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

May 7, 2008

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

RE: **EM-VER-076-080415** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 864 Opening Hill Road, Madison, Connecticut.

Dear Attorney Baldwin:

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

The proposed modifications are to be implemented as specified here and in your notice dated April 15, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Thank you for your attention and cooperation.

Very truly yours,

S/Derek Phelps
Executive Director

SDP/MP

c: Honorable Al Goldberg, First Selectman, Town of Madison
Marilyn M. Ozols, Planning and Zoning Administrator, Town of Madison
Unison

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

April 16, 2008

The Honorable Al Goldberg
First Selectman
Town of Madison
Madison Town Campus
8 Campus Drive
Madison, CT 06443-2563

RE: **EM-VER-076-080415** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 864 Opening Hill Road, Madison, Connecticut.

Dear Mr. Goldberg:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by April 30, 2008.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps / m. p.

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Marilyn M. Ozols, Planning & Zoning Administrator, Town of Madison

ROBINSON & COLE

EM-VER-076-080415

KENNETH C. BALDWIN

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

ORIGINAL

April 15, 2008

Via Hand Delivery

ORIGINAL

RECEIVED
APR 15 2008
CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap**
864 Opening Hill Road, Madison, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility at the above referenced location. The Council approved Cellco's shared use of this facility on June 30, 1997. On April 19, 2005 the Council granted Cellco's request to replace six cellular antennas with six PCS antennas. Cellco now intends to modify its installation further by replacing two (2) cellular antennas with two (2) newer Model LPA-80080/6CF cellular antennas and two (2) tower mounted amplifiers (TMAs) at the 170-foot level on the 180-foot lattice tower. The tower is owned by Unison. Attached behind Tab 1 are the specifications for the proposed replacement antennas as well as the specifications and a mounting detail for the TMAs.

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 Alfred Goldberg, First Selectman of the Town of Madison. Pursuant to a Council directive, a copy of this letter is also being sent to the North Madison Volunteer Fire Company, the owner of the property on which the facility 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 the increase in the overall height of the existing structure. Cellco's replacement antennas and TMAs will be located at the 170-foot level of the 180-foot tower.

2. The proposed modifications will not involve any 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 power density table for the facility, including the TMAs, is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower can support the 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:
Alfred Goldberg, Madison First Selectman
North Madison Volunteer Fire Company
Sandy M. Carter

Vertically Polarized, Log Periodic 80° / 14 dBd

LPA-80080/6CF ___

When ordering replace "___" with connector type.

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
[4] Weight	9.5 kg	21.0 lbs
Wind Area		
Fore/Aft	0.25 m^2	2.7 ft^2
Side	0.60 m^2	6.5 ft^2
Rated Wind Velocity (Safety factor 2.0)	>295 km/hr	>183 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	415 N	93.3 lbs
Side	870 N	195.6 lbs

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

Mounting and Downtilting

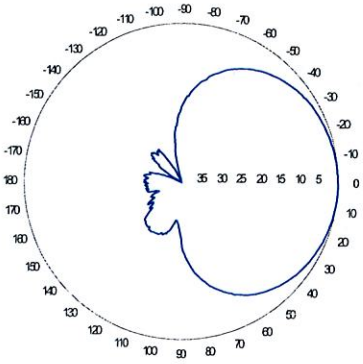
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

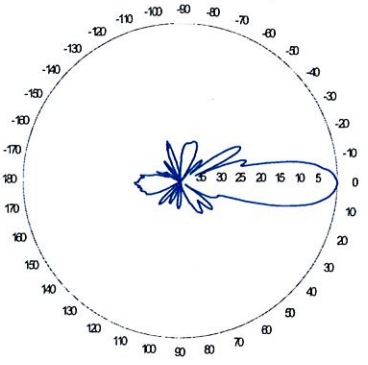
Electrical specifications

	Frequency Range	806-960 MHz
	Impedance	50Ω
[3]	Connector(s)	NE or E-DIN 1 port / center
[1]	VSWR	≤ 1.4:1
	Polarization	Vertical
[1]	Gain	14 dBd
[2]	Power Rating	500 W
[1]	Half Power Angle	
	H-Plane	80°
	E-Plane	10°
[1]	Electrical Downtilt	0°
[1]	Null Fill	10%
	Lightning Protection	Direct Ground

Radiation pattern[1]



Horizontal

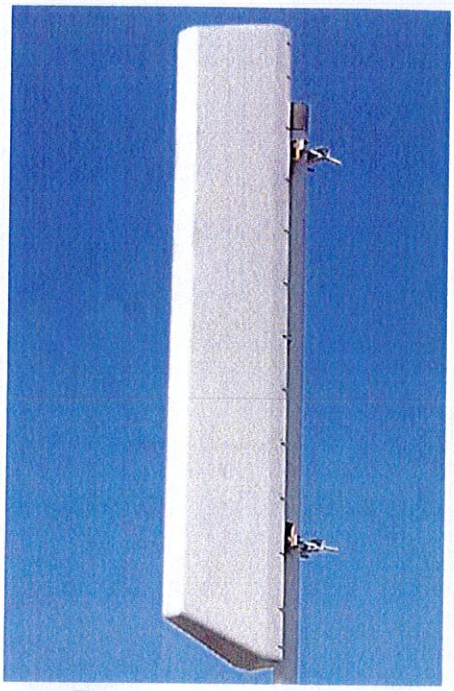


Vertical

Featuring upper side lobe suppression.

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.



Amphenol Antel's Exclusive 3T (True Transmission Line 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 band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

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) The antenna weight listed above does not include the bracket weight.

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

CF Denotes a Center-Fed Connector.

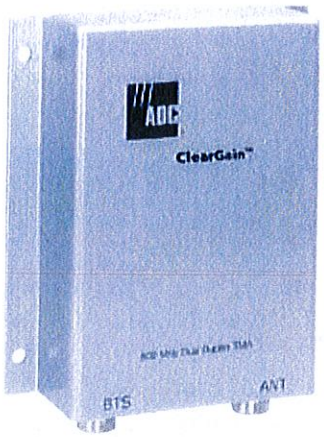
806-960 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 7/5/07

ClearGain® Tower-Mounted Amplifiers
Americas



As mobile usage continues to increase, service providers are faced with the challenge of optimizing and expanding their wireless networks to provide new and existing services. ADC's ClearGain® Tower-Mounted Amplifiers (TMAs) minimize the cost of network expansion and improve quality of service, allowing service providers to increase profitability from new and existing services.

The ClearGain TMAs improve signal quality by boosting the uplink signal of a mobile system to increase receiver performance and improve overall coverage.

SPEC SHEET

Features:

- Provides amplification of the Band
- Highly advanced LNA amplifies RX signal for improved receiver performance and increase in coverage
- Dual duplex feature reduces the number of feeder cable runs by providing simultaneous operation of TX and RX with low TX loss
- Full Band feature provides amplification of the entire band
- Advanced filtering maintains the lowest possible noise figure for improved quality of service
- Slim, stackable design conserves tower space and reduces tower-related costs
- Seamless aluminum sleeve construction protects components from the elements
- Modular system is fully compatible with all base stations
- Power and alarming for up to six masthead units is provided from a single unit at the base station

www.adc.com • +1-952-938-8080 • 1-800-366-3891

ClearGain® Tower-Mounted Amplifiers
Americas

Introduction

Unacceptable network quality is one of the main reasons for mobile subscriber churn. With industry churn at their current rates, a service provider's entire customer base could be lost in as few as three years. The cost of acquiring new subscribers to replace the existing customer base can be enormous. Improvements in quality of service can directly impact a service provider's profitability through the cost savings associated with increased subscriber retention and the additional revenue gained from increased billable minutes of use resulting from improved signal quality.

While subscribers are willing to pay a premium for data services, improved quality of service is necessary to provide new data services. Due to the tradeoff between bit rate and bandwidth inherent to data services, improved signal quality is required to achieve the same level of performance at even higher data rates. ADC's ClearGain Tower-Mounted Amplifiers help provide this improvement in signal quality.

TMAs improve signal quality by boosting the uplink (RX) signal of a mobile system immediately after the antenna. This compensates for the loss in signal strength that occurs when the signal is passed through the coaxial feeder cable to the base transceiver station (BTS) at the base of the tower. ClearGain TMAs perform this amplification with the lowest possible noise contribution, resulting in a substantial increase in receiver performance and an improvement in overall coverage. These improvements in quality of service allow mobile subscribers to place more calls, make longer calls, and successfully complete calls in an expanded geographic area, resulting in increased revenue.

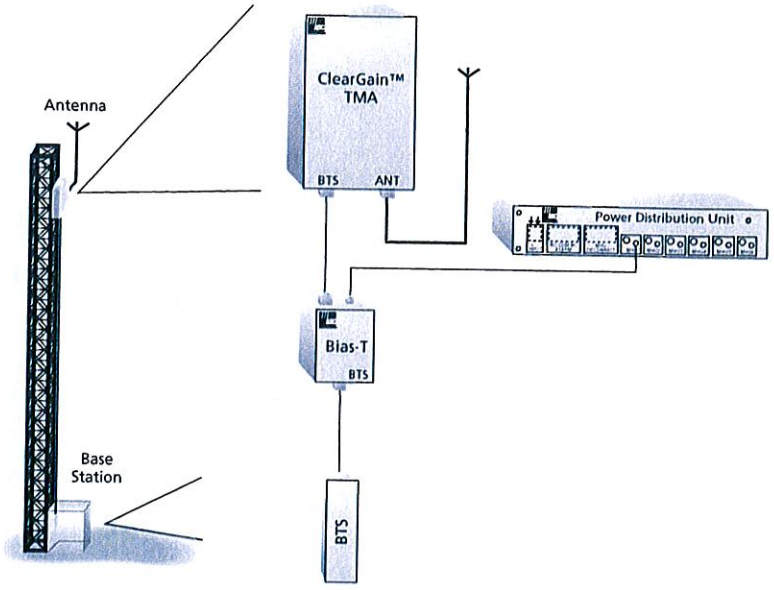
System Overview

The ClearGain TMA system is modular, consisting of a Masthead Unit (MHU), a Power Distribution Unit (PDU) and a Bias-T Unit. This system provides full compatibility with all base stations. The ClearGain MHU offers dual duplex operation and incorporates a highly advanced fixed-gain, low-noise amplifier (LNA) and high-performance filters for added reliability. The MHU amplifies each band to maximize signal quality and optimize coverage.

The ClearGain MHU features a slim, lightweight design. This allows two ClearGain TMAs to be mounted with one set of brackets thereby, conserving valuable and costly tower space and reducing clutter on the tower. The TMA is protected with a strong, aluminum sleeve construction designed to ensure superior weather protection and resistance to corrosion, resulting in increased reliability.

In the ClearGain TMA system, DC power is supplied to the MHU from a ClearGain PDU. The PDU also provides alarming and monitoring of the feeder cable and up to six MHUs from a single unit. The flexible design of the ClearGain PDU allows it to be rack- or wall-mounted on the side of a BTS cabinet.

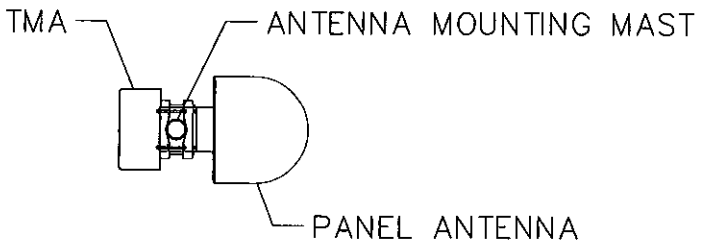
An external Bias-T Unit is used in conjunction with the ClearGain PDU. The Bias-T inserts DC power onto the coaxial cable and extracts alarm and monitoring signals from the coaxial cable.



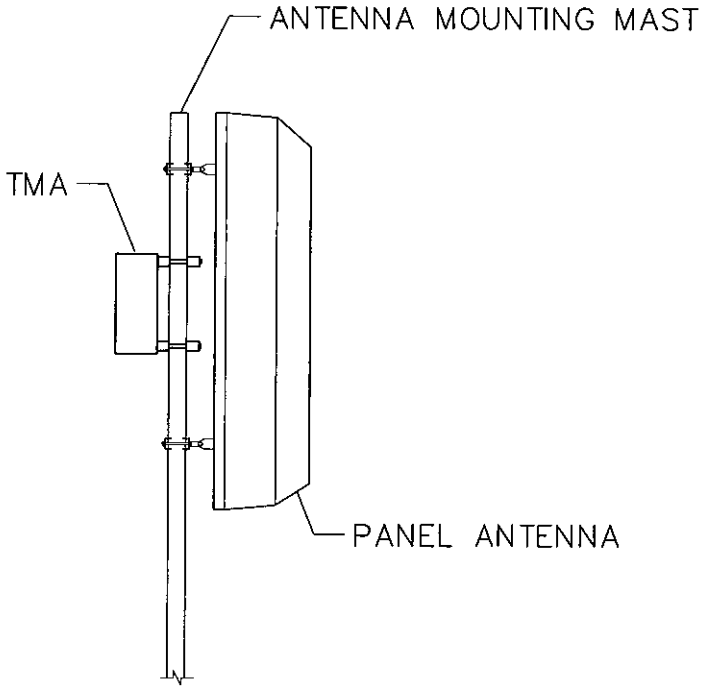
ClearGain® Tower-Mounted Amplifiers
Americas

Dual Band 800/1900 MHz Full Band Typical Specifications

ELECTRICAL	
Nominal Impedance of RF Inputs and Outputs:	50 Ohm
Frequency Range	
TX: 800:	869-894 MHz
1900:	1930-1990 MHz
RX: 800:	824-849 MHz
1900:	1850-1910 MHz
Filter Bandwidth:	25/60 MHz
Passband (RX)	
Gain:	12 dB
Noise Figure:	
800:	1.5 dB
1900:	1.6 dB
Dynamic Range	
Input at 1 dB Gain Compression:	+0 dBm
IIP3:	+13 dBm
Max. Input Power:	+10 dBm
851 MHz Rejection:	<30 dB
1915 MHz Rejection:	<15 dB
1916 MHz Rejection:	<30 dB
Bypass Insertion Loss:	2.0 dB
Isolation in TX Path:	80 dB
Insertion Loss of TX Path (TX to Antenna):	4 dB
Passband Return Loss:	
TX Band:	>18 dB
RX Band:	>18 dB
Intemodulation:	-120 dBm
Max. Input Power (RMS Power):	
800:	500 W
1900:	250 W
Tx Filter Rejection in RX Path:	40 dB
POWER	
Operational Voltage:	7 to 20 Vdc
Operational Current:	280 ± 10 mA
Alarm Current Level:	350-520 mA
PHYSICAL	
Dimensions (HxWxD):	357 mm x 287 mm x 149 mm
Weight:	10.5 kg (22.5 lbs.)
Color:	Silver
Housing:	Aluminum
CONNECTORS	
Antenna Connector:	7/16 DIN female
BTS Connector:	7/16 DIN female
ENVIRONMENTAL	
Operating Temperature:	-40° to +60 °C
Lightning Protection:	IEC 61000-4-5
Vibration:	
Storage:	ETS3019-1-1
Transport:	ETS3019-1-2
Operation:	ETS3019-1-3
REGULATORY	
EMC:	ETS300 342-2
APPROVALS	
FCC:	Part 15, Class A
UL:	1950
QUALITY	
MTBF:	900,000 hours



PLAN VIEW



SIDE ELEVATION

TYPICAL TOWER MOUNTED AMPLIFIER (TMA) - MOUNTING DETAIL

NOT TO SCALE

	General	Power	Density					
Site Name: Madison								
Tower Height: Verizon @ 170Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	Total
*VoiceStream	8	246	130	0.0419	1930	1.0000	4.19%	
*Fire Company	1	100	180	0.0011	46.06	0.2000	0.55%	
*Police Dept	1	100	180	0.0011	453.5	0.3023	0.37%	
*Cingular/TDMA	16	100	139	0.0298	880	0.5867	5.08%	
*Cingular/GSM	2	296	139	0.0110	880	0.5867	1.88%	
*Cingular/GSM	2	427	139	0.0159	1930	1.0000	1.59%	
*Sprint	11	122	150	0.0214	1962.5	1.0000	2.14%	
*Nextel	9	100	160	0.0126	851	0.5673	2.23%	
Verizon **	**9**	**634**	**170**	**0.0710**	**880**	**0.5866**	**12.10%**	
Verizon	**3**	**196**	**170**	**0.0073**	**1900**	**1.0000**	**0.73%**	
								30.86%
* Source: Siting Council								
** Including Tower Mounted Amplifiers (TMAs)								

NATCOMM INC.
CONSULTING ENGINEERS

Structural Analysis Report

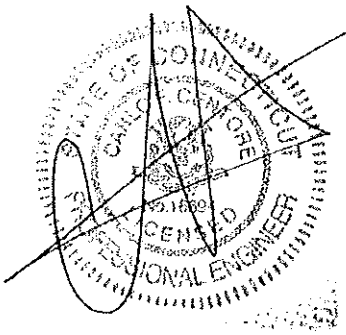
180' Existing Lattice Tower

"North Madison Fire Department"
864 Opening Hill Road
Madison, CT

Natcomm Project No. 08007.CO11

~~Date: March 17, 2008~~

Rev. 1: April 9, 2008



Prepared for:
Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
63-2 N. Branford Rd
Branford, CT 06405

Table of Contents

Natcomm, Inc.
Structural Lattice Tower Analysis
180' Existing ROHN Lattice Tower
Madison, CT
Revision 1 ~ April 9, 2008

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna exchange proposed by Verizon Wireless on the existing self supporting lattice tower located in Madison, Connecticut. The host tower is a 180-ft, three legged, tapered lattice tower originally designed and manufactured by UNR-ROHN; file no. 35130AE, drawing no(s). A982923 (tower) dated November 25, 1998 and A982942-1 (foundation) dated November 30, 1998. The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry and structure member sizes were taken from a structural analysis prepared by Paul J. Ford and Company Structural Engineers (PJF); job no. A02-T030, dated March 13, 2002. Foundation information was taken from a structural analysis prepared by Malouf Engineering Intl., Inc. (MEI); job no. 00-538, dated June 13, 2000. Antenna and appurtenance inventory were taken from a structural analysis prepared by Manzi Engineering dated September 12, 2002 and site assessment information obtained by Natcomm personnel on March 11, 2008. The structural analyses prepared by PJF, MEI and Manzi Engineering are available for reference in Section 4 of this report.

The tower is made of nine (9) tapered vertical sections consisting of hollow structural steel pipe legs. Diagonal and horizontal lateral support bracing consists of hollow structural steel piping and angle shapes. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by welded and bolted gusset connections. The width of the tower face is 8.56-ft at the top and 25.38-ft at the base.

Verizon Wireless is proposing the replacement of two (2) existing Cellular antennas and the addition of two (2) TMA's on their existing T-Frame mount. Refer to the Antenna and Appurtenance Summary below and "Antenna Replacement Details" drawing "ANT-1" in Section 4 of this report for a detailed description and layout of the existing and proposed antenna configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- TOWN (Existing):
  Antenna: One (1) 12 Bay Dipole antenna mounted with an elevation of ±185-ft above the tower base.
  Coax Cable: One (1) 1/2" ∅ coax cable and one (1) 1" rigid conduit on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: Three (3) PD455-5 antennas mounted on three (3) 6' Standoffs with an elevation of ±180-ft above the tower base.
  Coax Cable: Three (3) 7/8" ∅ coax cables and one (1) 2" rigid conduit running on a leg/face of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing/Removed/Reconfigured):
  Antennas: Six (6) Decibel DB844H90 and six (6) Decibel DB948F85T2E-M panel antennas mounted on (3) 15' T-Frames with a RAD center elevation of ±170-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **VERIZON (Proposed/Reconfigured):**
  Antennas: Two (2) Antel LPA-80080-6CF (proposed), four (4) Decibel DB844H90 (existing to remain), six (6) Decibel DB948F85T2E-M (existing to remain) panel antennas and two (2) 14" by 11.3" by 6" TMA's mounted on (3) 15' T-Frames with a RAD center elevation of ±170-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- NEXTEL (Existing):
  Antennas: Twelve (12) Decibel DB844H90 panel antennas mounted on (3) 15' T-Frames with a RAD center elevation of ±160-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- SPRINT (Existing):
  Antennas: Nine (9) Decibel DB980H90E-M (6 existing / 3 reserved) panel antennas mounted on (3) 15' T-Frames with a RAD center elevation of ±150-ft above the existing tower base.
  Coax Cables: Nine (9) 1-5/8" ∅ coax cables (6 existing / 3 reserved) running on a leg/face of the existing tower as specified in Section 3 of this report.

- AT&T (Existing):
  Antennas: Six (6) DUO1417-8686 panel antennas, six (6) 10" by 8" by 3" TMA's and three (3) diplexers mounted on (3) 15' T-Frames with a RAD center elevation of ±140-ft above the existing tower base.
  Coax Cables: Nine (9) 1-1/4" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- T-MOBILE (Existing):
  Antennas: Six (6) EMS 72" by 12" by 4" panel antennas (3 existing / 3 reserved) and six (6) 10" by 8" by 3" TMA's mounted on (3) 15' T-Frames with a RAD center elevation of ±130-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables (6 existing / six reserved) running on a leg/face of the existing tower as specified in Section 3 of this report.

- SPRINT (Existing):
  Antennas: One (1) GPS antenna mounted on a 2' Standoff with a RAD center elevation of ±75-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be routed as specified in Section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 95 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Madison; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	CT Building Code wind speed Controls	
Load Cases:	Load Case 1; 95 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 82 mph wind speed w/ ½" radial ice plus gravity load -- used in calculation of tower stresses. The 82 mph wind speed velocity represents 75% of the wind pressure generated by the 95 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1610.1.3 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses were found to be within allowable limits. In Load Case 2, per RISATower "Section Capacity Table", this tower was found to be at **77.7%** of its total capacity.

Foundation and Anchors

The existing foundation consists of three (3) 6-ft ∅ by 25-ft deep reinforced concrete caissons concentrically bearing directly on existing sub grade. The sub grade conditions used in the analysis of the existing foundation were derived from the aforementioned MEI structural analysis available for reference in Section 4 of this report. Tower legs are connected to the three (3) caissons by means of (16) 1"∅, ASTM A354 Grade BC anchor bolts per leg, embedded into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 2 were used in the verification of the foundation and its anchors:
  - Uplift @ top of caisson = **282.2** kips
  - Shear @ top of caisson = **41.4** kips
  - Compression @ top of caisson = **337.2** kips
- Base plates, anchor bolts and the foundation were found to be within allowable limits.
- Foundation resists two times the calculated wind load per the requirements of section 3108.4.2 of the 2005 CT State Building Code Supplement to the 2003 International Building Code (IBC).

Conclusions

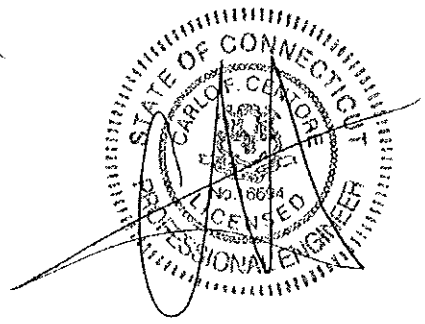
This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Natcomm, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer



Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

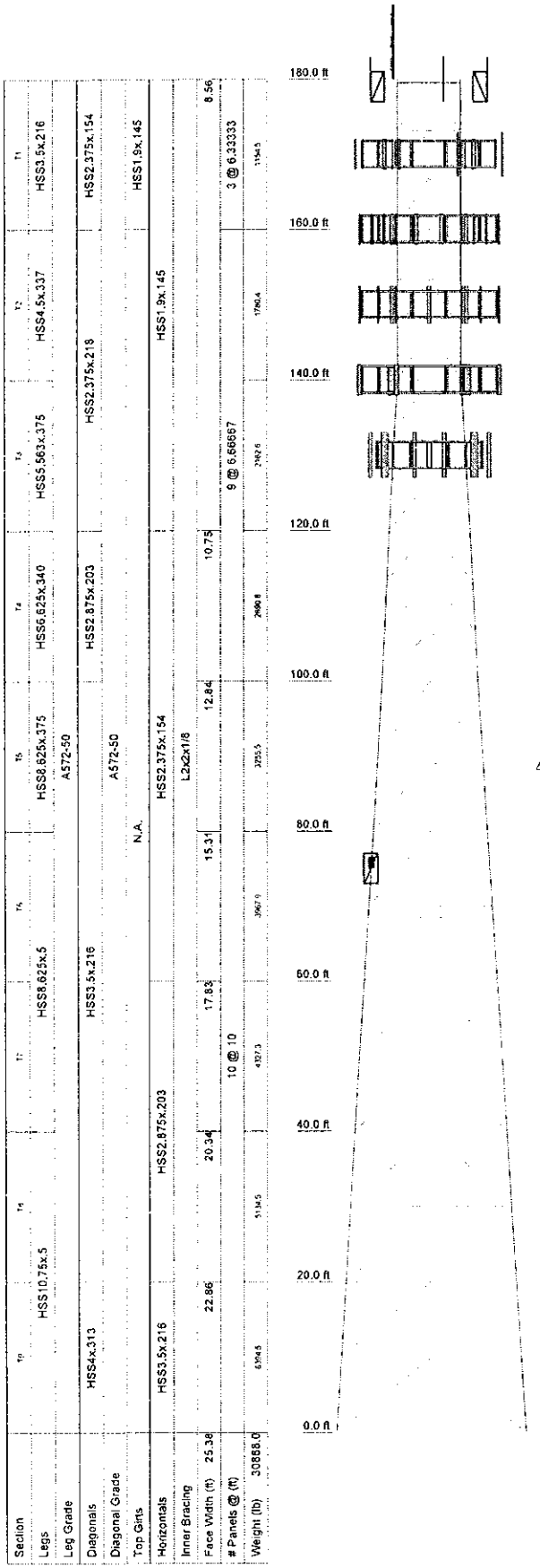
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Natcomm, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to Natcomm, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Natcomm, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12 Bay Dipole	185	(2) DB980H90E-M (Sprint)	150
6' Standoff	180	DB980H90E-M (Sprint Reserved)	150
6' Standoff	180	DB980H90E-M (Sprint Reserved)	150
6' Standoff	180	DB980H90E-M (Sprint Reserved)	150
PD455-5	180	15' T-Frame (ATT)	140
PD455-5	180	15' T-Frame (ATT)	140
PD455-5	180	15' T-Frame (ATT)	140
15' T-Frame (Verizon)	170	(2) DUO1417-8686 (ATT)	140
15' T-Frame (Verizon)	170	(2) DUO1417-8686 (ATT)	140
15' T-Frame (Verizon)	170	(2) DUO1417-8686 (ATT)	140
DB844H90 (Verizon)	170	(2) TMA 10"x8"x3" (ATT)	140
DB948F85T2E-M (Verizon)	170	(2) TMA 10"x8"x3" (ATT)	140
DB948F85T2E-M (Verizon)	170	(2) TMA 10"x8"x3" (ATT)	140
DB844H90 (Verizon)	170	Diplexer (ATT)	140
LPA-80080-6CF (Verizon)	170	Diplexer (ATT)	140
DB948F85T2E-M (Verizon)	170	Diplexer (ATT)	140
DB948F85T2E-M (Verizon)	170	15' T-Frame (T-Mobile)	130
LPA-80080-6CF (Verizon)	170	15' T-Frame (T-Mobile)	130
DB844H90 (Verizon)	170	15' T-Frame (T-Mobile)	130
DB948F85T2E-M (Verizon)	170	EMS 72"x12"x4" Panel (T-Mobile)	130
DB948F85T2E-M (Verizon)	170	EMS 72"x12"x4" Panel (T-Mobile)	130
DB844H90 (Verizon)	170	EMS 72"x12"x4" Panel (T-Mobile)	130
(2) TMA 14"x11.3"x6" (Verizon)	170	EMS 72"x12"x4" Panel (T-Mobile Reserved)	130
15' T-Frame (Nextel)	160	EMS 72"x12"x4" Panel (T-Mobile Reserved)	130
15' T-Frame (Nextel)	160	EMS 72"x12"x4" Panel (T-Mobile Reserved)	130
15' T-Frame (Nextel)	160	(2) TMA 10"x8"x3" (T-Mobile)	130
(4) DB844H90 (Nextel)	160	(2) TMA 10"x8"x3" (T-Mobile)	130
(4) DB844H90 (Nextel)	160	(2) TMA 10"x8"x3" (T-Mobile)	130
(4) DB844H90 (Nextel)	160	GPS	75
15' T-Frame (Sprint)	150	2' Standoff	75
15' T-Frame (Sprint)	150		
15' T-Frame (Sprint)	150		
(2) DB980H90E-M (Sprint)	150		
(2) DB980H90E-M (Sprint)	150		

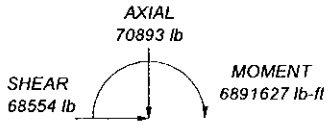
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

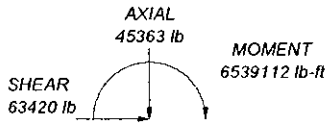
TOWER DESIGN NOTES

1. Tower designed for a 95 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 82 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 77.7%

MAX. CORNER REACTIONS AT BASE:
DOWN: 337173 lb
UPLIFT: -282201 lb
SHEAR: 41385 lb



TORQUE 48924 lb-ft
82 mph WIND - 0.5000 in ICE



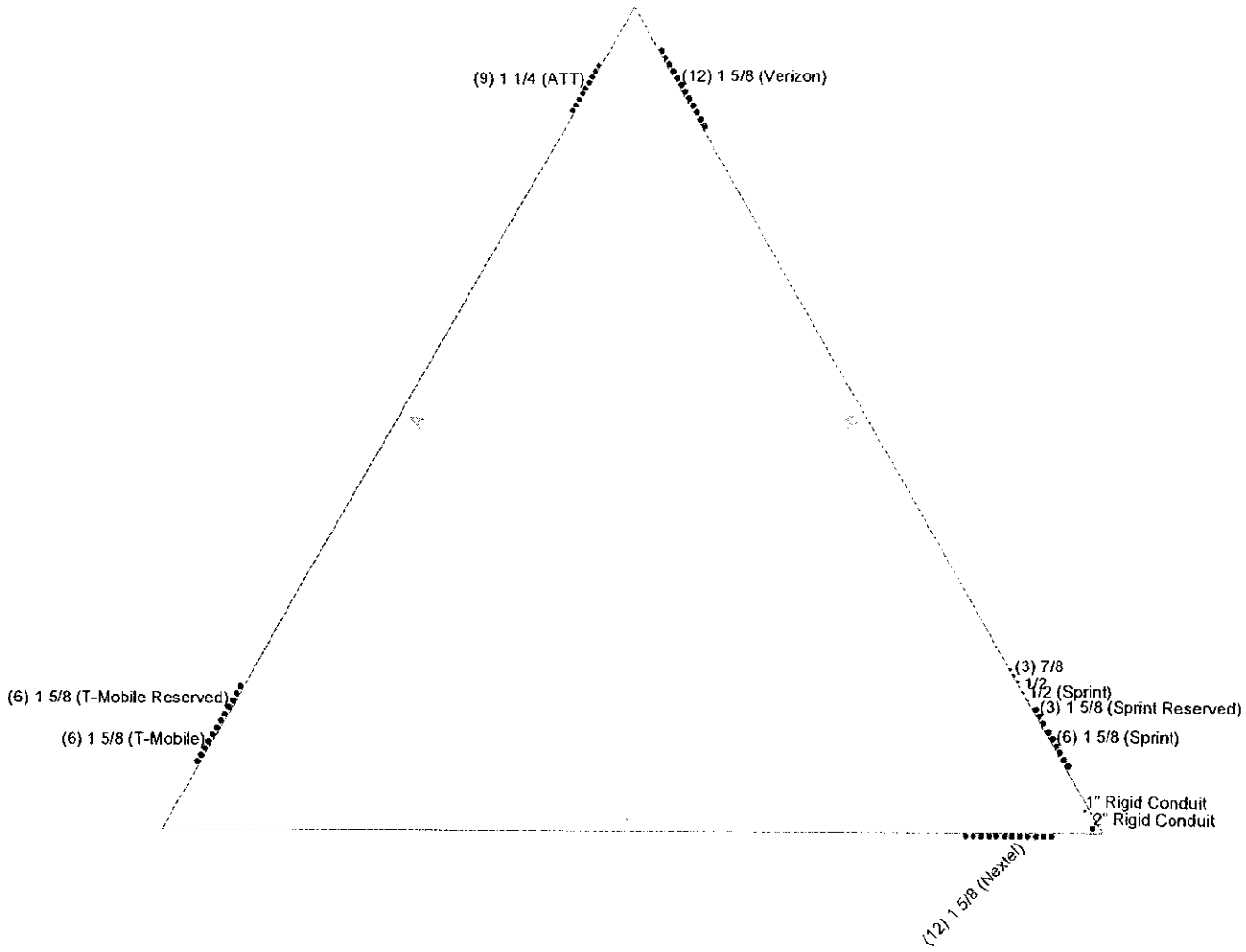
TORQUE 42589 lb-ft
REACTIONS - 95 mph WIND

NATCOMM
63-2 N. Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 180' ROHN Self-Support Lattice			
Project: 08007.CO11 - 864 Opening Hill Road, Madison, CT			
Client: Verizon	Drawn by: Staff		App'd:
Code: TIA/EIA-222-F	Date: 03/17/08		Scale: NTS
Path: C:\Users\keman21\Documents\Natcomm\08007.CO11 Madison\ERI Files\180 Lattice Madison.dn			Dwg No. E-1

Feedline Plan

Round Flat App In Face App Out Face



NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***180' ROHN Self-Support Lattice***		
	Project: ***08007.CO11 - 864 Opening Hill Road, Madison, CT***		
	Client: Verizon	Drawn by: Staff	App'd:
	Code: TIA/EIA-222-F	Date: 03/16/08	Scale: NTS
	Path: C:\Users\herman2\Documents\Natcomm\08007.CO11 Madison\ERI Files\180 Lattice Madison.dwg		Dwg No. E-7

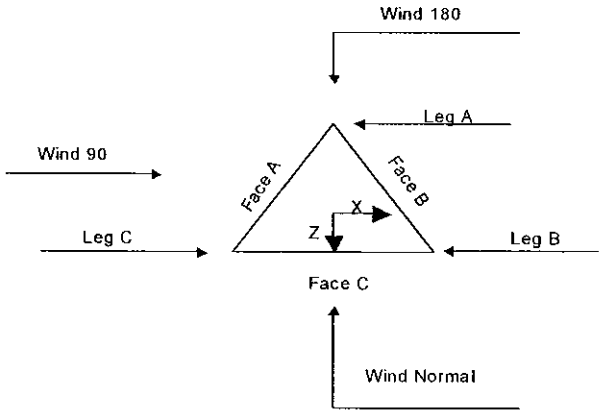
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 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 25.38 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 95 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 82 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			8.56	1	20.00
T2	160.00-140.00			8.56	1	20.00
T3	140.00-120.00			8.56	1	20.00
T4	120.00-100.00			10.75	1	20.00
T5	100.00-80.00			12.84	1	20.00
T6	80.00-60.00			15.31	1	20.00
T7	60.00-40.00			17.83	1	20.00
T8	40.00-20.00			20.34	1	20.00
T9	20.00-0.00			22.86	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	6.33	K Brace Down	No	Yes	6.0000	6.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	140.00-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

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
T7	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	20.00-0.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	HSS3.5x.216	A572-50 (50 ksi)	Pipe	HSS2.375x.154	A572-50 (50 ksi)
T2 160.00-140.00	Pipe	HSS4.5x.337	A572-50 (50 ksi)	Pipe	HSS2.375x.218	A572-50 (50 ksi)
T3 140.00-120.00	Pipe	HSS5.563x.375	A572-50 (50 ksi)	Pipe	HSS2.375x.218	A572-50 (50 ksi)
T4 120.00-100.00	Pipe	HSS6.625x.340	A572-50 (50 ksi)	Pipe	HSS2.875x.203	A572-50 (50 ksi)
T5 100.00-80.00	Pipe	HSS8.625x.375	A572-50 (50 ksi)	Pipe	HSS3.5x.216	A572-50 (50 ksi)
T6 80.00-60.00	Pipe	HSS8.625x.5	A572-50 (50 ksi)	Pipe	HSS3.5x.216	A572-50 (50 ksi)
T7 60.00-40.00	Pipe	HSS8.625x.5	A572-50 (50 ksi)	Pipe	HSS3.5x.216	A572-50 (50 ksi)
T8 40.00-20.00	Pipe	HSS10.75x.5	A572-50 (50 ksi)	Pipe	HSS3.5x.216	A572-50 (50 ksi)
T9 20.00-0.00	Pipe	HSS10.75x.5	A572-50 (50 ksi)	Pipe	HSS4x.313	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Solid Round		A572-50 (50 ksi)	Pipe	HSS1.9x.145	A572-50 (50 ksi)
T2 160.00-140.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS1.9x.145	A572-50 (50 ksi)
T3 140.00-120.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS1.9x.145	A572-50 (50 ksi)
T4 120.00-100.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS2.375x.154	A572-50 (50 ksi)
T5 100.00-80.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS2.375x.154	A572-50 (50 ksi)
T6 80.00-60.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS2.375x.154	A572-50 (50 ksi)
T7 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS2.875x.203	A572-50 (50 ksi)
T8 40.00-20.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS2.875x.203	A572-50 (50 ksi)
T9 20.00-0.00	None	Single Angle		A36 (36 ksi)	Pipe	HSS3.5x.216	A572-50 (50 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
T1 180.00-160.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 160.00-140.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 140.00-120.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 120.00-100.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T5 100.00-80.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T6 80.00-60.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T7 60.00-40.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T8 40.00-20.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T9 20.00-0.00	Equal Angle		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_l	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] 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 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	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 Net Width Deduct in	U	Diagonal Net Width Deduct in	U	Top Girt Net Width Deduct in	U	Bottom Girt Net Width Deduct in	U	Mid Girt Net Width Deduct in	U	Long Horizontal Net Width Deduct in	U	Short Horizontal Net Width Deduct in	U
T1 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 180.00-160.00	Flange	0.8750 A325N	0	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 100.00-80.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T6 80.00-60.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T7 60.00-40.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T8 40.00-20.00	Flange	1.0000 A325N	12	0.6250 A325N	3	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T9 20.00-0.00	Flange	1.0000 A325N	12	0.7500 A325N	3	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	2	0.6250 A325X	0

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 5/8 (Verizon)	B	Yes	Ar (CfAe)	170.00 - 3.00	0.0000	-0.4	12	12	0.5000 1.9800	1.9800		1.04
1 5/8 (Sprint)	B	Yes	Ar (CfAe)	150.00 - 3.00	0.0000	0.4	6	6	0.5000 1.9800	1.9800		1.04
1 5/8 (Sprint Reserved)	B	Yes	Ar (CfAe)	150.00 - 3.00	0.0000	0.36	3	3	0.5000 1.9800	1.9800		1.04
1 1/4 (ATT)	A	Yes	Ar (CfAe)	140.00 - 3.00	0.0000	0.4	9	9	0.5000 1.5500	1.5500		0.66
1 5/8 (T-Mobile)	A	Yes	Ar (CfAe)	130.00 - 3.00	0.0000	-0.4	6	6	0.5000 1.9800	1.9800		1.04
1 5/8 (T-Mobile Reserved)	A	Yes	Ar (CfAe)	130.00 - 3.00	0.0000	-0.35	6	6	0.5000 1.9800	1.9800		1.04
1 5/8 (Nextel)	C	Yes	Ar (CfAe)	160.00 - 3.00	0.0000	-0.4	12	12	0.5000 1.9800	1.9800		1.04
1/2 (Sprint)	B	Yes	Ar (CfAe)	150.00 - 3.00	0.0000	0.34	1	1	0.5800	0.5800		0.25
1/2	B	Yes	Ar (CfAe)	180.00 - 3.00	0.0000	0.33	1	1	0.5800	0.5800		0.25
7/8	B	Yes	Ar (CfAe)	180.00 - 3.00	0.0000	0.31	3	3	1.1100	1.1100		0.54
2" Rigid Conduit	B	Yes	Ar (CfAe)	180.00 - 3.00	-1.0000	0.49	1	1	2.0000	2.0000		2.80
1" Rigid Conduit	B	Yes	Ar (CfAe)	180.00 - 3.00	-1.0000	0.47	1	1	1.0000	1.0000		0.70

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	31.317	0.000	0.000	0.000	232.20
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	66.450	0.000	0.000	0.000	453.10
		C	39.600	0.000	0.000	0.000	249.60
T3	140.00-120.00	A	43.050	0.000	0.000	0.000	243.60
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T4	120.00-100.00	A	62.850	0.000	0.000	0.000	368.40
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T5	100.00-80.00	A	62.850	0.000	0.000	0.000	368.40
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T6	80.00-60.00	A	62.850	0.000	0.000	0.000	368.40
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T7	60.00-40.00	A	62.850	0.000	0.000	0.000	368.40
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T8	40.00-20.00	A	62.850	0.000	0.000	0.000	368.40
		B	81.783	0.000	0.000	0.000	549.20
		C	39.600	0.000	0.000	0.000	249.60
T9	20.00-0.00	A	53.422	0.000	0.000	0.000	313.14
		B	69.516	0.000	0.000	0.000	466.82
		C	33.660	0.000	0.000	0.000	212.16

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
T1	180.00-160.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		24.000	22.733	0.000	0.000	552.85
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		32.767	59.933	0.000	0.000	1127.59
		C		4.967	45.467	0.000	0.000	648.76
T3	140.00-120.00	A	0.500	9.217	48.000	0.000	0.000	674.47
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T4	120.00-100.00	A	0.500	14.183	68.667	0.000	0.000	997.23
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T5	100.00-80.00	A	0.500	14.183	68.667	0.000	0.000	997.23
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T6	80.00-60.00	A	0.500	14.183	68.667	0.000	0.000	997.23
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T7	60.00-40.00	A	0.500	14.183	68.667	0.000	0.000	997.23
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T8	40.00-20.00	A	0.500	14.183	68.667	0.000	0.000	997.23
		B		39.050	74.400	0.000	0.000	1377.95
		C		4.967	45.467	0.000	0.000	648.76
T9	20.00-0.00	A	0.500	12.056	58.367	0.000	0.000	847.64

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B		33.193	63.240	0.000	0.000	1171.26
		C		4.222	38.647	0.000	0.000	551.44

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.000	0.000	0.000	0.000
		B	2.404	5.215	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	160.00-140.00	A	0.000	0.000	0.000	0.000
		B	5.230	10.599	0.000	0.000
		C	3.117	5.767	0.000	0.000
T3	140.00-120.00	A	3.154	6.100	0.000	0.000
		B	5.992	12.096	0.000	0.000
		C	2.901	5.377	0.000	0.000
T4	120.00-100.00	A	5.224	9.462	0.000	0.000
		B	6.798	12.957	0.000	0.000
		C	3.292	5.760	0.000	0.000
T5	100.00-80.00	A	4.342	7.581	0.000	0.000
		B	5.650	10.381	0.000	0.000
		C	2.736	4.615	0.000	0.000
T6	80.00-60.00	A	4.056	7.097	0.000	0.000
		B	5.278	9.718	0.000	0.000
		C	2.556	4.320	0.000	0.000
T7	60.00-40.00	A	4.118	7.103	0.000	0.000
		B	5.358	9.726	0.000	0.000
		C	2.595	4.324	0.000	0.000
T8	40.00-20.00	A	3.972	6.855	0.000	0.000
		B	5.169	9.388	0.000	0.000
		C	2.503	4.173	0.000	0.000
T9	20.00-0.00	A	3.848	6.414	0.000	0.000
		B	5.007	8.783	0.000	0.000
		C	2.425	3.904	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	5.7771	-7.0542	6.8788	-4.5749
T2	160.00-140.00	15.7143	-1.4381	14.0484	-0.7847
T3	140.00-120.00	11.3683	-3.3331	10.4662	-2.8152
T4	120.00-100.00	8.0246	-1.9628	8.1375	-1.8257
T5	100.00-80.00	9.0194	-2.1949	9.4067	-2.0924
T6	80.00-60.00	10.4474	-2.5322	10.8954	-2.4136
T7	60.00-40.00	11.6428	-2.8135	12.1661	-2.6893
T8	40.00-20.00	12.1763	-2.9356	12.8786	-2.8403
T9	20.00-0.00	11.5371	-2.7768	12.3327	-2.7214

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
12 Bay Dipole	C	From Leg	0.50 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	50.00 93.17
6' Standoff	A	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	70.00 130.00
6' Standoff	B	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	70.00 130.00
6' Standoff	C	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	70.00 130.00
PD455-5	A	From Leg	6.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.83 4.87	2.83 4.87	24.00 47.59
PD455-5	B	From Leg	6.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.83 4.87	2.83 4.87	24.00 47.59
PD455-5	C	From Leg	6.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.83 4.87	2.83 4.87	24.00 47.59
15' T-Frame (Verizon)	A	From Leg	1.50 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 18.50	15.00 18.50	300.00 400.00
15' T-Frame (Verizon)	B	From Leg	1.50 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 18.50	15.00 18.50	300.00 400.00
15' T-Frame (Verizon)	C	From Leg	1.50 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	15.00 18.50	15.00 18.50	300.00 400.00
DB844H90 (Verizon)	A	From Leg	3.00 -6.00 0.00	0.0000	170.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	10.00 36.27
DB948F85T2E-M (Verizon)	A	From Leg	3.00 -4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.92 2.22	3.26 3.62	8.50 27.57
DB948F85T2E-M (Verizon)	A	From Leg	3.00 4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.92 2.22	3.26 3.62	8.50 27.57
DB844H90 (Verizon)	A	From Leg	3.00 6.00 0.00	0.0000	170.00	No Ice 1/2" Ice	2.87 3.18	3.97 4.34	10.00 36.27
LPA-80080-6CF (Verizon)	B	From Leg	3.00 -6.00 0.00	0.0000	170.00	No Ice 1/2" Ice	4.33 4.76	9.09 9.64	21.00 69.24
DB948F85T2E-M (Verizon)	B	From Leg	3.00 -4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.92 2.22	3.26 3.62	8.50 27.57
DB948F85T2E-M (Verizon)	B	From Leg	3.00 4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.92 2.22	3.26 3.62	8.50 27.57
LPA-80080-6CF	B	From Leg	3.00	0.0000	170.00	No Ice	4.33	9.09	21.00

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
(Verizon)			6.00				1/2" Ice	4.76	9.64	69.24
			0.00							
DB844H90	C	From Leg	3.00		0.0000	170.00	No Ice	2.87	3.97	10.00
(Verizon)			-6.00				1/2" Ice	3.18	4.34	36.27
			0.00							
DB948F85T2E-M	C	From Leg	3.00		0.0000	170.00	No Ice	1.92	3.26	8.50
(Verizon)			-4.00				1/2" Ice	2.22	3.62	27.57
			0.00							
DB948F85T2E-M	C	From Leg	3.00		0.0000	170.00	No Ice	1.92	3.26	8.50
(Verizon)			4.00				1/2" Ice	2.22	3.62	27.57
			0.00							
DB844H90	C	From Leg	3.00		0.0000	170.00	No Ice	2.87	3.97	10.00
(Verizon)			6.00				1/2" Ice	3.18	4.34	36.27
			0.00							
(2) TMA 14"x11.3"x6"	B	From Leg	3.00		0.0000	170.00	No Ice	1.54	0.82	22.50
(Verizon)			0.00				1/2" Ice	1.71	0.95	33.59
			0.00							
15' T-Frame	A	From Leg	1.50		0.0000	160.00	No Ice	15.00	15.00	300.00
(Nextel)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	B	From Leg	1.50		0.0000	160.00	No Ice	15.00	15.00	300.00
(Nextel)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	C	From Leg	1.50		0.0000	160.00	No Ice	15.00	15.00	300.00
(Nextel)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
(4) DB844H90	A	From Leg	3.00		0.0000	160.00	No Ice	2.87	3.97	10.00
(Nextel)			0.00				1/2" Ice	3.18	4.34	36.27
			0.00							
(4) DB844H90	B	From Leg	3.00		0.0000	160.00	No Ice	2.87	3.97	10.00
(Nextel)			0.00				1/2" Ice	3.18	4.34	36.27
			0.00							
(4) DB844H90	C	From Leg	3.00		0.0000	160.00	No Ice	2.87	3.97	10.00
(Nextel)			0.00				1/2" Ice	3.18	4.34	36.27
			0.00							
15' T-Frame	A	From Leg	1.50		0.0000	150.00	No Ice	15.00	15.00	300.00
(Sprint)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	B	From Leg	1.50		0.0000	150.00	No Ice	15.00	15.00	300.00
(Sprint)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	C	From Leg	1.50		0.0000	150.00	No Ice	15.00	15.00	300.00
(Sprint)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
(2) DB980H90E-M	A	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50
(Sprint)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
(2) DB980H90E-M	B	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50
(Sprint)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
(2) DB980H90E-M	C	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50
(Sprint)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
DB980H90E-M	A	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50
(Sprint Reserved)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
DB980H90E-M	B	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50

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
(Sprint Reserved)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
DB980H90E-M	C	From Leg	3.00		0.0000	150.00	No Ice	3.80	2.19	8.50
(Sprint Reserved)			0.00				1/2" Ice	4.18	2.56	28.62
			0.00							
15' T-Frame	A	From Leg	1.50		0.0000	140.00	No Ice	15.00	15.00	300.00
(ATT)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	B	From Leg	1.50		0.0000	140.00	No Ice	15.00	15.00	300.00
(ATT)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	C	From Leg	1.50		0.0000	140.00	No Ice	15.00	15.00	300.00
(ATT)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
(2) DUO1417-8686	A	From Leg	3.00		0.0000	140.00	No Ice	6.53	4.20	20.30
(ATT)			0.00				1/2" Ice	6.94	4.57	62.49
			0.00							
(2) DUO1417-8686	B	From Leg	3.00		0.0000	140.00	No Ice	6.53	4.20	20.30
(ATT)			0.00				1/2" Ice	6.94	4.57	62.49
			0.00							
(2) DUO1417-8686	C	From Leg	3.00		0.0000	140.00	No Ice	6.53	4.20	20.30
(ATT)			0.00				1/2" Ice	6.94	4.57	62.49
			0.00							
(2) TMA 10"x8"x3"	A	From Leg	3.00		0.0000	140.00	No Ice	0.78	0.29	15.00
(ATT)			0.00				1/2" Ice	0.90	0.38	20.06
			0.00							
(2) TMA 10"x8"x3"	B	From Leg	3.00		0.0000	140.00	No Ice	0.78	0.29	15.00
(ATT)			0.00				1/2" Ice	0.90	0.38	20.06
			0.00							
(2) TMA 10"x8"x3"	C	From Leg	3.00		0.0000	140.00	No Ice	0.78	0.29	15.00
(ATT)			0.00				1/2" Ice	0.90	0.38	20.06
			0.00							
Diplexer	A	From Leg	3.00		0.0000	140.00	No Ice	0.35	0.12	8.00
(ATT)			0.00				1/2" Ice	0.43	0.17	10.43
			0.00							
Diplexer	B	From Leg	3.00		0.0000	140.00	No Ice	0.35	0.12	8.00
(ATT)			0.00				1/2" Ice	0.43	0.17	10.43
			0.00							
Diplexer	C	From Leg	3.00		0.0000	140.00	No Ice	0.35	0.12	8.00
(ATT)			0.00				1/2" Ice	0.43	0.17	10.43
			0.00							
15' T-Frame	A	From Face	1.50		0.0000	130.00	No Ice	15.00	15.00	300.00
(T-Mobile)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	B	From Face	1.50		0.0000	130.00	No Ice	15.00	15.00	300.00
(T-Mobile)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
15' T-Frame	C	From Face	1.50		0.0000	130.00	No Ice	15.00	15.00	300.00
(T-Mobile)			0.00				1/2" Ice	18.50	18.50	400.00
			0.00							
EMS 72"x12"x4" Panel	A	From Face	3.00		0.0000	130.00	No Ice	8.40	3.53	20.00
(T-Mobile)			6.00				1/2" Ice	8.95	3.97	61.77
			0.00							
EMS 72"x12"x4" Panel	B	From Face	3.00		0.0000	130.00	No Ice	8.40	3.53	20.00
(T-Mobile)			6.00				1/2" Ice	8.95	3.97	61.77
			0.00							
EMS 72"x12"x4" Panel	C	From Face	3.00		0.0000	130.00	No Ice	8.40	3.53	20.00

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
(T-Mobile)			6.00			1/2" Ice	8.95	3.97	61.77
			0.00						
EMS 72"x12"x4" Panel	A	From Face	3.00	0.0000	130.00	No Ice	8.40	3.53	20.00
(T-Mobile Reserved)			-6.00			1/2" Ice	8.95	3.97	61.77
			0.00						
EMS 72"x12"x4" Panel	B	From Face	3.00	0.0000	130.00	No Ice	8.40	3.53	20.00
(T-Mobile Reserved)			-6.00			1/2" Ice	8.95	3.97	61.77
			0.00						
EMS 72"x12"x4" Panel	C	From Face	3.00	0.0000	130.00	No Ice	8.40	3.53	20.00
(T-Mobile Reserved)			-6.00			1/2" Ice	8.95	3.97	61.77
			0.00						
(2) TMA 10"x8"x3"	A	From Face	3.00	0.0000	130.00	No Ice	0.78	0.29	15.00
(T-Mobile)			6.00			1/2" Ice	0.90	0.38	20.06
			0.00						
(2) TMA 10"x8"x3"	B	From Face	3.00	0.0000	130.00	No Ice	0.78	0.29	15.00
(T-Mobile)			6.00			1/2" Ice	0.90	0.38	20.06
			0.00						
(2) TMA 10"x8"x3"	C	From Face	3.00	0.0000	130.00	No Ice	0.78	0.29	15.00
(T-Mobile)			6.00			1/2" Ice	0.90	0.38	20.06
			0.00						
GPS	C	From Leg	0.00	0.0000	75.00	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00						
2' Standoff	C	From Leg	0.00	0.0000	75.00	No Ice	0.75	0.75	27.00
			0.00			1/2" Ice	0.95	0.95	35.41
			0.00						

Tower Pressures - No Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 180.00-160.00	170.00	1.597	37	177.033	A	0.000	24.362	11.667	47.89	0.000	0.000
					B	0.000	53.274		21.90		
					C	0.000	24.362		47.89		
T2 160.00-140.00	150.00	1.541	36	178.700	A	0.000	27.897	15.000	53.77	0.000	0.000
					B	0.000	89.117		16.83		
					C	0.000	64.380		23.30		
T3 140.00-120.00	130.00	1.48	34	202.386	A	0.000	72.134	18.580	25.76	0.000	0.000
					B	0.000	108.029		17.20		
					C	0.000	68.936		26.95		
T4 120.00-100.00	110.00	1.411	33	246.957	A	0.000	98.614	22.123	22.43	0.000	0.000
					B	0.000	115.974		19.08		
					C	0.000	77.297		28.62		
T5 100.00-80.00	90.00	1.332	31	295.902	A	0.000	106.183	28.823	27.14	0.000	0.000
					B	0.000	123.808		23.28		
					C	0.000	84.539		34.09		

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T6 80.00-60.00	70.00	1.24	29	345.803	A	0.000	108.397	28.826	26.59	0.000	0.000
					B	0.000	126.109		22.86		
					C	0.000	86.648		33.27		
T7 60.00-40.00	50.00	1.126	26	396.103	A	0.000	111.848	28.825	25.77	0.000	0.000
					B	0.000	129.541		22.25		
					C	0.000	90.122		31.98		
T8 40.00-20.00	30.00	1	23	449.952	A	0.000	121.214	35.928	29.64	0.000	0.000
					B	0.000	138.951		25.86		
					C	0.000	99.434		36.13		
T9 20.00-0.00	10.00	1	23	500.352	A	0.000	119.136	35.928	30.16	0.000	0.000
					B	0.000	134.070		26.80		
					C	0.000	100.797		35.64		

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	28	0.5000	178.700	A	0.000	33.454	15.000	44.84	0.000	0.000
						B	22.733	52.239		20.01		
						C	0.000	33.454		44.84		
T2 160.00-140.00	150.00	1.541	27	0.5000	180.367	A	0.000	37.071	18.333	49.45	0.000	0.000
						B	59.933	59.238		15.38		
						C	45.467	36.271		22.43		
T3 140.00-120.00	130.00	1.48	26	0.5000	204.055	A	48.000	44.888	21.920	23.60	0.000	0.000
						B	74.400	68.725		15.32		
						C	45.467	41.361		25.25		
T4 120.00-100.00	110.00	1.411	24	0.5000	248.626	A	68.667	56.086	25.463	20.41	0.000	0.000
						B	74.400	77.458		16.77		
						C	45.467	50.572		26.51		
T5 100.00-80.00	90.00	1.332	23	0.5000	297.572	A	68.667	63.693	32.165	24.30	0.000	0.000
						B	74.400	85.759		20.08		
						C	45.467	57.442		31.26		
T6 80.00-60.00	70.00	1.24	21	0.5000	347.473	A	68.667	66.784	32.168	23.75	0.000	0.000
						B	74.400	89.030		19.68		
						C	45.467	60.344		30.40		
T7 60.00-40.00	50.00	1.126	20	0.5000	397.773	A	68.667	71.007	32.167	23.03	0.000	0.000
						B	74.400	93.251		19.19		
						C	45.467	64.570		29.23		
T8 40.00-20.00	30.00	1	17	0.5000	451.622	A	68.667	81.152	39.270	26.21	0.000	0.000
						B	74.400	103.486		22.08		
						C	45.467	74.617		32.70		
T9 20.00-0.00	10.00	1	17	0.5000	502.022	A	58.367	87.424	39.270	26.94	0.000	0.000
						B	63.240	106.192		23.18		
						C	38.647	82.099		32.52		

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{Leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 180.00-160.00	170.00	1.597	10	177.033	A	0.000	24.362	11.667	47.89	0.000	0.000
					B	0.000	53.274		21.90		
					C	0.000	24.362		47.89		
T2 160.00-140.00	150.00	1.541	10	178.700	A	0.000	27.897	15.000	53.77	0.000	0.000
					B	0.000	89.117		16.83		
					C	0.000	64.380		23.30		
T3 140.00-120.00	130.00	1.48	9	202.386	A	0.000	72.134	18.580	25.76	0.000	0.000
					B	0.000	108.029		17.20		
					C	0.000	68.936		26.95		
T4 120.00-100.00	110.00	1.411	9	246.957	A	0.000	98.614	22.123	22.43	0.000	0.000
					B	0.000	115.974		19.08		
					C	0.000	77.297		28.62		
T5 100.00-80.00	90.00	1.332	9	295.902	A	0.000	106.183	28.823	27.14	0.000	0.000
					B	0.000	123.808		23.28		
					C	0.000	84.539		34.09		
T6 80.00-60.00	70.00	1.24	8	345.803	A	0.000	108.397	28.826	26.59	0.000	0.000
					B	0.000	126.109		22.86		
					C	0.000	86.648		33.27		
T7 60.00-40.00	50.00	1.126	7	396.103	A	0.000	111.848	28.825	25.77	0.000	0.000
					B	0.000	129.541		22.25		
					C	0.000	90.122		31.98		
T8 40.00-20.00	30.00	1	6	449.952	A	0.000	121.214	35.928	29.64	0.000	0.000
					B	0.000	138.951		25.86		
					C	0.000	99.434		36.13		
T9 20.00-0.00	10.00	1	6	500.352	A	0.000	119.136	35.928	30.16	0.000	0.000
					B	0.000	134.070		26.80		
					C	0.000	100.797		35.64		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	232.20	1154.51	A	0.138	2.818	0.58	1	1	14.122	3114.49	155.72	B
			B	0.301	2.294	0.616	1	1	32.827			
			C	0.138	2.818	0.58	1	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	1	1	16.248	4713.62	235.68	B
			B	0.499	1.902	0.697	1	1	62.100			
			C	0.36	2.148	0.636	1	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	1	1	45.790	5506.86	275.34	B
			B	0.534	1.86	0.715	1	1	77.274			
			C	0.341	2.194	0.629	1	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	1	1	64.230	5616.62	280.83	B
			B	0.47	1.943	0.682	1	1	79.149			
			C	0.313	2.262	0.62	1	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	1	1	67.498	5711.85	285.59	B
			B	0.418	2.029	0.659	1	1	81.625			
			C	0.286	2.335	0.612	1	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	1	1	67.219	5521.30	276.06	B
			B	0.365	2.138	0.638	1	1	80.435			
			C	0.251	2.436	0.602	1	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	1	1	68.302	5253.01	262.65	B
			B	0.327	2.227	0.625	1	1	80.904			
			C	0.228	2.507	0.596	1	1	53.749			
T8 40.00-	1167.20	5134.48	A	0.269	2.381	0.607	1	1	73.579	5059.46	252.97	B

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
20.00			B	0.309	2.273	0.619	1	1	85.960			
			C	0.221	2.527	0.595	1	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	1	1	71.352	5022.60	251.13	B
			B	0.268	2.385	0.607	1	1	81.329			
			C	0.201	2.591	0.591	1	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	3935443.6 lb-ft	45519.81		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	232.20	1154.51	A	0.138	2.818	0.58	0.8	1	14.122	3114.49	155.72	B
			B	0.301	2.294	0.616	0.8	1	32.827			
			C	0.138	2.818	0.58	0.8	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	0.8	1	16.248	4713.62	235.68	B
			B	0.499	1.902	0.697	0.8	1	62.100			
			C	0.36	2.148	0.636	0.8	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	0.8	1	45.790	5506.86	275.34	B
			B	0.534	1.86	0.715	0.8	1	77.274			
			C	0.341	2.194	0.629	0.8	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	0.8	1	64.230	5616.62	280.83	B
			B	0.47	1.943	0.682	0.8	1	79.149			
			C	0.313	2.262	0.62	0.8	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	0.8	1	67.498	5711.85	285.59	B
			B	0.418	2.029	0.659	0.8	1	81.625			
			C	0.286	2.335	0.612	0.8	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	0.8	1	67.219	5521.30	276.06	B
			B	0.365	2.138	0.638	0.8	1	80.435			
			C	0.251	2.436	0.602	0.8	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	0.8	1	68.302	5253.01	262.65	B
			B	0.327	2.227	0.625	0.8	1	80.904			
			C	0.228	2.507	0.596	0.8	1	53.749			
T8 40.00-20.00	1167.20	5134.48	A	0.269	2.381	0.607	0.8	1	73.579	5059.46	252.97	B
			B	0.309	2.273	0.619	0.8	1	85.960			
			C	0.221	2.527	0.595	0.8	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	0.8	1	71.352	5022.60	251.13	B
			B	0.268	2.385	0.607	0.8	1	81.329			
			C	0.201	2.591	0.591	0.8	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	3935443.6 lb-ft	45519.81		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-	232.20	1154.51	A	0.138	2.818	0.58	0.85	1	14.122	3114.49	155.72	B

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_I	D_R	A_E ft²	F lb	w plf	Ctrl. Face
160.00			B	0.301	2.294	0.616	0.85	1	32.827			
			C	0.138	2.818	0.58	0.85	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	0.85	1	16.248	4713.62	235.68	B
			B	0.499	1.902	0.697	0.85	1	62.100			
			C	0.36	2.148	0.636	0.85	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	0.85	1	45.790	5506.86	275.34	B
			B	0.534	1.86	0.715	0.85	1	77.274			
			C	0.341	2.194	0.629	0.85	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	0.85	1	64.230	5616.62	280.83	B
			B	0.47	1.943	0.682	0.85	1	79.149			
			C	0.313	2.262	0.62	0.85	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	0.85	1	67.498	5711.85	285.59	B
			B	0.418	2.029	0.659	0.85	1	81.625			
			C	0.286	2.335	0.612	0.85	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	0.85	1	67.219	5521.30	276.06	B
			B	0.365	2.138	0.638	0.85	1	80.435			
			C	0.251	2.436	0.602	0.85	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	0.85	1	68.302	5253.01	262.65	B
			B	0.327	2.227	0.625	0.85	1	80.904			
			C	0.228	2.507	0.596	0.85	1	53.749			
T8 40.00-20.00	1167.20	5134.48	A	0.269	2.381	0.607	0.85	1	73.579	5059.46	252.97	B
			B	0.309	2.273	0.619	0.85	1	85.960			
			C	0.221	2.527	0.595	0.85	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	0.85	1	71.352	5022.60	251.13	B
			B	0.268	2.385	0.607	0.85	1	81.329			
			C	0.201	2.591	0.591	0.85	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	3935443.6 6 lb-ft	45519.81		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	552.85	1730.33	A	0.187	2.639	0.588	1	1	19.667	3596.42	179.82	B
			B	0.42	2.027	0.66	1	1	57.199			
			C	0.187	2.639	0.588	1	1	19.667			
T2 160.00-140.00	1776.35	2401.70	A	0.206	2.578	0.592	1	1	21.929	5691.93	284.60	B
			B	0.661	1.779	0.793	1	1	106.888			
			C	0.453	1.968	0.675	1	1	69.940			
T3 140.00-120.00	2701.17	2852.62	A	0.455	1.965	0.676	1	1	78.330	6676.59	333.83	B
			B	0.701	1.776	0.821	1	1	130.817			
			C	0.426	2.016	0.662	1	1	72.862			
T4 120.00-100.00	3023.93	3567.96	A	0.502	1.898	0.698	1	1	107.837	6564.60	328.23	B
			B	0.611	1.798	0.76	1	1	133.288			
			C	0.386	2.092	0.646	1	1	78.141			
T5 100.00-80.00	3023.93	4174.87	A	0.445	1.982	0.671	1	1	111.398	6525.20	326.26	B
			B	0.538	1.855	0.718	1	1	135.953			
			C	0.346	2.181	0.631	1	1	81.712			
T6 80.00-60.00	3023.93	4950.77	A	0.39	2.085	0.647	1	1	111.909	6319.91	316.00	B
			B	0.47	1.942	0.683	1	1	135.191			
			C	0.305	2.284	0.617	1	1	82.717			
T7 60.00-40.00	3023.93	5410.13	A	0.351	2.169	0.633	1	1	113.606	6017.43	300.87	B
			B	0.421	2.023	0.661	1	1	136.001			
			C	0.277	2.36	0.609	1	1	84.791			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T8 40.00-20.00	3023.93	6367.75	A	0.332	2.215	0.626	1	1	119.478	5709.11	285.46	B
			B	0.394	2.076	0.649	1	1	141.575			
			C	0.266	2.391	0.606	1	1	90.689			
T9 20.00-0.00	2570.34	7813.87	A	0.29	2.322	0.613	1	1	111.959	5554.78	277.74	B
			B	0.337	2.201	0.628	1	1	129.938			
			C	0.241	2.466	0.6	1	1	87.866			
Sum Weight:	22720.39	39269.99						OTM	4612597.6 3 lb-ft	52655.96		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	552.85	1730.33	A	0.187	2.639	0.588	0.8	1	19.667	3310.54	165.53	B
			B	0.42	2.027	0.66	0.8	1	52.652			
			C	0.187	2.639	0.588	0.8	1	19.667			
T2 160.00-140.00	1776.35	2401.70	A	0.206	2.578	0.592	0.8	1	21.929	5053.63	252.68	B
			B	0.661	1.779	0.793	0.8	1	94.901			
			C	0.453	1.968	0.675	0.8	1	60.847			
T3 140.00-120.00	2701.17	2852.62	A	0.455	1.965	0.676	0.8	1	68.730	5917.15	295.86	B
			B	0.701	1.776	0.821	0.8	1	115.937			
			C	0.426	2.016	0.662	0.8	1	63.768			
T4 120.00-100.00	3023.93	3567.96	A	0.502	1.898	0.698	0.8	1	94.104	5831.74	291.59	B
			B	0.611	1.798	0.76	0.8	1	118.408			
			C	0.386	2.092	0.646	0.8	1	69.047			
T5 100.00-80.00	3023.93	4174.87	A	0.445	1.982	0.671	0.8	1	97.665	5811.02	290.55	B
			B	0.538	1.855	0.718	0.8	1	121.073			
			C	0.346	2.181	0.631	0.8	1	72.619			
T6 80.00-60.00	3023.93	4950.77	A	0.39	2.085	0.647	0.8	1	98.176	5624.30	281.22	B
			B	0.47	1.942	0.683	0.8	1	120.311			
			C	0.305	2.284	0.617	0.8	1	73.623			
T7 60.00-40.00	3023.93	5410.13	A	0.351	2.169	0.633	0.8	1	99.873	5359.06	267.95	B
			B	0.421	2.023	0.661	0.8	1	121.121			
			C	0.277	2.36	0.609	0.8	1	75.698			
T8 40.00-20.00	3023.93	6367.75	A	0.332	2.215	0.626	0.8	1	105.744	5109.06	255.45	B
			B	0.394	2.076	0.649	0.8	1	126.695			
			C	0.266	2.391	0.606	0.8	1	81.596			
T9 20.00-0.00	2570.34	7813.87	A	0.29	2.322	0.613	0.8	1	100.285	5014.08	250.70	B
			B	0.337	2.201	0.628	0.8	1	117.290			
			C	0.241	2.466	0.6	0.8	1	80.136			
Sum Weight:	22720.39	39269.99						OTM	4119615.3 9 lb-ft	47030.58		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	552.85	1730.33	A	0.187	2.639	0.588	0.85	1	19.667	3382.01	169.10	B
			B	0.42	2.027	0.66	0.85	1	53.789			
			C	0.187	2.639	0.588	0.85	1	19.667			
T2 160.00-140.00	1776.35	2401.70	A	0.206	2.578	0.592	0.85	1	21.929	5213.20	260.66	B
			B	0.661	1.779	0.793	0.85	1	97.898			
			C	0.453	1.968	0.675	0.85	1	63.120			
T3 140.00-120.00	2701.17	2852.62	A	0.455	1.965	0.676	0.85	1	71.130	6107.01	305.35	B
			B	0.701	1.776	0.821	0.85	1	119.657			
			C	0.426	2.016	0.662	0.85	1	66.042			
T4 120.00-100.00	3023.93	3567.96	A	0.502	1.898	0.698	0.85	1	97.537	6014.95	300.75	B
			B	0.611	1.798	0.76	0.85	1	122.128			
			C	0.386	2.092	0.646	0.85	1	71.321			
T5 100.00-80.00	3023.93	4174.87	A	0.445	1.982	0.671	0.85	1	101.098	5989.57	299.48	B
			B	0.538	1.855	0.718	0.85	1	124.793			
			C	0.346	2.181	0.631	0.85	1	74.892			
T6 80.00-60.00	3023.93	4950.77	A	0.39	2.085	0.647	0.85	1	101.609	5798.20	289.91	B
			B	0.47	1.942	0.683	0.85	1	124.031			
			C	0.305	2.284	0.617	0.85	1	75.897			
T7 60.00-40.00	3023.93	5410.13	A	0.351	2.169	0.633	0.85	1	103.306	5523.65	276.18	B
			B	0.421	2.023	0.661	0.85	1	124.841			
			C	0.277	2.36	0.609	0.85	1	77.971			
T8 40.00-20.00	3023.93	6367.75	A	0.332	2.215	0.626	0.85	1	109.178	5259.07	262.95	B
			B	0.394	2.076	0.649	0.85	1	130.415			
			C	0.266	2.391	0.606	0.85	1	83.869			
T9 20.00-0.00	2570.34	7813.87	A	0.29	2.322	0.613	0.85	1	103.204	5149.26	257.46	B
			B	0.337	2.201	0.628	0.85	1	120.452			
			C	0.241	2.466	0.6	0.85	1	82.069			
Sum Weight:	22720.39	39269.99						OTM	4242860.95 lb-ft	48436.93		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	232.20	1154.51	A	0.138	2.818	0.58	1	1	14.122	862.74	43.14	B
			B	0.301	2.294	0.616	1	1	32.827			
			C	0.138	2.818	0.58	1	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	1	1	16.248	1305.71	65.29	B
			B	0.499	1.902	0.697	1	1	62.100			
			C	0.36	2.148	0.636	1	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	1	1	45.790	1525.45	76.27	B
			B	0.534	1.86	0.715	1	1	77.274			
			C	0.341	2.194	0.629	1	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	1	1	64.230	1555.85	77.79	B
			B	0.47	1.943	0.682	1	1	79.149			
			C	0.313	2.262	0.62	1	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	1	1	67.498	1582.23	79.11	B
			B	0.418	2.029	0.659	1	1	81.625			
			C	0.286	2.335	0.612	1	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	1	1	67.219	1529.45	76.47	B
			B	0.365	2.138	0.638	1	1	80.435			
			C	0.251	2.436	0.602	1	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	1	1	68.302	1455.13	72.76	B
			B	0.327	2.227	0.625	1	1	80.904			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.228	2.507	0.596	1	1	53.749			
T8 40.00-20.00	1167.20	5134.48	A	0.269	2.381	0.607	1	1	73.579	1401.51	70.08	B
			B	0.309	2.273	0.619	1	1	85.960			
			C	0.221	2.527	0.595	1	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	1	1	71.352	1391.30	69.57	B
			B	0.268	2.385	0.607	1	1	81.329			
			C	0.201	2.591	0.591	1	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	1090150.6 0 lb-ft	12609.37		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	232.20	1154.51	A	0.138	2.818	0.58	0.8	1	14.122	862.74	43.14	B
			B	0.301	2.294	0.616	0.8	1	32.827			
			C	0.138	2.818	0.58	0.8	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	0.8	1	16.248	1305.71	65.29	B
			B	0.499	1.902	0.697	0.8	1	62.100			
			C	0.36	2.148	0.636	0.8	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	0.8	1	45.790	1525.45	76.27	B
			B	0.534	1.86	0.715	0.8	1	77.274			
			C	0.341	2.194	0.629	0.8	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	0.8	1	64.230	1555.85	77.79	B
			B	0.47	1.943	0.682	0.8	1	79.149			
			C	0.313	2.262	0.62	0.8	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	0.8	1	67.498	1582.23	79.11	B
			B	0.418	2.029	0.659	0.8	1	81.625			
			C	0.286	2.335	0.612	0.8	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	0.8	1	67.219	1529.45	76.47	B
			B	0.365	2.138	0.638	0.8	1	80.435			
			C	0.251	2.436	0.602	0.8	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	0.8	1	68.302	1455.13	72.76	B
			B	0.327	2.227	0.625	0.8	1	80.904			
			C	0.228	2.507	0.596	0.8	1	53.749			
T8 40.00-20.00	1167.20	5134.48	A	0.269	2.381	0.607	0.8	1	73.579	1401.51	70.08	B
			B	0.309	2.273	0.619	0.8	1	85.960			
			C	0.221	2.527	0.595	0.8	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	0.8	1	71.352	1391.30	69.57	B
			B	0.268	2.385	0.607	0.8	1	81.329			
			C	0.201	2.591	0.591	0.8	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	1090150.6 0 lb-ft	12609.37		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1 180.00-160.00	232.20	1154.51	A	0.138	2.818	0.58	0.85	1	14.122	862.74	43.14	B
			B	0.301	2.294	0.616	0.85	1	32.827			
			C	0.138	2.818	0.58	0.85	1	14.122			
T2 160.00-140.00	702.70	1780.42	A	0.156	2.749	0.582	0.85	1	16.248	1305.71	65.29	B
			B	0.499	1.902	0.697	0.85	1	62.100			
			C	0.36	2.148	0.636	0.85	1	40.958			
T3 140.00-120.00	1042.40	2162.57	A	0.356	2.157	0.635	0.85	1	45.790	1525.45	76.27	B
			B	0.534	1.86	0.715	0.85	1	77.274			
			C	0.341	2.194	0.629	0.85	1	43.373			
T4 120.00-100.00	1167.20	2690.82	A	0.399	2.065	0.651	0.85	1	64.230	1555.85	77.79	B
			B	0.47	1.943	0.682	0.85	1	79.149			
			C	0.313	2.262	0.62	0.85	1	47.921			
T5 100.00-80.00	1167.20	3255.49	A	0.359	2.151	0.636	0.85	1	67.498	1582.23	79.11	B
			B	0.418	2.029	0.659	0.85	1	81.625			
			C	0.286	2.335	0.612	0.85	1	51.707			
T6 80.00-60.00	1167.20	3967.88	A	0.313	2.261	0.62	0.85	1	67.219	1529.45	76.47	B
			B	0.365	2.138	0.638	0.85	1	80.435			
			C	0.251	2.436	0.602	0.85	1	52.164			
T7 60.00-40.00	1167.20	4327.32	A	0.282	2.344	0.611	0.85	1	68.302	1455.13	72.76	B
			B	0.327	2.227	0.625	0.85	1	80.904			
			C	0.228	2.507	0.596	0.85	1	53.749			
T8 40.00-20.00	1167.20	5134.48	A	0.269	2.381	0.607	0.85	1	73.579	1401.51	70.08	B
			B	0.309	2.273	0.619	0.85	1	85.960			
			C	0.221	2.527	0.595	0.85	1	59.154			
T9 20.00-0.00	992.12	6394.53	A	0.238	2.474	0.599	0.85	1	71.352	1391.30	69.57	B
			B	0.268	2.385	0.607	0.85	1	81.329			
			C	0.201	2.591	0.591	0.85	1	59.540			
Sum Weight:	8805.42	30868.02						OTM	1090150.6 0 lb-ft	12609.37		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	16702.43					
Bracing Weight	14165.59					
Total Member Self-Weight	30868.02			-413.78	-17603.94	
Total Weight	45362.74			-413.78	-17603.94	
Wind 0 deg - No Ice		105.34	-63359.21	-6660372.54	-35511.28	42528.28
Wind 30 deg - No Ice		31710.01	-54923.35	-5777060.93	-3352752.73	32941.12
Wind 60 deg - No Ice		54818.01	-31770.83	-3345901.37	-5776343.75	14527.41
Wind 90 deg - No Ice		63237.57	-105.34	-18321.12	-6656885.09	-7778.91
Wind 120 deg - No Ice		54712.68	31588.38	3314057.39	-5758436.41	-28000.88
Wind 150 deg - No Ice		31527.56	54818.01	5758326.02	-3321736.31	-40720.03
Wind 180 deg - No Ice		-105.34	63359.21	6659544.98	303.39	-42528.28
Wind 210 deg - No Ice		-31710.01	54923.35	5776233.36	3317544.84	-32941.12
Wind 240 deg - No Ice		-54818.01	31770.83	3345073.81	5741135.86	-14527.41
Wind 270 deg - No Ice		-63237.57	105.34	17493.56	6621677.20	7778.91
Wind 300 deg - No Ice		-54712.68	-31588.38	-3314884.95	5723228.52	28000.88
Wind 330 deg - No Ice		-31527.56	-54818.01	-5759153.59	3286528.42	40720.03
Member Ice	8401.97					
Total Weight Ice	70893.26			-6124.18	-42637.30	
Wind 0 deg - Ice		79.44	-68553.74	-7051607.56	-56142.43	48775.26
Wind 30 deg - Ice		32190.28	-55755.20	-5794242.97	-3384409.24	35245.38

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 60 deg - Ice		54457.83	-31532.98	-3294070.54	-5710517.17	15719.03
Wind 90 deg - Ice		64242.97	-79.44	-19629.32	-6702789.60	-7327.64
Wind 120 deg - Ice		59250.11	34208.07	3504921.72	-6123947.18	-31459.08
Wind 150 deg - Ice		32052.68	55675.76	5768489.48	-3361017.65	-42573.01
Wind 180 deg - Ice		-79.44	62928.35	6546376.96	-29132.16	-43646.20
Wind 210 deg - Ice		-32190.28	55755.20	5781994.62	3299134.65	-35245.38
Wind 240 deg - Ice		-59329.56	34345.67	3528313.31	6052177.72	-17316.18
Wind 270 deg - Ice		-64242.97	79.44	7380.96	6617515.01	7327.64
Wind 300 deg - Ice		-54378.39	-31395.38	-3270678.95	5611737.44	27927.18
Wind 330 deg - Ice		-32052.68	-55675.76	-5780737.84	3275743.06	42573.01
Total Weight	45362.74			-413.78	-17603.94	
Wind 0 deg - Service		29.18	-17551.03	-1844291.55	-4890.77	11780.69
Wind 30 deg - Service		8783.94	-15214.22	-1599606.90	-923794.22	9124.96
Wind 60 deg - Service		15185.05	-8800.78	-926155.50	-1595149.07	4024.21
Wind 90 deg - Service		17517.33	-29.18	-4388.11	-1839066.34	-2154.82
Wind 120 deg - Service		15155.87	8750.24	918708.43	-1590188.59	-7756.48
Wind 150 deg - Service		8733.40	15185.05	1595791.15	-915202.41	-11279.79
Wind 180 deg - Service		-29.18	17551.03	1845436.29	5030.19	-11780.69
Wind 210 deg - Service		-8783.94	15214.22	1600751.63	923933.64	-9124.96
Wind 240 deg - Service		-15185.05	8800.78	927300.23	1595288.49	-4024.21
Wind 270 deg - Service		-17517.33	29.18	5532.85	1839205.76	2154.82
Wind 300 deg - Service		-15155.87	-8750.24	-917563.69	1590328.01	7756.48
Wind 330 deg - Service		-8733.40	-15185.05	-1594646.41	915341.83	11279.79

Load Combinations

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

Comb. No.	Description
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	180 - 160	Leg	Max Tension	4	10695.07	725.58	-360.50
			Max. Compression	15	-13030.41	90.28	1242.06
			Max. Mx	11	321.50	-1403.84	-11.78
			Max. My	2	-126.05	-35.96	-1621.96
			Max. Vy	23	-3603.82	1095.41	-585.61
			Max. Vx	15	-4068.67	90.28	1242.06
		Diagonal	Max Tension	7	4921.05	0.00	0.00
			Max. Compression	7	-4977.00	0.00	0.00
			Max. Mx	16	2252.28	21.42	0.00
			Max. My	15	460.07	0.00	-0.30
			Max. Vy	16	-11.21	0.00	0.00
			Max. Vx	15	0.16	0.00	0.00
		Horizontal	Max Tension	8	2876.70	-5.60	3.28
			Max. Compression	2	-2836.40	-7.41	-3.35
			Max. Mx	17	-809.52	-12.11	-6.18
			Max. My	8	-930.79	-8.16	-6.58
			Max. Vy	17	-11.42	-12.11	-6.18
			Max. Vx	8	1.60	-8.16	-6.58
		Top Girt	Max Tension	21	586.06	-8.87	0.74
			Max. Compression	15	-586.26	-9.69	-0.75
			Max. Mx	21	-335.36	-10.06	-1.38
			Max. My	25	-320.70	-10.03	-1.49
			Max. Vy	21	-10.94	-10.06	-1.38
			Max. Vx	19	-0.44	-8.48	1.48
		Inner Bracing	Max Tension	2	49.13	0.00	0.00
			Max. Compression	2	-49.13	0.00	0.00
			Max. Mx	14	0.01	-8.21	0.00
			Max. My	23	47.05	0.00	-0.08
			Max. Vy	14	7.67	0.00	0.00
			Max. Vx	23	0.07	0.00	0.00
T2	160 - 140	Leg	Max Tension	4	33581.14	-624.84	336.75
			Max. Compression	19	-38863.57	19.17	-92.02
			Max. Mx	11	-20882.45	-1167.47	-7.53
			Max. My	15	-13050.73	90.31	1242.04
			Max. Vy	11	1307.72	959.47	-399.33
			Max. Vx	2	1355.27	81.62	1197.73
		Diagonal	Max Tension	13	12033.04	0.00	0.00
			Max. Compression	13	-12102.01	0.00	0.00
			Max. Mx	18	7083.86	27.90	0.00
			Max. My	15	628.18	0.00	-0.41
			Max. Vy	18	-14.09	0.00	0.00
			Max. Vx	15	0.21	0.00	0.00
		Horizontal	Max Tension	7	6520.04	-7.02	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	13	-6494.96	-7.25	-0.12
			Max. Mx	17	-948.38	-22.42	-12.50
			Max. My	8	-1237.25	-18.46	-13.18
			Max. Vy	17	-13.83	-22.42	-12.50
			Max. Vx	8	3.13	-18.46	-13.18
		Inner Bracing	Max Tension	13	112.50	0.00	0.00
			Max. Compression	13	-112.50	0.00	0.00
			Max. Mx	14	0.01	-8.21	0.00
			Max. My	19	65.22	0.00	-0.08
			Max. Vy	14	7.67	0.00	0.00
			Max. Vx	19	0.07	0.00	0.00
T3	140 - 120	Leg	Max Tension	4	78083.20	-864.87	-10.26
			Max. Compression	19	-88032.10	392.38	45.48
			Max. Mx	12	61965.95	1059.80	-24.72
			Max. My	9	-3545.40	-21.73	-1065.26
			Max. Vy	8	-1004.74	21.06	143.06
			Max. Vx	11	-977.14	2.06	73.29
		Diagonal	Max Tension	13	12795.82	0.00	0.00
			Max. Compression	13	-12882.08	0.00	0.00
			Max. Mx	18	11229.73	37.72	0.00
			Max. My	15	1313.10	0.00	-0.37
			Max. Vy	18	-17.61	0.00	0.00
			Max. Vx	15	-0.18	0.00	0.00
		Horizontal	Max Tension	13	8021.40	-9.19	-0.05
			Max. Compression	13	-8064.94	-9.22	-0.05
			Max. Mx	17	-1024.82	-25.46	-12.63
			Max. My	23	1142.43	-0.07	14.90
			Max. Vy	17	-15.13	-25.46	-12.63
			Max. Vx	23	-3.56	-0.07	14.90
		Inner Bracing	Max Tension	13	139.69	0.00	0.00
			Max. Compression	13	-139.69	0.00	0.00
			Max. Mx	14	0.53	-11.25	0.00
			Max. My	19	125.43	0.00	-0.09
			Max. Vy	14	8.98	0.00	0.00
			Max. Vx	19	0.07	0.00	0.00
T4	120 - 100	Leg	Max Tension	4	122568.44	-488.87	-1.72
			Max. Compression	19	-137169.62	1232.72	51.30
			Max. Mx	15	-137137.26	1237.18	-76.29
			Max. My	3	-5811.21	-4.79	-1165.85
			Max. Vy	12	176.60	-1222.72	-53.11
			Max. Vx	15	169.61	-617.53	-1057.04
		Diagonal	Max Tension	13	12646.58	0.00	0.00
			Max. Compression	13	-12756.24	0.00	0.00
			Max. Mx	18	10990.24	55.98	0.00
			Max. My	15	1322.46	0.00	-0.36
			Max. Vy	18	-24.19	0.00	0.00
			Max. Vx	15	0.16	0.00	0.00
		Horizontal	Max Tension	26	8553.50	-27.10	-0.07
			Max. Compression	26	-8598.42	-27.11	-0.07
			Max. Mx	17	-670.65	-49.65	-17.11
			Max. My	23	771.84	0.52	19.76
			Max. Vy	17	-23.87	-49.65	-17.11
			Max. Vx	23	-3.78	0.67	19.75
		Inner Bracing	Max Tension	26	148.93	0.00	0.00
			Max. Compression	26	-148.93	0.00	0.00
			Max. Mx	14	0.11	-16.52	0.00
			Max. My	19	135.38	0.00	-0.10
			Max. Vy	14	10.89	0.00	0.00
			Max. Vx	19	0.07	0.00	0.00
T5	100 - 80	Leg	Max Tension	4	153661.97	-1343.13	-12.93
			Max. Compression	19	-173609.54	1005.66	31.94

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	8	135480.47	-1343.49	56.30
			Max. My	3	-6449.03	-22.21	-1419.36
			Max. Vy	12	-153.50	-1334.33	-43.35
			Max. Vx	3	-179.43	-22.22	-1419.35
		Diagonal	Max Tension	26	14261.49	0.00	0.00
			Max. Compression	26	-14490.92	0.00	0.00
			Max. Mx	20	14114.03	115.67	0.00
			Max. My	15	1574.67	0.00	-0.73
			Max. Vy	20	-36.72	0.00	0.00
			Max. Vx	15	0.24	0.00	0.00
		Horizontal	Max Tension	26	8586.40	-35.20	-0.04
			Max. Compression	26	-8728.64	-35.21	-0.04
			Max. Mx	17	-944.02	-57.89	-15.20
			Max. My	23	520.00	-4.15	18.26
			Max. Vy	17	-26.41	-57.89	-15.20
			Max. Vx	23	-2.94	-4.15	18.26
		Inner Bracing	Max Tension	26	151.18	0.00	0.00
			Max. Compression	26	-151.18	0.00	0.00
			Max. Mx	14	0.59	-22.20	0.00
			Max. My	19	140.73	0.00	-0.11
			Max. Vy	14	12.62	0.00	0.00
			Max. Vx	19	0.06	0.00	0.00
T6	80 - 60	Leg	Max Tension	4	186026.95	-1247.34	-6.65
			Max. Compression	19	-213005.40	1508.68	76.98
			Max. Mx	23	-211152.49	1521.05	37.23
			Max. My	3	-8941.64	-23.63	-1606.97
			Max. Vy	12	151.60	-1237.29	-17.35
			Max. Vx	15	183.82	-797.69	-1491.79
		Diagonal	Max Tension	26	13838.38	0.00	0.00
			Max. Compression	26	-14105.71	0.00	0.00
			Max. Mx	20	13722.64	142.97	0.00
			Max. My	15	1426.90	0.00	-0.55
			Max. Vy	20	-42.67	0.00	0.00
			Max. Vx	15	0.17	0.00	0.00
		Horizontal	Max Tension	26	9184.71	-46.45	-0.02
			Max. Compression	26	-9281.82	-46.45	-0.02
			Max. Mx	17	-866.94	-61.41	-13.63
			Max. My	23	329.46	-22.44	16.08
			Max. Vy	17	-28.82	-61.41	-13.63
			Max. Vx	23	-2.19	-22.44	16.08
		Inner Bracing	Max Tension	26	160.77	0.00	0.00
			Max. Compression	26	-160.77	0.00	0.00
			Max. Mx	14	0.45	-30.76	0.00
			Max. My	19	149.76	0.00	-0.11
			Max. Vy	14	14.85	0.00	0.00
			Max. Vx	19	0.06	0.00	0.00
T7	60 - 40	Leg	Max Tension	4	215852.02	-1210.02	-7.06
			Max. Compression	19	-250407.20	1191.25	26.27
			Max. Mx	23	-229513.42	1521.04	37.23
			Max. My	3	-9370.26	-23.64	-1606.97
			Max. Vy	12	-145.76	-1513.47	-73.08
			Max. Vx	15	-170.42	-797.70	-1491.79
		Diagonal	Max Tension	26	13982.13	0.00	0.00
			Max. Compression	26	-14344.75	0.00	0.00
			Max. Mx	20	13899.03	173.33	0.00
			Max. My	15	1326.82	0.00	-0.40
			Max. Vy	20	-48.60	0.00	0.00
			Max. Vx	15	0.12	0.00	0.00
		Horizontal	Max Tension	26	10020.94	-89.41	-0.08
			Max. Compression	26	-10085.29	-89.41	-0.09
			Max. Mx	17	-789.69	-120.15	-18.50

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	23	321.32	-43.39	21.84
			Max. Vy	17	-48.32	-120.15	-18.50
			Max. Vx	23	-2.56	-43.39	21.84
		Inner Bracing	Max Tension	26	174.68	0.00	0.00
			Max. Compression	26	-174.68	0.00	0.00
			Max. Mx	14	-5.46	-40.81	0.00
			Max. My	19	158.43	0.00	-0.11
			Max. Vy	14	17.11	0.00	0.00
			Max. Vx	19	0.05	0.00	0.00
T8	40 - 20	Leg	Max Tension	4	243769.42	-1731.24	10.58
			Max. Compression	19	-286564.11	2667.61	196.36
			Max. Mx	21	230071.07	-3684.59	272.76
			Max. My	16	-20846.75	-644.56	-3309.67
			Max. Vy	25	334.23	-3680.45	-177.08
			Max. Vx	15	295.07	-2294.76	-3134.27
		Diagonal	Max Tension	26	13982.64	0.00	0.00
			Max. Compression	26	-14390.55	0.00	0.00
			Max. Mx	20	13825.73	207.19	0.00
			Max. My	15	1252.13	0.00	-0.25
			Max. Vy	20	-54.56	0.00	0.00
			Max. Vx	15	0.07	0.00	0.00
		Horizontal	Max Tension	26	10623.98	-112.46	-0.12
			Max. Compression	26	-10536.85	-112.47	-0.13
			Max. Mx	17	-669.50	-134.07	-17.19
			Max. My	23	278.18	-74.67	20.24
			Max. Vy	17	-52.85	-134.07	-17.19
			Max. Vx	23	-2.07	-74.67	20.24
		Inner Bracing	Max Tension	26	182.50	0.00	0.00
			Max. Compression	26	-182.50	0.00	0.00
			Max. Mx	14	-5.99	-52.28	0.00
			Max. My	19	167.87	0.00	-0.09
			Max. Vy	14	19.36	0.00	0.00
			Max. Vx	19	0.04	0.00	0.00
T9	20 - 0	Leg	Max Tension	4	269958.42	-2117.64	9.82
			Max. Compression	19	-321520.62	-0.00	-0.46
			Max. Mx	15	-303695.82	4948.28	47.35
			Max. My	16	-21807.60	-644.57	-3309.67
			Max. Vy	23	583.75	4938.82	-15.92
			Max. Vx	3	-324.90	-64.12	-1914.29
		Diagonal	Max Tension	26	14456.53	0.00	0.00
			Max. Compression	26	-15129.37	0.00	0.00
			Max. Mx	26	14456.53	366.55	0.00
			Max. My	15	1167.85	0.00	-0.15
			Max. Vy	26	-90.73	0.00	0.00
			Max. Vx	15	-0.04	0.00	0.00
		Horizontal	Max Tension	26	11992.14	-119.77	-0.71
			Max. Compression	26	-11530.47	-160.01	0.12
			Max. Mx	17	-1144.65	-200.32	-25.94
			Max. My	23	219.01	-115.82	30.09
			Max. Vy	17	-72.00	-200.32	-25.94
			Max. Vx	23	-2.70	-115.82	30.09
		Inner Bracing	Max Tension	26	199.71	0.00	0.00
			Max. Compression	26	-199.71	0.00	0.00
			Max. Mx	14	-8.59	-65.19	0.00
			Max. My	19	187.65	0.00	-0.06
			Max. Vy	14	21.62	0.00	0.00
			Max. Vx	19	0.02	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	334871.37	35997.13	-20315.26
	Max. H_x	23	334871.37	35997.13	-20315.26
	Max. H_z	4	-282200.66	-30959.89	17495.82
	Min. Vert	4	-282200.66	-30959.89	17495.82
	Min. H_x	4	-282200.66	-30959.89	17495.82
	Min. H_z	23	334871.37	35997.13	-20315.26
Leg B	Max. Vert	19	337173.43	-35402.35	-21289.60
	Max. H_x	12	-279396.83	30350.70	18264.72
	Max. H_z	26	-230996.39	24520.87	18556.11
	Min. Vert	12	-279396.83	30350.70	18264.72
	Min. H_x	19	337173.43	-35402.35	-21289.60
	Min. H_z	19	337173.43	-35402.35	-21289.60
Leg A	Max. Vert	15	336977.46	1122.85	41369.48
	Max. H_x	24	23294.64	5768.05	1767.61
	Max. H_z	15	336977.46	1122.85	41369.48
	Min. Vert	8	-281478.35	-969.90	-35547.03
	Min. H_x	19	-132077.94	-5945.36	-18026.61
	Min. H_z	8	-281478.35	-969.90	-35547.03

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	45362.74	0.00	0.00	-413.83	-17604.04	0.00
Dead+Wind 0 deg - No Ice	45362.74	105.34	-63359.21	-6519997.76	-35678.68	42588.72
Dead+Wind 30 deg - No Ice	45362.74	31710.01	-54923.35	-5655455.56	-3282653.61	33001.20
Dead+Wind 60 deg - No Ice	45362.74	54818.01	-31770.83	-3275714.19	-5654787.15	14570.52
Dead+Wind 90 deg - No Ice	45362.74	63237.57	-105.34	-18374.27	-6516454.15	-7780.41
Dead+Wind 120 deg - No Ice	45362.74	54712.68	31588.38	3243782.35	-5636850.83	-28046.49
Dead+Wind 150 deg - No Ice	45362.74	31527.56	54818.01	5636692.71	-3251589.35	-40780.39
Dead+Wind 180 deg - No Ice	45362.74	-105.34	63359.21	6519170.29	213.70	-42588.77
Dead+Wind 210 deg - No Ice	45362.74	-31710.01	54923.35	5654705.12	3247247.76	-33001.14
Dead+Wind 240 deg - No Ice	45362.74	-54818.01	31770.83	3274949.16	5619479.44	-14570.44
Dead+Wind 270 deg - No Ice	45362.74	-63237.57	105.34	17517.35	6481206.32	7781.40
Dead+Wind 300 deg - No Ice	45362.74	-54712.68	-31588.38	-3244716.44	5601522.32	28046.55
Dead+Wind 330 deg - No Ice	45362.74	-31527.56	-54818.01	-5637611.96	3216163.56	40774.76
Dead+Ice+Temp	70893.26	0.00	-0.00	-6123.38	-42632.40	-0.01
Dead+Wind 0 deg+Ice+Temp	70893.26	79.44	-68553.74	-6887267.04	-56400.61	48923.83
Dead+Wind 30 deg+Ice+Temp	70893.26	32190.28	-55755.20	-5663855.60	-3309294.77	35375.10
Dead+Wind 60 deg+Ice+Temp	70893.26	54457.83	-31532.98	-3221106.54	-5584174.48	15785.74
Dead+Wind 90 deg+Ice+Temp	70893.26	64242.97	-79.44	-19698.06	-6552241.23	-7349.01
Dead+Wind 120 deg+Ice+Temp	70893.26	59250.11	34208.07	3422441.42	-5981757.20	-31583.02
Dead+Wind 150 deg+Ice+Temp	70893.26	32052.68	55675.76	5638027.97	-3285845.68	-42725.16
Dead+Wind 180 deg+Ice+Temp	70893.26	-79.44	62928.35	6400401.18	-29297.06	-43788.81
Dead+Wind 210 deg+Ice+Temp	70893.26	-32190.28	55755.20	5651650.72	3223659.03	-35368.66
Dead+Wind 240 deg+Ice+Temp	70893.26	-59329.56	34345.67	3446287.20	5909563.59	-17396.19
Dead+Wind 270 deg+Ice+Temp	70893.26	-64242.97	79.44	7394.97	6466757.96	7350.31
Dead+Wind 300 deg+Ice+Temp	70893.26	-54378.39	-31395.38	-3197725.76	5485090.99	28029.06
Dead+Wind 330 deg+Ice+Temp	70893.26	-32052.68	-55675.76	-5650388.85	3200191.77	42714.92
Dead+Wind 0 deg - Service	45362.74	29.18	-17551.03	-1806407.76	-22614.38	11798.72
Dead+Wind 30 deg - Service	45362.74	8783.94	-15214.22	-1566935.08	-922071.09	9139.05
Dead+Wind 60 deg - Service	45362.74	15185.05	-8800.78	-907717.62	-1579186.16	4033.19
Dead+Wind 90 deg - Service	45362.74	17517.33	-29.18	-5388.55	-1817886.09	-2157.17

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 120 deg - Service	45362.74	15155.87	8750.24	898274.44	-1574212.20	-7767.94
Dead+Wind 150 deg - Service	45362.74	8733.40	15185.05	1561134.51	-913460.39	-11297.40
Dead+Wind 180 deg - Service	45362.74	-29.18	17551.03	1805581.21	-12670.21	-11799.96
Dead+Wind 210 deg - Service	45362.74	-8783.94	15214.22	1566112.51	886789.64	-9142.96
Dead+Wind 240 deg - Service	45362.74	-15185.05	8800.78	906888.98	1543910.79	-4035.10
Dead+Wind 270 deg - Service	45362.74	-17517.33	29.18	4555.05	1782611.38	2153.55
Dead+Wind 300 deg - Service	45362.74	-15155.87	-8750.24	-899111.49	1538941.71	7766.44
Dead+Wind 330 deg - Service	45362.74	-8733.40	-15185.05	-1561970.70	878179.67	11296.36

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-45362.74	0.00	-0.00	45362.74	0.00	0.000%
2	105.34	-45362.74	-63359.21	-105.34	45362.74	63359.21	0.000%
3	31710.01	-45362.74	-54923.35	-31710.01	45362.74	54923.35	0.000%
4	54818.01	-45362.74	-31770.83	-54818.01	45362.74	31770.83	0.000%
5	63237.57	-45362.74	-105.34	-63237.57	45362.74	105.34	0.000%
6	54712.68	-45362.74	31588.38	-54712.68	45362.74	-31588.38	0.000%
7	31527.56	-45362.74	54818.01	-31527.56	45362.74	-54818.01	0.000%
8	-105.34	-45362.74	63359.21	105.34	45362.74	-63359.21	0.000%
9	-31710.01	-45362.74	54923.35	31710.01	45362.74	-54923.35	0.000%
10	-54818.01	-45362.74	31770.83	54818.01	45362.74	-31770.83	0.000%
11	-63237.57	-45362.74	105.34	63237.57	45362.74	-105.34	0.000%
12	-54712.68	-45362.74	-31588.38	54712.68	45362.74	31588.38	0.000%
13	-31527.56	-45362.74	-54818.01	31527.56	45362.74	54818.01	0.000%
14	0.00	-70893.26	-0.00	-0.00	70893.26	0.00	0.000%
15	79.44	-70893.26	-68553.74	-79.44	70893.26	68553.74	0.000%
16	32190.28	-70893.26	-55755.20	-32190.28	70893.26	55755.20	0.000%
17	54457.83	-70893.26	-31532.98	-54457.83	70893.26	31532.98	0.000%
18	64242.97	-70893.26	-79.44	-64242.97	70893.26	79.44	0.000%
19	59250.11	-70893.26	34208.07	-59250.11	70893.26	-34208.07	0.000%
20	32052.68	-70893.26	55675.76	-32052.68	70893.26	-55675.76	0.000%
21	-79.44	-70893.26	62928.35	79.44	70893.26	-62928.35	0.000%
22	-32190.28	-70893.26	55755.20	32190.28	70893.26	-55755.20	0.000%
23	-59329.56	-70893.26	34345.67	59329.56	70893.26	-34345.67	0.000%
24	-64242.97	-70893.26	79.44	64242.97	70893.26	-79.44	0.000%
25	-54378.39	-70893.26	-31395.38	54378.39	70893.26	31395.38	0.000%
26	-32052.68	-70893.26	-55675.76	32052.68	70893.26	55675.76	0.000%
27	29.18	-45362.74	-17551.03	-29.18	45362.74	17551.03	0.000%
28	8783.94	-45362.74	-15214.22	-8783.94	45362.74	15214.22	0.000%
29	15185.05	-45362.74	-8800.78	-15185.05	45362.74	8800.78	0.000%
30	17517.33	-45362.74	-29.18	-17517.33	45362.74	29.18	0.000%
31	15155.87	-45362.74	8750.24	-15155.87	45362.74	-8750.24	0.000%
32	8733.40	-45362.74	15185.05	-8733.40	45362.74	-15185.05	0.000%
33	-29.18	-45362.74	17551.03	29.18	45362.74	-17551.03	0.000%
34	-8783.94	-45362.74	15214.22	8783.94	45362.74	-15214.22	0.000%
35	-15185.05	-45362.74	8800.78	15185.05	45362.74	-8800.78	0.000%
36	-17517.33	-45362.74	29.18	17517.33	45362.74	-29.18	0.000%
37	-15155.87	-45362.74	-8750.24	15155.87	45362.74	8750.24	0.000%
38	-8733.40	-45362.74	-15185.05	8733.40	45362.74	15185.05	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.166	29	0.1476	0.0483
T2	160 - 140	2.531	29	0.1451	0.0465
T3	140 - 120	1.910	29	0.1324	0.0389
T4	120 - 100	1.360	29	0.1111	0.0281
T5	100 - 80	0.917	29	0.0851	0.0203
T6	80 - 60	0.589	29	0.0631	0.0143
T7	60 - 40	0.337	29	0.0459	0.0093
T8	40 - 20	0.161	28	0.0282	0.0056
T9	20 - 0	0.046	35	0.0143	0.0022

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	12 Bay Dipole	29	3.166	0.1476	0.0483	Inf
180.00	6' Standoff	29	3.166	0.1476	0.0483	Inf
170.00	15' T-Frame	29	2.849	0.1472	0.0479	Inf
160.00	15' T-Frame	29	2.531	0.1451	0.0465	Inf
150.00	15' T-Frame	29	2.215	0.1401	0.0435	120094
140.00	15' T-Frame	29	1.910	0.1324	0.0389	62479
130.00	15' T-Frame	29	1.623	0.1227	0.0334	50740
75.00	GPS	29	0.519	0.0586	0.0129	71332

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	11.635	19	0.5344	0.1875
T2	160 - 140	9.339	15	0.5254	0.1818
T3	140 - 120	7.091	15	0.4811	0.1539
T4	120 - 100	5.085	15	0.4061	0.1127
T5	100 - 80	3.458	15	0.3132	0.0825
T6	80 - 60	2.237	15	0.2339	0.0585
T7	60 - 40	1.289	15	0.1710	0.0385
T8	40 - 20	0.625	15	0.1055	0.0230
T9	20 - 0	0.181	23	0.0536	0.0090

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	12 Bay Dipole	19	11.635	0.5344	0.1875	Inf
180.00	6' Standoff	19	11.635	0.5344	0.1875	Inf
170.00	15' T-Frame	15	10.487	0.5328	0.1865	Inf
160.00	15' T-Frame	15	9.339	0.5254	0.1818	257280
150.00	15' T-Frame	15	8.198	0.5079	0.1708	34328
140.00	15' T-Frame	15	7.091	0.4811	0.1539	17683
130.00	15' T-Frame	15	6.047	0.4469	0.1331	14262
75.00	GPS	15	1.975	0.2175	0.0530	19724

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	180	Diagonal	A325N	0.6250	3	1659.00	6442.72	0.257 ✓	1.333	Bolt Shear

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
		Horizontal	A325N	0.6250	2	1438.35	6442.72	0.223 ✓	1.333	Bolt Shear
T2	160	Leg	A325N	0.8750	4	8395.29	26458.00	0.317 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4034.00	6442.72	0.626 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3260.02	6442.72	0.506 ✓	1.333	Bolt Shear
T3	140	Leg	A325N	1.0000	4	19520.80	34557.50	0.565 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4294.03	6442.72	0.666 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4032.47	6442.72	0.626 ✓	1.333	Bolt Shear
T4	120	Leg	A325N	1.0000	6	20428.10	34557.50	0.591 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4252.08	6442.72	0.660 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4299.21	6442.72	0.667 ✓	1.333	Bolt Shear
T5	100	Leg	A325N	1.0000	6	25610.30	34557.50	0.741 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4830.31	6442.72	0.750 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4364.32	6442.72	0.677 ✓	1.333	Bolt Shear
T6	80	Leg	A325N	1.0000	8	23253.40	34557.50	0.673 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4701.90	6442.72	0.730 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4640.91	6442.72	0.720 ✓	1.333	Bolt Shear
T7	60	Leg	A325N	1.0000	8	26981.50	34557.50	0.781 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4781.58	6442.72	0.742 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5042.64	6442.72	0.783 ✓	1.333	Bolt Shear
T8	40	Leg	A325N	1.0000	12	20314.10	34557.50	0.588 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4796.85	6442.72	0.745 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5311.99	6442.72	0.824 ✓	1.333	Bolt Shear
T9	20	Leg	A325N	1.0000	12	22496.50	34557.50	0.651 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	5043.12	9277.52	0.544 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	5996.07	9277.52	0.646 ✓	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 P / P_a
T1	180 - 160	HSS3.5x.216	20.00	6.33	65.0 K=1.00	21.839	2.0832	-13030.40	45494.50	0.286 ✓
T2	160 - 140	HSS4.5x.337	20.00	6.67	53.9 K=1.00	23.729	4.1415	-38863.60	98272.80	0.395 ✓
T3	140 - 120	HSS5.563x.375	20.04	6.68	43.4 K=1.00	25.348	5.7167	-88032.10	144906.00	0.608 ✓

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 $\frac{P}{P_a}$
T4	120 - 100	HSS6.625x.340	20.04	6.68	36.0 K=1.00	26.378	6.7133	-137170.00	177085.00	0.775 ✓
T5	100 - 80	HSS8.625x.375	20.05	10.03	41.1 K=1.00	25.680	9.0739	-173610.00	233017.00	0.745 ✓
T6	80 - 60	HSS8.625x.5	20.05	10.03	41.6 K=1.00	25.600	11.9205	-213005.00	305168.00	0.698 ✓
T7	60 - 40	HSS8.625x.5	20.05	10.03	41.6 K=1.00	25.600	11.9205	-250407.00	305169.00	0.821 ✓
T8	40 - 20	HSS10.75x.5	20.05	10.03	33.1 K=1.00	26.767	15.0247	-286564.00	402170.00	0.713 ✓
T9	20 - 0	HSS10.75x.5	20.05	10.03	33.1 K=1.00	26.767	15.0247	-321521.00	402170.00	0.799 ✓

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	180 - 160	HSS2.375x.154	7.64	7.38	112.0 K=1.00	11.895	1.0027	-4977.00	11926.80	0.417 ✓
T2	160 - 140	HSS2.375x.218	7.92	7.58	117.9 K=1.00	10.741	1.3914	-12102.00	14944.60	0.810 ✓
T3	140 - 120	HSS2.375x.218	8.57	8.20	127.6 K=1.00	9.173	1.3914	-12882.10	12763.20	1.009 ✓
T4	120 - 100	HSS2.875x.203	9.26	8.86	111.7 K=1.00	11.974	1.5948	-12490.90	19095.90	0.654 ✓
T5	100 - 80	HSS3.5x.216	12.60	12.01	123.3 K=1.00	9.821	2.0832	-14425.80	20458.40	0.705 ✓
T6	80 - 60	HSS3.5x.216	13.40	12.86	132.1 K=1.00	8.560	2.0832	-14076.40	17831.20	0.789 ✓
T7	60 - 40	HSS3.5x.216	14.27	13.76	141.3 K=1.00	7.475	2.0832	-14344.70	15571.70	0.921 ✓
T8	40 - 20	HSS3.5x.216	15.19	14.60	149.9 K=1.00	6.646	2.0832	-14332.70	13845.60	1.035 ✓
T9	20 - 0	HSS4x.313	16.16	15.59	142.2 K=1.00	7.382	3.3908	-15129.40	25029.70	0.604 ✓

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 $\frac{P}{P_a}$
T1	180 - 160	HSS1.9x.145	8.56	4.13	79.3 K=1.00	19.158	0.7486	-2836.40	14341.10	0.198 ✓
T2	160 - 140	HSS1.9x.145	8.56	4.09	78.5 K=1.00	19.317	0.7486	-6494.96	14459.60	0.449 ✓
T3	140 - 120	HSS1.9x.145	10.02	4.78	91.6	16.588	0.7486	-8064.94	12417.00	0.650

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 $\frac{P}{P_a}$
T4	120 - 100	HSS2.375x.154	12.14	5.80	K=1.00 88.0	17.375	1.0027	-8598.42	17422.60	✓ 0.494
T5	100 - 80	HSS2.375x.154	14.07	6.68	K=1.00 101.3	14.394	1.0027	-8728.64	14432.70	✓ 0.605
T6	80 - 60	HSS2.375x.154	16.57	7.93	K=1.00 120.3	10.323	1.0027	-9281.82	10350.90	✓ 0.897
T7	60 - 40	HSS2.875x.203	19.09	9.18	K=1.00 115.8	11.145	1.5948	-10085.30	17774.30	✓ 0.567
T8	40 - 20	HSS2.875x.203	21.60	10.35	K=1.00 130.5	8.770	1.5948	-10536.80	13986.80	✓ 0.753
T9	20 - 0	HSS3.5x.216	24.12	11.61	K=1.00 119.2	10.502	2.0832	-11241.40	21876.60	✓ 0.514
					K=1.00					✓

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	180 - 160	HSS1.9x.145	8.56	4.13	79.3 K=1.00	19.158	0.7486	-586.26	14341.10	0.041 ✓

Inner Bracing 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	180 - 160	L2x2x1/8	4.28	4.28	129.2 K=1.00	8.947	0.4844	-49.13	4333.61	0.011 ✓
T2	160 - 140	L2x2x1/8	4.28	4.28	129.2 K=1.00	8.947	0.4844	-112.50	4333.61	0.026 ✓
T3	140 - 120	L2x2x1/8	5.01	5.01	151.2 K=1.00	6.529	0.4844	-139.69	3162.73	0.044 ✓
T4	120 - 100	L2x2x1/8	6.07	6.07	183.3 K=1.00	4.446	0.4844	-148.93	2153.38	0.069 ✓
T5	100 - 80	L2x2x1/8	7.04	7.04	212.4 K=1.00	3.309	0.4844	-151.18	1602.88	0.094 ✓
T6	80 - 60	L2x2x1/8	8.28	8.28	250.1 K=1.00	2.388	0.4844	-160.77	1156.52	0.139 ✓
T7	60 - 40	KL/R > 250 (C) - 196 L2x2x1/8	9.54	9.54	288.0 K=1.00	1.800	0.4844	-174.68	871.79	0.200 ✓
T8	40 - 20	KL/R > 250 (C) - 223 L2x2x1/8	10.80	10.80	326.0 K=1.00	1.405	0.4844	-182.50	680.60	0.268 ✓
T9	20 - 0	KL/R > 250 (C) - 250 L2x2x1/8	12.06	12.06	364.0	1.127	0.4844	-194.71	545.81	0.357

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 $\frac{P}{P_a}$
					K=1.00					✓
		KL/R > 250 (C) - 277								

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 $\frac{P}{P_a}$
T1	180 - 160	HSS3.5x.216	20.00	6.33	65.0	30.000	2.0832	10695.10	62495.60	0.171 ✓
T2	160 - 140	HSS4.5x.337	20.00	6.67	53.9	30.000	4.1415	33581.10	124244.00	0.270 ✓
T3	140 - 120	HSS5.563x.375	20.04	6.68	43.4	30.000	5.7167	78083.20	171501.00	0.455 ✓
T4	120 - 100	HSS6.625x.340	20.04	6.68	36.0	30.000	6.7133	122568.00	201398.00	0.609 ✓
T5	100 - 80	HSS8.625x.375	20.05	10.03	41.1	30.000	9.0739	153662.00	272218.00	0.564 ✓
T6	80 - 60	HSS8.625x.5	20.05	10.03	41.6	30.000	11.9205	186027.00	357614.00	0.520 ✓
T7	60 - 40	HSS8.625x.5	20.05	10.03	41.6	30.000	11.9205	215852.00	357614.00	0.604 ✓
T8	40 - 20	HSS10.75x.5	20.05	10.03	33.1	30.000	15.0247	243769.00	450742.00	0.541 ✓
T9	20 - 0	HSS10.75x.5	20.05	10.03	33.1	30.000	15.0247	269958.00	450742.00	0.599 ✓

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 $\frac{P}{P_a}$
T1	180 - 160	HSS2.375x.154	7.64	7.38	112.0	30.000	1.0027	4921.05	30081.60	0.164 ✓
T2	160 - 140	HSS2.375x.218	7.92	7.58	117.9	30.000	1.3914	12033.00	41740.80	0.288 ✓
T3	140 - 120	HSS2.375x.218	8.57	8.20	127.6	30.000	1.3914	12795.80	41740.80	0.307 ✓
T4	120 - 100	HSS2.875x.203	8.79	8.39	105.8	30.000	1.5948	12646.60	47845.30	0.264 ✓
T5	100 - 80	HSS3.5x.216	12.23	11.64	119.6	30.000	2.0832	14261.50	62495.60	0.228 ✓
T6	80 - 60	HSS3.5x.216	12.99	12.45	127.9	30.000	2.0832	13838.40	62495.60	0.221

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 $\frac{P}{P_a}$
T7	60 - 40	HSS3.5x.216	13.83	13.32	136.8	30.000	2.0832	13982.10	62495.60	0.224 ✓
T8	40 - 20	HSS3.5x.216	14.72	14.13	145.1	30.000	2.0832	13982.60	62495.60	0.224 ✓
T9	20 - 0	HSS4x.313	16.16	15.59	142.2	30.000	3.3908	14456.50	101723.00	0.142 ✓

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 $\frac{P}{P_a}$
T1	180 - 160	HSS1.9x.145	8.56	4.13	79.3	30.000	0.7486	2876.70	22456.90	0.128 ✓
T2	160 - 140	HSS1.9x.145	8.56	4.09	78.5	30.000	0.7486	6520.04	22456.90	0.290 ✓
T3	140 - 120	HSS1.9x.145	10.02	4.78	91.6	30.000	0.7486	8021.40	22456.90	0.357 ✓
T4	120 - 100	HSS2.375x.154	12.14	5.80	88.0	30.000	1.0027	8553.50	30081.60	0.284 ✓
T5	100 - 80	HSS2.375x.154	14.07	6.68	101.3	30.000	1.0027	8586.40	30081.60	0.285 ✓
T6	80 - 60	HSS2.375x.154	16.57	7.93	120.3	30.000	1.0027	9184.71	30081.60	0.305 ✓
T7	60 - 40	HSS2.875x.203	19.09	9.18	115.8	30.000	1.5948	10020.90	47845.30	0.209 ✓
T8	40 - 20	HSS2.875x.203	21.60	10.35	130.5	30.000	1.5948	10624.00	47845.30	0.222 ✓
T9	20 - 0	HSS3.5x.216	24.12	11.61	119.2	30.000	2.0832	11992.10	62495.60	0.192 ✓

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	180 - 160	HSS1.9x.145	8.56	4.13	79.3	30.000	0.7486	586.06	22456.90	0.026 ✓

Inner Bracing 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	180 - 160	L2x2x1/8	4.28	4.28	82.0	21.600	0.4844	49.13	10462.50	0.005 ✓
T2	160 - 140	L2x2x1/8	4.28	4.28	82.0	21.600	0.4844	112.50	10462.50	0.011 ✓
T3	140 - 120	L2x2x1/8	5.01	5.01	96.0	21.600	0.4844	139.69	10462.50	0.013 ✓
T4	120 - 100	L2x2x1/8	6.07	6.07	116.3	21.600	0.4844	148.93	10462.50	0.014 ✓
T5	100 - 80	L2x2x1/8	7.04	7.04	134.9	21.600	0.4844	151.18	10462.50	0.014 ✓
T6	80 - 60	L2x2x1/8	8.28	8.28	158.8	21.600	0.4844	160.77	10462.50	0.015 ✓
T7	60 - 40	L2x2x1/8	9.54	9.54	182.9	21.600	0.4844	174.68	10462.50	0.017 ✓
T8	40 - 20	L2x2x1/8	10.80	10.80	207.0	21.600	0.4844	182.50	10462.50	0.017 ✓
T9	20 - 0	L2x2x1/8	11.43	11.43	219.0	21.600	0.4844	199.71	10462.50	0.019 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	180 - 160	Leg	HSS3.5x.216	3	-13030.40	60644.17	21.5	Pass
T2	160 - 140	Leg	HSS4.5x.337	41	-38863.60	130997.63	29.7	Pass
T3	140 - 120	Leg	HSS5.563x.375	80	-88032.10	193159.69	45.6	Pass
T4	120 - 100	Leg	HSS6.625x.340	119	-137170.00	236054.30	58.1	Pass
T5	100 - 80	Leg	HSS8.625x.375	158	-173610.00	310611.65	55.9	Pass
T6	80 - 60	Leg	HSS8.625x.5	185	-213005.00	406788.93	52.4	Pass
T7	60 - 40	Leg	HSS8.625x.5	212	-250407.00	406790.26	61.6	Pass
T8	40 - 20	Leg	HSS10.75x.5	239	-286564.00	536092.59	53.5	Pass
T9	20 - 0	Leg	HSS10.75x.5	266	-321521.00	536092.59	60.0	Pass
T1	180 - 160	Diagonal	HSS2.375x.154	11	-4977.00	15898.42	31.3	Pass
T2	160 - 140	Diagonal	HSS2.375x.218	48	-12102.00	19921.15	60.7	Pass
T3	140 - 120	Diagonal	HSS2.375x.218	87	-12882.10	17013.35	75.7	Pass
T4	120 - 100	Diagonal	HSS2.875x.203	126	-12490.90	25454.83	49.1 49.5 (b)	Pass
T5	100 - 80	Diagonal	HSS3.5x.216	165	-14425.80	27271.05	52.9 56.2 (b)	Pass
T6	80 - 60	Diagonal	HSS3.5x.216	192	-14076.40	23768.99	59.2	Pass
T7	60 - 40	Diagonal	HSS3.5x.216	219	-14344.70	20757.08	69.1	Pass
T8	40 - 20	Diagonal	HSS3.5x.216	246	-14332.70	18456.18	77.7	Pass
T9	20 - 0	Diagonal	HSS4x.313	273	-15129.40	33364.59	45.3	Pass
T1	180 - 160	Horizontal	HSS1.9x.145	10	-2836.40	19116.68	14.8 16.7 (b)	Pass
T2	160 - 140	Horizontal	HSS1.9x.145	46	-6494.96	19274.65	33.7 38.0 (b)	Pass
T3	140 - 120	Horizontal	HSS1.9x.145	85	-8064.94	16551.86	48.7	Pass
T4	120 - 100	Horizontal	HSS2.375x.154	124	-8598.42	23224.32	37.0 50.1 (b)	Pass
T5	100 - 80	Horizontal	HSS2.375x.154	163	-8728.64	19238.79	45.4 50.8 (b)	Pass
T6	80 - 60	Horizontal	HSS2.375x.154	190	-9281.82	13797.75	67.3	Pass
T7	60 - 40	Horizontal	HSS2.875x.203	217	-10085.30	23693.14	42.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
							58.7 (b)	
T8	40 - 20	Horizontal	HSS2.875x.203	244	-10536.80	18644.40	56.5	Pass
							61.9 (b)	
T9	20 - 0	Horizontal	HSS3.5x.216	271	-11241.40	29161.51	38.5	Pass
							48.5 (b)	
T1	180 - 160	Top Girt	HSS1.9x.145	6	-586.26	19116.68	3.1	Pass
T1	180 - 160	Inner Bracing	L2x2x1/8	16	-49.13	5776.70	0.9	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	52	-112.50	5776.70	1.9	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	92	-139.69	4215.92	3.3	Pass
T4	120 - 100	Inner Bracing	L2x2x1/8	131	-148.93	2870.46	5.2	Pass
T5	100 - 80	Inner Bracing	L2x2x1/8	169	-151.18	2136.64	7.1	Pass
T6	80 - 60	Inner Bracing	L2x2x1/8	196	-160.77	1541.64	10.4	Pass
T7	60 - 40	Inner Bracing	L2x2x1/8	223	-174.68	1162.10	15.0	Pass
T8	40 - 20	Inner Bracing	L2x2x1/8	250	-182.50	907.23	20.1	Pass
T9	20 - 0	Inner Bracing	L2x2x1/8	278	-194.71	727.57	26.8	Pass
							Summary	
						Leg (T7)	61.6	Pass
						Diagonal (T8)	77.7	Pass
						Horizontal (T6)	67.3	Pass
						Top Girt (T1)	3.1	Pass
						Inner Bracing (T9)	26.8	Pass
						Bolt Checks	61.9	Pass
						RATING =	**77.7**	**Pass**

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 284·kips	*user input*	
Shear:	Shear := 42·kips	*user input*	
Compression:	Compression := 338·kips	*user input*	

Anchor Bolt Data:

Use ASTM A354 Grade BC

Number of Anchor Bolts = N	N := 16	*user input*	
Bolt Ultimate Strength:	F_u := 125·ksi	*user input*	
Bolt Yield Strength:	Fy := 109·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.0in	*user input*	
Threads per Inch:	n := 8	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 0.785\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 0.606\cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.33\cdot\left(0.33\cdot A_g\cdot F_u\right) \qquad AllowableTension = 43.1\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.33\cdot\left(0.60\cdot A_n\cdot Fy\right) \qquad F_{net.area} = 52.7\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 17.8\cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.34$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 3.4 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 1.2 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 9.7 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.4$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.1$$

Condition3 = "OK"

NATCOMM

Job	180' Rohn SSVMW - Madison, CT	Project No.	08007.CO11	Page	___ of ___
Description	Evaluation of Drilled Pier Caisson	Computed by	JEK	Sheet	1 of 2
		Checked by		Date	03/17/08

3 SIDED SELF SUPPORTING TOWER FOUNDATION DRILLED PIER

Compression:	DownLoad := 338·kips	γc := 150pcf	Concrete unit weight
Uplift:	uplift := 284·kips	γw := 62.4pcf	Water unit weight
Depth Neglected for Skin Friction at the top	Depthunbond := 8·ft	γs := 120pcf	Soil unit weight
Drill Caisson length	CasissonLength := 25·ft	Pierϕ := 6·ft	Pier diameter
Water Table Below grade:	Wd := 1·ft	hg := 0.5·ft	Height of Pier Above grade
Ave allowable Shear at Depth of 8' to 16'	f1 := 600psf h1 := 6ft	SoilBearingCapaciy := 30ksf	
Ave allowable Shear at Depth of 16' to 20'	f2 := 3000psf h2 := 6ft	Per Malouf Report 6.13.2000	
Ave allowable Shear at Depth of 20' to 25'	f3 := 4000psf h3 := 5ft		

Loading:

$$\text{TotalDownLoad} := \text{DownLoad} + \pi\cdot\frac{\text{Pier}\phi^2}{4}\cdot[\text{hg}\cdot\gamma c + [(\gamma c - \gamma s)\cdot(\text{CasissonLength} - \text{hg})]]$$

$$\text{TotalDownLoad} = 360.9\cdot\text{kips}$$

$$\text{Pierweight} := \pi\cdot\frac{\text{Pier}\phi^2}{4}\cdot[(\text{Wd} + \text{hg})\cdot\gamma c + (\text{CasissonLength} - \text{Wd} - \text{hg})\cdot(\gamma c - \gamma w)]$$

$$\text{Pierweight} = 64.57\cdot\text{kips}$$

$$\text{Soilshear} := \pi\cdot\text{Pier}\phi\cdot(f1\cdot h1 + f2\cdot h2 + f3\cdot h3)$$

$$\text{Soilshear} = 784.14\cdot\text{kips}$$

Compression Capacity:

$$\text{TotalDownLoadCapacity} := .5\left[\text{Soilshear} + \text{SoilBearingCapaciy}\cdot\left(\pi\cdot\frac{\text{Pier}\phi^2}{4}\right)\right]$$

$$\text{TotalDownLoadCapacity} = 816.19\cdot\text{kips}$$

$$\text{CheckDownLoadCapacity} := \text{if}(\text{TotalDownLoad} < \text{TotalDownLoadCapacity}, \text{"Okay"}, \text{"No Good"})$$

$$\text{CheckDownLoadCapacity} = \text{"Okay"}$$

NATCOMM

				Page ___	of ___
Job	180' Rohn SSVMW - Madison, CT	Project No.	08007.CO11	Sheet 2	of 2
Description	Evaluation of Drilled Pier Caisson	Computed by	JEK	Date	03/17/08
		Checked by		Date	

Tension Capacity:

TotalUpLiftCapacity := .5(Soilshear + Pierweight)

TotalUpLiftCapacity = 424.35·kips

CkeckUpLiftCapacity := if(uplift < TotalUpLiftCapacity, "Okay", "No Good")

CkeckUpLiftCapacity = "Okay"

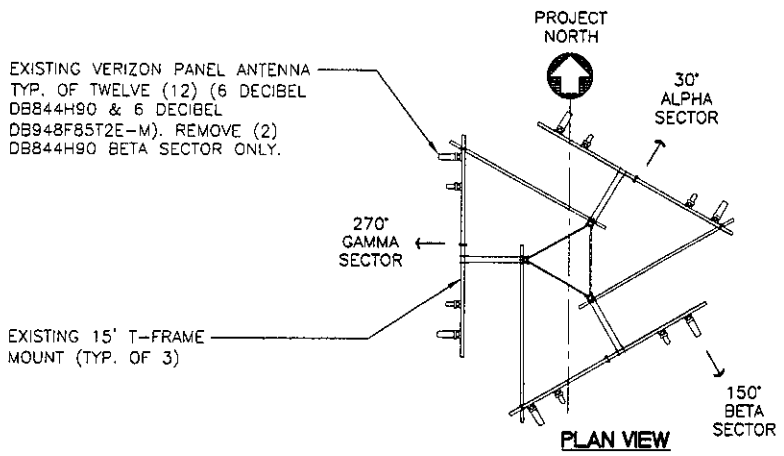
Check Cone Failure

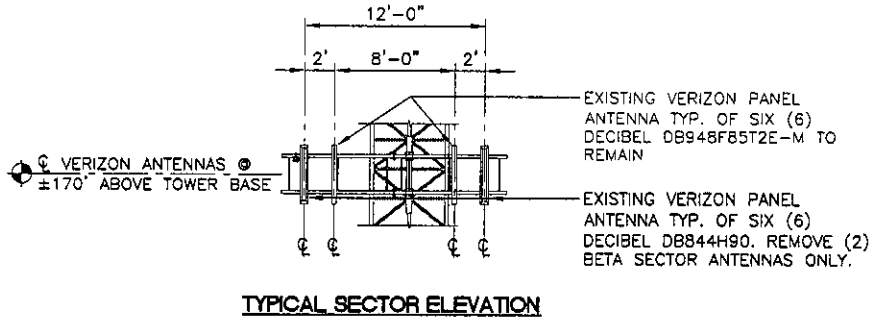
$$\text{ConeFailureCapacity} := \frac{[(\text{CasissonLength} - \text{hg})\cdot\tan(30\cdot\text{deg})\cdot 2 + \text{Pier}\phi]^2\cdot\pi}{4}\cdot\frac{\text{CasissonLength} - \text{hg}}{3}\cdot\gamma s$$

ConeFailureCapacity = 905.01·kips

CheckConeFailureCapacity := if(uplift < ConeFailureCapacity, "Okay", "No Good")

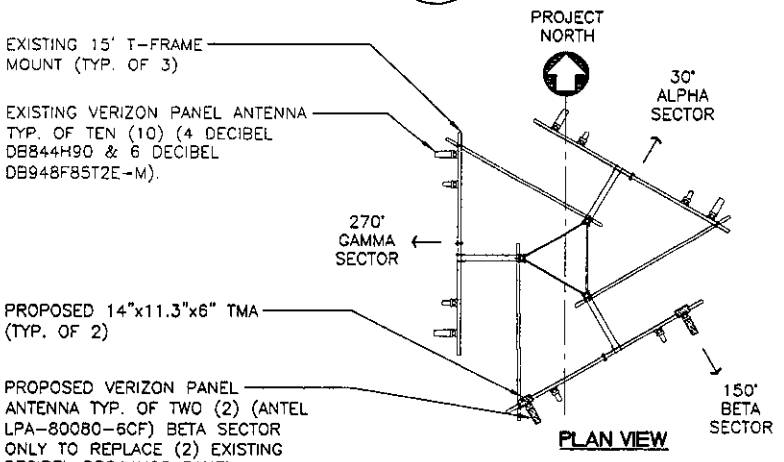
CkeckUpLiftCapacity = "Okay"

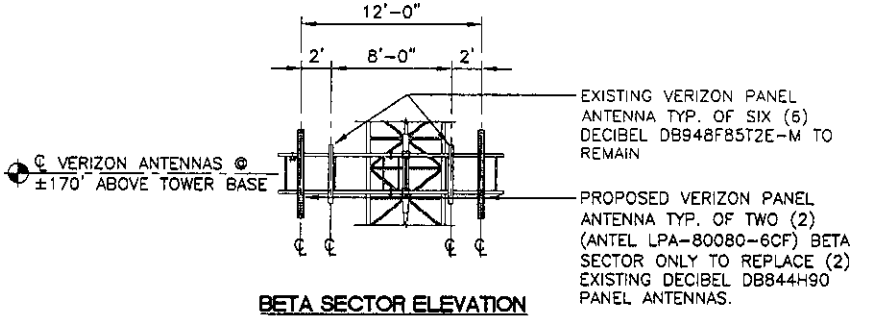




1 ANT-1 EXISTING ANTENNA MOUNTING CONFIGURATION

NOT TO SCALE





2 ANT-1 PROPOSED ANTENNA MOUNTING CONFIGURATION

NOT TO SCALE

REVISIONS		
00	03/17/06	ANTENNA LAYOUT
01	05/18/06	REVISED TMA TOTALS

Cellco Partnership d.b.a. verizonwireless

NATCOMM
CONSULTING ENGINEERS
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63-2 N. Branford Rd.
Branford, CT 06405

MADISON CT

864 OPENING HILL ROAD
MADISON, CT

PROJECT NO:	06007.CD11
DRAWN BY:	DEB
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	03/17/06

ANTENNA REPLACEMENT DETAILS

ANT-1

DWG. 1 OF 1

542A CT 666.1

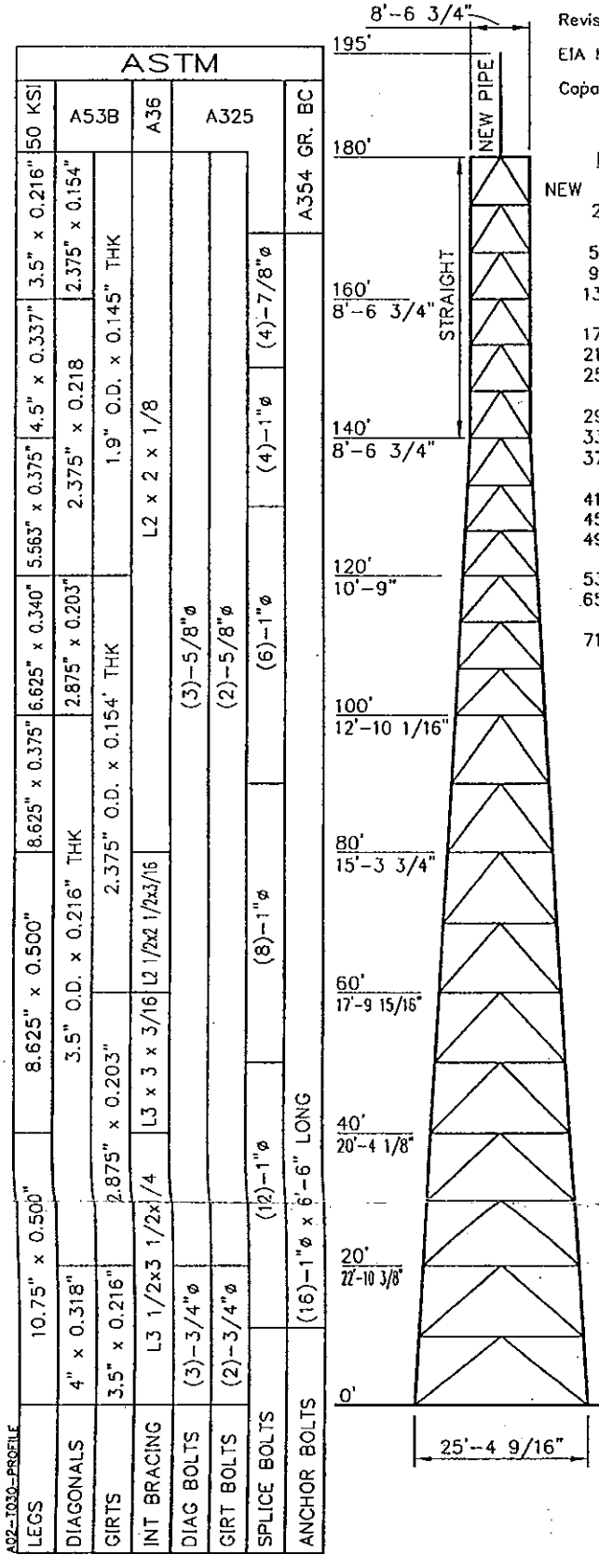
WMNR FINE ARTS RADIO

1014 MONROE TURNPIKE MONROE, CONNECTICUT 06468
PH: (203) 268-9667 FAX: (203) 268-6020

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street Suite 500 Columbus, Ohio 43215
PH (614)-221-6679 FAX (614)-221-0166

Tower EXISTING 180 FT SELF SUPPORT
Location NORTH MADISON, CONNECTICUT
Site CT-11-384A

Page 1 Of 2
By YW Date 3-13-2002
PJF No. A02-T030
Revision No. Date
EIA Min 85 MPH/74 MPH + 1/2" RADIAL ICE
Capacity 112 MPH/95 MPH + 1/2" RADIAL ICE
According to ANSI/EIA 222-F 1996



ASTM													
LEGS	10.75" x 0.500"		8.625" x 0.500"		8.625" x 0.375"	6.625" x 0.340"	5.563" x 0.375"	4.5" x 0.337"	3.5" x 0.216"	50 KSI	A53B	A36	A325	A354 GR. BC
DIAGONALS	4" x 0.318"		3.5" O.D. x 0.216" THK		2.375" O.D. x 0.154" THK	2.875" x 0.203"	2.375" x 0.218"		2.375" x 0.154"					
GIRTS	3.5" x 0.216"		2.875" x 0.203"				1.9" O.D. x 0.145" THK							
INT BRACING	L3 1/2x3 1/2x1/4		L3 x 3 x 3/16		L2 1/2x2 1/2x3/16		L2 x 2 x 1/8							
DIAG BOLTS	(3)-3/4"ø						(3)-5/8"ø							
GIRT BOLTS	(2)-3/4"ø						(2)-5/8"ø							
SPLICE BOLTS			(12)-1"ø		(8)-1"ø	(6)-1"ø		(4)-1"ø	(4)-7/8"ø					
ANCHOR BOLTS	(16)-1"ø x 6'-6" LONG													

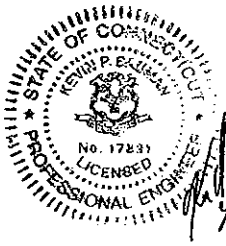
A02-T030-PROFILE

ANTENNA LIST

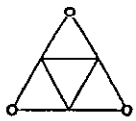
NO	EL	ANTENNA	COAX
NEW 1	190'	1-BAY SHIVELY 6810 FM ANTENNA	7/8"
2-4	180'	(3) PD455 ANTENNA	(3)-1 5/8"
	180'	(3) 6" SIDE ARM MOUNTS	
5-8	170'	(4) ALP9212N ANTENNA	(4)-1 5/8"
9-12	170'	(4) ALP9212N ANTENNA	(4)-1 5/8"
13-16	170'	(4) ALP9212N ANTENNA	(4)-1 5/8"
	170'	15' SECTOR FRAME MOUNTS	
17-20	160'	(4) ALP9212N ANTENNA	(4)-1 5/8"
21-24	160'	(4) ALP9212N ANTENNA	(4)-1 5/8"
25-28	160'	(4) ALP9212N ANTENNA	(4)-1 5/8"
	160'	15' SECTOR FRAME MOUNTS	
29-32	150'	(4) ALP9212N ANTENNA	(4)-1 5/8"
33-36	150'	(4) ALP9212N ANTENNA	(4)-1 5/8"
37-40	150'	(4) ALP9212N ANTENNA	(4)-1 5/8"
	150'	15' SECTOR FRAME MOUNTS	
41-44	140'	(4) ALP9212N ANTENNA	(4)-1 5/8"
45-48	140'	(4) ALP9212N ANTENNA	(4)-1 5/8"
49-52	140'	(4) ALP9212N ANTENNA	(4)-1 5/8"
	140'	15' SECTOR FRAME MOUNTS	
53-64	130'	(12) EMS RR90-17-002DP	(24)-1 5/8"
65-70	130'	(6) PCS1900MHA	
	130'	15' SECTOR FRAME MOUNTS	
71-86	110'	(16) LARSEN ISM PANEL ANTENNA	(1)-2"
	110'	(3) 12' BOOM	

- COAX ASSUMED TO BE EVENLY DISTRIBUTED TO ALL THREE TOWER FACES.

TOWER IS A ROHN SSMW CONSTRUCTED IN 1998



3/13/2002



INTERIOR BRACING
EL 10' TO 180'

FOUNDATION REACTIONS

UPLIFT: 266 KIPS MAX ONE LEG
COMP: 317 KIPS MAX ONE LEG
HORIZ: 34.2 KIPS MAX ONE LEG

WMNR FINE ARTS RADIO

1014 MONROE TURNPIKE MONROE, CONNECTICUT 06468
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Page 2 Of 2
By YW Date 3-13-2002
Job No. A02-T030
Revision No. Date

STRUCTURAL ANALYSIS OF EXISTING TOWERS

1. PAUL J. FORD AND COMPANY has not made a field inspection to verify tower member sizes and dimensions. We were provided with a previous structural analysis report by Malouf Engineering Intl., Inc., dated 6-13-2000. If the existing conditions are not as represented on these sketches, we should be contacted immediately to reevaluate the structural integrity of the tower.

2. No allowance was made for any damaged, missing, or rusted tower members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same capacity as the day the tower was built.

3. It is not possible to have all of the very detailed information to perform a detailed and thorough analysis of every structural sub component of an existing tower. The structural analysis provided by PAUL J. FORD AND COMPANY verifies the adequacy of the main structural members of the tower. PAUL J. FORD AND COMPANY provides a limited scope of service in that we cannot verify the adequacy of every weld, plate, connection detail, etc.

4. The structural integrity of the existing tower foundations can only be verified if exact foundation sizes and soils conditions are known. PAUL J. FORD AND COMPANY will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.

5. It is the owner's responsibility to determine the amount of ice accumulation, if any, that shall be used in the structural analysis.

6. The tower has been analyzed according to the minimum design wind loads recommended by the Electronics Industry Association Standard ANSI/EIA-222-F. If the owner or local or state agencies require a higher design wind load, PAUL J. FORD AND COMPANY should be made aware of this requirement.

7. The enclosed sketches are a schematic representation of the tower we have analyzed. If any material is fabricated from these sketches, the fabricator shall be responsible for field verifying the existing conditions and for proper fit and clearance in the field.

8. Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> INTO TOWER FACE *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE = 0 FT.
TOWER HEIGHT = 180.00 FT NO. OF LEGS = 3
WIND VELOCITY = 85.00 MPH IMPORTANCE FACTOR = 1
RADIAL ICE = 0.00 IN TOP GIRT WIDTH = 8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	29.9	33.48	0.15	2.78	0.58	4.87	13.6	454
2	173	167	8.6	1.60	29.5	33.12	0.15	2.78	0.58	4.87	13.6	449
3	167	160	8.6	1.58	29.2	32.74	0.15	2.78	0.58	4.87	13.6	444
4	160	153	8.6	1.56	28.9	32.35	0.39	2.08	0.65	14.51	30.2	976
5	153	147	8.6	1.54	28.5	31.95	0.42	2.02	0.66	15.86	32.1	1026
6	147	140	8.6	1.52	28.1	31.54	0.45	1.97	0.67	17.28	34.1	1076
7	140	133	9.3	1.50	27.8	31.11	0.45	1.97	0.67	18.16	35.8	1113
8	133	127	10.0	1.48	27.4	30.67	0.50	1.90	0.70	22.34	42.5	1303
9	127	120	10.8	1.46	27.0	30.21	0.54	1.86	0.72	26.70	49.5	1497
10	120	113	11.4	1.43	26.5	29.74	0.54	1.85	0.72	28.86	53.4	1589
11	113	107	12.1	1.41	26.1	29.24	0.51	1.88	0.70	28.42	53.5	1565
12	107	100	12.8	1.39	25.6	28.72	0.49	1.92	0.69	28.06	53.8	1545
13	100	90	14.1	1.35	25.0	28.04	0.47	1.94	0.68	43.54	84.4	2366
14	90	80	15.3	1.31	24.2	27.17	0.44	2.00	0.67	42.76	85.4	2320
15	80	70	16.6	1.26	23.4	26.21	0.41	2.05	0.65	42.22	86.7	2273
16	70	60	17.8	1.21	22.4	25.16	0.38	2.11	0.64	41.84	88.2	2220
17	60	50	19.1	1.16	21.4	23.99	0.36	2.15	0.64	42.16	90.7	2175
18	50	40	20.3	1.09	20.2	22.65	0.34	2.20	0.63	42.04	92.4	2092
19	40	30	21.6	1.02	18.8	21.08	0.34	2.20	0.63	44.60	98.1	2068
20	30	20	22.9	1.00	18.5	20.73	0.32	2.24	0.62	44.56	99.8	2069
21	20	10	24.1	1.00	18.5	20.73	0.32	2.25	0.62	46.38	104.4	2163
22	10	0	25.4	1.00	18.5	20.73	0.18	2.68	0.59	25.57	68.4	1419

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7	z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7)	h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2	V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag	e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4	Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57	Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar)	Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

****
* WIND DIRECTION ==> INTO TOWER FACE *
****

-- LOADS -- WIND INTO FACE 85 mph wind

ANTENNA LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)
180.00	33.66	5.00	168	108	+0.0
180.00	33.66	10.68	359	69	+0.0
180.00	33.66	12.60	424	744	+0.0
170.00	33.12	69.12	2289	324	+0.0
170.00	33.12	31.04	1028	1753	+0.0
160.00	32.55	69.12	2250	324	+0.0
160.00	32.55	31.04	1010	1753	+0.0
150.00	31.95	69.12	2209	324	+0.0
150.00	31.95	31.04	992	1753	+0.0
140.00	31.33	69.12	2165	324	+0.0
140.00	31.33	31.04	972	1753	+0.0
130.00	30.67	52.32	1605	216	+0.0
130.00	30.67	18.66	572	258	+0.0
130.00	30.67	31.04	952	1753	+0.0
110.00	29.24	36.00	1053	336	+0.0
110.00	29.24	20.31	594	1131	+0.0
190.00	34.18	4.30	147	135	+0.0
185.00	33.93	9.00	305	227	+0.0

UNIFORM LOADS (LINEAR APPURT)

PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
5.940	3.12	180.0	170
29.700	15.60	170.0	160
5.940	3.12	160.0	150
17.820	9.36	150.0	130
5.940	3.12	130.0	110
8.320	6.77	110.0	8
1.100	0.54	190.0	8
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0

UNIFORM LOADS (STRUCTURE)

PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
23.760	24.96	160.00	150
29.700	31.20	150.00	140
29.700	43.68	140.00	130
47.520	74.88	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE

TOTAL TOWER LOADS AT BASE OF EACH SECTION 85 mph wind no ice

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	7.42	14.82	2052	2.05	0.00	411	1.72
2	166.67	7.42	42.01	4183	6.24	0.00	411	4.28
3	160.00	7.42	87.30	4376	10.61	0.00	411	6.87
4	153.33	7.42	161.80	1128	11.74	0.00	639	7.70
5	146.67	7.42	254.86	4503	16.24	0.00	639	10.65
6	140.00	7.42	368.05	4612	20.85	0.00	639	13.64
7	133.33	8.05	512.10	1505	22.36	0.00	772	14.77
8	126.67	8.68	677.02	4698	27.06	0.00	805	18.24
9	120.00	9.31	862.86	1639	28.70	0.00	818	19.58
10	113.33	9.91	1059.93	1729	30.42	0.00	948	21.06
11	106.67	10.52	1273.96	3372	33.80	0.00	963	24.02
12	100.00	11.12	1505.03	1725	35.52	0.00	979	25.55
13	90.00	12.19	1873.40	2630	38.15	0.00	1839	28.21
14	80.00	13.26	2267.80	2575	40.73	0.00	1919	30.95
15	70.00	14.35	2687.68	2520	43.25	0.00	2321	34.09
16	60.00	15.44	3132.43	2457	45.70	0.00	2354	37.27
17	50.00	16.53	3601.48	2401	48.10	0.00	2501	40.59
18	40.00	17.62	4094.06	2305	50.41	0.00	2608	44.02
19	30.00	18.71	4609.49	2266	52.68	0.00	3082	47.93
20	20.00	19.80	5147.58	2264	54.94	0.00	3125	51.87
21	10.00	20.89	5708.79	2359	57.30	0.00	3754	56.45
22	0.00	21.98	6289.23	1458	58.76	0.00	3901	60.51

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 1.0 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER LEG CAPACITY (allowable load)			TOWER LEG LOAD		LEG BOLTS	
SEC NO.	LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	1.65	0.43	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	4.29	1.41	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	9.29	3.60	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	19.11	8.34	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	30.62	13.63	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	44.81	20.27	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	61.21	26.90	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	75.91	32.93	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	91.55	39.81	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	106.50	46.44	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	121.46	52.57	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	136.49	59.16	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	153.31	67.44	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	172.12	75.19	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	190.02	82.28	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	207.07	89.02	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	223.52	95.41	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	239.45	101.51	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	255.02	107.21	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	270.14	112.69	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	285.13	117.82	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	299.70	122.90	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 122.90 KIPS COMPRESSION= 306.31 KIPS HORIZONTAL LOAD = 33.92 KIPS

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* WIND DIRECTION FOR MAXIMUM LEG COMPRESSIVE LOAD *
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EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

SEC No.	TOWER DIAG CAPACITY (allowable load) DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER DIAG LOAD COMP (kips)	TENSION (kips)	DIAG BOLTS *ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.10	1.10	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.33	3.33	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	5.67	5.67	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	6.27	6.27	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	8.68	8.68	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	11.14	11.14	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	8.96	8.96	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	10.24	10.24	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	9.84	9.84	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	9.81	9.81	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	10.41	10.41	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	10.25	10.25	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	11.96	11.96	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	11.60	11.60	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	11.21	11.21	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	11.04	11.04	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	10.93	10.93	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	10.84	10.84	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	10.79	10.79	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	10.80	10.80	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	10.90	10.90	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	10.68	10.68	37.11	3- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

	TOWER GIRT CAPACITY (allowable load)			TOWER GIRT LOAD		GIRT BOLTS	
SEC No.	GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.59	0.59	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	1.80	1.80	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	3.06	3.06	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.39	3.39	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	4.69	4.69	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	6.02	6.02	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	5.13	5.13	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	6.15	6.15	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	6.18	6.18	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	6.39	6.39	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	7.01	7.01	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	7.11	7.11	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	6.88	6.88	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	7.05	7.05	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	7.15	7.15	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	7.34	7.34	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	7.54	7.54	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	7.73	7.73	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	7.91	7.91	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	8.13	8.13	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	8.39	8.39	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	8.39	8.39	24.74	2- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 85 mph wind

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	49.4	10.956	0.545	0.000
2	173.33	81.67	189.5	10.196	0.544	0.000
3	166.67	81.67	431.0	9.436	0.539	0.000
4	160.00	161.55	830.3	8.684	0.529	0.000
5	153.33	161.55	1,388.9	7.946	0.518	0.000
6	146.67	161.55	2,076.4	7.222	0.501	0.000
7	140.00	243.54	2,933.8	6.522	0.476	0.000
8	133.33	284.95	3,963.7	5.857	0.452	0.000
9	126.67	329.61	5,132.9	5.226	0.425	0.000
10	120.00	413.41	6,409.3	4.632	0.394	0.000
11	113.33	466.91	7,779.6	4.082	0.363	0.000
12	106.67	523.65	9,263.3	3.575	0.330	0.000
13	100.00	880.02	16,892.1	3.114	0.296	0.000
14	90.00	1,049.23	20,706.0	2.495	0.258	0.000
15	80.00	1,621.34	24,777.4	1.955	0.219	0.000
16	70.00	1,887.29	29,100.5	1.497	0.188	0.000
17	60.00	2,173.42	33,669.6	1.103	0.158	0.000
18	50.00	2,479.75	38,477.7	0.772	0.127	0.000
19	40.00	3,541.25	43,517.8	0.505	0.097	0.000
20	30.00	3,979.66	48,785.4	0.303	0.072	0.000
21	20.00	4,443.15	54,281.8	0.151	0.048	0.000
22	10.00	4,931.65	59,989.9	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 50 mph wind

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	17.1	3.791	0.189	0.000
2	173.33	81.67	65.6	3.528	0.188	0.000
3	166.67	81.67	149.1	3.265	0.187	0.000
4	160.00	161.55	287.3	3.005	0.183	0.000
5	153.33	161.55	480.6	2.749	0.179	0.000
6	146.67	161.55	718.5	2.499	0.174	0.000
7	140.00	243.54	1,015.2	2.257	0.165	0.000
8	133.33	284.95	1,371.5	2.027	0.156	0.000
9	126.67	329.61	1,776.1	1.808	0.147	0.000
10	120.00	413.41	2,217.8	1.603	0.136	0.000
11	113.33	466.91	2,691.9	1.413	0.126	0.000
12	106.67	523.65	3,205.3	1.237	0.114	0.000
13	100.00	880.02	5,845.0	1.077	0.102	0.000
14	90.00	1,049.23	7,164.7	0.863	0.089	0.000
15	80.00	1,621.34	8,573.5	0.677	0.076	0.000
16	70.00	1,887.29	10,069.4	0.518	0.065	0.000
17	60.00	2,173.42	11,650.4	0.382	0.055	0.000
18	50.00	2,479.75	13,314.1	0.267	0.044	0.000
19	40.00	3,541.25	15,058.0	0.175	0.033	0.000
20	30.00	3,979.66	16,880.8	0.105	0.025	0.000
21	20.00	4,443.15	18,782.6	0.052	0.017	0.000
22	10.00	4,931.65	20,757.8	0.017	0.008	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> INTO TOWER APEX *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE =	0 FT.		
TOWER HEIGHT =	180.00 FT	NO. OF LEGS =	3
WIND VELOCITY =	85.00 MPH	IMPORTANCE FACTOR =	1
RADIAL ICE =	0.00 IN	TOP GIRT WIDTH =	8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	29.9	33.48	0.15	2.78	0.58	4.87	13.6	454
2	173	167	8.6	1.60	29.5	33.12	0.15	2.78	0.58	4.87	13.6	449
3	167	160	8.6	1.58	29.2	32.74	0.15	2.78	0.58	4.87	13.6	444
4	160	153	8.6	1.56	28.9	32.35	0.39	2.08	0.65	14.51	30.2	976
5	153	147	8.6	1.54	28.5	31.95	0.42	2.02	0.66	15.86	32.1	1026
6	147	140	8.6	1.52	28.1	31.54	0.45	1.97	0.67	17.28	34.1	1076
7	140	133	9.3	1.50	27.8	31.11	0.45	1.97	0.67	18.16	35.8	1113
8	133	127	10.0	1.48	27.4	30.67	0.50	1.90	0.70	22.34	42.5	1303
9	127	120	10.8	1.46	27.0	30.21	0.54	1.86	0.72	26.70	49.5	1497
10	120	113	11.4	1.43	26.5	29.74	0.54	1.85	0.72	28.86	53.4	1589
11	113	107	12.1	1.41	26.1	29.24	0.51	1.88	0.70	28.42	53.5	1565
12	107	100	12.8	1.39	25.6	28.72	0.49	1.92	0.69	28.06	53.8	1545
13	100	90	14.1	1.35	25.0	28.04	0.47	1.94	0.68	43.54	84.4	2366
14	90	80	15.3	1.31	24.2	27.17	0.44	2.00	0.67	42.76	85.4	2320
15	80	70	16.6	1.26	23.4	26.21	0.41	2.05	0.65	42.22	86.7	2273
16	70	60	17.8	1.21	22.4	25.16	0.38	2.11	0.64	41.84	88.2	2220
17	60	50	19.1	1.16	21.4	23.99	0.36	2.15	0.64	42.16	90.7	2175
18	50	40	20.3	1.09	20.2	22.65	0.34	2.20	0.63	42.04	92.4	2092
19	40	30	21.6	1.02	18.8	21.08	0.34	2.20	0.63	44.60	98.1	2068
20	30	20	22.9	1.00	18.5	20.73	0.32	2.24	0.62	44.56	99.8	2069
21	20	10	24.1	1.00	18.5	20.73	0.32	2.25	0.62	46.38	104.4	2163
22	10	0	25.4	1.00	18.5	20.73	0.18	2.68	0.59	25.57	68.4	1419

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7	z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7)	h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2	V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag	e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4	Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57	Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar)	Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

****
* WIND DIRECTION ==> INTO TOWER APEX *
****

-- LOADS -- WIND INTO APEX 85 mph wind

ANTENNA LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)
180.00	33.66	5.00	168	108	+0.0
180.00	33.66	10.68	359	69	+0.0
180.00	33.66	12.60	424	744	+0.0
170.00	33.12	69.12	2289	324	+0.0
170.00	33.12	31.04	1028	1753	+0.0
160.00	32.55	69.12	2250	324	+0.0
160.00	32.55	31.04	1010	1753	+0.0
150.00	31.95	69.12	2209	324	+0.0
150.00	31.95	31.04	992	1753	+0.0
140.00	31.33	69.12	2165	324	+0.0
140.00	31.33	31.04	972	1753	+0.0
130.00	30.67	52.32	1605	216	+0.0
130.00	30.67	18.66	572	258	+0.0
130.00	30.67	31.04	952	1753	+0.0
110.00	29.24	36.00	1053	336	+0.0
110.00	29.24	20.31	594	1131	+0.0
190.00	34.18	4.30	147	135	+0.0
185.00	33.93	9.00	305	227	+0.0

UNIFORM LOADS (LINEAR APPURT)

PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
5.940	3.12	180.0	170
29.700	15.60	170.0	160
5.940	3.12	160.0	150
17.820	9.36	150.0	130
5.940	3.12	130.0	110
8.320	6.77	110.0	8
1.100	0.54	190.0	8
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0

UNIFORM LOADS (STRUCTURE)

PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
23.760	24.96	160.00	150
29.700	31.20	150.00	140
29.700	43.68	140.00	130
47.520	74.88	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX

TOTAL TOWER LOADS AT BASE OF EACH SECTION 85 mph wind no ice

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	7.42	14.82	2052	2.05	0.00	411	1.72
2	166.67	7.42	42.01	4183	6.24	0.00	411	4.28
3	160.00	7.42	87.30	4376	10.61	0.00	411	6.87
4	153.33	7.42	161.80	1128	11.74	0.00	639	7.70
5	146.67	7.42	254.86	4503	16.24	0.00	639	10.65
6	140.00	7.42	368.05	4612	20.85	0.00	639	13.64
7	133.33	8.05	512.10	1505	22.36	0.00	772	14.77
8	126.67	8.68	677.02	4698	27.06	0.00	805	18.24
9	120.00	9.31	862.86	1639	28.70	0.00	818	19.58
10	113.33	9.91	1059.93	1729	30.42	0.00	948	21.06
11	106.67	10.52	1273.96	3372	33.80	0.00	963	24.02
12	100.00	11.12	1505.03	1725	35.52	0.00	979	25.55
13	90.00	12.19	1873.40	2630	38.15	0.00	1839	28.21
14	80.00	13.26	2267.80	2575	40.73	0.00	1919	30.95
15	70.00	14.35	2687.68	2520	43.25	0.00	2321	34.09
16	60.00	15.44	3132.43	2457	45.70	0.00	2354	37.27
17	50.00	16.53	3601.48	2401	48.10	0.00	2501	40.59
18	40.00	17.62	4094.06	2305	50.41	0.00	2608	44.02
19	30.00	18.71	4609.49	2266	52.68	0.00	3082	47.93
20	20.00	19.80	5147.58	2264	54.94	0.00	3125	51.87
21	10.00	20.89	5708.79	2359	57.30	0.00	3754	56.45
22	0.00	21.98	6289.23	1458	58.76	0.00	3901	60.51

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 0.8 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER LEG CAPACITY (allowable load)			TOWER LEG LOAD		LEG BOLTS	
SEC NO.	LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	0.65	1.42	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	1.46	4.24	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	3.41	9.48	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	8.20	19.25	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	13.43	30.82	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	19.99	45.09	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	29.39	58.72	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	36.90	71.93	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	45.21	86.16	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	53.04	99.91	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	60.89	113.14	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	68.81	126.85	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	76.47	144.28	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	86.61	160.70	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	96.38	175.93	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	105.63	190.46	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	114.57	204.36	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	123.26	217.70	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	131.83	230.39	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	140.16	242.67	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	148.49	254.45	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	156.63	265.96	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 265.96 KIPS COMPRESSION= 163.24 KIPS HORIZONTAL LOAD = 33.92 KIPS

****
* WIND DIRECTION FOR MAXIMUM LEG SPLICE BOLT TENSION *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER DIAG CAPACITY (allowable load)			TOWER DIAG LOAD		DIAG BOLTS	
SEC No.	DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.10	1.10	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.33	3.33	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	5.67	5.67	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	6.27	6.27	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	8.68	8.68	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	11.14	11.14	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	8.96	8.96	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	10.24	10.24	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	9.84	9.84	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	9.81	9.81	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	10.41	10.41	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	10.25	10.25	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	11.96	11.96	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	11.60	11.60	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	11.21	11.21	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	11.04	11.04	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	10.93	10.93	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	10.84	10.84	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	10.79	10.79	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	10.80	10.80	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	10.90	10.90	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	10.68	10.68	37.11	3- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

SEC No.	TOWER GIRT CAPACITY (allowable load) GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER GIRT LOAD COMP (kips)	TENSION (kips)	GIRT BOLTS *ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.59	0.59	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	1.80	1.80	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	3.06	3.06	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.39	3.39	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	4.69	4.69	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	6.02	6.02	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	5.13	5.13	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	6.15	6.15	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	6.18	6.18	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	6.39	6.39	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	7.01	7.01	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	7.11	7.11	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	6.88	6.88	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	7.05	7.05	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	7.15	7.15	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	7.34	7.34	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	7.54	7.54	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	7.73	7.73	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	7.91	7.91	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	8.13	8.13	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	8.39	8.39	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	8.39	8.39	24.74	2- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 85 mph wind

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	49.4	10.956	0.545	0.000
2	173.33	81.67	189.5	10.196	0.544	0.000
3	166.67	81.67	431.0	9.436	0.539	0.000
4	160.00	161.55	830.3	8.684	0.529	0.000
5	153.33	161.55	1,388.9	7.946	0.518	0.000
6	146.67	161.55	2,076.4	7.222	0.501	0.000
7	140.00	243.54	2,933.8	6.522	0.476	0.000
8	133.33	284.95	3,963.7	5.857	0.452	0.000
9	126.67	329.61	5,132.9	5.226	0.425	0.000
10	120.00	413.41	6,409.3	4.632	0.394	0.000
11	113.33	466.91	7,779.6	4.082	0.363	0.000
12	106.67	523.65	9,263.3	3.575	0.330	0.000
13	100.00	880.02	16,892.1	3.114	0.296	0.000
14	90.00	1,049.23	20,706.0	2.495	0.258	0.000
15	80.00	1,621.34	24,777.4	1.955	0.219	0.000
16	70.00	1,887.29	29,100.5	1.497	0.188	0.000
17	60.00	2,173.42	33,669.6	1.103	0.158	0.000
18	50.00	2,479.75	38,477.7	0.772	0.127	0.000
19	40.00	3,541.25	43,517.8	0.505	0.097	0.000
20	30.00	3,979.66	48,785.4	0.303	0.072	0.000
21	20.00	4,443.15	54,281.8	0.151	0.048	0.000
22	10.00	4,931.65	59,989.9	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 50 mph wind

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	17.1	3.791	0.189	0.000
2	173.33	81.67	65.6	3.528	0.188	0.000
3	166.67	81.67	149.1	3.265	0.187	0.000
4	160.00	161.55	287.3	3.005	0.183	0.000
5	153.33	161.55	480.6	2.749	0.179	0.000
6	146.67	161.55	718.5	2.499	0.174	0.000
7	140.00	243.54	1,015.2	2.257	0.165	0.000
8	133.33	284.95	1,371.5	2.027	0.156	0.000
9	126.67	329.61	1,776.1	1.808	0.147	0.000
10	120.00	413.41	2,217.8	1.603	0.136	0.000
11	113.33	466.91	2,691.9	1.413	0.126	0.000
12	106.67	523.65	3,205.3	1.237	0.114	0.000
13	100.00	880.02	5,845.0	1.077	0.102	0.000
14	90.00	1,049.23	7,164.7	0.863	0.089	0.000
15	80.00	1,621.34	8,573.5	0.677	0.076	0.000
16	70.00	1,887.29	10,069.4	0.518	0.065	0.000
17	60.00	2,173.42	11,650.4	0.382	0.055	0.000
18	50.00	2,479.75	13,314.1	0.267	0.044	0.000
19	40.00	3,541.25	15,058.0	0.175	0.033	0.000
20	30.00	3,979.66	16,880.8	0.105	0.025	0.000
21	20.00	4,443.15	18,782.6	0.052	0.017	0.000
22	10.00	4,931.65	20,757.8	0.017	0.008	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> PARALLEL TO TOWER FACE *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE = 0 FT.
TOWER HEIGHT = 180.00 FT
WIND VELOCITY = 85.00 MPH
RADIAL ICE = 0.00 IN
NO. OF LEGS = 3
IMPORTANCE FACTOR = 1
TOP GIRT WIDTH = 8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	29.9	33.48	0.15	2.78	0.58	4.87	13.6	454
2	173	167	8.6	1.60	29.5	33.12	0.15	2.78	0.58	4.87	13.6	449
3	167	160	8.6	1.58	29.2	32.74	0.15	2.78	0.58	4.87	13.6	444
4	160	153	8.6	1.56	28.9	32.35	0.39	2.08	0.65	14.51	30.2	976
5	153	147	8.6	1.54	28.5	31.95	0.42	2.02	0.66	15.86	32.1	1026
6	147	140	8.6	1.52	28.1	31.54	0.45	1.97	0.67	17.28	34.1	1076
7	140	133	9.3	1.50	27.8	31.11	0.45	1.97	0.67	18.16	35.8	1113
8	133	127	10.0	1.48	27.4	30.67	0.50	1.90	0.70	22.34	42.5	1303
9	127	120	10.8	1.46	27.0	30.21	0.54	1.86	0.72	26.70	49.5	1497
10	120	113	11.4	1.43	26.5	29.74	0.54	1.85	0.72	28.86	53.4	1589
11	113	107	12.1	1.41	26.1	29.24	0.51	1.88	0.70	28.42	53.5	1565
12	107	100	12.8	1.39	25.6	28.72	0.49	1.92	0.69	28.06	53.8	1545
13	100	90	14.1	1.35	25.0	28.04	0.47	1.94	0.68	43.54	84.4	2366
14	90	80	15.3	1.31	24.2	27.17	0.44	2.00	0.67	42.76	85.4	2320
15	80	70	16.6	1.26	23.4	26.21	0.41	2.05	0.65	42.22	86.7	2273
16	70	60	17.8	1.21	22.4	25.16	0.38	2.11	0.64	41.84	88.2	2220
17	60	50	19.1	1.16	21.4	23.99	0.36	2.15	0.64	42.16	90.7	2175
18	50	40	20.3	1.09	20.2	22.65	0.34	2.20	0.63	42.04	92.4	2092
19	40	30	21.6	1.02	18.8	21.08	0.34	2.20	0.63	44.60	98.1	2068
20	30	20	22.9	1.00	18.5	20.73	0.32	2.24	0.62	44.56	99.8	2069
21	20	10	24.1	1.00	18.5	20.73	0.32	2.25	0.62	46.38	104.4	2163
22	10	0	25.4	1.00	18.5	20.73	0.18	2.68	0.59	25.57	68.4	1419

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7	z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7)	h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2	V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag	e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4	Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57	Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar)	Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

****
* WIND DIRECTION ==> PARALLEL TO TOWER FACE *
****

-- LOADS -- WIND PARALLEL TO FACE 85 mph wind

ANTENNA LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)
180.00	33.66	5.00	168	108	+0.0
180.00	33.66	10.68	359	69	+0.0
180.00	33.66	12.60	424	744	+0.0
170.00	33.12	69.12	2289	324	+0.0
170.00	33.12	31.04	1028	1753	+0.0
160.00	32.55	69.12	2250	324	+0.0
160.00	32.55	31.04	1010	1753	+0.0
150.00	31.95	69.12	2209	324	+0.0
150.00	31.95	31.04	992	1753	+0.0
140.00	31.33	69.12	2165	324	+0.0
140.00	31.33	31.04	972	1753	+0.0
130.00	30.67	52.32	1605	216	+0.0
130.00	30.67	18.66	572	258	+0.0
130.00	30.67	31.04	952	1753	+0.0
110.00	29.24	36.00	1053	336	+0.0
110.00	29.24	20.31	594	1131	+0.0
190.00	34.18	4.30	147	135	+0.0
185.00	33.93	9.00	305	227	+0.0

UNIFORM LOADS (LINEAR APPURT)

PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
5.940	3.12	180.0	170
29.700	15.60	170.0	160
5.940	3.12	160.0	150
17.820	9.36	150.0	130
5.940	3.12	130.0	110
8.320	6.77	110.0	8
1.100	0.54	190.0	8
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0

UNIFORM LOADS (STRUCTURE)

PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
23.760	24.96	160.00	150
29.700	31.20	150.00	140
29.700	43.68	140.00	130
47.520	74.88	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE

TOTAL TOWER LOADS AT BASE OF EACH SECTION 85 mph wind no ice

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	8.56	14.82	2052	2.05	0.00	411	1.72
2	166.67	8.56	42.01	4183	6.24	0.00	411	4.28
3	160.00	8.56	87.30	4376	10.61	0.00	411	6.87
4	153.33	8.56	161.80	1128	11.74	0.00	639	7.70
5	146.67	8.56	254.86	4503	16.24	0.00	639	10.65
6	140.00	8.56	368.05	4612	20.85	0.00	639	13.64
7	133.33	9.29	512.10	1505	22.36	0.00	772	14.77
8	126.67	10.02	677.02	4698	27.06	0.00	805	18.24
9	120.00	10.75	862.86	1639	28.70	0.00	818	19.58
10	113.33	11.45	1059.93	1729	30.42	0.00	948	21.06
11	106.67	12.14	1273.96	3372	33.80	0.00	963	24.02
12	100.00	12.84	1505.03	1725	35.52	0.00	979	25.55
13	90.00	14.08	1873.40	2630	38.15	0.00	1839	28.21
14	80.00	15.31	2267.80	2575	40.73	0.00	1919	30.95
15	70.00	16.57	2687.68	2520	43.25	0.00	2321	34.09
16	60.00	17.83	3132.43	2457	45.70	0.00	2354	37.27
17	50.00	19.09	3601.48	2401	48.10	0.00	2501	40.59
18	40.00	20.34	4094.06	2305	50.41	0.00	2608	44.02
19	30.00	21.60	4609.49	2266	52.68	0.00	3082	47.93
20	20.00	22.86	5147.58	2264	54.94	0.00	3125	51.87
21	10.00	24.12	5708.79	2359	57.30	0.00	3754	56.45
22	0.00	25.38	6289.23	1458	58.76	0.00	3901	60.51

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 0.85 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER LEG CAPACITY (allowable load)			TOWER LEG LOAD		LEG BOLTS	
SEC NO.	LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	1.24	1.16	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	3.10	3.48	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	6.98	7.90	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	15.37	16.33	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	24.88	26.21	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	36.71	38.44	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	51.54	50.19	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	64.19	61.48	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	77.95	73.74	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	91.03	85.58	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	104.04	96.91	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	117.21	108.71	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	131.21	123.69	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	147.78	137.78	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	163.60	150.83	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	178.61	163.28	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	193.10	175.17	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	207.14	186.57	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	220.88	197.39	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	234.22	207.84	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	247.44	217.84	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	260.34	227.63	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 227.63 KIPS COMPRESSION= 267.97 KIPS HORIZONTAL LOAD = 33.92 KIPS

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER DIAG CAPACITY (allowable load)			TOWER DIAG LOAD		DIAG BOLTS	
SEC No.	DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.27	1.27	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.85	3.85	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	6.55	6.55	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	7.24	7.24	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	10.02	10.02	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	12.86	12.86	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	10.35	10.35	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	11.82	11.82	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	11.36	11.36	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	11.32	11.32	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	12.02	12.02	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	11.84	11.84	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	13.81	13.81	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	13.40	13.40	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	12.94	12.94	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	12.75	12.75	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	12.62	12.62	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	12.52	12.52	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	12.45	12.45	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	12.47	12.47	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	12.59	12.59	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	12.33	12.33	37.11	3- 3/4

****
* WIND DIRECTION FOR MAXIMUM DIAGONAL LOAD *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 85 mph wind

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

SEC No.	TOWER GIRT CAPACITY (allowable load) GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER GIRT LOAD COMP (kips)	TENSION (kips)	GIRT BOLTS *ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.68	0.68	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	2.08	2.08	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	3.54	3.54	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.91	3.91	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	5.41	5.41	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	6.95	6.95	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	5.92	5.92	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	7.10	7.10	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	7.13	7.13	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	7.38	7.38	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	8.09	8.09	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	8.21	8.21	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	7.95	7.95	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	8.14	8.14	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	8.26	8.26	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	8.48	8.48	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	8.71	8.71	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	8.93	8.93	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	9.14	9.14	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	9.38	9.38	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	9.69	9.69	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	9.68	9.68	24.74	2- 3/4

****
* WIND DIRECTION FOR MAXIMUM GIRT LOAD *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 85 mph wind

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	49.4	10.956	0.545	0.000
2	173.33	81.67	189.5	10.196	0.544	0.000
3	166.67	81.67	431.0	9.436	0.539	0.000
4	160.00	161.55	830.3	8.684	0.529	0.000
5	153.33	161.55	1,388.9	7.946	0.518	0.000
6	146.67	161.55	2,076.4	7.222	0.501	0.000
7	140.00	243.54	2,933.8	6.522	0.476	0.000
8	133.33	284.95	3,963.7	5.857	0.452	0.000
9	126.67	329.61	5,132.9	5.226	0.425	0.000
10	120.00	413.41	6,409.3	4.632	0.394	0.000
11	113.33	466.91	7,779.6	4.082	0.363	0.000
12	106.67	523.65	9,263.3	3.575	0.330	0.000
13	100.00	880.02	16,892.1	3.114	0.296	0.000
14	90.00	1,049.23	20,706.0	2.495	0.258	0.000
15	80.00	1,621.34	24,777.4	1.955	0.219	0.000
16	70.00	1,887.29	29,100.5	1.497	0.188	0.000
17	60.00	2,173.42	33,669.6	1.103	0.158	0.000
18	50.00	2,479.75	38,477.7	0.772	0.127	0.000
19	40.00	3,541.25	43,517.8	0.505	0.097	0.000
20	30.00	3,979.66	48,785.4	0.303	0.072	0.000
21	20.00	4,443.15	54,281.8	0.151	0.048	0.000
22	10.00	4,931.65	59,989.9	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 50 mph wind

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	17.1	3.791	0.189	0.000
2	173.33	81.67	65.6	3.528	0.188	0.000
3	166.67	81.67	149.1	3.265	0.187	0.000
4	160.00	161.55	287.3	3.005	0.183	0.000
5	153.33	161.55	480.6	2.749	0.179	0.000
6	146.67	161.55	718.5	2.499	0.174	0.000
7	140.00	243.54	1,015.2	2.257	0.165	0.000
8	133.33	284.95	1,371.5	2.027	0.156	0.000
9	126.67	329.61	1,776.1	1.808	0.147	0.000
10	120.00	413.41	2,217.8	1.603	0.136	0.000
11	113.33	466.91	2,691.9	1.413	0.126	0.000
12	106.67	523.65	3,205.3	1.237	0.114	0.000
13	100.00	880.02	5,845.0	1.077	0.102	0.000
14	90.00	1,049.23	7,164.7	0.863	0.089	0.000
15	80.00	1,621.34	8,573.5	0.677	0.076	0.000
16	70.00	1,887.29	10,069.4	0.518	0.065	0.000
17	60.00	2,173.42	11,650.4	0.382	0.055	0.000
18	50.00	2,479.75	13,314.1	0.267	0.044	0.000
19	40.00	3,541.25	15,058.0	0.175	0.033	0.000
20	30.00	3,979.66	16,880.8	0.105	0.025	0.000
21	20.00	4,443.15	18,782.6	0.052	0.017	0.000
22	10.00	4,931.65	20,757.8	0.017	0.008	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> INTO TOWER FACE *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE =	0 FT.		
TOWER HEIGHT =	180.00 FT	NO. OF LEGS =	3
WIND VELOCITY =	73.61 MPH	IMPORTANCE FACTOR =	1
RADIAL ICE =	0.50 IN	TOP GIRT WIDTH =	8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	22.4	25.11	0.20	2.59	0.59	6.81	17.6	443
2	173	167	8.6	1.60	22.2	24.84	0.20	2.59	0.59	6.81	17.6	438
3	167	160	8.6	1.58	21.9	24.55	0.20	2.59	0.59	6.81	17.6	433
4	160	153	8.6	1.56	21.6	24.26	0.56	1.83	0.73	23.57	43.1	1047
5	153	147	8.6	1.54	21.4	23.96	0.61	1.80	0.76	26.28	47.3	1134
6	147	140	8.6	1.52	21.1	23.65	0.65	1.78	0.79	29.20	52.0	1231
7	140	133	9.3	1.50	20.8	23.33	0.65	1.78	0.78	30.09	53.6	1252
8	133	127	10.0	1.48	20.5	23.00	0.72	1.78	0.83	38.44	68.3	1572
9	127	120	10.8	1.46	20.2	22.66	0.78	1.80	0.88	47.42	85.4	1936
10	120	113	11.4	1.43	19.9	22.30	0.77	1.80	0.87	49.60	89.1	1987
11	113	107	12.1	1.41	19.6	21.93	0.73	1.78	0.84	48.11	85.7	1878
12	107	100	12.8	1.39	19.2	21.54	0.69	1.78	0.81	46.88	83.3	1794
13	100	90	14.1	1.35	18.8	21.03	0.66	1.78	0.79	69.87	124.4	2615
14	90	80	15.3	1.31	18.2	20.37	0.61	1.80	0.76	67.43	121.4	2474
15	80	70	16.6	1.26	17.5	19.66	0.56	1.83	0.73	65.60	120.2	2362
16	70	60	17.8	1.21	16.8	18.87	0.53	1.87	0.71	64.21	120.0	2265
17	60	50	19.1	1.16	16.1	17.99	0.50	1.90	0.70	63.88	121.6	2188
18	50	40	20.3	1.09	15.2	16.99	0.47	1.94	0.68	63.11	122.6	2084
19	40	30	21.6	1.02	14.1	15.81	0.46	1.96	0.68	65.69	128.4	2031
20	30	20	22.9	1.00	13.9	15.55	0.44	1.99	0.67	65.18	129.9	2019
21	20	10	24.1	1.00	13.9	15.55	0.43	2.01	0.66	66.93	134.5	2091
22	10	0	25.4	1.00	13.9	15.55	0.22	2.54	0.59	32.10	81.4	1266

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7	z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7)	h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2	V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag	e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4	Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57	Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar)	Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

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**********************************************************
*          WIND DIRECTION ==> INTO TOWER FACE            *
**********************************************************
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-- LOADS -- WIND INTO FACE 73.61 mph wind with 0.50 inch radial ice

ANTENNA LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)
180.00	25.25	6.70	169	144	+0.0
180.00	25.25	17.28	436	153	+0.0
180.00	25.25	16.59	419	984	+0.0
170.00	24.84	76.68	1904	864	+0.0
170.00	24.84	36.82	914	2315	+0.0
160.00	24.41	76.68	1872	864	+0.0
160.00	24.41	36.82	899	2315	+0.0
150.00	23.96	76.68	1838	864	+0.0
150.00	23.96	36.82	882	2315	+0.0
140.00	23.50	76.68	1802	864	+0.0
140.00	23.50	36.82	865	2315	+0.0
130.00	23.00	56.64	1303	480	+0.0
130.00	23.00	20.82	479	414	+0.0
130.00	23.00	36.82	847	2315	+0.0
110.00	21.93	39.00	855	672	+0.0
110.00	21.93	26.10	572	1500	+0.0
190.00	25.64	5.50	141	265	+0.0
185.00	25.44	11.00	280	289	+0.0

UNIFORM LOADS (LINEAR APPURT)

PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
8.940	7.66	180.0	170
44.700	38.32	170.0	160
8.940	7.66	160.0	150
26.820	22.99	150.0	130
8.940	7.66	130.0	110
12.320	13.07	110.0	8
2.100	1.52	190.0	8
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0

UNIFORM LOADS (STRUCTURE)

PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
35.760	61.32	160.00	150
44.700	76.65	150.00	140
44.700	107.31	140.00	130
71.520	183.95	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE

TOTAL TOWER LOADS AT BASE OF EACH SECTION
73.61 mph wind with 0.50 inch radial ice accumulation

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	7.42	15.15	2125	2.13	0.00	411	2.49
2	166.67	7.42	41.28	3736	5.86	0.00	411	6.41
3	160.00	7.42	84.35	3970	9.83	0.00	411	10.44
4	153.33	7.42	153.97	1225	11.06	0.00	639	11.72
5	146.67	7.42	241.35	4173	15.23	0.00	639	16.29
6	140.00	7.42	348.50	4353	19.58	0.00	639	20.96
7	133.33	8.05	484.72	1702	21.28	0.00	772	22.80
8	126.67	8.68	641.87	4508	25.79	0.00	805	28.09
9	120.00	9.31	820.82	2103	27.89	0.00	818	30.40
10	113.33	9.91	1013.95	2151	30.05	0.00	948	32.89
11	106.67	10.52	1225.86	3492	33.54	0.00	963	37.59
12	100.00	11.12	1456.12	2001	35.54	0.00	979	40.15
13	90.00	12.19	1826.10	2919	38.46	0.00	1839	44.39
14	80.00	13.26	2224.51	2767	41.22	0.00	1919	48.72
15	70.00	14.35	2649.99	2646	43.87	0.00	2321	53.47
16	60.00	15.44	3101.38	2537	46.41	0.00	2354	58.26
17	50.00	16.53	3577.70	2447	48.86	0.00	2501	63.22
18	40.00	17.62	4077.89	2329	51.18	0.00	2608	68.31
19	30.00	18.71	4601.02	2259	53.44	0.00	3082	73.93
20	20.00	19.80	5146.66	2243	55.69	0.00	3125	79.60
21	10.00	20.89	5715.10	2315	58.00	0.00	3754	85.97
22	0.00	21.98	6301.84	1311	59.31	0.00	3901	90.92

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 1.0 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 73.61 mph wind with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER LEG CAPACITY (allowable load)			TOWER LEG LOAD		LEG BOLTS	
SEC NO.	LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	1.92	0.19	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	5.07	0.65	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	10.44	2.21	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	19.70	6.47	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	31.13	10.84	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	45.18	16.51	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	60.82	22.52	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	75.51	27.62	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	90.78	33.95	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	105.79	40.18	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	121.35	45.76	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	136.83	52.10	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	154.50	60.11	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	174.43	67.63	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	193.51	74.51	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	211.73	81.02	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	229.33	87.15	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	246.36	92.96	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	263.00	98.32	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	279.14	103.42	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	295.10	108.13	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	310.29	113.05	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 113.05 KIPS COMPRESSION= 317.01 KIPS HORIZONTAL LOAD = 34.24 KIPS

****
* WIND DIRECTION FOR MAXIMUM LEG COMPRESSIVE LOAD *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 73.61 mph wind with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER DIAG CAPACITY (allowable load)			TOWER DIAG LOAD		DIAG BOLTS	
SEC No.	DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.14	1.14	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.13	3.13	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	5.25	5.25	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	5.91	5.91	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	8.14	8.14	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	10.46	10.46	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	8.55	8.55	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	9.78	9.78	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	9.66	9.66	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	9.83	9.83	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	10.48	10.48	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	10.44	10.44	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	12.36	12.36	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	12.04	12.04	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	11.66	11.66	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	11.47	11.47	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	11.33	11.33	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	11.22	11.22	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	11.13	11.13	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	11.10	11.10	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	11.17	11.17	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	10.87	10.87	37.11	3- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 73.61 mph wind with 0.50 inch radial ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

SEC No.	TOWER GIRT CAPACITY (allowable load) GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER GIRT LOAD COMP (kips)	TENSION (kips)	GIRT BOLTS *ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.61	0.61	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	1.69	1.69	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	2.84	2.84	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.19	3.19	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	4.40	4.40	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	5.65	5.65	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	4.89	4.89	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	5.87	5.87	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	6.06	6.06	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	6.40	6.40	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	7.06	7.06	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	7.24	7.24	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	7.11	7.11	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	7.32	7.32	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	7.44	7.44	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	7.63	7.63	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	7.82	7.82	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	8.00	8.00	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	8.16	8.16	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	8.35	8.35	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	8.60	8.60	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	8.53	8.53	24.74	2- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 73.61 mph wind with 0.50 inch radial ice

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	50.5	10.756	0.530	0.000
2	173.33	81.67	188.1	10.015	0.529	0.000
3	166.67	81.67	418.8	9.276	0.525	0.000
4	160.00	161.55	794.4	8.544	0.514	0.000
5	153.33	161.55	1,317.8	7.825	0.505	0.000
6	146.67	161.55	1,966.2	7.120	0.489	0.000
7	140.00	243.54	2,777.4	6.438	0.465	0.000
8	133.33	284.95	3,755.3	5.789	0.442	0.000
9	126.67	329.61	4,875.6	5.172	0.416	0.000
10	120.00	413.41	6,115.9	4.591	0.387	0.000
11	113.33	466.91	7,466.0	4.051	0.358	0.000
12	106.67	523.65	8,939.9	3.552	0.326	0.000
13	100.00	880.02	16,411.1	3.097	0.292	0.000
14	90.00	1,049.23	20,253.0	2.484	0.255	0.000
15	80.00	1,621.34	24,372.5	1.949	0.217	0.000
16	70.00	1,887.29	28,756.8	1.494	0.188	0.000
17	60.00	2,173.42	33,395.4	1.102	0.157	0.000
18	50.00	2,479.75	38,277.9	0.772	0.127	0.000
19	40.00	3,541.25	43,394.6	0.505	0.097	0.000
20	30.00	3,979.66	48,738.4	0.303	0.072	0.000
21	20.00	4,443.15	54,308.8	0.151	0.048	0.000
22	10.00	4,931.65	60,084.5	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO FACE 50 mph wind with 0.50 inch radial ice

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	23.3	4.962	0.245	0.000
2	173.33	81.67	86.8	4.621	0.244	0.000
3	166.67	81.67	193.2	4.280	0.242	0.000
4	160.00	161.55	366.5	3.942	0.237	0.000
5	153.33	161.55	608.0	3.610	0.233	0.000
6	146.67	161.55	907.1	3.285	0.225	0.000
7	140.00	243.54	1,281.4	2.970	0.214	0.000
8	133.33	284.95	1,732.6	2.671	0.204	0.000
9	126.67	329.61	2,249.4	2.386	0.192	0.000
10	120.00	413.41	2,821.7	2.118	0.178	0.000
11	113.33	466.91	3,444.6	1.869	0.165	0.000
12	106.67	523.65	4,124.5	1.639	0.150	0.000
13	100.00	880.02	7,571.5	1.429	0.135	0.000
14	90.00	1,049.23	9,344.0	1.146	0.118	0.000
15	80.00	1,621.34	11,244.6	0.899	0.100	0.000
16	70.00	1,887.29	13,267.3	0.689	0.087	0.000
17	60.00	2,173.42	15,407.4	0.508	0.073	0.000
18	50.00	2,479.75	17,660.0	0.356	0.059	0.000
19	40.00	3,541.25	20,020.7	0.233	0.045	0.000
20	30.00	3,979.66	22,486.1	0.140	0.033	0.000
21	20.00	4,443.15	25,056.1	0.070	0.022	0.000
22	10.00	4,931.65	27,720.8	0.023	0.011	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> INTO TOWER APEX *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE = 0 FT.
TOWER HEIGHT = 180.00 FT
WIND VELOCITY = 73.61 MPH
RADIAL ICE = 0.50 IN
NO. OF LEGS = 3
IMPORTANCE FACTOR = 1
TOP GIRT WIDTH = 8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	22.4	25.11	0.20	2.59	0.59	6.81	17.6	443
2	173	167	8.6	1.60	22.2	24.84	0.20	2.59	0.59	6.81	17.6	438
3	167	160	8.6	1.58	21.9	24.55	0.20	2.59	0.59	6.81	17.6	433
4	160	153	8.6	1.56	21.6	24.26	0.56	1.83	0.73	23.57	43.1	1047
5	153	147	8.6	1.54	21.4	23.96	0.61	1.80	0.76	26.28	47.3	1134
6	147	140	8.6	1.52	21.1	23.65	0.65	1.78	0.79	29.20	52.0	1231
7	140	133	9.3	1.50	20.8	23.33	0.65	1.78	0.78	30.09	53.6	1252
8	133	127	10.0	1.48	20.5	23.00	0.72	1.78	0.83	38.44	68.3	1572
9	127	120	10.8	1.46	20.2	22.66	0.78	1.80	0.88	47.42	85.4	1936
10	120	113	11.4	1.43	19.9	22.30	0.77	1.80	0.87	49.60	89.1	1987
11	113	107	12.1	1.41	19.6	21.93	0.73	1.78	0.84	48.11	85.7	1878
12	107	100	12.8	1.39	19.2	21.54	0.69	1.78	0.81	46.88	83.3	1794
13	100	90	14.1	1.35	18.8	21.03	0.66	1.78	0.79	69.87	124.4	2615
14	90	80	15.3	1.31	18.2	20.37	0.61	1.80	0.76	67.43	121.4	2474
15	80	70	16.6	1.26	17.5	19.66	0.56	1.83	0.73	65.60	120.2	2362
16	70	60	17.8	1.21	16.8	18.87	0.53	1.87	0.71	64.21	120.0	2265
17	60	50	19.1	1.16	16.1	17.99	0.50	1.90	0.70	63.88	121.6	2188
18	50	40	20.3	1.09	15.2	16.99	0.47	1.94	0.68	63.11	122.6	2084
19	40	30	21.6	1.02	14.1	15.81	0.46	1.96	0.68	65.69	128.4	2031
20	30	20	22.9	1.00	13.9	15.55	0.44	1.99	0.67	65.18	129.9	2019
21	20	10	24.1	1.00	13.9	15.55	0.43	2.01	0.66	66.93	134.5	2091
22	10	0	25.4	1.00	13.9	15.55	0.22	2.54	0.59	32.10	81.4	1266

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7	z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7)	h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2	V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag	e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4	Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57	Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar)	Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

****
* WIND DIRECTION ==> INTO TOWER APEX *
****

-- LOADS -- WIND INTO APEX 73.61 mph wind with 0.50 inch radial ice

ANTENNA LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)
180.00	25.25	6.70	169	144	+0.0
180.00	25.25	17.28	436	153	+0.0
180.00	25.25	16.59	419	984	+0.0
170.00	24.84	76.68	1904	864	+0.0
170.00	24.84	36.82	914	2315	+0.0
160.00	24.41	76.68	1872	864	+0.0
160.00	24.41	36.82	899	2315	+0.0
150.00	23.96	76.68	1838	864	+0.0
150.00	23.96	36.82	882	2315	+0.0
140.00	23.50	76.68	1802	864	+0.0
140.00	23.50	36.82	865	2315	+0.0
130.00	23.00	56.64	1303	480	+0.0
130.00	23.00	20.82	479	414	+0.0
130.00	23.00	36.82	847	2315	+0.0
110.00	21.93	39.00	855	672	+0.0
110.00	21.93	26.10	572	1500	+0.0
190.00	25.64	5.50	141	265	+0.0
185.00	25.44	11.00	280	289	+0.0

UNIFORM LOADS (LINEAR APPURT)

PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
8.940	7.66	180.0	170
44.700	38.32	170.0	160
8.940	7.66	160.0	150
26.820	22.99	150.0	130
8.940	7.66	130.0	110
12.320	13.07	110.0	8
2.100	1.52	190.0	8
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0
0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0
0.00	0.00	0.00	0

UNIFORM LOADS (STRUCTURE)

PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
35.760	61.32	160.00	150
44.700	76.65	150.00	140
44.700	107.31	140.00	130
71.520	183.95	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX

TOTAL TOWER LOADS AT BASE OF EACH SECTION
73.61 mph wind with 0.50 inch radial ice accumulation

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	7.42	15.15	2125	2.13	0.00	411	2.49
2	166.67	7.42	41.28	3736	5.86	0.00	411	6.41
3	160.00	7.42	84.35	3970	9.83	0.00	411	10.44
4	153.33	7.42	153.97	1225	11.06	0.00	639	11.72
5	146.67	7.42	241.35	4173	15.23	0.00	639	16.29
6	140.00	7.42	348.50	4353	19.58	0.00	639	20.96
7	133.33	8.05	484.72	1702	21.28	0.00	772	22.80
8	126.67	8.68	641.87	4508	25.79	0.00	805	28.09
9	120.00	9.31	820.82	2103	27.89	0.00	818	30.40
10	113.33	9.91	1013.95	2151	30.05	0.00	948	32.89
11	106.67	10.52	1225.86	3492	33.54	0.00	963	37.59
12	100.00	11.12	1456.12	2001	35.54	0.00	979	40.15
13	90.00	12.19	1826.10	2919	38.46	0.00	1839	44.39
14	80.00	13.26	2224.51	2767	41.22	0.00	1919	48.72
15	70.00	14.35	2649.99	2646	43.87	0.00	2321	53.47
16	60.00	15.44	3101.38	2537	46.41	0.00	2354	58.26
17	50.00	16.53	3577.70	2447	48.86	0.00	2501	63.22
18	40.00	17.62	4077.89	2329	51.18	0.00	2608	68.31
19	30.00	18.71	4601.02	2259	53.44	0.00	3082	73.93
20	20.00	19.80	5146.66	2243	55.69	0.00	3125	79.60
21	10.00	20.89	5715.10	2315	58.00	0.00	3754	85.97
22	0.00	21.98	6301.84	1311	59.31	0.00	3901	90.92

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 0.8 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 73.61 mph wind with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER LEG CAPACITY (allowable load)			TOWER LEG LOAD		LEG BOLTS	
SEC NO.	LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	0.90	1.21	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	2.29	3.43	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	4.75	7.90	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	9.32	16.86	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	14.86	27.12	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	21.68	40.01	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	30.70	52.64	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	38.53	64.60	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	46.70	78.03	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	54.65	91.33	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	63.07	104.05	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	71.35	117.58	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	79.59	135.01	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	90.55	151.51	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	101.18	166.84	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	111.29	181.45	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	121.10	195.38	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	130.63	208.69	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	140.04	221.27	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	149.18	233.38	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	158.31	244.92	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	166.94	256.40	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 256.40 KIPS COMPRESSION= 173.66 KIPS HORIZONTAL LOAD = 34.24 KIPS

****
* WIND DIRECTION FOR MAXIMUM LEG SPLICE BOLT TENSION *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 73.61 mph wind with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

SEC No.	TOWER DIAG CAPACITY (allowable load) DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER DIAG LOAD COMP (kips)	TENSION (kips)	DIAG BOLTS *ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.14	1.14	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.13	3.13	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	5.25	5.25	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	5.91	5.91	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	8.14	8.14	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	10.46	10.46	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	8.55	8.55	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	9.78	9.78	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	9.66	9.66	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	9.83	9.83	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	10.48	10.48	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	10.44	10.44	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	12.36	12.36	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	12.04	12.04	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	11.66	11.66	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	11.47	11.47	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	11.33	11.33	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	11.22	11.22	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	11.13	11.13	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	11.10	11.10	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	11.17	11.17	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	10.87	10.87	37.11	3- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 73.61 mph wind with 0.50 inch radial ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

SEC No.	TOWER GIRT CAPACITY (allowable load) GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER GIRT LOAD COMP (kips)	TENSION (kips)	GIRT BOLTS *ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.61	0.61	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	1.69	1.69	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	2.84	2.84	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.19	3.19	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	4.40	4.40	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	5.65	5.65	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	4.89	4.89	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	5.87	5.87	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	6.06	6.06	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	6.40	6.40	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	7.06	7.06	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	7.24	7.24	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	7.11	7.11	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	7.32	7.32	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	7.44	7.44	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	7.63	7.63	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	7.82	7.82	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	8.00	8.00	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	8.16	8.16	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	8.35	8.35	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	8.60	8.60	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	8.53	8.53	24.74	2- 3/4

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 73.61 mph wind with 0.50 inch radial ice

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	50.5	10.756	0.530	0.000
2	173.33	81.67	188.1	10.015	0.529	0.000
3	166.67	81.67	418.8	9.276	0.525	0.000
4	160.00	161.55	794.4	8.544	0.514	0.000
5	153.33	161.55	1,317.8	7.825	0.505	0.000
6	146.67	161.55	1,966.2	7.120	0.489	0.000
7	140.00	243.54	2,777.4	6.438	0.465	0.000
8	133.33	284.95	3,755.3	5.789	0.442	0.000
9	126.67	329.61	4,875.6	5.172	0.416	0.000
10	120.00	413.41	6,115.9	4.591	0.387	0.000
11	113.33	466.91	7,466.0	4.051	0.358	0.000
12	106.67	523.65	8,939.9	3.552	0.326	0.000
13	100.00	880.02	16,411.1	3.097	0.292	0.000
14	90.00	1,049.23	20,253.0	2.484	0.255	0.000
15	80.00	1,621.34	24,372.5	1.949	0.217	0.000
16	70.00	1,887.29	28,756.8	1.494	0.188	0.000
17	60.00	2,173.42	33,395.4	1.102	0.157	0.000
18	50.00	2,479.75	38,277.9	0.772	0.127	0.000
19	40.00	3,541.25	43,394.6	0.505	0.097	0.000
20	30.00	3,979.66	48,738.4	0.303	0.072	0.000
21	20.00	4,443.15	54,308.8	0.151	0.048	0.000
22	10.00	4,931.65	60,084.5	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND INTO APEX 50 mph wind with 0.50 inch radial ice

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	23.3	4.962	0.245	0.000
2	173.33	81.67	86.8	4.621	0.244	0.000
3	166.67	81.67	193.2	4.280	0.242	0.000
4	160.00	161.55	366.5	3.942	0.237	0.000
5	153.33	161.55	608.0	3.610	0.233	0.000
6	146.67	161.55	907.1	3.285	0.225	0.000
7	140.00	243.54	1,281.4	2.970	0.214	0.000
8	133.33	284.95	1,732.6	2.671	0.204	0.000
9	126.67	329.61	2,249.4	2.386	0.192	0.000
10	120.00	413.41	2,821.7	2.118	0.178	0.000
11	113.33	466.91	3,444.6	1.869	0.165	0.000
12	106.67	523.65	4,124.5	1.639	0.150	0.000
13	100.00	880.02	7,571.5	1.429	0.135	0.000
14	90.00	1,049.23	9,344.0	1.146	0.118	0.000
15	80.00	1,621.34	11,244.6	0.899	0.100	0.000
16	70.00	1,887.29	13,267.3	0.689	0.087	0.000
17	60.00	2,173.42	15,407.4	0.508	0.073	0.000
18	50.00	2,479.75	17,660.0	0.356	0.059	0.000
19	40.00	3,541.25	20,020.7	0.233	0.045	0.000
20	30.00	3,979.66	22,486.1	0.140	0.033	0.000
21	20.00	4,443.15	25,056.1	0.070	0.022	0.000
22	10.00	4,931.65	27,720.8	0.023	0.011	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

DESIGN STANDARD = ANSI/EIA/TIA-222 Rev F 1996 (ELECTRONICS INDUSTRY ASSOC)

****
* WIND DIRECTION ==> PARALLEL TO TOWER FACE *
****

*** TRIANGULAR TOWER ***

ELEVATION OF TOWER BASE ABOVE GRADE = 0 FT.
TOWER HEIGHT = 180.00 FT
WIND VELOCITY = 73.61 MPH
RADIAL ICE = 0.50 IN
NO. OF LEGS = 3
IMPORTANCE FACTOR = 1
TOP GIRT WIDTH = 8.5625 FT

WIND EXPOSURE C (per ASCE-7)

WIND LOAD ON EACH TOWER SECTION (tower structure only)

SEC. No.	ELEV (ft) FROM	TO	BASE WIDTH (ft)	Kz	Qz	WIND PRESSURE (psf)	e	Cf	Rr	Ae (ft^2)	TOTAL AREA (ft^2)	WIND FORCE (lb)
1	180	173	8.6	1.62	22.4	25.11	0.20	2.59	0.59	6.81	17.6	443
2	173	167	8.6	1.60	22.2	24.84	0.20	2.59	0.59	6.81	17.6	438
3	167	160	8.6	1.58	21.9	24.55	0.20	2.59	0.59	6.81	17.6	433
4	160	153	8.6	1.56	21.6	24.26	0.56	1.83	0.73	23.57	43.1	1047
5	153	147	8.6	1.54	21.4	23.96	0.61	1.80	0.76	26.28	47.3	1134
6	147	140	8.6	1.52	21.1	23.65	0.65	1.78	0.79	29.20	52.0	1231
7	140	133	9.3	1.50	20.8	23.33	0.65	1.78	0.78	30.09	53.6	1252
8	133	127	10.0	1.48	20.5	23.00	0.72	1.78	0.83	38.44	68.3	1572
9	127	120	10.8	1.46	20.2	22.66	0.78	1.80	0.88	47.42	85.4	1936
10	120	113	11.4	1.43	19.9	22.30	0.77	1.80	0.87	49.60	89.1	1987
11	113	107	12.1	1.41	19.6	21.93	0.73	1.78	0.84	48.11	85.7	1878
12	107	100	12.8	1.39	19.2	21.54	0.69	1.78	0.81	46.88	83.3	1794
13	100	90	14.1	1.35	18.8	21.03	0.66	1.78	0.79	69.87	124.4	2615
14	90	80	15.3	1.31	18.2	20.37	0.61	1.80	0.76	67.43	121.4	2474
15	80	70	16.6	1.26	17.5	19.66	0.56	1.83	0.73	65.60	120.2	2362
16	70	60	17.8	1.21	16.8	18.87	0.53	1.87	0.71	64.21	120.0	2265
17	60	50	19.1	1.16	16.1	17.99	0.50	1.90	0.70	63.88	121.6	2188
18	50	40	20.3	1.09	15.2	16.99	0.47	1.94	0.68	63.11	122.6	2084
19	40	30	21.6	1.02	14.1	15.81	0.46	1.96	0.68	65.69	128.4	2031
20	30	20	22.9	1.00	13.9	15.55	0.44	1.99	0.67	65.18	129.9	2019
21	20	10	24.1	1.00	13.9	15.55	0.43	2.01	0.66	66.93	134.5	2091
22	10	0	25.4	1.00	13.9	15.55	0.22	2.54	0.59	32.10	81.4	1266

GUST FACTOR = Gh = 1.121

Kz = (z/33)^2/7 — z = MIDSECTION HEIGHT ABOVE GRADE
Gh = 0.65 + 0.60/((h/33)^1/7) — h = ELEVATION AT TOP OF TOWER
Qz = 0.00256 * Kz * (I * V)^2 — V = BASIC WIND VELOCITY AT 33 ft
e = (Af + Ar)/Ag — e = SOLIDITY RATIO
Cf = 3.4 * e^2 - 4.7 * e + 3.4 — Cf = FORCE COEFFICIENT
Rr = 0.51 * e^2 + 0.57 — Rr = ROUND MEMBER SHAPE FACTOR
Ae = (Df * Af) + (Dr * Rr * Ar) — Ae = PROJECTED AREA OF ONE TOWER FACE

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

****
* WIND DIRECTION ==> PARALLEL TO TOWER FACE *
****

-- LOADS -- WIND PARALLEL TO FACE 73.61 mph with 0.50 inch radial ice

ANTENNA LOADS (DISCRETE APPURTENANCE)

UNIFORM LOADS (LINEAR APPURT)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Aa)	WIND FORCE (LB)	WT. (LB)	TORQUE (FT-K)	PROJECTED AREA (IN^2/FT) (Aa)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
180.00	25.25	6.70	169	144	+0.0	8.940	7.66	180.0	170
180.00	25.25	17.28	436	153	+0.0	44.700	38.32	170.0	160
180.00	25.25	16.59	419	984	+0.0	8.940	7.66	160.0	150
170.00	24.84	76.68	1904	864	+0.0	26.820	22.99	150.0	130
170.00	24.84	36.82	914	2315	+0.0	8.940	7.66	130.0	110
160.00	24.41	76.68	1872	864	+0.0	12.320	13.07	110.0	8
160.00	24.41	36.82	899	2315	+0.0	2.100	1.52	190.0	8
150.00	23.96	76.68	1838	864	+0.0	0.000	0.00	0.0	0
150.00	23.96	36.82	882	2315	+0.0	0.000	0.00	0.0	0
140.00	23.50	76.68	1802	864	+0.0	0.000	0.00	0.0	0
140.00	23.50	36.82	865	2315	+0.0	0.000	0.00	0.0	0
130.00	23.00	56.64	1303	480	+0.0	0.000	0.00	0.0	0
130.00	23.00	20.82	479	414	+0.0	0.000	0.00	0.0	0
130.00	23.00	36.82	847	2315	+0.0	0.000	0.00	0.0	0
110.00	21.93	39.00	855	672	+0.0	0.000	0.00	0.0	0
110.00	21.93	26.10	572	1500	+0.0	0.000	0.00	0.0	0
190.00	25.64	5.50	141	265	+0.0	0.000	0.00	0.0	0
185.00	25.44	11.00	280	289	+0.0	0.000	0.00	0.0	0

POINT LOADS (DISCRETE APPURTENANCE)

UNIFORM LOADS (STRUCTURE)

ELEV (FT) (Z)	WIND PRESSURE (PSF)	PROJECTED AREA (FT^2) (Ca Ac)	WT. (LB)	PROJECTED AREA (IN^2/FT) (Ar)	WT. (LB/FT)	ELEVATION (FT.) TOP	BOT
0.00	0.00	0.00	0	35.760	61.32	160.00	150
0.00	0.00	0.00	0	44.700	76.65	150.00	140
0.00	0.00	0.00	0	44.700	107.31	140.00	130
0.00	0.00	0.00	0	71.520	183.95	130.00	8

WIND FORCE ON ANTENNA & COAX = 0.00256 * Kz * Gh * (I * V)^2 * Ca * Aa
Equivalent Area for Microwave Antenna = (Ca/0.00256) * Area

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE

TOTAL TOWER LOADS AT BASE OF EACH SECTION
73.61 mph wind with 0.50 inch radial ice accumulation

SEC No.	ELEV (ft)	BASE SPREAD (ft)	TOTAL MOMENT (ft-k)	SECTION SHEAR (lbs)	TOTAL SHEAR (kips)	TOTAL TORQUE (ft-k)	SECTION STL WT (lbs)	TOTAL WEIGHT (kips)
1	173.33	8.56	15.15	2125	2.13	0.00	411	2.49
2	166.67	8.56	41.28	3736	5.86	0.00	411	6.41
3	160.00	8.56	84.35	3970	9.83	0.00	411	10.44
4	153.33	8.56	153.97	1225	11.06	0.00	639	11.72
5	146.67	8.56	241.35	4173	15.23	0.00	639	16.29
6	140.00	8.56	348.50	4353	19.58	0.00	639	20.96
7	133.33	9.29	484.72	1702	21.28	0.00	772	22.80
8	126.67	10.02	641.87	4508	25.79	0.00	805	28.09
9	120.00	10.75	820.82	2103	27.89	0.00	818	30.40
10	113.33	11.45	1013.95	2151	30.05	0.00	948	32.89
11	106.67	12.14	1225.86	3492	33.54	0.00	963	37.59
12	100.00	12.84	1456.12	2001	35.54	0.00	979	40.15
13	90.00	14.08	1826.10	2919	38.46	0.00	1839	44.39
14	80.00	15.31	2224.51	2767	41.22	0.00	1919	48.72
15	70.00	16.57	2649.99	2646	43.87	0.00	2321	53.47
16	60.00	17.83	3101.38	2537	46.41	0.00	2354	58.26
17	50.00	19.09	3577.70	2447	48.86	0.00	2501	63.22
18	40.00	20.34	4077.89	2329	51.18	0.00	2608	68.31
19	30.00	21.60	4601.02	2259	53.44	0.00	3082	73.93
20	20.00	22.86	5146.66	2243	55.69	0.00	3125	79.60
21	10.00	24.12	5715.10	2315	58.00	0.00	3754	85.97
22	0.00	25.38	6301.84	1311	59.31	0.00	3901	90.92

ESTIMATED TOTAL WEIGHT OF TOWER STEEL = 35.84 KIPS

Df = 0.85 Dr = 1.0

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 73.61 mph with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

LEG LOADS (KIPS) (Fy = 50.0 KSI)

SEC NO.	TOWER LEG CAPACITY (allowable load) LEG MEMBER SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER LEG LOAD COMP (kips)	TENSION (kips)	LEG BOLTS *ALLOW (kips)	BOLTS (size)
1	3.500x0.216 PIPE	69	62.88	1.50	0.94	0.00	NONE
2	3.500x0.216 PIPE	69	62.88	3.92	2.68	0.00	NONE
3	3.500x0.216 PIPE	69	62.88	8.23	6.37	141.11	4- 7/8
4	4.500x0.337 PIPE	54	139.18	16.15	14.07	0.00	NONE
5	4.500x0.337 PIPE	54	139.18	25.71	22.76	0.00	NONE
6	4.500x0.337 PIPE	54	139.18	37.52	33.72	184.31	4- 1
7	5.563x0.375 PIPE	44	206.35	51.66	44.57	0.00	NONE
8	5.563x0.375 PIPE	44	206.35	64.39	54.69	0.00	NONE
9	5.563x0.375 PIPE	44	206.35	77.80	66.22	276.46	6- 1
10	6.625x0.340 PIPE	36	236.12	90.94	77.62	0.00	NONE
11	6.625x0.340 PIPE	36	236.12	104.54	88.43	0.00	NONE
12	6.625x0.340 PIPE	36	236.12	118.12	100.03	276.46	6- 1
13	8.625x0.375 PIPE	41	332.60	132.86	114.94	0.00	NONE
14	8.625x0.375 PIPE	41	332.60	150.47	129.03	368.61	8- 1
15	8.625x0.500 PIPE	42	435.21	167.38	142.10	0.00	NONE
16	8.625x0.500 PIPE	42	435.21	183.49	154.54	368.61	8- 1
17	8.625x0.500 PIPE	42	435.21	199.06	166.38	0.00	NONE
18	8.625x0.500 PIPE	42	435.21	214.14	177.68	552.92	12- 1
19	10.75x0.500 PIPE	33	574.37	228.88	188.33	0.00	NONE
20	10.75x0.500 PIPE	33	574.37	243.19	198.56	552.92	12- 1
21	10.75x0.500 PIPE	33	574.37	257.35	208.26	0.00	NONE
22	10.75x0.500 PIPE	33	574.37	270.84	217.99	691.15	16-1

-- FOUNDATION REACTIONS --
UPLIFT= 217.99 KIPS COMPRESSION= 278.60 KIPS HORIZONTAL LOAD = 34.24 KIPS

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 73.61 mph with 0.50 inch ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

DIAG LOADS (KIPS) (Fy = 50.0 KSI)

	TOWER DIAG CAPACITY (allowable load)			TOWER DIAG LOAD		DIAG BOLTS	
SEC No.	DIAGONAL SIZE	L/r (K=1)	*ALLOW. (kips)	COMP (kips)	TENSION (kips)	*ALLOW (kips)	BOLTS (size)
1	2.375x0.154 PIPE	114.42	16.35	1.31	1.31	25.77	3- 5/8
2	2.375x0.154 PIPE	114.42	16.35	3.62	3.62	25.77	3- 5/8
3	2.375x0.154 PIPE	114.42	16.35	6.06	6.06	25.77	3- 5/8
4	2.375x0.218 PIPE	114.88	22.28	6.82	6.82	25.77	3- 5/8
5	2.375x0.218 PIPE	114.88	22.28	9.39	9.39	25.77	3- 5/8
6	2.375x0.218 PIPE	114.88	22.28	12.08	12.08	25.77	3- 5/8
7	2.375x0.218 PIPE	115.89	21.90	9.88	9.88	25.77	3- 5/8
8	2.375x0.218 PIPE	118.86	20.82	11.29	11.29	25.77	3- 5/8
9	2.375x0.218 PIPE	121.95	19.77	11.15	11.15	25.77	3- 5/8
10	2.875x0.203 PIPE	105.41	30.51	11.35	11.35	25.77	3- 5/8
11	2.875x0.203 PIPE	107.87	29.15	12.10	12.10	25.77	3- 5/8
12	2.875x0.203 PIPE	110.36	27.86	12.05	12.05	25.77	3- 5/8
13	3.500x0.216 PIPE	114.92	33.59	14.27	14.27	25.77	3- 5/8
14	3.500x0.216 PIPE	118.27	31.72	13.91	13.91	25.77	3- 5/8
15	3.500x0.216 PIPE	121.80	29.90	13.46	13.46	25.77	3- 5/8
16	3.500x0.216 PIPE	125.38	28.22	13.24	13.24	25.77	3- 5/8
17	3.500x0.216 PIPE	129.04	26.64	13.09	13.09	25.77	3- 5/8
18	3.500x0.216 PIPE	132.77	25.16	12.96	12.96	25.77	3- 5/8
19	3.500x0.216 PIPE	134.68	24.46	12.85	12.85	25.77	3- 5/8
20	3.500x0.216 PIPE	138.61	23.09	12.82	12.82	25.77	3- 5/8
21	4.000x0.318 PIPE	130.10	43.26	12.90	12.90	37.11	3- 3/4
22	4.000x0.318 PIPE	133.69	40.98	12.55	12.55	37.11	3- 3/4

****
* WIND DIRECTION FOR MAXIMUM DIAGONAL LOAD *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 73.61 mph with 0.50 inch radial ice

* MEANS ALLOWABLE STRESS INCREASED BY 1/3

GIRT LOADS (KIPS) (Fy = 50.0 KSI)
Loads Shown for Zero Force Girts represent 1-1/2% of the Leg Load

SEC No.	TOWER GIRT CAPACITY (allowable load) GIRT SIZE	L/r (K=1)	*ALLOW. (kips)	TOWER GIRT LOAD COMP (kips)	TENSION (kips)	GIRT BOLTS *ALLOW (kips)	BOLTS (size)
1	1.900x0.145 PIPE	99.85	15.71	0.71	0.71	17.18	2- 5/8
2	1.900x0.145 PIPE	99.85	15.71	1.95	1.95	17.18	2- 5/8
3	1.900x0.145 PIPE	99.85	15.71	3.28	3.28	17.18	2- 5/8
4	1.900x0.145 PIPE	99.45	15.81	3.69	3.69	17.18	2- 5/8
5	1.900x0.145 PIPE	99.45	15.81	5.08	5.08	17.18	2- 5/8
6	1.900x0.145 PIPE	99.45	15.81	6.53	6.53	17.18	2- 5/8
7	1.900x0.145 PIPE	99.02	15.92	5.65	5.65	17.18	2- 5/8
8	1.900x0.145 PIPE	102.54	15.04	6.78	6.78	17.18	2- 5/8
9	1.900x0.145 PIPE	106.05	14.15	7.00	7.00	17.18	2- 5/8
10	2.375x0.154 PIPE	98.87	21.45	7.39	7.39	17.18	2- 5/8
11	2.375x0.154 PIPE	101.52	20.57	8.15	8.15	17.18	2- 5/8
12	2.375x0.154 PIPE	104.18	19.67	8.36	8.36	17.18	2- 5/8
13	2.375x0.154 PIPE	106.19	18.98	8.21	8.21	17.18	2- 5/8
14	2.375x0.154 PIPE	110.91	17.31	8.45	8.45	17.18	2- 5/8
15	2.375x0.154 PIPE	115.62	16.01	8.59	8.59	17.18	2- 5/8
16	2.375x0.154 PIPE	120.51	14.74	8.81	8.81	17.18	2- 5/8
17	2.875x0.203 PIPE	114.18	26.03	9.03	9.03	17.18	2- 5/8
18	2.875x0.203 PIPE	118.16	24.30	9.24	9.24	17.18	2- 5/8
19	2.875x0.203 PIPE	121.95	22.81	9.43	9.43	17.18	2- 5/8
20	2.875x0.203 PIPE	126.86	21.08	9.65	9.65	17.18	2- 5/8
21	3.500x0.216 PIPE	116.64	32.61	9.93	9.93	24.74	2- 3/4
22	3.500x0.216 PIPE	119.88	30.87	9.85	9.85	24.74	2- 3/4

****
* WIND DIRECTION FOR MAXIMUM GIRT LOAD *
****

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 73.61 mph with 0.50 inch radial ice

-- Deflection, Sway & twist --

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	50.5	10.756	0.530	0.000
2	173.33	81.67	188.1	10.015	0.529	0.000
3	166.67	81.67	418.8	9.276	0.525	0.000
4	160.00	161.55	794.4	8.544	0.514	0.000
5	153.33	161.55	1,317.8	7.825	0.505	0.000
6	146.67	161.55	1,966.2	7.120	0.489	0.000
7	140.00	243.54	2,777.4	6.438	0.465	0.000
8	133.33	284.95	3,755.3	5.789	0.442	0.000
9	126.67	329.61	4,875.6	5.172	0.416	0.000
10	120.00	413.41	6,115.9	4.591	0.387	0.000
11	113.33	466.91	7,466.0	4.051	0.358	0.000
12	106.67	523.65	8,939.9	3.552	0.326	0.000
13	100.00	880.02	16,411.1	3.097	0.292	0.000
14	90.00	1,049.23	20,253.0	2.484	0.255	0.000
15	80.00	1,621.34	24,372.5	1.949	0.217	0.000
16	70.00	1,887.29	28,756.8	1.494	0.188	0.000
17	60.00	2,173.42	33,395.4	1.102	0.157	0.000
18	50.00	2,479.75	38,277.9	0.772	0.127	0.000
19	40.00	3,541.25	43,394.6	0.505	0.097	0.000
20	30.00	3,979.66	48,738.4	0.303	0.072	0.000
21	20.00	4,443.15	54,308.8	0.151	0.048	0.000
22	10.00	4,931.65	60,084.5	0.050	0.024	0.000

EXISTING 180-FT SELF SUPPORT TOWER N MADISON CT FOR WMNR (#A02-T030)

-- OUTPUT -- WIND PARALLEL TO FACE 50 mph with 0.50 inch radial ice

-- Deflection, Sway & twist based upon 50 MPH Wind--

SECTION NO.	ELEV (ft)	AVG MOMENT OF INERTIA (ft^2-in^2)	MOMENT AREA (ft^2-K)	DEFLECTION (inches)	SWAY (deg)	TWIST (deg)
1	180.00	81.67	23.3	4.962	0.245	0.000
2	173.33	81.67	86.8	4.621	0.244	0.000
3	166.67	81.67	193.2	4.280	0.242	0.000
4	160.00	161.55	366.5	3.942	0.237	0.000
5	153.33	161.55	608.0	3.610	0.233	0.000
6	146.67	161.55	907.1	3.285	0.225	0.000
7	140.00	243.54	1,281.4	2.970	0.214	0.000
8	133.33	284.95	1,732.6	2.671	0.204	0.000
9	126.67	329.61	2,249.4	2.386	0.192	0.000
10	120.00	413.41	2,821.7	2.118	0.178	0.000
11	113.33	466.91	3,444.6	1.869	0.165	0.000
12	106.67	523.65	4,124.5	1.639	0.150	0.000
13	100.00	880.02	7,571.5	1.429	0.135	0.000
14	90.00	1,049.23	9,344.0	1.146	0.118	0.000
15	80.00	1,621.34	11,244.6	0.899	0.100	0.000
16	70.00	1,887.29	13,267.3	0.689	0.087	0.000
17	60.00	2,173.42	15,407.4	0.508	0.073	0.000
18	50.00	2,479.75	17,660.0	0.356	0.059	0.000
19	40.00	3,541.25	20,020.7	0.233	0.045	0.000
20	30.00	3,979.66	22,486.1	0.140	0.033	0.000
21	20.00	4,443.15	25,056.1	0.070	0.022	0.000
22	10.00	4,931.65	27,720.8	0.023	0.011	0.000

CT 666.1

542

SELF-SUPPORTING TOWER REPORT

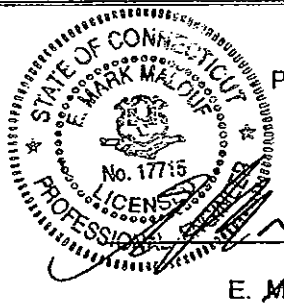
Structural Analysis Report

Proposed Antennae Configuration
Existing 180 ft. Self-Supporting Tower
NORTH MADISON VFD SITE # NYC0018A
Madison, Connecticut

MEI PROJECT # 00-538

For

METRICOM, INC.
Plano, Texas



Prepared by:

E. Mark Malouf, PE
Registered Professional Engineer
Connecticut # 17715

June 13, 2000

MALOUF ENGINEERING INTL., INC.
STRUCTURAL CONSULTANTS

275 W. CAMPBELL RD., SUITE 611 ■ RICHARDSON, TEXAS 75080-3549 ■ TEL. 972 -783-2578 FAX 972-783-2583
www.mei1inc.com

Table of Contents

I. SUMMARY

A stress analysis was performed by MEI as requested and authorized by Mr. Jay Ditsworth, MetriCom, Inc. and Alan Saccente, WFI, to determine whether the existing tower will be in compliance with the TIA/EIA 222-F Standard when supporting the provided proposed antenna configuration. The different report sections detail the applicable information used in this evaluation, relating to the tower data, the antenna configuration and the wind and ice loading considered.

Based on the analysis results, the tower member stresses are in conformance with the TIA/EIA 222F Standard for the loading considered.

II. TOWER HISTORY / DATA

The following tower information has been made available or is known to MEI :

	Type of Information
Site Address	864 Open Hill Road, Madison, CT 06443
Tower Owner & Site No.	NORTH MADISON FIRE DEPARTMENT, Madison, CT
Original Designer Fabricator	UNR-ROHN – PEORIA, ILLINOIS
Origination Date	1998
Tower Model & Configuration	*180 ft. SSMW* – Triangular cross-section made of bolted sections and a fixed base. Face width varying from 25'-4 9/16" C.L. at the base to 12'-10 1/16" c.l. at Elev. 100' then to 8'-6 3/4" at Elev. 140 and then straight to the top with K lacing configuration. The tower base is on relatively level ground.
Original Wind & Ice Requirements	TIA/EIA-222 – F – 90 Mph + 1/2" Ice
Tower History / Prior Structural Modification	No details available. No known prior structural modification.

INFORMATION SUPPLIED FOR ANALYSIS:

All tower information used in the analysis was obtained as follows:

	Supplied By	*Type of Information*
Tower Mast	METRICOM – JAY DITSWORTH	Original Tower Manufacturer Drawings, Rohn file # 35130AE and drwg # A982923, dated 11/25/98 were made available.
Antennas	METRICOM – JAY DITSWORTH	Existing antenna information as per original design and photos provided with Metricom WAP Candidate Form. Proposed antenna information as per list supplied with original data.
Foundation	METRICOM – JAY DITSWORTH	Original Foundation as per Rohn drwg # A982942-1 dated 11/30/98 and Soil data as per Rohn foundation notes.

Tower and antenna data used in analysis is based on and is as accurate as the data furnished/obtained. Please review tower model and antenna configuration and if any discrepancies are noted, please notify MEI.

MATERIALS INFORMATION USED IN ANALYSIS:

The following material properties were used for this structural analysis:

Legs *	Pipe – 50 KSI Yield Strength
Diagonals *	Pipe – 50 KSI Yield Strength
Horizontals *	Pipe – 50 KSI Yield Strength
Redundant Braces *	Not Applicable
Leg Splice & Lacing Bolts *	A-325 High Strength grade

* = As per Rohn file # 35130AE and drwg # A982923, dated 11/25/98.

ASSUMPTIONS:

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
- The antenna configuration is as supplied and/or as stated in the analysis section. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained in accordance with the TIA/EIA Standard and/or its original manufacturer and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, to have been properly installed and to be fully effective.

MEI recommends that an assessment of the actual condition of the tower be performed by qualified personnel. Please contact MEI for a checklist.

III. ANALYSIS

The purpose of this independent stress analysis review is to determine that the existing tower member design is in conformance to the ANSI/TIA/EIA 222-F Standard requirements for the proposed antennae loads installation by METRICOM, INC.

The proprietary Self-Supporter Tower Computer Program provides a complete and rigorous analysis based on a pin-joint, three-dimensional, cantilevered truss type structure with a fixed base. The computer program analyzes triangular or square self-supporting towers with round, angle or bent plate members. The wind is applied in three directions (Wind A - Face Wind, Wind B - Apex Wind, Wind C - Parallel Wind) to all members with the shape factors as required according to code. This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities. Refer to the related section in this report for a listing of the assumptions made.

The subject tower is analyzed for conformance with the following:

Minimum Code Requirements	*New Haven County Area, Connecticut* ANSI/TIA/EIA 222-F Standard *85 Mph basic wind speed*
Present Analysis	ANSI/TIA/EIA 222-F Standard – June 1996
Basic wind speed Used	*85 Mph with and without 1/2" Ice with 25% reduction for simultaneous wind and ice condition*

ANTENNA LOADS

The following antenna loading configuration was considered:

ELEVATION	APPURTENANCES DESCRIPTION	TENANT NAME	LOCATION	TRANSMISSION LINES
Ft - AGL	PROPOSED		Azimuth	
110.0	*(16) LARSEN ISM Dual Band Panel Antennas + (3) 12' Antenna Booms (max. mounts CaAa = 48 ft² total)*	*METRICOM*	*0°, 120°, 240°*	*(1) 2" Dia. Conduit*
	EXISTING / FUTURE			
180.0	Lightning Rod		L1 /	
180.0	(3) PD455 Ants + (3) 6' Side Arm Mounts		L1 / L2 / L3	(3) 1-5/8" Dia.
170.0	(12) ALP9212N Ants + (3) 15' Frame Mounts		L1 / L2 / L3	(12) 1-5/8" Dia.
160.0	(12) ALP9212N Ants + (3) 15' Frame Mounts		L1 / L2 / L3	(12) 1-5/8" Dia.
150.0	(12) ALP9212N Ants + (3) 15' Frame Mounts		L1 / L2 / L3	(12) 1-5/8" Dia.
140.0	(12) ALP9212N Ants + (3) 15' Frame Mounts		L1 / L2 / L3	(12) 1-5/8" Dia.

Notes:

1. *The 2" conduit contains the 1/2 " Ethernet cables for the MetriCom ISM antennas*
2. If any shielding is taken on the transmission lines, it is as per field data obtained / supplied.
3. Location is numbered using following convention: L1 = leg # clockwise ; F12 = face between Legs 1 & 2.
4. The above antennas, mounts, and lines represent MEI's understanding of the proposed antenna configuration. If different than above, the analysis is invalid. Please refer to the appendix for projected wind areas used in the calculations for antennas and mounts. Please contact MEI if any discrepancies are found. Additional re-analysis charges may be incurred.

IV. RESULTS

The existing self-supporting tower is analyzed with the antennae configuration loading as stated in Section III and as per ANSI/TIA/EIA 222-F Standard requirements.

The results of the computer structural analysis indicated the following:

MEMBERS	RESULTS
LEGS	All Members Are **Satisfactory** *Maximum Stress Ratio = 72.9% at Elev. .00' - 10.00'*
DIAGONALS	All Members Are **Satisfactory** *Maximum Stress Ratio = 92.1% at Elev. 20.00' - 30.00'*
HORIZONTALS	All Members Are **Satisfactory** *Maximum Stress Ratio = 76.7% at Elev. 60.00' - 70.00'*
FOUNDATION	Based on Data Available – **Satisfactory**
TWIST/SWAY	**Not Applicable**

Notes:

1. The percent of *Overstress* (OS) is the percentage that the maximum load in the member is above the allowable load as determined by Code requirements (which already includes the applicable allowed stress increase).
2. Refer to the Appendix for more details on the tower member loads.
3. NG = Not Good / Not Satisfactory ; Acceptable = max. stress ratio between 100% to 105%; SF = Safety Factor.
4. *Basic Wind Speed is the Fastest-mile wind speed (a sustained type of wind) and is not a Gusting wind speed (short duration gust wind of 3-second duration in general).*

V. FINDINGS

- Based on the computer structural analysis results, *the existing self-supporting tower mast does meet the requirements of ANSI/TIA/EIA 222-F Standard for a basic wind speed of 85 Mph with 0" Ice and 73.9 Mph with 1/2" Ice for the antennae configuration considered without structural modification.*
- Based on the analysis results, the *tower members are below their allowable capacities* at all elevations (see pg. 6) at the wind loading considered. Refer to the Graphical Results Diagrams in Appendix 2 for visual depictions of the analysis results.
- Based on the data available and soil parameters used, the existing foundation is *satisfactory* for the new base reactions.
- This analysis considered the transmission lines to be properly supported and to be located at the appropriate wind exposure as per data available. The proposed 2" conduit transmission line can be attached to the existing waveguide ladder and are to be properly supported and tied.
- All tower and antenna data is based on information supplied by WFI and therefore, the analysis results are based on and as accurate as that supplied data.
- *The tower mast is near its maximum support capacity (92.1% max. stress ratio) at this wind loading; however, no additional loads besides the antenna configuration considered should be installed without further structural evaluation.*

VI. RECOMMENDATIONS

- *The existing tower member stresses are in conformance with the TIA/EIA 222-F Standard for the wind loading considered while supporting the previously stated antenna configuration loads.*
- *Install the new MetriCom panel antennas at elevation 110 ft. c.l. AGL using 12 ft Nudd Antenna Boom Mounts (mounts CaAa = 48 ft^2 total) and use existing waveguide ladder/support for the new MetriCom conduit line which are to be properly supported and tied. Install accordingly*

Installation procedures and loading are not with the scope of this report and should be performed and evaluated by a competent tower erection contractor.

VII. REPORT SCOPE & LIMITATIONS

The engineering services rendered by MALOUF ENGINEERING INTERNATIONAL, INC. ('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.

The information and conclusions contained in this report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae, and MEI assumes no obligation to revise any of the information or conclusions contained in this report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

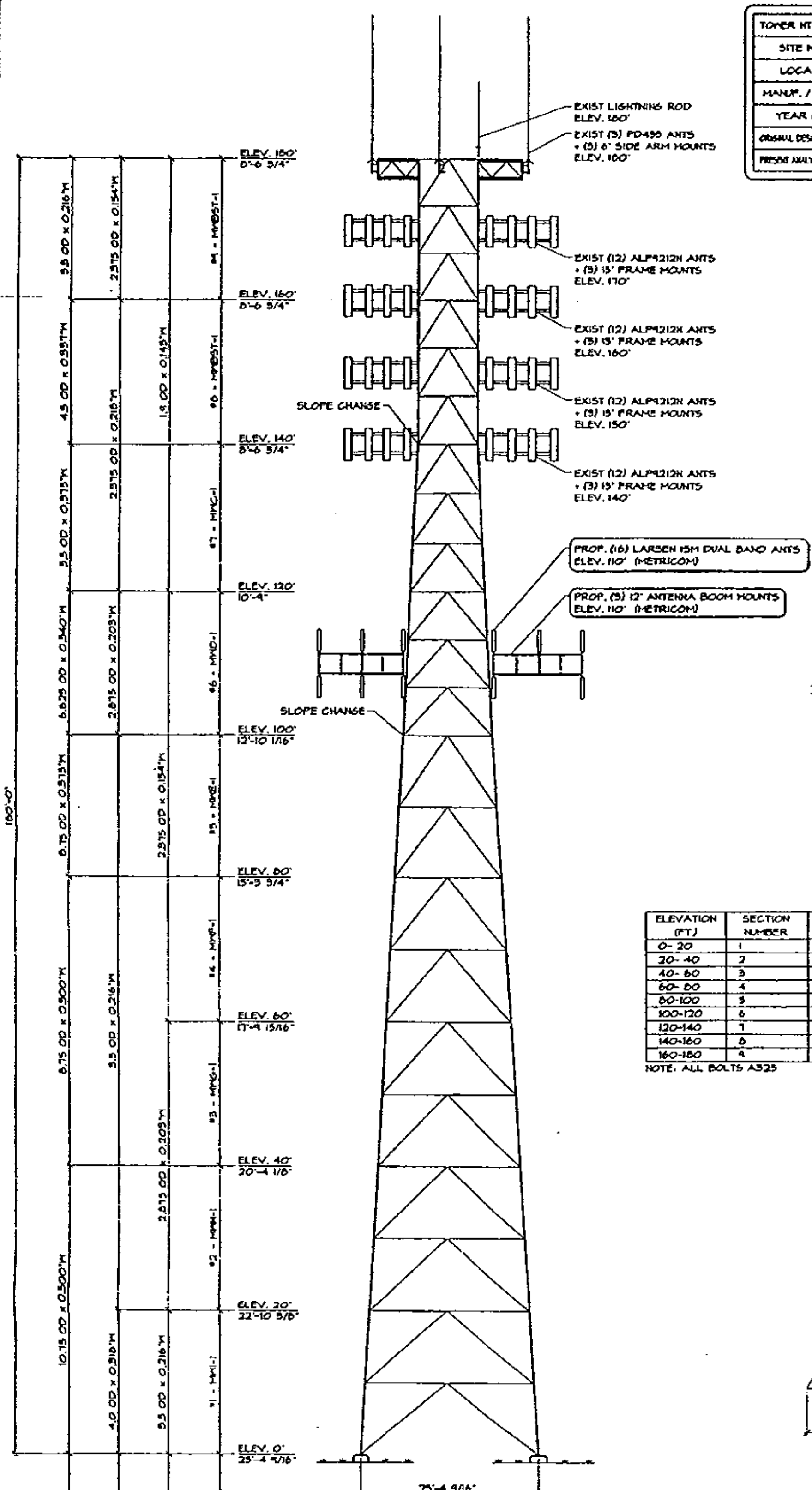
MEI makes no warranties, expressed or implied in connection with this Report and disclaims any liability arising from original design, material, fabrication, and erection deficiencies or the "As-Built" condition of this tower. MEI will not be responsible whatsoever for or on account of consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this Report. The maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC. pursuant to this Report shall be limited to the total fee received for the preparation of this Report.

Installation procedures and loading are not within the scope of this report and should be performed and evaluated by a competent tower erection contractor. Modification Design is Not within the scope of this report. The tower reinforcement design and detailing can be performed by MEI under a new consulting agreement.

APPENDIX - 1

TOWER ELEVATION DRAWING

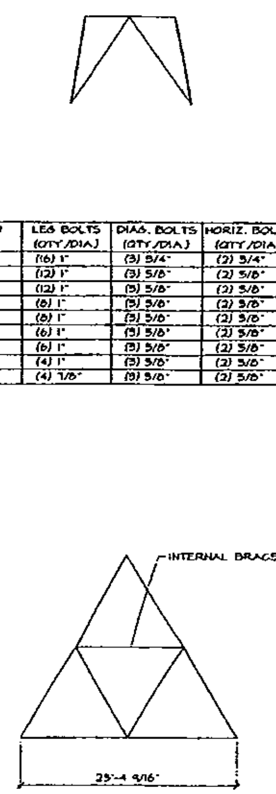
TOWER HT. & TYPE:	180' S.S. TOWER
SITE NAME:	NYCOO18A-MADISON
LOCATION:	MADISON, CT
MANUF. / MODEL:	ROHN/SSMW
YEAR BUILT:	1999
ORIGINAL DESIGN CRITERIA:	TIA/EIA F- 90 MPH + 1/2" ICE
PRESENT ANALYSIS CRITERIA:	TIA/EIA-222-F - 85 MPH + 1/2" ICE



101 **ELEVATION: 180' S.S. TOWER**

SCALE: 1" = 15'

TYPICAL LACING CONFIGURATIONS



ELEVATION (FT)	SECTION NUMBER	LEG BOLTS (QTY/DIA)	DIAG. BOLTS (QTY/DIA)	HORIZ. BOLTS (QTY/DIA)
0- 20	1	(6) 1"	(3) 3/4"	(2) 3/4"
20- 40	2	(12) 1"	(3) 5/8"	(2) 5/8"
40- 60	3	(12) 1"	(3) 5/8"	(2) 5/8"
60- 80	4	(8) 1"	(3) 5/8"	(2) 5/8"
80-100	5	(8) 1"	(3) 5/8"	(2) 5/8"
100-120	6	(6) 1"	(3) 5/8"	(2) 5/8"
120-140	7	(6) 1"	(3) 5/8"	(2) 5/8"
140-160	8	(4) 1"	(3) 5/8"	(2) 5/8"
160-180	9	(4) 7/8"	(3) 5/8"	(2) 5/8"

NOTE: ALL BOLTS A325

SHEET NO 1 OF 1

DATE 06/12/00

JOB NO 00-538

REVISIONS

DRAWN BY: JMG

ENG'D. BY: JMG

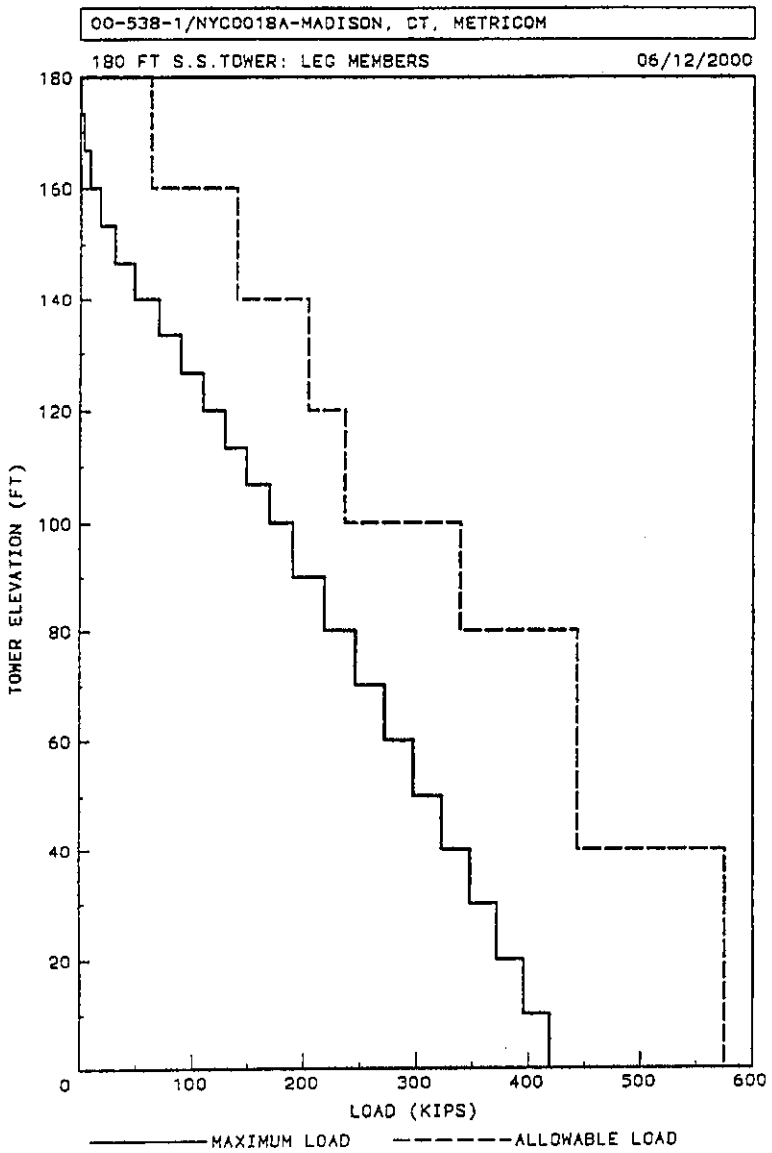
APP'D. BY: MM

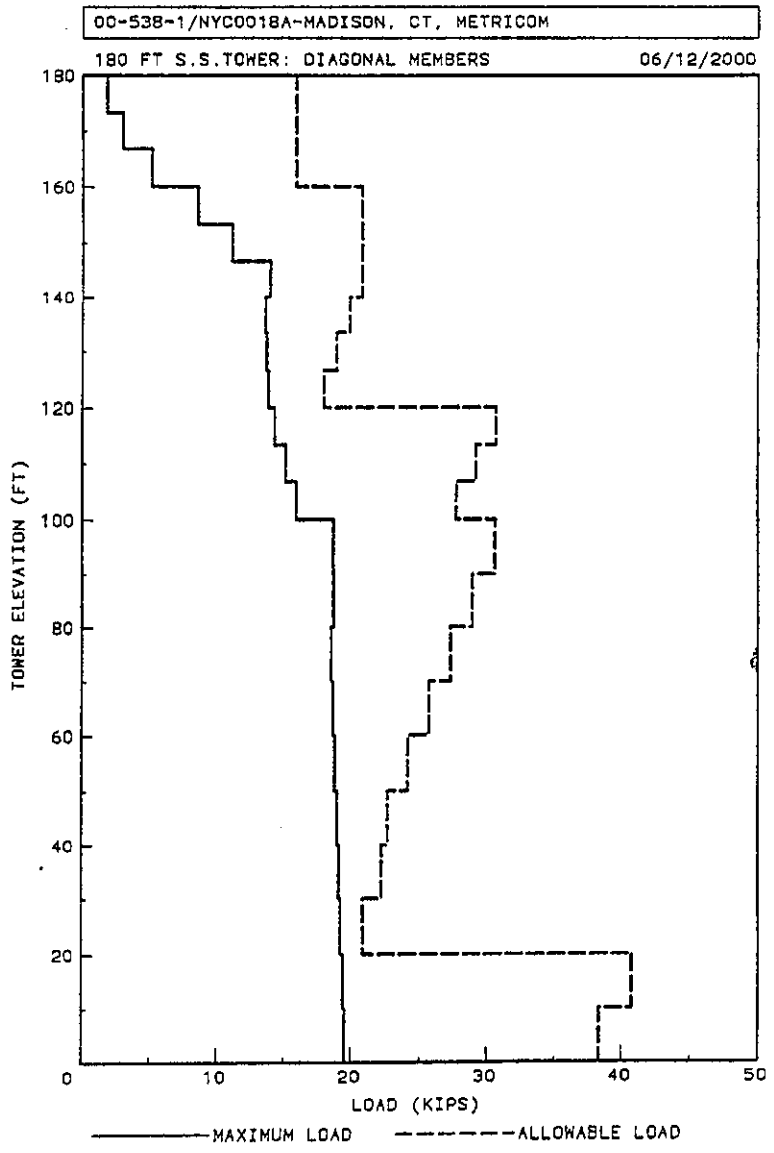
TOWER ELEVATION AND SECTION
180' S.S. TOWER - NYCOO18A-MADISON
METRICOM, INC
PLANO TX

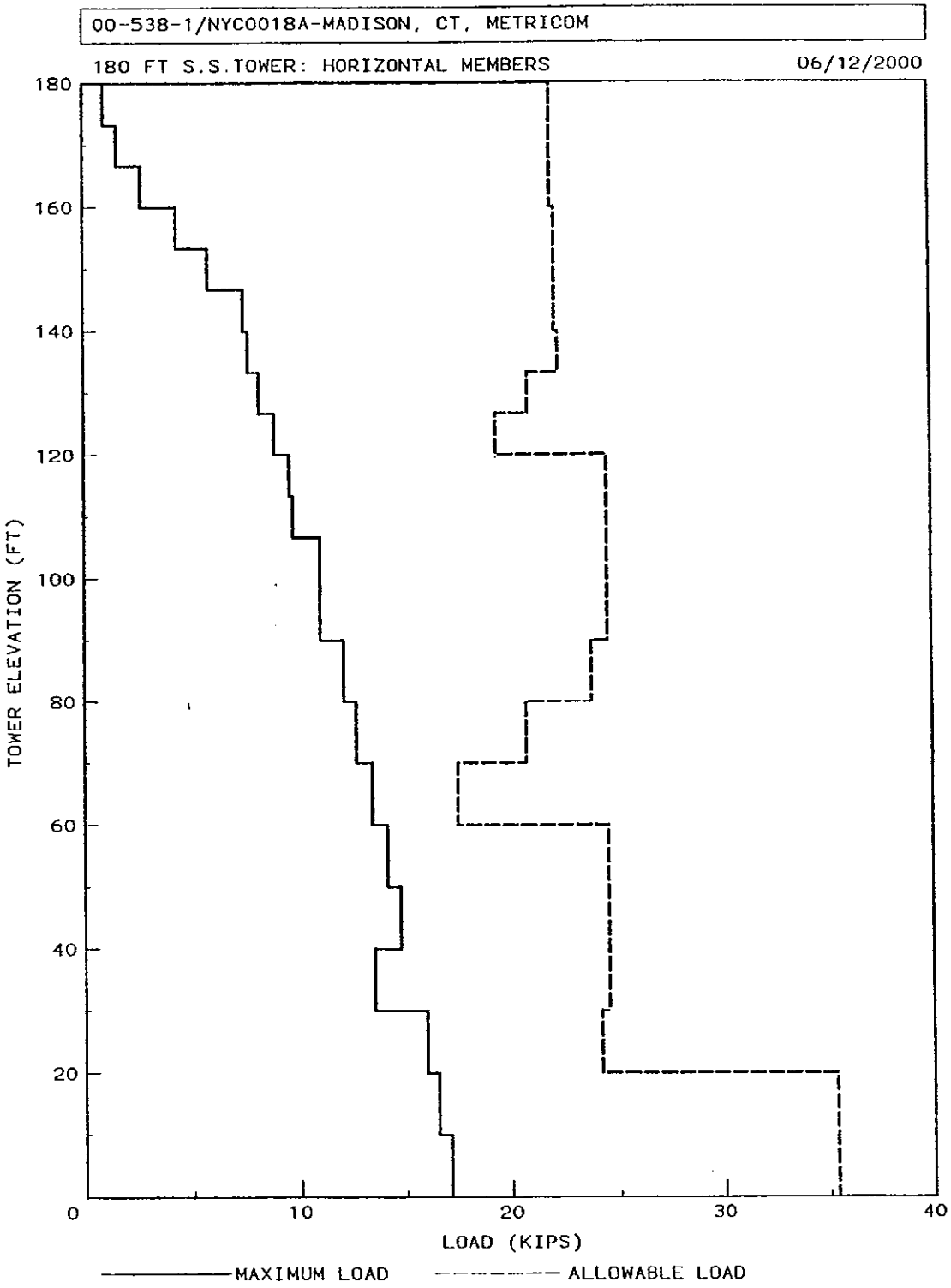
MALOUF ENGINEERING INT'L, INC.
STRUCTURAL CONSULTANTS
275 W. CAMPBELL RD. SUITE 611
RICHARDSON, TEXAS 75080-3549
Tel 972-783-2578 Fax 972-783-2583

APPENDIX - 2

GRAPHICAL RESULTS DIAGRAMS


00-538-1/NYC0018A-MADISON, CT, METRICOM
180 FT S.S.TOWER: LEG MEMBERS
06/12/2000
TOWER ELEVATION (FT)
0
20
40
60
80
100
120
140
160
180
100
200
300
400
500
600
LOAD (KIPS)
MAXIMUM LOAD
ALLOWABLE LOAD


00-538-1/NYC0018A-MADISON, CT, METRICOM
180 FT S.S.TOWER: DIAGONAL MEMBERS
06/12/2000
TOWER ELEVATION (FT)
0
20
40
60
80
100
120
140
160
180
10
20
30
40
50
LOAD (KIPS)
MAXIMUM LOAD
ALLOWABLE LOAD


00-538-1/NYC0018A-MADISON, CT, METRICOM
180 FT S.S.TOWER: HORIZONTAL MEMBERS
06/12/2000
TOWER ELEVATION (FT)
180
160
140
120
100
80
60
40
20
0
10
20
30
40
LOAD (KIPS)
MAXIMUM LOAD
ALLOWABLE LOAD

APPENDIX - 3

PROPOSED ANTENNA CONFIGURATION

STRUCTURAL ANALYSIS COMPUTER PRINTOUT

ANALYSIS PRINTOUT

```
SSTICE.A1                                                    ST24F44
************************************************************
*         SELF-SUPPORTING TOWER COMPUTER ANALYSIS          *
*         (c) 1999, Malouf Engineering Intl., Inc.         *
************************************************************

MEI JOB NO.       : 00-538-1
SITE NAME         : NYC0018A-MADISON
SITE LOCATION     : MADISON,CT / NEW HAVEN COUNTY
CLIENT NAME       : METRICOM, INC
CLIENT LOCATION   : PLANO,TX
TOWER DESCR.      : ROHN/SSMW - 1999
ORIGINAL DESIGN   : TIA/EIA F- 90 MPH + 1/2" ICE

TOWER DESCRIPTION
-----------------
<COMMENTS>
TOWER OWNER IS N. MADISON FIRE DEPT.
TOWER ANALYSIS FOR METRICOM.
PLEASE REFER TO TOWER MAST FOR ANT. LISTING.
FACE WIDTH OF TOWER IS APPROXIMATE AND IS BASED ON TYPICAL ROHN TOWERS.

<PROPERTIES>
TOWER HEIGHT          =  180.0 FT
TOWER SHAPE           =  TRIANGULAR
BASE TYPE             =  FIXED
LEGS          50ksi   =  /  TUBULAR  /
DIAGONALS     50ksi   =  /  TUBULAR  /
HORIZONTALS   50ksi   =  /  TUBULAR  /
CODE REVISION         =  TIA/EIA 222-F
BASIC WIND VELOCITY   =  85.0 MPH
ICE CONDITION         =   .50 IN. OF SOLID ICE
LOAD REDUCTION        =  25% FOR SIMULTANEOUS WIND & ICE LOADING
ALLOWABLE STRESS      =  1/3 INCREASE
*RESULTS INCLUDE ALSO NO ICE CONDITION WITH NO LOAD REDUCTION

ANALYSIS AND INPUTS BY
----------------------
J GEORGE,EIT / M. MALOUF, PE
MALOUF ENGINEERING INTL, Inc.
275 W.Campbell Rd., Suite 611
Richardson, Texas 75080-3549
TEL:972-783-2578

RUN DATE  : 06/12/2000
RUN TIME  : 15:14:24.85
INPUT FILE: 00-538-1.DAT
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************************************************************************************
                          TOWER CONFIGURATION DATA
************************************************************************************
TOWER SHAPE        = TRIANGULAR
TOWER HEIGHT       =  180.0 FT
NUMBER OF SECTIONS =      9
BASE WIDTH         = 25.380 FT
TOP WIDTH          =  8.563 FT
------------------------------------------------------------------------------------
 160.0 - 180.0 FT --> **|MWBST-1|****** SECTION 9: 160-180' ***
SECTION   9: HEIGHT = 20.0 FT, 3 BAYS, BOT/TOP WIDTHS =  8.563  8.563 FT

BAY HEIGHT=  6.667 FT, EQUIVALENT BAYS= 3, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 2.375 2.375  .154 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 1.900 1.900  .145 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  4 x  .875 A325
------------------------------------------------------------------------------------
 140.0 - 160.0 FT --> **|MWBST-1|****** SECTION 8: 140-160' ***
SECTION   8: HEIGHT = 20.0 FT, 3 BAYS, BOT/TOP WIDTHS =  8.563  8.563 FT

BAY HEIGHT=  6.667 FT, EQUIVALENT BAYS= 3, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 4.500 4.500  .337 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 2.375 2.375  .218 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 1.900 1.900  .145 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  4 x 1.000 A325
------------------------------------------------------------------------------------
 120.0 - 140.0 FT --> **|MWC-1|****** SECTION 7: 120-140' ***
SECTION   7: HEIGHT = 20.0 FT, 3 BAYS, BOT/TOP WIDTHS = 10.750  8.563 FT

BAY HEIGHT=  6.667 FT, EQUIVALENT BAYS= 3, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 5.500 5.500  .375 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 2.375 2.375  .218 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 1.900 1.900  .145 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  6 x 1.000 A325
------------------------------------------------------------------------------------
 100.0 - 120.0 FT --> **|MWD-1|****** SECTION 6: 100-120' ***
SECTION   6: HEIGHT = 20.0 FT, 3 BAYS, BOT/TOP WIDTHS = 12.840 10.750 FT

BAY HEIGHT=  6.667 FT, EQUIVALENT BAYS= 3, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 6.625 6.625  .340 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 2.875 2.875  .203 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 2.375 2.375  .154 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  6 x 1.000 A325
------------------------------------------------------------------------------------
  80.0 - 100.0 FT --> **|MWE-1|****** SECTION 5: 80-100' ***
SECTION   5: HEIGHT = 20.0 FT, 2 BAYS, BOT/TOP WIDTHS = 15.310 12.840 FT

BAY HEIGHT= 10.000 FT, EQUIVALENT BAYS= 2, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 8.750 8.750  .375 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 2.375 2.375  .154 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  8 x 1.000 A325
------------------------------------------------------------------------------------
```

```
  60.0 -  80.0 FT --> **|MWF-1|****** SECTION 4: 60-80' ***
SECTION   4: HEIGHT = 20.0 FT, 2 BAYS, BOT/TOP WIDTHS = 17.827 15.310 FT

BAY HEIGHT= 10.000 FT, EQUIVALENT BAYS= 2, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 8.750 8.750  .500 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 2.375 2.375  .154 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE :  8 x 1.000 A325
-------------------------------------------------------------------------------
  40.0 -  60.0 FT --> **|MWG-1|****** SECTION 3: 40-60' ***
SECTION   3: HEIGHT = 20.0 FT, 2 BAYS, BOT/TOP WIDTHS = 20.345 17.827 FT

BAY HEIGHT= 10.000 FT, EQUIVALENT BAYS= 2, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE= 8.750 8.750  .500 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 2.875 2.875  .203 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE : 12 x 1.000 A325
-------------------------------------------------------------------------------
  20.0 -  40.0 FT --> **|MWH-1|****** SECTION 2: 20-40' ***
SECTION   2: HEIGHT = 20.0 FT, 2 BAYS, BOT/TOP WIDTHS = 22.862 20.345 FT

BAY HEIGHT= 10.000 FT, EQUIVALENT BAYS= 2, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE=10.75010.750  .500 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .625 A325
HOR(PI): SIZE= 2.875 2.875  .203 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .625 A325

SPLICE : 12 x 1.000 A325
-------------------------------------------------------------------------------
   .0 -  20.0 FT --> **|MWI-1|****** SECTION 1: 0-20' ***
SECTION   1: HEIGHT = 20.0 FT, 2 BAYS, BOT/TOP WIDTHS = 25.380 22.862 FT

BAY HEIGHT= 10.000 FT, EQUIVALENT BAYS= 2, CONF/MEM=  1 3, INT.BRACE(H/D)= 1/0
LEG(PI): SIZE=10.75010.750  .500 IN, FY=50.KSI, XF/YF= 1.00 1.00
DIA(PI): SIZE= 4.000 4.000  .318 IN, FY=50.KSI, XF/YF= 1.00 1.00, 30  .750 A325
HOR(PI): SIZE= 3.500 3.500  .216 IN, FY=50.KSI, XF/YF= 1.00 1.00, 23  .750 A325

SPLICE : 16 x 1.000 A325
-------------------------------------------------------------------------------
BAY WIDTH OFFSET FOR DIAG./HORZ. VARIES FROM 4.0" TO 12.0" (DEPENDING ON THE
SIZE OF THE LEG), MEASURED FROM THE INSIDE OF THE LEG MEMBERS
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ANTENNA LOAD CALCULATIONS

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INDIVIDUAL LINE LOADS

LINE TYPE	OUTSIDE DIA.(IN)	WEIGHT (LBS/FT)	EXPOSURE (NO ICE)	EXPOSURE (+ICE)	BEG.Span (FT)	END.Span (FT)
3- MISC.	.75	1.00	1.00	1.00	.00	180.00
1- MISC. WEIGHT	.00	15.00	1.00	1.00	.00	180.00
1- Waveguide Ladder	2.25	7.50	1.00	1.00	10.00	180.00
3- 1-5/8" Dia.	1.98	1.08	1.00	1.00	.00	180.00
12- 1-5/8" Dia.	1.98	1.08	1.00	1.00	.00	170.00
1- Waveguide Ladder	2.25	7.50	1.00	1.00	10.00	160.00
12- 1-5/8" Dia.	1.98	1.08	1.00	1.00	.00	160.00
1- Waveguide Ladder	2.25	7.50	1.00	1.00	10.00	150.00
12- 1-5/8" Dia.	1.98	1.08	1.00	1.00	.00	150.00
1- Waveguide Ladder	2.25	7.50	1.00	1.00	10.00	140.00
12- 1-5/8" Dia.	1.98	1.08	1.00	1.00	.00	140.00
1- 2" Dia. Conduit	2.38	3.65	1.00	1.00	.00	110.00

UNIFORM LOADING FROM LINES

Elevation (ft)	NO ICE CaAa (ft2/ft)	NO ICE Unif.Wt (plf)	NO ICE Weight (kips)	+ ICE CaAa (ft2/ft)	+ ICE Unif.Wt (plf)	+ ICE Weight (kips)
170.00 - 180.00	1.044	28.740	.287	1.844	37.719	.377
160.00 - 170.00	3.420	41.700	.417	5.420	69.184	.692
150.00 - 160.00	6.021	62.160	.622	9.321	109.858	1.099
140.00 - 150.00	8.622	82.620	.826	13.222	150.533	1.505
110.00 - 140.00	11.223	103.080	3.092	17.123	191.208	5.736
10.00 - 110.00	11.460	106.730	10.673	17.461	196.645	19.665
.00 - 10.00	10.561	76.730	.767	16.161	159.806	1.598

TOTAL WEIGHT FROM LINES = 16.685 KIPS (NO ICE), 30.672 KIPS (+ ICE)

ANTENNA LOADS: (R=000/120/240)

This program calculates wind loads based on location in 12 directions for triangular towers and uses the maximum loads for different wind direction type, i.e. face, apex, or parallel. TOA = .0 DEG

Dir=	0	30	60	90	120	150	180	210	240	270	300	330
# 1 ELEV 180.0 FT / TYPE = MISC. ANT (EXIST LIGHTNING ROD (ASSUMED)) LOC= 1												
CaAa= 3.0 ft2 W= .050k OFF= .00ft Az= .0 LVR= 4.00ft Ice.F= 1.75												
HOR K	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
(+ICE)	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
(+ICE)	.53	.53	.53	.53	.53	.53	.53	.53	.53	.53	.53	.53

ANALYSIS PRINTOUT

# 2 ELEV 180.0 FT / TYPE = MISC. ANT (EXIST (3) PD455 ANTS) LOC= 1
CaAa= 11.0 ft2 W= .075k OFF= .00ft Az= .0 LVR= 11.00ft Ice.F= 2.00

HOR K	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37	.37
(+ICE)	.56	.56	.56	.56	.56	.56	.56	.56	.56	.56	.56	.56
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07
(+ICE)	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11

# 3 ELEV 180.0 FT / TYPE = MISC. ANT (EXIST (3) 6' SIDE ARMS) LOC= 1
CaAa= 24.0 ft2 W= .700k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.33

HOR K	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81
(+ICE)	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81	.81
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 4 ELEV 170.0 FT / TYPE = MISC. ANT (EXIST (12) ALP9212N ANTS) LOC= 1
CaAa= 47.0 ft2 W= .350k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.09

HOR K	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
(+ICE)	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 5 ELEV 170.0 FT / TYPE = MISC. ANT (EXIST (3) 15' FRAME MOUNTS) LOC= 1
CaAa= 72.0 ft2 W= 1.500k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.33

HOR K	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
(+ICE)	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 6 ELEV 160.0 FT / TYPE = MISC. ANT (EXIST (12) ALP9212N ANTS) LOC= 1
CaAa= 47.0 ft2 W= .350k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.09

HOR K	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
(+ICE)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 7 ELEV 160.0 FT / TYPE = MISC. ANT (EXIST (3) 15' FRAME MOUNTS) LOC= 1
CaAa= 72.0 ft2 W= 1.500k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.33

HOR K	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
(+ICE)	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 8 ELEV 150.0 FT / TYPE = MISC. ANT (EXIST (12) ALP9212N ANTS) LOC= 1
CaAa= 47.0 ft2 W= .350k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.09

HOR K	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
(+ICE)	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 9 ELEV 150.0 FT / TYPE = MISC. ANT (EXIST (3) 15' FRAME MOUNTS) LOC= 1
CaAa= 72.0 ft2 W= 1.500k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.33

HOR K	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
(+ICE)	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 10 ELEV 140.0 FT / TYPE = MISC. ANT (EXIST (12) ALP9212N ANTS) LOC= 1
CaAa= 47.0 ft2 W= .350k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.09

HOR K	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
(+ICE)	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 11 ELEV 140.0 FT / TYPE = MISC. ANT (EXIST (3) 15' FRAME MOUNTS) LOC= 1
CaAa= 72.0 ft2 W= 1.500k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.33

HOR K	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
(+ICE)	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 12 ELEV 110.0 FT / TYPE = MISC. ANT (PROP. (16) LARSEN PANEL ANTS) LOC= 1
CaAa= 36.0 ft2 W= .336k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.17

HOR K	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
(+ICE)	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

# 13 ELEV 110.0 FT / TYPE = MISC. ANT (PROP. (3)12'ANTENNA BOOM MNTS) LOC= 1
CaAa= 48.0 ft2 W= 1.200k OFF= .00ft Az= .0 LVR= .00ft Ice.F= 1.25

HOR K	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
(+ICE)	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
TOR '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MOM '-K	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(+ICE)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

ANALYSIS PRINTOUT

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ANALYSIS RESULTS SUMMARIES

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GENERAL TOWER INFORMATION (NO ICE)

SEC	ELEV (FT)	FACE WIDTH (FT)	SR	QZ*GH (PSF)	HORZ. SHEAR (KIPS)	BEND. MOMNT (K-FT)	VERT. FORCE (KIPS)	SWAY (DEG)	TWIST (DEG)	APPURTENANCES CaAa FT2/FT	APPURTENANCES WEIGHT LB/FT	APPURTENANCES AE FT2/FT
9	180.0	8.6										
	173.3	8.6	.15	33.48	1.97	15.5	1.41	.000	.000	1.044	28.7	.00
	166.7	8.6	.15	33.48	7.12	46.1	3.93	.002	.000	3.420	41.7	.00
8	160.0	8.6	.15	33.12	12.78	99.7	6.59	.007	.000	6.021	62.2	.00
	153.3	8.6	.17	32.74	14.58	191.2	7.61	.012	.000	6.021	62.2	.00
	146.7	8.6	.17	32.35	20.73	309.1	10.62	.022	.000	8.622	82.6	.00
7	140.0	8.6	.17	31.95	27.33	457.1	13.77	.039	.000	11.223	103.1	.00
	133.3	9.3	.18	31.54	30.22	649.2	15.18	.057	.000	11.223	103.1	.00
	126.7	10.0	.17	31.11	33.08	860.4	16.61	.079	.000	11.223	103.1	.00
6	120.0	10.8	.16	30.67	35.92	1090.6	18.04	.105	.000	11.223	103.1	.00
	113.3	11.4	.19	30.22	38.82	1340.1	19.61	.129	.000	11.223	103.1	.00
	106.7	12.1	.18	29.74	44.20	1617.2	22.76	.156	.000	11.460	106.7	.00
5	100.0	12.8	.17	29.24	47.09	1921.9	24.38	.185	.000	11.460	106.7	.00
	90.0	14.1	.18	28.59	51.45	2415.2	27.15	.217	.000	11.460	106.7	.00
4	80.0	15.3	.17	28.04	55.76	2951.9	29.95	.249	.000	11.460	106.7	.00
	70.0	16.6	.16	27.17	59.97	3531.2	33.11	.275	.000	11.460	106.7	.00
3	60.0	17.8	.15	26.21	64.06	4152.1	36.29	.301	.000	11.460	106.7	.00
	50.0	19.1	.15	25.16	68.04	4813.5	39.62	.328	.000	11.460	106.7	.00
2	40.0	20.3	.14	23.99	71.87	5513.9	42.99	.355	.000	11.460	106.7	.00
	30.0	21.6	.15	22.65	75.61	6252.2	46.73	.377	.000	11.460	106.7	.00
1	20.0	22.9	.14	21.08	79.12	7026.7	50.51	.399	.000	11.460	106.7	.00
	10.0	24.1	.15	20.73	82.67	7836.8	54.92	.422	.000	11.460	106.7	.00
	.0	25.4	.14	20.73	86.06	8681.6	59.09	.444	.000	10.561	76.7	.00

GENERAL TOWER INFORMATION (+ ICE)

SEC	ELEV (FT)	FACE WIDTH (FT)	SR	0.75x QZ*GH (PSF)	HORZ. SHEAR (KIPS)	BEND. MOMNT (K-FT)	VERT. FORCE (KIPS)	SWAY (DEG)	TWIST (DEG)	APPURTENANCES CaAa FT2/FT	APPURTENANCES WEIGHT LB/FT	APPURTENANCES AE FT2/FT
9	180.0	8.6										
	173.3	8.6	.20	25.11	2.25	19.4	1.98	.000	.000	1.844	37.7	.00
	166.7	8.6	.20	25.11	7.25	51.3	5.38	.002	.000	5.420	69.2	.00
8	160.0	8.6	.20	24.84	12.82	106.4	9.05	.008	.000	9.321	109.9	.00
	153.3	8.6	.22	24.55	14.81	198.8	10.57	.013	.000	9.321	109.9	.00
	146.7	8.6	.22	24.26	20.93	318.2	14.73	.024	.000	13.222	150.5	.00
7	140.0	8.6	.22	23.96	27.58	468.6	19.17	.041	.000	17.123	191.2	.00
	133.3	9.3	.23	23.66	30.76	663.3	21.36	.060	.000	17.123	191.2	.00
	126.7	10.0	.22	23.34	33.93	879.2	23.57	.083	.000	17.123	191.2	.00
6	120.0	10.8	.21	23.00	37.06	1116.1	25.80	.108	.000	17.123	191.2	.00
	113.3	11.4	.23	22.66	40.22	1374.0	28.20	.134	.000	17.123	191.2	.00
	106.7	12.1	.22	22.30	45.65	1660.6	32.55	.161	.000	17.461	196.6	.00
5	100.0	12.8	.21	21.93	48.79	1975.8	35.03	.191	.000	17.461	196.6	.00
	90.0	14.1	.22	21.44	53.48	2487.7	39.11	.223	.000	17.461	196.6	.00
4	80.0	15.3	.20	21.03	58.11	3046.3	43.23	.257	.000	17.461	196.6	.00
	70.0	16.6	.19	20.37	62.62	3650.6	47.72	.284	.000	17.461	196.6	.00
3	60.0	17.8	.18	19.66	67.00	4299.4	52.24	.311	.000	17.461	196.6	.00
	50.0	19.1	.18	18.87	71.26	4991.6	56.94	.339	.000	17.461	196.6	.00
2	40.0	20.3	.17	17.99	75.34	5725.5	61.70	.367	.000	17.461	196.6	.00
	30.0	21.6	.18	16.99	79.30	6499.6	66.87	.389	.000	17.461	196.6	.00
1	20.0	22.9	.17	15.81	83.01	7312.0	72.10	.412	.000	17.461	196.6	.00
	10.0	24.1	.18	15.55	86.73	8161.7	78.03	.436	.000	17.461	196.6	.00
	.0	25.4	.17	15.55	90.28	9047.8	83.67	.459	.000	16.161	159.8	.00

FOUNDATION REACTIONS

	NO ICE	+ICE		
VERTICAL DOWN FORCE =	414.679	439.536	KIPS	(MAXIMUM PER LEG)
UPLIFT FORCE =	375.286	383.755	KIPS	(MAXIMUM PER LEG)
HORIZONTAL FORCE =	43.030	45.138	KIPS	(MAXIMUM PER LEG)
OVERTURNING MOMENT =	8681.614	9047.848	FT-KIPS	(TOTAL)

MEMBER SUMMARIES

LEG MEMBER LOADS

SECT NO.	ELEV (FT)	MEMBER DESCRIPT.	/FY (KSI)	L.EFF (FT)	MAX.LD KIPS-WD		ALLOW.LD KIPS-IC		STRESS RATIO		CONF
9	173.3 180.0	PI 3.5000	.2160	/50 6.67	.66	B	62.89	0 I	.010		1/3
	166.7 173.3	PI 3.5000	.2160	/50 6.67	3.27	A	62.89	0 I	.052		1/3
	160.0 166.7	PI 3.5000	.2160	/50 6.67	8.71	A	62.89	0 I	.138		1/3
	SPLICE 0	4 X .875	A325		5.12	A	89.14	1 i	.057		
8	153.3 160.0	PI 4.5000	.3370	/50 6.67	17.37	A	139.20	0 I	.125		1/3
	146.7 153.3	PI 4.5000	.3370	/50 6.67	30.33	A	139.20	0 I	.218		1/3
	140.0 146.7	PI 4.5000	.3370	/50 6.67	47.82	A	139.20	0 I	.344		1/3
	SPLICE 0	4 X 1.000	A325		38.14	A	176.30	1	.216		
7	133.3 140.0	PI 5.5000	.3750	/50 6.69	69.79	A	203.14	0 I	.344		1/3
	126.7 133.3	PI 5.5000	.3750	/50 6.69	89.82	A	203.14	0 i	.442		1/3
	120.0 126.7	PI 5.5000	.3750	/50 6.69	109.49	A	203.14	0 i	.539		1/3
	SPLICE 0	6 X 1.000	A325		93.61	A	241.51	1	.388		
6	113.3 120.0	PI 6.6250	.3400	/50 6.68	128.83	A	236.07	0 i	.546		1/3
	106.7 113.3	PI 6.6250	.3400	/50 6.68	148.41	A	236.07	0 i	.629		1/3
	100.0 106.7	PI 6.6250	.3400	/50 6.68	169.22	A	236.07	0 i	.717		1/3
	SPLICE 0	6 X 1.000	A325		147.06	A	268.53	1 i	.548		
5	90.0 100.0	PI 8.7500	.3750	/50 10.0	190.08	A	338.65	0 i	.561		1/3
	80.0 90.0	PI 8.7500	.3750	/50 10.0	217.96	A	338.65	0 i	.644		1/3
	SPLICE 0	8 X 1.000	A325		191.05	A	368.61	2 i	.518		
4	70.0 80.0	PI 8.7500	.5000	/50 10.0	245.13	A	443.35	0 i	.553		1/3
	60.0 70.0	PI 8.7500	.5000	/50 10.0	271.39	A	443.35	0 I	.612		1/3
	SPLICE 0	8 X 1.000	A325		238.51	A	368.61	2 i	.647		
3	50.0 60.0	PI 8.7500	.5000	/50 10.0	297.06	A	443.35	0 I	.670		1/3
	40.0 50.0	PI 8.7500	.5000	/50 10.0	322.24	A	443.35	0 I	.727		1/3
	SPLICE 0	12 X 1.000	A325		283.01	A	518.36	1 i	.546		
2	30.0 40.0	PI 10.7500	.5000	/50 10.0	346.89	A	574.21	0 I	.604		1/3
	20.0 30.0	PI 10.7500	.5000	/50 10.0	371.15	A	574.21	0 I	.646		1/3
	SPLICE 0	12 X 1.000	A325		325.10	A	552.91	2 i	.588		
1	10.0 20.0	PI 10.7500	.5000	/50 10.0	394.89	A	574.21	0 I	.688		1/3
	.0 10.0	PI 10.7500	.5000	/50 10.0	418.37	A	574.21	0 I	.729		1/3
	SPLICE 0	16 X 1.000	A325		364.70	A	644.03	1 i	.566		

WD= CONTROLLING WIND DIRECTION FOR MAXIMUM LOAD
IC= CAPACITY CODE(0=COMP;1=MEM.GOVERNS SPLICE;2=BOLTS GOV.SPL;3=PLATE GOV.SPL)
NOTE: STRESS RATIOS PRECEDED BY I=ICE GOVERNS BY MORE THAN 5%, i= LESS THAN 5%

DIAGONAL MEMBER LOADS

SECT NO.	ELEV (FT)	MEMBER DESCRIPT.	/FY (KSI)	L.EFF (FT)	MAX.LD KIPS-WD		ALLOW.LD KIPS-IC		STRESS RATIO	NB	DIA (IN)	ID
9	173.3 180.0	PI 2.3750	.1540	/50 7.63	1.79	C	15.80	1 I	.113	30	.625	1
	166.7 173.3	PI 2.3750	.1540	/50 7.63	2.95	C	15.80	1 i	.187	30	.625	1
	160.0 166.7	PI 2.3750	.1540	/50 7.63	5.11	C	15.80	1 i	.323	30	.625	1
8	153.3 160.0	PI 2.3750	.2180	/50 7.61	8.54	C	20.70	1 i	.413	30	.625	1
	146.7 153.3	PI 2.3750	.2180	/50 7.61	11.05	C	20.70	1 i	.534	30	.625	1
	140.0 146.7	PI 2.3750	.2180	/50 7.61	13.92	C	20.70	1 i	.672	30	.625	1
7	133.3 140.0	PI 2.3750	.2180	/50 7.78	13.54	C	19.81	1 i	.683	30	.625	1
	126.7 133.3	PI 2.3750	.2180	/50 7.98	13.64	C	18.86	1 i	.723	30	.625	1
	120.0 126.7	PI 2.3750	.2180	/50 8.18	13.77	C	17.93	1 i	.768	30	.625	1
6	113.3 120.0	PI 2.8750	.2030	/50 8.31	14.25	C	30.60	1 i	.466	30	.625	1
	106.7 113.3	PI 2.8750	.2030	/50 8.52	15.07	C	29.13	1 i	.517	30	.625	1
	100.0 106.7	PI 2.8750	.2030	/50 8.74	15.85	C	27.67	1 i	.573	30	.625	1
5	90.0 100.0	PI 3.5000	.2160	/50 11.7	18.64	C	30.57	1 i	.610	30	.625	1
	80.0 90.0	PI 3.5000	.2160	/50 12.0	18.66	C	28.92	1 i	.645	30	.625	1
4	70.0 80.0	PI 3.5000	.2160	/50 12.4	18.49	C	27.27	1 I	.678	30	.625	1
	60.0 70.0	PI 3.5000	.2160	/50 12.7	18.61	C	25.67	1 I	.725	30	.625	1
3	50.0 60.0	PI 3.5000	.2160	/50 13.1	18.76	C	24.14	1 I	.777	30	.625	1
	40.0 50.0	PI 3.5000	.2160	/50 13.6	18.92	C	22.68	1 I	.834	30	.625	1
2	30.0 40.0	PI 3.5000	.2160	/50 13.7	19.07	C	22.20	1 I	.859	30	.625	1
	20.0 30.0	PI 3.5000	.2160	/50 14.1	19.21	C	20.85	1 I	.921	30	.625	1
1	10.0 20.0	PI 4.0000	.3180	/50 14.6	19.36	C	40.76	1 I	.475	30	.750	1
	.0 10.0	PI 4.0000	.3180	/50 15.1	19.53	C	38.29	1 I	.510	30	.750	1

WD= CONTROLLING WIND DIRECTION FOR MAXIMUM LOAD
IC= CAPACITY CODE (0=TEN.MEMBER; 1=COMP.MEMBER; 2=BOLT SHEAR; 3=BOLT BEARING)
NOTE: STRESS RATIOS PRECEDED BY I=ICE GOVERNS BY MORE THAN 5%, i= LESS THAN 5%

HORIZONTAL MEMBER LOADS

SECT NO.	ELEV (FT)	MEMBER DESCRIPT./FY (KSI)	L.EFF (FT)	MAX.LD KIPS-WD		ALLOW.LD KIPS-IC		STRESS RATIO	NB	DIA (IN)	ID
173.3	180.0	PI 1.9000	.1450 /50	3.72	.97	C	21.99 1	I .044	23	.625	1
166.7	173.3	PI 1.9000	.1450 /50	3.72	1.60	C	21.99 1	I .073	23	.625	1
160.0	166.7	PI 1.9000	.1450 /50	3.72	2.68	C	21.99 1	.122	23	.625	1
153.3	160.0	PI 1.9000	.1450 /50	3.68	4.32	B	22.15 1	.195	23	.625	1
146.7	153.3	PI 1.9000	.1450 /50	3.68	5.79	B	22.15 1	i .261	23	.625	1
140.0	146.7	PI 1.9000	.1450 /50	3.68	7.52	C	22.15 1	i .340	23	.625	1
133.3	140.0	PI 1.9000	.1450 /50	3.64	7.74	C	22.30 1	i .347	23	.625	1
126.7	133.3	PI 1.9000	.1450 /50	4.00	8.23	B	20.88 1	.394	23	.625	1
120.0	126.7	PI 1.9000	.1450 /50	4.36	8.93	B	19.37 1	i .461	23	.625	1
113.3	120.0	PI 2.3750	.1540 /50	4.60	9.62	B	24.54 2	i .392	23	.625	1
106.7	113.3	PI 2.3750	.1540 /50	4.95	9.78	C	24.54 2	.398	23	.625	1
100.0	106.7	PI 2.3750	.1540 /50	5.30	11.03	B	24.54 2	.449	23	.625	1
90.0	100.0	PI 2.3750	.1540 /50	5.39	11.03	B	24.54 2	.449	23	.625	1
80.0	90.0	PI 2.3750	.1540 /50	6.01	12.11	B	23.78 1	I .509	23	.625	1
70.0	80.0	PI 2.3750	.1540 /50	6.62	12.71	B	20.74 1	i .613	23	.625	1
60.0	70.0	PI 2.3750	.1540 /50	7.25	13.42	B	17.50 1	I .767	23	.625	1
50.0	60.0	PI 2.8750	.2030 /50	7.88	14.12	B	24.54 2	I .575	23	.625	1
40.0	50.0	PI 2.8750	.2030 /50	8.51	14.77	B	24.54 2	I .602	23	.625	1
30.0	40.0	PI 2.8750	.2030 /50	8.72	13.49	B	24.54 2	i .550	23	.625	1
20.0	30.0	PI 2.8750	.2030 /50	9.35	15.98	B	24.17 1	I .661	23	.625	1
10.0	20.0	PI 3.5000	.2160 /50	9.98	16.54	B	35.34 2	I .468	23	.750	1
.0	10.0	PI 3.5000	.2160 /50	10.6	17.08	B	35.34 2	I .483	23	.750	1

WD= CONTROLLING WIND DIRECTION FOR MAXIMUM LOAD
IC= CAPACITY CODE (0=TEN.MEMBER; 1=COMP.MEMBER; 2=BOLT SHEAR; 3=BOLT BEARING)
NOTE: STRESS RATIOS PRECEDED BY I=ICE GOVERNS BY MORE THAN 5%, i= LESS THAN 5%

ANALYSIS PRINTOUT

```
Version: FDN2-D58/AK
 ***********************************************************
 *                FOUNDATION ANALYSIS PROGRAM              *
 *                        Pier Analysis                    *
 *          (c) 1999, Malouf Engineering Intl., Inc.       *
 ***********************************************************

 ---------------------------------------------------------------------------
 MEI JOB NUMBER = 00-538
 DESCRIPTION    = 180 FT SS TOWER
 SITE NAME      = MADISON, CT
 CLIENT NAME    = METRICOM
 TIME/DATE/FILE = 15:28:12 / 06-12-2000 / 00-538-1.dat
 ---------------------------------------------------------------------------

 =====================
  INPUT DATA
 =====================
 *LOADS*                                    | ORIGINAL DESIGN
 COMPRESSION FORCE              =  414.679 KIPS    |   517.100 KIPS
 UPLIFT FORCE                   =  375.286 KIPS    |   441.200 KIPS
 SHEAR FORCE                    =   43.030 KIPS    |    66.300 KIPS
 MOMENT                         =     .000 KIP-FT  |      .000 KIP-FT

 *PIER DIMENSIONS AND PROPERTIES*
 PIER DEPTH                     =   25.000 FT
 PIER DIAMETER                  =    6.000 FT
 EXTENSION ABOVE GRADE          =     .500 FT

 *FACTOR OF SAFETY VALUES*
 F.O.S. BEARING PRESSURE        =    2.000
 F.O.S. PASSIVE PRESSURE        =    2.000
 F.O.S. CONCRETE WEIGHT         =    1.250
 F.O.S. SOIL WEIGHT             =    1.500
 F.O.S. SKIN FRICTION (UPLIFT)  =    2.000
 F.O.S. SKIN FRICTION (DOWNLD)  =    2.000

 *SOIL LAYER DATA*  (WATER DEPTH=   .0FT)
 ---------------------------------------------------------------------------
                    |                          ULT.    ULT.   SOIL CONCR. ULT.
   DESCRIPTION      | THK DEPTH  PHI     Cu PASS.PR SKIN FR DENS. DENS.  Q
                    |  ft    ft  deg    ksf    kcf     ksf    kcf   kcf  ksf
                    |
 1 NEGLECT          | 8.0   8.0   .0   .000   .043*   .000   .043  .088   .0
 2                  | 6.0  14.0 30.0   .000   .298*   .600   .043  .088  2.0
 3                  | 6.0  20.0 28.0   .000   .393*  3.000   .043  .088  2.0
 4                  | 5.0  25.0 28.0   .000   .590*  4.000   .043  .088 30.0
 ---------------------------------------------------------------------------
 * PASSIVE PRESSURE COMPUTED BASED ON SOIL FRICTION AND COHESION

 *** COMMENTS ***
 SOIL PARAMETERS PER ROHN FOUNDATION CALCULATIONS

 =====================
  RESULTS
 =====================
 **COMPARISON WITH ORIGINAL DESIGN LOADS**
 ORIGINAL COMPRESSION   =   517.1 KIPS >     414.7 KIPS (OK)    R=  .802
 ORIGINAL UPLIFT        =   441.2 KIPS >     375.3 KIPS (OK)    R=  .851
 ORIGINAL SHEAR         =    66.3 KIPS >      43.0 KIPS (OK)    R=  .649

 WT./VOL. OF SOIL ABOVE =      .0 KIPS /     .000 FT3
 WT./VOL. OF CONCRETE PIER =  64.0 KIPS /  720.996 FT3

 SKIN RESISTANCE        =   392.1 KIPS (ALLOWABLE)
 TIP BEARING CAPACITY   =   424.1 KIPS (ALLOWABLE)

 UPLIFT CAPACITY OF PIER =  443.3 KIPS >     375.3 KIPS (OK)    R=  .847
 TOTAL DOWNLOAD CAPACITY =  816.2 KIPS >     414.7 KIPS (OK)    R=  .508

 BROM'S METHOD FOR GRANULAR SOILS:
 DEPTH OF SOIL NEGLECTED =    8.000 FT
 AVERAGE ALLW PASSIVE PRESS=   .064 KCF
 REQUIRED PIER LENGTH    =   23.738 FT  ( 8.662 FT DEPTH TO ZERO SHEAR)
 AVAILABLE PIER LENGTH   =   25.000 FT  >    23.738 FT   (OK)    R=  .950
 MAXIMUM MOMENT          =   614.25 KIP-FT

 ===========================================================================
 REINFORCEMENT CHECK (PIER FOUNDATION) L= 25.50' D= 72.0"  C= 3.0" FC= 3000 PSI
 ===========================================================================

 FACTORED MOMENT LOAD    =   887.25 KIP-FT
 FACTORED COMPRESSION LOAD =  718.78 KIPS (ECC= 17.78")
 FACTORED UPLIFT LOAD    =   542.08 KIPS
 REINFD. COMPR. CAPACITY =  5108.64 KIPS (COMPR. & MOMENT: TENSION CONTROLS)

 REQUIRED STEEL AREA     =     .00 IN2 (COMPR. AND MOMENT)
 REQUIRED STEEL AREA     =   21.40 IN2 (TENSION AND MOMENT: Xna= 20.77")
 REQUIRED STEEL AREA     =   20.36 IN2 (ACI MIN.= 0.005A)

 TOTAL BAR AREA PROVIDED =   27.98 IN2 (28 x NO. 9 BARS) /FY= 60.KSI,C= 3.0"
 THE TOTAL BAR AREA PROVIDED IS SUFFICIENT.
 VERT. BAR CLEAR SPACING =    6.28 IN
```

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(603) 475-1394 cell
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SPECIALIZING IN TELECOMMUNICATIONS RELATED STRUCTURAL ENGINEERING

September 12, 2002

Natcomm, L.L.C.
63-2 North Branford Road
Branford, CT 06405
Attn: Jason Pintek

864 Opening Hill Road, Madison

Dear Jason,

Per your recent request I am providing you with this re-analysis of the existing 180 ft "ROHN" tower located in Madison, CT. This analysis considers the addition of 6 Allgon 7250.03 panels mounted 120 ft agl on a relocated mounting frame from the 110' level with the associated coax run down the outside of the tower on an existing coax ladder. It also includes a new Shively 6810 FM antenna above the top of the tower.

This analysis was done in accordance with the EIA/TIA-222-F "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures". Wind loads were generated for a basic design wind speed of 85 mph and a loading combination that included 1/2" of radial ice as is required for New Haven, County.

All pertinent tower information was taken from the June 13, 2000 "Structural Analysis Report", MEI Project #00-538, by Malouf Engineering as supplied by you and are assumed to be correct. This report identifies the tower to be per Rohn file #35130AE and drwg # A982923 dated 11/25/98. It also refers to the original Rohn foundation drawing # A982942-1 dated 11/30/98.

Existing antenna inventory is per recent survey as performed by "CSB Communications". Final antenna quantities are as proposed by NATCOMM, LLC.

All tower existing and proposed loadings, structural properties and existing foundation information are as supplied by NATCOMM, LLC.

PROPOSED FINAL CONFIGURATION:

- 1 Shively 6810 FM Antenna above top of tower
- 3 top mounted whips on 6 ft side arms
- 12 DB844H90 panels & 1 GPS Antenna at 175' AGL on 12' mounting frames
- 12 DB844H90 panels at 165.5' AGL on 12' mounting frames
- 12 DB980H panels at 154' AGL on 12' mounting frames
- 12 Swedcom SC9014-DIN panels at 144.5' AGL on 12' mounting frames
- 12 EMS RR90-17 panels at 134.5' AGL on 12' mounting frames
- 6 Allgon 7250.03 panels at 120' AGL on 12' frame mounts
- 1 GPS Antennas at 50' AGL
- All coax to be run in the 5 existing coax ladders on 3 faces per attached "Figure 1"

AT&T (removed?) Letter at back of this package

Based on my investigation your addition of 6 Allgon 7250.03 panels, the relocation of the frame mount from the 110' level to the 120' level, the addition of the Shively 6810 FM antenna and associated coax will meet all the structural requirements of the EIA/TIA-222 –F "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures".

Any changes in antenna type, platform type or routing of coax could affect the validity of this analysis and should be reevaluated.

I appreciate this opportunity to assist you and look forward to working with you in the future. If you have any questions please call me at (603) 382-6219.

Sincerely,

Anthony P. Manzi
Professional Engineer

STATE OF CONNECTICUT
ANTHONY P. MANZI
No. 14291
LICENSED
PROFESSIONAL ENGINEER

9/14/12

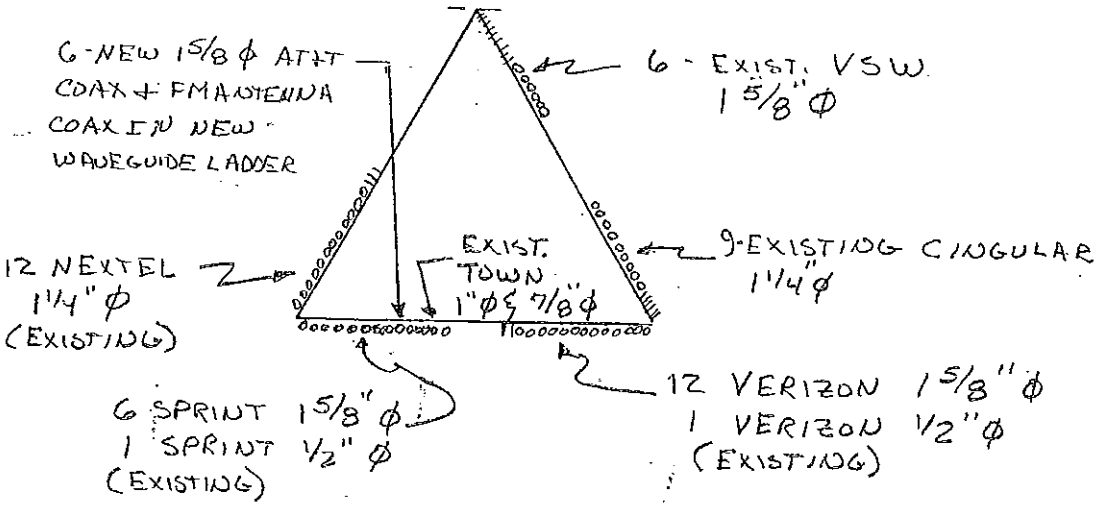


FIGURE 1

(COAX LAYOUT)

NOTES.

1) EXISTING COAX LAYOUT PER RECENT NATCOMM SITE SURVEY.

Tower Inventory
Madison CT
Self-Supporting Tower

Performed by: Bruce Barton of CSB Communications on 8/12/2002

Tower Inventory
Madison
Self-supporter

Antenna Information

Elevation Sprint GPS 50'
Leg Southwest
Mount 2 ½" x 3' Pipe
Coax ½"

Elevation Metricom 111.5' – 116.5'
Leg All (3)
Mount 12' T-Booms Nudd
Antenna Type (12) Hirschman
Antenna Model # E5960
Coax (1) 2" Seal tight & (1) 1" Seal tight

ANTENNAS BEING REMOVED, MOUNTS BEING RELOCATED

Elevation Voicestream 134.5'
Leg All (3)
Mount 12' T-Boom Pirod
Antenna Type (3) EMS Wireless
Antenna Model # RR901702DP
Coax (6) 1 5/8"

FUTURE QUANTITY - 12

Elevation Cingular 144.5'
Leg All (3)
Mount 12' Gate boom Rohn
Antenna Type (9) Swedcom
Antenna Model # SC9014-DIN
Coax (9) 1 ¼"

FUTURE QUANTITY - 12

Elevation Sprint 154'
Leg All (3)
Mount 12' Gate Boom Rohn
Antenna Type (6) Decibel
Antenna Model # DB980H90E-M
Coax (6) 1 5/8"

FUTURE QUANTITY - 12

Elevation Nextel 165.5'
Leg All (3)

Mount 12' Gate Booms Rohn
Antenna Type (12) Decibel
Antenna Model # DB844H90E-XY
Coax (12) 1 ¼"

Elevation Verizon 175'
Leg All (3)
Mount 12' Gate Boom Rohn
Antenna Type (12) Decibel
Antenna Model # 844H90EXY-BAM
Coax (12) 1 5/8"

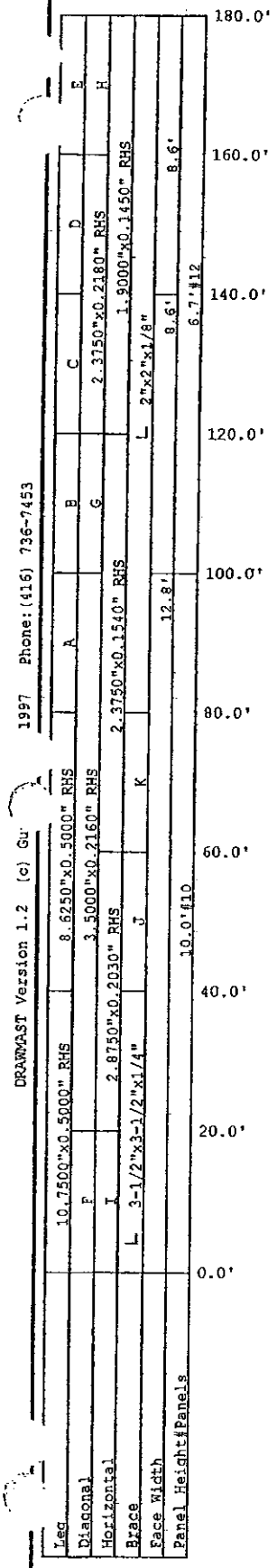
Elevation Verizon GPS 178'
Mount Verizon Gate Boom
Coax ½"

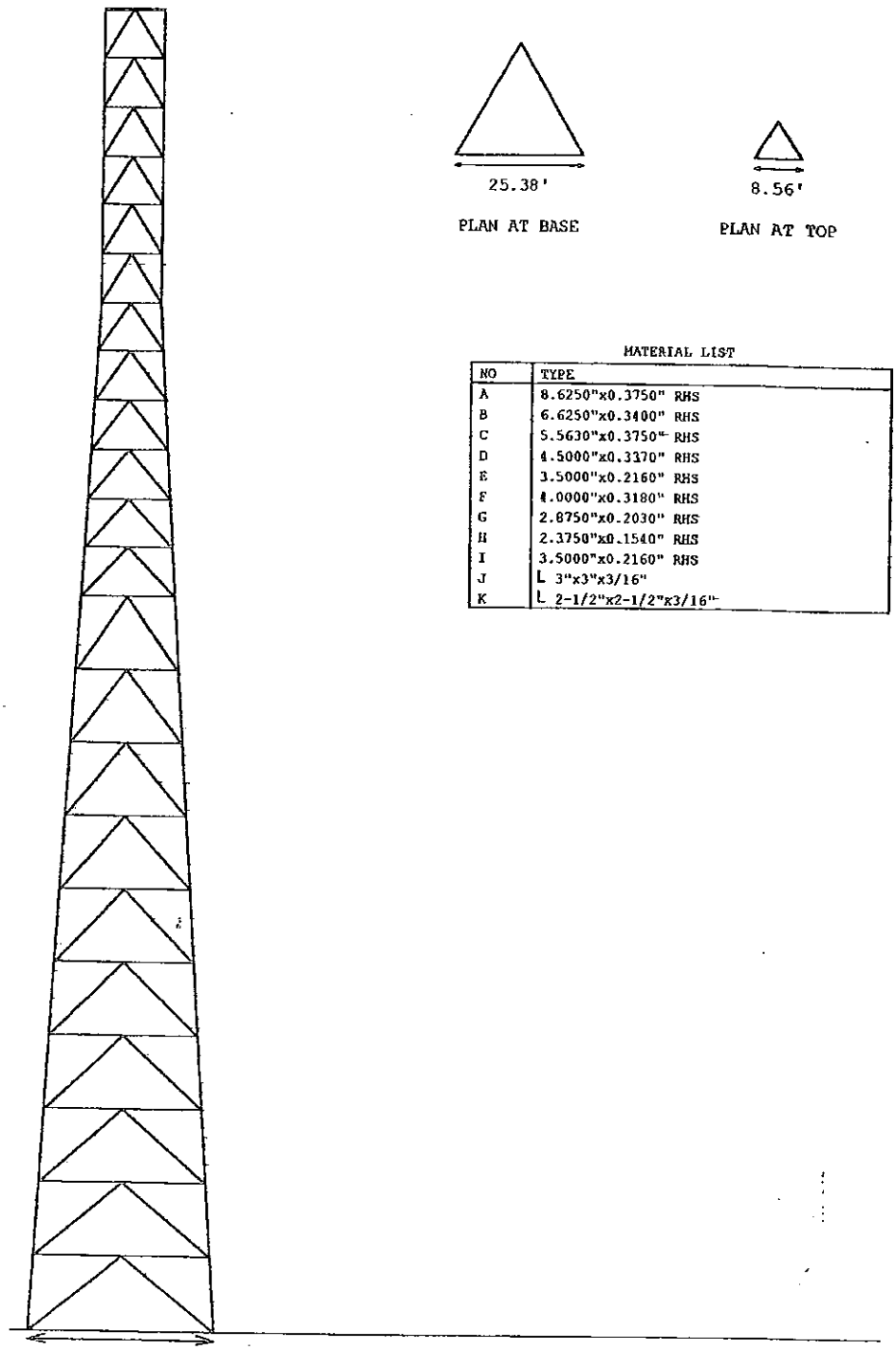
Elevation Town 186'
Mount 6' Side arm
Antenna Type 10' Di-pole
Antenna Model # None Found
Coax (1) ½"

Elevation Town 186'
Mount 6' Side arm
Antenna Type 12'
Antenna Model # None Found
Coax (1) ½"

APPURTENANCE LOADS

APPURTENANCE	QUANTITY	AVG HGT	AREA	Ca	180' Gh	V(mph)	Kz	Qz	P(lbs)
NEW SHIVELY 6810 FM ANTENNA @ 195 FT	1	195.0	3.58	1.2	1.12	85.0	1.66	30.73	148
EXISTING 12' WHIP - TOWN	1	186.0	1.2	1.4	1.12	85.0	1.64	30.31	57
EXISTING 10' DI-POLE - TOWN	2	185.0	2	1.4	1.12	85.0	1.64	30.27	190
EXISTING 6' SIDE ARM MOUNT	3	178.0	4.5	1.2	1.12	85.0	1.62	29.94	543
EXISTING DB844H90 PANEL - VERIZON	12	175.0	2.83	1.2	1.12	85.0	1.61	29.79	1360
EXISTING GPS - VERIZON	1	50.0	1.5	2.0	1.12	85.0	1.13	20.83	70
EXISTING MOUNTNG FRAME	3	175.0	15.0	2.0	1.12	85.0	1.61	29.79	3003
EXISTING DB844H90 PANEL - NEXTEL	12	165.5	2.83	1.2	1.12	85.0	1.59	29.32	1338
EXISTING MOUNTNG FRAME	3	165.5	15.0	2.0	1.12	85.0	1.59	29.32	2955
EXISTING DB 980H 90E - SPRINT	12	154.0	2.5	2.0	1.12	85.0	1.55	28.72	1930
EXISTING MOUNTNG FRAME	3	154.0	15.0	2.0	1.12	85.0	1.55	28.72	2895
EXISTING SWEDCOM SC9014-DIN - CINGULAR	12	144.5	1.31	1.5	1.12	85.0	1.52	28.20	745
EXISTING MOUNTNG FRAME	3	144.5	15.0	2.0	1.12	85.0	1.52	28.20	2843
EXISTING EMS RR90-17 - VOICESTREAM	12	134.5	3.11	1.0	1.12	85.0	1.49	27.63	1155
EXISTING MOUNTNG FRAME	3	134.5	15.0	2.0	1.12	85.0	1.49	27.63	2785
NEW ALLGON 7250 - AT&T	6	120.0	2.8	2.0	1.12	85.0	1.45	26.75	1007
RELOCATED MOUNTNG FRAME @ 120 FT	3	120.0	15.0	2.0	1.12	85.0	1.45	26.75	2696
EXISTING GPS - SPRINT	1	50.0	1.5	2.0	1.12	85.0	1.13	20.83	70





ELEVATION

PLAN AT BASE

PLAN AT TOP

MATERIAL LIST

NO	TYPE
A	8.6250"x0.3750" RHS
B	6.6250"x0.3400" RHS
C	5.5630"x0.3750" RHS
D	4.5000"x0.3370" RHS
E	3.5000"x0.2160" RHS
F	4.0000"x0.3180" RHS
G	2.8750"x0.2030" RHS
H	2.3750"x0.1540" RHS
I	3.5000"x0.2160" RHS
J	L 3"x3"x3/16"
K	L 2-1/2"x2-1/2"x3/16"

TOTAL FOUNDATION LOADS
H=88.94k
V=102.82k
M=9827.87k-ft
T=-34.66k-ft

INDIVIDUAL FOOTING LOADS
H=54.49k
V=481.41k
U=-416.99k

Anthony Manzi
3 Cifre Lane, Plaistow, NH 03865
Phone: (603) 382-6219
Fax: (603) 382-0523

Client: N/A
Location: N/A
Standard: N/A

Job No: N/A

Date: 2 sep 2002
Tower Height: 180.00'
Design Wind & Ice: N/A

LEG CHECK

TOWER SECTION	DIAGONAL DIAM	WALL THK	UNBRACED LENGTH	YIELD	Cc	RADIUS OF GYRATION	L/R	Area	F.S.	ALLOW STRESS	ALLOW LOAD	ACTUAL LOAD	
0 TO 20	10.75	0.500	120.0	50.0	107.0	3.63	33.07	16.10	1.78	26.76	574.4	463.1	OK
20 TO 40	10.75	0.500	120.0	50.0	107.0	3.63	33.07	16.10	1.78	26.76	574.4	419.4	OK
40 TO 60	8.75	0.500	120.0	50.0	107.0	2.92	41.07	12.96	1.80	25.68	443.6	373.2	OK
60 TO 80	8.75	0.500	120.0	50.0	107.0	2.92	41.07	12.96	1.80	25.68	443.6	324.0	OK
80 TO 100	8.75	0.375	120.0	50.0	107.0	2.96	40.49	9.87	1.80	25.76	338.8	270.4	OK
100 TO 120	6.63	0.340	80.0	50.0	107.0	2.23	35.92	6.72	1.79	26.39	236.4	218.0	OK
120 TO 140	5.50	0.375	80.0	50.0	107.0	1.82	44.03	6.04	1.81	25.25	203.2	145.4	OK
140 TO 160	4.50	0.337	80.0	50.0	107.0	1.48	54.18	4.41	1.84	23.69	139.2	67.9	OK
160 TO 180	3.50	0.216	80.0	50.0	107.0	1.16	68.75	2.23	1.87	21.17	62.9	12.5	OK

DIAGONAL CHECK

TOWER SECTION	DIAGONAL DIAM	WALL THK	UNBRACED LENGTH	YIELD	Cc	RADIUS OF GYRATION	L/R	Area	F.S.	ALLOW STRESS	ALLOW LOAD	ACTUAL LOAD	
0 TO 10	4.00	0.318	181.20	50.0	107.00	1.31	138.68	3.68	6.28	7.76	38.07	18.20	OK
10 TO 20	4.00	0.318	175.20	50.0	107.00	1.31	134.09	3.68	6.28	8.31	40.73	18.10	OK
20 TO 30	3.50	0.216	169.20	50.0	107.00	1.16	145.41	2.23	3.02	7.06	20.98	17.93	OK
30 TO 40	3.50	0.216	164.40	50.0	107.00	1.16	141.29	2.23	3.02	7.48	22.22	17.83	OK
40 TO 50	3.50	0.216	163.20	50.0	107.00	1.16	140.26	2.23	3.02	7.59	22.55	17.80	OK
50 TO 60	3.50	0.216	157.20	50.0	107.00	1.16	135.10	2.23	3.02	8.18	24.30	17.75	OK
60 TO 70	3.50	0.216	152.40	50.0	107.00	1.16	130.98	2.23	3.02	8.71	25.86	17.93	OK
70 TO 80	3.50	0.216	148.80	50.0	107.00	1.16	127.88	2.23	3.02	9.13	27.13	18.24	OK
80 TO 90	3.50	0.216	144.00	50.0	107.00	1.16	123.76	2.23	3.02	9.75	28.96	18.71	OK
90 TO 100	3.50	0.216	140.40	50.0	107.00	1.16	120.66	2.23	3.02	10.26	30.47	19.40	OK
100 TO 106.67	2.88	0.203	104.88	50.0	107.00	0.95	110.70	1.70	1.53	12.19	27.68	17.31	OK
106.67 TO 113.34	2.88	0.203	102.24	50.0	107.00	0.95	107.91	1.70	1.53	12.82	29.13	17.67	OK
113.34 TO 120	2.88	0.203	99.72	50.0	107.00	0.95	105.25	1.70	1.53	13.48	30.62	18.10	OK
120 TO 126.67	2.38	0.218	98.16	50.0	107.00	0.77	128.06	1.48	0.87	9.11	17.93	16.54	OK
126.67 TO 133.34	2.38	0.218	95.76	50.0	107.00	0.77	124.65	1.48	0.87	9.61	18.97	17.03	OK
133.34 TO 140	2.38	0.218	93.36	50.0	107.00	0.77	121.52	1.48	0.87	10.11	19.96	15.80	OK
140 TO 146.67	2.38	0.218	91.32	50.0	107.00	0.77	119.14	1.48	0.87	10.52	20.72	18.91	OK
146.67 TO 153.34	2.38	0.218	91.32	50.0	107.00	0.77	118.87	1.48	0.87	10.57	20.86	15.51	OK
153.34 TO 160	2.38	0.218	91.32	50.0	107.00	0.77	118.87	1.48	0.87	10.57	20.86	11.57	OK
160 TO 166.67	2.38	0.154	91.56	50.0	107.00	0.79	116.06	1.08	0.67	11.09	15.91	8.44	OK
166.67 TO 173.34	2.38	0.154	91.56	50.0	107.00	0.79	116.06	1.08	0.67	11.09	15.91	4.99	OK
173.34 TO 180	2.38	0.154	91.56	50.0	107.00	0.79	116.06	1.08	0.67	11.09	15.91	1.92	OK

HORIZONTAL CHECK

TOWER SECTION	DIAGONAL DIAM	WALL THK	UNBRACED LENGTH	YIELD	Cc	RADIUS OF GYRATION	L/R	Area	ALLOW STRESS	ALLOW LOAD	ACTUAL LOAD	
0 TO 10	3.50	0.216	127.20	50.0	107.00	1.16	109.32	2.23	11.90	35.30	14.36	OK
10 TO 20	3.50	0.216	119.76	50.0	107.00	1.16	102.92	2.23	11.90	35.30	14.01	OK
20 TO 30	2.88	0.203	112.20	50.0	107.00	0.95	118.43	1.70	10.65	24.20	13.56	OK
30 TO 40	2.88	0.203	104.64	50.0	107.00	0.95	110.24	1.71	10.65	24.30	13.15	OK
40 TO 50	2.88	0.203	102.12	50.0	107.00	0.95	107.59	1.71	10.65	24.30	12.76	OK
50 TO 60	2.88	0.203	94.56	50.0	107.00	0.95	99.62	1.71	10.72	24.40	12.33	OK
60 TO 70	2.375	0.154	87.00	50.0	107.00	0.79	110.53	1.07	12.30	17.50	12.02	OK
70 TO 80	2.375	0.154	79.44	50.0	107.00	0.79	100.92	1.07	14.55	20.70	11.73	OK
80 TO 90	2.375	0.154	72.12	50.0	107.00	0.79	91.62	1.07	16.72	23.80	11.46	OK
90 TO 100	2.375	0.154	64.68	50.0	107.00	0.79	82.17	1.07	17.36	24.70	11.31	OK
100 TO 106.67	2.375	0.154	63.60	50.0	107.00	0.79	80.80	1.07	17.36	24.70	12.06	OK
106.67 TO 113.34	2.375	0.154	59.40	50.0	107.00	0.79	75.46	1.07	17.36	24.70	11.92	OK
113.34 TO 120	2.375	0.154	55.20	50.0	107.00	0.79	70.13	1.07	17.36	24.70	11.81	OK
120 TO 126.67	1.9	0.145	52.32	50.0	107.00	0.62	84.03	0.80	18.23	19.40	10.38	OK
126.67 TO 133.34	1.9	0.145	48.00	50.0	107.00	0.62	77.10	0.80	19.64	20.90	10.25	OK
133.34 TO 140	1.9	0.145	43.68	50.0	107.00	0.62	70.16	0.80	20.96	22.30	9.66	OK
140 TO 146.67	1.9	0.145	44.16	50.0	107.00	0.62	70.93	0.80	20.86	22.20	10.24	OK
146.67 TO 153.34	1.9	0.145	44.16	50.0	107.00	0.62	70.93	0.80	20.86	22.20	8.38	OK
153.34 TO 160	1.9	0.145	44.16	50.0	107.00	0.62	70.93	0.80	20.86	22.20	6.25	OK
160 TO 166.67	1.9	0.145	44.64	50.0	107.00	0.62	71.70	0.80	20.63	22.00	4.62	OK
166.67 TO 173.34	1.9	0.145	44.64	50.0	107.00	0.62	71.70	0.80	20.63	22.00	2.90	OK
173.34 TO 180	1.9	0.145	44.64	50.0	107.00	0.62	71.70	0.80	20.63	22.00	1.22	OK

FOUNDATION:

	ORIGINAL DESIGN	PROPOSED LOADING
UPLIFT	441.2 K	417.0 K
DOWNLOAD	517.0 K	481.4 K
SHEAR	66.3 K	54.5 K

EXISTING FOUNDATION IS ADEQUATE.

MAST - Latticed Tower Analysis (Unguyed) (c)1997 Guymast Inc. 416-736-7453
ocessed under license at:

hony Manzi

on: 2 sep 2002 at: 10:56:58

180 FT ROHN TOWER @ MADISON CT 85 MPH REVISED SEPT 1 2002

MAST GEOMETRY (ft)

PANEL TYPE	NO.OF LEGS	ELEV.AT BOTTOM	ELEV.AT TOP	F.W..AT BOTTOM	F.W..AT TOP	TYPICAL PANEL HEIGHT
A	3	140.00	180.00	8.56	8.56	6.67
A	3	100.00	140.00	12.84	8.56	6.67
A	3	0.00	100.00	25.38	12.84	10.00

MEMBER PROPERTIES

MEMBER TYPE	BOTTOM ELEV ft	TOP ELEV ft	X-SECTN AREA in.sq	RADIUS OF GYRAT in	ELASTIC MODULUS ksi	THERMAL EXPANSN /deg
LE	160.00	180.00	2.228	0.000	29000.	0.0000000
LE	140.00	160.00	4.407	0.000	29000.	0.0000000
LE	120.00	140.00	6.112	0.000	29000.	0.0000000
LE	100.00	120.00	6.713	0.000	29000.	0.0000000
LE	80.00	100.00	9.719	0.000	29000.	0.0000000
LE	40.00	80.00	12.763	0.000	29000.	0.0000000
LE	0.00	40.00	16.101	0.000	29000.	0.0000000
DI	160.00	180.00	1.075	0.000	29000.	0.0000000
DI	120.00	160.00	1.477	0.000	29000.	0.0000000
DI	100.00	120.00	1.704	0.000	29000.	0.0000000
DI	20.00	100.00	2.228	0.000	29000.	0.0000000
DI	0.00	20.00	3.678	0.000	29000.	0.0000000
HO	120.00	180.00	0.799	0.000	29000.	0.0000000
HO	60.00	120.00	1.075	0.000	29000.	0.0000000
HO	20.00	60.00	1.704	0.000	29000.	0.0000000
HO	0.00	20.00	2.228	0.000	29000.	0.0000000
BR	80.00	180.00	0.484	0.000	29000.	0.0000000
BR	60.00	80.00	0.902	0.000	29000.	0.0000000
BR	40.00	60.00	1.090	0.000	29000.	0.0000000
BR	0.00	40.00	1.687	0.000	29000.	0.0000000

I DING CONDITION A

z 85 mph EIA 222 f

MAST LOADING

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AD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	0.0	0.94	0.80	0.00	0.00
C	175.0	0.00	0.0	0.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	0.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	0.0	4.83	1.00	0.00	0.00
C	145.0	0.00	0.0	0.0	3.59	1.00	0.00	0.00
C	135.0	0.00	0.0	0.0	3.94	1.00	0.00	0.00
C	120.0	0.00	0.0	0.0	3.70	1.00	0.00	0.00
C	50.0	0.00	0.0	0.0	0.14	0.20	0.00	0.00
D	180.0	0.00	279.0	0.0	0.25	0.12	0.07	-0.20
D	173.3	0.00	279.0	0.0	0.25	0.12	0.07	-0.20
D	173.3	0.00	279.0	0.0	0.31	0.17	0.07	-0.20
D	166.7	0.00	279.0	0.0	0.31	0.17	0.07	-0.20
D	166.7	0.00	279.0	0.0	0.38	0.22	0.07	-0.20
D	160.0	0.00	279.0	0.0	0.38	0.22	0.07	-0.20
D	160.0	0.00	279.0	0.0	0.38	0.25	0.07	-0.19
D	140.0	0.00	279.0	0.0	0.37	0.25	0.07	-0.19
D	140.0	0.00	281.0	0.0	0.38	0.27	0.07	-0.18
D	133.3	0.00	281.0	0.0	0.38	0.27	0.07	-0.18
D	133.3	0.00	286.0	0.0	0.37	0.27	0.07	-0.17
D	126.7	0.00	286.0	0.0	0.37	0.27	0.07	-0.17
D	126.7	0.00	291.0	0.0	0.37	0.27	0.07	-0.16
D	120.0	0.00	291.0	0.0	0.37	0.27	0.07	-0.16
D	120.0	0.00	296.0	0.0	0.38	0.29	0.07	-0.15
D	113.3	0.00	296.0	0.0	0.38	0.29	0.07	-0.15
D	113.3	0.00	301.0	0.0	0.37	0.30	0.07	-0.14
D	106.7	0.00	301.0	0.0	0.37	0.30	0.07	-0.14
D	106.7	0.00	306.0	0.0	0.37	0.30	0.07	-0.13
D	100.0	0.00	306.0	0.0	0.37	0.30	0.07	-0.13
D	100.0	0.00	313.0	0.0	0.37	0.33	0.07	-0.12
D	90.0	0.00	313.0	0.0	0.37	0.33	0.07	-0.12
D	90.0	0.00	321.0	0.0	0.36	0.34	0.07	-0.10
D	80.0	0.00	321.0	0.0	0.36	0.34	0.07	-0.10
D	80.0	0.00	329.0	0.0	0.36	0.38	0.08	-0.09
D	70.0	0.00	329.0	0.0	0.36	0.38	0.08	-0.09
D	70.0	0.00	335.0	0.0	0.36	0.39	0.08	-0.07
D	60.0	0.00	335.0	0.0	0.36	0.39	0.08	-0.07
D	60.0	0.00	341.0	0.0	0.35	0.41	0.09	-0.06
D	50.0	0.00	341.0	0.0	0.35	0.41	0.09	-0.06
D	50.0	0.00	345.0	0.0	0.34	0.41	0.10	-0.05
D	40.0	0.00	345.0	0.0	0.34	0.41	0.10	-0.05
D	40.0	0.00	349.0	0.0	0.34	0.47	0.11	-0.03
D	30.0	0.00	349.0	0.0	0.34	0.47	0.11	-0.03
D	30.0	0.00	353.0	0.0	0.34	0.48	0.11	-0.02
D	20.0	0.00	353.0	0.0	0.34	0.48	0.11	-0.02
D	20.0	0.00	356.0	0.0	0.35	0.55	0.12	-0.01
D	10.0	0.00	356.0	0.0	0.35	0.55	0.12	-0.01
D	10.0	0.00	358.0	0.0	0.27	0.46	0.13	0.00
D	0.0	0.00	358.0	0.0	0.27	0.46	0.13	0.00

S PRESS PRINTING

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...FOR THIS LOADING.. .....MAXIMUMS.....

LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

LOADING CONDITION B

30 az 85 mph EIA 222 f

MAST LOADING

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	30.0	0.94	0.80	0.00	0.00
C	175.0	0.00	0.0	30.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	30.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	30.0	4.83	1.00	0.00	0.00
C	145.0	0.00	0.0	30.0	3.59	1.00	0.00	0.00
C	135.0	0.00	0.0	30.0	3.94	1.00	0.00	0.00
	120.0	0.00	0.0	30.0	3.70	1.00	0.00	0.00
C	50.0	0.00	0.0	30.0	0.14	0.20	0.00	0.00
D	180.0	0.00	279.0	30.0	0.25	0.12	0.07	-0.21
D	173.3	0.00	279.0	30.0	0.25	0.12	0.07	-0.21
D	173.3	0.00	279.0	30.0	0.31	0.17	0.07	-0.21
D	166.7	0.00	279.0	30.0	0.31	0.17	0.07	-0.21
D	166.7	0.00	279.0	30.0	0.38	0.22	0.07	-0.21
D	160.0	0.00	279.0	30.0	0.38	0.22	0.07	-0.21
D	160.0	0.00	279.0	30.0	0.38	0.25	0.07	-0.20
D	140.0	0.00	279.0	30.0	0.37	0.25	0.07	-0.20
D	140.0	0.00	281.0	30.0	0.38	0.27	0.07	-0.20
D	133.3	0.00	281.0	30.0	0.38	0.27	0.07	-0.20
D	133.3	0.00	286.0	30.0	0.37	0.27	0.07	-0.20
D	126.7	0.00	286.0	30.0	0.37	0.27	0.07	-0.20
D	126.7	0.00	291.0	30.0	0.37	0.27	0.07	-0.20
D	120.0	0.00	291.0	30.0	0.37	0.27	0.07	-0.20
D	120.0	0.00	296.0	30.0	0.38	0.29	0.07	-0.20
D	113.3	0.00	296.0	30.0	0.38	0.29	0.07	-0.20
D	113.3	0.00	301.0	30.0	0.37	0.30	0.07	-0.20
D	106.7	0.00	301.0	30.0	0.37	0.30	0.07	-0.20
D	106.7	0.00	306.0	30.0	0.37	0.30	0.07	-0.20
D	100.0	0.00	306.0	30.0	0.37	0.30	0.07	-0.20
D	100.0	0.00	313.0	30.0	0.37	0.33	0.07	-0.20
D	90.0	0.00	313.0	30.0	0.37	0.33	0.07	-0.20
D	90.0	0.00	321.0	30.0	0.36	0.34	0.07	-0.20
D	80.0	0.00	321.0	30.0	0.36	0.34	0.07	-0.20
D	80.0	0.00	329.0	30.0	0.36	0.38	0.08	-0.19
D	70.0	0.00	329.0	30.0	0.36	0.38	0.08	-0.19
D	70.0	0.00	335.0	30.0	0.36	0.39	0.08	-0.19
D	60.0	0.00	335.0	30.0	0.36	0.39	0.08	-0.19
D	60.0	0.00	341.0	30.0	0.35	0.41	0.09	-0.19

D	50.0	0.00	341.0	30.0	0.35	0.41	0.09	-0.19
D	50.0	0.00	345.0	30.0	0.34	0.41	0.10	-0.18
	40.0	0.00	345.0	30.0	0.34	0.41	0.10	-0.18
D	40.0	0.00	349.0	30.0	0.34	0.47	0.11	-0.17
	30.0	0.00	349.0	30.0	0.34	0.47	0.11	-0.17
	30.0	0.00	353.0	30.0	0.34	0.48	0.11	-0.17
D	20.0	0.00	353.0	30.0	0.34	0.48	0.11	-0.17
D	20.0	0.00	356.0	30.0	0.35	0.55	0.12	-0.18
D	10.0	0.00	356.0	30.0	0.35	0.55	0.12	-0.18
D	10.0	0.00	358.0	30.0	0.27	0.46	0.13	-0.18
D	0.0	0.00	358.0	30.0	0.27	0.46	0.13	-0.18

SUPPRESS PRINTING
==========

	...FOR THIS LOADING..			.....MAXIMUMS.....			
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION C ==========

C az 85 mph EIA 222 f

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	60.0	0.94	0.80	0.00	0.00
C	175.0	0.00	0.0	60.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	60.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	60.0	4.83	1.00	0.00	0.00
C	145.0	0.00	0.0	60.0	3.59	1.00	0.00	0.00
C	135.0	0.00	0.0	60.0	3.94	1.00	0.00	0.00
C	120.0	0.00	0.0	60.0	3.70	1.00	0.00	0.00
C	50.0	0.00	0.0	60.0	0.14	0.20	0.00	0.00
D	180.0	0.00	279.0	60.0	0.25	0.12	0.07	-0.13
D	173.3	0.00	279.0	60.0	0.25	0.12	0.07	-0.13
D	173.3	0.00	279.0	60.0	0.31	0.17	0.07	-0.13
D	166.7	0.00	279.0	60.0	0.31	0.17	0.07	-0.13
D	166.7	0.00	279.0	60.0	0.38	0.22	0.07	-0.13
D	160.0	0.00	279.0	60.0	0.38	0.22	0.07	-0.13
D	160.0	0.00	279.0	60.0	0.38	0.25	0.07	-0.13
D	140.0	0.00	279.0	60.0	0.37	0.25	0.07	-0.12
	140.0	0.00	281.0	60.0	0.38	0.27	0.07	-0.12
D	133.3	0.00	281.0	60.0	0.38	0.27	0.07	-0.12
D	133.3	0.00	286.0	60.0	0.37	0.27	0.07	-0.13
D	126.7	0.00	286.0	60.0	0.37	0.27	0.07	-0.13
D	126.7	0.00	291.0	60.0	0.37	0.27	0.07	-0.14

D	120.0	0.00	291.0	60.0	0.37	0.27	0.07	-0.14
D	120.0	0.00	296.0	60.0	0.38	0.29	0.07	-0.14
	113.3	0.00	296.0	60.0	0.38	0.29	0.07	-0.14
D	113.3	0.00	301.0	60.0	0.37	0.30	0.07	-0.15
	106.7	0.00	301.0	60.0	0.37	0.30	0.07	-0.15
	106.7	0.00	306.0	60.0	0.37	0.30	0.07	-0.15
D	100.0	0.00	306.0	60.0	0.37	0.30	0.07	-0.15
D	100.0	0.00	313.0	60.0	0.37	0.33	0.07	-0.16
D	90.0	0.00	313.0	60.0	0.37	0.33	0.07	-0.16
D	90.0	0.00	321.0	60.0	0.36	0.34	0.07	-0.17
D	80.0	0.00	321.0	60.0	0.36	0.34	0.07	-0.17
D	80.0	0.00	329.0	60.0	0.36	0.38	0.08	-0.17
D	70.0	0.00	329.0	60.0	0.36	0.38	0.08	-0.17
D	70.0	0.00	335.0	60.0	0.36	0.39	0.08	-0.18
D	60.0	0.00	335.0	60.0	0.36	0.39	0.08	-0.18
D	60.0	0.00	341.0	60.0	0.35	0.41	0.09	-0.18
D	50.0	0.00	341.0	60.0	0.35	0.41	0.09	-0.18
D	50.0	0.00	345.0	60.0	0.34	0.41	0.10	-0.18
D	40.0	0.00	345.0	60.0	0.34	0.41	0.10	-0.18
D	40.0	0.00	349.0	60.0	0.34	0.47	0.11	-0.18
D	30.0	0.00	349.0	60.0	0.34	0.47	0.11	-0.18
D	30.0	0.00	353.0	60.0	0.34	0.48	0.11	-0.18
D	20.0	0.00	353.0	60.0	0.34	0.48	0.11	-0.18
D	20.0	0.00	356.0	60.0	0.35	0.55	0.12	-0.19
D	10.0	0.00	356.0	60.0	0.35	0.55	0.12	-0.19
D	10.0	0.00	358.0	60.0	0.27	0.46	0.13	-0.20
D	0.0	0.00	358.0	60.0	0.27	0.46	0.13	-0.20

PRESS PRINTING
==============

LOADS INPUT	...FOR THIS LOADING.. DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	.....MAXIMUMS..... DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION D ==========

90 az 85 mph EIA 222 f

MAST LOADING
============

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	90.0	0.94	0.80	0.00	0.00
	175.0	0.00	0.0	90.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	90.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	90.0	4.83	1.00	0.00	0.00
C	145.0	0.00	0.0	90.0	3.59	1.00	0.00	0.00
C	135.0	0.00	0.0	90.0	3.94	1.00	0.00	0.00

C	120.0	0.00	0.0	90.0	3.70	1.00	0.00	0.00
C	50.0	0.00	0.0	90.0	0.14	0.20	0.00	0.00
L	180.0	0.00	279.0	90.0	0.25	0.12	0.07	0.01
	173.3	0.00	279.0	90.0	0.25	0.12	0.07	0.01
	173.3	0.00	279.0	90.0	0.31	0.17	0.07	0.01
L	166.7	0.00	279.0	90.0	0.31	0.17	0.07	0.01
D	166.7	0.00	279.0	90.0	0.38	0.22	0.07	0.01
D	160.0	0.00	279.0	90.0	0.38	0.22	0.07	0.01
D	160.0	0.00	279.0	90.0	0.38	0.25	0.07	0.01
D	140.0	0.00	279.0	90.0	0.37	0.25	0.07	0.01
D	140.0	0.00	281.0	90.0	0.38	0.27	0.07	0.01
D	133.3	0.00	281.0	90.0	0.38	0.27	0.07	0.01
D	133.3	0.00	286.0	90.0	0.37	0.27	0.07	-0.01
D	126.7	0.00	286.0	90.0	0.37	0.27	0.07	-0.01
D	126.7	0.00	291.0	90.0	0.37	0.27	0.07	-0.02
D	120.0	0.00	291.0	90.0	0.37	0.27	0.07	-0.02
D	120.0	0.00	296.0	90.0	0.38	0.29	0.07	-0.03
D	113.3	0.00	296.0	90.0	0.38	0.29	0.07	-0.03
D	113.3	0.00	301.0	90.0	0.37	0.30	0.07	-0.04
D	106.7	0.00	301.0	90.0	0.37	0.30	0.07	-0.04
D	106.7	0.00	306.0	90.0	0.37	0.30	0.07	-0.05
D	100.0	0.00	306.0	90.0	0.37	0.30	0.07	-0.05
D	100.0	0.00	313.0	90.0	0.37	0.33	0.07	-0.07
D	90.0	0.00	313.0	90.0	0.37	0.33	0.07	-0.07
D	90.0	0.00	321.0	90.0	0.36	0.34	0.07	-0.08
D	80.0	0.00	321.0	90.0	0.36	0.34	0.07	-0.08
D	80.0	0.00	329.0	90.0	0.36	0.38	0.08	-0.10
D	70.0	0.00	329.0	90.0	0.36	0.38	0.08	-0.10
	70.0	0.00	335.0	90.0	0.36	0.39	0.08	-0.11
D	60.0	0.00	335.0	90.0	0.36	0.39	0.08	-0.11
D	60.0	0.00	341.0	90.0	0.35	0.41	0.09	-0.13
D	50.0	0.00	341.0	90.0	0.35	0.41	0.09	-0.13
D	50.0	0.00	345.0	90.0	0.34	0.41	0.10	-0.14
D	40.0	0.00	345.0	90.0	0.34	0.41	0.10	-0.14
D	40.0	0.00	349.0	90.0	0.34	0.47	0.11	-0.14
D	30.0	0.00	349.0	90.0	0.34	0.47	0.11	-0.14
D	30.0	0.00	353.0	90.0	0.34	0.48	0.11	-0.15
D	20.0	0.00	353.0	90.0	0.34	0.48	0.11	-0.15
D	20.0	0.00	356.0	90.0	0.35	0.55	0.12	-0.17
D	10.0	0.00	356.0	90.0	0.35	0.55	0.12	-0.17
D	10.0	0.00	358.0	90.0	0.27	0.46	0.13	-0.18
D	0.0	0.00	358.0	90.0	0.27	0.46	0.13	-0.18

SUPPRESS PRINTING
==========

	...FOR THIS LOADING..			ALL	.....MAXIMUMS.....		
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS		DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION E ==========

0 az 74 mph EIA 222 f WITH 1/2" ICE

...AST LOADING
...==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	0.0	1.17	1.00	0.00	0.00
C	175.0	0.00	0.0	0.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	0.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	0.0	4.80	1.00	0.00	0.00
C	145.0	0.00	0.0	0.0	3.72	1.00	0.00	0.00
C	135.0	0.00	0.0	0.0	3.96	1.00	0.00	0.00
C	120.0	0.00	0.0	0.0	3.76	1.00	0.00	0.00
C	50.0	0.00	0.0	0.0	0.14	0.35	0.00	0.00
D	180.0	0.00	279.0	0.0	0.22	0.19	0.11	-0.17
D	173.3	0.00	279.0	0.0	0.22	0.19	0.11	-0.17
D	173.3	0.00	279.0	0.0	0.29	0.29	0.11	-0.17
D	166.7	0.00	279.0	0.0	0.29	0.29	0.11	-0.17
D	166.7	0.00	279.0	0.0	0.42	0.39	0.11	-0.17
D	160.0	0.00	279.0	0.0	0.42	0.39	0.11	-0.17
D	160.0	0.00	279.0	0.0	0.43	0.43	0.11	-0.17
D	140.0	0.00	279.0	0.0	0.41	0.43	0.11	-0.16
D	140.0	0.00	281.0	0.0	0.41	0.45	0.11	-0.16
D	133.3	0.00	281.0	0.0	0.41	0.45	0.11	-0.16
D	133.3	0.00	286.0	0.0	0.39	0.45	0.11	-0.15
D	126.7	0.00	286.0	0.0	0.39	0.45	0.11	-0.15
D	126.7	0.00	291.0	0.0	0.38	0.46	0.10	-0.14
D	120.0	0.00	291.0	0.0	0.38	0.46	0.10	-0.14
D	120.0	0.00	296.0	0.0	0.38	0.49	0.10	-0.13
D	113.3	0.00	296.0	0.0	0.38	0.49	0.10	-0.13
D	113.3	0.00	301.0	0.0	0.37	0.49	0.10	-0.12
D	106.7	0.00	301.0	0.0	0.37	0.49	0.10	-0.12
D	106.7	0.00	306.0	0.0	0.37	0.49	0.10	-0.11
D	100.0	0.00	306.0	0.0	0.37	0.49	0.10	-0.11
D	100.0	0.00	313.0	0.0	0.36	0.52	0.11	-0.10
D	90.0	0.00	313.0	0.0	0.36	0.52	0.11	-0.10
D	90.0	0.00	321.0	0.0	0.35	0.53	0.11	-0.09
D	80.0	0.00	321.0	0.0	0.35	0.53	0.11	-0.09
D	80.0	0.00	329.0	0.0	0.34	0.58	0.12	-0.08
D	70.0	0.00	329.0	0.0	0.34	0.58	0.12	-0.08
D	70.0	0.00	335.0	0.0	0.34	0.59	0.13	-0.06
D	60.0	0.00	335.0	0.0	0.34	0.59	0.13	-0.06
D	60.0	0.00	341.0	0.0	0.33	0.62	0.14	-0.05
D	50.0	0.00	341.0	0.0	0.33	0.62	0.14	-0.05
D	50.0	0.00	345.0	0.0	0.32	0.62	0.15	-0.04
D	40.0	0.00	345.0	0.0	0.32	0.62	0.15	-0.04
D	40.0	0.00	349.0	0.0	0.31	0.69	0.16	-0.03
D	30.0	0.00	349.0	0.0	0.31	0.69	0.16	-0.03
D	30.0	0.00	353.0	0.0	0.31	0.70	0.17	-0.02
D	20.0	0.00	353.0	0.0	0.31	0.70	0.17	-0.02
D	20.0	0.00	356.0	0.0	0.32	0.78	0.19	-0.01
D	10.0	0.00	356.0	0.0	0.32	0.78	0.19	-0.01
D	10.0	0.00	358.0	0.0	0.23	0.58	0.20	0.00
D	0.0	0.00	358.0	0.0	0.23	0.58	0.20	0.00

SUPPRESS PRINTING

LOADS INPUT	...FOR THIS LOADING.. DISPL	MEMBER FORCES	FOUNDN LOADS	.....MAXIMUMS..... ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

LOADING CONDITION F

30 az 74 mph EIA 222 f WITH 1/2" ICE

MAST LOADING

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	30.0	1.17	1.00	0.00	0.00
C	175.0	0.00	0.0	30.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	30.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	30.0	4.80	1.00	0.00	0.00
C	145.0	0.00	0.0	30.0	3.72	1.00	0.00	0.00
C	135.0	0.00	0.0	30.0	3.96	1.00	0.00	0.00
C	120.0	0.00	0.0	30.0	3.76	1.00	0.00	0.00
C	50.0	0.00	0.0	30.0	0.14	0.35	0.00	0.00
D	180.0	0.00	279.0	30.0	0.22	0.19	0.11	-0.18
D	173.3	0.00	279.0	30.0	0.22	0.19	0.11	-0.18
D	173.3	0.00	279.0	30.0	0.29	0.29	0.11	-0.18
D	166.7	0.00	279.0	30.0	0.29	0.29	0.11	-0.18
D	166.7	0.00	279.0	30.0	0.42	0.39	0.11	-0.18
D	160.0	0.00	279.0	30.0	0.42	0.39	0.11	-0.18
D	160.0	0.00	279.0	30.0	0.43	0.43	0.11	-0.18
D	140.0	0.00	279.0	30.0	0.41	0.43	0.11	-0.17
D	140.0	0.00	281.0	30.0	0.41	0.45	0.11	-0.17
D	133.3	0.00	281.0	30.0	0.41	0.45	0.11	-0.17
D	133.3	0.00	286.0	30.0	0.39	0.45	0.11	-0.17
D	126.7	0.00	286.0	30.0	0.39	0.45	0.11	-0.17
D	126.7	0.00	291.0	30.0	0.38	0.46	0.10	-0.17
D	120.0	0.00	291.0	30.0	0.38	0.46	0.10	-0.17
D	120.0	0.00	296.0	30.0	0.38	0.49	0.10	-0.17
D	113.3	0.00	296.0	30.0	0.38	0.49	0.10	-0.17
D	113.3	0.00	301.0	30.0	0.37	0.49	0.10	-0.17
D	106.7	0.00	301.0	30.0	0.37	0.49	0.10	-0.17
D	106.7	0.00	306.0	30.0	0.37	0.49	0.10	-0.17
D	100.0	0.00	306.0	30.0	0.37	0.49	0.10	-0.17
D	100.0	0.00	313.0	30.0	0.36	0.52	0.11	-0.17
D	90.0	0.00	313.0	30.0	0.36	0.52	0.11	-0.17
D	90.0	0.00	321.0	30.0	0.35	0.53	0.11	-0.17
D	80.0	0.00	321.0	30.0	0.35	0.53	0.11	-0.17
D	80.0	0.00	329.0	30.0	0.34	0.58	0.12	-0.17

D	70.0	0.00	329.0	30.0	0.34	0.58	0.12	-0.17
D	70.0	0.00	335.0	30.0	0.34	0.59	0.13	-0.17
	60.0	0.00	335.0	30.0	0.34	0.59	0.13	-0.17
D	60.0	0.00	341.0	30.0	0.33	0.62	0.14	-0.16
	50.0	0.00	341.0	30.0	0.33	0.62	0.14	-0.16
	50.0	0.00	345.0	30.0	0.32	0.62	0.15	-0.16
D	40.0	0.00	345.0	30.0	0.32	0.62	0.15	-0.16
D	40.0	0.00	349.0	30.0	0.31	0.69	0.16	-0.15
D	30.0	0.00	349.0	30.0	0.31	0.69	0.16	-0.15
D	30.0	0.00	353.0	30.0	0.31	0.70	0.17	-0.15
D	20.0	0.00	353.0	30.0	0.31	0.70	0.17	-0.15
D	20.0	0.00	356.0	30.0	0.32	0.78	0.19	-0.15
D	10.0	0.00	356.0	30.0	0.32	0.78	0.19	-0.15
D	10.0	0.00	358.0	30.0	0.23	0.58	0.20	-0.16
D	0.0	0.00	358.0	30.0	0.23	0.58	0.20	-0.16

SUPPRESS PRINTING
==========

LOADS INPUT	...FOR THIS LOADING.. DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	.....MAXIMUMS..... DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION G ==========

60 az 74 mph EIA 222 f WITH 1/2" ICE

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	60.0	1.17	1.00	0.00	0.00
C	175.0	0.00	0.0	60.0	4.36	1.00	0.00	0.00
C	165.0	0.00	0.0	60.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	60.0	4.80	1.00	0.00	0.00
C	145.0	0.00	0.0	60.0	3.72	1.00	0.00	0.00
C	135.0	0.00	0.0	60.0	3.96	1.00	0.00	0.00
C	120.0	0.00	0.0	60.0	3.76	1.00	0.00	0.00
C	50.0	0.00	0.0	60.0	0.14	0.35	0.00	0.00
D	180.0	0.00	279.0	60.0	0.22	0.19	0.11	-0.11
D	173.3	0.00	279.0	60.0	0.22	0.19	0.11	-0.11
D	173.3	0.00	279.0	60.0	0.29	0.29	0.11	-0.11
D	166.7	0.00	279.0	60.0	0.29	0.29	0.11	-0.11
D	166.7	0.00	279.0	60.0	0.42	0.39	0.11	-0.11
D	160.0	0.00	279.0	60.0	0.42	0.39	0.11	-0.11
D	160.0	0.00	279.0	60.0	0.43	0.43	0.11	-0.11
D	140.0	0.00	279.0	60.0	0.41	0.43	0.11	-0.11
D	140.0	0.00	281.0	60.0	0.41	0.45	0.11	-0.11

D	133.3	0.00	281.0	60.0	0.41	0.45	0.11	-0.11
D	133.3	0.00	286.0	60.0	0.39	0.45	0.11	-0.11
	126.7	0.00	286.0	60.0	0.39	0.45	0.11	-0.11
D	126.7	0.00	291.0	60.0	0.38	0.46	0.10	-0.12
	120.0	0.00	291.0	60.0	0.38	0.46	0.10	-0.12
	120.0	0.00	296.0	60.0	0.38	0.49	0.10	-0.12
D	113.3	0.00	296.0	60.0	0.38	0.49	0.10	-0.12
D	113.3	0.00	301.0	60.0	0.37	0.49	0.10	-0.13
D	106.7	0.00	301.0	60.0	0.37	0.49	0.10	-0.13
D	106.7	0.00	306.0	60.0	0.37	0.49	0.10	-0.13
D	100.0	0.00	306.0	60.0	0.37	0.49	0.10	-0.13
D	100.0	0.00	313.0	60.0	0.36	0.52	0.11	-0.14
D	90.0	0.00	313.0	60.0	0.36	0.52	0.11	-0.14
D	90.0	0.00	321.0	60.0	0.35	0.53	0.11	-0.14
D	80.0	0.00	321.0	60.0	0.35	0.53	0.11	-0.14
D	80.0	0.00	329.0	60.0	0.34	0.58	0.12	-0.15
D	70.0	0.00	329.0	60.0	0.34	0.58	0.12	-0.15
D	70.0	0.00	335.0	60.0	0.34	0.59	0.13	-0.15
D	60.0	0.00	335.0	60.0	0.34	0.59	0.13	-0.15
D	60.0	0.00	341.0	60.0	0.33	0.62	0.14	-0.16
D	50.0	0.00	341.0	60.0	0.33	0.62	0.14	-0.16
D	50.0	0.00	345.0	60.0	0.32	0.62	0.15	-0.16
D	40.0	0.00	345.0	60.0	0.32	0.62	0.15	-0.16
D	40.0	0.00	349.0	60.0	0.31	0.69	0.16	-0.15
D	30.0	0.00	349.0	60.0	0.31	0.69	0.16	-0.15
D	30.0	0.00	353.0	60.0	0.31	0.70	0.17	-0.16
D	20.0	0.00	353.0	60.0	0.31	0.70	0.17	-0.16
D	20.0	0.00	356.0	60.0	0.32	0.78	0.19	-0.17
	10.0	0.00	356.0	60.0	0.32	0.78	0.19	-0.17
D	10.0	0.00	358.0	60.0	0.23	0.58	0.20	-0.17
	0.0	0.00	358.0	60.0	0.23	0.58	0.20	-0.17

SUPPRESS PRINTING
==========

	...FOR THIS LOADING..			.....MAXIMUMS.....			
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION H ==========

90 az 74 mph EIA 222 f WITH 1/2" ICE

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	180.0	0.00	0.0	90.0	1.17	1.00	0.00	0.00
C	175.0	0.00	0.0	90.0	4.36	1.00	0.00	0.00

C	165.0	0.00	0.0	90.0	4.29	1.00	0.00	0.00
C	155.0	0.00	0.0	90.0	4.80	1.00	0.00	0.00
	145.0	0.00	0.0	90.0	3.72	1.00	0.00	0.00
C	135.0	0.00	0.0	90.0	3.96	1.00	0.00	0.00
	120.0	0.00	0.0	90.0	3.76	1.00	0.00	0.00
	50.0	0.00	0.0	90.0	0.14	0.35	0.00	0.00
D	180.0	0.00	279.0	90.0	0.22	0.19	0.11	0.01
D	173.3	0.00	279.0	90.0	0.22	0.19	0.11	0.01
D	173.3	0.00	279.0	90.0	0.29	0.29	0.11	0.01
D	166.7	0.00	279.0	90.0	0.29	0.29	0.11	0.01
D	166.7	0.00	279.0	90.0	0.42	0.39	0.11	0.01
D	160.0	0.00	279.0	90.0	0.42	0.39	0.11	0.01
D	160.0	0.00	279.0	90.0	0.43	0.43	0.11	0.01
D	140.0	0.00	279.0	90.0	0.41	0.43	0.11	0.01
D	140.0	0.00	281.0	90.0	0.41	0.45	0.11	0.00
D	133.3	0.00	281.0	90.0	0.41	0.45	0.11	0.00
D	133.3	0.00	286.0	90.0	0.39	0.45	0.11	-0.01
D	126.7	0.00	286.0	90.0	0.39	0.45	0.11	-0.01
D	126.7	0.00	291.0	90.0	0.38	0.46	0.10	-0.02
D	120.0	0.00	291.0	90.0	0.38	0.46	0.10	-0.02
D	120.0	0.00	296.0	90.0	0.38	0.49	0.10	-0.03
D	113.3	0.00	296.0	90.0	0.38	0.49	0.10	-0.03
D	113.3	0.00	301.0	90.0	0.37	0.49	0.10	-0.04
D	106.7	0.00	301.0	90.0	0.37	0.49	0.10	-0.04
D	106.7	0.00	306.0	90.0	0.37	0.49	0.10	-0.05
D	100.0	0.00	306.0	90.0	0.37	0.49	0.10	-0.05
D	100.0	0.00	313.0	90.0	0.36	0.52	0.11	-0.06
D	90.0	0.00	313.0	90.0	0.36	0.52	0.11	-0.06
D	90.0	0.00	321.0	90.0	0.35	0.53	0.11	-0.08
	80.0	0.00	321.0	90.0	0.35	0.53	0.11	-0.08
D	80.0	0.00	329.0	90.0	0.34	0.58	0.12	-0.09
D	70.0	0.00	329.0	90.0	0.34	0.58	0.12	-0.09
D	70.0	0.00	335.0	90.0	0.34	0.59	0.13	-0.10
D	60.0	0.00	335.0	90.0	0.34	0.59	0.13	-0.10
D	60.0	0.00	341.0	90.0	0.33	0.62	0.14	-0.11
D	50.0	0.00	341.0	90.0	0.33	0.62	0.14	-0.11
D	50.0	0.00	345.0	90.0	0.32	0.62	0.15	-0.12
D	40.0	0.00	345.0	90.0	0.32	0.62	0.15	-0.12
D	40.0	0.00	349.0	90.0	0.31	0.69	0.16	-0.13
D	30.0	0.00	349.0	90.0	0.31	0.69	0.16	-0.13
D	30.0	0.00	353.0	90.0	0.31	0.70	0.17	-0.14
D	20.0	0.00	353.0	90.0	0.31	0.70	0.17	-0.14
D	20.0	0.00	356.0	90.0	0.32	0.78	0.19	-0.15
D	10.0	0.00	356.0	90.0	0.32	0.78	0.19	-0.15
D	10.0	0.00	358.0	90.0	0.23	0.58	0.20	-0.16
D	0.0	0.00	358.0	90.0	0.23	0.58	0.20	-0.16

SUPPRESS PRINTING
==========

...FOR THIS LOADING..				.....MAXIMUMS.....			
LOADS INPUT	DISPL	MEMBER FORCES	FOUNDN LOADS	ALL	DISPL	MEMBER FORCES	FOUNDN LOADS
no	yes	yes	yes	no	no	no	no

3T - Latticed Tower Analysis (Unguyed) (c)1997 Guymast Inc. 416-736-7453
Processed under license at:

:hony Manzi on: 2 sep 2002 at: 10:56:58

180 FT ROHN TOWER @ MADISON CT 85 MPH REVISED SEPT 1 2002

LOADING CONDITION A

0 az 85 mph EIA 222 f

LOADING CONDITION B

30 az 85 mph EIA 222 f

LOADING CONDITION C

az 85 mph EIA 222 f

LOADING CONDITION D

90 az 85 mph EIA 222 f

LOADING CONDITION E

0 az 74 mph EIA 222 f WITH 1/2" ICE

LOADING CONDITION F

30 az 74 mph EIA 222 f WITH 1/2" ICE

LOADING CONDITION G

az 74 mph EIA 222 f WITH 1/2" ICE

LOADING CONDITION H ==========

90 az 74 mph EIA 222 f WITH 1/2" ICE

==========

MAST - Latticed Tower Analysis (Unguyed) (c)1997 Guymast Inc. 416-736-7453
Processed under license at:

Anthony Manzi
on: 2 sep 2002 at: 10:56:58

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MAXIMUM MAST DISPLACEMENTS:
==========

ELEV ft	------DEFLECTIONS (ft)----- NORTH	EAST	DOWN	--TILTS (DEG)--- NORTH	EAST	TWIST DEG
180.0	-1.402 E	-1.402 H	0.016 G	-0.808 E	-0.808 H	-0.145 B
173.3	-1.307 E	-1.307 H	0.015 G	-0.808 E	-0.808 H	-0.144 B
166.7	-1.210 E	-1.210 H	0.014 G	-0.805 E	-0.805 H	-0.140 B
160.0	-1.113 E	-1.113 H	0.013 G	-0.793 E	-0.793 H	-0.134 B
153.3	-1.017 E	-1.017 H	0.012 G	-0.779 E	-0.779 H	-0.128 B
146.7	-0.923 E	-0.923 H	0.011 F	-0.755 E	-0.755 H	-0.120 B
140.0	-0.831 E	-0.831 H	0.011 F	-0.718 E	-0.718 H	-0.111 B
133.3	-0.744 E	-0.744 H	0.010 F	-0.684 E	-0.684 H	-0.100 B
126.7	-0.662 E	-0.662 H	0.009 F	-0.643 E	-0.643 H	-0.090 B
120.0	-0.585 E	-0.585 H	0.009 F	-0.597 E	-0.597 H	-0.080 B
113.3	-0.514 E	-0.514 H	0.008 F	-0.550 E	-0.550 H	-0.073 B
106.7	-0.449 E	-0.449 H	0.007 F	-0.499 E	-0.499 H	-0.065 B
100.0	-0.390 E	-0.390 H	0.007 F	-0.445 E	-0.445 H	-0.058 B
90.0	-0.314 E	-0.314 H	0.006 F	-0.388 E	-0.388 H	-0.049 B
80.0	-0.248 E	-0.248 H	0.005 F	-0.328 E	-0.328 H	-0.041 B
70.0	-0.190 E	-0.190 H	0.005 F	-0.283 E	-0.283 H	-0.033 B
60.0	-0.140 E	-0.140 H	0.004 F	-0.237 E	-0.237 H	-0.026 B
50.0	-0.099 E	-0.099 H	0.003 F	-0.191 E	-0.191 H	-0.021 B
40.0	-0.066 E	-0.066 H	0.003 F	-0.145 E	-0.145 H	-0.015 B
30.0	-0.039 A	-0.039 D	0.002 H	-0.109 E	-0.109 H	-0.011 B
20.0	-0.018 A	-0.018 D	0.001 H	-0.073 E	-0.073 H	-0.006 B
10.0	-0.006 A	-0.006 D	0.001 H	-0.036 E	-0.036 H	-0.003 B
0.0	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A

MAXIMUM TENSION IN MAST MEMBERS (kip)
==========

ELEV ft	LEGS	DIAG	HORIZ	BRACE
180.0	----------		1.24 E	0.00 C
	0.00 A	1.92 H		
173.3	----------		2.95 A	0.00 D
	1.56 A	4.99 H		

166.7			4.69 E	0.00 H
	8.12 A	8.44 H		
160.0			6.25 H	0.00 D
	19.64 A	11.57 H		
153.3			8.38 H	0.00 D
	35.38 A	15.51 H		
146.7			10.24 H	0.00 D
	56.66 A	18.91 H		
140.0			9.32 E	0.00 H
	82.76 A	15.80 H		
133.3			10.16 H	0.00 A
	104.02 E	17.03 H		
126.7			10.31 H	0.00 C
	126.72 E	16.54 H		
120.0			11.71 H	0.00 E
	147.76 E	18.10 H		
113.3			11.84 H	0.00 B
	170.55 E	17.67 H		
106.7			11.98 H	0.00 A
	192.14 E	17.31 H		
100.0			11.03 H	0.00 E
	212.45 E	19.40 H		
90.0			11.31 H	0.00 H
	238.13 E	18.71 H		
80.0			11.57 H	0.00 B
	261.91 E	18.24 H		
70.0			11.86 H	0.00 A
	284.15 E	17.93 H		
60.0			12.20 D	0.00 H
	305.14 E	17.75 D		
50.0			12.64 D	0.00 G
	324.95 E	17.80 D		
40.0			13.02 D	0.00 E
	344.18 A	17.83 D		
30.0			13.43 D	0.00 G
	363.27 A	17.93 D		
20.0			13.87 D	0.00 C
	381.69 A	18.11 D		
10.0			14.22 D	0.00 B
	399.70 A	18.20 D		
0.0			0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
180.0			-1.22 G	0.00 E
	-0.63 E	-1.92 H		
173.3			-2.90 C	0.00 A
	-4.22 G	-4.99 H		
166.7			-4.62 G	0.00 G
	-12.52 G	-8.44 H		
160.0			-6.25 H	0.00 C

	-25.93 G	-11.57 H		
153.3	----------		-8.38 H	0.00 G
	-44.05 G	-15.51 H		
146.7	----------		-10.24 H	0.00 A
	-67.92 G	-18.91 H		
140.0	----------		-9.66 G	0.00 H
	-96.86 G	-15.80 H		
133.3	----------		-10.25 H	0.00 C
	-120.70 G	-17.03 H		
126.7	----------		-10.38 H	0.00 A
	-145.43 G	-16.54 H		
120.0	----------		-11.81 H	0.00 A
	-169.23 G	-18.10 H		
113.3	----------		-11.92 H	0.00 F
	-194.20 G	-17.67 H		
106.7	----------		-12.06 H	0.00 B
	-217.97 G	-17.31 H		
100.0	----------		-11.31 H	0.00 G
	-241.14 G	-19.40 H		
90.0	----------		-11.46 H	0.00 H
	-270.35 G	-18.71 H		
80.0	----------		-11.73 H	0.00 A
	-297.85 G	-18.24 H		
70.0	----------		-12.02 H	0.00 E
	-323.99 G	-17.93 H		
60.0	----------		-12.33 H	0.00 H
	-349.00 G	-17.75 D		
50.0	----------		-12.76 D	0.00 D
	-373.19 G	-17.80 D		
40.0	----------		-13.15 D	0.00 A
	-396.60 G	-17.83 D		
30.0	----------		-13.56 D	0.00 D
	-419.36 G	-17.93 D		
20.0	----------		-14.01 D	0.00 B
	-441.59 G	-18.11 D		
10.0	----------		-14.36 D	0.00 F
	-463.10 G	-18.20 D		
0.0	----------		0.00 A	0.00 A

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)
==========

LOAD---COMPONENTS				
NORTH	EAST	DOWN	UPLIFT	TOTAL SHEAR
-50.62 A	-47.47 G	481.41 G	-416.99 A	54.49 G

I IMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)
==========

HORIZONTAL			DOWN	OVERTURNING			TORSION
NORTH	EAST	TOTAL @ 270.0		NORTH	EAST	TOTAL @ 270.0	

-88.9	-88.9	88.9	102.8	-9827.8	-9827.9	9827.9	-34.7
A	D	D	F	E	H	H	B

ORIGINAL DATA FILE :

C:\Program Files\Guymast\Tower\madison\madseptredo.usm

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 180 FT ROHN TOWER @ MADISON CT 85 MPH REVISED SEPT 1 2002
 MAST GEOMETRY
 A 3 140.0 180.0 8.563 8.563 6.67
 A 3 100.0 140.0 12.839 8.563 6.67
 A 3 0.0 100.0 25.38 12.839 10.0
 MEMBER PROPERTIES
 LE 160.0 180.0 2.228 0.0 29000. 0.0
 LE 140.0 160.0 4.407 0.0 29000. 0.0
 LE 120.0 140.0 6.112 0.0 29000. 0.0
 LE 100.0 120.0 6.713 0.0 29000. 0.0
 LE 80.0 100.0 9.719 0.0 29000. 0.0
 LE 40.0 80.0 12.763 0.0 29000. 0.0
 LE 0.0 40.0 16.101 0.0 29000. 0.0
 DI 160.0 180.0 1.075 0.0 29000. 0.0
  I 120.0 160.0 1.477 0.0 29000. 0.0
 DI 100.0 120.0 1.704 0.0 29000. 0.0
  I 20.0 100.0 2.228 0.0 29000. 0.0
 DI 0.0 20.0 3.678 0.0 29000. 0.0
 HO 120.0 180.0 0.799 0.0 29000. 0.0
 HO 60.0 120.0 1.075 0.0 29000. 0.0
 HO 20.0 60.0 1.704 0.0 29000. 0.0
 HO 0.0 20.0 2.228 0.0 29000. 0.0
 BR 80.0 180.0 0.484 0.0 29000. 0.0
 BR 60.0 80.0 0.902 0.0 29000. 0.0
 BR 40.0 60.0 1.09 0.0 29000. 0.0
 BR 0.0 40.0 1.687 0.0 29000. 0.0
 0 az 85 mph EIA 222 f
 MAST LOADING
D  180. 0. 279. 0. 0.2458 0.1248 0.0725 -0.2005
D  173.33 0. 279. 0. 0.2458 0.1248 0.0725 -0.2005
D  173.33 0. 279. 0. 0.3107 0.1717 0.0725 -0.1983
D  166.66 0. 279. 0. 0.3107 0.1717 0.0725 -0.1983
D  166.66 0. 279. 0. 0.3804 0.2184 0.0725 -0.1961
D  159.99 0. 279. 0. 0.3804 0.2184 0.0725 -0.1961
D  159.99 0. 279. 0. 0.3834 0.2513 0.0725 -0.1937
D  140. 0. 279. 0. 0.3738 0.2514 0.0725 -0.1889
D  140. 0. 281. 0. 0.3754 0.2705 0.0715 -0.1823
D  133.33 0. 281. 0. 0.3754 0.2705 0.0715 -0.1823
D  133.33 0. 286. 0. 0.3722 0.2727 0.0699 -0.172
D  126.66 0. 286. 0. 0.3722 0.2727 0.0699 -0.172
D  126.66 0. 291. 0. 0.3697 0.2749 0.0688 -0.1618
D  119.99 0. 291. 0. 0.3697 0.2749 0.0688 -0.1618
D  119.99 0. 296. 0. 0.3769 0.295 0.0681 -0.1515
D  113.32 0. 296. 0. 0.3769 0.295 0.0681 -0.1515
D  113.32 0. 301. 0. 0.3748 0.2978 0.0681 -0.1416
D  106.65 0. 301. 0. 0.3748 0.2978 0.0681 -0.1416
```

D 106.65 0. 306. 0. 0.3728 0.3008 0.0685 -0.1318
D 100. 0. 306. 0. 0.3728 0.3008 0.0685 -0.1318
100. 0. 313. 0. 0.3689 0.3318 0.07 -0.119
L 90. 0. 313. 0. 0.3689 0.3318 0.07 -0.119
90. 0. 321. 0. 0.364 0.3353 0.0733 -0.1032
80. 0. 321. 0. 0.364 0.3353 0.0733 -0.1032
L 80. 0. 329. 0. 0.3629 0.3823 0.0779 -0.0879
D 70. 0. 329. 0. 0.3629 0.3823 0.0779 -0.0879
D 70. 0. 335. 0. 0.3555 0.3864 0.0836 -0.0731
D 60. 0. 335. 0. 0.3555 0.3864 0.0836 -0.0731
D 60. 0. 341. 0. 0.3527 0.4083 0.0902 -0.059
D 50. 0. 341. 0. 0.3527 0.4083 0.0902 -0.059
D 50. 0. 345. 0. 0.3402 0.4135 0.0975 -0.0456
D 40. 0. 345. 0. 0.3402 0.4135 0.0975 -0.0456
D 40. 0. 349. 0. 0.3368 0.4726 0.1054 -0.033
D 30. 0. 349. 0. 0.3368 0.4726 0.1054 -0.033
D 30. 0. 353. 0. 0.3381 0.4786 0.1138 -0.0232
D 20. 0. 353. 0. 0.3381 0.4786 0.1138 -0.0232
D 20. 0. 356. 0. 0.3488 0.5463 0.1225 -0.0139
D 10. 0. 356. 0. 0.3488 0.5463 0.1225 -0.0139
D 10. 0. 358. 0. 0.2703 0.4611 0.1315 -0.0046
D 0. 0. 358. 0. 0.2703 0.4611 0.1315 -0.0046
C 180. 0. 0. 0. 0.94 0.8 0. 0.
C 175. 0. 0. 0. 4.36 1. 0. 0.
C 165. 0. 0. 0. 4.29 1. 0. 0.
C 155. 0. 0. 0. 4.83 1. 0. 0.
C 145. 0. 0. 0. 3.59 1. 0. 0.
C 135. 0. 0. 0. 3.94 1. 0. 0.
120. 0. 0. 0. 3.7 1. 0. 0.
C 50. 0. 0. 0. 0.14 0.2 0. 0.
) az 85 mph EIA 222 f
MAST LOADING
D 180. 0. 279. 30. 0.2458 0.1248 0.0725 -0.2107
D 173.33 0. 279. 30. 0.2458 0.1248 0.0725 -0.2107
D 173.33 0. 279. 30. 0.3107 0.1717 0.0725 -0.2084
D 166.66 0. 279. 30. 0.3107 0.1717 0.0725 -0.2084
D 166.66 0. 279. 30. 0.3804 0.2184 0.0725 -0.206
D 159.99 0. 279. 30. 0.3804 0.2184 0.0725 -0.206
D 159.99 0. 279. 30. 0.3834 0.2513 0.0725 -0.2036
D 140. 0. 279. 30. 0.3738 0.2514 0.0725 -0.1985
D 140. 0. 281. 30. 0.3754 0.2705 0.0715 -0.1975
D 133.33 0. 281. 30. 0.3754 0.2705 0.0715 -0.1975
D 133.33 0. 286. 30. 0.3722 0.2727 0.0699 -0.198
D 126.66 0. 286. 30. 0.3722 0.2727 0.0699 -0.198
D 126.66 0. 291. 30. 0.3697 0.2749 0.0688 -0.1984
D 119.99 0. 291. 30. 0.3697 0.2749 0.0688 -0.1984
D 119.99 0. 296. 30. 0.3769 0.295 0.0681 -0.1983
D 113.32 0. 296. 30. 0.3769 0.295 0.0681 -0.1983
D 113.32 0. 301. 30. 0.3748 0.2978 0.0681 -0.1982
D 106.65 0. 301. 30. 0.3748 0.2978 0.0681 -0.1982
D 106.65 0. 306. 30. 0.3728 0.3008 0.0685 -0.1978
D 100. 0. 306. 30. 0.3728 0.3008 0.0685 -0.1978
D 100. 0. 313. 30. 0.3689 0.3318 0.07 -0.1974
90. 0. 313. 30. 0.3689 0.3318 0.07 -0.1974
L 90. 0. 321. 30. 0.364 0.3353 0.0733 -0.1965
80. 0. 321. 30. 0.364 0.3353 0.0733 -0.1965
L 80. 0. 329. 30. 0.3629 0.3823 0.0779 -0.1947
D 70. 0. 329. 30. 0.3629 0.3823 0.0779 -0.1947
D 70. 0. 335. 30. 0.3555 0.3864 0.0836 -0.1917
D 60. 0. 335. 30. 0.3555 0.3864 0.0836 -0.1917

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D  60. 0. 341. 30. 0.3527 0.4083 0.0902 -0.1873
D  50. 0. 341. 30. 0.3527 0.4083 0.0902 -0.1873
   50. 0. 345. 30. 0.3402 0.4135 0.0975 -0.1812
D  40. 0. 345. 30. 0.3402 0.4135 0.0975 -0.1812
   40. 0. 349. 30. 0.3368 0.4726 0.1054 -0.1727
   30. 0. 349. 30. 0.3368 0.4726 0.1054 -0.1727
D  30. 0. 353. 30. 0.3381 0.4786 0.1138 -0.1738
D  20. 0. 353. 30. 0.3381 0.4786 0.1138 -0.1738
D  20. 0. 356. 30. 0.3488 0.5463 0.1225 -0.1776
D  10. 0. 356. 30. 0.3488 0.5463 0.1225 -0.1776
D  10. 0. 358. 30. 0.2703 0.4611 0.1315 -0.1816
D  0. 0. 358. 30. 0.2703 0.4611 0.1315 -0.1816
C  180. 0. 0. 30. 0.94 0.8 0. 0.
C  175. 0. 0. 30. 4.36 1. 0. 0.
C  165. 0. 0. 30. 4.29 1. 0. 0.
C  155. 0. 0. 30. 4.83 1. 0. 0.
C  145. 0. 0. 30. 3.59 1. 0. 0.
C  135. 0. 0. 30. 3.94 1. 0. 0.
C  120. 0. 0. 30. 3.7 1. 0. 0.
C  50. 0. 0. 30. 0.14 0.2 0. 0.
 60 az 85 mph EIA 222 f
 MAST LOADING
D  180. 0. 279. 60. 0.2458 0.1248 0.0725 -0.1299
D  173.33 0. 279. 60. 0.2458 0.1248 0.0725 -0.1299
D  173.33 0. 279. 60. 0.3107 0.1717 0.0725 -0.1285
D  166.66 0. 279. 60. 0.3107 0.1717 0.0725 -0.1285
D  166.66 0. 279. 60. 0.3804 0.2184 0.0725 -0.127
D  159.99 0. 279. 60. 0.3804 0.2184 0.0725 -0.127
   159.99 0. 279. 60. 0.3834 0.2513 0.0725 -0.1255
D  140. 0. 279. 60. 0.3738 0.2514 0.0725 -0.1224
   140. 0. 281. 60. 0.3754 0.2705 0.0715 -0.1246
D  133.33 0. 281. 60. 0.3754 0.2705 0.0715 -0.1246
D  133.33 0. 286. 60. 0.3722 0.2727 0.0699 -0.1307
D  126.66 0. 286. 60. 0.3722 0.2727 0.0699 -0.1307
D  126.66 0. 291. 60. 0.3697 0.2749 0.0688 -0.1364
D  119.99 0. 291. 60. 0.3697 0.2749 0.0688 -0.1364
D  119.99 0. 296. 60. 0.3769 0.295 0.0681 -0.1417
D  113.32 0. 296. 60. 0.3769 0.295 0.0681 -0.1417
D  113.32 0. 301. 60. 0.3748 0.2978 0.0681 -0.1468
D  106.65 0. 301. 60. 0.3748 0.2978 0.0681 -0.1468
D  106.65 0. 306. 60. 0.3728 0.3008 0.0685 -0.1515
D  100. 0. 306. 60. 0.3728 0.3008 0.0685 -0.1515
D  100. 0. 313. 60. 0.3689 0.3318 0.07 -0.1578
D  90. 0. 313. 60. 0.3689 0.3318 0.07 -0.1578
D  90. 0. 321. 60. 0.364 0.3353 0.0733 -0.165
D  80. 0. 321. 60. 0.364 0.3353 0.0733 -0.165
D  80. 0. 329. 60. 0.3629 0.3823 0.0779 -0.171
D  70. 0. 329. 60. 0.3629 0.3823 0.0779 -0.171
D  70. 0. 335. 60. 0.3555 0.3864 0.0836 -0.1754
D  60. 0. 335. 60. 0.3555 0.3864 0.0836 -0.1754
D  60. 0. 341. 60. 0.3527 0.4083 0.0902 -0.1779
D  50. 0. 341. 60. 0.3527 0.4083 0.0902 -0.1779
D  50. 0. 345. 60. 0.3402 0.4135 0.0975 -0.1782
D  40. 0. 345. 60. 0.3402 0.4135 0.0975 -0.1782
D  40. 0. 349. 60. 0.3368 0.4726 0.1054 -0.1753
D  30. 0. 349. 60. 0.3368 0.4726 0.1054 -0.1753
D  30. 0. 353. 60. 0.3381 0.4786 0.1138 -0.1816
D  20. 0. 353. 60. 0.3381 0.4786 0.1138 -0.1816
D  20. 0. 356. 60. 0.3488 0.5463 0.1225 -0.1907
D  10. 0. 356. 60. 0.3488 0.5463 0.1225 -0.1907
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D  10. 0. 358. 60. 0.2703 0.4611 0.1315 -0.2
D  0. 0. 358. 60. 0.2703 0.4611 0.1315 -0.2
   180. 0. 0. 60. 0.94 0.8 0. 0.
C  175. 0. 0. 60. 4.36 1. 0. 0.
C  165. 0. 0. 60. 4.29 1. 0. 0.
   155. 0. 0. 60. 4.83 1. 0. 0.
C  145. 0. 0. 60. 3.59 1. 0. 0.
C  135. 0. 0. 60. 3.94 1. 0. 0.
C  120. 0. 0. 60. 3.7 1. 0. 0.
C  50. 0. 0. 60. 0.14 0.2 0. 0.
 90 az 85 mph EIA 222 f
 MAST LOADING
D  180. 0. 279. 90. 0.2458 0.1248 0.0725 0.015
D  173.33 0. 279. 90. 0.2458 0.1248 0.0725 0.015
D  173.33 0. 279. 90. 0.3107 0.1717 0.0725 0.0148
D  166.66 0. 279. 90. 0.3107 0.1717 0.0725 0.0148
D  166.66 0. 279. 90. 0.3804 0.2184 0.0725 0.0146
D  159.99 0. 279. 90. 0.3804 0.2184 0.0725 0.0146
D  159.99 0. 279. 90. 0.3834 0.2513 0.0725 0.0145
D  140. 0. 279. 90. 0.3738 0.2514 0.0725 0.0141
D  140. 0. 281. 90. 0.3754 0.2705 0.0715 0.0075
D  133.33 0. 281. 90. 0.3754 0.2705 0.0715 0.0075
D  133.33 0. 286. 90. 0.3722 0.2727 0.0699 -0.0053
D  126.66 0. 286. 90. 0.3722 0.2727 0.0699 -0.0053
D  126.66 0. 291. 90. 0.3697 0.2749 0.0688 -0.0176
D  119.99 0. 291. 90. 0.3697 0.2749 0.0688 -0.0176
D  119.99 0. 296. 90. 0.3769 0.295 0.0681 -0.0296
D  113.32 0. 296. 90. 0.3769 0.295 0.0681 -0.0296
   113.32 0. 301. 90. 0.3748 0.2978 0.0681 -0.0411
D  106.65 0. 301. 90. 0.3748 0.2978 0.0681 -0.0411
   106.65 0. 306. 90. 0.3728 0.3008 0.0685 -0.0522
D  100. 0. 306. 90. 0.3728 0.3008 0.0685 -0.0522
D  100. 0. 313. 90. 0.3689 0.3318 0.07 -0.0669
D  90. 0. 313. 90. 0.3689 0.3318 0.07 -0.0669
D  90. 0. 321. 90. 0.364 0.3353 0.0733 -0.0846
D  80. 0. 321. 90. 0.364 0.3353 0.0733 -0.0846
D  80. 0. 329. 90. 0.3629 0.3823 0.0779 -0.1006
D  70. 0. 329. 90. 0.3629 0.3823 0.0779 -0.1006
D  70. 0. 335. 90. 0.3555 0.3864 0.0836 -0.1149
D  60. 0. 335. 90. 0.3555 0.3864 0.0836 -0.1149
D  60. 0. 341. 90. 0.3527 0.4083 0.0902 -0.1269
D  50. 0. 341. 90. 0.3527 0.4083 0.0902 -0.1269
D  50. 0. 345. 90. 0.3402 0.4135 0.0975 -0.1363
D  40. 0. 345. 90. 0.3402 0.4135 0.0975 -0.1363
D  40. 0. 349. 90. 0.3368 0.4726 0.1054 -0.1422
D  30. 0. 349. 90. 0.3368 0.4726 0.1054 -0.1422
D  30. 0. 353. 90. 0.3381 0.4786 0.1138 -0.1548
D  20. 0. 353. 90. 0.3381 0.4786 0.1138 -0.1548
D  20. 0. 356. 90. 0.3488 0.5463 0.1225 -0.1697
D  10. 0. 356. 90. 0.3488 0.5463 0.1225 -0.1697
D  10. 0. 358. 90. 0.2703 0.4611 0.1315 -0.1848
D  0. 0. 358. 90. 0.2703 0.4611 0.1315 -0.1848
C  180. 0. 0. 90. 0.94 0.8 0. 0.
C  175. 0. 0. 90. 4.36 1. 0. 0.
C  165. 0. 0. 90. 4.29 1. 0. 0.
C  155. 0. 0. 90. 4.83 1. 0. 0.
C  145. 0. 0. 90. 3.59 1. 0. 0.
C  135. 0. 0. 90. 3.94 1. 0. 0.
C  120. 0. 0. 90. 3.7 1. 0. 0.
C  50. 0. 0. 90. 0.14 0.2 0. 0.
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  0 az 74 mph EIA 222 f WITH 1/2" ICE
  MAST LOADING
    180. 0. 279. 0. 0.2232 0.1909 0.1099 -0.1745
D   173.33 0. 279. 0. 0.2232 0.1909 0.1099 -0.1745
    173.33 0. 279. 0. 0.2928 0.2928 0.1099 -0.1726
    166.66 0. 279. 0. 0.2928 0.2928 0.1099 -0.1726
D   166.66 0. 279. 0. 0.4208 0.3944 0.1099 -0.1707
D   159.99 0. 279. 0. 0.4208 0.3944 0.1099 -0.1707
D   159.99 0. 279. 0. 0.4251 0.4292 0.1099 -0.1686
D   140. 0. 279. 0. 0.4145 0.4293 0.1099 -0.1644
D   140. 0. 281. 0. 0.4084 0.451 0.1084 -0.1587
D   133.33 0. 281. 0. 0.4084 0.451 0.1084 -0.1587
D   133.33 0. 286. 0. 0.3932 0.4544 0.1059 -0.1497
D   126.66 0. 286. 0. 0.3932 0.4544 0.1059 -0.1497
D   126.66 0. 291. 0. 0.3818 0.4578 0.1042 -0.1409
D   119.99 0. 291. 0. 0.3818 0.4578 0.1042 -0.1409
D   119.99 0. 296. 0. 0.3817 0.485 0.1033 -0.1319
D   113.32 0. 296. 0. 0.3817 0.485 0.1033 -0.1319
D   113.32 0. 301. 0. 0.3741 0.4892 0.1031 -0.1233
D   106.65 0. 301. 0. 0.3741 0.4892 0.1031 -0.1233
D   106.65 0. 306. 0. 0.3678 0.4937 0.1038 -0.1148
D   100. 0. 306. 0. 0.3678 0.4937 0.1038 -0.1148
D   100. 0. 313. 0. 0.3587 0.5243 0.1061 -0.1037
D   90. 0. 313. 0. 0.3587 0.5243 0.1061 -0.1037
D   90. 0. 321. 0. 0.3497 0.5294 0.111 -0.0899
D   80. 0. 321. 0. 0.3497 0.5294 0.111 -0.0899
D   80. 0. 329. 0. 0.3443 0.5814 0.118 -0.0766
    70. 0. 329. 0. 0.3443 0.5814 0.118 -0.0766
    70. 0. 335. 0. 0.3351 0.5873 0.1266 -0.0637
D   60. 0. 335. 0. 0.3351 0.5873 0.1266 -0.0637
    60. 0. 341. 0. 0.3292 0.6161 0.1366 -0.0514
D   50. 0. 341. 0. 0.3292 0.6161 0.1366 -0.0514
D   50. 0. 345. 0. 0.3164 0.6235 0.1477 -0.0397
D   40. 0. 345. 0. 0.3164 0.6235 0.1477 -0.0397
D   40. 0. 349. 0. 0.3098 0.6925 0.1597 -0.0288
D   30. 0. 349. 0. 0.3098 0.6925 0.1597 -0.0288
D   30. 0. 353. 0. 0.3103 0.7008 0.1724 -0.0202
D   20. 0. 353. 0. 0.3103 0.7008 0.1724 -0.0202
D   20. 0. 356. 0. 0.3185 0.7766 0.1856 -0.0121
D   10. 0. 356. 0. 0.3185 0.7766 0.1856 -0.0121
D   10. 0. 358. 0. 0.2347 0.5841 0.1992 -0.004
D   0. 0. 358. 0. 0.2347 0.5841 0.1992 -0.004
C   180. 0. 0. 0. 1.17 1. 0. 0.
C   175. 0. 0. 0. 4.36 1. 0. 0.
C   165. 0. 0. 0. 4.29 1. 0. 0.
C   155. 0. 0. 0. 4.8 1. 0. 0.
C   145. 0. 0. 0. 3.72 1. 0. 0.
C   135. 0. 0. 0. 3.96 1. 0. 0.
C   120. 0. 0. 0. 3.76 1. 0. 0.
C   50. 0. 0. 0. 0.14 0.35 0. 0.
  30 az 74 mph EIA 222 f WITH 1/2" ICE
  MAST LOADING
D   180. 0. 279. 30. 0.2232 0.1909 0.1099 -0.1836
    173.33 0. 279. 30. 0.2232 0.1909 0.1099 -0.1836
D   173.33 0. 279. 30. 0.2928 0.2928 0.1099 -0.1816
    166.66 0. 279. 30. 0.2928 0.2928 0.1099 -0.1816
D   166.66 0. 279. 30. 0.4208 0.3944 0.1099 -0.1795
D   159.99 0. 279. 30. 0.4208 0.3944 0.1099 -0.1795
D   159.99 0. 279. 30. 0.4251 0.4292 0.1099 -0.1774
D   140. 0. 279. 30. 0.4145 0.4293 0.1099 -0.1729
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D  140. 0. 281. 30. 0.4084 0.451 0.1084 -0.172
D  133.33 0. 281. 30. 0.4084 0.451 0.1084 -0.172
   133.33 0. 286. 30. 0.3932 0.4544 0.1059 -0.1723
D  126.66 0. 286. 30. 0.3932 0.4544 0.1059 -0.1723
   126.66 0. 291. 30. 0.3818 0.4578 0.1042 -0.1725
   119.99 0. 291. 30. 0.3818 0.4578 0.1042 -0.1725
D  119.99 0. 296. 30. 0.3817 0.485 0.1033 -0.1723
D  113.32 0. 296. 30. 0.3817 0.485 0.1033 -0.1723
D  113.32 0. 301. 30. 0.3741 0.4892 0.1031 -0.1721
D  106.65 0. 301. 30. 0.3741 0.4892 0.1031 -0.1721
D  106.65 0. 306. 30. 0.3678 0.4937 0.1038 -0.1717
D  100. 0. 306. 30. 0.3678 0.4937 0.1038 -0.1717
D  100. 0. 313. 30. 0.3587 0.5243 0.1061 -0.1714
D  90. 0. 313. 30. 0.3587 0.5243 0.1061 -0.1714
D  90. 0. 321. 30. 0.3497 0.5294 0.111 -0.1704
D  80. 0. 321. 30. 0.3497 0.5294 0.111 -0.1704
D  80. 0. 329. 30. 0.3443 0.5814 0.118 -0.1686
D  70. 0. 329. 30. 0.3443 0.5814 0.118 -0.1686
D  70. 0. 335. 30. 0.3351 0.5873 0.1266 -0.1659
D  60. 0. 335. 30. 0.3351 0.5873 0.1266 -0.1659
D  60. 0. 341. 30. 0.3292 0.6161 0.1366 -0.1619
D  50. 0. 341. 30. 0.3292 0.6161 0.1366 -0.1619
D  50. 0. 345. 30. 0.3164 0.6235 0.1477 -0.1566
D  40. 0. 345. 30. 0.3164 0.6235 0.1477 -0.1566
D  40. 0. 349. 30. 0.3098 0.6925 0.1597 -0.1491
D  30. 0. 349. 30. 0.3098 0.6925 0.1597 -0.1491
D  30. 0. 353. 30. 0.3103 0.7008 0.1724 -0.1499
   20. 0. 353. 30. 0.3103 0.7008 0.1724 -0.1499
   20. 0. 356. 30. 0.3185 0.7766 0.1856 -0.1531
   10. 0. 356. 30. 0.3185 0.7766 0.1856 -0.1531
   10. 0. 358. 30. 0.2347 0.5841 0.1992 -0.1564
D  0. 0. 358. 30. 0.2347 0.5841 0.1992 -0.1564
C  180. 0. 0. 30. 1.17 1. 0. 0.
C  175. 0. 0. 30. 4.36 1. 0. 0.
C  165. 0. 0. 30. 4.29 1. 0. 0.
C  155. 0. 0. 30. 4.8 1. 0. 0.
C  145. 0. 0. 30. 3.72 1. 0. 0.
C  135. 0. 0. 30. 3.96 1. 0. 0.
C  120. 0. 0. 30. 3.76 1. 0. 0.
C  50. 0. 0. 30. 0.14 0.35 0. 0.
 60 az 74 mph EIA 222 f WITH 1/2" ICE
 MAST LOADING
D  180. 0. 279. 60. 0.2232 0.1909 0.1099 -0.1131
D  173.33 0. 279. 60. 0.2232 0.1909 0.1099 -0.1131
D  173.33 0. 279. 60. 0.2928 0.2928 0.1099 -0.1118
D  166.66 0. 279. 60. 0.2928 0.2928 0.1099 -0.1118
D  166.66 0. 279. 60. 0.4208 0.3944 0.1099 -0.1106
D  159.99 0. 279. 60. 0.4208 0.3944 0.1099 -0.1106
D  159.99 0. 279. 60. 0.4251 0.4292 0.1099 -0.1093
D  140. 0. 279. 60. 0.4145 0.4293 0.1099 -0.1065
D  140. 0. 281. 60. 0.4084 0.451 0.1084 -0.1085
D  133.33 0. 281. 60. 0.4084 0.451 0.1084 -0.1085
D  133.33 0. 286. 60. 0.3932 0.4544 0.1059 -0.1138
D  126.66 0. 286. 60. 0.3932 0.4544 0.1059 -0.1138
D  126.66 0. 291. 60. 0.3818 0.4578 0.1042 -0.1188
D  119.99 0. 291. 60. 0.3818 0.4578 0.1042 -0.1188
D  119.99 0. 296. 60. 0.3817 0.485 0.1033 -0.1234
D  113.32 0. 296. 60. 0.3817 0.485 0.1033 -0.1234
D  113.32 0. 301. 60. 0.3741 0.4892 0.1031 -0.1278
D  106.65 0. 301. 60. 0.3741 0.4892 0.1031 -0.1278
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D  106.65 0. 306. 60. 0.3678 0.4937 0.1038 -0.1319
D  100. 0. 306. 60. 0.3678 0.4937 0.1038 -0.1319
   100. 0. 313. 60. 0.3587 0.5243 0.1061 -0.1375
D  90. 0. 313. 60. 0.3587 0.5243 0.1061 -0.1375
   90. 0. 321. 60. 0.3497 0.5294 0.111 -0.1438
   80. 0. 321. 60. 0.3497 0.5294 0.111 -0.1438
D  80. 0. 329. 60. 0.3443 0.5814 0.118 -0.149
D  70. 0. 329. 60. 0.3443 0.5814 0.118 -0.149
D  70. 0. 335. 60. 0.3351 0.5873 0.1266 -0.1529
D  60. 0. 335. 60. 0.3351 0.5873 0.1266 -0.1529
D  60. 0. 341. 60. 0.3292 0.6161 0.1366 -0.1551
D  50. 0. 341. 60. 0.3292 0.6161 0.1366 -0.1551
D  50. 0. 345. 60. 0.3164 0.6235 0.1477 -0.1553
D  40. 0. 345. 60. 0.3164 0.6235 0.1477 -0.1553
D  40. 0. 349. 60. 0.3098 0.6925 0.1597 -0.1528
D  30. 0. 349. 60. 0.3098 0.6925 0.1597 -0.1528
D  30. 0. 353. 60. 0.3103 0.7008 0.1724 -0.1583
D  20. 0. 353. 60. 0.3103 0.7008 0.1724 -0.1583
D  20. 0. 356. 60. 0.3185 0.7766 0.1856 -0.1663
D  10. 0. 356. 60. 0.3185 0.7766 0.1856 -0.1663
D  10. 0. 358. 60. 0.2347 0.5841 0.1992 -0.1744
D  0. 0. 358. 60. 0.2347 0.5841 0.1992 -0.1744
C  180. 0. 0. 60. 1.17 1. 0. 0.
C  175. 0. 0. 60. 4.36 1. 0. 0.
C  165. 0. 0. 60. 4.29 1. 0. 0.
C  155. 0. 0. 60. 4.8 1. 0. 0.
C  145. 0. 0. 60. 3.72 1. 0. 0.
   135. 0. 0. 60. 3.96 1. 0. 0.
   120. 0. 0. 60. 3.76 1. 0. 0.
C  50. 0. 0. 60. 0.14 0.35 0. 0.
   ) az 74 mph EIA 222 f WITH 1/2" ICE
 MAST LOADING
D  180. 0. 279. 90. 0.2232 0.1909 0.1099 0.011
D  173.33 0. 279. 90. 0.2232 0.1909 0.1099 0.011
D  173.33 0. 279. 90. 0.2928 0.2928 0.1099 0.0108
D  166.66 0. 279. 90. 0.2928 0.2928 0.1099 0.0108
D  166.66 0. 279. 90. 0.4208 0.3944 0.1099 0.0107
D  159.99 0. 279. 90. 0.4208 0.3944 0.1099 0.0107
D  159.99 0. 279. 90. 0.4251 0.4292 0.1099 0.0106
D  140. 0. 279. 90. 0.4145 0.4293 0.1099 0.0103
D  140. 0. 281. 90. 0.4084 0.451 0.1084 0.0046
D  133.33 0. 281. 90. 0.4084 0.451 0.1084 0.0046
D  133.33 0. 286. 90. 0.3932 0.4544 0.1059 -0.0066
D  126.66 0. 286. 90. 0.3932 0.4544 0.1059 -0.0066
D  126.66 0. 291. 90. 0.3818 0.4578 0.1042 -0.0175
D  119.99 0. 291. 90. 0.3818 0.4578 0.1042 -0.0175
D  119.99 0. 296. 90. 0.3817 0.485 0.1033 -0.0279
D  113.32 0. 296. 90. 0.3817 0.485 0.1033 -0.0279
D  113.32 0. 301. 90. 0.3741 0.4892 0.1031 -0.038
D  106.65 0. 301. 90. 0.3741 0.4892 0.1031 -0.038
D  106.65 0. 306. 90. 0.3678 0.4937 0.1038 -0.0477
D  100. 0. 306. 90. 0.3678 0.4937 0.1038 -0.0477
D  100. 0. 313. 90. 0.3587 0.5243 0.1061 -0.0607
   90. 0. 313. 90. 0.3587 0.5243 0.1061 -0.0607
D  90. 0. 321. 90. 0.3497 0.5294 0.111 -0.0761
   80. 0. 321. 90. 0.3497 0.5294 0.111 -0.0761
D  80. 0. 329. 90. 0.3443 0.5814 0.118 -0.0902
D  70. 0. 329. 90. 0.3443 0.5814 0.118 -0.0902
D  70. 0. 335. 90. 0.3351 0.5873 0.1266 -0.1026
D  60. 0. 335. 90. 0.3351 0.5873 0.1266 -0.1026
```

```
D  60. 0. 341. 90. 0.3292 0.6161 0.1366 -0.1131
D  50. 0. 341. 90. 0.3292 0.6161 0.1366 -0.1131
   50. 0. 345. 90. 0.3164 0.6235 0.1477 -0.1213
D  40. 0. 345. 90. 0.3164 0.6235 0.1477 -0.1213
   40. 0. 349. 90. 0.3098 0.6925 0.1597 -0.1264
   30. 0. 349. 90. 0.3098 0.6925 0.1597 -0.1264
D  30. 0. 353. 90. 0.3103 0.7008 0.1724 -0.1375
D  20. 0. 353. 90. 0.3103 0.7008 0.1724 -0.1375
D  20. 0. 356. 90. 0.3185 0.7766 0.1856 -0.1506
D  10. 0. 356. 90. 0.3185 0.7766 0.1856 -0.1506
D  10. 0. 358. 90. 0.2347 0.5841 0.1992 -0.1638
D  0. 0. 358. 90. 0.2347 0.5841 0.1992 -0.1638
C  180. 0. 0. 90. 1.17 1. 0. 0.
C  175. 0. 0. 90. 4.36 1. 0. 0.
C  165. 0. 0. 90. 4.29 1. 0. 0.
C  155. 0. 0. 90. 4.8 1. 0. 0.
C  145. 0. 0. 90. 3.72 1. 0. 0.
C  135. 0. 0. 90. 3.96 1. 0. 0.
C  120. 0. 0. 90. 3.76 1. 0. 0.
C  50. 0. 0. 90. 0.14 0.35 0. 0.
```

END OF FILE

ELAPSED CPU TIME 0.23 SECONDS.