

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

April 23, 2009

Mark R. Richard
UMTS Project Manager
T-Mobile USA, Inc.
35 Griffin Road South
Bloomfield, CT 06002

RE: **EM-T-MOBILE-107-090309** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc.,
notice of intent to modify an existing telecommunications facility located at Grassy Hill Road,
Orange, Connecticut.

Dear Mr. Richard:

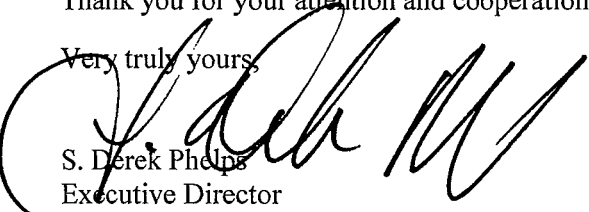
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated March 5, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,


S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange
Crown Castle USA, Inc.
Carrie L. Larson, Esq., Pullman & Comley, LLC



CONNECTICUT SITING COUNCIL
Affirmative Action / Equal Opportunity Employer

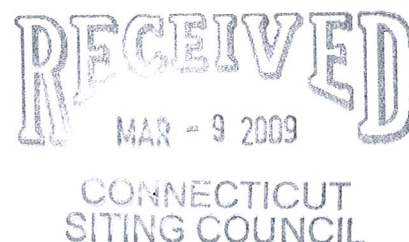
March 5, 2009

Via Federal Express

S. Derek Phelps, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

ORIGINAL

**Re: Notice of Exempt Modification
Crown Castle USA, Inc. Telecommunications Facility
Grassy Hill Road, Orange, Connecticut
T-Mobile Site CT11083Q**



Dear Mr. Phelps:

Omnipoint Communications, a subsidiary of T-Mobile USA, Inc. ("T-Mobile"), intends to install additional antennas and ground equipment to complement its existing equipment at the existing 140-foot monopole facility owned by Crown Castle USA, Inc. and located at Grassy Hill Road, Orange, Connecticut ("Facility"). T-Mobile is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation. This installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g *et. seq.* (PUESA), and Section 16-50j-72(b)(2) of the Regulations of the Connecticut State Agencies adopted pursuant to PUESA. In accordance with R.C.S.A. Section 16-50j-73, a copy of this notice has been sent to James Zeoli, First Selectman, Town of Orange.

The existing Facility consists of a 140-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-17'-08" and Long: 72°-02'-38"**. The tower is located approximately 250 feet east of the Wilbur Cross (Merritt) Parkway (Route 15) in the central portion of Orange. The Facility is just off the northbound ramp to Grassy Hill Road, roughly 300 feet west of Grassy Hill Road (see Site Map, attached as Exhibit A). The tower currently supports Pocket antennas at the one hundred foot level centerline AGL (above ground level) (100'), Verizon antennas at the one hundred twenty foot level (120') AGL, Sprint antennas at the one hundred thirty foot level (130') AGL and future AT&T antennas will be at the one hundred thirty six foot level (136') AGL. T-Mobile currently has antennas on the tower at the one hundred ten foot level (110') AGL. The current T-Mobile antenna configuration is one per sector, for a total of three antennas. T-Mobile proposes to add three additional UMTS antennas to the three existing GSM antennas. T-Mobile proposes to install three RFS APXV18-206516 antennas on existing mounts at the same elevation, (110') AGL. T-Mobile also intends to add a UMTS 3106 BTS equipment cabinet to its current configuration of two existing S8000 equipment cabinets. The three cabinets will both be mounted on T-Mobile's existing equipment pad contained within T-Mobile's existing lease area. T-Mobile intends to run new coaxial cable on its existing ice bridge from its current equipment pad to the existing tower. Utilities will be run via a proposed underground conduit

from existing utility sources at the Facility (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

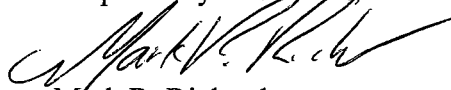
For the following reasons, the proposed modifications to the Grassy Hill Road Facility meet the exempt modification criteria set forth in R.C.S.A. Section 16-50j-72(b)(2):

1. The proposed modification will not increase the height of the tower as T-Mobile seeks to replace its existing antennas and install new antennas at a center line height of approximately 110 feet.
2. The installation and replacement of T-Mobile's antennas and ground equipment will not require an extension of the site boundaries.
3. The proposed modifications will not increase the noise levels at the existing Facility by six decibels or more.
4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. The worst-case RF power density calculations for the proposed T-Mobile antennas would be 28.1244% of the FCC standard (see general power density calculations table, attached as Exhibit D).

Also attached, Exhibit E, is a structural assessment confirming that the tower can support the existing and proposed antennas and associated equipment.

For the foregoing reasons, T-Mobile respectfully submits that the proposed antenna installation and equipment at the Orange Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Respectfully Submitted



Mark R. Richard
UMTS Project Manager
Agent for T-Mobile

cc: James Zeoli, First Selectman, Town of Orange (Town of Orange is also underlying property owner).

Exhibit A

Site Map

T-Mobile Site CT11083Q

700 Grassy Hill Road

Orange, Connecticut

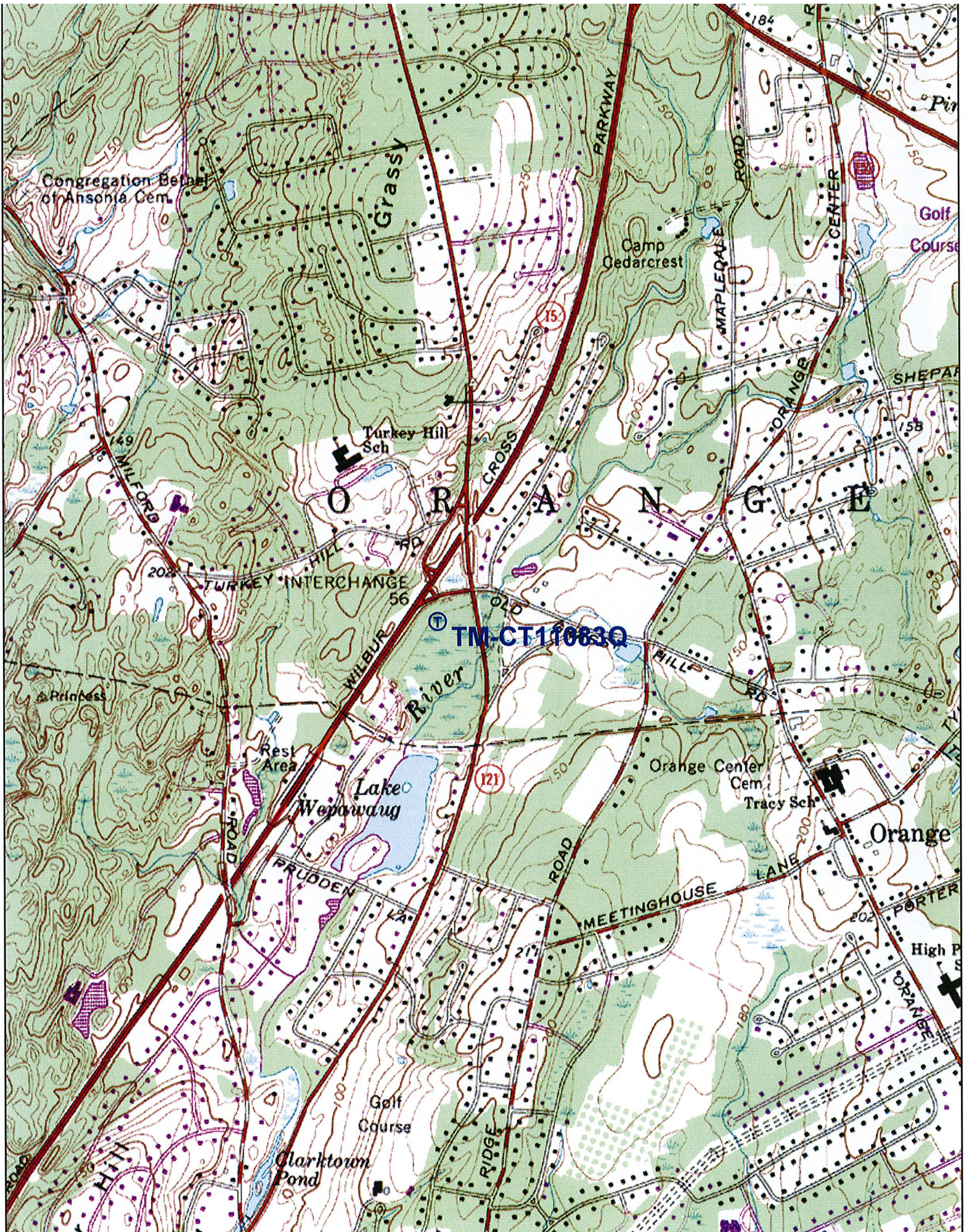


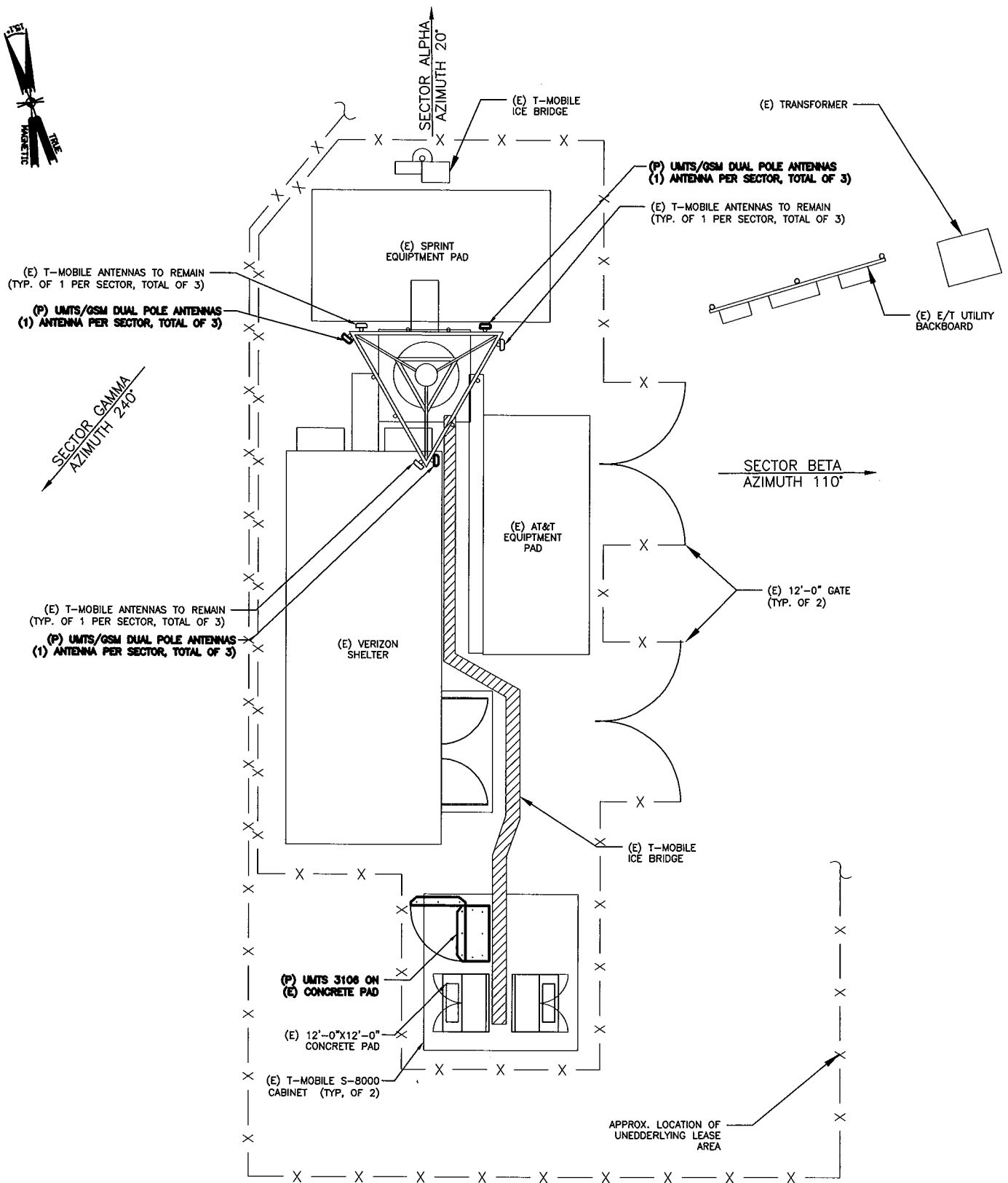
Exhibit B

Design Drawings

T-Mobile Site CT11083Q

700 Grassy Hill Road

Orange, Connecticut



COMPOUND LAYOUT PLAN

SCALE: NTS

1

T-Mobile
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002



50 Eastman St.
South Easton, MA 02375
Phone: (508) 936-6363
Fax: (508) 936-6365

PROJECT LOCATION:
CT083/SPRIN/GRASSY HILL
CT11083Q
700 GRASSY HILL ROAD
ORANGE, CT 06477

APPROVED BY:

PROJECT MANAGER:
KB

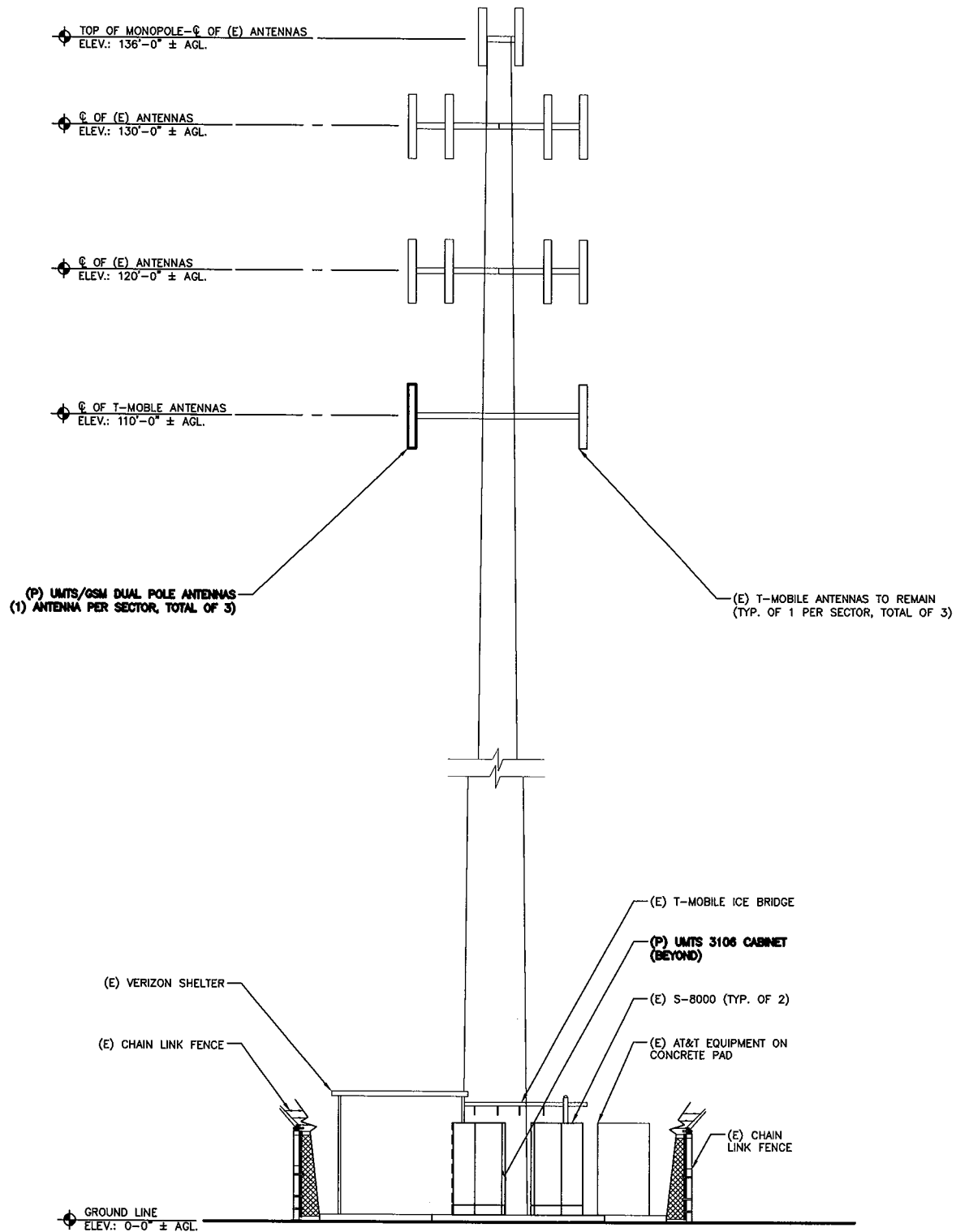
DRAWN BY:
MK

BSDA PROJ. #:
2898.235

02/03/09
01/16/09

**COMPOUND
LAYOUT
PLAN**

SHEET:
L1



T-Mobile
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002



50 Eastman St.
South Easton, MA 02375
Phone: (508) 836-8383
Fax: (508) 836-8385

PROJECT LOCATION:
CT083/SPRIN/GRASSY HILL
CT11083Q
700 GRASSY HILL ROAD
ORANGE, CT 06477

APPROVED BY:

PROJECT MANAGER:
KB

DRAWN BY:
MK

BSDA PROJ. #:
2898.235

SHEET:

ELEVATION

L2

02/03/09
01/16/09

Exhibit C

Equipment Specifications

T-Mobile Site CT11083Q

700 Grassy Hill Road

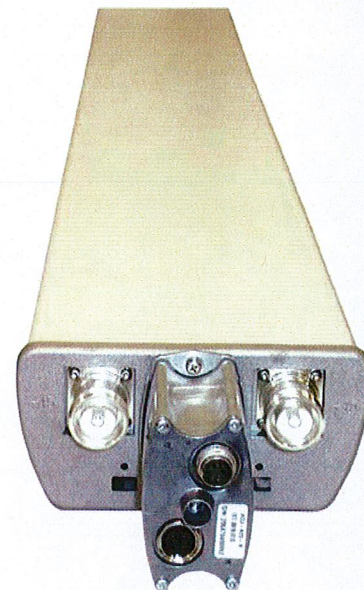
Orange, Connecticut

Optimizer® Panel Dual Polarized Antenna equipped with AISG 2.0 ACU motor
Product Description

This X-Polarized variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire AWS frequency band (1710-2155 MHz). The antenna comes pre-connected with one antenna control unit (ACU).

Features/Benefits

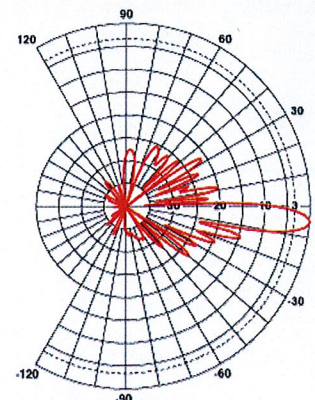
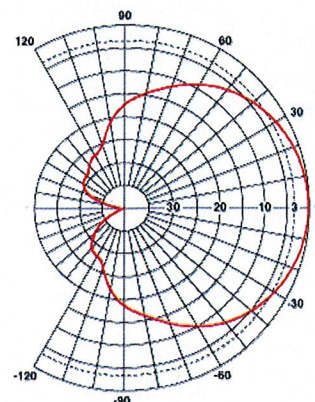
- **Variable electrical downtilt** - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.
- **High Suppression of all Upper Sidelobes** (Typically <-18dB).
- **Gain tracking** – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.
- **Azimuth horizontal beamwidth difference** <6deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz)
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes AISG 2.0 Compatible ACU-A20-N antenna control unit**


Technical Specifications
Electrical Specifications

Frequency Range, MHz	1710-2170
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable
Gain, dBi (dBd)	18.4 (16.3)
Electrical Downtilt, deg	0-10, 0-10
Horizontal Beamwidth, deg	65
VSWR	< 1.5:1
Vertical Beamwidth, deg	5.9 to 7.7
1st Upper Sidelobe Suppression, dB	> 18
Upper Sidelobe Suppression, dB	> 18 all
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	>26 (typically 28)
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)

Mechanical Specifications

Rated Wind Speed, km/h (mph)	160 (100)
Survival Wind Speed, km/h (mph)	200 (125)
Max Wind Loading Area, m² (ft²)	0.29 (2.9)
Maximum Thrust @ Rated Wind, N (lbf)	380 (185)
Front Thrust @ Rated Wind, N (lbf)	380 (185)
Reflector Material	Aluminum
Radiating Element Material	Brass
Radome Material	Fiberglass
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Mounting Hardware	APM40-2
Weight w/o Mtg Hardware, kg (lb)	8.5 (18.7)
Packing Dimensions, HxWxD, mm (in)	1439 x 237 x 260 (56.6 x 9.3 x 10.3)
Dimensions - HxWxD, mm (in)	1349 x 175 x 80 (53.1 x 6.9 x 3.15)
Shipping Weight, kg (lb)	14.5 (31.9)


Vertical Pattern

Horizontal Pattern

3 Dimensions

This section describes the physical characteristics of the RBS, that is, dimensions, weight, and color.

Table 1 RBS 3106 Dimensions

Unit	Dimensions (mm)
Height (including installation frame)	1626
Width	1300
Depth	710
Depth including door	926

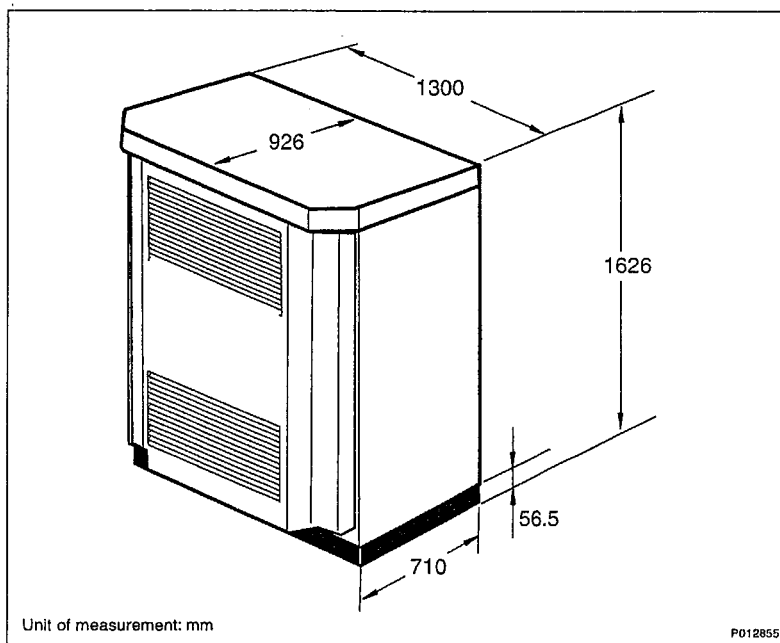


Figure 2 RBS 3106 Dimensions

The various weights of the RBS 3106 are shown in the table below.

Table 2 RBS 3106 Weights

Unit	Type	Weight (kg)
RBS fully equipped excluding batteries	AC-powered	560
RBS fully equipped including batteries	AC-powered	850

Unit	Type	Weight (kg)
RBS fully equipped including batteries and future expansion of hardware (not yet available)	AC-powered	875
RBS fully equipped	DC-powered	510
Installation frame	AC- and DC-powered	12

The color of RBS 3106 is shown in the table below.

Table 3 RBS 3106 Color

Color	Color Standard
Gray	RAL 7035
Green	NCS 8010-G 10 Y

Exhibit D

Power Density Calculations

T-Mobile Site CT11083Q

700 Grassy Hill Road

Orange, Connecticut

Technical Memo

To: Maxton
From: Farid Marbough - Radio Frequency Engineer
cc: Jason Overbey
Subject: Power Density Report for CT11083Q
Date: February 12, 2009

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile PCS antenna installation on a Monopole at 700 Grassy Hill Road, Orange, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

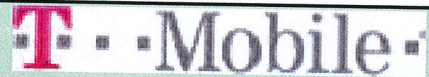
- 1) The emissions from T-Mobile transmitters are in the (1935-1944.8), (1980.2-1984.8), (2140-2145), (2110-2120)MHz frequency Band.
- 2) The antenna array consists of three sectors, with 2 antennas per sector.
- 3) The model number for GSM antenna is RR90-17-02DP.
- 3) The model number for UMTS antenna is APXV18-206516S.
- 4) GSM antenna center line height is 110 ft.
- 4) UMTS antenna center line height is 110 ft.
- 5) The maximum transmit power from any GSM sector is 1614.66 Watts Effective Radiated Power (EiRP) assuming 8 channels per sector.
- 5) The maximum transmit power from any UMTS sector is 2075.15 Watts Effective Radiated Power (EiRP) assuming 2 channels per sector.
- 6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
- 7) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) The average ground level of the studied area does not change significantly with respect to the transmitting location

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile PCS antenna installation on a Monopole at 700 Grassy Hill Road, Orange, CT, is 0.07484 mW/cm². This value represents 7.484% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm²) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area. The combined Power Density from other carriers is 20.64%. The combined Power Density for the site is 28.124% of the M.P.E. standard.

Connecticut Market



Worst Case Power Density

Site: CT11083Q
Site Address: 700 Grassy Hill Road
Town: Orange
Tower Height: 140 ft.
Tower Style: Monopole

GSM Data		UMTS Data	
Base Station TX output	20 W	Base Station TX output	40 W
Number of channels	8	Number of channels	2
Antenna Model	RR90-17-02DP	Antenna Model	APXV18-206516S
Cable Size	1 5/8 in.	Cable Size	1 5/8 in.
Cable Length	169 ft.	Cable Length	169 ft.
Antenna Height	110.0 ft.	Antenna Height	110.0 ft.
Ground Reflection	1.6	Ground Reflection	1.6
Frequency	1945.0 MHz	Frequency	2.1 GHz
Jumper & Connector loss	4.50 dB	Jumper & Connector loss	1.50 dB
Antenna Gain	16.5 dBi	Antenna Gain	17.6 dBi
Cable Loss per foot	0.0116 dB	Cable Loss per foot	0.0116 dB
Total Cable Loss	1.9604 dB	Total Cable Loss	1.9604 dB
Total Attenuation	6.4604 dB	Total Attenuation	3.4604 dB
Total EIRP per Channel (In Watts)	53.05 dBm 201.83 W	Total EIRP per Channel (In Watts)	60.16 dBm 1037.58 W
Total EIRP per Sector (In Watts)	62.08 dBm 1614.66 W	Total EIRP per Sector (In Watts)	63.17 dBm 2075.15 W
nsg	10.0396	nsg	14.1396
Power Density (S) = 0.032752 mW/cm^2		Power Density (S) = 0.042092 mW/cm^2	
T-Mobile Worst Case % MPE =		7.4844%	
Equation Used :			
$S = \frac{(1000)(grf)^2 (Power) 10^{(nsg/10)}}{4 \pi (R)^2}$			
Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997			

Co-Location Total

Carrier	% of Standard
Verizon	7.7000 %
Cingular	3.1300 %
Sprint	9.8100 %
AT&T Wireless	
Nextel	
Pocket	
Other Antenna Systems	
Total Excluding T-Mobile	20.6400 %
T-Mobile	7.4844
Total % MPE for Site	28.1244%

Exhibit E

Structural Analysis

T-Mobile Site CT11083Q

700 Grassy Hill Road

Orange, Connecticut

Date: February 09, 2009

Veronica Harris
Crown Castle USA Inc.
1200 McArthur Blvd
Mahwah, NJ 07430



Crown Castle USA Inc.
2000 Corporate Drive
Canonsburg, PA
724-416-2000

Subject: Structural Analysis Report

Carrier Designation:	T-MOBILE Co-Locate	
	Carrier Site Number:	CT11083Q
Crown Castle Designation:	Crown Castle BU Number:	881541
PROPERTY	Crown Castle Site Name:	ROGERS
	Crown Castle JDE Job Number:	114309
	Crown Castle Work Order Number:	251827
Engineering Firm Designation:	Crown Castle USA Inc. Project Number:	251827
Site Data:	Grassy Hill Road, Orange, New Haven County, CT Latitude 41° 17' 7.75", Longitude -73° 2' 33.27" 139.5 Foot - Monopole Tower	

Dear Veronica Harris,

Crown Castle USA Inc. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 251827, in accordance with application 73382, revision 2.

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:

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

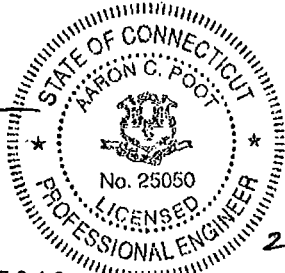
All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Jon W. McElroy, Engineer I

Respectfully submitted by:


Aaron C. Poot, P.E.
Engineering Supervisor



2/9/09

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1) INTRODUCTION

This tower is a 139.5 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in March of 2004. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 73.6 mph with 0.5 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
108	109	3	rfs celwave	APXV18-206516S-C-A20 w/ Mount Pipe	-	-	-
		3	rfs celwave	ATMAA1412D-1A20			

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
136	136	3	powerwave technologies	7770.00 w/Mount Pipe	6	1-5/8	2
		6	powerwave technologies	LGP21401			
		-	tower mounts	Flushed Mount			
130	130	6	css	CSS-XS4-65-R	6	1-5/8	1
		-	tower mounts	T-Arm Mount [TA 602-3]			
120	121	12	decibel	DB844H90 w/ Mount Pipe	12	1-5/8	1
	120	-	tower mounts	T-Arm Mount [TA 602-3]			
108	109	3	ems wireless	RR90-17-02DP w/Mount Pipe	12	1-5/8	1
		6	ericsson	KRY 112 71			
	108	-	tower mounts	T-Arm Mount [TA 602-3]			
100	100	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	2
		-	tower mounts	Flushed Mount			
75	77	1	lucent	KS24019-L112A	1	1/2	1
	75	-	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
140	140	12	dapa	48000	12	-
130	130	12	dapa	48000	12	-
120	120	12	dapa	48000	12	-
110	110	12	dapa	48000	12	-
100	100	12	dapa	48000	12	-
75	75	1	-	GPS	1	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Geotechnical Engineering	2245154	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	2208511	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	2245157	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	2207700	CCISITES
Application	T-Mobile, Rev. 2	App# 73382	CCISITES

3.1) Analysis Method

RISATower (version 5.3.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	139.5 - 93.12	Pole	TP26.989x15.5x0.25	1	-6.638	1063.443	41.5	Pass
L2	93.12 - 46.4354	Pole	TP37.928x25.529x0.375	2	-14.584	2244.119	47.1	Pass
L3	46.4354 - 0	Pole	TP48.5x35.892x0.375	3	-26.726	2977.855	54.1	Pass
							Summary	
						Pole (L3)	54.1	Pass
						RATING =	54.1	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	41.4	Pass
1	Base Plate	0	68.4	Pass
1	Base Foundation (Compared w/ Design Loads)	0	61.2	Pass

Structure Rating (max from all components) =	68.4%
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Notes:

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

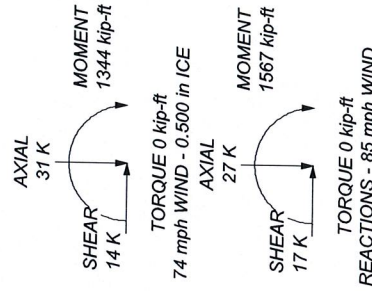
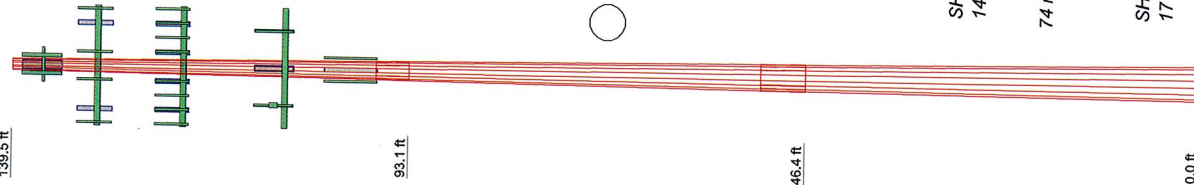
4.1) Recommendations

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

APPENDIX A
RISA TOWER OUTPUT

139.5 ft

Section	Length (ft)	Number of Sides	Thickness (in)	Lap Splice (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	46.380	18	0.250	3.872	15.500	26.989		2.8
2	50.557	18	0.375		25.529	37.926	A572-65	6.7
3	51.677	18	0.375	5.242	35.892	48.500		9.2
								18.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 w/ Mount Pipe	136	RR90-17-02DP w/ Mount Pipe	108
7770.00 w/ Mount Pipe	136	(2) KRY 112 71	108
7770.00 w/ Mount Pipe	136	APXY18-206516S-C-A20 w/ Mount Pipe	108
(2) LGP21401	136	ATMAA1412D-1A20	108
(2) LGP21401	136	APXY18-206516S-C-A20 w/ Mount Pipe	108
Flushed Mount	136	ATMAA1412D-1A20	108
(2) CSS-XS4-65-R w/ Mount Pipe	130	APXY18-206516S-C-A20 w/ Mount Pipe	108
(2) CSS-XS4-65-R w/ Mount Pipe	130	ATMAA1412D-1A20	108
(2) CSS-XS4-65-R w/ Mount Pipe	130	(2) 2"6"x4" Pipe Mount	108
T-Arm Mount [TA 602-3]	130	(2) 2"6"x4" Pipe Mount	108
(4) DB844H90 w/ Mount Pipe	120	T-Arm Mount [TA 602-3]	108
(4) DB844H90 w/ Mount Pipe	120	742 213 w/ Mount Pipe	100
(4) DB844H90 w/ Mount Pipe	120	742 213 w/ Mount Pipe	100
T-Arm Mount [TA 602-3]	120	Flushed Mount	100
RR90-17-02DP w/ Mount Pipe	108	KS24019L112A	75
(2) KRY 112 71	108	Side Arm Mount [SO 701-1]	75
RR90-17-02DP w/ Mount Pipe	108		
(2) KRY 112 71	108		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 54.1%



CROWN CASTLE
Shaping the Wireless World

Crown Castle USA, Inc.
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: **BU # 881541**

Project: Crown Castle USA
Client: Crown Castle USA
Code: TIA/EIA-222-F
Date: 02/09/09
Scale: NTS
Path: R:\S&A Models - Letters\Work Area\Mac\881541\881541.dwg
Dwg No: E-1

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	Client	Crown Castle USA	Designed by jcaruthers

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.500 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Options

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

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	139.500-93.120	46.380	3.872	18	15.500	26.989	0.250	1.000	A572-65 (65 ksi)
L2	93.120-46.435	50.557	5.242	18	25.529	37.928	0.375	1.500	A572-65 (65 ksi)
L3	46.435-0.000	51.677		18	35.892	48.500	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

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Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	15.739	12.101	355.544	5.414	7.874	45.154	711.557	6.052	2.288	9.152
	27.405	21.217	1916.463	9.492	13.710	139.784	3835.447	10.611	4.310	17.24
L2	26.888	29.940	2393.408	8.930	12.969	184.549	4789.965	14.973	3.833	10.222
	38.513	44.697	7963.348	13.331	19.267	413.311	15937.174	22.353	6.015	16.041
L3	37.744	42.274	6737.330	12.609	18.233	369.509	13483.525	21.141	5.657	15.085
	49.248	57.281	16760.535	17.084	24.638	680.272	33543.123	28.646	7.876	21.003

Tower Elevation	Gusset Area (per face)	Gusset Thickness	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
ft	ft ²	in						
L1 139.500-93.120				1	1	1.05		
L2 93.120-46.435				1	1	1.05		
L3 46.435-0.000				1	1	1.05		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight klf
LDF7-50A(1-5/8")	B	No	Inside Pole	136.000 - 0.000	6	No Ice 0.000	0.001
LDF7-50A(1-5/8")	C	No	Inside Pole	130.000 - 0.000	6	1/2" Ice 0.000	0.001
LDF7-50A(1-5/8")	A	No	Inside Pole	120.000 - 0.000	12	No Ice 0.000	0.001
LDF7-50A(1-5/8")	B	No	Inside Pole	108.000 - 0.000	12	1/2" Ice 0.000	0.001
CR 50 1873(1-5/8")	B	No	Inside Pole	100.000 - 0.000	6	No Ice 0.000	0.001
LDF4-50A(1/2")	B	No	Inside Pole	75.000 - 0.000	1	1/2" Ice 0.000	0.001
						No Ice 0.000	0.000
						1/2" Ice 0.000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	139.500-93.120	A	0.000	0.000	0.000	0.000	0.264
		B	0.000	0.000	0.000	0.000	0.392
		C	0.000	0.000	0.000	0.000	0.181
L2	93.120-46.435	A	0.000	0.000	0.000	0.000	0.459
		B	0.000	0.000	0.000	0.000	0.926
		C	0.000	0.000	0.000	0.000	0.230
L3	46.435-0.000	A	0.000	0.000	0.000	0.000	0.457
		B	0.000	0.000	0.000	0.000	0.924
		C	0.000	0.000	0.000	0.000	0.228

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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} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	139.500-93.120	A	0.500	0.000	0.000	0.000	0.000	0.264
		B		0.000	0.000	0.000	0.000	0.392
		C		0.000	0.000	0.000	0.000	0.181
L2	93.120-46.435	A	0.500	0.000	0.000	0.000	0.000	0.459
		B		0.000	0.000	0.000	0.000	0.926
		C		0.000	0.000	0.000	0.000	0.230
L3	46.435-0.000	A	0.500	0.000	0.000	0.000	0.000	0.457
		B		0.000	0.000	0.000	0.000	0.924
		C		0.000	0.000	0.000	0.000	0.228

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	139.500-93.120	0.000	0.000	0.000	0.000
L2	93.120-46.435	0.000	0.000	0.000	0.000
L3	46.435-0.000	0.000	0.000	0.000	0.000

Discrete Tower Loads

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
7770.00 w/Mount Pipe	A	From Leg	0.500	0.000	136.000	No Ice	5.921	0.052
			0.000			1/2" Ice	6.363	0.096
			0.000					
7770.00 w/Mount Pipe	B	From Leg	0.500	0.000	136.000	No Ice	5.921	0.052
			0.000			1/2" Ice	6.363	0.096
			0.000					
7770.00 w/Mount Pipe	C	From Leg	0.500	0.000	136.000	No Ice	5.921	0.052
			0.000			1/2" Ice	6.363	0.096
			0.000					
(2) LGP21401	A	From Leg	0.500	0.000	136.000	No Ice	1.288	0.014
			0.000			1/2" Ice	1.445	0.021
			0.000					
(2) LGP21401	B	From Leg	0.500	0.000	136.000	No Ice	1.288	0.014
			0.000			1/2" Ice	1.445	0.021
			0.000					
(2) LGP21401	C	From Leg	0.500	0.000	136.000	No Ice	1.288	0.014
			0.000			1/2" Ice	1.445	0.021
			0.000					
Flushed Mount	C	None		0.000	136.000	No Ice	3.470	0.052
						1/2" Ice	4.450	0.059

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) CSS-XS4-65-R w/MountPipe	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	3.176 3.532	3.045 3.599	0.052 0.081
(2) CSS-XS4-65-R w/MountPipe	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	3.176 3.532	3.045 3.599	0.052 0.081
(2) CSS-XS4-65-R w/MountPipe	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice	3.176 3.532	3.045 3.599	0.052 0.081
T-Arm Mount [TA 602-3]	A	None		0.000	130.000	No Ice 1/2" Ice	11.590 15.440	11.590 15.440	0.774 0.990
**** ****									
(4) DB844H90 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	120.000	No Ice 1/2" Ice	3.299 3.690	4.921 5.596	0.028 0.066
(4) DB844H90 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	120.000	No Ice 1/2" Ice	3.299 3.690	4.921 5.596	0.028 0.066
(4) DB844H90 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	120.000	No Ice 1/2" Ice	3.299 3.690	4.921 5.596	0.028 0.066
T-Arm Mount [TA 602-3]	A	None		0.000	120.000	No Ice 1/2" Ice	11.590 15.440	11.590 15.440	0.774 0.990
** **									
RR90-17-02DP w/Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	4.910 5.572	3.636 4.703	0.044 0.082
(2) KRY 112 71	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	0.681 0.802	0.450 0.559	0.000 0.005
RR90-17-02DP w/Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	4.910 5.572	3.636 4.703	0.044 0.082
(2) KRY 112 71	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	0.681 0.802	0.450 0.559	0.000 0.005
RR90-17-02DP w/Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	4.910 5.572	3.636 4.703	0.044 0.082
(2) KRY 112 71	C	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	0.681 0.802	0.450 0.559	0.000 0.005
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	3.859 4.274	3.296 4.004	0.039 0.071
ATMAA1412D-1A20	A	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	1.517 1.683	0.467 0.575	0.013 0.022
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	3.859 4.274	3.296 4.004	0.039 0.071
ATMAA1412D-1A20	B	From Leg	4.000 0.000 1.000	0.000	108.000	No Ice 1/2" Ice	1.517 1.683	0.467 0.575	0.013 0.022
APXV18-206516S-C-A20 w/	C	From Leg	4.000	0.000	108.000	No Ice	3.859	3.296	0.039

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Mount Pipe			0.000		1/2" Ice	4.274	4.004	0.071
ATMAA1412D-1A20	C	From Leg	1.000					
			4.000	0.000	108.000	No Ice	1.517	0.467
			0.000			1/2" Ice	1.683	0.575
			1.000					0.013
(2) 2'6"x4" Pipe Mount	A	From Leg	4.000	0.000	108.000	No Ice	0.750	0.750
			0.000			1/2" Ice	0.947	0.947
			0.000					0.027
(2) 2'6"x4" Pipe Mount	B	From Leg	4.000	0.000	108.000	No Ice	0.750	0.750
			0.000			1/2" Ice	0.947	0.947
			0.000					0.027
(2) 2'6"x4" Pipe Mount	C	From Leg	4.000	0.000	108.000	No Ice	0.750	0.750
			0.000			1/2" Ice	0.947	0.947
			0.000					0.027
T-Arm Mount [TA 602-3]	C	None	0.000	0.000	108.000	No Ice	11.590	11.590
						1/2" Ice	15.440	15.440
								0.774
****								0.990

KS24019-L112A	A	From Leg	3.000	0.000	75.000	No Ice	0.100	0.100
			0.000			1/2" Ice	0.180	0.180
			2.000					0.005
Side Arm Mount [SO 701-1]	A	From Leg	1.500	0.000	75.000	No Ice	0.850	1.670
			0.000			1/2" Ice	1.140	2.340
			0.000					0.065
****								0.079

742 213 w/ Mount Pipe	A	From Leg	0.500	0.000	100.000	No Ice	5.373	4.620
			0.000			1/2" Ice	5.950	6.000
			0.000					0.049
742 213 w/ Mount Pipe	B	From Leg	0.500	0.000	100.000	No Ice	5.373	4.620
			0.000			1/2" Ice	5.950	6.000
			0.000					0.049
742 213 w/ Mount Pipe	C	From Leg	0.500	0.000	100.000	No Ice	5.373	4.620
			0.000			1/2" Ice	5.950	6.000
			0.000					0.049
Flushed Mount	C	None	0.000	0.000	100.000	No Ice	3.470	1.670
						1/2" Ice	4.450	2.100
								0.052
								0.059

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	139.5 - 93.12	Pole	Max Tension	5	0.000	0.000	-0.000
			Max. Compression	14	-9.618	0.000	0.000
			Max. Mx	5	-6.638	-230.043	0.004
			Max. My	2	-6.638	0.000	230.038
			Max. Vy	5	10.525	-230.043	0.004
			Max. Vx	2	-10.525	0.000	230.038
			Max. Torque	10			0.000
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.298	0.000	0.248
			Max. Mx	5	-14.584	-776.118	0.207
L2	93.12 - 46.4354	Pole	Max. My	2	-14.586	0.000	775.545
			Max. Vy	5	13.616	-776.118	0.207
			Max. Vx	2	-13.583	0.000	775.545
			Max. Torque	18			0.219
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.466	0.000	0.248
			Max. Mx	5	-26.726	-1566.880	0.209
			Max. My	2	-26.726	0.000	1564.616
			Max. Vy	5	17.022	-1566.880	0.209
			Max. Vx	2	-16.989	0.000	1564.616
L3	46.4354 - 0	Pole	Max. Torque	24			-0.219

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Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	31.466	0.000	0.000
	Max. H _x	11	26.736	17.006	0.000
	Max. H _z	2	26.736	0.000	16.974
	Max. M _x	2	1564.616	0.000	16.974
	Max. M _z	5	1566.880	-17.006	0.000
	Max. Torsion	18	0.219	-14.155	0.000
	Min. Vert	5	26.736	-17.006	0.000
	Min. H _x	5	26.736	-17.006	0.000
	Min. H _z	8	26.736	0.000	-16.974
	Min. M _x	8	-1564.197	0.000	-16.974
	Min. M _z	11	-1566.880	17.006	0.000
	Min. Torsion	24	-0.219	14.155	0.000

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	26.736	0.000	0.000	-0.203	0.000	0.000
Dead+Wind 0 deg - No Ice	26.736	0.000	-16.974	-1564.616	0.000	0.000
Dead+Wind 30 deg - No Ice	26.736	8.504	-14.701	-1355.127	-783.500	-0.101
Dead+Wind 60 deg - No Ice	26.736	14.729	-8.487	-782.471	-1357.060	-0.176
Dead+Wind 90 deg - No Ice	26.736	17.006	-0.000	-0.209	-1566.880	-0.203
Dead+Wind 120 deg - No Ice	26.736	14.729	8.487	782.052	-1357.060	-0.176
Dead+Wind 150 deg - No Ice	26.736	8.504	14.701	1354.708	-783.500	-0.102
Dead+Wind 180 deg - No Ice	26.736	0.000	16.974	1564.197	0.000	0.000
Dead+Wind 210 deg - No Ice	26.736	-8.504	14.701	1354.708	783.500	0.102
Dead+Wind 240 deg - No Ice	26.736	-14.729	8.487	782.052	1357.060	0.176
Dead+Wind 270 deg - No Ice	26.736	-17.006	-0.000	-0.209	1566.880	0.203
Dead+Wind 300 deg - No Ice	26.736	-14.729	-8.487	-782.471	1357.060	0.176
Dead+Wind 330 deg - No Ice	26.736	-8.504	-14.701	-1355.127	783.500	0.101
Dead+Ice	31.466	0.000	0.000	-0.248	0.000	0.000
Dead+Wind 0 deg+Ice	31.466	0.000	-14.120	-1341.236	0.000	0.000
Dead+Wind 30 deg+Ice	31.466	7.078	-12.228	-1161.604	-671.868	-0.109
Dead+Wind 60 deg+Ice	31.466	12.259	-7.060	-670.761	-1163.708	-0.189
Dead+Wind 90 deg+Ice	31.466	14.155	-0.000	-0.259	-1343.706	-0.219
Dead+Wind 120 deg+Ice	31.466	12.259	7.060	670.243	-1163.708	-0.189
Dead+Wind 150 deg+Ice	31.466	7.078	12.228	1161.086	-671.868	-0.109
Dead+Wind 180 deg+Ice	31.466	0.000	14.120	1340.718	0.000	0.000
Dead+Wind 210 deg+Ice	31.466	-7.078	12.228	1161.086	671.868	0.109
Dead+Wind 240 deg+Ice	31.466	-12.259	7.060	670.243	1163.708	0.189
Dead+Wind 270 deg+Ice	31.466	-14.155	-0.000	-0.259	1343.706	0.219
Dead+Wind 300 deg+Ice	31.466	-12.259	-7.060	-670.761	1163.708	0.189
Dead+Wind 330 deg+Ice	31.466	-7.078	-12.228	-1161.604	671.868	0.109
Dead+Wind 0 deg - Service	26.736	0.000	-5.873	-541.783	0.000	0.000
Dead+Wind 30 deg - Service	26.736	2.942	-5.086	-469.226	-271.215	-0.035
Dead+Wind 60 deg - Service	26.736	5.096	-2.937	-270.997	-469.758	-0.061
Dead+Wind 90 deg - Service	26.736	5.885	0.000	-0.210	-542.430	-0.070
Dead+Wind 120 deg - Service	26.736	5.096	2.937	270.577	-469.758	-0.061
Dead+Wind 150 deg - Service	26.736	2.942	5.086	468.807	-271.215	-0.035
Dead+Wind 180 deg - Service	26.736	0.000	5.873	541.364	0.000	0.000

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Load Combination	Vertical K	Shear _x K	Shear _y K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 210 deg - Service	26.736	-2.942	5.086	468.807	271.215	0.035
Dead+Wind 240 deg - Service	26.736	-5.096	2.937	270.577	469.758	0.061
Dead+Wind 270 deg - Service	26.736	-5.885	0.000	-0.210	542.430	0.070
Dead+Wind 300 deg - Service	26.736	-5.096	-2.937	-270.997	469.758	0.061
Dead+Wind 330 deg - Service	26.736	-2.942	-5.086	-469.226	271.215	0.035

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	0.000	-26.736	0.000	0.000	26.736	0.000	0.000%
2	0.000	-26.736	-16.975	0.000	26.736	16.974	0.003%
3	8.504	-26.736	-14.701	-8.504	26.736	14.701	0.000%
4	14.729	-26.736	-8.487	-14.729	26.736	8.487	0.000%
5	17.007	-26.736	0.000	-17.006	26.736	0.000	0.003%
6	14.729	-26.736	8.487	-14.729	26.736	-8.487	0.000%
7	8.504	-26.736	14.701	-8.504	26.736	-14.701	0.000%
8	0.000	-26.736	16.975	0.000	26.736	-16.974	0.003%
9	-8.504	-26.736	14.701	8.504	26.736	-14.701	0.000%
10	-14.729	-26.736	8.487	14.729	26.736	-8.487	0.000%
11	-17.007	-26.736	0.000	17.006	26.736	0.000	0.003%
12	-14.729	-26.736	-8.487	14.729	26.736	8.487	0.000%
13	-8.504	-26.736	-14.701	8.504	26.736	14.701	0.000%
14	0.000	-31.466	0.000	0.000	31.466	0.000	0.000%
15	0.000	-31.466	-14.120	0.000	31.466	14.120	0.001%
16	7.078	-31.466	-12.228	-7.078	31.466	12.228	0.000%
17	12.259	-31.466	-7.060	-12.259	31.466	7.060	0.000%
18	14.155	-31.466	0.000	-14.155	31.466	0.000	0.001%
19	12.259	-31.466	7.060	-12.259	31.466	-7.060	0.000%
20	7.078	-31.466	12.228	-7.078	31.466	-12.228	0.000%
21	0.000	-31.466	14.120	0.000	31.466	-14.120	0.001%
22	-7.078	-31.466	12.228	7.078	31.466	-12.228	0.000%
23	-12.259	-31.466	7.060	12.259	31.466	-7.060	0.000%
24	-14.155	-31.466	0.000	14.155	31.466	0.000	0.001%
25	-12.259	-31.466	-7.060	12.259	31.466	7.060	0.000%
26	-7.078	-31.466	-12.228	7.078	31.466	12.228	0.000%
27	0.000	-26.736	-5.874	0.000	26.736	5.873	0.001%
28	2.942	-26.736	-5.087	-2.942	26.736	5.086	0.001%
29	5.096	-26.736	-2.937	-5.096	26.736	2.937	0.001%
30	5.885	-26.736	0.000	-5.885	26.736	-0.000	0.001%
31	5.096	-26.736	2.937	-5.096	26.736	-2.937	0.001%
32	2.942	-26.736	5.087	-2.942	26.736	-5.086	0.001%
33	0.000	-26.736	5.874	0.000	26.736	-5.873	0.001%
34	-2.942	-26.736	5.087	2.942	26.736	-5.086	0.001%
35	-5.096	-26.736	2.937	5.096	26.736	-2.937	0.001%
36	-5.885	-26.736	0.000	5.885	26.736	-0.000	0.001%
37	-5.096	-26.736	-2.937	5.096	26.736	2.937	0.001%
38	-2.942	-26.736	-5.087	2.942	26.736	5.086	0.001%

Non-Linear Convergence Results

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00006538	0.00014413
3	Yes	7	0.00000001	0.00008455
4	Yes	7	0.00000001	0.00008540
5	Yes	5	0.00006538	0.00014623
6	Yes	7	0.00000001	0.00008424
7	Yes	7	0.00000001	0.00008511
8	Yes	5	0.00006538	0.00014407
9	Yes	7	0.00000001	0.00008511
10	Yes	7	0.00000001	0.00008424
11	Yes	5	0.00006538	0.00014623
12	Yes	7	0.00000001	0.00008540
13	Yes	7	0.00000001	0.00008455
14	Yes	4	0.00000001	0.00000001
15	Yes	6	0.00000001	0.00003556
16	Yes	7	0.00000001	0.00007393
17	Yes	7	0.00000001	0.00007502
18	Yes	6	0.00000001	0.00003622
19	Yes	7	0.00000001	0.00007355
20	Yes	7	0.00000001	0.00007463
21	Yes	6	0.00000001	0.00003554
22	Yes	7	0.00000001	0.00007463
23	Yes	7	0.00000001	0.00007355
24	Yes	6	0.00000001	0.00003622
25	Yes	7	0.00000001	0.00007502
26	Yes	7	0.00000001	0.00007393
27	Yes	5	0.00000001	0.00006140
28	Yes	5	0.00000001	0.00007011
29	Yes	5	0.00000001	0.00007314
30	Yes	5	0.00000001	0.00006154
31	Yes	5	0.00000001	0.00006923
32	Yes	5	0.00000001	0.00007211
33	Yes	5	0.00000001	0.00006133
34	Yes	5	0.00000001	0.00007211
35	Yes	5	0.00000001	0.00006923
36	Yes	5	0.00000001	0.00006154
37	Yes	5	0.00000001	0.00007314
38	Yes	5	0.00000001	0.00007011

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139.5 - 93.12	20.131	30	1.234	0.000
L2	96.9924 - 46.4354	9.847	30	0.970	0.000
L3	51.6774 - 0	2.761	30	0.502	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
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<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>			<i>in</i>	<i>°</i>	<i>°</i>	<i>ft</i>
136.000	7770.00 w/Mount Pipe	30	19.229	1.218	0.000	45620
130.000	(2) CSS-XS4-65-R w/MountPipe	30	17.690	1.191	0.000	24010
120.000	(4) DB844H90 w/ Mount Pipe	30	15.169	1.139	0.000	11697
108.000	RR90-17-02DP w/Mount Pipe	30	12.285	1.063	0.000	7240
100.000	742 213 w/ Mount Pipe	30	10.489	0.998	0.000	5780
75.000	KS24019-L112A	30	5.781	0.726	0.000	4914

Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation</i>	<i>Horz. Deflection</i>	<i>Gov. Load Comb.</i>	<i>Tilt</i>	<i>Twist</i>
	<i>ft</i>	<i>in</i>		<i>°</i>	<i>°</i>
L1	139.5 - 93.12	58.110	5	3.563	0.001
L2	96.9924 - 46.4354	28.432	5	2.802	0.001
L3	51.6774 - 0	7.976	5	1.449	0.000

Critical Deflections and Radius of Curvature - Design Wind

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection</i>	<i>Tilt</i>	<i>Twist</i>	<i>Radius of Curvature</i>
<i>ft</i>			<i>in</i>	<i>°</i>	<i>°</i>	<i>ft</i>
136.000	7770.00 w/Mount Pipe	5	55.508	3.514	0.001	15909
130.000	(2) CSS-XS4-65-R w/MountPipe	5	51.065	3.427	0.001	8373
120.000	(4) DB844H90 w/ Mount Pipe	5	43.792	3.272	0.001	4078
108.000	RR90-17-02DP w/Mount Pipe	5	35.468	3.053	0.001	2523
100.000	742 213 w/ Mount Pipe	5	30.285	2.876	0.001	2013
75.000	KS24019-L112A	5	16.693	2.153	0.001	1707

Compression Checks

Pole Design Data

<i>Section No.</i>	<i>Elevation</i>	<i>Size</i>	<i>L</i>	<i>L_u</i>	<i>Kl/r</i>	<i>F_a</i>	<i>A</i>	<i>Actual P</i>	<i>Allow. P_a</i>	<i>Ratio P</i>
	<i>ft</i>		<i>ft</i>	<i>ft</i>		<i>ksi</i>	<i>in²</i>	<i>K</i>	<i>K</i>	<i>P_a</i>
L1	139.5 - 93.12 (1)	TP26.989x15.5x0.25	46.380	0.000	0.0	39.000	20.456	-6.638	797.782	0.008
L2	93.12 - 46.4354 (2)	TP37.928x25.529x0.375	50.557	0.000	0.0	39.000	43.167	-14.584	1683.510	0.009
L3	46.4354 - 0 (3)	TP48.5x35.892x0.375	51.677	0.000	0.0	39.000	57.281	-26.726	2233.950	0.012

Pole Bending Design Data

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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	139.5 - 93.12 (1)	TP26.989x15.5x0.25	230.063	21.255	39.000	0.545	0.000	0.000	39.000	0.000
L2	93.12 - 46.4354 (2)	TP37.928x25.529x0.375	776.118	24.168	39.000	0.620	0.000	0.000	39.000	0.000
L3	46.4354 - 0 (3)	TP48.5x35.892x0.375	1566.88 3	27.640	39.000	0.709	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	139.5 - 93.12 (1)	TP26.989x15.5x0.25	10.526	0.515	26.000	0.040	0.000	0.000	26.000	0.000
L2	93.12 - 46.4354 (2)	TP37.928x25.529x0.375	13.616	0.315	26.000	0.024	0.203	0.003	26.000	0.000
L3	46.4354 - 0 (3)	TP48.5x35.892x0.375	17.022	0.297	26.000	0.023	0.203	0.002	26.000	0.000

Pole Interaction Design Data

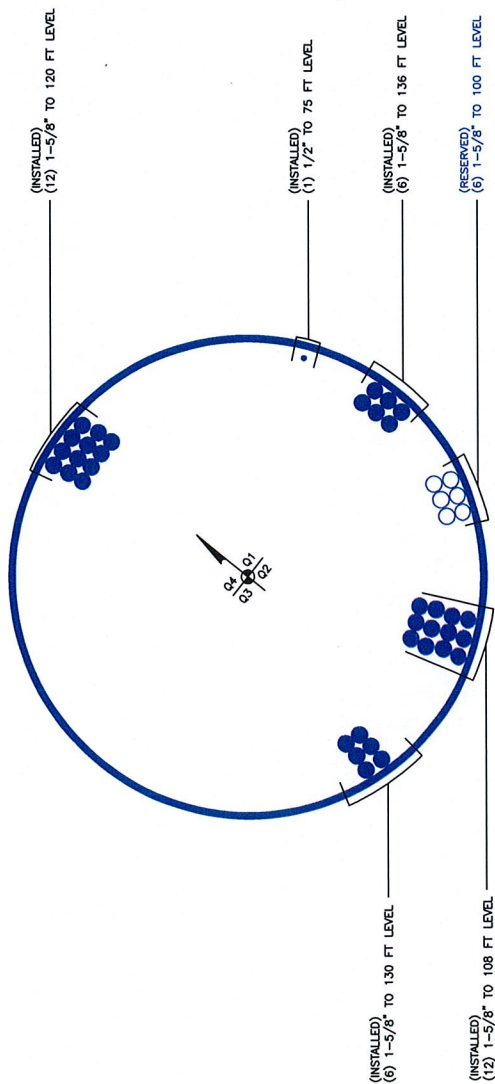
Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139.5 - 93.12 (1)	0.008	0.545	0.000	0.040	0.000	0.554 ✓	1.333	H1-3+VT ✓
L2	93.12 - 46.4354 (2)	0.009	0.620	0.000	0.024	0.000	0.629 ✓	1.333	H1-3+VT ✓
L3	46.4354 - 0 (3)	0.012	0.709	0.000	0.023	0.000	0.721 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF * P_{allow}$ K	% Capacity	Pass Fail
L1	139.5 - 93.12	Pole	TP26.989x15.5x0.25	1	-6.638	1063.443	41.5	Pass
L2	93.12 - 46.4354	Pole	TP37.928x25.529x0.375	2	-14.584	2244.119	47.1	Pass
L3	46.4354 - 0	Pole	TP48.5x35.892x0.375	3	-26.726	2977.855	54.1	Pass
							Summary	
							Pole (L3)	Pass
							RATING = 54.1	Pass

<i>RISATower</i> <i>Crown Castle USA, Inc.</i> <i>2000 Corporate Drive</i> <i>Canonsburg, PA 15317</i> <i>Phone: (724) 416-2000</i> <i>FAX: (724) 416-2254</i>	Job BU # 881541	Page 12 of 12
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APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: 881541 TOWER ID: C_BASELEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

FOUNDATION REACTION COMPARISON

BU #881541

WO#251827

REACTIONS	DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	2561.0	1567.0	61.2%
SHEAR (kips)	24.7	17.0	68.8%

Design loads from: CCIsites Doc #2207700

Although the shear capacity is at 68.8%, the moment reaction is the governing criteria for a monopole drilled pier foundation. Therefore, the overall capacity for this foundation is 61.2%

Unstiffened, UngROUTed, Circular Base Plate

Site Data

BU#: 881541
 Site Name: Rogers Property
 App #: 73382 Rev #2

Reactions

Moment:	1567	ft-kips
Axial:	27	kips
Shear:	17	kips

Connection Type: *Butt*

Anchor Rod Data

Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Circle:	57	in

Anchor Rod Results

Maximum Rod Tension: 80.8 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 41.4% **Pass**

Plate Data

Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Eff. Width:	9.62	in

Base Plate Results

Flexural Check
 Base Plate Stress: 41.0 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 68.4% **Pass**

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

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

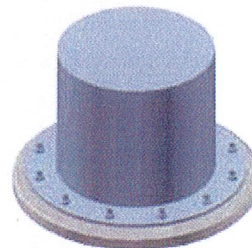
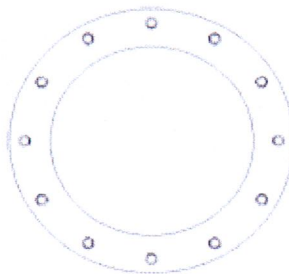
Pole Punching Shear Check: n/a

Pole Data

Diam:	48.5	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi

Stress Increase Factor

ASIF: 1.333



* 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



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

March 13, 2009

The Honorable James M. Zeoli
First Selectman
Town of Orange
Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-T-MOBILE-107-090309** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at Grassy Hill Road, Orange, Connecticut.

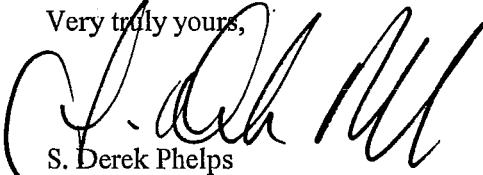
Dear Mr. Zeoli:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 27, 2009.

Thank you for your cooperation and consideration.

Very truly yours,



S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange