



10 INDUSTRIAL AVE,
SUITE 3
MAHWAH NJ 07430

PHONE: 201.684.0055
FAX: 201.684.0066

June 2, 2017

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

Notice of Exempt Modification
14 Thompson Hill Road, Columbia, CT 06237
Latitude- 41.71737800
Longitude- -72.29981700

Dear Ms. Bachman,

T-Mobile currently maintains (6) existing antennas at the 160' level of the existing 180' monopole at 14 Thompson Hill Road in Columbia, CT. The tower is owned by Crown Castle. The property is owned by Joshua & Eileen Lanati. T-Mobile intends to keep the same existing antenna configuration, and install (6) new coax and (3) new Tower Mounted Amplifiers.

This facility was approved by the Columbia Planning & Zoning Commission on November 16, 1999. This approval did not come with conditions that could be violated by this modification. The modification complies with all conditions of the original approval.

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 Carmen L. Vance, First Selectman of the Town of Columbia, as well as the tower owner and property 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: Carmen L. Vance- as elected official
Crown Castle- as tower owner
Joshua & Eileen Lanati- as property owner
Paula Stahl- as zoning official

14 THOMPSON HILL RD

Location 14 THOMPSON HILL RD

Mblu 011/ / 069/ /

Acct# 00054300

Owner LANATI JOSHUA & EILEEN

Assessment \$250,400

Appraisal \$502,300

PID 543

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$127,400	\$374,900	\$502,300

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$89,200	\$161,200	\$250,400

Owner of Record

Owner LANATI JOSHUA & EILEEN
Co-Owner
Address 14 THOMPSON HILL RD
COLUMBIA, CT 06237

Sale Price \$155,000
Certificate
Book & Page 0197/0163
Sale Date 04/14/2011
Instrument 28

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
LANATI JOSHUA & EILEEN	\$155,000		0197/0163	28	04/14/2011
DEOJAY THOMAS R ESTATE OF	\$0		0122/0722	25	09/23/2010
DEOJAY THOMAS R	\$0		0122/0722		10/25/1999
DEOJAY THOMAS R & WILLIE JO	\$0		0059/0018		05/18/1982

Building Information

Building 1 : Section 1

Year Built: 1955
Living Area: 1,677
Replacement Cost: \$190,432
Building Percent 66
Good:

**Replacement Cost
Less Depreciation:** \$125,700

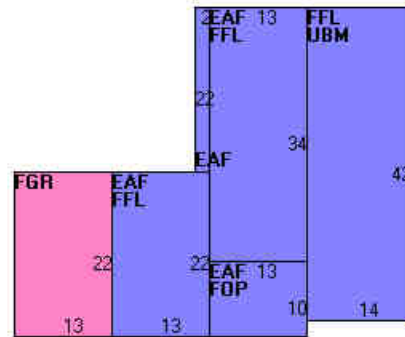
Building Attributes	
Field	Description
Style	Conventional
Model	Residential
Grade:	Average +20
Stories:	1 1/2 Stories
Occupancy	1
Exterior Wall 1	Stucco/Masonry
Exterior Wall 2	Wood Shingle
Roof Structure:	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Pine/Soft Wood
Interior Flr 2	
Heat Fuel	Electric
Heat Type:	Electr Basebrd
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	
Total Rooms:	8 Rooms
Bath Style:	Average
Kitchen Style:	Average
Whirlpool	
Fireplace(s)	1
Fndtn. Level	

Building Photo



(<http://images.vgsi.com/photos2/ColumbiaCTPhotos//\00\00\75>)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
FFL	First Floor Living	1,316	1,316
EAF	Attic, Expansion, Finished	902	361
FGR	Garage, Framed	286	0
FOP	Porch, Open, Finished	130	0
UBM	Basement, Unfinished	588	0
		3,222	1,677

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Land Line Valuation

Use Code	1010	Size (Acres)	29.4
Description	Single Fam	Frontage	0
Zone	RA	Depth	0
Neighborhood	12	Assessed Value	\$161,200
Alt Land Appr Category	No	Appraised Value	\$374,900

Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
BRN3	Barn 1 St. w Loft			540 S.F.	\$1,300	1
SHD1	Shed Frame			64 S.F.	\$400	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$127,400	\$374,900	\$502,300
2015	\$123,000	\$374,900	\$497,900
2014	\$123,000	\$374,900	\$497,900

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$89,200	\$161,200	\$250,400
2015	\$86,100	\$160,330	\$246,430
2014	\$86,100	\$160,330	\$246,430

(c) 2016 Vision Government Solutions, Inc. All rights reserved.



Property Information

Property ID 09013030-011-069
Location 14 THOMPSON HILL RD
Owner CROWN CABLE TOWERS 09 LLC



**MAP FOR REFERENCE ONLY
 NOT A LEGAL DOCUMENT**

CRCOG makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

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

T-Mobile Existing Facility

Site ID: CT11503A

Sprint Columbia Rt 6 14
Thompson Hill Road
Columbia, CT 06237

May 25, 2017

EBI Project Number: 6217002232

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	6.85 %

May 25, 2017

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

Emissions Analysis for Site: **CT11503A – Sprint Columbia Rt 6**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **14 Thompson Hill Road, Columbia, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **14 Thompson Hill Road, Columbia, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF path an additional 2.28 dB of cable loss was factored into the calculations used for this analysis. This is based on manufacturers Specifications for 215 feet of 1-5/8” coax cable on each path.

- 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-4** & **Ericsson AIR21 B2A/B4P**. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B12P-4** has a maximum gain of **15.5 dBd** at its main lobe at 2100 MHz and a maximum gain of **11.5 dBd** at its main lobe at 700 MHz. The **Ericsson AIR21 B2A/B4P** 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 **160 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-4	Make / Model:	Ericsson AIR21 B4A/B12P-4	Make / Model:	Ericsson AIR21 B4A/B12P-4
Gain:	15.5 / 11.5 dBd	Gain:	15.5 / 11.5 dBd	Gain:	15.5 / 11.5 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,105.28	ERP (W):	5,105.28	ERP (W):	5,105.28
Antenna A1 MPE%	0.92	Antenna B1 MPE%	0.92	Antenna C1 MPE%	0.92
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
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	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	3,715.14	ERP (W):	3,715.14	ERP (W):	3,715.14
Antenna A2 MPE%	0.56	Antenna B2 MPE%	0.56	Antenna C2 MPE%	0.56

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.48 %
AT&T	2.64 %
Sprint	0.12 %
Verizon Wireless	2.61 %
Site Total MPE %:	6.85 %

T-Mobile Sector A Total:	1.48 %
T-Mobile Sector B Total:	1.48 %
T-Mobile Sector C Total:	1.48 %
Site Total:	6.85 %

T-Mobile_Max Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,128.88	160	6.45	AWS - 2100 MHz	1000	0.65%
T-Mobile 700 MHz LTE	2	423.76	160	1.28	700 MHz	467	0.28%
T-Mobile AWS - 2100 MHz UMTS	2	690.43	160	2.09	AWS - 2100 MHz	1000	0.21%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	160	3.54	PCS - 1900 MHz	1000	0.35%
						Total*:	1.48%

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

Summary

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

The anticipated maximum composite contributions from the 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:	1.48 %
Sector B:	1.48 %
Sector C:	1.48 %
T-Mobile Per Sector Maximum:	1.48 %
Site Total:	6.85 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **6.85%** 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.



Date: May 09, 2017

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

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

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate
Carrier Site Number: CT11503A
Carrier Site Name: Sprint Columbia Rt6

Crown Castle Designation: Crown Castle BU Number: 876391
Crown Castle Site Name: COLUMBIA / DEOJAY
Crown Castle JDE Job Number: 434835
Crown Castle Work Order Number: 1401746
Crown Castle Application Number: 387890 Rev. 1

Engineering Firm Designation: Paul J Ford and Company Project Number: 37517-0133.002.7805

Site Data: 14 Thompson Hill Rd, COLUMBIA, Tolland County, CT
Latitude 41° 43' 3.44", Longitude -72° 17' 59.09"
180 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 1033881, in accordance with application 387890, revision 1.

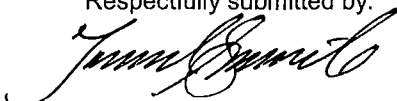

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

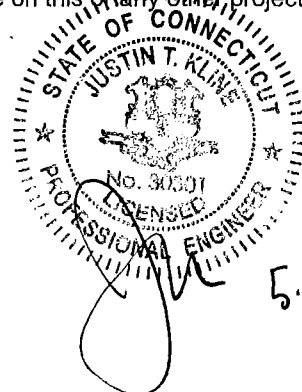
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:


Jared Smith, E.I.
Structural Designer 



Date: **May 09, 2017**

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

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

Subject: Structural Analysis Report

Carrier Designation: **T-Mobile Co-Locate**
Carrier Site Number: CT11503A
Carrier Site Name: Sprint Columbia Rt6

Crown Castle Designation: **Crown Castle BU Number:** 876391
Crown Castle Site Name: COLUMBIA / DEOJAY
Crown Castle JDE Job Number: 434835
Crown Castle Work Order Number: 1401746
Crown Castle Application Number: 387890 Rev. 1

Engineering Firm Designation: **Paul J Ford and Company Project Number:** 37517-0133.002.7805

Site Data: **14 Thompson Hill Rd, COLUMBIA, Tolland County, CT**
Latitude 41° 43' 3.44", Longitude -72° 17' 59.09"
180 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 1033881, in accordance with application 387890, 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 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:

Jared Smith, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Components vs. Capacity

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in November of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
161.0	160.0	3	commscope	TMAT1921B78-21A	6	1-5/8	-

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	181.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	6	5/16	2
		3	rfs celwave	FD9R6004/1C-3L			
161.0	180.0	1	tower mounts	Platform Mount [LP 601-1]	6	1-5/8	1
	161.0	1	tower mounts	Platform Mount [LP 305-1]	1	1-5/8	1
	160.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
147.0	150.0	3	alcatel lucent	RRH2X60-AWS	14	1/2 1-5/8	1
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		6	andrew	LNx-6514DS-A1M w/ Mount Pipe			
		1	lucent	KS24019-L112A			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
	6	rfs celwave	FD9R6004/1C-3L				
147.0	1	tower mounts	Platform Mount [LP 712-1]				
141.0	141.0	1	tower mounts	Pipe Mount [PM 601-3]	-	-	1
	138.0	3	ericsson	TME-RRUS 11 BAND 12	-	-	-

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	powerwave technologies	1001940	1	3/8	2
		3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	2 12 1	7/16 1-5/8 2	1
		3	ericsson	RRUS 12			
		3	ericsson	RRUS A2			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP 17201			
		6	powerwave technologies	LGP21901			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
83.0	84.0	-	-	-			
	83.0	2	kathrein	OG-860/1920/GPS-A	2	1-1/4	1
		2	tower mounts	Side Arm Mount [SO 701-1]			
78.0	79.0	1	kathrein	OG-860/1920/GPS-A	1	1-1/2	1
	78.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, Inc., CT33XC519, 06/08/99	1613526	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	E EI, 6151, 12/20/99	1613632	CCISITES
4-TOWER MANUFACTURER DRAWINGS	E EI, 6151, 12/20/1999	1614546	CCISITES
4-TOWER MANUFACTURER DESIGN CALCULATIONS	E EI, 99-1429, 11/22/1999	1440653	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 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-12.81	1686.69	48.8	Pass
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-22.92	3408.11	64.4	Pass
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-37.25	4767.07	69.5	Pass
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-59.20	6465.70	69.0	Pass
							Summary	
						Pole (L3)	69.5	Pass
						Rating =	69.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	74.5	Pass
1	Base Plate	0	81.3	Pass
1	Base Foundation Structural Steel	0	77.0	Pass
1	Base Foundation Soil Interaction	0	41.0	Pass

Structure Rating (max from all components) =	81.3%
---	--------------

Notes:

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

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 Tolland County, Connecticut.
- 2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- 3) Basic wind speed of 101 mph.
- 4) Structure Class II.
- 5) Exposure Category C.
- 6) Topographic Category 1.
- 7) Crest Height 0.0000 ft.
- 8) Nominal ice thickness of 1.0000 in.
- 9) Ice thickness is considered to increase with height.
- 10) Ice density of 56.00 pcf.
- 11) A wind speed of 50 mph is used in combination with ice.
- 12) Temperature drop of 50 °F.
- 13) Deflections calculated using a wind speed of 60 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
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
✓ Use Code Stress Ratios
✓ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile

Include Bolts In Member Capacity

Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric | Distribute Leg Loads As Uniform
Assume Legs Pinned
✓ Assume Rigid Index Plate
✓ Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
✓ Bypass Mast Stability Checks
✓ Use Azimuth Dish Coefficients
✓ Project Wind Area of Appurt.

✓ Autocalc Torque Arm Areas

Add IBC .6D+W Combination
Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder | Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
✓ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-G Bracing Resist.
Exemption
Use TIA-222-G Tension Splice
Exemption

<div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets |
|--|--|---|

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	180.0000- 131.7500	48.2500	4.50	18	21.0000	31.3900	0.2500	1.0000	A572-65 (65 ksi)
L2	131.7500- 86.7100	49.5400	5.58	18	29.9210	40.4600	0.3750	1.5000	A572-65 (65 ksi)
L3	86.7100- 43.1600	49.1300	6.67	18	38.5229	48.9600	0.4375	1.7500	A572-65 (65 ksi)
L4	43.1600- 0.0000	49.8300		18	46.6680	57.2500	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	31.8742	24.7096	3027.1937	11.0547	15.9461	189.8389	6058.3706	12.3571	5.0846	20.339
L2	31.3547	35.1671	3878.5645	10.4888	15.1999	255.1711	7762.2325	17.5869	4.6061	12.283
	41.0842	47.7112	9685.4835	14.2302	20.5537	471.2287	19383.711	23.8601	6.4610	17.229
L3	40.3209	52.8864	9691.6752	13.5203	19.5696	495.2402	19396.102	26.4482	6.0100	13.737
	49.7153	67.3796	20042.502	17.2255	24.8717	805.8363	40111.376	33.6962	7.8470	17.936
L4	48.8263	73.2687	19730.525	16.3897	23.7074	832.2531	39487.013	36.6413	7.3336	14.667
	58.1332	90.0622	36644.767	20.1462	29.0830	1260.0065	73337.753	45.0397	9.1960	18.392

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 180.0000-131.7500				1	1	1			
L2 131.7500-86.7100				1	1	1			
L3 86.7100-43.1600				1	1	1			
L4 43.1600-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	r in	r in	plf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C _A A _A	Weight		
				ft			ft ² /ft	plf		
LDF7-50A(1-5/8)	C	No	Inside Pole	180.0000 - 0.0000	6	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.82 0.82 0.82		
ATCB-B01-006(5/16)	C	No	Inside Pole	180.0000 - 0.0000	6	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.07 0.07 0.07		
**										
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	Inside Pole	161.0000 - 0.0000	7	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	1.07 1.07 1.07		
**										
LDF4-50A(1/2)	C	No	Inside Pole	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.15 0.15 0.15		
LDF7-50A(1-5/8)	C	No	Inside Pole	147.0000 - 0.0000	12	No Ice 1/2" Ice	0.0000 0.0000	0.82 0.82		

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	1	1" Ice	0.0000	0.82
						No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	1	1" Ice	0.0000	4.94
						No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
**								
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG122ST-BRDA(7/16)	C	No	Inside Pole	140.0000 - 0.0000	2	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.14
						1" Ice	0.0000	0.14
LDF7-50A(1-5/8)	C	No	Inside Pole	140.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
ICE 200(2)	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.23
						1/2" Ice	0.0000	0.23
						1" Ice	0.0000	0.23
2" (Nominal) Conduit	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
**								
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	83.0000 - 0.0000	1	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	83.0000 - 0.0000	1	No Ice	0.1550	0.60
						1/2" Ice	0.2550	1.85
						1" Ice	0.3550	3.72
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	83.0000 - 0.0000	2	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
**								
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	78.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
**								

Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	180.0000-131.7500	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	3.019	0.76
L2	131.7500-86.7100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.918	1.65
L3	86.7100-43.1600	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	14.798	1.66
L4	43.1600-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.235	1.65

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	180.0000-	A	2.334	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L2	131.7500-86.7100	B	2.253	0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.138	1.16
		A		0.000	0.000	0.000	0.000	0.00
L3	86.7100-43.1600	B	2.139	0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.941	2.81
		A		0.000	0.000	0.000	0.000	0.00
L4	43.1600-0.0000	B	1.919	0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	52.369	4.56
		A		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	52.160	4.44

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	180.0000-131.7500	-0.0884	0.0511	-0.2403	0.1387
L2	131.7500-86.7100	-0.2377	0.1372	-0.6304	0.3639
L3	86.7100-43.1600	-0.4001	0.2310	-1.0873	0.6278
L4	43.1600-0.0000	-0.4184	0.2416	-1.1443	0.6606

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 ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000	0.00	180.0000	No Ice	8.2619	6.9458	0.08
			0.00			1/2"	8.8215	8.1266	0.15
			1.00			Ice	9.3462	9.0212	0.23
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000	0.00	180.0000	No Ice	8.2619	6.9458	0.08
			0.00			1/2"	8.8215	8.1266	0.15
			1.00			Ice	9.3462	9.0212	0.23
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	180.0000	No Ice	8.2619	6.9458	0.08
			0.00			1/2"	8.8215	8.1266	0.15
			1.00			Ice	9.3462	9.0212	0.23
FD9R6004/1C-3L	A	From Leg	4.0000	0.00	180.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.00
			1.00			Ice	0.4656	0.1685	0.01
FD9R6004/1C-3L	B	From Leg	4.0000	0.00	180.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.00
			1.00			Ice	0.4656	0.1685	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
FD9R6004/1C-3L	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.00
						Ice	0.4656	0.1685	0.01
						1" Ice			
Platform Mount [LP 601-1]	C	None		0.00	180.0000	No Ice	28.4700	28.4700	1.12
						1/2"	33.5900	33.5900	1.51
						Ice	38.7100	38.7100	1.91
						1" Ice			
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.00	180.0000	No Ice	7.0700	7.0700	0.04
						1/2"	9.7300	9.7300	0.07
						Ice	11.1900	11.1900	0.08
						1" Ice			
(3) 2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2"	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			
(3) 2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2"	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			
(3) 2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2"	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			

Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
						1/2"	8.3076	7.5944	0.23
						Ice	8.7610	8.3255	0.31
						1" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
						1/2"	8.3076	7.5944	0.23
						Ice	8.7610	8.3255	0.31
						1" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
						1/2"	8.3076	7.5944	0.23
						Ice	8.7610	8.3255	0.31
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2"	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2"	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2"	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			
TMAT1921B78-21A	A	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	0.6525	0.3000	0.02
						1/2"	0.7545	0.3759	0.02
						Ice	0.8640	0.4593	0.03
						1" Ice			
TMAT1921B78-21A	B	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	0.6525	0.3000	0.02
						1/2"	0.7545	0.3759	0.02
						Ice	0.8640	0.4593	0.03
						1" Ice			
TMAT1921B78-21A	C	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	0.6525	0.3000	0.02
						1/2"	0.7545	0.3759	0.02
						Ice	0.8640	0.4593	0.03
						1" Ice			
RRUS 11 B12	A	From Leg	4.0000 0.00 -1.00	0.00	161.0000	No Ice	2.8333	1.1821	0.05
						1/2"	3.0426	1.3299	0.07
						Ice	3.2593	1.4848	0.10
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RRUS 11 B12	B	From Leg	4.0000	0.00	161.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			-1.00			Ice	3.2593	1.4848	0.10
RRUS 11 B12	C	From Leg	4.0000	0.00	161.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2"	3.0426	1.3299	0.07
			-1.00			Ice	3.2593	1.4848	0.10
Platform Mount [LP 305-1]	C	None		0.00	161.0000	No Ice	18.0100	18.0100	1.12
						1/2"	23.3300	23.3300	1.35
						Ice	28.6500	28.6500	1.58
						1" Ice			
**									
(2) LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2"	8.9745	8.2729	0.13
			3.00			Ice	9.5048	9.1847	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2"	8.9745	8.2729	0.13
			3.00			Ice	9.5048	9.1847	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2"	8.9745	8.2729	0.13
			3.00			Ice	9.5048	9.1847	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.0000	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00			1/2"	9.3417	8.1817	0.14
			3.00			Ice	9.8885	9.1436	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.0000	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00			1/2"	9.3417	8.1817	0.14
			3.00			Ice	9.8885	9.1436	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.0000	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00			1/2"	9.3417	8.1817	0.14
			3.00			Ice	9.8885	9.1436	0.21
KS24019-L112A	B	From Leg	4.0000	0.00	147.0000	No Ice	0.1407	0.1407	0.01
			0.00			1/2"	0.1979	0.1979	0.01
			3.00			Ice	0.2621	0.2621	0.01
(2) FD9R6004/1C-3L	A	From Leg	4.0000	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.00
			3.00			Ice	0.4656	0.1685	0.01
(2) FD9R6004/1C-3L	B	From Leg	4.0000	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.00
			3.00			Ice	0.4656	0.1685	0.01
(2) FD9R6004/1C-3L	C	From Leg	4.0000	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.00
			3.00			Ice	0.4656	0.1685	0.01
RRH2X60-AWS	A	From Leg	4.0000	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00			1/2"	2.0551	1.3858	0.06
			3.00			Ice	2.2401	1.5441	0.08
RRH2X60-AWS	B	From Leg	4.0000	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00			1/2"	2.0551	1.3858	0.06
			3.00			Ice	2.2401	1.5441	0.08
RRH2X60-AWS	C	From Leg	4.0000	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00			1/2"	2.0551	1.3858	0.06
			3.00			Ice	2.2401	1.5441	0.08
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000	0.00	147.0000	No Ice	4.8000	2.0000	0.04
			0.00			1/2"	5.0704	2.1926	0.08
			3.00			Ice	5.3481	2.3926	0.12
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000	0.00	147.0000	1" Ice			
			0.00			No Ice	4.8000	2.0000	0.04
			3.00			1/2"	5.0704	2.1926	0.08
RRH2X60-PCS	A	From Leg	4.0000	0.00	147.0000	Ice	5.3481	2.3926	0.12
			0.00			1/2"	2.3926	1.9015	0.08
			3.00			Ice	2.5926	2.0870	0.10
RRH2X60-PCS	B	From Leg	4.0000	0.00	147.0000	1" Ice			
			0.00			No Ice	2.2000	1.7233	0.06
			3.00			1/2"	2.3926	1.9015	0.08
RRH2X60-PCS	C	From Leg	4.0000	0.00	147.0000	Ice	2.5926	2.0870	0.10
			0.00			1/2"	2.3926	1.9015	0.08
			3.00			Ice	2.5926	2.0870	0.10
Platform Mount [LP 712-1]	C	None		0.00	147.0000	1" Ice			
						No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
**	A	From Leg	1.0000	0.00	141.0000	Ice	35.3500	35.3500	1.96
			0.00			1/2"	2.7649	1.2260	0.07
			-3.00			Ice	2.9710	1.3765	0.09
TME-RRUS 11 BAND 12	B	From Leg	1.0000	0.00	141.0000	1" Ice			
			0.00			No Ice	2.5662	1.0828	0.05
			-3.00			1/2"	2.7649	1.2260	0.07
TME-RRUS 11 BAND 12	C	From Leg	1.0000	0.00	141.0000	Ice	2.9710	1.3765	0.09
			0.00			1/2"	2.7649	1.2260	0.07
			-3.00			Ice	2.9710	1.3765	0.09
Pipe Mount [PM 601-3]	C	None		0.00	141.0000	1" Ice			
						No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
***	A	From Leg	4.0000	0.00	140.0000	Ice	6.5700	6.5700	0.28
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
1001940	B	From Leg	4.0000	0.00	140.0000	1" Ice			
			0.00			No Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
1001940	C	From Leg	4.0000	0.00	140.0000	Ice	0.2950	0.1778	0.01
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000	0.00	140.0000	1" Ice			
			0.00			No Ice	5.7981	4.5454	0.09
			0.00			1/2"	6.2677	5.5082	0.14
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000	0.00	140.0000	Ice	6.6966	6.2127	0.21
			0.00			1/2"	6.2677	5.5082	0.14
			0.00			Ice	6.6966	6.2127	0.21
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.00	140.0000	1" Ice			
			0.00			No Ice	5.7981	4.5454	0.09
			0.00			1/2"	6.2677	5.5082	0.14
			0.00			Ice	6.6966	6.2127	0.21

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
(2) LGP 17201	A	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	1.6680	0.4669	0.03
							1/2" Ice	1.8289	0.5676	0.04
(2) LGP 17201	B	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	1.6680	0.4669	0.03
							1/2" Ice	1.8289	0.5676	0.04
(2) LGP 17201	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	1.6680	0.4669	0.03
							1/2" Ice	1.8289	0.5676	0.04
(2) LGP21901	A	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	0.2310	0.1575	0.01
							1/2" Ice	0.2941	0.2129	0.01
(2) LGP21901	B	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	0.2310	0.1575	0.01
							1/2" Ice	0.2941	0.2129	0.01
(2) LGP21901	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	0.2310	0.1575	0.01
							1/2" Ice	0.2941	0.2129	0.01
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	9.8953	8.1125	0.08
							1/2" Ice	10.4700	9.3041	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	9.8953	8.1125	0.08
							1/2" Ice	10.4700	9.3041	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	9.8953	8.1125	0.08
							1/2" Ice	10.4700	9.3041	0.16
RRUS 12	A	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	3.1450	1.2854	0.06
							1/2" Ice	3.3648	1.4379	0.08
RRUS 12	B	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	3.1450	1.2854	0.06
							1/2" Ice	3.3648	1.4379	0.08
RRUS 12	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	3.1450	1.2854	0.06
							1/2" Ice	3.3648	1.4379	0.08
RRUS A2	A	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	2.0663	0.4988	0.02
							1/2" Ice	2.2451	0.6087	0.03
RRUS A2	B	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	2.0663	0.4988	0.02
							1/2" Ice	2.2451	0.6087	0.03
RRUS A2	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	2.0663	0.4988	0.02
							1/2" Ice	2.2451	0.6087	0.03
DC6-48-60-18-8F	C	From Leg	4.0000	0.00	0.00	140.0000	1" Ice			
							No Ice	0.9167	0.9167	0.02
							1/2" Ice	1.4583	1.4583	0.04
							1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Platform Mount [LP 303-1]	C	None		0.00	140.0000	No Ice 14.6600 1/2" 18.8700 Ice 23.0800 1" Ice	14.6600 18.8700 23.0800	1.25 1.48 1.71
**								
OG-860/1920/GPS-A	A	From Leg	3.0000 0.00 1.00	0.00	83.0000	No Ice 0.3077 1/2" 0.3952 Ice 0.4897 1" Ice	0.3667 0.4572 0.5548	0.00 0.01 0.01
OG-860/1920/GPS-A	B	From Leg	3.0000 0.00 1.00	0.00	83.0000	No Ice 0.3077 1/2" 0.3952 Ice 0.4897 1" Ice	0.3667 0.4572 0.5548	0.00 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.00	83.0000	No Ice 0.8500 1/2" 1.1400 Ice 1.4300 1" Ice	1.6700 2.3400 3.0100	0.07 0.08 0.09
Side Arm Mount [SO 701-1]	B	None		0.00	83.0000	No Ice 0.8500 1/2" 1.1400 Ice 1.4300 1" Ice	1.6700 2.3400 3.0100	0.07 0.08 0.09

OG-860/1920/GPS-A	B	From Leg	3.0000 0.00 1.00	0.00	78.0000	No Ice 0.3077 1/2" 0.3952 Ice 0.4897 1" Ice	0.3667 0.4572 0.5548	0.00 0.01 0.01
Side Arm Mount [SO 701-1]	B	None		0.00	78.0000	No Ice 0.8500 1/2" 1.1400 Ice 1.4300 1" Ice	1.6700 2.3400 3.0100	0.07 0.08 0.09
**								

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
L1 180.0000-131.7500	154.4747	1.387	34.38	106.951	A	0.000	106.951	106.951	100.00	0.000	0.000
				1	B	0.000	106.951		100.00	0.000	0.000
					C	0.000	106.951		100.00	0.000	3.019
L2 131.7500-86.7100	108.4660	1.287	31.90	135.944	A	0.000	135.944	135.944	100.00	0.000	0.000
				4	B	0.000	135.944		100.00	0.000	0.000
					C	0.000	135.944		100.00	0.000	8.918
L3 86.7100-43.1600	64.5656	1.154	28.53	163.378	A	0.000	163.378	163.378	100.00	0.000	0.000
				8	B	0.000	163.378		100.00	0.000	0.000
					C	0.000	163.378		100.00	0.000	14.798
L4 43.1600-0.0000	21.8139	0.919	22.83	192.349	A	0.000	192.349	192.349	100.00	0.000	0.000
				9	B	0.000	192.349		100.00	0.000	0.000
					C	0.000	192.349		100.00	0.000	15.235

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft ²	F a c e	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²
L1 180.0000-131.7500	154.4747	1.387	8.43	2.3338	125.718	A	0.000	125.718	125.718	100.00	0.000	0.000
						B	0.000	125.718	100.00	0.000	0.000	
						C	0.000	125.718	100.00	0.000	10.138	
L2 131.7500-86.7100	108.4660	1.287	7.82	2.2527	153.463	A	0.000	153.463	153.463	100.00	0.000	0.000
						B	0.000	153.463	100.00	0.000	0.000	
						C	0.000	153.463	100.00	0.000	29.941	
L3 86.7100-43.1600	64.5656	1.154	6.99	2.1388	179.729	A	0.000	179.729	179.729	100.00	0.000	0.000
						B	0.000	179.729	100.00	0.000	0.000	
						C	0.000	179.729	100.00	0.000	52.369	
L4 43.1600-0.0000	21.8139	0.919	5.60	1.9189	207.734	A	0.000	207.734	207.734	100.00	0.000	0.000
						B	0.000	207.734	100.00	0.000	0.000	
						C	0.000	207.734	100.00	0.000	52.160	

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft ²	F a c e	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²
L1 180.0000-131.7500	154.4747	1.387	10.86	106.95	A	0.000	106.951	106.951	100.00	0.000	0.000
					B	0.000	106.951	100.00	0.000	0.000	
					C	0.000	106.951	100.00	0.000	3.019	
L2 131.7500-86.7100	108.4660	1.287	10.07	135.94	A	0.000	135.944	135.944	100.00	0.000	0.000
					B	0.000	135.944	100.00	0.000	0.000	
					C	0.000	135.944	100.00	0.000	8.918	
L3 86.7100-43.1600	64.5656	1.154	9.01	163.37	A	0.000	163.378	163.378	100.00	0.000	0.000
					B	0.000	163.378	100.00	0.000	0.000	
					C	0.000	163.378	100.00	0.000	14.798	
L4 43.1600-0.0000	21.8139	0.919	7.21	192.34	A	0.000	192.349	192.349	100.00	0.000	0.000
					B	0.000	192.349	100.00	0.000	0.000	
					C	0.000	192.349	100.00	0.000	15.235	

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

Comb. No.	Description
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
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

Sectio n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 131.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.45	0.18	-0.24
			Max. Mx	20	-12.83	499.72	0.84
			Max. My	14	-12.82	-0.88	-500.76
			Max. Vy	20	-25.25	499.72	0.84
			Max. Vx	14	25.32	-0.88	-500.76
			Max. Torque	24			1.41
L2	131.75 - 86.71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.09	2.03	-1.33
			Max. Mx	20	-22.93	1726.79	3.42
			Max. My	14	-22.92	-3.37	-1730.98
			Max. Vy	20	-30.62	1726.79	3.42
			Max. Vx	14	30.69	-3.37	-1730.98
			Max. Torque	24			1.85
L3	86.71 - 43.16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.26	6.54	-4.08
			Max. Mx	20	-37.26	3155.98	5.75
			Max. My	14	-37.26	-5.58	-3163.19
			Max. Vy	20	-36.43	3155.98	5.75
			Max. Vx	14	36.50	-5.58	-3163.19
			Max. Torque	24			2.95
L4	43.16 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-110.46	13.00	-7.81
			Max. Mx	20	-59.20	5113.76	8.34
			Max. My	14	-59.20	-7.97	-5124.37
			Max. Vy	20	-41.74	5113.76	8.34
			Max. Vx	14	41.81	-7.97	-5124.37
			Max. Torque	24			4.51

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	110.46	-0.00	0.00
	Max. H _x	21	44.43	41.70	0.06
	Max. H _z	2	59.24	0.06	41.76
	Max. M _x	2	5123.15	0.06	41.76
	Max. M _z	8	5111.79	-41.69	-0.06
	Max. Torsion	24	4.51	20.90	36.20
	Min. Vert	15	44.43	-0.06	-41.76
	Min. H _x	9	44.43	-41.70	-0.06
	Min. H _z	14	59.24	-0.06	-41.76
	Min. M _x	14	-5124.37	-0.06	-41.76
	Min. M _z	20	-5113.76	41.69	0.06
	Min. Torsion	12	-4.51	-20.90	-36.20

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	49.36	-0.00	0.00	0.49	0.80	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	59.24	-0.06	-41.76	-5123.15	9.90	-3.85
0.9 Dead+1.6 Wind 0 deg - No Ice	44.43	-0.06	-41.76	-5065.02	9.55	-3.84
1.2 Dead+1.6 Wind 30 deg - No Ice	59.24	20.80	-36.14	-4432.53	-2548.06	-2.16
0.9 Dead+1.6 Wind 30 deg - No Ice	44.43	20.80	-36.14	-4382.44	-2519.42	-2.16
1.2 Dead+1.6 Wind 60 deg - No Ice	59.24	36.08	-20.83	-2553.72	-4423.03	0.11
0.9 Dead+1.6 Wind 60 deg - No Ice	44.43	36.08	-20.83	-2524.93	-4373.14	0.11
1.2 Dead+1.6 Wind 90 deg - No Ice	59.24	41.69	0.06	9.54	-5111.79	2.34
0.9 Dead+1.6 Wind 90 deg - No Ice	44.43	41.70	0.06	9.27	-5054.35	2.34
1.2 Dead+1.6 Wind 120 deg - No Ice	59.24	36.14	20.93	2570.37	-4431.92	3.96
0.9 Dead+1.6 Wind 120 deg - No Ice	44.43	36.14	20.93	2541.08	-4381.92	3.95
1.2 Dead+1.6 Wind 150 deg - No Ice	59.24	20.90	36.20	4442.63	-2563.52	4.51
0.9 Dead+1.6 Wind 150 deg - No Ice	44.43	20.90	36.20	4392.11	-2534.69	4.51
1.2 Dead+1.6 Wind 180 deg - No Ice	59.24	0.06	41.76	5124.37	-7.97	3.86
0.9 Dead+1.6 Wind 180 deg - No Ice	44.43	0.06	41.76	5065.93	-8.11	3.86
1.2 Dead+1.6 Wind 210 deg - No Ice	59.24	-20.80	36.14	4433.77	2550.01	2.17
0.9 Dead+1.6 Wind 210 deg - No Ice	44.43	-20.80	36.14	4383.36	2520.87	2.17
1.2 Dead+1.6 Wind 240 deg - No Ice	59.24	-36.08	20.83	2554.95	4425.01	-0.11
0.9 Dead+1.6 Wind 240 deg - No Ice	44.43	-36.08	20.83	2525.84	4374.61	-0.11
1.2 Dead+1.6 Wind 270 deg - No Ice	59.24	-41.69	-0.06	-8.34	5113.76	-2.36
0.9 Dead+1.6 Wind 270 deg - No Ice	44.43	-41.70	-0.06	-8.38	5055.81	-2.35
1.2 Dead+1.6 Wind 300 deg - No Ice	59.24	-36.14	-20.93	-2569.19	4433.87	-3.97

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
0.9 Dead+1.6 Wind 300 deg - No Ice	44.43	-36.14	-20.93	-2540.20	4383.37	-3.96
1.2 Dead+1.6 Wind 330 deg - No Ice	59.24	-20.90	-36.20	-4441.43	2565.44	-4.51
0.9 Dead+1.6 Wind 330 deg - No Ice	44.43	-20.90	-36.20	-4391.22	2536.12	-4.51
1.2 Dead+1.0 Ice+1.0 Temp	110.46	0.00	-0.00	7.81	13.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	110.46	-0.01	-12.70	-1601.27	14.97	-1.97
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	110.46	6.33	-10.99	-1384.84	-788.91	-1.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	110.46	10.98	-6.34	-795.20	-1377.83	0.04
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	110.46	12.68	0.01	9.66	-1594.00	1.18
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	110.46	10.99	6.36	814.07	-1379.49	2.01
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	110.46	6.35	11.00	1402.50	-791.78	2.29
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	110.46	0.01	12.70	1617.28	11.65	1.97
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	110.46	-6.33	10.99	1400.85	815.54	1.11
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	110.46	-10.98	6.34	811.21	1404.46	-0.04
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	110.46	-12.68	-0.01	6.35	1620.63	-1.18
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	110.46	-10.99	-6.36	-798.07	1406.11	-2.01
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	110.46	-6.35	-11.00	-1386.50	818.40	-2.29
Dead+Wind 0 deg - Service	49.36	-0.01	-8.24	-1004.96	2.57	-0.14
Dead+Wind 30 deg - Service	49.36	4.10	-7.13	-869.38	-499.36	-0.07
Dead+Wind 60 deg - Service	49.36	7.12	-4.11	-500.71	-867.27	0.02
Dead+Wind 90 deg - Service	49.36	8.23	0.01	2.26	-1002.58	0.10
Dead+Wind 120 deg - Service	49.36	7.13	4.13	504.77	-869.03	0.16
Dead+Wind 150 deg - Service	49.36	4.12	7.14	872.15	-502.40	0.17
Dead+Wind 180 deg - Service	49.36	0.01	8.24	1005.98	-0.93	0.14
Dead+Wind 210 deg - Service	49.36	-4.10	7.13	870.40	501.00	0.07
Dead+Wind 240 deg - Service	49.36	-7.12	4.11	501.73	868.91	-0.02
Dead+Wind 270 deg - Service	49.36	-8.23	-0.01	-1.24	1004.22	-0.10
Dead+Wind 300 deg - Service	49.36	-7.13	-4.13	-503.75	870.67	-0.16
Dead+Wind 330 deg - Service	49.36	-4.12	-7.14	-871.13	504.04	-0.17

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-49.36	0.00	0.00	49.36	-0.00	0.000%
2	-0.06	-59.24	-41.77	0.06	59.24	41.76	0.003%
3	-0.06	-44.43	-41.77	0.06	44.43	41.76	0.006%
4	20.80	-59.24	-36.14	-20.80	59.24	36.14	0.000%
5	20.80	-44.43	-36.14	-20.80	44.43	36.14	0.000%
6	36.08	-59.24	-20.83	-36.08	59.24	20.83	0.000%
7	36.08	-44.43	-20.83	-36.08	44.43	20.83	0.000%
8	41.70	-59.24	0.06	-41.69	59.24	-0.06	0.007%
9	41.70	-44.43	0.06	-41.70	44.43	-0.06	0.006%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
10	36.14	-59.24	20.93	-36.14	59.24	-20.93	0.000%
11	36.14	-44.43	20.93	-36.14	44.43	-20.93	0.000%
12	20.90	-59.24	36.20	-20.90	59.24	-36.20	0.000%
13	20.90	-44.43	36.20	-20.90	44.43	-36.20	0.000%
14	0.06	-59.24	41.77	-0.06	59.24	-41.76	0.003%
15	0.06	-44.43	41.77	-0.06	44.43	-41.76	0.006%
16	-20.80	-59.24	36.14	20.80	59.24	-36.14	0.000%
17	-20.80	-44.43	36.14	20.80	44.43	-36.14	0.000%
18	-36.08	-59.24	20.83	36.08	59.24	-20.83	0.000%
19	-36.08	-44.43	20.83	36.08	44.43	-20.83	0.000%
20	-41.70	-59.24	-0.06	41.69	59.24	0.06	0.007%
21	-41.70	-44.43	-0.06	41.70	44.43	0.06	0.006%
22	-36.14	-59.24	-20.93	36.14	59.24	20.93	0.000%
23	-36.14	-44.43	-20.93	36.14	44.43	20.93	0.000%
24	-20.90	-59.24	-36.20	20.90	59.24	36.20	0.000%
25	-20.90	-44.43	-36.20	20.90	44.43	36.20	0.000%
26	0.00	-110.46	0.00	-0.00	110.46	0.00	0.001%
27	-0.01	-110.46	-12.70	0.01	110.46	12.70	0.001%
28	6.33	-110.46	-10.99	-6.33	110.46	10.99	0.001%
29	10.98	-110.46	-6.34	-10.98	110.46	6.34	0.001%
30	12.68	-110.46	0.01	-12.68	110.46	-0.01	0.001%
31	10.99	-110.46	6.36	-10.99	110.46	-6.36	0.001%
32	6.35	-110.46	11.00	-6.35	110.46	-11.00	0.001%
33	0.01	-110.46	12.70	-0.01	110.46	-12.70	0.001%
34	-6.33	-110.46	10.99	6.33	110.46	-10.99	0.001%
35	-10.98	-110.46	6.34	10.98	110.46	-6.34	0.001%
36	-12.68	-110.46	-0.01	12.68	110.46	0.01	0.001%
37	-10.99	-110.46	-6.36	10.99	110.46	6.36	0.001%
38	-6.35	-110.46	-11.00	6.35	110.46	11.00	0.001%
39	-0.01	-49.36	-8.24	0.01	49.36	8.24	0.002%
40	4.11	-49.36	-7.13	-4.10	49.36	7.13	0.002%
41	7.12	-49.36	-4.11	-7.12	49.36	4.11	0.002%
42	8.23	-49.36	0.01	-8.23	49.36	-0.01	0.002%
43	7.13	-49.36	4.13	-7.13	49.36	-4.13	0.002%
44	4.12	-49.36	7.14	-4.12	49.36	-7.14	0.002%
45	0.01	-49.36	8.24	-0.01	49.36	-8.24	0.002%
46	-4.11	-49.36	7.13	4.10	49.36	-7.13	0.002%
47	-7.12	-49.36	4.11	7.12	49.36	-4.11	0.002%
48	-8.23	-49.36	-0.01	8.23	49.36	0.01	0.002%
49	-7.13	-49.36	-4.13	7.13	49.36	4.13	0.002%
50	-4.12	-49.36	-7.14	4.12	49.36	7.14	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00004045	0.00007884
3	Yes	14	0.00006337	0.00014010
4	Yes	18	0.00000001	0.00012443
5	Yes	18	0.00000001	0.00008809
6	Yes	18	0.00000001	0.00012552
7	Yes	18	0.00000001	0.00008891
8	Yes	14	0.00009498	0.00014490
9	Yes	14	0.00006339	0.00011716
10	Yes	18	0.00000001	0.00012924
11	Yes	18	0.00000001	0.00009157
12	Yes	18	0.00000001	0.00012439
13	Yes	18	0.00000001	0.00008797
14	Yes	15	0.00004045	0.00006900
15	Yes	14	0.00006337	0.00012468
16	Yes	18	0.00000001	0.00012710
17	Yes	18	0.00000001	0.00009003
18	Yes	18	0.00000001	0.00012580
19	Yes	18	0.00000001	0.00008909

20	Yes	14	0.00009498	0.00013007
21	Yes	14	0.00006339	0.00010595
22	Yes	18	0.00000001	0.00012465
23	Yes	18	0.00000001	0.00008817
24	Yes	18	0.00000001	0.00012970
25	Yes	18	0.00000001	0.00009189
26	Yes	10	0.00000001	0.00001434
27	Yes	16	0.00009888	0.00007916
28	Yes	16	0.00009863	0.00012748
29	Yes	16	0.00009863	0.00012869
30	Yes	16	0.00009890	0.00007841
31	Yes	16	0.00009860	0.00013363
32	Yes	16	0.00009859	0.00012814
33	Yes	16	0.00009885	0.00007969
34	Yes	16	0.00009855	0.00013383
35	Yes	16	0.00009855	0.00013228
36	Yes	16	0.00009883	0.00007930
37	Yes	16	0.00009857	0.00012913
38	Yes	16	0.00009858	0.00013496
39	Yes	14	0.00000001	0.00003151
40	Yes	14	0.00000001	0.00002876
41	Yes	14	0.00000001	0.00002928
42	Yes	14	0.00000001	0.00003137
43	Yes	14	0.00000001	0.00003122
44	Yes	14	0.00000001	0.00002816
45	Yes	14	0.00000001	0.00003151
46	Yes	14	0.00000001	0.00003035
47	Yes	14	0.00000001	0.00002962
48	Yes	14	0.00000001	0.00003140
49	Yes	14	0.00000001	0.00002825
50	Yes	14	0.00000001	0.00003153

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	28.97	44	1.41	0.00
L2	136.25 - 86.71	16.72	44	1.20	0.00
L3	92.29 - 43.16	7.42	44	0.78	0.00
L4	49.83 - 0	2.11	44	0.39	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	APXVSP18-C-A20 w/ Mount Pipe	44	28.97	1.41	0.00	56970
161.0000	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	44	23.44	1.34	0.00	14991
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	44	19.54	1.27	0.00	8631
141.0000	TME-RRUS 11 BAND 12	44	17.94	1.23	0.00	7303
140.0000	1001940	44	17.68	1.22	0.00	7122
83.0000	OG-860/1920/GPS-A	44	5.94	0.69	0.00	5891
78.0000	OG-860/1920/GPS-A	44	5.22	0.64	0.00	5808

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	147.37	14	7.18	0.02
L2	136.25 - 86.71	85.14	12	6.11	0.01
L3	92.29 - 43.16	37.83	12	4.00	0.00
L4	49.83 - 0	10.78	12	1.99	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	APXVSP18-C-A20 w/ Mount Pipe	14	147.37	7.18	0.02	11508
161.0000	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	12	119.29	6.81	0.02	3025
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	12	99.46	6.46	0.01	1738
141.0000	TME-RRUS 11 BAND 12	12	91.35	6.27	0.01	1469
140.0000	1001940	12	90.03	6.24	0.01	1432
83.0000	OG-860/1920/GPS-A	12	30.28	3.53	0.00	1165
78.0000	OG-860/1920/GPS-A	12	26.58	3.28	0.00	1147

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	180 - 131.75 (1)	TP31.39x21x0.25	48.250 0	0.0000	0.0	23.940 7	-12.81	1686.69	0.008
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	49.540 0	0.0000	0.0	46.298 3	-22.92	3408.11	0.007
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	49.130 0	0.0000	0.0	65.411 9	-37.25	4767.07	0.008
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	49.830 0	0.0000	0.0	90.062 2	-59.20	6465.70	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	180 - 131.75 (1)	TP31.39x21x0.25	501.27	1046.01	0.479	0.00	1046.01	0.000
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	1733.03	2721.23	0.637	0.00	2721.23	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	3166.57	4611.06	0.687	0.00	4611.06	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	5129.18	7538.14	0.680	0.00	7538.14	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	180 - 131.75 (1)	TP31.39x21x0.25	25.36	843.35	0.030	1.19	2094.57	0.001
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	30.73	1704.05	0.018	1.85	5449.12	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	36.54	2383.53	0.015	2.95	9233.42	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	41.84	3232.85	0.013	4.51	15094.75	0.000

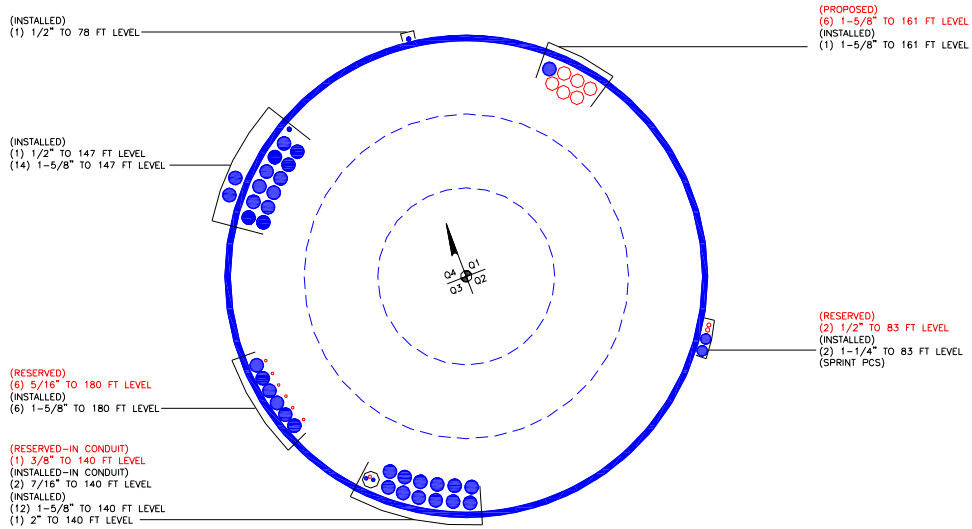
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 131.75 (1)	0.008	0.479	0.000	0.030	0.001	0.488	1.000	4.8.2 ✓
L2	131.75 - 86.71 (2)	0.007	0.637	0.000	0.018	0.000	0.644	1.000	4.8.2 ✓
L3	86.71 - 43.16 (3)	0.008	0.687	0.000	0.015	0.000	0.695	1.000	4.8.2 ✓
L4	43.16 - 0 (4)	0.009	0.680	0.000	0.013	0.000	0.690	1.000	4.8.2 ✓

Section Capacity Table

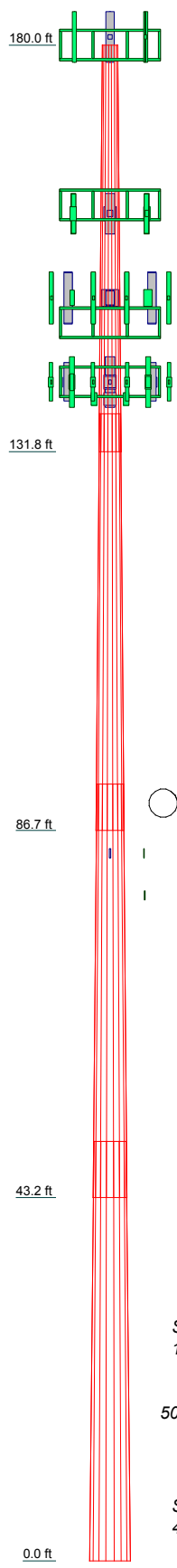
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-12.81	1686.69	48.8	Pass	
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-22.92	3408.11	64.4	Pass	
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-37.25	4767.07	69.5	Pass	
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-59.20	6465.70	69.0	Pass	
							Summary		
							Pole (L3)	69.5	Pass
							RATING =	69.5	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4
Length (ft)	48.2500	49.5400	49.1300	49.8300
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3750	0.4375	0.5000
Socket Length (ft)	4.5000	5.5800	6.6700	46.6680
Top Dia (in)	21.0000	29.9210	38.5229	57.2500
Bot Dia (in)	31.3900	40.4800	48.9600	
Grade	A572-65			
Weight (K)	3.4	7.0	10.1	13.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSP18-C-A20 w/ Mount Pipe	180	RRH2X60-AWS	147
APXVSP18-C-A20 w/ Mount Pipe	180	RRH2X60-AWS	147
APXVSP18-C-A20 w/ Mount Pipe	180	DB-T1-6Z-8AB-0Z	147
FD9R6004/1C-3L	180	DB-T1-6Z-8AB-0Z	147
FD9R6004/1C-3L	180	RRH2X60-PCS	147
FD9R6004/1C-3L	180	RRH2X60-PCS	147
Platform Mount [LP 601-1]	180	RRH2X60-PCS	147
8-ft Ladder	180	Platform Mount [LP 712-1]	147
(3) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
(3) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
(3) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	Pipe Mount [PM 601-3]	141
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	1001940	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	1001940	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	1001940	140
Ericsson Air 21 B2A B4P w/ Mount Pipe	161	(2) 7770.00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) 7770.00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) 7770.00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) LGP 17201	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) LGP 17201	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) LGP 17201	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) LGP 17201	140
TMAT1921B78-21A	161	(2) LGP21901	140
TMAT1921B78-21A	161	(2) LGP21901	140
TMAT1921B78-21A	161	(2) LGP21901	140
RRUS 11 B12	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
RRUS 11 B12	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
RRUS 11 B12	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
Platform Mount [LP 305-1]	161	RRUS 12	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS 12	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS 12	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS A2	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	RRUS A2	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	RRUS A2	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	RRUS A2	140
KS24019-L112A	147	DC6-48-60-18-8F	140
(2) FD9R6004/1C-3L	147	Platform Mount [LP 303-1]	140
(2) FD9R6004/1C-3L	147	OG-860/1920/GPS-A	83
(2) FD9R6004/1C-3L	147	OG-860/1920/GPS-A	83
RRH2X60-AWS	147	Side Arm Mount [SO 701-1]	83
		Side Arm Mount [SO 701-1]	83
		OG-860/1920/GPS-A	78
		OG-860/1920/GPS-A	78
		Side Arm Mount [SO 701-1]	78

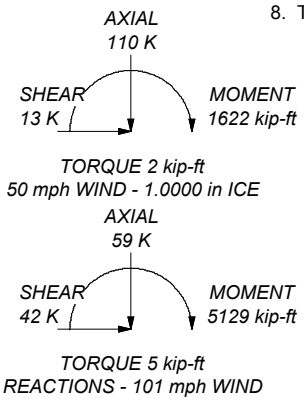
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 69.5%

ALL REACTIONS ARE FACTORED



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

Job: **180' Monopole / Columbia/Deojay**
 Project: **PJF 37517-0133 / BU 876391**
 Client: Crown Castle Drawn by: Jared Smith App'd:
 Code: TIA-222-G Date: 05/09/17 Scale: NTS
 Path: Dwg No. E-1

©10/09/2017 3:25 PM C:\pjt\37517\0133_876391_COLUMBIA_DEJOJAY\37517-0133-002-7865_SA_1461746\37517-0133-002-7865.dwg

Factored Foundation Loads:

	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	59	44.25	kips
Factored Horiz. Load at Top of Pier =	42	42	kips
Factored OTM at Top of Pier =	5129	5129	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 =	5 ft
Uplift Cone from	Top of footing

Soil Wedges have been included to counteract overturning.

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
7	100	0	30	12	7.00

Dimensions:

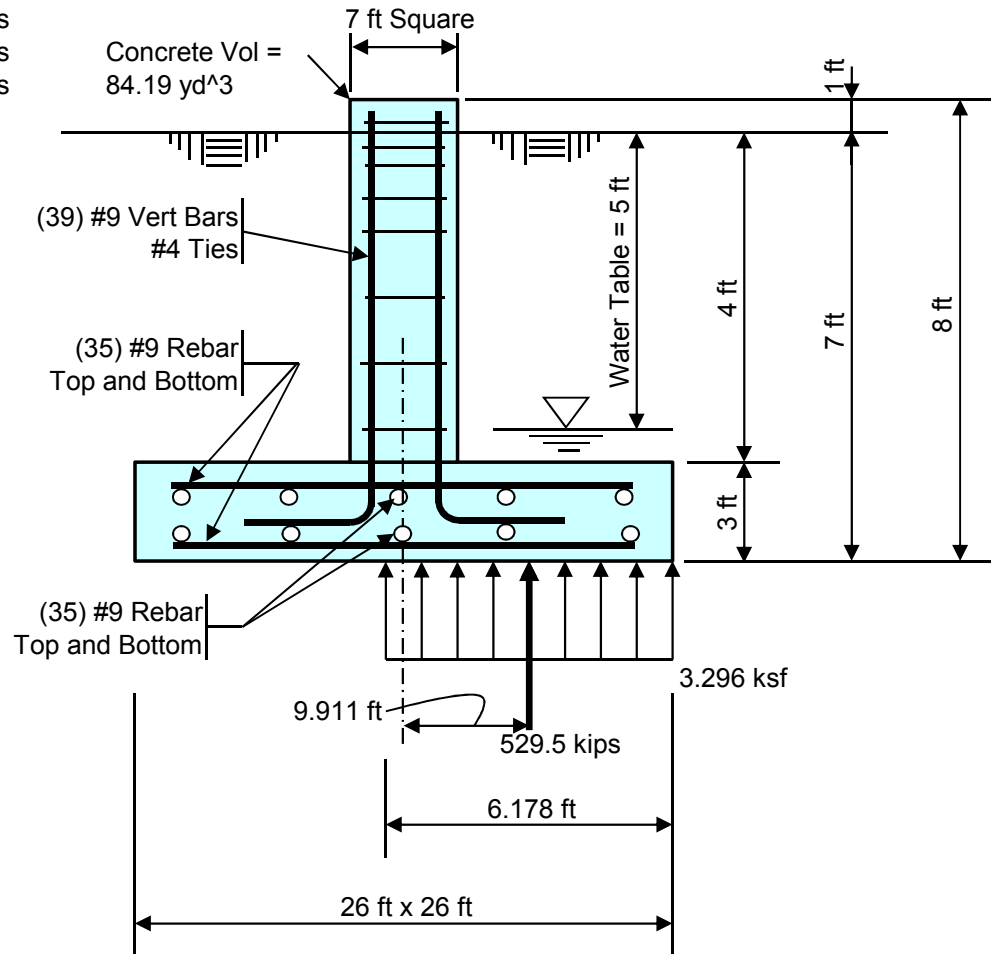
Pier Shape =	Square
Pier Width =	7 ft Square
Pier Height above Grade =	1 ft
Depth to Bottom of Footing =	7 ft
Footing Thickness =	3 ft
Footing Width, B =	26 ft
Footing Length, L =	26 ft

Concrete:

Concrete Strength =	4 ksi
Rebar Strength =	60 ksi

Summary Results:

	Required	Available
Maximum Net Soil Bearing =	3.687 ksf	9.000 ksf
Uplift =	0.0 kips	418.7 kips
Punching Shear Stress =	0.054 ksi	0.190 ksi
Bending Shear Stress =	377.7 kips	926.7 kips
Bending Moment =	2628.6 k-ft	4775.1 k-ft
Conc Pier Reinforcing Steel =	5339.0 k-ft	6935.5 k-ft



Total Pad Reinf Stl =	70.00 in ² >= 20.22 in ² = Min Stl, OK
Total Pier Reinf Stl =	39.00 in ² >= 35.28 in ² = Min Stl, OK
Footing Thickness =	3.00 ft >= 1.5 ft = Min Ftg Thk, OK

Stress Ratio =	41.0% in Soil Bearing
Stress Ratio =	0.0% in Uplift
Stress Ratio =	28.6% in Punching Shear
Stress Ratio =	40.8% in Bending Shear
Stress Ratio =	55.0% in Bending Moment
Stress Ratio =	77.0% in Pier Rebar

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

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

Site Data	
BU#:	876391
Site Name:	Columbia / Deojay
App #:	
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	20
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	66 in

Plate Data	
Diam:	72 in
Thick:	2.25 in
Grade:	60 ksi
Single-Rod B-eff:	9.09 in

Stiffener Data (Welding at both sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

Pole Data	
Diam:	57.25 in
Thick:	0.5 in
Grade:	65 ksi
# of Sides:	18 "0" IF Round
Fu	80 ksi
Reinf. Fillet Weld	0 "0" if None

Reactions		
Mu:	5129	ft-kips
Axial, Pu:	59	kips
Shear, Vu:	42	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Results
 Max Rod ($C_u + V_u/r$): 193.7 Kips
 Allowable Axial, $\Phi * F_u * A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 74.5% **Pass**

Rigid
AISC LRFD
$\phi * T_n$

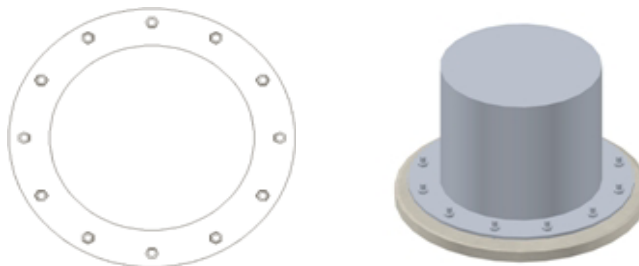
Base Plate Results
 Base Plate Stress: 43.9 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 81.3% **Pass**

Flexural Check
 43.9 ksi
 54.0 ksi
 81.3% **Pass**

Rigid
AISC LRFD
$\phi * F_y$
Y.L. Length: 32.84

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

Pole Results
 Pole Punching Shear Check: n/a



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

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



WIRELESS COMMUNICATIONS FACILITY

SPRINT COLUMBIA RT 6

SITE ID: CT11503A - U1900

CROWN CASTLE BU No.: 876391

14 THOMPSON HILL ROAD

COLUMBIA, CT 06237

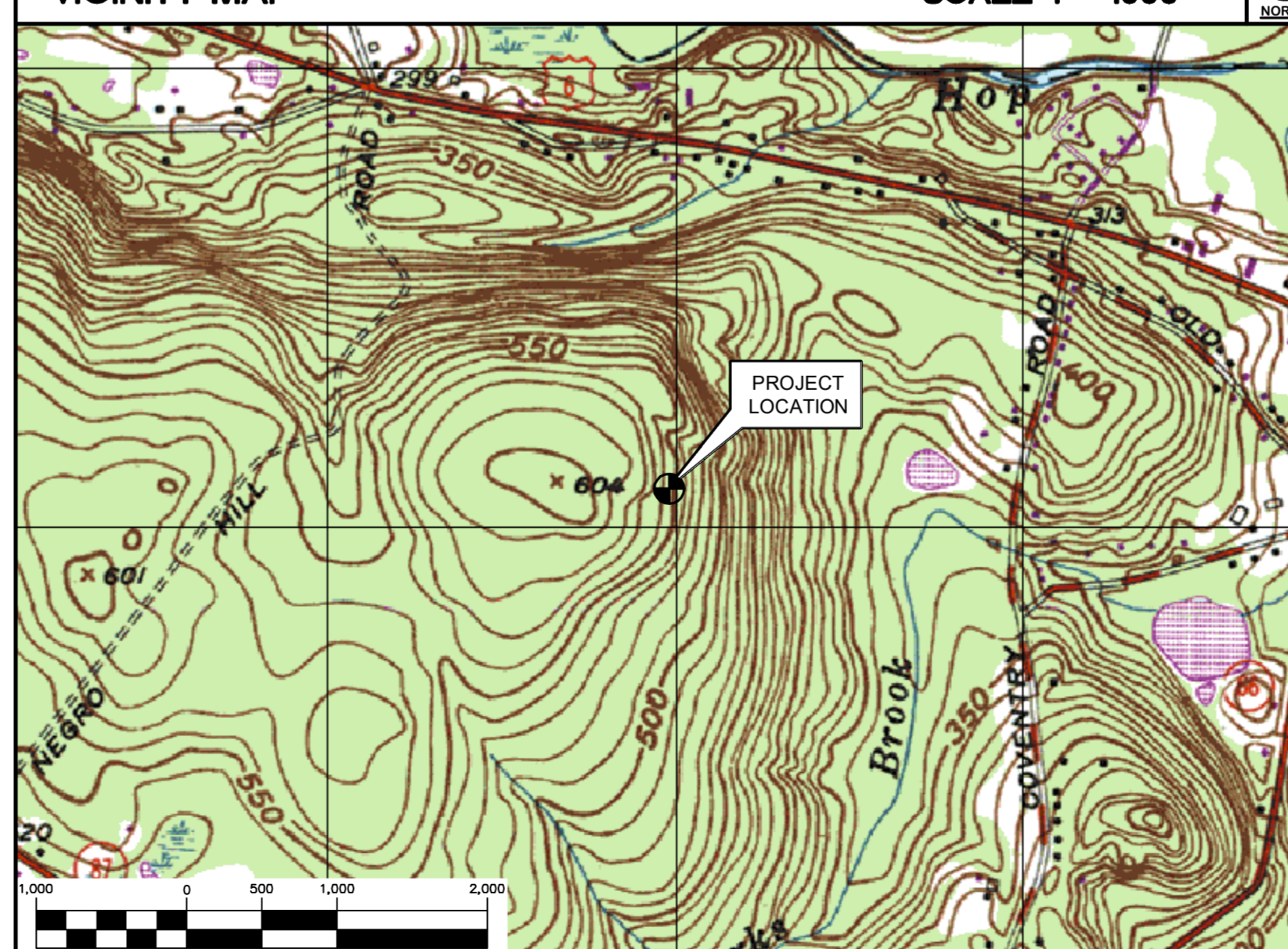
GENERAL NOTES

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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: 14 THOMPSON HILL ROAD COLUMBIA, CT 06237
1. HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2. TAKE THE 2ND RIGHT ONTO DAY HILL RD.	3.64 MI.
3. MERGE ONTO I-91 S TOWARD HARTFORD	3.99 MI.
4. MERGE ONTO I-291 E via EXIT 35A TOWARD MANCHESTER	6.18 MI.
5. TAKE THE EXIT TOWARD I-384/I-84 W/HARTFORD	0.35 MI.
6. MERGE ONTO I-384 E via THE RAMP ON THE LEFT	8.85 MI.
7. I-384 E BECOMES US-6 E/US-44 E/BOSTON TURNPIKE	0.22 MI.
8. TAKE US-6 E TOWARD WILLIMANTIC/PROVIDENCE	10.12 MI.
9. TURN RIGHT ONTO EDGARTON RD	0.15 MI.
10. TAKE THE 1ST RIGHT ONTO THOMPSON HILL RD	0.18 MI.
10. 14 THOMPSON HILL RD IS ON THE RIGHT	

VICINITY MAP



T-MOBILE RF CONFIGURATION

702Cc

PROJECT SUMMARY

- THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
 - INSTALL THREE (3) PROPOSED T-MOBILE TWIN AWS TOWER MOUNTED AMPLIFIERS (TMAs), (1) PER SECTOR, MOUNTED BEHIND POSITION 2 ANTENNA.
 - INSTALL (6) PROPOSED 1-5/8" COAX CABLES FROM THE EXISTING EQUIPMENT TO THE ANTENNA SECTOR LOCATIONS.

PROJECT INFORMATION

SITE NAME:	SPRINT COLUMBIA RT 6
SITE ID:	CT11503A - U1900
SITE ADDRESS:	CROWN CASTLE BU No.: 876391 14 THOMPSON HILL ROAD COLUMBIA, CT 06237
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	BRIAN PAUL (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (860) 550-5971
ENGINEER:	CENTEX ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-43'-03.42" N LONGITUDE: 72°-17'-59.39" W GROUND ELEVATION: 634'± 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	PLUMBING DIAGRAM	0

PROFESSIONAL ENGINEER SEAL



CENTEX engineering
Centered on Solutions™

(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentelEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY

SPRINT COLUMBIA RT 6
SITE ID: CT11503A - U1900
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

DATE: 04/03/17
SCALE: AS NOTED
JOB NO. 17012.47

TITLE SHEET

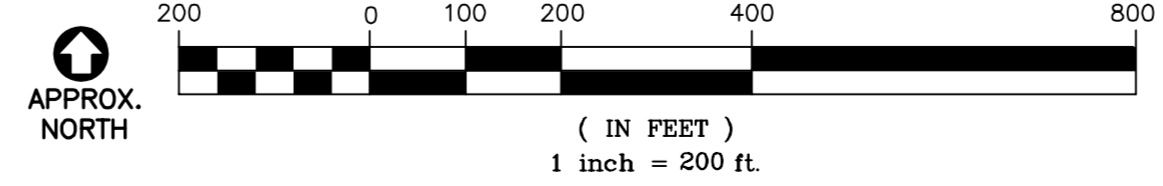
T-1

Sheet No. 1 of 5

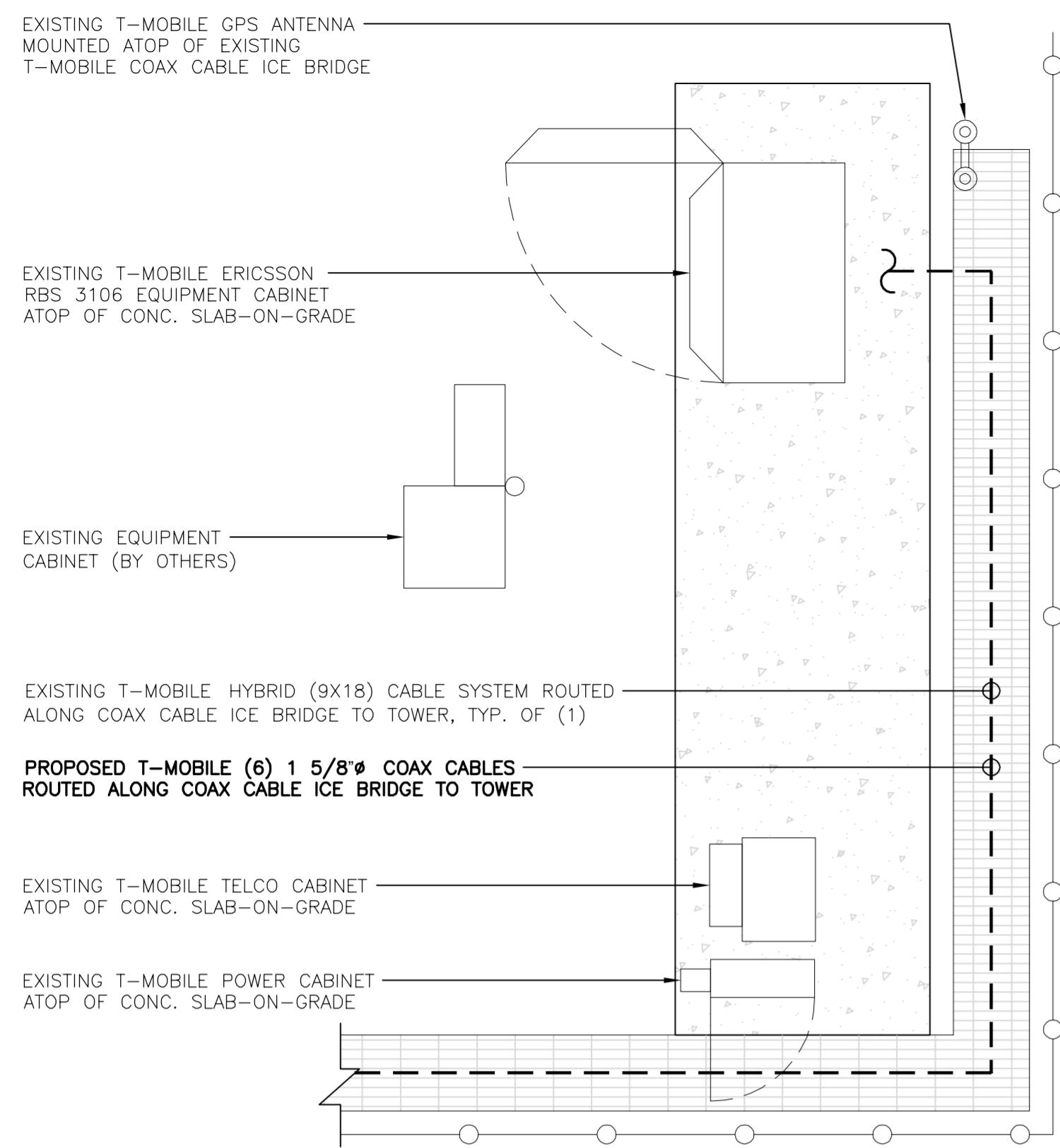
0 06/02/17 KAWUR CAG CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
REV. DATE DRAWN BY CHK'D BY DESCRIPTION



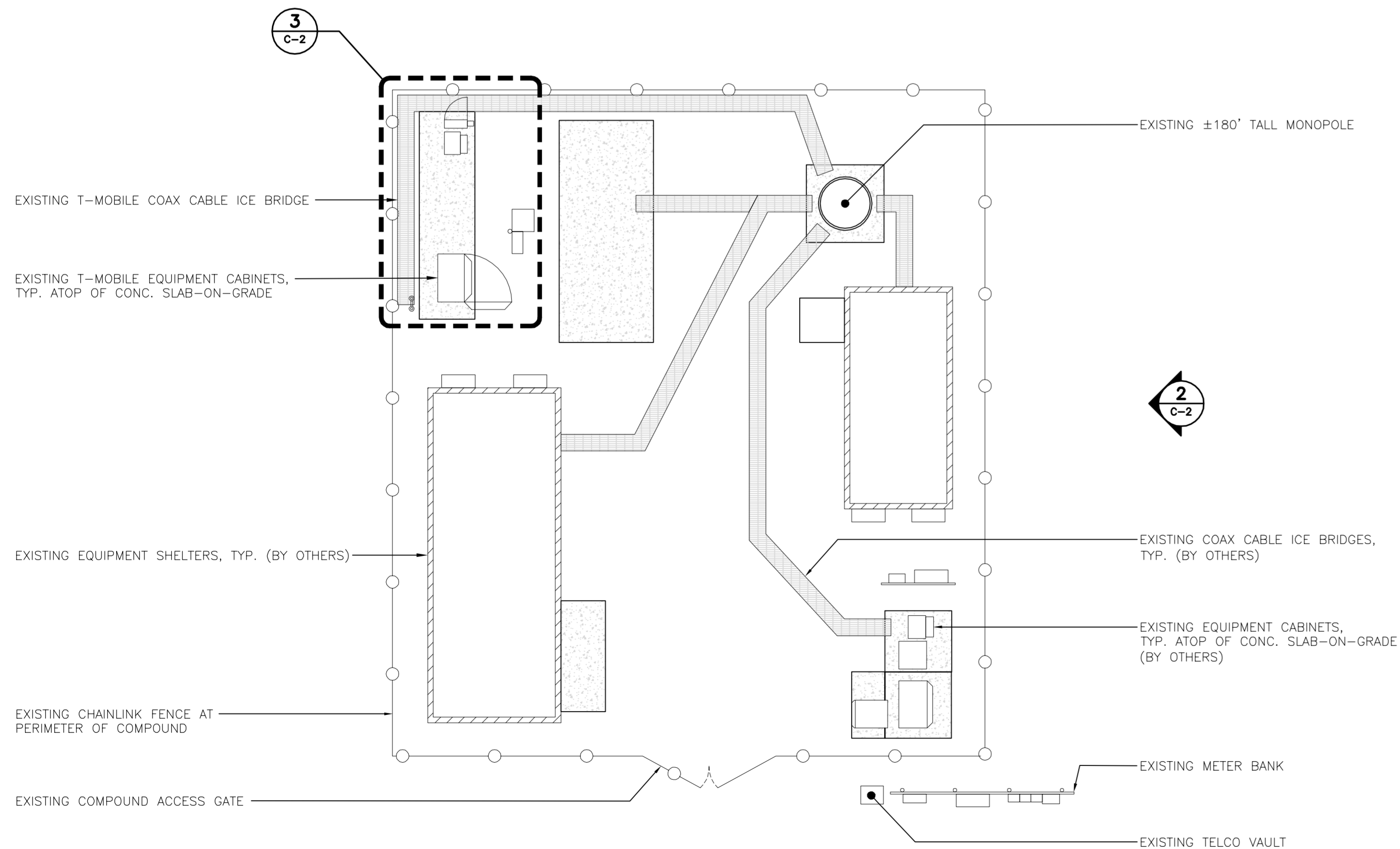
1 SITE LOCATION PLAN
C-1 SCALE: 1" = 200'



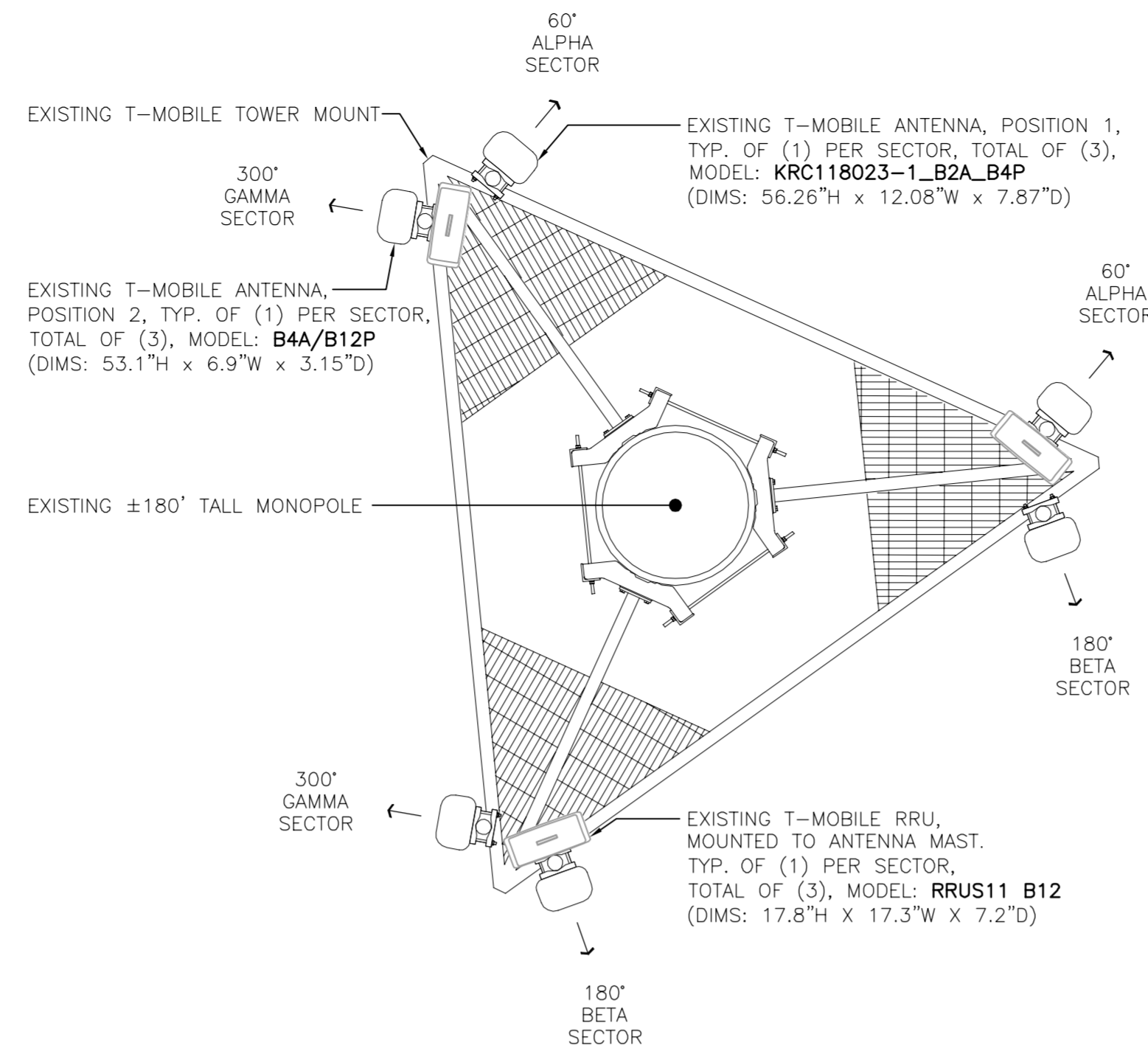
<p>T-MOBILE NORTHEAST LLC WIRELESS COMMUNICATIONS FACILITY SPRINT COLUMBIA RT 6 SITE ID: CT11503A - U1900 14 THOMPSON HILL ROAD COLUMBIA, CT 06237</p>		<p>CENTEK engineering Centered on Solutions™ (203) 488-0360 (203) 488-8387 Fax 63-2 North Branford Road Branford, CT 06405 www.CentekEng.com</p>		<p>PROFESSIONAL ENGINEER SEAL</p>	
<p>T-Mobile</p>		<p>0 06/02/17 KAWJR CAG CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION</p>		<p>REV. DATE DRAWN BY CHK'D BY DESCRIPTION</p>	
<p>DATE: 04/03/17</p>		<p>SCALE: AS NOTED</p>		<p>JOB NO. 17012.47</p>	
<p>SITE LOCATION PLAN</p>		<p>C-1</p>		<p>Sheet No. 3 of 5</p>	



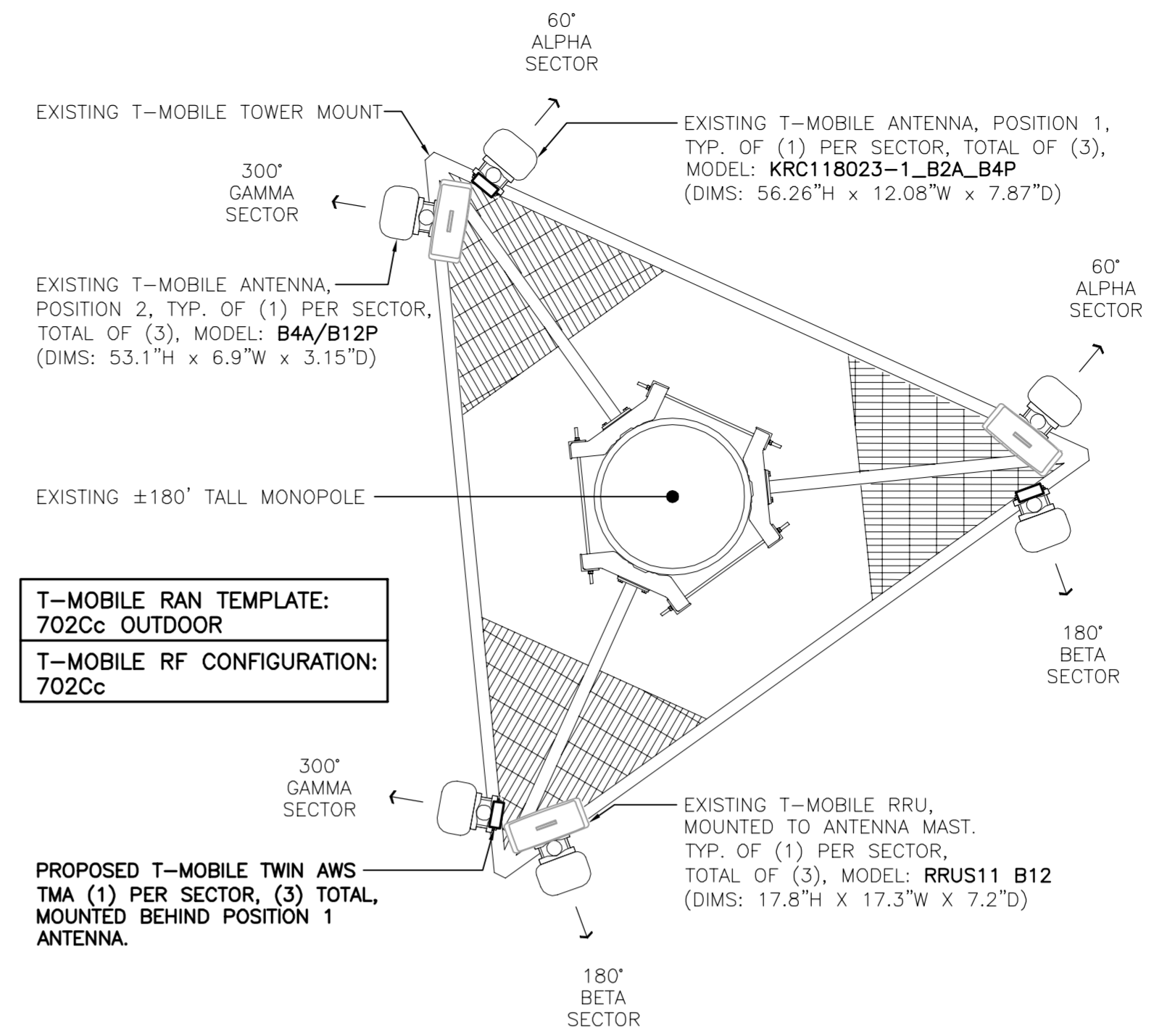
3 EQUIPMENT PLAN
 C-2 SCALE: 3/8" = 1'
 TRUE NORTH



1 COMPOUND PLAN
 C-2 SCALE: 1/8" = 1'-0"
 TRUE NORTH

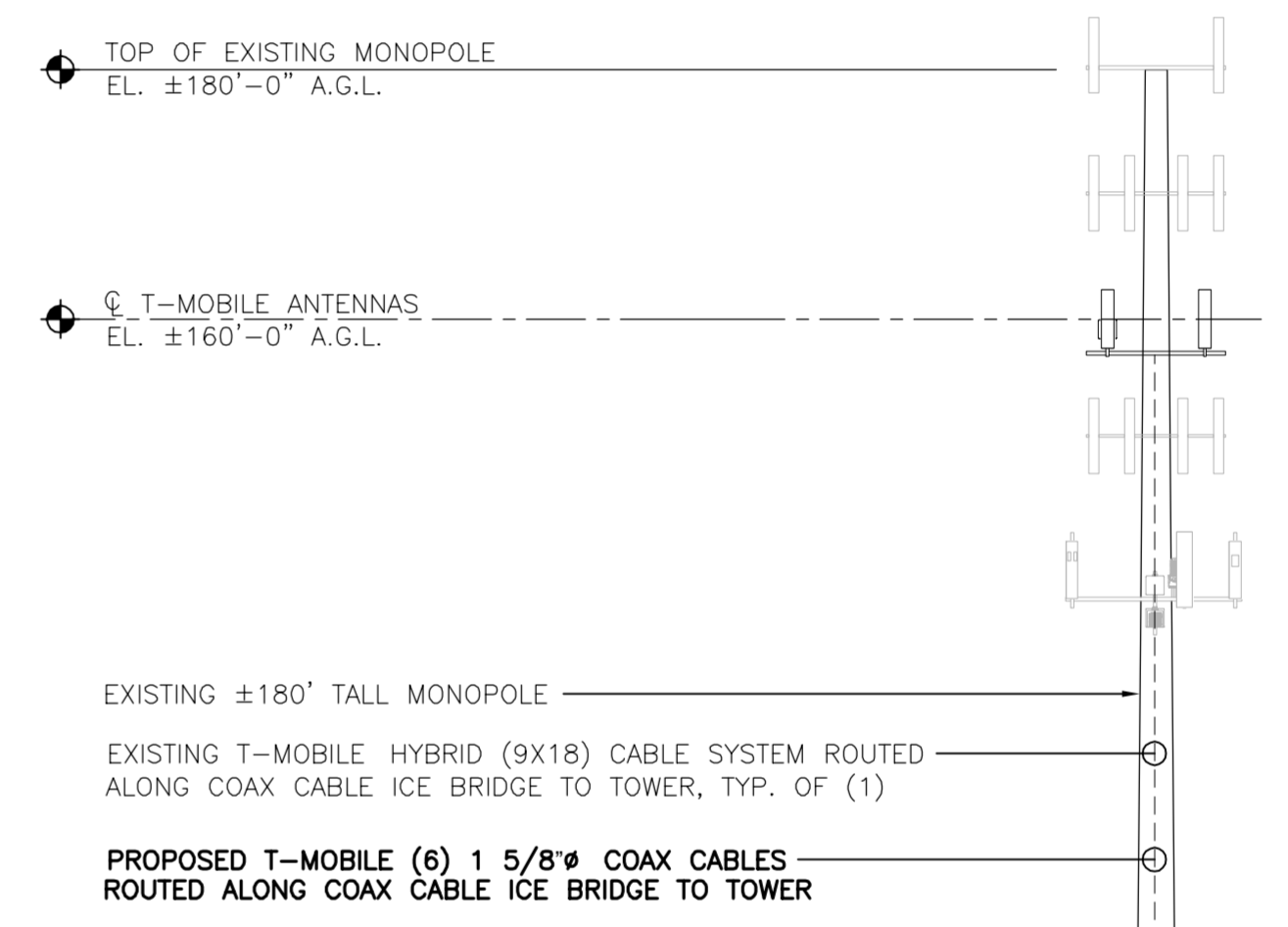


4 EXISTING ANTENNA MOUNTING CONFIGURATION
 C-2 SCALE: 3/8" = 1'
 160' ELEVATION TRUE NORTH



T-MOBILE RAN TEMPLATE:
 702Cc OUTDOOR
 T-MOBILE RF CONFIGURATION:
 702Cc

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

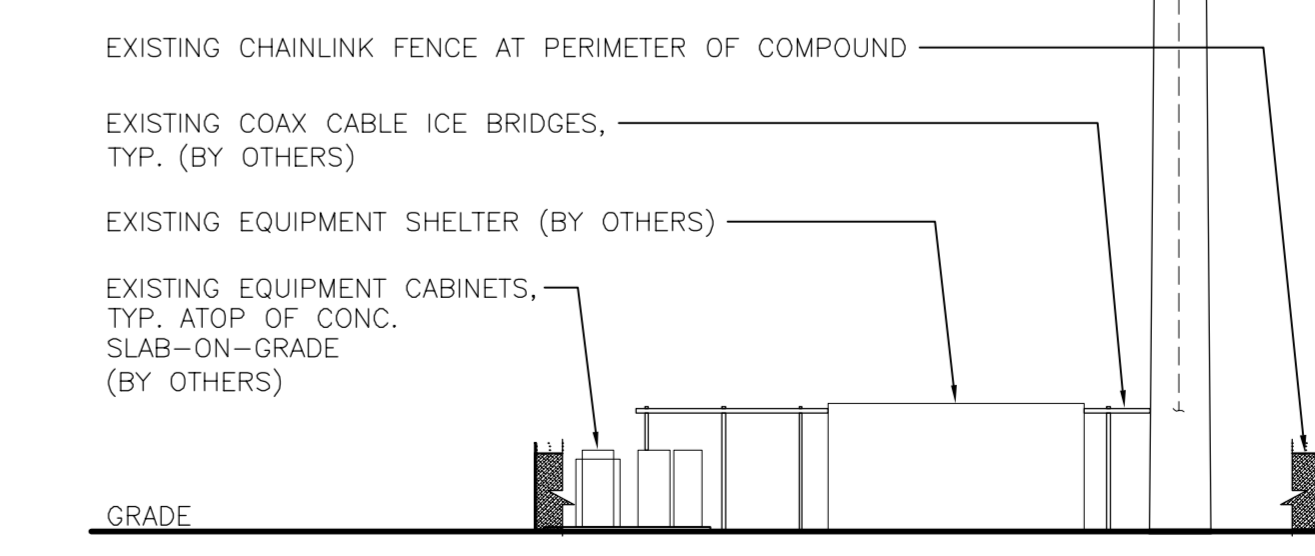


TOWER STRUCTURAL NOTES:

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

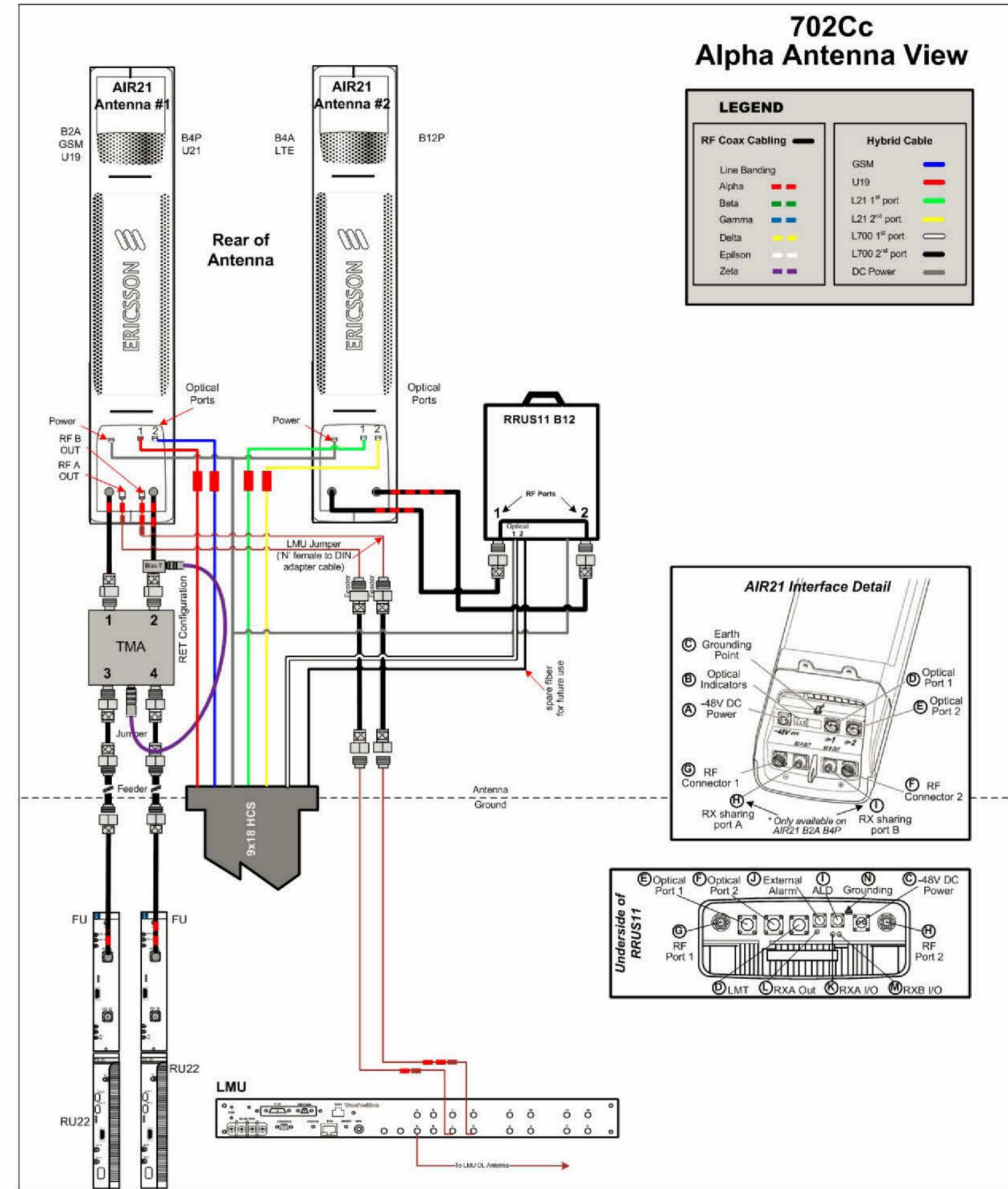
NOTES:

- A.G.L. = ABOVE GRADE LEVEL



2 WEST TOWER ELEVATION
 C-2 SCALE: 1" = 15'
 GRAPHIC SCALE
 (IN FEET)
 1 inch = 15 ft.

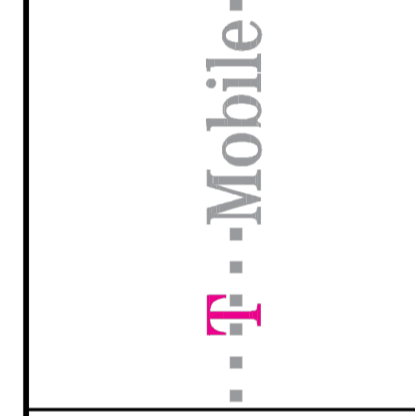
PROFESSIONAL ENGINEER SEAL	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
DATE: 06/02/17	DATE: 06/02/17
REV. 0	REV. 0
DRAWN BY: KANUR	DRAWN BY: CHK'D BY:
CAG	CAG
(203) 488-0360 (203) 488-8387 Fax 63-2 North Branford Road Branford, CT 06405 www.CentekEng.com	
T-MOBILE NORTHEAST LLC WIRELESS COMMUNICATIONS FACILITY SPRINT COLUMBIA RT 6 SITE ID: CT11503A - U1900 14 THOMPSON HILL ROAD COLUMBIA, CT 06237	
DATE: 04/03/17	SCALE: AS NOTED
JOB NO. 17012.47	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.
C-2 Sheet No. 4 of 5	



1 PROPOSED PLUMBING DIAGRAM
E-1 SCALE: NONE

REV.	DATE	BY	DESCRIPTION
0	06/02/17	KAWR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL



CEN TEK engineering
Centered on Solutions™
(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
SPRINT COLUMBIA RT 6
SITE ID: CT11503A - U1900
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

DATE: 04/03/17
SCALE: AS NOTED
JOB NO. 17012.47

PLUMBING DIAGRAM