

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

ORIGINAL

December 13, 2010

RECEIVED
DEC 14 2010
**CONNECTICUT
SITING COUNCIL**

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Construction Activity**
EM-VER-002-100107 – 401 Wakelee Avenue, Ansonia, Connecticut
EM-VER-057-100111 – 1081 North Street, Greenwich, Connecticut
EM-VER-008-100222 – 93 Old Amity Road, Bethany, Connecticut
EM-VER-015-100427 – 623 Pine Street, Bridgeport, Connecticut
EM-VER-058-091217 – 2 Sunny Lane, Westport, Connecticut
EM-VER-035-100311 – Ledge Road, Darien, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you that construction activity associated with the above-referenced facility modifications has been completed.

If you have any questions or need any additional information regarding any of these facilities, please do not hesitate to contact me.



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

Sincerely,

Kenneth C. Baldwin

KCB/kmd

Copy to:

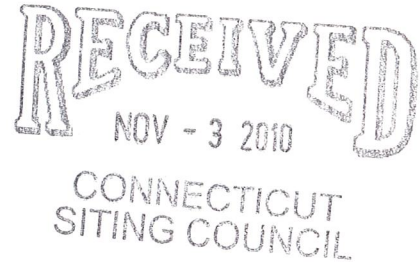
Sandy M. Carter

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

ORIGINAL

November 2, 2010

Michael Perrone
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051



Re: **EM-VER-035-100311 – Cellco Partnership d/b/a Verizon Wireless
Ledge Road, Darien, Connecticut**

Dear Mr. Perrone:

On April 26, 2010, the Siting Council acknowledged receipt of Cellco's notice of intent to modify the above-referenced telecommunications facility. This modification involved the replacement of all twelve of Cellco's existing antennas with six newer model cellular antennas; three newer model PCS antennas; and three LTE (700 MHz) antennas.

In addition to these antenna modifications, Cellco now intends to install six (6) antenna cable diplexers on its antenna platform. Attached to this letter is a Structural Analysis Report verifying that the tower can support all of the previously approved antenna modifications and the addition of the antenna cable diplexers.

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kenneth C. Baldwin".

Kenneth C. Baldwin



Law Offices

BOSTON

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

SARASOTA

www.rc.com

Attachment

Copy to:

Sandy M. Carter
Brian Ragozzine
Mark Gauger

Date: October 27, 2010

LaTisha Leach
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277



Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

| | | |
|--------------------------------------|--|----------------|
| Carrier Designation: | Verizon Wireless Co-Locate | |
| | Carrier Site Number: | N/A |
| | Carrier Site Name: | Darien, CT |
| Crown Castle Designation: | Crown Castle BU Number: | 806352 |
| | Crown Castle Site Name: | BRG 302 943052 |
| | Crown Castle JDE Job Number: | 143478 |
| | Crown Castle Work Order Number: | 365883 |
| Engineering Firm Designation: | Crown Castle Project Number: | 365883 |
| Site Data: | 126 Ledge Road, DARIEN, Fairfield County, CT Latitude 41° 4' 20.75", Longitude -73° 28' 41.4" 117 Foot - Monopole Tower | |

Dear LaTisha Leach,

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 365883, in accordance with application 109316, 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: Existing + Reserved + Proposed Equipment

Sufficient Capacity

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

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

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

Structural analysis prepared by: Rebecca Lim, EIT / MRC

Respectfully submitted by:

Handwritten signature of Douglas K. Pineo in black ink.

Douglas K. Pineo, P.E.
Manager Structural Design

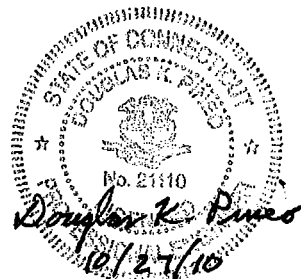


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

RISATower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by VALMONT in May of 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E. The tower was extended to 117 ft by Valmont in July of 2007. The modification designed by Tower Engineering Professionals (TEP) in 2010 was considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 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 |
|---------------------|----------------------------|--------------------|----------------------|------------------------------|----------------------|---------------------|------|
| 100 | 102 | 3 | andrew | LNx-6514DS-T4M w/ Mount Pipe | - | - | - |
| | | 6 | decibel | DB844G65ZAXY w/ Mount Pipe | | | |
| | | 6 | rfs celwave | FD9R6004/2C-3L | | | |
| | | 3 | rymsa wireless | MG D3-800TV w/ Mount Pipe | | | |

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 |
|---------------------|----------------------------|-----------------------|-------------------------------|-----------------------------|----------------------|---------------------|------|
| 117 | 120 | 3 | communication components inc. | DTMA1819VG12A | - | - | 2 |
| | | 3 | decibel | 932LG65VTE-B | 7 | 1-5/8 | 1 |
| 110 | 110 | 1 | tower mounts | Pipe Mount [PM 501-3] | | | |
| | | 3 | andrew | ETW190VS12UB | | | |
| | | 3 | rfs celwave | APX16PV-16PVL-E | 12 | 1-1/4 | 1 |
| | | 3 | rfs celwave | ATMAA1412D-1A20 | | | |
| 100 | 102 | 1 | tower mounts | Pipe Mount [PM 601-3] | 12 | 7/8 | 5 |
| | | 6 | decibel | DB948F85T2E-M w/ Mount Pipe | | | |
| | | 12 | mla | MLA_ ANTENNA w/ Mount Pipe | | | |
| 95 | 95 | 6 | swedcom | ALP 9212-N w/ Mount Pipe | - | - | 5 |
| | | 1 | tower mounts | Platform Mount [LP 502-1] | 4 | 1/2 | 2 |
| | | 2 | andrew | VHLP1-23 | | | |
| | | 1 | andrew | VHLP2-11 | | | |
| | | 1 | andrew | VHLP2.5-11 | | | |
| 1 | tower mounts | Pipe Mount [PM 501-1] | | | | | |
| 1 | tower mounts | Pipe Mount [PM 501-3] | | | | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---------------------|----------------------------|------------------------|----------------------------|----------------------------|----------------------|---------------------|---------------------------|
| 87 | 89 | 3 | - | diplexer | 3 | 1-1/4 | 4 |
| | | 6 | generic | TMA | 9 | 1-5/8 | |
| | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-1/4 | 1 | |
| | 87 | 1 | tower mounts | | | | Platform Mount [LP 713-1] |
| 81 | 81 | 3 | kathrein | 800 10504 w/ Mount Pipe | 6 | 1-5/8 | 1 |
| | | 1 | tower mounts | Side Arm Mount [SO 102-3] | | | |
| 72 | 74 | 3 | argus technologies | LLPX310R w/ Mount Pipe | 6 | 5/16 | 2 |
| | | 6 | decibel | DB844H90E-XY w/ Mount Pipe | 9 | 7/8 | 1 |
| | | 3 | samsung telecommunications | FDD_R6_RRH | - | - | 2 |
| | 72 | 1 | tower mounts | Platform Mount [LP 402-1] | | | 1 |
| 50 | 50 | 1 | gps | GPS_A | 1 | 1/2 | 1 |
| | | 1 | tower mounts | Side Arm Mount [SO 701-1] | | | |

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment; considered in this analysis
- 3) MLA Equipment not Controlling, not considered in this analysis
- 4) SLA Equipment not Controlling, not considered in this analysis
- 5) Existing Equipment to be Removed; not considered in this analysis. Feedlines to remain

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) |
|---------------------|----------------------------|--------------------|----------------------|---------------|----------------------|---------------------|
| 97 | 97 | 2 | rfs celwave | PD100 | - | - |
| | | 6 | sinclair | SRL410C4R105 | | |
| 84 | 84 | 2 | rfs celwave | PD100 | - | - |
| | | 6 | sinclair | SRL410C4R105 | | |

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

| Document | Remarks | Reference | Source |
|--|------------------------------|------------|----------|
| 4-GEOTECHNICAL REPORTS | Clarence Wetli Associates | 217769 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | SAC Engineering, Inc. | 217771 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | VALMONT | 217772 | CCISITES |
| 4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA | TEP | On File | On File |
| 4-APPLICATION | Verizon Wireless, Revision 1 | App#109316 | CCISITES |

3.1) Analysis Method

RISATower (5.4.2.0) was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

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.
- 5) The base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

| Elevation (ft) | Pole Bending fb (ksi) | Allowable Bending Fb (ksi) | Reinf. Compr. Cr (k) | Allowable Compr. Ca (k) | Reinf. Tension Tr (k) | Allowable Tension Ta (k) | Controlling Stress | % Capacity | Pass / Fail |
|----------------|-----------------------|----------------------------|----------------------|-------------------------|-----------------------|--------------------------|--------------------|------------|-------------|
| 70 | 37.12 | 52 | | | | | Pole | 72.3% | Pass |
| 52 | 31.15 | 50.898623 | 144.85 | 170.16 | 144.85 | 234.00 | 1st Reinf.Comp | 85.1% | Pass |
| 35 | 33.32 | 52 | 154.59 | 170.16 | 154.59 | 234.00 | 1st Reinf.Comp | 90.8% | Pass |
| 0 | 37.38 | 51.581828 | 229.86 | 250.40 | 229.86 | 312.00 | 1st Reinf.Comp | 91.8% | Pass |

Table 6 - Tower Component Stresses vs. Capacity - LC1

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|-------------------------------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 83.7 | Pass |
| 1 | Base Plate | 0 | 61.2 | Pass |
| 1 | Base Foundation Soil Interaction | 0 | 83.6 | Pass |
| 1 | Flange Bolts | 100 | 15.0 | Pass |
| 1 | Flange Plate | 100 | 18.3 | Pass |
| 1 | Flange Bolts | 110 | 3.9 | Pass |
| 1 | Flange Plate | 110 | 4.0 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 91.8% |
|---|--------------|

Notes:

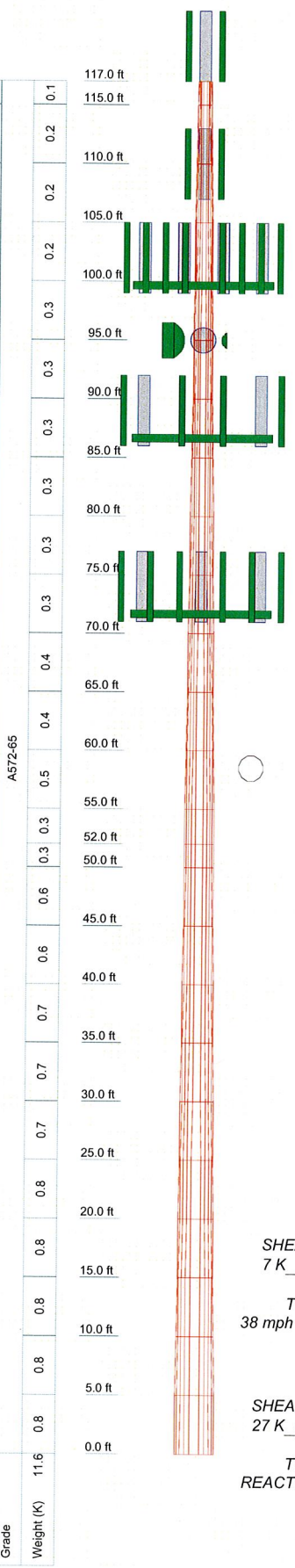
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The monopole, anchor rods and foundation have sufficient capacity to carry the existing, reserved, and proposed loads after the completion of modifications made for this site.

APPENDIX A
RISA TOWER OUTPUT

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Length (ft) | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Number of Sides | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Thickness (in) | 0.1875 | 0.1875 | 0.1875 | 0.1875 | 0.2500 | 0.2500 | 0.2500 | 0.2500 | 0.2500 | 0.2500 | 0.4272 | 0.4181 | 0.4100 | 0.5098 | 0.5021 | 0.4954 | 0.4893 | 0.5311 | 0.5240 | 0.5175 | 0.5115 | 0.5058 | 0.5005 | 0.4956 | |
| Top Dia (in) | 14.8141 | 14.8141 | 15.9400 | 17.0700 | 18.2000 | 19.4385 | 20.6771 | 21.9156 | 23.1542 | 24.3927 | 25.6313 | 26.8698 | 28.1083 | 29.3469 | 30.5854 | 31.8239 | 33.0624 | 34.3009 | 35.5394 | 36.7779 | 38.0164 | 39.2549 | 40.4934 | 41.7319 | |
| Bot Dia (in) | 15.9400 | 17.0700 | 18.2000 | 19.4385 | 20.6771 | 21.9156 | 23.1542 | 24.3927 | 25.6313 | 26.8698 | 28.1083 | 29.3469 | 30.5854 | 31.8239 | 33.0624 | 34.3009 | 35.5394 | 36.7779 | 38.0164 | 39.2549 | 40.4934 | 41.7319 | 42.9704 | 44.2089 | |
| Grade | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 | A572-65 |
| Weight (K) | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 |



DESIGNED APPURTENANCE LOADING

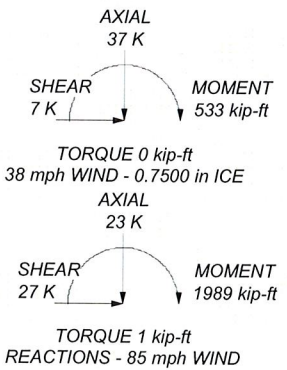
| TYPE | ELEVATION | TYPE | ELEVATION |
|--------------------------------|-----------|--------------------------------|-----------|
| 932LG65VTE-B | 117 | Pipe Mount [PM 501-3] | 95 |
| DTMA1819VG12A | 117 | Pipe Mount [PM 501-1] | 95 |
| 932LG65VTE-B | 117 | VHLP2-11 | 95 |
| DTMA1819VG12A | 117 | VHLP1-23 | 95 |
| 932LG65VTE-B | 117 | VHLP1-23 | 95 |
| DTMA1819VG12A | 117 | VHLP2.5-11 | 95 |
| Pipe Mount [PM 501-3] | 117 | (2) 7770.00 w/ Mount Pipe | 87 |
| ETW190VS12UB | 110 | (2) TMA | 87 |
| APX16PV-16PVL-E | 110 | Platform Mount [LP 713-1] | 87 |
| ATMAA1412D-1A20 | 110 | (2) 7770.00 w/ Mount Pipe | 87 |
| ETW190VS12UB | 110 | (2) TMA | 87 |
| APX16PV-16PVL-E | 110 | (2) 7770.00 w/ Mount Pipe | 87 |
| ATMAA1412D-1A20 | 110 | (2) TMA | 87 |
| ETW190VS12UB | 110 | 800 10504 w/ Mount Pipe | 81 |
| APX16PV-16PVL-E | 110 | 800 10504 w/ Mount Pipe | 81 |
| ATMAA1412D-1A20 | 110 | 800 10504 w/ Mount Pipe | 81 |
| Pipe Mount [PM 601-3] | 110 | Side Arm Mount [SO 102-3] | 81 |
| LNx-6514DS-T4M w/ Mount Pipe | 100 | LLPX310R w/ Mount Pipe | 72 |
| (2) DB844G65ZAXY w/ Mount Pipe | 100 | FDD_R6_RRH | 72 |
| (2) FD9R6004/2C-3L | 100 | (2) DB844H90E-XY w/ Mount Pipe | 72 |
| MG D3-800TV w/ Mount Pipe | 100 | LLPX310R w/ Mount Pipe | 72 |
| LNx-6514DS-T4M w/ Mount Pipe | 100 | FDD_R6_RRH | 72 |
| (2) DB844G65ZAXY w/ Mount Pipe | 100 | Platform Mount [LP 402-1] | 72 |
| (2) FD9R6004/2C-3L | 100 | (2) DB844H90E-XY w/ Mount Pipe | 72 |
| MG D3-800TV w/ Mount Pipe | 100 | LLPX310R w/ Mount Pipe | 72 |
| LNx-6514DS-T4M w/ Mount Pipe | 100 | FDD_R6_RRH | 72 |
| (2) DB844G65ZAXY w/ Mount Pipe | 100 | (2) DB844H90E-XY w/ Mount Pipe | 72 |
| (2) FD9R6004/2C-3L | 100 | GPS_A | 50 |
| MG D3-800TV w/ Mount Pipe | 100 | Side Arm Mount [SO 701-1] | 50 |
| Platform Mount [LP 502-1] | 100 | | |

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. Tower Rating: 91.8%



| | |
|---|--|
| <p>Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Shaping the Wireless World Phone: (724) 416-2000 FAX: (724) 416-2254</p> | <p>Job: BU# 806352</p> |
| | <p>Client: Crown Castle</p> |
| | <p>Code: TIA/EIA-222-F</p> |
| | <p>Date: 10/26/10</p> |
| | <p>Path: R:\SA Models - Letters\Work Area\RL\m\806352\806352-AFTER.MXD</p> |
| <p>Drawn by: RLIm</p> | <p>App'd:</p> |
| <p>Scale: NTS</p> | <p>Dwg No: E-1</p> |

| | | |
|---|-------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 1 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Tower Rating: 91.8%.

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

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|--|

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 | 117.00-115.00 | 2.00 | 0.00 | 12 | 14.3600 | 14.8114 | 0.1875 | 0.0001 | A572-65 (65 ksi) |
| L2 | 115.00-110.00 | 5.00 | 0.00 | 12 | 14.8114 | 15.9400 | 0.1875 | 0.0001 | A572-65 (65 ksi) |
| L3 | 110.00-105.00 | 5.00 | 0.00 | 12 | 15.9400 | 17.0700 | 0.1875 | 0.0001 | A572-65 (65 ksi) |
| L4 | 105.00-100.00 | 5.00 | 0.00 | 12 | 17.0700 | 18.2000 | 0.1875 | 0.0001 | A572-65 (65 ksi) |
| L5 | 100.00-95.00 | 5.00 | 0.00 | 12 | 18.2000 | 19.4385 | 0.2500 | 0.0001 | A572-65 |

| | | |
|---|-------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 2 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

| 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 |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L6 | 95.00-90.00 | 5.00 | 0.00 | 12 | 19.4385 | 20.6771 | 0.2500 | 0.0001 | (65 ksi) A572-65 |
| L7 | 90.00-85.00 | 5.00 | 0.00 | 12 | 20.6771 | 21.9156 | 0.2500 | 0.0001 | (65 ksi) A572-65 |
| L8 | 85.00-80.00 | 5.00 | 0.00 | 12 | 21.9156 | 23.1542 | 0.2500 | 0.0001 | (65 ksi) A572-65 |
| L9 | 80.00-75.00 | 5.00 | 0.00 | 12 | 23.1542 | 24.3927 | 0.2500 | 0.0001 | (65 ksi) A572-65 |
| L10 | 75.00-70.00 | 5.00 | 0.00 | 12 | 24.3927 | 25.6313 | 0.2500 | 0.0001 | (65 ksi) A572-65 |
| L11 | 70.00-65.00 | 5.00 | 0.00 | 12 | 25.6313 | 26.8698 | 0.4272 | 0.0001 | (65 ksi) A572-65 |
| L12 | 65.00-60.00 | 5.00 | 0.00 | 12 | 26.8698 | 28.1083 | 0.4181 | 0.0001 | (65 ksi) A572-65 |
| L13 | 60.00-55.00 | 5.00 | 0.00 | 12 | 28.1083 | 29.3469 | 0.4100 | 0.0001 | (65 ksi) A572-65 |
| L14 | 55.00-52.00 | 3.00 | 0.00 | 12 | 29.3469 | 30.0900 | 0.4054 | 0.0001 | (65 ksi) A572-65 |
| L15 | 52.00-50.00 | 2.00 | 0.00 | 12 | 30.0900 | 30.0900 | 0.5093 | 0.0001 | (65 ksi) A572-65 |
| L16 | 50.00-45.00 | 5.00 | 0.00 | 12 | 30.0900 | 30.1231 | 0.5021 | 0.0001 | (65 ksi) A572-65 |
| L17 | 45.00-40.00 | 5.00 | 0.00 | 12 | 30.1231 | 31.2538 | 0.4954 | 0.0001 | (65 ksi) A572-65 |
| L18 | 40.00-35.00 | 5.00 | 0.00 | 12 | 31.2538 | 32.3846 | 0.4893 | 0.0001 | (65 ksi) A572-65 |
| L19 | 35.00-30.00 | 5.00 | 0.00 | 12 | 32.3846 | 33.5154 | 0.5311 | 0.0001 | (65 ksi) A572-65 |
| L20 | 30.00-25.00 | 5.00 | 0.00 | 12 | 33.5154 | 34.6462 | 0.5240 | 0.0001 | (65 ksi) A572-65 |
| L21 | 25.00-20.00 | 5.00 | 0.00 | 12 | 34.6462 | 35.7769 | 0.5175 | 0.0001 | (65 ksi) A572-65 |
| L22 | 20.00-15.00 | 5.00 | 0.00 | 12 | 35.7769 | 36.9077 | 0.5115 | 0.0001 | (65 ksi) A572-65 |
| L23 | 15.00-10.00 | 5.00 | 0.00 | 12 | 36.9077 | 38.0385 | 0.5058 | 0.0001 | (65 ksi) A572-65 |
| L24 | 10.00-5.00 | 5.00 | 0.00 | 12 | 38.0385 | 39.1692 | 0.5005 | 0.0001 | (65 ksi) A572-65 |
| L25 | 5.00-0.00 | 5.00 | | 12 | 39.1692 | 40.3000 | 0.4956 | 0.0001 | (65 ksi) A572-65 |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | Iw/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|-------------------------|---------|--------|
| L1 | 14.8666 | 8.5666 | 219.3727 | 5.0738 | 7.4385 | 29.4916 | 444.5085 | 4.2113 | 3.7479 | 19.989 |
| | 15.3339 | 8.8292 | 241.0087 | 5.2354 | 7.6723 | 31.4128 | 488.3490 | 4.3455 | 3.8689 | 20.634 |
| L2 | 15.3339 | 8.8292 | 241.0087 | 5.2354 | 7.6723 | 31.4128 | 488.3490 | 4.3455 | 3.8689 | 20.634 |
| | 16.5023 | 9.5106 | 301.2254 | 5.6394 | 8.2569 | 36.4816 | 610.3643 | 4.6808 | 4.1714 | 22.247 |
| L3 | 16.5023 | 9.5106 | 301.2254 | 5.6394 | 8.2569 | 36.4816 | 610.3643 | 4.6808 | 4.1714 | 22.247 |
| | 17.6722 | 10.1928 | 370.8116 | 6.0439 | 8.8423 | 41.9363 | 751.3649 | 5.0166 | 4.4742 | 23.862 |
| L4 | 17.6722 | 10.1928 | 370.8116 | 6.0439 | 8.8423 | 41.9363 | 751.3649 | 5.0166 | 4.4742 | 23.862 |
| | 18.8420 | 10.8750 | 450.3655 | 6.4485 | 9.4276 | 47.7710 | 912.5625 | 5.3524 | 4.7770 | 25.478 |
| L5 | 18.8420 | 14.4498 | 594.2582 | 6.4261 | 9.4276 | 63.0339 | 1204.1282 | 7.1117 | 4.7435 | 18.974 |
| | 20.1242 | 15.4467 | 725.9470 | 6.8695 | 10.0691 | 72.0962 | 1470.9654 | 7.6024 | 5.0755 | 20.302 |

| | | |
|---|--------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | Page |
| | Project | Date |
| | Client | Designed by |
| | BU# 806352 | 3 of 27 |
| | | 10:54:43 10/26/10 |
| | Crown Castle | RLim |

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L6 | 20.1242 | 15.4467 | 725.9470 | 6.8695 | 10.0691 | 72.0962 | 1470.9654 | 7.6024 | 5.0755 | 20.302 |
| | 21.4065 | 16.4438 | 875.7940 | 7.3129 | 10.7107 | 81.7679 | 1774.5961 | 8.0931 | 5.4074 | 21.63 |
| L7 | 21.4065 | 16.4438 | 875.7940 | 7.3129 | 10.7107 | 81.7679 | 1774.5961 | 8.0931 | 5.4074 | 21.63 |
| | 22.6887 | 17.4408 | 1044.9463 | 7.7563 | 11.3523 | 92.0473 | 2117.3446 | 8.5838 | 5.7393 | 22.957 |
| L8 | 22.6887 | 17.4408 | 1044.9463 | 7.7563 | 11.3523 | 92.0473 | 2117.3446 | 8.5838 | 5.7393 | 22.957 |
| | 23.9710 | 18.4379 | 1234.6027 | 8.1997 | 11.9939 | 102.9361 | 2501.6397 | 9.0746 | 6.0713 | 24.285 |
| L9 | 23.9710 | 18.4379 | 1234.6027 | 8.1997 | 11.9939 | 102.9361 | 2501.6397 | 9.0746 | 6.0713 | 24.285 |
| | 25.2532 | 19.4349 | 1445.9036 | 8.6431 | 12.6354 | 114.4326 | 2929.7927 | 9.5653 | 6.4032 | 25.613 |
| L10 | 25.2532 | 19.4349 | 1445.9036 | 8.6431 | 12.6354 | 114.4326 | 2929.7927 | 9.5653 | 6.4032 | 25.613 |
| | 26.5355 | 20.4319 | 1680.0547 | 9.0865 | 13.2770 | 126.5386 | 3404.2463 | 10.0560 | 6.7351 | 26.941 |
| L11 | 26.5355 | 20.4319 | 1680.0547 | 9.0865 | 13.2770 | 126.5386 | 3404.2463 | 10.0560 | 6.7351 | 26.941 |
| | 27.8177 | 21.4289 | 1934.2767 | 9.4665 | 13.9186 | 139.186 | 3929.8367 | 10.5467 | 7.0672 | 28.269 |
| L12 | 27.8177 | 21.4289 | 1934.2767 | 9.4665 | 13.9186 | 139.186 | 3929.8367 | 10.5467 | 7.0672 | 28.269 |
| | 29.0999 | 22.4259 | 2208.3817 | 9.8511 | 14.5601 | 152.3337 | 4454.9270 | 11.0374 | 7.3993 | 29.597 |
| L13 | 29.0999 | 22.4259 | 2208.3817 | 9.8511 | 14.5601 | 152.3337 | 4454.9270 | 11.0374 | 7.3993 | 29.597 |
| | 30.3821 | 23.4229 | 2502.4867 | 10.2357 | 15.2017 | 166.5899 | 5000.0173 | 11.5281 | 7.7314 | 30.925 |
| L14 | 30.3821 | 23.4229 | 2502.4867 | 10.2357 | 15.2017 | 166.5899 | 5000.0173 | 11.5281 | 7.7314 | 30.925 |
| | 31.1515 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| L15 | 31.1515 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| | 31.1515 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| L16 | 31.1515 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| | 31.1857 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| L17 | 31.1857 | 24.4200 | 2816.5917 | 10.6103 | 15.8432 | 181.8471 | 5545.1076 | 12.0188 | 8.0635 | 32.253 |
| | 32.3563 | 25.4171 | 3140.6967 | 11.0115 | 16.4847 | 197.1043 | 6090.1979 | 12.5095 | 8.3956 | 33.581 |
| L18 | 32.3563 | 25.4171 | 3140.6967 | 11.0115 | 16.4847 | 197.1043 | 6090.1979 | 12.5095 | 8.3956 | 33.581 |
| | 33.5270 | 26.4142 | 3484.8017 | 11.4185 | 17.1262 | 213.3615 | 6635.2882 | 13.0002 | 8.7277 | 34.909 |
| L19 | 33.5270 | 26.4142 | 3484.8017 | 11.4185 | 17.1262 | 213.3615 | 6635.2882 | 13.0002 | 8.7277 | 34.909 |
| | 34.6977 | 27.4113 | 3848.9067 | 11.8255 | 17.7677 | 230.6187 | 7180.3785 | 13.4909 | 9.0600 | 36.237 |
| L20 | 34.6977 | 27.4113 | 3848.9067 | 11.8255 | 17.7677 | 230.6187 | 7180.3785 | 13.4909 | 9.0600 | 36.237 |
| | 35.8684 | 28.4084 | 4233.0117 | 12.2325 | 18.4092 | 248.8759 | 7725.4688 | 13.9816 | 9.3921 | 37.565 |
| L21 | 35.8684 | 28.4084 | 4233.0117 | 12.2325 | 18.4092 | 248.8759 | 7725.4688 | 13.9816 | 9.3921 | 37.565 |
| | 37.0390 | 29.4055 | 4637.1167 | 12.6395 | 19.0507 | 268.1331 | 8270.5591 | 14.4723 | 9.7242 | 38.893 |
| L22 | 37.0390 | 29.4055 | 4637.1167 | 12.6395 | 19.0507 | 268.1331 | 8270.5591 | 14.4723 | 9.7242 | 38.893 |
| | 38.2097 | 30.4026 | 5061.2217 | 13.0465 | 19.6922 | 288.3903 | 8815.6494 | 14.9630 | 10.0563 | 40.221 |
| L23 | 38.2097 | 30.4026 | 5061.2217 | 13.0465 | 19.6922 | 288.3903 | 8815.6494 | 14.9630 | 10.0563 | 40.221 |
| | 39.3804 | 31.4000 | 5505.3267 | 13.4535 | 20.3337 | 309.6475 | 9360.7397 | 15.4537 | 10.3904 | 41.549 |
| L24 | 39.3804 | 31.4000 | 5505.3267 | 13.4535 | 20.3337 | 309.6475 | 9360.7397 | 15.4537 | 10.3904 | 41.549 |
| | 40.5509 | 32.3975 | 5969.4317 | 13.8605 | 20.9752 | 331.9047 | 9905.8300 | 15.9444 | 10.7245 | 42.877 |
| L25 | 40.5509 | 32.3975 | 5969.4317 | 13.8605 | 20.9752 | 331.9047 | 9905.8300 | 15.9444 | 10.7245 | 42.877 |
| | 41.7216 | 33.3950 | 6453.5367 | 14.2675 | 21.6167 | 355.1619 | 10450.9203 | 16.4351 | 11.0586 | 44.205 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _f | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|-----------------|------------------------|------------------|--------------|-------------------------------|-------------------------------|--------------|--|--|
| ft | ft ² | in | | | | | in | in |
| L1 | | | | 1 | 1 | 1 | | |
| 117.00-115.00 | | | | | | | | |
| L2 | | | | 1 | 1 | 1 | | |
| 115.00-110.00 | | | | | | | | |
| L3 | | | | 1 | 1 | 1 | | |
| 110.00-105.00 | | | | | | | | |
| L4 | | | | 1 | 1 | 1 | | |
| 105.00-100.00 | | | | | | | | |
| L5 | | | | 1 | 1 | 1 | | |
| 100.00-95.00 | | | | | | | | |
| L6 | | | | 1 | 1 | 1 | | |
| 95.00-90.00 | | | | | | | | |
| L7 | | | | 1 | 1 | 1 | | |
| 90.00-85.00 | | | | | | | | |
| L8 | | | | 1 | 1 | 1 | | |
| 85.00-80.00 | | | | | | | | |
| L9 | | | | 1 | 1 | 1 | | |
| 80.00-75.00 | | | | | | | | |
| L10 | | | | 1 | 1 | 1 | | |

| | | |
|---|-----------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 4 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A_f | Adjust. Factor A_r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in |
|-----------------|------------------------|------------------|--------------|----------------------|----------------------|--------------|---|---|
| ft | ft ² | in | | | | | | |
| 75.00-70.00 | | | | | | | | |
| L11 | | | | 1 | 1 | 0.71 | | |
| 70.00-65.00 | | | | | | | | |
| L12 | | | | 1 | 1 | 0.72 | | |
| 65.00-60.00 | | | | | | | | |
| L13 | | | | 1 | 1 | 0.73 | | |
| 60.00-55.00 | | | | | | | | |
| L14 | | | | 1 | 1 | 0.74 | | |
| 55.00-52.00 | | | | | | | | |
| L15 | | | | 1 | 1 | 0.78 | | |
| 52.00-50.00 | | | | | | | | |
| L16 | | | | 1 | 1 | 0.78 | | |
| 50.00-45.00 | | | | | | | | |
| L17 | | | | 1 | 1 | 0.79 | | |
| 45.00-40.00 | | | | | | | | |
| L18 | | | | 1 | 1 | 0.8 | | |
| 40.00-35.00 | | | | | | | | |
| L19 | | | | 1 | 1 | 0.76 | | |
| 35.00-30.00 | | | | | | | | |
| L20 | | | | 1 | 1 | 0.76 | | |
| 30.00-25.00 | | | | | | | | |
| L21 | | | | 1 | 1 | 0.77 | | |
| 25.00-20.00 | | | | | | | | |
| L22 | | | | 1 | 1 | 0.78 | | |
| 20.00-15.00 | | | | | | | | |
| L23 | | | | 1 | 1 | 0.78 | | |
| 15.00-10.00 | | | | | | | | |
| L24 10.00-5.00 | | | | 1 | 1 | 0.79 | | |
| L25 5.00-0.00 | | | | 1 | 1 | 0.79 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | C_{AA} ft ² /ft | Weight plf |
|--------------------|-------------|--------------|--------------------|---------------|--------------|----------|------------------------------|------------|
| HJ7-50A(1-5/8") | A | No | CaAa (Out Of Face) | 117.00 - 5.00 | 2 | No Ice | 0.20 | 1.04 |
| | | | | | | 1/2" Ice | 0.30 | 2.55 |
| | | | | | | 1" Ice | 0.40 | 4.68 |
| | | | | | | 2" Ice | 0.60 | 10.76 |
| | | | | | | 4" Ice | 1.00 | 30.26 |
| HJ7-50A(1-5/8") | A | No | CaAa (Out Of Face) | 117.00 - 5.00 | 5 | No Ice | 0.00 | 1.04 |
| | | | | | | 1/2" Ice | 0.00 | 2.55 |
| | | | | | | 1" Ice | 0.00 | 4.68 |
| | | | | | | 2" Ice | 0.00 | 10.76 |
| | | | | | | 4" Ice | 0.00 | 30.26 |
| * LDF6-50A(1-1/4") | B | No | Inside Pole | 110.00 - 5.00 | 12 | No Ice | 0.00 | 0.66 |
| | | | | | | 1/2" Ice | 0.00 | 0.66 |
| | | | | | | 1" Ice | 0.00 | 0.66 |
| | | | | | | 2" Ice | 0.00 | 0.66 |
| | | | | | | 4" Ice | 0.00 | 0.66 |
| * LDF7-50A(1-5/8") | C | No | Inside Pole | 100.00 - 5.00 | 12 | No Ice | 0.00 | 0.82 |
| | | | | | | 1/2" Ice | 0.00 | 0.82 |
| | | | | | | 1" Ice | 0.00 | 0.82 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 5 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | C _A A | Weight |
|--------------------------|-------------|--------------|--------------------|---------------|--------------|---------------------|--------|
| | | | | | | ft ³ /ft | plf |
| | | | | | | 2" Ice | 0.82 |
| | | | | | | 4" Ice | 0.82 |
| * 7983A(1/2") | A | No | CaAa (Out Of Face) | 95.00 - 5.00 | 4 | No Ice | 0.08 |
| | | | | | | 1/2" Ice | 0.74 |
| | | | | | | 1" Ice | 2.01 |
| | | | | | | 2" Ice | 6.39 |
| | | | | | | 4" Ice | 22.47 |
| * LDF6-50A(1-1/4") | B | No | Inside Pole | 87.00 - 5.00 | 3 | No Ice | 0.66 |
| | | | | | | 1/2" Ice | 0.66 |
| | | | | | | 1" Ice | 0.66 |
| | | | | | | 2" Ice | 0.66 |
| | | | | | | 4" Ice | 0.66 |
| LDF7-50A(1-5/8") | B | No | Inside Pole | 87.00 - 5.00 | 9 | No Ice | 0.82 |
| | | | | | | 1/2" Ice | 0.82 |
| | | | | | | 1" Ice | 0.82 |
| | | | | | | 2" Ice | 0.82 |
| | | | | | | 4" Ice | 0.82 |
| * HJ7-50A(1-5/8") | B | No | CaAa (Out Of Face) | 81.00 - 5.00 | 2 | No Ice | 1.04 |
| | | | | | | 1/2" Ice | 2.55 |
| | | | | | | 1" Ice | 4.68 |
| | | | | | | 2" Ice | 10.76 |
| | | | | | | 4" Ice | 30.26 |
| HJ7-50A(1-5/8") | B | No | CaAa (Out Of Face) | 81.00 - 5.00 | 4 | No Ice | 0.70 |
| | | | | | | 1/2" Ice | 2.23 |
| | | | | | | 1" Ice | 4.38 |
| | | | | | | 2" Ice | 10.50 |
| | | | | | | 4" Ice | 30.07 |
| * LDF5-50A(7/8") | A | No | Inside Pole | 72.00 - 5.00 | 9 | No Ice | 0.33 |
| | | | | | | 1/2" Ice | 0.33 |
| | | | | | | 1" Ice | 0.33 |
| | | | | | | 2" Ice | 0.33 |
| | | | | | | 4" Ice | 0.33 |
| 9207(5/16") | A | No | CaAa (Out Of Face) | 72.00 - 5.00 | 6 | No Ice | 0.60 |
| | | | | | | 1/2" Ice | 1.11 |
| | | | | | | 1" Ice | 2.22 |
| | | | | | | 2" Ice | 6.29 |
| | | | | | | 4" Ice | 21.76 |
| 2-1/2" Conduit | A | No | CaAa (Out Of Face) | 72.00 - 5.00 | 1 | No Ice | 2.80 |
| | | | | | | 1/2" Ice | 4.63 |
| | | | | | | 1" Ice | 6.47 |
| | | | | | | 2" Ice | 10.13 |
| | | | | | | 4" Ice | 17.46 |
| 2-1/2" Conduit | A | No | CaAa (Out Of Face) | 72.00 - 5.00 | 1 | No Ice | 2.80 |
| | | | | | | 1/2" Ice | 4.63 |
| | | | | | | 1" Ice | 6.47 |
| | | | | | | 2" Ice | 10.13 |
| | | | | | | 4" Ice | 17.46 |
| * * LDF4-50A(1/2") | A | No | CaAa (Out Of Face) | 50.00 - 5.00 | 1 | No Ice | 0.15 |
| | | | | | | 1/2" Ice | 0.84 |
| | | | | | | 1" Ice | 2.14 |
| | | | | | | 2" Ice | 6.58 |
| | | | | | | 4" Ice | 22.78 |
| * Safety Line 3/8 | C | No | CaAa (Out Of Face) | 117.00 - 5.00 | 1 | No Ice | 0.22 |
| | | | | | | 1/2" Ice | 0.75 |

| | | | | |
|--|---------|--------------|-------------|-------------------|
| RISA Tower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 6 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | $C_A A_A$ | Weight | |
|------------------------------------|-------------|--------------|--------------------|---------------|--------------|-----------|--------|------|
| | | | | | | ft^2/ft | plf | |
| | | | | | | 1" Ice | 0.24 | 1.28 |
| | | | | | | 2" Ice | 0.44 | 2.34 |
| | | | | | | 4" Ice | 0.84 | 4.46 |
| ** | | | | | | | | |
| Reinforcing Plates (1"x4-1/2"x35') | A | No | CaAa (Out Of Face) | 70.00 - 35.00 | 1 | No Ice | 0.00 | 0.00 |
| | | | | | | 1/2" Ice | 0.00 | 0.00 |
| | | | | | | 1" Ice | 0.00 | 0.00 |
| | | | | | | 2" Ice | 0.00 | 0.00 |
| | | | | | | 4" Ice | 0.00 | 0.00 |
| Reinforcing Plates (1"x4-1/2"x35') | B | No | CaAa (Out Of Face) | 70.00 - 35.00 | 1 | No Ice | 0.00 | 0.00 |
| | | | | | | 1/2" Ice | 0.00 | 0.00 |
| | | | | | | 1" Ice | 0.00 | 0.00 |
| | | | | | | 2" Ice | 0.00 | 0.00 |
| | | | | | | 4" Ice | 0.00 | 0.00 |
| Reinforcing Plates (1"x4-1/2"x35') | C | No | CaAa (Out Of Face) | 70.00 - 35.00 | 1 | No Ice | 0.17 | 0.00 |
| | | | | | | 1/2" Ice | 0.33 | 0.00 |
| | | | | | | 1" Ice | 0.50 | 0.00 |
| | | | | | | 2" Ice | 0.83 | 0.00 |
| | | | | | | 4" Ice | 1.50 | 0.00 |
| ** | | | | | | | | |
| Reinforcing Plates (1"x6"x35') | A | No | CaAa (Out Of Face) | 35.00 - 0.00 | 1 | No Ice | 0.00 | 0.00 |
| | | | | | | 1/2" Ice | 0.00 | 0.00 |
| | | | | | | 1" Ice | 0.00 | 0.00 |
| | | | | | | 2" Ice | 0.00 | 0.00 |
| | | | | | | 4" Ice | 0.00 | 0.00 |
| Reinforcing Plates (1"x6"x35') | B | No | CaAa (Out Of Face) | 35.00 - 0.00 | 1 | No Ice | 0.00 | 0.00 |
| | | | | | | 1/2" Ice | 0.00 | 0.00 |
| | | | | | | 1" Ice | 0.00 | 0.00 |
| | | | | | | 2" Ice | 0.00 | 0.00 |
| | | | | | | 4" Ice | 0.00 | 0.00 |
| Reinforcing Plates (1"x6"x35') | C | No | CaAa (Out Of Face) | 35.00 - 0.00 | 1 | No Ice | 0.17 | 0.00 |
| | | | | | | 1/2" Ice | 0.33 | 0.00 |
| | | | | | | 1" Ice | 0.50 | 0.00 |
| | | | | | | 2" Ice | 0.83 | 0.00 |
| | | | | | | 4" Ice | 1.50 | 0.00 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A_R | A_F | $C_A A_A$ In Face | $C_A A_A$ Out Face | Weight K |
|---------------|--------------------|------|--------|--------|-------------------|--------------------|----------|
| | | | ft^2 | ft^2 | ft^2 | ft^2 | |
| L1 | 117.00-115.00 | A | 0.000 | 0.000 | 0.000 | 0.792 | 0.01 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.075 | 0.00 |
| L2 | 115.00-110.00 | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.00 |
| L3 | 110.00-105.00 | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.00 |
| L4 | 105.00-100.00 | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.00 |
| L5 | 100.00-95.00 | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| L6 | 95.00-90.00 | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |

| | | |
|---|--------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | Page |
| | Project | Date |
| | Client | Designed by |
| | BU# 806352 | 7 of 27 |
| | | 10:54:43 10/26/10 |
| | Crown Castle | RLim |

| Tower Section | Tower Elevation ft | Face | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|------|--------------------------|--------------------------|--|---|-------------|
| L7 | 90.00-85.00 | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.06 |
| L8 | 85.00-80.00 | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.396 | 0.09 |
| L9 | 80.00-75.00 | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 1.980 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L10 | 75.00-70.00 | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 2.480 | 0.06 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L11 | 70.00-65.00 | C | 0.000 | 0.000 | 0.000 | 0.188 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L12 | 65.00-60.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L13 | 60.00-55.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L14 | 55.00-52.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 1.938 | 0.06 |
| | | B | 0.000 | 0.000 | 0.000 | 1.188 | 0.07 |
| L15 | 52.00-50.00 | C | 0.000 | 0.000 | 0.000 | 0.613 | 0.03 |
| | | A | 0.000 | 0.000 | 0.000 | 1.292 | 0.04 |
| | | B | 0.000 | 0.000 | 0.000 | 0.792 | 0.04 |
| L16 | 50.00-45.00 | C | 0.000 | 0.000 | 0.000 | 0.408 | 0.02 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L17 | 45.00-40.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L18 | 40.00-35.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L19 | 35.00-30.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L20 | 30.00-25.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L21 | 25.00-20.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L22 | 20.00-15.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L23 | 15.00-10.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L24 | 10.00-5.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | A | 0.000 | 0.000 | 0.000 | 3.230 | 0.10 |
| | | B | 0.000 | 0.000 | 0.000 | 1.980 | 0.11 |
| L25 | 5.00-0.00 | C | 0.000 | 0.000 | 0.000 | 1.021 | 0.05 |
| | | 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 | 0.833 | 0.00 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 8 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|-----------------------------------|-----------------------------------|---|--|-------------|
| L1 | 117.00-115.00 | A | 0.872 | 0.000 | 0.000 | 0.000 | 1.490 | 0.06 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.424 | 0.00 |
| L2 | 115.00-110.00 | A | 0.869 | 0.000 | 0.000 | 0.000 | 3.718 | 0.14 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.056 | 0.01 |
| L3 | 110.00-105.00 | A | 0.864 | 0.000 | 0.000 | 0.000 | 3.708 | 0.14 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.052 | 0.01 |
| L4 | 105.00-100.00 | A | 0.859 | 0.000 | 0.000 | 0.000 | 3.698 | 0.14 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.047 | 0.01 |
| L5 | 100.00-95.00 | A | 0.854 | 0.000 | 0.000 | 0.000 | 3.688 | 0.14 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.042 | 0.05 |
| L6 | 95.00-90.00 | A | 0.849 | 0.000 | 0.000 | 0.000 | 3.677 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.04 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.036 | 0.05 |
| L7 | 90.00-85.00 | A | 0.843 | 0.000 | 0.000 | 0.000 | 3.666 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.06 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.031 | 0.05 |
| L8 | 85.00-80.00 | A | 0.837 | 0.000 | 0.000 | 0.000 | 3.654 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.731 | 0.11 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.025 | 0.05 |
| L9 | 80.00-75.00 | A | 0.831 | 0.000 | 0.000 | 0.000 | 3.642 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.642 | 0.20 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.018 | 0.05 |
| L10 | 75.00-70.00 | A | 0.824 | 0.000 | 0.000 | 0.000 | 4.458 | 0.22 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.629 | 0.20 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.012 | 0.05 |
| L11 | 70.00-65.00 | A | 0.817 | 0.000 | 0.000 | 0.000 | 5.682 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.614 | 0.20 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.200 | 0.05 |
| L12 | 65.00-60.00 | A | 0.810 | 0.000 | 0.000 | 0.000 | 5.659 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.599 | 0.20 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.180 | 0.05 |
| L13 | 60.00-55.00 | A | 0.802 | 0.000 | 0.000 | 0.000 | 5.635 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.583 | 0.20 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.158 | 0.05 |
| L14 | 55.00-52.00 | A | 0.795 | 0.000 | 0.000 | 0.000 | 3.369 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 2.142 | 0.12 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.884 | 0.03 |
| L15 | 52.00-50.00 | A | 0.790 | 0.000 | 0.000 | 0.000 | 2.240 | 0.11 |
| | | B | | 0.000 | 0.000 | 0.000 | 1.424 | 0.08 |
| | | C | | 0.000 | 0.000 | 0.000 | 1.251 | 0.02 |
| L16 | 50.00-45.00 | A | 0.784 | 0.000 | 0.000 | 0.000 | 5.581 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.547 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.110 | 0.05 |
| L17 | 45.00-40.00 | A | 0.773 | 0.000 | 0.000 | 0.000 | 5.549 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.526 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.082 | 0.05 |
| L18 | 40.00-35.00 | A | 0.762 | 0.000 | 0.000 | 0.000 | 5.515 | 0.29 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.503 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.051 | 0.05 |
| L19 | 35.00-30.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L20 | 30.00-25.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 9 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|--------------------------|--------------------------|--|---|-------------|
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L21 | 25.00-20.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L22 | 20.00-15.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L23 | 15.00-10.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L24 | 10.00-5.00 | A | 0.750 | 0.000 | 0.000 | 0.000 | 5.480 | 0.28 |
| | | B | | 0.000 | 0.000 | 0.000 | 3.480 | 0.19 |
| | | C | | 0.000 | 0.000 | 0.000 | 3.021 | 0.05 |
| L25 | 5.00-0.00 | A | 0.750 | 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 | 2.083 | 0.00 |

Feed Line Center of Pressure

| Section | Elevation ft | CP_x in | CP_z in | CP_x Ice in | CP_z Ice in |
|---------|-----------------|--------------|--------------|---------------------|---------------------|
| L1 | 117.00-115.00 | -0.0359 | -0.4171 | -0.1444 | -0.5026 |
| L2 | 115.00-110.00 | -0.0364 | -0.4228 | -0.1477 | -0.5149 |
| L3 | 110.00-105.00 | -0.0370 | -0.4303 | -0.1521 | -0.5313 |
| L4 | 105.00-100.00 | -0.0376 | -0.4370 | -0.1560 | -0.5464 |
| L5 | 100.00-95.00 | -0.0382 | -0.4433 | -0.1598 | -0.5609 |
| L6 | 95.00-90.00 | -0.0387 | -0.4493 | -0.1633 | -0.5749 |
| L7 | 90.00-85.00 | -0.0392 | -0.4548 | -0.1665 | -0.5877 |
| L8 | 85.00-80.00 | 0.0443 | -0.3968 | -0.0437 | -0.5032 |
| L9 | 80.00-75.00 | 0.3283 | -0.1895 | 0.3572 | -0.2062 |
| L10 | 75.00-70.00 | 0.3221 | -0.2912 | 0.3506 | -0.3327 |
| L11 | 70.00-65.00 | 0.1588 | -0.3306 | 0.0489 | -0.3095 |
| L12 | 65.00-60.00 | 0.1614 | -0.3361 | 0.0508 | -0.3174 |
| L13 | 60.00-55.00 | 0.1639 | -0.3412 | 0.0528 | -0.3250 |
| L14 | 55.00-52.00 | 0.1658 | -0.3452 | 0.0545 | -0.3309 |
| L15 | 52.00-50.00 | 0.1665 | -0.3466 | 0.0553 | -0.3330 |
| L16 | 50.00-45.00 | 0.1665 | -0.3467 | 0.0560 | -0.3332 |
| L17 | 45.00-40.00 | 0.1676 | -0.3489 | 0.0576 | -0.3366 |
| L18 | 40.00-35.00 | 0.1695 | -0.3530 | 0.0599 | -0.3428 |
| L19 | 35.00-30.00 | 0.1714 | -0.3569 | 0.0622 | -0.3487 |
| L20 | 30.00-25.00 | 0.1732 | -0.3606 | 0.0632 | -0.3544 |
| L21 | 25.00-20.00 | 0.1749 | -0.3642 | 0.0642 | -0.3598 |
| L22 | 20.00-15.00 | 0.1766 | -0.3676 | 0.0651 | -0.3650 |
| L23 | 15.00-10.00 | 0.1781 | -0.3709 | 0.0660 | -0.3701 |
| L24 | 10.00-5.00 | 0.1796 | -0.3740 | 0.0669 | -0.3750 |
| L25 | 5.00-0.00 | -0.2061 | 0.1190 | -0.4651 | 0.2685 |

Discrete Tower Loads

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 10 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight | |
|-----------------------|-------------|-------------|----------------------------|--------------------|-----------|--|--|--|--------------------------------------|
| | | | ft ft ft | ° | ft | ft ² | ft ² | K | |
| 932LG65VTE-B | A | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.26 4.65 5.05 5.88 7.64 | 3.53 3.89 4.28 5.09 6.81 | 0.02 0.05 0.08 0.17 0.40 |
| DTMA1819VG12A | A | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 0.81 0.94 1.07 1.36 2.05 | 0.30 0.39 0.49 0.72 1.28 | 0.01 0.02 0.02 0.04 0.11 |
| 932LG65VTE-B | B | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.26 4.65 5.05 5.88 7.64 | 3.53 3.89 4.28 5.09 6.81 | 0.02 0.05 0.08 0.17 0.40 |
| DTMA1819VG12A | B | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 0.81 0.94 1.07 1.36 2.05 | 0.30 0.39 0.49 0.72 1.28 | 0.01 0.02 0.02 0.04 0.11 |
| 932LG65VTE-B | C | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 4.26 4.65 5.05 5.88 7.64 | 3.53 3.89 4.28 5.09 6.81 | 0.02 0.05 0.08 0.17 0.40 |
| DTMA1819VG12A | C | From Leg | 1.00 0.00 3.00 | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 0.81 0.94 1.07 1.36 2.05 | 0.30 0.39 0.49 0.72 1.28 | 0.01 0.02 0.02 0.04 0.11 |
| Pipe Mount [PM 501-3] | C | None | | 0.0000 | 117.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 5.78 7.37 8.96 12.14 18.50 | 5.78 7.37 8.96 12.14 18.50 | 0.16 0.18 0.20 0.24 0.32 |
| * | | | | | | | | | |
| ETW190VS12UB | A | From Leg | 1.00 0.00 0.00 | 0.0000 | 110.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 0.76 0.88 1.01 1.30 1.97 | 0.35 0.44 0.54 0.77 1.33 | 0.01 0.02 0.02 0.04 0.11 |
| APX16PV-16PVL-E | A | From Leg | 1.00 0.00 0.00 | 0.0000 | 110.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 6.70 7.13 7.57 8.48 10.40 | 2.00 2.33 2.66 3.34 4.81 | 0.04 0.07 0.11 0.19 0.43 |
| ATMAA1412D-1A20 | A | From Leg | 1.00 0.00 0.00 | 0.0000 | 110.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 1.17 1.31 1.47 1.81 2.58 | 0.47 0.57 0.69 0.95 1.57 | 0.01 0.02 0.03 0.06 0.14 |
| ETW190VS12UB | B | From Leg | 1.00 0.00 0.00 | 0.0000 | 110.00 | No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice | 0.76 0.88 1.01 1.30 1.97 | 0.35 0.44 0.54 0.77 1.33 | 0.01 0.02 0.02 0.04 0.11 |
| APX16PV-16PVL-E | B | From Leg | 1.00 | 0.0000 | 110.00 | No Ice | 6.70 | 2.00 | 0.04 |

| | | | | |
|---|-------------------------------|--|----------------------------------|--|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | | Page 11 of 27 | |
| | Project | | Date 10:54:43 10/26/10 | |
| | Client Crown Castle | | Designed by RLim | |

| Description | Face or Leg | Offset Type | Offsets: | | | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight |
|--------------------------------|-------------|-------------|----------|------|---------|--------------------|-----------|-----------------------|----------------------|--------|
| | | | Horz | Vert | Lateral | | | | | |
| | | | 0.00 | | | | 1/2" Ice | 7.13 | 2.33 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 7.57 | 2.66 | 0.11 |
| | | | | | | | 2" Ice | 8.48 | 3.34 | 0.19 |
| | | | | | | | 4" Ice | 10.40 | 4.81 | 0.43 |
| ATMAA1412D-1A20 | B | From Leg | 1.00 | | 0.0000 | 110.00 | No Ice | 1.17 | 0.47 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 1.31 | 0.57 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.47 | 0.69 | 0.03 |
| | | | | | | | 2" Ice | 1.81 | 0.95 | 0.06 |
| | | | | | | | 4" Ice | 2.58 | 1.57 | 0.14 |
| ETW190VS12UB | C | From Leg | 1.00 | | 0.0000 | 110.00 | No Ice | 0.76 | 0.35 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.88 | 0.44 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.01 | 0.54 | 0.02 |
| | | | | | | | 2" Ice | 1.30 | 0.77 | 0.04 |
| | | | | | | | 4" Ice | 1.97 | 1.33 | 0.11 |
| APX16PV-16PVL-E | C | From Leg | 1.00 | | 0.0000 | 110.00 | No Ice | 6.70 | 2.00 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 7.13 | 2.33 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 7.57 | 2.66 | 0.11 |
| | | | | | | | 2" Ice | 8.48 | 3.34 | 0.19 |
| | | | | | | | 4" Ice | 10.40 | 4.81 | 0.43 |
| ATMAA1412D-1A20 | C | From Leg | 1.00 | | 0.0000 | 110.00 | No Ice | 1.17 | 0.47 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 1.31 | 0.57 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.47 | 0.69 | 0.03 |
| | | | | | | | 2" Ice | 1.81 | 0.95 | 0.06 |
| | | | | | | | 4" Ice | 2.58 | 1.57 | 0.14 |
| Pipe Mount [PM 601-3] | C | None | | | 0.0000 | 110.00 | No Ice | 4.39 | 4.39 | 0.20 |
| | | | | | | | 1/2" Ice | 5.48 | 5.48 | 0.24 |
| | | | | | | | 1" Ice | 6.57 | 6.57 | 0.28 |
| | | | | | | | 2" Ice | 8.75 | 8.75 | 0.36 |
| | | | | | | | 4" Ice | 13.11 | 13.11 | 0.53 |
| * | | | | | | | | | | |
| LNX-6514DS-T4M w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2.00 | | | | 1" Ice | 9.84 | 9.08 | 0.20 |
| | | | | | | | 2" Ice | 11.10 | 10.90 | 0.38 |
| | | | | | | | 4" Ice | 13.75 | 14.93 | 0.89 |
| (2) DB844G65ZAXY w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 4.90 | 4.92 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice | 5.35 | 5.60 | 0.08 |
| | | | 2.00 | | | | 1" Ice | 5.80 | 6.28 | 0.13 |
| | | | | | | | 2" Ice | 6.73 | 7.71 | 0.26 |
| | | | | | | | 4" Ice | 8.73 | 10.83 | 0.62 |
| (2) FD9R6004/2C-3L | A | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 0.37 | 0.08 | 0.00 |
| | | | 0.00 | | | | 1/2" Ice | 0.45 | 0.14 | 0.01 |
| | | | 2.00 | | | | 1" Ice | 0.54 | 0.20 | 0.01 |
| | | | | | | | 2" Ice | 0.75 | 0.34 | 0.02 |
| | | | | | | | 4" Ice | 1.28 | 0.74 | 0.06 |
| MG D3-800TV w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2.00 | | | | 1" Ice | 4.39 | 4.78 | 0.11 |
| | | | | | | | 2" Ice | 5.33 | 6.16 | 0.21 |
| | | | | | | | 4" Ice | 7.34 | 9.18 | 0.52 |
| LNX-6514DS-T4M w/ Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2.00 | | | | 1" Ice | 9.84 | 9.08 | 0.20 |
| | | | | | | | 2" Ice | 11.10 | 10.90 | 0.38 |
| | | | | | | | 4" Ice | 13.75 | 14.93 | 0.89 |
| (2) DB844G65ZAXY w/ Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 100.00 | No Ice | 4.90 | 4.92 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice | 5.35 | 5.60 | 0.08 |

| | | | |
|---|-------------------------------|--|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | | Page 12 of 27 |
| | Project | | Date 10:54:43 10/26/10 |
| | Client Crown Castle | | Designed by RLim |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A ₁ Front | C _A A ₁ Side | Weight |
|--------------------------------|-------------|-------------|----------|---------|--------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | Horz | Lateral | | | | | |
| | | | | 2.00 | | | | | |
| | | | | | | 1" Ice | 5.80 | 6.28 | 0.13 |
| | | | | | | 2" Ice | 6.73 | 7.71 | 0.26 |
| | | | | | | 4" Ice | 8.73 | 10.83 | 0.62 |
| (2) FD9R6004/2C-3L | B | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 0.37 | 0.08 | 0.00 |
| | | | 0.00 | | | 1/2" Ice | 0.45 | 0.14 | 0.01 |
| | | | 2.00 | | | 1" Ice | 0.54 | 0.20 | 0.01 |
| | | | | | | 2" Ice | 0.75 | 0.34 | 0.02 |
| | | | | | | 4" Ice | 1.28 | 0.74 | 0.06 |
| MG D3-800TV w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0.00 | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2.00 | | | 1" Ice | 4.39 | 4.78 | 0.11 |
| | | | | | | 2" Ice | 5.33 | 6.16 | 0.21 |
| | | | | | | 4" Ice | 7.34 | 9.18 | 0.52 |
| LNx-6514DS-T4M w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0.00 | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2.00 | | | 1" Ice | 9.84 | 9.08 | 0.20 |
| | | | | | | 2" Ice | 11.10 | 10.90 | 0.38 |
| | | | | | | 4" Ice | 13.75 | 14.93 | 0.89 |
| (2) DB844G65ZAXY w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 4.90 | 4.92 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 5.35 | 5.60 | 0.08 |
| | | | 2.00 | | | 1" Ice | 5.80 | 6.28 | 0.13 |
| | | | | | | 2" Ice | 6.73 | 7.71 | 0.26 |
| | | | | | | 4" Ice | 8.73 | 10.83 | 0.62 |
| (2) FD9R6004/2C-3L | C | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 0.37 | 0.08 | 0.00 |
| | | | 0.00 | | | 1/2" Ice | 0.45 | 0.14 | 0.01 |
| | | | 2.00 | | | 1" Ice | 0.54 | 0.20 | 0.01 |
| | | | | | | 2" Ice | 0.75 | 0.34 | 0.02 |
| | | | | | | 4" Ice | 1.28 | 0.74 | 0.06 |
| MG D3-800TV w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 100.00 | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0.00 | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2.00 | | | 1" Ice | 4.39 | 4.78 | 0.11 |
| | | | | | | 2" Ice | 5.33 | 6.16 | 0.21 |
| | | | | | | 4" Ice | 7.34 | 9.18 | 0.52 |
| Platform Mount [LP 502-1] | C | None | | 0.0000 | 100.00 | No Ice | 32.35 | 32.35 | 0.93 |
| | | | | | | 1/2" Ice | 45.67 | 45.67 | 1.19 |
| | | | | | | 1" Ice | 58.99 | 58.99 | 1.46 |
| | | | | | | 2" Ice | 85.63 | 85.63 | 2.00 |
| | | | | | | 4" Ice | 138.91 | 138.91 | 3.07 |
| * | | | | | | | | | |
| Pipe Mount [PM 501-3] | C | None | | 0.0000 | 95.00 | No Ice | 5.78 | 5.78 | 0.16 |
| | | | | | | 1/2" Ice | 7.37 | 7.37 | 0.18 |
| | | | | | | 1" Ice | 8.96 | 8.96 | 0.20 |
| | | | | | | 2" Ice | 12.14 | 12.14 | 0.24 |
| | | | | | | 4" Ice | 18.50 | 18.50 | 0.32 |
| Pipe Mount [PM 501-1] | C | From Leg | 0.50 | 0.0000 | 95.00 | No Ice | 3.47 | 1.67 | 0.05 |
| | | | 0.00 | | | 1/2" Ice | 4.45 | 2.10 | 0.06 |
| | | | 0.00 | | | 1" Ice | 5.43 | 2.53 | 0.07 |
| | | | | | | 2" Ice | 7.39 | 3.39 | 0.08 |
| | | | | | | 4" Ice | 11.31 | 5.11 | 0.11 |
| * | | | | | | | | | |
| (2) 7770.00 w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 87.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0.00 | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | 2.00 | | | 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) TMA | A | From Leg | 4.00 | 0.0000 | 87.00 | No Ice | 0.68 | 0.45 | 0.01 |
| | | | 0.00 | | | 1/2" Ice | 0.80 | 0.56 | 0.02 |

| | | | | |
|---|-------------------------------|--|----------------------------------|--|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | | Page 13 of 27 | |
| | Project | | Date 10:54:43 10/26/10 | |
| | Client Crown Castle | | Designed by RLim | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight |
|--------------------------------|-------------|-------------|----------|--------------|--------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | Horz | Lateral Vert | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K |
| | | | | 2.00 | | | 1" Ice 0.93 | 0.68 | 0.03 |
| | | | | | | | 2" Ice 1.22 | 0.94 | 0.04 |
| | | | | | | | 4" Ice 1.90 | 1.57 | 0.11 |
| (2) 7770.00 w/ Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 87.00 | No Ice 6.12 | 4.25 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice 6.63 | 5.01 | 0.10 |
| | | | 2.00 | | | | 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) TMA | B | From Leg | 4.00 | | 0.0000 | 87.00 | No Ice 0.68 | 0.45 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice 0.80 | 0.56 | 0.02 |
| | | | 2.00 | | | | 1" Ice 0.93 | 0.68 | 0.03 |
| | | | | | | | 2" Ice 1.22 | 0.94 | 0.04 |
| | | | | | | | 4" Ice 1.90 | 1.57 | 0.11 |
| (2) 7770.00 w/ Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 87.00 | No Ice 6.12 | 4.25 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice 6.63 | 5.01 | 0.10 |
| | | | 2.00 | | | | 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) TMA | C | From Leg | 4.00 | | 0.0000 | 87.00 | No Ice 0.68 | 0.45 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice 0.80 | 0.56 | 0.02 |
| | | | 2.00 | | | | 1" Ice 0.93 | 0.68 | 0.03 |
| | | | | | | | 2" Ice 1.22 | 0.94 | 0.04 |
| | | | | | | | 4" Ice 1.90 | 1.57 | 0.11 |
| Platform Mount [LP 713-1] | C | None | | | 0.0000 | 87.00 | No Ice 31.27 | 31.27 | 1.51 |
| | | | | | | | 1/2" Ice 39.68 | 39.68 | 1.93 |
| | | | | | | | 1" Ice 48.09 | 48.09 | 2.35 |
| | | | | | | | 2" Ice 64.91 | 64.91 | 3.19 |
| | | | | | | | 4" Ice 98.55 | 98.55 | 4.86 |
| * | | | | | | | | | |
| 800 10504 w/ Mount Pipe | A | From Leg | 1.00 | | 0.0000 | 81.00 | No Ice 3.59 | 3.18 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice 4.01 | 3.91 | 0.07 |
| | | | 0.00 | | | | 1" Ice 4.42 | 4.58 | 0.11 |
| | | | | | | | 2" Ice 5.34 | 5.98 | 0.21 |
| | | | | | | | 4" Ice 7.38 | 8.98 | 0.51 |
| 800 10504 w/ Mount Pipe | B | From Leg | 1.00 | | 0.0000 | 81.00 | No Ice 3.59 | 3.18 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice 4.01 | 3.91 | 0.07 |
| | | | 0.00 | | | | 1" Ice 4.42 | 4.58 | 0.11 |
| | | | | | | | 2" Ice 5.34 | 5.98 | 0.21 |
| | | | | | | | 4" Ice 7.38 | 8.98 | 0.51 |
| 800 10504 w/ Mount Pipe | C | From Leg | 1.00 | | 0.0000 | 81.00 | No Ice 3.59 | 3.18 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice 4.01 | 3.91 | 0.07 |
| | | | 0.00 | | | | 1" Ice 4.42 | 4.58 | 0.11 |
| | | | | | | | 2" Ice 5.34 | 5.98 | 0.21 |
| | | | | | | | 4" Ice 7.38 | 8.98 | 0.51 |
| Side Arm Mount [SO 102-3] | C | None | | | 0.0000 | 81.00 | No Ice 3.00 | 3.00 | 0.08 |
| | | | | | | | 1/2" Ice 3.48 | 3.48 | 0.11 |
| | | | | | | | 1" Ice 3.96 | 3.96 | 0.14 |
| | | | | | | | 2" Ice 4.92 | 4.92 | 0.20 |
| | | | | | | | 4" Ice 6.84 | 6.84 | 0.32 |
| * | | | | | | | | | |
| (2) DB844H90E-XY w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 72.00 | No Ice 3.30 | 4.92 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice 3.69 | 5.60 | 0.07 |
| | | | 2.00 | | | | 1" Ice 4.12 | 6.28 | 0.12 |
| | | | | | | | 2" Ice 5.01 | 7.71 | 0.23 |
| | | | | | | | 4" Ice 6.92 | 10.83 | 0.56 |
| LLPX310R w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 72.00 | No Ice 5.07 | 2.98 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice 5.48 | 3.53 | 0.08 |

| | | | | | | | | |
|---|----------------|--|--------------|--|--------------------|--|-------------------|--|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | | BU# 806352 | | Page | | 14 of 27 | |
| | Project | | | | Date | | 10:54:43 10/26/10 | |
| | Client | | Crown Castle | | Designed by | | RLim | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight | |
|--------------------------------|-------------|-------------|----------------------------|--------------------|-----------|-------------------------------------|------------------------------------|--------|------|
| | | | ft | ° | ft | ft ² | ft ² | K | |
| | | | 2.00 | | | 1" Ice | 5.91 | 4.09 | 0.13 |
| | | | | | | 2" Ice | 6.79 | 5.31 | 0.23 |
| | | | | | | 4" Ice | 8.70 | 8.13 | 0.54 |
| FDD_R6_RRH | A | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 2.00 | | | 1" Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | 2" Ice | 2.57 | 1.39 | 0.09 |
| | | | | | | 4" Ice | 3.49 | 2.14 | 0.20 |
| (2) DB844H90E-XY w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 3.30 | 4.92 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 3.69 | 5.60 | 0.07 |
| | | | 2.00 | | | 1" Ice | 4.12 | 6.28 | 0.12 |
| | | | | | | 2" Ice | 5.01 | 7.71 | 0.23 |
| | | | | | | 4" Ice | 6.92 | 10.83 | 0.56 |
| LLPX310R w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 5.07 | 2.98 | 0.05 |
| | | | 0.00 | | | 1/2" Ice | 5.48 | 3.53 | 0.08 |
| | | | 2.00 | | | 1" Ice | 5.91 | 4.09 | 0.13 |
| | | | | | | 2" Ice | 6.79 | 5.31 | 0.23 |
| | | | | | | 4" Ice | 8.70 | 8.13 | 0.54 |
| FDD_R6_RRH | B | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 2.00 | | | 1" Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | 2" Ice | 2.57 | 1.39 | 0.09 |
| | | | | | | 4" Ice | 3.49 | 2.14 | 0.20 |
| (2) DB844H90E-XY w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 3.30 | 4.92 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 3.69 | 5.60 | 0.07 |
| | | | 2.00 | | | 1" Ice | 4.12 | 6.28 | 0.12 |
| | | | | | | 2" Ice | 5.01 | 7.71 | 0.23 |
| | | | | | | 4" Ice | 6.92 | 10.83 | 0.56 |
| LLPX310R w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 5.07 | 2.98 | 0.05 |
| | | | 0.00 | | | 1/2" Ice | 5.48 | 3.53 | 0.08 |
| | | | 2.00 | | | 1" Ice | 5.91 | 4.09 | 0.13 |
| | | | | | | 2" Ice | 6.79 | 5.31 | 0.23 |
| | | | | | | 4" Ice | 8.70 | 8.13 | 0.54 |
| FDD_R6_RRH | C | From Leg | 4.00 | 0.0000 | 72.00 | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 2.00 | | | 1" Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | 2" Ice | 2.57 | 1.39 | 0.09 |
| | | | | | | 4" Ice | 3.49 | 2.14 | 0.20 |
| Platform Mount [LP 402-1] | C | None | | 0.0000 | 72.00 | No Ice | 33.04 | 33.04 | 2.17 |
| | | | | | | 1/2" Ice | 43.38 | 43.38 | 2.68 |
| | | | | | | 1" Ice | 53.72 | 53.72 | 3.19 |
| | | | | | | 2" Ice | 74.40 | 74.40 | 4.21 |
| | | | | | | 4" Ice | 115.76 | 115.76 | 6.26 |
| * | | | | | | | | | |
| * | | | | | | | | | |
| GPS_A | A | From Leg | 3.00 | 0.0000 | 50.00 | No Ice | 0.30 | 0.30 | 0.00 |
| | | | 0.00 | | | 1/2" Ice | 0.37 | 0.37 | 0.00 |
| | | | 0.00 | | | 1" Ice | 0.46 | 0.46 | 0.01 |
| | | | | | | 2" Ice | 0.65 | 0.65 | 0.02 |
| | | | | | | 4" Ice | 1.15 | 1.15 | 0.08 |
| Side Arm Mount [SO 701-1] | A | From Leg | 1.50 | 0.0000 | 50.00 | No Ice | 0.85 | 1.67 | 0.07 |
| | | | 0.00 | | | 1/2" Ice | 1.14 | 2.34 | 0.08 |
| | | | 0.00 | | | 1" Ice | 1.43 | 3.01 | 0.09 |
| | | | | | | 2" Ice | 2.01 | 4.35 | 0.12 |
| | | | | | | 4" Ice | 3.17 | 7.03 | 0.18 |

| | | |
|---|-------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 15 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: | | Azimuth Adjustment | 3 dB Beam Width | Elevation | Outside Diameter | Aperture Area | Weight | |
|-------------|-------------------|-----------------------------|----------------|----------------------|----------|-----------------------|-----------------------|-----------|---------------------|------------------|--------|------|
| | | | | Horz Lateral | Vert | | | | | | | |
| | | | | ft | ° | | | ft | ft | ft ² | K | |
| VHLP2-11 | A | Paraboloid w/o Radome | From Leg | 1.00 0.00 0.00 | 38.0000 | ° | ° | 95.00 | 2.17 | No Ice | 3.72 | 0.03 |
| | | | | | | | | | | 1/2" Ice | 4.01 | 0.05 |
| | | | | | | | | | | 1" Ice | 4.30 | 0.07 |
| | | | | | | | | | | 2" Ice | 4.88 | 0.11 |
| | | | | | | | | | | 4" Ice | 6.04 | 0.19 |
| VHLP1-23 | B | Paraboloid w/o Radome | From Leg | 1.00 0.00 0.00 | -42.0000 | | | 95.00 | 1.27 | No Ice | 1.28 | 0.01 |
| | | | | | | | | | | 1/2" Ice | 1.45 | 0.02 |
| | | | | | | | | | | 1" Ice | 1.62 | 0.02 |
| | | | | | | | | | | 2" Ice | 1.97 | 0.04 |
| | | | | | | | | | | 4" Ice | 2.66 | 0.07 |
| VHLP1-23 | C | Paraboloid w/o Radome | From Leg | 1.00 0.00 0.00 | 28.0000 | | | 95.00 | 1.27 | No Ice | 1.28 | 0.01 |
| | | | | | | | | | | 1/2" Ice | 1.45 | 0.02 |
| | | | | | | | | | | 1" Ice | 1.62 | 0.02 |
| | | | | | | | | | | 2" Ice | 1.97 | 0.04 |
| | | | | | | | | | | 4" Ice | 2.66 | 0.07 |
| VHLP2.5-11 | C | Paraboloid w/Shroud (HP) | From Leg | 1.00 0.00 0.00 | -42.0000 | | | 95.00 | 2.92 | No Ice | 6.68 | 0.03 |
| | | | | | | | | | | 1/2" Ice | 7.07 | 0.04 |
| | | | | | | | | | | 1" Ice | 7.46 | 0.05 |
| | | | | | | | | | | 2" Ice | 8.23 | 0.07 |
| | | | | | | | | | | 4" Ice | 9.78 | 0.11 |

Load Combinations

| Comb. No. | Description |
|-----------|----------------------------|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 60 deg - No Ice |
| 5 | Dead+Wind 90 deg - No Ice |
| 6 | Dead+Wind 120 deg - No Ice |
| 7 | Dead+Wind 150 deg - No Ice |
| 8 | Dead+Wind 180 deg - No Ice |
| 9 | Dead+Wind 210 deg - No Ice |
| 10 | Dead+Wind 240 deg - No Ice |
| 11 | Dead+Wind 270 deg - No Ice |
| 12 | Dead+Wind 300 deg - No Ice |
| 13 | Dead+Wind 330 deg - No Ice |
| 14 | Dead+Ice+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 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 16 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Comb. No. | Description |
|-----------|-----------------------------|
| 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 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 | 117 - 115 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -0.64 | 0.00 | 0.03 |
| | | | Max. Mx | 11 | -0.23 | 3.73 | 0.01 |
| | | | Max. My | 2 | -0.23 | 0.00 | 3.74 |
| | | | Max. Vy | 11 | -1.04 | 3.73 | 0.01 |
| | | | Max. Vx | 2 | -1.04 | 0.00 | 3.74 |
| | | | Max. Torque | 11 | | | -0.01 |
| L2 | 115 - 110 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -1.04 | 0.00 | 0.13 |
| | | | Max. Mx | 11 | -0.39 | 9.91 | 0.03 |
| | | | Max. My | 2 | -0.39 | 0.00 | 9.94 |
| | | | Max. Vy | 11 | -1.44 | 9.91 | 0.03 |
| | | | Max. Vx | 2 | -1.44 | 0.00 | 9.94 |
| | | | Max. Torque | 11 | | | -0.02 |
| L3 | 110 - 105 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -2.19 | 0.01 | 0.23 |
| | | | Max. Mx | 11 | -0.90 | 23.06 | 0.04 |
| | | | Max. My | 2 | -0.90 | -0.00 | 23.11 |
| | | | Max. Vy | 11 | -2.84 | 23.06 | 0.04 |
| | | | Max. Vx | 2 | -2.84 | -0.00 | 23.11 |
| | | | Max. Torque | 11 | | | -0.04 |
| L4 | 105 - 100 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -2.66 | 0.01 | 0.33 |
| | | | Max. Mx | 11 | -1.13 | 38.36 | 0.06 |
| | | | Max. My | 2 | -1.13 | -0.00 | 38.44 |
| | | | Max. Vy | 11 | -3.28 | 38.36 | 0.06 |
| | | | Max. Vx | 2 | -3.28 | -0.00 | 38.44 |
| | | | Max. Torque | 11 | | | -0.05 |
| L5 | 100 - 95 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -6.21 | 0.01 | 0.45 |
| | | | Max. Mx | 11 | -2.57 | 82.88 | 0.07 |
| | | | Max. My | 2 | -2.57 | -0.00 | 82.99 |
| | | | Max. Vy | 11 | -8.02 | 82.88 | 0.07 |
| | | | Max. Vx | 2 | -8.02 | -0.00 | 82.99 |
| | | | Max. Torque | 11 | | | -0.07 |
| L6 | 95 - 90 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -7.27 | 0.16 | 0.60 |
| | | | Max. Mx | 11 | -3.18 | 128.73 | -1.61 |
| | | | Max. My | 2 | -3.18 | -0.59 | 128.60 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 17 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L7 | 90 - 85 | Pole | Max. Vy | 11 | -9.39 | 128.73 | -1.61 |
| | | | Max. Vx | 8 | 9.37 | 1.53 | -128.40 |
| | | | Max. Torque | 7 | | | -0.80 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -11.15 | 0.17 | 0.76 |
| | | | Max. Mx | 11 | -5.35 | 185.44 | -3.28 |
| | | | Max. My | 2 | -5.35 | -1.24 | 185.20 |
| L8 | 85 - 80 | Pole | Max. Vy | 11 | -12.73 | 185.44 | -3.28 |
| | | | Max. Vx | 8 | 12.70 | 2.97 | -184.97 |
| | | | Max. Torque | 7 | | | -0.79 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -12.32 | 0.15 | 0.92 |
| | | | Max. Mx | 11 | -6.02 | 250.84 | -4.95 |
| | | | Max. My | 2 | -6.03 | -1.91 | 250.49 |
| L9 | 80 - 75 | Pole | Max. Vy | 11 | -13.77 | 250.84 | -4.95 |
| | | | Max. Vx | 8 | 13.75 | 4.41 | -250.24 |
| | | | Max. Torque | 7 | | | -0.78 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -13.20 | 0.06 | 1.04 |
| | | | Max. Mx | 11 | -6.58 | 321.08 | -6.64 |
| | | | Max. My | 2 | -6.58 | -2.59 | 320.64 |
| L10 | 75 - 70 | Pole | Max. Vy | 11 | -14.34 | 321.08 | -6.64 |
| | | | Max. Vx | 8 | 14.32 | 5.83 | -320.38 |
| | | | Max. Torque | 7 | | | -0.77 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -18.24 | -0.04 | 1.22 |
| | | | Max. Mx | 11 | -9.61 | 403.49 | -8.30 |
| | | | Max. My | 2 | -9.61 | -3.27 | 402.98 |
| L11 | 70 - 65 | Pole | Max. Vy | 11 | -17.97 | 403.49 | -8.30 |
| | | | Max. Vx | 8 | 17.95 | 7.26 | -402.66 |
| | | | Max. Torque | 7 | | | -0.75 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -19.35 | -0.15 | 1.47 |
| | | | Max. Mx | 11 | -10.33 | 494.94 | -9.94 |
| | | | Max. My | 2 | -10.34 | -3.96 | 494.38 |
| L12 | 65 - 60 | Pole | Max. Vy | 11 | -18.64 | 494.94 | -9.94 |
| | | | Max. Vx | 8 | 18.61 | 8.69 | -493.95 |
| | | | Max. Torque | 7 | | | -0.73 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -20.49 | -0.25 | 1.74 |
| | | | Max. Mx | 11 | -11.08 | 589.74 | -11.58 |
| | | | Max. My | 2 | -11.08 | -4.64 | 589.14 |
| L13 | 60 - 55 | Pole | Max. Vy | 11 | -19.30 | 589.74 | -11.58 |
| | | | Max. Vx | 8 | 19.28 | 10.12 | -588.58 |
| | | | Max. Torque | 7 | | | -0.71 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -21.64 | -0.36 | 2.02 |
| | | | Max. Mx | 11 | -11.85 | 687.86 | -13.21 |
| | | | Max. My | 2 | -11.86 | -5.33 | 687.23 |
| L14 | 55 - 52 | Pole | Max. Vy | 11 | -19.97 | 687.86 | -13.21 |
| | | | Max. Vx | 8 | 19.95 | 11.54 | -686.54 |
| | | | Max. Torque | 7 | | | -0.69 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -22.34 | -0.43 | 2.19 |
| | | | Max. Mx | 11 | -12.33 | 748.33 | -14.19 |
| | | | Max. My | 2 | -12.33 | -5.75 | 747.69 |
| L15 | 52 - 50 | Pole | Max. Vy | 11 | -20.37 | 748.33 | -14.19 |
| | | | Max. Vx | 8 | 20.35 | 12.40 | -746.91 |
| | | | Max. Torque | 8 | | | -0.68 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -22.87 | -0.48 | 2.30 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 18 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L16 | 50 - 45 | Pole | Max. Mx | 11 | -12.71 | 789.31 | -14.84 |
| | | | Max. My | 2 | -12.71 | -6.02 | 788.66 |
| | | | Max. Vy | 11 | -20.63 | 789.31 | -14.84 |
| | | | Max. Vx | 8 | 20.61 | 12.97 | -787.82 |
| | | | Max. Torque | 8 | | | -0.67 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -24.30 | -0.59 | 2.86 |
| | | | Max. Mx | 11 | -13.73 | 894.41 | -16.29 |
| | | | Max. My | 2 | -13.73 | -6.71 | 893.77 |
| | | | Max. Vy | 11 | -21.35 | 894.41 | -16.29 |
| L17 | 45 - 40 | Pole | Max. Vx | 8 | 21.30 | 14.39 | -892.42 |
| | | | Max. Torque | 4 | | | 0.75 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -25.63 | -0.71 | 3.15 |
| | | | Max. Mx | 11 | -14.70 | 1002.66 | -17.91 |
| | | | Max. My | 2 | -14.71 | -7.40 | 1001.85 |
| | | | Max. Vy | 11 | -21.97 | 1002.66 | -17.91 |
| | | | Max. Vx | 8 | 21.93 | 15.81 | -1000.36 |
| | | | Max. Torque | 4 | | | 0.77 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| L18 | 40 - 35 | Pole | Max. Compression | 14 | -26.99 | -0.82 | 3.44 |
| | | | Max. Mx | 11 | -15.71 | 1113.99 | -19.52 |
| | | | Max. My | 2 | -15.71 | -8.09 | 1113.02 |
| | | | Max. Vy | 11 | -22.58 | 1113.99 | -19.52 |
| | | | Max. Vx | 8 | 22.53 | 17.22 | -1111.37 |
| | | | Max. Torque | 4 | | | 0.78 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -28.39 | -0.93 | 3.73 |
| | | | Max. Mx | 11 | -16.76 | 1228.33 | -21.12 |
| | | | Max. My | 2 | -16.76 | -8.78 | 1227.20 |
| L19 | 35 - 30 | Pole | Max. Vy | 11 | -23.18 | 1228.33 | -21.12 |
| | | | Max. Vx | 8 | 23.13 | 18.63 | -1225.39 |
| | | | Max. Torque | 4 | | | 0.79 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -29.81 | -1.05 | 4.04 |
| | | | Max. Mx | 11 | -17.83 | 1345.67 | -22.72 |
| | | | Max. My | 2 | -17.83 | -9.47 | 1344.39 |
| | | | Max. Vy | 11 | -23.79 | 1345.67 | -22.72 |
| | | | Max. Vx | 8 | 23.74 | 20.03 | -1342.41 |
| | | | Max. Torque | 4 | | | 0.80 |
| L20 | 30 - 25 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -31.26 | -1.18 | 4.35 |
| | | | Max. Mx | 11 | -18.93 | 1466.06 | -24.31 |
| | | | Max. My | 2 | -18.93 | -10.16 | 1464.63 |
| | | | Max. Vy | 11 | -24.40 | 1466.06 | -24.31 |
| | | | Max. Vx | 8 | 24.35 | 21.43 | -1462.48 |
| | | | Max. Torque | 4 | | | 0.81 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -32.74 | -1.30 | 4.67 |
| | | | Max. Mx | 11 | -20.06 | 1589.54 | -25.90 |
| L21 | 25 - 20 | Pole | Max. My | 2 | -20.07 | -10.84 | 1587.96 |
| | | | Max. Vy | 11 | -25.02 | 1589.54 | -25.90 |
| | | | Max. Vx | 8 | 24.97 | 22.83 | -1585.63 |
| | | | Max. Torque | 4 | | | 0.83 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -34.25 | -1.44 | 5.01 |
| | | | Max. Mx | 11 | -21.22 | 1716.12 | -27.47 |
| | | | Max. My | 2 | -21.22 | -11.53 | 1714.40 |
| | | | Max. Vy | 11 | -25.65 | 1716.12 | -27.47 |
| | | | Max. Vx | 8 | 25.60 | 24.22 | -1711.89 |
| L22 | 20 - 15 | Pole | Max. Torque | 4 | | | 0.84 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -34.25 | -1.44 | 5.01 |
| | | | Max. Mx | 11 | -21.22 | 1716.12 | -27.47 |
| | | | Max. My | 2 | -21.22 | -11.53 | 1714.40 |
| L23 | 15 - 10 | Pole | Max. Vy | 11 | -25.65 | 1716.12 | -27.47 |
| | | | Max. Vx | 8 | 25.60 | 24.22 | -1711.89 |
| | | | Max. Torque | 4 | | | 0.84 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -34.25 | -1.44 | 5.01 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 19 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L24 | 10 - 5 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -35.78 | -1.57 | 5.35 |
| | | | Max. Mx | 11 | -22.40 | 1845.86 | -29.04 |
| | | | Max. My | 2 | -22.40 | -12.21 | 1844.01 |
| | | | Max. Vy | 11 | -26.28 | 1845.86 | -29.04 |
| | | | Max. Vx | 8 | 26.23 | 25.60 | -1841.30 |
| | | | Max. Torque | 4 | | | 0.85 |
| L25 | 5 - 0 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -36.81 | -1.57 | 5.35 |
| | | | Max. Mx | 11 | -23.34 | 1978.40 | -30.71 |
| | | | Max. My | 2 | -23.34 | -12.86 | 1976.26 |
| | | | Max. Vy | 11 | -26.75 | 1978.40 | -30.71 |
| | | | Max. Vx | 8 | 26.71 | 27.01 | -1973.60 |
| | | | Max. Torque | 4 | | | 0.85 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Pole | Max. Vert | 16 | 36.81 | -3.50 | 6.02 |
| | Max. H _x | 11 | 23.35 | 26.75 | -0.33 |
| | Max. H _z | 2 | 23.35 | -0.13 | 26.69 |
| | Max. M _x | 2 | 1976.26 | -0.13 | 26.69 |
| | Max. M _z | 5 | 1971.27 | -26.67 | 0.17 |
| | Max. Torsion | 4 | 0.85 | -23.17 | 13.50 |
| | Min. Vert | 1 | 23.35 | 0.00 | 0.00 |
| | Min. H _x | 5 | 23.35 | -26.67 | 0.17 |
| | Min. H _z | 8 | 23.35 | 0.28 | -26.70 |
| | Min. M _x | 8 | -1973.60 | 0.28 | -26.70 |
| | Min. M _z | 11 | -1978.40 | 26.75 | -0.33 |
| | Min. Torsion | 10 | -0.77 | 23.16 | -13.57 |

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 | 23.35 | 0.00 | 0.00 | -1.69 | -0.29 | 0.00 |
| Dead+Wind 0 deg - No Ice | 23.35 | 0.13 | -26.69 | -1976.26 | -12.86 | -0.34 |
| Dead+Wind 30 deg - No Ice | 23.35 | 13.48 | -23.19 | -1719.11 | -999.96 | -0.64 |
| Dead+Wind 60 deg - No Ice | 23.35 | 23.17 | -13.50 | -1003.90 | -1714.48 | -0.85 |
| Dead+Wind 90 deg - No Ice | 23.35 | 26.67 | -0.17 | -17.84 | -1971.27 | -0.65 |
| Dead+Wind 120 deg - No Ice | 23.35 | 23.03 | 13.22 | 973.76 | -1701.22 | -0.18 |
| Dead+Wind 150 deg - No Ice | 23.35 | 13.12 | 23.16 | 1712.69 | -965.55 | 0.40 |
| Dead+Wind 180 deg - No Ice | 23.35 | -0.28 | 26.70 | 1973.60 | 27.01 | 0.59 |
| Dead+Wind 210 deg - No Ice | 23.35 | -13.53 | 23.18 | 1714.53 | 1004.29 | 0.70 |
| Dead+Wind 240 deg - No Ice | 23.35 | -23.16 | 13.57 | 1007.86 | 1712.92 | 0.77 |
| Dead+Wind 270 deg - No Ice | 23.35 | -26.75 | 0.33 | 30.71 | 1978.40 | 0.58 |
| Dead+Wind 300 deg - No Ice | 23.35 | -23.06 | -13.17 | -971.83 | 1703.50 | 0.17 |
| Dead+Wind 330 deg - No Ice | 23.35 | -13.18 | -23.10 | -1710.92 | 970.52 | -0.20 |
| Dead+Ice+Temp | 36.81 | 0.00 | -0.00 | -5.35 | -1.57 | -0.00 |
| Dead+Wind 0 deg+Ice+Temp | 36.81 | 0.03 | -6.94 | -529.66 | -4.67 | -0.10 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 20 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Load Combination | Vertical K | Shear _x K | Shear _y K | Overturning Moment, M _x kip-ft | Overturning Moment, M _y kip-ft | Torque kip-ft |
|-----------------------------|---------------|-------------------------|-------------------------|--|--|------------------|
| Dead+Wind 30 deg+Ice+Temp | 36.81 | 3.50 | -6.02 | -461.21 | -267.14 | -0.18 |
| Dead+Wind 60 deg+Ice+Temp | 36.81 | 6.03 | -3.50 | -271.05 | -457.32 | -0.23 |
| Dead+Wind 90 deg+Ice+Temp | 36.81 | 6.94 | -0.04 | -9.22 | -525.76 | -0.18 |
| Dead+Wind 120 deg+Ice+Temp | 36.81 | 5.99 | 3.44 | 253.84 | -454.09 | -0.06 |
| Dead+Wind 150 deg+Ice+Temp | 36.81 | 3.42 | 6.01 | 449.49 | -259.04 | 0.10 |
| Dead+Wind 180 deg+Ice+Temp | 36.81 | -0.07 | 6.94 | 519.09 | 4.87 | 0.16 |
| Dead+Wind 210 deg+Ice+Temp | 36.81 | -3.52 | 6.02 | 450.20 | 265.09 | 0.20 |
| Dead+Wind 240 deg+Ice+Temp | 36.81 | -6.03 | 3.52 | 261.97 | 453.93 | 0.22 |
| Dead+Wind 270 deg+Ice+Temp | 36.81 | -6.96 | 0.08 | 2.14 | 524.33 | 0.16 |
| Dead+Wind 300 deg+Ice+Temp | 36.81 | -6.00 | -3.43 | -263.43 | 451.57 | 0.05 |
| Dead+Wind 330 deg+Ice+Temp | 36.81 | -3.44 | -6.00 | -459.10 | 257.10 | -0.05 |
| Dead+Wind 0 deg - Service | 23.35 | 0.04 | -9.23 | -685.48 | -4.64 | -0.12 |
| Dead+Wind 30 deg - Service | 23.35 | 4.66 | -8.02 | -596.44 | -346.46 | -0.22 |
| Dead+Wind 60 deg - Service | 23.35 | 8.02 | -4.67 | -348.77 | -593.89 | -0.30 |
| Dead+Wind 90 deg - Service | 23.35 | 9.23 | -0.06 | -7.31 | -682.80 | -0.23 |
| Dead+Wind 120 deg - Service | 23.35 | 7.97 | 4.58 | 336.06 | -589.28 | -0.06 |
| Dead+Wind 150 deg - Service | 23.35 | 4.54 | 8.01 | 591.94 | -334.54 | 0.14 |
| Dead+Wind 180 deg - Service | 23.35 | -0.10 | 9.24 | 682.29 | 9.16 | 0.21 |
| Dead+Wind 210 deg - Service | 23.35 | -4.68 | 8.02 | 592.59 | 347.58 | 0.25 |
| Dead+Wind 240 deg - Service | 23.35 | -8.01 | 4.70 | 347.88 | 592.97 | 0.27 |
| Dead+Wind 270 deg - Service | 23.35 | -9.25 | 0.12 | 9.50 | 684.90 | 0.20 |
| Dead+Wind 300 deg - Service | 23.35 | -7.98 | -4.56 | -337.66 | 589.69 | 0.06 |
| Dead+Wind 330 deg - Service | 23.35 | -4.56 | -7.99 | -593.59 | 335.88 | -0.07 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 1 | 0.00 | -23.35 | 0.00 | 0.00 | 23.35 | 0.00 | 0.000% |
| 2 | 0.13 | -23.35 | -26.69 | -0.13 | 23.35 | 26.69 | 0.000% |
| 3 | 13.48 | -23.35 | -23.19 | -13.48 | 23.35 | 23.19 | 0.000% |
| 4 | 23.17 | -23.35 | -13.50 | -23.17 | 23.35 | 13.50 | 0.000% |
| 5 | 26.67 | -23.35 | -0.17 | -26.67 | 23.35 | 0.17 | 0.000% |
| 6 | 23.03 | -23.35 | 13.22 | -23.03 | 23.35 | -13.22 | 0.000% |
| 7 | 13.12 | -23.35 | 23.16 | -13.12 | 23.35 | -23.16 | 0.000% |
| 8 | -0.28 | -23.35 | 26.70 | 0.28 | 23.35 | -26.70 | 0.000% |
| 9 | -13.53 | -23.35 | 23.18 | 13.53 | 23.35 | -23.18 | 0.000% |
| 10 | -23.16 | -23.35 | 13.57 | 23.16 | 23.35 | -13.57 | 0.000% |
| 11 | -26.75 | -23.35 | 0.33 | 26.75 | 23.35 | -0.33 | 0.000% |
| 12 | -23.06 | -23.35 | -13.17 | 23.06 | 23.35 | 13.17 | 0.000% |
| 13 | -13.18 | -23.35 | -23.10 | 13.18 | 23.35 | 23.10 | 0.000% |
| 14 | 0.00 | -36.81 | 0.00 | -0.00 | 36.81 | 0.00 | 0.000% |
| 15 | 0.03 | -36.81 | -6.94 | -0.03 | 36.81 | 6.94 | 0.000% |
| 16 | 3.50 | -36.81 | -6.02 | -3.50 | 36.81 | 6.02 | 0.000% |
| 17 | 6.03 | -36.81 | -3.50 | -6.03 | 36.81 | 3.50 | 0.000% |
| 18 | 6.94 | -36.81 | -0.04 | -6.94 | 36.81 | 0.04 | 0.000% |
| 19 | 5.99 | -36.81 | 3.44 | -5.99 | 36.81 | -3.44 | 0.000% |
| 20 | 3.42 | -36.81 | 6.01 | -3.42 | 36.81 | -6.01 | 0.000% |
| 21 | -0.07 | -36.81 | 6.94 | 0.07 | 36.81 | -6.94 | 0.000% |
| 22 | -3.52 | -36.81 | 6.02 | 3.52 | 36.81 | -6.02 | 0.000% |
| 23 | -6.03 | -36.81 | 3.52 | 6.03 | 36.81 | -3.52 | 0.000% |
| 24 | -6.96 | -36.81 | 0.08 | 6.96 | 36.81 | -0.08 | 0.000% |
| 25 | -6.00 | -36.81 | -3.43 | 6.00 | 36.81 | 3.43 | 0.000% |
| 26 | -3.44 | -36.81 | -6.00 | 3.44 | 36.81 | 6.00 | 0.000% |
| 27 | 0.04 | -23.35 | -9.23 | -0.04 | 23.35 | 9.23 | 0.000% |
| 28 | 4.66 | -23.35 | -8.02 | -4.66 | 23.35 | 8.02 | 0.000% |
| 29 | 8.02 | -23.35 | -4.67 | -8.02 | 23.35 | 4.67 | 0.000% |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 21 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 30 | 9.23 | -23.35 | -0.06 | -9.23 | 23.35 | 0.06 | 0.000% |
| 31 | 7.97 | -23.35 | 4.58 | -7.97 | 23.35 | -4.58 | 0.000% |
| 32 | 4.54 | -23.35 | 8.01 | -4.54 | 23.35 | -8.01 | 0.000% |
| 33 | -0.10 | -23.35 | 9.24 | 0.10 | 23.35 | -9.24 | 0.000% |
| 34 | -4.68 | -23.35 | 8.02 | 4.68 | 23.35 | -8.02 | 0.000% |
| 35 | -8.01 | -23.35 | 4.70 | 8.01 | 23.35 | -4.70 | 0.000% |
| 36 | -9.25 | -23.35 | 0.12 | 9.25 | 23.35 | -0.12 | 0.000% |
| 37 | -7.98 | -23.35 | -4.56 | 7.98 | 23.35 | 4.56 | 0.000% |
| 38 | -4.56 | -23.35 | -7.99 | 4.56 | 23.35 | 7.99 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 4 | 0.00000001 | 0.00000001 |
| 2 | Yes | 4 | 0.00000001 | 0.00011979 |
| 3 | Yes | 5 | 0.00000001 | 0.00016435 |
| 4 | Yes | 5 | 0.00000001 | 0.00017252 |
| 5 | Yes | 4 | 0.00000001 | 0.00036615 |
| 6 | Yes | 5 | 0.00000001 | 0.00016313 |
| 7 | Yes | 5 | 0.00000001 | 0.00015826 |
| 8 | Yes | 4 | 0.00000001 | 0.00060406 |
| 9 | Yes | 5 | 0.00000001 | 0.00017247 |
| 10 | Yes | 5 | 0.00000001 | 0.00016485 |
| 11 | Yes | 4 | 0.00000001 | 0.00018366 |
| 12 | Yes | 5 | 0.00000001 | 0.00016170 |
| 13 | Yes | 5 | 0.00000001 | 0.00016601 |
| 14 | Yes | 4 | 0.00000001 | 0.00002860 |
| 15 | Yes | 5 | 0.00000001 | 0.00011273 |
| 16 | Yes | 5 | 0.00000001 | 0.00013051 |
| 17 | Yes | 5 | 0.00000001 | 0.00013100 |
| 18 | Yes | 5 | 0.00000001 | 0.00011169 |
| 19 | Yes | 5 | 0.00000001 | 0.00012581 |
| 20 | Yes | 5 | 0.00000001 | 0.00012564 |
| 21 | Yes | 5 | 0.00000001 | 0.00011031 |
| 22 | Yes | 5 | 0.00000001 | 0.00012798 |
| 23 | Yes | 5 | 0.00000001 | 0.00012762 |
| 24 | Yes | 5 | 0.00000001 | 0.00011152 |
| 25 | Yes | 5 | 0.00000001 | 0.00012764 |
| 26 | Yes | 5 | 0.00000001 | 0.00012833 |
| 27 | Yes | 4 | 0.00000001 | 0.00005692 |
| 28 | Yes | 4 | 0.00000001 | 0.00055978 |
| 29 | Yes | 4 | 0.00000001 | 0.00061907 |
| 30 | Yes | 4 | 0.00000001 | 0.00006962 |
| 31 | Yes | 4 | 0.00000001 | 0.00055590 |
| 32 | Yes | 4 | 0.00000001 | 0.00052399 |
| 33 | Yes | 4 | 0.00000001 | 0.00009936 |
| 34 | Yes | 4 | 0.00000001 | 0.00061473 |
| 35 | Yes | 4 | 0.00000001 | 0.00055876 |
| 36 | Yes | 4 | 0.00000001 | 0.00004742 |
| 37 | Yes | 4 | 0.00000001 | 0.00054955 |
| 38 | Yes | 4 | 0.00000001 | 0.00057988 |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 22 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L1 | 117 - 115 | 22.838 | 28 | 1.6909 | 0.0032 |
| L2 | 115 - 110 | 22.130 | 28 | 1.6885 | 0.0032 |
| L3 | 110 - 105 | 20.368 | 28 | 1.6765 | 0.0032 |
| L4 | 105 - 100 | 18.624 | 28 | 1.6525 | 0.0032 |
| L5 | 100 - 95 | 16.912 | 28 | 1.6157 | 0.0031 |
| L6 | 95 - 90 | 15.243 | 28 | 1.5685 | 0.0031 |
| L7 | 90 - 85 | 13.634 | 28 | 1.5033 | 0.0025 |
| L8 | 85 - 80 | 12.100 | 28 | 1.4234 | 0.0020 |
| L9 | 80 - 75 | 10.659 | 28 | 1.3286 | 0.0016 |
| L10 | 75 - 70 | 9.322 | 28 | 1.2226 | 0.0013 |
| L11 | 70 - 65 | 8.101 | 28 | 1.1082 | 0.0010 |
| L12 | 65 - 60 | 6.979 | 28 | 1.0345 | 0.0008 |
| L13 | 60 - 55 | 5.937 | 28 | 0.9555 | 0.0007 |
| L14 | 55 - 52 | 4.979 | 28 | 0.8727 | 0.0006 |
| L15 | 52 - 50 | 4.447 | 28 | 0.8217 | 0.0006 |
| L16 | 50 - 45 | 4.109 | 28 | 0.7935 | 0.0006 |
| L17 | 45 - 40 | 3.318 | 28 | 0.7154 | 0.0005 |
| L18 | 40 - 35 | 2.613 | 28 | 0.6313 | 0.0004 |
| L19 | 35 - 30 | 1.996 | 28 | 0.5463 | 0.0003 |
| L20 | 30 - 25 | 1.465 | 28 | 0.4682 | 0.0003 |
| L21 | 25 - 20 | 1.016 | 28 | 0.3897 | 0.0002 |
| L22 | 20 - 15 | 0.649 | 28 | 0.3111 | 0.0002 |
| L23 | 15 - 10 | 0.364 | 28 | 0.2328 | 0.0001 |
| L24 | 10 - 5 | 0.162 | 28 | 0.1547 | 0.0001 |
| L25 | 5 - 0 | 0.040 | 28 | 0.0771 | 0.0000 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 117.00 | 932LG65VTE-B | 28 | 22.838 | 1.6909 | 0.0032 | 21696 |
| 110.00 | ETW190VS12UB | 28 | 20.368 | 1.6765 | 0.0032 | 16364 |
| 100.00 | LNx-6514DS-T4M w/ Mount Pipe | 28 | 16.912 | 1.6157 | 0.0031 | 6941 |
| 95.00 | VHLP2-11 | 28 | 15.243 | 1.5685 | 0.0031 | 5081 |
| 87.00 | (2) 7770.00 w/ Mount Pipe | 28 | 12.704 | 1.4572 | 0.0022 | 3503 |
| 81.00 | 800 10504 w/ Mount Pipe | 28 | 10.939 | 1.3483 | 0.0017 | 2929 |
| 72.00 | (2) DB844H90E-XY w/ Mount Pipe | 28 | 8.576 | 1.1508 | 0.0011 | 2780 |
| 50.00 | GPS A | 28 | 4.109 | 0.7935 | 0.0006 | 3760 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L1 | 117 - 115 | 65.736 | 3 | 4.8711 | 0.0092 |
| L2 | 115 - 110 | 63.701 | 3 | 4.8643 | 0.0092 |
| L3 | 110 - 105 | 58.633 | 3 | 4.8297 | 0.0092 |
| L4 | 105 - 100 | 53.618 | 3 | 4.7610 | 0.0091 |

| | | |
|---|-----------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 23 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L5 | 100 - 95 | 48.695 | 3 | 4.6553 | 0.0090 |
| L6 | 95 - 90 | 43.895 | 3 | 4.5195 | 0.0088 |
| L7 | 90 - 85 | 39.264 | 3 | 4.3319 | 0.0070 |
| L8 | 85 - 80 | 34.851 | 3 | 4.1017 | 0.0056 |
| L9 | 80 - 75 | 30.702 | 3 | 3.8285 | 0.0044 |
| L10 | 75 - 70 | 26.854 | 3 | 3.5232 | 0.0035 |
| L11 | 70 - 65 | 23.339 | 3 | 3.1935 | 0.0027 |
| L12 | 65 - 60 | 20.107 | 3 | 2.9811 | 0.0024 |
| L13 | 60 - 55 | 17.106 | 3 | 2.7537 | 0.0021 |
| L14 | 55 - 52 | 14.348 | 3 | 2.5149 | 0.0019 |
| L15 | 52 - 50 | 12.815 | 3 | 2.3680 | 0.0017 |
| L16 | 50 - 45 | 11.840 | 3 | 2.2867 | 0.0017 |
| L17 | 45 - 40 | 9.562 | 3 | 2.0617 | 0.0014 |
| L18 | 40 - 35 | 7.530 | 3 | 1.8196 | 0.0012 |
| L19 | 35 - 30 | 5.754 | 3 | 1.5748 | 0.0010 |
| L20 | 30 - 25 | 4.223 | 3 | 1.3495 | 0.0008 |
| L21 | 25 - 20 | 2.928 | 3 | 1.1233 | 0.0007 |
| L22 | 20 - 15 | 1.871 | 3 | 0.8969 | 0.0005 |
| L23 | 15 - 10 | 1.050 | 3 | 0.6710 | 0.0004 |
| L24 | 10 - 5 | 0.466 | 3 | 0.4459 | 0.0002 |
| L25 | 5 - 0 | 0.116 | 3 | 0.2222 | 0.0001 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 117.00 | 932LG65VTE-B | 3 | 65.736 | 4.8711 | 0.0092 | 7661 |
| 110.00 | ETW190VS12UB | 3 | 58.633 | 4.8297 | 0.0092 | 5779 |
| 100.00 | LNx-6514DS-T4M w/ Mount Pipe | 3 | 48.695 | 4.6553 | 0.0090 | 2445 |
| 95.00 | VHLP2-11 | 3 | 43.895 | 4.5195 | 0.0088 | 1786 |
| 87.00 | (2) 7770.00 w/ Mount Pipe | 3 | 36.587 | 4.1990 | 0.0061 | 1230 |
| 81.00 | 800 10504 w/ Mount Pipe | 3 | 31.509 | 3.8854 | 0.0046 | 1027 |
| 72.00 | (2) DB844H90E-XY w/ Mount Pipe | 3 | 24.707 | 3.3163 | 0.0030 | 972 |
| 50.00 | GPS A | 3 | 11.840 | 2.2867 | 0.0018 | 1309 |

Compression Checks

Pole Design Data

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P/P _a |
|-------------|-----------------|------------------------|---------|----------------------|------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| L1 | 117 - 115 (1) | TP14.8114x14.36x0.1875 | 2.00 | 0.00 | 0.0 | 39.000 | 8.8292 | -0.23 | 344.34 | 0.001 |
| L2 | 115 - 110 (2) | TP15.94x14.8114x0.1875 | 5.00 | 0.00 | 0.0 | 39.000 | 9.5106 | -0.39 | 370.91 | 0.001 |
| L3 | 110 - 105 (3) | TP17.07x15.94x0.1875 | 5.00 | 0.00 | 0.0 | 39.000 | 10.1928 | -0.90 | 397.52 | 0.002 |
| L4 | 105 - 100 (4) | TP18.2x17.07x0.1875 | 5.00 | 0.00 | 0.0 | 39.000 | 10.8750 | -1.13 | 424.13 | 0.003 |
| L5 | 100 - 95 (5) | TP19.4385x18.2x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 15.4467 | -2.57 | 602.42 | 0.004 |
| L6 | 95 - 90 (6) | TP20.6771x19.4385x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 16.4438 | -3.17 | 641.31 | 0.005 |
| L7 | 90 - 85 (7) | TP21.9156x20.6771x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 17.4408 | -5.34 | 680.19 | 0.008 |

| | | |
|--|-------------------------------|----------------------------------|
| RISA Tower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 24 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

| Section No. | Elevation ft | Size | L ft | L _u ft | KI/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|-------------|-----------------|--------------------------|---------|----------------------|------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| L8 | 85 - 80 (8) | TP23.1542x21.9156x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 18.4379 | -6.01 | 719.08 | 0.008 |
| L9 | 80 - 75 (9) | TP24.3927x23.1542x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 19.4349 | -6.57 | 757.96 | 0.009 |
| L10 | 75 - 70 (10) | TP25.6313x24.3927x0.25 | 5.00 | 0.00 | 0.0 | 39.000 | 20.4319 | -9.60 | 796.85 | 0.012 |
| L11 | 70 - 65 (11) | TP26.8698x25.6313x0.4272 | 5.00 | 0.00 | 0.0 | 39.000 | 36.3740 | -10.32 | 1418.59 | 0.007 |
| L12 | 65 - 60 (12) | TP28.1083x26.8698x0.4181 | 5.00 | 0.00 | 0.0 | 39.000 | 37.2788 | -11.07 | 1453.87 | 0.008 |
| L13 | 60 - 55 (13) | TP29.3469x28.1083x0.41 | 5.00 | 0.00 | 0.0 | 39.000 | 38.2025 | -11.84 | 1489.90 | 0.008 |
| L14 | 55 - 52 (14) | TP30.09x29.3469x0.4054 | 3.00 | 0.00 | 0.0 | 39.000 | 38.7499 | -12.32 | 1511.25 | 0.008 |
| L15 | 52 - 50 (15) | TP30.09x30.09x0.5093 | 2.00 | 0.00 | 0.0 | 39.000 | 48.5107 | -12.70 | 1891.92 | 0.007 |
| L16 | 50 - 45 (16) | TP30.1231x30.09x0.5021 | 5.00 | 0.00 | 0.0 | 39.000 | 47.8901 | -13.72 | 1867.71 | 0.007 |
| L17 | 45 - 40 (17) | TP31.2538x30.1231x0.4954 | 5.00 | 0.00 | 0.0 | 39.000 | 49.0654 | -14.70 | 1913.55 | 0.008 |
| L18 | 40 - 35 (18) | TP32.3846x31.2538x0.4893 | 5.00 | 0.00 | 0.0 | 39.000 | 50.2525 | -15.70 | 1959.85 | 0.008 |
| L19 | 35 - 30 (19) | TP33.5154x32.3846x0.5311 | 5.00 | 0.00 | 0.0 | 39.000 | 56.4078 | -16.76 | 2199.91 | 0.008 |
| L20 | 30 - 25 (20) | TP34.6462x33.5154x0.524 | 5.00 | 0.00 | 0.0 | 39.000 | 57.5737 | -17.83 | 2245.37 | 0.008 |
| L21 | 25 - 20 (21) | TP35.7769x34.6462x0.5175 | 5.00 | 0.00 | 0.0 | 39.000 | 58.7545 | -18.93 | 2291.43 | 0.008 |
| L22 | 20 - 15 (22) | TP36.9077x35.7769x0.5115 | 5.00 | 0.00 | 0.0 | 39.000 | 59.9456 | -20.06 | 2337.88 | 0.009 |
| L23 | 15 - 10 (23) | TP38.0385x36.9077x0.5058 | 5.00 | 0.00 | 0.0 | 39.000 | 61.1286 | -21.21 | 2384.02 | 0.009 |
| L24 | 10 - 5 (24) | TP39.1692x38.0385x0.5005 | 5.00 | 0.00 | 0.0 | 39.000 | 62.3189 | -22.40 | 2430.44 | 0.009 |
| L25 | 5 - 0 (25) | TP40.3x39.1692x0.4956 | 5.00 | 0.00 | 0.0 | 39.000 | 63.5211 | -23.34 | 2477.32 | 0.009 |

Pole Bending Design Data

| Section No. | Elevation ft | Size | Actual M _x kip-ft | Actual f _{bx} ksi | Allow. F _{bx} ksi | Ratio f _{bx} F _{bx} | Actual M _y kip-ft | Actual f _{by} ksi | Allow. F _{by} ksi | Ratio f _{by} F _{by} |
|-------------|-----------------|--------------------------|------------------------------------|----------------------------------|----------------------------------|---|------------------------------------|----------------------------------|----------------------------------|---|
| L1 | 117 - 115 (1) | TP14.8114x14.36x0.1875 | 3.74 | 1.428 | 39.000 | 0.037 | 0.00 | 0.000 | 39.000 | 0.000 |
| L2 | 115 - 110 (2) | TP15.94x14.8114x0.1875 | 9.94 | 3.271 | 39.000 | 0.084 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 110 - 105 (3) | TP17.07x15.94x0.1875 | 23.11 | 6.614 | 39.000 | 0.170 | 0.00 | 0.000 | 39.000 | 0.000 |
| L4 | 105 - 100 (4) | TP18.2x17.07x0.1875 | 38.44 | 9.655 | 39.000 | 0.248 | 0.00 | 0.000 | 39.000 | 0.000 |
| L5 | 100 - 95 (5) | TP19.4385x18.2x0.25 | 82.99 | 13.813 | 39.000 | 0.354 | 0.00 | 0.000 | 39.000 | 0.000 |
| L6 | 95 - 90 (6) | TP20.6771x19.4385x0.25 | 129.20 | 18.961 | 39.000 | 0.486 | 0.00 | 0.000 | 39.000 | 0.000 |
| L7 | 90 - 85 (7) | TP21.9156x20.6771x0.25 | 186.43 | 24.304 | 39.000 | 0.623 | 0.00 | 0.000 | 39.000 | 0.000 |
| L8 | 85 - 80 (8) | TP23.1542x21.9156x0.25 | 252.37 | 29.421 | 39.000 | 0.754 | 0.00 | 0.000 | 39.000 | 0.000 |
| L9 | 80 - 75 (9) | TP24.3927x23.1542x0.25 | 323.18 | 33.891 | 39.000 | 0.869 | 0.00 | 0.000 | 39.000 | 0.000 |
| L10 | 75 - 70 (10) | TP25.6313x24.3927x0.25 | 406.14 | 38.516 | 39.000 | 0.988 | 0.00 | 0.000 | 39.000 | 0.000 |
| L11 | 70 - 65 (11) | TP26.8698x25.6313x0.4272 | 498.19 | 25.632 | 39.000 | 0.657 | 0.00 | 0.000 | 39.000 | 0.000 |
| L12 | 65 - 60 (12) | TP28.1083x26.8698x0.4181 | 593.60 | 28.427 | 39.000 | 0.729 | 0.00 | 0.000 | 39.000 | 0.000 |
| L13 | 60 - 55 (13) | TP29.3469x28.1083x0.41 | 692.34 | 30.932 | 39.000 | 0.793 | 0.00 | 0.000 | 39.000 | 0.000 |
| L14 | 55 - 52 (14) | TP30.09x29.3469x0.4054 | 753.19 | 32.323 | 39.000 | 0.829 | 0.00 | 0.000 | 39.000 | 0.000 |
| L15 | 52 - 50 (15) | TP30.09x30.09x0.5093 | 794.42 | 27.425 | 39.000 | 0.703 | 0.00 | 0.000 | 39.000 | 0.000 |
| L16 | 50 - 45 (16) | TP30.1231x30.09x0.5021 | 900.18 | 31.428 | 39.000 | 0.806 | 0.00 | 0.000 | 39.000 | 0.000 |
| L17 | 45 - 40 (17) | TP31.2538x30.1231x0.4954 | 1008.96 | 33.082 | 39.000 | 0.848 | 0.00 | 0.000 | 39.000 | 0.000 |
| L18 | 40 - 35 (18) | TP32.3846x31.2538x0.4893 | 1120.80 | 34.577 | 39.000 | 0.887 | 0.00 | 0.000 | 39.000 | 0.000 |
| L19 | 35 - 30 (19) | TP33.5154x32.3846x0.5311 | 1235.67 | 32.864 | 39.000 | 0.843 | 0.00 | 0.000 | 39.000 | 0.000 |
| L20 | 30 - 25 (20) | TP34.6462x33.5154x0.524 | 1353.54 | 34.069 | 39.000 | 0.874 | 0.00 | 0.000 | 39.000 | 0.000 |
| L21 | 25 - 20 (21) | TP35.7769x34.6462x0.5175 | 1474.46 | 35.170 | 39.000 | 0.902 | 0.00 | 0.000 | 39.000 | 0.000 |
| L22 | 20 - 15 (22) | TP36.9077x35.7769x0.5115 | 1598.46 | 36.181 | 39.000 | 0.928 | 0.00 | 0.000 | 39.000 | 0.000 |
| L23 | 15 - 10 (23) | TP38.0385x36.9077x0.5058 | 1725.58 | 37.121 | 39.000 | 0.952 | 0.00 | 0.000 | 39.000 | 0.000 |
| L24 | 10 - 5 (24) | TP39.1692x38.0385x0.5005 | 1855.86 | 37.991 | 39.000 | 0.974 | 0.00 | 0.000 | 39.000 | 0.000 |
| L25 | 5 - 0 (25) | TP40.3x39.1692x0.4956 | 1988.78 | 38.783 | 39.000 | 0.994 | 0.00 | 0.000 | 39.000 | 0.000 |

Pole Shear Design Data

| | | |
|---|-------------------------------|----------------------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 25 of 27 |
| | Project | Date 10:54:43 10/26/10 |
| | Client Crown Castle | Designed by RLim |

| Section No. | Elevation ft | Size | Actual V K | Actual f _v ksi | Allow. F _v ksi | Ratio F _v /F _v | Actual T kip-ft | Actual f _v ksi | Allow. F _v ksi | Ratio f _v /F _v |
|-------------|---------------|--------------------------|------------|---------------------------|---------------------------|--------------------------------------|-----------------|---------------------------|---------------------------|--------------------------------------|
| L1 | 117 - 115 (1) | TP14.8114x14.36x0.1875 | 1.04 | 0.117 | 26.000 | 0.009 | 0.00 | 0.000 | 26.000 | 0.000 |
| L2 | 115 - 110 (2) | TP15.94x14.8114x0.1875 | 1.44 | 0.152 | 26.000 | 0.012 | 0.00 | 0.000 | 26.000 | 0.000 |
| L3 | 110 - 105 (3) | TP17.07x15.94x0.1875 | 2.84 | 0.279 | 26.000 | 0.022 | 0.00 | 0.001 | 26.000 | 0.000 |
| L4 | 105 - 100 (4) | TP18.2x17.07x0.1875 | 3.28 | 0.302 | 26.000 | 0.024 | 0.01 | 0.001 | 26.000 | 0.000 |
| L5 | 100 - 95 (5) | TP19.4385x18.2x0.25 | 8.02 | 0.519 | 26.000 | 0.041 | 0.01 | 0.001 | 26.000 | 0.000 |
| L6 | 95 - 90 (6) | TP20.6771x19.4385x0.25 | 9.50 | 0.577 | 26.000 | 0.045 | 0.39 | 0.027 | 26.000 | 0.001 |
| L7 | 90 - 85 (7) | TP21.9156x20.6771x0.25 | 12.83 | 0.736 | 26.000 | 0.058 | 0.41 | 0.025 | 26.000 | 0.001 |
| L8 | 85 - 80 (8) | TP23.1542x21.9156x0.25 | 13.89 | 0.753 | 26.000 | 0.059 | 0.59 | 0.032 | 26.000 | 0.001 |
| L9 | 80 - 75 (9) | TP24.3927x23.1542x0.25 | 14.46 | 0.744 | 26.000 | 0.058 | 0.58 | 0.029 | 26.000 | 0.001 |
| L10 | 75 - 70 (10) | TP25.6313x24.3927x0.25 | 18.08 | 0.885 | 26.000 | 0.069 | 0.57 | 0.026 | 26.000 | 0.001 |
| L11 | 70 - 65 (11) | TP26.8698x25.6313x0.4272 | 18.74 | 0.515 | 26.000 | 0.040 | 0.51 | 0.012 | 26.000 | 0.000 |
| L12 | 65 - 60 (12) | TP28.1083x26.8698x0.4181 | 19.41 | 0.521 | 26.000 | 0.041 | 0.51 | 0.011 | 26.000 | 0.000 |
| L13 | 60 - 55 (13) | TP29.3469x28.1083x0.41 | 20.07 | 0.525 | 26.000 | 0.041 | 0.51 | 0.011 | 26.000 | 0.000 |
| L14 | 55 - 52 (14) | TP30.09x29.3469x0.4054 | 20.47 | 0.528 | 26.000 | 0.041 | 0.51 | 0.010 | 26.000 | 0.000 |
| L15 | 52 - 50 (15) | TP30.09x30.09x0.5093 | 20.73 | 0.427 | 26.000 | 0.033 | 0.51 | 0.008 | 26.000 | 0.000 |
| L16 | 50 - 45 (16) | TP30.1231x30.09x0.5021 | 21.43 | 0.448 | 26.000 | 0.035 | 0.62 | 0.010 | 26.000 | 0.000 |
| L17 | 45 - 40 (17) | TP31.2538x30.1231x0.4954 | 22.05 | 0.449 | 26.000 | 0.035 | 0.62 | 0.010 | 26.000 | 0.000 |
| L18 | 40 - 35 (18) | TP32.3846x31.2538x0.4893 | 22.66 | 0.451 | 26.000 | 0.035 | 0.62 | 0.009 | 26.000 | 0.000 |
| L19 | 35 - 30 (19) | TP33.5154x32.3846x0.5311 | 23.26 | 0.412 | 26.000 | 0.032 | 0.62 | 0.008 | 26.000 | 0.000 |
| L20 | 30 - 25 (20) | TP34.6462x33.5154x0.524 | 23.86 | 0.415 | 26.000 | 0.032 | 0.63 | 0.007 | 26.000 | 0.000 |
| L21 | 25 - 20 (21) | TP35.7769x34.6462x0.5175 | 24.48 | 0.417 | 26.000 | 0.033 | 0.63 | 0.007 | 26.000 | 0.000 |
| L22 | 20 - 15 (22) | TP36.9077x35.7769x0.5115 | 25.10 | 0.419 | 26.000 | 0.033 | 0.63 | 0.007 | 26.000 | 0.000 |
| L23 | 15 - 10 (23) | TP38.0385x36.9077x0.5058 | 25.72 | 0.421 | 26.000 | 0.033 | 0.63 | 0.006 | 26.000 | 0.000 |
| L24 | 10 - 5 (24) | TP39.1692x38.0385x0.5005 | 26.36 | 0.423 | 26.000 | 0.033 | 0.63 | 0.006 | 26.000 | 0.000 |
| L25 | 5 - 0 (25) | TP40.3x39.1692x0.4956 | 26.83 | 0.422 | 26.000 | 0.033 | 0.64 | 0.006 | 26.000 | 0.000 |

Pole Interaction Design Data

| Section No. | Elevation ft | Ratio P/P _a | Ratio f _{bx} /F _{bx} | Ratio f _{by} /F _{by} | Ratio f _v /F _v | Ratio f _u /F _u | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|---------------|------------------------|--|--|--------------------------------------|--------------------------------------|--------------------|---------------------|-----------|
| L1 | 117 - 115 (1) | 0.001 | 0.037 | 0.000 | 0.009 | 0.000 | 0.037 | 1.333 | H1-3+VT ✓ |
| L2 | 115 - 110 (2) | 0.001 | 0.084 | 0.000 | 0.012 | 0.000 | 0.085 | 1.333 | H1-3+VT ✓ |
| L3 | 110 - 105 (3) | 0.002 | 0.170 | 0.000 | 0.022 | 0.000 | 0.172 | 1.333 | H1-3+VT ✓ |
| L4 | 105 - 100 (4) | 0.003 | 0.248 | 0.000 | 0.024 | 0.000 | 0.250 | 1.333 | H1-3+VT ✓ |
| L5 | 100 - 95 (5) | 0.004 | 0.354 | 0.000 | 0.041 | 0.000 | 0.359 | 1.333 | H1-3+VT ✓ |
| L6 | 95 - 90 (6) | 0.005 | 0.486 | 0.000 | 0.045 | 0.001 | 0.492 | 1.333 | H1-3+VT ✓ |
| L7 | 90 - 85 (7) | 0.008 | 0.623 | 0.000 | 0.058 | 0.001 | 0.632 | 1.333 | H1-3+VT ✓ |
| L8 | 85 - 80 (8) | 0.008 | 0.754 | 0.000 | 0.059 | 0.001 | 0.764 | 1.333 | H1-3+VT ✓ |
| L9 | 80 - 75 (9) | 0.009 | 0.869 | 0.000 | 0.058 | 0.001 | 0.879 | 1.333 | H1-3+VT ✓ |
| L10 | 75 - 70 (10) | 0.012 | 0.988 | 0.000 | 0.069 | 0.001 | 1.001 | 1.333 | H1-3+VT ✓ |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 26 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Section No. | Elevation ft | Ratio | Ratio | Ratio | Ratio | Ratio | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|-----------------|-------|----------|----------|-------|----------|--------------------|---------------------|-----------|
| | | P | f_{bx} | f_{by} | f_v | f_{vt} | | | |
| L11 | 70 - 65 (11) | 0.007 | 0.657 | 0.000 | 0.040 | 0.000 | 0.665 | 1.333 | H1-3+VT ✓ |
| L12 | 65 - 60 (12) | 0.008 | 0.729 | 0.000 | 0.041 | 0.000 | 0.737 | 1.333 | H1-3+VT ✓ |
| L13 | 60 - 55 (13) | 0.008 | 0.793 | 0.000 | 0.041 | 0.000 | 0.802 | 1.333 | H1-3+VT ✓ |
| L14 | 55 - 52 (14) | 0.008 | 0.829 | 0.000 | 0.041 | 0.000 | 0.837 | 1.333 | H1-3+VT ✓ |
| L15 | 52 - 50 (15) | 0.007 | 0.703 | 0.000 | 0.033 | 0.000 | 0.710 | 1.333 | H1-3+VT ✓ |
| L16 | 50 - 45 (16) | 0.007 | 0.806 | 0.000 | 0.035 | 0.000 | 0.813 | 1.333 | H1-3+VT ✓ |
| L17 | 45 - 40 (17) | 0.008 | 0.848 | 0.000 | 0.035 | 0.000 | 0.856 | 1.333 | H1-3+VT ✓ |
| L18 | 40 - 35 (18) | 0.008 | 0.887 | 0.000 | 0.035 | 0.000 | 0.895 | 1.333 | H1-3+VT ✓ |
| L19 | 35 - 30 (19) | 0.008 | 0.843 | 0.000 | 0.032 | 0.000 | 0.851 | 1.333 | H1-3+VT ✓ |
| L20 | 30 - 25 (20) | 0.008 | 0.874 | 0.000 | 0.032 | 0.000 | 0.882 | 1.333 | H1-3+VT ✓ |
| L21 | 25 - 20 (21) | 0.008 | 0.902 | 0.000 | 0.033 | 0.000 | 0.910 | 1.333 | H1-3+VT ✓ |
| L22 | 20 - 15 (22) | 0.009 | 0.928 | 0.000 | 0.033 | 0.000 | 0.937 | 1.333 | H1-3+VT ✓ |
| L23 | 15 - 10 (23) | 0.009 | 0.952 | 0.000 | 0.033 | 0.000 | 0.961 | 1.333 | H1-3+VT ✓ |
| L24 | 10 - 5 (24) | 0.009 | 0.974 | 0.000 | 0.033 | 0.000 | 0.984 | 1.333 | H1-3+VT ✓ |
| L25 | 5 - 0 (25) | 0.009 | 0.994 | 0.000 | 0.033 | 0.000 | 1.004 | 1.333 | H1-3+VT ✓ |

Section Capacity Table

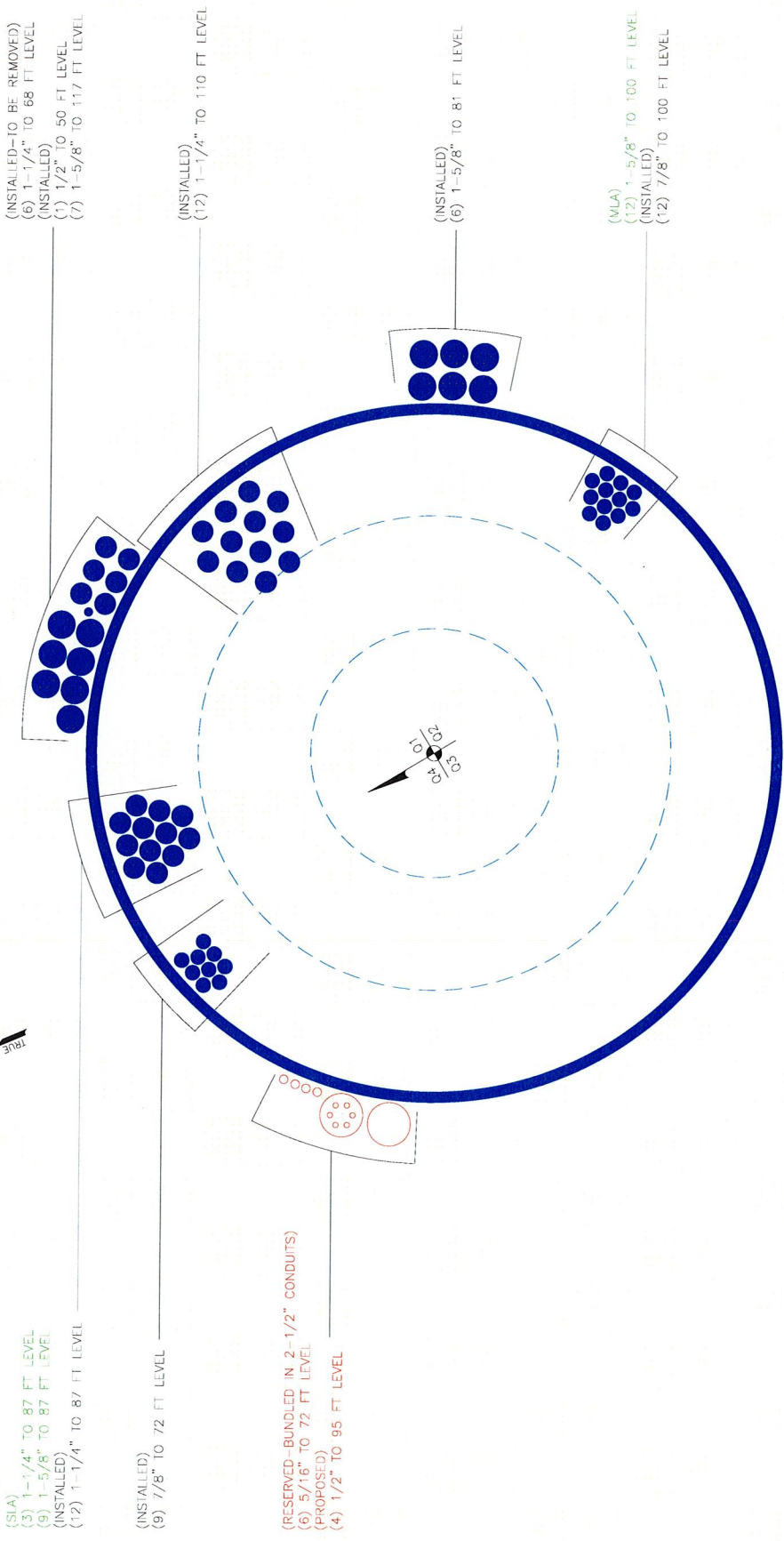
| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|-------------------|--------------------------|---------------------|--------|----------------------------|---------------|--------------|
| L1 | 117 - 115 | Pole | TP14.8114x14.36x0.1875 | 1 | -0.23 | 459.00 | 2.8 | Pass |
| L2 | 115 - 110 | Pole | TP15.94x14.8114x0.1875 | 2 | -0.39 | 494.43 | 6.4 | Pass |
| L3 | 110 - 105 | Pole | TP17.07x15.94x0.1875 | 3 | -0.90 | 529.89 | 12.9 | Pass |
| L4 | 105 - 100 | Pole | TP18.2x17.07x0.1875 | 4 | -1.13 | 565.36 | 18.8 | Pass |
| L5 | 100 - 95 | Pole | TP19.4385x18.2x0.25 | 5 | -2.57 | 803.03 | 26.9 | Pass |
| L6 | 95 - 90 | Pole | TP20.6771x19.4385x0.25 | 6 | -3.17 | 854.86 | 36.9 | Pass |
| L7 | 90 - 85 | Pole | TP21.9156x20.6771x0.25 | 7 | -5.34 | 906.70 | 47.4 | Pass |
| L8 | 85 - 80 | Pole | TP23.1542x21.9156x0.25 | 8 | -6.01 | 958.53 | 57.3 | Pass |
| L9 | 80 - 75 | Pole | TP24.3927x23.1542x0.25 | 9 | -6.57 | 1010.36 | 65.9 | Pass |
| L10 | 75 - 70 | Pole | TP25.6313x24.3927x0.25 | 10 | -9.60 | 1062.20 | 75.1 | Pass |
| L11 | 70 - 65 | Pole | TP26.8698x25.6313x0.4272 | 11 | -10.32 | 1890.98 | 49.9 | Pass |
| L12 | 65 - 60 | Pole | TP28.1083x26.8698x0.4181 | 12 | -11.07 | 1938.01 | 55.3 | Pass |
| L13 | 60 - 55 | Pole | TP29.3469x28.1083x0.41 | 13 | -11.84 | 1986.04 | 60.1 | Pass |
| L14 | 55 - 52 | Pole | TP30.09x29.3469x0.4054 | 14 | -12.32 | 2014.50 | 62.8 | Pass |
| L15 | 52 - 50 | Pole | TP30.09x30.09x0.5093 | 15 | -12.70 | 2521.93 | 53.3 | Pass |

| | | | | |
|---|---------|--------------|-------------|-------------------|
| RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 27 of 27 |
| | Project | | Date | 10:54:43 10/26/10 |
| | Client | Crown Castle | Designed by | RLim |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail | |
|-------------|--------------|----------------|--------------------------|------------------|--------|-------------------------|-----------------|-------------|-------------|
| L16 | 50 - 45 | Pole | TP30.1231x30.09x0.5021 | 16 | -13.72 | 2489.66 | 61.0 | Pass | |
| L17 | 45 - 40 | Pole | TP31.2538x30.1231x0.4954 | 17 | -14.70 | 2550.76 | 64.2 | Pass | |
| L18 | 40 - 35 | Pole | TP32.3846x31.2538x0.4893 | 18 | -15.70 | 2612.48 | 67.1 | Pass | |
| L19 | 35 - 30 | Pole | TP33.5154x32.3846x0.5311 | 19 | -16.76 | 2932.48 | 63.8 | Pass | |
| L20 | 30 - 25 | Pole | TP34.6462x33.5154x0.524 | 20 | -17.83 | 2993.08 | 66.1 | Pass | |
| L21 | 25 - 20 | Pole | TP35.7769x34.6462x0.5175 | 21 | -18.93 | 3054.48 | 68.3 | Pass | |
| L22 | 20 - 15 | Pole | TP36.9077x35.7769x0.5115 | 22 | -20.06 | 3116.39 | 70.3 | Pass | |
| L23 | 15 - 10 | Pole | TP38.0385x36.9077x0.5058 | 23 | -21.21 | 3177.90 | 72.1 | Pass | |
| L24 | 10 - 5 | Pole | TP39.1692x38.0385x0.5005 | 24 | -22.40 | 3239.78 | 73.8 | Pass | |
| L25 | 5 - 0 | Pole | TP40.3x39.1692x0.4956 | 25 | -23.34 | 3302.27 | 75.3 | Pass | |
| | | | | | | | Summary | | |
| | | | | | | | Pole (L25) | 75.3 | Pass |
| | | | | | | | RATING = | 75.3 | Pass |

Note: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.

APPENDIX B
BASE LEVEL DRAWING



(INSTALLED-TO BE REMOVED)
(6) 1-1/4" TO 68 FT LEVEL
(INSTALLED)
(1) 1/2" TO 50 FT LEVEL
(7) 1-5/8" TO 117 FT LEVEL

(INSTALLED)
(12) 1-1/4" TO 110 FT LEVEL

(INSTALLED)
(6) 1-5/8" TO 81 FT LEVEL

(VLA)
(12) 1-5/8" TO 100 FT LEVEL
(INSTALLED)
(12) 7/8" TO 100 FT LEVEL

(SIA)
(3) 1-1/4" TO 87 FT LEVEL
(9) 1-5/8" TO 87 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 87 FT LEVEL

(INSTALLED)
(9) 7/8" TO 72 FT LEVEL

(RESERVED-BUNDLED IN 2-1/2" CONDUITS)
(PROPOSED)
(6) 5/16" TO 72 FT LEVEL
(4) 1/2" TO 95 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

| |
|---------------------------|
| BU#: 806352 |
| Site Name: BRG 302 943052 |
| App #: 109316 |
| Pole Manufacturer: Other |

| Reactions | | |
|-----------|------|---------|
| Moment: | 1989 | ft-kips |
| Axial: | 23 | kips |
| Shear: | 27 | kips |

Anchor Rod Data

| | | |
|----------------|--------|-----|
| Qty: | 12 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | ksi |
| Yield (Fy): | 75 | ksi |
| Bolt Circle: | 48.22 | in |

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

Anchor Rod Results

Maximum Rod Tension: 163.1 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 83.7% **Pass**

| |
|-------------|
| Rigid |
| Service ASD |
| Fty*ASIF |

Plate Data

| | | |
|-------------------|-------|-----|
| Diam: | 54.22 | in |
| Thick: | 2.5 | in |
| Grade: | 60 | ksi |
| Single-Rod B-eff: | 10.80 | in |

Base Plate Results

Base Plate Stress: 36.7 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 61.2% **Pass**

Flexural Check

| |
|--------------|
| Rigid |
| Service ASD |
| 0.75*Fy*ASIF |
| Y.L. Length: |
| 26.48 |

Stiffener Data (Welding at both sides)

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

n/a

Stiffener Results

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

Pole Results

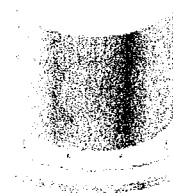
Pole Punching Shear Check: n/a

Pole Data

| | | |
|--------------------|--------|--------------|
| Diam: | 40.3 | in |
| Thick: | 0.3438 | in |
| Grade: | 65 | ksi |
| # of Sides: | 12 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

Stress Increase Factor

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



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

| | |
|---------------------------|-------|
| BU#: 806352 | |
| Site Name: BRG 302 943052 | |
| App #: 109316 | |
| Connection Type: | Butt |
| Pole Manufacturer: | Other |

Bolt Data

| | | | |
|-----------------|------|---------------|-----------|
| Qty: | 12 | | |
| Diameter (in.): | 1 | Bolt Fu: | 120 |
| Bolt Material: | A325 | Bolt Fy: | 92 |
| N/A: | 75 | <-- Disregard | Bolt Fty: |
| N/A: | 55 | <-- Disregard | 44.00 |
| Circle (in.): | 22 | | |

Plate Data

| | | |
|-------------------|------|-----|
| Diam: | 28 | in |
| Thick, t: | 1 | in |
| Grade (Fy): | 36 | ksi |
| Strength, Fu: | 58 | ksi |
| Single-Rod B-eff: | 4.27 | in |

Stiffener Data (Welding at Both Sides)

| | | |
|-----------------|--------|---------------|
| Config: | 1 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.25 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.1875 | in |
| Fillet V. Weld: | 0.1875 | in |
| Width: | 6 | in |
| Height: | 12 | in |
| Thick: | 1 | in |
| Notch: | 0 | in |
| Grade: | 36 | ksi |
| Weld str.: | 70 | ksi |

Pole Data

| | | |
|--------------------|--------|--------------|
| Diam: | 15.94 | in |
| Thick: | 0.1875 | in |
| Grade: | 65 | ksi |
| # of Sides: | 12 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

Stress Increase Factor

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

Reactions

| | | |
|------------|------|---------|
| Moment: | 9.94 | ft-kips |
| Axial: | 0.39 | kips |
| Shear: | 1.44 | kips |
| Elevation: | 110 | feet |

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

Flange Bolt Results

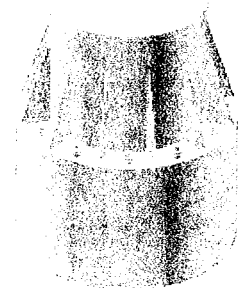
| | | |
|------------------------------------|--------------|------------------|
| Bolt Tension Capacity, B: | 46.07 kips | Stiffened |
| Max Bolt directly applied T: | 1.77 Kips | Service, ASD |
| Min. PL "tc" for B cap. w/o Pry: | Stiffened in | Fty*ASIF |
| Min PL "treq" for actual T w/ Pry: | Stiffened in | |
| Min PL "t1" for actual T w/o Pry: | Stiffened in | |
| T allowable | 46.07 kips | <-- B, Stiffened |
| Prying Force, Q: | 0.00 kips | Stiffened |
| Total Bolt Tension=T+Q: | 1.77 kips | |
| Non-Prying Bolt Stress Ratio, T/B: | 3.9% Pass | |

Exterior Flange Plate Results

| | |
|--|--------------------|
| Flexural Check | Stiffened |
| Compression Side Plate Stress: | Service, ASD |
| Allowable Plate Stress: | 0.75*Fy*ASIF |
| Compression Plate Stress Ratio: | 4.0% Pass |
| Stiffened | Comp. Y.L. Length: |
| Tension Side Stress Ratio, (treq/t)^2: | N/A, Roark |

Stiffener Results

| | |
|---------------------------------------|-----------|
| Horizontal Weld : | 4.0% Pass |
| Vertical Weld: | 2.4% Pass |
| Plate Flex+Shear, fb/Fb+(fv/Fv)^2: | 0.4% Pass |
| Plate Tension+Shear, ft/Ft+(fv/Fv)^2: | 1.0% Pass |
| Plate Comp. (AISC Bracket): | 1.7% Pass |
| Pole Results | |
| Pole Punching Shear Check: | 0.8% 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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

| | |
|---------------------------|-------|
| BU#: 806352 | |
| Site Name: BRG 302 943052 | |
| App #: 109316 | |
| Connection Type: | Butt |
| Pole Manufacturer: | Other |

| Reactions | | |
|------------|-------|---------|
| Moment: | 38.44 | ft-kips |
| Axial: | 1.13 | kips |
| Shear: | 3.28 | kips |
| Elevation: | 100 | feet |

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

| Bolt Data | | |
|-----------------|------|-----------------|
| Qty: | 12 | |
| Diameter (in.): | 1 | Bolt Fu: 120 |
| Bolt Material: | A325 | Bolt Fy: 92 |
| N/A: | 75 | <-- Disregard |
| N/A: | 55 | <-- Disregard |
| Circle (in.): | 22 | Bolt Fty: 44.00 |

Flange Bolt Results

| | |
|--|-----------------------------|
| Bolt Tension Capacity, B : | 46.07 kips |
| Max Bolt directly applied T: | 6.89 Kips |
| Min. PL "tc" for B cap. w/o Pry: | Stiffened in |
| Min PL "treq" for actual T w/ Pry: | Stiffened in |
| Min PL "t1" for actual T w/o Pry: | Stiffened in |
| T allowable | 46.07 kips <-- B, Stiffened |
| Prying Force, Q: | 0.00 kips |
| Total Bolt Tension=T+Q: | 6.89 kips |
| Non-Prying Bolt Stress Ratio, T/B: | 15.0% Pass |

| |
|--------------|
| Stiffened |
| Service, ASD |
| Fty*ASIF |

| Plate Data | | |
|-------------------|------|-----|
| Diam: | 28 | in |
| Thick, t: | 1 | in |
| Grade (Fy): | 36 | ksi |
| Strength, Fu: | 58 | ksi |
| Single-Rod B-eff: | 4.88 | in |

Exterior Flange Plate Results

| | |
|--|-------------------|
| Flexural Check | Stiffened |
| Compression Side Plate Stress: | 6.6 ksi |
| Allowable Plate Stress: | 36.0 ksi |
| Compression Plate Stress Ratio: | 18.3% Pass |
| Stiffened | |
| Tension Side Stress Ratio, (treq/t)^2: | N/A |

| |
|--------------------|
| Stiffened |
| Service, ASD |
| 0.75*Fy*ASIF |
| Comp. Y.L. Length: |
| N/A, Roark |

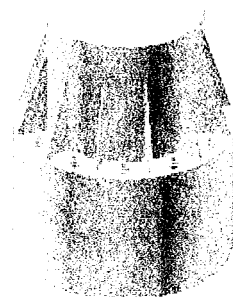
| Stiffener Data (Welding at Both Sides) | | |
|--|--------|---------------|
| Config: | 1 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.25 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.1875 | in |
| Fillet V. Weld: | 0.1875 | in |
| Width: | 6 | in |
| Height: | 12 | in |
| Thick: | 1 | in |
| Notch: | 0 | in |
| Grade: | 36 | ksi |
| Weld str.: | 70 | ksi |

Stiffener Results

| | |
|---------------------------------------|-------------------|
| Horizontal Weld : | 17.2% Pass |
| Vertical Weld: | 7.9% Pass |
| Plate Flex+Shear, fb/Fb+(fv/Fv)^2: | 1.1% Pass |
| Plate Tension+Shear, ft/Ft+(fv/Fv)^2: | 4.3% Pass |
| Plate Comp. (AISC Bracket): | 6.0% Pass |
| Pole Results | |
| Pole Punching Shear Check: | 2.3% Pass |

| Pole Data | | |
|--------------------|--------|--------------|
| Diam: | 18.2 | in |
| Thick: | 0.1875 | in |
| Grade: | 65 | ksi |
| # of Sides: | 12 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

| Stress Increase Factor | | |
|------------------------|-------|--|
| ASIF: | 1.333 | |



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

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

Monopole Block Foundation

Checks capacity of monolithic block foundation for a monopole tower per TIA/EIA-222-F

BU #: 806352
 Site Name: BRG 302 943052
 App No.: 109316



| Design Reactions | |
|--------------------|-----------------|
| Shear, S: | 27.00 kips |
| Moment, M: | 1989.00 ft-kips |
| Height, H: | 117.00 ft |
| Weight, W: | 22.00 kips |
| Base Diameter, BD: | 40.3 in |

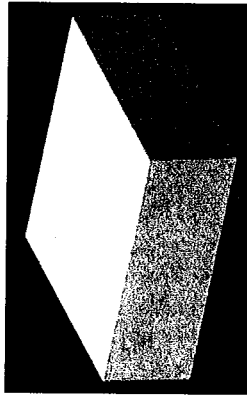
| Foundation Dimensions | |
|---------------------------|---------|
| Depth, D: | 5.0 ft |
| Block Width, W: | 20.0 ft |
| Neglected Depth, N: | 3.3 ft |
| Ext. Above Grade, E: | 0.0 ft |
| Anchor Steel Length, Lst: | 60.0 in |
| Clear Cover, cc: | 4.0 in |

| Soil Properties | |
|----------------------------------|-----------|
| Soil Unit Weight, γ : | 0.134 kcf |
| Allowable Bearing, Bc: | 6.000 ksf |
| Int. Angle of Friction, Φ : | 35.00 deg |
| Cohesion, Co: | 0.000 ksf |
| Passive Pressure, Pp: | 0.000 kcf |
| Base Friction, μ : | 0.4 |
| Seismic Zone, z: | 1 |

| Material Properties | |
|--------------------------------|-----------|
| Rebar Yield Strength, Fy: | 60000 psi |
| Concrete Strength, F'c: | 3000 psi |
| Concrete Density, δ_c : | 0.150 kcf |

| Rebar Properties | |
|---------------------|----|
| Pad Rebar Size, sp: | 11 |
| Rebar Quantity, mp: | 15 |
| | 9 |

| Design Checks | | | |
|-----------------------------------|-----------------------|----------------|-------|
| | Capacity/Availability | Demands/Limits | Check |
| Shear (ksf) | 56.35 | 27.00 | OK |
| Overturning (ft-kips) | 2540.61 | 2124.00 | OK |
| Bearing (ksf) | 6.00 | 3.15 | OK |
| Shear - 1-Way (kips) | 1453.74 | 539.01 | OK |
| Pad Rebar Area (in ²) | 23.42 | 12.96 | OK |
| Bar Spacing (in) | 15.06 | 18 > Bs > 2 | OK |
| Development Length (in) | 116.00 | 60.24 | OK |



| Modification Checks | | | |
|--|-----------------------|----------------|----------|
| | Capacity/Availability | Demands/Limits | Check |
| Minimum Extra Thickness (in) | 0.00 | 0.00 | Not Used |
| Pad Rebar Area-short (in ²) | 8.84 | 0.00 | Not Used |
| Pad Rebar Area-long (in ²) | 2.21 | 0.00 | Not Used |
| Pad Rebar Spacing-short (in ²) | 11.42 | 18 > Bs > 2 | Not Used |
| Pad Rebar Spacing-long (in ²) | 57.06 | 18 > Bs > 2 | Not Used |
| End Cap Width (in) | 0.00 | 0.00 | Not Used |
| End Cap Rebar Area (in ²) | 4.81 | 0.00 | Not Used |
| EC Rebar Spacing (in) | -2.02 | 18 > Bs > 2 | Not Used |
| Tie Spacing (in) | 11.71 | 232 > s > 4.5 | Not Used |
| Dowel Area (in ²) | 8.84 | 0.00 | Not Used |
| Dowel Embedment (in) | 15.00 | 6.00 | Not Used |
| Shear Strength of Cone (kips) | 59.63 | 23.86 | Not Used |
| Dowel Edge Distance (in) | 12.00 | 14.51 | Not Used |
| Dowel Spacing (in) | 24.00 | 30.00 | Not Used |
| Dowel Edge Distance (vert) (in) | 30.00 | 14.51 | Not Used |
| Dowel Devel. Length (in) | -4.00 | 15.38 | Not Used |

| Modifications | | | |
|------------------------------|----|----|------------------------|
| | in | ft | in |
| Pad Thickness, Te: | 0 | 0 | 0 |
| Revised Pad Thickness, Tr: | 5 | 0 | 20 |
| Rebar Size, Se: | 6 | 7 | per side, top & bottom |
| Rebar Quantity (long), me: | 20 | 0 | 8 |
| Rebar Quantity (short), msc: | 5 | 0 | 4 |
| Dowel Size, Sed: | 7 | 0 | 20 |
| Dowel Quantity, med: | 20 | 0 | 6 |
| End Cap Width, Wec: | 0 | 0 | 20 |
| Revised Width, Wx: | 0 | 0 | 2 |
| EC Rebar Size, Sec: | 0 | 0 | 15 |
| EC Rebar Quantity, mecd: | 0 | 0 | 12 |
| Tie Quantity, mect: | 0 | 0 | 0 |
| EC Dowel Size, Seecd: | 0 | 0 | 0 |
| Dowel Quantity, meecd: | 0 | 0 | 0 |
| Rows of Dowels, Nrd: | 0 | 0 | 2 |
| Dowel Depth, decd: | 0 | 0 | 15 |
| Edge Distance, eecd: | 0 | 0 | 12 |

Instructions

Replace "Table 5" in your report with the table that has been generated below.

| Elevation (ft) | Pole Bending fb (ksi) | Allowable Bending Fb (ksi) | Reinr. Compr. Cr (k) | Allowable Compr. Ca (k) | Reinr. Tension Tr (k) | Allowable Tension Ta (k) | Controlling Stress | % Capacity | Pass / Fail |
|----------------|-----------------------|----------------------------|----------------------|-------------------------|-----------------------|--------------------------|--------------------|------------|-------------|
| 70 | 37.12 | 52 | | | | | Pole | 72.3% | Pass |
| 52 | 31.15 | 50.898623 | 144.85 | 170.16 | 144.85 | 234.00 | 1st Reinf.Comp | 85.1% | Pass |
| 35 | 33.32 | 52 | 154.59 | 170.16 | 154.59 | 234.00 | 1st Reinf.Comp | 90.8% | Pass |
| 0 | 37.38 | 51.5818279 | 229.86 | 250.40 | 229.86 | 312.00 | 1st Reinf.Comp | 91.8% | Pass |

Monopole Reinforcement Tool v1.01

Calculates the equivalent thickness of a monopole tower after modification at every relevant point for input into RISA.

BU#: 806352

Site Name: BRG 302 943052

App Number: 109316



First Reinforcement Tension Only? No Yes

| Pole Properties | | Blue denotes user input. |
|--|----------|--------------------------|
| Pole Grade, Gp: | 65 | ksi |
| Number of tower sections, tnr: | 4 | |
| Number of pole faces (0 for round), num: | 12 | |
| Section 1 (highest section) length, Sh_1: | 7 | ft |
| Top diameter, Td_1: | 14.36 | in |
| Bottom diameter, Bd_1: | 15.94 | in |
| Section 1 Taper, taper_1: | 0.018810 | |
| Section wall thickness, St_1: | 0.188 | in |
| Length of overlap with section below, O_1: | 0 | in |
| Critical point height above ground, Cp_1: | 110.000 | ft |
| Section 2 length, Sh_2: | 10 | ft |
| Top outer diameter, Td_2: | 15.94 | in |
| Bottom outer diameter, Bd_2: | 18.2 | in |
| Section 2 Taper, taper_2: | 0.018833 | |
| Section wall thickness, St_2: | 0.188 | in |
| Length of overlap with section below, O_2: | 0 | in |
| Critical point height above ground, Cp_2: | 100.000 | ft |
| Section 3 length, Sh_3: | 48 | ft |
| Top outer diameter, Td_3: | 18.2 | in |
| Bottom outer diameter, Bd_3: | 30.09 | in |
| Section 3 Taper, taper_3: | 0.020642 | |
| Section wall thickness, St_3: | 0.25 | in |
| Length of overlap with section below, O_3: | 0 | in |
| Critical point height above ground, Cp_3: | 52.000 | ft |
| Section 4 length, Sh_4: | 52 | ft |
| Top outer diameter, Td_4: | 28.54 | in |
| Bottom diameter, Bd_4: | 40.3 | in |
| Section 4 Taper, taper_4: | 0.018846 | |
| Section wall thickness, St_4: | 0.3438 | in |
| Total tower height, Ht: | 117 | ft |

| Reinforcement Properties | |
|--|-----------------|
| Number of reinforcement sections, Rnum: | 2 |
| Elevation Range 1 (Uppermost Reinforcements) | |
| Top height Hta: | 70 |
| Bottom height Hba: | 35 |
| Number of types of reinforcements, numtyp: | 1 |
| First Reinforcements | |
| Type of reinforcement, typ: | Plate |
| Number of reinforcements of type, numa: | 3 |
| Width of plate, Wpa: | 4.5 |
| Distance to centroid of plate, Tpa: | 0.5 |
| Cross sectional area of plate, Apa: | 4.5 |
| | in ² |

| Compression Check 1 | |
|-----------------------------|------------|
| Effective-length factor, K: | 0.8 |
| Unbraced length, Lu: | 20.625 |
| Radius of gyration, Rg: | 0.28867513 |
| Yield Strength, Fy: | 65 |
| | ksi |

First Reinforcement Tension Only? No

| Elevation Range 2 | |
|--|-------------------|
| Top height Hta: | 35 ft |
| Bottom height Hba: | 0 ft |
| Number of types of reinforcements, numtyp: | 1 |
| First Reinforcements | |
| Type of reinforcement, type: | Plate |
| Number of reinforcements of type, numa: | 3 |
| Width of plate, Wpa: | 6 in |
| Distance to centroid of plate, Tpa: | 0.5 in |
| Cross sectional area of plate, Apat: | 6 in ² |

| Compression Check 2 | |
|-----------------------------|---------------|
| First Reinforcements | |
| Effective-length factor, K: | 0.8 |
| Unbraced length, Lu: | 16.375 in |
| Radius of gyration, Rg: | 0.28867513 in |
| Yield Strength, Fy: | 65 ksi |

RISA Tower Input

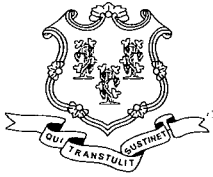
| Pole Height Above Base (ft) | Section Length (ft) | Number of Sides | Top Diameter (in) | Bottom Diameter (in) | Wall Thickness (in) | Weight Adjustment Factor |
|-----------------------------|---------------------|-----------------|-------------------|----------------------|---------------------|--------------------------|
| 117.00 | 2.0 | 12 | 14.3600 | 14.8114 | 0.1880 | 1.00 |
| 115.00 | 5.0 | 12 | 14.8114 | 15.9400 | 0.1880 | 1.00 |
| 110.00 | 5.0 | 12 | 15.9400 | 17.0700 | 0.1880 | 1.00 |
| 105.00 | 5.0 | 12 | 17.0700 | 18.2000 | 0.1880 | 1.00 |
| 100.00 | 5.0 | 12 | 18.2000 | 19.4385 | 0.2500 | 1.00 |
| 95.00 | 5.0 | 12 | 19.4385 | 20.6771 | 0.2500 | 1.00 |
| 90.00 | 5.0 | 12 | 20.6771 | 21.9156 | 0.2500 | 1.00 |
| 85.00 | 5.0 | 12 | 21.9156 | 23.1542 | 0.2500 | 1.00 |
| 80.00 | 5.0 | 12 | 23.1542 | 24.3927 | 0.2500 | 1.00 |
| 75.00 | 5.0 | 12 | 24.3927 | 25.6313 | 0.2500 | 1.00 |
| 70.00 | 5.0 | 12 | 25.6313 | 26.8698 | 0.4272 | 0.71 |
| 65.00 | 5.0 | 12 | 26.8698 | 28.1083 | 0.4181 | 0.72 |
| 60.00 | 5.0 | 12 | 28.1083 | 29.3469 | 0.4100 | 0.73 |
| 55.00 | 3.0 | 12 | 29.3469 | 30.0900 | 0.4054 | 0.74 |
| 52.00 | 2.0 | 12 | 30.0900 | 28.9923 | 0.5093 | 0.78 |
| 50.00 | 5.0 | 12 | 28.9923 | 30.1231 | 0.5021 | 0.78 |
| 45.00 | 5.0 | 12 | 30.1231 | 31.2538 | 0.4954 | 0.79 |
| 40.00 | 5.0 | 12 | 31.2538 | 32.3846 | 0.4893 | 0.80 |
| 35.00 | 5.0 | 12 | 32.3846 | 33.5154 | 0.5311 | 0.76 |
| 30.00 | 5.0 | 12 | 33.5154 | 34.6462 | 0.5240 | 0.76 |
| 25.00 | 5.0 | 12 | 34.6462 | 35.7769 | 0.5175 | 0.77 |
| 20.00 | 5.0 | 12 | 35.7769 | 36.9077 | 0.5115 | 0.78 |
| 15.00 | 5.0 | 12 | 36.9077 | 38.0385 | 0.5058 | 0.78 |
| 10.00 | 5.0 | 12 | 38.0385 | 39.1692 | 0.5005 | 0.79 |
| 5.00 | 5.0 | 12 | 39.1692 | 40.3000 | 0.4956 | 0.79 |

Pole Checks

| Elevation (ft) | F _b (ksi) | f _s (ksi) | f _b (ksi) | % Capacity |
|----------------|----------------------|----------------------|----------------------|------------|
| 115.00 | 52 | 0.026 | 1.37 | 2.7% |
| 110.00 | 52 | 0.041 | 3.14 | 6.1% |
| 105.00 | 52 | 0.088 | 6.36 | 12.4% |
| 100.00 | 52 | 0.104 | 9.28 | 18.1% |
| 95.00 | 52 | 0.167 | 13.31 | 25.9% |
| 90.00 | 52 | 0.193 | 18.28 | 35.5% |
| 85.00 | 52 | 0.307 | 23.43 | 45.6% |
| 80.00 | 52 | 0.326 | 28.36 | 55.2% |
| 75.00 | 52 | 0.339 | 32.67 | 63.5% |
| 70.00 | 52 | 0.471 | 37.12 | 72.3% |
| 65.00 | 52 | 0.482 | 24.70 | 48.4% |
| 60.00 | 52 | 0.494 | 27.39 | 53.6% |
| 55.00 | 51.5452417 | 0.506 | 29.82 | 58.8% |
| 52.00 | 50.898623 | 0.514 | 31.15 | 62.2% |
| 50.00 | 52 | 0.401 | 28.52 | 55.6% |
| 45.00 | 52 | 0.417 | 30.29 | 59.0% |
| 40.00 | 52 | 0.430 | 31.88 | 62.1% |
| 35.00 | 52 | 0.443 | 33.32 | 64.9% |
| 30.00 | 52 | 0.457 | 31.67 | 61.8% |
| 25.00 | 52 | 0.470 | 32.83 | 64.0% |
| 20.00 | 52 | 0.483 | 33.89 | 66.1% |
| 15.00 | 52 | 0.496 | 34.87 | 68.0% |
| 10.00 | 52 | 0.509 | 35.78 | 69.8% |
| 5.00 | 52 | 0.522 | 36.62 | 71.4% |
| 0.00 | 51.5818279 | 0.528 | 37.38 | 73.5% |

First Reinforcement Checks

| Elevation (ft) | P (k) | kl/r | Fa (ksi) | Ccap (ksi) | Tcap (ksi) | Axial Capacity (ksi) | % Capacity |
|----------------|--------|-------|----------|------------|------------|----------------------|------------|
| 115.00 | | | | | | | |
| 110.00 | | | | | | | |
| 105.00 | | | | | | | |
| 100.00 | | | | | | | |
| 95.00 | | | | | | | |
| 90.00 | | | | | | | |
| 85.00 | | | | | | | |
| 80.00 | | | | | | | |
| 75.00 | | | | | | | |
| 70.00 | | | | | | | |
| 65.00 | 115.29 | 57.16 | 28.36 | 170.16 | | 170.161 | 67.8% |
| 60.00 | 127.66 | 57.16 | 28.36 | 170.16 | | 170.161 | 75.0% |
| 55.00 | 138.74 | 57.16 | 28.36 | 170.16 | | 170.161 | 81.5% |
| 52.00 | 144.85 | 57.16 | 28.36 | 170.16 | | 170.161 | 85.1% |
| 50.00 | 132.77 | 57.16 | 28.36 | 170.16 | | 170.161 | 78.0% |
| 45.00 | 140.82 | 57.16 | 28.36 | 170.16 | | 170.161 | 82.8% |
| 40.00 | 148.06 | 57.16 | 28.36 | 170.16 | | 170.161 | 87.0% |
| 35.00 | 154.59 | 57.16 | 28.36 | 170.16 | | 170.161 | 90.8% |
| 30.00 | 195.71 | 45.38 | 31.30 | 250.40 | | 250.401 | 78.2% |
| 25.00 | 202.67 | 45.38 | 31.30 | 250.40 | | 250.401 | 80.9% |
| 20.00 | 209.05 | 45.38 | 31.30 | 250.40 | | 250.401 | 83.5% |
| 15.00 | 214.91 | 45.38 | 31.30 | 250.40 | | 250.401 | 85.8% |
| 10.00 | 220.31 | 45.38 | 31.30 | 250.40 | | 250.401 | 88.0% |
| 5.00 | 225.30 | 45.38 | 31.30 | 250.40 | | 250.401 | 90.0% |
| 0.00 | 229.86 | 45.38 | 31.30 | 250.40 | | 250.401 | 91.8% |



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

April 26, 2010

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

RE: **EM-VER-035-100311-** Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Ledge Road, Darien, 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 March 11, 2010, 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 David M. Campbell, First Selectman, Town of Darien
John Crary, Town Administrator, Town of Darien
David J. Keating, Zoning Enforcement Officer, Town of Darien
Crown Castle USA, Inc.

ROBINSON & COLE

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

ORIGINAL

March 11, 2010

Via Hand Delivery

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

RECEIVED
MAR 11 2010

CONNECTICUT
SITING COUNCIL

Re: **Notice of Exempt Modification – Antenna Swap
Ledge Road, Darien, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 102-foot level on the existing 117-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of the existing tower in 1992 through Docket No. 155. Cellco now intends to modify its installation by replacing its antennas with four (4) DB844G65ZAXY cellular antennas; two (2) DB846F65ZAXY cellular antennas; three (3) model MG D3-800T0 PCS antennas; and three (3) model LNX-6514DS-T4M LTE antennas, all at the same 102-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

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 David Campbell, First Selectman for the Town of Darien. The Town of Darien is the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in any increase in the height of the existing tower. Cellco’s antennas will be located at the same 102-foot level on the existing 117-foot tower.



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

ROBINSON & COLE_{LLP}

S. Derek Phelps
March 11, 2010
Page 2

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.
4. The operation of the replacement 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. A Calculated Radio Frequency Emissions Report for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

David Campbell, Darien First Selectman
Sandy M. Carter



Product Specifications



DB844G65ZAXY

Directed Dipole™ Antenna, 806–960 MHz, 65° horizontal beamwidth, fixed electrical tilt



- Excellent azimuth roll-off, reducing sector-to-sector interference and soft hand-offs
- Air dielectric feed system with no screws, rivets, solder, or welding in dipole feed point
- Low profile for ease of zoning approval
- Excellent upper sidelobe suppression

CHARACTERISTICS

General Specifications

| | |
|--------------------------|------------------|
| Antenna Type | Directed Dipole™ |
| Brand | Directed Dipole™ |
| Operating Frequency Band | 806 – 960 MHz |

Electrical Specifications

| Frequency Band, MHz | 806–896 | 870–960 |
|--|---------------|---------------|
| Beamwidth, Horizontal, degrees | 65 | 65 |
| Gain, dBd | 13.5 | 13.8 |
| Gain, dBi | 15.6 | 15.9 |
| Beamwidth, Vertical, degrees | 15.0 | 15.0 |
| Beam Tilt, degrees | 0 | 0 |
| Upper Sidelobe Suppression (USLS), typical, dB | 15 | 15 |
| Null Fill, dB | 20 | 20 |
| Front-to-Back Ratio at 180°, dB | 40 | 40 |
| VSWR Return Loss, db | 1.33:1 17.0 | 1.33:1 17.0 |
| Intermodulation Products, 3rd Order, 2 x 20 W, dBc | -150 | -150 |
| Input Power, maximum, watts | 500 | 500 |
| Polarization | Vertical | Vertical |
| Impedance, ohms | 50 | 50 |
| Lightning Protection | dc Ground | dc Ground |

Product Specifications

DB844G65ZAXY



Mechanical Specifications

| | |
|-----------------------|---|
| Color | Light gray |
| Connector Interface | 7-16 DIN Female |
| Connector Location | Back |
| Connector Quantity | 1 |
| Wind Loading, maximum | 235.8 N @ 100 mph 53.0 lbf @ 100 mph |
| Wind Speed, maximum | 241.4 km/h 150.0 mph |

Dimensions

| | |
|------------|---------------------|
| Depth | 203.2 mm 8.0 in |
| Length | 1219.2 mm 48.0 in |
| Width | 254.0 mm 10.0 in |
| Net Weight | 5.4 kg 12.0 lb |

Regulatory Compliance/Certifications

Agency

RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)



INCLUDED PRODUCTS



DB5083

Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members



DB380

Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

DB382NS

Side Offset Bracket for 4.5 in (114.3 mm) OD round members

www.commscope.com/andrew

Join the Evolution

©2009 CommScope, Inc. All rights reserved.

All trademarks identified by ® or ™ are registered trademarks or trademarks, respectively, of CommScope. All specifications are subject to change. See www.commscope.com/andrew for the most current information.

page 2 of 3
12/18/2009

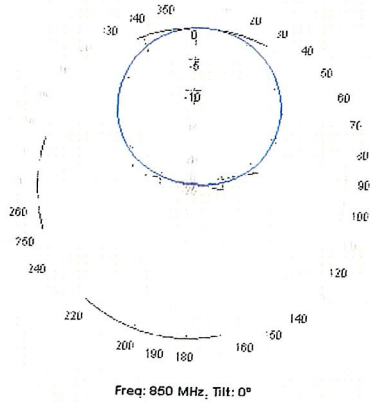
Product Specifications

DB844G65ZAXY

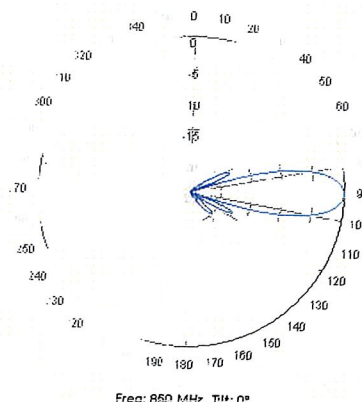


Horizontal Pattern

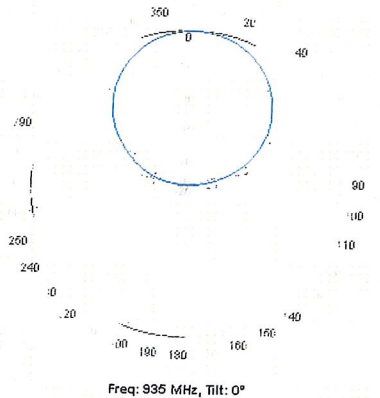
Vertical Pattern



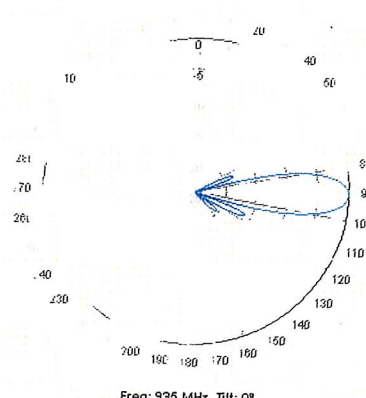
Freq: 850 MHz, Tilt: 0°



Freq: 850 MHz, Tilt: 0°



Freq: 935 MHz, Tilt: 0°



Freq: 935 MHz, Tilt: 0°

Vertically Polarized Directed Dipole® Panel Antennas

806 - 960 MHz

65° HORIZONTAL BEAMWIDTH

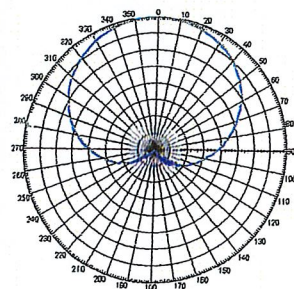
| HORIZONTAL BEAMWIDTH | 65° | 65° | 65° |
|-----------------------------------|-----------------------------|--------------------|--------------------|
| FREQUENCY RANGE | 806-960 MHz | 806-896 MHz | 806-896 MHz |
| | 14.5 & 14.8 dBd / 0° Tilt | 14.5 dBd / 0° Tilt | 14.3 dBd / 5° Tilt |
| MODEL | DB846F65ZAXY | DB846H65E-SX | 846H65T5E-SX |
| TYPE | Directed Dipole®, No Screen | Directed Dipole® | Directed Dipole® |
| ELECTRICAL SPECIFICATIONS | | | |
| Frequency Range (MHz) | 806-896 | 870-960 | 806-896 |
| Gain (dBd/dBi) | 14.5 / 16.6 | 14.8 / 16.9 | 14.3 / 16.4 |
| Horizontal Beamwidth (Deg.) | 65 | 60 | 65 |
| Elevation Beamwidth (Deg.) | 11 | 10.5 | 10.5 |
| USLS (dB) | >15 | >15 | >15 |
| Null Fill (dB) – Below Peak | N/A | N/A | N/A |
| Beam Tilt (Deg.) | 0 | 0 | 5 |
| VSWR | <1.33:1 | <1.33:1 | <1.5:1 |
| Front-To-Back Ratio (dB) | 40 | 40 | 30 |
| Isolation (dB) | N/A | N/A | N/A |
| Max. Input Power (Watts) | 500 | 500 | 500 |
| Polarization | Vertical | Vertical | Vertical |
| Connector Location | Back | Back | Back |
| Connector Type | 7-16 DIN - Female | 7-16 DIN - Female | 7-16 DIN - Female |
| Optional Connectors | N/A | N/A | N/A |
| MECHANICAL SPECIFICATIONS | | | |
| Length (inch/mm) | 72 / 1,829 | 72 / 1,829 | 72 / 1,829 |
| Width (inch/mm) | 10 / 254 | 10 / 254 | 20.5 / 521 |
| Depth (inch/mm) | 8.5 / 216 | 8.5 / 216 | 9 / 229 |
| Net Weight (lbs/kg) | 21 / 9.5 | 21 / 9.5 | 24 / 10.9 |
| Max. Flat Plate Area (ft²/m²) | 1.61 / 0.15 | 1.61 / 0.15 | 4.95 / 0.46 |
| Max. Wind Load at 100 mph (lbf/N) | 87 / 386 | 87 / 386 | 273 / 1,214 |
| Max. Wind Speed (mph/kmh) | 125 / 201 | 125 / 201 | 125 / 201 |
| Radome Material | ABS, UV Resistant | ABS, UV Resistant | ABS, UV Resistant |
| Reflector Material | Pass. Aluminum | Pass. Aluminum | Pass. Aluminum |
| Radiator Material | Aluminum | Aluminum | Brass |
| Hardware Material | Galvanized Steel | Galvanized Steel | Galvanized Steel |
| Color | Light Gray | Light Gray | Light Gray |
| Std. Mounting Hardware | DB380 | DB380 | DB380 |
| Optional Downtilt Kit | DB5083 | DB5083 | DB5083 |
| Optional Special Mounting | DB5084-AZ | DB5084-AZ | DB5084-AZ |

Specifications are subject to change. Please see our website for the latest information.

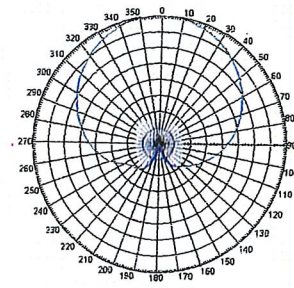
Azimuth Pattern

Elevation Pattern

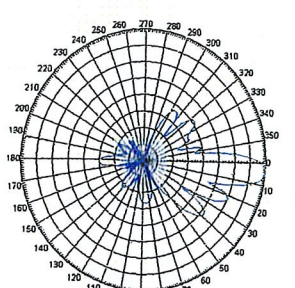
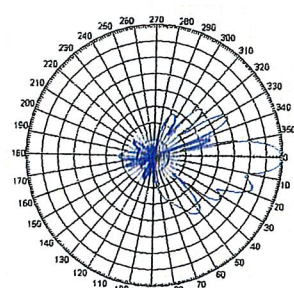
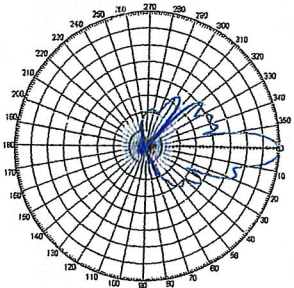
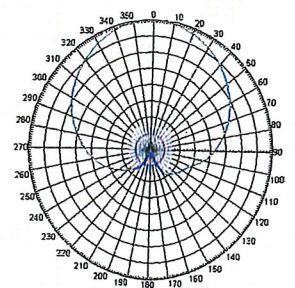
DB846F65ZAXY



DB846H65E-SX



846H65T5E-SX



Scale: 10° radials, 5 dB per division



1710-2170 MHz

Model # MG D3-800TX

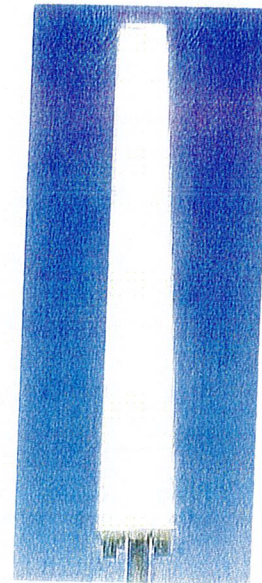
XPoI GSM1800+PCS & UMTS Panel Antenna

Beamwidth: H 65°/V 6.5°

Gain: 16.15 dBd/18.25 dBi

Length: 52.7 in

| Electrical Specifications | | | |
|---|-----------------|-----------|-------------|
| Antenna model | MG D3-800TX | | |
| Frequency range (MHz) | 1710-1880 | 1850-1990 | 1920-2170 |
| Impedance | 50 ohms | | |
| VSWR | 1.4 | | |
| Polarization | ±45° | | |
| Isolation between ports (dB) | 30 | | |
| Average gain (dBd/dBi) | 15.7/17.8 | 15.9/18 | 16.15/18.25 |
| Horizontal beamwidth (deg) | 65°±5° | | |
| Vertical beamwidth (deg) | 6.5°±0.5° | 6.3°±0.5° | 6.3°±0.5° |
| Electrical tilt (deg) | Fixed 0°-14° | | |
| Upper sidelobe suppression (dB) | 18 | | |
| Front-to-back ratio (dB) @180°±30° | 30 | | |
| Polarization isolation (dB) @3 dB beamwidth | 20 | | |
| Maximum power per input (w) | 250 | | |
| Intermodulation products (dBc) | -150 | | |
| Connectors | 2 X 7/16 female | | |
| Connector position | Antenna bottom | | |



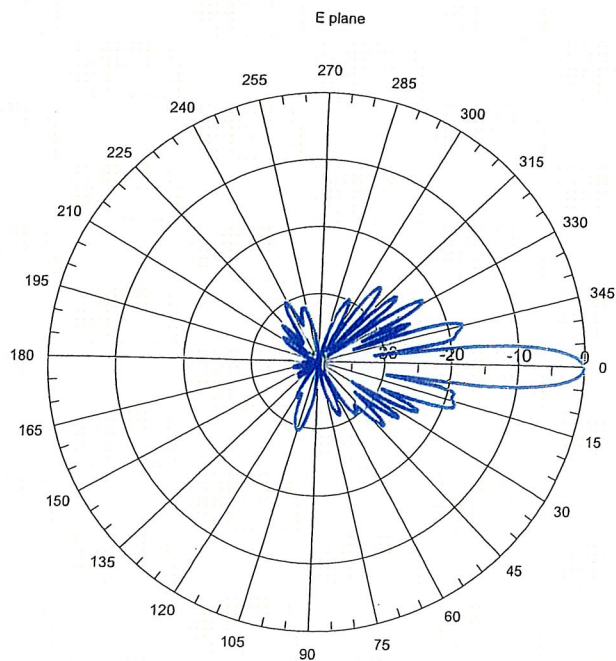
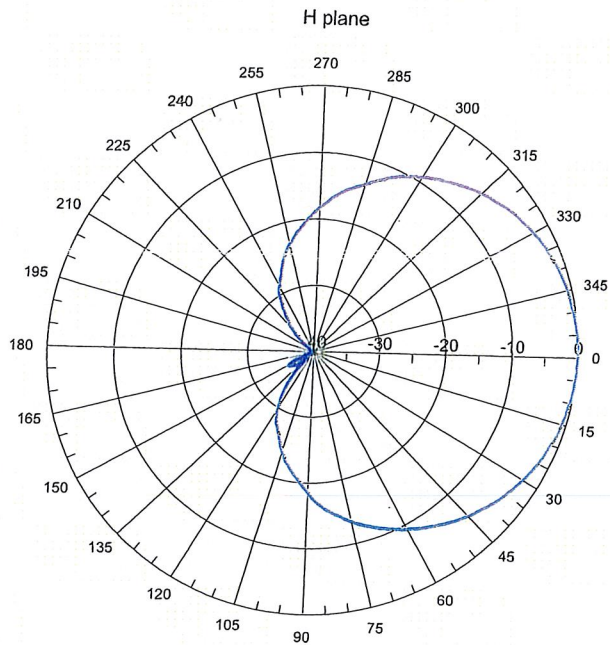
| Mechanical & Environmental Specifications | |
|--|---------------------------------------|
| Dimensions in (mm) | 52.7 x 6.3 x 3.5 (1380 x 160 x 90) |
| Survival wind speed mph (kph) | 124 (200) |
| Front windload lbs (N) @100 mph/160 kph | 74 (335) |
| Lateral windload lbs (N) @100 mph/160 kph | 42 (188) |
| Antenna weight lbs (kg) | 15 (7) |
| Clamps weight lbs (kg) | 7.7 (3.5) |
| Mast mounting in (cm) | 2.0 to 5.3 (50 to 135) |
| Radome color | Gray |
| Grounding | All metallic parts DC grounded |
| Temperature range F (°C) | -67° to 140° (-55 to +60°) |
| Humidity | 100% |

| Shipping Specifications | |
|-------------------------|--------------------------------------|
| Dimensions in (mm) | 64 x 8.8 x 6.9 (1630 x 225 x 175) |
| Weight lbs (kg) | 27 (12.5) |
| Material | Cardboard and foam |

1710-2170 MHz

Model # MG D3-800TX

XPoI GSM1800+PCS & UMTS Panel Antenna



Product Specifications



LNX-6514DS-T4M

DualPol® Antenna, 698–896 MHz, 65° horizontal beamwidth, fixed electrical tilt



- Broadband, providing future-ready single antenna for application in 700 MHz and existing 850 MHz cellular operation
- Air dielectric design provides superior PIM performance with repeatable antenna-to-antenna gain and pattern consistency
- Single piece radome provides long term mechanical stability
- Proven core design technology, with over 1,000,000 similar antennas deployed
- Exceptional USLS pattern shaping for optimizing coverage and interference mitigation for LTE applications
- Specifically designed to have physical dimensions similar to most existing cellular antennas

CHARACTERISTICS

General Specifications

| | |
|--------------------------|---------------|
| Antenna Type | DualPol® |
| Brand | DualPol® |
| Operating Frequency Band | 698 – 896 MHz |

Electrical Specifications

| Frequency Band, MHz | 698–806 | 806–896 |
|--|---------------|---------------|
| Beamwidth, Horizontal, degrees | 66 | 64 |
| Gain, dBd | 13.8 | 14.5 |
| Gain, dBi | 15.9 | 16.6 |
| Beamwidth, Vertical, degrees | 12.0 | 11.0 |
| Beam Tilt, degrees | 4 | 4 |
| Upper Sidelobe Suppression (USLS), typical, dB | 18 | 18 |
| Front-to-Back Ratio at 180°, dB | 33 | 33 |
| Isolation, dB | 30 | 30 |
| VSWR Return Loss, db | 1.35:1 16.5 | 1.35:1 16.5 |
| Intermodulation Products, 3rd Order, 2 x 20 W, dBc | -150 | -150 |
| Input Power, maximum, watts | 500 | 500 |
| Polarization | ±45° | ±45° |
| Impedance, ohms | 50 | 50 |
| Lightning Protection | dc Ground | dc Ground |

www.commscope.com/andrew

Join the Evolution

©2009 CommScope, Inc. All rights reserved.

All trademarks identified by ® or ™ are registered trademarks or trademarks, respectively, of CommScope. All specifications are subject to change. See www.commscope.com/andrew for the most current information.

page 1 of 3
10/28/2009

Product Specifications

INX-6514DS-T4M



Mechanical Specifications

| | |
|-----------------------|--|
| Color | Light gray |
| Connector Interface | 7-16 DIN Female |
| Connector Location | Bottom |
| Connector Quantity | 2 |
| Wind Loading, maximum | 617.7 N @ 150 km/h 138.9 lbf @ 150 km/h |
| Wind Speed, maximum | 241.4 km/h 150.0 mph |

Dimensions

| | |
|------------|---------------------|
| Depth | 181.0 mm 7.1 in |
| Length | 1847.0 mm 72.7 in |
| Width | 301.0 mm 11.9 in |
| Net Weight | 17.0 kg 37.5 lb |

Regulatory Compliance/Certifications

Agency

RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)



INCLUDED PRODUCTS

MTG-L-STD

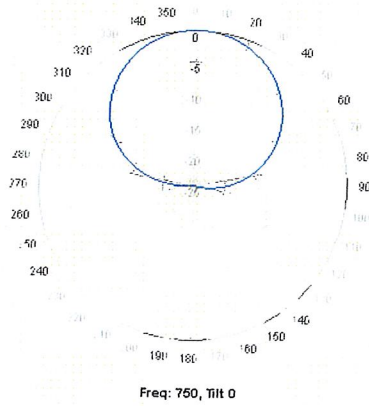
Downtilt Mounting Kit for panel Antennas

Product Specifications

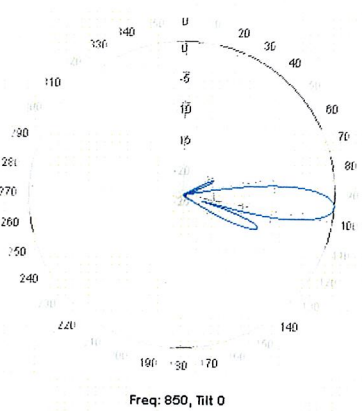
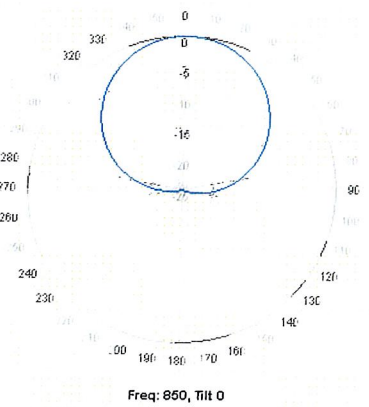
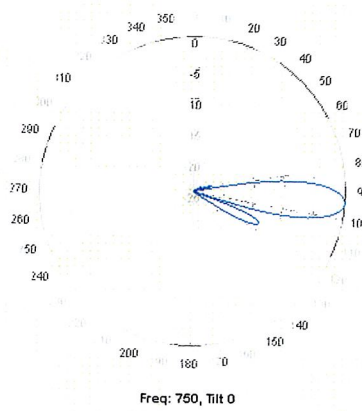
LNx6514DS-T4M



Horizontal Pattern



Vertical Pattern





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

support@csquaredsystems.com

Calculated Radio Frequency Emissions



Darien CT

55 Ledge Rd, Darien, CT

Table of Contents

| | |
|--|---|
| 1. Introduction..... | 1 |
| 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits..... | 1 |
| 3. RF Exposure Prediction Methods | 2 |
| 4. Verizon Wireless Antenna Inventory | 2 |
| 5. Calculation Results..... | 3 |
| 6. Conclusion | 4 |
| 7. Statement of Certification | 4 |
| Attachment A: References..... | 5 |
| Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)..... | 6 |

List of Tables

| | |
|--|---|
| Table 1: Verizon Wireless Antenna Inventory..... | 2 |
| Table 2: Existing & Proposed Carrier Information | 3 |
| Table 3: Power Density Results | 3 |

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Verizon Wireless antenna upgrade on the existing monopole at 55 Ledge Rd, Darien, CT. Verizon Wireless is proposing to modify their existing three-sector array to accommodate the addition of their 700 MHz LTE system to the existing monopole and to modify their existing antenna arrays for their 850 MHz Cellular and 1900 MHz PCS systems.

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

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.

4. Verizon Wireless Antenna Inventory

Table 1 below outlines the proposed Verizon Wireless antenna configuration on the existing monopole.

| Antenna ID | Height AGL (feet) | Antenna Model | TX Freq (MHz) | Ant Gain (dBi) | Ant Length (feet) | Beam Width | Down Tilt |
|------------|-------------------|----------------|---------------|----------------|-------------------|------------|-----------|
| A1 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 6 |
| A2 | 102 | MG D3-800T0 | 1900 | 18.0 | 4 | 63 | 2 |
| A3 | 102 | LNx-6514DS-T4M | 700 | 15.9 | 6 | 65 | 0 |
| A4 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 6 |
| B1 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 3 |
| B2 | 102 | MG D3-800T0 | 1900 | 18.0 | 4 | 63 | 2 |
| B3 | 102 | LNx-6514DS-T4M | 700 | 15.9 | 6 | 65 | 0 |
| B4 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 3 |
| G1 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 5 |
| G2 | 102 | MG D3-800T0 | 1900 | 18.0 | 4 | 63 | 2 |
| G3 | 102 | LNx-6514DS-T4M | 700 | 15.9 | 6 | 65 | 0 |
| G4 | 102 | DB844G65ZAXY | 850 | 15.6 | 4 | 65 | 5 |

Table 1: Verizon Wireless Antenna Inventory

5. Calculation Results

Table 2 below outlines the power density information for the site. All information for Verizon Wireless was obtained directly from the carrier.

| 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 |
|---------|------------------|--|-----------------------|---------------------------|-------------------|-------------------------------------|--------------|--------------|
| Verizon | 3 | 608 | 102 | 1970 | 1824 | 0.0111 | 1.0000 | 1.11% |
| Verizon | 9 | 437 | 102 | 869 | 3933 | 0.0240 | 0.5793 | 4.14% |
| Verizon | 1 | 959 | 102 | 757 | 959 | 0.0058 | 0.5047 | 1.16% |
| | | | | | | | Total | 6.41% |

Table 2: Existing & Proposed Carrier Information

The calculated power density results are shown in Table 3 below.

| Horizontal Distance from Site (feet) | % MPE |
|--------------------------------------|-------|
| 0 | 6.4% |
| 50 | 5.0% |
| 100 | 3.0% |
| 500 | 2.3% |
| 750 | 1.0% |
| 1000 | 0.6% |

Table 3: Power Density Results

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.

6. Conclusion

The above analysis verifies that emissions from the 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 existing and 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 6.41% 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.



Daniel I. Goulet
C Squared Systems, LLC

February 16, 2010
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 |

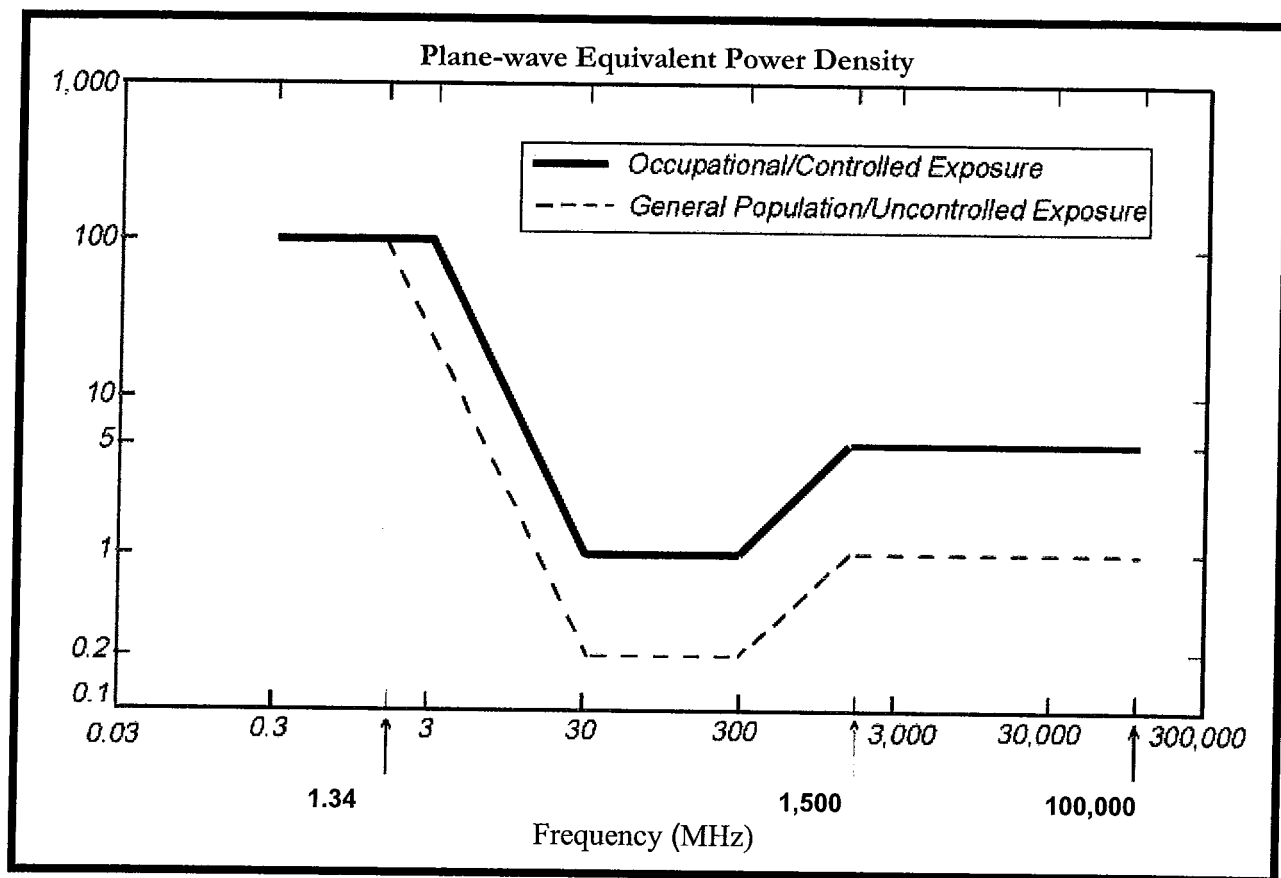
(B) Limits for General Population/Uncontrolled Exposure

| 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)

Date: December 09, 2009

Mike Peterson
Crown Castle USA Inc.
12725 Morris Road Extension, Suite 400
Alpharetta, GA 30004



Crown Castle USA Inc.
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

| | | |
|--------------------------------------|--|----------------|
| Carrier Designation: | Verizon Wireless Co-Locate | |
| | Carrier Site Number: | N/A |
| | Carrier Site Name: | N/A |
| Crown Castle Designation: | Crown Castle BU Number: | 806352 |
| | Crown Castle Site Name: | BRG 302 943052 |
| | Crown Castle JDE Job Number: | 127912 |
| | Crown Castle Work Order Number: | 308584 |
| Engineering Firm Designation: | Crown Castle USA Inc. Project Number: | 308584 |
| Site Data: | 126 Ledge Road, DARIEN, Fairfield County, CT Latitude 41° 4' 20.75", Longitude -73° 28' 41.4" 117 Foot - Monopole Tower | |

Dear Mike Peterson,

Crown Castle USA Inc. is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 308846, in accordance with application 91587, revision 3.

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

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

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

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

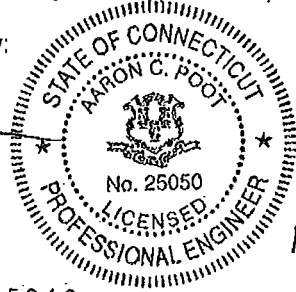
All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Christopher Volk, E.I.T./JCM

Respectfully submitted by:


Aaron C Poot, P.E.
Engineering Supervisor



12/9/09

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

RISATower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 117 ft Monopole tower designed by VALMONT in January of 1993. The tower was originally designed as a 100 ft pole, for a wind speed of 90 mph per TIA/EIA-222-E. In 2008 a 17 ft extension was added to the existing tower.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---------------------|----------------------------|--------------------|----------------------|------------------------------|----------------------|---------------------|------|
| 100 | 102 | 3 | andrew | LNx-6514DS-T4M w/ Mount Pipe | | | |
| | | 4 | decibel | DB844G65ZAXY w/Mount Pipe | | | |
| | | 2 | decibel | DB846F65ZAXY w/Mount Pipe | | | |
| | | 3 | rymsa wireless | MG D3-800TV w/ Mount Pipe | | | |

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 |
|---------------------|----------------------------|--------------------|------------------------|------------------------------|----------------------|---------------------|------|
| 117 | 120 | 3 | decibel | 932LG65VTE-B w/ Mount Pipe | 7 | 1-5/8 | 1 |
| | 117 | 1 | tower mounts | Pipe Mount [PM 501-3] | | | |
| 110 | 110 | 3 | andrew | ETW190VS12UB | 12 | 1-1/4 | 2 |
| | | 3 | rfs celwave | APX16PV-16PVL-E w/Mount Pipe | - | - | 1 |
| | | 3 | rfs celwave | ATMAA1412D-1A20 | | | 2 |
| | | 1 | tower mounts | Pipe Mount [PM 501-3] | | | 1 |
| | | 6 | decibel | DB948F85T2E-M w/Mount Pipe | 12 | 7/8 | 5 |
| 100 | 102 | 12 | mla | MLA_ANTENNA w/Mount Pipe | 12 | 1-5/8 | 3 |
| | | 6 | swedcom | ALP 9212-N w/Mount Pipe | - | - | 5 |
| | 100 | 1 | tower mounts | Platform Mount [LP 502-1] | | | 1 |
| | | 6 | generic | TMA | 12 | 1-1/4 | 1 |
| 87 | 89 | 3 | generic | diplexer | 9 | 1-5/8 | 4 |
| | | 3 | | | 3 | 1-1/4 | |
| | 87 | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | - | - | 1 |
| | 87 | 1 | tower mounts | Platform Mount [LP 713-1] | | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (In) | Note |
|---------------------|----------------------------|--------------------|----------------------------|----------------------------------|----------------------|---------------------|------|
| 81 | 81 | 3 | kathrein | 800 10504 w/ Mount Pipe | 6 | 1-5/8 | 2 |
| | | 1 | tower mounts | Pipe Mount [PM 501-3] | | | |
| | | 3 | argus technologies | LLPX310R w/ Mount Pipe | | | |
| 72 | 75 | 3 | samsung telecommunications | FDD_R6_RRH | 6 | 5/16 | 2 |
| | | 3 | | | 3 | 1/2 | |
| | | 6 | antel | BXA-80090/4 DIN FP w/ Mount Pipe | | | |
| 40 | 74 | 9 | swedcom | ALP-E 9011-DIN w/ Mount Pipe | 9 | 1-1/4 | 4 |
| | | 3 | dragonwave | A-ANT-23G-2-C | - | - | 2 |
| | | 1 | tower mounts | Platform Mount [LP 713-1] | 9 | 7/8 | 1 |
| 40 | 40 | 1 | tower mounts | Pipe Mount [PM 701-1] | 1 | 1/2 | 1 |
| | | 1 | unknown | GPS | | | |

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) MLA Equipment did not Control, was not used in analysis
- 4) SLA Equipment did not Control, was not used in analysis
- 5) Equipment to be Removed; Installed feedlines to be used with proposed loading

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) |
|---------------------|----------------------------|--------------------|----------------------|---------------|----------------------|---------------------|
| 97 | 97 | 2 | Celwave | PD100 | - | - |
| | | 6 | Sinclair | SRL410C4R105 | - | - |
| 84 | 84 | 2 | Celwave | PD100 | - | - |
| | | 6 | Sinclair | SRL410C4R105 | - | - |

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

| Document | Remarks | Reference | Source |
|--|---------------------------|-----------|----------|
| 4-GEOTECHNICAL REPORTS | Clarence Wetli Associates | 217769 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | SAC Engineering | 217771 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | Valmont Industries, Inc. | 217772 | CCISITES |

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail | |
|-------------|----------------|----------------|-----------------------|------------------|--------|----------------|-----------------|-------------|-------------|
| L1 | 117 - 110 | Pole | TP15.94x14.36x0.1875 | 1 | -0.28 | 494.43 | 5.5 | Pass | |
| L2 | 110 - 100 | Pole | TP18.2x15.94x0.1875 | 2 | -0.87 | 565.36 | 16.8 | Pass | |
| L3 | 100 - 47.4167 | Pole | TP30.09x18.2x0.25 | 3 | -10.16 | 1205.42 | 99.9 | Pass | |
| L4 | 47.4167 - 0 | Pole | TP40.3x28.5536x0.3438 | 4 | -20.23 | 2299.21 | 98.4 | Pass | |
| | | | | | | | Summary: | | |
| | | | | | | | Pole (L3) | 99.9 | Pass |
| | | | | | | | RATING = | 99.9 | Pass |

Table 6 - Tower Component Stresses vs. Capacity - LC1

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|-----------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 76.7 | Pass |
| 1 | Base Plate | 0 | 56.1 | Pass |
| 1 | Base Foundation | 0 | 77.2 | Pass |
| 1 | Flange Bolts | 100 | 13.4 | Pass |
| 1 | Flange Plate | 100 | 16.4 | Pass |
| 1 | Flange Bolts | 110 | 3.4 | Pass |
| 1 | Flange Plate | 110 | 3.5 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 99.9% |
|---|--------------|

Notes:

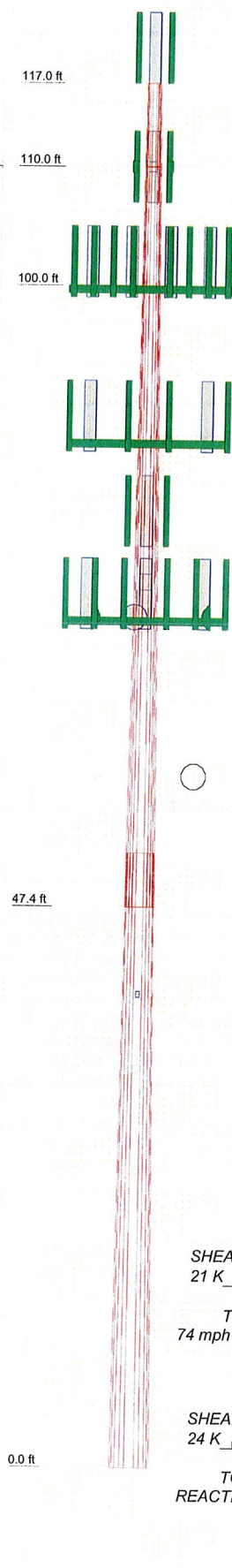
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
RISA TOWER OUTPUT

| | | | | |
|-----------------|---------|---------|-------------|---------|
| Section | 1 | 2 | 3 | 4 |
| Length (ft) | 7 | 10' | 52'6-31/32" | 52' |
| Number of Sides | 12 | 12 | 12 | 12 |
| Thickness (in) | 0.1875 | 0.1875 | 0.2500 | 0.3438 |
| Lap Splice (ft) | | | | |
| Top Dia (in) | 14.3600 | 15.9400 | 18.2000 | 28.5636 |
| Bot Dia (in) | 15.9400 | 18.2000 | 30.0900 | 40.3000 |
| Grade | | | A572-65 | |
| Weight (K) | 0.2 | 0.3 | 3.4 | 6.7 |



DESIGNED APPURTENANCE LOADING

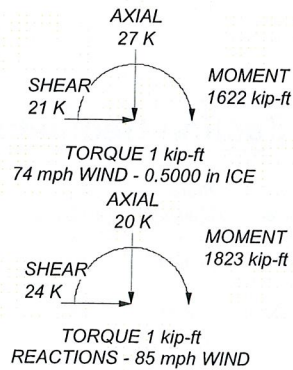
| TYPE | ELEVATION | TYPE | ELEVATION |
|--------------------------------|-----------|--------------------------------------|-----------|
| 932LG65VTE-B w/ Mount Pipe | 117 | (2) TMA | 87 |
| 932LG65VTE-B w/ Mount Pipe | 117 | (2) 7770.00 w/ Mount Pipe | 87 |
| 932LG65VTE-B w/ Mount Pipe | 117 | (2) TMA | 87 |
| Chain Mount | 117 | Platform Mount [LP 713-1] | 87 |
| APX16PV-16PVL-E w/ Mount Pipe | 110 | 800 10504 w/ Mount Pipe | 81 |
| ETW190VS12UB | 110 | 800 10504 w/ Mount Pipe | 81 |
| ATMAA1412D-1A20 | 110 | 800 10504 w/ Mount Pipe | 81 |
| APX16PV-16PVL-E w/ Mount Pipe | 110 | Chain Mount | 81 |
| ETW190VS12UB | 110 | (2) BXA-80090/4 DIN FP w/ Mount Pipe | 72 |
| ATMAA1412D-1A20 | 110 | LLPX310R w/ Mount Pipe | 72 |
| APX16PV-16PVL-E w/ Mount Pipe | 110 | FDD_R6_RRH | 72 |
| ETW190VS12UB | 110 | (2) BXA-80090/4 DIN FP w/ Mount Pipe | 72 |
| ATMAA1412D-1A20 | 110 | LLPX310R w/ Mount Pipe | 72 |
| Chain Mount | 110 | FDD_R6_RRH | 72 |
| (2) DB844G65ZAXY w/ Mount Pipe | 100 | Platform Mount [LP 713-1] | 72 |
| MG D3-800TV w/ Mount Pipe | 100 | A-ANT-23G-2-C | 72 |
| LNx-6514DS-T4M w/ Mount Pipe | 100 | A-ANT-23G-2-C | 72 |
| (2) DB846F65ZAXY w/ Mount Pipe | 100 | A-ANT-23G-2-C | 72 |
| MG D3-800TV w/ Mount Pipe | 100 | Side Arm Mount [SO 701-1] | 40 |
| LNx-6514DS-T4M w/ Mount Pipe | 100 | GPS | 40 |
| Platform Mount [LP 502-1] | 100 | | |
| (2) 7770.00 w/ Mount Pipe | 87 | | |
| (2) TMA | 87 | | |
| (2) 7770.00 w/ Mount Pipe | 87 | | |

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.9%



| | | |
|---|--|---|
| Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job: BU# 806352 Project: Client: Crown Castle USA, Inc. Code: TIA/EIA-222-F Path: | Drawn by: jmessmer Date: 12/09/09 Scale: NTS Dwg No: E-1 |
| | <small>R:\SA Models - Letters\Work Area\C\Vo\K\806352-WO308584\806352.dwg</small> | |

| | | |
|---|---|----------------------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 1 of 13 |
| | Project | Date 10:23:04 12/09/09 |
| | Client Crown Castle USA, Inc. | Designed by jmessmer |

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 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 | Section Length | Splice Length | Number of Sides | Top Diameter | Bottom Diameter | Wall Thickness | Bend Radius | Pole Grade |
|---------|------------------|----------------|---------------|-----------------|--------------|-----------------|----------------|-------------|---------------------|
| | <i>ft</i> | <i>ft</i> | <i>ft</i> | | <i>in</i> | <i>in</i> | <i>in</i> | <i>in</i> | |
| L1 | 117'-110' | 7' | 0' | 12 | 14.3600 | 15.9400 | 0.1875 | 0.7500 | A572-65 (65 ksi) |
| L2 | 110'-100' | 10' | 0' | 12 | 15.9400 | 18.2000 | 0.1875 | 0.7500 | A572-65 (65 ksi) |
| L3 | 100'-47'5"-1/32" | 52'6"-31/32" | 4'6"-31/32" | 12 | 18.2000 | 30.0900 | 0.2500 | 1.0000 | A572-65 (65 ksi) |
| L4 | 47'5"-1/32"-0' | 52' | | 12 | 28.5536 | 40.3000 | 0.3438 | 1.3750 | A572-65 (65 ksi) |

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 2 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |
| | | | | |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L1 | 14.8666 | 8.5566 | 219.3727 | 5.0738 | 7.4385 | 29.4916 | 444.5085 | 4.2113 | 3.3460 | 17.845 |
| | 16.5023 | 9.5106 | 301.2254 | 5.6394 | 8.2569 | 36.4816 | 610.3643 | 4.6808 | 3.7694 | 20.104 |
| L2 | 16.5023 | 9.5106 | 301.2254 | 5.6394 | 8.2569 | 36.4816 | 610.3643 | 4.6808 | 3.7694 | 20.104 |
| | 18.8420 | 10.8750 | 450.3655 | 6.4485 | 9.4276 | 47.7710 | 912.5625 | 5.3524 | 4.3751 | 23.334 |
| L3 | 18.8420 | 14.4498 | 594.2582 | 6.4261 | 9.4276 | 63.0339 | 1204.1282 | 7.1117 | 4.2076 | 16.83 |
| | 31.1515 | 24.0212 | 2730.0983 | 10.6827 | 15.5866 | 175.1565 | 5531.9194 | 11.8225 | 7.3941 | 29.576 |
| L4 | 30.6328 | 31.2248 | 3171.6715 | 10.0991 | 14.7908 | 214.4357 | 6426.6664 | 15.3679 | 6.7311 | 19.581 |
| | 41.7216 | 44.2266 | 9012.3634 | 14.3043 | 20.8754 | 431.7217 | 18261.4916 | 21.7670 | 9.8791 | 28.739 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _f | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|-----------------|---------------------------|------------------|--------------|----------------------------------|----------------------------------|--------------|---|---|
| ft | ft ² | in | | | | | in | in |
| L1 117'-110' | | | | 1 | 1 | 1 | | |
| L2 110'-100' | | | | 1 | 1 | 1 | | |
| L3 | | | | 1 | 1 | 1 | | |
| 100'-475'-1/32" | | | | | | | | |
| L4 | | | | 1 | 1 | 1 | | |
| 475'-1/32"-0' | | | | | | | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement | Total Number | C _A A _A | Weight |
|------------------|-------------|--------------|--------------------|-----------|--------------|-------------------------------|--------------|
| | | | | ft | | ft ² /ft | plf |
| HJ7-50A(1-5/8") | B | No | CaAa (Out Of Face) | 117' - 0' | 2 | No Ice 1/2" Ice | 0.20 2.55 |
| HJ7-50A(1-5/8") | B | No | CaAa (Out Of Face) | 117' - 0' | 5 | No Ice 1/2" Ice | 0.00 2.55 |
| LDF6-50A(1-1/4") | C | No | Inside Pole | 110' - 0' | 12 | No Ice 1/2" Ice | 0.00 0.66 |
| LDF5-50A(7/8") | C | No | Inside Pole | 100' - 0' | 12 | No Ice 1/2" Ice | 0.00 0.66 |
| LDF6-50A(1-1/4") | B | No | Inside Pole | 87' - 0' | 12 | No Ice 1/2" Ice | 0.00 0.33 |
| AVA7-50(1-5/8") | C | No | CaAa (Out Of Face) | 81' - 0' | 1 | No Ice 1/2" Ice | 0.20 2.23 |
| AVA7-50(1-5/8") | C | No | CaAa (Out Of Face) | 81' - 0' | 5 | No Ice 1/2" Ice | 0.00 2.23 |
| LDF5-50A(7/8") | A | No | Inside Pole | 72' - 0' | 9 | No Ice 1/2" Ice | 0.00 0.33 |
| 7983A(1/2") | A | No | Inside Pole | 72' - 0' | 3 | No Ice 1/2" Ice | 0.00 0.08 |
| 9207(5/16") | A | No | Inside Pole | 72' - 0' | 6 | No Ice 1/2" Ice | 0.00 0.60 |
| LDF4-50A(1/2") | B | No | CaAa (Out Of Face) | 40' - 0' | 1 | No Ice 1/2" Ice | 0.00 0.15 |
| | | | | | | | 0.84 |

Feed Line/Linear Appurtenances Section Areas

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 3 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |

| Tower Section | Tower Elevation ft | Face | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|------|--------------------------|--------------------------|--|---|-------------|
| L1 | 117'-110' | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 2.772 | 0.05 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L2 | 110'-100' | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 3.960 | 0.07 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.08 |
| L3 | 100'-47'5-1/32" | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.17 |
| | | B | 0.000 | 0.000 | 0.000 | 20.823 | 0.70 |
| | | C | 0.000 | 0.000 | 0.000 | 6.649 | 0.77 |
| L4 | 47'5-1/32"-0' | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.32 |
| | | B | 0.000 | 0.000 | 0.000 | 18.777 | 0.73 |
| | | C | 0.000 | 0.000 | 0.000 | 9.389 | 0.77 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|--------------------------|--------------------------|--|---|-------------|
| L1 | 117'-110' | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 4.172 | 0.13 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L2 | 110'-100' | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 5.960 | 0.18 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.08 |
| L3 | 100'-47'5-1/32" | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.17 |
| | | B | | 0.000 | 0.000 | 0.000 | 31.339 | 1.25 |
| | | C | | 0.000 | 0.000 | 0.000 | 10.008 | 1.08 |
| L4 | 47'5-1/32"-0' | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.32 |
| | | B | | 0.000 | 0.000 | 0.000 | 28.260 | 1.26 |
| | | C | | 0.000 | 0.000 | 0.000 | 14.130 | 1.20 |

Feed Line Center of Pressure

| Section | Elevation ft | CP_x in | CP_z in | CP_x Ice in | CP_z Ice in |
|---------|-----------------|--------------|--------------|---------------------|---------------------|
| L1 | 117'-110' | 0.3916 | 0.2261 | 0.5034 | 0.2906 |
| L2 | 110'-100' | 0.4024 | 0.2323 | 0.5240 | 0.3025 |
| L3 | 100'-47'5-1/32" | 0.2664 | 0.3178 | 0.3526 | 0.4206 |
| L4 | 47'5-1/32"-0' | 0.2136 | 0.3700 | 0.2898 | 0.5020 |

Discrete Tower Loads

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 4 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight K | |
|-------------------------------|-------------|-------------|---|-------------------------|-----------------|---|--|-------------|------|
| 932LG65VTE-B w/ Mount Pipe | A | From Leg | 1.00 | 0.0000 | 117' | No Ice | 4.49 | 4.79 | 0.04 |
| | | | 0' | | | 1/2" Ice | 4.95 | 5.50 | 0.08 |
| | | | 3' | | | | | | |
| 932LG65VTE-B w/ Mount Pipe | B | From Leg | 1.00 | 0.0000 | 117' | No Ice | 4.49 | 4.79 | 0.04 |
| | | | 0' | | | 1/2" Ice | 4.95 | 5.50 | 0.08 |
| | | | 3' | | | | | | |
| 932LG65VTE-B w/ Mount Pipe | C | From Leg | 1.00 | 0.0000 | 117' | No Ice | 4.49 | 4.79 | 0.04 |
| | | | 0' | | | 1/2" Ice | 4.95 | 5.50 | 0.08 |
| | | | 3' | | | | | | |
| Chain Mount | C | None | | 0.0000 | 117' | No Ice | 1.00 | 0.90 | 0.02 |
| | | | | | | 1/2" Ice | 1.39 | 1.42 | 0.03 |
| *** | | | | | | | | | |
| APX16PV-16PVL-E w/Mount Pipe | A | From Leg | 1.00 | 0.0000 | 110' | No Ice | 6.74 | 3.05 | 0.06 |
| | | | 0' | | | 1/2" Ice | 7.18 | 3.66 | 0.10 |
| | | | 0' | | | | | | |
| ETW190VS12UB | A | From Leg | 1.00 | 0.0000 | 110' | No Ice | 0.76 | 0.35 | 0.01 |
| | | | 0' | | | 1/2" Ice | 0.88 | 0.44 | 0.02 |
| | | | 0' | | | | | | |
| ATMAA1412D-1A20 | A | From Leg | 1.00 | 0.0000 | 110' | No Ice | 1.52 | 0.47 | 0.01 |
| | | | 0' | | | 1/2" Ice | 1.68 | 0.57 | 0.02 |
| | | | 0' | | | | | | |
| APX16PV-16PVL-E w/Mount Pipe | B | From Leg | 1.00 | 0.0000 | 110' | No Ice | 6.74 | 3.05 | 0.06 |
| | | | 0' | | | 1/2" Ice | 7.18 | 3.66 | 0.10 |
| | | | 0' | | | | | | |
| ETW190VS12UB | B | From Leg | 1.00 | 0.0000 | 110' | No Ice | 0.76 | 0.35 | 0.01 |
| | | | 0' | | | 1/2" Ice | 0.88 | 0.44 | 0.02 |
| | | | 0' | | | | | | |
| ATMAA1412D-1A20 | B | From Leg | 1.00 | 0.0000 | 110' | No Ice | 1.52 | 0.47 | 0.01 |
| | | | 0' | | | 1/2" Ice | 1.68 | 0.57 | 0.02 |
| | | | 0' | | | | | | |
| APX16PV-16PVL-E w/Mount Pipe | C | From Leg | 1.00 | 0.0000 | 110' | No Ice | 6.74 | 3.05 | 0.06 |
| | | | 0' | | | 1/2" Ice | 7.18 | 3.66 | 0.10 |
| | | | 0' | | | | | | |
| ETW190VS12UB | C | From Leg | 1.00 | 0.0000 | 110' | No Ice | 0.76 | 0.35 | 0.01 |
| | | | 0' | | | 1/2" Ice | 0.88 | 0.44 | 0.02 |
| | | | 0' | | | | | | |
| ATMAA1412D-1A20 | C | From Leg | 1.00 | 0.0000 | 110' | No Ice | 1.52 | 0.47 | 0.01 |
| | | | 0' | | | 1/2" Ice | 1.68 | 0.57 | 0.02 |
| | | | 0' | | | | | | |
| Chain Mount | C | None | | 0.0000 | 110' | No Ice | 1.00 | 0.90 | 0.02 |
| | | | | | | 1/2" Ice | 1.39 | 1.42 | 0.03 |
| *** | | | | | | | | | |
| (2) DB844G65ZAXY w/Mount Pipe | A | From Leg | 4.00 | 0.0000 | 100' | No Ice | 5.38 | 5.40 | 0.04 |
| | | | 0' | | | 1/2" Ice | 6.07 | 6.49 | 0.09 |
| | | | 2' | | | | | | |
| MG D3-800TV w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 100' | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0' | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2' | | | | | | |
| LNX-6514DS-T4M w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 100' | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0' | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2' | | | | | | |
| (2) DB846F65ZAXY w/Mount Pipe | B | From Leg | 4.00 | 0.0000 | 100' | No Ice | 7.27 | 7.82 | 0.05 |
| | | | 0' | | | 1/2" Ice | 7.88 | 9.01 | 0.11 |
| | | | 2' | | | | | | |
| MG D3-800TV w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 100' | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0' | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2' | | | | | | |

| | | | | | | | | |
|---|----------------|--|------------------------|--|--------------------|--|-------------------|--|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | | BU# 806352 | | Page | | 5 of 13 | |
| | Project | | | | Date | | 10:23:04 12/09/09 | |
| | Client | | Crown Castle USA, Inc. | | Designed by | | jmessmer | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A | | Weight | |
|--------------------------------------|-------------|-------------|----------|------|--------------------|-----------|-------------------------------|-----------------|--------|------|
| | | | Horz | Vert | | | Front | Side | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K | |
| LNX-6514DS-T4M w/ Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 100' | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0' | | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2' | | | | | | | |
| (2) DB844G65ZAXY w/Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 100' | No Ice | 5.38 | 5.40 | 0.04 |
| | | | 0' | | | | 1/2" Ice | 6.07 | 6.49 | 0.09 |
| | | | 2' | | | | | | | |
| MG D3-800TV w/ Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 100' | No Ice | 3.57 | 3.42 | 0.04 |
| | | | 0' | | | | 1/2" Ice | 3.98 | 4.12 | 0.07 |
| | | | 2' | | | | | | | |
| LNX-6514DS-T4M w/ Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 100' | No Ice | 8.57 | 7.00 | 0.06 |
| | | | 0' | | | | 1/2" Ice | 9.22 | 8.19 | 0.12 |
| | | | 2' | | | | | | | |
| Platform Mount [LP 502-1] | C | None | | | 0.0000 | 100' | No Ice | 32.35 | 32.35 | 0.93 |
| | | | | | | | 1/2" Ice | 45.67 | 45.67 | 1.19 |
| *** | | | | | | | | | | |
| (2) 7770.00 w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0' | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | 2' | | | | | | | |
| (2) TMA | A | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 0.00 | 0.45 | 0.01 |
| | | | 0' | | | | 1/2" Ice | 0.00 | 0.56 | 0.02 |
| | | | 2' | | | | | | | |
| (2) 7770.00 w/ Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0' | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | 2' | | | | | | | |
| (2) TMA | B | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 0.00 | 0.45 | 0.01 |
| | | | 0' | | | | 1/2" Ice | 0.00 | 0.56 | 0.02 |
| | | | 2' | | | | | | | |
| (2) 7770.00 w/ Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | 0' | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | 2' | | | | | | | |
| (2) TMA | C | From Leg | 4.00 | | 0.0000 | 87' | No Ice | 0.00 | 0.45 | 0.01 |
| | | | 0' | | | | 1/2" Ice | 0.00 | 0.56 | 0.02 |
| | | | 2' | | | | | | | |
| Platform Mount [LP 713-1] | C | None | | | 0.0000 | 87' | No Ice | 31.27 | 31.27 | 1.51 |
| | | | | | | | 1/2" Ice | 39.68 | 39.68 | 1.93 |
| *** | | | | | | | | | | |
| 800 10504 w/ Mount Pipe | A | From Leg | 1.00 | | 0.0000 | 81' | No Ice | 3.35 | 1.87 | 0.02 |
| | | | 0' | | | | 1/2" Ice | 3.70 | 2.20 | 0.04 |
| | | | 0' | | | | | | | |
| 800 10504 w/ Mount Pipe | B | From Leg | 1.00 | | 0.0000 | 81' | No Ice | 3.35 | 1.87 | 0.02 |
| | | | 0' | | | | 1/2" Ice | 3.70 | 2.20 | 0.04 |
| | | | 0' | | | | | | | |
| 800 10504 w/ Mount Pipe | C | From Leg | 1.00 | | 0.0000 | 81' | No Ice | 3.35 | 1.87 | 0.02 |
| | | | 0' | | | | 1/2" Ice | 3.70 | 2.20 | 0.04 |
| | | | 0' | | | | | | | |
| Chain Mount | C | None | | | 0.0000 | 81' | No Ice | 1.00 | 0.90 | 0.02 |
| | | | | | | | 1/2" Ice | 1.39 | 1.42 | 0.03 |
| | | | | | | | | | | |
| *** | | | | | | | | | | |
| (2) BXA-80090/4 DIN FP w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 72' | No Ice | 3.97 | 3.88 | 0.03 |
| | | | 0' | | | | 1/2" Ice | 4.39 | 4.49 | 0.07 |
| | | | 2' | | | | | | | |
| LLPX310R w/ Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 72' | No Ice | 5.07 | 2.98 | 0.05 |
| | | | 0' | | | | 1/2" Ice | 5.48 | 3.53 | 0.08 |
| | | | 3' | | | | | | | |
| FDD_R6_RRH | A | From Leg | 4.00 | | 0.0000 | 72' | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0' | | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 3' | | | | | | | |

| | | |
|---|---|----------------------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 6 of 13 |
| | Project | Date 10:23:04 12/09/09 |
| | Client Crown Castle USA, Inc. | Designed by jmessmer |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight |
|--------------------------------------|-------------|-------------|--------------|--------|--------------------|-----------|-----------------------|----------------------|--------|
| | | | Horz Lateral | Vert | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K |
| (2) BXA-80090/4 DIN FP w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 72' | No Ice | 3.97 | 3.88 | 0.03 |
| | | | 0' | | | 1/2" Ice | 4.39 | 4.49 | 0.07 |
| | | | 2' | | | | | | |
| LLPX310R w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 72' | No Ice | 5.07 | 2.98 | 0.05 |
| | | | 0' | | | 1/2" Ice | 5.48 | 3.53 | 0.08 |
| | | | 3' | | | | | | |
| FDD_R6_RRH | B | From Leg | 4.00 | 0.0000 | 72' | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0' | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 3' | | | | | | |
| (2) BXA-80090/4 DIN FP w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 72' | No Ice | 3.97 | 3.88 | 0.03 |
| | | | 0' | | | 1/2" Ice | 4.39 | 4.49 | 0.07 |
| | | | 2' | | | | | | |
| LLPX310R w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 72' | No Ice | 5.07 | 2.98 | 0.05 |
| | | | 0' | | | 1/2" Ice | 5.48 | 3.53 | 0.08 |
| | | | 3' | | | | | | |
| FDD_R6_RRH | C | From Leg | 4.00 | 0.0000 | 72' | No Ice | 1.79 | 0.78 | 0.03 |
| | | | 0' | | | 1/2" Ice | 1.97 | 0.92 | 0.04 |
| | | | 3' | | | | | | |
| Platform Mount [LP 713-1] | C | None | | 0.0000 | 72' | No Ice | 31.27 | 31.27 | 1.51 |
| | | | | | | 1/2" Ice | 39.68 | 39.68 | 1.93 |
| ** | | | | | | | | | |
| GPS | A | From Leg | 1.00 | 0.0000 | 40' | No Ice | 0.17 | 0.17 | 0.00 |
| | | | 0' | | | 1/2" Ice | 0.24 | 0.24 | 0.00 |
| Side Arm Mount [SO 701-1] | A | From Leg | 0.50 | 0.0000 | 40' | No Ice | 0.85 | 1.67 | 0.07 |
| | | | 0' | | | 1/2" Ice | 1.14 | 2.34 | 0.08 |
| | | | 0' | | | | | | |

Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: | | Azimuth Adjustment | 3 dB Beam Width | Elevation | Outside Diameter | Aperture Area | Weight | | |
|---------------|-------------|-----------------------|-------------|--------------|----------|--------------------|-----------------|-----------|------------------|---------------|--------|------|------|
| | | | | Horz Lateral | Vert | | | | | | | | |
| | | | ft | ft | ° | ° | ft | ft | ft ² | K | | | |
| A-ANT-23G-2-C | A | Paraboloid w/o Radome | From Leg | 4.00 | 0.0000 | 72' | 2.17 | No Ice | 3.72 | 3.72 | 0.01 | | |
| | | | -1' | | 1/2" Ice | | | | | | | 4.01 | 0.03 |
| | | | 0' | | | | | | | | | | |
| A-ANT-23G-2-C | B | Paraboloid w/o Radome | From Leg | 4.00 | 0.0000 | 72' | 2.17 | No Ice | 3.72 | 3.72 | 0.01 | | |
| | | | -1' | | 1/2" Ice | | | | | | | 4.01 | 0.03 |
| | | | 0' | | | | | | | | | | |
| A-ANT-23G-2-C | C | Paraboloid w/o Radome | From Leg | 4.00 | 0.0000 | 72' | 2.17 | No Ice | 3.72 | 3.72 | 0.01 | | |
| | | | -1' | | 1/2" Ice | | | | | | | 4.01 | 0.03 |
| | | | 0' | | | | | | | | | | |

Load Combinations

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 7 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |

| Comb. No. | Description |
|-----------|-----------------------------|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 60 deg - No Ice |
| 5 | Dead+Wind 90 deg - No Ice |
| 6 | Dead+Wind 120 deg - No Ice |
| 7 | Dead+Wind 150 deg - No Ice |
| 8 | Dead+Wind 180 deg - No Ice |
| 9 | Dead+Wind 210 deg - No Ice |
| 10 | Dead+Wind 240 deg - No Ice |
| 11 | Dead+Wind 270 deg - No Ice |
| 12 | Dead+Wind 300 deg - No Ice |
| 13 | Dead+Wind 330 deg - No Ice |
| 14 | Dead+Ice+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 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 | 117 - 110 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -0.69 | -0.07 | -0.04 |
| | | | Max. Mx | 5 | -0.28 | -8.62 | -0.02 |
| | | | Max. My | 8 | -0.28 | -0.03 | -8.61 |
| | | | Max. Vy | 5 | 1.24 | -8.62 | -0.02 |
| | | | Max. Vx | 2 | -1.24 | -0.03 | 8.58 |
| | | | Max. Torque | 22 | | | 0.02 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -1.84 | -0.18 | -0.11 |
| | | | Max. Mx | 5 | -0.87 | -34.43 | -0.04 |
| L2 | 110 - 100 | Pole | Max. My | 8 | -0.87 | -0.08 | -34.40 |
| | | | Max. Vy | 5 | 3.01 | -34.43 | -0.04 |
| | | | Max. Vx | 2 | -3.01 | -0.08 | 34.32 |
| | | | Max. Torque | 22 | | | 0.06 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | | | |
| L3 | 100 - 47.4167 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | | | |

| | | |
|---|---|----------------------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 8 of 13 |
| | Project | Date 10:23:04 12/09/09 |
| | Client Crown Castle USA, Inc. | Designed by jmessmer |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L4 | 47.4167 - 0 | Pole | Max. Compression | 14 | -15.85 | -0.74 | -0.90 |
| | | | Max. Mx | 5 | -10.17 | -696.91 | 3.02 |
| | | | Max. My | 2 | -10.16 | -1.36 | 699.15 |
| | | | Max. Vy | 5 | 18.83 | -696.91 | 3.02 |
| | | | Max. Vx | 2 | -18.94 | -1.36 | 699.15 |
| | | | Max. Torque | 2 | | | -1.34 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -27.11 | -1.09 | -1.92 |
| | | | Max. Mx | 5 | -20.23 | -1815.54 | 9.64 |
| | | | Max. My | 2 | -20.23 | -2.64 | 1821.85 |
| | | | Max. Vy | 5 | 24.23 | -1815.54 | 9.64 |
| | | | Max. Vx | 2 | -24.31 | -2.64 | 1821.85 |
| | | | Max. Torque | 2 | | | -1.44 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Pole | Max. Vert | 21 | 27.11 | 0.02 | -21.08 |
| | Max. H _x | 11 | 20.26 | 24.20 | 0.09 |
| | Max. H _z | 2 | 20.26 | -0.02 | 24.28 |
| | Max. M _x | 2 | 1821.85 | -0.02 | 24.28 |
| | Max. M _z | 5 | 1815.54 | -24.20 | 0.13 |
| | Max. Torsion | 9 | 1.20 | 12.02 | -21.02 |
| | Min. Vert | 1 | 20.26 | 0.00 | 0.00 |
| | Min. H _x | 5 | 20.26 | -24.20 | 0.13 |
| | Min. H _z | 8 | 20.26 | 0.02 | -24.24 |
| | Min. M _x | 8 | -1819.74 | 0.02 | -24.24 |
| | Min. M _z | 11 | -1814.44 | 24.20 | 0.09 |
| | Min. Torsion | 2 | -1.44 | -0.02 | 24.28 |

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 | 20.26 | 0.00 | 0.00 | 0.65 | -0.54 | 0.00 |
| Dead+Wind 0 deg - No Ice | 20.26 | 0.02 | -24.28 | -1821.85 | -2.64 | 1.44 |
| Dead+Wind 30 deg - No Ice | 20.26 | 12.22 | -20.91 | -1569.24 | -916.96 | 1.42 |
| Dead+Wind 60 deg - No Ice | 20.26 | 21.00 | -12.14 | -910.69 | -1575.82 | 1.26 |
| Dead+Wind 90 deg - No Ice | 20.26 | 24.20 | -0.13 | -9.64 | -1815.54 | 0.83 |
| Dead+Wind 120 deg - No Ice | 20.26 | 21.02 | 12.13 | 910.12 | -1576.72 | 0.38 |
| Dead+Wind 150 deg - No Ice | 20.26 | 11.99 | 21.00 | 1576.70 | -899.13 | -0.51 |
| Dead+Wind 180 deg - No Ice | 20.26 | -0.02 | 24.24 | 1819.74 | 1.54 | -1.02 |
| Dead+Wind 210 deg - No Ice | 20.26 | -12.02 | 21.02 | 1578.77 | 901.64 | -1.20 |
| Dead+Wind 240 deg - No Ice | 20.26 | -21.04 | 12.16 | 913.73 | 1577.70 | -0.85 |
| Dead+Wind 270 deg - No Ice | 20.26 | -24.20 | -0.09 | -5.45 | 1814.44 | -0.61 |
| Dead+Wind 300 deg - No Ice | 20.26 | -20.98 | -12.10 | -907.06 | 1572.63 | 0.04 |
| Dead+Wind 330 deg - No Ice | 20.26 | -12.18 | -20.89 | -1567.15 | 912.24 | 0.74 |
| Dead+Ice+Temp | 27.11 | 0.00 | 0.00 | 1.92 | -1.09 | -0.00 |
| Dead+Wind 0 deg+Ice+Temp | 27.11 | 0.02 | -21.12 | -1618.65 | -3.23 | 1.23 |
| Dead+Wind 30 deg+Ice+Temp | 27.11 | 10.62 | -18.19 | -1394.84 | -815.89 | 1.24 |

| | | | | |
|---|---------|------------------------|------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 9 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | | Designed by |

| Load Combination | Vertical | Shear _x | Shear _y | Overturning Moment, M _x | Overturning Moment, M _y | Torque |
|-----------------------------|----------|--------------------|--------------------|------------------------------------|------------------------------------|--------|
| | K | K | K | kip-ft | kip-ft | kip-ft |
| Dead+Wind 60 deg+Ice+Temp | 27.11 | 18.27 | -10.56 | -808.78 | -1402.14 | 1.11 |
| Dead+Wind 90 deg+Ice+Temp | 27.11 | 21.05 | -0.11 | -6.87 | -1615.40 | 0.74 |
| Dead+Wind 120 deg+Ice+Temp | 27.11 | 18.28 | 10.54 | 810.42 | -1402.47 | 0.33 |
| Dead+Wind 150 deg+Ice+Temp | 27.11 | 10.43 | 18.26 | 1403.34 | -800.61 | -0.44 |
| Dead+Wind 180 deg+Ice+Temp | 27.11 | -0.02 | 21.08 | 1619.75 | 1.02 | -0.89 |
| Dead+Wind 210 deg+Ice+Temp | 27.11 | -10.47 | 18.28 | 1405.45 | 802.07 | -1.06 |
| Dead+Wind 240 deg+Ice+Temp | 27.11 | -18.30 | 10.58 | 814.10 | 1402.36 | -0.78 |
| Dead+Wind 270 deg+Ice+Temp | 27.11 | -21.05 | -0.07 | -2.62 | 1613.18 | -0.56 |
| Dead+Wind 300 deg+Ice+Temp | 27.11 | -18.25 | -10.52 | -805.10 | 1397.81 | 0.00 |
| Dead+Wind 330 deg+Ice+Temp | 27.11 | -10.59 | -18.17 | -1392.73 | 810.00 | 0.62 |
| Dead+Wind 0 deg - Service | 20.26 | 0.01 | -8.40 | -630.83 | -1.28 | 0.50 |
| Dead+Wind 30 deg - Service | 20.26 | 4.23 | -7.24 | -543.30 | -318.09 | 0.50 |
| Dead+Wind 60 deg - Service | 20.26 | 7.27 | -4.20 | -315.11 | -546.38 | 0.44 |
| Dead+Wind 90 deg - Service | 20.26 | 8.38 | -0.05 | -2.90 | -629.44 | 0.29 |
| Dead+Wind 120 deg - Service | 20.26 | 7.27 | 4.20 | 315.79 | -546.69 | 0.13 |
| Dead+Wind 150 deg - Service | 20.26 | 4.15 | 7.27 | 546.75 | -311.91 | -0.18 |
| Dead+Wind 180 deg - Service | 20.26 | -0.01 | 8.39 | 630.97 | 0.17 | -0.36 |
| Dead+Wind 210 deg - Service | 20.26 | -4.16 | 7.27 | 547.48 | 312.05 | -0.42 |
| Dead+Wind 240 deg - Service | 20.26 | -7.28 | 4.21 | 317.05 | 546.30 | -0.30 |
| Dead+Wind 270 deg - Service | 20.26 | -8.38 | -0.03 | -1.45 | 628.33 | -0.21 |
| Dead+Wind 300 deg - Service | 20.26 | -7.26 | -4.19 | -313.85 | 544.54 | 0.01 |
| Dead+Wind 330 deg - Service | 20.26 | -4.22 | -7.23 | -542.57 | 315.72 | 0.26 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|---------|------------------|---------|--------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | | |
| 1 | 0.00 | -20.26 | 0.00 | 0.00 | 20.26 | 0.00 | 0.000% | |
| 2 | 0.02 | -20.26 | -24.28 | -0.02 | 20.26 | 24.28 | 0.000% | |
| 3 | 12.22 | -20.26 | -20.91 | -12.22 | 20.26 | 20.91 | 0.000% | |
| 4 | 21.00 | -20.26 | -12.14 | -21.00 | 20.26 | 12.14 | 0.000% | |
| 5 | 24.20 | -20.26 | -0.13 | -24.20 | 20.26 | 0.13 | 0.000% | |
| 6 | 21.02 | -20.26 | 12.13 | -21.02 | 20.26 | -12.13 | 0.000% | |
| 7 | 11.99 | -20.26 | 21.00 | -11.99 | 20.26 | -21.00 | 0.000% | |
| 8 | -0.02 | -20.26 | 24.24 | 0.02 | 20.26 | -24.24 | 0.000% | |
| 9 | -12.02 | -20.26 | 21.02 | 12.02 | 20.26 | -21.02 | 0.000% | |
| 10 | -21.04 | -20.26 | 12.16 | 21.04 | 20.26 | -12.16 | 0.000% | |
| 11 | -24.20 | -20.26 | -0.09 | 24.20 | 20.26 | 0.09 | 0.000% | |
| 12 | -20.98 | -20.26 | -12.10 | 20.98 | 20.26 | 12.10 | 0.000% | |
| 13 | -12.18 | -20.26 | -20.89 | 12.18 | 20.26 | 20.89 | 0.000% | |
| 14 | 0.00 | -27.11 | 0.00 | -0.00 | 27.11 | -0.00 | 0.000% | |
| 15 | 0.02 | -27.11 | -21.12 | -0.02 | 27.11 | 21.12 | 0.000% | |
| 16 | 10.62 | -27.11 | -18.19 | -10.62 | 27.11 | 18.19 | 0.000% | |
| 17 | 18.27 | -27.11 | -10.56 | -18.27 | 27.11 | 10.56 | 0.000% | |
| 18 | 21.05 | -27.11 | -0.11 | -21.05 | 27.11 | 0.11 | 0.000% | |
| 19 | 18.28 | -27.11 | 10.54 | -18.28 | 27.11 | -10.54 | 0.000% | |
| 20 | 10.43 | -27.11 | 18.26 | -10.43 | 27.11 | -18.26 | 0.000% | |
| 21 | -0.02 | -27.11 | 21.08 | 0.02 | 27.11 | -21.08 | 0.000% | |
| 22 | -10.47 | -27.11 | 18.28 | 10.47 | 27.11 | -18.28 | 0.000% | |
| 23 | -18.30 | -27.11 | 10.58 | 18.30 | 27.11 | -10.58 | 0.000% | |
| 24 | -21.05 | -27.11 | -0.07 | 21.05 | 27.11 | 0.07 | 0.000% | |
| 25 | -18.25 | -27.11 | -10.52 | 18.25 | 27.11 | 10.52 | 0.000% | |
| 26 | -10.59 | -27.11 | -18.17 | 10.59 | 27.11 | 18.17 | 0.000% | |
| 27 | 0.01 | -20.26 | -8.40 | -0.01 | 20.26 | 8.40 | 0.000% | |
| 28 | 4.23 | -20.26 | -7.24 | -4.23 | 20.26 | 7.24 | 0.000% | |
| 29 | 7.27 | -20.26 | -4.20 | -7.27 | 20.26 | 4.20 | 0.000% | |
| 30 | 8.38 | -20.26 | -0.05 | -8.38 | 20.26 | 0.05 | 0.000% | |

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 10 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 31 | 7.27 | -20.26 | 4.20 | -7.27 | 20.26 | -4.20 | 0.000% |
| 32 | 4.15 | -20.26 | 7.27 | -4.15 | 20.26 | -7.27 | 0.000% |
| 33 | -0.01 | -20.26 | 8.39 | 0.01 | 20.26 | -8.39 | 0.000% |
| 34 | -4.16 | -20.26 | 7.27 | 4.16 | 20.26 | -7.27 | 0.000% |
| 35 | -7.28 | -20.26 | 4.21 | 7.28 | 20.26 | -4.21 | 0.000% |
| 36 | -8.38 | -20.26 | -0.03 | 8.38 | 20.26 | 0.03 | 0.000% |
| 37 | -7.26 | -20.26 | -4.19 | 7.26 | 20.26 | 4.19 | 0.000% |
| 38 | -4.22 | -20.26 | -7.23 | 4.22 | 20.26 | 7.23 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 4 | 0.00000001 | 0.00000001 |
| 2 | Yes | 4 | 0.00000001 | 0.00093665 |
| 3 | Yes | 5 | 0.00000001 | 0.00030361 |
| 4 | Yes | 5 | 0.00000001 | 0.00026982 |
| 5 | Yes | 4 | 0.00000001 | 0.00038432 |
| 6 | Yes | 5 | 0.00000001 | 0.00028635 |
| 7 | Yes | 5 | 0.00000001 | 0.00029058 |
| 8 | Yes | 4 | 0.00000001 | 0.00072158 |
| 9 | Yes | 5 | 0.00000001 | 0.00026806 |
| 10 | Yes | 5 | 0.00000001 | 0.00029787 |
| 11 | Yes | 4 | 0.00000001 | 0.00039031 |
| 12 | Yes | 5 | 0.00000001 | 0.00028303 |
| 13 | Yes | 5 | 0.00000001 | 0.00027477 |
| 14 | Yes | 4 | 0.00000001 | 0.00000001 |
| 15 | Yes | 5 | 0.00000001 | 0.00011019 |
| 16 | Yes | 5 | 0.00000001 | 0.00084691 |
| 17 | Yes | 5 | 0.00000001 | 0.00077946 |
| 18 | Yes | 5 | 0.00000001 | 0.00009168 |
| 19 | Yes | 5 | 0.00000001 | 0.00081341 |
| 20 | Yes | 5 | 0.00000001 | 0.00081891 |
| 21 | Yes | 5 | 0.00000001 | 0.00010133 |
| 22 | Yes | 5 | 0.00000001 | 0.00077485 |
| 23 | Yes | 5 | 0.00000001 | 0.00083698 |
| 24 | Yes | 5 | 0.00000001 | 0.00009189 |
| 25 | Yes | 5 | 0.00000001 | 0.00079918 |
| 26 | Yes | 5 | 0.00000001 | 0.00078428 |
| 27 | Yes | 4 | 0.00000001 | 0.00020473 |
| 28 | Yes | 5 | 0.00000001 | 0.00003539 |
| 29 | Yes | 4 | 0.00000001 | 0.00084254 |
| 30 | Yes | 4 | 0.00000001 | 0.00010696 |
| 31 | Yes | 4 | 0.00000001 | 0.00093652 |
| 32 | Yes | 4 | 0.00000001 | 0.00096296 |
| 33 | Yes | 4 | 0.00000001 | 0.00016821 |
| 34 | Yes | 4 | 0.00000001 | 0.00083200 |
| 35 | Yes | 5 | 0.00000001 | 0.00003418 |
| 36 | Yes | 4 | 0.00000001 | 0.00009659 |
| 37 | Yes | 4 | 0.00000001 | 0.00090742 |
| 38 | Yes | 4 | 0.00000001 | 0.00085925 |

| | | | | |
|---|---------|------------------------|------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 11 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | | Designed by |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation <i>ft</i> | Horz. Deflection <i>in</i> | Gov. Load Comb. | Tilt <i>°</i> | Twist <i>°</i> |
|-------------|------------------------|-------------------------------|-----------------|------------------|-------------------|
| L1 | 117 - 110 | 29.835 | 33 | 2.1092 | 0.0076 |
| L2 | 110 - 100 | 26.751 | 33 | 2.0964 | 0.0075 |
| L3 | 100 - 47.4167 | 22.409 | 33 | 2.0426 | 0.0074 |
| L4 | 52 - 0 | 5.935 | 35 | 1.0682 | 0.0016 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation <i>ft</i> | Appurtenance | Gov. Load Comb. | Deflection <i>in</i> | Tilt <i>°</i> | Twist <i>°</i> | Radius of Curvature <i>ft</i> |
|------------------------|-------------------------------|-----------------|-------------------------|------------------|-------------------|----------------------------------|
| 117' | 932LG65VTE-B w/ Mount Pipe | 33 | 29.835 | 2.1092 | 0.0076 | 30050 |
| 110' | APX16PV-16PVL-E w/Mount Pipe | 33 | 26.751 | 2.0964 | 0.0075 | 20039 |
| 100' | (2) DB844G65ZAXY w/Mount Pipe | 33 | 22.409 | 2.0426 | 0.0074 | 6125 |
| 87' | (2) 7770.00 w/ Mount Pipe | 35 | 17.068 | 1.8396 | 0.0064 | 3761 |
| 81' | 800 10504 w/ Mount Pipe | 35 | 14.774 | 1.7078 | 0.0056 | 3209 |
| 72' | A-ANT-23G-2-C | 35 | 11.591 | 1.4911 | 0.0043 | 2631 |
| 40' | GPS | 35 | 3.661 | 0.9446 | 0.0009 | 2440 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation <i>ft</i> | Horz. Deflection <i>in</i> | Gov. Load Comb. | Tilt <i>°</i> | Twist <i>°</i> |
|-------------|------------------------|-------------------------------|-----------------|------------------|-------------------|
| L1 | 117 - 110 | 85.883 | 2 | 6.0736 | 0.0221 |
| L2 | 110 - 100 | 77.021 | 2 | 6.0369 | 0.0220 |
| L3 | 100 - 47.4167 | 64.543 | 2 | 5.8830 | 0.0216 |
| L4 | 52 - 0 | 17.119 | 10 | 3.0816 | 0.0046 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation <i>ft</i> | Appurtenance | Gov. Load Comb. | Deflection <i>in</i> | Tilt <i>°</i> | Twist <i>°</i> | Radius of Curvature <i>ft</i> |
|------------------------|-------------------------------|-----------------|-------------------------|------------------|-------------------|----------------------------------|
| 117' | 932LG65VTE-B w/ Mount Pipe | 2 | 85.883 | 6.0736 | 0.0221 | 10702 |
| 110' | APX16PV-16PVL-E w/Mount Pipe | 2 | 77.021 | 6.0369 | 0.0220 | 7142 |
| 100' | (2) DB844G65ZAXY w/Mount Pipe | 2 | 64.543 | 5.8830 | 0.0216 | 2182 |
| 87' | (2) 7770.00 w/ Mount Pipe | 2 | 49.178 | 5.3528 | 0.0186 | 1329 |
| 81' | 800 10504 w/ Mount Pipe | 2 | 42.572 | 5.0065 | 0.0164 | 1131 |
| 72' | A-ANT-23G-2-C | 10 | 33.406 | 4.4174 | 0.0125 | 924 |
| 40' | GPS | 10 | 10.565 | 2.4439 | 0.0022 | 849 |

| | | |
|---|---|----------------------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job BU# 806352 | Page 12 of 13 |
| | Project | Date 10:23:04 12/09/09 |
| | Client Crown Castle USA, Inc. | Designed by jmessmer |

Compression Checks

Pole Design Data

| Section No. | Elevation <i>ft</i> | Size | L <i>ft</i> | L _u <i>ft</i> | Kl/r | F _a <i>ksi</i> | A <i>in²</i> | Actual P <i>K</i> | Allow. P _a <i>K</i> | Ratio <i>P/P_a</i> |
|-------------|------------------------|-----------------------|----------------|-----------------------------|------|------------------------------|----------------------------|----------------------|-----------------------------------|---------------------------------|
| L1 | 117 - 110 (1) | TP15.94x14.36x0.1875 | 7' | 0' | 0.0 | 39.000 | 9.5106 | -0.28 | 370.91 | 0.001 |
| L2 | 110 - 100 (2) | TP18.2x15.94x0.1875 | 10' | 0' | 0.0 | 39.000 | 10.8750 | -0.87 | 424.13 | 0.002 |
| L3 | 100 - 47.4167 (3) | TP30.09x18.2x0.25 | 52'-6-31/3" | 0' | 0.0 | 39.000 | 23.1869 | -10.16 | 904.29 | 0.011 |
| L4 | 47.4167 - 0 (4) | TP40.3x28.5536x0.3438 | 52' | 0' | 0.0 | 39.000 | 44.2266 | -20.23 | 1724.84 | 0.012 |

Pole Bending Design Data

| Section No. | Elevation <i>ft</i> | Size | Actual M _x <i>kip-ft</i> | Actual f _{bx} <i>ksi</i> | Allow. F _{bx} <i>ksi</i> | Ratio <i>f_{bx}/F_{bx}</i> | Actual M _y <i>kip-ft</i> | Actual f _{by} <i>ksi</i> | Allow. F _{by} <i>ksi</i> | Ratio <i>f_{by}/F_{by}</i> |
|-------------|------------------------|-----------------------|--|--------------------------------------|--------------------------------------|---|--|--------------------------------------|--------------------------------------|---|
| L1 | 117 - 110 (1) | TP15.94x14.36x0.1875 | 8.62 | 2.837 | 39.000 | 0.073 | 0.00 | 0.000 | 39.000 | 0.000 |
| L2 | 110 - 100 (2) | TP18.2x15.94x0.1875 | 34.44 | 8.651 | 39.000 | 0.222 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 100 - 47.4167 (3) | TP30.09x18.2x0.25 | 699.38 | 51.440 | 39.000 | 1.319 | 0.00 | 0.000 | 39.000 | 0.000 |
| L4 | 47.4167 - 0 (4) | TP40.3x28.5536x0.3438 | 1823.20 | 50.677 | 39.000 | 1.299 | 0.00 | 0.000 | 39.000 | 0.000 |

Pole Shear Design Data

| Section No. | Elevation <i>ft</i> | Size | Actual V <i>K</i> | Actual f _v <i>ksi</i> | Allow. F _v <i>ksi</i> | Ratio <i>f_v/F_v</i> | Actual T <i>kip-ft</i> | Actual f _{vt} <i>ksi</i> | Allow. F _{vt} <i>ksi</i> | Ratio <i>f_{vt}/F_{vt}</i> |
|-------------|------------------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|---|---------------------------|--------------------------------------|--------------------------------------|---|
| L1 | 117 - 110 (1) | TP15.94x14.36x0.1875 | 1.24 | 0.130 | 26.000 | 0.010 | 0.00 | 0.000 | 26.000 | 0.000 |
| L2 | 110 - 100 (2) | TP18.2x15.94x0.1875 | 3.01 | 0.277 | 26.000 | 0.022 | 0.00 | 0.000 | 26.000 | 0.000 |
| L3 | 100 - 47.4167 (3) | TP30.09x18.2x0.25 | 18.94 | 0.817 | 26.000 | 0.064 | 0.75 | 0.026 | 26.000 | 0.001 |
| L4 | 47.4167 - 0 (4) | TP40.3x28.5536x0.3438 | 24.33 | 0.550 | 26.000 | 0.043 | 0.85 | 0.011 | 26.000 | 0.000 |

Pole Interaction Design Data

| Section No. | Elevation <i>ft</i> | Ratio <i>P/P_a</i> | Ratio <i>f_{bx}/F_{bx}</i> | Ratio <i>f_{by}/F_{by}</i> | Ratio <i>f_v/F_v</i> | Ratio <i>f_{vt}/F_{vt}</i> | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|------------------------|---------------------------------|---|---|---|---|--------------------|---------------------|-----------|
| L1 | 117 - 110 (1) | 0.001 | 0.073 | 0.000 | 0.010 | 0.000 | 0.074 | 1.333 | H1-3+VT ✓ |
| L2 | 110 - 100 (2) | 0.002 | 0.222 | 0.000 | 0.022 | 0.000 | 0.224 | 1.333 | H1-3+VT ✓ |
| L3 | 100 - 47.4167 (3) | 0.011 | 1.319 | 0.000 | 0.064 | 0.001 | 1.331 | 1.333 | H1-3+VT ✓ |

| | | | | |
|---|---------|------------------------|-------------|-------------------|
| RISATower Crown Castle USA, Inc. 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254 | Job | BU# 806352 | Page | 13 of 13 |
| | Project | | Date | 10:23:04 12/09/09 |
| | Client | Crown Castle USA, Inc. | Designed by | jmessmer |

| 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 |
|-------------|-----------------|--------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------------|--------------------|---------------------|-----------|
| L4 | 47.4167 - 0 (4) | 0.012 | 1.299 | 0.000 | 0.043 | 0.000 | 1.312 | 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 | 117 - 110 | Pole | TP15.94x14.36x0.1875 | 1 | -0.28 | 494.43 | 5.5 | Pass | |
| L2 | 110 - 100 | Pole | TP18.2x15.94x0.1875 | 2 | -0.87 | 565.36 | 16.8 | Pass | |
| L3 | 100 - 47.4167 | Pole | TP30.09x18.2x0.25 | 3 | -10.16 | 1205.42 | 99.9 | Pass | |
| L4 | 47.4167 - 0 | Pole | TP40.3x28.5536x0.3438 | 4 | -20.23 | 2299.21 | 98.4 | Pass | |
| | | | | | | | Summary | | |
| | | | | | | | Pole (L3) | 99.9 | Pass |
| | | | | | | | RATING = | 99.9 | Pass |

APPENDIX B
BASE LEVEL DRAWING

(SLA)
(3) 1-7/8" TO 87 FT LEVEL
(7) 1-5/8" TO 87 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 87 FT LEVEL

(MLA)
(9) 1-1/4" 72 FT LEVEL
(INSTALLED)
(9) 7/8" TO 72 FT LEVEL

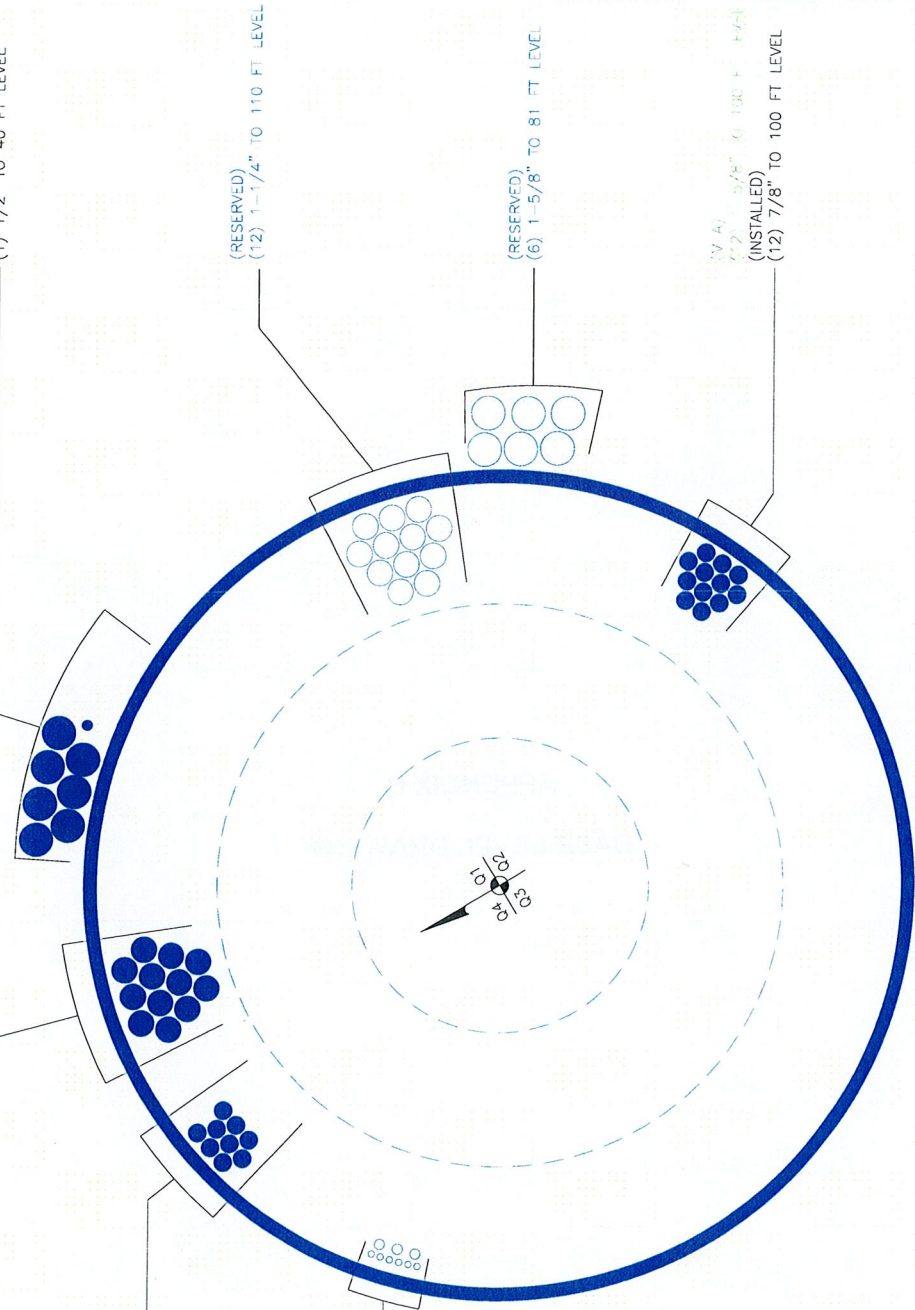
(RESERVED)
(3) 1/2" TO 72 FT LEVEL
(6) 5/16" TO 72 FT LEVEL

(INSTALLED)
(7) 1-5/8" TO 117 FT LEVEL
(INSTALLED)
(1) 1/2" TO 40 FT LEVEL

(RESERVED)
(12) 1-1/4" TO 110 FT LEVEL

(RESERVED)
(6) 1-5/8" TO 81 FT LEVEL

(V A)
(7) 5/8" TO 100 FT LEVEL
(INSTALLED)
(12) 7/8" TO 100 FT LEVEL



APPENDIX C
ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

| | |
|---------------------------|-------|
| BU#: 806352 | |
| Site Name: BRG 302 943052 | |
| App #: 91587 Rev. 1 | |
| Connection Type: | Butt |
| Pole Manufacturer: | Other |

| Reactions | | |
|------------|-------|---------|
| Moment: | 34.44 | ft-kips |
| Axial: | 0.87 | kips |
| Shear: | 3.01 | kips |
| Elevation: | 100 | feet |

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

| Bolt Data | | | |
|-----------------|------|---------------|-------|
| Qty: | 12 | Bolt Fu: | 120 |
| Diameter (in.): | 1 | Bolt Fy: | 92 |
| Bolt Material: | A325 | Bolt Fty: | 44.00 |
| N/A: | 75 | <-- Disregard | |
| N/A: | 55 | <-- Disregard | |
| Circle (in.): | 22 | | |

Flange Bolt Results

| | |
|---|-------------------|
| Bolt Tension Capacity, B: | 46.07 kips |
| Max Bolt <u>directly</u> applied T: | 6.19 Kips |
| Min. PL "tc" for B cap. w/o Pry: | Stiffened in |
| Min PL "treq" for actual T w/ Pry: | Stiffened in |
| Min PL "t1" for actual T w/o Pry: | Stiffened in |
| T allowable | 46.07 kips |
| Prying Force, Q: | 0.00 kips |
| Total Bolt Tension=T+Q: | 6.19 kips |
| Non-Prying Bolt Stress Ratio, T/B: | 13.4% Pass |

| |
|--------------|
| Stiffened |
| Service, ASD |
| Fty*ASIF |

| Plate Data | | |
|-------------------|------|-----|
| Diam: | 28 | in |
| Thick, t: | 1 | in |
| Grade (Fy): | 36 | ksi |
| Strength, Fu: | 58 | ksi |
| Single-Rod B-eff: | 4.76 | in |

Exterior Flange Plate Results

| | |
|--|-------------------|
| Flexural Check | |
| Compression Side Plate Stress: | 5.9 ksi |
| Allowable Plate Stress: | 36.0 ksi |
| Compression Plate Stress Ratio: | 16.4% Pass |
| Stiffened | |
| Tension Side Stress Ratio, (treq/t)^2: | N/A |

| |
|--------------------|
| Stiffened |
| Service, ASD |
| 0.75*Fy*ASIF |
| Comp. Y.L. Length: |
| N/A, Roark |

| Stiffener Data (Welding at Both Sides) | | |
|--|--------|---------------|
| Config: | 1 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.25 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.1875 | in |
| Fillet V. Weld: | 0.1875 | in |
| Width: | 6 | in |
| Height: | 12 | in |
| Thick: | 1 | in |
| Notch: | 0 | in |
| Grade: | 36 | ksi |
| Weld str.: | 70 | ksi |

Stiffener Results

| | |
|---------------------------------------|-------------------|
| Horizontal Weld : | 15.4% Pass |
| Vertical Weld: | 7.1% Pass |
| Plate Flex+Shear, fb/Fb+(fv/Fv)^2: | 1.0% Pass |
| Plate Tension+Shear, ft/Ft+(fv/Fv)^2: | 3.8% Pass |
| Plate Comp. (AISC Bracket): | 5.4% Pass |
| Pole Results | |
| Pole Punching Shear Check: | 2.1% Pass |

| Pole Data | | |
|--------------------|--------|--------------|
| Diam: | 18.2 | in |
| Thick: | 0.1875 | in |
| Grade: | 65 | ksi |
| # of Sides: | 0 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

| Stress Increase Factor | |
|------------------------|-------|
| ASIF: | 1.333 |

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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

| | |
|---------------------------|-------|
| BU#: 806352 | |
| Site Name: BRG 302 943052 | |
| App #: 91587 Rev. 1 | |
| Connection Type: | Butt |
| Pole Manufacturer: | Other |

| Reactions | | |
|------------|------|---------|
| Moment: | 8.62 | ft-kips |
| Axial: | 0.28 | kips |
| Shear: | 1.24 | kips |
| Elevation: | 110 | feet |

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

| Bolt Data | | |
|-----------------|------|-----------------|
| Qty: | 12 | |
| Diameter (in.): | 1 | Bolt Fu: 120 |
| Bolt Material: | A325 | Bolt Fy: 92 |
| N/A: | 75 | <-- Disregard |
| N/A: | 55 | <-- Disregard |
| Circle (in.): | 22 | Bolt Fty: 44.00 |

Flange Bolt Results

| | |
|------------------------------------|------------------|
| Bolt Tension Capacity, B: | 46.07 kips |
| Max Bolt directly applied T: | 1.54 Kips |
| Min. PL "tc" for B cap. w/o Pry: | Stiffened in |
| Min PL "treq" for actual T w/ Pry: | Stiffened in |
| Min PL "t1" for actual T w/o Pry: | Stiffened in |
| T allowable | 46.07 kips |
| Prying Force, Q: | 0.00 kips |
| Total Bolt Tension=T+Q: | 1.54 kips |
| Non-Prying Bolt Stress Ratio, T/B: | 3.4% Pass |

| |
|--------------|
| Stiffened |
| Service, ASD |
| Fty*ASIF |

| Plate Data | | |
|-------------------|------|-----|
| Diam: | 28 | in |
| Thick, t: | 1 | in |
| Grade (Fy): | 36 | ksi |
| Strength, Fu: | 58 | ksi |
| Single-Rod B-eff: | 4.17 | in |

Exterior Flange Plate Results

| | |
|--|------------------|
| Flexural Check | Stiffened |
| Compression Side Plate Stress: | 1.2 ksi |
| Allowable Plate Stress: | 36.0 ksi |
| Compression Plate Stress Ratio: | 3.4% Pass |
| Stiffened | |
| Tension Side Stress Ratio, (treq/t)^2: | N/A |

| |
|--------------------|
| Stiffened |
| Service, ASD |
| 0.75*Fy*ASIF |
| Comp. Y.L. Length: |
| N/A, Roark |

| Stiffener Data (Welding at Both Sides) | | |
|--|--------|---------------|
| Config: | 1 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.25 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.1875 | in |
| Fillet V. Weld: | 0.1875 | in |
| Width: | 6 | in |
| Height: | 12 | in |
| Thick: | 1 | in |
| Notch: | 0 | in |
| Grade: | 36 | ksi |
| Weld str.: | 70 | ksi |

Stiffener Results

| | |
|---------------------------------------|------------------|
| Horizontal Weld : | 3.5% Pass |
| Vertical Weld: | 2.0% Pass |
| Plate Flex+Shear, fb/Fb+(fv/Fv)^2: | 0.3% Pass |
| Plate Tension+Shear, ft/Ft+(fv/Fv)^2: | 0.8% Pass |
| Plate Comp. (AISC Bracket): | 1.5% Pass |
| Pole Results | |
| Pole Punching Shear Check: | 0.7% Pass |

| Pole Data | | |
|--------------------|--------|--------------|
| Diam: | 15.94 | in |
| Thick: | 0.1875 | in |
| Grade: | 65 | ksi |
| # of Sides: | 0 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

| Stress Increase Factor | | |
|------------------------|-------|--|
| ASIF: | 1.333 | |

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

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

Monopole Block Foundation

Checks capacity of monolithic block foundation for a monopole tower per TIA/EIA-222-F

BU #: 806352
 Site Name: BRG 302 943052
 App No.: 91587 Rev. 1

CROWN

| Design Reactions | | |
|--------------------|---------|---------|
| Shear, S: | 24.00 | kips |
| Moment, M: | 1823.00 | ft*kips |
| Height, H: | 117.00 | ft |
| Weight, W: | 20.00 | kips |
| Base Diameter, BD: | 40.3 | in |

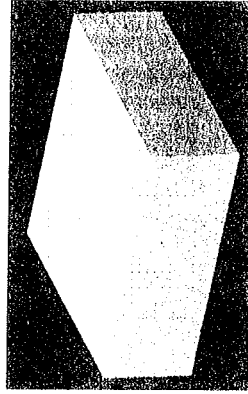
| Foundation Dimensions | | |
|---------------------------|-------|----|
| Depth, D: | 5.0 | ft |
| Block Width, W: | 20.0 | ft |
| Neglected Depth, N: | 2.0 | ft |
| Ext. Above Grade, E: | 0.0 | ft |
| Anchor Steel Length, Lst: | 113.0 | in |
| Clear Cover, cc: | 4.0 | in |

| Soil Properties | | |
|----------------------------------|-------|-----|
| Soil Unit Weight, γ : | 0.130 | kcf |
| Allowable Bearing, Bc: | 6.000 | ksf |
| Int. Angle of Friction, Φ : | 35.00 | deg |
| Cohesion, Cc: | 0.000 | ksf |
| Passive Pressure, Pp: | 0.000 | kcf |
| Base Friction, μ : | 0.4 | |
| Seismic Zone, z: | 1 | |

| Material Properties | | |
|--------------------------------|-------|-----|
| Rebar Yield Strength, Fy: | 60000 | psi |
| Concrete Strength, F'c: | 3000 | psi |
| Concrete Density, δ_c : | 0.150 | kcf |

| Rebar Properties | | |
|---------------------|----|---|
| Pad Rebar Size, sp: | 11 | |
| Rebar Quantity, mp: | 16 | 9 |

| Design Checks | | | | |
|-----------------------------------|-----------------------|----------------|-------|-------|
| | Capacity/Availability | Demands/Limits | Check | % |
| Shear (ksf) | 56.00 | 24.00 | OK | 42.9% |
| Overturning (ft*kips) | 2515.51 | 1943.00 | OK | 77.2% |
| Bearing (ksf) | 6.00 | 2.72 | OK | 45.3% |
| Shear - 1-Way (kips) | 1453.74 | 447.13 | OK | 30.8% |
| Pad Rebar Area (in ²) | 24.98 | 12.96 | OK | N/A |
| Bar Spacing (in) | 13.96 | 18 > Bs > 2 | OK | N/A |
| Development Length (in) | 116.00 | 60.24 | OK | N/A |



| Modification Checks | | | | |
|--|-----------------------|----------------|----------|--|
| | Capacity/Availability | Demands/Limits | Check | |
| Minimum Extra Thickness (in): | 0.00 | 0.00 | Not Used | |
| Pad Rebar Area-short (in ²): | 8.84 | 0.00 | Not Used | |
| Pad Rebar Area-long (in ²): | 2.21 | 0.00 | Not Used | |
| Pad Rebar Spacing-short (in): | 11.42 | 18 > Bs > 2 | Not Used | |
| Pad Rebar Spacing-long (in): | 57.06 | 18 > Bs > 2 | Not Used | |
| End Cap Width (in): | 0.00 | 0.00 | Not Used | |
| EC Rebar Area (in ²): | 4.81 | 0.00 | Not Used | |
| EC Rebar Spacing (in): | -2.02 | 18 > Bs > 2 | Not Used | |
| Tie Spacing (in): | 11.71 | 232 > s > 4.5 | Not Used | |
| Dowel Area (in ²): | 8.84 | 0.00 | Not Used | |
| Dowel Embedment (in): | 15.00 | 6.00 | Not Used | |
| Shear Strength of Cone (kips): | 67.46 | 23.88 | Not Used | |
| Dowel Edge Distance (in): | 12.00 | 14.51 | Not Used | |
| Dowel Spacing (in): | 24.00 | 30.00 | Not Used | |
| Dowel Edge Distance (vert) (in): | 30.00 | 14.51 | Not Used | |
| Dowel Devel. Length (in): | -4.00 | 15.38 | Not Used | |

| Modifications | | | | |
|-----------------------------|----|----|-------------------------|----|
| Pad Thickness, Te: | 0 | in | End Cap Width, We: | 0 |
| Revised Pad Thickness, Tr: | 5 | ft | Revised Width, Wk: | 20 |
| Pad Rebar Size, Se: | 6 | | EC Rebar Size, Sec: | 7 |
| Rebar Quantity (long), me: | 20 | 0 | EC Rebar Quantity, mec: | 8 |
| Rebar Quantity (short), me: | 5 | 0 | EC Tie Size, Sect: | 4 |
| Dowel Size, Sed: | 7 | | Tie Quantity, mecd: | 20 |
| Dowel Quantity, mecd: | 20 | 0 | EC Dowel Size, Secd: | 6 |
| | | | Dowel Quantity, mecd: | 20 |
| | | | Rows of Dowels, Nrd: | 2 |
| | | | Dowel Depth, decd: | 15 |
| | | | Edge Distance, eecd: | 12 |

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

TIA Rev F

Site Data

| |
|---------------------------|
| BU#: 806352 |
| Site Name: BRG 302 943052 |
| App #: 91587 Rev. 1 |
| Pole Manufacturer: Other |

| Reactions | | |
|-----------|------|---------|
| Moment: | 1823 | ft-kips |
| Axial: | 20 | kips |
| Shear: | 24 | kips |

Anchor Rod Data

| | | |
|----------------|--------|-----|
| Qty: | 12 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | ksi |
| Yield (Fy): | 75 | ksi |
| Bolt Circle: | 48.22 | in |

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

Anchor Rod Results

Maximum Rod Tension: 149.6 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 76.7% **Pass**

| |
|--------------|
| Rigid |
| Service, ASD |
| Fty*ASIF |

Plate Data

| | | |
|-------------------|-------|-----|
| Diam: | 54.22 | in |
| Thick: | 2.5 | in |
| Grade: | 60 | ksi |
| Single-Rod B-eff: | 10.80 | in |

Base Plate Results

Base Plate Stress: 33.6 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 56.1% **Pass**

Flexural Check

| |
|--------------|
| Rigid |
| Service ASD |
| 0.75*Fy*ASIF |
| Y.L. Length: |
| 26.48 |

Stiffener Data (Welding at both sides)

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

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

Pole Data

| | | |
|--------------------|---------|--------------|
| Diam: | 40.3 | in |
| Thick: | 0.34375 | in |
| Grade: | 65 | ksi |
| # of Sides: | 12 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

Stress Increase Factor

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

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

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