ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

May 3, 2010

ORIGINAL

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

Re: **EM-VER-040-091201 – 60 South Main Street, East Granby, Connecticut**
Completion of Construction Activity

Dear Mr. Phelps:

The purpose of this letter is to notify you and the Connecticut Siting Council that the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facility has now been activated.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Copy to:
Sandy M. Carter

10350405-v1

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

January 12, 2010

Kenneth C. Baldwin
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-040-091201** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 60 South Main Street, East Granby, Connecticut.

Dear Attorney Baldwin:

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

The proposed modifications are to be implemented as specified here and in your notice dated December 1, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable James M. Hayden, First Selectman, Town of East Granby
Lincoln B. White, Zoning Enforcement Officer, Town of East Granby
Crown Castle USA, Inc.

ROBINSON & CO[illegible]

EM-VER-040-091201

ORIGINAL

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
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kbaldwin@rc.com
Direct (860) 275-8345

December 1, 2009

Via Hand Delivery

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

Re: **Notice of Exempt Modification**
60 South Main Street, East Granby, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") intends to install antennas on the existing 98-foot self-supporting monopole tower owned by Crown Castle USA Inc. at 60 South Main Street in East Granby, Connecticut. Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James M. Hayden, First Selectman of East Granby. A copy of this letter is also being sent to Galasso Holdings LLC, the owner of the property on which the tower is located.

The facility consists of a 98-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound at 60 South Main Street in East Granby. The tower is currently shared by Sprint Nextel with an antennas at the 96.5-foot level; T-Mobile with antennas at the 89.75-foot level; and AT&T with antennas located at the 82.5-foot level on the tower. Cellco intends to install six (6) LPA-80063/6CF_2 antennas; three (3) BXA-185063/12CF_2 antennas; and three (3) BXA-70063/6CF_2 antennas at the 67-foot level on the tower. Equipment associated with Cellco's antennas, as well as a propane-fueled generator, will be located in a 12' x 30' shelter placed on the ground to the west of the tower. Cellco will also install a 1000 gallon propane tank on a concrete pad in the northeast corner of the fenced compound. Attached behind Tab 1 are Project Plans for the proposed Cellco facility.

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

1. The proposed modification will not increase the overall height of the existing tower. Cellco's antennas will be mounted with their centerline at the 67-foot level on the 98-foot tower.

2. The proposed installation of the associated equipment shelter will require a minor extension of the fenced compound. All improvements, however, will remain within Crown's leased area.

3. The proposed installation will not increase the noise levels at the facility by six decibels or more.

4. The operation of the antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. The worst-case RF power density calculations for existing and Cellco antennas would be 53.20% of the FCC standard. A copy of the Calculated Radio Frequency Emissions Report, prepared by C Squared Systems, LLC, is attached behind Tab 2..

Included behind Tab 3, is a Structural Modification Report confirming that the tower and foundation can support the existing and Cellco antennas and associated equipment.

For the foregoing reasons, Cellco respectfully submits that the proposed antenna installation at the facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Attachments
Copy to:
James M. Hayden, East Granby First Selectman
Galasso Holdings LLC
Sandy M. Carter
Michelle Kababik

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

EAST GRANBY 3, CT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT
TO: 60 SOUTH MAIN STREET, EAST GRANBY, CT 06026

1.	Depart E River Dr	0.3 mi
2.	Turn left to stay on E River Dr	0.1 mi
3.	Turn left onto US-44 / Connecticut Blvd	0.1 mi
4.	Take ramp left for I-84 West / US-6 West / US-44 West	0.4 mi
5.	At exit 51, take ramp right for I-91 North toward Springfield	9.4 mi
6.	At exit 40, take ramp right for SR-20 / Bradley Field Connector West toward Bradley International Airport	3.5 mi
7.	Take ramp right for Ct-20 West toward E. Granby / Granby	0.4 mi
8.	Keep straight onto SR-20	2.8 mi
9.	Turn left onto Hillcrest Dr	0.3 mi
10.	Arrive at Site Access off Hillcrest Rd, East Granby, CT 06026-9530	

GENERAL NOTES

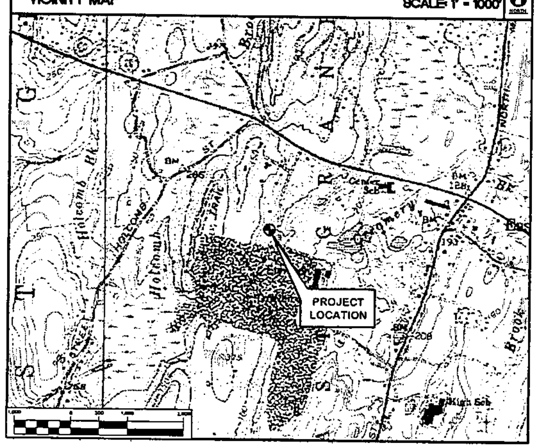
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 12'x30' PREFABRICATED WIRELESS EQUIPMENT SHELTER ON A CONCRETE FOUNDATION WITHIN A PROPOSED FENCED EXPANSION TO THE EXISTING WIRELESS COMMUNICATIONS LEASE AREA AND A 1,000 GALLON PROPANE TANK ON A CONCRETE PAD, LOCATED WITHIN THE EXISTING WIRELESS COMMUNICATIONS LEASE AREA.
2. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED ON AN EXISTING ±98' TALL MONOPOLE TOWER AT A CENTERLINE ELEVATION OF ±67' ABOVE THE TOWER BASE.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE PROPOSED EQUIPMENT SHELTER FROM AN EXISTING UTILITY BACKBOARD ADJACENT TO THE FENCED COMPOUND.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	EAST GRANBY 3, CT
SITE ADDRESS:	60 SOUTH MAIN STREET EAST GRANBY, CT 06026
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	SANDY CARTER CELLCO PARTNERSHIP (860) 803-8219
TOWER COORDINATES:	LATITUDE 41°-56'-29.6" LONGITUDE 72°-44'-19.2" COORDINATES ARE BASED ON CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	A
C-1	COMPOUND PLAN AND ELEVATION	A

DESIGNED BY:	CFC
DRAWN BY:	DEB
CHK'D BY:	DMD

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	11/17/09	DEB	DMD	ISSUED FOR CSC-CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

NATCOMM

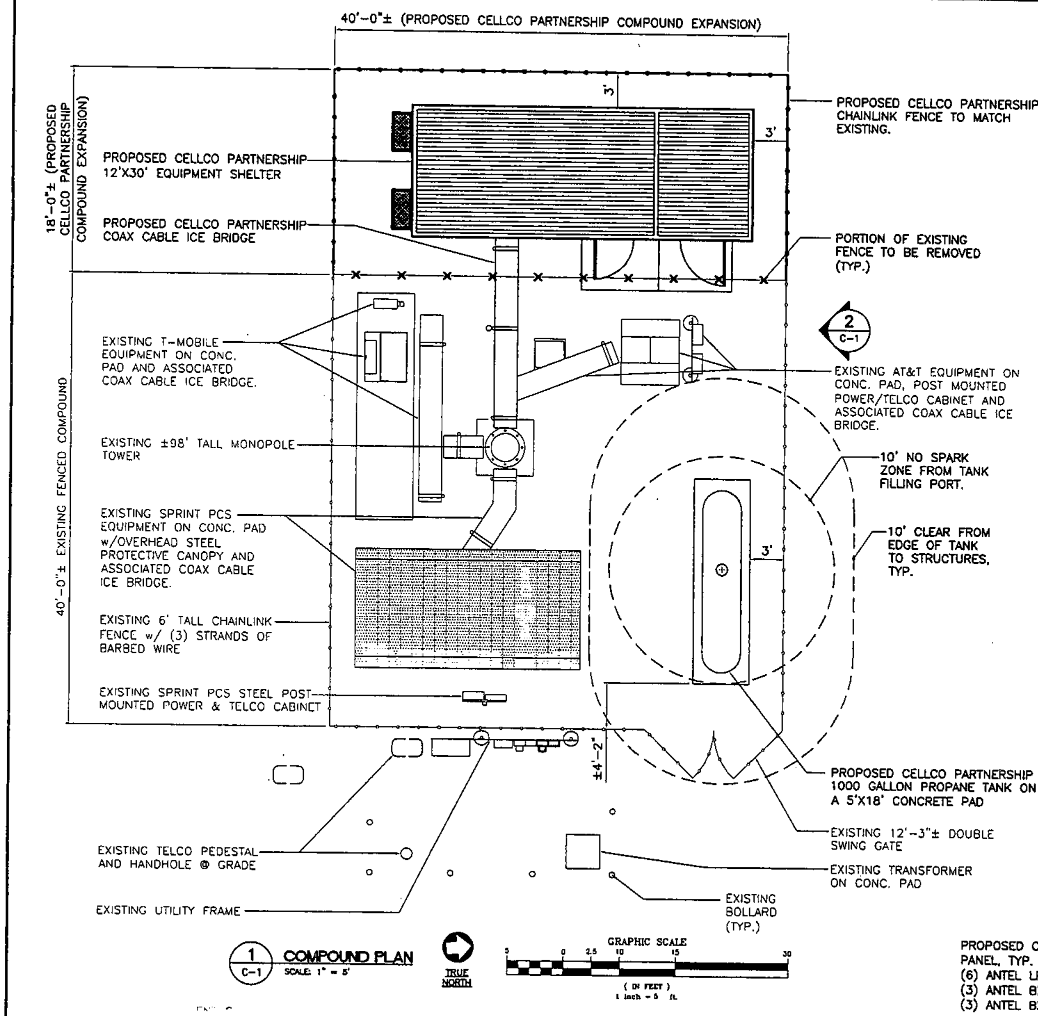
VERIZON WIRELESS
WIRELESS COMMUNICATIONS FACILITY
EAST GRANBY 3, CT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

DATE: 11/16/09
SCALE: AS NOTED
JOB NO. 08111

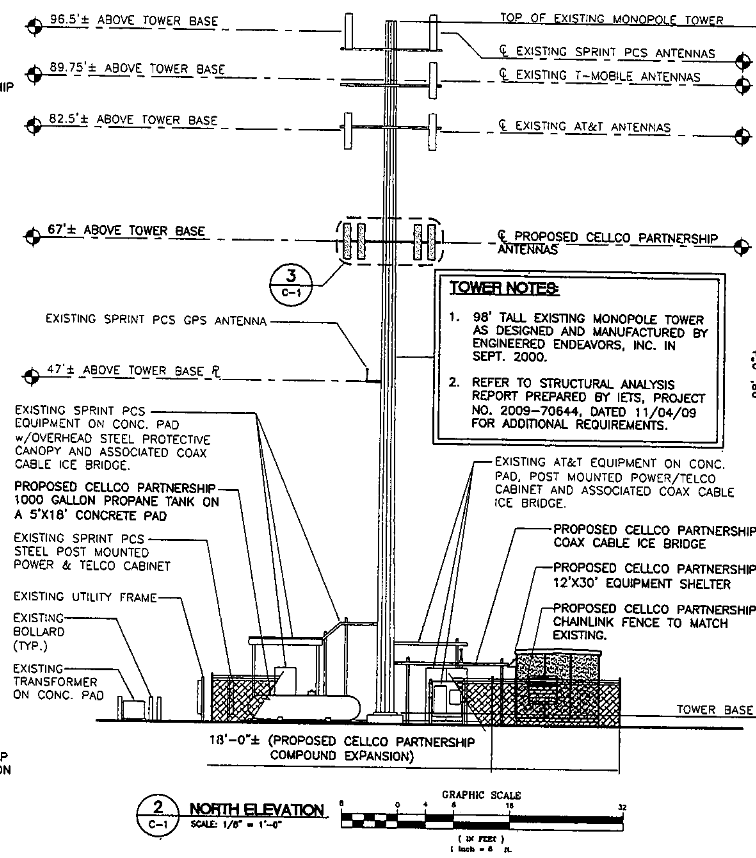
TITLE SHEET

T-1

Sheet No. 1 of 2


40'-0"± (PROPOSED CELLCO PARTNERSHIP COMPOUND EXPANSION)
18'-0"± (PROPOSED CELLCO PARTNERSHIP COMPOUND EXPANSION)
40'-0"± EXISTING FENCED COMPOUND
PROPOSED CELLCO PARTNERSHIP 12'X30' EQUIPMENT SHELTER
PROPOSED CELLCO PARTNERSHIP COAX CABLE ICE BRIDGE
EXISTING T-MOBILE EQUIPMENT ON CONC. PAD AND ASSOCIATED COAX CABLE ICE BRIDGE.
EXISTING ±98' TALL MONOPOLE TOWER
EXISTING SPRINT PCS EQUIPMENT ON CONC. PAD w/OVERHEAD STEEL PROTECTIVE CANOPY AND ASSOCIATED COAX CABLE ICE BRIDGE.
EXISTING 6' TALL CHAINLINK FENCE w/ (3) STRANDS OF BARBED WIRE
EXISTING SPRINT PCS STEEL POST-MOUNTED POWER & TELCO CABINET
EXISTING TELCO PEDESTAL AND HANDHOLE @ GRADE
EXISTING UTILITY FRAME
PROPOSED CELLCO PARTNERSHIP CHAINLINK FENCE TO MATCH EXISTING.
PORTION OF EXISTING FENCE TO BE REMOVED (TYP.)
EXISTING AT&T EQUIPMENT ON CONC. PAD, POST MOUNTED POWER/TELCO CABINET AND ASSOCIATED COAX CABLE ICE BRIDGE.
10' NO SPARK ZONE FROM TANK FILLING PORT.
10' CLEAR FROM EDGE OF TANK TO STRUCTURES, TYP.
PROPOSED CELLCO PARTNERSHIP 1000 GALLON PROPANE TANK ON A 5'X18' CONCRETE PAD
EXISTING 12'-3"± DOUBLE SWING GATE
EXISTING TRANSFORMER ON CONC. PAD
EXISTING BOLLARD (TYP.)
3'
±4'-2"
TRUE NORTH
GRAPHIC SCALE
(IN FEET)
1 inch = 5 ft.

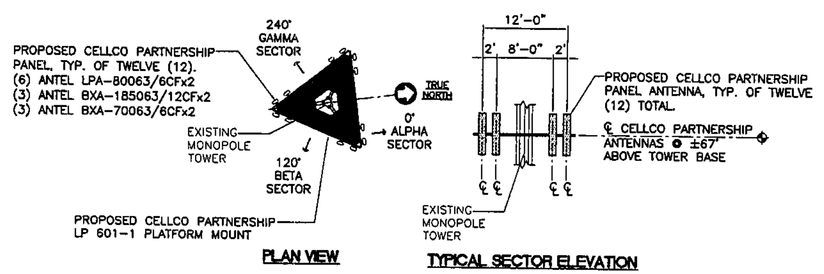
1 C-1 **COMPOUND PLAN**
SCALE: 1" = 5'


96.5'± ABOVE TOWER BASE
89.75'± ABOVE TOWER BASE
82.5'± ABOVE TOWER BASE
67'± ABOVE TOWER BASE
47'± ABOVE TOWER BASE
TOP OF EXISTING MONOPOLE TOWER
℄ EXISTING SPRINT PCS ANTENNAS
℄ EXISTING T-MOBILE ANTENNAS
℄ EXISTING AT&T ANTENNAS
℄ PROPOSED CELLCO PARTNERSHIP ANTENNAS
EXISTING SPRINT PCS GPS ANTENNA
98'-0"±
EXISTING SPRINT PCS EQUIPMENT ON CONC. PAD w/OVERHEAD STEEL PROTECTIVE CANOPY AND ASSOCIATED COAX CABLE ICE BRIDGE.
PROPOSED CELLCO PARTNERSHIP 1000 GALLON PROPANE TANK ON A 5'X18' CONCRETE PAD
EXISTING SPRINT PCS STEEL POST MOUNTED POWER & TELCO CABINET
EXISTING UTILITY FRAME
EXISTING BOLLARD (TYP.)
EXISTING TRANSFORMER ON CONC. PAD
EXISTING AT&T EQUIPMENT ON CONC. PAD, POST MOUNTED POWER/TELCO CABINET AND ASSOCIATED COAX CABLE ICE BRIDGE.
PROPOSED CELLCO PARTNERSHIP COAX CABLE ICE BRIDGE
PROPOSED CELLCO PARTNERSHIP 12'X30' EQUIPMENT SHELTER
PROPOSED CELLCO PARTNERSHIP CHAINLINK FENCE TO MATCH EXISTING.
TOWER BASE
18'-0"± (PROPOSED CELLCO PARTNERSHIP COMPOUND EXPANSION)
GRAPHIC SCALE
(IN FEET)
1 inch = 8 ft.

TOWER NOTES:

1. 98' TALL EXISTING MONOPOLE TOWER AS DESIGNED AND MANUFACTURED BY ENGINEERED ENDEAVORS, INC. IN SEPT. 2000.
2. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY IETS, PROJECT NO. 2009-70644, DATED 11/04/09 FOR ADDITIONAL REQUIREMENTS.

2 C-1 **NORTH ELEVATION**
SCALE: 1/8" = 1'-0"


PROPOSED CELLCO PARTNERSHIP PANEL, TYP. OF TWELVE (12).
(6) ANTEL LPA-80063/6CFx2
(3) ANTEL BXA-185063/12CFx2
(3) ANTEL BXA-70063/6CFx2
240° GAMMA SECTOR
0° ALPHA SECTOR
120° BETA SECTOR
TRUE NORTH
EXISTING MONOPOLE TOWER
PROPOSED CELLCO PARTNERSHIP LP 601-1 PLATFORM MOUNT
PLAN VIEW
12'-0"
2'
8'-0"
2'
PROPOSED CELLCO PARTNERSHIP PANEL ANTENNA, TYP. OF TWELVE (12) TOTAL.
℄ CELLCO PARTNERSHIP ANTENNAS @ ±67' ABOVE TOWER BASE
EXISTING MONOPOLE TOWER
TYPICAL SECTOR ELEVATION

3 C-1 **ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	11/17/09	DEB	DMD	ISSUED FOR CSC-CLIENT REVIEW

DESIGNED BY: CFC
DRAWN BY: DEB
CHK'D BY: DMD

Cellco Partnership d.b.a Verizon wireless

NATCOMM

VERIZON WIRELESS
WIRELESS COMMUNICATIONS FACILITY
EAST GRANBY 3, CT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

DATE: 11/16/09
SCALE: AS NOTED
JOB NO. 08111

COMPOUND PLAN AND ELEVATION

C-1
Sheet No. 2 of 2

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

Calculated Radio Frequency Emissions

verizonwireless

East Granby 3

60 South Main St, East Granby, 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 Verizon Wireless antennas to be installed on the existing tower at 60 Main St, East Granby, CT. Verizon Wireless is proposing to add three sectors of five antennas each to the existing tower.

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 Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

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.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report. 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.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment provided they are fully aware of the potential for exposure, and are able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels considered acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

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.

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 radiation center of antenna

Off Beam Loss is determined by the selected antenna patterns

4. Verizon Wireless Antenna Inventory

Table 1 below outlines the proposed Verizon Wireless antenna configuration to be installed on the existing tower.

Antenna ID	Height AGL (feet)	Antenna Model	Azimuth	TX Freq (MHz)	Power at Ant (Watts)	Power EIRP (Watts)	Ant Gain (dBi)	Ant Length (feet)	Beam Width	Down Tilt
A-1	67	LPA 80063/6CF_2	300	869	90	4209	16.7	6	63	2
A-2	67	BXA 185063/12CF_2	300	1970	96	10771	20.5	6	63	2
A-3	67	BXA 70063/6CF_2	300	746	40	1787	16.5	6	63	2
A-4	67	BXA 185063/12CF_2	300	1970	96	10771	20.5	6	63	2
A-5	67	LPA 80063/6CF_2	300	869	90	4209	16.7	6	63	2
B-1	67	LPA 80063/6CF_2	50	869	90	4209	16.7	6	63	5
B-2	67	BXA 185063/12CF_2	50	1970	96	10771	20.5	6	63	4
B-3	67	BXA 70063/6CF_2	50	746	40	1787	16.5	6	63	6
B-4	67	BXA 185063/12CF_2	50	1970	96	10771	20.5	6	63	4
B-5	67	LPA 80063/6CF_2	50	869	90	4209	16.7	6	63	5
G-1	67	LPA 80063/6CF_2	170	869	90	4209	16.7	6	63	4
G-2	67	BXA 185063/12CF_2	170	1970	96	10771	20.5	6	63	4
G-3	67	BXA 70063/6CF_2	170	746	40	1787	16.5	6	63	5
G-4	67	BXA 185063/12CF_2	170	1970	96	10771	20.5	6	63	4
G-5	67	LPA 80063/6CF_2	170	869	90	4209	16.7	6	63	4

Table 1: Verizon Wireless Antenna Inventory

5. Calculation Results

Table 2 below outlines the power density information for the site. All information for carriers other than Verizon Wireless was obtained from the current CSC database, except where otherwise noted[1].

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	**82.5**	880	500	**0.0264**	0.5867	**4.50%**
AT&T	2	427	**82.5**	1900	854	**0.0451**	1.0000	**4.51%**
AT&T	4	296	**82.5**	880	1184	**0.0625**	0.5867	**10.66%**
Verizon	3	746	67	1970	2238	0.0338	1.0000	3.38%
Verizon	9	458	67	869	4122	0.0623	0.5793	10.75%
Verizon	1	928	67	746	928	0.0140	0.4973	2.82%
Sprint	8	250	**96.5**	1962.5	2000	**0.0772**	1.0000	**7.72%**
T-Mobile	8	248	**89.75**	1930	1984	**0.0886**	1.0000	**8.86%**
							Total	53.20%

Table 2: Existing & Proposed Carrier Information

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.

Note that where the antenna models for the Verizon Wireless proposed facility are known, (Reference Table 1: Verizon Wireless Antenna Inventory) off-beam loss has been included in the above calculations for Verizon Wireless only to account for the selected antenna patterns.

[1] All centerlines shown in Table 2 above are based on a recent structural analysis report prepared by IETS Project Number 2009-70644, Dated 11/04/09 as reflected in the tower elevation view prepared by NATCOMM Consulting Engineers, Inc. (Recommended updates to CSC database are displayed in bold type in Table 2.)

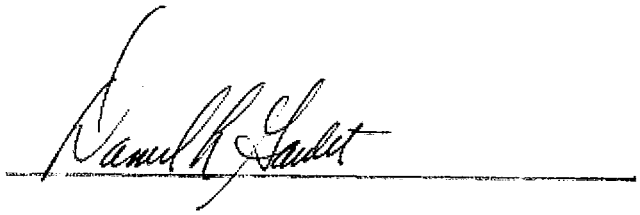
6. Conclusion

The above analysis verifies that emissions from the proposed site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. When using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is below the limit for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 53.2% 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.

7. 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/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



November 25, 2009
Date

Daniel l. Goulet
C Squared Systems, LLC

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

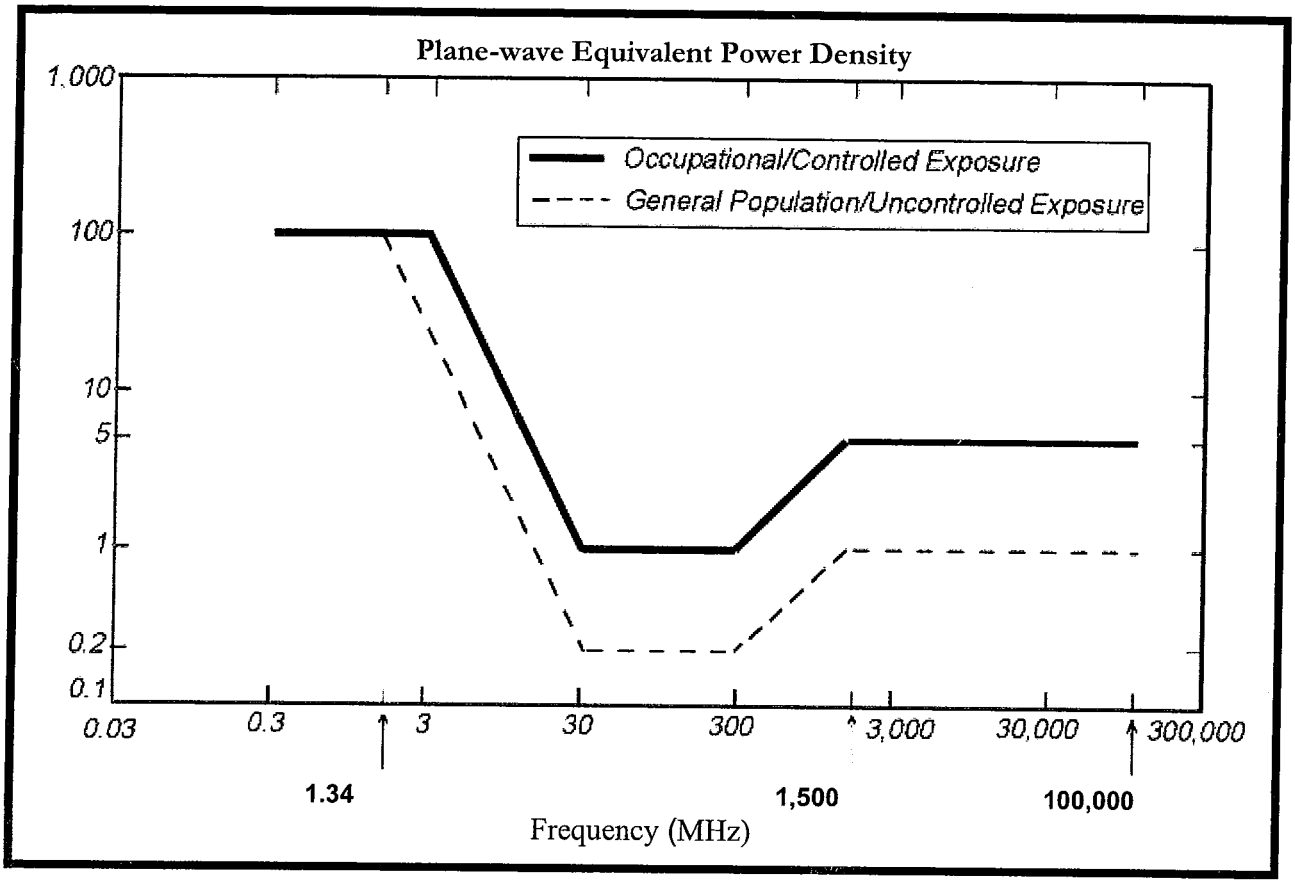
(B) Limits for General Population/Uncontrolled Exposure

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

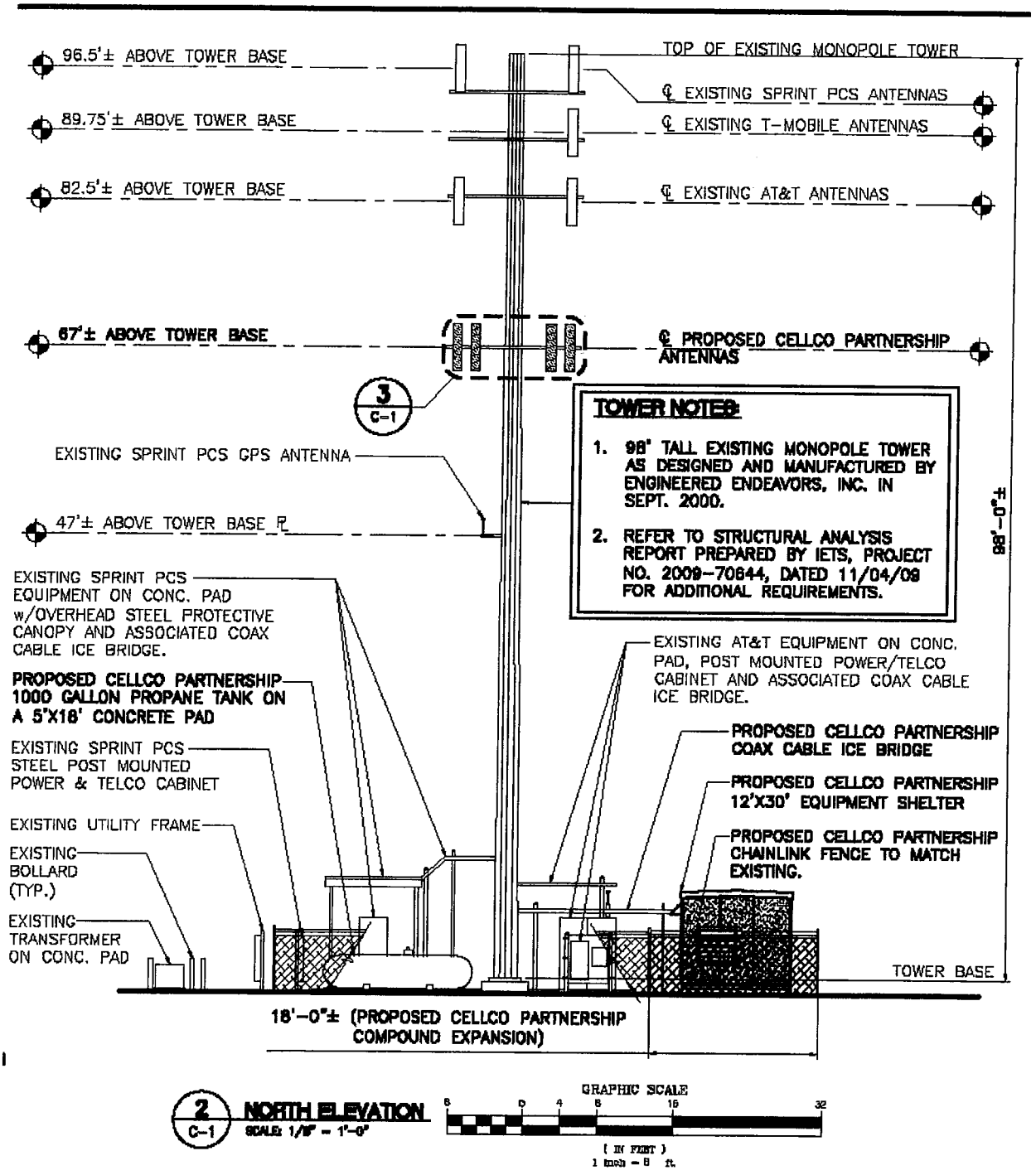
NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations 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)

Attachment C: Tower Mapping



Date: **November 04, 2009**

Mr. Ben Goodhart
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6545

IETS
129 Greenwich Road
Charlotte, NC 28211
(704) 522-1131
towerdata@iets.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Name:	E. Granby 3, CT
Crown Castle Designation:	**Crown Castle BU Number:**	876399
	Crown Castle Site Name:	(F) E. Granby 4Q2000 / GALASSO
	Crown Castle JDE Job Number:	125754
	Crown Castle Work Order Number:	299751
Engineering Firm Designation:	**IETS Project Number:**	2009-70644
Site Data:	**60 South Main St., EAST GRANBY, Hartford County, CT**	
	Latitude *41° 56' 29.58"*, Longitude *-72° 44' 19.248"*	
	98 Foot - Monopole Tower	

Dear Mr. Goodhart,

IETS is pleased to submit this **"Structural Modification 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 349468, in accordance with application 89121, revision 1.

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

LC4: Modified Structure w/ Existing + Reserved + Proposed **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 2006 Connecticut Building Code based upon a wind speed of 80 mph fastest mile.

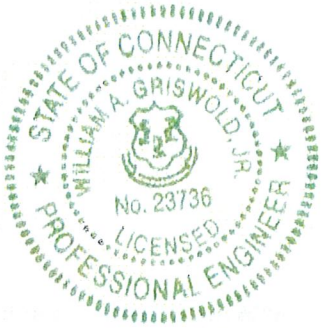
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *IETS* 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:

Ted Haile, P.E.
Project Engineer

William A. Griswold, Jr., P.E.
Chief Engineer



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1) INTRODUCTION

This tower is a 98 ft Monopole tower designed by Engineered Endeavors, Inc. in September of 2000. The tower was originally designed for a wind speed of 85 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 80 mph with no ice, 32 mph with 1.0 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
67	67	3	Antel	BXA-185063/12CFx2	18	1-5/8	1
		3	Antel	BXA-70063/6CFx2			
		6	Antel	LPA-80063/6CFx2			
		1	Tower Mounts	Platform Mount [LP 601-1]			

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
94	96.5	1	Andrew	HBX-6516DS-VTM	8	1-5/8	2
		1	Antel	BXA-80063/4CF			
		4	Decibel	DB980H65E-M			
	94	1	Tower Mounts	Platform Mount [LP 305-1]	6	1-1/4	1
89	89.75	-	-	-	12	1-5/8	3
		3	EMS Wireless	RR90-17-02DP			
	89	1	Tower Mounts	Platform Mount [LP 303-1]	6	7/8	1
83	83	1	Tower Mounts	Platform Mount [LP 301-1]	6	7/8	1
		6	Powerwave Tech.	LGP21401			
		6	Powerwave Tech.	LGP21903	6	7/8	2
	82.5	6	Powerwave Tech.	7770.00			
47	49	1	Lucent	KS24019-L112A	1	1/2	1
	47	1	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment – Pending Application
3) SLA Feedlines

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)
96.5	97.5	12	DAPA	48000		
87.5	87.5	12	DAPA	48000		
77.5	77.5	12	DAPA	48000		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Dr. Clarence Welti, P.E.	1531971	CCISITES
Tower Faoundation Drawings	EEI	2066334	CCISITES
Tower Manufacturer Drawings	EEI	1613691	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. IETS 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	98 - 82.7917	Pole	TP15.28x12x0.1875	1	-2.83	450.82	18.6	Pass
L2	82.7917 - 45.2917	Pole	TP22.86x14.3838x0.25	2	-9.15	902.77	84.2	Pass
L3	45.2917 - 0	Pole	TP32x21.6345x0.3125	3	-16.46	1633.95	90.7	Pass
							Summary	
						Pole (L3)	90.7	Pass
						Rating =	90.7	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	73.2	Pass
1	Base Plate	0	65.5	Pass
1	Base Foundation	0	72.7	Pass

Structure Rating (max from all components) =	90.7%

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

APPENDIX A

RISA TOWER OUTPUT

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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 32 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	98'-82'9-15/32"	15'2-17/32"	2'5-1/32"	18	12.0000	15.2800	0.1875	0.7500	A572-65 (65 ksi)
L2	82'9-15/32"-45'3-15/32"	39'11-1/32"	3'5-1/32"	18	14.3838	22.8600	0.2500	1.0000	A572-65 (65 ksi)
L3	45'3-15/32"-0'	48'8-17/32"		18	21.6345	32.0000	0.3125	1.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.1851	7.0299	123.9285	4.1934	6.0960	20.3295	248.0200	3.5156	1.7820	9.504
	15.5157	8.9819	258.4813	5.3578	7.7622	33.2998	517.3028	4.4918	2.3593	12.583
L2	15.1268	11.2152	283.0484	5.0175	7.3070	38.7368	566.4693	5.6086	2.0915	8.366
	23.2127	17.9410	1158.7402	8.0266	11.6129	99.7806	2319.0051	8.9722	3.5834	14.333
L3	22.7065	21.1487	1214.7221	7.5693	10.9903	110.5266	2431.0425	10.5764	3.2577	10.425
	32.4937	31.4300	3987.1110	11.2491	16.2560	245.2701	7979.4683	15.7180	5.0820	16.262

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
7/8 Cable	A	No	Inside Pole	83' - 0'	6	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
7/8 Cable	A	No	Inside Pole	83' - 0'	6	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
1 1/4 Cable	B	No	Inside Pole	94' - 0'	6	No Ice	0.00	0.63
						1/2" Ice	0.00	0.63
						1" Ice	0.00	0.63
						2" Ice	0.00	0.63
						4" Ice	0.00	0.63
1/2 Cable	B	No	Inside Pole	47' - 0'	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
1 5/8 Cable	B	No	Inside Pole	94' - 0'	8	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
1 5/8 Cable	B	No	CaAa (Out Of Face)	67' - 0'	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.32
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
1 5/8 Cable (Shielded)	B	No	Inside Pole	67' - 0'	16	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
7/8 Cable	C	No	Inside Pole	89' - 0'	6	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
1 5/8 Cable	C	No	Inside Pole	89' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 305-1]	C	None		0.0000	94'	No Ice	18.01	18.01	1.12
						1/2" Ice	23.33	23.33	1.35
						1" Ice	28.65	28.65	1.58
						2" Ice	39.29	39.29	2.05
						4" Ice	60.57	60.57	2.97
(2) DB980H65E-M w/ Mount Pipe	A	From Leg	6.00 0'	0.0000	94'	No Ice	4.04	3.62	0.03
						1/2"	4.50	4.48	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'6"			Ice	4.95	5.22	0.11
						1" Ice	5.87	6.74	0.22
						2" Ice	8.05	10.00	0.55
						4" Ice			
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	6.00 0' 2'6"	0.0000	94'	No Ice	3.60	3.24	0.03
						1/2"	4.00	3.91	0.06
						Ice	4.43	4.56	0.10
						1" Ice	5.37	5.91	0.20
						2" Ice	7.36	8.88	0.50
						4" Ice			
BXA-80063/4CF w/ Mount Pipe	B	From Leg	6.00 0' 2'6"	0.0000	94'	No Ice	5.40	3.42	0.03
						1/2"	5.84	4.02	0.07
						Ice	6.30	4.64	0.11
						1" Ice	7.24	5.92	0.23
						2" Ice	9.26	8.93	0.56
						4" Ice			
(2) DB980H65E-M w/ Mount Pipe	C	From Leg	6.00 0' 2'6"	0.0000	94'	No Ice	4.04	3.62	0.03
						1/2"	4.50	4.48	0.06
						Ice	4.95	5.22	0.11
						1" Ice	5.87	6.74	0.22
						2" Ice	8.05	10.00	0.55
						4" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	89'	No Ice	14.66	14.66	1.25
						1/2"	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
						2" Ice	48.34	48.34	3.10
						4" Ice			
RR90-17-02DP w/ Mount Pipe	A	From Leg	6.00 0' 9"	0.0000	89'	No Ice	4.59	3.32	0.03
						1/2"	5.09	4.09	0.07
						Ice	5.58	4.78	0.11
						1" Ice	6.59	6.23	0.22
						2" Ice	8.73	9.31	0.56
						4" Ice			
RR90-17-02DP w/ Mount Pipe	B	From Leg	6.00 0' 9"	0.0000	89'	No Ice	4.59	3.32	0.03
						1/2"	5.09	4.09	0.07
						Ice	5.58	4.78	0.11
						1" Ice	6.59	6.23	0.22
						2" Ice	8.73	9.31	0.56
						4" Ice			
RR90-17-02DP w/ Mount Pipe	C	From Leg	6.00 0' 9"	0.0000	89'	No Ice	4.59	3.32	0.03
						1/2"	5.09	4.09	0.07
						Ice	5.58	4.78	0.11
						1" Ice	6.59	6.23	0.22
						2" Ice	8.73	9.31	0.56
						4" Ice			
Platform Mount [LP 301-1]	C	None		0.0000	83'	No Ice	30.10	30.10	1.59
						1/2"	40.80	40.80	2.03
						Ice	51.50	51.50	2.47
						1" Ice	72.90	72.90	3.35
						2" Ice	115.70	115.70	5.11
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	6.00 0' -6"	0.0000	83'	No Ice	6.12	4.25	0.06
						1/2"	6.63	5.01	0.10
						Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) LGP21401	A	From Leg	6.00 0' 0'	0.0000	83'	No Ice	1.29	0.23	0.01
						1/2"	1.45	0.31	0.02
						Ice	1.61	0.40	0.03
						1" Ice	1.97	0.61	0.05
						2" Ice	2.79	1.12	0.14
						4" Ice			
(2) LGP21903	A	From Leg	6.00	0.0000	83'	No Ice	0.27	0.18	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0' 0'			1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) 7770.00 w/ Mount Pipe	B	From Leg	6.00 0' -6"	0.0000	83'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP21401	B	From Leg	6.00 0' 0'	0.0000	83'	No Ice	1.29	0.23	0.01
						1/2" Ice	1.45	0.31	0.02
						1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(2) LGP21903	B	From Leg	6.00 0' 0'	0.0000	83'	No Ice	0.27	0.18	0.01
						1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) 7770.00 w/ Mount Pipe	C	From Leg	6.00 0' -6"	0.0000	83'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP21401	C	From Leg	6.00 0' 0'	0.0000	83'	No Ice	1.29	0.23	0.01
						1/2" Ice	1.45	0.31	0.02
						1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(2) LGP21903	C	From Leg	6.00 0' 0'	0.0000	83'	No Ice	0.27	0.18	0.01
						1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
Platform Mount [LP 601-1]	C	None		0.0000	67'	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
						2" Ice	48.95	48.95	2.69
						4" Ice	69.43	69.43	4.26
(2) LPA-80063/6CFx2 w/ Mount Pipe	A	From Leg	6.00 0' 0'	0.0000	67'	No Ice	10.58	10.67	0.05
						1/2" Ice	11.24	11.93	0.14
						1" Ice	11.87	12.91	0.24
						2" Ice	13.16	14.92	0.48
						4" Ice	15.87	19.16	1.09
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	6.00 0' 0'	0.0000	67'	No Ice	7.97	5.40	0.04
						1/2" Ice	8.61	6.55	0.10
						1" Ice	9.22	7.41	0.17
						2" Ice	10.46	9.18	0.33
						4" Ice	13.07	12.93	0.79
BXA-185063/12CFx2 w/ Mount Pipe	A	From Leg	6.00 0' 0'	0.0000	67'	No Ice	4.77	4.25	0.02
						1/2" Ice	5.22	4.99	0.06
						1" Ice	5.68	5.75	0.10
						2" Ice	6.62	7.30	0.22
						4" Ice	8.61	10.67	0.57

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LPA-80063/6CFx2 w/ Mount Pipe	B	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
BXA-70063/6CFx2 w/ Mount Pipe	B	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
BXA-185063/12CFx2 w/ Mount Pipe	B	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.77 5.22 5.68 6.62 8.61	4.25 4.99 5.75 7.30 10.67	0.02 0.06 0.10 0.22 0.57
(2) LPA-80063/6CFx2 w/ Mount Pipe	C	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
BXA-70063/6CFx2 w/ Mount Pipe	C	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.40 6.55 7.41 9.18 12.93	0.04 0.10 0.17 0.33 0.79
BXA-185063/12CFx2 w/ Mount Pipe	C	From Leg	6.00 0' 0'		0.0000	67'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.77 5.22 5.68 6.62 8.61	4.25 4.99 5.75 7.30 10.67	0.02 0.06 0.10 0.22 0.57
Side Arm Mount [SO 701-1]	A	From Leg	0.00 0' 0'		0.0000	47'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
KS24019-L112A	A	From Leg	3.00 0' 2'		0.0000	47'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	0.01 0.01 0.01 0.02 0.06

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

Comb. No.	Description
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	26.59	-0.00	-0.00
	Max. H_x	11	16.48	13.60	0.02
	Max. H_z	2	16.48	0.02	13.55
	Max. M_x	2	947.53	0.02	13.55
	Max. M_z	5	951.68	-13.60	-0.02
	Max. Torsion	5	0.06	-13.60	-0.02
	Min. Vert	5	16.48	-13.60	-0.02
	Min. H_x	5	16.48	-13.60	-0.02
	Min. H_z	8	16.48	-0.02	-13.55
	Min. M_x	8	-947.48	-0.02	-13.55
	Min. M_z	11	-951.47	13.60	0.02
	Min. Torsion	11	-0.06	13.60	0.02

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	98 - 82.7917 (1)	TP15.28x12x0.1875	15'2-17/32"	0'	0.0	39.000	8.6717	-2.83	338.20	0.008
L2	82.7917 - 45.2917 (2)	TP22.86x14.3838x0.25	39'11-1/32"	0'	0.0	39.000	17.3653	-9.15	677.25	0.014
L3	45.2917 - 0 (3)	TP32x21.6345x0.3125	48'8-17/32"	0'	0.0	39.000	31.4300	-16.46	1225.77	0.013

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	98 - 82.7917 (1)	TP15.28x12x0.1875	24.13	9.331	39.000	0.239	0.00	0.000	39.000	0.000
L2	82.7917 - 45.2917 (2)	TP22.86x14.3838x0.25	336.74	43.243	39.000	1.109	0.00	0.000	39.000	0.000
L3	45.2917 - 0 (3)	TP32x21.6345x0.3125	952.89	46.621	39.000	1.195	0.00	0.000	39.000	0.000

Pole Shear Design Data

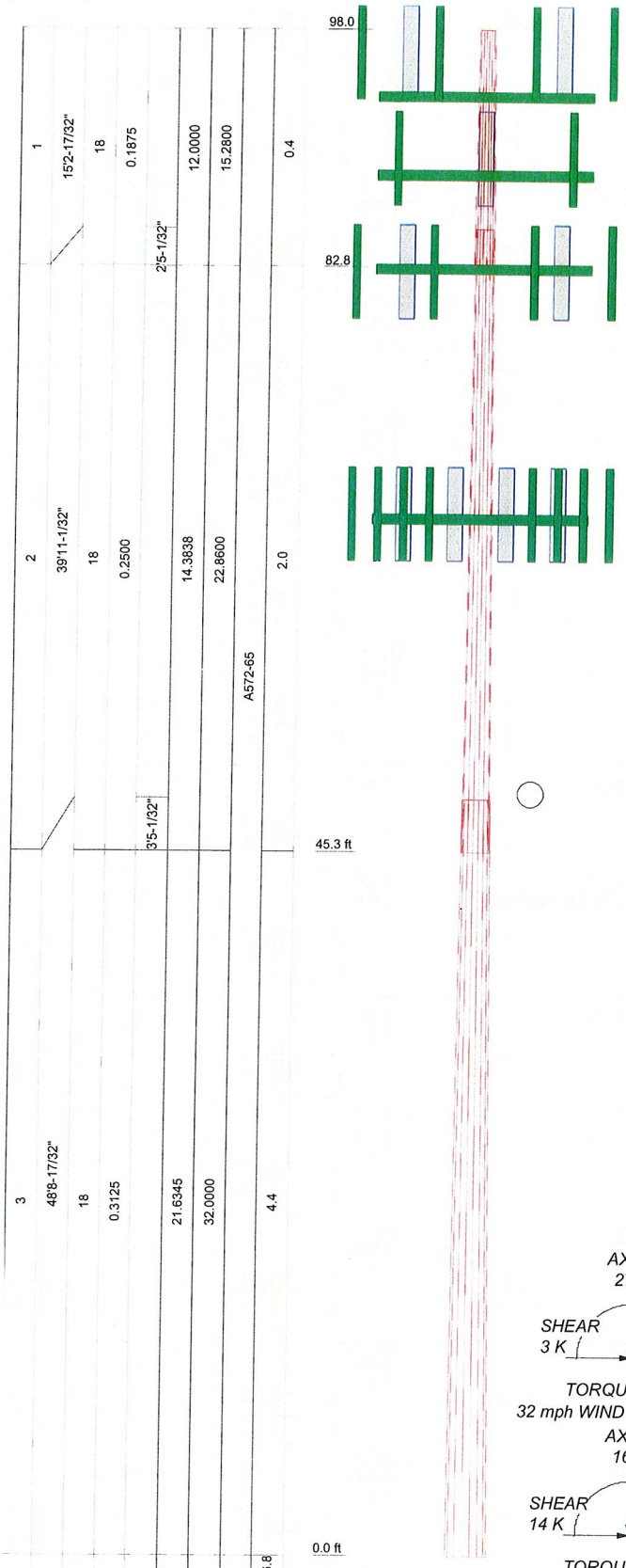
Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	98 - 82.7917 (1)	TP15.28x12x0.1875	3.20	0.369	26.000	0.028	0.00	0.000	26.000	0.000
L2	82.7917 - 45.2917 (2)	TP22.86x14.3838x0.25	11.65	0.671	26.000	0.052	0.00	0.000	26.000	0.000
L3	45.2917 - 0 (3)	TP32x21.6345x0.3125	13.63	0.434	26.000	0.033	0.06	0.001	26.000	0.000

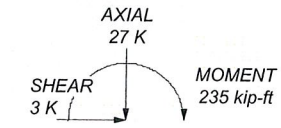
Pole Interaction Design Data

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	98 - 82.7917 (1)	0.008	0.239	0.000	0.028	0.000	0.248	1.333	H1-3+VT
L2	82.7917 - 45.2917 (2)	0.014	1.109	0.000	0.052	0.000	1.123	1.333	H1-3+VT
L3	45.2917 - 0 (3)	0.013	1.195	0.000	0.033	0.000	1.209	1.333	H1-3+VT

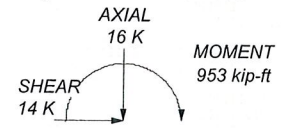
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	98 - 82.7917	Pole	TP15.28x12x0.1875	1	-2.83	450.82	18.6	Pass
L2	82.7917 - 45.2917	Pole	TP22.86x14.3838x0.25	2	-9.15	902.77	84.2	Pass
L3	45.2917 - 0	Pole	TP32x21.6345x0.3125	3	-16.46	1633.95	90.7	Pass
							Summary	
						Pole (L3)	90.7	Pass
						RATING =	**90.7**	**Pass**





TORQUE 0 kip-ft
32 mph WIND - 1.0000 in ICE



TORQUE 0 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 305-1]	94	(2) 7770.00 w/ Mount Pipe	83
(2) DB980H65E-M w/ Mount Pipe	94	(2) LGP21401	83
HBX-6516DS-VTM w/ Mount Pipe	94	(2) LGP21903	83
BXA-80063/4CF w/ Mount Pipe	94	Platform Mount [LP 601-1]	67
(2) DB980H65E-M w/ Mount Pipe	94	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
Platform Mount [LP 303-1]	89	BXA-70063/6CFx2 w/ Mount Pipe	67
RR90-17-02DP w/ Mount Pipe	89	BXA-185063/12CFx2 w/ Mount Pipe	67
RR90-17-02DP w/ Mount Pipe	89	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
RR90-17-02DP w/ Mount Pipe	89	BXA-70063/6CFx2 w/ Mount Pipe	67
Platform Mount [LP 301-1]	83	BXA-185063/12CFx2 w/ Mount Pipe	67
(2) 7770.00 w/ Mount Pipe	83	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
(2) LGP21401	83	BXA-70063/6CFx2 w/ Mount Pipe	67
(2) LGP21903	83	BXA-185063/12CFx2 w/ Mount Pipe	67
(2) 7770.00 w/ Mount Pipe	83	Side Arm Mount [SO 701-1]	47
(2) LGP21401	83	KS24019-L112A	47
(2) LGP21903	83		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 32 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90.7%

IETS
129 Greenwich Road
Charlotte, NC 28211
Phone: (704) 522-1131
FAX: (704) 522-1280

Job: *2009-70644 BU# 876399 "E. Granby 4Q2000/Galassc*			
Project: *Modification*			
Client: Crown Castle International	Drawn by: Ted Haile	App'd:	
Code: TIA/EIA-222-F	Date: 11/04/09	Scale: NTS	
Path: N:\2009-70600 Thru 70699\2009-70644 ME 876399 FE Granby Galassi\Mod\Calc\2009-70644 876399.eri		Dwg No. E-1	

APPENDIX B

BASE LEVEL & MODIFICATION DRAWINGS

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IETS

Engineering Services

(F) E. GRANBY 4Q2000/GALASSO

BU#: 876399

PROJECT DESCRIPTION:
TELECOMMUNICATIONS TOWER UPGRADE

SITE NAME:
(F) E. GRANBY 4Q2000/GALASSO

SITE ADDRESS:
60 SOUTH MAIN STREET
EAST GRANBY, CT
HARTFORD COUNTY

SITE OWNER
CROWN CASTLE INTERNATIONAL, LLC
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277
CONTACT: MR. BENJAMIN GOODHART (704) 405-6545

EXISTING STRUCTURE INFO:
LATITUDE: 41° 56' 29.58"
LONGITUDE: -72° 44' 19.248"

CONSULTING FIRMS:

INDUSTRIAL ENGINEERING & TESTING SERVICES, P.C.
WILLIAM A. GRISWOLD JR., P.E.
(704) 522-1131

SHEET NO.	DESCRIPTION
01	TITLE PAGE - GENERAL SITE INFORMATION
02	TOWER MODIFICATIONS
03	SECTIONS AND DETAILS
PMI	PMI CHECKLIST

Approved By:

ZONING INFORMATION:

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Engineering Services
129 Greenwich Road
Charlotte, NC 28211
Ph:(704)522-1131
Fax:(704)522-1280

REVISIONS			
NO.	DATE	DESCRIPTION	BY
0	11-03-09	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 11-03-09

SITE NAME & BU#

SITE NAME - (F) E. GRANBY
BU NUMBER - 876399

SITE INFORMATION

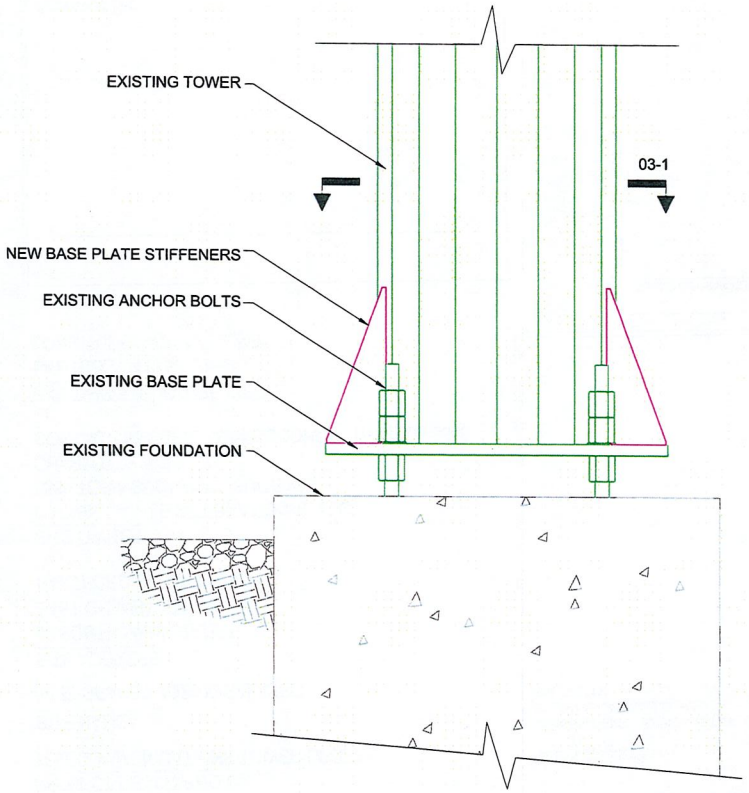
98 FOOT MONOPOLE TOWER
60 SOUTH MAIN STREET
EAST GRANBY, CT
HARTFORD COUNTY

SHEET TITLE

TOWER MODIFICATIONS

SHEET NUMBER

2009-70644-01



SECTION 02-1
SCALE: NTS

THE MODIFICATIONS WERE DESIGNED IN ACCORDANCE WITH THE 2006 IBC BASED UPON A FASTEST MILE WIND SPEED OF 80 MPH IN ACCORDANCE WITH THE TIA/EIA-222-F STANDARD.

GENERAL NOTES:
1. ALL WORK SHALL COMPLY WITH CROWN CASTLE USA CUTTING, WELDING, & SAFETY GUIDELINES & ALL CCUSA SAFETY POLICIES.
2. ALL DIMENSIONS AND DETAILS SHOWN HAVE BEEN OBTAINED FROM EXISTING DRAWINGS. ACTUAL SITE DIMENSIONS MUST BE VERIFIED PRIOR TO FABRICATION OF ANY MATERIAL.
3. REATTACH ALL CABLE LADDERS OR OTHER MOUNTINGS TO NEW REINFORCING MATERIAL TO MATCH EXISTING LOCATION. ALL TELECOMMUNICATION EQUIPMENT MUST REMAIN IN SERVICE DURING NEW TOWER WORK, UNLESS NOTED OTHERWISE.
4. CONTRACTOR SHALL SUBMIT TO ENGINEER ANY INTENT TO DEVIATE FROM PLANS AND DETAILS FOR APPROVAL PRIOR TO START OF ANY WORK.
5. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS PRIOR TO START OF ANY WORK.
6. CONTRACTOR SHALL BE EXPERIENCED IN TYPE OF WORK REPRESENTED IN THESE DRAWINGS. CONTRACTOR SHALL BE LICENSED AND REGISTERED IN THE STATE AND/OR COUNTY IN WHICH THE WORK IS TO BE PERFORMED.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL WORK SCHEDULES AND MATERIAL ACCESS WITH RESIDENT LEASING AGENT. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING ALL EXISTING STRUCTURES AND BURIED UTILITIES IMPACTED BY THIS CONSTRUCTION.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND PROGRAMS. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL WORK IS PERFORMED IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS.
9. ALL SIDES AND FACES OF THE TOWER SHALL BE REINFORCED IDENTICALLY.
10. CONTRACTOR TO COORDINATE WITH OWNER AND IETS FOR FINAL OBSERVATION.
11. THE ENGINEER OR OWNER MAY ACCEPT OR REJECT ANY WORK THAT DOES NOT MEET THE REQUIREMENTS OF THESE NOTES OR THE CONTRACT DOCUMENTS.

STRUCTURAL STEEL NOTES:
1. ALL NEW STEEL PLATE SHALL TO BE ASTM A-572 GRADE 50 MATERIAL, UNLESS NOTED OTHERWISE.
2. ALL NEW STEEL PLATE SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A-123.
3. STEEL DESIGN, DETAILING, AND ERECTION TO BE IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION AND TIA/EIA-222-F.

WELD INSPECTION NOTES:
1. PRIOR TO INSTALLING BASE PLATE STIFFENERS, THE CONTRACTOR SHALL HIRE AN ASNT LEVEL II INSPECTOR THAT SHALL PERFORM EITHER DYE PENETRANT OR MAGNETIC PARTICLE TESTING ON THE EXISTING BASE PLATE TO TOWER SHELL WELD.
2. PRIOR TO THE INSPECTION, THE WELD SHALL BE CLEANED OF ANY PAINT OR MATERIAL THAT WILL IMPACT THE RESULTS.
3. A COPY OF THE INSPECTION REPORT SHALL BE PROVIDED TO IETS PRIOR TO WELDING THE BASE PLATE STIFFENERS.
4. IN THE EVENT CRACKS OR OTHER INACCEPTABLE INDICATIONS ARE DISCOVERED IN THE BASE PLATE WELD ALL WORK SHALL STOP UNTIL AN ADEQUATE REPAIR CAN BE DETERMINED AND COMPLETED.
5. THE INSPECTION SHALL BE PERFORMED PRIOR TO ANY PAINTING OR GALVANIZING IN THE WELD AREA.

WELDING NOTES
1. ALL WELDING SHALL COMPLY WITH THE LATEST EDITION OF AWS D1.1 STRUCTURAL WELDING CODE - STEEL.
2. WELD MINIMUM SIZE TO BE 3/16" FILLET, UNLESS NOTED OTHERWISE. ELECTRODES SHALL BE E70-XXX MIN. WELDING SHALL BE LOW-HEAT.
3. PROVIDE PHOTOGRAPHIC EVIDENCE OF PROPER PRE-HEAT WHERE APPLICABLE.
4. TOUCH UP CUT OR DAMAGED GALVANIZED AREAS AND WELD-AFFECTED AREAS WITH COLD APPLIED GALVANIZING.
5. IN ACCORDANCE WITH AWS D1.1, THE FOLLOWING, NOTES 6 THROUGH 11, ARE MANDATORY:
6. ALL WELDERS SHALL BE QUALIFIED PER AWS D1.1 SECTION 4 FOR THE POSITIONS AND ELECTRODE SPECIFICATION ON THE pWPS AND OR WPS.
7. THE pWPS (PREQUALIFIED WELDING PROCEDURE SPECIFICATION) AND OR WPS (WELDING ROCEDURE SPECIFICATION) SHALL BE FURNISHED TO IETS FOR APPROVAL PRIOR TO MOBILIZATION OR INSTALLATION.
8. EACH WELDERS WPQ (WELDER PERFORMANCE QUALIFICATION) FOR THE POSITIONS AND WELDING PROCEDURE (pWPS OR WPS) SHALL BE FURNISHED TO IETS PRIOR TO MOBILIZATION OR INSTALLATION.
9. IF A WPS IS FURNISHED IT SHALL REFER TO A SUPPORTING PQR (PERFORMANCE QUALIFICATION RECORD).
10. PER AWS D1.1 SECTION 6.6, "THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISUAL INSPECTIONS AND NECESSARY CORRECTION OF ALL DEFICIENCIES IN MATERIAL AND WORKMANSHIP IN CONFORMANCE WITH THE REQUIREMENTS OF THIS CODE."
11. ALL INSPECTORS SHALL BE QUALIFIED PER AWS D1.1 SECTION 6.4. INSPECTOR QUALIFICATIONS SHALL BE SUBMITTED TO IETS PRIOR TO FINAL INSPECTION.

CONTRACTOR SHALL PROVIDE THE FOLLOWING SUBMITTALS TO IETS:
1. BASE PLATE WELD INSPECTION REPORT
2. PWPS AND/OR WPS AND WELDER CERTIFICATIONS (WPQ'S) PRIOR TO CONSTRUCTION.
3. CONTRACTOR FIRE PREVENTION AND PROCEDURE PLAN.
4. MILL CERTIFICATIONS OR BILL OF MATERIAL FOR ALL NEW MATERIAL.
5. GALVANIZING RECORD FOR ALL NEW MATERIAL.
6. PHOTOGRAPHIC EVIDENCE OF PRE-HEAT TEMPERATURE REQUIRED BY AWS D1.1

REINFORCING SUMMARY			
ELEVATION	DESCRIPTION	NO. & SIZE	REFERENCE DWGS
BASE	BASE PLATE STIFFENER PLATES	(16) @ PL 1/2"	02 & 03

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0	11-03-09	ORIGINAL RELEASE	TH
1	09-04-08	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 09-04-08

SITE NAME & BU#

SITE NAME - (F) E. GRANBY
BU NUMBER - 876399

SITE INFORMATION

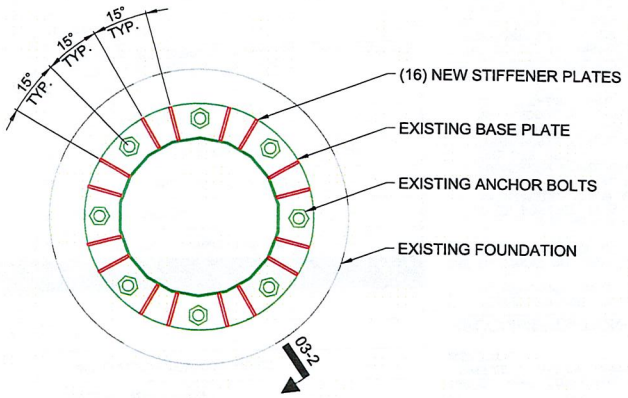
98 FOOT MONOPOLE TOWER
60 SOUTH MAIN STREET
EAST GRANBY, CT
HARTFORD COUNTY

SHEET TITLE

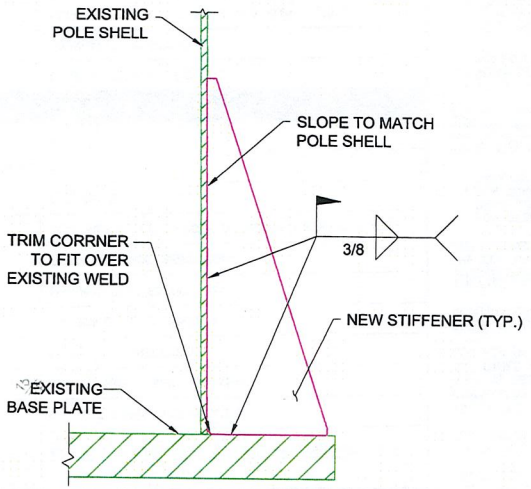
TOWER MODIFICATIONS

SHEET NUMBER

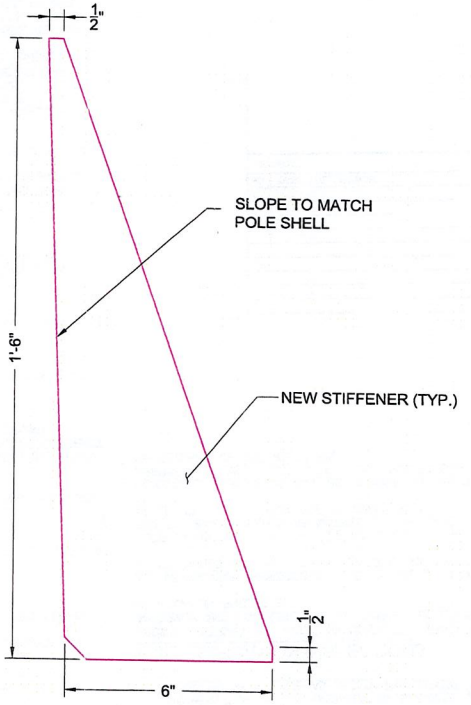
2009-70644-02



SECTION 03-1
SCALE: NTS



DETAIL 03-2
SCALE: NTS



DETAIL 03-3
SCALE: NTS

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0	11-03-09	ORIGINAL RELEASE	TH

DRAWN BY: T. HAILE
CHECKED BY: W. GRISWOLD
DRAWING DATE: 11-03-09

SITE NAME & BU#

SITE NAME - (F) E. GRANBY
BU NUMBER - 876399

SITE INFORMATION

98 FOOT MONOPOLE TOWER
60 SOUTH MAIN STREET
EAST GRANBY, CT
HARTFORD COUNTY

SHEET TITLE

TOWER MODIFICATIONS

SHEET NUMBER

2009-70644-03

POST-MODIFICATION CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	PMI CHECKLIST DRAWING
	EXHIBIT B: CROWN APPROVED A&E VENDOR AGREEEMENT (REQUIRED FOR TURNKEY PROJECTS)
X	BUILDING PERMIT (AS REQUIRED)
	EOR APPROVED SHOP DRAWINGS
	FABRICATION INSPECTION
	FABRICATOR WELD INSPECTION
	MATERIAL TEST REPORT (MTR)
	FABRICATOR NDE INSPECTION
	CONTRACTOR NDE REPORT OF MONOPOLE BASE PLATE
	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
	CONSTRUCTION INSPECTIONS
	FOUNDATION INSPECTIONS
	CONCRETE COMP. STRENGTH AND SLUMP TESTS
	POST INSTALLED ANCHOR ROD EPOXY/GROUT VERIFICATION
	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
	EARTHWORK: LIFT AND DENSITY
X	GALVANIZING VERIFICATION
	REDLINE CONSTRUCTION DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
	AS-BUILT/RECORD DRAWINGS (STAMPED)
	FOUNDATION INSPECTIONS
	BASE LEVEL DRAWING (COAX PLACEMENT)
	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
	CERTIFICATE OF OCCUPANCY
X	PHOTOGRAPHS
	EXHIBIT C: CERTIFICATE OF COMPLIANCE (REQUIRED WHEN CROWN DOES NOT ISSUE A PO FOR PMI)
X	PMI REPORT
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT

POST MODIFICATION INSPECTION NOTES:

GENERAL

THE POST MODIFICATION INSPECTION (PMI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE PMI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE PMI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL PMI'S SHALL BE CONDUCTED BY AN APPROVED ENGINEERING VENDOR (AEV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN.

TO ENSURE THAT THE REQUIREMENTS OF THE PMI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE PMI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : POST MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

ENGINEER OF RECORD

THE EOR SHALL SUBMIT THIS PMI CHECKLIST IDENTIFYING ALL REQUIRED DOCUMENTS AND INSPECTIONS REQUIRED FOR THE ACCEPTANCE OF THE MODIFICATION INSTALLATION.

- FOR DESIGN-BID-BUILD (DBB) THE CHECKLIST SHALL BE SUBMITTED WITH THE MODIFICATION DRAWINGS.
- FOR TURNKEY PROJECTS THIS CHECKLIST SHALL BE SUBMITTED AS PART OF THE BID RESPONSE PACKAGE AND AS PART OF THE FINAL MODIFICATION DRAWING PACKAGE.

PMI INSPECTOR

THE PMI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE PMI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE PMI CHECKLIST
- BEGIN DEVELOPING A SCHEDULE TO CONDUCT ON-SITE PMI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE PMI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS FROM THE GC, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD PMI, AND TO SUBMIT THE PMI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE PMI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE PMI CHECKLIST
- BEGIN DEVELOPING A SCHEDULE TO CONDUCT ON-SITE PMI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL COORDINATE AND CONDUCT ALL CONSTRUCTION INSPECTIONS AND REPORTS AS IDENTIFIED IN THE PMI CHECKLIST AND SUBMIT SAID INSPECTIONS AND REPORTS TO THE PMI INSPECTOR.

RECOMMENDATIONS

IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE PMI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE PMI TO BE CONDUCTED.

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A PMI REPORT:

- THE GC AND PMI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND PMI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND PMI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND PMI INSPECTOR ON-SITE DURING THE PMI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL PMI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE PMI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE PMI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED PMI

IF THE GC AND PMI INSPECTOR AGREE TO A DATE ON WHICH THE PMI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING PMI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE PMI ("REJECTED"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT PMI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

ALL ASSOCIATED COST FOR CORRECTING "REJECTED" PMI'S SHALL BE BORN BY THE GC.

PAYMENT

PAYMENT OF PMI INSPECTOR

- WHEN CROWN ISSUES A PO DIRECTLY TO AN AEV FOR PMI SERVICES, FULL PAYMENT FOR THE PMI SERVICES MAY BE RELEASED WHEN A PMI REPORT ADHERES TO THE REQUIREMENTS OF THE PMI CHECKLIST AND ENG-SOW-10007 : PMI SOW. EXCEPTIONS MAY BE MADE WHEN THE PMI INSPECTOR PERFORMED DUE DILIGENCE IN REQUESTING INSPECTION AND TESTING DOCUMENTATION FROM THE GC BUT WAS UNABLE TO OBTAIN.

PAYMENT OF GENERAL CONTRACTOR

- PAYMENT FOR THE GC INSTALLATION SERVICES MAY BE RELEASED UPON RECEIPT OF A "PASSING" OR A "PASS AS NOTED" PMI REPORT AND ALL CLOSE OUT MATERIALS.

PMI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A PMI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED PMI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS AS CONTAINED HEREIN AND THE CONTRACT DOCUMENTS.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING" OR "PASS AS NOTED" PMI REPORT FOR THE ORIGINAL PROJECT.

REJECTABLE INDICATIONS WILL BE RELAYED TO THE ORIGINAL PMI INSPECTOR AND THE GC. APPROPRIATE DISCIPLINARY ACTION MAY RESULT DEPENDENT UPON THE FREQUENCY AND THE LEVEL OF SEVERITY OF THE REJECTIONS.

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

CROWN CASTLE

SITE NAME: FE. GRANBY / GALASSO

BU NUMBER: 876399

SITE ADDRESS:
60 SOUTH MAIN STREET
EAST GRANBY, CT, 06026
HARTFORD COUNTY, USA

DRAWN BY: TH DATE: 11/04/09

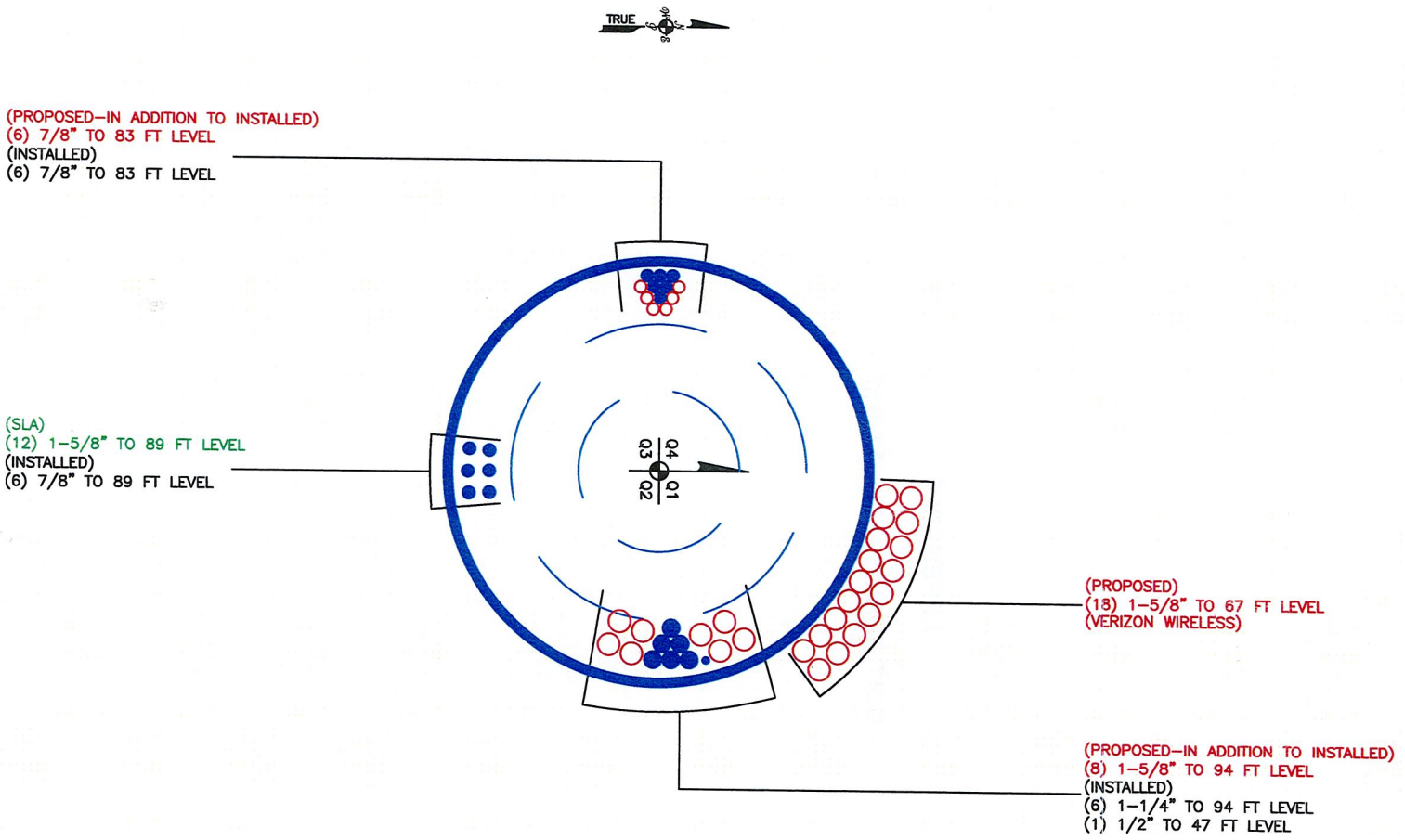
CHECKED BY: LC DATE: 11/04/09

SCALE: AS SHOWN

REVISION: 0

POST MODIFICATION INSPECTION CHECKLIST

S-7



Existing, Proposed, & Reserved Cables

Verizon Co-Locate
"E. Granby 3, CT"

www.iets.com
IETS Engineering Services
129 Greenwich Road
Charlotte, NC 28211
Ph:(704)522-1131
Fax:(704)522-1280

NOTES

RELEASE: ORIGINAL

DRAWN BY: J. Guerard
CHECKED BY: W. A. Griswold
DRAWING DATE: 10-16-2009

BUSINESS UNIT NUMBER
876399

SITE NAME
E. Granby

SITE INFORMATION
98' Monopole
60 South Main St.
East Granby, CT

DRAWING TITLE
Cable Routing Drawing

DRAWING NUMBER
2009-70637-01

APPENDIX C

ADDITIONAL CALCULATIONS

www.iets.com
IETS Engineering Services

Industrial Engineering & Testing Services, P.C.
129 Greenwich Road
Charlotte, North Carolina 28211
Phone: (704) 522-1131 / Fax: (704) 522-1280
Web: www.IETS.com email: towerdata@iets.com

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

TIA Rev F

Site Data

BU#: *876399*
Site Name: *F E Granby 4Q2000-G*
App #: *89121*

Connection Type:	*Butt*

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	40	in

Plate Data		
Diam:	46	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	12.70	in

Stiffener Data (Welding at both sides)		
Config:	3	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	32	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	953	ft-kips
Axial:	16	kips
Shear:	14	kips

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	141.0 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	72.3% **Pass**	

Base Plate Results

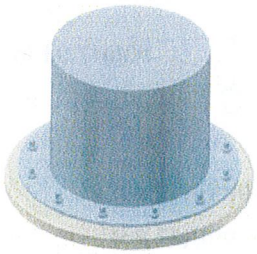
	Shear Check Only	Stiffened
Base Plate Stress:	8.1 ksi	Service, ASD
Allowable Plate Stress:	32.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	25.2% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	65.8% **Pass**
Vertical Weld:	21.9% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	12.3% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	51.0% **Pass**
Plate Comp. (AISC Bracket):	52.2% **Pass**

Pole Results

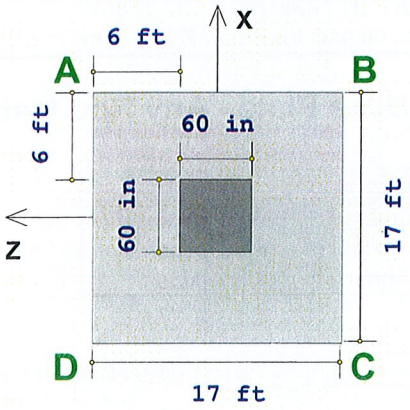
Pole Punching Shear Check:	7.1% **Pass**

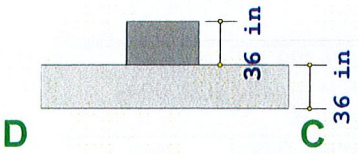


* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

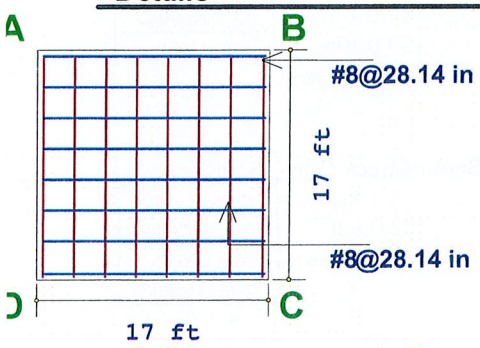
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

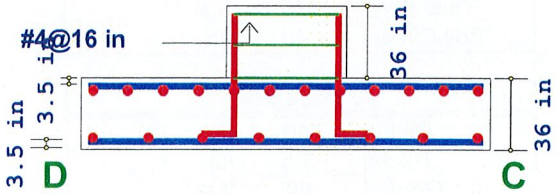
Sketch





Details



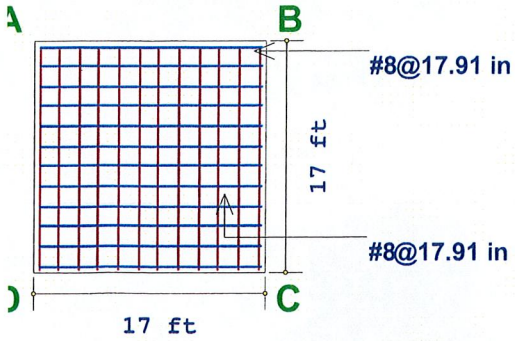


Footing Elevation

X Dir. Steel: 5.89 in^2 (min)(8,#8)

Z Dir. Steel: 6.02 in^2 (min)(8 #8)

Bottom Rebar Plan



X Dir. Steel: 9.42 in^2 (min)(12 #8)

Z Dir. Steel: 9.42 in^2 (min)(12 #8)

Top Rebar Plan

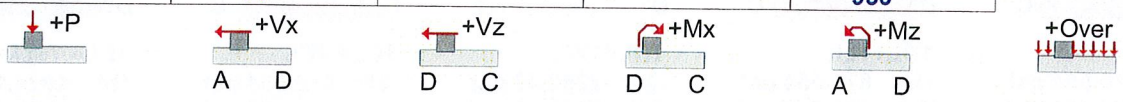
Geometry, Materials and Criteria

Length	: **17 ft**	eX : **0 in**	Gross Allow. Bearing	: **4000 psf**	Steel fy	: **60 ksi**
Width	: **17 ft**	eZ : **0 in**	Concrete Weight	: **145 pcf**	Minimum Steel	: **.0018**
Thickness	: **36 in**	pX : **60 in**	Concrete f'c	: **4 ksi**	Maximum Steel	: **.0075**
Height	: **36 in**	pZ : **60 in**	Design Code	: **ACI 318-02**		

Footing Top Bar Cover	: **3.5 in**	Overturning Safety Factor	: **1.5**	Phi for Flexure	: **0.9**
Footing Bottom Bar Cover	: **3.5 in**	Coefficient of Friction	: **0.3**	Phi for Shear	: **0.75**
Pedestal Longitudinal Bar Cover	: **1.5 in**	Passive Resistance of Soil	: **0 k**	Phi for Bearing	: **0.65**

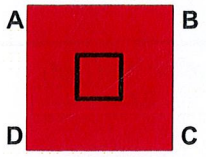
Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	**16**					**375**
WL		**14**			**953**	

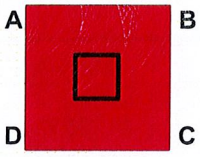


Soil Bearing

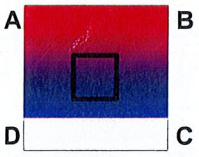
Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
ASCE 2.4.1-1	1DL	4000	870.554 (A)	.218
ASCE 2.4.1-2	1DL+1LL	4000	870.554 (A)	.218
ASCE 2.4.1-3a	1DL+1WL	4000	2253.49 (A)	.563
ASCE 2.4.1-3b	1DL+.7EL	4000	870.554 (A)	.218
ASCE 2.4.1-3c	1DL+.75LL+.75WL	4000	1824.16 (A)	.456
ASCE 2.4.1-3d	1DL+.75LL+.7EL	4000	870.554 (A)	.218



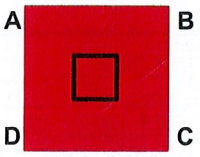
1DL
QA: 870.554 psf
QB: 870.554 psf
QC: 870.554 psf
QD: 870.554 psf
NAZ: -1 in
NAX: -1 in



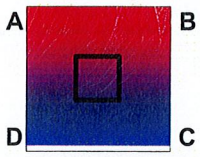
1DL+1LL
QA: 870.554 psf
QB: 870.554 psf
QC: 870.554 psf
QD: 870.554 psf
NAZ: -1 in
NAX: -1 in



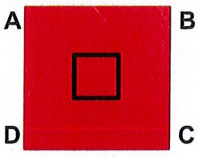
1DL+1WL
QA: 2253.49 psf
QB: 2253.49 psf
QC: 0 psf
QD: 0 psf
NAZ: -1 in
NAX: 157.616 in



1DL+.7EL
QA: 870.554 psf
QB: 870.554 psf
QC: 870.554 psf
QD: 870.554 psf
NAZ: -1 in
NAX: -1 in



1DL+.75LL+.75WL
QA: 1824.16 psf
QB: 1824.16 psf
QC: 0 psf
QD: 0 psf
NAZ: -1 in
NAX: 194.712 in



1DL+.75LL+.7EL
QA: 870.554 psf
QB: 870.554 psf
QC: 870.554 psf
QD: 870.554 psf
NAZ: -1 in
NAX: -1 in

Footing Flexure Design (Bottom Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
ACI 9-1	1.4DL+1.7LL	39.838	.277	39.838	.277

Footing Flexure Design (Top Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
SW+OVER	1SW+1OVER	208.022	1.447	247.86	1.725

Footing Shear Check

Two Way (Punching) Vc: 2979.12 k One Way (X Dir. Cut) Vc 825.734 k One Way (Z Dir. Cut) Vc: 825.734 k

		Punching		X Dir. Cut		Z Dir. Cut	
Description	Categories and Factors	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc
ACI 9-1	1.4DL+1.7LL	29.973	.013	7.377	.012	7.377	.012

Concrete Bearing Check (Vertical Loads Only)

Bearing Bc : **24480 k**

Description	Categories and Factors	Bearing Bu (k)	Bearing Bu/⌀Bc
ACI 9-1	**1.4DL+1.7LL**	**37.625**	**.002**

Overturning Check (Service)

Description	Categories and Factors	Mo-XX (k-ft)	Ms-XX (k-ft)	Mo-ZZ (k-ft)	Ms-ZZ (k-ft)	OSF-XX	OSF-ZZ
ASCE 2.4.1-1	**1DL**	**0**	**2138.52**	**0**	**2138.52**	**NA**	**NA**
ASCE 2.4.1-2	**1DL+1LL**	**0**	**2138.52**	**0**	**2138.52**	**NA**	**NA**
ASCE 2.4.1-3a	**1DL+1WL**	**0**	**2138.52**	**1037**	**2138.52**	**NA**	**2.062**
ASCE 2.4.1-3b	**1DL+.7EL**	**0**	**2138.52**	**0**	**2138.52**	**NA**	**NA**
ASCE 2.4.1-3c	**1DL+.75LL+.75WL**	**0**	**2138.52**	**777.75**	**2138.52**	**NA**	**2.75**
ASCE 2.4.1-3d	**1DL+.75LL+.7EL**	**0**	**2138.52**	**0**	**2138.52**	**NA**	**NA**

Mo-XX: Governing Overturning Moment about AD or BC
Ms-XX: Governing Stablizing Moment about AD or BC
OSF-XX: Ratio of Ms-XX to Mo-XX

Sliding Check (Service)

Description	Categories and Factors	Va-XX (k)	Vr-XX (k)	Va-ZZ (k)	Vr-ZZ (k)	SR-XX	SR-ZZ
ASCE 2.4.1-1	**1DL**	**0**	**75.477**	**0**	**75.477**	**NA**	**NA**
ASCE 2.4.1-2	**1DL+1LL**	**0**	**75.477**	**0**	**75.477**	**NA**	**NA**
ASCE 2.4.1-3a	**1DL+1WL**	**14**	**75.477**	**0**	**75.477**	**5.391**	**NA**
ASCE 2.4.1-3b	**1DL+.7EL**	**0**	**75.477**	**0**	**75.477**	**NA**	**NA**
ASCE 2.4.1-3c	**1DL+.75LL+.75WL**	**10.5**	**75.477**	**0**	**75.477**	**7.188**	**NA**
ASCE 2.4.1-3d	**1DL+.75LL+.7EL**	**0**	**75.477**	**0**	**75.477**	**NA**	**NA**

Va-XX: Applied Lateral Force to Cause Sliding Along XX Axis
Vr-XX: Resisting Lateral Force Against Sliding Along XX Axis
SR-XX: Ratio of Vr-XX to Va-XX

Martin, David C.

From: Dan Goulet [Dan.Goulet@csquaredsystems.com]
Sent: Wednesday, December 23, 2009 12:39 PM
To: Martin, David C.
Subject: RE: East Granby numbers
Attachments: AlphaExMPxcerpt_Adjusted.xls

David,

The differences between the formulas used in your attachment and the one we are using for the Verizon antennas are as follows:

In your formula you are using:

- ground reflection factor of 1.6
- Antenna centerline of 67 (not accounting for the height in (feet) of the average person (6 Ft.)
- No off-beam attenuation loss for the antenna pattern adjustment

In the formulas we used:

- ground reflection factor of 2
- a 6' adjustment to account for the height of the average person (bringing the antenna centerline down to 61' for the radius used in the denominator
- an ERP adjustment factor of -10

You will note that if you add the 6' height of an individual and remove the .64 (the residual difference between using a ground reflection factor of 1.6 as opposed to a ground reflection factor of 2.0 in the numerator) the resulting power density is 0.3381, or 33.81%MPE. If you then factor the total ERP by -10 the result is 3.38%.

For the sake of discussion, I have modified the formula in the attached file to include the antenna pattern adjustment. Note that I have not changed the values you are using for ground reflection or the radius.

Please call me if you would like to discuss this further or run through the equation variations over the phone.

Regards,

Dan Goulet
C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
PCS: 978 204-4895
Office: 603 657-9702

From: Martin, David C. [mailto:David.C.Martin@po.state.ct.us]
Sent: Wednesday, December 23, 2009 10:25 AM
To: Dan Goulet
Subject: East Granby numbers

Attached is a copy of my spreadsheet for the east granby site we've been discussing.

<<AlphaExMPxcerpt.xls>>