



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

September 25, 2008

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

RE: **EM-VER-111-080821** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 171 Town Hill Road, Plymouth, Connecticut.

Dear Attorney Baldwin:

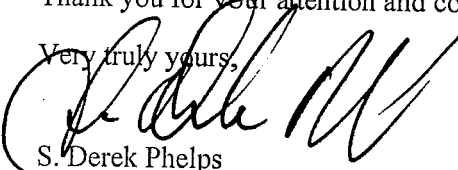
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated August 21, 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/jb

c: The Honorable Vincent Festa, Jr., Mayor, Town of Plymouth
William Kuehn, Town Planner, Town of Plymouth
Hans Fiedler, T-Mobile

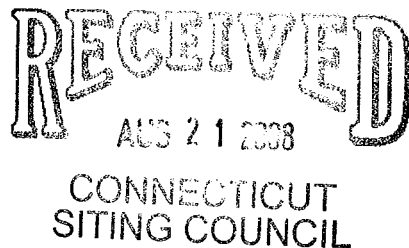
EM-VER-111-080821

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

August 21, 2008

Via Hand Delivery

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



Re: **Notice of Exempt Modification – Antenna Swap
171 Town Hill Road, Plymouth, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains a wireless telecommunications facility, with antennas at the 135-foot level on an existing 169-foot tower at 171 Town Hill Road in Plymouth, Connecticut. The tower is owned by T-Mobile. The Council approved Cellco’s shared use of this facility on October 29, 2003. Other carriers sharing this tower include T-Mobile at 165 feet; Sprint Nextel at 155 feet; and Alltel at 145 feet.

As you and the Council are aware, on May 30, 2008, Cellco acquired Alltel’s CT-1 RSA cellular license for Litchfield County Connecticut. Cellco now intends to remove its twelve PCS antennas from the 135-foot level and Alltel’s twelve cellular antennas from the 145-foot level on the existing tower and install six (6) LPA-80080/6CF cellular antennas and six (6) DB950F85E-M PCS antennas at the 145-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Vincent Festa, Jr., Mayor of the Town of Plymouth. Pursuant to a Council directive, a copy of this letter is being sent to Terryville Country Fair, Inc., the owner of the property on which the tower is located.

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



Law Offices

BOSTON

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

SARASOTA

www.rc.com

HART1-1484111-1

ROBINSON & COLE_{LLP}

S. Derek Phelps
August 21, 2008
Page 2

1. The proposed modifications will not result in the increase in the overall height of the existing structure. Cellco's replacement antennas will be located at the 145-foot level of the 169-foot tower.

2. The proposed modifications will not require a change to any of Cellco's ground-mounted equipment and, therefore, no extension of the site boundaries is required. Alltel's ground mounted equipment will be removed from of the existing site compound.

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 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:

Vincent Festa, Jr., Plymouth Mayor
Terryville Country Fair, Inc.
Sandy M. Carter



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)		
	>216 km/hr	>134 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

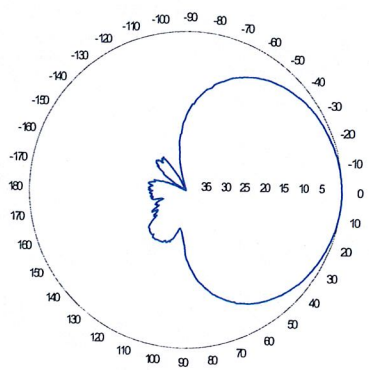
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

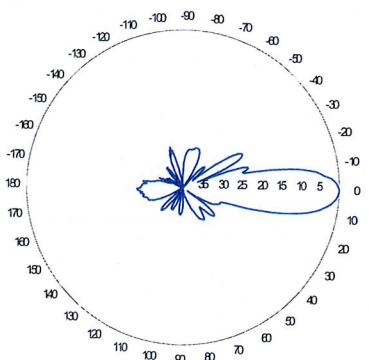
Electrical specifications

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 pattern¹⁾



Horizontal

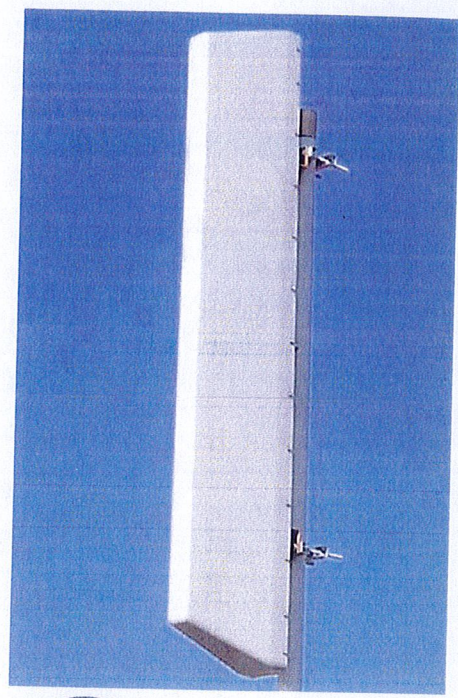


Vertical

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 bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

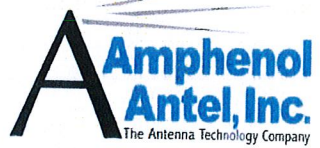
This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

806-960 MHz

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.



HORIZONTAL BEAMWIDTH	85°	85°	85°	85°
FREQUENCY RANGE	1850-1990 MHz	1850-1990 MHz	1850-1990 MHz	1850-1990 MHz
	16.5 dBi / 4° Tilt	15.9 dBi / 6° Tilt	17 dBi / 0° Tilt	17.7 dBi / 0° Tilt
MODEL	948G85T4E-M	948F85T6E-M	DB950F85E-M	DB950G85E-M
TYPE	Directed Dipole®	Directed Dipole®	Directed Dipole®	Directed Dipole®

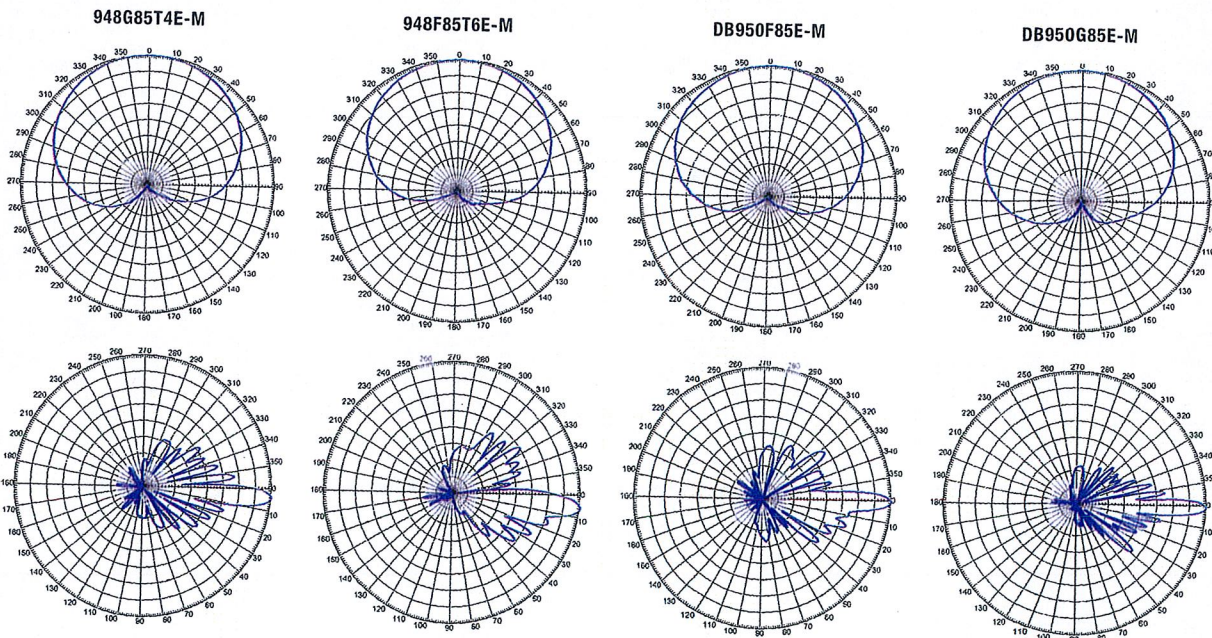
ELECTRICAL SPECIFICATIONS				
Frequency Range (MHz)	1850-1990	1850-1990	1850-1990	1850-1990
Gain (dBd/dBi)	14.4 / 16.5	13.8 / 15.9	14.9 / 17	15.6 / 17.7
Horizontal Beamwidth (Deg.)	85	85	85	85
Elevation Beamwidth (Deg.)	7	8	6.5	6
USLS (dB)	N/A	>20	>18	N/A
Null Fill (dB) - Below Peak	N/A	15	12	N/A
Beam Tilt (Deg.)	4	6	0	0
VSWR	<1.33:1	<1.33:1	<1.33:1	<1.33:1
Front-To-Back Ratio (dB)	40	40	40	40
Isolation (dB)	N/A	N/A	N/A	N/A
Max. Input Power (Watts)	250	250	250	250
Polarization	Vertical	Vertical	Vertical	Vertical
Connector Location	Bottom	Bottom	Bottom	Bottom
Connector Type	7-16 DIN - Female	7-16 DIN - Female	7-16 DIN - Female	7-16 DIN - Female

MECHANICAL SPECIFICATIONS				
Length (inch/mm)	48 / 1,219	48 / 1,219	60 / 1,524	60 / 1,524
Width (inch/mm)	3.5 / 89	3.5 / 89	3.5 / 89	3.5 / 89
Depth (inch/mm)	7 / 178	7 / 178	7 / 178	7 / 178
Net Weight (lbs/kg)	8.5 / 3.9	8.5 / 3.9	11.5 / 5.2	11.5 / 5.2
Max. Flat Plate Area (ft²/m²)	1.18 / 0.11	1.18 / 0.11	1.51 / 0.14	1.51 / 0.14
Max. Wind Load at 100 mph (lbf/N)	65 / 285	65 / 285	84 / 373	84 / 373
Max. Wind Speed (mph/kmh)	125 / 201	125 / 201	125 / 201	125 / 201
Radome Material	ABS, UV Resistant	ABS, UV Resistant	ABS, UV Resistant	ABS, UV Resistant
Reflector Material	Pass. Aluminum	Pass. Aluminum	Pass. Aluminum	Pass. Aluminum
Radiator Material	Low Loss Circuit Board	Low Loss Circuit Board	Low Loss Circuit Board	Low Loss Circuit Board
Hardware Material	Galvanized Steel	Galvanized Steel	Galvanized Steel	Galvanized Steel
Color	Light Gray	Light Gray	Light Gray	Light Gray
Std. Mounting Hardware	DB390	DB390	DB390	DB390
Optional Downtilt Kit	DB5098	DB5098	DB5098	DB5098
Optional Special Mounting	DB5094-AZ	DB5094-AZ	DB5094-AZ	DB5094-AZ

Specifications are subject to change. Please see our website for the latest information.
*TELETILT® compatible.

Azimuth Pattern

Elevation Pattern



Scale: 10° radials, 5 dB per division

		General		Power		Density							
Site Name: Plymouth													
Tower Height: Verizon @ 145ft													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*Sprint	11	492.18	155	0.0810	1962.5	1.0000	8.10%						
*T-Mobile	8	95	165	0.0131	1935	1.0000	1.31%						
*Town	1	500	178	0.0057	147.32	0.2000	2.84%						
*Town	1	500	178	0.0057	224.78	0.2000	2.84%						
*Town	1	500	178	0.0057	50.39	0.2000	2.84%						
*Town	1	500	80	0.0281	425	0.2833	9.91%						
*Nextel	12	500	178	0.0057	442.3	0.2949	1.92%						
*Cingular	6	100	119	0.0305	851	0.5673	5.37%						
*Cingular	3	296	115	0.0483	880	0.5867	8.23%						
Verizon	9	427	115	0.0348	1930	1.0000	3.48%						
Verizon	9	485	145	0.0746	1970	1.0000	7.46%						
Verizon	9	200	145	0.0308	875	0.5830	5.28%						
* Source: Siting Council													59.60%



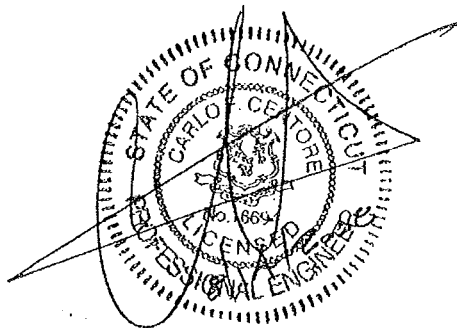
Structural Analysis Report

169' Existing Monopole

*171 Town Hill Road
Plymouth, CT*

Natcomm Project No. 08007.CO22

Date: August 14, 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

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PIROD Monopole
Plymouth, CT
August 14, 2008

Table of Contents

SECTION 1 - REPORT

- INTRODUCTION.
- ANTENNA AND APPURTENANCE SUMMARY.
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS.
- ANALYSIS.
- TOWER LOADING.
- ALLOWABLE STRESSES.
- FOUNDATION AND ANCHORS.
- CONCLUSION.

SECTION 2 - CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS.
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM.

SECTION 3 - CALCULATIONS

- RISATower INPUT/OUTPUT SUMMARY.
- RISATower DETAILED OUTPUT.
- ANCHOR BOLT AND BASE PLATE ANALYSIS.
- MONOPOLE FOUNDATION ANALYSIS.

SECTION 4 - REFERENCE MATERIALS

- PIROD'S STRUCTURE AND FOUNDATION DRAWINGS.
- SEMAAN ENGINEERING SOLUTIONS STRUCTURAL ANALYSIS
- RF ANTENNA CUT SHEET.

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PiROD Monopole
Plymouth, CT
August 14, 2008

Introduction

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna installation proposed by Verizon Wireless on the existing monopole (tower) located in Plymouth, Connecticut. The host tower is a 169-ft, six section, eighteen sided, tapered monopole originally designed and manufactured by PiROD; drawing no. 150737-B dated September 1, 2000. The tower geometry, structure member sizes, antenna and appurtenance information were taken from the aforementioned PiROD drawing and a structural analysis report prepared by Semaan Engineering Solutions, dated March 21, 2005. PiROD's structure and foundation drawing and the Semaan's structural analysis report are available for reference in section 4 of this report.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- **TOWN (EXISTING):**
Antennas: One (1) PD455-5, one (1) PD220, one (1) SRL-229 and one (1) ACP305 panel antennas mounted on three (3) 4' side mount standoffs with a RAD center elevation of 169-ft above grade level.
Coax Cables: Four (4) 1-5/8" \varnothing coax cables running on the inside of the existing tower.
- **T-MOBILE (EXISTING/RESERVED):**
Antennas: Twelve (12) RR65-19-00DP panel antennas (3 existing / 9 reserved) mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 165-ft above grade level.
Coax Cables: Twenty-four (24) 1-5/8" \varnothing coax cables running on the inside of the existing tower.
- **SPRINT (EXISTING/RESERVED):**
Antennas: Nine (9) Decibel DB980H90E-M panel antennas (6 existing / 3 reserved) on a PiROD 13-ft low profile platform with a RAD center elevation of 155-ft above grade level.
Coax Cables: Nine (9) 1-5/8" \varnothing coax cables running on the inside of the existing tower.
- **AT&T (EXISTING TO BE REMOVED):**
Antennas: Three (3) Powerwave 7770.00 panel antennas mounted with a RAD center elevation of 145-ft above grade level and related coax to be removed.

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PiROD Monopole
Plymouth, CT
August 14, 2008

- **VERIZON (PROPOSED):**
Antennas: Six (6) Decibel DB950F85E-M panel antennas and six (6) LPA-80080/6CF panel antennas mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 145-ft above grade level.
Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on the inside of the existing tower.
- **VERIZON (EXISTING TO BE REMOVED):**
Antennas: Twelve (12) Decibel DB950F85E-M panel antennas mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 135-ft above grade level and related coax to be removed.
- **NEXTEL (EXISTING):**
Antennas: Twelve (12) Decibel DB844H90E-XY panel antennas mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 125-ft above grade level.
Coax Cables: Fifteenth (15) 1-5/8" Ø coax cables running on the outside of the existing tower.
- **TOWN (EXISTING):**
Antennas: One (1) PD455-5 panel antenna mounted on a 4' side mount standoff with a RAD center elevation of 122-ft above grade level.
Coax Cables: One (1) 7/8" Ø coax cable running on the inside of the existing tower.
- **AT&T (EXISTING):**
Antennas: Six (6) Powerwave 7770.00 panel antennas, six (6) LGP21401 trmas, and six (6) LGP13519 Diplexers mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 115-ft above grade level.
Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on the outside of the existing tower.
- **TOWN (EXISTING):**
Antennas: One (1) PD455-5 panel antenna mounted on a 4' side mount standoff with a RAD center elevation of 80-ft above grade level.
Coax Cables: One (1) 7/8" Ø coax cable running on the inside of the existing tower.

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PiROD Monopole
Plymouth, CT
August 14, 2008

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 installed within tower.
- A new porthole will not be required.

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 shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 80mph 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).

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PiROD Monopole
Plymouth, CT
August 14, 2008

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 1/2" radial ice tower structure and its components.

Basic Wind Speed:	Litchfield; v = 77.5 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	Plymouth; v = 95 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	[Appendix K of the 2005 CT Building Code Supplement]
	TIA/EIA-22-F-96 wind speed controls	
Load Cases:	<u>Load Case 1</u> ; 80 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]
	<u>Load Case 2</u> ; 69 mph wind speed w/ 1/2" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1610.1.3 of State Bldg. Code 2005] does not control in the design of this structure type

Allowable Stresses

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 1, per RISATower "Section Capacity Table", this tower was found to be at 77.3% of its total capacity.

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PIROD Monopole
Plymouth, CT
August 14, 2008

Foundation and Anchors

The existing foundation consists of a 8'x8'x6.5' reinforced concrete pedestal bearing on a 27'x27'x2.5 pad bearing directly on existing sub grade. The monopole tower is connected to the pedestal by means of forty-five (45) 1-1/4" \emptyset A615-GR75 anchor bolts embedded 6-ft 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 1 were used in the verification of the foundation and its anchors:
 - Shear Force @ top of pedestal = 32.6 kips
 - Moment @ top of pedestal = 3531.0 ft-kips
 - Axial Force @ top of pedestal = 52.0 kips
- The base plate, anchor bolts and the foundation are 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

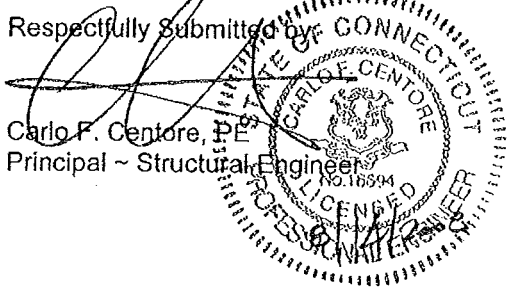
This analysis shows that the subject tower is adequate to support the proposed antennas and associated hardware.

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



Natcomm, Inc.
Structural Monopole Analysis
169' Existing PiROD Monopole
Plymouth, CT
August 14, 2008

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 feedline 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 are performed, results obtained, and recommendations made 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.

Natcomm, Inc.
Structural Monopole Analysis
169' Existing PIROD Monopole
Plymouth, CT
August 14, 2008

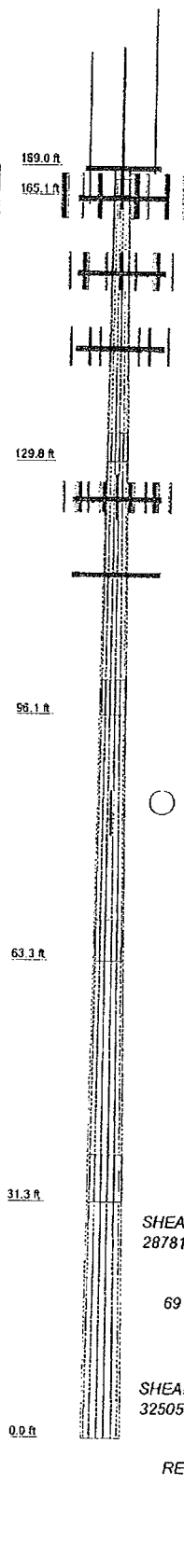
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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.

Section	Length (ft)	Number of Sticks	Thickness (in)	Lap Splice (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	3.82	18	0.2500	2.17	24.8638	25.0000	A572-65	266.2
2	37.50	18	0.3125	3.43	24.8638	33.9800	A572-65	3684.3
3	37.50	18	0.3750	4.67	32.4232	41.8100	A572-65	5585.2
4	37.50	18	0.3750	5.50	39.7167	48.9200	A572-65	6674.2
5	37.50	18	0.3750	6.25	46.8202	56.0200	A572-65	7752.8
6	37.50	18	0.3750	53.7367	52.9300		A572-65	8602.8
								32745.4



DESIGNED APPURTENANCE LOADING

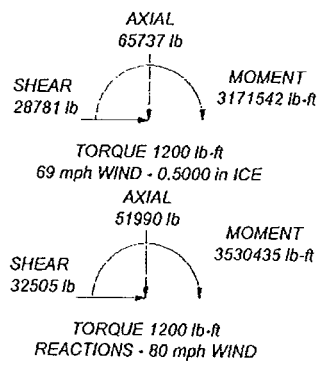
TYPE	ELEVATION	TYPE	ELEVATION
4' Side Mount Standoff	169	LPA-80080/BCF (Verizon)	145
4' Side Mount Standoff	169	Low Profile Platform (Verizon)	145
4' Side Mount Standoff	169	LPA-80080/BCF (Verizon)	145
PD455-5	169	DB950F85E-M (Verizon)	145
PD220	169	DB950F85E-M (Verizon)	145
SRL-229	169	LPA-80080/BCF (Verizon)	145
ACP305	169	LPA-80080/BCF (Verizon)	145
Low Profile Platform (T-Mobile)	165	DB950F85E-M (Verizon)	145
RR65-19-00DP (T-Mobile)	165	Low Profile Platform (Nextel)	125
(3) RR65-19-00DP (T-Mobile)	165	(4) DB844H90E-XY (Nextel)	125
RR65-19-00DP (T-Mobile)	165	(4) DB844H90E-XY (Nextel)	125
(3) RR65-19-00DP (T-Mobile)	165	(4) DB844H90E-XY (Nextel)	125
RR65-19-00DP (T-Mobile)	165	4' Side Mount Standoff	122
(3) RR65-19-00DP (T-Mobile)	165	PD455-5	122
Low Profile Platform (Sprint)	155	(2) LGP13519 Diplexer (ATT)	115
(2) DB980H90E-M (Sprint)	155	(2) LGP13519 Diplexer (ATT)	115
DB980H90E-M (Sprint)	155	(2) 7770.00 (ATT)	115
(2) DB980H90E-M (Sprint)	155	(2) LGP21401 TMA (ATT)	115
DB980H90E-M (Sprint)	155	(2) LGP13519 Diplexer (ATT)	115
(2) DB980H90E-M (Sprint)	155	Low Profile Platform (ATT)	115
DB980H90E-M (Sprint)	155	(2) 7770.00 (ATT)	115
DB950F85E-M (Verizon)	145	(2) LGP21401 TMA (ATT)	115
LPA-80080/BCF (Verizon)	145	(2) 7770.00 (ATT)	115
LPA-80080/BCF (Verizon)	145	(2) LGP21401 TMA (ATT)	115
DB950F85E-M (Verizon)	145	4' Side Mount Standoff	80
DB950F85E-M (Verizon)	145	PD455-5	80

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
5. Welds are fabricated with ER-70S-6 electrodes.
6. TOWER RATING: 77.3%



NATCOMM		Job: 169' Pirod Monopole	
63-2 N. Branford Rd. Branford, CT 06405		Project: 08007.CO22 - 171 Town Hill Road, Plymouth, Ct	
Phone: (203) 488-0580	FAX: (203) 488-8587	Client: Verizon	Drawn by: Staff
		Code: TIA/EIA-222-F	Date: 08/14/08
		Path:	Scale: NTS
			Dwg No: E-1

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	169' Pirod Monopole	Page	2 of 21
	Project	08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date	09:11:04 08/14/08
	Client	Verizon	Designed by	Staff

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade (65 ksi)
L6	31.25-0.00	37.50		18	53.7367	62.9300	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	wt
L1	25.2334	19.5201	1492.4153	8.7330	12.6238	118.2224	2986.7944	9.7619	3.9336	15.734
	26.4011	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	25.7822	24.3519	1854.4685	8.7157	12.6308	146.8208	3711.3772	12.1782	3.8260	12.243
	34.5042	33.3940	4782.1919	11.9520	17.2618	277.0384	9570.6764	16.7001	5.4305	17.378
L3	33.8769	38.1454	4949.7904	11.3771	16.4710	300.5157	9906.0939	19.0763	5.0465	13.457
	42.2519	49.0800	10543.2289	14.6384	21.1379	498.7836	21100.3309	24.5446	6.6634	17.769
L4	41.4924	46.8264	9156.5973	13.9663	20.1761	453.8345	18325.2430	23.4177	6.3301	16.88
	49.6747	57.7807	17203.1968	17.2335	24.8514	692.2437	34429.0299	28.8958	7.9499	21.2
L5	48.9126	55.2814	15065.9861	16.4880	23.7847	633.4331	30151.7965	27.6459	7.5804	20.214
	56.8842	66.2315	25909.2046	19.7540	28.4582	910.4315	51852.5012	33.1220	9.1995	24.532
L6	56.1215	63.5138	22848.8588	18.9434	27.2982	837.0084	45727.7827	31.7629	8.7977	23.46
	63.9008	74.4561	36809.6532	22.2070	31.9684	1151.4373	73667.7415	37.2351	10.4157	27.775

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 169.00-165.08				1	1	1		
L2 165.08-129.75				1	1	1		
L3 129.75-96.08				1	1	1		
L4 96.08-63.25				1	1	1		
L5 63.25-31.25				1	1	1		
L6 31.25-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _d A _d ft ² /ft	Weight plf
1 5/8 (T-Mobile)	A	No	Inside Pole	165.00 - 3.00	24	No Ice 1/2" Ice	0.00 1.04
1 5/8 (Verizon)	B	No	Inside Pole	145.00 - 3.00	12	No Ice 1/2" Ice	0.00 1.04
1 5/8 (Nextel)	A	No	CaAa (Out Of Face)	125.00 - 3.00	3	No Ice 1/2" Ice	0.20 2.55
1 5/8 (Nextel)	A	No	CaAa (Out Of Face)	125.00 - 3.00	12	No Ice 1/2" Ice	0.00 2.55
1 5/8 (ATT)	A	No	CaAa (Out Of Face)	115.00 - 3.00	3	No Ice 1/2" Ice	0.20 2.55
1 5/8 (ATT)	A	No	CaAa (Out Of Face)	115.00 - 3.00	9	No Ice 1/2" Ice	0.00 2.55

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	169' Pirod Monopole	Page	4 of 21
	Project	08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date	09:11:04 08/14/08
	Client	Verizon	Designed by	Staff

Tower Section	Tower Elevation ft	Face or Leg C	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
		C		0.000	0.000	0.000	0.000	381.94

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	169.00-165.08	0.0000	0.0000	0.0000	0.0000
L2	165.08-129.75	0.0000	0.0000	0.0000	0.0000
L3	129.75-96.08	0.0000	-1.1047	0.0000	-1.4874
L4	96.08-63.25	0.0000	-1.4463	0.0000	-1.9263
L5	63.25-31.25	0.0000	-1.4997	0.0000	-2.0265
L6	31.25-0.00	0.0000	-1.4135	0.0000	-1.9466

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
Low Profile Platform (T-Mobile)	C	None		0.0000	165.00	No Ice 15.70 1/2" Ice 20.10	15.70 20.10	1300.00 1765.00
RR65-19-00DP (T-Mobile)	A	From Face	4.00 -6.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
(3) RR65-19-00DP (T-Mobile)	A	From Face	4.00 3.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
RR65-19-00DP (T-Mobile)	B	From Face	4.00 -6.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
(3) RR65-19-00DP (T-Mobile)	B	From Face	4.00 3.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
RR65-19-00DP (T-Mobile)	C	From Face	4.00 -6.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
(3) RR65-19-00DP (T-Mobile)	C	From Face	4.00 3.00 0.00	0.0000	165.00	No Ice 5.87 1/2" Ice 6.32	2.75 3.23	23.00 51.51
Low Profile Platform (Sprint)	C	None		0.0000	155.00	No Ice 15.70 1/2" Ice 20.10	15.70 20.10	1300.00 1765.00
(2) DB980H90E-M (Sprint)	A	From Face	4.00 0.00 0.00	0.0000	155.00	No Ice 3.80 1/2" Ice 4.18	2.19 2.56	8.50 28.62
DB980H90E-M (Sprint)	A	From Face	4.00 0.00 0.00	0.0000	155.00	No Ice 3.80 1/2" Ice 4.18	2.19 2.56	8.50 28.62
(2) DB980H90E-M	B	From Face	4.00	0.0000	155.00	No Ice 3.80	2.19	8.50

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	Project	Date
	Client	Designed by
	169' Pirod Monopole	6 of 21
	08007.CO22 - 171 Town Hill Road, Plymouth, CT	09:11:04 08/14/08
	Verizon	Staff

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C ₁ A ₁ Front ft ²	C ₁ A ₁ Side ft ²	Weight lb
(4) DB844H90E-XY (Nextel)	C	From Face	4.00 0.00 0.00	0.0000	125.00	No Ice 2.87 1/2" Ice 3.18	3.73 4.10	10.00 35.38
Low Profile Platform (ATT)	C	None		0.0000	115.00	No Ice 15.70 1/2" Ice 20.10	15.70 20.10	1300.00 1765.00
(2) 7770.00 (ATT)	A	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 5.88 1/2" Ice 6.31	2.93 3.27	35.00 67.63
(2) LGP21401 TMA (ATT)	A	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
(2) LGP13519 Diplexer (ATT)	A	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.27 1/2" Ice 0.34	0.18 0.25	5.30 7.71
(2) 7770.00 (ATT)	B	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 5.88 1/2" Ice 6.31	2.93 3.27	35.00 67.63
(2) LGP21401 TMA (ATT)	B	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
(2) LGP13519 Diplexer (ATT)	B	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.27 1/2" Ice 0.34	0.18 0.25	5.30 7.71
(2) 7770.00 (ATT)	C	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 5.88 1/2" Ice 6.31	2.93 3.27	35.00 67.63
(2) LGP21401 TMA (ATT)	C	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.95 1/2" Ice 1.09	0.37 0.48	17.50 23.31
(2) LGP13519 Diplexer (ATT)	C	From Face	4.00 0.00 0.00	0.0000	115.00	No Ice 0.27 1/2" Ice 0.34	0.18 0.25	5.30 7.71
4' Side Mount Standoff	A	From Face	2.00 0.00 0.00	0.0000	169.00	No Ice 2.72 1/2" Ice 4.91	2.72 4.91	50.00 89.00
4' Side Mount Standoff	B	From Face	2.00 0.00 0.00	0.0000	169.00	No Ice 2.72 1/2" Ice 4.91	2.72 4.91	50.00 89.00
4' Side Mount Standoff	C	From Face	2.00 0.00 0.00	0.0000	169.00	No Ice 2.72 1/2" Ice 4.91	2.72 4.91	50.00 89.00
PD455-5	A	From Face	4.00 0.00 5.00	0.0000	169.00	No Ice 2.83 1/2" Ice 4.87	2.83 4.87	24.00 47.59
PD220	B	From Face	4.00 0.00 10.00	0.0000	169.00	No Ice 3.08 1/2" Ice 5.30	3.08 5.30	23.00 48.68
SRL-229	C	From Face	4.00 0.00 5.00	0.0000	169.00	No Ice 6.45 1/2" Ice 8.63	6.45 8.63	25.00 71.37
ACP305	A	From Face	4.00 0.00 5.00	0.0000	169.00	No Ice 6.45 1/2" Ice 8.63	6.45 8.63	25.00 71.37
4' Side Mount Standoff	C	From Face	2.00 0.00 0.00	0.0000	122.00	No Ice 2.72 1/2" Ice 4.91	2.72 4.91	50.00 89.00
PD455-5	C	From Face	4.00	0.0000	122.00	No Ice 2.83	2.83	24.00

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	Project	Date
	Client	Designed by
	169' Pirod Monopole	8 of 21
	08007.CO22 - 171 Town Hill Road, Plymouth, CT	09:11:04 08/14/08
	Verizon	Staff

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _d A _i In Face	C _d A _i Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L2 165.08-129.75	146.72	1.532	19	0.5000	90.351	A	0.000	90.351	90.351	100.00	0.000	0.000
						B	0.000	90.351		100.00		
						C	0.000	90.351		100.00		
L3 129.75-96.08	112.48	1.42	17	0.5000	107.976	A	0.000	107.976	107.976	100.00	0.000	48.231
						B	0.000	107.976		100.00		
						C	0.000	107.976		100.00		
L4 96.08-63.25	79.42	1.285	16	0.5000	125.562	A	0.000	125.562	125.562	100.00	0.000	65.632
						B	0.000	125.562		100.00		
						C	0.000	125.562		100.00		
L5 63.25-31.25	47.24	1.108	14	0.5000	141.586	A	0.000	141.586	141.586	100.00	0.000	63.967
						B	0.000	141.586		100.00		
						C	0.000	141.586		100.00		
L6 31.25-0.00	15.29	1	12	0.5000	156.509	A	0.000	156.509	156.509	100.00	0.000	56.471
						B	0.000	156.509		100.00		
						C	0.000	156.509		100.00		

Tower Pressure - Service

$G_H = 1.690$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _d A _i In Face	C _d A _i Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 169.00-165.08	167.03	1.589	10	8.298	A	0.000	8.298	8.298	100.00	0.000	0.000
					B	0.000	8.298		100.00		
					C	0.000	8.298		100.00		
L2 165.08-129.75	146.72	1.532	10	87.407	A	0.000	87.407	87.407	100.00	0.000	0.000
					B	0.000	87.407		100.00		
					C	0.000	87.407		100.00		
L3 129.75-96.08	112.48	1.42	9	105.170	A	0.000	105.170	105.170	100.00	0.000	31.290
					B	0.000	105.170		100.00		
					C	0.000	105.170		100.00		
L4 96.08-63.25	79.42	1.285	8	122.826	A	0.000	122.826	122.826	100.00	0.000	42.650
					B	0.000	122.826		100.00		
					C	0.000	122.826		100.00		
L5 63.25-31.25	47.24	1.108	7	138.919	A	0.000	138.919	138.919	100.00	0.000	41.568
					B	0.000	138.919		100.00		
					C	0.000	138.919		100.00		
L6 31.25-0.00	15.29	1	6	153.905	A	0.000	153.905	153.905	100.00	0.000	36.697
					B	0.000	153.905		100.00		
					C	0.000	153.905		100.00		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 169.00-165.08	16.29	266.24	A	1	0.65	1	1	1	8.298	237.38	60.61	C
			B	1	0.65	1	1	1	8.298			
			C	1	0.65	1	1	1	8.298			

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	169' Pirod Monopole	Page	10 of 21
	Project	08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date	09:11:04 08/14/08
	Client	Verizon	Designed by	Staff

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 169.00-165.08	16.29	266.24	A	1	0.65	1	1	1	8.298	237.38	60.61	C
			B	1	0.65	1	1	1	8.298			
			C	1	0.65	1	1	1	8.298			
L2 165.08-129.75	1453.49	3684.30	A	1	0.65	1	1	1	87.407	2407.74	68.14	C
			B	1	0.65	1	1	1	87.407			
			C	1	0.65	1	1	1	87.407			
L3 129.75-96.08	2416.85	5565.16	A	1	0.65	1	1	1	105.170	3912.93	116.22	C
			B	1	0.65	1	1	1	105.170			
			C	1	0.65	1	1	1	105.170			
L4 96.08-63.25	2621.90	6674.15	A	1	0.65	1	1	1	122.826	4350.25	132.50	C
			B	1	0.65	1	1	1	122.826			
			C	1	0.65	1	1	1	122.826			
L5 63.25-31.25	2563.84	7752.77	A	1	0.65	1	1	1	138.919	4023.66	125.74	C
			B	1	0.65	1	1	1	138.919			
			C	1	0.65	1	1	1	138.919			
L6 31.25-0.00	2263.39	8802.76	A	1	0.65	1	1	1	153.905	3786.05	121.15	C
			B	1	0.65	1	1	1	153.905			
			C	1	0.65	1	1	1	153.905			
Sunt Weight:	11335.76	32745.38						OTM	1426460.1 5 lb-ft	18718.00		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 169.00-165.08	16.29	328.90	A	1	0.65	1	1	1	8.625	185.03	47.24	C
			B	1	0.65	1	1	1	8.625			
			C	1	0.65	1	1	1	8.625			
L2 165.08-129.75	1453.49	4342.54	A	1	0.65	1	1	1	90.351	1866.64	52.83	C
			B	1	0.65	1	1	1	90.351			
			C	1	0.65	1	1	1	90.351			
L3 129.75-96.08	3440.00	6354.44	A	1	0.65	1	1	1	107.976	3487.31	103.58	C
			B	1	0.65	1	1	1	107.976			
			C	1	0.65	1	1	1	107.976			
L4 96.08-63.25	3992.67	7593.93	A	1	0.65	1	1	1	125.562	3922.24	119.46	C
			B	1	0.65	1	1	1	125.562			
			C	1	0.65	1	1	1	125.562			
L5 63.25-31.25	3899.84	8791.48	A	1	0.65	1	1	1	141.586	3570.01	111.56	C
			B	1	0.65	1	1	1	141.586			
			C	1	0.65	1	1	1	141.586			
L6 31.25-0.00	3442.83	9952.23	A	1	0.65	1	1	1	156.509	3285.33	105.13	C
			B	1	0.65	1	1	1	156.509			
			C	1	0.65	1	1	1	156.509			
Sunt Weight:	16245.12	37363.52						OTM	1227380.2 0 lb-ft	16316.56		

Tower Forces - With Ice - Wind 60 To Face

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	Project	Date
	Client	Designed by
	169' Pirod Monopole	12 of 21
	08007.CO22 - 171 Town Hill Road, Plymouth, CT	09:11:04 08/14/08
	Verizon	Staff

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 169.00-165.08	16.29	266.24	A	1	0.65	1	1	1	8.298	92.73	23.67	C
			B	1	0.65	1	1	1	8.298			
			C	1	0.65	1	1	1	8.298			
L2 165.08-129.75	1453.49	3684.30	A	1	0.65	1	1	1	87.407	940.52	26.62	C
			B	1	0.65	1	1	1	87.407			
			C	1	0.65	1	1	1	87.407			
L3 129.75-96.08	2416.85	5565.16	A	1	0.65	1	1	1	105.170	1528.49	45.40	C
			B	1	0.65	1	1	1	105.170			
			C	1	0.65	1	1	1	105.170			
L4 96.08-63.25	2621.90	6674.15	A	1	0.65	1	1	1	122.826	1699.32	51.76	C
			B	1	0.65	1	1	1	122.826			
			C	1	0.65	1	1	1	122.826			
L5 63.25-31.25	2563.84	7752.77	A	1	0.65	1	1	1	138.919	1571.74	49.12	C
			B	1	0.65	1	1	1	138.919			
			C	1	0.65	1	1	1	138.919			
L6 31.25-0.00	2263.39	8802.76	A	1	0.65	1	1	1	153.905	1478.92	47.33	C
			B	1	0.65	1	1	1	153.905			
			C	1	0.65	1	1	1	153.905			
Sum Weight:	11335.76	32745.38						OTM	557211.00 lb-ft	7311.72		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 169.00-165.08	16.29	266.24	A	1	0.65	1	1	1	8.298	92.73	23.67	C
			B	1	0.65	1	1	1	8.298			
			C	1	0.65	1	1	1	8.298			
L2 165.08-129.75	1453.49	3684.30	A	1	0.65	1	1	1	87.407	940.52	26.62	C
			B	1	0.65	1	1	1	87.407			
			C	1	0.65	1	1	1	87.407			
L3 129.75-96.08	2416.85	5565.16	A	1	0.65	1	1	1	105.170	1528.49	45.40	C
			B	1	0.65	1	1	1	105.170			
			C	1	0.65	1	1	1	105.170			
L4 96.08-63.25	2621.90	6674.15	A	1	0.65	1	1	1	122.826	1699.32	51.76	C
			B	1	0.65	1	1	1	122.826			
			C	1	0.65	1	1	1	122.826			
L5 63.25-31.25	2563.84	7752.77	A	1	0.65	1	1	1	138.919	1571.74	49.12	C
			B	1	0.65	1	1	1	138.919			
			C	1	0.65	1	1	1	138.919			
L6 31.25-0.00	2263.39	8802.76	A	1	0.65	1	1	1	153.905	1478.92	47.33	C
			B	1	0.65	1	1	1	153.905			
			C	1	0.65	1	1	1	153.905			
Sum Weight:	11335.76	32745.38						OTM	557211.00 lb-ft	7311.72		

Tower Forces - Service - Wind 90 To Face

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 169' Pirad Monopole	Page 14 of 21
	Project 08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date 09:11:04 08/14/08
	Client Verizon	Designed by Staff

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 _y lb-ft	Sum of Torques lb-ft
Wind 330 deg - Ice		-14390.74	-24925.49	-2639907.57	1515387.80	-1165.01
Total Weight	51990.44			-6265.10	113.38	
Wind 0 deg - Service		0.00	-12697.10	-1334619.32	113.38	-468.19
Wind 30 deg - Service		6348.55	-10996.01	-1155736.06	-667488.03	-365.66
Wind 60 deg - Service		10996.01	-6348.55	-667017.91	-1156206.18	-165.15
Wind 90 deg - Service		12697.10	0.00	583.49	-1335089.43	79.61
Wind 120 deg - Service		10996.01	6348.55	668184.90	-1156206.18	303.04
Wind 150 deg - Service		6348.55	10996.01	1156903.05	-667488.03	445.27
Wind 180 deg - Service		0.00	12697.10	1335786.31	113.38	468.19
Wind 210 deg - Service		-6348.55	10996.01	1156903.05	667714.79	365.66
Wind 240 deg - Service		-10996.01	6348.55	668184.90	1156432.94	165.15
Wind 270 deg - Service		-12697.10	0.00	583.49	1335316.20	-79.61
Wind 300 deg - Service		-10996.01	-6348.55	-667017.91	1156432.94	-303.04
Wind 330 deg - Service		-6348.55	-10996.01	-1155736.06	667714.79	-445.27

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
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

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	Page
	Project	Date
	Client	Designed by
	169' Pirod Monopole	16 of 21
	08007.CO22 - 171 Town Hill Road, Plymouth, CT	09:11:04 08/14/08
	Verizon	Staff

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	15	65737.28	-0.00	28781.50
	Max. H _x	11	51990.44	32504.58	0.00
	Max. H _z	2	51990.44	0.00	32504.58
	Max. M _x	2	3530434.75	0.00	32504.58
	Max. M _z	5	3523885.60	-32504.58	0.00
	Max. Torsion	15	1200.20	-0.00	28781.50
	Min. Vert	1	51990.44	0.00	0.00
	Min. H _x	5	51990.44	-32504.58	0.00
	Min. H _z	8	51990.44	0.00	-32504.58
	Min. M _x	8	-3517576.42	0.00	-32504.58
	Min. M _z	11	-3524125.58	32504.58	0.00
	Min. Torsion	21	-1200.14	-0.00	-28781.50

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	51990.44	0.00	0.00	-6265.10	113.38	0.00
Dead+Wind 0 deg - No Ice	51990.44	-0.00	-32504.58	-3530434.75	114.88	-1199.68
Dead+Wind 30 deg - No Ice	51990.44	16252.28	-28149.78	-3058312.19	-1761885.25	-942.32
Dead+Wind 60 deg - No Ice	51990.44	28149.78	-16252.28	-1768439.37	-3051760.17	-432.50
Dead+Wind 90 deg - No Ice	51990.44	32504.58	-0.00	-6438.48	-3523885.60	193.24
Dead+Wind 120 deg - No Ice	51990.44	28149.78	16252.28	1755567.05	-3051768.23	767.19
Dead+Wind 150 deg - No Ice	51990.44	16252.28	28149.78	3045449.19	-1761893.31	1135.56
Dead+Wind 180 deg - No Ice	51990.44	-0.00	32504.58	3517576.42	114.90	1199.69
Dead+Wind 210 deg - No Ice	51990.44	-16252.28	28149.78	3045453.63	1762125.63	942.33
Dead+Wind 240 deg - No Ice	51990.44	-28149.78	16252.28	1755571.48	3052005.67	432.47
Dead+Wind 270 deg - No Ice	51990.44	-32504.58	-0.00	-6438.48	3524125.58	-193.25
Dead+Wind 300 deg - No Ice	51990.44	-28149.78	-16252.28	-1768443.81	3051997.58	-767.18
Dead+Wind 330 deg - No Ice	51990.44	-16252.28	-28149.78	-3058316.63	1762117.54	-1135.56
Dead+Ice+Temp	65737.28	-0.00	-0.00	-16150.97	328.29	-0.05
Dead+Wind 0 deg+Ice+Temp	65737.28	0.00	-28781.50	-3171542.08	324.98	-1200.20
Dead+Wind 30 deg+Ice+Temp	65737.28	14390.75	-24925.51	-2748817.58	-1577302.13	-909.54
Dead+Wind 60 deg+Ice+Temp	65737.28	24925.51	-14390.75	-1593916.51	-2732208.92	-375.22
Dead+Wind 90 deg+Ice+Temp	65737.28	28781.50	-0.00	-16287.31	-3154941.22	259.68
Dead+Wind 120 deg+Ice+Temp	65737.28	24925.51	14390.75	1561350.53	-2732223.87	824.99
Dead+Wind 150 deg+Ice+Temp	65737.28	14390.75	24925.51	2716268.89	-1577317.06	1169.21
Dead+Wind 180 deg+Ice+Temp	65737.28	0.00	28781.50	3139002.04	325.04	1200.14
Dead+Wind 210 deg+Ice+Temp	65737.28	-14390.75	24925.51	2716273.97	1577970.06	909.48
Dead+Wind 240 deg+Ice+Temp	65737.28	-24925.51	14390.75	1561355.61	2732882.71	375.08
Dead+Wind 270 deg+Ice+Temp	65737.28	-28781.50	-0.00	-16287.31	3155602.97	-259.79
Dead+Wind 300 deg+Ice+Temp	65737.28	-24925.51	-14390.75	-1593921.58	2732867.71	-825.05
Dead+Wind 330 deg+Ice+Temp	65737.28	-14390.75	-24925.51	-2748822.66	1577955.04	-1169.28
Dead+Wind 0 deg - Service	51990.44	-0.00	-12697.10	-1383688.32	119.49	-470.55
Dead+Wind 30 deg - Service	51990.44	6348.55	-10996.01	-1199171.61	-688505.54	-369.24
Dead+Wind 60 deg - Service	51990.44	10996.01	-6348.55	-695063.23	-1192614.24	-169.00
Dead+Wind 90 deg - Service	51990.44	12697.10	-0.00	-6438.08	-1377131.39	76.54
Dead+Wind 120 deg - Service	51990.44	10996.01	6348.55	682187.78	-1192615.47	301.56
Dead+Wind 150 deg - Service	51990.44	6348.55	10996.01	1186297.58	-688506.77	445.77
Dead+Wind 180 deg - Service	51990.44	-0.00	12697.10	1370815.00	119.50	470.54
Dead+Wind 210 deg - Service	51990.44	-6348.55	10996.01	1186298.26	688746.16	369.23
Dead+Wind 240 deg - Service	51990.44	-10996.01	6348.55	682188.46	1192855.64	168.97
Dead+Wind 270 deg - Service	51990.44	-12697.10	-0.00	-6438.08	1377371.94	-76.55
Dead+Wind 300 deg - Service	51990.44	-10996.01	-6348.55	-695063.91	1192854.40	-301.57
Dead+Wind 330 deg - Service	51990.44	-6348.55	-10996.01	-1199172.29	688744.92	-445.79

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	169' Pirod Monopole	Page	18 of 21
	Project	08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date	09:11:04 08/14/08
	Client	Verizon	Designed by	Staff

9	Yes	5	0.0000001	0.00033187
10	Yes	5	0.0000001	0.00032666
11	Yes	4	0.0000001	0.00031719
12	Yes	5	0.0000001	0.00032022
13	Yes	5	0.0000001	0.00033936
14	Yes	4	0.0000001	0.00003103
15	Yes	5	0.0000001	0.00030147
16	Yes	5	0.0000001	0.00071058
17	Yes	5	0.0000001	0.00071646
18	Yes	5	0.0000001	0.00029907
19	Yes	5	0.0000001	0.00071754
20	Yes	5	0.0000001	0.00069623
21	Yes	5	0.0000001	0.00029910
22	Yes	5	0.0000001	0.00071326
23	Yes	5	0.0000001	0.00070717
24	Yes	5	0.0000001	0.00029920
25	Yes	5	0.0000001	0.00070771
26	Yes	5	0.0000001	0.00072952
27	Yes	4	0.0000001	0.00013534
28	Yes	4	0.0000001	0.00072204
29	Yes	4	0.0000001	0.00074458
30	Yes	4	0.0000001	0.00011080
31	Yes	4	0.0000001	0.00077683
32	Yes	4	0.0000001	0.00069285
33	Yes	4	0.0000001	0.00013429
34	Yes	4	0.0000001	0.00075772
35	Yes	4	0.0000001	0.00073279
36	Yes	4	0.0000001	0.00011084
37	Yes	4	0.0000001	0.00070981
38	Yes	4	0.0000001	0.00079694

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 165.083	28.999	27	1.3820	0.0038
L2	167.25 - 129.75	28.493	27	1.3813	0.0036
L3	133.583 - 96.083	19.036	27	1.2638	0.0019
L4	100.75 - 63.25	11.093	27	1.0177	0.0010
L5	68.75 - 31.25	5.238	27	0.7042	0.0005
L6	37.5 - 0	1.600	27	0.3823	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
169.00	4' Side Mount Standoff	27	28.999	1.3820	0.0038	52197
165.00	Low Profile Platform	27	27.843	1.3795	0.0034	52197
155.00	Low Profile Platform	27	24.969	1.3600	0.0027	22482
145.00	Low Profile Platform	27	22.148	1.3234	0.0022	13794
125.00	Low Profile Platform	27	16.800	1.2085	0.0016	8409
122.00	4' Side Mount Standoff	27	16.043	1.1874	0.0016	8066
115.00	Low Profile Platform	27	14.329	1.1351	0.0014	7365

RISATower NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	169' Pirod Monopole	Page	20 of 21
	Project	08007.CO22 - 171 Town Hill Road, Plymouth, CT	Date	09:11:04 08/14/08
	Client	Verizon	Designed by	Staff

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _c ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P P _a
-------------	-----------------	------	---------	----------------------	------	-----------------------	----------------------	-------------------	--------------------------------	------------------------------

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x lb-ft	Actual f _{bx} ksi	Allow. F _{bc} ksi	Ratio f _{bc} F _{bc}	Actual M _y lb-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	169 - 165.083 (1)	TP26x24.85x0.25	8370.17	-0.815	39.000	0.021	0.00	0.000	39.000	0.000
L2	165.083 - 129.75 (2)	TP33.98x24.8638x0.3125	267539. 17	-12.261	39.000	0.314	0.00	0.000	39.000	0.000
L3	129.75 - 96.083 (3)	TP41.61x32.4232x0.375	815937. 50	-20.771	39.000	0.533	0.00	0.000	39.000	0.000
L4	96.083 - 63.25 (4)	TP48.92x39.7167x0.375	1541616 .67	-28.281	39.000	0.725	0.00	0.000	39.000	0.000
L5	63.25 - 31.25 (5)	TP56.02x46.8202x0.375	2380800 .00	-33.190	39.000	0.851	0.00	0.000	39.000	0.000
L6	31.25 - 0 (6)	TP62.93x53.7367x0.375	3530433 .33	-36.793	37.126	0.991	0.00	0.000	37.126	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P _a	Ratio f _{bx} F _{bc}	Ratio f _{by} F _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 165.083 (1)	TP26x24.85x0.25	0.010	0.021	0.000	0.031 ✓	1.333	H1-3 ✓
L2	165.083 - 129.75 (2)	TP33.98x24.8638x0.3125	0.056	0.314	0.000	0.370 ✓	1.333	H1-3 ✓
L3	129.75 - 96.083 (3)	TP41.61x32.4232x0.375	0.055	0.533	0.000	0.587 ✓	1.333	H1-3 ✓
L4	96.083 - 63.25 (4)	TP48.92x39.7167x0.375	0.049	0.725	0.000	0.775 ✓	1.333	H1-3 ✓
L5	63.25 - 31.25 (5)	TP56.02x46.8202x0.375	0.045	0.851	0.000	0.896 ✓	1.333	H1-3 ✓
L6	31.25 - 0 (6)	TP62.93x53.7367x0.375	0.039	0.991	0.000	1.030 ✓	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail
L1	169 - 165.083	Pole	TP26x24.85x0.25	1	-574.75	76663.36	2.3	Pass
L2	165.083 - 129.75	Pole	TP33.98x24.8638x0.3125	2	-8856.93	212238.92	27.8	Pass
L3	129.75 - 96.083	Pole	TP41.61x32.4232x0.375	3	-19219.90	467845.66	44.1	Pass
L4	96.083 - 63.25	Pole	TP48.92x39.7167x0.375	4	-28328.10	763190.46	58.1	Pass
L5	63.25 - 31.25	Pole	TP56.02x46.8202x0.375	5	-38543.10	1150306.97	67.2	Pass
L6	31.25 - 0	Pole	TP62.93x53.7367x0.375	6	-51977.70	1772410.05	77.3	Pass
Summary								
Pole (L6)							77.3	Pass

NATCOMM

Job	169' Monopole - Plymouth, CT	Project No.	08007.CO22	Page	of
Description	Anchor Bolt and Base Plate Analysis	Computed by	Staff	Sheet	1 of 6
		Checked by		Date	08/14/08
				Date	

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	OM := 3531-ft-kips	user input
Shear Force:	Shear := 32.6-kips	user input
Axial Force:	Axial := 52-kips	user input

Anchor Bolt Data:

Use ASTM A687		user input
Number of Anchor Bolts = N	N := 45	user input
Diameter of Bolt Circle:	D _{bc} := 68in	user input
Bolt "Column" Distance:	l := 3in	user input
Bolt Ultimate Strength:	F _u := 150-ksi	user input
Bolt Yield Strength:	F _y := 105-ksi	user input
Bolt Modulus:	E := 29000-ksi	user input
Anchor Bolt Diameter	D := 1.25in	user input
Threads per Inch:	n := 7	user input

Base Plate Data:

Plate Yield Strength:	F _{ybp} := 36-ksi	user input
Base Plate Thickness:	PlateThickness := 1.5-in	user input
Base Plate Diameter:	D _{bp} := 73-in	user input
Outer Pole Diameter:	D _{pole} := 62.93in	user input

Gusset Data:

Gusset Thickness:	t _{Gusset} := 0.75-in	user input
Gusset Height:	H _{Gusset} := 8-in	user input

NATCOMM

Job 169' Monopole - Plymouth, CT

Project No. 08007.CO22

Page _____ of _____

Description Anchor Bolt and Base Plate Analysis

Computed by Staff

Sheet 3 of 6

Date 08/14/08

Checked by _____

Date _____

Anchor Bolt Analysis:

Polar Moment of Inertia I_p :

$$I_p := \sum_i (d_i)^2 \quad I_p = 2.601 \times 10^4 \cdot \text{in}^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \quad A_g = 1.227 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \quad A_n = 0.969 \cdot \text{in}^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \quad D_n = 1.11 \cdot \text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \quad r = 0.28 \cdot \text{in}$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^3}{32} \quad S_x = 0.135 \cdot \text{in}^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{\text{Shear}}{N} \right) \cdot l \quad M_x = 0.181 \cdot \text{ft} \cdot \text{kips}$$

$$f_{bx} := \frac{M_x}{S_x} \quad f_{bx} = 16.2 \cdot \text{ksi}$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot F_y \quad F_{bx} = 84.0 \cdot \text{ksi}$$

Note: 1.333 increase allowed per TIA/EIA

NATCOMM

Job 169' Monopole - Plymouth, CT Project No. 08007.CO22 Page of
 Description Anchor Bolt and Base Plate Analysis Computed by Staff Sheet 5 of 6
 Checked by Date 08/14/08
 Date

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0.00 \text{in} & \text{otherwise} \end{cases} \quad l = 3.00 \text{in} \quad f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0 \text{ksi} & \text{otherwise} \end{cases} \quad f_{bx} = 16.2 \cdot \text{ksi}$$

Allowable Compressive Force:

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} \quad C_c = 73.84$$

$$F_a := \begin{cases} \frac{\left[1 - \frac{\left(\frac{K \cdot l}{r} \right)^2}{2 \cdot C_c^2} \right] \cdot F_y}{\frac{5}{3} + \frac{3 \cdot \left(\frac{K \cdot l}{r} \right)}{8 \cdot C_c} - \frac{\left(\frac{K \cdot l}{r} \right)^3}{8 \cdot C_c^3}} & \text{if } \frac{K \cdot l}{r} \leq C_c \\ \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r} \right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} \quad F_a = 61.4 \cdot \text{ksi}$$

$$F_a := 1.333 \cdot F_a \quad \text{Note: 1.333 increase allowed per TIA/EIA} \quad F_a = 81.9 \cdot \text{ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \quad \text{MaxCompression} = 56.5 \cdot \text{kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \quad f_a = 58.3 \cdot \text{ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.91$$

$$\text{Condition} := \text{if} \left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \boxed{\text{Condition} = \text{"OK"}}$$

NATCOMM

Job 169' Monopole - Plymouth, CT Project No. 08007.CO22 Page 1 of 9
 Description Spread Footing w/ Pier Analysis Computed by Staff Sheet 1 of 9
 Checked by _____ Date 08/14/08
 Date _____

MONOPOLE FOUNDATION ANALYSIS

TOWER FORCES:

Moment Caused by Tower $M_t := 3531 \text{ ft}\cdot\text{kips}$
 Shear at Base of Tower $S_t := 32.6 \text{ kip}$
 Max Compressive Force $C_t := 52 \text{ kip}$
 Height of Tower $H_t := 169 \text{ ft}$
 Base Plate Bolt Circle $MP := 68 \text{ in}$

PROPERTIES:

Compressive Strength of Concrete $f_c := 4000 \text{ psi}$
 Yield Strength of Steel Reinforcement $f_y := 60000 \text{ psi}$
 Yield Strength of Anchor Bolt $f_{ya} := 75000 \text{ psi}$
 Internal Friction Angle of Soil $\phi_s := 30 \text{ deg}$
 Allowable Bearing Capacity $q_s := 5000 \text{ psf}$
 Unit Weight of Soil $\gamma_s := 120 \text{ pcf}$

FOOTING DIMENSIONS:

Overall Depth of Footing $D_f := 8.5 \text{ ft}$
 Length of Pier $L_p := 6.5 \text{ ft}$
 Extension of Pier Above Grade $L_{pag} := 0.5 \text{ ft}$
 Diameter of Pier $d_p := 8 \text{ ft}$
 Thickness of Footing $T_f := 2.5 \text{ ft}$
 Width of Footing: $W_f := 27 \text{ ft}$
 Length of Anchor Bolts: $L_{st} := 80 \text{ in}$
 Projection of anchor bolts above pier $A_{BP} := 8.5 \text{ in}$

Unit Weight of Concrete $\gamma_c := 150 \text{ pcf}$
 Depth to Neglect $n := 0 \text{ ft}$
 Cohesion of Clay Type Soil
 Note: Use 0 for Sandy Soil $c := 0 \text{ ksf}$

Seismic Zone Factor:
 UBC Fig 23-2 $Z := 2$
 Coefficient of Friction
 between Concrete: $\mu := 0.45$

Clear Cover of Reinforcement Pier: $C_{vr_pier} := 3 \text{ in}$
 Clear Cover of Reinforcement Pad: $C_{vr_pad} := 3 \text{ in}$

Anchor Bolt Diameter $d_{anchor} := 1.25 \text{ in}$

Anchor bolt area

$A_{anchor} := 1.23 \text{ in}^2$

PIER REINFORCEMENT:

Bar Size $BS_{pier} := 9$ Bar Diameter $d_{bpier} := 1.128 \text{ in}$
 Number of Bars $NB_{pier} := 39$ Bar Area $A_{bpier} := 1.0 \text{ in}^2$

PAD REINFORCEMENT:

TOP: Bar Size $BS_{top} := 9$ Bar Diameter $d_{btop} := 1.128 \text{ in}$
 Number of Bars $NB_{top} := 36$ Bar Area $A_{btop} := 1.0 \text{ in}^2$

BOTTOM: Bar Size $BS_{bot} := 9$ Bar Diameter $d_{bbot} := 1.128 \text{ in}$
 Number of Bars $NB_{bot} := 36$ Bar Area $A_{bot} := 1.0 \text{ in}^2$

Coefficient of Lateral Soil Pressure: $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)} K_p = 3$

Load Factor (EIA 3.1.1): $LF := \text{if} \left[H_t \leq 700 \text{ ft}, 1.333, \text{if} \left[H_t \geq 1200, 1.7, 1.333 + \left(\frac{H_t - 700}{1200 - 700} \right) \cdot 0.4 \right] \right] LF = 1.333$

NATCOMM

Job	169' Monopole - Plymouth, CT	Project No.	08007.CO22	Page	of
Description	Spread Footing w/ Pler Analysis	Computed by	Staff	Sheet	3 of 9
		Checked by		Date	08/14/08
				Date	

SHEAR CAPACITY IN PIER FS := 2

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS}$$

$$S_p = 285.2919 \cdot \text{kips}$$

$$\text{ShearCheck} := \text{if}(S_p > S_t, \text{"Okay"}, \text{"No Good"})$$

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

BEARING PRESSURE CAUSED BY FOOTING

$$A_{mat} := W_f^2$$

$$A_{mat} = 729 \cdot \text{ft}^2$$

$$S := \frac{W_f^3}{6}$$

$$S = 3280.5 \cdot \text{ft}^3$$

$$P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$$

$$P_{max} = 2.3681 \cdot \text{ksf}$$

$$P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$$

$$P_{min} = 0.0365 \cdot \text{ksf}$$

$$\text{MaxPressure} := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

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

$$\text{MinPressure} := \text{if}[(P_{min} \geq 0) \cdot (P_{min} < q_s), \text{"Okay"}, \text{"No Good"}]$$

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

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{\frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3}}{W_f}$$

$$X_p = 9.1408 \cdot \text{ft}$$

Distance to Kern:

$$X_k := \frac{W_f}{6}$$

$$X_k = 4.5 \cdot \text{ft}$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$$e := \frac{M_{ot}}{WT_{tot}}$$

$$e = 4.3634$$

Adjusted Soil Pressure:

$$P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e \right)}$$

$$P_a = 2.3686 \cdot \text{ksf}$$

$$q_{adj} := \text{if} \left(P_{min} < 0, P_a, \frac{P_{max}}{\text{ft}^2} \right)$$

$$q_{adj} = 2.3681 \cdot \text{ksf}$$

$$\text{PressureCheck} := \text{if}(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"})$$

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

NATCOMM

Job	169' Monopole - Plymouth, CT	Project No.	08007.CO22	Page	5	of	9
Description	Spread Footing w/ Pier Analysis	Computed by	Staff	Date	08/14/08		
		Checked by		Date			

Guess Value: $v_u := 1 \text{ksf}$

(From "Foundation Analysis and design",
By Joseph Bowles, Eq. 8-9)

$$\text{Given } d^2 + d_p \cdot d = \frac{WT_{\text{tot}}}{\pi \cdot v_u}$$

$$v_u := \text{Find}(v_u)$$

$$v_u = 12.7413 \cdot \text{ksf}$$

$$V_u := v_u \cdot d \cdot W_f$$

$$V_u = 741.6948 \cdot \text{kips}$$

$$V_{\text{req}} := LF \cdot V_u$$

$$V_{\text{req}} = 988.6791 \cdot \text{kips}$$

$$V_{\text{Avail}} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_o \cdot d$$

$$V_{\text{Avail}} = 2130.0644 \cdot \text{kips}$$

$$\text{PunchingShearCheck} := \text{if}(V_{\text{req}} < V_{\text{Avail}}, \text{"Okay"}, \text{"No Good"}) \quad \text{PunchingShearCheck} = \text{"Okay"}$$

STEEL REINFORCEMENT IN THE PAD

$$\phi_m := .90 \text{ ACI 9.3.2.2}$$

Take Maximum Bending at face of Pier:

$$q_b := q_{\text{adj}} - d_l \cdot \text{Slope}$$

$$q_b = 1.5477 \cdot \text{ksf}$$

$$M_n := \frac{1}{LF \cdot \phi_m} \cdot \left[(q_{\text{adj}} - q_b) \cdot \frac{d_l^2}{3} + q_b \cdot \frac{d_l^2}{2} \right] \cdot W_f$$

$$M_n = 2127.2272 \cdot \text{kip} \cdot \text{ft}$$

ACI 10.2.7.3

$$\beta := \text{if} \left[f_c \leq 4000 \cdot \text{psi}, .85, \text{if} \left[f_c \geq 8000 \cdot \text{psi}, .65, .85 - \left(\frac{f_c - 4000}{\text{psi}} \right) \cdot .05 \right] \right] \quad \beta = 0.85$$

$$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2}$$

$$R_u = 18832.6 \text{ lbf}$$

$$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}} \right)$$

$$\rho = 0.0022$$

$$\rho_{\text{min}} := 1.333 \cdot \rho$$

$$\rho_{\text{min}} = 0.00296$$

NATCOMM

Job 169' Monopole - Plymouth, CT Project No. 08007.CO22 Page 7 of 9
 Description Spread Footing w/ Pier Analysis Computed by Staff Date 08/14/08
 Checked by _____ Date _____

REINFORCEMENT IN PIER

Pier Area: $A_p := \frac{\pi \cdot d_p^2}{4}$ $A_p = 7238.2295 \cdot \text{in}^2$
 (ACI 10.8.4 and 10.9.1) $A_{smin} := 0.01 \cdot 0.05 \cdot A_p$ $A_{smin} = 3.6191 \cdot \text{in}^2$
 $A_{sprov} := NB_{pier} \cdot A_{b_{pier}}$ $A_{sprov} = 39 \cdot \text{in}^2$
 SteelAreaCheck := if($A_{sprov} > A_{smin}$, "Okay", "No Good") SteelAreaCheck = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier: $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{b_{pier}}$ $B_{sPier} = 6.6052 \cdot \text{in}$

Diameter of Reinforcement Cage: $Diam_{cage} := d_p - 2 \cdot C_{vr_{pier}}$ $Diam_{cage} = 90 \cdot \text{in}$

Maximum Moment in Pier: $M_p := \left[M_t + S_t \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF$ $M_p = 60056.1155 \cdot \text{in-kips}$

Pier Check evaluated from outside program and results are listed below;

(defined variables) $(f_c \ f_y \ c1 \ Spiral) = (3 \ 60 \ 3 \ 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches: $(D \ N \ n \ P_u \ M_{xu}) := (96 \ 39 \ 9 \ 52 \ 3531)$

Clears any previous output: $(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := (0 \ 0 \ 0 \ 0)$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P'_n (D, N, n, P_u, M_{xu})^T$$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio:

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (1841.0854 \ 125016.7776 \ -60 \ 0.0054)$$

Column size and reinforcement may be changed to match capacity to the applied load.

AxialLoadCheck := if($\phi P_n \geq P_u$, "Okay", "No Good") AxialLoadCheck = "Okay"

BendingCheck := if($\phi M_{xn} \geq M_{xu}$, "Okay", "No Good") BendingCheck = "Okay"

NATCOMM

Job 169' Monopole - Plymouth, CT
 Description Spread Footing w/ Pier Analysis

Project No. 08007.CO22

Computed by Staff

Checked by _____

Page _____ of _____
 Sheet 9 of 9

Date 08/14/08

Date _____

TIE SIZE AND SPACING IN COLUMN

Minimum Tie Size:

$$Tie_{min} := \text{if}(BS_{pier} \leq 10, 3, 4)$$

$$Tie_{min} = 3$$

Used #4 Ties

$$d_{Tie} := 4$$

Seismic factor:
(ACI 21.10.5)

$$z := \text{if}(Z \leq 2, 1, 0.5)$$

$$z = 1$$

$$s_{lim1} := 16 \cdot d_{bpier} \cdot z$$

$$s_{lim1} = 18.048 \cdot \text{in}$$

$$s_{lim2} := \frac{48 \cdot d_{Tie} \cdot \text{in}}{8} \cdot z$$

$$s_{lim2} = 24 \cdot \text{in}$$

$$s_{lim3} := D_f \cdot z$$

$$s_{lim3} = 102 \cdot \text{in}$$

$$s_{lim4} := 18 \cdot \text{in}$$

$$s_{lim4} = 18 \cdot \text{in}$$

Maximum Spacing:

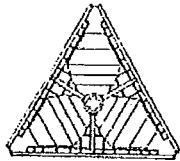
$$s_{tie} := \min \left(\begin{array}{c} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{array} \right)$$

$$s_{tie} = 18 \cdot \text{in}$$

Number of Ties Required:

$$n_{tie} := \frac{L_{pier} - 3 \cdot \text{in}}{s_{tie}} + 1$$

$$n_{tie} = 5$$



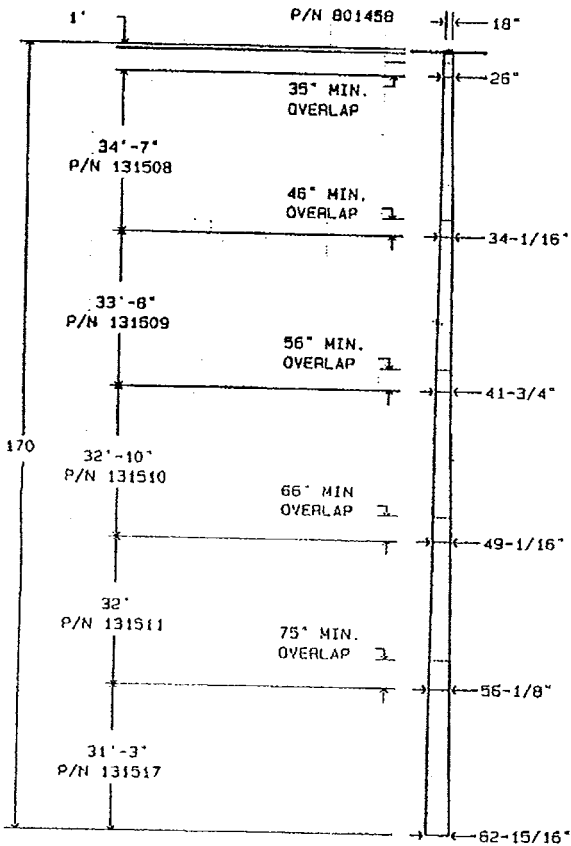
ROTATABLE TOP - TOP VIEW

TAPERED POLE SECTION DATA

LENGTH	PART #	SIZE	WALL	HT. #	BOLT @ BOT #	
					DIAM	LENGTH #
1'	801458	18"	N/A		1"	4-1/2"
4'-9"	134325	26"	.2500"	351#		
37'-6"	131508	34"	.3125"	3900#		
37'-6"	131509	42"	.3750"	5875#		
37'-6"	131510	49"	.3750"	7040#		
37'-6"	131511	56"	.3750"	8155#		
37'-6"	131517	63"	.3750"	9220#		

*THE WEIGHTS LISTED ARE THEORETICAL THE ACTUAL WEIGHTS WILL VARY. ALL WEIGHTS SHOULD BE CONFIRMED IN THE FIELD PRIOR TO ERECTION. **ALL CONNECTION BOLTS ARE A-325.

TOP 1' CONSISTS OF ROTATABLE TOP ASSEMBLY. SEE DWG # 130855-B FOR INSTALLATION DETAILS. JAM NUTS NOT REQUIRED.



SEE PAGE 2 OF THIS DRAWING FOR OPENING INFORMATION.

SEE PAGE 4 OF THIS DRAWING FOR CONNECTION BOLT TIGHTENING SPECIFICATIONS.

SEE PAGE 7 OF THIS DRAWING FOR BASE SECTION INSTALL.

REMOVABLE CLIMBING RUNGS



SEP 01 2000

VOICESTREAM WIRELESS
TERRYVILLE CT-11-417C CT
TP63 X 170' ASSEMBLY DRAWING

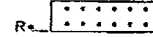
REV	DESCRIPTION OF REVISIONS	INI	DATE	DRANN BY	TSD	APPROVED/ENG.	MRR 09/01/2000
B	ADDED FOUNDATIONS PER SOIL REPORT	ACP	09/01/2000			APPROVED/FOLAND	
A	HEIGHT CHANGE	TSD	08/28/2000				



1545 Pldco Dr.
Plymouth, IN 46563-0128
219-936-4221

OPENINGS & BRACKETS (CONTINUED FROM PREVIOUS PAGE)

NOMINAL HT AGL	HEIGHT #H	TYP	DESCRIPTION	ANGL	ASSEMBLY DRAWING#
1'	1'	7	GROUNDING PLATE	270°	



GROUNDING PLATE



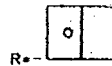
LINE BRIDGE BRACKET



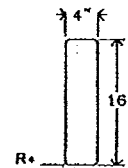
SAFETY CLIMB BRACKET

FRONT VIEW

TOP VIEW



GROUNDING ANGLE



TYPE 22 OPENING



SEP 01 2000

				VOICESTREAM WIRELESS TERRAVILLE CT-11-417C, CT TP63 X 170' OPENINGS	
				APPROVED/ENG.	MR 09/01/2000
				APPROVED/FOUND	
A	HEIGHT CHANGE	TSO	08/28/2000		
REV	DESCRIPTION OF REVISIONS	INI	DATE	DRAWN BY	TSO
From: F1000825.DFT - 08/28/2000 13:20 Printed from: 1507373A.DWG - 08/28/2000 13:22 @ 09/01/2000 13:28				ENG. FILE NO. A-117464- ARCHIVE F-1000825	DRAWING NO 150737-8 PAGE 3 OF 9



1545 Pidco Dr.
Plymouth, IN 46583-0128
219-936-4221

FOUNDATION NOTES

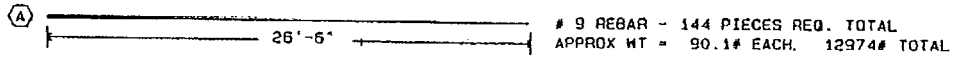
1. SOIL AS PER REPORT BY: CLARENCE MALTI ASSOCIATES, DATED: 8/14/00
2. CONCRETE TO BE 4000 PSI @ 28 DAYS. REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. CONCRETE INSTALLATION TO CONFORM TO ACI-318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE. ALL CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH FREE OF WATER AND ALL FOREIGN OBJECTS AND MATERIALS. A MINIMUM OF THREE INCHES OF CONCRETE SHALL COVER ALL REINFORCEMENT. WELDING OF REBAR NOT PERMITTED.
3. A COLD JOINT IS PERMISSIBLE UPON CONSULTATION WITH PIROD. ALL COLD JOINTS SHALL BE COATED WITH BONDING AGENTS PRIOR TO SECOND POUR.
4. ALL FILL SHOULD BE PLACED IN LOOSE LEVEL LIFTS OF NO MORE THAN 9" THICK. FILL MATERIALS SHOULD BE CLEAN AND FREE OF ORGANIC AND FROZEN MATERIALS OR ANY OTHER DELETERIOUS MATERIALS. COMPACT FILL TO 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557.
5. GROUTING OF POLE BASE IS OPTIONAL. IF GROUT IS USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF THE POLE. REFER TO DRAWING # 118492-B FOR BASE SECTION INSTALLATION.
6. BENDING, STRAIGHTENING OR REALIGNING (HOT OR COLD) OF THE ANCHOR BOLTS BY ANY METHOD IS PROHIBITED
7. CROWN TOP OF FOUNDATION FOR PROPER DRAINAGE.
8. INSTALL BASE SECTION WITH MINIMUM OF 2" CLEARANCE ABOVE CONCRETE. SEE PAGE 9 OF THIS DRAWING FOR MORE INFORMATION.
9. A WELL POINT OR OTHER DEWATERING SYSTEM MAY BE REQUIRED TO LOWER THE WATER TABLE TO FACILITATE THE INSTALLATION OF THE FOUNDATION.
10. SOFT OR UNSTABLE SUBGRADE SOILS SHOULD BE REMOVED AND REPLACED WITH COMPACTED FILL.



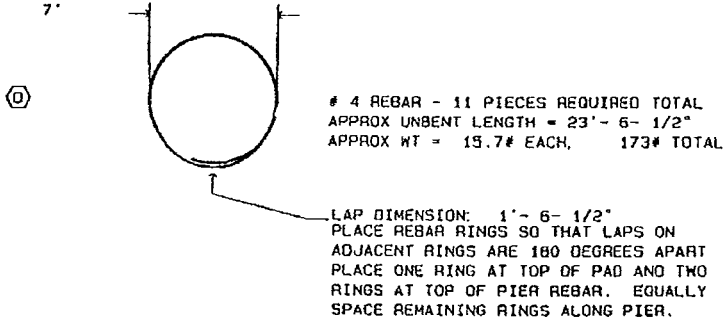
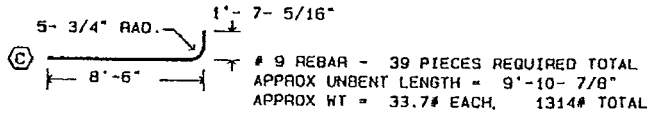
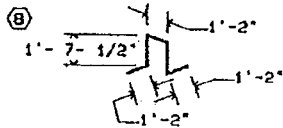
SEP 01 2000

				VOIESTREAM WIRELESS TERRYVILLE CT-11-417C. CT TP63 X 170' NOTES	
				APPROVED/ENG.	MBA 09/01/2000
				APPROVED/FOUND	MBA 09/01/2000
B	ADDED FOUNDATIONS PER SOIL REPORT	ACP	09/01/2000		
A	HEIGHT CHANGE	TSD	08/28/2000		
REV	DESCRIPTION OF REVISIONS	INI	DATE	DRAWN BY	TSD
From: F1000825.OFT - 09/01/2000 12:59 Printed from: 15073758.DWG - 09/01/2000 13:01 # 09/01/2000 13:28				ENG. FILE NO. A-117464- ARCHIVE F-1000825	DRAWING NO. 150737-B PAGE 5 OF 9





REBAR SUPPORTS MAY CONSIST OF ANY ACCEPTABLE MEANS OF SECURELY SUPPORTING THE TOP REINFORCEMENT GRID ABOVE THE BOTTOM REINFORCEMENT GRID WHILE MAINTAINING A SEPARATION OF 2" (OUTSIDE REBAR TO OUTSIDE REBAR).



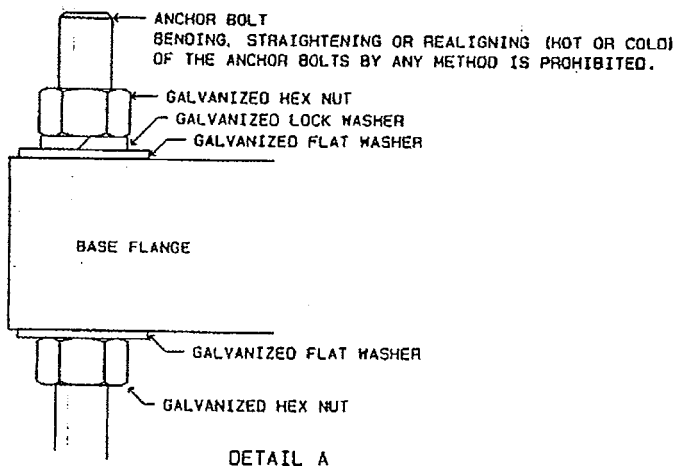
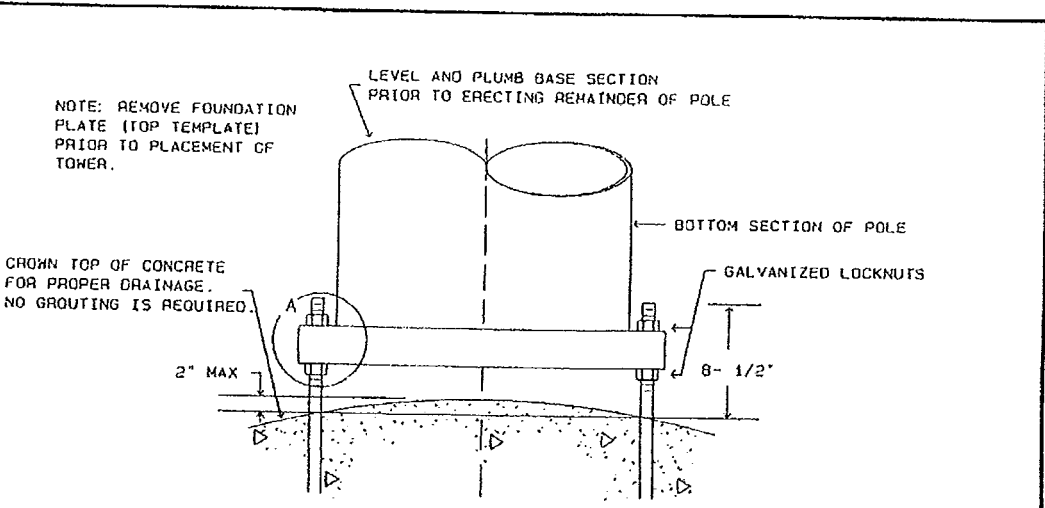
REBAR DETAIL

TOTAL APPROX REBAR WEIGHT = 14915#
REINFORCING BAR TO CONFORM TO
ASTM A615 GRADE 60 SPECIFICATIONS



SEP 01 2000

				VOICESTREAM WIRELESS TERRYVILLE CT-11-417C, CT TP63 X 170' REBAR DETAIL	
APPROVED/ENG.		WBR 09/01/2000		 1545 Picco Dr. Plymouth, IN 46563-0128 219-936-4221	
APPROVED/FOUND		WBR 09/01/2000			
DRAWN BY		TSD			
B	ADDED FOUNDATIONS PER SOIL REPORT	ACP	09/01/2000		
A	HEIGHT CHANGE	TSD	08/28/2000		
REV	DESCRIPTION OF REVISIONS	INT	DATE		
From: F1000825.DFT - 09/01/2000 12:59 Printed from: 15073778.DWG - 09/01/2000 13:01 @ 09/01/2000 13:28				ENG. FILE NO. A-117464- ARCHIVE F-1000825	DRAWING NO. 150737-8 PAGE 7 OF 9



TOWER BASE SECTION PLACEMENT



SEP 01 2000

				VOICESTREAM WIRELESS TERRYVILLE, CT-11-417C, CT TP63 X 170' BASE SECTION PLACEMENT	
		APPROVED/ENG. MBR 09/01/2000		 1545 Pideo Dr. Plymouth, IN 46563-0128 219-936-4221	
		APPROVED/FOUND MBR 09/01/2000			
B	ADDED FOUNDATIONS PER SOIL REPORT	ACP	09/01/2000	DRAWN BY	TSD
REV	DESCRIPTION OF REVISIONS	INI	DATE	ENG. FILE NO.	A-117464-
From: F1000825.DFT - 09/01/2000 12:59 Printed from: 15073798.DWG - 09/01/2000 13:01 # 09/01/2000 13:28				ARCHIVE	F-1000825
				DRAWING NO.	150737-B
				PAGE	9 OF 9

EM-CING-111-050817

1079 N. 204th Avenue
Elkhorn, NE 68022
Ph: 402-289-1888
Fax: 402-289-1861

SEMAAN ENGINEERING SOLUTIONS

169 ft PIROD Monopole
Structural Analysis

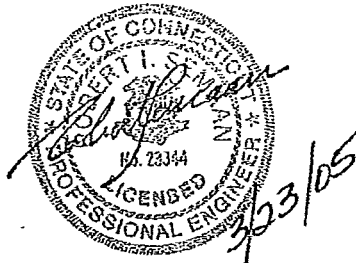
RECEIVED
MAR 17 2005
CONNECTICUT
SITING COUNCIL

APPROVED

Mark [Signature] 3/28/05
T-Mobile Site Marketing

Prepared for:
T-Mobile USA
12920 SE 38th Street
Bellevue, WA 98006

Site: CT11417C / Plymouth - Rt. 6 / Cingular
Plymouth, CT



March 21, 2005

RECEIVED
MAR 24 2005

Structure loading:

Per the loading sheet supplied, the analysis was performed using the following loading: (Proposed loading in bold)

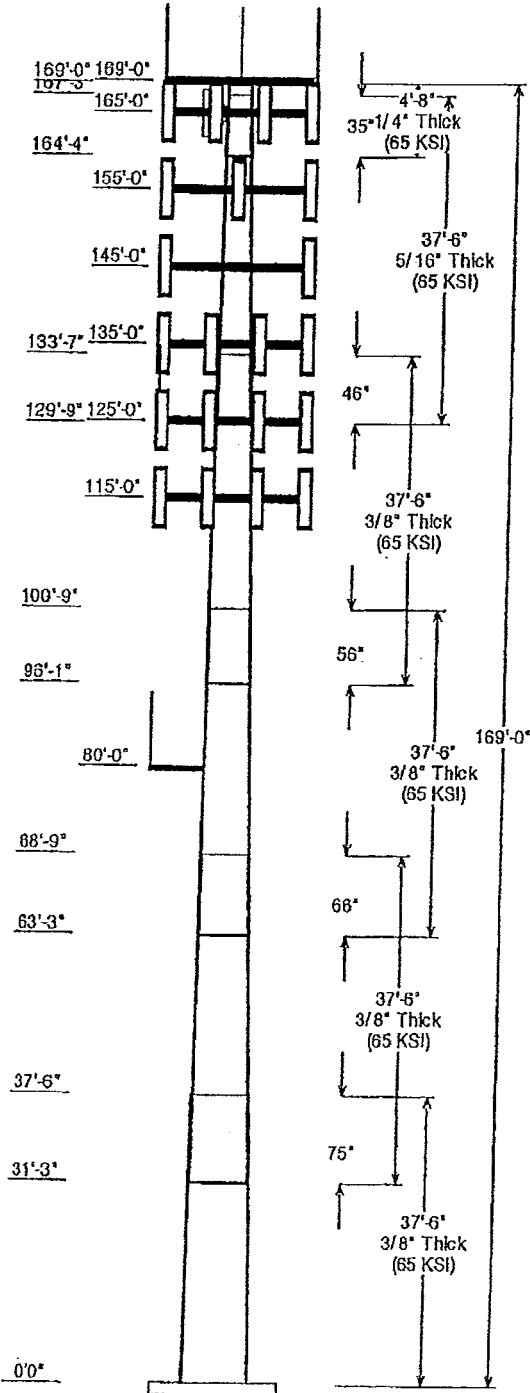
Elev. (ft)	Qty	Antennas and Mounts	Coax	Owner
169.0	1	ACP-305 On a 4 Omni Mount	(4) 7/8	Landlord
	1	PD220 On Same Mount		
	1	PD455 On Same Mount		
	1	SRL-229 On Same Mount		
165.0	12	RR65-19-00XP On a Low Profile Platform	(25) 1-5/8	T-Mobile
	12	S20045A1 LNA		
	1	4 ft HP Dish		
155.0	9	DB980H90 On a 13 ft Low Profile Platform	(9) 1-5/8	Sprint
145.0	3	Allgon 7250.03 On a 13 ft Low Profile Platform	(12) 1-1/4	AT&T
	3	731DG65V1EXM On Same Platform		
135.0	12	DB950F85T2E-M On a Low Profile Platform	(12) 1-5/8	Verizon
125.0	12	DB846G90A-XY On a Low Profile Platform	(15) 1 5/8 (Outside)	Nextel
125.0	1	Celwave 201 On Existing Platform	(1) 1/2	Terryville FD
115.0	6	AP14/17-880/1940/088D/ADT/XP On a Low Profile Platform	(12) 1 5/8 (Outside)	Cingular
	12	LGP2140X TMAs		
80.0	1	PD455 On a 4 FT Standoff	(1) 7/8	Landlord

All transmission lines are assumed running inside of pole shaft except as noted

SEMAAN ENGINEERING SOLUTIONS

1079 N.204th Avenue
 Elkhorn, NE 68022
 Phone: 402-289-1888
 Fax: 402-289-1861

Copyright Semaan Engineering Solutions, Inc



Job Information	
Pole :	CT11417C
Description :	
Client :	T-Mobile USA-WA
Location :	Plymouth - Rt. 6, Plymouth, CT
Type :	18 Sides Base Elev (ft): 0.00
Height : (ft)	169.00 Taper: 0.245310 (In/ft)

Sections Properties							
Shaft Section	Length (ft)	Diameter (in)		Thick Joint (in)	Overlap Length (in)	Taper (In/ft)	Steel Grade (ksi)
		Across Flats Top	Across Flats Bottom				
1	37.500	53.73	62.93	0.375	0.000	0.245310	65
2	37.500	46.82	56.02	0.375 Slip Joint	75.000	0.245310	65
3	37.500	39.72	48.92	0.375 Slip Joint	68.000	0.245310	65
4	37.500	32.41	41.61	0.375 Slip Joint	56.000	0.245310	65
5	37.500	24.78	33.98	0.313 Slip Joint	46.000	0.245310	65
6	4.667	24.85	26.00	0.250 Slip Joint	35.000	0.245310	65

Discrete Appurtenance			
Attach Elev (ft)	Force Elev (ft)	Qty	Description
169.000	170.000	1	4 Omni Mount
169.000	180.750	1	SRL-229
169.000	181.000	1	PD455
169.000	181.000	1	PD220
169.000	180.750	1	ACP-305
165.000	165.000	1	4 ft HP Dish
165.000	165.000	12	S20045A1 LNA
165.000	165.000	1	13 ft Low Profile Platform
165.000	165.000	12	RR65-19-00XP
155.000	155.000	1	13 ft Low Profile Platform
155.000	155.000	9	DB980H90
145.000	145.000	3	731DG66V1EXM
145.000	145.000	3	Allgon 7250.03
145.000	145.000	1	13 ft Low Profile Platform
135.000	135.000	1	Low Profile Platform
135.000	135.000	12	DB950F85T2E-M
125.000	128.875	1	Celwave 201
125.000	125.000	1	Low Profile Platform
125.000	125.000	12	DB846G90A-XY
115.000	115.000	1	Low Profile Platform
115.000	115.000	12	LGP2140X TMAs
115.000	115.000	6	AP14/17-880/1940/088D/ADT/XP
80.000	80.000	1	4 FT Standoff
80.000	91.000	1	PD455

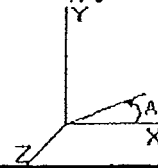
Linear Appurtenance			
Elev (ft)		Description	Exposed To Wind
From	To		
0.000	115.0	1 5/8" Coax	Yes
0.000	125.0	1 5/8" Coax	Yes

Reactions			
Load Case	Moment (Kip-ft)	Shear (Kips)	Axial (Kips)
80.00 mph Wind w/ No Ice	4,307.413	35.669	-47.921
69.28 mph Wind w/ 0.50 In Ice	3,661.968	29.540	-62.374

Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height : 169.0 (ft)
 Shape : 18 Sides
 Base Dia : 62.93 (in)
 Taper : 0.245310 (in/ft)

T-Mobile USA-WA
 Base Elev : 0.000 (ft)
 Top Dia : 24.85 (in)

Copyright Semaan Engineering Solutions, Inc
 3/21/2005 2:48:12 PM
 Page : 1



Shaft Section Properties

Sect Num	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip		Bottom					Top							
					Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (sqin)	Ix (In^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (In^4)	W/t Ratio	D/t Ratio	Taper (in/ft)
1	37.500	0.3750	65		0.00	8,803	62.93	0.000	74.46	36822.9	28.18	167.8	53.73	37.50	63.51	22851.0	23.86	143.30	0.24531
2	37.500	0.3750	65	Slip Joint	75.00	7,753	56.02	31.25	66.23	26911.4	24.93	149.3	46.82	68.75	65.28	15068.2	20.61	124.86	0.24531
3	37.500	0.3750	65	Slip Joint	66.00	6,674	48.92	63.25	57.78	17204.9	21.59	130.4	39.72	100.7	46.83	9160.7	17.27	106.93	0.24531
4	37.500	0.3750	65	Slip Joint	56.00	5,565	41.61	96.08	49.09	10548.8	18.16	110.9	32.41	133.5	38.14	4947.5	13.83	86.45	0.24531
5	37.500	0.3125	65	Slip Joint	48.00	3,679	33.98	129.7	33.40	4783.7	17.76	108.7	24.78	167.2	24.27	1836.5	12.57	79.31	0.24531
6	4.667	0.2500	65	Slip Joint	35.00	317	26.00	164.3	20.43	1711.6	16.93	104.0	24.85	169.0	19.52	1493.3	16.12	99.42	0.24531
					Shaft Weight	32,792													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (st)	CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	CaAa Factor	Distance From Face (ft)	X Angle (deg)	Vert Ecc (ft)
169.0	4 Omnl Mount	1	1642.00	24.830	1.00	2100.00	26.000	1.00	0.000	0.00	1.000
169.0	SRL-229	1	25.00	6.450	1.00	71.00	8.630	1.00	0.000	0.00	11.750
169.0	PD455	1	23.00	3.560	1.00	83.00	6.860	1.00	0.000	0.00	12.000
169.0	PD220	1	23.00	3.560	1.00	83.00	6.860	1.00	0.000	0.00	12.000
169.0	ACP-305	1	25.00	6.450	1.00	71.00	8.630	1.00	0.000	0.00	11.750
165.0	4 ft HP Dish	1	170.00	15.860	1.00	280.00	16.520	1.00	0.000	0.00	0.000
165.0	S20045A1 LNA	12	9.92	0.762	1.00	15.03	0.953	1.00	0.000	0.00	0.000
165.0	13 ft Low Profile Platform	1	1346.00	15.300	1.00	2075.00	17.020	1.00	0.000	0.00	0.000
165.0	RR65-19-00XP	12	23.00	6.000	1.00	52.00	6.850	1.00	0.000	0.00	0.000
155.0	13 ft Low Profile Platform	1	1346.00	15.300	1.00	2075.00	17.020	1.00	0.000	0.00	0.000
155.0	DB980H90	9	9.00	3.280	0.67	28.00	3.850	0.67	0.000	0.00	0.000
145.0	731DG65V1EXM	3	20.00	6.070	1.00	58.30	6.670	1.00	0.000	0.00	0.000
145.0	Allgon 7250.03	3	16.00	4.300	0.67	36.00	5.000	0.67	0.000	0.00	0.000
145.0	13 ft Low Profile Platform	1	1346.00	15.300	1.00	2075.00	17.020	1.00	0.000	0.00	0.000
135.0	Low Profile Platform	1	1300.00	25.550	1.00	2100.00	27.320	1.00	0.000	0.00	0.000
135.0	DB950F85T2E-M	12	10.50	4.400	1.00	30.00	5.000	1.00	0.000	0.00	0.000
125.0	Celwave 201	1	4.00	1.020	1.00	12.70	1.810	1.00	0.000	0.00	3.875
125.0	Low Profile Platform	1	1600.00	25.550	1.00	2100.00	27.320	1.00	0.000	0.00	0.000
125.0	DB846G90A-XY	12	21.00	5.867	1.00	59.35	6.556	1.00	0.000	0.00	0.000
115.0	Low Profile Platform	1	1600.00	25.550	1.00	2100.00	27.320	1.00	0.000	0.00	0.000
115.0	LGP2140X TMA's	12	5.60	0.387	0.67	8.86	0.531	0.67	0.000	0.00	0.000
115.0	AP14/17-	6	61.70	7.608	1.00	106.26	8.393	1.00	0.000	0.00	0.000
80.00	4 FT Standoff	1	53.32	3.500	1.00	84.00	5.790	1.00	0.000	0.00	0.000
80.00	PD455	1	23.00	3.560	1.00	83.00	6.860	1.00	0.000	0.00	11.000
		Totals	96	11925.76		18548.04			Number of Loadings : 24		

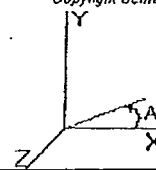
Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	No Ice Weight (lb/ft)	No Ice CaAa (sf/ft)	Ice Weight (lb/ft)	Ice CaAa (sf/ft)	Exposed To Wind
0.00	115.00	(12) 1 5/8" Coax	12.00	0.00	24.00	0.00	Y
0.00	125.00	(15) 1 5/8" Coax	15.00	0.30	30.00	0.40	Y
Total Weight			3,255.00 (lb)		6,510.00 (lb)		

Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height: 169.0 (ft)
 Shaps: 18 Sides
 Base Dia: 62.93 (ln)
 Taper: 0.245310 (ln/ft)

T-Mobile USA-WA
 Base Elev: 0.000 (ft)
 Top Dia: 24.85 (ln)

Copyright Semaan Engineering Solutions, Inc
 3/21/2005 2:48:13 PM
 Page: 3



Load Case: No Ice 80 mph - No Ice 24 Iterations

Gust Response Factor: 1.69 Effective Wind Speed: 80.00 (mph)

Dead Load Factor: 1.00

Wind Load Factor: 1.00

Shaft Forces

Seg Top Elev (ft)	Description	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Wind Force Z (lb)	Weight (lb)
0.00		1.00	16.38	27.68	419.58	0.650	0.00	0.000	0.000	0.00	0.00	0.0
5.00		1.00	16.38	27.68	411.41	0.650	5.00	25.968	16.879	467.38	0.00	1,254.5
10.00		1.00	16.38	27.68	403.23	0.650	5.00	25.457	16.547	458.18	0.00	1,229.6
15.00		1.00	16.38	27.68	395.05	0.650	5.00	24.946	16.215	448.98	0.00	1,204.8
20.00		1.00	16.38	27.68	386.88	0.650	5.00	24.435	15.883	439.78	0.00	1,180.0
25.00		1.00	16.38	27.68	378.70	0.650	5.00	23.924	15.551	430.58	0.00	1,155.1
30.00		1.00	16.38	27.68	370.52	0.650	5.00	23.413	15.219	421.39	0.00	1,130.3
31.25	Bot - Section 2	1.00	16.38	27.68	368.48	0.650	1.25	5.773	3.753	103.91	0.00	278.7
35.00		1.01	16.66	28.15	365.40	0.650	3.75	17.363	11.286	317.79	0.00	1,664.9
37.50	Top - Section 1	1.03	16.99	28.71	364.86	0.650	2.50	11.416	7.420	213.10	0.00	1,094.4
40.00		1.05	17.31	29.25	369.17	0.650	2.50	11.288	7.337	214.64	0.00	544.8
45.00		1.09	17.90	30.25	366.89	0.650	5.00	22.192	14.425	436.43	0.00	1,071.0
50.00		1.12	18.44	31.17	363.78	0.650	5.00	21.681	14.093	439.41	0.00	1,046.1
55.00		1.15	18.95	32.04	359.97	0.650	5.00	21.170	13.761	440.89	0.00	1,021.3
60.00		1.18	19.43	32.84	356.57	0.650	5.00	20.659	13.429	441.08	0.00	996.4
63.25	Bot - Section 3	1.20	19.73	33.34	352.42	0.650	3.25	13.154	8.560	285.12	0.00	634.4
65.00		1.21	19.88	33.60	350.65	0.650	1.75	7.103	4.617	155.16	0.00	679.8
68.75	Top - Section 2	1.23	20.20	34.14	346.66	0.650	3.75	15.010	9.757	333.18	0.00	1,466.2
70.00		1.24	20.31	34.32	350.84	0.650	1.25	4.939	3.211	110.21	0.00	238.2
75.00		1.28	20.71	35.00	345.12	0.650	5.00	19.439	12.635	442.34	0.00	937.1
80.00	Appertunance(s)	1.28	21.10	35.66	339.04	0.650	5.00	18.927	12.303	438.72	0.00	912.3
85.00		1.31	21.46	36.28	332.63	0.650	5.00	18.416	11.971	434.34	0.00	887.4
90.00		1.33	21.82	36.88	325.92	0.650	5.00	17.905	11.638	429.24	0.00	862.6
95.00		1.35	22.16	37.45	318.93	0.650	5.00	17.394	11.306	423.48	0.00	837.8
96.08	Bot - Section 4	1.35	22.23	37.57	317.39	0.650	1.08	3.701	2.406	90.41	0.00	178.2
100.00		1.37	22.49	38.00	311.70	0.650	3.92	13.427	8.727	331.71	0.00	1,281.3
100.75	Top - Section 3	1.37	22.53	38.08	310.59	0.650	0.75	2.635	1.648	82.77	0.00	241.9
105.00		1.39	22.80	38.54	310.13	0.650	4.25	14.149	9.197	354.47	0.00	681.2
110.00		1.41	23.11	39.05	302.49	0.650	5.00	16.174	10.513	410.60	0.00	778.4
115.00	Appertunance(s)	1.42	23.40	39.55	294.64	0.650	5.00	15.663	10.181	402.71	0.00	753.6
120.00		1.44	23.69	40.04	286.61	0.650	5.00	15.151	9.848	394.34	0.00	728.8
125.00	Appertunance(s)	1.46	23.97	40.51	278.39	0.650	5.00	14.640	9.516	385.50	0.00	703.9
129.75	Bot - Section 5	1.47	24.22	40.94	270.43	0.650	4.75	13.435	8.733	357.55	0.00	645.7
130.00		1.48	24.24	40.96	270.01	0.650	0.25	0.707	0.460	18.84	0.00	61.7
133.58	Top - Section 4	1.49	24.43	41.28	263.90	0.650	3.58	9.998	6.499	268.31	0.00	872.6
135.00	Appertunance(s)	1.49	24.50	41.41	266.56	0.650	1.42	3.880	2.522	104.45	0.00	155.7
140.00		1.51	24.75	41.84	257.90	0.650	5.00	13.368	8.689	363.57	0.00	536.1
145.00	Appertunance(s)	1.52	25.00	42.26	249.09	0.650	5.00	12.857	8.357	353.20	0.00	515.4
150.00		1.54	25.25	42.67	240.15	0.650	5.00	12.346	8.025	342.46	0.00	494.7
155.00	Appertunance(s)	1.55	25.49	43.07	231.08	0.650	5.00	11.834	7.692	331.37	0.00	474.0
160.00		1.57	25.72	43.47	221.89	0.650	5.00	11.323	7.360	319.95	0.00	453.3
164.33	Bot - Section 6	1.58	25.91	43.80	213.82	0.650	4.33	9.400	6.110	267.65	0.00	376.1
165.00	Appertunance(s)	1.58	25.94	43.85	212.57	0.650	0.67	1.440	0.936	41.04	0.00	102.7
167.25	Top - Section 5	1.59	26.05	44.02	208.34	0.650	2.25	4.793	3.115	137.14	0.00	341.7
169.00	Appertunance(s)	1.59	26.12	44.15	209.25	0.650	1.75	3.656	2.376	104.93	0.00	117.3
Totals:							189.00		13,768.28	0.00	32,792.1	

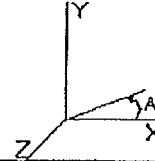
Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height: 189.0 (ft)
 Shape: 18 Sides
 Base Dia: 62.93 (In)
 Taper: 0.245310 (In/ft)

T-Mobile USA-WA
 Base Elev: 0.000 (ft)
 Top Dia: 24.85 (In)

Copyright Semaan Engineering Solutions, Inc

3/21/2005 2:48:13 PM

Page: 5



Load Case: No Ice 80 mph - No Ice 24 Iterations

Gust Response Factor : 1.69 Effective Wind Speed : 80.00 (mph)

Dead Load Factor : 1.00

Wind Load Factor : 1.00

Linear Appurtenance Forces

Seg Elev (ft)	Description	Exposed To Wind	Applied Length (ft)	Weight (lb/ft)	CaAa (sf/ft)	qz (psf)	Wind Force X (lb)	Wind Force Z (lb)	Weight (lb)
5.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
5.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
10.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
10.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
15.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
15.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
20.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
20.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
25.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
25.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
30.00	1 5/8" Coax	Yes	5.00	12.00	0.00	16.384	0.00	0.00	60.00
30.00	1 5/8" Coax	Yes	5.00	15.00	0.30	16.384	41.53	0.00	75.00
31.25	1 5/8" Coax	Yes	1.25	12.00	0.00	16.384	0.00	0.00	15.00
31.25	1 5/8" Coax	Yes	1.25	15.00	0.30	16.384	10.38	0.00	18.75
35.00	1 5/8" Coax	Yes	3.75	12.00	0.00	16.662	0.00	0.00	45.00
35.00	1 5/8" Coax	Yes	3.75	15.00	0.30	16.662	31.68	0.00	56.25
37.50	1 5/8" Coax	Yes	2.50	12.00	0.00	16.993	0.00	0.00	30.00
37.50	1 5/8" Coax	Yes	2.50	15.00	0.30	16.993	21.54	0.00	37.50
40.00	1 5/8" Coax	Yes	2.50	12.00	0.00	17.310	0.00	0.00	30.00
40.00	1 5/8" Coax	Yes	2.50	15.00	0.30	17.310	21.94	0.00	37.50
45.00	1 5/8" Coax	Yes	5.00	12.00	0.00	17.902	0.00	0.00	60.00
45.00	1 5/8" Coax	Yes	5.00	15.00	0.30	17.902	45.38	0.00	75.00
50.00	1 5/8" Coax	Yes	5.00	12.00	0.00	18.449	0.00	0.00	60.00
50.00	1 5/8" Coax	Yes	5.00	15.00	0.30	18.449	46.77	0.00	75.00
55.00	1 5/8" Coax	Yes	5.00	12.00	0.00	18.959	0.00	0.00	60.00
55.00	1 5/8" Coax	Yes	5.00	15.00	0.30	18.959	48.06	0.00	75.00
60.00	1 5/8" Coax	Yes	5.00	12.00	0.00	19.436	0.00	0.00	60.00
60.00	1 5/8" Coax	Yes	5.00	15.00	0.30	19.436	49.27	0.00	75.00
63.25	1 5/8" Coax	Yes	3.25	12.00	0.00	19.731	0.00	0.00	39.00
63.25	1 5/8" Coax	Yes	3.25	15.00	0.30	19.731	32.51	0.00	48.75
66.00	1 5/8" Coax	Yes	1.75	12.00	0.00	19.885	0.00	0.00	21.00
66.00	1 5/8" Coax	Yes	1.75	15.00	0.30	19.885	17.64	0.00	26.25
68.75	1 5/8" Coax	Yes	3.75	12.00	0.00	20.207	0.00	0.00	45.00
68.75	1 5/8" Coax	Yes	3.75	15.00	0.30	20.207	38.42	0.00	56.25
70.00	1 5/8" Coax	Yes	1.25	12.00	0.00	20.311	0.00	0.00	15.00
70.00	1 5/8" Coax	Yes	1.25	15.00	0.30	20.311	12.87	0.00	18.75
75.00	1 5/8" Coax	Yes	5.00	12.00	0.00	20.715	0.00	0.00	60.00
75.00	1 5/8" Coax	Yes	5.00	15.00	0.30	20.715	52.51	0.00	75.00
80.00	1 5/8" Coax	Yes	5.00	12.00	0.00	21.101	0.00	0.00	60.00
80.00	1 5/8" Coax	Yes	5.00	15.00	0.30	21.101	53.49	0.00	75.00
85.00	1 5/8" Coax	Yes	5.00	12.00	0.00	21.469	0.00	0.00	60.00
85.00	1 5/8" Coax	Yes	5.00	15.00	0.30	21.469	54.43	0.00	75.00
90.00	1 5/8" Coax	Yes	5.00	12.00	0.00	21.823	0.00	0.00	60.00
90.00	1 5/8" Coax	Yes	5.00	15.00	0.30	21.823	55.32	0.00	75.00
95.00	1 5/8" Coax	Yes	5.00	12.00	0.00	22.163	0.00	0.00	60.00
95.00	1 5/8" Coax	Yes	5.00	15.00	0.30	22.163	56.18	0.00	75.00
96.08	1 5/8" Coax	Yes	1.08	12.00	0.00	22.235	0.00	0.00	13.00
96.08	1 5/8" Coax	Yes	1.08	15.00	0.30	22.235	12.21	0.00	16.25
100.0	1 5/8" Coax	Yes	3.92	12.00	0.00	22.490	0.00	0.00	47.00
100.0	1 5/8" Coax	Yes	3.92	15.00	0.30	22.490	44.86	0.00	58.75
100.7	1 5/8" Coax	Yes	0.75	12.00	0.00	22.538	0.00	0.00	9.00

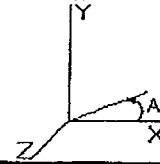
Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height: 169.0 (ft)
 Shape: 18 Sides
 Base Dia: 62.93 (in)
 Taper: 0.245310 (in/ft)

T-Mobile USA-WA
 Base Elev: 0.000 (ft)
 Top Dia: 24.85 (in)

Copyright Semaan Engineering Solutions, Inc

3/21/2005 2:48:13 PM

Page: 7



Load Case: No Ice 80 mph - No Ice 24 Iterations
 Gust Response Factor : 1.69 Effective Wind Speed : 80.00 (mph)
 Dead Load Factor : 1.00
 Wind Load Factor : 1.00

Applied Forces Summary

Seg Elev (ft)	X Coord (ft)	Z Coord (ft)	Lateral FX (-) (lb)	Axial FY (-) (lb)	Lateral FZ (lb)	Moment MX (lb-ft)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	508.91	1,389.47	0.00	0.00	0.00	0.00
10.00	0.00	0.00	499.71	1,364.64	0.00	0.00	0.00	0.00
15.00	0.00	0.00	490.51	1,339.80	0.00	0.00	0.00	0.00
20.00	0.00	0.00	481.31	1,314.96	0.00	0.00	0.00	0.00
25.00	0.00	0.00	472.12	1,290.12	0.00	0.00	0.00	0.00
30.00	0.00	0.00	462.92	1,265.29	0.00	0.00	0.00	0.00
31.25	0.00	0.00	114.29	312.44	0.00	0.00	0.00	0.00
35.00	0.00	0.00	349.47	1,766.16	0.00	0.00	0.00	0.00
37.50	0.00	0.00	234.64	1,161.91	0.00	0.00	0.00	0.00
40.00	0.00	0.00	236.58	612.29	0.00	0.00	0.00	0.00
45.00	0.00	0.00	481.81	1,205.96	0.00	0.00	0.00	0.00
50.00	0.00	0.00	486.17	1,181.12	0.00	0.00	0.00	0.00
55.00	0.00	0.00	488.95	1,156.29	0.00	0.00	0.00	0.00
60.00	0.00	0.00	490.35	1,131.45	0.00	0.00	0.00	0.00
63.25	0.00	0.00	317.83	722.12	0.00	0.00	0.00	0.00
65.00	0.00	0.00	172.80	727.04	0.00	0.00	0.00	0.00
68.75	0.00	0.00	371.60	1,537.46	0.00	0.00	0.00	0.00
70.00	0.00	0.00	123.08	271.91	0.00	0.00	0.00	0.00
75.00	0.00	0.00	494.85	1,072.12	0.00	0.00	0.00	0.00
80.00	0.00	0.00	748.74	1,123.60	0.00	0.00	0.00	1,448.82
85.00	0.00	0.00	488.76	1,022.45	0.00	0.00	0.00	0.00
90.00	0.00	0.00	484.56	997.61	0.00	0.00	0.00	0.00
95.00	0.00	0.00	479.66	972.77	0.00	0.00	0.00	0.00
96.08	0.00	0.00	102.62	207.49	0.00	0.00	0.00	0.00
100.00	0.00	0.00	376.37	1,387.03	0.00	0.00	0.00	0.00
100.75	0.00	0.00	71.34	262.12	0.00	0.00	0.00	0.00
105.00	0.00	0.00	403.61	795.96	0.00	0.00	0.00	0.00
110.00	0.00	0.00	469.19	913.45	0.00	0.00	0.00	0.00
115.00	0.00	0.00	3,400.91	2,926.01	0.00	0.00	0.00	0.00
120.00	0.00	0.00	454.40	803.77	0.00	0.00	0.00	0.00
125.00	0.00	0.00	4,375.05	2,634.93	0.00	0.00	0.00	161.52
129.75	0.00	0.00	357.55	645.73	0.00	0.00	0.00	0.00
130.00	0.00	0.00	18.84	61.75	0.00	0.00	0.00	0.00
133.58	0.00	0.00	268.31	872.56	0.00	0.00	0.00	0.00
135.00	0.00	0.00	3,348.98	1,581.66	0.00	0.00	0.00	0.00
140.00	0.00	0.00	363.57	536.12	0.00	0.00	0.00	0.00
145.00	0.00	0.00	2,133.15	1,969.42	0.00	0.00	0.00	0.00
150.00	0.00	0.00	342.46	494.72	0.00	0.00	0.00	0.00
155.00	0.00	0.00	1,838.66	1,901.02	0.00	0.00	0.00	0.00
160.00	0.00	0.00	319.95	453.33	0.00	0.00	0.00	0.00
164.33	0.00	0.00	267.65	376.14	0.00	0.00	0.00	0.00
165.00	0.00	0.00	4,968.06	2,013.73	0.00	0.00	0.00	0.00
167.25	0.00	0.00	137.14	341.69	0.00	0.00	0.00	0.00
169.00	0.00	0.00	2,104.41	1,855.27	0.00	0.00	0.00	11,768.13
Totals:			35,599.63	47,972.90	0.00	0.00	0.00	13,378.46

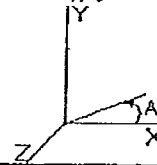
Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height: 169.0 (ft)
 Shape: 18 Sides
 Base Dia: 62.93 (in)
 Taper: 0.245310 (in/ft)

T-Mobile USA-WA
 Base Elev: 0.000 (ft)
 Top Dia: 24.85 (in)

Copyright Semaan Engineering Solutions, Inc

3/21/2005 2:48:13 PM

Page: 9



Load Case: No Ice 80 mph - No Ice 24 Iterations

Gust Response Factor: 1.69 Effective Wind Speed: 80.00 (mph)

Dead Load Factor: 1.00

Wind Load Factor: 1.00

Calculated Stresses

Seg Elev (ft)	Applied Stresses							Allowable Stress (Fb) (ksi)	Stress Ratio
	Axial (Y) (ksi)	Shear (X) (ksi)	Shear (Z) (ksi)	Torsion (ksi)	Bending (X) (ksi)	Bending (Z) (ksi)	Combined (ksi)		
0.00	0.644	0.965	0.000	0.000	0.000	44.855	45.529	49.1	0.927
5.00	0.636	0.974	0.000	0.000	0.000	44.740	45.407	49.6	0.915
10.00	0.629	0.984	0.000	0.000	0.000	44.599	45.260	50.1	0.904
15.00	0.621	0.993	0.000	0.000	0.000	44.429	45.083	50.6	0.891
20.00	0.614	1.004	0.000	0.000	0.000	44.227	44.875	51.1	0.879
25.00	0.606	1.015	0.000	0.000	0.000	43.988	44.629	51.6	0.866
30.00	0.600	1.025	0.000	0.000	0.000	43.709	44.344	52.0	0.853
31.25	0.598	1.029	0.000	0.000	0.000	43.635	44.268	52.0	0.852
35.00	0.579	1.036	0.000	0.000	0.000	43.389	44.005	52.0	0.847
37.50	0.559	1.028	0.000	0.000	0.000	42.018	42.815	52.0	0.820
40.00	0.555	1.034	0.000	0.000	0.000	41.821	42.413	52.0	0.816
45.00	0.547	1.045	0.000	0.000	0.000	41.374	41.960	52.0	0.807
50.00	0.539	1.056	0.000	0.000	0.000	40.867	41.447	52.0	0.797
55.00	0.532	1.068	0.000	0.000	0.000	40.293	40.867	52.0	0.786
60.00	0.524	1.079	0.000	0.000	0.000	39.645	40.213	52.0	0.774
63.25	0.520	1.087	0.000	0.000	0.000	39.185	39.760	52.0	0.765
65.00	0.511	1.091	0.000	0.000	0.000	38.925	39.481	52.0	0.760
68.75	0.485	1.081	0.000	0.000	0.000	37.108	37.840	52.0	0.724
70.00	0.482	1.085	0.000	0.000	0.000	36.898	37.427	52.0	0.720
75.00	0.474	1.097	0.000	0.000	0.000	35.971	36.495	52.0	0.702
80.00	0.465	1.100	0.000	0.000	0.000	34.902	35.419	52.0	0.681
85.00	0.457	1.113	0.000	0.000	0.000	33.783	34.274	52.0	0.659
90.00	0.449	1.126	0.000	0.000	0.000	32.481	32.988	52.0	0.635
95.00	0.442	1.139	0.000	0.000	0.000	31.039	31.543	52.0	0.607
98.08	0.440	1.143	0.000	0.000	0.000	30.709	31.212	52.0	0.600
100.00	0.421	1.153	0.000	0.000	0.000	29.424	29.912	52.0	0.575
100.75	0.409	1.134	0.000	0.000	0.000	28.082	28.559	52.0	0.549
105.00	0.402	1.147	0.000	0.000	0.000	26.548	27.023	52.0	0.520
110.00	0.394	1.162	0.000	0.000	0.000	24.526	25.001	52.0	0.481
115.00	0.344	1.037	0.000	0.000	0.000	22.240	22.856	52.0	0.436
120.00	0.337	1.050	0.000	0.000	0.000	20.152	20.570	52.0	0.396
125.00	0.291	0.863	0.000	0.000	0.000	17.778	18.131	52.0	0.349
129.75	0.286	0.873	0.000	0.000	0.000	15.951	16.307	52.0	0.314
130.00	0.284	0.874	0.000	0.000	0.000	15.850	16.205	52.0	0.312
133.58	0.316	1.034	0.000	0.000	0.000	16.420	16.832	52.0	0.324
135.00	0.278	0.829	0.000	0.000	0.000	15.671	16.014	52.0	0.308
140.00	0.272	0.836	0.000	0.000	0.000	13.595	13.942	52.0	0.268
145.00	0.222	0.716	0.000	0.000	0.000	11.223	11.512	52.0	0.221
150.00	0.215	0.720	0.000	0.000	0.000	9.062	9.361	52.0	0.180
155.00	0.161	0.605	0.000	0.000	0.000	6.582	6.823	52.0	0.131
160.00	0.152	0.606	0.000	0.000	0.000	4.292	4.566	52.0	0.088
164.33	0.144	0.608	0.000	0.000	0.000	2.031	2.416	52.0	0.046
165.00	0.081	0.196	0.000	0.000	0.000	1.663	1.776	52.0	0.034
167.25	0.084	0.229	0.000	0.000	0.000	1.539	1.670	52.0	0.032
169.00	0.000	0.217	0.000	0.000	0.000	1.193	1.251	52.0	0.024

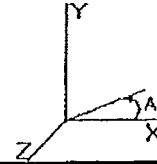
Pole : CT11417C
 Location: Plymouth - Rt. 8, Plymouth, CT
 Height: 169.0 (ft)
 Shape: 18 Sides
 Base Dia: 62.93 (In)
 Taper: 0.245310 (In/ft)

T-Mobile USA-WA
 Base Elev: 0.000 (ft)
 Top Dia: 24.85 (In)

Copyright Semaan Engineering Solutions, Inc

3/21/2005 2:48:14 PM

Page: 11



Load Case: Ice 80 mph - With Ice - Ice Thickness = 0.5 in 24 Iterations

Gust Response Factor: 1.69 Effective Wind Speed: 69.28 (mph)

Dead Load Factor: 1.00

Wind Load Factor: 1.00

Discrete Appurtenance Forces

Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Total CaAa (sf)	CaAa Factor	Horz Ecc (ft)	Vert Ecc (ft)	X Angle (deg)	Wind Force X (lb)	Wind Force Z (lb)	Mom X (lb-ft)	Mom Y (lb-ft)	Mom Z (lb-ft)	Weight (lb)
80.00	4 FT Standoff	1	15.82	26.74	5.790	1.000	0.000	0.0	0.0	154.85	0.00	0.00	0.00	0.00	84.0
80.00	PD455	1	16.41	27.74	8.860	1.000	0.000	11.0	0.0	190.34	0.00	0.00	0.00	2093.75	83.0
115.00	Low Profile Platform	1	17.55	29.66	27.320	1.000	0.000	0.0	0.0	810.46	0.00	0.00	0.00	0.00	2100.0
115.00	LGP2140X TMAs	12	17.55	29.66	4.250	0.667	0.000	0.0	0.0	126.08	0.00	0.00	0.00	0.00	106.3
115.00	AP14/17-	6	17.55	29.66	50.358	1.000	0.000	0.0	0.0	1493.90	0.00	0.00	0.00	0.00	637.6
125.00	Celwave 201	1	18.13	30.64	1.810	1.000	0.000	3.9	0.0	55.47	0.00	0.00	0.00	214.95	12.7
125.00	Low Profile Platform	1	17.97	30.38	27.320	1.000	0.000	0.0	0.0	830.00	0.00	0.00	0.00	0.00	2100.0
125.00	DB846G90A-XY	12	17.97	30.38	78.872	1.000	0.000	0.0	0.0	2390.11	0.00	0.00	0.00	0.00	712.2
135.00	Low Profile Platform	1	18.37	31.05	27.320	1.000	0.000	0.0	0.0	848.45	0.00	0.00	0.00	0.00	2100.0
135.00	DB950F85T2E-M	12	18.37	31.05	60.000	1.000	0.000	0.0	0.0	1863.37	0.00	0.00	0.00	0.00	360.0
145.00	731DG65V1EXM	3	18.75	31.69	20.010	1.000	0.000	0.0	0.0	834.25	0.00	0.00	0.00	0.00	174.9
145.00	Allgon 7250.03	3	18.75	31.69	10.005	0.667	0.000	0.0	0.0	317.13	0.00	0.00	0.00	0.00	108.0
145.00	13 ft Low Profile	1	18.75	31.69	17.020	1.000	0.000	0.0	0.0	539.48	0.00	0.00	0.00	0.00	2075.0
155.00	13 ft Low Profile	1	19.11	32.30	17.020	1.000	0.000	0.0	0.0	549.86	0.00	0.00	0.00	0.00	2075.0
155.00	DB980H90	9	19.11	32.30	23.112	0.667	0.000	0.0	0.0	746.65	0.00	0.00	0.00	0.00	252.0
165.00	4 ft HP Dish	1	19.46	32.88	16.520	1.000	0.000	0.0	0.0	543.32	0.00	0.00	0.00	0.00	280.0
165.00	S20045A1 LNA	12	19.46	32.88	11.436	1.000	0.000	0.0	0.0	376.12	0.00	0.00	0.00	0.00	180.4
165.00	13 ft Low Profile	1	19.46	32.88	17.020	1.000	0.000	0.0	0.0	659.77	0.00	0.00	0.00	0.00	2075.0
165.00	RR65-19-00XP	12	19.46	32.88	82.200	1.000	0.000	0.0	0.0	2703.46	0.00	0.00	0.00	0.00	624.0
169.00	4 Omni Mount	1	19.62	33.17	26.000	1.000	0.000	1.0	0.0	862.43	0.00	0.00	0.00	862.43	2100.0
169.00	SRL-229	1	19.97	33.75	8.630	1.000	0.000	11.8	0.0	291.32	0.00	0.00	0.00	3423.02	71.0
169.00	PD455	1	19.98	33.77	8.860	1.000	0.000	12.0	0.0	231.66	0.00	0.00	0.00	2779.95	83.0
169.00	PD220	1	19.98	33.77	8.860	1.000	0.000	12.0	0.0	231.66	0.00	0.00	0.00	2779.95	83.0
169.00	ACP-305	1	19.97	33.75	8.630	1.000	0.000	11.8	0.0	291.32	0.00	0.00	0.00	3423.02	71.0
										17,641.4	0.00				18,648.0

Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height : 169.0 (ft)
 Shape : 18 Sides
 Base Dia : 62.93 (In)
 Taper : 0.245310 (In/ft)

T-Mobile USA-WA

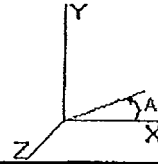
Base Elev: 0.000 (ft)

Top Dia : 24.85 (In)

Copyright Semaon Engineering Solutions, Inc

3/21/2005 2:48:14 PM

Page: 13



Load Case: Ice 80 mph - With Ice - Ice Thickness = 0.5 in 24 Iterations

Gust Response Factor : 1.69 Effective Wind Speed : 69.28 (mph)
 Dead Load Factor : 1.00
 Wind Load Factor : 1.00

100.7	15/8" Coax	Yes	0.75	30.00	0.40	16.902	8.57	0.00	22.50
105.0	15/8" Coax	Yes	4.25	24.00	0.00	17.103	0.00	0.00	102.00
105.0	15/8" Coax	Yes	4.25	30.00	0.40	17.103	49.14	0.00	127.50
110.0	15/8" Coax	Yes	5.00	24.00	0.00	17.332	0.00	0.00	120.00
110.0	15/8" Coax	Yes	5.00	30.00	0.40	17.332	58.58	0.00	150.00
115.0	15/8" Coax	Yes	5.00	24.00	0.00	17.554	0.00	0.00	120.00
115.0	15/8" Coax	Yes	5.00	30.00	0.40	17.554	59.33	0.00	150.00
120.0	15/8" Coax	Yes	5.00	30.00	0.40	17.768	60.06	0.00	150.00
125.0	15/8" Coax	Yes	5.00	30.00	0.40	17.977	60.76	0.00	150.00
Totals:							1,250.85	0.00	6,510.0

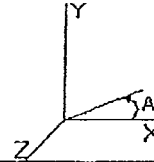
Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height : 169.0 (ft)
 Shape : 18 Sides
 Base Dia : 62.93 (in)
 Taper : 0.245310 (in/ft)

T-Mobile USA-WA
 Base Elev : 0.000 (ft)
 Top Dia : 24.85 (in)

Copyright Sema Engineering Solutions, Inc

3/21/2005 2:48:14 PM

Page: 15



Load Case: Ice 80 mph - W/lt Ice - Ice Thickness = 0.5 in 24 Iterations
 Gust Response Factor : 1.69 Effective Wind Speed : 69.28 (mph)
 Dead Load Factor : 1.00
 Wind Load Factor : 1.00

Calculated Forces and Deflections

Seg Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	X Deflect (in)	Z Deflect (in)	Total Deflect (in)	Rotation (deg)
0.00	28.540	62.374	0.000	0.000	0.000	3,661.968	0.000	0.000	0.000	0.000
5.00	29.288	60.586	0.000	0.000	0.000	3,514.271	-0.075	0.000	0.075	-0.139
10.00	29.038	58.828	0.000	0.000	0.000	3,367.833	-0.296	0.000	0.296	-0.280
15.00	28.788	57.099	0.000	0.000	0.000	3,222.849	-0.666	0.000	0.666	-0.423
20.00	28.539	55.398	0.000	0.000	0.000	3,078.713	-1.188	0.000	1.188	-0.569
25.00	28.292	53.727	0.000	0.000	0.000	2,936.020	-1.864	0.000	1.864	-0.718
30.00	27.993	52.113	0.000	0.000	0.000	2,794.565	-2.697	0.000	2.697	-0.868
31.25	27.967	51.887	0.000	0.000	0.000	2,759.576	-2.930	0.000	2.930	-0.908
35.00	27.744	49.649	0.000	0.000	0.000	2,654.702	-3.690	0.000	3.690	-1.024
37.50	27.602	48.300	0.000	0.000	0.000	2,585.345	-4.247	0.000	4.247	-1.102
40.00	27.497	47.485	0.000	0.000	0.000	2,516.343	-4.846	0.000	4.846	-1.182
45.00	27.207	45.916	0.000	0.000	0.000	2,378.863	-6.165	0.000	6.165	-1.333
50.00	26.907	44.378	0.000	0.000	0.000	2,242.833	-7.644	0.000	7.644	-1.486
55.00	26.599	42.869	0.000	0.000	0.000	2,108.300	-9.284	0.000	9.284	-1.641
60.00	26.264	41.403	0.000	0.000	0.000	1,975.309	-11.086	0.000	11.086	-1.797
63.25	26.040	40.468	0.000	0.000	0.000	1,889.954	-12.346	0.000	12.346	-1.901
65.00	25.937	39.606	0.000	0.000	0.000	1,844.386	-13.053	0.000	13.053	-1.957
68.75	25.835	37.831	0.000	0.000	0.000	1,747.124	-14.639	0.000	14.639	-2.077
70.00	25.589	37.449	0.000	0.000	0.000	1,715.081	-15.188	0.000	15.188	-2.118
75.00	25.241	36.048	0.000	0.000	0.000	1,587.140	-17.488	0.000	17.488	-2.269
80.00	24.537	34.526	0.000	0.000	0.000	1,458.843	-19.946	0.000	19.946	-2.421
85.00	24.181	33.187	0.000	0.000	0.000	1,335.160	-22.562	0.000	22.562	-2.571
90.00	23.821	31.880	0.000	0.000	0.000	1,215.280	-25.335	0.000	25.335	-2.721
95.00	23.427	30.627	0.000	0.000	0.000	1,096.159	-28.264	0.000	28.264	-2.869
96.08	23.372	30.337	0.000	0.000	0.000	1,070.780	-28.919	0.000	28.919	-2.902
100.00	23.024	28.735	0.000	0.000	0.000	979.243	-31.347	0.000	31.347	-3.016
100.75	22.988	28.408	0.000	0.000	0.000	961.975	-31.823	0.000	31.823	-3.038
105.00	22.671	27.362	0.000	0.000	0.000	864.280	-34.582	0.000	34.582	-3.159
110.00	22.289	26.169	0.000	0.000	0.000	750.926	-37.959	0.000	37.959	-3.287
115.00	19.307	22.316	0.000	0.000	0.000	639.485	-41.466	0.000	41.466	-3.408
120.00	18.925	21.313	0.000	0.000	0.000	542.953	-45.096	0.000	45.096	-3.523
125.00	15.092	17.735	0.000	0.000	0.000	448.117	-48.842	0.000	48.842	-3.628
129.75	14.783	16.996	0.000	0.000	0.000	376.430	-52.498	0.000	52.498	-3.722
130.00	14.776	16.921	0.000	0.000	0.000	372.735	-52.693	0.000	52.693	-3.726
133.58	14.519	15.979	0.000	0.000	0.000	319.792	-55.514	0.000	55.514	-3.792
135.00	11.571	13.513	0.000	0.000	0.000	299.224	-56.842	0.000	56.842	-3.817
140.00	11.267	12.882	0.000	0.000	0.000	241.372	-60.687	0.000	60.687	-3.908
145.00	9.315	10.031	0.000	0.000	0.000	185.040	-64.822	0.000	64.822	-3.988
150.00	9.019	9.455	0.000	0.000	0.000	138.466	-69.033	0.000	69.033	-4.056
155.00	7.269	6.679	0.000	0.000	0.000	93.370	-73.309	0.000	73.309	-4.112
160.00	6.986	6.157	0.000	0.000	0.000	57.024	-77.636	0.000	77.636	-4.153
164.33	6.747	5.727	0.000	0.000	0.000	26.752	-81.414	0.000	81.414	-4.176
166.00	2.305	2.769	0.000	0.000	0.000	22.254	-81.997	0.000	81.997	-4.178
167.25	2.171	2.401	0.000	0.000	0.000	17.068	-83.966	0.000	83.966	-4.185
169.00	1.990	0.000	0.000	0.000	0.000	13.268	-85.499	0.000	85.499	-4.189

Pole : CT11417C
 Location: Plymouth - Rt. 6, Plymouth, CT
 Height: 189.0 (ft)
 Shape: 18 Sides
 Base Dia: 62.93 (in)
 Taper: 0.245310 (in/ft)

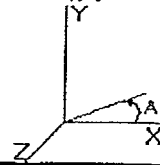
T-Mobile USA-WA

Base Elev: 0.000 (ft)
 Top Dia: 24.85 (in)

Copyright Semaan Engineering Solutions, Inc

3/21/2006 2:48:15 PM

Page: 17



Load Case: No Ice	80 mph - No Ice	24 Iterations
Gust Response Factor: 1.69	Effective Wind Speed: 80.00 (mph)	
Dead Load Factor: 1.00		
Wind Load Factor: 1.00		

Analysis Summary

Load Case	Reactions						Max Stresses			
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
No Ice	35.669	0.000	47.921	0.000	0.000	4,307.413	45.529	49.1	0.000	0.927
Ice	29.540	0.000	62.374	0.000	0.000	3,661.968	38.996	49.1	0.000	0.794

Site Name: Plymouth, CT Site #: 73-01-11.59 W GEL : 889'
 Coordinates: 41-40-06.19 N

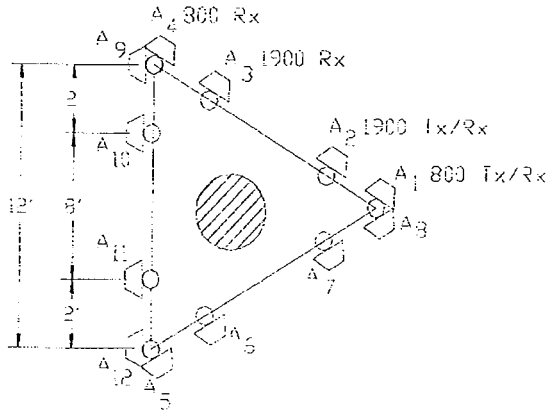
850 MHz Cellular Site	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Modcell	Modcell	Modcell
ANTENNA TYPE	LPA-80080/6CF	LPA-80080/6CF	LPA-80080/6CF
QUANTITY PER FACE	2	2	2
ORIENTATION	340°	80°	190°
DOWN TILT (DEG.)	4° M	4° M	4° M
RAD CTR (FT AGL)	142.03'	142.03'	142.03'

1900 MHz PCS Site Information	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Modcell	Modcell	Modcell
ANTENNA TYPE	Decibel DB950F85E-M	Decibel DB950F85E-M	Decibel DB950F85E-M
QUANTITY PER FACE	2	2	2
ORIENTATION	340°	80°	190°
DOWN TILT (DEG.)	3° M	3° M	3° M
RAD CTR (FT AGL)	142.03'	142.03'	142.03'

Cable Information	ALPHA	BETA	GAMMA
FEEDLINE SIZE	1 5/8	1 5/8	1 5/8
FEEDLINE LENGTH	~170'	~170'	~170'
JUMPER SIZE	1/2"	1/2"	1/2"
JUMPER LENGTH	6'	6'	6'

ALPHA				BETA				GAMMA			
Ant	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A5	800	Tx2/Rx0	BLUE	A9	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/WHITE	A6	1900	Tx2/Rx0	BLUE/WHITE	A10	1900	Tx3/Rx0	GREEN/WHITE
A3	1900	Tx4/Rx1	RED/RED/WHITE	A7	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A11	1900	Tx6/Rx1	GREEN/GREEN/WHITE
A4	800	Tx4/Rx1	RED/RED	A8	800	Tx5/Rx1	BLUE/BLUE	A12	800	Tx6/Rx1	GREEN/GREEN

PLEASE SEE ATTACHED ANTENNA CONFIGURATIONS: Please align antennas to TRUE NORTH. Send sweep reports to: NEWSweepdata@verizonwireless.com. Follow diagram below. This is an Alltel/Verizon co-location. We will keep alltel's location on the tower. Add 2 PCS antennas, and add 2 850Mhz antennas per face.



APPROVALS	INITIALS	DATE
Prepared By : John Chizmar RF Engineer	JRC	1/6/04
Sharon D'Ambra System Design Manager		
Mark Gauger Construction Manager		
Sandy Carter Regulatory Manager		