ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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September 15, 2009

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

Re: **EM-VER-069-090217**
280 Ross Road, Danielson, Connecticut
Completion of Construction Activity

Dear Mr. Phelps:

The purpose of this letter is to notify you and the Connecticut Siting Council that the modifications to the above-referenced telecommunications facility approved in EM-VER-069-090217 have been completed and the cell site has now been activated.

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

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Copy to:
Sandy M. Carter

ROBINSON & COLE LLP

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ORIGINAL

April 30, 2009

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

Re: **Cellco Partnership d/b/a Verizon Wireless**
Exempt Modification Approval

Dear Mr. Perrone:

Enclosed you will find a Structural Analysis Report confirming that the tower and foundation are able to support the existing and proposed antenna configuration. The attached report relates specifically to the following Siting Council filing.

1. EM-VER-069-090217
Danielson South – 280 Ross Road, Danielson, CT

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

NATCOMM INC.
CONSULTING ENGINEERS

RECEIVED
MAY - 1 2009
CONNECTICUT
SITING COUNCIL

Structural Analysis Report

120' Existing EEI Monopole

AT&T Wireless Site Ref:
Killingly Ross Road

Verizon Wireless Site Ref:
Danielson South

280 Ross Rd
Killingly, CT

Natcomm Project No. 09009-CO.6

Date: March 30, 2009

Prepared for:

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

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

Table of Contents

Natcomm, Inc.
Structural Monopole Analysis
120' Existing EEI Monopole
Killingly, CT
March 30, 2009

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 an existing monopole (tower) owned and operated by AT&T, located in Killingly, Connecticut.

The host tower is a 120-ft, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Inc (EEI)—job no: 13781, dated November 7, 2005. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned EEI design report. Antenna and appurtenance information were obtained from an RF data sheet provided by Verizon.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 18.50-in at the top and 50.50-in at the base.

The aforementioned EEI design report and RF data information sheet are available for reference in Section 4 of this report.

Verizon proposes the installation of twelve (12) panel antennas on a low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

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:

- CARRIER AT&T (Existing):
  Antennas: Six (6) Powerwave 7770 panel antennas and twelve (12) Power LGP17201 TMA's with a RAD center elevation of 119-ft above the existing tower base plate.
  Coax Cables: Fifteen (15) 1 5/8" ∅ coax cables (interior of monopole).

- T-Mobile (Existing):
  Antennas: Nine (9) panel antennas (3 existing and 6 reserved) and nine (9) TMA's (6 existing and 3 reserved) mounted to one (1) low profile platform with a RAD center elevation of 109-ft above the existing tower base plate.
  Coax Cables: Eighteen (18) 1 5/8" ∅ coax cables (interior of monopole).

- **VERIZON (Proposed):**
  Antennas: Six (6) Antel LPA-80080/6CF, three (3) Antel BXA-185085/12CF_2, and three (3) Antel BXA-70063/6CF panel antennas mounted to one (1) low profile platform with a RAD center elevation of 99-ft above the existing tower base plate.
  Coax Cables: Eighteen (18) 1 5/8" ∅ coax cables (interior of monopole).

Note: All elevations are taken above tower base plate. Tower base plate approximately 1'-0" above grade.

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 or reinforcement drawings.
- 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 existing coax cables to be installed within tower through engineered port holes.

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

Tower Loading

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

Basic Wind Speed:	Windham; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Killingly; v = 105 mph (3 second gust) equivalent to v = 85 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed and Appendix K wind speed criteria equal.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design. This load case typically controls the design of monopole towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed. This load case typically controls the design of lattice towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

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

Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **50.1%** of its total capacity.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	46.83'-95.12'	**50.1%**	**PASS**

Foundation and Anchors

The existing foundation consists of a 7.0-ft ∅ x 4.50' long reinforced concrete pier and a 3.0-ft thick x 24.5-ft wide reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural design report; EEI; job no: 13781, dated November 7, 2005. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure.

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

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Base Reactions	Vector	Proposed Load (kips/ft-kips)
Base	Shear	**18**
	Axial	**27**
	Moment	**1515**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2	Proposed Loading	Result
Reinf. Conc. Pad and Pier	OTM	2.0	3.48	**PASS**

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Compression	40.4%	**PASS**
Base Plate	Bending	48.0%	**PASS**

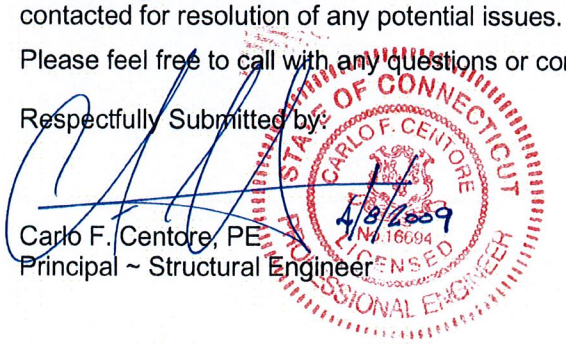
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Carlo F. Centore, PE
Principal ~ Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

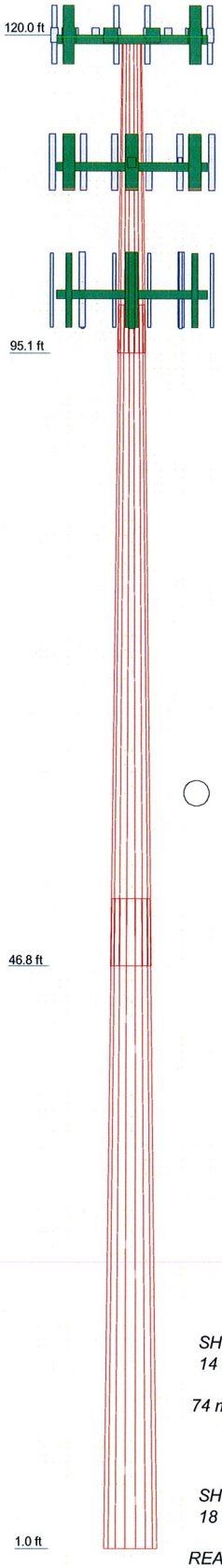
RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

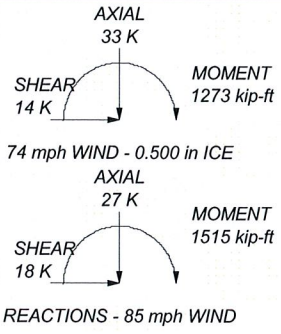
RISATower Features:

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

Section	1	2	3
Length (ft)	24.880	52.040	51.163
Number of Sides	18	18	18
Thickness (in)	0.188	0.313	0.375
Lap Splice (ft)	3.750	5.333	
Top Dia (in)	18.500	24.027	36.338
Bot Dia (in)	25.450	38.440	50.500
Grade	A572-65		
Weight (K)	1.1	5.4	8.9

15.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00 (ATI Existing)	120	10"x8"x3" TMA (T-Mobile Reserved)	110
(2) 7770.00 (ATI Existing)	120	EEI Low Profile Platform (T-Mobile)	110
(2) 7770.00 (ATI Existing)	120	BXA-70063/6CF (Verizon Proposed)	100
(4) LGP 17201 TMA (ATI Existing)	120	BXA-70063/6CF (Verizon Proposed)	100
(4) LGP 17201 TMA (ATI Existing)	120	BXA-70063/6CF (Verizon Proposed)	100
(4) LGP 17201 TMA (ATI Existing)	120	(2) LPA-80080-6CF (Verizon Proposed)	100
EEI Low Profile Platform (ATI)	120		
53"x12"x4" (T-Mobile Existing)	110	(2) LPA-80080-6CF (Verizon Proposed)	100
53"x12"x4" (T-Mobile Existing)	110		
53"x12"x4" (T-Mobile Existing)	110	(2) LPA-80080-6CF (Verizon Proposed)	100
(2) 10"x8"x3" TMA (T-Mobile Existing)	110		
(2) 10"x8"x3" TMA (T-Mobile Existing)	110	BXA-185085/12CF_2 (Verizon Proposed)	100
(2) 10"x8"x3" TMA (T-Mobile Existing)	110		
(2) 53"x12"x4" (T-Mobile Reserved)	110	BXA-185085/12CF_2 (Verizon Proposed)	100
(2) 53"x12"x4" (T-Mobile Reserved)	110		
(2) 53"x12"x4" (T-Mobile Reserved)	110	BXA-185085/12CF_2 (Verizon Proposed)	100
10"x8"x3" TMA (T-Mobile Reserved)	110		
10"x8"x3" TMA (T-MobileReserved)	110	EEI Low Profile Platform (Verizon)	100

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. Base of tower taken as 1'-0" above existing grade.
10. TOWER RATING: 50.1%

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

Job: ***119' EEI Monopole - Danielson South***		
Project: ***280 Ross Rd., Killingly, CT***		
Client: Verizon Wireless	Drawn by: Staff	App'd:
Code: TIA/EIA-222-F	Date: 03/30/09	Scale: NTS
Path: J:\Jobs\0900000 WICO-06- 280 Ross Road, Killingly, CT\ERI Files\119' Monopole - Killingly, CT.eri		Dwg No. E-1

RISATower	Job	Page
	119' EEI Monopole - Danielson South	1 of 18
NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 280 Ross Rd., Killingly, CT	Date 09:20:32 03/30/09
	Client Verizon Wireless	Designed by Staff

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
Base of tower taken as 1'-0" above existing grade..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.000-95.120	24.880	3.750	18	18.500	25.450	0.188	0.750	A572-65 (65 ksi)
L2	95.120-46.830	52.040	5.333	18	24.027	38.440	0.313	1.250	A572-65 (65 ksi)

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
L3	46.830-1.000	51.163		18	36.338	50.500	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.785	10.898	461.730	6.501	9.398	49.131	924.069	5.450	2.926	15.605
	25.843	15.034	1212.201	8.968	12.929	93.761	2425.997	7.519	4.149	22.129
L2	25.453	23.522	1671.330	8.419	12.206	136.927	3344.859	11.763	3.679	11.772
	39.033	37.818	6945.594	13.535	19.528	355.682	13900.327	18.912	6.215	19.889
L3	38.398	42.805	6994.298	12.767	18.460	378.895	13997.798	21.407	5.735	15.295
	51.279	59.661	18938.204	17.794	25.654	738.216	37901.328	29.836	8.228	21.941

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 120.000-95.120				1	1	1		
L2 95.120-46.830				1	1	1		
L3 46.830-1.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (Verizon Existing)	C	No	Inside Pole	101.000 - 1.000	18	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (AT&T Existing/Reserved)	C	No	Inside Pole	120.000 - 1.000	15	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (T-Mobile Existing/Reserved)	C	No	Inside Pole	111.000 - 1.000	18	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-95.120	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.795
L2	95.120-46.830	A	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	2.561
L3	46.830-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	2.431

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-95.120	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.795
L2	95.120-46.830	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	2.561
L3	46.830-1.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	2.431

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7770.00	A	From Face	3.500	0.000	120.000	No Ice	5.882	2.928	0.035
(AT&T Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(2) 7770.00	B	From Face	3.500	0.000	120.000	No Ice	5.882	2.928	0.035
(AT&T Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(2) 7770.00	C	From Face	3.500	0.000	120.000	No Ice	5.882	2.928	0.035
(AT&T Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(4) LGP 17201 TMA	A	From Face	3.500	0.000	120.000	No Ice	1.946	0.500	0.031
(AT&T Existing)			0.000			1/2" Ice	2.134	0.618	0.042
			0.000						
(4) LGP 17201 TMA	B	From Face	3.500	0.000	120.000	No Ice	1.946	0.500	0.031
(AT&T Existing)			0.000			1/2" Ice	2.134	0.618	0.042
			0.000						
(4) LGP 17201 TMA	C	From Face	3.500	0.000	120.000	No Ice	1.946	0.500	0.031
(AT&T Existing)			0.000			1/2" Ice	2.134	0.618	0.042
			0.000						
EEI Low Profile Platform	C	None		0.000	120.000	No Ice	22.500	22.500	1.500
(AT&T)						1/2" Ice	28.200	28.200	2.250
53"x12"x4"	A	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020
(T-Mobile Existing)			0.000			1/2" Ice	6.609	2.696	0.051
			0.000						
53"x12"x4"	B	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile Existing)			0.000 0.000			1/2" Ice	6.609	2.696	0.051
53"x12"x4"	C	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020
(T-Mobile Existing)			0.000 0.000			1/2" Ice	6.609	2.696	0.051
(2) 10"x8"x3" TMA	A	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-Mobile Existing)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
(2) 10"x8"x3" TMA	B	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-Mobile Existing)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
(2) 10"x8"x3" TMA	C	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-Mobile Existing)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
(2) 53"x12"x4"	A	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020
(T-Mobile Reserved)			0.000 0.000			1/2" Ice	6.609	2.696	0.051
(2) 53"x12"x4"	B	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020
(T-Mobile Reserved)			0.000 0.000			1/2" Ice	6.609	2.696	0.051
(2) 53"x12"x4"	C	From Face	3.500	0.000	110.000	No Ice	6.183	2.368	0.020
(T-Mobile Reserved)			0.000 0.000			1/2" Ice	6.609	2.696	0.051
10"x8"x3" TMA	A	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-Mobile Reserved)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
10"x8"x3" TMA	B	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-MobileReserved)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
10"x8"x3" TMA	C	From Face	3.500	0.000	110.000	No Ice	0.778	0.292	0.010
(T-Mobile Reserved)			0.000 0.000			1/2" Ice	0.899	0.380	0.015
EEI Low Profile Platform	C	None		0.000	110.000	No Ice	22.500	22.500	1.500
(T-Mobile)						1/2" Ice	28.200	28.200	2.250
BXA-70063/6CF	A	From Face	3.500	0.000	100.000	No Ice	7.731	3.755	0.017
(Verizon Proposed)			0.000 0.000			1/2" Ice	8.268	4.189	0.058
BXA-70063/6CF	B	From Face	3.500	0.000	100.000	No Ice	7.731	3.755	0.017
(Verizon Proposed)			0.000 0.000			1/2" Ice	8.268	4.189	0.058
BXA-70063/6CF	C	From Face	3.500	0.000	100.000	No Ice	7.731	3.755	0.017
(Verizon Proposed)			0.000 0.000			1/2" Ice	8.268	4.189	0.058
(2) LPA-80080-6CF	A	From Face	3.500	0.000	100.000	No Ice	4.326	9.088	0.021
(Verizon Proposed)			0.000 0.000			1/2" Ice	4.764	9.637	0.069
(2) LPA-80080-6CF	B	From Face	3.500	0.000	100.000	No Ice	4.326	9.088	0.021
(Verizon Proposed)			0.000 0.000			1/2" Ice	4.764	9.637	0.069
(2) LPA-80080-6CF	C	From Face	3.500	0.000	100.000	No Ice	4.326	9.088	0.021
(Verizon Proposed)			0.000 0.000			1/2" Ice	4.764	9.637	0.069
BXA-185085/12CF_2	A	From Face	3.500	0.000	100.000	No Ice	4.791	3.618	0.013
(Verizon Proposed)			0.000 0.000			1/2" Ice	5.242	4.058	0.040
BXA-185085/12CF_2	B	From Face	3.500	0.000	100.000	No Ice	4.791	3.618	0.013
(Verizon Proposed)			0.000			1/2" Ice	5.242	4.058	0.040

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-185085/12CF_2 (Verizon Proposed)	C	From Face	0.000 3.500 0.000 0.000	0.000	100.000	No Ice 1/2" Ice	4.791 5.242	3.618 4.058	0.013 0.040
EEI Low Profile Platform (Verizon)	C	None		0.000	100.000	No Ice 1/2" Ice	22.500 28.200	22.500 28.200	1.500 2.250

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.000-95.120	106.904	1.399	0.026	45.562	A	0.000	45.562	45.562	100.00	0.000	0.000
					B	0.000	45.562		100.00	0.000	0.000
					C	0.000	45.562		100.00	0.000	0.000
L2 95.120-46.830	69.868	1.239	0.023	127.779	A	0.000	127.779	127.779	100.00	0.000	0.000
					B	0.000	127.779		100.00	0.000	0.000
					C	0.000	127.779		100.00	0.000	0.000
L3 46.830-1.000	22.917	1	0.019	168.643	A	0.000	168.643	168.643	100.00	0.000	0.000
					B	0.000	168.643		100.00	0.000	0.000
					C	0.000	168.643		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.000-95.120	106.904	1.399	0.019	0.500	47.635	A	0.000	47.635	47.635	100.00	0.000	0.000
						B	0.000	47.635		100.00	0.000	0.000
						C	0.000	47.635		100.00	0.000	0.000
L2 95.120-46.830	69.868	1.239	0.017	0.500	131.804	A	0.000	131.804	131.804	100.00	0.000	0.000
						B	0.000	131.804		100.00	0.000	0.000
						C	0.000	131.804		100.00	0.000	0.000
L3 46.830-1.000	22.917	1	0.014	0.500	172.462	A	0.000	172.462	172.462	100.00	0.000	0.000
						B	0.000	172.462		100.00	0.000	0.000
						C	0.000	172.462		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.000-95.120	106.904	1.399	0.009	45.562	A	0.000	45.562	45.562	100.00	0.000	0.000
					B	0.000	45.562		100.00	0.000	0.000
					C	0.000	45.562		100.00	0.000	0.000
L2 95.120-46.830	69.868	1.239	0.008	127.779	A	0.000	127.779	127.779	100.00	0.000	0.000
					B	0.000	127.779		100.00	0.000	0.000
					C	0.000	127.779		100.00	0.000	0.000
L3 46.830-1.000	22.917	1	0.006	168.643	A	0.000	168.643	168.643	100.00	0.000	0.000
					B	0.000	168.643		100.00	0.000	0.000
					C	0.000	168.643		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	1.295	0.052	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	3.199	0.066	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	3.454	0.075	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	433.204 kip-ft	7.949		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	1.295	0.052	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	3.199	0.066	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	3.454	0.075	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	433.204 kip-ft	7.949		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	1.295	0.052	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	3.199	0.066	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	3.454	0.075	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	433.204 kip-ft	7.949		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	1.295	0.052	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	3.199	0.066	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	3.454	0.075	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	433.204 kip-ft	7.949		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.443	A	1	0.65	1	1	1	47.635	1.016	0.041	C
			B	1	0.65	1	1	1	47.635			
			C	1	0.65	1	1	1	47.635			
L2 95.120-46.830	2.561	6.392	A	1	0.65	1	1	1	131.804	2.475	0.051	C
			B	1	0.65	1	1	1	131.804			
			C	1	0.65	1	1	1	131.804			
L3 46.830-1.000	2.431	10.183	A	1	0.65	1	1	1	172.462	2.650	0.058	C
			B	1	0.65	1	1	1	172.462			
			C	1	0.65	1	1	1	172.462			
Sum Weight:	5.788	18.018						OTM	336.075 kip-ft	6.140		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.443	A	1	0.65	1	1	1	47.635	1.016	0.041	C
			B	1	0.65	1	1	1	47.635			
			C	1	0.65	1	1	1	47.635			
L2 95.120-46.830	2.561	6.392	A	1	0.65	1	1	1	131.804	2.475	0.051	C
			B	1	0.65	1	1	1	131.804			
			C	1	0.65	1	1	1	131.804			
L3 46.830-1.000	2.431	10.183	A	1	0.65	1	1	1	172.462	2.650	0.058	C
			B	1	0.65	1	1	1	172.462			
			C	1	0.65	1	1	1	172.462			
Sum Weight:	5.788	18.018						OTM	336.075 kip-ft	6.140		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.443	A	1	0.65	1	1	1	47.635	1.016	0.041	C
			B	1	0.65	1	1	1	47.635			
			C	1	0.65	1	1	1	47.635			
L2 95.120-46.830	2.561	6.392	A	1	0.65	1	1	1	131.804	2.475	0.051	C
			B	1	0.65	1	1	1	131.804			
			C	1	0.65	1	1	1	131.804			
L3 46.830-1.000	2.431	10.183	A	1	0.65	1	1	1	172.462	2.650	0.058	C
			B	1	0.65	1	1	1	172.462			
			C	1	0.65	1	1	1	172.462			
Sum Weight:	5.788	18.018						OTM	336.075 kip-ft	6.140		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.443	A	1	0.65	1	1	1	47.635	1.016	0.041	C
			B	1	0.65	1	1	1	47.635			
			C	1	0.65	1	1	1	47.635			
L2 95.120-46.830	2.561	6.392	A	1	0.65	1	1	1	131.804	2.475	0.051	C
			B	1	0.65	1	1	1	131.804			
			C	1	0.65	1	1	1	131.804			
L3 46.830-1.000	2.431	10.183	A	1	0.65	1	1	1	172.462	2.650	0.058	C
			B	1	0.65	1	1	1	172.462			
			C	1	0.65	1	1	1	172.462			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
Sum Weight:	5.788	18.018						OTM	336.075 kip-ft	6.140		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	0.448	0.018	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	1.107	0.023	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	1.195	0.026	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	149.898 kip-ft	2.750		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	0.448	0.018	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	1.107	0.023	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	1.195	0.026	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	149.898 kip-ft	2.750		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	0.448	0.018	C
			B	1	0.65	1	1	1	45.562			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	1.107	0.023	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	1.195	0.026	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	149.898 kip-ft	2.750		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 120.000-95.120	0.795	1.098	A	1	0.65	1	1	1	45.562	0.448	0.018	C
			B	1	0.65	1	1	1	45.562			
			C	1	0.65	1	1	1	45.562			
L2 95.120-46.830	2.561	5.431	A	1	0.65	1	1	1	127.779	1.107	0.023	C
			B	1	0.65	1	1	1	127.779			
			C	1	0.65	1	1	1	127.779			
L3 46.830-1.000	2.431	8.920	A	1	0.65	1	1	1	168.643	1.195	0.026	C
			B	1	0.65	1	1	1	168.643			
			C	1	0.65	1	1	1	168.643			
Sum Weight:	5.788	15.448						OTM	149.898 kip-ft	2.750		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	15.448					
Bracing Weight	0.000					
Total Member Self-Weight	15.448			0.000	0.000	
Total Weight	26.804			0.000	0.000	
Wind 0 deg - No Ice		0.000	-17.698	-1484.843	0.000	0.000
Wind 30 deg - No Ice		8.849	-15.327	-1285.912	-742.422	0.000
Wind 45 deg - No Ice		12.514	-12.514	-1049.943	-1049.943	0.000
Wind 60 deg - No Ice		15.327	-8.849	-742.422	-1285.912	0.000
Wind 90 deg - No Ice		17.698	0.000	0.000	-1484.843	0.000
Wind 120 deg - No Ice		15.327	8.849	742.422	-1285.912	0.000
Wind 135 deg - No Ice		12.514	12.514	1049.943	-1049.943	0.000
Wind 150 deg - No Ice		8.849	15.327	1285.912	-742.422	0.000
Wind 180 deg - No Ice		0.000	17.698	1484.843	0.000	0.000
Wind 210 deg - No Ice		-8.849	15.327	1285.912	742.422	0.000
Wind 225 deg - No Ice		-12.514	12.514	1049.943	1049.943	0.000
Wind 240 deg - No Ice		-15.327	8.849	742.422	1285.912	0.000
Wind 270 deg - No Ice		-17.698	0.000	0.000	1484.843	0.000

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 300 deg - No Ice		-15.327	-8.849	-742.422	1285.912	0.000
Wind 315 deg - No Ice		-12.514	-12.514	-1049.943	1049.943	0.000
Wind 330 deg - No Ice		-8.849	-15.327	-1285.912	742.422	0.000
Member Ice	2.569					
Total Weight Ice	32.771			0.000	0.000	
Wind 0 deg - Ice		0.000	-14.487	-1237.264	0.000	0.000
Wind 30 deg - Ice		7.243	-12.546	-1071.502	-618.632	0.000
Wind 45 deg - Ice		10.244	-10.244	-874.877	-874.877	0.000
Wind 60 deg - Ice		12.546	-7.243	-618.632	-1071.502	0.000
Wind 90 deg - Ice		14.487	0.000	0.000	-1237.264	0.000
Wind 120 deg - Ice		12.546	7.243	618.632	-1071.502	0.000
Wind 135 deg - Ice		10.244	10.244	874.877	-874.877	0.000
Wind 150 deg - Ice		7.243	12.546	1071.502	-618.632	0.000
Wind 180 deg - Ice		0.000	14.487	1237.264	0.000	0.000
Wind 210 deg - Ice		-7.243	12.546	1071.502	618.632	0.000
Wind 225 deg - Ice		-10.244	10.244	874.877	874.877	0.000
Wind 240 deg - Ice		-12.546	7.243	618.632	1071.502	0.000
Wind 270 deg - Ice		-14.487	0.000	0.000	1237.264	0.000
Wind 300 deg - Ice		-12.546	-7.243	-618.632	1071.502	0.000
Wind 315 deg - Ice		-10.244	-10.244	-874.877	874.877	0.000
Wind 330 deg - Ice		-7.243	-12.546	-1071.502	618.632	0.000
Total Weight	26.804			0.000	0.000	
Wind 0 deg - Service		0.000	-6.124	-513.787	0.000	0.000
Wind 30 deg - Service		3.062	-5.303	-444.952	-256.893	0.000
Wind 45 deg - Service		4.330	-4.330	-363.302	-363.302	0.000
Wind 60 deg - Service		5.303	-3.062	-256.893	-444.952	0.000
Wind 90 deg - Service		6.124	0.000	0.000	-513.787	0.000
Wind 120 deg - Service		5.303	3.062	256.893	-444.952	0.000
Wind 135 deg - Service		4.330	4.330	363.302	-363.302	0.000
Wind 150 deg - Service		3.062	5.303	444.952	-256.893	0.000
Wind 180 deg - Service		0.000	6.124	513.787	0.000	0.000
Wind 210 deg - Service		-3.062	5.303	444.952	256.893	0.000
Wind 225 deg - Service		-4.330	4.330	363.302	363.302	0.000
Wind 240 deg - Service		-5.303	3.062	256.893	444.952	0.000
Wind 270 deg - Service		-6.124	0.000	0.000	513.787	0.000
Wind 300 deg - Service		-5.303	-3.062	-256.893	444.952	0.000
Wind 315 deg - Service		-4.330	-4.330	-363.302	363.302	0.000
Wind 330 deg - Service		-3.062	-5.303	-444.952	256.893	0.000

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice

Comb. No.	Description
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 95.12	Pole	Max Tension	18	0.000	0.000	0.000
			Max. Compression	18	-10.838	0.000	0.000
			Max. Mx	6	-6.647	-112.220	0.000
			Max. My	10	-6.647	0.000	-112.220
			Max. Vy	6	11.140	-112.220	0.000
			Max. Vx	10	11.140	0.000	-112.220
			Max. Torque	11			-0.000
L2	95.12 - 46.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-19.076	0.000	0.000
			Max. Mx	6	-14.184	-701.616	0.000
			Max. My	2	-14.184	0.000	701.616
			Max. Vy	6	14.168	-701.616	0.000
			Max. Vx	2	-14.168	0.000	701.616
			Max. Torque	9			0.000
L3	46.83 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-32.771	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	6	-26.795	-1515.394	0.000
			Max. My	2	-26.795	0.000	1515.394
			Max. Vy	6	17.710	-1515.394	0.000
			Max. Vx	2	-17.710	0.000	1515.394
			Max. Torque	9			0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	32.771	0.000	0.000
	Max. H_x	14	26.804	17.697	0.000
	Max. H_z	2	26.804	0.000	17.697
	Max. M_x	2	1515.394	0.000	17.697
	Max. M_z	6	1515.394	-17.697	0.000
	Max. Torsion	9	0.000	-8.849	-15.327
	Min. Vert	10	26.804	0.000	-17.697
	Min. H_x	6	26.804	-17.697	0.000
	Min. H_z	10	26.804	0.000	-17.697
	Min. M_x	10	-1515.394	0.000	-17.697
	Min. M_z	14	-1515.394	17.697	0.000
	Min. Torsion	11	-0.000	8.849	-15.327

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.804	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg - No Ice	26.804	0.000	-17.697	-1515.394	0.000	0.000
Dead+Wind 30 deg - No Ice	26.804	8.849	-15.327	-1312.435	-757.735	0.000
Dead+Wind 45 deg - No Ice	26.804	12.514	-12.514	-1071.598	-1071.598	0.000
Dead+Wind 60 deg - No Ice	26.804	15.327	-8.849	-757.735	-1312.435	-0.000
Dead+Wind 90 deg - No Ice	26.804	17.697	0.000	0.000	-1515.394	0.000
Dead+Wind 120 deg - No Ice	26.804	15.327	8.849	757.735	-1312.435	0.000
Dead+Wind 135 deg - No Ice	26.804	12.514	12.514	1071.598	-1071.598	0.000
Dead+Wind 150 deg - No Ice	26.804	8.849	15.327	1312.435	-757.735	-0.000
Dead+Wind 180 deg - No Ice	26.804	0.000	17.697	1515.394	0.000	0.000
Dead+Wind 210 deg - No Ice	26.804	-8.849	15.327	1312.435	757.735	0.000
Dead+Wind 225 deg - No Ice	26.804	-12.514	12.514	1071.598	1071.598	0.000
Dead+Wind 240 deg - No Ice	26.804	-15.327	8.849	757.735	1312.435	-0.000
Dead+Wind 270 deg - No Ice	26.804	-17.697	0.000	0.000	1515.394	0.000
Dead+Wind 300 deg - No Ice	26.804	-15.327	-8.849	-757.735	1312.435	0.000
Dead+Wind 315 deg - No Ice	26.804	-12.514	-12.514	-1071.598	1071.598	0.000
Dead+Wind 330 deg - No Ice	26.804	-8.849	-15.327	-1312.435	757.735	-0.000
Dead+Ice+Temp	32.771	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg+Ice+Temp	32.771	0.000	-14.486	-1272.960	0.000	0.000
Dead+Wind 30 deg+Ice+Temp	32.771	7.243	-12.546	-1102.437	-636.492	0.000
Dead+Wind 45 deg+Ice+Temp	32.771	10.243	-10.243	-900.136	-900.136	0.000
Dead+Wind 60 deg+Ice+Temp	32.771	12.546	-7.243	-636.492	-1102.437	-0.000
Dead+Wind 90 deg+Ice+Temp	32.771	14.486	0.000	0.000	-1272.960	0.000
Dead+Wind 120 deg+Ice+Temp	32.771	12.546	7.243	636.492	-1102.437	0.000

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 135 deg+Ice+Temp	32.771	10.243	10.243	900.136	-900.136	0.000
Dead+Wind 150 deg+Ice+Temp	32.771	7.243	12.546	1102.437	-636.492	-0.000
Dead+Wind 180 deg+Ice+Temp	32.771	0.000	14.486	1272.960	0.000	0.000
Dead+Wind 210 deg+Ice+Temp	32.771	-7.243	12.546	1102.437	636.492	0.000
Dead+Wind 225 deg+Ice+Temp	32.771	-10.243	10.243	900.136	900.136	0.000
Dead+Wind 240 deg+Ice+Temp	32.771	-12.546	7.243	636.492	1102.437	-0.000
Dead+Wind 270 deg+Ice+Temp	32.771	-14.486	0.000	0.000	1272.960	0.000
Dead+Wind 300 deg+Ice+Temp	32.771	-12.546	-7.243	-636.492	1102.437	0.000
Dead+Wind 315 deg+Ice+Temp	32.771	-10.243	-10.243	-900.136	900.136	0.000
Dead+Wind 330 deg+Ice+Temp	32.771	-7.243	-12.546	-1102.437	636.492	-0.000
Dead+Wind 0 deg - Service	26.804	0.000	-6.123	-524.471	0.000	0.000
Dead+Wind 30 deg - Service	26.804	3.061	-5.303	-454.205	-262.235	0.000
Dead+Wind 45 deg - Service	26.804	4.330	-4.330	-370.857	-370.857	0.000
Dead+Wind 60 deg - Service	26.804	5.303	-3.061	-262.235	-454.205	-0.000
Dead+Wind 90 deg - Service	26.804	6.123	0.000	0.000	-524.471	0.000
Dead+Wind 120 deg - Service	26.804	5.303	3.061	262.235	-454.205	0.000
Dead+Wind 135 deg - Service	26.804	4.330	4.330	370.857	-370.857	0.000
Dead+Wind 150 deg - Service	26.804	3.061	5.303	454.205	-262.235	-0.000
Dead+Wind 180 deg - Service	26.804	0.000	6.123	524.471	0.000	0.000
Dead+Wind 210 deg - Service	26.804	-3.061	5.303	454.205	262.235	0.000
Dead+Wind 225 deg - Service	26.804	-4.330	4.330	370.857	370.857	0.000
Dead+Wind 240 deg - Service	26.804	-5.303	3.061	262.235	454.205	-0.000
Dead+Wind 270 deg - Service	26.804	-6.123	0.000	0.000	524.471	0.000
Dead+Wind 300 deg - Service	26.804	-5.303	-3.061	-262.235	454.205	0.000
Dead+Wind 315 deg - Service	26.804	-4.330	-4.330	-370.857	370.857	0.000
Dead+Wind 330 deg - Service	26.804	-3.061	-5.303	-454.205	262.235	-0.000

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-26.804	0.000	0.000	26.804	0.000	0.000%
2	0.000	-26.804	-17.698	0.000	26.804	17.697	0.002%
3	8.849	-26.804	-15.327	-8.849	26.804	15.327	0.000%
4	12.514	-26.804	-12.514	-12.514	26.804	12.514	0.000%
5	15.327	-26.804	-8.849	-15.327	26.804	8.849	0.000%
6	17.698	-26.804	0.000	-17.697	26.804	0.000	0.002%
7	15.327	-26.804	8.849	-15.327	26.804	-8.849	0.000%
8	12.514	-26.804	12.514	-12.514	26.804	-12.514	0.000%
9	8.849	-26.804	15.327	-8.849	26.804	-15.327	0.000%
10	0.000	-26.804	17.698	0.000	26.804	-17.697	0.002%
11	-8.849	-26.804	15.327	8.849	26.804	-15.327	0.000%
12	-12.514	-26.804	12.514	12.514	26.804	-12.514	0.000%
13	-15.327	-26.804	8.849	15.327	26.804	-8.849	0.000%
14	-17.698	-26.804	0.000	17.697	26.804	0.000	0.002%
15	-15.327	-26.804	-8.849	15.327	26.804	8.849	0.000%
16	-12.514	-26.804	-12.514	12.514	26.804	12.514	0.000%
17	-8.849	-26.804	-15.327	8.849	26.804	15.327	0.000%
18	0.000	-32.771	0.000	0.000	32.771	0.000	0.000%
19	0.000	-32.771	-14.487	0.000	32.771	14.486	0.001%
20	7.243	-32.771	-12.546	-7.243	32.771	12.546	0.000%
21	10.244	-32.771	-10.244	-10.243	32.771	10.243	0.000%
22	12.546	-32.771	-7.243	-12.546	32.771	7.243	0.000%
23	14.487	-32.771	0.000	-14.486	32.771	0.000	0.001%
24	12.546	-32.771	7.243	-12.546	32.771	-7.243	0.000%
25	10.244	-32.771	10.244	-10.243	32.771	-10.243	0.000%
26	7.243	-32.771	12.546	-7.243	32.771	-12.546	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
27	0.000	-32.771	14.487	0.000	32.771	-14.486	0.001%
28	-7.243	-32.771	12.546	7.243	32.771	-12.546	0.000%
29	-10.244	-32.771	10.244	10.243	32.771	-10.243	0.000%
30	-12.546	-32.771	7.243	12.546	32.771	-7.243	0.000%
31	-14.487	-32.771	0.000	14.486	32.771	0.000	0.001%
32	-12.546	-32.771	-7.243	12.546	32.771	7.243	0.000%
33	-10.244	-32.771	-10.244	10.243	32.771	10.243	0.000%
34	-7.243	-32.771	-12.546	7.243	32.771	12.546	0.000%
35	0.000	-26.804	-6.124	0.000	26.804	6.123	0.003%
36	3.062	-26.804	-5.303	-3.061	26.804	5.303	0.003%
37	4.330	-26.804	-4.330	-4.330	26.804	4.330	0.003%
38	5.303	-26.804	-3.062	-5.303	26.804	3.061	0.003%
39	6.124	-26.804	0.000	-6.123	26.804	0.000	0.003%
40	5.303	-26.804	3.062	-5.303	26.804	-3.061	0.003%
41	4.330	-26.804	4.330	-4.330	26.804	-4.330	0.003%
42	3.062	-26.804	5.303	-3.061	26.804	-5.303	0.003%
43	0.000	-26.804	6.124	0.000	26.804	-6.123	0.003%
44	-3.062	-26.804	5.303	3.061	26.804	-5.303	0.003%
45	-4.330	-26.804	4.330	4.330	26.804	-4.330	0.003%
46	-5.303	-26.804	3.062	5.303	26.804	-3.061	0.003%
47	-6.124	-26.804	0.000	6.123	26.804	0.000	0.003%
48	-5.303	-26.804	-3.062	5.303	26.804	3.061	0.003%
49	-4.330	-26.804	-4.330	4.330	26.804	4.330	0.003%
50	-3.062	-26.804	-5.303	3.061	26.804	5.303	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	12	0.00000001	0.00006628
3	Yes	14	0.00000001	0.00006168
4	Yes	14	0.00000001	0.00007083
5	Yes	14	0.00000001	0.00006168
6	Yes	12	0.00000001	0.00006628
7	Yes	14	0.00000001	0.00006168
8	Yes	14	0.00000001	0.00007083
9	Yes	14	0.00000001	0.00006168
10	Yes	12	0.00000001	0.00006628
11	Yes	14	0.00000001	0.00006168
12	Yes	14	0.00000001	0.00007083
13	Yes	14	0.00000001	0.00006168
14	Yes	12	0.00000001	0.00006628
15	Yes	14	0.00000001	0.00006168
16	Yes	14	0.00000001	0.00007083
17	Yes	14	0.00000001	0.00006168
18	Yes	6	0.00000001	0.00000001
19	Yes	13	0.00000001	0.00006882
20	Yes	14	0.00000001	0.00007603
21	Yes	14	0.00000001	0.00008649
22	Yes	14	0.00000001	0.00007603
23	Yes	13	0.00000001	0.00006882
24	Yes	14	0.00000001	0.00007603
25	Yes	14	0.00000001	0.00008649
26	Yes	14	0.00000001	0.00007603
27	Yes	13	0.00000001	0.00006882

28	Yes	14	0.00000001	0.00007603
29	Yes	14	0.00000001	0.00008649
30	Yes	14	0.00000001	0.00007603
31	Yes	13	0.00000001	0.00006882
32	Yes	14	0.00000001	0.00007603
33	Yes	14	0.00000001	0.00008649
34	Yes	14	0.00000001	0.00007603
35	Yes	11	0.00000001	0.00008151
36	Yes	11	0.00000001	0.00008021
37	Yes	11	0.00000001	0.00007976
38	Yes	11	0.00000001	0.00008021
39	Yes	11	0.00000001	0.00008151
40	Yes	11	0.00000001	0.00008021
41	Yes	11	0.00000001	0.00007976
42	Yes	11	0.00000001	0.00008021
43	Yes	11	0.00000001	0.00008151
44	Yes	11	0.00000001	0.00008021
45	Yes	11	0.00000001	0.00007976
46	Yes	11	0.00000001	0.00008021
47	Yes	11	0.00000001	0.00008151
48	Yes	11	0.00000001	0.00008021
49	Yes	11	0.00000001	0.00007976
50	Yes	11	0.00000001	0.00008021

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 95.12	13.422	39	1.018	0.000
L2	98.87 - 46.83	9.079	39	0.908	0.000
L3	52.163 - 1	2.336	39	0.431	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.000	(2) 7770.00	39	13.422	1.018	0.000	28017
110.000	53"x12"x4"	39	11.317	0.976	0.000	14009
100.000	BXA-70063/6CF	39	9.298	0.917	0.000	7114

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 95.12	38.759	6	2.941	0.000
L2	98.87 - 46.83	26.222	6	2.624	0.000
L3	52.163 - 1	6.747	6	1.246	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.000	(2) 7770.00	6	38.759	2.941	0.000	9748
110.000	53"x12"x4"	6	32.683	2.814	0.000	4873
100.000	BXA-70063/6CF	6	26.854	2.647	0.000	2474

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	120 - 95.12 (1)	TP25.45x18.5x0.188	24.880	0.000	0.0	39.000	14.411	-6.647	562.027	0.012
L2	95.12 - 46.83 (2)	TP38.44x24.027x0.313	52.040	0.000	0.0	39.000	36.353	-14.184	1417.760	0.010
L3	46.83 - 1 (3)	TP50.5x36.338x0.375	51.163	0.000	0.0	39.000	59.661	-26.795	2326.790	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	120 - 95.12 (1)	TP25.45x18.5x0.188	112.227	15.638	39.000	0.401	0.000	0.000	39.000	0.000
L2	95.12 - 46.83 (2)	TP38.44x24.027x0.313	701.653	25.627	39.000	0.657	0.000	0.000	39.000	0.000
L3	46.83 - 1 (3)	TP50.5x36.338x0.375	1515.467	24.634	39.000	0.632	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	120 - 95.12 (1)	TP25.45x18.5x0.188	11.142	0.773	26.000	0.059	0.000	0.000	26.000	0.000
L2	95.12 - 46.83 (2)	TP38.44x24.027x0.313	14.168	0.390	26.000	0.030	0.000	0.000	26.000	0.000
L3	46.83 - 1 (3)	TP50.5x36.338x0.375	17.711	0.297	26.000	0.023	0.000	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 95.12 (1)	0.012	0.401	0.000	0.059	0.000	0.414 ✔	1.333	H1-3+VT ✔
L2	95.12 - 46.83 (2)	0.010	0.657	0.000	0.030	0.000	0.667 ✔	1.333	H1-3+VT ✔
L3	46.83 - 1 (3)	0.012	0.632	0.000	0.023	0.000	0.643 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	120 - 95.12	Pole	TP25.45x18.5x0.188	1	-6.647	749.182	31.0	Pass
L2	95.12 - 46.83	Pole	TP38.44x24.027x0.313	2	-14.184	1889.874	50.1	Pass
L3	46.83 - 1	Pole	TP50.5x36.338x0.375	3	-26.795	3101.611	48.3	Pass
							Summary	
							Pole (L2) 50.1	Pass
							RATING =	**50.1** **Pass**

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Subject:	ANCHOR BOLT AND BASE PLATE ANALYSIS
Location:	Killingly, CT
Rev. 0: 03/30/09	Prepared by: Staff. Checked by: C.F.C. Job No. 09009. CO6

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 1515·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 18·kips	(Input From RisaTower)
Axial Force =	Axial := 27·kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 16	(User Input)
Diameter of Bolt Circle =	D_{bc} := 59·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strenght =	F_u := 100·ksi	(User Input)
Bolt Yeild Strenght =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 Grade 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.0·in	(User Input)
Base Plate Diameter =	D_{bp} := 65.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 50.5·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 29.5 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 11.29 \cdot in$ $d_7 = 11.29 \cdot in$

$d_2 = 20.86 \cdot in$ $d_8 = 0.00 \cdot in$

$d_3 = 27.25 \cdot in$ $d_9 = -11.29 \cdot in$

$d_4 = 29.50 \cdot in$ $d_{10} = -20.86 \cdot in$

$d_5 = 27.25 \cdot in$ $d_{11} = -27.25 \cdot in$

$d_6 = 20.86 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 25.3 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.00 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 4.25 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 2.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 32.7 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 6.962 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 75.3 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 0.39$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.281 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 4.1 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

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.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 78.7 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 24.2 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^2}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^3}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = 40.4 \cdot \%$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, "OK", "Overstressed"\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 31.2 \cdot kips$ $C_7 = 31.2 \cdot kips$

$C_2 = 56.2 \cdot kips$ $C_8 = 1.7 \cdot kips$

$C_3 = 72.9 \cdot kips$ $C_9 = -27.8 \cdot kips$

$C_4 = 78.7 \cdot kips$ $C_{10} = -52.8 \cdot kips$

$C_5 = 72.9 \cdot kips$ $C_{11} = -69.5 \cdot kips$

$C_6 = 56.2 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 28.7 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 48 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	OM := 1515·ft·kips	(User Input from RISATower)	
Shear Force =	Shear := 18·kip	(User Input from RISATower)	
Axial Force =	Axial := 27·kip	(User Input from RISATower)	
Tower Height =	H_t := 120·ft	(User Input)	

Footing Data:

Overall Depth of Footing =	D_f := 7.5·ft	(User Input)	
Length of Pier =	L_p := 4.5·ft	(User Input)	
Extension of Pier Above Grade =	L_{pag} := 1.0·ft	(User Input)	
Diameter of Pier =	d_p := 7.0·ft	(User Input)	
Thickness of Footing =	T_f := 3.0·ft	(User Input)	
Width of Footing =	W_f := 24.5·ft	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts =	L_{st} := 96·in	(User Input)	
Projection of Anchor Bolts Above Pier =	A_{BP} := 12.0·in	(User Input)	
Anchor Bolt Diameter =	d_{anchor} := 2.25·in	(User Input)	
Base Plate Bolt Circle =	MP := 59.0·in	(User Input)	

Material Properties:

Concrete Compressive Strength =	f_c := 4000·psi	(User Input)	
Steel Reinforcment Yield Strength =	f_y := 60000·psi	(User Input)	
Anchor Bolt Yield Strength =	f_{ya} := 75000·psi	(User Input)	
Internal Friction Angle of Soil =	θ_s := 30·deg	(User Input)	
Allowable Soil Bearing Capacity =	q_s := 8000·psf	(User Input)	
Unit Weight of Soil =	π_{soil} := 100·pcf	(User Input)	
Unit Weight of Concrete =	π_{conc} := 150·pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 1.0·ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0·ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 8$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.0 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 46$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\pi_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 4 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 8$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.0 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 25$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 8$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.0 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 33$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\pi_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =
$$A_{bpier} := \frac{\pi \cdot d_{bpier}^{2}}{4} = 0.785 \cdot in^2$$

Pad Top Reinforcement Bar Area =
$$A_{btop} := \frac{\pi \cdot d_{btop}^{2}}{4} = 0.785 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =
$$A_{bbot} := \frac{\pi \cdot d_{bbot}^{2}}{4} = 0.785 \cdot in^2$$

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

Load Factor =
$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft} \right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\pi_c := if(Bouyancy = 1, \pi_{conc} - 62.4pcf, \pi_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\pi_s := if(Bouyancy = 1, \pi_{soil} - 62.4pcf, \pi_{soil}) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \pi_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0.3 \cdot ksf$

$P_{pt} := K_p \cdot \pi_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.35 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.35 \cdot ksf$

$P_{bot} := K_p \cdot \pi_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.25 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.8 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 3$

$A_p := W_f \cdot T_p = 73.5$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 132.3 \cdot kip$

Weight of Concrete Pad = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + \frac{d_p^2 \cdot \pi}{4} L_p\right] \cdot \pi_c = 296.09 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[W_f^2 - \frac{d_p^2 \cdot \pi}{4} \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \pi_s = 50.4 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\theta_s)}{2} \cdot W_f\right) \cdot \pi_s = 39.783 \cdot kip$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(D_f)^3 \cdot \frac{\tan(\theta_s)}{3}\right] \cdot \pi_s = 16.238 \cdot kips$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + Axial = 373.493 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \cdot \left(W_f + \frac{D_f \cdot \tan(\theta_s)}{3}\right) = 5.74 \times 10^3 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + Shear \cdot (L_p + T_f) = 1.65 \times 10^3 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 3.48$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier =

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 150.186 \cdot kips$$

$$Shear\_Check := if(S_p > Shear, "Okay", "No Good")$$

Shear_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat =

$$A_{mat} := W_f^{\,2} = 600.25$$

Section Modulus of Mat =

$$S := \frac{W_f^{\,3}}{6} = 2451.02 \cdot ft^3$$

Maximum Pressure in Mat =

$$P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.295 \cdot ksf$$

$$Max\_Pressure\_Check := if(P_{max} < q_s, "Okay", "No Good")$$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat =

$$P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.051 \cdot ksf$$

$$Min\_Pressure\_Check := if\left[(P_{min} \geq 0) \cdot (P_{min} < q_s), "Okay", "No Good"\right]$$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution =

$$X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 7.858$$

Distance to Kern =

$$X_k := \frac{W_f}{6} = 4.083$$

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

Eccentricity =

$$e := \frac{M_{ot}}{WT_{tot}} = 4.418$$

Adjusted Soil Pressure =

$$P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.298 \cdot ksf$$

$$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.298 \cdot ksf$$

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

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\theta_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \theta_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.225 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if(P_b > LF \cdot Axial, "Okay", "No Good")$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot}$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := LF \cdot \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 30.4$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 73.4$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 526.9$

Guess Value = $v_u := 1ksf$ (From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

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

$v_u := \text{Find}(v_u) = 4.6 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 301.3 \cdot kips$

Required Shear Strength = $V_{req} := LF \cdot V_u = 401.7 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2507.6 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 0.814 \cdot ksf$

Maximum Bending at Face of Pier = $M_n := \frac{1}{LF \cdot \phi_m} \cdot \left[\left(q_{adj} - q_b \right) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 888.5 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2} = 5.7 \cdot ksf$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}} \right) = 0.0007$

$\rho_{min} := 1.333 \cdot \rho = 0.00088$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := \max(\rho, \rho_{min}, \rho_{sh}) \cdot W_f \cdot d = 16.9 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 25.9 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if(As_{prov} > As, "Okay", "No Good")$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := \rho_{sh} \cdot (W_f \cdot d) = 16.9 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 19.6 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if(As_{prov} > As, "Okay", "No Good")$$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 7.97 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0$$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \pi_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 23.7 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in$$ (ACI-2008 12.2.1)

$$L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 102 \cdot in$$

$$Lpad\_Check := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$$

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier =

$$A_p := \frac{\pi \cdot d_p^{\,2}}{4} = 5541.77 \cdot in^2$$

$$A_{smin} := 0.01 \cdot 0.05 \cdot A_p = 2.77 \cdot in^2 \qquad \text{(ACI-2008 10.8.4 \& 10.9.1)}$$

$$A_{sprov} := NB_{pier} \cdot A_{bpier} = 36.13 \cdot in^2$$

$$Steel\_Area\_Check := if\left(A_{sprov} > A_{smin}, \text{"Okay"}, \text{"No Good"}\right)$$

Steel_Area_Check = "Okay"

Bar Spacing In Pier =

$$B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 4.737 \cdot in$$

Diameter of Reinforcement Cage =

$$Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 78 \cdot in$$

Maximum Moment in Pier =

$$M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2}\right)\right] \cdot LF = 25673.6 \cdot in \cdot kips$$

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

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := \left(d_p \cdot 12 \;\; NB_{pier} \;\; BS_{pier} \;\; \frac{Axial \cdot 1.333}{kips} \;\; \frac{M_p}{in \cdot kips}\right)$$

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) = \left(84 \;\; 46 \;\; 8 \;\; 35.991 \;\; 2.567 \times 10^4\right)$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$$

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

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = \left(98.749 \;\; 7.044 \times 10^4 \;\; -60 \;\; 6.557 \times 10^{-3}\right)$$

$$Axial\_Load\_Check := if\left(\phi P_n \geq P_u, \text{"Okay"}, \text{"No Good"}\right)$$

Axial_Load_Check = "Okay"

$$Bending\_Check := if\left(\phi M_{xn} \geq M_{xu}, \text{"Okay"}, \text{"No Good"}\right)$$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 51 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 33 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 2.368 \cdot in$

Transverse Reinforcement = $k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \pi_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 30.04 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 13.282 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 18.974 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 18 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 18.974 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

Tie Size and Spacing in Column:

Minimum Tie Size =

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

Used #4 Ties

Seismic Factor =

$z := if(Z \le 2, 1, 0.5) = 1$ (ACI-2008 21.10.5)

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

$s_{lim2} := \frac{48 \cdot d_{Tie}}{8} \cdot z = 24 \cdot in$

$s_{lim3} := D_f \cdot z = 90 \cdot in$

$s_{lim4} := 18in$

Maximum Spacing =

$s_{tie} := \min\left(\begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix}\right) = 16 \cdot in$

Number of Ties Required =

$n_{tie} := \frac{L_{pier} - 3 \cdot in}{s_{tie}} + 1 = 4$

Check Anchor Steel Embedment:

Depth Available =

$D_{ab} := L_{st} - A_{BP} = 7 \cdot ft$

Length of Anchor Bolt =

$L_{anchor} := \frac{(0.11 \cdot f_{ya}) \cdot in}{\sqrt{f_c \cdot psi}} = 10.87 \cdot ft$

$Depth\_Check := if(D_{ab} \ge L_{anchor}, "Okay", "No Good")$

Depth_Check = "No Good"

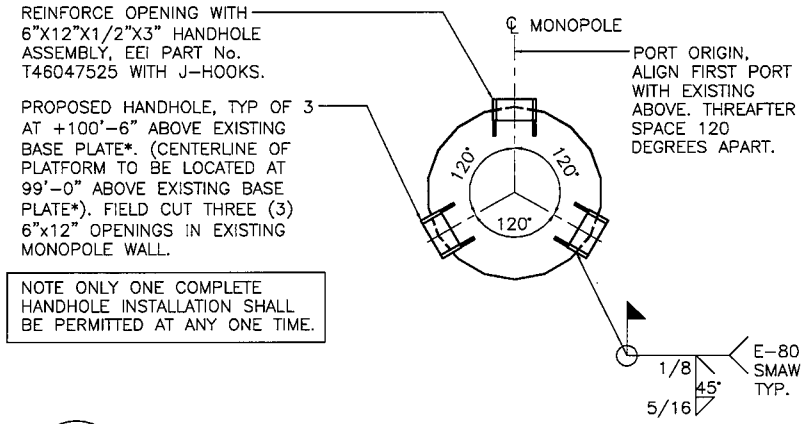
Note: Anchor plate is provided

INSTALLATION NOTES:

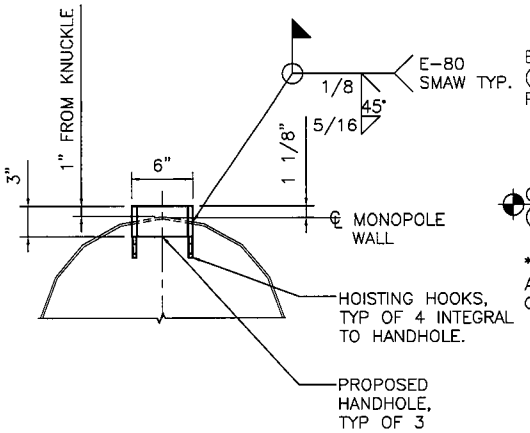
1. REFER TO DRAWING S-2 FOR INSPECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF CONSTRUCTION RELATED ACTIVITIES.
2. GRIND EXISTING SURFACE TO REMOVE EXISTING GALVANIZING PRIOR TO WELDING.
3. PRE-HEAT/POST-HEAT WELD AREA PER AWS. D1.1 SPECIFICATIONS.
4. PROTECT/RELOCATE EXISTING COAXIAL CABLE TRANSMISSION LINES AND RELATED EQUIPMENT PRIOR TO COMMENCING WITH WELDING ACITIVITY.
5. GRIND STEEL EDGES AFTER COMPLETION OF FIELD CUTTING TO REMOVE BURRS.
6. CLEAN SURFACE AFTER WELDING AND TOUCH UP ABRASIONS AND NON-GALVANIZED SURFACES PER NOTE 7 ON SHEET S-2.

GENERAL DRAWING NOTES:

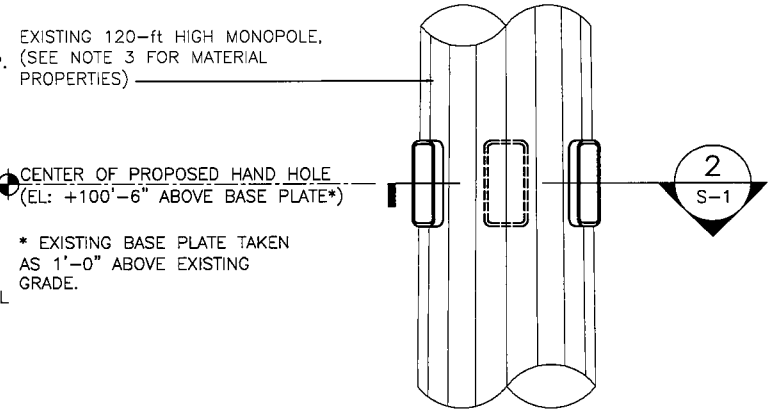
7. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY NATCOMM INC FOR VERIZON WIRELESS ON BEHALF OF VERIZON WIRELESS, DATED MARCH 30, 2009. DESIGN LOADS ARE BASED ON THE ABOVE REPORT.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR PROCURING ALL NECESSARY PERMITS, LICENSES, APPROVALS AND OTHER REQUIREMENTS FOR CONSTRUCTION.
9. EXISTING SUMMIT MANUFACTURING MONOPOLE INFORMATION:-
   SECTION #L2 (46.83-ft-95.12-ft)
   MATERIAL GRADE = A572-65 (65ksi)
   OUTSIDE DIAMETER AT BOT = 25.450in
   OUTSIDE DIAMETER AT TOP = 18.500in
   WALL THICKNESS = 0.188in
3. PROPOSED HAND HOLE MATERIAL INFORMATION:-
   EEI PART No. T46047525 WITH J-HOOKS
   SIZE = 6"X12"X1/2"X3"
   MATERIAL GRADE = A500 GRADE B (46ksi)
   WEIGHT (EA) = 19.63lbs
4. HANDHOLE SHALL BE LOACTED AS SHOWN WITHIN THESE DRAWINGS. UNDER NO CIRCUMSTANCE SHALL THE LOCATION BE MODIFIED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD.
5. THE INSTALLATION OF TOWER REINFORCEMENT SHALL BE CONDUCTED ONLY ON DAYS WHEN THE EXPECTED WEATHER CONDTION INDICATES LESS THAN 15 MPH WIND SPEED. HANDHOLE INSTALLATION SHALL BE COMPLETED ON SAME WORKING DAY. CONTRACTOR SHALL ENSURE THE STABILITY OF THE SUBJECT TOWER DURING MODIFICATION WORK.



2 / S-1 **PROPOSED HAND HOLE (SECTION)**
SCALE: 1/2" = 1'-0"



3 / S-1 **HAND HOLE (DETAIL)**
SCALE: 1" = 1'-0"



1 / S-1 **PROPOSED HAND HOLE (ELEVATION)**
SCALE: 1/2" = 1'-0"

REVISIONS		
00	03/24/09	CONSTRUCTION

NATCOMM INC
CONSULTING ENGINEERS
p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
e: info@nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

VERIZON WIRELESS

DANIELSON SOUTH

280 ROSS ROAD
KILLINGLY CT 06239

PROJECT NO:	09006.C06
DRAWN BY:	JRM
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	03/30/09

HANDHOLE DETAILS AND NOTES

S-1
DWG. 1 OF 2

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES".

2. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH TOWER OWNER.

3. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WOPSRK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

4. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.

5. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.

7. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

8. TOWER REINFORCING SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

9. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH TOWER REINFORCEMENT.

STRUCTURAL STEEL NOTES:

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992, (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36, (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   C. CONNECTION BOLTS---ASTM A325-N
   D. ANCHOR RODS---ASTM F 1554
   E. WELDING ELECTRODE---ASTM E 70XX

2. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

3. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

4. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

5. NOTIFY THE ENGINEER PRIOR TO FIELD CUTTING OR MODIFYING APPROVED FABRICATIONS.

6. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

7. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

8. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

9. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

10. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

11. **INSPECTION AND TESTING OF ALL WELDING** SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY. THE INSPECTOR SHALL PROVIDE VISUAL AND ULTRASONIC INSPECTION OF ALL WELDS. **NO WORK IS TO PROCEED WITHOUT THE WELDING INSPECTOR PRESENT.**

12. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REVISIONS		
00	03/24/09	CONSTRUCTION

NATCOMM LLC
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63-2 N. Branford Rd.
Branford, CT 06405

PROFESSIONAL ENGINEER SEAL

VERIZON WIRELESS

DANIELSON SOUTH

280 ROSS ROAD
KILLINGLY CT 06239

PROJECT NO:	09006.C06
DRAWN BY:	DEB
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	03/30/09

NOTES

S-2

DWG. 2 OF 2

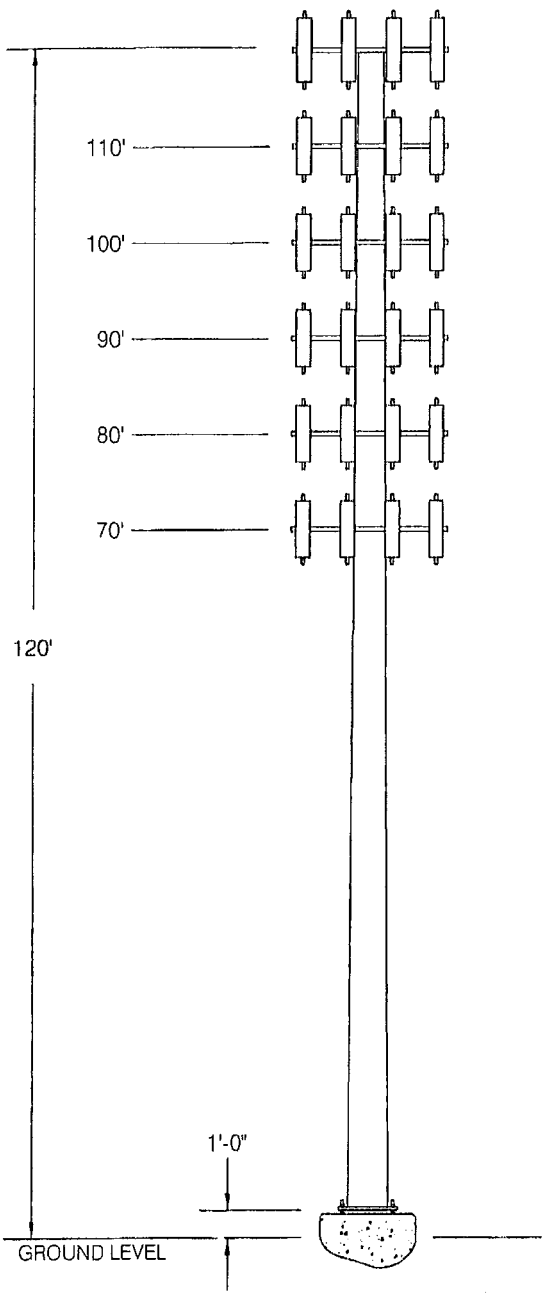
ENGINEERED ENDEAVORS INCORPORATED
The Experienced Point of View

Customer: TECTONIC ENGINEERING
Description: 120' MONOPOLE
EEI Job Number: 13781

EMERSON™ Network Power

SITE INFORMATION
Location: WINDHAM COUNTY, CT
Site Name: KILLINGLY
Site Number: 3917

DESIGN INFORMATION
Designed By: JAY PARR
Design Date: 11/7/2005
Status: REVISION 0



ANTENNA LOADING

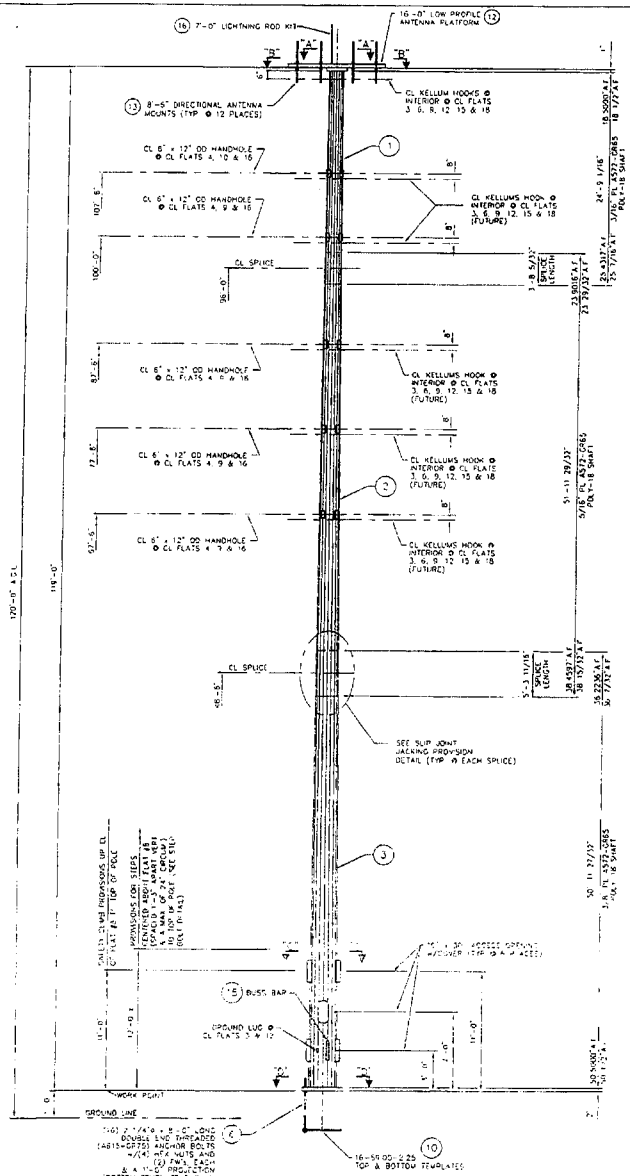
(12) 7770.00 PANEL ANTENNAS, (6) AMPLIFIERS, AND (18) DIPLEXERS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 120'
(12) ALP 9212 PANEL ANTENNAS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 110'
(12) ALP 9212 PANEL ANTENNAS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 100'
(12) ALP 9212 PANEL ANTENNAS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 90'
(12) ALP 9212 PANEL ANTENNAS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 80'
(12) ALP 9212 PANEL ANTENNAS MOUNTED ON A 16 ft LOW PROFILE PLATFORM AT 70'

DESIGN CRITERIA

DESIGNED IN ACCORDANCE WITH THE TIA/EIA 222-F FOR 90 MPH FASTEST MILE WIND SPEED AND 1/2" RADIAL ICE (NON-SIMULTANEOUS)

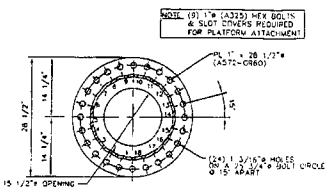
DESIGN MEETS THE REQUIREMENTS OF SECTIONS 1609 AND 3108 OF THE 2000 AND 2003 INTERNATIONAL BUILDING CODES FOR 110 MPH 3-SECOND GUST WIND SPEED

ENGINEERED ENDEAVORS, INC.
7610 Jenther Drive • Mentor, Ohio 44060-4872
Phone: (440) 918-1101 • Phone: (888) 270-3855
Fax: (440) 918-1108 • www.engend.com

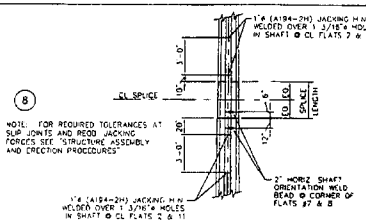


NOTE: ALL DIMENSIONS SHOWN FROM BOTTOM OF BASE PLATE UNLESS OTHERWISE NOTED

NOTE (8) 1"@ (A325) HEX BOLTS & SLOT DRIVERS REQUIRED FOR PLATFORM ATTACHMENT

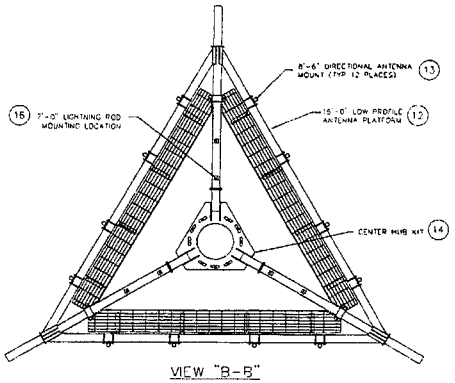


VIEW "A-A"
NOTE: PLATFORM REMOVED FOR CLARITY

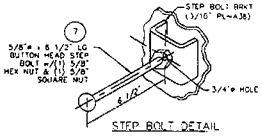


8 NOTE: FOR REQUIRED TOLERANCES AT SLIP JOINTS AND REQD JACKING FORCES SEE "STRUCTURE ASSEMBLY AND ERECTION PROCEDURES"

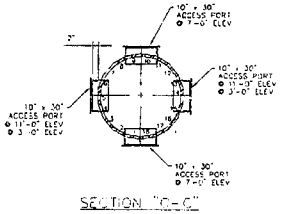
SLIP JOINT JACKING PROVISION DETAIL



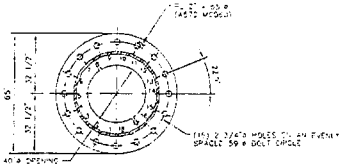
VIEW "B-B"



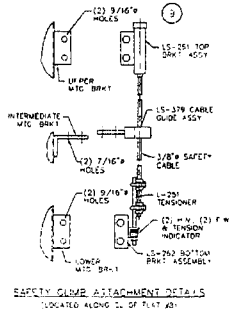
STEP BOLT DETAIL



SECTION "C-C"



SECTION "D-D"



SAFETY CLIMB ATTACHMENT DETAILS
(LOCATED ALONG CL OF FLAT #3)

MATERIAL REQ'D. PER ASSEMBLY

	GALV. WT	QTY	ITEM	MK. NO	DESCRIPTION
*	1357.20	1	1	GSC33558	SHAFT ASSY (TOP) 24.84' LG
*	5828.67	1	2	GSC33559	SHAFT ASSY (MIDDLE) 51.99' LG
*	10905.11	1	3	GSC33560	SHAFT ASSY (BOTTOM) 51.15' LG
*	31.41	6	4	K11497	10" x 30" ACCESS PORT COVER PL
			5		HARDWARE AS FOLLOWS:
*	6.87	15	5A	K11097	6" x 12" HANDHOLE COVER PL
	129.50	16	6	2.25-A860DE-4	2 1/4"x 4'-0" LG (A615-GR75) ANCHOR BOLTS w/ (4) HEX NUTS (A194-2H) & (2) FWL EACH
	1.08	92	7	S10006	5/8"ø x 1 1/2" LG BUTTON HEAD STEP BOLT w/ (1) HEX & (1) SQUARE NUT EACH
		1	8		STRUCTURE ASSEMBLY AND ERECTION PROCEDURES
		1	9	DBI-120	120'-0" SAFETY CLIMB KIT
		1	9A	L2010	SAFETY CLIMB HARNESS
	110.74	2	10	16-59.00-2.25	SETTING TEMPLATE
	0.40	6	11	GS13220	3/8"ø KELLUMS HOOK ASSY
	1562.58	1	12	K10995A	16'-0" LOW PROFILE ANTENNA PLATFORM
	40.91	12	13	K11014	8'-6" LOW PROFILE DIRECTIONAL ANTENNA MOUNTS
	292.32	1	14	K11128	PLATFORM CENTER HUB
	7.50	1	15	K10062	BUSS BAR KIT
	28.60	1	16	K10333	7' LIGHTNING ROD

TOTAL GALV. STR. & ACCES WT 20866.17#
TOTAL ANCHOR BOLT & TEMPLATE WT. 2293.49#

GENERAL NOTES

1) MONOPOLE IS DESIGNED IN ACCORDANCE WITH TIA/EIA-222-F FOR 90 MPH FASTEST MILE WIND SPEED AND 1/2" RADIAL ICE (NON-SIMULTANEOUS), MEETS THE REQUIREMENTS OF SECTIONS 1609 & 3108 OF THE 2000 & 2003 IBC FOR 110 MPH 3-SECOND GUST WIND SPEED.
2) ALL WELDS SHALL BE IN ACCORDANCE WITH AWS D1.1. FLATEST EDITION. LONGITUDINAL SEAM WELDS WITHIN SLIP JOINT AREA IN FEMALE SECTION SHALL BE 100% PENETRATION.
3) MONOPOLE SHALL BE HOT DIP GALVANIZED PER ASTM A123.
4) CONTRACTOR SHALL THOROUGHLY REVIEW EEI'S ASSEMBLY & ERECTION PROCEDURE PRIOR TO INITIATING THE ERECTION OF THE MONOPOLE.
5) THE ORIENTATION OF THE MONOPOLE SHALL BE VERIFIED PRIOR TO ERECTION OF THE POLE.
6) SECTIONS OF THE MONOPOLE SHALL BE JACKED TOGETHER WITH A MINIMUM JACKING FORCE OF 10,000 lbf APPLIED TO EACH SIDE FOR A MAXIMUM RECOMMENDED JACKING FORCE. SPLICE LENGTH TOLERANCE, AND AIR GAP BETWEEN SECTIONS REFER TO EEI ASSEMBLY & ERECTION PROCEDURE.
7) FOR PROPER SHAFT ALIGNMENT A 2" HORIZONTAL WELD BEAD AND A MARK ARE POSITIONED ON EACH SHAFT AT EACH SPLICE. THE 2" HORIZONTAL WELD BEADS ARE ON THE MATCHING CORNERS. THE MARK NUMBER IS ON THE ADJACENT FLAT. THE CORNERS WITH WELD BEADS SHALL BE ALIGNED FROM TOP TO BOTTOM OF THE POLE. MARK NUMBERS SHALL BE MATCHED FOR EACH SIDE & THE DISTANCE BETWEEN TWO WELD BEADS SHOULD BE 18" (±4").
8) FIELD ASSEMBLY NUTS (1"ø) FOR JACKING SECTIONS TOGETHER ARE LOCATED ON OPPOSING SECTION FLATS ABOVE AND BELOW SPLICES.
9) GAP BETWEEN TOP OF THE FOUNDATION AND BOTTOM OF THE BASE PLATE MAY BE FILLED WITH A NON-SHRINK GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 7,000 psi. WATER DRAINAGE MUST BE PROVIDED UNDERNEATH THE BASE PLATE TO ENSURE THAT MOISTURE DOES NOT COLLECT INSIDE THE MONOPOLE.
10) ALL BOLTED CONNECTIONS WITH A325 HIGH-STRENGTH BOLTS SHALL BE ASSEMBLED IN ACCORDANCE WITH SPECIFICATIONS FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS. BOLTS SHALL BE BROUGHT TO SNUG-TIGHT CONDITIONS AS RECOMMENDED BY THE FLANGE SPECIFICATIONS IN "FLANGE-TYPE JOINTS" AND SHOULD BE SHIMMED IF NECESSARY.
11) ANCHOR BOLTS SHALL BE TIGHTENED AFTER THE STRUCTURE IS PLUMB. BOTH TOP & BOTTOM NUT SHALL BE TIGHTEN TO 600 ft-lbs MOMENT. FOR DETAIL ANCHOR BOLT INSTALLATION REFER TO EEI ASSEMBLY AND ERECTION PROCEDURE.
12) POLE TAPER = 0.250in/ft

ASSEMBLY MARKING PROTOCOL: EACH INDIVIDUAL ASSEMBLY SHALL HAVE A METAL TAG WELDED TO IT WHICH WILL BE ENGRAVED WITH THE ASSEMBLY MARK NO. AS SHOWN IN THE MATERIAL SHEET. (MINIMUM OF 5/8" HIGH LETTERS)

NO	DESCRIPTION	DATE	BY
1	COMPLETED DETAILS	11/22/06	J A M
0	COMPLETED APPROVAL DWG	11/8/06	J A M

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120'-0" MONOPOLE
TECTONIC ENGINEERING
KILLINGLY 3917
WINDHAM COUNTY, CT

SCALE	NONE	PROJECT NO	13781
		DRAWING NO	GS56036

Engineered Endeavors Inc.

7610 Jenther Drive
Mentor, Ohio 44060
Tel (440) 918-1101 Fax (440) 918-1108

Communications Structure Nonlinear Analysis and Design Program

13:13:37 11-07-2005
Revision 1.3 - 1/22/01
Engineer: PARR

Customer **Tectonic Engineering**
Job Name **13781**
Structure **120' Monopole**
Location **Windham County, CT**
Site **Killingly**

OD BOT	OD TOP	NUM. SIDES	THICK INCH	TAPER IN/FT	LENGTH FT	JOINT INCH	JOINT TYPE	YIELD KSI	WEIGHT LBS	JOINT HEIGHT
25.45	18.50	18	0.1875	0.279	24.88	45.00	SLIP	65.0	1084.	96.00
38.44	23.90	18	0.3125	0.279	52.04	64.00	SLIP	65.0	5355.	48.50
50.50	36.20	18	0.3750	0.279	51.17	0.00	BASEPL	65.0	8798.	-0.00
			TOTAL TUBE WEIGHT						15236.	POUNDS
			POLE SHAFT LENGTH						119.00	FEET

E = 29600.0 KSI
UNIT WGT = 0.283 LBS/CU IN
AISC constants are used for stress reductions.
TUBE SECTIONS HAVE 18 SIDES AND ARE TREATED AS ROUND
Internal bend radius = 3 X T
Tube diameters are measured flat to flat.
Tube diameters are increased by 1.020 for wind across points.
Drag coefficients are increase by 1.300 for steps on the pole.
AISC Tube Shape Coefficient of 1.000 is applied.
ORIGINAL DATA FILE NAME t:\ENG3\QUOTES\51660120
REVISED DATA FILE NAME t:\ENG3\JOBS\13781120

APPURTENANCES

DESCRIPTION	NUM.	ELEV.	Kz	AREA < WITHOUT ICE	WGT	Ca >	AREA < WITH ICE	WGT	Ca >	FACTOR
7770.00	12	119.	1.443	4.20	35.	1.4000	4.67	68.	1.4000	0.93
AMPLIFIER/DIPLEXER	24	119.	1.443	0.67	18.	1.4000	0.83	23.	1.4000	0.89
16' LOW PROFILE PLAT	1	119.	1.443	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00
ALP 9212	12	109.	1.407	3.90	27.	1.4000	4.24	55.	1.4000	0.85
16' LOW PROFILE PLAT	1	109.	1.407	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00
ALP 9212	12	99.	1.369	3.90	27.	1.4000	4.24	55.	1.4000	0.85
16' LOW PROFILE PLAT	1	99.	1.369	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00
ALP 9212	12	89.	1.328	3.90	27.	1.4000	4.24	55.	1.4000	0.85
16' LOW PROFILE PLAT	1	89.	1.328	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00
ALP 9212	12	79.	1.283	3.90	27.	1.4000	4.24	55.	1.4000	0.85
16' LOW PROFILE PLAT	1	79.	1.283	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00
ALP 9212	12	69.	1.235	3.90	27.	1.4000	4.24	55.	1.4000	0.85
16' LOW PROFILE PLAT	1	69.	1.235	11.00	1900.	2.0000	14.00	2200.	2.0000	1.00

LOAD CASE 1

BASIC LOADING

DEAD LOAD FACTOR 1.00 WIND PSF REDUCTION 1.00 RADIAL ICE 0.00 IN.

WIND VELOCITY 90 BOTTOM 20.91 PSF TOP 29.80 PSF
MAX BASE ROTATION 0.00 DEG

APPLIED APPURTENANCE FORCES

	ELEVATION FT	WEIGHT KIPS	WIND KIPS
7770.00	119.00	0.420	3.317
AMPLIFIER/DIPLEXER	119.00	0.420	1.013
16' LOW PROFILE PLATFORM	119.00	1.900	1.112
ALP 9212	109.00	0.324	2.746
16' LOW PROFILE PLATFORM	109.00	1.900	1.085
ALP 9212	99.00	0.324	2.671
16' LOW PROFILE PLATFORM	99.00	1.900	1.055
ALP 9212	89.00	0.324	2.591
16' LOW PROFILE PLATFORM	89.00	1.900	1.024
ALP 9212	79.00	0.324	2.505
16' LOW PROFILE PLATFORM	79.00	1.900	0.989
ALP 9212	69.00	0.324	2.410
16' LOW PROFILE PLATFORM	69.00	1.900	0.952

TUBE PROPERTIES			MEMBER FORCES			STRESSES			STRESS	TOTAL	
ELEV FT	DIAM IN	WALL IN	SHEAR K	BENDING K-FT	AXIAL K	AXIAL KSI	BEND. KSI	ALLOW KSI	RATIOS	DEFL IN	TILT DEG
119.00	18.50	0.1875	5.93	0.00	2.41	0.22	0.00	50.98	0.00	69.9	5.23
109.00	21.29	0.1875	5.93	59.07	2.41	0.19	10.90	49.07	0.23	59.2	5.09
99.00	24.09	0.1875	10.49	163.52	4.71	0.33	23.51	47.60	0.50	48.9	4.73
96.00	24.93	0.1875	14.76	207.61	6.94	0.48	27.85	47.22	0.60	46.0	4.59
			TYPE OF JOINT: SLIP JOINT								
96.00	24.43	0.3125	15.07	207.58	7.63	0.32	17.68	51.99	0.35	46.0	4.59
89.00	26.38	0.3125	15.07	312.72	7.63	0.30	22.76	51.99	0.44	39.5	4.33
79.00	29.18	0.3125	19.36	505.83	10.40	0.37	30.00	51.81	0.59	30.9	3.89
69.00	31.97	0.3125	23.62	741.51	13.48	0.43	36.53	50.46	0.73	23.3	3.39
58.50	34.90	0.3125	27.73	1032.24	16.80	0.49	42.55	49.28	0.87	16.5	2.81
48.50	37.70	0.3125	28.34	1315.39	18.23	0.50	46.39	48.32	0.97	11.1	2.25
			TYPE OF JOINT: SLIP JOINT								
48.50	36.95	0.3750	29.05	1315.40	20.84	0.48	40.47	51.00	0.80	11.1	2.25
36.00	40.44	0.3750	29.05	1678.32	20.84	0.44	42.99	49.74	0.87	6.0	1.63
24.00	43.79	0.3750	29.78	2035.56	23.80	0.47	44.37	48.72	0.92	2.6	1.06
12.00	47.15	0.3750	30.49	2401.41	25.90	0.47	45.08	47.84	0.95	0.7	0.51
0.00	50.50	0.3750	31.76	2776.38	29.33	0.50	45.36	47.08	0.97	0.0	0.00

REACTION COMPONENTS (KIPS AND FT-KIPS)

TRANSVERSE SHEAR	VERTICAL FORCE	WIND SHEAR	MOMENT ABOUT TRANSVERSE	MOMENT ABOUT VERTICAL	MOMENT ABOUT WIND AXIS
0.000	29.333	-31.759	2776.382	0.000	0.000

LOAD CASE 2

BASIC LOADING PLUS ICE

DEAD LOAD FACTOR 1.00 WIND PSF REDUCTION 0.75 RADIAL ICE 0.50 IN.

WIND VELOCITY 90 BOTTOM 15.68 PSF TOP 22.35 PSF
MAX BASE ROTATION 0.00 DEG

APPLIED APPURTENANCE FORCES

	ELEVATION FT	WEIGHT KIPS	WIND KIPS
7770.00	119.00	0.811	2.767
AMPLIFIER/DIPLEXER	119.00	0.559	0.941
16' LOW PROFILE PLATFORM	119.00	2.200	1.062
ALP 9212	109.00	0.660	2.239
16' LOW PROFILE PLATFORM	109.00	2.200	1.035
ALP 9212	99.00	0.660	2.178
16' LOW PROFILE PLATFORM	99.00	2.200	1.007
ALP 9212	89.00	0.660	2.113
16' LOW PROFILE PLATFORM	89.00	2.200	0.977
ALP 9212	79.00	0.660	2.042
16' LOW PROFILE PLATFORM	79.00	2.200	0.944
ALP 9212	69.00	0.660	1.965
16' LOW PROFILE PLATFORM	69.00	2.200	0.909

TUBE PROPERTIES			MEMBER FORCES			STRESSES			STRESS	TOTAL	
ELEV FT	DIAM IN	WALL IN	SHEAR K	BENDING K-FT	AXIAL K	AXIAL KSI	BEND. KSI	ALLOW KSI	RATIOS	DEFL IN	TILT DEG
119.00	18.50	0.1875	5.24	0.00	3.37	0.31	0.00	50.98	0.00	60.3	4.52
109.00	21.29	0.1875	5.24	52.26	3.37	0.27	9.64	49.07	0.20	51.0	4.40
99.00	24.09	0.1875	9.15	143.48	6.39	0.45	20.63	47.60	0.44	42.1	4.08
96.00	24.93	0.1875	12.80	181.79	9.34	0.64	24.39	47.22	0.53	39.6	3.96
TYPE OF JOINT: SLIP JOINT											
96.00	24.43	0.3125	13.05	181.80	10.03	0.42	15.48	51.99	0.31	39.6	3.96
89.00	26.38	0.3125	13.05	272.97	10.03	0.39	19.87	51.99	0.39	34.0	3.73
79.00	29.18	0.3125	16.71	439.78	13.50	0.48	26.09	51.81	0.51	26.5	3.35
69.00	31.97	0.3125	20.32	642.62	17.25	0.56	31.66	50.46	0.64	20.0	2.91
58.50	34.90	0.3125	23.77	891.94	21.21	0.62	36.77	49.28	0.76	14.1	2.42
48.50	37.70	0.3125	24.20	1133.76	22.58	0.62	39.99	48.32	0.84	9.5	1.93
TYPE OF JOINT: SLIP JOINT											
48.50	36.95	0.3750	24.70	1133.76	25.84	0.60	34.88	51.00	0.69	9.5	1.93
36.00	40.44	0.3750	24.70	1442.43	25.84	0.55	36.95	49.74	0.75	5.2	1.39
24.00	43.79	0.3750	25.20	1744.74	27.81	0.54	38.03	48.72	0.79	2.3	0.90
12.00	47.15	0.3750	25.69	2053.02	29.91	0.54	38.54	47.84	0.82	0.6	0.44
0.00	50.50	0.3750	26.61	2367.66	33.35	0.56	38.68	47.08	0.83	0.0	0.00

REACTION COMPONENTS (KIPS AND FT-KIPS)

TRANSVERSE SHEAR	VERTICAL FORCE	WIND SHEAR	MOMENT ABOUT TRANSVERSE	MOMENT ABOUT VERTICAL	MOMENT ABOUT WIND AXIS
0.000	33.347	-26.611	2367.656	0.000	0.000

SUMMARY TABLE

ELEV	STRESS RATIO	AXIAL	BENDING	LOADING
119.00	0.02	2.41	0.0	1 BASIC LOADING
109.00	0.23	2.41	59.1	1 BASIC LOADING
99.00	0.50	4.71	163.5	1 BASIC LOADING
96.00	0.60	6.94	207.6	1 BASIC LOADING
89.00	0.44	7.63	312.7	1 BASIC LOADING
79.00	0.59	10.40	505.8	1 BASIC LOADING
69.00	0.73	13.48	741.5	1 BASIC LOADING
58.50	0.87	16.80	1032.2	1 BASIC LOADING
48.50	0.97	18.23	1315.4	1 BASIC LOADING
36.00	0.87	20.84	1678.3	1 BASIC LOADING
24.00	0.92	23.80	2035.6	1 BASIC LOADING
12.00	0.95	25.90	2401.4	1 BASIC LOADING
0.00	0.97	29.33	2776.4	1 BASIC LOADING

MAXIMUM SUPPORT MOMENT K-FT	2776.38
CORRESPONDING AXIAL FORCE KIPS	29.33
CORRESPONDING SHEAR FORCE KIPS	31.76

BASE PLATE AT ELEVATION	0.00	FEET
TUBE DIAMETER	50.50	INCHES
DESIGN MOMENT	2776.4	KIP FT
DESIGN MOMENT IS	0.	DEGREES FROM THE WIND DIRECTION
BOLTS ARE ON THE KNUCKLES OF THE TUBE		
APPLIED AXIAL FORCE	29.3	KIPS
APPLIED SHEAR	31.76	KIPS

BOLT DATA

BOLT TYPE	A615 GR75	
BOLTS ARE EVENLY SPACED		
DIAMETER	2.250	INCHES
EFFECTIVE AREA	3.250	SQ IN
TOTAL LENGTH	8.0	FEET
End plates are required.		
MINIMUM EMBEDMENT	7.4	FEET
NUMBER OF BOLTS	16	
BOLT CIRCLE DIAMETER	59.00	INCHES
ALLOWABLE STRESS	60.0	KSI
APPLIED AXIAL STRESS	44.0	KSI
MAX BOLT FORCE	143.0	KIPS
BOLT BENDING STRESS	2.9	KSI
COMBINED BOLT STRESS	46.9	KSI
CLEARANCE UNDER PLATE	3.25	INCHES
BOLT WEIGHT	1804.8	POUNDS

PLATE DATA

DIAMETER OF PLATE	65.00	INCHES
MATERIAL	A572 MOD60	
PROVIDED THICKNESS	2.000	INCHES
REQUIRED THICKNESS	1.667	INCHES
BOLT HOLE DIAMETER	2.625	INCHES
CENTER HOLE SIZE	40.50	INCHES
NET WEIGHT	1100.0	POUNDS
RAW STOCK WEIGHT	2391.3	POUNDS
SURFACE AREA	26.99	SQ FT
ALLOWABLE STRESS	60.00	KSI
MAX APPLIED STRESS	41.69	KSI
CONCRETE STRENGTH	3000.	PSI

Base Plate - use 65.00 inch ROUND x 2.000 inch A572 MOD60 with (16) 2.250 diameter x 8.00 foot caged A615 GR75 bolts on a 59.00 inch bolt circle. End plates are required.

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EMERSON.
Network Power

DESIGN CALCULATIONS
FOR A
SPREAD FOOTER FOUNDATION

Tectonic Engineering

120' Monopole

Killingly / 3917 Site

Windham County, CT

EEI Project Number 13781, Revision 0

November 15, 2005

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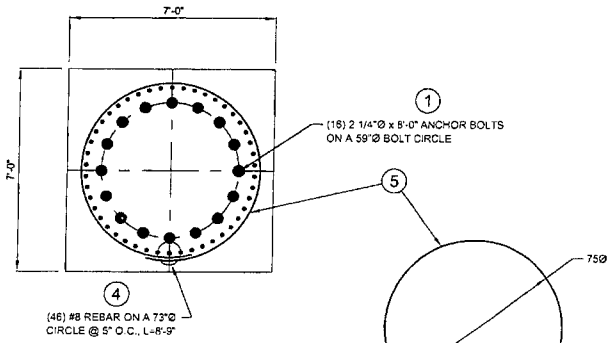
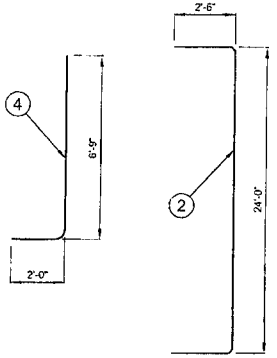


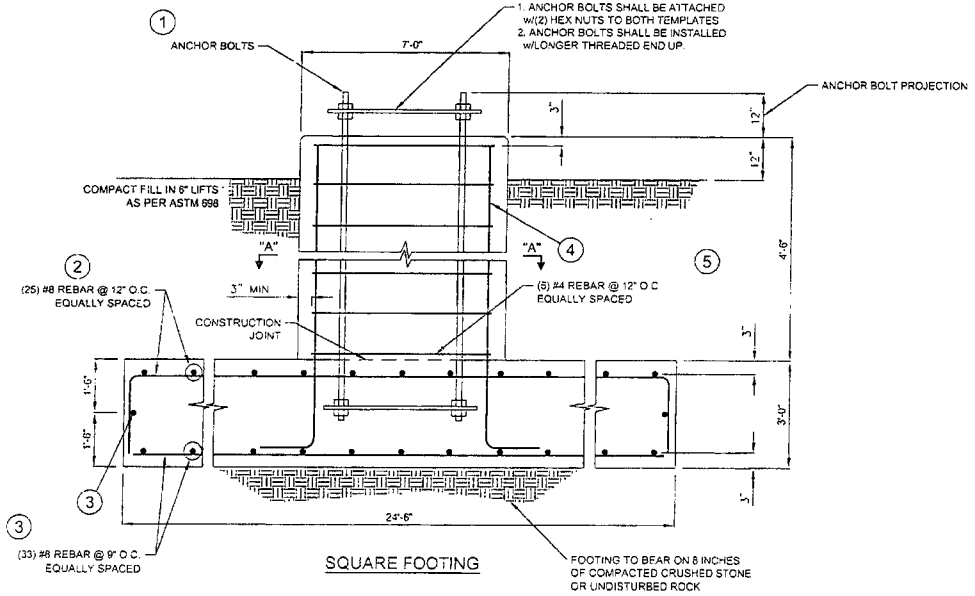
SECTION "A-A"



FOUNDATION LOADING	
MOMENT	2776.4 kip-ft
SHEAR	31.8 kips
AXIAL	29.3 kips

MATERIAL LIST		
ITEM	QTY.	DESCRIPTION
1	18	2 1/4"Ø x 8'-0" (A615-GR.75) ANCHOR BOLTS
2	50	#8 REBAR x 29'-0" (ASTM A615-GR.60)
3	70	#8 REBAR x 24'-0" (ASTM A615-GR.60)
4	46	#8 REBAR x 8'-9" (ASTM A615-GR.60)
5	5	#4 REBAR x 21'-9" (ASTM A615-GR.60)

VOL. CONCRETE @ 4000 psi (TYPE II CEMENT)	74.9 yd^3
STEEL (ASTM A615-GR.60)	11300.3 lbs



SQUARE FOOTING

GENERAL NOTES:

1. FOUNDATION DESIGN IS BASED ON THE EEI JOB NUMBER 13781 AND DRAWING NUMBER GS56036. THE SOIL REPORT WAS PROVIDED BY TECTONIC ENGINEERING & SURVEYING CONSULTANTS, P.C REFER TO REPORT NUMBER 3917.KILLINGLY DATED 11/7/05.
2. FOUNDATION EMBEDMENT IS SHOWN FROM THE GROUND LEVEL AT THE TIME OF SOIL INVESTIGATION AS DEPICTED IN THE SOIL REPORT. SHOULD THE ACTUAL SOIL CONDITIONS DIFFER FROM THOSE IN THE REPORT, THE GEOTECHNICAL ENGINEER AND FOUNDATION DESIGNER SHOULD BE NOTIFIED IN ORDER TO RE-EVALUATE THE FOUNDATION DESIGN.
3. SOIL REPORT SHOULD BE CONSULTED PRIOR TO CONSTRUCTION. STEEL CASING OR SLURRY METHOD MAY BE REQUIRED TO PREVENT SOIL FROM CAVING DURING CONSTRUCTION. THE CASING SHOULD BE REMOVED AFTER COMPLETION OF CONCRETING OR, IF LEFT IN THE GROUND, ALL VOIDS AROUND THE CASING SHALL BE FILLED WITH PRESSURIZED GROUT. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
4. FOUNDATION EXCAVATION SHALL BE INSPECTED PRIOR TO PLACEMENT OF REINFORCEMENT AND ANCHOR BOLTS.
5. SPECIAL INSPECTION OF REINFORCEMENT, ANCHOR BOLT INSTALLATION, AND CONCRETE IS REQUIRED PER 2003 IBC. FOUNDATION REINFORCEMENT AND ANCHOR BOLTS SHALL BE INSPECTED PRIOR TO PLACEMENT.
6. REINFORCING STEEL SHALL COMFORM TO ASTM A615-87, Fy=60 ksi. REINFORCEMENT SHALL BE ASSEMBLED USING STEEL WIRE. WELDING IS NOT PERMITTED. MINIMUM SPLICE LENGTH: FOR No. 6 BARS AND SMALLER - 44 x Ø bar; FOR No. 7 BARS AND LARGER - 65 x Ø bar. HORIZONTAL TIES SHALL BE STAGGERED WITH NO MORE THAN 50% OF SPLICES IN ONE PLACE.
7. CONCRETE MIX DESIGN AND CONSTRUCTION PROCEDURE SHALL BE IN COMPLIANCE WITH ACI 318-02, ACI 336.3R-93, AND ALL APPLICABLE STATE AND LOCAL CODES
   a. MINIMUM COMPRESSIVE STRENGTH - 4000 psi AT 28 DAYS. USE TYPE II CEMENT UNLESS STATED OTHERWISE
   b. CONCRETE MIX SHOULD HAVE A SLUMP OF 7" (±1") FOR DRILLED PIER AND 3" (±1") FOR MAT FOUNDATIONS.
   c. FOR DRILLED PIERS ONLY THE CONCRETE OVER THE ENTIRE LENGTH OF ANCHOR BOLTS SHALL BE VIBRATED. FOR MAT FOUNDATIONS ALL CONCRETE SHALL BE VIBRATED
8. ANCHOR BOLT ORIENTATION REQUIRED PRIOR TO CONCRETE PLACEMENT. THE CONTRACTOR SHOULD CONSULT THE SITE PLAN AND MONOPOLE DRAWING FOR PROPER ACCESS PORT ORIENTATION

REV	DESCRIPTION	DATE	DWN	CHK
0	COMPLETED DRAWING	11/15/2005	J.P.	

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TECTONIC ENGINEERING
120'-0" MONOPOLE
KILLINGLY / 3917
WINDHAM COUNTY, CT

SCALE: N.T.S.	PROJECT NO	13781	
SHEET 1 of 1	DRAWING NO.	S13781-120.0	

FOUNDATION DESIGN CALCULATIONS FOR A SPREAD FOOTER FOUNDATION

ENGINEERED ENDEAVORS INCORPORATED

ENGINEERED ENDEAVORS INCORPORATED
*7610 Jenther Drive * Mentor, Ohio 44060*
*Tel:(440)918-1101 * Fax:(440)918-1108*

CUSTOMER: TECTONIC ENGINEERING
STRUCTURE: 120' MONOPOLE
JOB NUMBER: 13781
LOCATION: WINDHAM COUNTY, CT
SITE NAME: KILLINGLY

SERVICE LOADS AT BASE OF THE MONOPOLE

DESIGN LOADING	
MOMENT	2776.4 ft-kips
SHEAR	31.8 kips
AXIAL	29.3 kips

ANCHOR BOLTS

QUANTITY	16.0
LENGTH	8.0 ft
BOLT CIRCLE	59.0 in
PROJECTION	12.0 in

FOUNDATION PARAMETERS

MINIMUM PEDESTAL WIDTH	79.0 in
PEDESTAL PROJECTION	12.0 in
MINIMUM FOUNDATION HEIGHT	7.5 ft

	HEIGHT	WIDTH
FOOTING	3.00 ft	24.50 ft
PEDESTAL	4.50 ft	7.00 ft

SOIL UNIT WEIGHT	100 pcf
CONCRETE WEIGHT	150 pcf
ANGLE OF FRICTION	30 degrees

FOUNDATION WEIGHT	303.19 kips
CONCRETE VOLUME	74.86 yds^3
SOIL WEIGHT	229.50 kips
TOTAL VERTICAL LOAD	561.99 kips
KERN OF ECCENTRICITY	4.08 ft
ACTUAL ECCENTRICITY	5.36 ft
OVERTURNING MOMENT	3014.9 ft-kips
RESISTING MOMENT	6884.3 ft-kips
ALLOWABLE GROSS SOIL PRESSURE	0.0 ksf
ALLOWABLE NET SOIL PRESSURE	8.0 ksf

H= 3.50
B= 28.54

		GROSS	NET
SOIL PRESSURE	MAXIMUM q=	2.22 ksf	1.33 ksf
	MINIMUM q=	0.00 ksf	

SAFETY FACTOR **Sf = 2.28**

ULTIMATE STRENGTH DESIGN OF FOOTING

CONCRETE, psi	3000
STEEL, KSI	60

SHEAR IN FOOTING

1. CASE I -DEAD LOAD, TWO-WAY SHEAR U= 1.4*D

Ultimate Vertical Load, kips		786.78	
Ultimate Pressure, ksf		1.31	
Ultimate shear V, kips		**668.48**	
Design shear Vn, kips		**2547.57**	O.K.

2. CASE II - WIND LOAD, ONE-WAY SHEAR U=0.9*D+1.6*W

Ultimate Moment, kip-ft		4823.84	
Ultimate Vertical Load, kips		505.79	
Eccentricity, ft		9.54	
Ultimate Pressure, ksf	qult=	5.07	
Dist. from edge to critical sect., ft		6.25	
Pressure distance ft	c=	8.14	
Pressure @ critical section, ksf		1.18	
Ultimate Shear, kips		**478.56**	
Design Shear, kips		**821.26**	O.K.

FLEXURE STRENGTH DESIGN

Ultimate Moment, kip-ft		Case I	1229.34		
		Case II	3053.58	q1=	0.00
Coefficient of Resistance		Rn=	153.9		
Reinforcement Ratio		r=	0.00265		
Min. Reinforcement Ratio		r min	0.00180		
Min. Steel Area, sq.in.		A1	23.35		
Type of Bars		#	8		
		Ab,in^2=	0.79		
BOTTOM	Min. Number of Bars		29.55		
	Actual Number of Bars		33.00		
	Actual Steel Area, sq.in.		26.07		
	Steel Ratio Actual	ra=	0.00296		
	Revised Coef of Resist	Rn=	177.33		
	Design Moment, kip-ft		**3519.14**		
	Horizontal Spacing, in	shor=	9.00		
TOP	Min. Steel Area, sq.in		15.88		
	Min. Number of Bars		20.10		
	Actual Number of Bars		25.00		
	Top Steel Area, sq.in		19.75		
	Horizontal Spacing, in	shor=	12.00		

PEDESTAL DESIGN

Pedestal Width, in		84	Ultim. Moment	4671.2	
Concrete, ksi		3			
Reinforcement, ksi		60			
Rebars , #8	Q-ty	46	Area, sq.in	0.79	
Design Rebars	Q-ty	12	Area, sq.in	3.03	
Minimum reinforcement ratio		0.0050	Rebar space, ir	5.05	
Actual reinforcement ratio		0.0052			
Concrete cover , in		4.5			
Rebar layout radius, in		37.00			

Bending about the major axis

No.	Angle, deg	Coord., in	Edge Dist., in	No.	Angle, deg	Coord., in	Edge Dist., in
1	0	37.00	5.00	7	180	-37.00	79.00
2	30	32.04	9.96	8	210	-32.04	74.04
3	60	18.50	23.50	9	240	-18.50	60.50
4	90	0.00	42.00	10	270	0.00	42.00
5	120	-18.50	60.50	11	300	18.50	23.50
6	150	-32.04	74.04	12	330	32.04	9.96

Location of neutral axis c=, ir **8.786**
Compression zone, a= **7.47**

	No.	e	Force *kips*
	1	0.0013	105.81
eu= 0.003			
Concrete, kips			1599.67
Total compression			**1705.48**

Tension zone	No.	e	Force *kips*
	2	0.0004	35.12
ey= 0.00207	3	0.0050	181.70
	4	0.0113	181.70
	5	0.0177	181.70
	6	0.0223	181.70
	7	0.0240	181.70
	8	0.0223	181.70
	9	0.0177	181.70
	10	0.0113	181.70
	11	0.0050	181.70
	12	0.0004	35.12
Total tension, kips			**1705.53**

Moment due to compression

Rebars	Force *kips*	Mom. Arm. *in*	Moment *k-ft*
1	105 81	37.00	326.24
Concrete	1599.67	38.27	5101.06
Total in compressior			**5427.31**

Moment due to tension

Rebars	Force *kips*	Mom. Arm. *in*	Moment *k-ft*
2	35.12	32.04	-93.77
3	181.70	18.50	-280.12
4	181.70	0.00	0.00
5	181.70	-18.50	280.12
6	181.70	-32.04	485.18
7	181.70	-37.00	560.24
8	181.70	-32.04	485.18
9	181.70	-18.50	280.12
10	181.70	0.00	0.00
11	181.70	18.50	-280.12
12	35.12	32.04	-93.77
Total in tension			**1343.07**

Design moment about the major axis, kip-f 6093.34

Bending about the diagonal

No.	Angle, deg phi	Coord., in c1	Edge Dist., in di
1	0	37.00	22.40
2	30	32.04	27.35
3	60	18.50	40.90
4	90	0.00	59.40
5	120	-18.50	77.90
6	150	-32.04	91.44
7	180	-37.00	96.40
8	210	-32.04	91.44
9	240	-18.50	77.90
10	270	0.00	59.40
11	300	18.50	40.90
12	330	32.04	27.35

Location of neutral axis c=, in **28.08**

Compression zone, a= **23.87**

		No.	e	Force kips
		1	0.000607161	45.60
eu=	0.003	2	7.75609E-05	6.81
		12	7.75609E-05	6.81

Tension zone		No.	e	Force kips
		2		
		3	0.0014	120.26
ey=	0.00207	4	0.0033	181.70
		5	0.0053	181.70
		6	0.0068	181.70
		7	0.0073	181.70
		8	0.0068	181.70
		9	0.0053	181.70
		10	0.0033	181.70
		11	0.0014	120.26
		12		

	Concrete, kips	1452.69	
	Total compression	**1511.91**	**Total tension, kips** **1512.414**

Moment due to compression

Rebars	Force kips	Mom. Arm. in	Moment k-ft
1	45.60	37.00	140.60
2	6.81	32.04	18.19
12	6.81	32.04	18.19
Concrete	1452.69	51.44	6227.31

Total in compressior **6404.28**

Moment due to tension

Rebars	Force kips	Mom. Arm. in	Moment k-ft
3	120.26	18.50	-185.40
4	181.70	18.50	-280.12
5	181.70	0.00	0.00
6	181.70	-18.50	280.12
7	181.70	-37.00	560.24
8	181.70	-32.04	485.18
9	181.70	-18.50	280.12
10	181.70	0.00	0.00
11	120.26	18.50	-185.40

Total in tension **954.75**

Design Moment, kip-ft **6623.13**

Pedestal Design Moment, kip-ft **6093.34**

Site Name	Danielson South, CT	Site #	
Latitude	41-46-17.5 N	Longitude	71-51-20.6 W
		GEL (Feet)	303'

New Cell Info			
850 MHz Cellular Site Info	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Modcell 4.0B	Modcell 4.0B	Modcell 4.0B
ANTENNA TYPE	LPA 80080/6CF	LPA 80080/6CF	LPA 80080/6CF
QUANTITY PER FACE	2	2	2
ORIENTATION	60 DEG	180 DEG	300 DEG
DOWN TILT (DEG.)	4 Deg Mec + 0 Deg Elec	2 Deg Mec + 0 Deg Elec	6 Deg Mec + 0 Deg Elec
RAD CTR (FT AGL)	100	100	100
TOWER MOUNTED AMPS (QTY)	NA	NA	NA

New Cell Info			
1900 MHz PCS Site Info	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-185085/12CF_2	BXA-185085/12CF_2	BXA-185085/12CF_2
QUANTITY PER FACE	1	1	1
ORIENTATION	60 DEG	180 DEG	300 DEG
DOWN TILT (DEG.)	0 Deg Mec + 2 Deg Elec	0 Deg Mec + 2 Deg Elec	0 Deg Mec + 2 Deg Elec
RAD CTR (FT AGL)	100	100	100
TOWER MOUNTED AMPS (QTY)	NA	NA	NA

New Cell Info			
700 MHz LTE Site Info	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	TBD	TBD	TBD
ANTENNA TYPE	BXA-70063/6CF	BXA-70063/6CF	BXA-70063/6CF
QUANTITY PER FACE	1	1	1
ORIENTATION	60 DEG	180 DEG	300 DEG
DOWN TILT (DEG.)	4 Deg Mec + 0 Deg Elec	2 Deg Mec + 0 Deg Elec	6 Deg Mec + 0 Deg Elec
RAD CTR (FT AGL)	100	100	100
TOWER MOUNTED AMPS (QTY)	NA	NA	NA

Cable

FEEDLINE SIZE	1 5/8"	FEEDLINE LENGTH	190'	JUMPER SIZE	1/2"	JUMPER LENGTH	6'

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A_1	800	Tx1/Rx0	RED	A_7	800	Tx2/Rx0	BLUE	A_{13}	800	Tx3/Rx0	GREEN
A_2	1900	Tx1/Rx0	RED/WHITE	A_8	1900	Tx2/Rx0	BLUE/WHITE	A_{14}	1900	Tx3/Rx0	EN/WHITE
A_3	1900	Tx4/Rx1	RED/RED/WHITE	A_9	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A_{15}	1900	Tx6/Rx1	/GREEN/WHITE
A_4	700	Tx1/Rx0	RED/ORANGE	A_{10}	700	Tx2/Rx0	BLUE/ORANGE	A_{16}	700	Tx3/Rx0	GREEN/ORANGE
A_5	700	Tx1/Rx0	RED/ORANGE	A_{11}	700	Tx2/Rx0	BLUE/ORANGE	A_{17}	700	Tx3/Rx0	GREEN/ORANGE
A_6	800	Tx4/Rx1	RED/RED	A_{12}	800	Tx5/Rx1	BLUE/BLUE	A_{18}	800	Tx6/Rx1	GREEN/GREEN

APPROVALS	INITIALS	DATE
Prepared By : Alex Restrepo > RF Engineer	AR	1/6/2009
Steve Weatherbee > RF Design Manager		
Mark Gauger > Construction Manager		
Sandy Carter > Regulatory Manager		

Slant ±45° Dual Polarized FET Panel 63° / 14.5 dBd
696-900 MHz

BXA-70063/6CF __
When ordering replace "__" with connector type.

Mechanical specifications

Length	1804	mm	71.0	in
Width	285	mm	11.2	in
Depth	114	mm	4.5	in
Depth with z-bracket	154	mm	6.1	in
Weight [4]	7.9	kg	17.0	lbs
Wind Area Fore/Aft	0.51	m^2	5.5	ft^2
Wind Area Side	0.21	m^2	2.2	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	753	N	169	lbf
Side	351	N	79	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

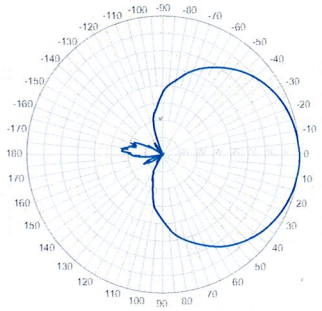
Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.35:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -25 dB
Gain [1]	14.5 dBd 16.5 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	11°
Electrical downtilt [5]	0°
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

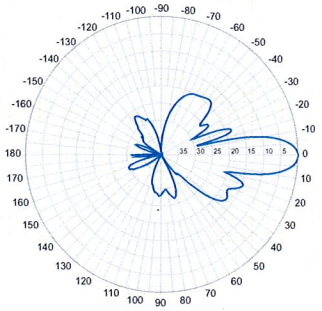
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern[1]
750 MHz

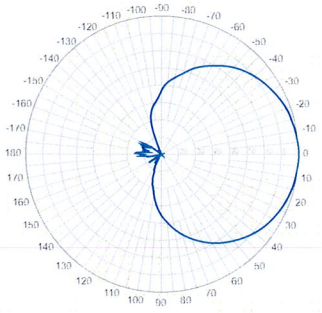


Horizontal

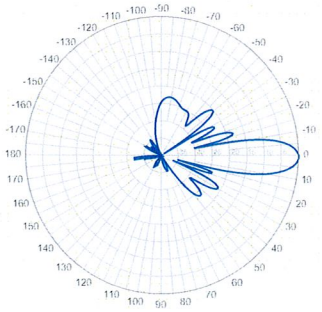


Vertical

850 MHz

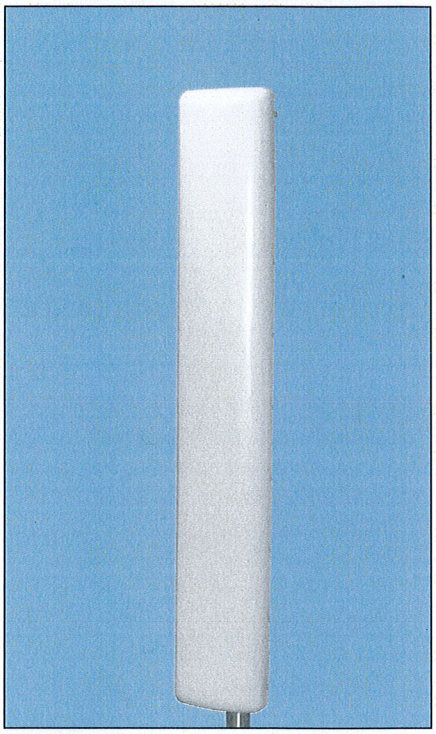


Horizontal



Vertical

696-900 MHz



Featuring our Exclusive 3T Technology™ Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

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

Revision Date: 01/08/09

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

Amphenol Antel, Inc. The Antenna Technology Company

Slant +/- 45° Dual Polarized, Panel 85° / 18 dBi

BXA-185085/12CF __ 2°

When ordering replace "___" with connector type.

Mechanical specifications

	Length	1840 mm	72.4 in
	Width	154 mm	6.1 in
	Depth	105 mm	4.1 in
	Depth with t-bracket	133 mm	5.2 in
4)	Weight	5.9 kg	13.0 lbs
	Wind Area		
	Fore/Aft	0.28 m^2	3.1 ft^2
	Side	0.19 m^2	2.1 ft^2
	Rated Wind Velocity (Safety factor 2.0)	>201 km/hr	>125 mph
	Wind Load @ 100 mph (161 km/hr)		
	Fore/Aft	460 N	103.4 lbs
	Side	304 N	68.3 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).

Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtilt bracket kit includes the mounting bracket kit.

Electrical specifications

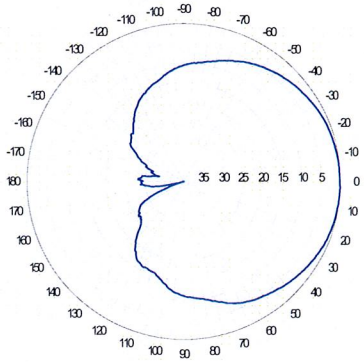
	Frequency Range	1850-1990 MHz
	Impedance	50Ω
3)	Connector(s)	NE or E-DIN 2 ports / center
1)	VSWR	≤ 1.4:1
	Polarization	Slant ± 45°
1)	Isolation Between Ports	< -30 dB
1)	Gain	18 dBi
2)	Power Rating	250 W
1)	Half Power Angle	
	H-Plane	85°
	E-Plane	5°
1)	Electrical Downtilt	2°
1)	Null Fill	5%
	Lightning Protection	Direct Ground

Patented Dipole Design: U.S. Patent No. 6,597,324 B2

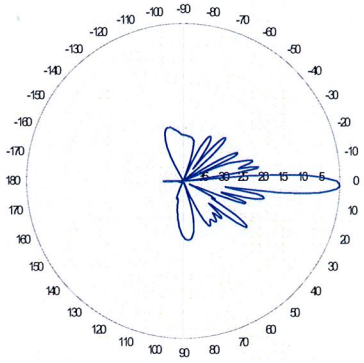
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

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

Radiation pattern[1)]



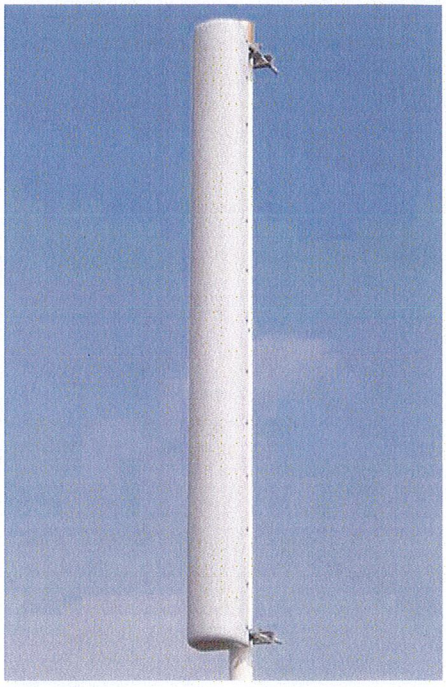
Horizontal



Vertical

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

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

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

Antenna available with center-fed connectors only.

CF Denotes a Center-Fed Connector.

1850-1990 MHz

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

Revision Date: 7/11/07

Vertically Polarized, Log Periodic 80° / 14 dBd

LPA-80080/6CF ___

When ordering replace "___" with connector type.

Mechanical specifications

	Length	1800 mm	70.9 in
	Width	140 mm	5.5 in
	Depth	335 mm	13.2 in
	Depth with z-bracket	375 mm	14.8 in
4)	Weight	9.5 kg	21.0 lbs
	Wind Area		
	Fore/Aft	0.25 m^2	2.7 ft^2
	Side	0.60 m^2	6.5 ft^2
	Rated Wind Velocity (Safety factor 2.0)	>295 km/hr	>183 mph
	Wind Load @ 100 mph (161 km/hr)		
	Fore/Aft	415 N	93.3 lbs
	Side	870 N	195.6 lbs

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

Mounting and Downtilting

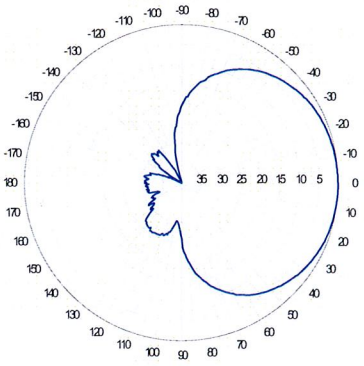
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit #21699999

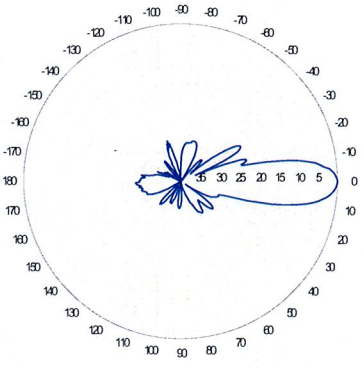
Electrical specifications

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

Radiation pattern1)



Horizontal

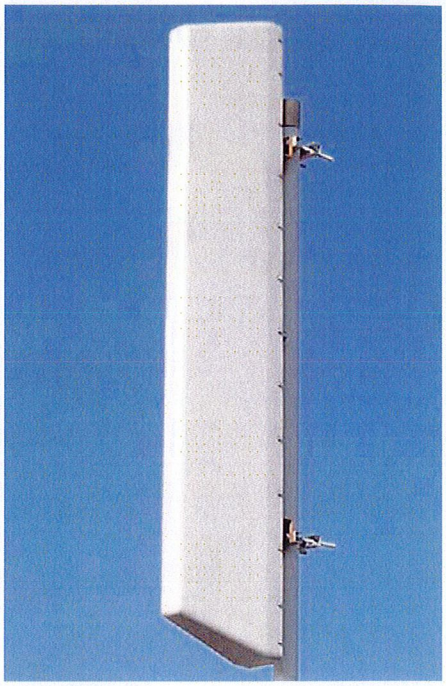


Vertical

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

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

Antenna available with center-fed connector only.

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

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

CF Denotes a Center-Fed Connector.

806-960 MHz

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The Antenna Technology Company

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Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Revision Date: 7/5/07

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 9, 2009

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

RE: **EM-VER-069-090217** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 280 Ross Road, Danielson, Connecticut

Dear Attorney Baldwin:

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

- The foundation shall be analyzed for adequacy and reinforced if necessary to achieved a post-construction foundation rating of not more than 100 percent; and

- A signed letter from a Professional Engineer shall be submitted to the Council to certify that a post-construction foundation rating of not more than 100 percent has been achieved.

The proposed modifications are to be implemented as specified here and in your notice dated February 17, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

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

February 17, 2009

The Honorable Janice Thurlow
Chairman Town Council
Town of Killingly
Town Office Building
172 Main Street
P. O. Box 6000
Danielson, CT 06239-6000

RE: **EM-VER-069-090217** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify existing telecommunications facilities located at 280 Ross Road, Danielson, Connecticut.

Dear Ms. Thurlow:

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

If you have any questions or comments regarding this proposal, please call me or inform the Council by February 24, 2009.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: Roger Gandolf, Zoning Officer, Town of Killingly
Bruce E. Benway, Town Manager, Town of Killingly

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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

EM-VER-069-090217

ORIGINAL

February 17, 2009

Via Hand Delivery

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

Re: **Notice of Exempt Modification**
280 Ross Road, Danielson, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") intends to install antennas on an existing monopole tower owned by AT&T Wireless ("AT&T") and located at 280 Ross Road in the Danielson section of Killingly, Connecticut. Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, of 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 Bruce E. Benway, Town Manager of the Town of Killingly. Pursuant to a Council directive, a copy of this letter is also being sent to representatives of the Snake Meadow Club, Inc., the owner of the property on which the tower is located.

The existing facility consists of a 120-foot monopole tower capable of supporting multiple carriers at 280 Ross Road in Danielson. The tower is shared by AT&T with antennas at the 120-foot level; and T-Mobile with antennas at the 109-foot level on the tower.

Cellco intends to install six (6) LPA 80080/6CF antennas; and three (3) BXA-185085/12CF_2 antennas, all at the 100-foot level on the tower. Associated equipment, including a diesel-fueled back-up generator, would be located in a 12' x 30' equipment shelter installed near the base of the tower. Attached behind Tab 1 are Project Plans for the proposed Cellco facility.

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

1. The proposed modification will not increase the overall height of the existing tower. Cellco's antennas will be mounted with their centerline at the 100-foot level on the 121-foot tower.

2. The proposed installation of Cellco's equipment shelter will not require an extension of the fenced compound or the lease area.

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

4. The operation of the antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. The RF power density calculations for Cellco antennas would be 41.69% of the FCC standard. A power density calculations table is included behind Tab 2.

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

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

Sincerely,

Kenneth C. Baldwin

Attachments
Copy to:
Bruce E. Benway, Killingly Town Manager
Snake Meadow Club, Inc.
Sandy M. Carter
Michelle Kababik

CELLCO PARTNERSHIP
DBA
verizon wireless

DANIELSON S CT

280 ROSS ROAD
DANIELSON, CONNECTICUT 06239

GENERAL NOTES

1. THE TYPE, DIMENSIONS, MOUNTING HARDWARE, AND POSITIONS OF ALL PROJECT OWNER'S EQUIPMENT ARE SHOWN IN ILLUSTRATIVE FASHION. THESE DRAWINGS ARE NOT INTENDED FOR CONSTRUCTION. ACTUAL HARDWARE DETAILS AND FINAL LOCATIONS MAY DIFFER SLIGHTLY FROM WHAT IS SHOWN.

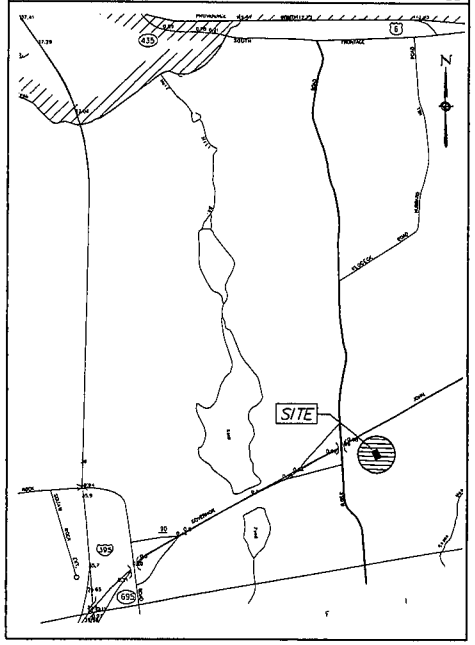
2. THE PROJECT OWNER'S PCS FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

3. THE DESIGN OF THE ANTENNA MOUNTING HARDWARE WILL MEET THE ANSI/EIA/TIA-222-F STANDARDS FOR STRUCTURAL STEEL ANTENNA SUPPORTING STRUCTURES AND STATE BUILDING CODE REQUIREMENTS. DETAILED CONSTRUCTION DRAWINGS AND STRUCTURAL CALCULATIONS WILL BE PREPARED BY A REGISTERED PROFESSIONAL ENGINEER AND SUBMITTED WITH A BUILDING PERMIT APPLICATION FOR REVIEW AND APPROVAL BY THE LOCAL BUILDING CODE ENFORCEMENT OFFICIAL.

4. ONCE THE FACILITY BECOMES FULLY OPERATIONAL, NORMAL AND ROUTINE MAINTENANCE BY PROJECT OWNER'S TECHNICIANS WILL BE PERFORMED ON A MONTHLY BASIS. THEREFORE, THE ESTIMATED VEHICLE TRIP GENERATION RATE IS 2 TRIPS PER MONTH. THE AVERAGE DAILY TRIP GENERATION RATE (ADT) IS 0.07.

VICINITY MAP

NO SCALE



PROJECT SUMMARY

SITE NAME:	DANIELSON S CT
SITE ADDRESS:	280 ROSS ROAD DANIELSON, CONNECTICUT 06239
CONTACT PERSON:	VERIZON WIRELESS BRIAN RAGOZZINE (860) 982-4246
TOWER OWNER:	AT&T 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
GOVERNING CODE:	CONNECTICUT BUILDING CODES CONNECTICUT LIFE SAFETY CODES
JURISDICTION:	CONNECTICUT SITING COUNCIL
APPLICANT:	VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT. 06108
ARCHITECT:	URS CORPORATION A.E.S. 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067
M/E/P ENGINEER:	URS CORPORATION A.E.S. 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067
LATITUDE:	41° 48' 17.5" NAD 83
LONGITUDE:	-71° 51' 20.6" NAD 83

LEGEND

SYMBOL	DESCRIPTION
	SECTION OR DETAIL NUMBER SHEET WHERE DETAIL/SECTION OCCURS
	ELEVATION NUMBER SHEET WHERE ELEVATION OCCURS

ABBREVIATIONS

MIN.	MINIMUM
V.I.F.	VERIFY IN FIELD
O.C.	ON CENTER
PSF	POUND/SQUARE FOOT
TYP.	TYPICAL
TOC	TOP OF CONCRETE
TOW	TOP OF WALL
FT.	FEET
SQ.FT.	SQUARE FEET
N/A	NOT APPLICABLE

SHEET INDEX

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET - GENERAL NOTES AND LEGENDS
SC-1	COMPOUND PLAN, ELEVATION AND ANTENNA ORIENTATION PLAN

CELLCO PARTNERSHIP
DBA
verizon wireless

A&E FIRM
URS CORPORATION AES
500 ENTERPRISE DRIVE
SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

A&E SEAL

SITE NAME: DANIELSON S CT
PROJECT ID: 2006166945
PROJECT TYPE: BLGCO
LOCATION CODE: 171758
SITE ADDRESS:
280 ROSS ROAD
DANIELSON, CONNECTICUT
06239

PROJECT NO: 36931164
JOB NO: VZ5-017
DRAWN BY: KAP
CHECKED BY: MJE

ISSUED FOR

A	02-16-09	REVIEW

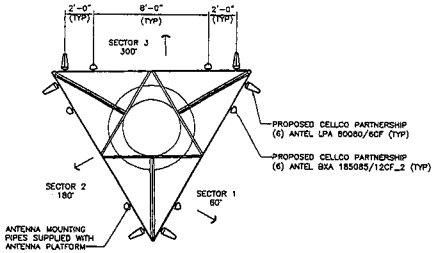
DANIELSON S CT

280 ROSS ROAD
DANIELSON, CONNECTICUT
06239

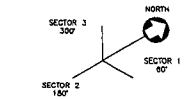
SCALE: AS NOTED

TITLE SHEET - GENERAL NOTES AND LEGENDS

T-1

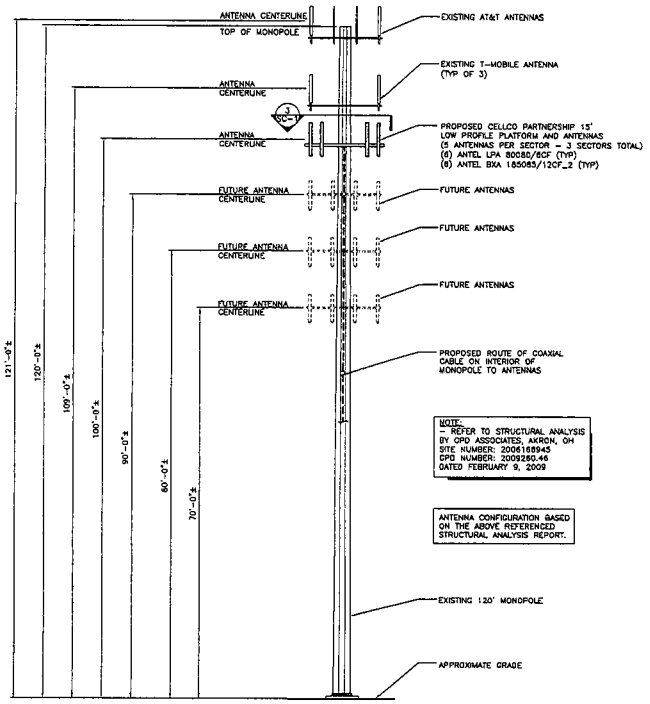


3 SC-1 ANTENNA ORIENTATION PLAN
SCALE: N.T.S.

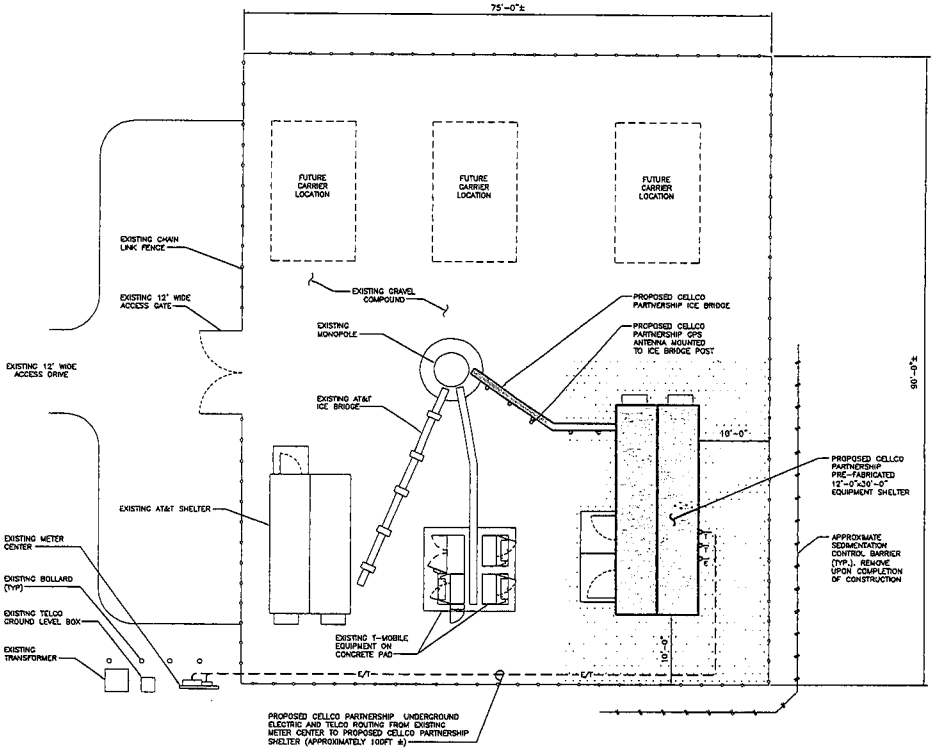


ANTENNA ORIENTATION KEY

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
LEASE LINE		
CHAIN LINK FENCE		
CONTOUR LINES	123	
UNDERGROUND UTILITIES		E/T
UTILITY POLE		
TREE LINE		
SEDIMENTATION FENCE		
SPOT ELEVATION	x 124.5	
WOOD FENCE		



2 SC-1 MONOPOLE ELEVATION
SCALE: 1"=10'-0"
0 5 10 20 30



1 SC-1 COMPOUND PLAN
SCALE: 1/8"=1'-0"
0 2 4 8 16 24

SITE PLAN INFORMATION

THIS SITE PLAN DRAWING WAS COMPILED FROM DATA COLLECTED IN THE FIELD AND FROM AVAILABLE EXISTING DRAWINGS OF THE SUBJECT AREA.

CELLCO PARTNERSHIP
DBA
verizon wireless

A&E FIRM
UBS CORPORATION AES
500 ENTERPRISE DRIVE
SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

A&E SEAL

SITE NAME: DANIELSON S CT
PROJECT ID: 2006166945
PROJECT TYPE: BLGCO
LOCATION CODE: 171758
SITE ADDRESS:
280 ROSS ROAD
DANIELSON, CONNECTICUT
06239

PROJECT NO: 36931164
JOB NO: VZS-017
DRAWN BY: KAP
CHECKED BY: MJE

ISSUED FOR

A	02-16-09	REVIEW

DANIELSON S CT
280 ROSS ROAD
DANIELSON, CONNECTICUT
06239

SCALE: AS NOTED

COMPOUND PLAN, ELEVATION AND ANTENNA ORIENTATION PLAN

SC-1

	General	Power	Density					
Site Name: Danielson S								
Tower Height: Verizon @ 100ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*New Cingular	6	296	120	0.0443	880	0.5867	7.56%	
*New Cingular	3	427	120	0.0320	1930	1.0000	3.20%	
*T-Mobile	8	193	110	0.0459	1935	1.0000	4.59%	
Verizon	**3**	**433**	**100**	**0.0467**	**1970**	**1.0000**	**4.67%**	
Verizon	**9**	**388**	**100**	**0.1256**	**869**	**0.5793**	**21.67%**	
								41.69%
* Source: Siting Council								

at&t
Glynn Walker
AT&T Mobility
5405 Windward Parkway
Alpharetta, GA 30004
(770) 708-6122

GPD ASSOCIATES
Kevin Clements
520 South Main St., Suite 2531
Akron, Ohio 44311
(330) 572-2195
kclements@gpdgroup.com

GPD# 2009260.46
February 9, 2009

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	**Site USID:**	**85214**
	Site Name:	**KILLINGLY ROSS ROAD**
	Site FA:	**10105809**
VERIZON DESIGNATION:	**Site Name:**	**Danielson South**
	Site Number:	**2006166945**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F & 2003 IBC** **85-mph with 0" ice** **74-mph with 1/2" ice**
SITE DATA:		**280 Ross Rd., Killingly, CT 06239, Windham County** **Latitude 41° 46' 17.544"N, Longitude 71° 51' 20.376"W** **119' Monopole**

Mr. Walker,

GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the addition of the following proposed loading configuration:

Elev. 100' (6) Antel LPA-80080/6CF Antennas on a 13' PiROD Low Profile Platform w/ (6) 1-5/8" internal coax
(6) Antel BXA-185085/12CF Antennas on the same mount w/ (6) 1-5/8" internal coax

Based on our analysis we have determined the design of the **tower is sufficient** for the proposed, existing, and reserved loadings as referenced in Appendix A. However the foundation could not be verified with the information provided.

We at GPD appreciate the opportunity of providing our continuing professional services to you and AT&T. If you have any questions please do not hesitate to call.

Respectfully submitted,

David B. Granger, P.E.
Connecticut #: 17557

STATE OF CONNECTICUT
DAVID B. GRANGER, P.E.
NO. 17557
LICENSED
PROFESSIONAL ENGINEER

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by Verizon to AT&T. This report was commissioned by Mr. Glynn Walker of AT&T.

No foundation or geotechnical information was available or provided for this report. Therefore, the in place capacity of the foundation could not be verified. It is recommended that a site specific geotechnical and foundation exploration be performed in order to complete a foundation analysis.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	25.4 %	Pass
Base Plate	56.0 %	Pass
Anchor Rods	46.4 %	Pass
Foundation	Not Verified	N/A

ANALYSIS METHOD

RISA Tower (Version 5.3.0.1), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information.

DOCUMENTS PROVIDED

Document	Remarks	Source
Preliminary Tower Summary	Verizon Co-location document	Siterra
Site Lease Application	Verizon Application, dated 1/8/09	Siterra
Tower Mapping	GPD Associates and Northeast Towers, Inc., dated 2/5/09	Siterra

ASSUMPTIONS

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

1. The monopole shaft sizes and shape are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations. If no data is available, the foundation system is not verified.
6. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
7. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
8. All existing loading was obtained from the tower mapping by GPD Associates and Northeast Towers Inc., dated 2/5/09, site photos and the provided preliminary tower summary and is assumed to be accurate.
9. All proposed coax is assumed to be internal to the tower.
10. Tower mounted amplifiers are assumed to be installed behind antennas.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Associates should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD ASSOCIATES has performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD ASSOCIATES in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD ASSOCIATES does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD ASSOCIATES provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

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

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD ASSOCIATES, but are beyond the scope of this report.

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

GPD ASSOCIATES makes no warranties, expressed and/or implied in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD ASSOCIATES will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD ASSOCIATES pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	KILLINGLY ROSS ROAD
Site USID	85214
FA #	10105809
Date of Analysis	2/9/2009
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	119	
Tower Manufacturer	n/a	
Tower Model	n/a	
Manufacturer Drawings	n/a	
Foundation Design	n/a	
Geotech Report	n/a	
Tower Mapping	GPD Associates and Northeast Towers, Inc.	2/5/2009
Previous Structural Analysis	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F
Location of Tower (County, State)	Windham, Connecticut
Basic Wind Speed (mph)	85-fastest
Ice Thickness (in)	0.5"
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (%Maximum Usage)

Existing Condition	
Tower	42.4%
Foundation	n/a
Guy Wire	n/a

Note: Foundation is not verified

Proposed Condition	
Tower	56.0%
Foundation	n/a
Guy Wire	n/a

Note: Foundation is not verified

Steel Yield Strength (ksi)

Pole	65
Base Plate	60
Anchor Rods	75

Note: Strengths assumed from experience with similar towers

Existing/Reserved

Antenna							Mount				Transmission Line		
Antenna Owner	Centerline Height (ft)	Quantity	Type	Model	EPA (ft²) each	Azimuth	Quantity	Type	Model	EPA (ft²) total	Quantity	Size	Attachment Leg/Face
AT&T	121	6	Panel	7770.00	6.58	0/120/240	1	13' LP Platform		30.00	12	1-5/8"	Internal
AT&T	121	6	TMA	LGP21401	shielded	0/120/240		behind antennas					
AT&T	121	6	Diplexer	Diplexer	shielded	0/120/240		behind antennas					
AT&T	121	6	BTS Units	BTS Units	shielded	0/120/240		behind antennas					
T-Mobile	109	3	Panel	53" x 12" x 4"	6.65	0/120/240	1	13' LP Platform	PiROD	15.70	12	1-5/8"	Internal
T-Mobile	109	6	TMA	TMA	shielded	0/120/240		behind antennas					

Proposed

Antenna							Mount				Transmission Line		
Antenna Owner	Centerline Height (ft)	Quantity	Type	Model	EPA (ft²) each	Azimuth	Quantity	Type	Model	EPA (ft²) total	Quantity	Size	Attachment Leg/Face
Verizon	100	6	Panel	LPA-80080/6CF	4.32	60/180/300	1	13' LP Platform	PiROD	15.70	6	1-5/8"	Internal
Verizon	100	6	Panel	BXA-185085/12CF	4.70	60/180/300		on same mounts			6	1-5/8"	Internal

Future

Antenna							Mount				Transmission Line		
Antenna Owner	Centerline Height (ft)	Quantity	Type	Model	EPA (ft²) each	Azimuth	Quantity	Type	Model	EPA (ft²) total	Quantity	Size	Attachment Leg/Face
AT&T	121	3	Panel	7770.00	6.58	0/120/240		on existing mount			3	1-5/8"	Internal

Note: Future loading is in addition to the existing loads at that elevation and was considered in the analysis.

APPENDIX B

RISA Tower Output File

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	119.00 - 11.00	15	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	107.00 - 2.50	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	100.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
13' LP Platform	C	None		0.0000	119.00	No Ice	30.00	30.00	1.75
						1/2" Ice	37.50	37.50	2.00
(3) 7770.00 w/Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice	6.58	4.94	0.08
						1/2" Ice	7.21	5.86	0.13
(3) 7770.00 w/Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice	6.58	4.94	0.08
						1/2" Ice	7.21	5.86	0.13
(3) 7770.00 w/Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice	6.58	4.94	0.08
						1/2" Ice	7.21	5.86	0.13
(2) LGP21401	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice	0.00	0.23	0.01
						1/2" Ice	0.00	0.31	0.02
(2) LGP21401	B	From	4.00	0.0000	119.00	No Ice	0.00	0.23	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00 2.00			1/2" Ice	0.00	0.31	0.02
(2) LGP21401	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.23 0.31	0.01 0.02
(2) LGP21903 Diplexer	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.18 0.25	0.01 0.01
(2) LGP21903 Diplexer	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.18 0.25	0.01 0.01
(2) LGP21903 Diplexer	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.18 0.25	0.01 0.01
(2) NextNet BTS-2500	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.96 1.12	0.03 0.04
(2) NextNet BTS-2500	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.96 1.12	0.03 0.04
(2) NextNet BTS-2500	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	119.00	No Ice 1/2" Ice	0.00 0.00	0.96 1.12	0.03 0.04
PiROD 13' Low Profile Platform (Monopole)	C	None		0.0000	107.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
APX16PV-16PVL	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	6.65 7.08	2.00 2.33	0.04 0.07
APX16PV-16PVL	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	6.65 7.08	2.00 2.33	0.04 0.07
APX16PV-16PVL	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	6.65 7.08	2.00 2.33	0.04 0.07
(2) TMA	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	0.00 0.00	0.46 0.58	0.01 0.02
(2) TMA	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	0.00 0.00	0.46 0.58	0.01 0.02
(2) TMA	C	From Centroid-Leg	4.00 0.00 2.00	0.0000	107.00	No Ice 1/2" Ice	0.00 0.00	0.46 0.58	0.01 0.02
PiROD 13' Low Profile Platform (Monopole)	C	None		0.0000	100.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
(2) LPA-80080/6CF	A	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.33 4.76	9.09 9.64	0.02 0.07
(2) LPA-80080/6CF	B	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.33 4.76	9.09 9.64	0.02 0.07
(2) LPA-80080/6CF	C	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.33 4.76	9.09 9.64	0.02 0.07
(2) BXA-185085/12CF	A	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.70 5.15	3.53 3.97	0.01 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) BXA-185085/12CF	B	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.70 5.15	3.53 3.97	0.01 0.04
(2) BXA-185085/12CF	C	From Centroid-Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.70 5.15	3.53 3.97	0.01 0.04

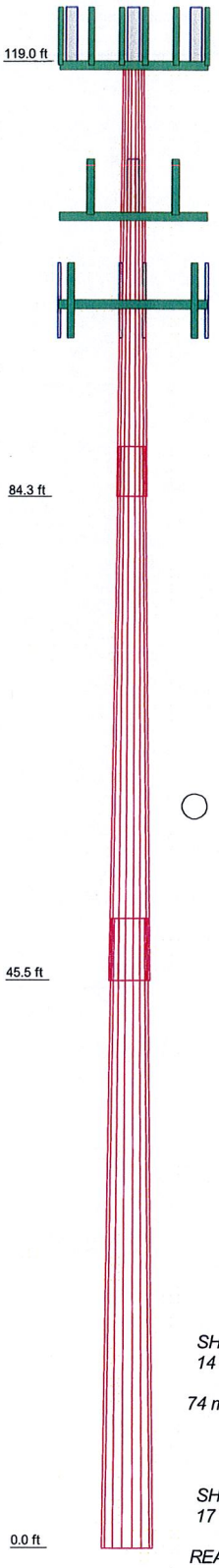
Section Capacity Table

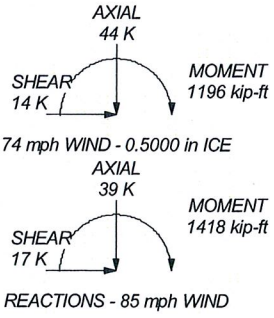
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	119 - 84.33	Pole	TP29.0291x19.1x0.5	1	-10.03	400.89	19.9	Pass
L2	84.33 - 45.5	Pole	TP39.1496x26.8835x0.625	2	-19.97	1245.46	24.7	Pass
L3	45.5 - 0	Pole	TP50.9303x36.4676x0.6875	3	-38.42	3070.39	25.4	Pass
							Summary	
						Pole (L3)	25.4	Pass
						RATING =	**25.4**	**Pass**

APPENDIX C

Tower Elevation Drawing

Section	Length (ft)	Number of Sides	Thickness (in)	Lap Splice (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	34.67	18	0.5000	4.00	19.1000	29.0291		4.4
2	42.83	18	0.6250	5.00	26.8835	39.1496	A572-65	9.4
3	50.50	18	0.6875		36.4676	50.9303		16.1
								29.9





74 mph WIND - 0.5000 in ICE

REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
13' LP Platform	119	APX16PV-16PVL	107
(3) 7770.00 w/Mount Pipe	119	APX16PV-16PVL	107
(3) 7770.00 w/Mount Pipe	119	APX16PV-16PVL	107
(3) 7770.00 w/Mount Pipe	119	(2) TMA	107
(2) LGP21401	119	(2) TMA	107
(2) LGP21401	119	(2) TMA	107
(2) LGP21401	119	PiROD 13' Low Profile Platform (Monopole)	100
(2) LGP21903 Diplexer	119		
(2) LGP21903 Diplexer	119	(2) LPA-80080/6CF	100
(2) LGP21903 Diplexer	119	(2) LPA-80080/6CF	100
(2) NextNet BTS-2500	119	(2) LPA-80080/6CF	100
(2) NextNet BTS-2500	119	(2) BXA-185085/12CF	100
(2) NextNet BTS-2500	119	(2) BXA-185085/12CF	100
PiROD 13' Low Profile Platform (Monopole)	107	(2) BXA-185085/12CF	100

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

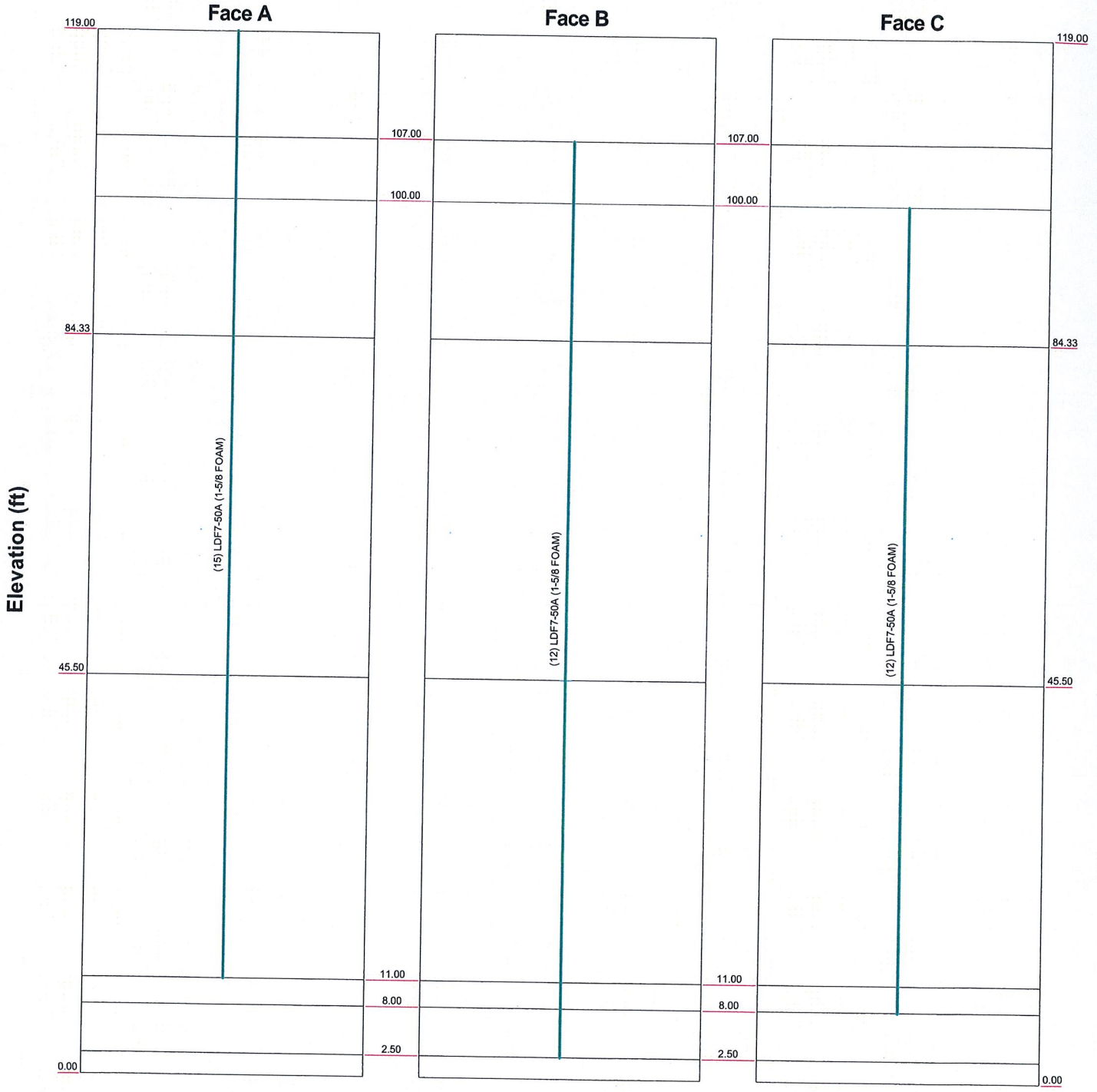
1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 25.4%

GPD GROUP
GPD Associates
520 South Main St. Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job:	***USID: 85214 KILLINGLY ROSS ROAD***		
Project:	***2009260.46***		
Client: AT&T	Drawn by: ZSHEETS	App'd:	
Code: TIA/EIA-222-F	Date: 02/09/09	Scale: NTS	
Path: N:\2009\2009260\46\RISA\85214 Killingly Ross Road.eri		Dwg No. E-1	

Feedline Distribution Chart
0' - 119'

Round | Flat | App In Face | App Out Face | Truss Leg



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Project: ***2009260.46***		
Client: AT&T	Drawn by: ZSHEETS	App'd:
Code: TIA/EIA-222-F	Date: 02/09/09	Scale: NTS
Path: N:\2009\2009260\46\RISA\85214 Killingly Ross Road.eri		Dwg No. E-7

APPENDIX D

Anchor Rod & Base Plate Analysis

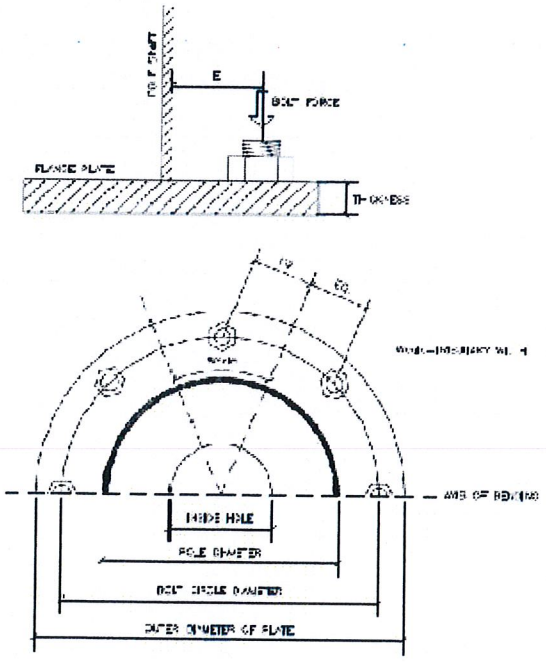
Anchor Rod and Base Plate Stresses
USID: 85214 KILLINGLY ROSS ROAD
2009260.46

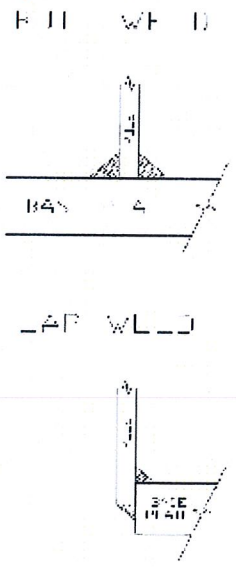
Overturning Moment =	1418.00	k*ft
Axial Force =	39.00	k
Shear Force =	17.00	k

Tower Manufacturer =	Unknown

Anchor Rods		
Pole Diameter =	50.93	in
Number of Rods =	16	
Type =	Upset Rod	
Rod Yield Strength (Fy) =	75	ksi
Rod Circle =	59	in
Rod Diameter =	2	in
Net Tensile Area =	2.50	in^2
Max Tension on Rod =	69.66	kips
Max Compression on Rod =	74.54	kips
Allow. Rod Force =	150.00	kips
Anchor Rod Capacity =	46.4%	OK

Base Plate		
Monopole Shape =	Polygonal	
# Monopole Sides =	18	
Plate Strength (Fy) =	60	ksi
Plate Thickness =	2	in
Base Weld Type =	Butt	
w_{calc} =	10.10	in
e =	3.035	in
w_{max} =	18.14	in
w =	10.10	in
S =	6.74	in^3
fb =	33.59	ksi
Fb =	60	ksi
Base Plate Capacity =	56.0%	OK





GPD Unstiffened Round Base Plate Stress (Rev F) - V1.7