PULLMAN & COMLEY LLC
ATTORNEYS AT LAW

EM-POCKET-014-081015

ORIGINAL

CARRIE L. LARSON
90 State House Square
Hartford, CT 06103-3702
p (860) 424-4312
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www.pullcom.com

October 14, 2008

Via Federal Express

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

Re: Notice of Exempt Modification
Crown Castle, USA, Inc. Telecommunications Facility
21 Acorn Road, Branford, Connecticut

Dear Mr. Phelps:

Youghiogheny Communications-Northeast, LLC, doing business as Pocket Communications ("Pocket"), intends to install antennas and appurtenant equipment at the existing 150-foot monopole facility owned by Crown Castle, USA, Inc. and located at 21 Acorn Road, Branford, Connecticut ("Facility"). Pocket Communications provides prepaid, flat rate wireless voice and data services to more than a quarter of a million subscribers. Pocket 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 Anthony DaRos, First Selectman, Town of Branford.

The existing Facility consists of a 150-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-17'-35" and Long: 72°–45'-46".** The tower is located in the southern portion of Branford, approximately 150 feet east of Acorn Road, approximately 250 feet west of Leetes Island Road and roughly 800 feet south of Interstate 95 (see Site Map, attached as Exhibit A). The tower currently supports AT&T antennas at the one hundred five (105') level centerline AGL (above ground level), Verizon antennas at the one hundred sixteen foot level (116') AGL, Nextel antennas at the one hundred thirty foot level (130') AGL and Sprint antennas at the one hundred forty seven foot level (147') AGL. Pocket proposes to install three Kathrein 742-213 flush mount antennas on the tower at the one hundred thirty seven foot centerline (137') AGL, and a Nortel CDMA Micro BTS 3231 cabinet, mounted on an "H-Frame," contained within a four foot by four foot (4'-0" x 4'-0") lease area. A small GPS antenna will be mounted to the tower at the

seventy eight foot level (78') AGL. An ice bridge will run from the lease area to the tower. Utilities will be run via a proposed underground conduit from an existing utility backboard, located on the west side of an existing building just north of the tower (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

For the following reasons, the proposed modifications to the Acorn 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 Pocket's antennas will be installed at a center line height of approximately 137 feet.

2. The installation of Pocket's equipment and shelter 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 Pocket antennas would be 75.74% of the FCC standard (see general power density calculations table, attached as Exhibit D).

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

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

Respectfully Submitted,

Carrie L. Larson

cc: Anthony DaRos, First Selectman, Town of Branford
Altrio Investment Group LLC, c/o Alfred Secondino, underlying property owner

Exhibit A

Site Map

Pocket Site NHCT0213A

21 Acorn Road,

Branford, Connecticut

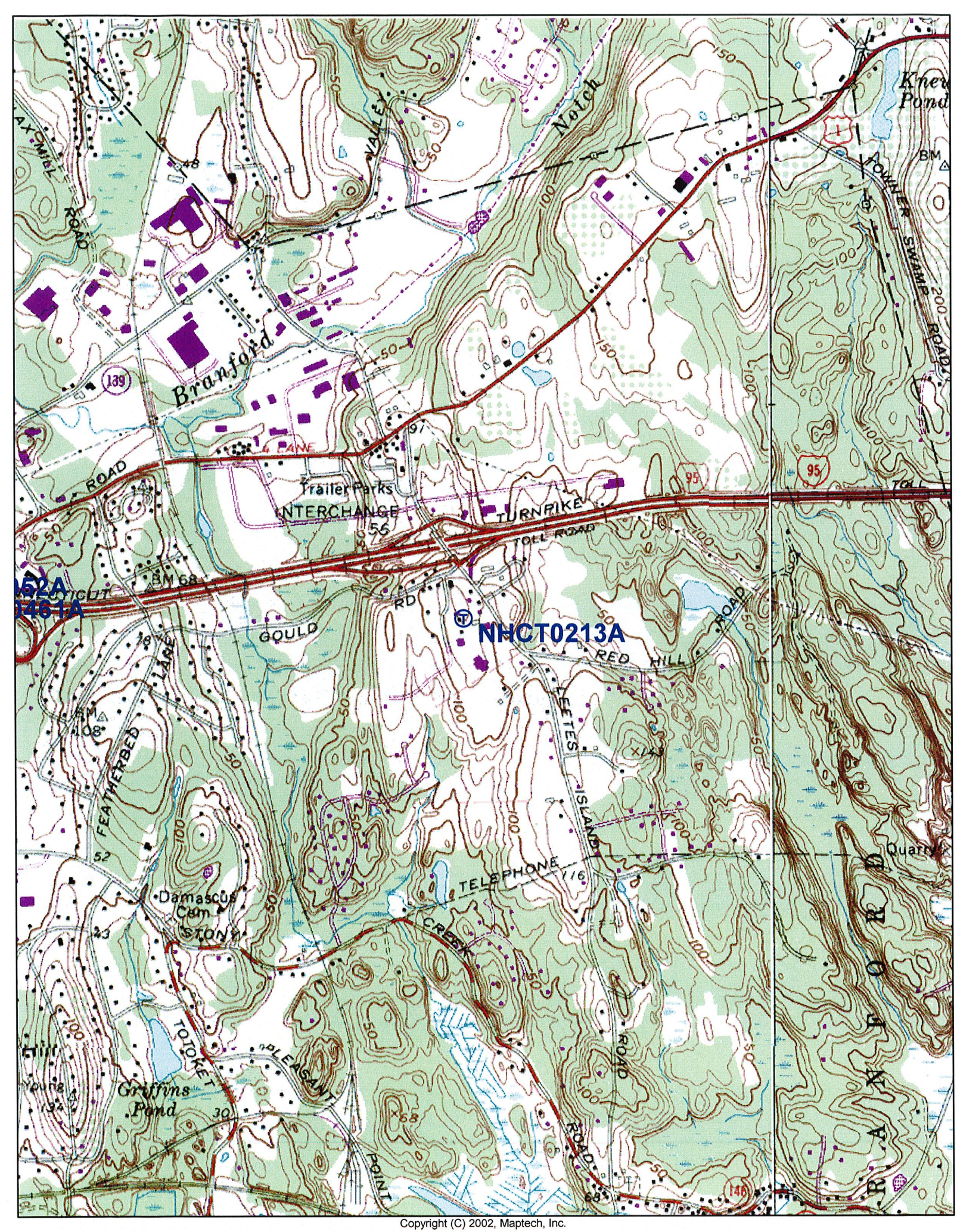


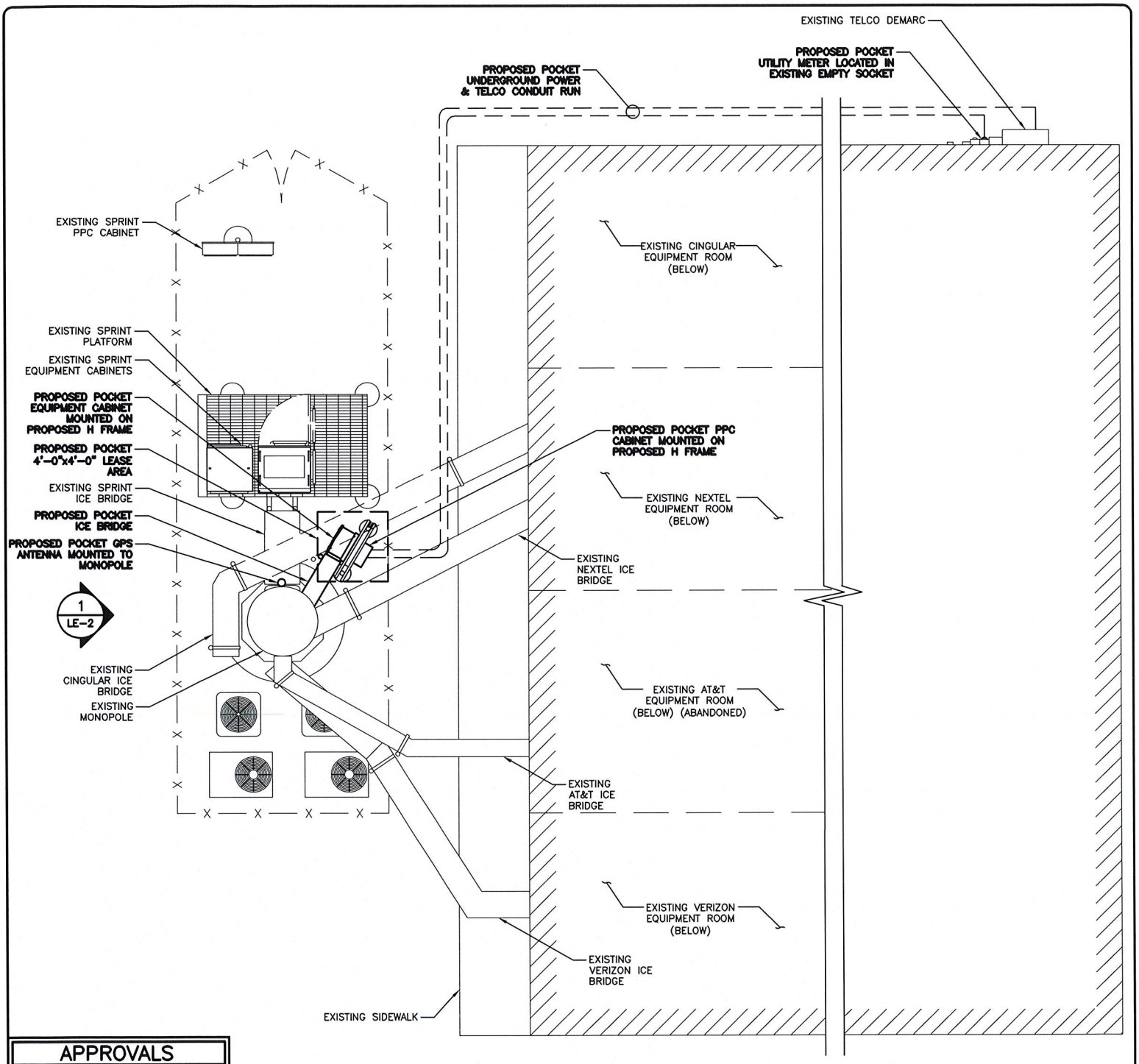
Exhibit B

Design Drawings

Pocket Site NHCT0213A

21 Acorn Road,

Branford, Connecticut



COMPOUND PLAN

SCALE: N.T.S.

1

APPROVALS

SITE OWNER	DATE
CONSTRUCTION MANAGER	DATE
R.F ENGINEER	DATE
SITE ACQUISITION	DATE

THE ABOVE PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES OR MODIFICATIONS THEY MAY IMPOSE.

MAXTON
50 Eastman St.
South Easton, MA 02375
Phone: (508) 936-6393
Fax: (508) 936-6395

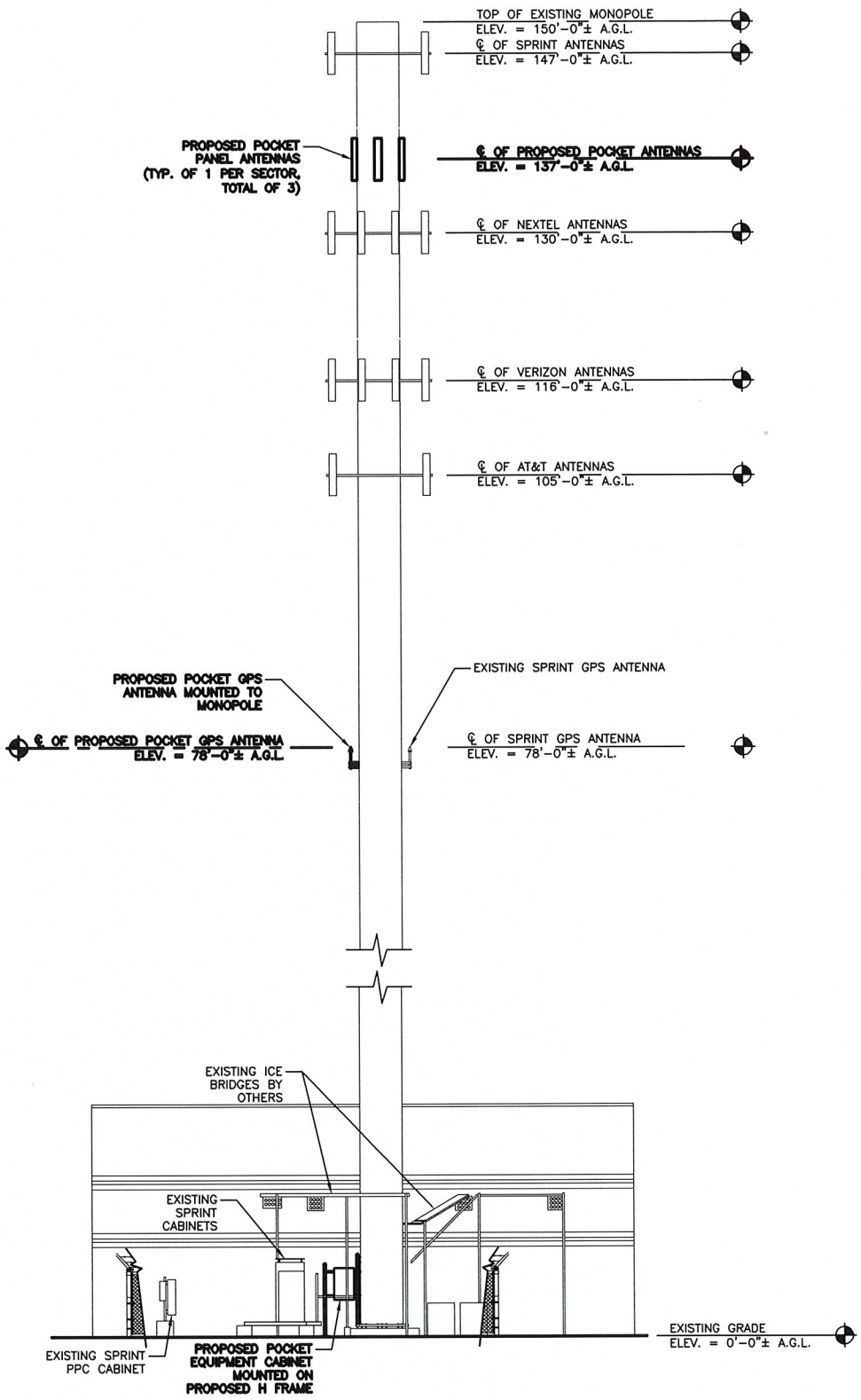
BAY STATE DESIGN
Bay State Design Associates, Inc.
Architects • Engineers
70 Tower Office Park
Woburn, MA 01801
Phone: 781-932-2467
Fax: 781-932-9771

PREPARED FOR:

pocket SMART WIRELESS

Pocket Communications
P.O. Box 5936
San Antonio, TX 78201

SITE NUMBER: CROWN 876316		DRAWN BY: DM	PROJECT NUMBER: 2882.038
SITE NAME: NH-213 BRANFORD, CT		CHECKED BY: JP	SHEET: LE-1
SITE ADDRESS: 21 ACORN RD. BRANFORD, CT 06405		DATE: 09/08/08	



ELEVATION 1

SCALE: N.T.S.

APPROVALS

SITE OWNER	DATE
CONSTRUCTION MANAGER	DATE
R.F ENGINEER	DATE
SITE ACQUISITION	DATE

THE ABOVE PARTIES HEREBY APPROVE AND ACCEPT THESE DRAWINGS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION REQUIRED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES OR MODIFICATIONS THEY MAY IMPOSE.

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

BAY STATE DESIGN
Bay State Design Associates, Inc.
Architects • Engineers
70 Tower Office Park
Woburn, MA 01801
Phone: 781-932-2467
Fax: 781-932-9771

PREPARED FOR:

pocket SMART WIRELESS

Pocket Communications
P.O. Box 5936
San Antonio, TX 78201

SITE NUMBER: CROWN 876316		DRAWN BY: DM	PROJECT NUMBER: 2882.038
SITE NAME: NH-213 BRANFORD, CT		CHECKED BY: JP	SHEET: LE-2
SITE ADDRESS: 21 ACORN RD. BRANFORD, CT 06405		DATE: 09/08/08	

Exhibit C

Equipment Specifications

Pocket Site NHCT0213A

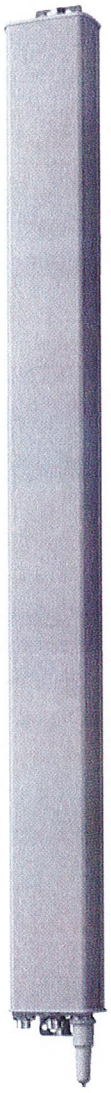
21 Acorn Road,

Branford, Connecticut

KATHREIN
SCALA DIVISION

742 213

65° Panel Antenna

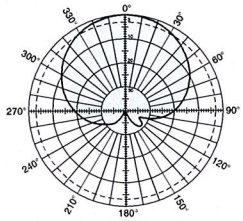


Kathrein's X-polarized adjustable electrical downtilt antennas offer the wireless carrier the ability to tailor polarization diversity sites for optimum performance. Using variable downtilt, only a few models need be procured to accommodate the needs of widely varying conditions. Remotely controlled downtilt is available as a retrofitable option.

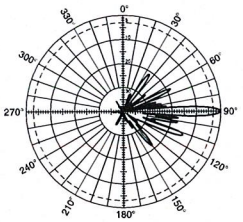
- 0-6° downtilt range.
- UV resistant pulltruded fiberglass radome.
- DC Grounded metallic parts for impulse suppression.
- No moving electrical connections.
- Wideband vector dipole technology.
- Optional remote downtilt Control.
- Will accomodate future 3G / UMTS applications.

General specifications:

Frequency range	1710–2170 MHz
VSWR	< 1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Front-to-back ratio (180°±30°)	>30 dB (co-polar) >25 dB (total power)
Maximum input power	300 watts per input (at 50°C)
Electrical downtilt continuously adjustable	0–6 degrees
Connector	2 x 7/16 DIN female
Isolation	>30 dB
Cross polar ratio Main direction 0° Sector ±60°	 25 dB (typical) >10 dB
Weight	22 lb (10 kg)
Dimensions	76.5 x 6.1 x 2.7 inches (1942 x 155 x 69 mm)
Equivalent flat plate area	4.62 ft² (0.429 m²)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	87.2 x 6.8 x 3.6 inches (2214 x 172 x 92 mm)
Shipping weight	24.3 lb (11 kg)
Mounting	Fixed and tilt mount options are available for 2 to 4.6 inch (50 to 115 mm) OD masts.
See reverse for order information.	



Horizontal pattern
±45°- polarization



Vertical pattern
±45°- polarization

Specifications:	**1710–1880 MHz**	**1850–1990 MHz**	**1920–2170 MHz**
Gain	19 dBi	19.2 dBi	19.5 dBi
+45° and -45° polarization horizontal beamwidth	67° (half-power)	65° (half-power)	63° (half-power)
+45° and -45° polarization vertical beamwidth	4.7° (half-power)	4.5° (half-power)	4.3° (half-power)
Vertical Pattern–sidelobe suppression for first side-lobe above main beam	0° 2° 4° 6° T 18 17 15 15 dB	0° 2° 4° 6° T 18 18 17 15 dB	0° 2° 4° 6° T 18 18 17 15 dB

RoHS Lead-Free

10642-H
936.2074/h

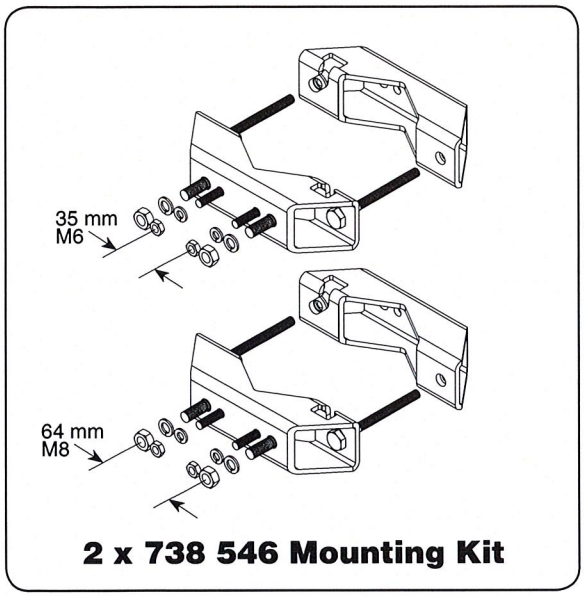
*Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com

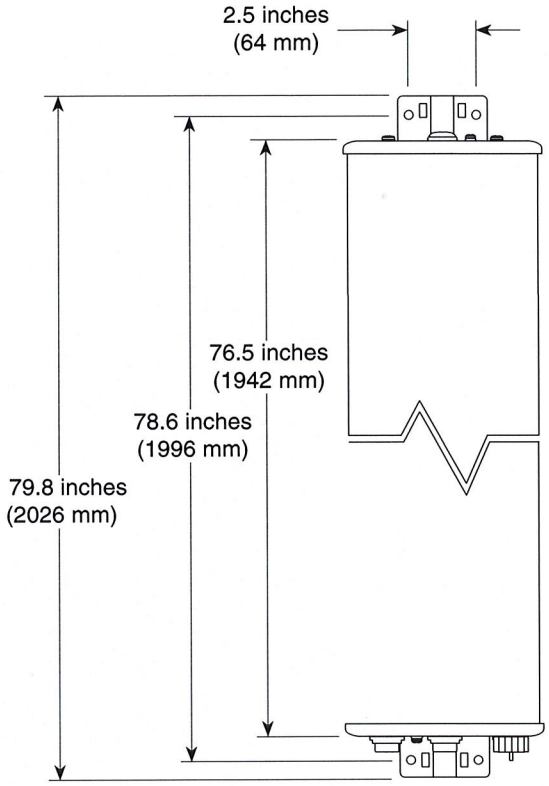
KATHREIN
SCALA DIVISION

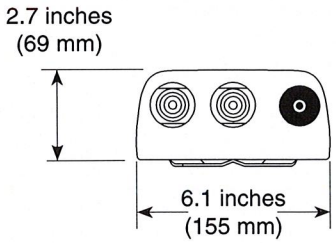
742 213

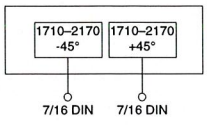
65° Panel Antenna



2 x 738 546 Mounting Kit







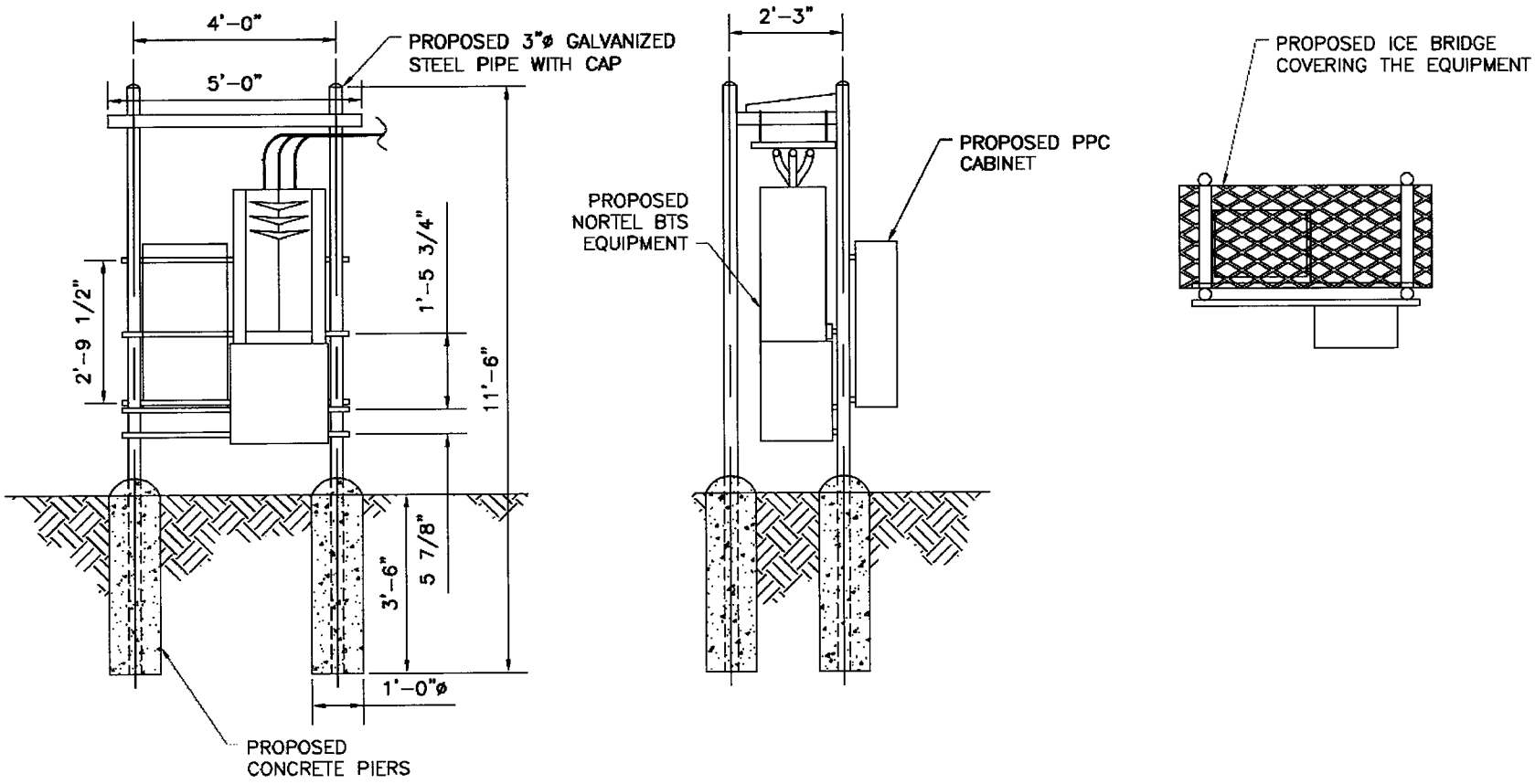
Mounting Options:

Model	Description
2 x 738 546	Mounting Kit for 2 to 4.6 inch (50 to 115 mm) OD mast.
737 978	Tilt Kit for use with the above mounting kit, 0–11 degrees downtilt angle. (requires 2 x 738 546 Mounting Kit)
742 263	Three-panel Sector Mounting Kit (120 deg. ea.) for 3.5 inch (89 mm) OD mast.

Order Information:

Model	Description
742 213	Antenna with 7/16 DIN connectors 0°–6° adjustable electrical downtilt

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com



Pocket/Youghiogheny Communications – Northeast, LLC

Rack Detail

>BUSINESS MADE **SIMPLE**

NORTEL

CDMA BTS 3231 AWS 1.7/2.1 GHz (Outdoor/Indoor)

CDMA BTS 3231

Industry's Highest Capacity AWS Micro BTS

The CDMA BTS 3231 is the latest extension to Nortel Networks BTS (Base Transceiver Station) portfolio providing the ideal solution for urban, sub-urban and rural deployments. The CDMA BTS 3231 is a 3-carrier, 3-sector outdoor/indoor BTS operating at the AWS band of 1.7/2.1 GHz supporting IS-95, 1XRTT and 1xEV-DO simultaneously. BTS 3231 provides flexible deployments solutions including floor, rack, and wall mount options. The power consumption of BTS3231 is industry leading consuming only 630W for 3C3S. The BTS 3231 is also very light at 240lbs making it easy to transport to hard to reach locations such as the top of a high rise building.

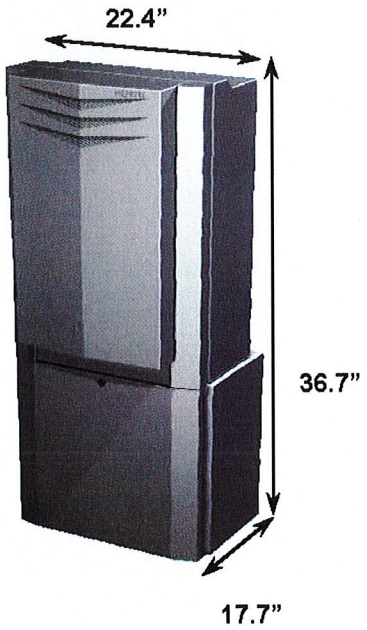


Exhibit D

Power Density Calculations

Pocket Site NHCT0213A

21 Acorn Road,

Branford, Connecticut

C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
Phone: (603) 657 9702
E-mail:
support@csquaredsystems.com

Calculated Radio Frequency Emissions

NHCT0213A

21 Acorn Road, Branford, CT

Table of Contents

List of Tables

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Pocket antennas to be installed on the existing tower at 21 Acorn Road, Branford, CT.

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (mW/cm^2). The number of mW/cm^2 emitted is called the power density. The general population exposure limit for the cellular band is 0.567-0.593 mW/cm^2, and the general population exposure limit for the PCS/AWS band is 1.0 mW/cm^2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

The FCC general population / uncontrolled limits set the maximum exposure to which most people may be subjected. General population / uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Higher exposure limits are permitted under the occupational / controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure (through training), and they must be able to exercise control over their exposure. General population / uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals."

The FCC describes exposure to radio frequency (RF) energy in terms of percentage of maximum permissible exposure (MPE) with 100% being the maximum allowed. Rather than the FCC presenting the user specification in terms of complex power density figures over a specified surface area, this MPE measure is particularly useful, and even more so when considering that power density limits actually vary by frequency because of the different absorptive properties of the human body at different frequencies.

MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over 30 minutes for general population / uncontrolled exposure (or 6 minutes for occupational / controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population / uncontrolled exposure and for occupational / controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include limits for Maximum Permissible Exposure (MPE) for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP), the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit. As shown in these excerpts, each frequency band has different exposure limits, requiring power density to be reported as a percent of Maximum Permissible Exposure (MPE) when dealing with carriers transmitting in different frequency bands.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{EIRP}{\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from bottom of antenna

Off Beam Loss is determined by the selected antenna patterns

4. Calculation Results

Table 1 below outlines the power density information for the site. All information for carriers other than Pocket was obtained from current CSC database.

Carrier	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Antenna Height (Feet)	Operating Frequency (MHz)	Total ERP (Watts)	Power Density (mw/cm^2)	Limit	%MPE
AT&T UMTS	1	500	105	1,935	500	0.0163	1.0000	1.63%
AT&T	20	250	105	880	5,000	0.1631	0.5867	27.80%
AT&T	3	427	105	1,900	1,281	0.0418	1.0000	4.18%
Verizon	9	766	116	880	6,894	0.1842	0.5867	31.40%
Verizon	3	198	116	1,900	594	0.0159	1.0000	1.59%
Sprint	11	122	150	1,958	1,342	0.0214	1.0000	2.14%
Nextel	9	100	130	851	900	0.0191	0.5673	3.38%
Pocket	3	631	137	2130-2133.75	1,893	0.0363	1.0000	3.63%
							Total	75.74%

Table 1: Proposed Carrier Information

5. Conclusion

The above analysis verifies that emissions from the proposed site will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 75.74% of the FCC limit.

As noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Tony Wells
C Squared Systems

October 10, 2008
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

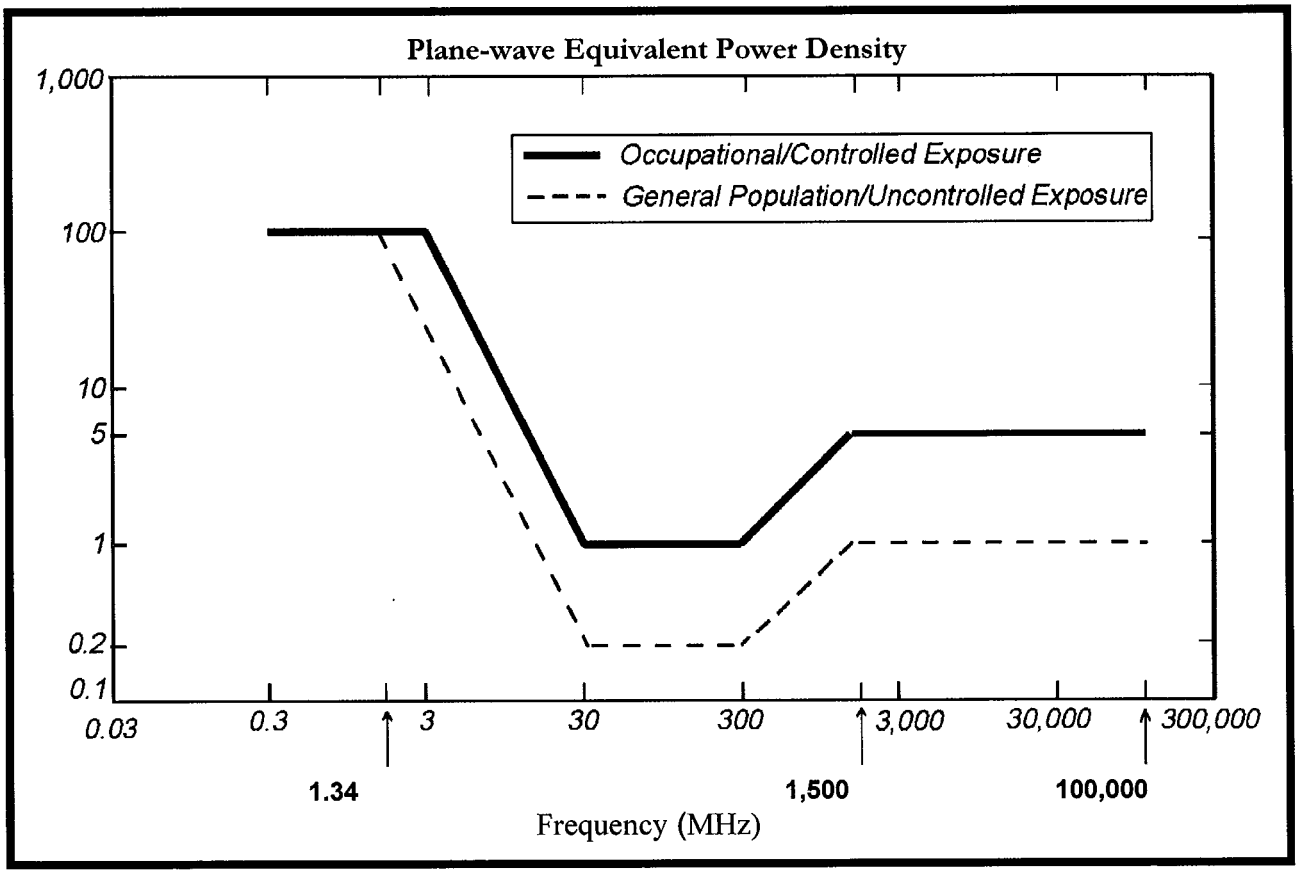
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



• FCC Limits for Maximum Permissible Exposure (MPE)

Exhibit E

Structural Analysis
Pocket Site NHCT0213A
21 Acorn Road,
Branford, Connecticut

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

October 2, 2008

Structure is Adequate
Monopole is Adequate
Foundation is Adequate

Tara Brewer
Crown Castle International
3530 Toringdon Way
Suite 300
Charlotte, NC 28277
(704) 321-3812

Subject: Structural Analysis Report of Existing 147-Ft Monopole

Carrier Designation	**Youghiogheny Communications Co-Locate**	
	Carrier Site Number:	**NHCT0213A**
	Carrier Site Name:	**N/A**
Crown Castle Designation	**Crown Castle BU Number:**	**876316**
	Crown Castle Site Name:	**Secondino Property**
	Crown Castle JDE Job Number:	**109342**
	Crown Castle Application Number:	**68141 Rev. #1**
	Crown Castle PO Number:	**305018**
	Crown Castle WO Number:	**233191**
Engineering Firm Designation	**Paul J. Ford and Company**	**37508-0592 R1**
Site Data	**21 Acorn Road, Branford, New Haven County, CT** **Latitude 41° 17' 35.06", Longitude -72° 45' 46.4"**	

Dear Tara Brewer,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural adequacy of the above monopole. This analysis has been performed in accordance with the Crown Castle Structural "Statement of Work", the terms of the Purchase Order, and the TIA/EIA-222-F Standard for the following Basic Wind Speeds: 85 mph without ice, 74 mph with 0.5" radial ice, and 50 mph (Operational) without ice.

The monopole was analyzed with the addition of the proposed antenna loading shown in the table below combined with the existing and reserved loading on the structure:

Elevation - ft	Count	Antenna Description
137	3	12' T-Arm Mounts
	3	Kathrein 742-213 w/Mount Pipe

Based on our analysis, we have determined that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading. Modifications are not required at this time.

Respectfully submitted,

Allen R. Bonham, E.I.T.
Structural Engineer
abonham@pjfweb.com

STATE OF CONNECTICUT
JOSEPH PACHICARAH JR.
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER
OCT 09 2008

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

October 2, 2008

Structure is Adequate
Monopole is Adequate
Foundation is Adequate

Tara Brewer
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Subject: Structural Analysis Report of Existing 147-Ft Monopole

Carrier Designation	**Youghiogheny Communications Co-Locate**	
	Carrier Site Number:	**NHCT0213A**
	Carrier Site Name:	**N/A**
Crown Castle Designation	**Crown Castle BU Number:**	**876316**
	Crown Castle Site Name:	**Secondino Property**
	Crown Castle JDE Job Number:	**109342**
	Crown Castle Application Number:	**68141 Rev. #1**
	Crown Castle PO Number:	**305018**
	Crown Castle WO Number:	**233191**
Engineering Firm Designation	**Paul J. Ford and Company**	**37508-0592 R1**
Site Data	**21 Acorn Road, Branford, New Haven County, CT**	
	Latitude 41° 17' 35.06", Longitude -72° 45' 46.4"	

Dear Tara Brewer,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural adequacy of the above monopole. This analysis has been performed in accordance with the Crown Castle Structural "Statement of Work", the terms of the Purchase Order, and the TIA/EIA-222-F Standard for the following Basic Wind Speeds: 85 mph without ice, 74 mph with 0.5" radial ice, and 50 mph (Operational) without ice.

The monopole was analyzed with the addition of the proposed antenna loading shown in the table below combined with the existing and reserved loading on the structure:

Elevation - ft	Count	Antenna Description
137	3	12' T-Arm Mounts
	3	Kathrein 742-213 w/Mount Pipe

Based on our analysis, we have determined that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading. Modifications are not required at this time.

Respectfully submitted,

Allen R. Bonham, E.I.T.
Structural Engineer
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INTRODUCTION

At the request of Crown Castle International, Paul J. Ford and Company has analyzed the monopole at the Secondino Property site located in Branford, New Haven County, CT. This structural analysis has been performed in accordance with the TIA/EIA-222-F-1996 Standard, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" to determine if the monopole structure has adequate capacity to support the existing, reserved, and proposed antenna loading.

ANALYSIS CRITERIA

The existing monopole has been analyzed for the antenna and coax loading listed in Tables 1A, 1B, 2A, and 2B below. The monopole has been analyzed in accordance with the TIA/EIA-222-F-1996 Standard for the following fastest-mile Basic Wind Speeds: 85 mph without ice, 74 with 0.5" radial ice, and 50 mph without ice as recommended for New Haven County, CT.

Table 1A - Proposed Antenna Information

Elevation - ft	Count	Antenna Description	Status
137	3	12' T-Arm Mounts	Proposed
	3	Kathrein 742-213 w/Mount Pipe	Proposed

Table 1B - Proposed Cable Information

Elevation - ft	Count	Cable Description	Location	Status
137 - 0	6	CR 50 1873 (1-5/8 FOAM)	External	Proposed

Table 2A - Existing and Reserved Antenna Information

Elevation - ft	Count	Antenna Description	Status
147	1	12' Low Profile Platform	Existing
145*	9	FV65-14-00NA2 w/Mount Pipe	MLA
132	12	FR90-12-00DAL2 w/Mount Pipe	Existing
130	1	12' Low Profile Platform	Existing
116	6	Antel LPA-185090/8CFx2 w/ mount pipe	Existing
	4	DB844H80-XY w/Mount Pipe	Existing
	2	Antel LPA-80063/6CF w/ Mount Pipe	Reserved
	2	ADC DUAL BAND 800/1900 FULL BAND	Reserved
	1	12' Low Profile Platform	Existing
108	9	Powerwave Technologies 7770 w/ Mount Pipe	Existing
	12	Powerwave Technologies LGP2140X	Existing
105	1	12' Low Profile Platform	Existing
81	2	KS24019-L112A	Existing
	1	Kathrein OG-860/1920/GPS-A	Existing
80	3	3' Side Arm Mount	Existing

* The MLA loading controls the analysis. The existing loading consists of: (4) FV65-14-00NA2 and (2) LPD-7907/4x3.

Table 2B - Existing and Reserved Cable Information

Elevation - ft	Count	Cable Description	Location	Status
147 – 0*	9	LDF7-50A (1-5/8 FOAM)	Internal	MLA
137 - 0	6	LDF7-50A (1-5/8 FOAM)	External	Existing
130 - 0	12	LDF6-50A (1-1/4 FOAM)	Internal	Existing
116 - 0	12	LDF7-50A (1-5/8 FOAM)	Internal	Existing
105 - 0	12	LDF7-50A (1-5/8 FOAM)	Internal	Existing
80 - 0	3	LDF4RN-50A (1/2 FOAM)	Internal	Existing

* The MLA coax loading controls the analysis. The existing coax loading consists of: (6) 1 5/8" coax lines.

Information for the existing monopole and foundation is based on the available drawings, documents, and/or information listed in Table 3 below.

Table 3 - Reference Documents Provided

Document	Source	Reference	Remarks
Proposed Antenna Loading	Crown Castle	876316	CCI
Existing Antenna Loading	Crown Castle	876316	CCI
Original Tower Drawings	Crown Castle	1632399	Summit Manufacturing Inc., 29297-566, 09-29-1997
Foundation Drawings	Crown Castle	1632435	Summit Manufacturing Inc., 29297-566, 09-29-1997
Geotechnical Report	Crown Castle	1529736	Dr. Clarence Welti, P.E., Geotchnical Engineering, 12-16-1996
Structural Analysis	Crown Castle	2223600	Tower Engineering Profesionals, 080368, 03-04-2008
Modification Drawings	Crown Castle		PJF, 37508-0592_BP, 05-08-2008

ANALYSIS PROCEDURE

ANALYSIS METHODS

RISA Tower (Version 5.3.0.1), a commercially available software program, was used to create a three-dimensional model of the monopole and calculate member stresses for various dead, live, wind, and ice load cases. The analysis was performed in accordance with the TIA/EIA-222-F Standard. Selected output from the analysis is included in Appendix A.

ASSUMPTIONS

1. Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2. Monopole has been properly maintained in accordance with manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1A, 1B, 2A, and 2B and the referenced drawings.
4. Monopole is reinforced in accordance with the Paul J. Ford & Company modification drawings, PJF# 37508-0234_BP, dated 05-08-2008.

If any of the above assumptions are not valid or have been made in error, then the results of this analysis may be affected. In that case, please notify Paul J. Ford and Company immediately so that we can review any new and/or modified information and determine its affect on the analysis results regarding the structural adequacy of the monopole and foundation.

ANALYSIS RESULTS

Our structural analysis indicates that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading.

Table 4 - Component Stresses vs. Capacity

Notes	Component	Elevation ft	% Capacity	Pass / Fail
Risa Tower Analysis Summary:				
	L1	147 - 105	69.2	Pass
	L2	105 - 90	93.1	Pass
	L3	90 - 73.75	72.1	Pass
	L4	73.75 - 42.75	87.9	Pass
	L5	42.75 - 0	98.5	Pass
Additional Components:				
	Base Plate	0 - 0	81.7	Pass
	Anchor Rods	0 - 0	100.0	Pass
	Foundation (Soil) - PJF Pole	0 - 0	97.1	Pass
	Foundation (Structural) - PJF Pole	0 - 0	56.5	Pass
		Structural Rating (maximum capacity of all components) =		**100.0**

As summarized in Table 4 above, our analysis indicates that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading. Modifications are not required at this time.

APPENDIX A

Output From Computer Programs

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1. Tower is located in New Haven County, Connecticut.
2. Basic wind speed of 85 mph.
3. Nominal ice thickness of 0.5000 in.
4. Ice density of 56 pcf.
5. A wind speed of 74 mph is used in combination with ice.
6. Temperature drop of 50 °F.
7. Deflections calculated using a wind speed of 50 mph.
8. A non-linear (P-delta) analysis was used.
9. Pressures are calculated at each section.
10. Stress ratio used in pole design is 1.333.
11. Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform	v	Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	v	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	v	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
v	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
v	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
	Escalate Ice	v	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	v	Use Azimuth Dish Coefficients	v	Consider Feedline Torque
	Use Special Wind Profile	v	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity	v	Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	v	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	147.00-105.00	42.00	3.75	18	22.0000	29.1410	0.2500	1.0000	A607-60 (60 ksi)
L2	105.00-90.00	18.75	0.00	18	28.0034	31.1900	0.3125	1.2500	A607-60 (60 ksi)
L3	90.00-73.75	16.25	4.25	18	31.1900	33.9550	0.4843	1.9372	A607-60 (60 ksi)
L4	73.75-42.75	35.25	4.75	18	32.2632	38.6010	0.5240	2.0959	A607-60 (60 ksi)
L5	42.75-0.00	47.50		18	36.6990	45.1200	0.5604	2.2416	A607-60

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 (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.5905	22.9250	2417.5313	10.2563	14.8036	163.3067	4838.2436	11.4647	4.6888	18.755
L2	29.0826	27.4659	2660.7626	9.8303	14.2257	187.0387	5325.0263	13.7356	4.3786	14.012
	31.6712	30.6266	3689.1030	10.9615	15.8445	232.8315	7383.0603	15.3162	4.9394	15.806
L3	31.6712	47.2006	5622.4122	10.9005	15.8445	354.8490	11252.222 6	23.6048	4.6371	9.575
	34.4788	51.4509	7282.1579	11.8821	17.2491	422.1751	14573.897 8	25.7304	5.1237	10.579
L4	33.5369	52.7863	6718.1890	11.2674	16.3897	409.9026	13445.217 9	26.3982	4.7561	9.077
	39.1965	63.3268	11599.816 5	13.5173	19.6093	591.5464	23214.896 3	31.6694	5.8716	11.206
L5	38.1202	64.2810	10606.268 1	12.8292	18.6431	568.9113	21226.492 1	32.1466	5.4727	9.766
	45.8160	79.2597	19882.560 7	15.8187	22.9210	867.4401	39791.283 3	39.6374	6.9548	12.41

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 147.00-105.00				1	1	1		
L2 105.00-90.00				1	1	1		
L3 90.00-73.75				1	1	1		
L4 73.75-42.75				1	1	1		
L5 42.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) **	C	No	Inside Pole	147.00 - 0.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	137.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
LDF7-50A (1-5/8 FOAM) ***	C	No	CaAa (Out Of Face)	137.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
LDF6-50A (1-1/4 FOAM) **	C	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
LDF7-50A (1-5/8 FOAM) **	C	No	Inside Pole	116.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM) **	C	No	Inside Pole	105.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF4RN-50A (1/2 FOAM) **	C	No	Inside Pole	80.00 - 0.00	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
Aero MP3-05	C	No	CaAa (Out Of Face)	90.00 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.00-105.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.336	0.77
L2	105.00-90.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.970	0.60
L3	90.00-73.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.869	0.65
L4	73.75-42.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.920	1.25
L5	42.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	23.333	1.72

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.00-105.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.536	1.06
L2	105.00-90.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.470	0.73
L3	90.00-73.75	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.344	0.80
L4	73.75-42.75	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.640	1.53
L5	42.75-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.843	2.11

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	147.00-105.00	-0.1891	0.1092	-0.2660	0.1536
L2	105.00-90.00	-0.2383	0.1376	-0.3358	0.1938
L3	90.00-73.75	-0.5903	0.3408	-0.7041	0.4065
L4	73.75-42.75	-0.5994	0.3461	-0.7187	0.4149
L5	42.75-0.00	-0.6120	0.3534	-0.7391	0.4267

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) FV65-14-00NA2 w/Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(3) FV65-14-00NA2 w/Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
12' Low Profile Platform	C	None		0.0000	147.00	No Ice 1/2" Ice	27.00 32.00	27.00 32.00	1.10 1.70
**									
12' T-Arm Mounts	C	None		0.0000	137.00	No Ice 1/2" Ice	12.00 18.00	12.00 18.00	1.14 1.27
Kathrein 742-213 w/Mount Pipe	A	From Face	0.50 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice	5.14 5.61	2.96 3.63	0.02 0.05
Kathrein 742-213 w/Mount Pipe	B	From Face	0.50 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice	5.14 5.61	2.96 3.63	0.02 0.05
Kathrein 742-213 w/Mount Pipe	C	From Face	0.50 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice	5.14 5.61	2.96 3.63	0.02 0.05
**									
(4) FR90-12-00DAL2 w/Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(4) FR90-12-00DAL2 w/Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
(4) FR90-12-00DAL2 w/Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice	8.64 9.29	6.95 8.13	0.06 0.12
12' Low Profile Platform	C	None		0.0000	130.00	No Ice 1/2" Ice	27.00 32.00	27.00 32.00	1.10 1.70
**									
(2) Antel LPA-185090/8CFx2 w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	2.20 2.52	3.78 4.36	0.02 0.05
(2) Antel LPA-185090/8CFx2 w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	2.20 2.52	3.78 4.36	0.02 0.05
(2) DB844H80-XY w/Mount	A	From Face	3.00	0.0000	116.00	No Ice	3.58	5.63	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0.00 0.00			1/2" Ice	4.20	6.73	0.08
(2) DB844H80-XY w/Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	3.58 4.20	5.63 6.73	0.04 0.08
(2) Antel LPA-80063/6CF w/ Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	10.68 11.31	11.41 12.38	0.08 0.18
(2) Antel LPA-185090/8CFx2 w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	2.20 2.52	3.78 4.36	0.02 0.05
(2) ADC DUAL BAND 800/1900 FULL BAND	B	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	0.65 0.76	0.81 0.94	0.03 0.04
12' Low Profile Platform **	C	None		0.0000	116.00	No Ice 1/2" Ice	27.00 32.00	27.00 32.00	1.10 1.70
(3) Powerwave Technologies 7770 w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	6.01 6.46	4.42 5.08	0.07 0.12
(3) Powerwave Technologies 7770 w/ Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	6.01 6.46	4.42 5.08	0.07 0.12
(3) Powerwave Technologies 7770 w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	6.01 6.46	4.42 5.08	0.07 0.12
(4) Powerwave Technologies LGP2140X	A	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
(4) Powerwave Technologies LGP2140X	B	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
(4) Powerwave Technologies LGP2140X	C	From Face	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
12' Low Profile Platform **	C	None		0.0000	105.00	No Ice 1/2" Ice	27.00 32.00	27.00 32.00	1.10 1.70
KS24019-L112A	A	From Face	3.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice	0.10 0.18	0.10 0.18	0.01 0.01
Kathrein OG-860/1920/GPS-A	B	From Face	3.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice	0.14 0.23	0.14 0.23	0.00 0.00
KS24019-L112A	C	From Face	3.00 0.00 0.00	0.0000	81.00	No Ice 1/2" Ice	0.10 0.18	0.10 0.18	0.01 0.01
3' Side Arm Mount	A	None		0.0000	80.00	No Ice 1/2" Ice	0.76 0.96	0.76 0.96	0.03 0.04
3' Side Arm Mount	B	None		0.0000	80.00	No Ice 1/2" Ice	0.76 0.96	0.76 0.96	0.03 0.04
3' Side Arm Mount	C	None		0.0000	80.00	No Ice 1/2" Ice	0.76 0.96	0.76 0.96	0.03 0.04

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.00-105.00	125.27	1.464	27	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	6.336
L2 105.00-90.00	97.39	1.362	25	37.394	A	0.000	37.394	37.394	100.00	0.000	0.000
					B	0.000	37.394		100.00	0.000	0.000
					C	0.000	37.394		100.00	0.000	2.970
L3 90.00-73.75	81.76	1.296	24	44.109	A	0.000	44.109	44.109	100.00	0.000	0.000
					B	0.000	44.109		100.00	0.000	0.000
					C	0.000	44.109		100.00	0.000	8.869
L4 73.75-42.75	58.14	1.176	22	92.520	A	0.000	92.520	92.520	100.00	0.000	0.000
					B	0.000	92.520		100.00	0.000	0.000
					C	0.000	92.520		100.00	0.000	16.920
L5 42.75-0.00	20.72	1	18	147.240	A	0.000	147.240	147.240	100.00	0.000	0.000
					B	0.000	147.240		100.00	0.000	0.000
					C	0.000	147.240		100.00	0.000	23.333

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.00-105.00	125.27	1.464	20	0.5000	92.997	A	0.000	92.997	92.997	100.00	0.000	0.000
						B	0.000	92.997		100.00	0.000	0.000
						C	0.000	92.997		100.00	0.000	9.536
L2 105.00-90.00	97.39	1.362	19	0.5000	38.644	A	0.000	38.644	38.644	100.00	0.000	0.000
						B	0.000	38.644		100.00	0.000	0.000
						C	0.000	38.644		100.00	0.000	4.470
L3 90.00-73.75	81.76	1.296	18	0.5000	45.463	A	0.000	45.463	45.463	100.00	0.000	0.000
						B	0.000	45.463		100.00	0.000	0.000
						C	0.000	45.463		100.00	0.000	11.344
L4 73.75-42.75	58.14	1.176	16	0.5000	95.103	A	0.000	95.103	95.103	100.00	0.000	0.000
						B	0.000	95.103		100.00	0.000	0.000
						C	0.000	95.103		100.00	0.000	21.640
L5 42.75-0.00	20.72	1	14	0.5000	150.803	A	0.000	150.803	150.803	100.00	0.000	0.000
						B	0.000	150.803		100.00	0.000	0.000
						C	0.000	150.803		100.00	0.000	29.843

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.00-	125.27	1.464	9	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
105.00					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	6.336
L2 105.00-90.00	97.39	1.362	9	37.394	A	0.000	37.394	37.394	100.00	0.000	0.000
					B	0.000	37.394		100.00	0.000	0.000
					C	0.000	37.394		100.00	0.000	2.970
L3 90.00-73.75	81.76	1.296	8	44.109	A	0.000	44.109	44.109	100.00	0.000	0.000
					B	0.000	44.109		100.00	0.000	0.000
					C	0.000	44.109		100.00	0.000	8.869
L4 73.75-42.75	58.14	1.176	7	92.520	A	0.000	92.520	92.520	100.00	0.000	0.000
					B	0.000	92.520		100.00	0.000	0.000
					C	0.000	92.520		100.00	0.000	16.920
L5 42.75-0.00	20.72	1	6	147.240	A	0.000	147.240	147.240	100.00	0.000	0.000
					B	0.000	147.240		100.00	0.000	0.000
					C	0.000	147.240		100.00	0.000	23.333

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 90 deg - No Ice
4	Dead+Wind 180 deg - No Ice
5	Dead+Ice+Temp
6	Dead+Wind 0 deg+Ice+Temp
7	Dead+Wind 90 deg+Ice+Temp
8	Dead+Wind 180 deg+Ice+Temp
9	Dead+Wind 0 deg - Service
10	Dead+Wind 90 deg - Service
11	Dead+Wind 180 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	147 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-14.29	-0.63	0.36
			Max. Mx	3	-7.84	-427.22	0.50
			Max. My	2	-7.85	-0.60	426.66
			Max. Vy	3	18.75	-427.22	0.50
			Max. Vx	2	-18.70	-0.60	426.66
			Max. Torque	4			2.05
L2	105 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-20.73	-0.36	0.21
			Max. Mx	3	-12.55	-857.80	1.34
			Max. My	2	-12.55	-1.43	856.27
			Max. Vy	3	24.06	-857.80	1.34
			Max. Vx	2	-24.00	-1.43	856.27
			Max. Torque	4			2.03
L3	90 - 73.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-23.68	-0.15	0.09
			Max. Mx	3	-15.27	-1153.43	1.87
			Max. My	2	-15.28	-1.93	1151.30
			Max. Vy	3	25.32	-1153.43	1.87
			Max. Vx	4	25.26	1.65	-1151.08
			Max. Torque	4			2.01
L4	73.75 - 42.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	5	-32.55	0.39	-0.23
			Max. Mx	3	-23.70	-1968.72	3.21
			Max. My	4	-23.70	3.24	-1965.02
			Max. Vy	3	28.04	-1968.72	3.21
			Max. Vx	4	27.99	3.24	-1965.02
			Max. Torque	4			1.94
L5	42.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-48.73	1.37	-0.79
			Max. Mx	3	-39.32	-3379.45	5.20
			Max. My	4	-39.32	5.77	-3373.78
			Max. Vy	3	31.25	-3379.45	5.20
			Max. Vx	4	31.20	5.77	-3373.78
			Max. Torque	4			1.79

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	5	48.73	0.00	-0.00
	Max. H_x	4	39.35	0.05	-31.16
	Max. H_z	2	39.35	-0.05	31.16
	Max. M_x	2	3373.38	-0.05	31.16
	Max. M_z	3	3379.45	-31.21	0.05
	Max. Torsion	4	1.60	0.05	-31.16
	Min. Vert	3	39.35	-31.21	0.05
	Min. H_x	3	39.35	-31.21	0.05
	Min. H_z	4	39.35	0.05	-31.16
	Min. M_x	4	-3373.78	0.05	-31.16
	Min. M_z	8	-5.94	0.04	-26.26
	Min. Torsion	2	-1.60	-0.05	31.16

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	39.35	0.00	0.00	0.20	0.35	0.00
Dead+Wind 0 deg - No Ice	39.35	0.05	-31.16	-3373.38	-5.04	1.60
Dead+Wind 90 deg - No Ice	39.35	31.21	-0.05	-5.20	-3379.45	-0.92
Dead+Wind 180 deg - No Ice	39.35	-0.05	31.16	3373.78	5.77	-1.60
Dead+Ice+Temp	48.73	-0.00	0.00	0.79	1.37	0.00
Dead+Wind 0 deg+Ice+Temp	48.73	0.04	-26.26	-2909.52	-3.10	1.07
Dead+Wind 90 deg+Ice+Temp	48.73	26.30	-0.04	-3.70	-2914.13	-0.62
Dead+Wind 180 deg+Ice+Temp	48.73	-0.04	26.26	2911.14	5.94	-1.07
Dead+Wind 0 deg - Service	39.35	0.02	-10.78	-1168.77	-1.53	0.56
Dead+Wind 90 deg - Service	39.35	10.80	-0.02	-1.67	-1170.79	-0.32
Dead+Wind 180 deg - Service	39.35	-0.02	10.78	1169.17	2.22	-0.56

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-39.35	0.00	0.00	39.35	0.00	0.000%
2	0.05	-39.35	-31.16	-0.05	39.35	31.16	0.002%
3	31.21	-39.35	-0.05	-31.21	39.35	0.05	0.002%
4	-0.05	-39.35	31.16	0.05	39.35	-31.16	0.002%
5	0.00	-48.73	0.00	0.00	48.73	-0.00	0.000%
6	0.04	-48.73	-26.26	-0.04	48.73	26.26	0.000%
7	26.30	-48.73	-0.04	-26.30	48.73	0.04	0.000%
8	-0.04	-48.73	26.26	0.04	48.73	-26.26	0.000%
9	0.02	-39.35	-10.78	-0.02	39.35	10.78	0.006%
10	10.80	-39.35	-0.02	-10.80	39.35	0.02	0.006%
11	-0.02	-39.35	10.78	0.02	39.35	-10.78	0.006%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00000001	0.00013472
3	Yes	15	0.00000001	0.00008656
4	Yes	15	0.00000001	0.00011386
5	Yes	6	0.00000001	0.00000001
6	Yes	17	0.00000001	0.00010093
7	Yes	17	0.00000001	0.00009951
8	Yes	17	0.00000001	0.00010021
9	Yes	13	0.00013611	0.00014018
10	Yes	13	0.00013611	0.00011235
11	Yes	13	0.00013611	0.00013558

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	37.496	10	2.1584	0.0042
L2	108.75 - 90	21.011	10	1.8318	0.0033
L3	90 - 73.75	14.401	10	1.4895	0.0020
L4	78 - 42.75	10.894	10	1.2980	0.0015
L5	47.5 - 0	4.092	10	0.7957	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	12' Low Profile Platform	10	37.496	2.1584	0.0042	26927
145.00	(3) FV65-14-00NA2 w/Mount Pipe	10	36.591	2.1488	0.0042	26927
137.00	12' T-Arm Mounts	10	32.983	2.1079	0.0042	13463
132.00	(4) FR90-12-00DAL2 w/Mount Pipe	10	30.755	2.0779	0.0041	8975
130.00	12' Low Profile Platform	10	29.872	2.0644	0.0041	7919
116.00	(2) Antel LPA-185090/8CFx2 w/ mount pipe	10	23.904	1.9336	0.0037	4341

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	(3) Powerwave Technologies 7770 w/ Mount Pipe	10	20.721	1.8196	0.0033	3501
105.00	12' Low Profile Platform	10	19.582	1.7679	0.0031	3337
81.00	KS24019-L112A	10	11.726	1.3460	0.0016	3980
80.00	3' Side Arm Mount	10	11.446	1.3302	0.0015	4145

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	107.959	3	6.2172	0.0122
L2	108.75 - 90	60.545	3	5.2780	0.0096
L3	90 - 73.75	41.516	3	4.2940	0.0056
L4	78 - 42.75	31.414	3	3.7426	0.0042
L5	47.5 - 0	11.804	3	2.2953	0.0019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	12' Low Profile Platform	3	107.959	6.2172	0.0122	9553
145.00	(3) FV65-14-00NA2 w/Mount Pipe	3	105.356	6.1894	0.0121	9553
137.00	12' T-Arm Mounts	3	94.983	6.0712	0.0121	4775
132.00	(4) FR90-12-00DAL2 w/Mount Pipe	3	88.574	5.9845	0.0119	3182
130.00	12' Low Profile Platform	3	86.036	5.9455	0.0118	2807
116.00	(2) Antel LPA-185090/8CFx2 w/ mount pipe	3	68.869	5.5697	0.0107	1536
108.00	(3) Powerwave Technologies 7770 w/ Mount Pipe	3	59.712	5.2431	0.0094	1237
105.00	12' Low Profile Platform	3	56.434	5.0954	0.0088	1178
81.00	KS24019-L112A	3	33.811	3.8776	0.0045	1394
80.00	3' Side Arm Mount	3	33.004	3.8329	0.0044	1452

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	147 - 105 (1)	TP29.141x22x0.25	42.00	0.00	0.0	36.000	22.4191	-7.84	807.09	0.010
L2	105 - 90 (2)	TP31.19x28.0034x0.3125	18.75	0.00	0.0	36.000	30.6266	-12.55	1102.56	0.011
L3	90 - 73.75 (3)	TP33.955x31.19x0.4843	16.25	0.00	0.0	36.000	50.3393	-15.27	1812.22	0.008
L4	73.75 - 42.75 (4)	TP38.601x32.2632x0.524	35.25	0.00	0.0	36.000	61.9065	-23.70	2228.63	0.011
L5	42.75 - 0 (5)	TP45.12x36.699x0.5604	47.50	0.00	0.0	36.000	79.2597	-39.32	2853.35	0.014

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	147 - 105 (1)	TP29.141x22x0.25	427.22	32.832	36.000	0.912	0.00	0.000	36.000	0.000
L2	105 - 90 (2)	TP31.19x28.0034x0.3125	857.80	44.210	36.000	1.228	0.00	0.000	36.000	0.000
L3	90 - 73.75 (3)	TP33.955x31.19x0.4843	1153.43	34.260	36.000	0.952	0.00	0.000	36.000	0.000
L4	73.75 - 42.75 (4)	TP38.601x32.2632x0.524	1968.72	41.804	36.000	1.161	0.00	0.000	36.000	0.000
L5	42.75 - 0 (5)	TP45.12x36.699x0.5604	3379.46	46.751	36.000	1.299	0.00	0.000	36.000	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	147 - 105 (1)	TP29.141x22x0.25	18.75	0.836	24.000	0.070	1.18	0.044	24.000	0.002
L2	105 - 90 (2)	TP31.19x28.0034x0.3125	24.06	0.786	24.000	0.065	1.16	0.029	24.000	0.001
L3	90 - 73.75 (3)	TP33.955x31.19x0.4843	25.32	0.503	24.000	0.042	1.13	0.016	24.000	0.001
L4	73.75 - 42.75 (4)	TP38.601x32.2632x0.524	28.04	0.453	24.000	0.038	1.05	0.011	24.000	0.000
L5	42.75 - 0 (5)	TP45.12x36.699x0.5604	31.25	0.394	24.000	0.033	0.93	0.006	24.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147 - 105 (1)	0.010	0.912	0.000	0.070	0.002	0.923 ✓	1.333	H1-3+VT ✓
L2	105 - 90 (2)	0.011	1.228	0.000	0.065	0.001	1.241 ✓	1.333	H1-3+VT ✓
L3	90 - 73.75 (3)	0.008	0.952	0.000	0.042	0.001	0.961 ✓	1.333	H1-3+VT ✓
L4	73.75 - 42.75 (4)	0.011	1.161	0.000	0.038	0.000	1.172 ✓	1.333	H1-3+VT ✓
L5	42.75 - 0 (5)	0.014	1.299	0.000	0.033	0.000	1.313 ✓	1.333	H1-3+VT ✓

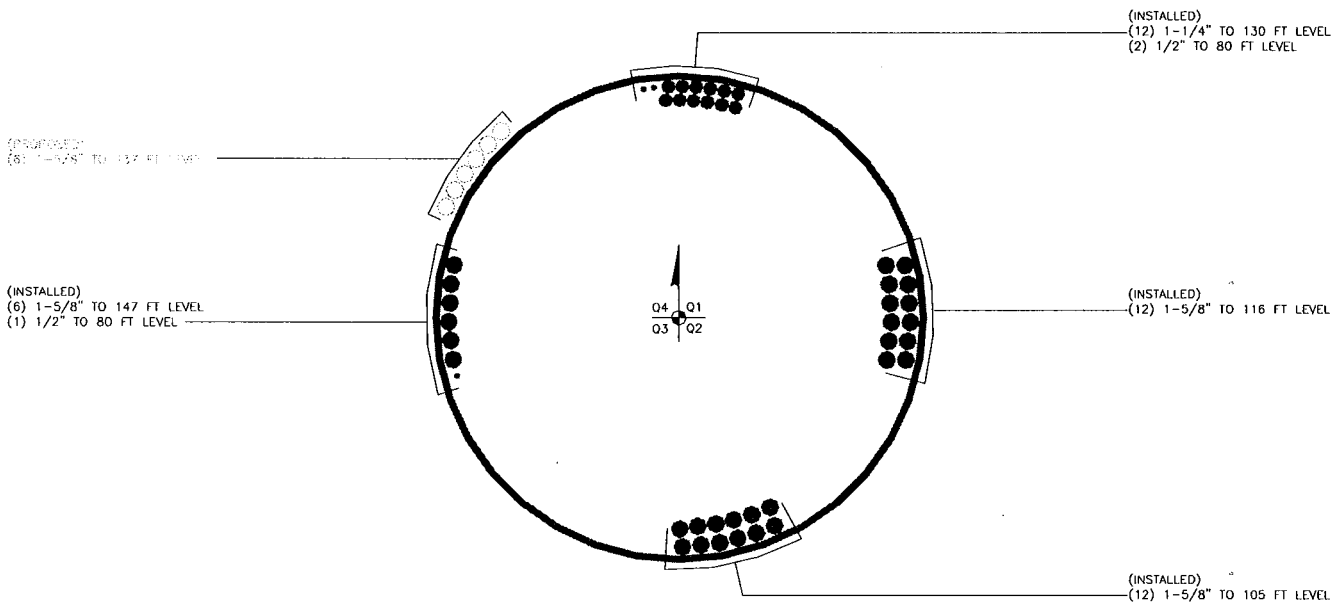
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-7.84	1075.85	69.2	Pass
L2	105 - 90	Pole	TP31.19x28.0034x0.3125	2	-12.55	1469.71	93.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L3	90 - 73.75	Pole	TP33.955x31.19x0.4843	3	-15.27	2415.69	72.1	Pass
L4	73.75 - 42.75	Pole	TP38.601x32.2632x0.524	4	-23.70	2970.76	87.9	Pass
L5	42.75 - 0	Pole	TP45.12x36.699x0.5604	5	-39.32	3803.52	98.5	Pass
							Summary	
						Pole (L5)	98.5	Pass
						RATING =	**98.5**	**Pass**

APPENDIX B

Cable Routing Drawing

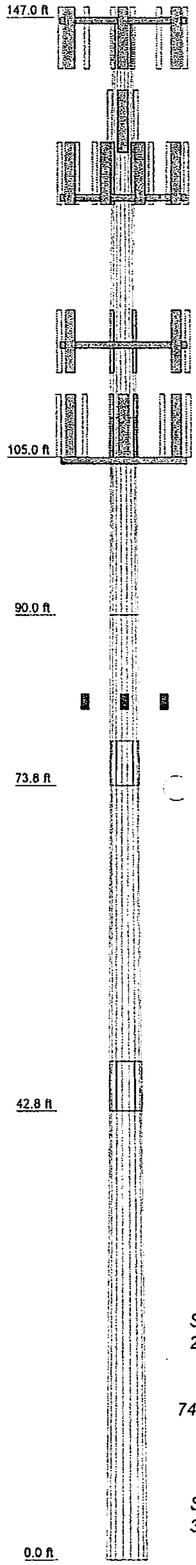


APPENDIX C

Table C1 - List of Attached Documents

Attachment
ERI Monopole Profile
Base Plate Calculations
Foundation Calculations

Program Version 5.3.1.0 - 10/3/2008 File:T:/375_Crown_Castle/2008/37508-0592_BU 876316 WO 208048/WO 233191 BU 876316/37508-0592_R1.eri



Section	1	2	3	4	5
Length (ft)	42.00	18.75	16.25	35.25	47.50
Number of Sides	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.4843	0.5240	0.5604
Lap Splice (ft)	3.75		4.25	4.75	
Top Dia (in)	22.0000	28.0034	31.1900	32.2632	36.6990
Bot Dia (in)	29.1410	31.1900	33.9550	38.6010	45.1200
Grade	A607-60				
Weight (K) 26.0	2.9	1.9	2.7	7.0	11.6

DESIGNED APPURTENANCE LOADING

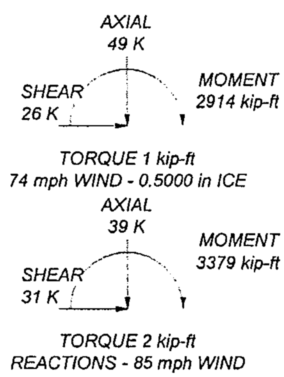
TYPE	ELEVATION	TYPE	ELEVATION
12' Low Profile Platform	147	(2) ADC DUAL BAND 800/1900 FULL BAND	116
(3) FV65-14-00NA2 w/Mount Pipe	145	12' Low Profile Platform	116
(3) FV65-14-00NA2 w/Mount Pipe	145	(3) Powerwave Technologies 7770 w/ Mount Pipe	108
(3) FV65-14-00NA2 w/Mount Pipe	145	(3) Powerwave Technologies 7770 w/ Mount Pipe	108
12' T-Arm Mounts	137	(3) Powerwave Technologies 7770 w/ Mount Pipe	108
Kathrein 742-213 w/Mount Pipe	137	(4) Powerwave Technologies LGP2140X	108
Kathrein 742-213 w/Mount Pipe	137	(4) Powerwave Technologies LGP2140X	108
Kathrein 742-213 w/Mount Pipe	137	(4) Powerwave Technologies LGP2140X	108
(4) FR90-12-00DAL2 w/Mount Pipe	132	12' Low Profile Platform	105
(4) FR90-12-00DAL2 w/Mount Pipe	132	KS24019-L112A	81
(4) FR90-12-00DAL2 w/Mount Pipe	132	Kathrein OG-860/1920/GPS-A	81
12' Low Profile Platform	130	KS24019-L112A	81
(2) Antel LPA-185090/8CFx2 w/ mount pipe	116	3' Side Arm Mount	80
(2) Antel LPA-185090/8CFx2 w/ mount pipe	116	3' Side Arm Mount	80
(2) DB844H80-XY w/Mount Pipe	116	3' Side Arm Mount	80
(2) DB844H80-XY w/Mount Pipe	116		
(2) Antel LPA-80063/6CF w/ Mount Pipe	116		
(2) Antel LPA-185090/8CFx2 w/ mount pipe	116		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 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: 98.5%



Paul J Ford and Company 250 E. Broad Street Suite 1500 Columbus, Ohio 43215 Phone: 614.221.6679 FAX: 614.448.4105	Job: *Ex. 147 ft Monopole, Secondino, Property Branford, C* Project: *PJF #37508-0592 R1/ BU #876316* Client: Crown Castle International — Drawn by: Allen Bonham — App'd: Code: TIA/EIA-222-F — Date: 10/08/08 — Scale: NTS Path: T:\375 Crown Castle\2008\37508-0592 BU 876316 WO ... R1 — Dwg No. E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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MONOPOLE BASE PLATE ANALYSIS

TITLE: 150-FT MONOPOLE
SITE: SECONDINO PROPERTY
OWNER: CCI
COMM. NO: 37508-0592
DATE: 08-Oct-08

Number of Sides	18	Stress Increase	1.33
Shaft Dia, DF	45.120 in.	Base Plate Shape	SQUARE
PT-to-PT, DP	45.816 in.		
Min Bolt Circle	49.12 in.	Actual Bolt Circle	52.00 in.

Base Reactions

Moment	3379.0 ft-kips
Axial Load	38.0 kips
Base Elevation	0.0 ft

Bolt Details

Number of Bolts	16
Bolt Diameter	2 1/4 inches
Bolt Type	A615 #18J
Mom. Of Inertia	5408.00 inches4
Bolt Tension, T	194.94 kips
Allowable Tension	195.00 kips
Bolt Compression, C	197.32 kips
Actual / Allowable Ratio	100.0% ☑

Base Plate Details

Plate Moment, MPL	1827.16 inch-kips
Bend Plane, W	29.83 inches
Plate Thickness, t	3.00 inches
Plate Width	53.00 inches
Plate Steel Spec.	ASTM A572 GRADE 50
Plate Steel Grade	50.00 ksi
Actual Stress	40.83 ksi
Allowable Stress	50.00 ksi
Actual / Allowable Ratio	81.7% ☑

This base plate check uses Crown Castles's Accepted Methodology to reduce the plate bending moment arm by 1/2 the diameter of the anchor nut.

Base Plate Analysis Summary

Plate Thickness	3.00 in.	Bolt Circle	52.00 in.
Plate Length	53.00 in.	Bolt Diameter	2.25 in.
Number of Bolts	16	Bolt Type	A615 #18J

PJF_Pole (tm) - Monopole Design Program
Windows Version 3.04.0000 Wed Oct 8, 2008 - 4:26:32 pm
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Job No.....: 37508-0592 Design No: BU# 876316 Engineer : DSK
Description : 147-FT MONOPOLE - SECONDINO PROPERTY
Design..... : 85 MPH / 74 MPH +1/2" RADIAL ICE
Owner..... : Crown Castle Client: Crown Castle 2008
Status..... : Preliminary Design Revision: Rev. Date :

S U M M A R Y O F C U R R E N T C A I S S O N D E S I G N

Diameter (ft) .....:	7.00	Compression (kips):	39.00	Friction S.F .....:	2.00
Min. Depth (ft) ...:	22.50	Horizontal (kips) :	31.00	Lateral S.F .....:	2.00
Depth Used (ft) ...:	22.50	Uplift (kips) ....:	0.00	Concrete S.F .....:	1.30
Rebar Area (in^2) .:	49.92	Moment (Ft-kips) .:	3388.0	Concrete F'c (psi) :	3000.0
Rebar Used .....:	(32)#11	Full Cohesion (ft):	21.00	Steel Cover (in) ..:	4.00
Water at (ft) .....:	5.00	Rock at (ft) .....:	26.00		

SOIL PROFILE :

Soil Layer	Layer Thickness (ft)	Unit Weight (pcf)	Ult. Skin Friction (psf)	Allowable Friction Bearing (psf)	Angle- Phi (deg)	Passive Coeff.- KP	Cohesion (c) (psf)
1	3.00	100.00	0.00	0.00	0.00	1.000	0.00
2	2.00	100.00	0.00	0.00	36.00	3.852	0.00
3	2.50	72.60	0.00	0.00	36.00	3.852	0.00
4	13.50	72.60	0.00	8000.00	40.00	4.599	0.00
5	5.00	72.60	0.00	8000.00	40.00	4.599	0.00

LATERAL / MOMENT CAPACITY (CHECK) :	Min Design	Actual Design
Caisson Diameter (ft) .....:	7.00	7.00
Height Above Grade (ft) .....:	0.50	0.50
Depth Below Grade (ft) .....:	22.50	22.50
Concrete Volume (CY) .....:	32.78	32.78
Applied Moment From Loads (Working), Mwork(Ft-kip):	3904.15	3904.15
Resisting Moment From Soil (Ult), Mult(Ft-kip) ...:	8023.24	8023.24
Moment S.F. (Mult / Mwork) .....:	2.06	2.06
Applied Horizontal Load (Working), Hwork (Kips) ..:	31.00	31.00
Horizontal Soil Resistance (Ultimate), Hult (Kips):	71.39	71.39
Horizontal S.F. (Hult / Hwork) .....:	2.30	2.30
Center of Rotation (from grade) (ft) .....:	16.15	16.15
Inflection Point (Max Design Moment Location (ft) :	5.20	5.20
Maximum Factored Design Moment for Reinf. (Ft-kip):	4854.14	4854.14
Area Steel Required From Loads (in^2) .....:	28.20	28.20
ACI Minimum Steel (0.5%) (in^2) .....:	27.71	27.71
Area Reinf. Steel Provided (in^2) .....:	49.92	49.92

UPLIFT CAPACITY CHECK :		
Actual Uplift on Caisson (Kips) .....:	0.00	0.00
Allowable Uplift Capacity (Kips) .....:	72.60	72.60

COMPRESSION CAPACITY CHECK :		
Actual Compression on Caisson (Kips) .....:	39.00	39.00
Total Compression (Includes Concrete Wt.) (Kips) .:	85.18	85.18
Allowable Compression Capacity (Kips) .....:	307.88	307.88

CAISSON DESIGN:
USE: 7.00 ft Diameter X 23.00 ft Long (Concrete Volume = 32.78 CY)
Reinf: (32)#11 Vert, w/Closed Ties: (14)#5 @6.0", remaining ties @18.0" (ASTM A615)
