ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

June 3, 2011

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

Re: **Notice of Completion of Construction Activity**
EM-VER-101-100119 – 15 Dwight Street, North Haven, Connecticut
EM-VER-014-101108 – 850 West Main Street, Branford, Connecticut
EM-VER-083-101118 – 213 Court Street, Middletown, Connecticut
EM-VER-045-110224 – 93 Roxbury Road, Niantic (East Lyme), 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.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso

Chairman

March 21, 2011

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

RE: **EM-VER-045-110224** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 93 Roxbury Road, East Lyme, 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 with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 24, 2011. 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. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Paul M. Formica, First Selectman, Town of East Lyme
Gary Goeschel, Director of Planning, Town of East Lyme
Crown Castle USA, Inc.

EM-VER-045-110224

ROBINSON & COLE LLP

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ORIGINAL

February 24, 2011

Via Hand Delivery

RECEIVED
FEB 24 2011
CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap**
93 Roxbury Road, East Lyme, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 148-foot level on the existing 150-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Connecticut Siting Council ("Council") approved Cellco's use of this tower in 1994. Cellco intends to remove all if its existing antennas and replace them with twelve (12) new antennas (four (4) model LPA-80063/6CF cellular antennas; two (2) model LPA-80080/6CF cellular antennas; three (3) model MG V5-800T2 PCS antennas; and three (3) model BXA 70063/6CF LTE antennas). All new antennas will be installed at the same 148-foot level on the tower. Cellco will also install six (6) coax cable diplexers on its existing antenna platform. Attached behind Tab 1 of this filing are the specifications for each of the proposed replacement antennas and the cable diplexers.

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 Paul Formica, First Selectman for the Town of East Lyme. The Town of East Lyme 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 overall height of the existing tower. Cellco's replacement antennas and diplexers will be located at the 148-foot level on the 150-foot tower.

2. The proposed modifications will not involve any modifications to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

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 cumulative General Power Density table for the 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 modifications. (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:
Paul Formica, East Lyme First Selectman
Sandy M. Carter

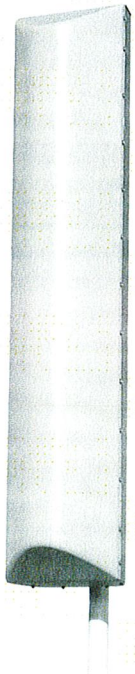
Amphenol ANTENNA SOLUTIONS

LPA-80063-6CF-EDIN-X

V-Pol | Log Periodic | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

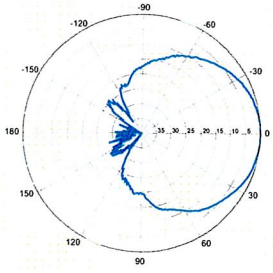
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



Electrical Characteristics		
Frequency bands	806-960 MHz	
Polarization	Vertical	
Horizontal beamwidth	63°	
Vertical beamwidth	10°	
Gain	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.4:1	
Null fill	5% (-26.02 dB)	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1805 x 385 x 332 mm	71.1 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm	14.6 in
Weight without mounting brackets	12.3 kg	27 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.70 m² Side: 0.59 m²	Front: 7.5 ft² Side: 6.3 ft²
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N	Front: 199 lbf Side: 170 lbf

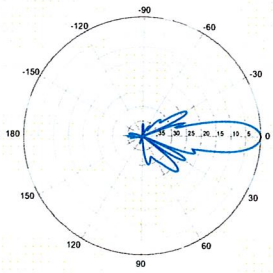
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000	50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80063-6CF-EDIN-X



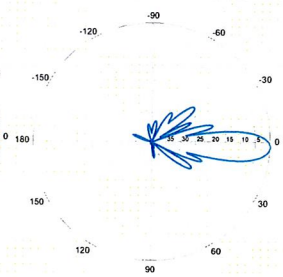
Horizontal

LPA-80063-6CF-EDIN-0



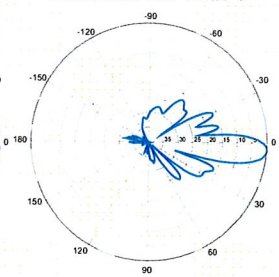
0° | Vertical

LPA-80063-6CF-EDIN-2



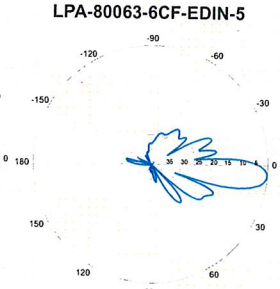
2° | Vertical

LPA-80063-6CF-EDIN-4



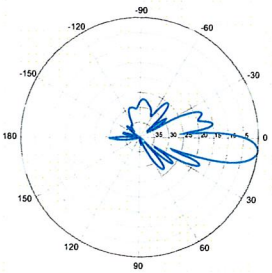
4° | Vertical

LPA-80063-6CF-EDIN-5



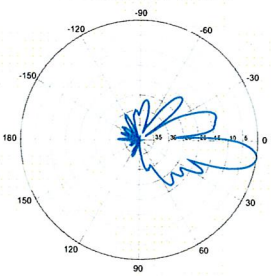
5° | Vertical

LPA-80063-6CF-EDIN-6



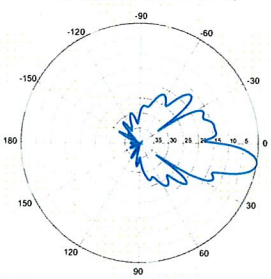
6° | Vertical

LPA-80063-6CF-EDIN-8



8° | Vertical

LPA-80063-6CF-EDIN-10



10° | Vertical

Vertically Polarized, Log-Periodic 80° / 14 dBd
806-960 MHz

Mechanical specifications

Length	1800	mm	70.9	in
Width	140	mm	5.5	in
Depth	335	mm	13.2	in
Depth with z-bracket	375	mm	14.8	in
Weight [4]	9.5	kg	21.0	lbs
Wind Area Fore/Aft [6]	0.25	m^2	2.7	ft^2
Wind Area Side [6]	0.61	m^2	6.6	ft^2
Max Wind Survivability [6]	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr) [6]				
Fore/Aft	415	N	93	lbf
Side	878	N	198	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a gray, UV safe fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mechanical downtilt angle 0-22°
Mounting & Downtilt Bracket Kit 21700000

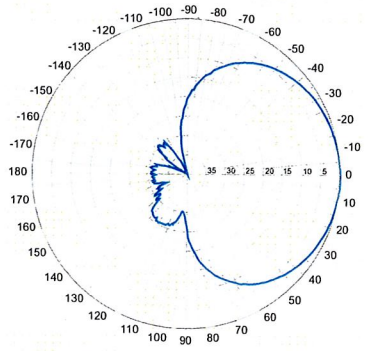
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 1 port / Center
VSWR [1]	≤ 1.4:1
Polarization	Vertical
Gain [1]	14 dBd
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	80°
Vertical Beamwidth	10°
Electrical downtilt [5]	0°
Null fill [1]	10%
Lightning protection	Direct ground

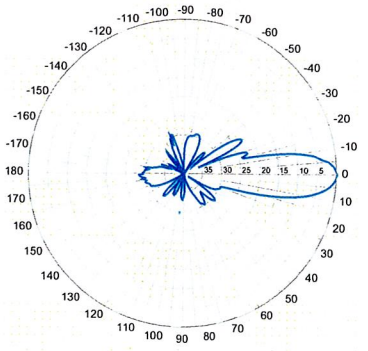
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.
6) Values reflect installation with all three brackets utilized.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]



Horizontal



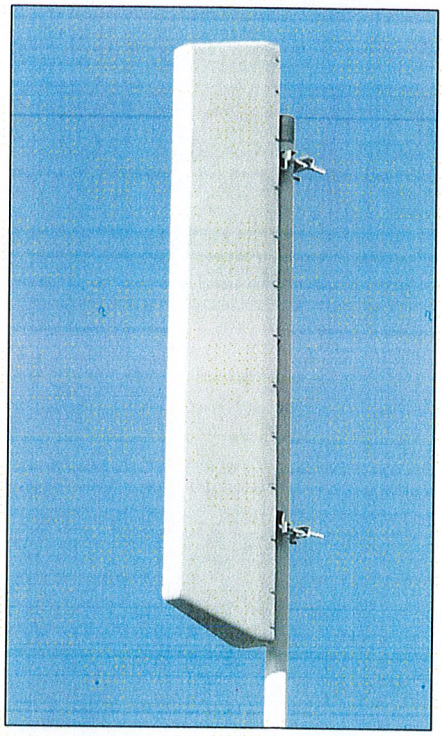
Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the front-to-back ratio.

LPA-80080/6CF __

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 08/18/08

806-960 MHz

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

SINGLE-BAND PANEL ANTENNA
BROADBAND 1710-2170 MHz

MGV5-800TX

	1710 - 2170	
1710-1880	1850-1990	1920-2170
H89º V7.6º	H87º V7.3º	H84º V6.5º
Fixed Tilt 0º,2º,4º,6º	Fixed Tilt 0º,2º,4º,6º	Fixed Tilt 0º,2º,4º,6º

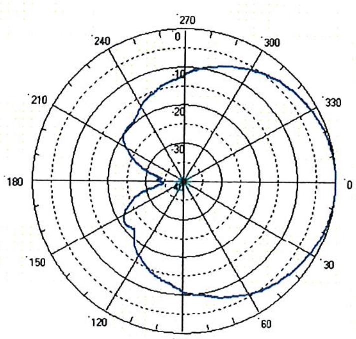
ELECTRICAL SPECIFICATIONS

***BROADBAND** 1710-2170 MHz*

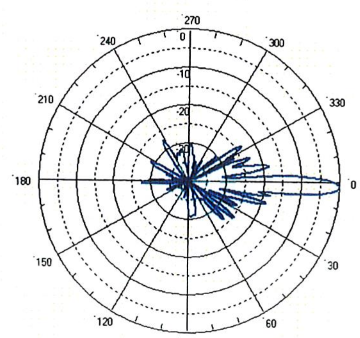
Antenna Model	MGV5-800TX		
Polarization	Vertical		
Frequency	***1710-2170***		
	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	89º	87º	84º
Vertical Beamwidth	7.6º	7.3º	6.5º
Gain (dBi)	16.5	16.6	17
Vertical Electrical Tilt	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º	FIXED 0º,2º,4º,6º
Upper Sidelobe Suppression for the 1st lobe above main beam (dB)	17	17	17
Front-to-Back Ratio @ 180º ± 20º (dB)	> 25	> 25	> 25
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< - 150		
Impedance (Ω)	50		

MECHANICAL SPECIFICATIONS

Connectors	1 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed km/h (mph)	200 (125)
Front Windload N @ 160 km/h (lbs @ 100 mph)	320 (72)
Lateral Windload N @ 160 km/h (lbs @ 100 mph)	170 (40)
Radome Color	Grey, paintable
Humidity	100%
Antenna Weight kg (lbs)	7 (15)
Antenna Dimension mm (in) H X W X D	1340 X 170 X 100 (53 X 7 X 4)



H&V Pattern



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Phone: +1 888 622 6093
www.rymsawireless.com

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

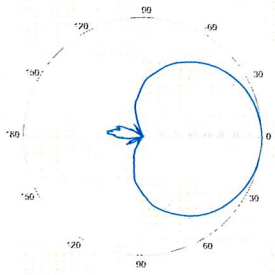
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

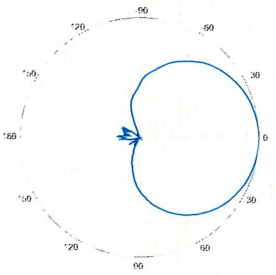
Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting Bracket Kit	36210003	50-160 mm 2.0-6.3 in	6.3 kg 14 lbs
3-Point Downtilt Bracket Kit (0-14°)	36210004	50-160 mm 2.0-6.3 in	7.3 kg 16 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications		
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X

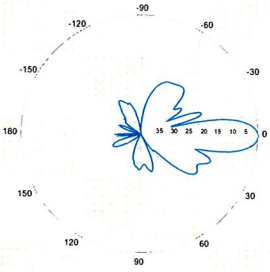


Horizontal | 750 MHz

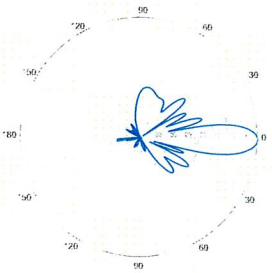


Horizontal | 850 MHz

BXA-70063-6CF-EDIN-0

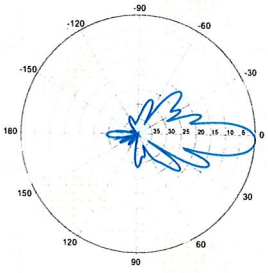


0° | Vertical | 750 MHz

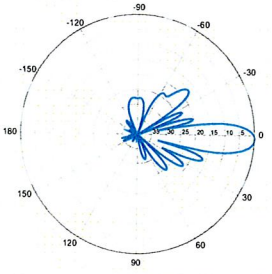


0° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-2



2° | Vertical | 750 MHz



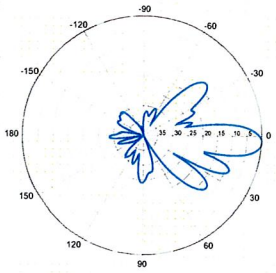
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

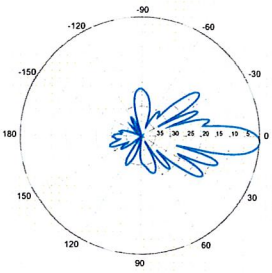
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

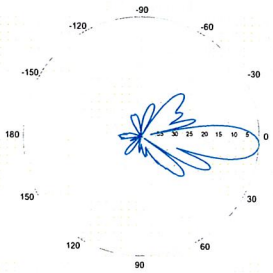


3° | Vertical | 750 MHz

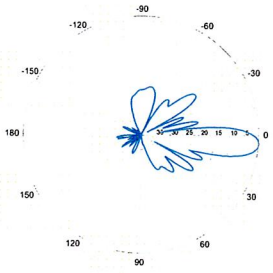


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

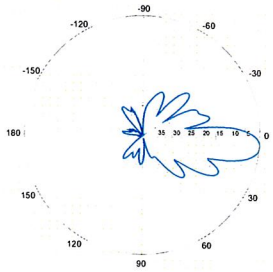


4° | Vertical | 750 MHz

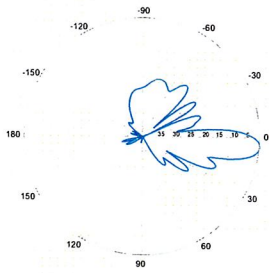


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

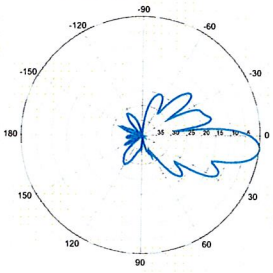


5° | Vertical | 750 MHz

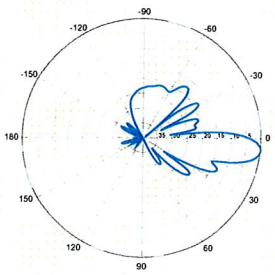


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



6° | Vertical | 750 MHz



6° | Vertical | 850 MHz

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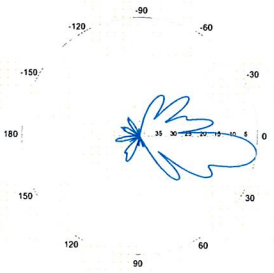
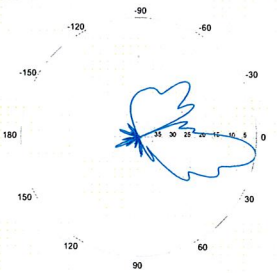
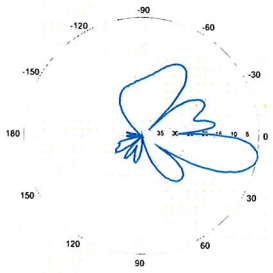


8° | Vertical | 750 MHz

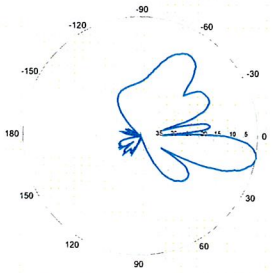


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

Product Data Sheet **FD9R6004/2C-3L**

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.

Features/Benefits

- **LTE ready design**
- **Extremely Low Insertion Loss**
- **High level of Rejection between bands – Protection against interferences**
- **Extremely High Power Handling Capability**
- **Integrated DC block/bypass versions available**
- **Very compact & small size design – Easy installation and reduced tower load**
- **In-line long-neck connectors for easy connection & waterproofing**
- **Exceptional reliability & environmental protection (IP 67)**
- **Equipped with 1 * Breathable Vent – Prevent any humidity inside the product**
- **Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)**
- **Grounding already provided through the mounting bracket**
- **Kit available for easy dual mount**

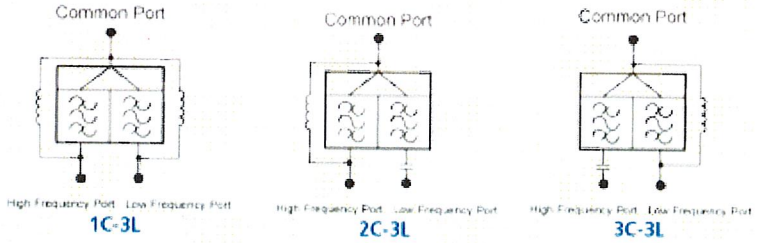
Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Band, MHz	698-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Frequency Range Low Frequency Path, MHz	698-960
Frequency Range High Frequency Path, MHz	1710-2200
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss 698-960 MHz Path, Typ, dB	0.07
Insertion Loss 1710-2200MHz path, Typ, dB	0.13
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Application	LTE 700MHz, GSM900/3G/UMTS, GSM900/GSM1800, Cellular 800/PCS
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

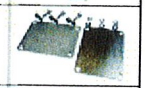
Notes

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information		
Model Number	**Description**	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FT9DW/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	

	General	Power	Density					
Site Name: East Lyme								
Tower Height: Verizon @ 145ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile GSM	8	138	103	0.0374	1945	1.0000	3.74%	
*T-Mobile UMTS	2	780	103	0.0529	2100	1.0000	5.29%	
*MetroPCS	3	727	134	0.0437	2140	1.0000	4.37%	
*Nextel	9	100	112.5	0.0143	851	0.5673	2.52%	
*Sprint	11	122	122.5	0.0322	1900	1.0000	3.22%	
*Town			155	0.0015		0.2000	0.75%	
Verizon	**3**	**362**	**148**	**0.0178**	**1970**	**1.0000**	**1.78%**	
Verizon	**9**	**342**	**148**	**0.0505**	**869**	**0.5793**	**8.72%**	
Verizon	**1**	**800**	**148**	**0.0131**	**757**	**0.4973**	**2.64%**	
								33.03%
* Source: Siting Council								

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

Date: **February 02, 2011**

Eva Morales
Crown Castle USA Inc.
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Charlotte, NC 28277
704-405-6612

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
614.221.6679
chedges@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117878
	Carrier Site Name:	East Lyme CT
Crown Castle Designation:	**Crown Castle BU Number:**	806384
	Crown Castle Site Name:	NLN 136 943455
	Crown Castle JDE Job Number:	148072
	Crown Castle Work Order Number:	384023
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37511-0187
Site Data:	**93 ROXBURY ROAD, EAST LYME, New London County, CT**	
	Latitude *41° 20' 8.35"*, Longitude *-72° 13' 18.28"*	
	151.292 Foot - Self Support Tower	

Dear Eva Morales,

Paul J Ford and Company 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 402991, in accordance with application 114567, revision 2.

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

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Christina Hedges, E.I.T
Structural Engineer

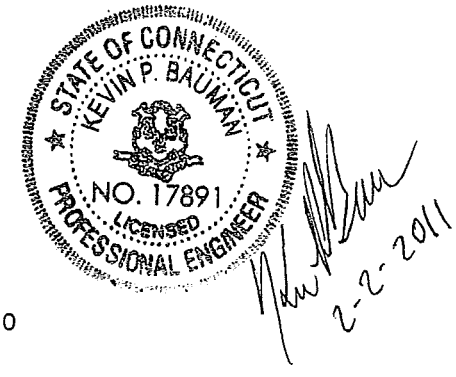


TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 151.292 ft Self Support tower designed by ROHN in March of 1990. The tower was originally designed for a wind speed of 85 mph per EIA-222-D.

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
148	149	3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80063/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		3	rymsa wireless	MG V5-800TX 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
150	157	1	telewave	ANT150F2	1 1	7/8 1/4	1
	152	1	motorola	PTP 49400 w/ Mount Pipe			
	150	1	tower mounts	Side Arm Mount [SO 304-1]			
148	149	6	decibel	DB846F65ZAXY w/Mount Pipe			2
		6	decibel	DB948F85T2E-M w/Mount Pipe			
	148	1	tower mounts	Sector Mount [SM 510-3]	12	1 5/8	1
143	143	1	andrew	PL6-59W	1	EW52	1
133	134	3	kathrein	800 10504 w/ Mount Pipe	9	1 5/8	1
	133	1	tower mounts	Sector Mount [SM 410-3]			
125	130	1	decibel	DB586-Y	1 1	7/8 1/4	3
	126	1	motorola	PTP 49400 w/ Mount Pipe			
	125	1	tower mounts	Side Arm Mount [SO 303-1]			
122	123	6	decibel	DB980H90E-M w/Mount Pipe	9	1 5/8	1
	122	1	tower mounts	Sector Mount [SM 505-3]			
112	112	9	decibel	DB844H90E-XY w/Mount Pipe	18	7/8	1
		12	swedcom	ALP 9212-N w/Mount Pipe	12	1 1/4	4
		1	tower mounts	Sector Mount [SM 510-3]			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
103	103	6	ems wireless	RR90-17-02DP w/Mount Pipe	12	1 5/8	1
		6	ericsson amplifiers	Ericsson KRY 112 71/1			
		3	rfs	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	6	1 5/8	3
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Sector Mount [SM 701-3]			1
90	96	1	sinclair	SRL-217	2 1	7/8 1/4	1
	95	1	motorola	PTP 49400 w/ Mount Pipe			
	90	1	telewave	ANT150D3			
		1	tower mounts	Side Arm Mount [SO 301-1]			
		1	tower mounts	Side Arm Mount [SO 302-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed
3) Future Equipment
4) SLA equipment controlling.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Drawings	March 5, 1990, Rohn	24792JC	258359
Foundation Drawings	March 5, 1990, Rohn	24792JC	958525
Geotechnical Report	July 19, 1989, Dr. Clarence Welti	-	258373
Modification Drawings	January 16, 2003, All Points Technology	CT105761	801526
Modification Drawings	February 26, 2008, Vertical Structures	2008-004-030	2215933
Modification Drawings	May 14, 2009, PJF	41709-0057	2457486
Structural Analysis	October 26, 2010, PJF	37510-1440	2724479

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	151.292 - 141.167	Leg	ROHN 2.5 STD	2	-6817.30	50293.16	15.9	Pass
T2	141.167 - 121.042	Leg	ROHN 2.5 EH	20	-27198.10	52977.02	51.3	Pass
T3	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	44	-30628.70	61869.99	49.5	Pass
T4	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	53	-40090.00	61867.72	64.8	Pass
T5	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	62	-56312.60	91492.98	61.5	Pass
T6	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	74	-61433.70	102414.52	60.0	Pass
T7	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	83	-72547.80	132155.48	54.9	Pass
T8	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	95	-90073.50	132524.46	68.0	Pass
T9	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	107	-97971.60	136793.79	71.6	Pass
T10	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	116	-114073.00	193618.24	58.9 66.8 (b)	Pass
T11	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	128	-139178.00	194567.34	71.5	Pass
T12	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	140	-154950.00	194647.32	79.6	Pass
T13	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	152	-162363.00	231920.66	70.0	Pass
T14	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	161	-186387.00	291605.73	63.9 74.5 (b)	Pass
T15	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	173	-193605.00	291672.38	66.4	Pass
T16	10.1041 - 0	Leg	ROHN 5 EH (GR)	185	-217512.00	291724.37	74.6	Pass
T1	151.292 - 141.167	Diagonal	L1 1/2x1 1/2x3/16	9	-2620.60	2917.39	89.8	Pass
T2	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	27	-4010.91	8577.46	46.8 73.0 (b)	Pass
T3	121.042 - 114.313	Diagonal	L2 1/2x2 1/2x3/16	48	-4608.67	7802.10	59.1	Pass
T4	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	57	-5623.17	7121.94	79.0	Pass
T5	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	66	-6719.56	27668.41	24.3 61.1 (b)	Pass
T6	100.917 - 94.2014	Diagonal	L3x3x3/16	78	-7376.17	10656.04	69.2	Pass
T7	94.2014 - 87.4861	Diagonal	L3x3x3/16	87	-7889.23	9740.18	81.0	Pass
T8	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	99	-8255.30	35614.03	23.2 75.1 (b)	Pass
T9	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	111	-9214.38	29260.28	31.5 80.4 (b)	Pass
T10	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	120	-9514.21	26882.74	35.4 80.5 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T11	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	132	-9706.69	32676.90	29.7 83.6 (b)	Pass
T12	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	144	-10066.00	29874.53	33.7 58.6 (b)	Pass
T13	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	156	-10287.60	43629.75	23.6 59.9 (b)	Pass
T14	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	165	-10753.10	40231.14	26.7 62.6 (b)	Pass
T15	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	177	-10894.10	55366.02	19.7 63.4 (b)	Pass
T16	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	189	-11746.00	51311.17	22.9 68.4 (b)	Pass
T5	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	70	-976.61	4253.63	23.0	Pass
T7	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	91	-1258.26	3443.41	36.5	Pass
T8	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	103	-1562.22	3111.40	50.2	Pass
T10	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	124	-1978.23	4890.70	40.4	Pass
T11	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	136	-2413.81	9857.64	24.5 43.9 (b)	Pass
T12	50.5104 - 40.4166	Secondary Horizontal	L3x3x1/4	148	-2687.34	8745.97	30.7 48.9 (b)	Pass
T14	30.3125 - 20.2083	Secondary Horizontal	L 3 x 3 x 3/16	169	-3232.31	5467.17	59.1	Pass
T15	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	181	-3357.43	4943.07	67.9	Pass
T16	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	194	-3772.02	9469.10	39.8 43.9 (b)	Pass
T1	151.292 - 141.167	Top Girt	L2 1/2x2 1/2x3/16	5	-63.93	3308.68	1.9	Pass
T2	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	23	-279.95	4403.90	6.4	Pass
							Summary	
						Leg (T12)	79.6	Pass
						Diagonal (T1)	89.8	Pass
						Secondary Horizontal (T15)	67.9	Pass
						Top Girt (T2)	6.4	Pass
						Bolt Checks	83.6	Pass
						Rating =	89.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		68.3	Pass
1	Base Foundation		33.6	Pass
1	Base Foundation Soil Interaction		82.3	Pass

Structure Rating (max from all components) =	89.8%

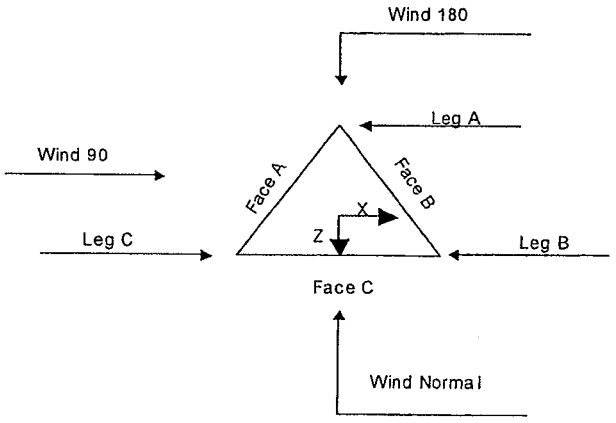
APPENDIX A

RISA TOWER OUTPUT

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 151.29 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 22.78 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

5) Tower is located in New London County, Connecticut.
6) Basic wind speed of 85 mph.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56 pcf.
10) A wind speed of 38 mph is used in combination with ice.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Grouted pipe f'_c is 7 ksi.
14) Pressures are calculated at each section.
15) Stress ratio used in tower member design is 1.333.
16) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	151.29-141.17			8.56	1	10.13
T2	141.17-121.04			8.56	1	20.13
T3	121.04-114.31			10.56	1	6.73
T4	114.31-107.65			11.24	1	6.67
T5	107.65-100.92			11.92	1	6.73
T6	100.92-94.20			12.60	1	6.72
T7	94.20-87.49			13.30	1	6.72
T8	87.49-80.77			14.00	1	6.72
T9	80.77-70.69			14.70	1	10.08
T10	70.69-60.60			15.70	1	10.08
T11	60.60-50.51			16.70	1	10.09
T12	50.51-40.42			17.73	1	10.09
T13	40.42-30.31			18.77	1	10.10
T14	30.31-20.21			19.78	1	10.10
T15	20.21-10.10			20.78	1	10.10
T16	10.10-0.00			21.78	1	10.10

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	151.29-141.17	5.00	X Brace	No	No	0.7500	0.7500
T2	141.17-121.04	6.67	X Brace	No	No	0.7500	0.7500
T3	121.04-114.31	6.67	X Brace	No	No	0.7500	0.0000
T4	114.31-107.65	6.67	X Brace	No	No	0.0000	0.0000
T5	107.65-100.92	6.67	X Brace	No	Yes	0.0000	0.7500
T6	100.92-94.20	6.65	X Brace	No	No	0.7500	0.0000
T7	94.20-87.49	6.72	X Brace	No	Yes	0.0000	0.0000
T8	87.49-80.77	6.63	X Brace	No	Yes	0.0000	1.0000
T9	80.77-70.69	10.00	X Brace	No	No	1.0000	0.0000
T10	70.69-60.60	10.08	X Brace	No	Yes	0.0000	0.0000
T11	60.60-50.51	9.91	X Brace	No	Yes	1.0000	1.2500
T12	50.51-40.42	9.91	X Brace	No	Yes	1.0000	1.2500
T13	40.42-30.31	10.00	X Brace	No	No	1.2500	0.0000
T14	30.31-20.21	10.00	X Brace	No	Yes	0.0000	1.2500
T15	20.21-10.10	10.00	X Brace	No	Yes	1.2500	0.0000
T16	10.10-0.00	10.00	X Brace	No	Yes	0.0000	1.2500

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 151.29-141.17	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 141.17-121.04	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 121.04-114.31	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 114.31-107.65	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 107.65-100.92	Grouted Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Double Angle	2L 2.5 x 2.5 x 3/16 (3/16)	A36 (36 ksi)
T6 100.92-94.20	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T7 94.20-87.49	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T8 87.49-80.77	Grouted Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T9 80.77-70.69	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T10 70.69-60.60	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T11 60.60-50.51	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T12 50.51-40.42	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T13 40.42-30.31	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T14 30.31-20.21	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T15 20.21-10.10	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 ksi)
T16 10.10-0.00	Grouted Pipe	ROHN 5 EH	A572-50 (50 ksi)	Double Angle	2L 4 x 4 x 1/4 (1/4)	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 151.29-141.17	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 141.17-121.04	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T5 107.65-100.92	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 94.20-87.49	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 87.49-80.77	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T10 70.69-60.60	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T11 60.60-50.51	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T12 50.51-40.42	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T14 30.31-20.21	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T15 20.21-10.10	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 10.10-0.00	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 151.29-141.17	0.60	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T2 141.17-121.04	0.80	0.1875	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T3 121.04-114.31	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T4 114.31-107.65	0.27	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T5 107.65-100.92	1.25	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T6 100.92-94.20	0.93	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T7 94.20-87.49	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T8 87.49-80.77	0.47	0.4375	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T9 80.77-70.69	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T10 70.69-60.60	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T11 60.60-50.51	0.45	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T12 50.51-40.42	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T13 40.42-30.31	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T14 30.31-20.21	0.45	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T15 20.21-10.10	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000
T16 10.10-0.00	1.50	0.5000	A36 (36 ksi)	1	1	1	Mid-Pt	30.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 151.29-141.17	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 141.17-121.04	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 121.04-114.31	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 114.31-107.65	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 107.65-100.92	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T6 100.92-94.20	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 94.20-87.49	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T8 87.49-80.77	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T9 80.77-70.69	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 70.69-60.60	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T11 60.60-50.51	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T12 50.51-40.42	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T13 40.42-30.31	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T14 30.31-20.21	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T15 20.21-10.10	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1
T16 10.10-0.00	No	No	1	1	1	1	1	1	0.5	1
				1	1	1	1	1	0.5	1

[1]Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 151.29-141.17	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T2 141.17-121.04	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T3 121.04-114.31	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T4 114.31-107.65	Flange	0.7500 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T5 107.65-100.92	Flange	0.7500 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T6 100.92-94.20	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T7 94.20-87.49	Flange	0.8750 A325N	0	0.5000 A325N	2	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T8 87.49-80.77	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T9 80.77-70.69	Flange	0.8750 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T10 70.69-60.60	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T11 60.60-50.51	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T12 50.51-40.42	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T13 40.42-30.31	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T14 30.31-20.21	Flange	1.0625 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T15 20.21-10.10	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T16 10.10-0.00	Flange	1.0000 A354-BC	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1

Grouted Pipe Properties

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
ROHN 2.5 EH (GR)	50	2.2535	4.2383	16.498	4769	36175	61

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
ROHN 3 EH (GR)	50	3.0159	6.6052	24.023	4769	37356	63
ROHN 4 EH (GR)	50	4.4074	11.4969	38.949	4769	38952	66
ROHN 5 EH (GR)	50	6.1120	18.1937	58.701	4769	40357	68

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1.5" flat Cable Ladder Rail	A	Yes	Af (CfAe)	133.00 - 8.00	0.5000	0.4	2	2	12.0000 1.5000	1.5000	6.0000	1.80
FXL 1873 PE(1 5/8") **	A	Yes	Ar (CfAe)	133.00 - 8.00	1.0000	0.4	9	5	0.2700	1.9800		0.01
1.5" flat Cable Ladder Rail	B	Yes	Af (CfAe)	103.00 - 8.00	0.5000	0.45	2	2	12.0000 1.5000	1.5000	6.0000	1.80
LDF7-50A (1-5/8 FOAM) **	B	Yes	Ar (CfAe)	103.00 - 8.00	1.0000	0.45	18	6	0.2700	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	112.00 - 8.00	-1.0000	-0.3	24	6	0.2700 1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	122.00 - 112.00	-1.0000	-0.3	18	6	0.2700 1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	148.00 - 122.00	-1.0000	-0.3	12	6	0.2700 1.0000	1.9800		0.82
LDF6-50A (1-1/4 FOAM)	B	Yes	Ar (CfAe)	90.00 - 8.00	1.0000	-0.37	9	6	1.5500	1.5500		0.66
LDF6-50A (1-1/4 FOAM)	B	Yes	Ar (CfAe)	112.00 - 90.00	1.0000	-0.37	7	7	1.5500	1.5500		0.66
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	125.00 - 112.00	1.0000	-0.37	2	1	1.0000	1.0900		0.33
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	150.00 - 125.00	1.0000	-0.37	1	1	1.0000	1.0900		0.33
LDF1-50A (1/4 FOAM)	B	Yes	Ar (CfAe)	125.00 - 90.00	1.0000	-0.4	3	2	0.3500	0.3500		0.06
LDF1-50A (1/4 FOAM)	B	Yes	Ar (CfAe)	150.00 - 125.00	1.0000	-0.4	2	1	0.3500	0.3500		0.06
EW52	B	Yes	Af (CfAe)	143.00 - 8.00	1.0000	-0.29	1	1	1.7426	1.7426	5.5505	0.59
1.5" flat Cable Ladder Rail **	B	Yes	Af (CfAe)	148.00 - 8.00	0.5000	-0.35	2	2	30.0000 1.5000	1.5000	6.0000	1.80

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Side Arm Mount [SO 304-1]	A	From Leg	1.00 0.00	0.0000	150.00	No Ice 1/2"	0.63 1.00	0.94 1.45	23.00 31.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			Ice	1.37	1.96	40.83
						1" Ice	2.11	2.98	58.66
						2" Ice	3.59	5.02	94.32
						4" Ice			
PTP 49400 w/ Mount Pipe	A	From Leg	2.00	0.0000	152.00	No Ice	2.22	0.92	20.16
			0.00			1/2"	2.48	1.18	36.69
			0.00			Ice	2.75	1.48	57.73
						1" Ice	3.35	2.15	111.16
						2" Ice	4.72	3.74	280.95
						4" Ice			
ANT150F2	A	From Leg	2.00	0.0000	157.00	No Ice	1.23	1.23	13.00
			0.00			1/2"	1.53	1.53	22.47
			0.00			Ice	1.84	1.84	35.41
						1" Ice	2.49	2.49	72.28
						2" Ice	3.97	3.97	194.27
						4" Ice			
**									
Sector Mount [SM 510-3]	B	None		0.0000	148.00	No Ice	40.10	40.10	2396.40
						1/2"	57.33	57.33	3089.00
						Ice	74.56	74.56	3781.60
						1" Ice	109.02	109.02	5166.80
						2" Ice	177.94	177.94	7937.20
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	7.98	5.41	42.28
			0.00			1/2"	8.62	6.56	98.43
			0.00			Ice	9.23	7.42	166.25
						1" Ice	10.47	9.20	327.70
						2" Ice	13.08	12.95	787.97
						4" Ice			
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	10.58	10.67	52.22
			0.00			1/2"	11.24	11.93	141.85
			0.00			Ice	11.87	12.91	243.93
						1" Ice	13.16	14.92	476.26
						2" Ice	15.87	19.16	1087.66
						4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	149.00	No Ice	0.37	0.08	3.10
			0.00			1/2"	0.45	0.14	5.40
			0.00			Ice	0.54	0.20	8.79
						1" Ice	0.75	0.34	19.61
						2" Ice	1.28	0.74	62.87
						4" Ice			
MG V5-800TX w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	3.57	3.42	34.68
			0.00			1/2"	3.98	4.12	66.31
			0.00			Ice	4.39	4.78	106.83
						1" Ice	5.33	6.16	207.70
						2" Ice	7.34	9.18	517.36
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	7.98	5.41	42.28
			0.00			1/2"	8.62	6.56	98.43
			0.00			Ice	9.23	7.42	166.25
						1" Ice	10.47	9.20	327.70
						2" Ice	13.08	12.95	787.97
						4" Ice			
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	10.58	10.67	52.22
			0.00			1/2"	11.24	11.93	141.85
			0.00			Ice	11.87	12.91	243.93
						1" Ice	13.16	14.92	476.26
						2" Ice	15.87	19.16	1087.66
						4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	149.00	No Ice	0.37	0.08	3.10
			0.00			1/2"	0.45	0.14	5.40
			0.00			Ice	0.54	0.20	8.79
						1" Ice	0.75	0.34	19.61
						2" Ice	1.28	0.74	62.87
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
MG V5-800TX w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	34.68 66.31 106.83 207.70 517.36
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.41 6.56 7.42 9.20 12.95	42.28 98.43 166.25 327.70 787.97
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	52.22 141.85 243.93 476.26 1087.66
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
MG V5-800TX w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	34.68 66.31 106.83 207.70 517.36
**									
Sector Mount [SM 410-3]	A	None		0.0000	133.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	23.96 34.06 44.16 64.36 104.76	23.96 34.06 44.16 64.36 104.76	1100.47 1599.78 2099.09 3097.71 5094.95
800 10504 w/ Mount Pipe	A	From Leg	3.50 3.50 0.00	44.0000	134.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	37.75 68.19 107.66 206.58 513.48
800 10504 w/ Mount Pipe	B	From Leg	3.50 3.50 0.00	44.0000	134.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	37.75 68.19 107.66 206.58 513.48
800 10504 w/ Mount Pipe	C	From Leg	3.50 3.50 0.00	44.0000	134.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	37.75 68.19 107.66 206.58 513.48
**									
Side Arm Mount [SO 303-1]	B	None		0.0000	125.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	2.24 3.19 4.14 6.04 9.84	5.32 7.69 10.06 14.80 24.28	115.00 158.73 202.46 289.92 464.85
DB586-Y	B	From Leg	6.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice Ice	1.01 1.28 1.56	1.01 1.28 1.56	8.25 16.59 28.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	2.14	2.14	60.71
						2" Ice	3.53	3.53	169.83
						4" Ice			
PTP 49400 w/ Mount Pipe	B	From Leg	6.00 0.00 0.00	0.0000	126.00	No Ice	2.22	0.92	20.16
						1/2" Ice	2.48	1.18	36.69
						1" Ice	2.75	1.48	57.73
						2" Ice	3.35	2.15	111.16
						4" Ice	4.72	3.74	280.95
**									
Sector Mount [SM 505-3]	A	None		0.0000	122.00	No Ice	34.86	34.86	1725.30
						1/2" Ice	49.79	49.79	2316.90
						1" Ice	64.72	64.72	2908.50
						2" Ice	94.58	94.58	4091.70
						4" Ice	154.30	154.30	6458.10
(2) DB980H90E-M w/Mount Pipe	A	From Leg	4.00 0.00 0.00	14.0000	123.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
						1" Ice	5.37	5.75	116.19
						2" Ice	6.42	7.39	231.29
						4" Ice	8.86	10.87	585.45
(2) DB980H90E-M w/Mount Pipe	B	From Leg	4.00 0.00 0.00	14.0000	123.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
						1" Ice	5.37	5.75	116.19
						2" Ice	6.42	7.39	231.29
						4" Ice	8.86	10.87	585.45
(2) DB980H90E-M w/Mount Pipe	C	From Leg	4.00 0.00 0.00	14.0000	123.00	No Ice	4.27	3.86	34.05
						1/2" Ice	4.86	4.95	69.84
						1" Ice	5.37	5.75	116.19
						2" Ice	6.42	7.39	231.29
						4" Ice	8.86	10.87	585.45
**									
Sector Mount [SM 510-3]	B	None		0.0000	112.00	No Ice	40.10	40.10	2396.40
						1/2" Ice	57.33	57.33	3089.00
						1" Ice	74.56	74.56	3781.60
						2" Ice	109.02	109.02	5166.80
						4" Ice	177.94	177.94	7937.20
(4) ALP 9212-N w/Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	112.00	No Ice	6.42	7.45	42.71
						1/2" Ice	7.11	8.59	103.63
						1" Ice	7.70	9.45	175.50
						2" Ice	8.91	11.20	342.81
						4" Ice	11.47	14.93	806.03
(4) ALP 9212-N w/Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	112.00	No Ice	6.42	7.45	42.71
						1/2" Ice	7.11	8.59	103.63
						1" Ice	7.70	9.45	175.50
						2" Ice	8.91	11.20	342.81
						4" Ice	11.47	14.93	806.03
(4) ALP 9212-N w/Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	112.00	No Ice	6.42	7.45	42.71
						1/2" Ice	7.11	8.59	103.63
						1" Ice	7.70	9.45	175.50
						2" Ice	8.91	11.20	342.81
						4" Ice	11.47	14.93	806.03
**									
Sector Mount [SM 701-3]	A	None		0.0000	103.00	No Ice	19.73	19.73	825.00
						1/2" Ice	27.41	27.41	1165.99
						1" Ice	35.09	35.09	1506.98
						2" Ice	50.45	50.45	2188.96
						4" Ice	81.17	81.17	3552.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice			
(2) RR90-17-02DP w/Mount Pipe	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
(2) RR90-17-02DP w/Mount Pipe	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
(2) RR90-17-02DP w/Mount Pipe	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
(2) Ericsson KRY 112 71/1	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
(2) Ericsson KRY 112 71/1	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
(2) Ericsson KRY 112 71/1	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.68 0.80 0.93 1.22 1.90	0.45 0.56 0.68 0.94 1.57	13.20 18.38 25.16 44.33 110.52
APX16DWV-16DWVS-E-A20 w/ Mount Pipe	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	61.35 107.59 163.58 297.50 682.77
APX16DWV-16DWVS-E-A20 w/ Mount Pipe	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	61.35 107.59 163.58 297.50 682.77
APX16DWV-16DWVS-E-A20 w/ Mount Pipe	C	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	61.35 107.59 163.58 297.50 682.77
ATMAA1412D-1A20	A	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice 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	13.00 20.62 30.11 55.52 137.44
ATMAA1412D-1A20	B	From Leg	1.50 0.00 0.00	0.0000	103.00	No Ice 1/2" Ice Ice 1" Ice	1.17 1.31 1.47 1.81	0.47 0.57 0.69 0.95	13.00 20.62 30.11 55.52

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	2.58	1.57	137.44
						4" Ice			
ATMAA1412D-1A20	C	From Leg	1.50	0.0000	103.00	No Ice	1.17	0.47	13.00
			0.00			1/2" Ice	1.31	0.57	20.62
			0.00			1" Ice	1.47	0.69	30.11
						2" Ice	1.81	0.95	55.52
						4" Ice	2.58	1.57	137.44
**									
PTP 49400 w/ Mount Pipe	A	From Leg	4.00	0.0000	95.00	No Ice	2.22	0.92	20.16
			0.00			1/2" Ice	2.48	1.18	36.69
			0.00			1" Ice	2.75	1.48	57.73
						2" Ice	3.35	2.15	111.16
						4" Ice	4.72	3.74	280.95
ANT150D3	A	From Leg	4.00	0.0000	90.00	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			0.00			1" Ice	4.16	4.16	28.80
						2" Ice	6.72	6.72	39.60
						4" Ice	11.84	11.84	61.20
Side Arm Mount [SO 302-1]	A	From Leg	2.00	0.0000	90.00	No Ice	1.67	3.27	55.00
			0.00			1/2" Ice	2.51	4.99	88.07
			0.00			1" Ice	3.35	6.71	121.14
						2" Ice	5.03	10.15	187.28
						4" Ice	8.39	17.03	319.57
SRL-217	B	From Leg	2.00	0.0000	96.00	No Ice	24.53	24.53	6.50
			0.00			1/2" Ice	25.33	25.33	289.97
			0.00			1" Ice	26.13	26.13	583.16
						2" Ice	27.78	27.78	1199.32
						4" Ice	31.20	31.20	2555.03
Side Arm Mount [SO 301-1]	B	From Leg	1.00	0.0000	90.00	No Ice	1.00	0.90	23.00
			0.00			1/2" Ice	1.39	1.42	32.57
			0.00			1" Ice	1.78	1.94	42.14
						2" Ice	2.56	2.98	61.28
						4" Ice	4.12	5.06	99.56
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
PL6-59W	A	Paraboloid w/Radome	From Leg	1.50	-30.0000		143.00	6.00	No Ice	28.27	143.00
				0.00					1/2" Ice	29.05	292.13
				0.00					1" Ice	29.83	441.25
									2" Ice	31.39	739.50
									4" Ice	34.51	1336.01

Load Combinations

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

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	10	211299.78	23096.61	-14140.08
	Max. H_x	10	211299.78	23096.61	-14140.08
	Max. H_z	4	-175455.71	-19528.38	12007.08
	Min. Vert	4	-175455.71	-19528.38	12007.08
	Min. H_x	4	-175455.71	-19528.38	12007.08
	Min. H_z	10	211299.78	23096.61	-14140.08
Leg B	Max. Vert	6	216319.00	-22967.40	-15001.71
	Max. H_x	12	-175026.83	19254.42	12659.72
	Max. H_z	12	-175026.83	19254.42	12659.72
	Min. Vert	12	-175026.83	19254.42	12659.72
	Min. H_x	6	216319.00	-22967.40	-15001.71
	Min. H_z	6	216319.00	-22967.40	-15001.71
Leg A	Max. Vert	2	215299.84	780.67	27239.64
	Max. H_x	11	15493.74	4550.31	1267.93
	Max. H_z	2	215299.84	780.67	27239.64
	Min. Vert	8	-175977.36	-720.34	-23140.62
	Min. H_x	6	-85440.62	-4570.62	-11785.21
	Min. H_z	8	-175977.36	-720.34	-23140.62

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	151.292 - 141.167	3.576	27	0.1966	0.0322
T2	141.167 - 121.042	3.163	27	0.1947	0.0307
T3	121.042 - 114.313	2.357	27	0.1790	0.0246
T4	114.313 - 107.646	2.105	27	0.1712	0.0223
T5	107.646 - 100.917	1.864	27	0.1615	0.0200
T6	100.917 - 94.2014	1.643	27	0.1498	0.0186
T7	94.2014 - 87.4861	1.427	27	0.1401	0.0163
T8	87.4861 - 80.7708	1.226	27	0.1290	0.0138
T9	80.7708 - 70.6875	1.048	27	0.1165	0.0123
T10	70.6875 - 60.6041	0.802	27	0.1028	0.0104
T11	60.6041 - 50.5104	0.590	27	0.0878	0.0085
T12	50.5104 - 40.4166	0.410	27	0.0714	0.0069
T13	40.4166 - 30.3125	0.269	27	0.0542	0.0053
T14	30.3125 - 20.2083	0.158	27	0.0413	0.0039
T15	20.2083 - 10.1041	0.077	31	0.0281	0.0025
T16	10.1041 - 0	0.021	31	0.0141	0.0012

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	ANT150F2	27	3.576	0.1966	0.0322	739821
152.00	PTP 49400 w/ Mount Pipe	27	3.576	0.1966	0.0322	739821
150.00	Side Arm Mount [SO 304-1]	27	3.523	0.1965	0.0321	739821
149.00	BXA-70063/6CF w/ Mount Pipe	27	3.483	0.1964	0.0319	739821
148.00	Sector Mount [SM 510-3]	27	3.442	0.1962	0.0318	739821
143.00	PL6-59W	27	3.238	0.1953	0.0310	523293
134.00	800 10504 w/ Mount Pipe	27	2.870	0.1909	0.0288	133093
133.00	Sector Mount [SM 410-3]	27	2.830	0.1902	0.0285	113989
130.00	DB586-Y	27	2.709	0.1878	0.0276	79678
126.00	PTP 49400 w/ Mount Pipe	27	2.549	0.1841	0.0262	56859
125.00	Side Arm Mount [SO 303-1]	27	2.510	0.1832	0.0259	53144
123.00	(2) DB980H90E-M w/Mount Pipe	27	2.432	0.1811	0.0252	48486
122.00	Sector Mount [SM 505-3]	27	2.394	0.1801	0.0249	47877
112.00	Sector Mount [SM 510-3]	27	2.020	0.1681	0.0214	39241
103.00	Sector Mount [SM 701-3]	27	1.710	0.1533	0.0191	66472
96.00	SRL-217	27	1.484	0.1426	0.0170	47442
95.00	PTP 49400 w/ Mount Pipe	27	1.452	0.1412	0.0166	38166
90.00	ANT150D3	27	1.299	0.1335	0.0146	23716

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	151.292 - 141.167	10.242	6	0.5595	0.0931
T2	141.167 - 121.042	9.065	6	0.5549	0.0887
T3	121.042 - 114.313	6.761	6	0.5116	0.0710
T4	114.313 - 107.646	6.039	6	0.4894	0.0645
T5	107.646 - 100.917	5.351	6	0.4621	0.0577
T6	100.917 - 94.2014	4.716	6	0.4287	0.0538
T7	94.2014 - 87.4861	4.097	6	0.4010	0.0470
T8	87.4861 - 80.7708	3.522	6	0.3696	0.0398
T9	80.7708 - 70.6875	3.009	6	0.3338	0.0357
T10	70.6875 - 60.6041	2.305	6	0.2947	0.0302
T11	60.6041 - 50.5104	1.696	6	0.2517	0.0245
T12	50.5104 - 40.4166	1.180	6	0.2048	0.0199
T13	40.4166 - 30.3125	0.775	6	0.1554	0.0152
T14	30.3125 - 20.2083	0.456	6	0.1186	0.0112
T15	20.2083 - 10.1041	0.222	6	0.0805	0.0071
T16	10.1041 - 0	0.060	6	0.0406	0.0035

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	ANT150F2	6	10.242	0.5595	0.0931	272763
152.00	PTP 49400 w/ Mount Pipe	6	10.242	0.5595	0.0931	272763
150.00	Side Arm Mount [SO 304-1]	6	10.092	0.5592	0.0926	272763
149.00	BXA-70063/6CF w/ Mount Pipe	6	9.976	0.5590	0.0923	272763
148.00	Sector Mount [SM 510-3]	6	9.860	0.5588	0.0919	272763
143.00	PL6-59W	6	9.278	0.5565	0.0897	194751
134.00	800 10504 w/ Mount Pipe	6	8.230	0.5446	0.0833	49342
133.00	Sector Mount [SM 410-3]	6	8.114	0.5426	0.0824	41906
130.00	DB586-Y	6	7.768	0.5361	0.0797	28859
126.00	PTP 49400 w/ Mount Pipe	6	7.312	0.5260	0.0758	20342
125.00	Side Arm Mount [SO 303-1]	6	7.200	0.5232	0.0748	18938
123.00	(2) DB980H90E-M w/Mount Pipe	6	6.977	0.5175	0.0729	17181
122.00	Sector Mount [SM 505-3]	6	6.866	0.5145	0.0719	16937
112.00	Sector Mount [SM 510-3]	6	5.795	0.4807	0.0620	13740
103.00	Sector Mount [SM 701-3]	6	4.909	0.4387	0.0551	23848
96.00	SRL-217	6	4.260	0.4083	0.0491	16652
95.00	PTP 49400 w/ Mount Pipe	6	4.169	0.4043	0.0480	13337
90.00	ANT150D3	6	3.729	0.3822	0.0422	8289

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	151.292	Leg	A325N	0.6250	4	1116.45	13386.30	0.083 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2572.86	3126.56	0.823 ✓	1.333	Member Block Shear
		Top Girt	A325N	0.5000	1	70.00	4123.34	0.017 ✓	1.333	Bolt Shear
T2	141.167	Leg	A325N	0.6250	4	5187.86	13263.20	0.391 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4010.91	4123.34	0.973 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	338.13	4123.34	0.082 ✓	1.333	Bolt Shear
T3	121.042	Diagonal	A325N	0.5000	2	2304.34	4123.34	0.559 ✓	1.333	Bolt Shear
T4	114.313	Diagonal	A325N	0.5000	2	2811.58	4123.34	0.682 ✓	1.333	Bolt Shear
T5	107.646	Leg	A325N	0.7500	4	11042.10	18956.90	0.582 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	6719.56	8246.68	0.815 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	976.61	5165.63	0.189 ✓	1.333	Member Block Shear
T6	100.917	Diagonal	A325N	0.5000	2	3715.77	4123.34	0.901 ✓	1.333	Bolt Shear
T7	94.2014	Diagonal	A325N	0.5000	2	3944.61	4123.34	0.957 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1258.26	5165.63	0.244 ✓	1.333	Member Block Shear
T8	87.4861	Leg	A325N	0.8750	4	18426.30	25999.50	0.709 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	8255.30	8246.68	1.001 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	1562.22	5165.63	0.302 ✓	1.333	Member Block Shear
T9	80.7708	Diagonal	A325N	0.6250	1	9222.72	8609.38	1.071 ✓	1.333	Gusset Bearing
T10	70.6875	Leg	A325N	0.8750	4	23559.00	26458.00	0.890 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	9238.44	8609.38	1.073 ✓	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1978.23	6117.19	0.323 ✓	1.333	Member Bearing
T11	60.6041	Diagonal	A325N	0.6250	1	9589.56	8609.38	1.114 ✓	1.333	Gusset Bearing
		Secondary Horizontal	A325N	0.5000	1	2413.81	4123.34	0.585 ✓	1.333	Bolt Shear
T12	50.5104	Leg	A325N	1.0000	4	32024.90	34083.10	0.940 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10066.00	12885.40	0.781 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.5000	1	2687.34	4123.34	0.652 ✓	1.333	Bolt Shear
T13	40.4166	Diagonal	A325N	0.6250	1	10287.60	12885.40	0.798 ✓	1.333	Bolt Shear
T14	30.3125	Leg	A325N	1.0625	4	38252.90	38515.30	0.993 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	10753.10	12885.40	0.835 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3232.31	6117.19	0.528 ✓	1.333	Member Bearing
T15	20.2083	Diagonal	A325N	0.6250	1	10894.10	12885.40	0.845 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3357.43	6117.19	0.549 ✓	1.333	Member Bearing
T16	10.1041	Leg	A354-BC	1.0000	6	29505.00	32397.70	0.911 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	11746.00	12885.40	0.912 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3772.02	6442.72	0.585 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 141.167	ROHN 2.5 STD	10.13	5.00	63.3 K=1.00	22.141	1.7040	-7129.47	37729.30	0.189 ✓
T2	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7 K=1.00	17.636	2.2535	-27198.10	39742.70	0.684 ✓
T3	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7 K=1.00	20.596	2.2535	-30628.70	46414.10	0.660 ✓
T4	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7 K=1.00	20.595	2.2535	-40090.00	46412.40	0.864 ✓
T5	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6 K=1.00	30.457	2.2535	-56312.60	68636.90	0.820 ✓
T6	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4 K=1.00	25.475	3.0159	-61433.70	76830.10	0.800 ✓
T7	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4 K=1.00	32.873	3.0159	-72547.80	99141.40	0.732 ✓
T8	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9 K=1.00	32.964	3.0159	-90073.50	99418.20	0.906 ✓
T9	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4 K=1.00	23.284	4.4074	-97971.60	102621.00	0.955 ✓
T10	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3 K=1.00	32.956	4.4074	-114073.00	145250.00	0.785 ✓
T11	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5 K=1.00	33.117	4.4074	-139178.00	145962.00	0.954 ✓
T12	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4 K=1.00	33.131	4.4074	-154950.00	146022.00	1.061 ✓
T13	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4 K=1.00	28.466	6.1120	-162363.00	173984.00	0.933 ✓
T14	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5 K=1.00	35.792	6.1120	-186387.00	218759.00	0.852 ✓
T15	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.800	6.1120	-193605.00	218809.00	0.885 ✓
T16	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4 K=1.00	35.807	6.1120	-217512.00	218848.00	0.994 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 141.167	L1 1/2x1 1/2x3/16	9.27	4.64	189.7 K=1.00	4.150	0.5273	-2620.60	2188.59	1.197 ✓
T2	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	144.7 K=1.00	7.134	0.9020	-4010.91	6434.70	0.623 ✓
T3	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	151.7 K=1.00	6.489	0.9020	-4608.67	5853.04	0.787 ✓
T4	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	158.8 K=1.00	5.923	0.9020	-5623.17	5342.79	1.052 ✓
T5	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	111.3 K=1.00	11.501	1.8047	-6719.56	20756.50	0.324 ✓
T6	100.917 - 94.2014	2L 'a' > 39.1618 in - 66 L3x3x3/16	13.81	7.09	142.7 K=1.00	7.334	1.0900	-7376.17	7994.03	0.923 ✓
T7	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	149.3 K=1.00	6.704	1.0900	-7889.23	7306.96	1.080 ✓
T8	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	104.1 K=1.00	12.257	2.1797	-8255.30	26717.20	0.309 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T9	80.7708 - 70.6875	2L 'a' > 44.0220 in - 99 2L3x3x3/16x1/4	17.36	8.97	121.1 K=1.00	10.071	2.1797	-9214.38	21950.70	0.420 ✓
T10	70.6875 - 60.6041	2L 'a' > 51.2231 in - 111 2L3x3x3/16x1/4	18.25	9.41	127.0 K=1.00	9.252	2.1797	-9514.21	20167.10	0.472 ✓
T11	60.6041 - 50.5104	2L 'a' > 53.7356 in - 120 2L3x3x1/4x1/4	19.03	9.80	132.3 K=1.00	8.527	2.8750	-9706.69	24513.80	0.396 ✓
T12	50.5104 - 40.4166	2L 'a' > 56.1325 in - 132 2L3x3x1/4x1/4	19.93	10.24	138.4 K=1.00	7.795	2.8750	-10066.00	22411.50	0.449 ✓
T13	40.4166 - 30.3125	2L 'a' > 58.7062 in - 144 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	124.1 K=1.00	9.698	3.3750	-10287.60	32730.50	0.314 ✓
T14	30.3125 - 20.2083	2L 'a' > 61.0427 in - 156 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	129.2 K=1.00	8.942	3.3750	-10753.10	30180.90	0.356 ✓
T15	20.2083 - 10.1041	2L 'a' > 63.5688 in - 165 2L 4 x 4 x 1/4 (1/4)	22.61	11.57	118.0 K=1.00	10.719	3.8750	-10894.10	41534.90	0.262 ✓
T16	10.1041 - 0	2L 'a' > 66.0834 in - 177 2L 4 x 4 x 1/4 (1/4) 2L 'a' > 68.6449 in - 189	23.51	12.01	122.6 K=1.00	9.934	3.8750	-11746.00	38493.00	0.305 ✓

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	182.9 K=0.50	4.463	0.7150	-976.61	3191.02	0.306 ✓
T7	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	203.3 K=0.50	3.613	0.7150	-1258.26	2583.20	0.487 ✓
T8	87.4861 - 80.7708	L 2 x 2 x 3/16	14.34	14.04	213.9 K=0.50	3.265	0.7150	-1562.22	2334.13	0.669 ✓
T10	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	191.6 K=0.50	4.068	0.9020	-1978.23	3668.94	0.539 ✓
T11	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	170.5 K=0.50	5.135	1.4400	-2413.81	7395.08	0.326 ✓
T12	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	181.0 K=0.50	4.556	1.4400	-2687.34	6561.12	0.410 ✓
T14	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	199.2 K=0.50	3.763	1.0898	-3232.31	4101.40	0.788 ✓
T15	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	209.5 K=0.50	3.402	1.0900	-3357.43	3708.23	0.905 ✓
T16	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	188.5 K=0.50	4.203	1.6900	-3772.02	7103.60	0.531 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 -	L2 1/2x2 1/2x3/16	8.56	8.32	201.8	3.668	0.9020	-63.93	3308.68	0.019

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
	141.167				K=1.00					✓
T2	141.167 - 121.042	KL/R > 200 (C) - 5 L2 1/2x2 1/2x3/16 KL/R > 200 (C) - 23	8.57	8.33	201.9 K=1.00	3.663	0.9020	-279.95	3303.75	0.085 ✓

* DL controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	151.292 - 141.167	ROHN 2.5 STD	10.13	5.00	63.3	30.000	1.7040	4465.79	51121.50	0.087 ✓
T2	141.167 - 121.042	ROHN 2.5 EH	20.16	6.68	86.7	30.000	2.2535	20751.40	67606.20	0.307 ✓
T3	121.042 - 114.313	ROHN 2.5 EH (GR)	6.74	6.68	86.7	30.000	2.2535	23850.00	67606.20	0.353 ✓
T4	114.313 - 107.646	ROHN 2.5 EH (GR)	6.68	6.68	86.7	30.000	2.2535	31519.90	67606.20	0.466 ✓
T5	107.646 - 100.917	ROHN 2.5 EH (GR)	6.74	3.43	44.6	30.000	2.2535	44168.20	67606.20	0.653 ✓
T6	100.917 - 94.2014	ROHN 3 EH (GR)	6.73	6.66	70.4	30.000	3.0159	48637.80	90477.90	0.538 ✓
T7	94.2014 - 87.4861	ROHN 3 EH (GR)	6.73	3.45	36.4	30.000	3.0159	58650.40	90477.90	0.648 ✓
T8	87.4861 - 80.7708	ROHN 3 EH (GR)	6.73	3.40	35.9	30.000	3.0159	73705.20	90477.90	0.815 ✓
T9	80.7708 - 70.6875	ROHN 4 EH (GR)	10.10	10.02	81.4	30.000	4.4074	80455.50	132223.00	0.608 ✓
T10	70.6875 - 60.6041	ROHN 4 EH (GR)	10.10	5.21	42.3	30.000	4.4074	94492.50	132223.00	0.715 ✓
T11	60.6041 - 50.5104	ROHN 4 EH (GR)	10.11	5.11	41.5	30.000	4.4074	115231.00	132223.00	0.871 ✓
T12	50.5104 - 40.4166	ROHN 4 EH (GR)	10.11	5.10	41.4	30.000	4.4074	128100.00	132223.00	0.969 ✓
T13	40.4166 - 30.3125	ROHN 5 EH (GR)	10.12	10.02	65.4	30.000	6.1120	134072.00	183359.00	0.731 ✓
T14	30.3125 - 20.2083	ROHN 5 EH (GR)	10.12	5.13	33.5	30.000	6.1120	153012.00	183359.00	0.834 ✓
T15	20.2083 - 10.1041	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	158593.00	183359.00	0.865 ✓
T16	10.1041 - 0	ROHN 5 EH (GR)	10.12	5.12	33.4	30.000	6.1120	177030.00	183359.00	0.965 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 141.167	L1 1/2x1 1/2x3/16	9.27	4.64	121.8	29.000	0.3076	2572.86	8920.90	0.288
T2	141.167 - 121.042	L2 1/2x2 1/2x3/16	11.56	5.97	92.1	29.000	0.5886	3942.55	17069.70	0.231
T3	121.042 - 114.313	L2 1/2x2 1/2x3/16	12.14	6.26	96.5	29.000	0.5886	4580.76	17069.70	0.268
T4	114.313 - 107.646	L2 1/2x2 1/2x3/16	12.73	6.55	101.0	29.000	0.5886	5538.39	17069.70	0.324
T5	107.646 - 100.917	2L 2.5 x 2.5 x 3/16 (3/16)	13.32	6.84	105.5	29.000	1.1777	6573.25	34154.30	0.192
T6	100.917 - 94.2014	2L 'a' > 39.1618 in - 67 L3x3x3/16	13.81	7.09	90.6	29.000	0.7296	7431.54	21158.70	0.351
T7	94.2014 - 87.4861	L3x3x3/16	14.46	7.41	94.7	29.000	0.7296	7728.41	21158.70	0.365
T8	87.4861 - 80.7708	2L 3 x 3 x 3/16 (1/4)	15.05	7.71	98.4	29.000	1.4590	8144.44	42310.50	0.192
T9	80.7708 - 70.6875	2L 'a' > 44.0220 in - 100 2L3x3x3/16x1/4	17.36	8.97	114.5	29.000	1.4238	9222.72	41291.00	0.223
T10	70.6875 - 60.6041	2L 'a' > 51.2231 in - 112 2L3x3x3/16x1/4	18.25	9.41	120.2	29.000	1.4238	9238.44	41291.00	0.224
T11	60.6041 - 50.5104	2L 'a' > 53.7356 in - 121 2L3x3x1/4x1/4	19.03	9.80	126.3	32.500	1.8750	9589.56	60937.50	0.157
T12	50.5104 - 40.4166	2L 'a' > 56.1325 in - 133 2L3x3x1/4x1/4	19.93	10.24	132.1	32.500	1.8750	9857.92	60937.50	0.162
T13	40.4166 - 30.3125	2L 'a' > 58.7062 in - 145 2L3 1/2x3 1/2x1/4x1/4	20.81	10.67	117.3	32.500	2.2500	10208.90	73125.00	0.140
T14	30.3125 - 20.2083	2L 'a' > 61.0427 in - 157 2L3 1/2x3 1/2x1/4x1/4	21.69	11.11	122.2	32.500	2.2500	10397.10	73125.00	0.142
T15	20.2083 - 10.1041	2L 'a' > 63.5688 in - 166 2L 4 x 4 x 1/4 (1/4)	22.61	11.57	110.8	32.500	2.6250	10843.80	85312.50	0.127
T16	10.1041 - 0	2L 'a' > 66.0834 in - 178 2L 4 x 4 x 1/4 (1/4)	23.51	12.01	115.1	32.500	2.6250	10997.70	85312.50	0.129
		2L 'a' > 68.6449 in - 190								

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	107.646 - 100.917	L 2 x 2 x 3/16	12.25	12.01	233.6	29.000	0.4308	976.61	12492.70	0.078
T7	94.2014 - 87.4861	L 2 x 2 x 3/16	13.64	13.35	259.7	29.000	0.4308	1258.26	12492.70	0.101
T8	87.4861 - 80.7708	L 2 x 2 x 3/16	14.34	14.04	273.2	29.000	0.4308	1562.22	12492.70	0.125
T10	70.6875 - 60.6041	L2 1/2x2 1/2x3/16	16.18	15.81	243.8	29.000	0.5710	1978.23	16559.90	0.119
T11	60.6041 - 50.5104	L3x3x1/4	17.20	16.82	217.1	29.000	0.9628	2413.81	27921.60	0.086

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T12	50.5104 - 40.4166	L3x3x1/4	18.24	17.86	230.5	29.000	0.9628	2687.34	27921.60	0.096 ✓
T14	30.3125 - 20.2083	L 3 x 3 x 3/16	20.26	19.80	252.9	29.000	0.7119	3232.31	20645.50	0.157 ✓
T15	20.2083 - 10.1041	L3x3x3/16	21.27	20.81	266.0	29.000	0.7120	3357.43	20648.90	0.163 ✓
T16	10.1041 - 0	L 3.5 x 3.5 x 1/4	22.27	21.80	239.9	29.000	1.1269	3772.02	32679.40	0.115 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	151.292 - 141.167	L2 1/2x2 1/2x3/16	8.56	8.32	128.4	29.000	0.5886	25.78	17069.70	0.002 ✓
T2	141.167 - 121.042	L2 1/2x2 1/2x3/16	8.57	8.33	128.5	29.000	0.5886	338.13	17069.70	0.020 ✓

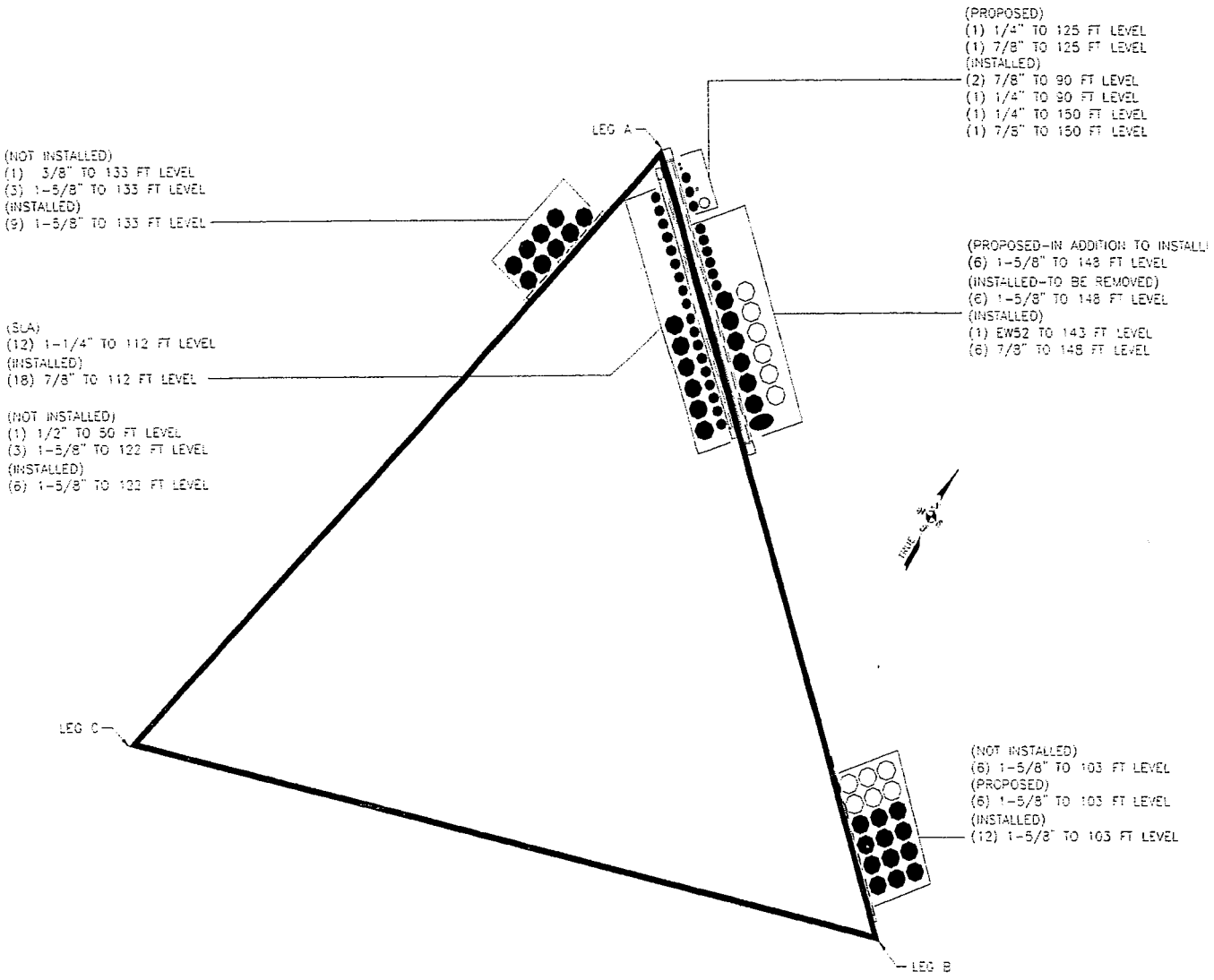
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	151.292 - 141.167	Leg	ROHN 2.5 STD	2	-6817.30	50293.16	15.9	Pass
T2	141.167 - 121.042	Leg	ROHN 2.5 EH	20	-27198.10	52977.02	51.3	Pass
T3	121.042 - 114.313	Leg	ROHN 2.5 EH (GR)	44	-30628.70	61869.99	49.5	Pass
T4	114.313 - 107.646	Leg	ROHN 2.5 EH (GR)	53	-40090.00	61867.72	64.8	Pass
T5	107.646 - 100.917	Leg	ROHN 2.5 EH (GR)	62	-56312.60	91492.98	61.5	Pass
T6	100.917 - 94.2014	Leg	ROHN 3 EH (GR)	74	-61433.70	102414.52	60.0	Pass
T7	94.2014 - 87.4861	Leg	ROHN 3 EH (GR)	83	-72547.80	132155.48	54.9	Pass
T8	87.4861 - 80.7708	Leg	ROHN 3 EH (GR)	95	-90073.50	132524.46	68.0	Pass
T9	80.7708 - 70.6875	Leg	ROHN 4 EH (GR)	107	-97971.60	136793.79	71.6	Pass
T10	70.6875 - 60.6041	Leg	ROHN 4 EH (GR)	116	-114073.00	193618.24	58.9 66.8 (b)	Pass
T11	60.6041 - 50.5104	Leg	ROHN 4 EH (GR)	128	-139178.00	194567.34	71.5	Pass
T12	50.5104 - 40.4166	Leg	ROHN 4 EH (GR)	140	-154950.00	194647.32	79.6	Pass
T13	40.4166 - 30.3125	Leg	ROHN 5 EH (GR)	152	-162363.00	231920.66	70.0	Pass
T14	30.3125 - 20.2083	Leg	ROHN 5 EH (GR)	161	-186387.00	291605.73	63.9 74.5 (b)	Pass
T15	20.2083 - 10.1041	Leg	ROHN 5 EH (GR)	173	-193605.00	291672.38	66.4	Pass
T16	10.1041 - 0	Leg	ROHN 5 EH (GR)	185	-217512.00	291724.37	74.6	Pass
T1	151.292 - 141.167	Diagonal	L1 1/2x1 1/2x3/16	9	-2620.60	2917.39	89.8	Pass
T2	141.167 - 121.042	Diagonal	L2 1/2x2 1/2x3/16	27	-4010.91	8577.46	46.8 73.0 (b)	Pass
T3	121.042 -	Diagonal	L2 1/2x2 1/2x3/16	48	-4608.67	7802.10	59.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
T4	114.313 - 107.646	Diagonal	L2 1/2x2 1/2x3/16	57	-5623.17	7121.94	79.0	Pass
T5	107.646 - 100.917	Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	66	-6719.56	27668.41	24.3	Pass
T6	100.917 - 94.2014	Diagonal	L3x3x3/16	78	-7376.17	10656.04	61.1 (b) 69.2	Pass
T7	94.2014 - 87.4861	Diagonal	L3x3x3/16	87	-7889.23	9740.18	81.0	Pass
T8	87.4861 - 80.7708	Diagonal	2L 3 x 3 x 3/16 (1/4)	99	-8255.30	35614.03	23.2	Pass
T9	80.7708 - 70.6875	Diagonal	2L3x3x3/16x1/4	111	-9214.38	29260.28	75.1 (b) 31.5	Pass
T10	70.6875 - 60.6041	Diagonal	2L3x3x3/16x1/4	120	-9514.21	26882.74	80.4 (b) 35.4	Pass
T11	60.6041 - 50.5104	Diagonal	2L3x3x1/4x1/4	132	-9706.69	32676.90	80.5 (b) 29.7	Pass
T12	50.5104 - 40.4166	Diagonal	2L3x3x1/4x1/4	144	-10066.00	29874.53	83.6 (b) 33.7	Pass
T13	40.4166 - 30.3125	Diagonal	2L3 1/2x3 1/2x1/4x1/4	156	-10287.60	43629.75	58.6 (b) 23.6	Pass
T14	30.3125 - 20.2083	Diagonal	2L3 1/2x3 1/2x1/4x1/4	165	-10753.10	40231.14	59.9 (b) 26.7	Pass
T15	20.2083 - 10.1041	Diagonal	2L 4 x 4 x 1/4 (1/4)	177	-10894.10	55366.02	62.6 (b) 19.7	Pass
T16	10.1041 - 0	Diagonal	2L 4 x 4 x 1/4 (1/4)	189	-11746.00	51311.17	63.4 (b) 22.9	Pass
T5	107.646 - 100.917	Secondary Horizontal	L 2 x 2 x 3/16	70	-976.61	4253.63	68.4 (b) 23.0	Pass
T7	94.2014 - 87.4861	Secondary Horizontal	L 2 x 2 x 3/16	91	-1258.26	3443.41	36.5	Pass
T8	87.4861 - 80.7708	Secondary Horizontal	L 2 x 2 x 3/16	103	-1562.22	3111.40	50.2	Pass
T10	70.6875 - 60.6041	Secondary Horizontal	L2 1/2x2 1/2x3/16	124	-1978.23	4890.70	40.4	Pass
T11	60.6041 - 50.5104	Secondary Horizontal	L3x3x1/4	136	-2413.81	9857.64	24.5	Pass
T12	50.5104 - 40.4166	Secondary Horizontal	L3x3x1/4	148	-2687.34	8745.97	43.9 (b) 30.7	Pass
T14	30.3125 - 20.2083	Secondary Horizontal	L 3 x 3 x 3/16	169	-3232.31	5467.17	48.9 (b) 59.1	Pass
T15	20.2083 - 10.1041	Secondary Horizontal	L3x3x3/16	181	-3357.43	4943.07	67.9	Pass
T16	10.1041 - 0	Secondary Horizontal	L 3.5 x 3.5 x 1/4	194	-3772.02	9469.10	39.8	Pass
T1	151.292 - 141.167	Top Girt	L2 1/2x2 1/2x3/16	5	-63.93	3308.68	43.9 (b) 1.9	Pass
T2	141.167 - 121.042	Top Girt	L2 1/2x2 1/2x3/16	23	-279.95	4403.90	6.4	Pass
							Summary	
						Leg (T12)	79.6	Pass
						Diagonal (T1)	89.8	Pass
						Secondary Horizontal (T15)	67.9	Pass
						Top Girt (T2)	6.4	Pass
						Bolt Checks	83.6	Pass
						RATING =	89.8	Pass

APPENDIX B

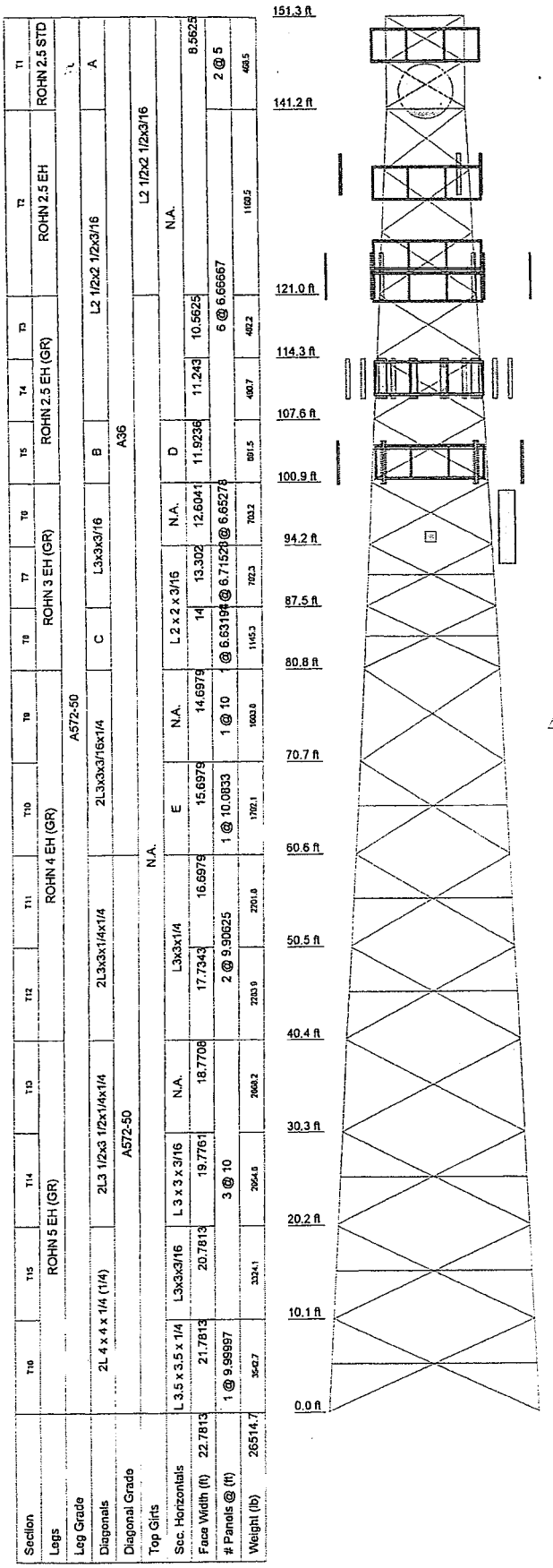
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 5.4.2.0 - 6/17/2010 File:T:/375_Crown_Castle/2011/37511-0187 BU 806384/37511-0187.eri



Section	T10	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		ROHN 5 EH (GR)				ROHN 4 EH (GR)			ROHN 3 EH (GR)			ROHN 2.5 EH (GR)			ROHN 2.5 EH	ROHN 2.5 STD
Leg Grade								A572-50								
Diagonals	2L 4 x 4 x 1/4 (1/4)		2L3 1/2x3 1/2x1/4x1/4			2L3x3x3/16x1/4		C	L3x3x3/16		B	L2 1/2x2 1/2x3/16		A		
Diagonal Grade				A572-50			A36									
Top Girts												L2 1/2x2 1/2x3/16				
Sec. Horizontals	L 3.5 x 3.5 x 1/4	L3x3x3/16	L 3 x 3 x 3/16	N.A.	L3x3x1/4		E	N.A.	L 2 x 2 x 3/16	N.A.	D	N.A.	11.243	10.5625	8.5625	
Face Width (ft)	21.7813	20.7813	19.7761	18.7708	17.7343	16.6979	15.6979	14.6979	13.302	12.6041	11.9236			6 @ 6.66667	2 @ 5	
# Panels @ (ft)	1 @ 9.99997	3 @ 10			2 @ 9.90625		1 @ 10.0833	1 @ 10	1 @ 6.63194	6 @ 6.71528	6 @ 6.65278					
Weight (lb)	26514.7	3542.7	3324.1	2954.6	2668.2	2283.9	2201.8	1702.1	1603.8	1145.3	782.3	703.2	691.5	490.7	402.2	1109.5	498.5

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ANT150F2	157	Sector Mount [SM 505-3]	122
PTP 49400 w/ Mount Pipe	152	(4) ALP 9212-N w/Mount Pipe	112
Side Arm Mount [SO 304-1]	150	(4) ALP 9212-N w/Mount Pipe	112
BXA-70063/6CF w/ Mount Pipe	149	(4) ALP 9212-N w/Mount Pipe	112
(2) LPA-80063/6CF w/ Mount Pipe	149	Sector Mount [SM 510-3]	112
(2) FD9R6004/2C-3L	149	(2) RR90-17-02DP w/Mount Pipe	103
MG V5-800TX w/ Mount Pipe	149	(2) RR90-17-02DP w/Mount Pipe	103
BXA-70063/6CF w/ Mount Pipe	149	(2) RR90-17-02DP w/Mount Pipe	103
(2) LPA-80063/6CF w/ Mount Pipe	149	(2) Ericsson KRY 112 71/1	103
(2) FD9R6004/2C-3L	149	(2) Ericsson KRY 112 71/1	103
MG V5-800TX w/ Mount Pipe	149	(2) Ericsson KRY 112 71/1	103
BXA-70063/6CF w/ Mount Pipe	149	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	103
(2) LPA-80063/6CF w/ Mount Pipe	149		
(2) FD9R6004/2C-3L	149	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	103
MG V5-800TX w/ Mount Pipe	149		
Sector Mount [SM 510-3]	148	APX16DWV-16DWVS-E-A20 w/ Mount Pipe	103
PL6-59W	143		
800 10504 w/ Mount Pipe	134	ATMAA1412D-1A20	103
800 10504 w/ Mount Pipe	134	ATMAA1412D-1A20	103
800 10504 w/ Mount Pipe	134	ATMAA1412D-1A20	103
Sector Mount [SM 410-3]	133	Sector Mount [SM 701-3]	103
DB586-Y	130	SRL-217	96
PTP 49400 w/ Mount Pipe	126	PTP 49400 w/ Mount Pipe	95
Side Arm Mount [SO 303-1]	125	ANT150D3	90
(2) DB980H90E-M w/Mount Pipe	123	Side Arm Mount [SO 301-1]	90
(2) DB980H90E-M w/Mount Pipe	123	Side Arm Mount [SO 302-1]	90
(2) DB980H90E-M w/Mount Pipe	123		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16	D	L 2 x 2 x 3/16
B	2L 2.5 x 2.5 x 3/16 (3/16)	E	L2 1/2x2 1/2x3/16
C	2L 3 x 3 x 3/16 (1/4)		

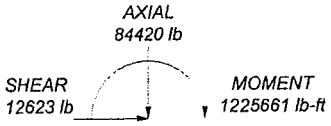
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

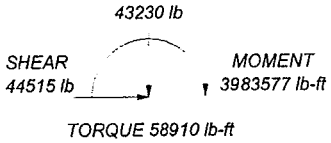
TOWER DESIGN NOTES

1. Tower is located in New London 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. Grouted pipe f'c is 7 ksi
6. TOWER RATING: 89.8%

MAX. CORNER REACTIONS AT BASE:
DOWN: 216319 lb
UPLIFT: -175977 lb
SHEAR: 27433 lb



TORQUE 14102 lb-ft
38 mph WIND - 0.7500 in ICE



TORQUE 58910 lb-ft
REACTIONS - 85 mph WIND

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *Modified 152-ft S/S Tower; East Lyme, CT*			
Project: *BU #806384 (PJF #37511-0187)*			
Client: Crown Castle	Drawn by: Christina Hedges	App'd:	
Code: TIA/EIA-222-F	Date: 02/01/11	Scale: NTS	
Path: T:\375_Crown_Castle\2011\37511-0187 BU 806384\37511-0187.eri		Dwg No. E-1	

PJF job no. **37511-0187** Project name **BU806384**

Foundation Loads:

Tower leg compression =	216.32	(kips)
Tower leg tension =	175.98	(kips)
Horizontal load at top of pier =	0	(kips)
Overturning moment at top of pier=	0	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	
Uplift safety factor: conc. weight =	1.25	
Uplift safety factor for soil weight =	2	

Soil Properties:

Soil density =	125	(pcf)
Allowable soil bearing =	6	(ksf)
Soil cone of uplift =	31	(degrees)
Uplift cone from top or bottom of ftg	B	("T" or "B")
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	R	("R" or "S")
Pier width =	3	(ft)
Pier height above grade =	0.5	(ft)
depth to bottom of footing =	12	(ft)
Footing thickness =	2	(ft)
Footing width =	8.25	(ft)
Footing length =	8.25	(ft)

Concrete:

Concrete strength =	3	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

Reinforcing Steel:

Pad

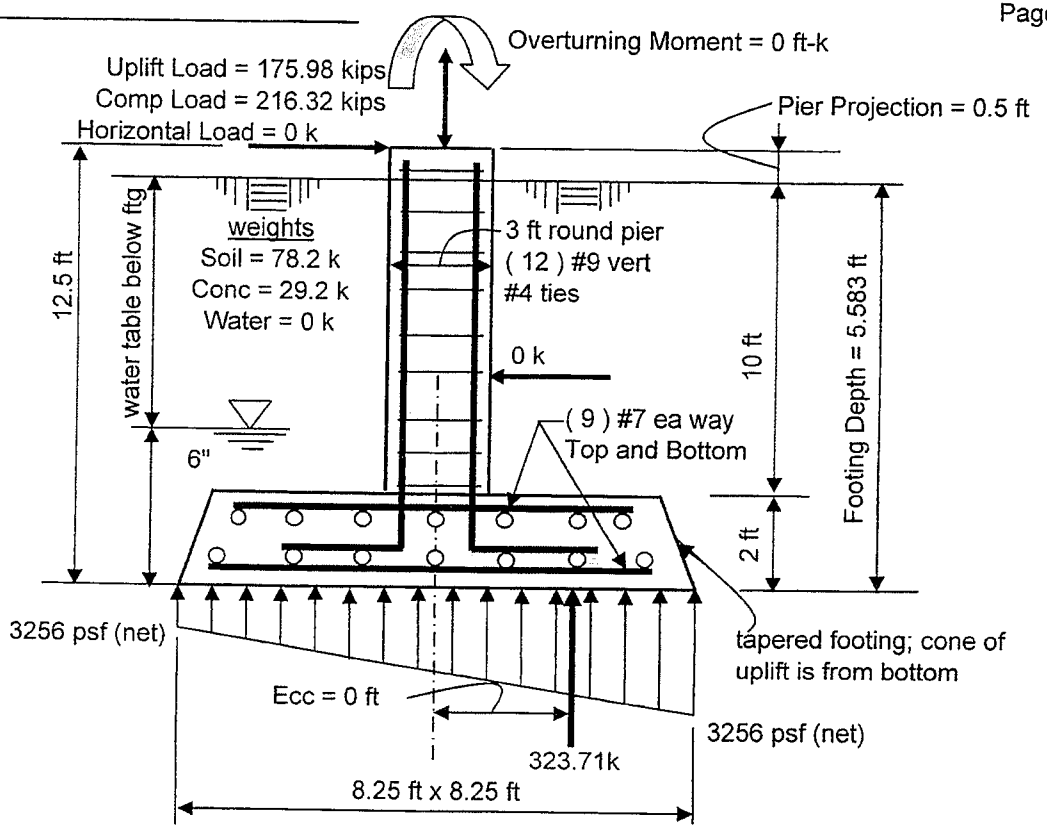
minimum cover over rebar =	3	inches
size of pad rebar =	#7	bar
quantity of pad rebar =	9	(ea direction)

Pier

size of vert rebar in pier=	#9	bar
vertical rebar quantity =	12	
size of pier ties =	#4	bar
minimum cover over rebar =	3	inches

Total volume of concrete = 7.2 cu yd each

(Total volume of concrete = 21.6 cu yd for 3)



Summary of analysis results	
Maximum Net Soil Bearing = 3.256 ksf Allowable Net Soil Bearing = 6 ksf **Soil Bearing Stress Ratio = 0.54 Okay**	Ult Punching Shear Capacity = 641 kips Ult Punching Shear Force = 104 kips **Punching Shear Stress Ratio = 0.16 OK**
Net Ftg Uplift Resistance = 213.8 kips Uplift Force = 175.977 kips Net Uplift Safety Factor = 2.25 **Ratio to Required Safety factor = 0.82 OK**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 37 psi **Bending Shear Stress Ratio = 0.34 Okay**
Ftg Overturning Resistance = 1335 ft-kips Overturning Moment = 0 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 999 **Ratio = 0 Okay**	Pad Bending Moment Capacity= 463 ft-k Pad Bending Moment = 118 ft-k **Bending Moment Stress Ratio = 0.26 OK**
	Allow Tension in Pier Rebar = 41.54 ksi Calc Vert Rebar Tension = 14.66 ksi **Ratio = 0.353 Okay**