**
SCALE: 1" = 17'

GRAPHIC SCALE
17 0 8.5 17 34 68
(IN FEET)
1 inch = 17 ft.

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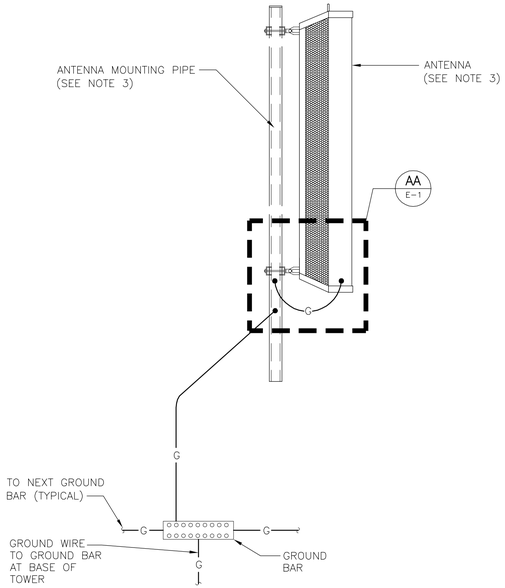
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

Sheet No. 4 of 5



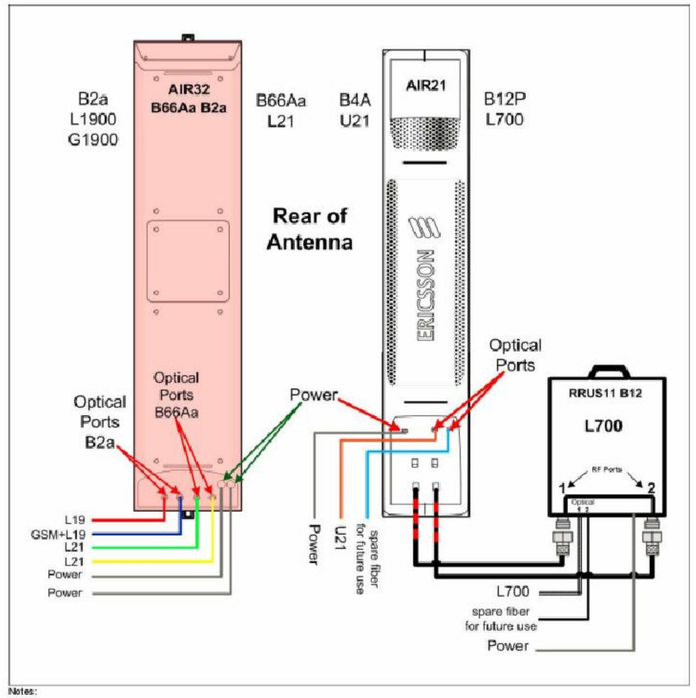
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 TYPICAL ANTENNA GROUNDING DETAIL

1 / E-1

SCALE: NONE

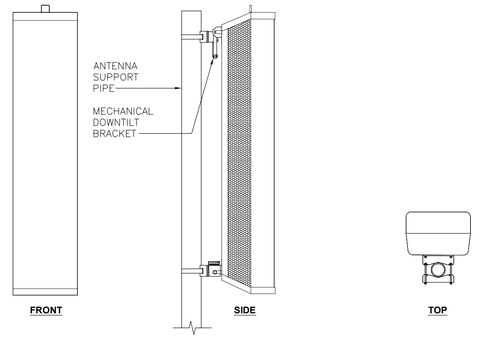


Notes:

2 PROPOSED PLUMBING DIAGRAM

2 / E-1

SCALE: NONE

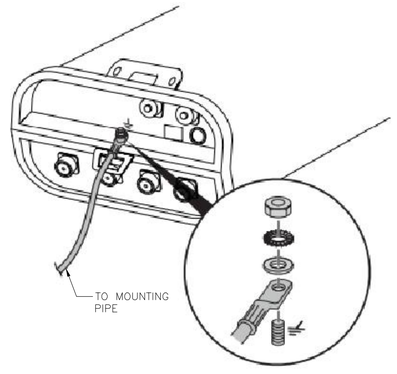


ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: KRD901146-1_B66A_B2A	56.65"L x 12.87"W x 8.66"D	132.2 LBS.

3 PROPOSED ANTENNA DETAIL

3 / E-1

SCALE: NONE



AA TYPICAL ANTENNA GROUNDING DETAIL

AA / E-1

SCALE: NONE

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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 5 of 5