

CONNECTICUT SITING COUNCIL

In re:

Request of Clear Wireless LLC for the Approval :
of the Shared Use of an Existing Tower Located at :
2189 Black Rock Turnpike, Fairfield, Connecticut. : August 31, 2010

TOWER SHARING APPLICATION

Clear Wireless LLC ("Clearwire") proposes herein to share an existing flagpole, telecommunications tower (the "Tower") located at 2189 Black Rock Turnpike in Fairfield, Connecticut (the "Facility"). Pursuant to Connecticut General Statutes §16-50aa (the "Statute"), Clearwire requests a finding from the Connecticut Siting Council (the "Council") that the shared use of this Facility is technically, legally, environmentally, and economically feasible, will meet public safety concerns, will avoid the unnecessary proliferation of towers and is in the public interest. Clearwire further requests an order approving the shared use of this Facility.

The purpose of this request is to use an existing telecommunications tower to develop Clearwire's 4G wireless broadband network to provide high-speed wireless data and to develop VoIP service within the State of Connecticut and in this area of Fairfield. Therefore, this application avoids the construction of an additional tower in Fairfield.

A. The Facility

The Facility is located at a latitude of 41° 10' 52.33" N and longitude of 73° 15' 14.69" W. The Tower is a 90-foot flagpole. Multiple carriers are currently located on the Tower. A site plan is attached.

B. Proposed Project

Clearwire will install three (3) WiMAX antennas (Model No. LLPX310R), three (3) Dragonwave dishes (Model No. AN-80i) and three (3) Samsung Remote Radio Heads (Model No. FDD_R6_RRH), one each per sector. Clearwire plans to mount its antennas, dishes and remote

radio heads within an enclosure to shield them from public view. Clearwire must utilize an RF transparent enclosure to shield its antennas because there is not sufficient space at that height inside of the Tower for Clearwire's installation. Six (6) cables, 5/16" in diameter, will run to the new WiMAX antennas (two per panel). Additionally, three (3) coax cables, 1/2" in diameter, will run to the new dishes (one per dish).

Clearwire will locate its equipment cabinet on the existing 20' x 8'-6" (approximately) concrete pad. No upgrades to the access road or parking area will be necessary.

C. Technical Feasibility

Consistent with the requirements of the Statute, it is technically feasible for Clearwire to collocate at this Facility. To analyze whether the Tower can support Clearwire's proposed modifications, Clearwire commissioned B&T Engineering, Inc. to perform a structural analysis of the Tower with Clearwire's proposed antennas. The structural analysis is attached. According to the Structural Analysis Report, dated August 12, 2010, "...the tower stress level for the structure and foundation, under the following load case ... LC1: Existing + Reserved + Proposed Equipment [is] Sufficient Capacity" (Page 1, Structural Analysis Report).

D. Legal Feasibility

The Council has the authority, pursuant to the Statute, to issue an order approving the shared use of this Tower. By issuing an order approving Clearwire's use of the Tower, Clearwire will be able to proceed with obtaining a building permit for its proposed installation on the Tower. Therefore, consistent with the Statute, Clearwire's proposal is legally feasible.

E. Economic Feasibility

Clearwire is a wireless telecommunications provider licensed by the Federal Communications Commission to provide service in areas of Connecticut, including but not limited

to Fairfield County. Clearwire has entered into a lease with Crown Castle for the purpose of locating its antennas and associated equipment at the Facility so that it may provide wireless telecommunications service to this area of Fairfield. A redacted copy of the Site Lease Acknowledgement, dated February 1, 2010, is attached. Therefore, the shared use of this Facility is economically feasible.

F. Environmental Feasibility

Pursuant to the Statute, the proposal will be environmentally feasible for the following reasons:

- The overall impact on the Town of Fairfield will be decreased with the sharing of a single tower versus the proliferation of towers.
- The proposal will not increase the height of the Tower.
- There will be little increase in the visibility of the Tower with the addition of Clearwire's antennas, Remote Radio Heads and dishes.
- There will be no impact on any wetlands or water resources as a result of Clearwire's modifications.
- There will be no increased impact on air quality because no air pollutants will be generated during the normal operation of the Facility.
- There will only be a brief, slight increase in noise pollution while the antennas are attached and the equipment buildings are installed.

- During construction, the proposed project will generate a small amount of traffic as workers arrive and depart and materials are delivered. Upon completion, traffic will be limited to an average of one monthly maintenance/inspection visit.

G. Public Safety Concerns / Benefits

There will be no adverse impact to the health and safety of the surrounding community or the workers at the Facility due to the addition of Clearwire's antennas to the Tower. Clearwire performed an analysis of the radio frequency fields emanating from the transmitting antennas on the Tower to ensure compliance with the National Council on Radiation Protection and Measurements' ("NCRP") standard for maximum permissible exposure (MPE) adopted by the Federal Communications Commission ("FCC"). The analysis, dated February 22, 2010, indicates that Clearwire's antennas will emit 0.0017% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, all of the antennas on the Tower will cumulatively emit 27.17% of the NCRP's standard for maximum permissible exposure. The power density analysis is attached. Therefore, the analysis demonstrates that the maximum level of radio-frequency energy emitted from the Tower will be well below the FCC's mandated radio frequency exposure limits.

Moreover, Clearwire expects to enhance safety in the Fairfield area by improving wireless communications for local residents and travelers. Clearwire is currently developing its 4G wireless broadband network to provide high-speed wireless data and its VoIP service within the State of Connecticut. Clearwire's 4G service leverages the WiMAX technology to enable enhanced wireless data communications. In order to provide reliable coverage to residents and

travelers in this area of Fairfield and fulfill their coverage goals to comply with their FCC license, this site is a necessary part of Clearwire's network development.

Specifically, this proposal is designed to provide reliable wireless coverage for approximately 0.8 miles along Stillson Road, 0.8 miles along State Highway 58, and 0.3 miles along Fairfield Woods Road. Clearwire's proposal will provide a reliable signal level for the vehicular traffic on the streets and highways as well as in the surrounding commercial and residential areas.

Conclusion

For the reasons stated above, the attachment of Clearwire's antennas, Remote Radio Heads and dishes to the Tower would meet all the requirements set forth in the Statute. This proposal is technically, legally, environmentally and economically feasible and meets all public safety concerns. Therefore, Clearwire respectfully requests that the Council approve this request for the shared use of the Tower located at 2189 Black Rock Turnpike, Connecticut.

CLEAR WIRELESS LLC

By: Thomas J. Regan
Thomas J. Regan
Brown Rudnick LLP
185 Asylum Street, CityPlace I
Hartford, CT 06103-3402
Email - tregan@brownrudnick.com
Phone - 860.509.6522
Fax - 860.509.66501

Certificate of Service

This is to certify that on this 31st day of August, 2010, the foregoing Tower Sharing Proposal was sent, via first class mail, to the following:

Town of Fairfield
First Selectman's Office
First Selectman Ken Flatto
John J. Sullivan Independence Hall
Second Floor
725 Old Post Road
Fairfield, CT 06824

By: Thomas J. Regan
Thomas J. Regan

40276525 v1 -- 025064/0017

clearw're

4400 CARILLON POINT
KIRKLAND, WA 98033

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVENUE
MAHWAH, NJ 07430

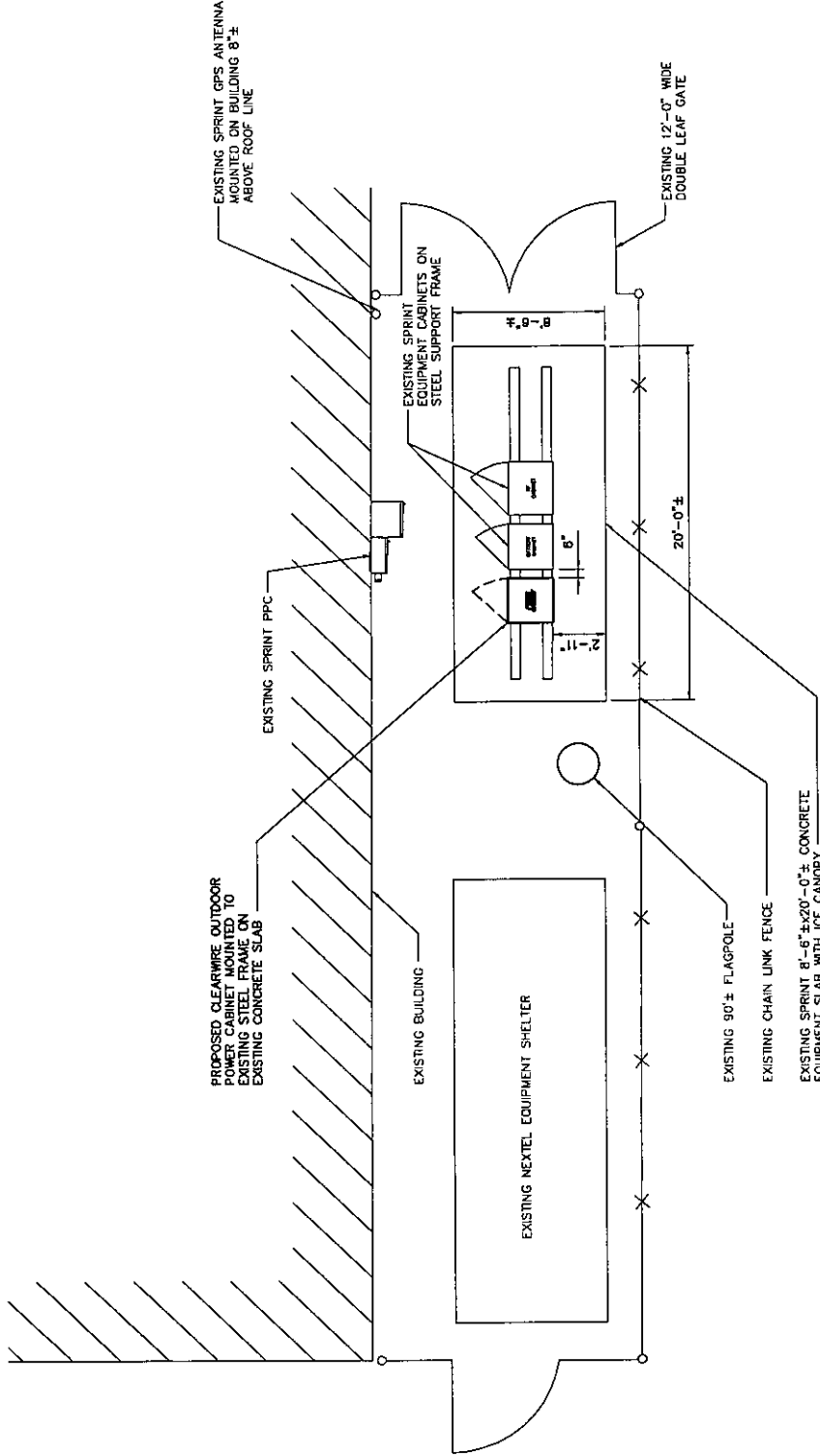
A&E FIRM

URS CORPORATION

500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

CA 09/24/10	REVISED	JES	PJS	ICA
CA 8/18/10	REVISED	BAL	PJS	ICA
CA 5/20/10	REVISED	KAP	JCF	ICA
CA 10/19/09	FINAL	KAP	JCF	ICA
CA 10/01/09	REVIEW	PD	JCF	ICA
NO.	DATE	REVISIONS	BY	CHK/APP'D
NOT TO SCALE DESIGNED BY: PJS DRAWN BY: PD				
A&E SEAL				

FAIRFIELD 2
CT-BDR0066
2189 BLACK ROCK
TURNPIKE
FAIRFIELD, CT
06430



1 COMPOUND PLAN
SC-1
SCALE: 1" = 10'-0"
NORTH

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
TWS-006	SC-1	09/24/10	1 OF 2	3
30924371				

clearw're

4400 CARILLON POINT
KIRKLAND, WA 98033

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVENUE
MAHWAH, NJ 07430

A&E FIRM

JES CORPORATION A/E/S

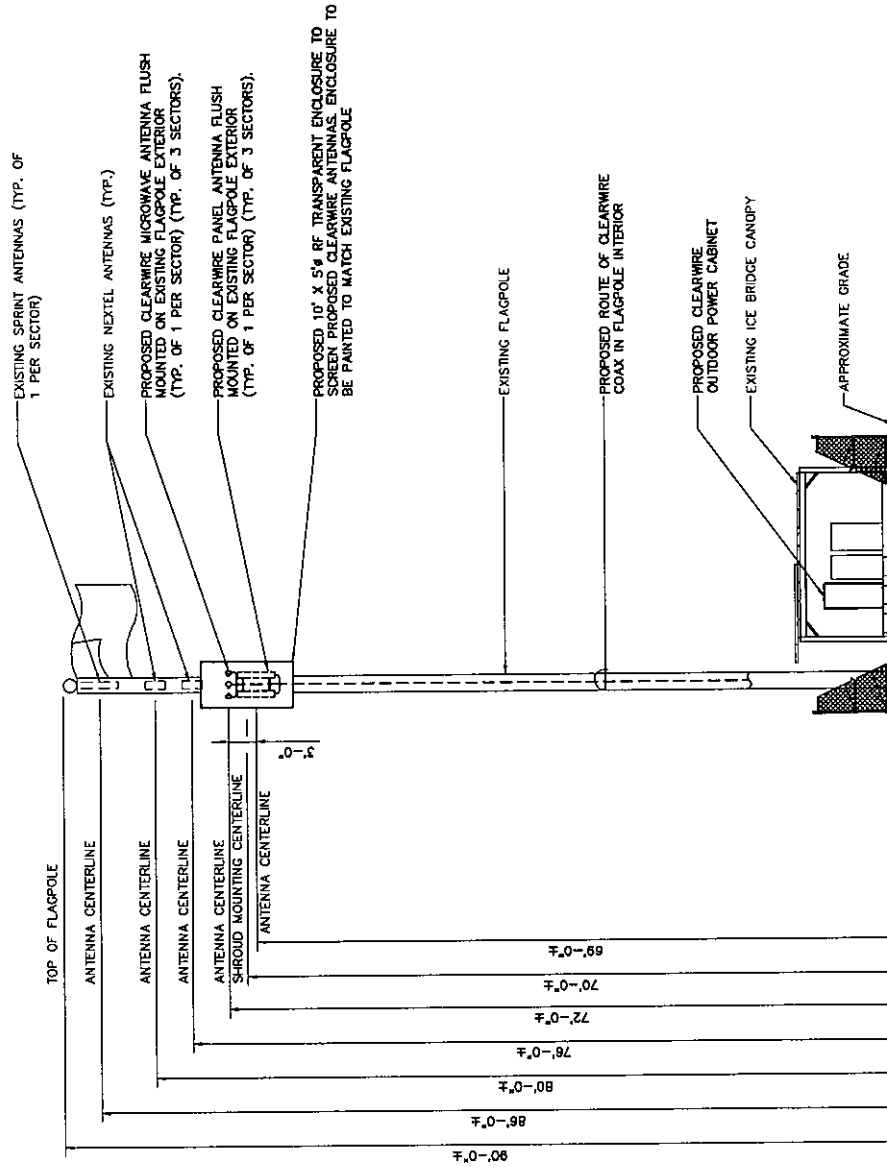
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

08/24/10	REVISED	JES	PJS	ICA
08/18/10	REVISED	BAL	PJS	ICA
05/20/10	REVISED	KAP	JCF	ICA
10/19/09	FINAL	KAP	JCF	ICA
10/01/09	REVIEW	PD	JCF	ICA
NO.	DATE	REVISIONS	BY	CHK/APP'D
NOT TO SCALE DESIGNED BY: PJS DRAWN BY: PD				
A&E SEAL				

FAIRFIELD 2
CT-BDR0066
2189 BLACK ROCK
TURNPIKE
FAIRFIELD, CT
06430

PROJECT NO.

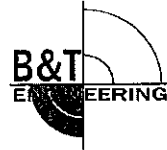
DRAWING NAME	DATE	SHEET NO	REV
TW3-008	08/24/10	2 OF 2	3
36924371	SC-2		



1 FLAGPOLE ELEVATION
SC-2 SCALE: 1" = 20'-0"

Date: **August 12, 2010**

Eva Morales
Crown Castle USA Inc.
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6612



B&T Engineering, Inc.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btengineering.com

Subject: Structural Analysis Report

Carrier Designation:	Clearwire Co-Locate	
	Carrier Site Number:	CT-BDR0066
	Carrier Site Name:	N/A
Crown Castle Designation:	Crown Castle BU Number:	876398
	Crown Castle Site Name:	Fairfield2-Sun Realty
	Crown Castle JDE Job Number:	123487
	Crown Castle Work Order Number:	351413
Engineering Firm Designation:	B&T Engineering, Inc. Project Number:	80791
Site Data:	2189-2215 Black Rock Tpke, Fairfield, CT, Fairfield County Latitude 41° 10' 52.33", Longitude -73° 15' 14.69" 74.5 Foot - Monopole	

Dear Eva Morales,

B&T Engineering, 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 383207, in accordance with application 86685, revision 5.

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 the 2003 IBC; 2003 IRC (State Building Code, 2005 CT supplement) based upon a wind speed of 85 mph fastest mile.

All modifications and 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 B&T Engineering, 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.

Respectfully submitted by:

Terry Carter
Project Engineer

Chad E. Tuttle, P.E.
President

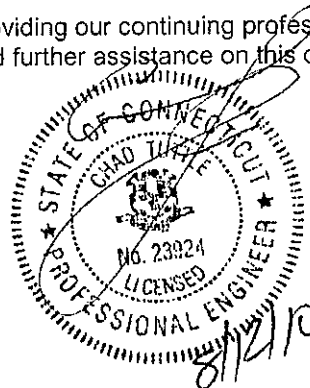


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

RISATower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 74 ft Monopole tower designed by EEI in October of 2000. 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 60 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
70	72	3	Redline	AN-80i	6 3	5/16 1/2	
	70	1	--	10'x60"Dia Fiberglass Enclosure			
	69	3	Argus	LLPX310R			
		3	Samsung	FDD_R6_RRH			

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
90	90	1	--	Decorative Gold Ball			1
86	86	1	--	8'x20"Dia Fiberglass Enclosure	6	1 1/4	1
		3	EMS Wireless	RR90-17-00DP			
83	83	1	--	15' x 25'	--	--	--
80	80	3	KathreinScala	AP9-850/090	6	7/8	1
78	78	1	--	8'x20"Dia Fiberglass Enclosure			1
76	76	3	KathreinScala	AP9-850/090	6	7/8	1

Notes:

- 1) Existing 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)
90	90	1	--	15'x25' Flag		
86	86	1	--	20" Dia x 8' Fibre Glass Enclosure		
		3	EMS Wireless	RR90-17		
78	78	1	--	20" Dia x 8' Fibre Glass Enclosure		
		3	EMS Wireless	RR90-17		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Clearwire Co-Locate Revision #5	86685	Crown OTG
Tower Manufacturing Drawings	EEL, Job No. 8027	2069490	Crown OTG
Foundation Drawing	EEL, Job No. 8027	2069482	Crown OTG
Geotech Report	Dr. Clearance Welti, Dtd.10/10/00	1531968	Crown OTG
Antenna Configuration	Crown CAD Package	Date: 08/09/10	Crown OTG

3.1) Analysis Method

RISA Tower (version 5.4.2.0), 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. B&T Engineering, 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	74.5 - 36.67	Pole	TP24.87x19.5x0.188	1	-3.728	402.523	71.3	Pass
L2	36.67 - 0.5	Pole	TP29.5x23.975x0.25	2	-7.279	649.714	93.8	Pass
							Summary	
						Pole (L2)	93.8	Pass
						Rating =	93.8	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	59.3	Pass
1	Base Plate	Base	88.9	Pass
1	Base Foundation	Base	48.2	Pass
Structure Rating (max from all components) =				93.8%

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Capacities up to 105% are considered acceptable based on analysis methods used.
- 3) Foundation capacity determined by comparing analysis reactions to original design reactions.

4.1) Recommendations

N/A

APPENDIX A
RISA TOWER OUTPUT

Section	1	2
Length (ft)	37.830	39.837
Number of Sides	18	18
Thickness (in)	0.188	0.250
Socket Length (ft)	3.667	
Top Dia (in)	19.500	23.975
Bot Dia (in)	24.870	28.500
Grade	A53-B-35	
Weight (K)	1.7	2.8

74 ft

36.7 ft

0.5 ft

DESIGNED APPURTENANCE LOADING

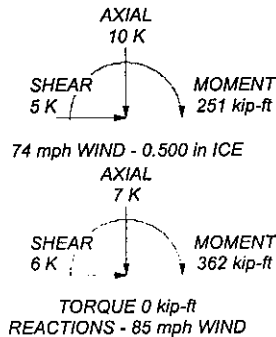
TYPE	ELEVATION	TYPE	ELEVATION
Decorative Gold Ball (E)	90	AP9-850/090 w/Mount Pipe (E(Concealed))	76
8'x20'Dia Fiberglass Enclosure (E)	86	10'x60'Dia Fiberglass Enclosure (P)	74.5 - 65
RR90-17-00DP w/Mount Pipe (E(Concealed))	86	AN-801 w/Mount Pipe (P(Concealed))	72
RR90-17-00DP w/Mount Pipe (E(Concealed))	86	AN-801 w/Mount Pipe (P(Concealed))	72
RR90-17-00DP w/Mount Pipe (E(Concealed))	86	AN-801 w/Mount Pipe (P(Concealed))	72
15'x25' Flag	83	LLPX310R w/Mount Pipe (P(Concealed))	69
AP9-850/090 w/Mount Pipe (E(Concealed))	80	LLPX310R w/Mount Pipe (P(Concealed))	69
AP9-850/090 w/Mount Pipe (E(Concealed))	80	FDD_R6_RRH (P(Concealed))	69
AP9-850/090 w/Mount Pipe (E(Concealed))	80	FDD_R6_RRH (P(Concealed))	69
8'x20'Dia Fiberglass Enclosure (E)	78	FDD_R6_RRH (P(Concealed))	69
AP9-850/090 w/Mount Pipe (E(Concealed))	76	LLPX310R w/Mount Pipe (P(Concealed))	69
AP9-850/090 w/Mount Pipe (E(Concealed))	76		

MATERIAL STRENGTH

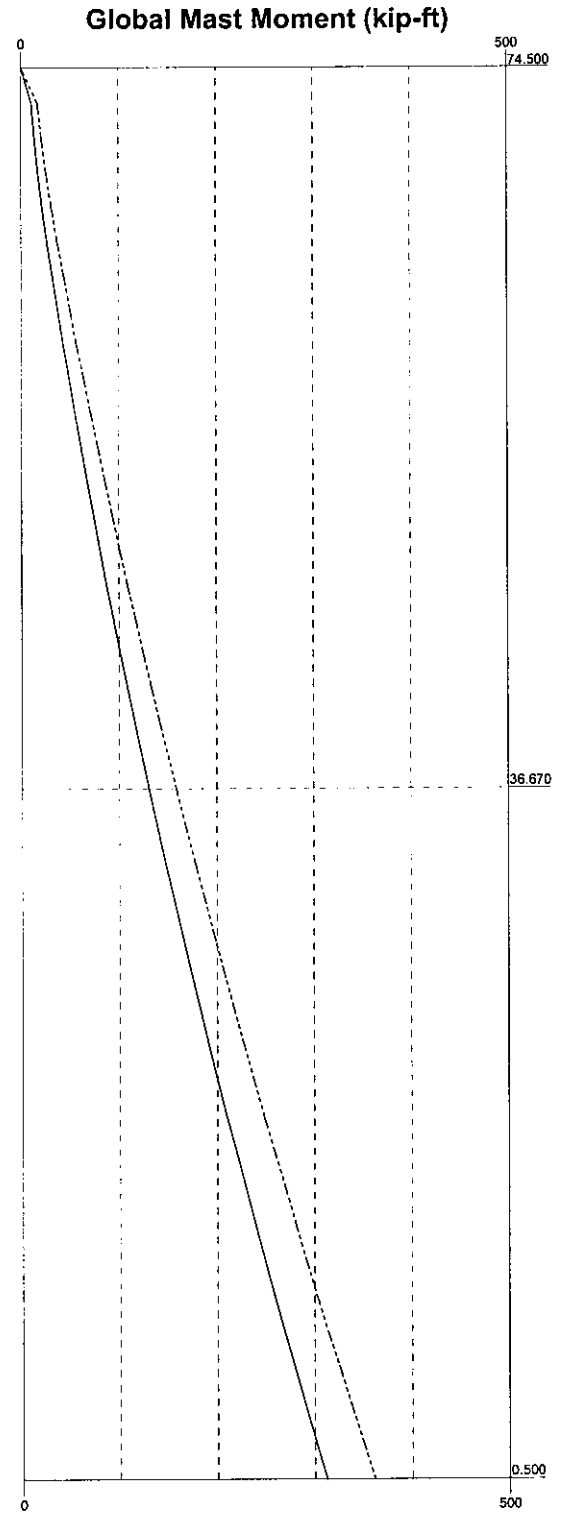
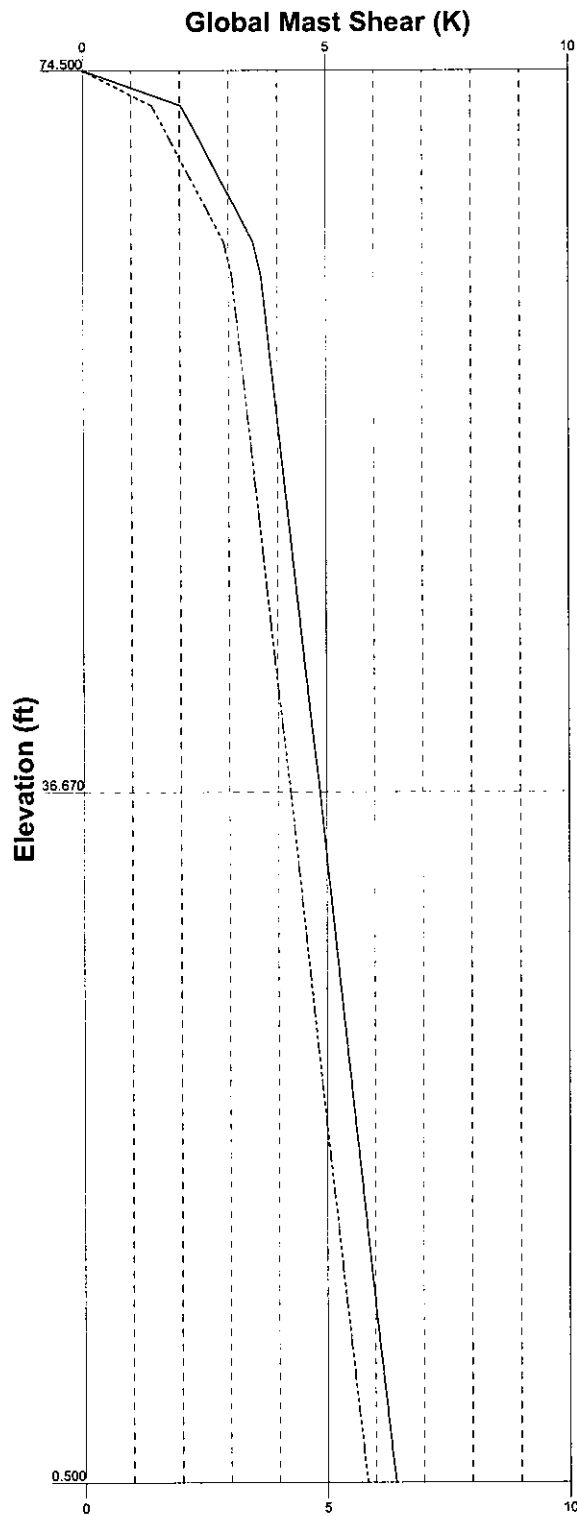
GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi			

TOWER DESIGN NOTES

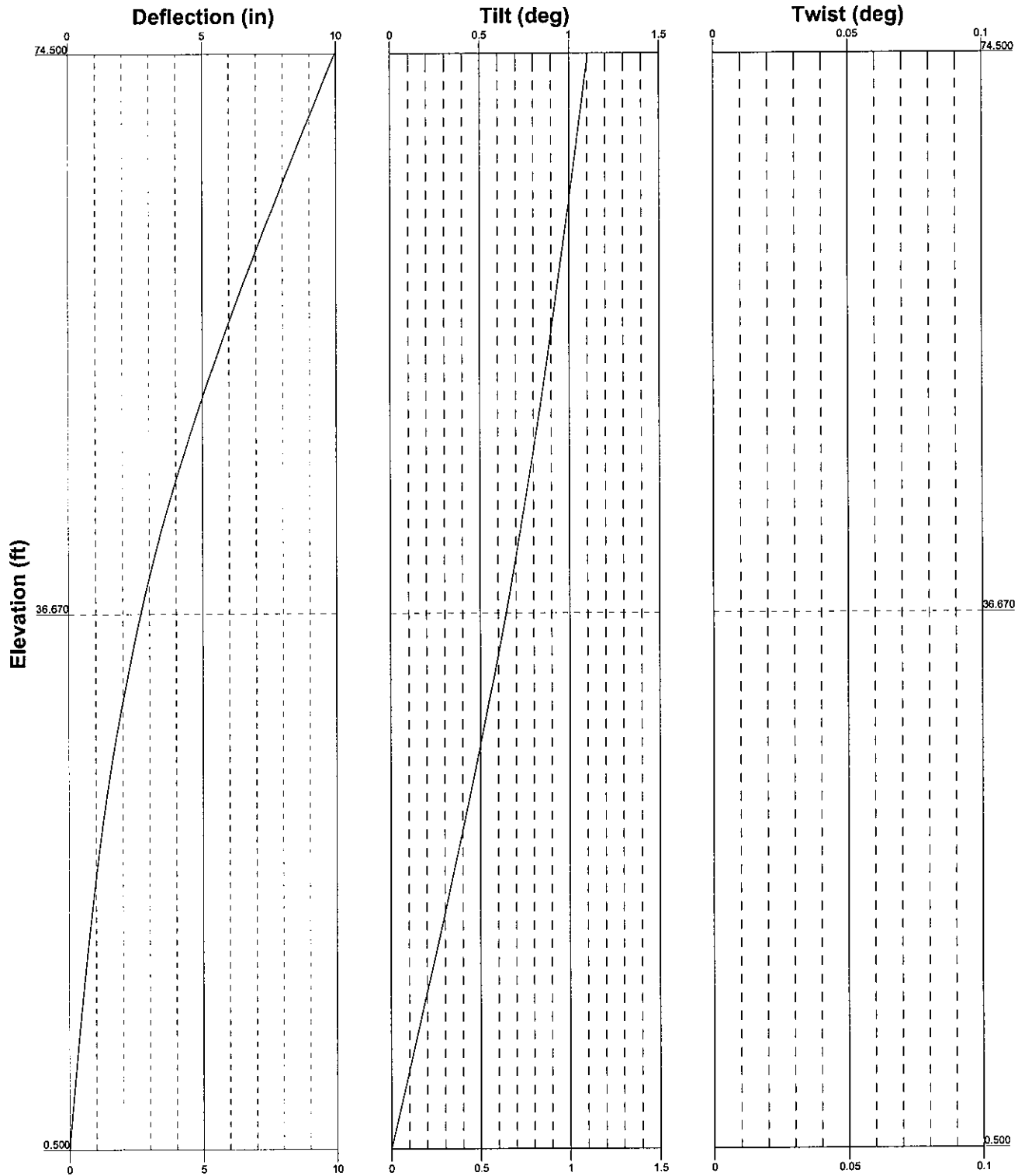
1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 93.8%



	B & T Engineering				Job: 80971 - Fairfield2/Sun Realty, CT (BU# 876396)
	1717 South Boulder				Project: 90' EEI Flag Monopole / App ID: 86685; Rev: 5
	Tulsa, OK 74159				Client: Crown Castle USA, Inc. Drawn by: Terry Carter App'd:
	Phone: 918-587-4630				Code: TIA/EIA-222-F Date: 08/12/10 Scale: NTS
	FAX: 918-295-0265				Path: Dwg No. E-1

—— V_x - - - - V_z—— M_x - - - - M_z

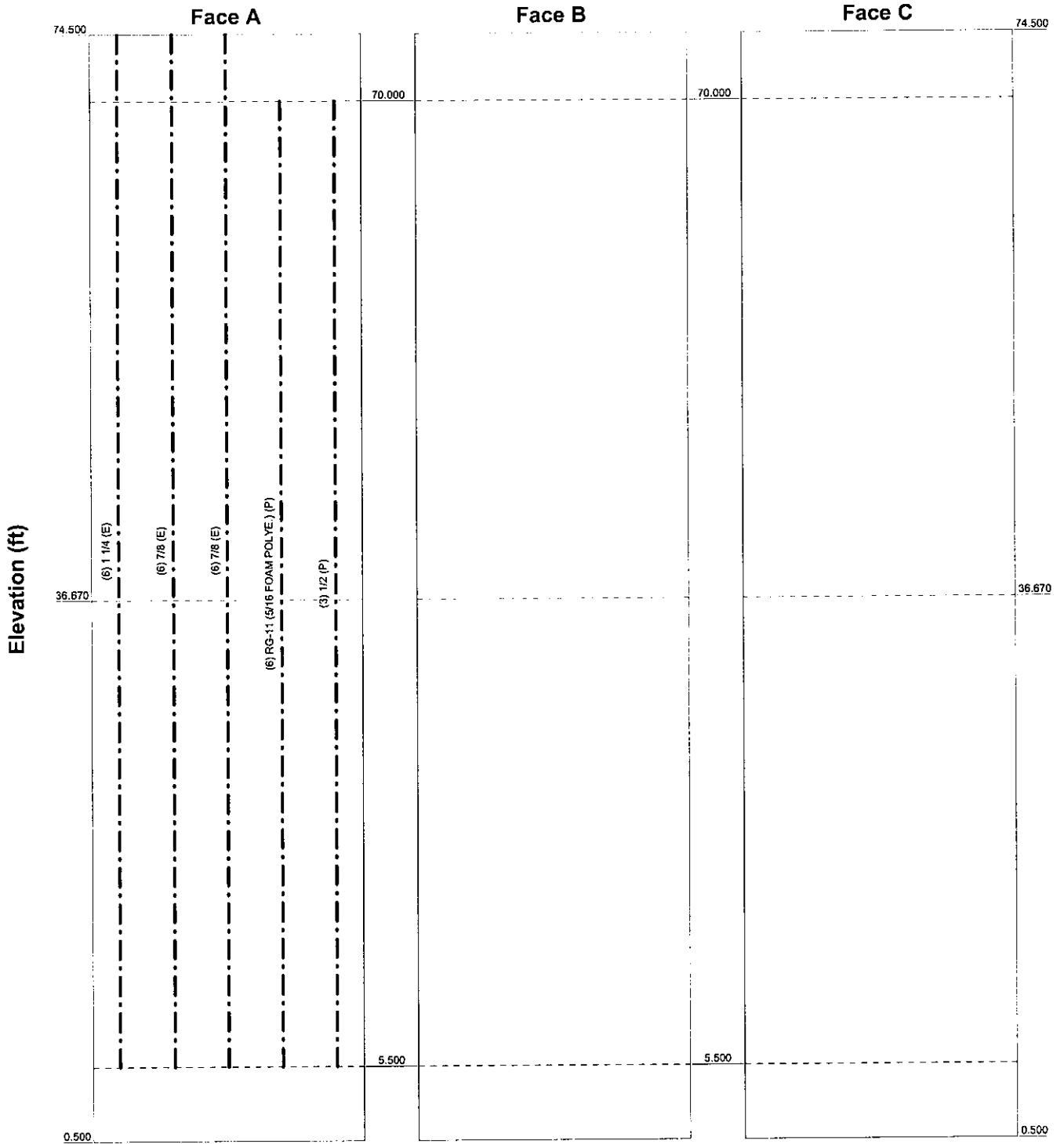
B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job: 80971 - Fairfield2/Sun Realty, CT (BU# 876398)		
	Project: 90' EEI Flag Monopole / App ID: 86685; Rev: 5		
	Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
	Code: TIA/EIA-222-F	Date: 08/12/10	Scale: NTS
	Path:		Dwg No. E-4



Feedline Distribution Chart

6" - 74'6"

Round Flat App In Face App Out Face Truss Leg



B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265		Job: 80971 - Fairfield2/Sun Realty, CT (BU# 876398)		
		Project: 90' EEI Flag Monopole / App ID: 86685; Rev: 5		
		Client: Crown Castle USA, Inc.	Drawn by: Terry Carter	App'd:
		Code: TIA/EIA-222-F	Date: 08/12/10	Scale: NTS
		Path:		Dwg No. E-7

RISA Tower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	1 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

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 Fairfield 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 60 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	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	74.500-36.670	37.830	3.667	18	19.500	24.870	0.188	0.750	A53-B-35 (35 ksi)
L2	36.670-0.500	39.837		18	23.975	29.500	0.250	1.000	A53-B-35 (35 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	I/Q	w	w/t
	in	in ²	in ⁴	in	in	in ³	in ⁴	in ²	in	
L1	19.801	11.493	541.578	6.856	9.906	54.672	1083.869	5.748	3.102	16.544
	25.254	14.689	1130.611	8.762	12.634	89.490	2262.709	7.346	4.047	21.585
L2	24.861	18.825	1338.680	8.422	12.179	109.917	2679.122	9.414	3.780	15.118
	29.955	23.210	2508.777	10.384	14.986	167.408	5020.854	11.607	4.752	19.008

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	2 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

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				1	1	1		
74.500-36.670								
L2				1	1	1		
36.670-0.500								

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 in	Width or Diameter in	Perimeter in	Weight klf
				ft						
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_{AA}	Weight
				ft			ft ² /ft	klf
1 1/4 (E)	A	No	Inside Pole	74.500 - 5.500	6	No Ice	0.000	0.001
**						1/2" Ice	0.000	0.001
7/8 (E)	A	No	Inside Pole	74.500 - 5.500	6	No Ice	0.000	0.001
**						1/2" Ice	0.000	0.001
7/8 (E)	A	No	Inside Pole	74.500 - 5.500	6	No Ice	0.000	0.001
**						1/2" Ice	0.000	0.001
RG-11 (5/16 FOAM POLYE.)	A	No	Inside Pole	70.000 - 5.500	6	No Ice	0.000	0.000
(P)						1/2" Ice	0.000	0.000
1/2 (P)	A	No	Inside Pole	70.000 - 5.500	3	No Ice	0.000	0.000
**						1/2" Ice	0.000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A_R	A_F	C_{AA} In Face	C_{AA} Out Face	Weight
	ft		ft ²	ft ²	ft ²	ft ²	K
L1	74.500-36.670	A	0.000	0.000	0.000	0.000	0.438
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	36.670-0.500	A	0.000	0.000	0.000	0.000	0.366
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	3 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	74.500-36.670	A	0.500	0.000	0.000	0.000	0.000	0.438
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	36.670-0.500	A	0.500	0.000	0.000	0.000	0.000	0.366
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	74.500-36.670	0.000	0.000	0.000	0.000
L2	36.670-0.500	0.000	0.000	0.000	0.000

User Defined Loads

Description	Elevation ft	Offset From Centroid ft	Azimuth Angle °	Weight K	F _x K	F _y K	Wind Force K	C _A A _C ft ²
15'x25' Flag	83.000	0.000	0.000	No Ice	0.030	0.590	0.000	0.000
				Ice	0.000	0.000	0.000	0.000
				Service	0.040	0.294	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 _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Decorative Gold Ball (E)	C	None		0.000	90.000	No Ice 1/2" Ice	3.000 5.000	0.200 0.250
8'x20"Dia Fiberglass Enclosure (E)	C	None		0.000	78.000	No Ice 1/2" Ice	10.667 11.317	0.655 0.766
8'x20"Dia Fiberglass Enclosure (E)	C	None		0.000	86.000	No Ice 1/2" Ice	10.667 11.317	0.655 0.766
10'x60"Dia Fiberglass Enclosure (P) **	C	None		0.000	74.500 - 65.000	No Ice 1/2" Ice	40.000 41.006	0.100 0.564
RR90-17-00DP w/Mount Pipe	C	From Leg	0.500 0.000	0.000	86.000	No Ice 1/2" Ice	0.000 0.000	0.044 0.082

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	5 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
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	74.5 - 36.67	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-5.840	0.000	0.000
			Max. Mx	5	-3.728	-140.855	0.000
			Max. My	2	-3.757	-25.674	115.201
			Max. Vy	5	4.695	-140.855	0.000
			Max. Vx	2	-4.091	-25.674	115.201

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page 6 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date 15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by Terry Carter

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	36.67 - 0.5	Pole	Max. Torque	2			-0.100
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-9.949	0.000	0.000
			Max. Mx	5	-7.279	-362.025	0.000
			Max. My	2	-7.280	-49.557	312.493
			Max. Vy	5	6.423	-362.025	0.000
			Max. Vx	2	-5.833	-49.557	312.493
			Max. Torque	2			-0.100

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	9.949	0.000	0.000
	Max. H _x	11	7.284	5.239	0.000
	Max. H _z	2	7.284	-0.590	5.829
	Max. M _x	2	312.493	-0.590	5.829
	Max. M _z	5	362.025	-6.418	0.000
	Max. Torsion	8	0.100	-0.590	-5.829
	Min. Vert	30	7.284	-3.198	0.000
	Min. H _x	5	7.284	-6.418	0.000
	Min. H _z	8	7.284	-0.590	-5.829
	Min. M _x	8	-312.493	-0.590	-5.829
	Min. M _z	11	-262.954	5.239	0.000
	Min. Torsion	2	-0.100	-0.590	5.829

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	7.284	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg - No Ice	7.284	0.590	-5.829	-312.493	-49.557	0.100
Dead+Wind 30 deg - No Ice	7.284	3.504	-5.048	-270.619	-205.797	0.086
Dead+Wind 60 deg - No Ice	7.284	5.638	-2.914	-156.238	-320.166	0.050
Dead+Wind 90 deg - No Ice	7.284	6.418	0.000	0.000	-362.025	0.000
Dead+Wind 120 deg - No Ice	7.284	5.638	2.914	156.238	-320.166	-0.050
Dead+Wind 150 deg - No Ice	7.284	3.504	5.048	270.619	-205.797	-0.086
Dead+Wind 180 deg - No Ice	7.284	0.590	5.829	312.493	-49.557	-0.100
Dead+Wind 210 deg - No Ice	7.284	-2.325	5.048	270.636	106.693	-0.086
Dead+Wind 240 deg - No Ice	7.284	-4.458	2.914	156.256	221.083	-0.050
Dead+Wind 270 deg - No Ice	7.284	-5.239	0.000	0.000	262.954	0.000
Dead+Wind 300 deg - No Ice	7.284	-4.458	-2.914	-156.256	221.083	0.050
Dead+Wind 330 deg - No Ice	7.284	-2.325	-5.048	-270.636	106.693	0.086
Dead+Ice	9.949	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg+Ice	9.949	0.000	-4.604	-251.371	0.000	0.000
Dead+Wind 30 deg+Ice	9.949	2.302	-3.987	-217.694	-125.685	0.000
Dead+Wind 60 deg+Ice	9.949	3.987	-2.302	-125.685	-217.694	-0.000
Dead+Wind 90 deg+Ice	9.949	4.604	0.000	0.000	-251.371	0.000
Dead+Wind 120 deg+Ice	9.949	3.987	2.302	125.685	-217.694	0.000
Dead+Wind 150 deg+Ice	9.949	2.302	3.987	217.694	-125.685	-0.000
Dead+Wind 180 deg+Ice	9.949	0.000	4.604	251.371	0.000	0.000

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	7 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

Load Combination	Vertical K	Shear _x K	Shear _y K	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Dead+Wind 210 deg+Ice	9.949	-2.302	3.987	217.694	125.685	0.000
Dead+Wind 240 deg+Ice	9.949	-3.987	2.302	125.685	217.694	-0.000
Dead+Wind 270 deg+Ice	9.949	-4.604	0.000	0.000	251.371	0.000
Dead+Wind 300 deg+Ice	9.949	-3.987	-2.302	-125.685	217.694	0.000
Dead+Wind 330 deg+Ice	9.949	-2.302	-3.987	-217.694	125.685	-0.000
Dead+Wind 0 deg - Service	7.284	0.294	-2.904	-155.721	-24.697	0.025
Dead+Wind 30 deg - Service	7.284	1.746	-2.515	-134.863	-102.561	0.021
Dead+Wind 60 deg - Service	7.284	2.809	-1.452	-77.862	-159.560	0.012
Dead+Wind 90 deg - Service	7.284	3.198	0.000	0.000	-180.415	0.000
Dead+Wind 120 deg - Service	7.284	2.809	1.452	77.862	-159.560	-0.012
Dead+Wind 150 deg - Service	7.284	1.746	2.515	134.863	-102.561	-0.021
Dead+Wind 180 deg - Service	7.284	0.294	2.904	155.721	-24.697	-0.025
Dead+Wind 210 deg - Service	7.284	-1.158	2.515	134.860	53.164	-0.021
Dead+Wind 240 deg - Service	7.284	-2.221	1.452	77.862	110.163	-0.012
Dead+Wind 270 deg - Service	7.284	-2.610	0.000	0.000	131.026	0.000
Dead+Wind 300 deg - Service	7.284	-2.221	-1.452	-77.862	110.163	0.012
Dead+Wind 330 deg - Service	7.284	-1.158	-2.515	-134.860	53.164	0.021

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	-7.284	0.000	0.000	7.284	0.000	0.000%
2	0.590	-7.284	-5.829	-0.590	7.284	5.829	0.000%
3	3.504	-7.284	-5.048	-3.504	7.284	5.048	0.000%
4	5.638	-7.284	-2.914	-5.638	7.284	2.914	0.000%
5	6.418	-7.284	0.000	-6.418	7.284	0.000	0.000%
6	5.638	-7.284	2.914	-5.638	7.284	-2.914	0.000%
7	3.504	-7.284	5.048	-3.504	7.284	-5.048	0.000%
8	0.590	-7.284	5.829	-0.590	7.284	-5.829	0.000%
9	-2.325	-7.284	5.048	2.325	7.284	-5.048	0.000%
10	-4.458	-7.284	2.914	4.458	7.284	-2.914	0.000%
11	-5.239	-7.284	0.000	5.239	7.284	0.000	0.000%
12	-4.458	-7.284	-2.914	4.458	7.284	2.914	0.000%
13	-2.325	-7.284	-5.048	2.325	7.284	5.048	0.000%
14	0.000	-9.949	0.000	0.000	9.949	0.000	0.000%
15	0.000	-9.949	-4.604	0.000	9.949	4.604	0.000%
16	2.302	-9.949	-3.987	-2.302	9.949	3.987	0.000%
17	3.987	-9.949	-2.302	-3.987	9.949	2.302	0.000%
18	4.604	-9.949	0.000	-4.604	9.949	0.000	0.000%
19	3.987	-9.949	2.302	-3.987	9.949	-2.302	0.000%
20	2.302	-9.949	3.987	-2.302	9.949	-3.987	0.000%
21	0.000	-9.949	4.604	0.000	9.949	-4.604	0.000%
22	-2.302	-9.949	3.987	2.302	9.949	-3.987	0.000%
23	-3.987	-9.949	2.302	3.987	9.949	-2.302	0.000%
24	-4.604	-9.949	0.000	4.604	9.949	0.000	0.000%
25	-3.987	-9.949	-2.302	3.987	9.949	2.302	0.000%
26	-2.302	-9.949	-3.987	2.302	9.949	3.987	0.000%
27	0.294	-7.284	-2.904	-0.294	7.284	2.904	0.001%
28	1.746	-7.284	-2.515	-1.746	7.284	2.515	0.000%
29	2.809	-7.284	-1.452	-2.809	7.284	1.452	0.000%
30	3.198	-7.284	0.000	-3.198	7.284	0.000	0.002%
31	2.809	-7.284	1.452	-2.809	7.284	-1.452	0.000%
32	1.746	-7.284	2.515	-1.746	7.284	-2.515	0.000%
33	0.294	-7.284	2.904	-0.294	7.284	-2.904	0.001%
34	-1.158	-7.284	2.515	1.158	7.284	-2.515	0.001%
35	-2.221	-7.284	1.452	2.221	7.284	-1.452	0.001%

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	8 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
36	-2.611	-7.284	0.000	2.610	7.284	0.000	0.001%
37	-2.221	-7.284	-1.452	2.221	7.284	1.452	0.001%
38	-1.158	-7.284	-2.515	1.158	7.284	2.515	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00007355
3	Yes	6	0.00000001	0.00002703
4	Yes	6	0.00000001	0.00002447
5	Yes	5	0.00000001	0.00002482
6	Yes	6	0.00000001	0.00002447
7	Yes	6	0.00000001	0.00002703
8	Yes	5	0.00000001	0.00007355
9	Yes	5	0.00000001	0.00007525
10	Yes	5	0.00000001	0.00009166
11	Yes	5	0.00000001	0.00000001
12	Yes	5	0.00000001	0.00009166
13	Yes	5	0.00000001	0.00007525
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00002525
16	Yes	5	0.00000001	0.00010644
17	Yes	5	0.00000001	0.00010644
18	Yes	5	0.00000001	0.00002525
19	Yes	5	0.00000001	0.00010644
20	Yes	5	0.00000001	0.00010644
21	Yes	5	0.00000001	0.00002525
22	Yes	5	0.00000001	0.00010644
23	Yes	5	0.00000001	0.00010644
24	Yes	5	0.00000001	0.00002525
25	Yes	5	0.00000001	0.00010644
26	Yes	5	0.00000001	0.00010644
27	Yes	4	0.00000001	0.00012700
28	Yes	5	0.00000001	0.00002971
29	Yes	5	0.00000001	0.00002873
30	Yes	4	0.00000001	0.00012517
31	Yes	5	0.00000001	0.00002873
32	Yes	5	0.00000001	0.00002971
33	Yes	4	0.00000001	0.00012700
34	Yes	4	0.00000001	0.00010784
35	Yes	4	0.00000001	0.00010132
36	Yes	4	0.00000001	0.00008779
37	Yes	4	0.00000001	0.00010132
38	Yes	4	0.00000001	0.00010784

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	74.5 - 36.67	9.957	30	1.104	0.000
L2	40.3366 - 0.5	3.170	30	0.701	0.000

RISA Tower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	9 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
90.000	Decorative Gold Ball	30	9.957	1.104	0.000	16994
86.000	8'x20"Dia Fiberglass Enclosure	30	9.957	1.104	0.000	16994
83.000	15'x25' Flag	30	9.957	1.104	0.000	16994
80.000	AP9-850/090 w/Mount Pipe	30	9.957	1.104	0.000	16994
78.000	8'x20"Dia Fiberglass Enclosure	30	9.957	1.104	0.000	16994
76.000	AP9-850/090 w/Mount Pipe	30	9.957	1.104	0.000	16994
74.500	10'x60"Dia Fiberglass Enclosure	30	9.957	1.104	0.000	16994
72.000	AN-80i w/Mount Pipe	30	9.392	1.078	0.000	16994
69.750	10'x60"Dia Fiberglass Enclosure	30	8.885	1.055	0.000	16994
69.000	LLPX310R w/Mount Pipe	30	8.717	1.047	0.000	15449
65.000	10'x60"Dia Fiberglass Enclosure	30	7.829	1.004	0.000	8944

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	74.5 - 36.67	19.975	5	2.216	0.000
L2	40.3366 - 0.5	6.361	5	1.407	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
90.000	Decorative Gold Ball	5	19.975	2.216	0.000	8486
86.000	8'x20"Dia Fiberglass Enclosure	5	19.975	2.216	0.000	8486
83.000	15'x25' Flag	5	19.975	2.216	0.000	8486
80.000	AP9-850/090 w/Mount Pipe	5	19.975	2.216	0.000	8486
78.000	8'x20"Dia Fiberglass Enclosure	5	19.975	2.216	0.000	8486
76.000	AP9-850/090 w/Mount Pipe	5	19.975	2.216	0.000	8486
74.500	10'x60"Dia Fiberglass Enclosure	5	19.975	2.216	0.000	8486
72.000	AN-80i w/Mount Pipe	5	18.842	2.163	0.001	8486
69.750	10'x60"Dia Fiberglass Enclosure	5	17.825	2.116	0.001	8486
69.000	LLPX310R w/Mount Pipe	5	17.488	2.100	0.001	7714
65.000	10'x60"Dia Fiberglass Enclosure	5	15.706	2.014	0.001	4466

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a
L1	74.5 - 36.67 (1)	TP24.87x19.5x0.188	37.830	0.000	0.0	21.0000	14.379	-3.728	301.968	0.012
L2	36.67 - 0.5 (2)	TP29.5x23.975x0.25	39.837	0.000	0.0	21.0000	23.210	-7.279	487.407	0.015

RISATower B & T Engineering 1717 South Boulder Tulsa, OK 74159 Phone: 918-587-4630 FAX: 918-295-0265	Job	80971 - Fairfield2/Sun Realty, CT (BU# 876398)	Page	10 of 10
	Project	90' EEI Flag Monopole / App ID: 86685; Rev: 5	Date	15:42:57 08/12/10
	Client	Crown Castle USA, Inc.	Designed by	Terry Carter

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	74.5 - 36.67 (1)	TP24.87x19.5x0.188	140.855	-19.7134	21.0000	0.939	0.000	0.0000	21.0000	0.000
L2	36.67 - 0.5 (2)	TP29.5x23.975x0.25	362.025	-25.9504	21.0000	1.236	0.000	0.0000	21.0000	0.000

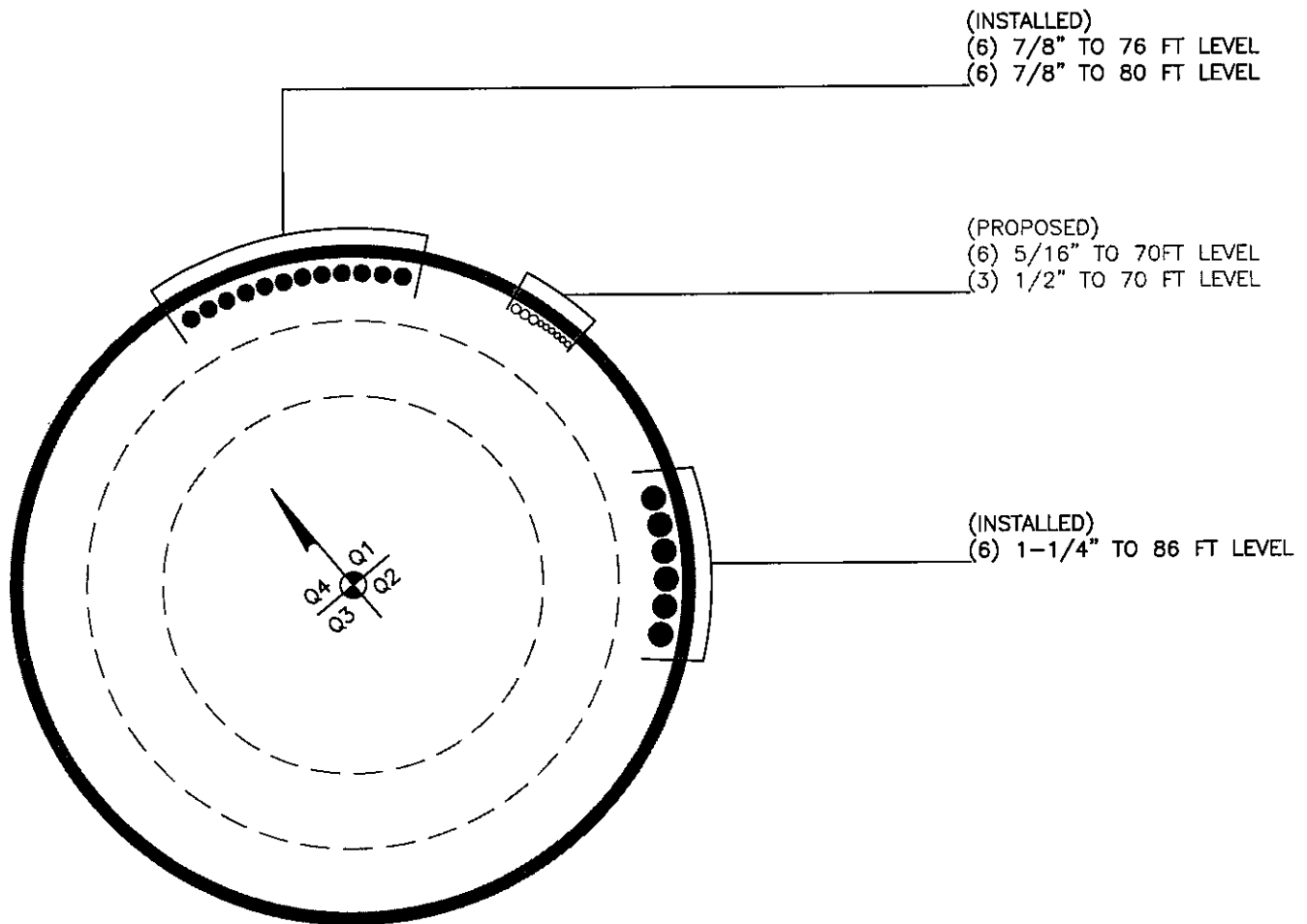
Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_o}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	74.5 - 36.67 (1)	TP24.87x19.5x0.188	0.012	0.939	0.000	0.951	1.333	H1-3 ✓
L2	36.67 - 0.5 (2)	TP29.5x23.975x0.25	0.015	1.236	0.000	1.251	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* P_{allow} K	% Capacity	Pass Fail
L1	74.5 - 36.67	Pole	TP24.87x19.5x0.188	1	-3.728	402.523	71.3	Pass
L2	36.67 - 0.5	Pole	TP29.5x23.975x0.25	2	-7.279	649.714	93.8	Pass
							Summary	
							Pole (L2)	93.8 Pass
							RATING =	93.8 Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: 876398 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	876398
Site Name:	Fairfield2-Sun Realty, CT
App #:	86685; Rev: 5
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	4	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	37	in

Plate Data

Diam:	43	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	17.25	in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data

Diam:	29.5	in
Thick:	0.25	in
Grade:	35	ksi
# of Sides:	18	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333	
-------	-------	--

Reactions

Moment:	362	ft-kips
Axial:	7	kips
Shear:	6	kips

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

Anchor Rod Results

Maximum Rod Tension: 115.7 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 59.3%

Non-Rigid

Service, ASD

Fty*ASIF

Base Plate Results

Base Plate Stress: 53.4 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 88.9% Pass

Flexural Check

Non-Rigid

Service ASD

0.75*Fy*ASIF

Y.L. Length:

22.33

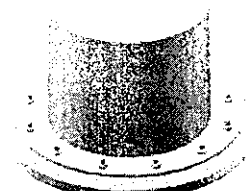
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



* 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

CAISSON Version 10.35 3:54:31 PM Thursday, August 12, 2010
B&T Engineering

* CAISSON - Pier Foundations Analysis and Design - Copyright Power Line Systems, Inc. 1993-2010 *

Project Title: 80971 - Fairfield2-Sun Realty, CT (BU# 876398)
Project Notes: 90' EEI Monopole- 5' Dia, 15' Minimum Depth(14' Bearing)

Calculation Method: Full 8CD

***** I N P U T D A T A

Pier Properties
15.0' provided => OK

Diameter	Distance of Top of Pier above Ground	Concrete Strength	Steel Yield Strength
(ft)	(ft)	(ksi)	(ksi)
5.00	1.00		

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Sand	9.00	0.00	125.0		3.852	36.00
2	Sand	9.00	9.00	65.0		3.852	36.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
362.0	7.0	6.00	2.00

***** R E S U L T S

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
12.000	35.343	356.5
		15.0' provided => OK

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Sand	1.00	7.83	125.0		3.852	221.46	6.22
Sand	8.83	1.17	125.0		3.852	-71.04	9.43
Sand	10.00	2.00	65.0		3.852	-137.51	11.02

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear Factor (kips)	Moment Factor (ft-k)	Shear Factor (kips)	Moment Factor (ft-k)
0.00	12.9	807.2	6.5	403.6
1.20	12.8	822.7	6.4	411.4
2.40	5.8	834.9	2.9	417.5
3.60	-11.5	832.6	-5.7	416.3
4.80	-39.2	803.2	-19.6	401.6
6.00	-77.4	734.3	-38.7	367.1
7.20	-125.9	613.4	-62.9	306.7
8.40	-184.8	428.0	-92.4	214.0
9.60	-162.9	200.1	-81.5	100.1
10.80	-84.3	51.1	-42.2	25.6
12.00	-0.0	0.0	-0.0	0.0

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: 876398
 Site Name: Fairfield2-Sun Realty, CT
 App #: 86685; Rev: 5

Enter Load Factors Below:

For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter = 5.0 ft
 Concrete Area = 2827.4 in²

Reinforcement:

Clear Cover to Tie = 4.00 in
 Horiz. Tie Bar Size = 5
 Vert. Cage Diameter = 4.15 ft
 Vert. Cage Diameter = 49.75 in
 Vertical Bar Size = 8
 Bar Diameter = 1.00 in
 Bar Area = 0.79 in²
 Number of Bars = 12
 As Total = 9.48 in²
 A s/ Aconc, Rho: 0.0034 0.34%

ACI 10.5, ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy: 0.0032
 200 / Fy: 0.0033
 IBC 1810.1.2: 0.0025 SDC C
 Governing: 0.0033 0.33%

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

Min As: 0.0050 0.50%

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.34%	OK

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	417.5	ft-kips (* Note)
Max. Service Shaft P:	7	kips
Max Axial Force Type:	Comp.	

(* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor Shaft Factored Loads

Load Factor	Mu:	542.75	ft-kips
1.30	Pu:	9.1	kips

Material Properties

Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code = 2002

Seismic Properties

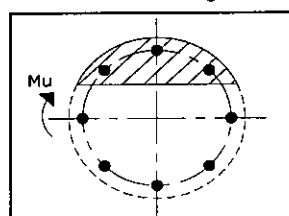
Seismic Design Category = C
 Seismic Risk = Moderate

Solve
(Run)

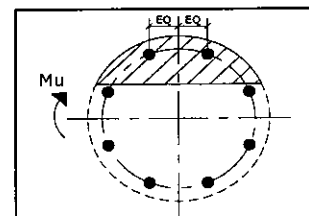
<-- Press Upon Completing All Input

Results:

Governing Orientation Case: 1



Case 1



Case 2

Dist. From Edge to Neutral Axis: 6.67 in

Extreme Steel Strain, ϵ_t : 0.0217

$\epsilon_t > 0.0050$, Tension Controlled

Reduction Factor, ϕ : 0.900

<-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):

Max Pu = ($\phi=0.65$) Pn	
Pn per ACI 318 (10-2)	5277.92 kips
at Mu=($\phi=0.65$) Mn	2288.34 ft-kips
Max Tu, ($\phi=0.9$) Tn =	511.92 kips
at Mu= $\phi=(0.90)$ Mn	0.00 ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, ϕ Pn = Pu: 9.10 kips

Drilled Shaft Moment Capacity, ϕ Mn: 1125.72 ft-kips

Drilled Shaft Superimposed Mu: 542.75 ft-kips

(Mu/ ϕ Mn, Drilled Shaft Flexure CSR: 48.21%

Clearwire Site Name: N/A
Clearwire Site Number: CT-BDR0066

REDACTED

Crown Site Name: Fairfield 2 / Sun Realty
JDE Business Unit Number: 876398

SITE LEASE ACKNOWLEDGMENT

This Master Lease Site Lease Acknowledgment ("SLA") is made and entered into as of this 1st day of February, 2010 (the "Effective Date"), by and between Clear Wireless LLC, a Nevada limited liability company (hereinafter designated as "CLEARWIRE"), and Global Signal Acquisitions II LLC, a Delaware limited liability company (hereinafter designated as "CROWN"), pursuant and subject to that certain Master Lease Agreement (the "Agreement") by and between the parties hereto, dated as of the 24th day of February, 1999, as amended. All capitalized terms have the meanings ascribed to them in the Agreement.

1. Site Description. The Site shall consist of a portion of that certain parcel of property, located in the City of Fairfield, the County of Fairfield, and the State of Connecticut, more particularly described as a parcel containing approximately Eight Hundred Forty (840) square feet situated at 2189-2215 Black Rock Turnpike, together with the non-exclusive right for ingress and egress, seven (7) days a week twenty-four (24) hours a day, on foot or motor vehicle, including trucks, and for the installation and maintenance of utility wires, poles, cables, conduits, and pipes over, under, or along a Twenty (20') feet wide right-of-way extending from the nearest public right-of-way, Black Rock Turnpike to the premises, said premises and right-of-way for access being substantially as described herein in Exhibit "1" to the SLA attached hereto and made a part hereof.

2. Equipment Specifications and Locations. CLEARWIRE shall have the right to install its antennas and equipment (collectively, the "Equipment") consistent with the specifications and in the locations described in Exhibit "2" to the SLA and Exhibit "3" to the SLA attached hereto and made a part hereof.

3. Commencement Date. The initial term of this SLA shall commence on November 1, 2009 (the "Commencement Date").

4. Annual Fee. 

Prepared by: C. Stinson
Created on: October 9, 2009
Revised on: 10/9/2009 10:49 AM

Clearwire Site Name: N/A
Clearwire Site Number: CT-BDR0066

Crown Site Name: Fairfield 2 / Sun Realty
JDE Business Unit Number: 876398

5. Prime Lease. CLEARWIRE acknowledges that Crown's rights in the Site derive from a certain Master Lease and Sublease dated May 26, 2005, by and among STC Five LLC, a Delaware limited liability company, Sprint Spectrum L.P., a Delaware limited partnership, Crown and Global Signal Inc., a Delaware corporation, as amended. STC Five LLC subleased its entire interest in and to the Prime Lease, as defined below, as of May 26, 2005 to Global Signal Acquisitions II LLC, which accepted such sublease from STC Five LLC. The parties further acknowledge that STC Five LLC, successor in interest to Sprint Spectrum L.P., rights in the Site derive from a certain PCS Site Agreement dated December 14, 1999, between Sun Realty Associates, LLC and Sprint Spectrum L.P., as amended (the "Prime Lease"), a copy of which is attached hereto as EXHIBIT "4" to the SLA. The Prime Lease commenced on January 12, 2007 and will expire on December 31, 2031.

6. Additional Provisions.

A. Site Identifier. CLEARWIRE will include with each monthly installment of the Annual Fee the following Site Identifier: 876398

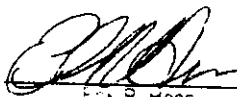
[Remainder of page intentionally left blank.]

Clearwire Site Name: N/A
Clearwire Site Number: CT-BDR0066

Crown Site Name: Fairfield 2 / Sun Realty
JDE Business Unit Number: 876398

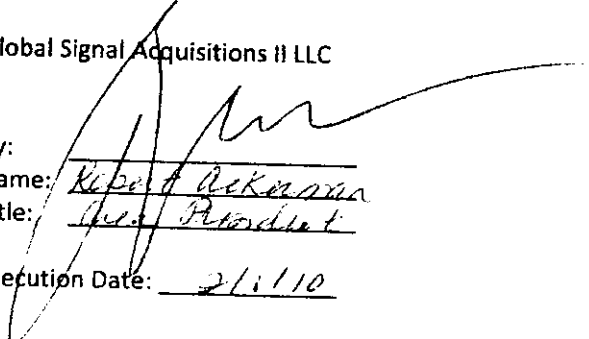
IN WITNESS WHEREOF, the parties hereto have set their hands and affixed their respective seals
the day and year first above written.

Clear Wireless LLC

By: 
Name: Eric B. Mess
Title: National Director
Clearwire

Execution Date: 01/27/10

Global Signal Acquisitions II LLC

By: 
Name: Robert A. DeKosman
Title: Gen. President

Execution Date: 2/1/10



To: HPC
From: Julius De La Cruz – Radio Frequency Engineer
Cc: Micah Hawthorne
Subject: Power Density Report for CT-BDR0066
Date: February 22, 2010

1. Introduction:

This report is the result of Electromagnetic Field Intensities (EMF – Power Densities) study for the Clearwire broadband antenna installation on a Self Support Tower at 2189 Black Rock Turnpike, Fairfield, CT 06430. 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 Clearwire transmitters are in the (2496 – 2960) Frequency Band
- 2) The emissions from the Clearwire Microwave dishes are in the 5.8 GHz Frequency Band
- 3) The model number for Clearwire Antenna is Argus LLPX310R
- 4) The model number for the Microwave dish is AN-80i.
- 5) The Clearwire panel antenna centerline is 69 feet.
- 6) The Clearwire microwave dish centerline is 72 feet.
- 7) The Maximum Transmit power from any Clearwire panel antenna is 251 Watts Effective Isotropic Radiated Power (EiRP) assuming 2 channels per sector.
- 8) The Maximum Transmit power from any Clearwire Microwave Dish is 346 Watts Effective Isotropic Radiated Power (EiRP) assuming 1 channel per dish.
- 9) All antennas are simultaneously transmitting and receiving 24 hours per day.
- 10) 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 used with the above information to perform the calculations.

3: Conclusion:

Based on the above worst case assumptions, the power density calculation from the Clearwire antenna installation on a self-support tower at 2189 Black Rock Turnpike, Fairfield, CT 06430 is $0.0000172 \text{ mW/cm}^2$. This value represents 0.001724% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm^2) set forth in the FCC/ANSI/IEEE C95-1-1991. Furthermore, the proposed antenna location for Clearwire 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 all other carriers is 29.17 %. The combined Power Density for this site is 29.171724% of the M.P.E. standard.