

ORIGINAL

March 11, 2010

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

RECEIVED
MAR 12 2010

CONNECTICUT
SITING COUNCIL

**Re: Notice of Exempt Modification
Clearwire Corporation Notice to make an Exempt Modification to an Existing
Facility at 60 Adams Street, Manchester, CT
Clearwire Site Number CT-HFD0037**

Dear Mr. Phelps,

Pursuant to Conn. Agency Regulations Sections 16-50j-73 and 16-50j-72(b), Clearwire Corporation (Clearwire) hereby gives notice to the Connecticut Siting Council (Council) and the Town of Manchester, CT. of Clearwire's intent to make an exempt modification to an existing monopole tower (tower) located at 60 Adams Street, Manchester, CT. Specifically, Clearwire plans to add three (3) antennas to the tower, one (1) per sector and to add two (2) microwave dishes for backhaul at the 115' AGL. Pursuant to the Council's regulations, (Conn. Agency Regulations Section 16-50j-72(b)), Clearwire's plans do not constitute a modification subject to the Council's review because Clearwire will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards. A copy of this notice has been sent to Town Manager Scott Shanley of the Town of Manchester, CT.

Clearwire is currently developing a 4G wireless broadband network to provide high-speed wireless data and VoIP service within the State of Connecticut. Clearwire's 4G service leverages the WiMAX technology to enable enhanced wireless data communications. In order to accomplish the upgrade at this site, Clearwire plans to add three (3) WiMAX antennas, two (2) dishes and to install additional WiMAX related electronic equipment at the base of the tower.

The tower is a 140' monopole located at 60 Adams Street, Manchester, Connecticut (Latitude 41 47 38.4 N Longitude 72 33 14.7 W). The tower is owned by William B Thompson. Currently, Pagenet, Sprint, Nextel, Cingular and Verizon are located on the tower. Presently, Clearwire is not located at the site. Clearwire's base station equipment will be located on the ground next to the pole. A site plan with the tower elevations and site plan specifications is attached.

Clearwire will add three (3) antennas, one (1) to each sector, and mount two (2) microwave dishes, one (1) above each of those antennas. The center line for the microwave dishes will be 115'. Nine coaxial cables will be added to the structure, 2 per antenna and one per microwave dish. These cables will be inside the tower and bundled. To confirm that the tower

can support these changes, Clearwire commissioned Bay State Design to perform a structural analysis of the tower and the proposed changes. According to that structural dated February 25, 2010 and attached hereto, the structure is sufficient to support the proposed loading and will not need to be modified. The tower, with the additions and the modifications will be at 92.7% of its capacity.

Within the existing compound, Clearwire will install one (1) WiMAX radio and power cabinet on the existing pad at the site. The new equipment will be adjacent to the existing tower. Excluding brief, construction related noise during the addition of this equipment, the proposed changes to the tower will not increase noise levels at the site.

The addition of new WiMAX antennas and microwave dishes will not adversely impact the health and safety of the surrounding community or the people working on the tower. The total radio frequency exposure measured around the base of the tower will be well below the National Council on Radiation Protection and Measurements' (NCRP) standard adopted by the Federal Communications Commission (FCC). The worst case power density analysis for the WiMAX antennas and dishes, measured at the base of the tower, indicates that the WiMAX antennas and dishes will emit .37% of the NCRP's standard for maximum permissible exposure. The cumulative power density analysis indicates that all the antennas on the structure will emit 66.67% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be well below the FCC mandated radio frequency exposure limits in all locations around the base of the tower. The power density analysis is attached.

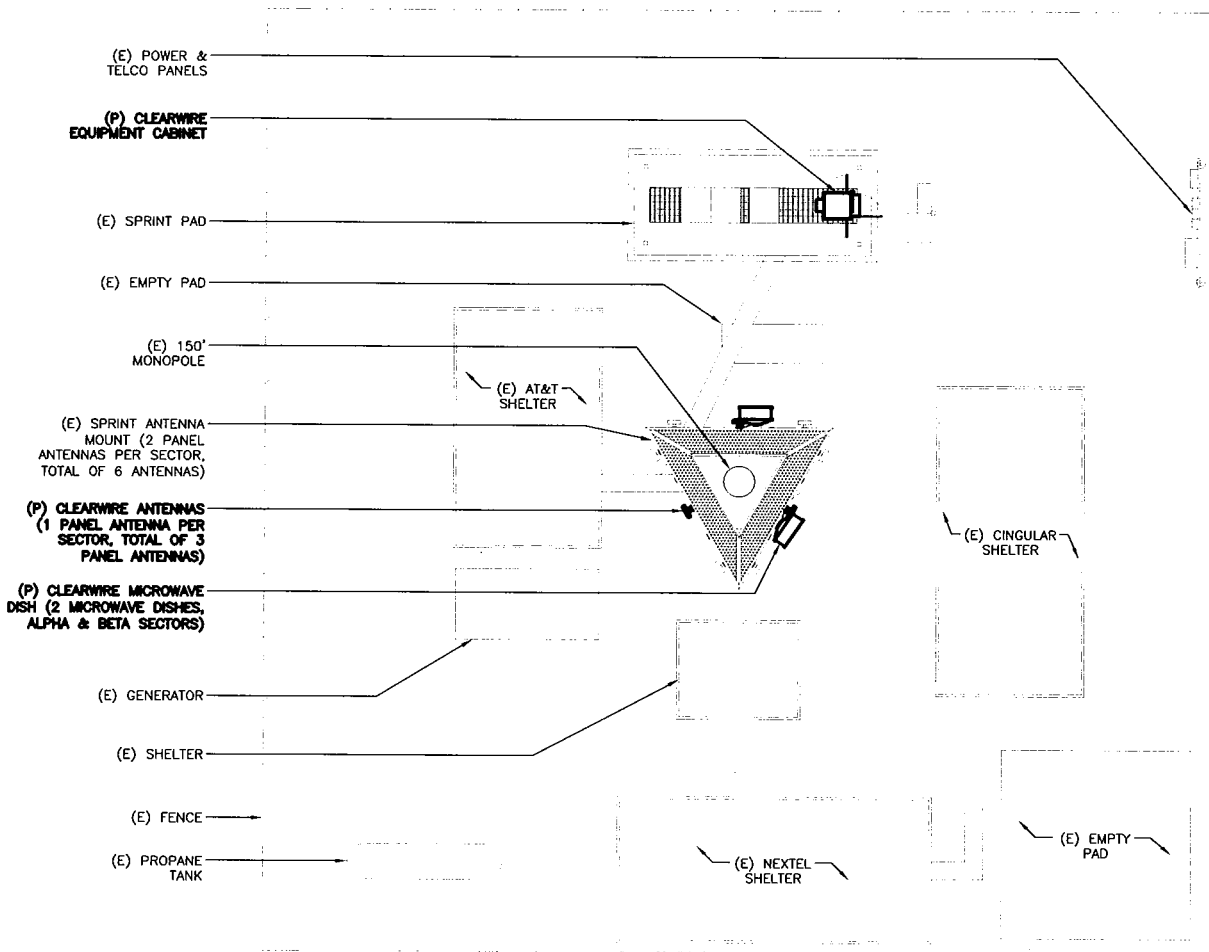
In conclusion, Clearwire's proposed plan to add three (3) WiMAX antennas, two (2) microwave dishes and the associated base station equipment does not constitute a modification subject to the Council's jurisdiction because Clearwire will not increase the height of the tower, will not extend the boundaries of the compound at the site, will not increase the noise levels at the site and the radio frequency electromagnetic radiation power density will stay within all applicable standards.

Respectfully Submitted



Thomas F. Flynn III
Site Development Project Manager
Maxton Technology Inc.
1296 Blue Hills Avenue
Bloomfield, CT 06002
508-821-6974
Tom.Flynn@maxtontech.com
Agent for Clearwire Corporation

Cc: Town Manager Scott Shanley
Town of Manchester



COMPOUND PLAN

SCALE: N.T.S

1

(E) EXISTING
(P) PROPOSED

MIXTON
241 Boston Post Road West
Marlborough, MA 01752
Phone: 508-229-4100
Fax: 508-485-5321

BAY STATE DESIGN
Bay State Design, Inc.
Architects • Engineers
241 Boston Post Road West
Marlborough, MA 01752
Phone: 508-229-4100
Fax: 508-485-5321

clear • e
5808 LAKE WASHINGTON BLVD.
NE SUITE 300
KIRKLAND, WA 98033

PROJECT LOCATION:
MANCHESTER
CT-HFD0037A
60 ADAMS STREET
MANCHESTER, CT 06042

APPROVED BY:

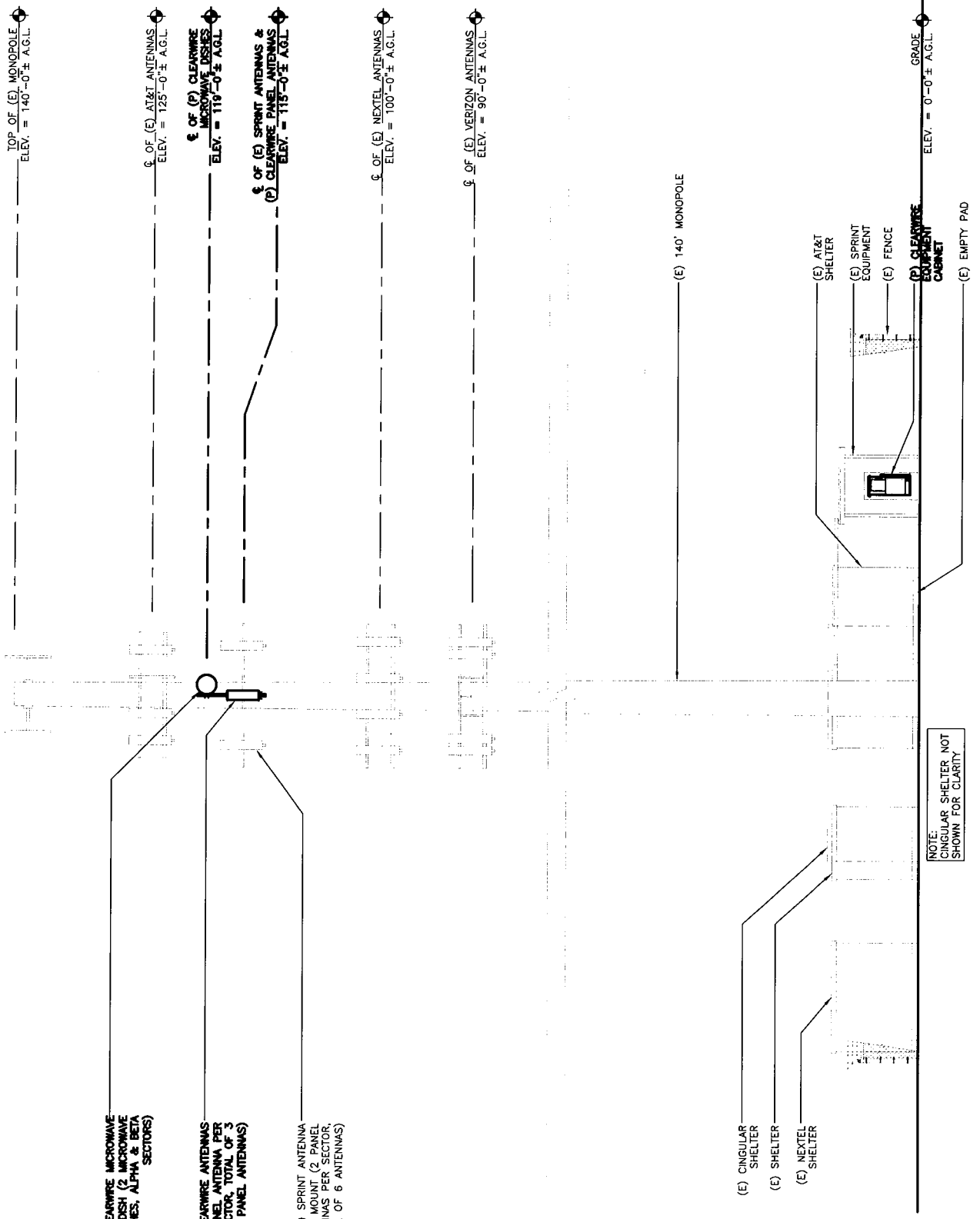
SITE TYPE:
MONOPOLE

PROJECT MANAGER: JP
DRAWN BY: NS

DATE: 02/23/10
REVISION: 1

BSDA PROJ. #:
2908.035

SHEET:
L1



- (P) CLEARWIRE MICROWAVE DISH (2 MICROWAVE DISHES, ALPHA & BETA SECTORS)
- (P) CLEARWIRE ANTENNAS (1 PANEL ANTENNA PER SECTOR, TOTAL OF 3 PANEL ANTENNAS)
- (E) SPRINT ANTENNA MOUNT (2 PANEL ANTENNAS PER SECTOR, TOTAL OF 6 ANTENNAS)

EAST ELEVATION

SCALE: N.T.S

1

(E) EXISTING
(P) PROPOSED

MIXTON
241 Boston Post Road West
Marlborough, MA 01752
Phone: 508-229-4100
Fax: 508-485-5321

BAY STATE DESIGN
Boy State Design, Inc.
Architects • Engineers
241 Boston Post Road West
Marlborough, MA 01752
Phone: 508-229-4100
Fax: 508-485-5321

clearw're
5808 LAKE WASHINGTON BLVD.
NE SUITE 300
KIRKLAND, WA 98033

PROJECT LOCATION:
MANCHESTER
CT-HFD0037A
60 ADAMS STREET
MANCHESTER, CT 06042

APPROVED BY:

SITE TYPE:
MONOPOLE

PROJECT MANAGER:
JP

DATE:
02/23/10

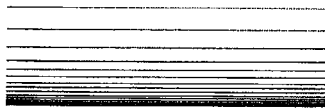
DRAWN BY:
NS

REVISION:
1

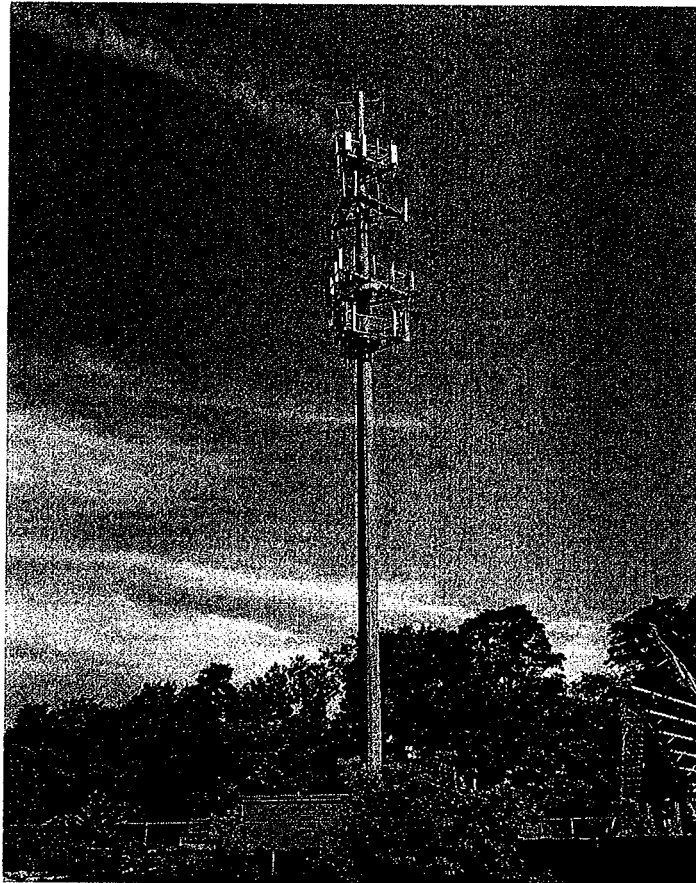
BSDA PROJ. #:
2908.035

SHEET:
L2

BAY STATE
DESIGN



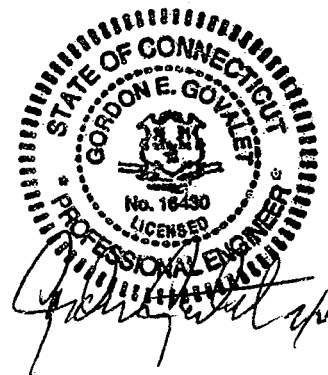
STRUCTURAL ANALYSIS REPORT



clearwire[®]
wireless broadband

Site ID CT-HFD0037A
60 Adams Street
Manchester, CT 06042

February 25, 2010



INTRODUCTION:

The purpose of this analysis is to determine the structural capability of the existing 140' Monopole at 60 Adams Street in Manchester, CT. Clearwire is proposing to add the following equipment to the existing Sprint platform at an elevation of 115':

3	Kathrein Model No. 80410054 Panel Antenna
3	Samsung WiMAX U-RAS Flexible RRU
2	Andrew VHLP 2.5' Microwave Dish

All proposed coax cables are to be run inside the monopole.

ASSUMPTIONS:

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

- Information supplied by the client regarding the structure itself, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of Bay State Design, Inc., or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Bay State Design, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, BSD assumes that all structures were constructed in accordance with the drawings / specifications and are in good condition and have not significantly changed from the "as new" condition.

All services were performed to codes specified by the client. BSD does not imply to have met any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are different from the minimum values recommended by code, the client shall specify the exact requirement.

All services are performed in accordance with generally accepted engineering principles and practices. Bay State Design, Inc., is not responsible for the conclusions, opinions and recommendations made by others based on the information provided.

REFERENCES:

This structural analysis was evaluated using RISA Tower, a general-purpose modeling, analysis, and design program created specifically for communications towers in accordance with the following:

- TIA/EIA 222-F Structural Standards for Steel Antenna Tower and Antenna Supporting Structures
- International Building Code 2003 Edition with the CT Supplement
- CT State Building Code 2005

- Tower Mapping / Inventory conducted by Maxton Technology, Inc. on 2/12/2010
- Original tower / foundation drawings from Engineered Endeavors, Inc. Job # 4795 dated 3/23/1999
- Previous structural analysis conducted for AT &T prepared by Malouf Engineering International, Inc., dated 8/17/2007

ANALYSIS RESULTS:

Based on the following calculations, Bay State Design, Inc. concludes the monopole does not meet the structural requirements as specified by TIA/EIA-222-F. Note, the following overstresses were observed:

Existing Conditions Only:

MEMBER TYPE	MAXIMUM STRESS RATIO	CONTROLLING ELEVATION/COMPONENT	PASS / FAIL	COMMENTS
POLE SHAFT	86.50%	0 - 45.3'	PASS	
BASE PLATE	177.30%		FAIL	

Existing Conditions Plus Proposed Clearwire Loading:

MEMBER TYPE	MAXIMUM STRESS RATIO	CONTROLLING ELEVATION/COMPONENT	PASS / FAIL	COMMENTS
POLE SHAFT	92.7%	0 - 45.3'	PASS	
BASE PLATE	190.2%		FAIL	

RECOMMENDATIONS:

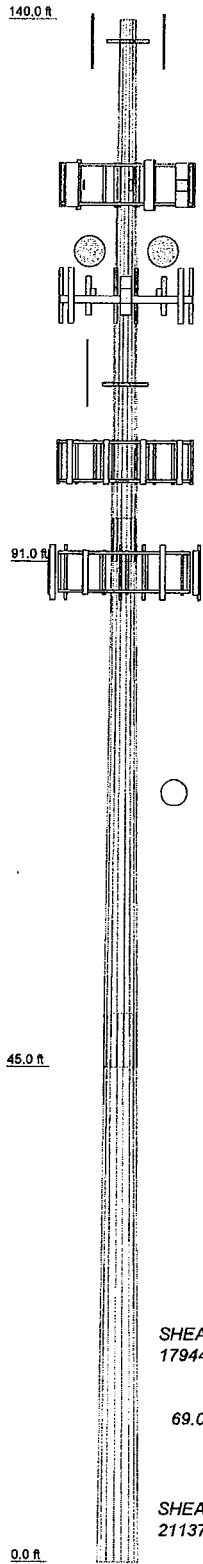
Bay State Design, Inc. proposes the following structural modifications:

- A total of (12) ¾" x 8" stiffener plates must be welded to the base plate.

CONCLUSION:

Provided these modifications have been made, the maximum stress ratio of the base plate is reduced to 92.7% and the monopole is structurally acceptable.

Section	1	2	3
Length (ft)	48.960	49.920	49.954
Number of Sides	18	18	18
Thickness (in)	0.188	0.313	0.375
Lap Splice (ft)		3.917	4.917
Top Dia (in)	18.000	26.071	33.766
Bot Dia (in)	27.180	36.300	43.000
Grade	A572-65	A572-65	
Weight (lb)	2221.2	5117.4	7689.9



DESIGNED APPURTENANCE LOADING

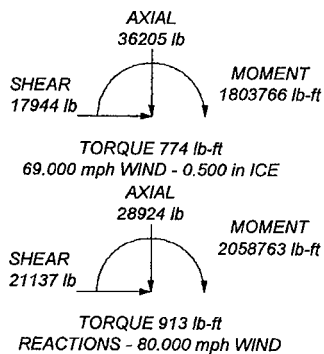
TYPE	ELEVATION	TYPE	ELEVATION
5' x 4" Horizontal Tube (Other Carrier)	138	RRH Clearwire (Clearwire)	115
5' x 4" Horizontal Tube (Other Carrier)	138	RRH Clearwire (Clearwire)	115
Pipe 2" x 5 ft (Other Carrier)	138	RRH Clearwire (Clearwire)	115
Pipe 2" x 5 ft (Other Carrier)	138	PIROD 15' Low Profile Platform (Monopole) (Sprint)	115
PIROD 13' Platform w/handrail (ATI)	125		
(2) DUO1417-8686 w/Mount Pipe (ATI)	125	(2) DB980H65E-M w/Mount Pipe (Sprint)	115
(2) DUO1417-8686 w/Mount Pipe (ATI)	125	Omni 6' (Other Carrier)	110
(2) DUO1417-8686 w/Mount Pipe (ATI)	125	5' x 4" Horizontal Tube (Other Carrier)	110
(2) DUO1417-8686 w/Mount Pipe (ATI)	125	5' x 4" Horizontal Tube (Other Carrier)	110
800-10121 with Mount Pipe (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	100
800-10121 with Mount Pipe (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	100
800-10121 with Mount Pipe (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	100
TMA ADC CG190W800 (ATI)	125	PIROD 15' Platform with handrail (Sprint - Nextel)	100
TMA ADC CG190W800 (ATI)	125	PIROD 15' Platform with handrail (Sprint - Nextel)	100
TMA ADC CG190W800 (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	100
Diplexer 806-960 782 10250 (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	100
Diplexer 806-960 782 10250 (ATI)	125	(2) 950G65VTZE-M w/Mount Pipe (Verizon)	90
Diplexer 806-960 782 10250 (ATI)	125	(2) 950G65VTZE-M w/Mount Pipe (Verizon)	90
Diplexer 806-960 782 10250 (ATI)	125	(2) 950G65VTZE-M w/Mount Pipe (Verizon)	90
7020.00 RET Unit (ATI)	125	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
7020.00 RET Unit (ATI)	125	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
7020.00 RET Unit (ATI)	125	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
2.5' foot dish	119	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
2.5' foot dish	119	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
(2) DB980H65E-M w/Mount Pipe (Sprint)	115	(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	90
(2) DB980H65E-M w/Mount Pipe (Sprint)	115	PIROD 15' Platform with handrail (Verizon)	90
800-10054 with Mount Pipe (Clearwire)	115	(2) 950G65VTZE-M w/Mount Pipe (Verizon)	90
800-10054 with Mount Pipe (Clearwire)	115		
800-10054 with Mount Pipe (Clearwire)	115		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.000 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69.000 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50.000 mph wind.
5. TOWER RATING: 190.2%



BAY STATE DESIGN	Bay State Design Inc.	Job: CT-HFD-00037		
	241 Boston Post Road W Marlborough, MA 01752	Project: 140' Monopole		
Consulting Engineers	Phone: (508) 229-4100 FAX: (508) 485-5321	Client: Clearwire CT	Drawn by: MC	App'd:
		Code: TIA/EIA-222-F	Date: 02/25/10	Scale: NTS
		Path: N:\PROJECTS\Clearwire-CT\CT-HFD0037\AICTHFD00037A.en		Dwg No. E-1

RISATower Bay State Design Inc. 241 Boston Post Road W Marlborough, MA 01752 Phone: (508) 229-4100 FAX: (508) 485-5321	Job CT-HFD-00037	Page 1 of 15
	Project 140' Monopole	Date 12:03:13 02/25/10
	Client Clearwire CT	Designed by MC

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 Hartford County, Connecticut.
- Basic wind speed of 80.000 mph.
- Nominal ice thickness of 0.500 in.
- Ice density of 56.000 pcf.
- A wind speed of 69.000 mph is used in combination with ice.
- Temperature drop of 50.00 °F.
- Deflections calculated using a wind speed of 50.000 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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	140.000-91.040	48.960	3.917	18	18.000	27.180	0.188	0.750	A572-65 (65 ksi)
L2	91.040-45.037	49.920	4.917	18	26.071	35.300	0.313	1.250	A572-65 (65 ksi)
L3	45.037-0.000	49.954		18	33.766	43.000	0.375	1.500	A572-65 (65 ksi)

RISATower Bay State Design Inc. 241 Boston Post Road W Marlborough, MA 01752 Phone: (508) 229-4100 FAX: (508) 485-5321	Job CT-HFD-00037	Page 2 of 15
	Project 140' Monopole	Date 12:03:13 02/25/10
	Client Clearwire CT	Designed by MC

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	18.278	10.601	424.933	6.323	9.144	46.471	850.425	5.301	2.838	15.136
L2	27.599	16.064	1478.683	9.582	13.807	107.093	2959.311	8.033	4.454	23.753
	27.208	25.549	2141.578	9.144	13.244	161.704	4285.975	12.777	4.038	12.923
L3	35.845	34.703	5367.019	12.421	17.932	299.292	10741.100	17.355	5.663	18.121
	35.210	39.744	5598.361	11.854	17.153	326.376	11204.089	19.876	5.283	14.087
	43.663	50.734	11645.786	15.132	21.844	533.134	23306.896	25.372	6.908	18.421

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 140.000-91.040				1	1	1		
L2 91.040-45.037				1	1	1		
L3 45.037-0.000				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.250 in
Number of bolts	12
Embedment length	114.000 in
f _c	3.000 ksi
Grout space	3.250 in
Base plate grade	A572-60
Base plate thickness	1.750 in
Bolt circle diameter	51.000 in
Outer diameter	57.000 in
Inner diameter	33.000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}	Weight
						ft ² /ft	plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	125.000 - 8.000	18	No Ice 1/2" Ice	0.000 0.820
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	115.000 - 8.000	6	No Ice 1/2" Ice	0.000 0.820
LDF5-50A (7/8 FOAM)	C	No	Inside Pole	110.000 - 8.000	1	No Ice 1/2" Ice	0.000 0.330
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	100.000 - 8.000	12	No Ice 1/2" Ice	0.000 0.820

RISATower Bay State Design Inc. 241 Boston Post Road W Marlborough, MA 01752 Phone: (508) 229-4100 FAX: (508) 485-5321	Job	CT-HFD-00037	Page	3 of 15
	Project	140' Monopole	Date	12:03:13 02/25/10
	Client	Clearwire CT	Designed by	MC

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	90.000 - 8.000	6	No Ice	0.000	0.820
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	90.000 - 8.000	6	1/2" Ice	0.000	0.820
LDF7-50A (1-5/8 FOAM)						No Ice	0.000	0.820
LDF7-50A (1-5/8 FOAM)						1/2" Ice	0.000	0.820

1/2 (Clearwire)	A	No	Inside Pole	115.000 - 8.000	3	No Ice	0.000	0.250
1/2 (Clearwire)						1/2" Ice	0.000	0.250
1/2 (Clearwire)	B	No	Inside Pole	115.000 - 8.000	2	No Ice	0.000	0.250
1/2 (Clearwire)						1/2" Ice	0.000	0.250

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
L1	140.000-91.040	A	0.000	0.000	0.000	0.000	607.386
		B	0.000	0.000	0.000	0.000	129.863
		C	0.000	0.000	0.000	0.000	6.257
L2	91.040-45.037	A	0.000	0.000	0.000	0.000	1166.176
		B	0.000	0.000	0.000	0.000	470.554
		C	0.000	0.000	0.000	0.000	236.399
L3	45.037-0.000	A	0.000	0.000	0.000	0.000	938.888
		B	0.000	0.000	0.000	0.000	382.963
		C	0.000	0.000	0.000	0.000	194.444

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
L1	140.000-91.040	A	0.500	0.000	0.000	0.000	0.000	607.386
		B		0.000	0.000	0.000	0.000	129.863
		C		0.000	0.000	0.000	0.000	6.257
L2	91.040-45.037	A	0.500	0.000	0.000	0.000	0.000	1166.176
		B		0.000	0.000	0.000	0.000	470.554
		C		0.000	0.000	0.000	0.000	236.399
L3	45.037-0.000	A	0.500	0.000	0.000	0.000	0.000	938.888
		B		0.000	0.000	0.000	0.000	382.963
		C		0.000	0.000	0.000	0.000	194.444

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	140.000-91.040	0.000	0.000	0.000	0.000
L2	91.040-45.037	0.000	0.000	0.000	0.000
L3	45.037-0.000	0.000	0.000	0.000	0.000

RISATower Bay State Design Inc. 241 Boston Post Road W Marlborough, MA 01752 Phone: (508) 229-4100 FAX: (508) 485-5321	Job CT-HFD-00037	Page 4 of 15
	Project 140' Monopole	Date 12:03:13 02/25/10
	Client Clearwire CT	Designed by MC

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight	
			Horz Lateral	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	lb	
5' x 4" Horizontal Tube (Other Carrier)	A	From Face	0.000	0.000	0.000	138.000	No Ice	2.333	0.156	60.000
			0.000	0.000			1/2" Ice	2.752	0.212	78.310
			0.000	0.000						
5' x 4" Horizontal Tube (Other Carrier)	B	From Face	0.000	0.000	0.000	138.000	No Ice	2.333	0.156	60.000
			0.000	0.000			1/2" Ice	2.752	0.212	78.310
			0.000	0.000						
Pipe 2" x 5 ft (Other Carrier)	A	From Face	3.000	0.000	0.000	138.000	No Ice	1.329	1.329	29.000
			0.000	0.000			1/2" Ice	1.633	1.633	39.707
			0.000	0.000						
Pipe 2" x 5 ft (Other Carrier)	B	From Face	3.000	0.000	0.000	138.000	No Ice	1.329	1.329	29.000
			0.000	0.000			1/2" Ice	1.633	1.633	39.707
			0.000	0.000						

PiROD 13' Platform w/handrail (AT&T)	C	None			0.000	125.000	No Ice	31.300	31.300	1822.000
							1/2" Ice	40.200	40.200	2452.000
(2) DUO1417-8686 w/Mount Pipe (AT&T)	A	From Face	3.000	0.000	0.000	125.000	No Ice	7.246	5.862	45.850
			0.000	0.000			1/2" ice	7.964	6.964	103.712
			0.000	0.000						
(2) DUO1417-8686 w/Mount Pipe (AT&T)	B	From Face	3.000	0.000	0.000	125.000	No Ice	7.246	5.862	45.850
			0.000	0.000			1/2" Ice	7.964	6.964	103.712
			0.000	0.000						
(2) DUO1417-8686 w/Mount Pipe (AT&T)	C	From Face	3.000	0.000	0.000	125.000	No Ice	7.246	5.862	45.850
			0.000	0.000			1/2" Ice	7.964	6.964	103.712
			0.000	0.000						
800-10121 with Mount Pipe (AT&T)	A	From Face	3.000	0.000	0.000	125.000	No Ice	5.804	4.718	72.600
			-2.000	0.000			1/2" Ice	6.350	5.564	118.966
			0.000	0.000						
800-10121 with Mount Pipe (AT&T)	B	From Face	3.000	0.000	0.000	125.000	No Ice	5.804	4.718	72.600
			-2.000	0.000			1/2" Ice	6.350	5.564	118.966
			0.000	0.000						
800-10121 with Mount Pipe (AT&T)	C	From Face	3.000	0.000	0.000	125.000	No Ice	5.804	4.718	72.600
			-2.000	0.000			1/2" Ice	6.350	5.564	118.966
			0.000	0.000						
TMA ADC CG190W800 (AT&T)	A	From Face	2.500	0.000	0.000	125.000	No Ice	1.398	0.328	16.000
			-5.000	0.000			1/2" Ice	1.557	0.431	23.656
			0.000	0.000						
TMA ADC CG190W800 (AT&T)	B	From Face	2.500	0.000	0.000	125.000	No Ice	1.398	0.328	16.000
			-5.000	0.000			1/2" Ice	1.557	0.431	23.656
			0.000	0.000						
TMA ADC CG190W800 (AT&T)	C	From Face	2.500	0.000	0.000	125.000	No Ice	1.398	0.328	16.000
			-5.000	0.000			1/2" Ice	1.557	0.431	23.656
			0.000	0.000						
Diplexer 806-960 782 10250 (AT&T)	A	From Face	2.500	0.000	0.000	125.000	No Ice	0.521	0.268	6.400
			-2.000	0.000			1/2" Ice	0.628	0.360	10.058
			0.000	0.000						
Diplexer 806-960 782 10250 (AT&T)	B	From Face	2.500	0.000	0.000	125.000	No Ice	0.521	0.268	6.400
			-2.000	0.000			1/2" Ice	0.628	0.360	10.058
			0.000	0.000						
Diplexer 806-960 782 10250 (AT&T)	C	From Face	2.500	0.000	0.000	125.000	No Ice	0.521	0.268	6.400
			-2.000	0.000			1/2" Ice	0.628	0.360	10.058
			0.000	0.000						

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	Project 140' Monopole	Date 12:03:13 02/25/10
	Client Clearwire CT	Designed by MC

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₁ Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	lb	
7020.00 RET Unit (AT&T)	A	From Face	2.500		0.000	125.000	No Ice	0.401	0.199	2.200
			5.000				1/2" Ice	0.492	0.274	5.133
			0.000							
7020.00 RET Unit (AT&T)	B	From Face	2.500		0.000	125.000	No Ice	0.401	0.199	2.200
			5.000				1/2" Ice	0.492	0.274	5.133
			0.000							
7020.00 RET Unit (AT&T)	C	From Face	2.500		0.000	125.000	No Ice	0.401	0.199	2.200
			5.000				1/2" Ice	0.492	0.274	5.133
			0.000							

PiROD 15' Low Profile Platform (Monopole) (Sprint)	C	None			0.000	115.000	No Ice	17.300	17.300	1500.000
							1/2" Ice	22.100	22.100	2030.000
(2) DB980H65E-M w/Mount Pipe (Sprint)	A	From Face	3.000		0.000	115.000	No Ice	4.274	3.857	34.050
			0.000				1/2" Ice	4.861	4.946	69.842
(2) DB980H65E-M w/Mount Pipe (Sprint)	B	From Face	3.000		0.000	115.000	No Ice	4.274	3.857	34.050
			0.000				1/2" Ice	4.861	4.946	69.842
(2) DB980H65E-M w/Mount Pipe (Sprint)	C	From Face	3.000		0.000	115.000	No Ice	4.274	3.857	34.050
			0.000				1/2" Ice	4.861	4.946	69.842
800-10054 with Mount Pipe (Clearwire)	A	From Face	3.000		0.000	115.000	No Ice	5.542	2.549	52.250
			0.000				1/2" Ice	5.993	3.115	87.649
800-10054 with Mount Pipe (Clearwire)	B	From Face	3.000		0.000	115.000	No Ice	5.542	2.549	52.250
			0.000				1/2" Ice	5.993	3.115	87.649
800-10054 with Mount Pipe (Clearwire)	C	From Face	3.000		0.000	115.000	No Ice	5.542	2.549	52.250
			0.000				1/2" Ice	5.993	3.115	87.649
RRH Clearwire (Clearwire)	A	From Face	2.500		0.000	115.000	No Ice	1.816	0.830	33.000
			0.000				1/2" Ice	2.000	0.973	44.912
RRH Clearwire (Clearwire)	B	From Face	2.500		0.000	115.000	No Ice	1.816	0.830	33.000
			0.000				1/2" Ice	2.000	0.973	44.912
RRH Clearwire (Clearwire)	C	From Face	2.500		0.000	115.000	No Ice	1.816	0.830	33.000
			0.000				1/2" Ice	2.000	0.973	44.912

5' x 4" Horizontal Tube (Other Carrier)	A	From Face	0.000		0.000	110.000	No Ice	2.333	0.156	60.000
			0.000				1/2" Ice	2.752	0.212	78.310
			-3.000							
5' x 4" Horizontal Tube (Other Carrier)	B	From Face	0.000		0.000	110.000	No Ice	2.333	0.156	60.000
			0.000				1/2" Ice	2.752	0.212	78.310
			-3.000							
Omni 6' (Other Carrier)	A	From Face	3.000		0.000	110.000	No Ice	1.767	1.767	20.000
			0.000				1/2" Ice	2.129	2.129	33.235
			-2.000							

PiROD 15' Platform with handrail (Sprint - Nextel)	C	None			0.000	100.000	No Ice	33.800	33.800	2043.000
							1/2" Ice	43.600	43.600	2748.000
(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	A	From Face	3.000		0.000	100.000	No Ice	3.579	5.396	35.550
			0.000				1/2" Ice	4.201	6.491	76.592
			0.000							

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	Project	140' Monopole	Date	12:03:13 02/25/10
	Client	Clearwire CT	Designed by	MC

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight lb	
(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	B	From Face	3.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice	3.579 4.201	5.396 6.491	35.550 76.592
(4) DB844H90E-XY w/Mount Pipe (Sprint - Nextel)	C	From Face	3.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice	3.579 4.201	5.396 6.491	35.550 76.592

PiROD 15' Platform with handrail (Verizon)	C	None		0.000	90.000	No Ice 1/2" Ice	33.800 43.600	33.800 43.600	2043.000 2748.000
(2) 950G65VTZE-M w/Mount Pipe (Verizon)	A	From Face	3.000 1.500 0.000	0.000	90.000	No Ice 1/2" Ice	4.468 5.057	4.440 5.536	35.550 74.794
(2) 950G65VTZE-M w/Mount Pipe (Verizon)	B	From Face	3.000 1.500 0.000	0.000	90.000	No Ice 1/2" Ice	4.468 5.057	4.440 5.536	35.550 74.794
(2) 950G65VTZE-M w/Mount Pipe (Verizon)	C	From Face	3.000 1.500 0.000	0.000	90.000	No Ice 1/2" Ice	4.468 5.057	4.440 5.536	35.550 74.794
(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	A	From Face	3.000 -1.500 0.000	0.000	90.000	No Ice 1/2" Ice	3.104 3.476	5.388 6.069	38.250 76.661
(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	B	From Face	3.000 -1.500 0.000	0.000	90.000	No Ice 1/2" Ice	3.104 3.476	5.388 6.069	38.250 76.661
(2) Powerwave 7125.16.33.00 with pipe mount (Verizon)	C	From Face	3.000 -1.500 0.000	0.000	90.000	No Ice 1/2" Ice	3.104 3.476	5.388 6.069	38.250 76.661

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb	
2.5' foot dish	A	Paraboloid w/o Radome	From Face	3.000 0.000 0.000	0.000		119.000	2.917	No Ice 1/2" Ice	6.681 7.069	70.000 106.288
2.5' foot dish	B	Paraboloid w/o Radome	From Face	3.000 0.000 0.000	0.000		119.000	2.917	No Ice 1/2" Ice	6.681 7.069	70.000 106.288

Tower Pressures - No Ice

$$G_H = 1.690$$

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	Client	Clearwire CT	Designed by	MC

Section Elevation	z	K _Z	q _e	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 140.000-91.040	114.230	1.426	23.313	92.167	A	0.000	92.167	92.167	100.00	0.000	0.000
					B	0.000	92.167		100.00	0.000	0.000
					C	0.000	92.167		100.00	0.000	0.000
L2 91.040-45.037	67.548	1.227	19.998	119.023	A	0.000	119.023	119.023	100.00	0.000	0.000
					B	0.000	119.023		100.00	0.000	0.000
					C	0.000	119.023		100.00	0.000	0.000
L3 45.037-0.000	21.741	1	16.422	145.760	A	0.000	145.760	145.760	100.00	0.000	0.000
					B	0.000	145.760		100.00	0.000	0.000
					C	0.000	145.760		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation	z	K _Z	q _e	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 140.000-91.040	114.230	1.426	17.343	0.500	96.247	A	0.000	96.247	96.247	100.00	0.000	0.000
						B	0.000	96.247		100.00	0.000	0.000
						C	0.000	96.247		100.00	0.000	0.000
L2 91.040-45.037	67.548	1.227	14.876	0.500	122.856	A	0.000	122.856	122.856	100.00	0.000	0.000
						B	0.000	122.856		100.00	0.000	0.000
						C	0.000	122.856		100.00	0.000	0.000
L3 45.037-0.000	21.741	1	12.216	0.500	149.513	A	0.000	149.513	149.513	100.00	0.000	0.000
						B	0.000	149.513		100.00	0.000	0.000
						C	0.000	149.513		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation	z	K _Z	q _e	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 140.000-91.040	114.230	1.426	9.107	92.167	A	0.000	92.167	92.167	100.00	0.000	0.000
					B	0.000	92.167		100.00	0.000	0.000
					C	0.000	92.167		100.00	0.000	0.000
L2 91.040-45.037	67.548	1.227	7.812	119.023	A	0.000	119.023	119.023	100.00	0.000	0.000
					B	0.000	119.023		100.00	0.000	0.000
					C	0.000	119.023		100.00	0.000	0.000
L3 45.037-0.000	21.741	1	6.415	145.760	A	0.000	145.760	145.760	100.00	0.000	0.000
					B	0.000	145.760		100.00	0.000	0.000
					C	0.000	145.760		100.00	0.000	0.000

Force Totals

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	Client	Clearwire CT	Designed by	MC

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-ft	Sum of Overturning Moments, M _y lb-ft	Sum of Torques lb-ft
Leg Weight	15028.454					
Bracing Weight	0.000					
Total Member Self-Weight	15028.454					
Total Weight	28923.534					
Wind 0 deg - No Ice		0.000	-20708.550	-1922850.529	69.011	-236.848
Wind 30 deg - No Ice		10445.024	-17920.044	-1663631.920	-972247.222	-335.707
Wind 60 deg - No Ice		18454.279	-10164.410	-939095.327	-1727225.126	-674.201
Wind 90 deg - No Ice		21136.488	201.749	23480.045	-1973889.747	-735.861
Wind 120 deg - No Ice		18322.249	10439.236	970743.540	-1711513.496	-676.692
Wind 150 deg - No Ice		10687.294	17923.661	1663006.229	-1001077.301	-375.924
Wind 180 deg - No Ice		0.000	20927.193	1947813.004	69.011	236.848
Wind 210 deg - No Ice		-10687.294	17923.661	1663006.229	1001215.324	786.156
Wind 240 deg - No Ice		-18322.249	10439.236	970743.540	1711651.519	913.540
Wind 270 deg - No Ice		-21136.488	201.749	23480.045	1974027.769	735.861
Wind 300 deg - No Ice		-18454.279	-10164.410	-939095.327	1727363.149	437.354
Wind 330 deg - No Ice		-10445.024	-17920.044	-1663631.920	972385.245	-74.525
Member Ice	2686.773					
Total Weight Ice	36204.904					
Wind 0 deg - Ice		0.000	-17592.754	-1659548.687	114.681	-212.345
Wind 30 deg - Ice		8874.881	-15224.684	-1435994.946	-838926.008	-308.668
Wind 60 deg - Ice		15657.438	-8646.932	-812374.843	-1487144.025	-581.704
Wind 90 deg - Ice		17943.736	158.798	18128.173	-1701049.676	-623.167
Wind 120 deg - Ice		15553.516	8863.250	836579.077	-1474777.264	-557.744
Wind 150 deg - Ice		9065.573	15227.531	1434796.110	-861618.414	-295.427
Wind 180 deg - Ice		0.000	17764.850	1678490.519	114.681	212.345
Wind 210 deg - Ice		-9065.573	15227.531	1434796.110	861847.776	663.220
Wind 240 deg - Ice		-15553.516	8863.250	836579.077	1475006.626	770.089
Wind 270 deg - Ice		-17943.736	158.798	18128.173	1701279.039	623.167
Wind 300 deg - Ice		-15657.438	-8646.932	-812374.843	1487373.387	369.359
Wind 330 deg - Ice		-8874.881	-15224.684	-1435994.946	839155.370	-59.125
Total Weight	28923.534					
Wind 0 deg - Service		0.000	-8089.277	-751435.257	69.011	-92.519
Wind 30 deg - Service		4080.088	-7000.017	-650177.988	-379742.017	-131.136
Wind 60 deg - Service		7208.703	-3970.473	-367155.881	-674655.261	-263.360
Wind 90 deg - Service		8256.441	78.808	8850.124	-771008.628	-287.446
Wind 120 deg - Service		7157.128	4077.826	378874.926	-668517.906	-264.333
Wind 150 deg - Service		4174.724	7001.430	649290.039	-391003.767	-146.845
Wind 180 deg - Service		0.000	8174.685	760542.686	69.011	92.519
Wind 210 deg - Service		-4174.724	7001.430	649290.039	391141.790	307.092
Wind 240 deg - Service		-7157.128	4077.826	378874.926	668655.928	356.851
Wind 270 deg - Service		-8256.441	78.808	8850.124	771146.651	287.446
Wind 300 deg - Service		-7208.703	-3970.473	-367155.881	674793.284	170.841
Wind 330 deg - Service		-4080.088	-7000.017	-650177.988	379880.040	-29.111

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	140 - 91.04	Pole	Max Tension	8	0.031	-0.156	0.001
			Max. Compression	14	-14025.682	117.936	793.231
			Max. Mx	11	-8877.978	264182.552	-4595.704
			Max. My	8	-8914.076	58.129	-257591.374
			Max. Vy	11	-13302.224	264182.552	-4595.704
			Max. Vx	8	13081.282	58.129	-257591.374
			Max. Torque	10			-920.213
			L2	91.04 - 45.037	Pole	Max Tension	1
Max. Compression	14	-25024.790				117.936	793.231
Max. Mx	11	-18104.922				1052608.504	-14203.408
Max. My	8	-18126.660				70.406	-1035993.657
Max. Vy	11	-19046.238				1052608.504	-14203.408
Max. Vx	8	18825.403				70.406	-1035993.657
L3	45.037 - 0	Pole	Max. Torque	10			-918.646
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-36204.904	117.935	793.230
			Max. Mx	11	-28901.369	2058615.90	-24589.512

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	Client	Clearwire CT	Designed by	MC

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	8	-28901.884	72.178	-2031203.9
			Max. Vy	11	-21166.791	2058615.90	-24589.512
			Max. Vx	8	20957.092	72.178	-2031203.9
			Max. Torque	10			-914.981

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	24	36204.905	17943.766	-158.798
	Max. H _x	11	28923.536	21136.495	-201.748
	Max. H _z	2	28923.536	0.000	20708.557
	Max. M _x	2	2005172.266	0.000	20708.557
	Max. M _z	5	2058468.040	-21136.495	-201.748
	Max. Torsion	5	729.737	-21136.495	-201.748
	Min. Vert	1	28923.534	0.000	0.000
	Min. H _x	5	28923.536	-21136.495	-201.748
	Min. H _z	8	28923.536	0.000	-20927.200
	Min. M _x	8	-2031203.994	0.000	-20927.200
	Min. M _z	11	-2058615.904	21136.495	-201.748
	Min. Torsion	10	-913.367	18322.249	-10439.236

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	28923.534	0.000	-0.000	-532.510	69.460	-0.004
Dead+Wind 0 deg - No Ice	28923.536	-0.000	-20708.557	-2005172.266	72.150	-231.952
Dead+Wind 30 deg - No Ice	28923.534	10445.024	-17920.044	-1734844.698	-1013929.192	-328.043
Dead+Wind 60 deg - No Ice	28923.534	18454.279	-10164.410	-979119.138	-1801359.690	-658.815
Dead+Wind 90 deg - No Ice	28923.536	21136.495	201.748	24589.760	-2058468.040	-729.737
Dead+Wind 120 deg - No Ice	28923.534	18322.249	10439.236	1012251.681	-1784887.507	-681.605
Dead+Wind 150 deg - No Ice	28923.534	10687.294	17923.661	1734113.569	-1044107.247	-386.547
Dead+Wind 180 deg - No Ice	28923.536	-0.000	20927.200	2031203.994	72.105	231.842
Dead+Wind 210 deg - No Ice	28923.534	-10687.294	17923.661	1734115.255	1044252.416	788.190
Dead+Wind 240 deg - No Ice	28923.534	-18322.249	10439.236	1012253.336	1785034.455	913.367
Dead+Wind 270 deg - No Ice	28923.536	-21136.495	201.748	24589.745	2058615.904	729.667
Dead+Wind 300 deg - No Ice	28923.534	-18454.279	-10164.410	-979120.827	1801506.664	426.959
Dead+Wind 330 deg - No Ice	28923.534	-10445.024	-17920.044	-1734846.327	1014074.389	-73.665
Dead+Ice+Temp	36204.904	-0.000	-0.000	-793.230	117.935	0.007
Dead+Wind 0 deg+Ice+Temp	36204.905	0.000	-17592.783	-1759260.476	125.151	-207.123
Dead+Wind 30 deg+Ice+Temp	36204.904	8874.881	-15224.686	-1522262.766	-889387.621	-303.491
Dead+Wind 60 deg+Ice+Temp	36204.904	15657.440	-8646.933	-861027.360	-1576749.155	-573.781
Dead+Wind 90 deg+Ice+Temp	36204.905	17943.766	158.798	19310.754	-1803408.786	-623.580
Dead+Wind 120 deg+Ice+Temp	36204.904	15553.518	8863.251	886786.222	-1563546.168	-566.568
Dead+Wind 150 deg+Ice+Temp	36204.904	9065.574	15227.533	1520883.860	-913581.107	-307.156
Dead+Wind 180 deg+Ice+Temp	36204.905	0.000	17764.879	1779340.825	125.108	207.042

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Load Combination	Vertical lb	Shear _x lb	Shear _y lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _y lb-ft	Torque lb-ft
Dead+Wind 210 deg+Ice+Temp	36204.904	-9065.574	15227.533	1520885.626	913832.340	665.874
Dead+Wind 240 deg+Ice+Temp	36204.904	-15553.518	8863.251	886787.957	1563799.251	773.569
Dead+Wind 270 deg+Ice+Temp	36204.905	-17943.766	158.798	19310.737	1803662.823	623.493
Dead+Wind 300 deg+Ice+Temp	36204.904	-15657.440	-8646.933	-861029.128	1577002.257	366.671
Dead+Wind 330 deg+Ice+Temp	36204.904	-8874.881	-15224.686	-1522264.474	889638.881	-55.241
Dead+Wind 0 deg - Service	28923.534	-0.000	-8089.280	-784605.909	74.483	-91.468
Dead+Wind 30 deg - Service	28923.534	4080.088	-7000.017	-678881.788	-396522.336	-130.703
Dead+Wind 60 deg - Service	28923.534	7208.703	-3970.473	-383324.933	-704550.181	-263.083
Dead+Wind 90 deg - Service	28923.534	8256.444	78.808	9268.639	-805125.083	-289.104
Dead+Wind 120 deg - Service	28923.534	7157.129	4077.826	395585.131	-698108.520	-267.582
Dead+Wind 150 deg - Service	28923.534	4174.724	7001.430	677908.445	-408338.736	-150.154
Dead+Wind 180 deg - Service	28923.534	-0.000	8174.688	794118.943	74.478	91.455
Dead+Wind 210 deg - Service	28923.534	-4174.724	7001.430	677908.705	408487.840	308.587
Dead+Wind 240 deg - Service	28923.534	-7157.129	4077.826	395585.387	698257.897	359.037
Dead+Wind 270 deg - Service	28923.534	-8256.444	78.808	9268.638	805274.599	289.082
Dead+Wind 300 deg - Service	28923.534	-7208.703	-3970.473	-383325.192	704699.561	171.601
Dead+Wind 330 deg - Service	28923.534	-4080.088	-7000.017	-678882.039	396671.442	-27.721

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.000	-28923.534	0.000	0.000	28923.534	0.000	0.000%
2	0.000	-28923.534	-20708.550	0.000	28923.536	20708.557	0.000%
3	10445.024	-28923.534	-17920.044	-10445.024	28923.534	17920.044	0.000%
4	18454.279	-28923.534	-10164.410	-18454.279	28923.534	10164.410	0.000%
5	21136.488	-28923.534	201.749	-21136.495	28923.536	-201.748	0.000%
6	18322.249	-28923.534	10439.236	-18322.249	28923.534	-10439.236	0.000%
7	10687.294	-28923.534	17923.661	-10687.294	28923.534	-17923.661	0.000%
8	0.000	-28923.534	20927.193	0.000	28923.536	-20927.200	0.000%
9	-10687.294	-28923.534	17923.661	10687.294	28923.534	-17923.661	0.000%
10	-18322.249	-28923.534	10439.236	18322.249	28923.534	-10439.236	0.000%
11	-21136.488	-28923.534	201.749	21136.495	28923.536	-201.748	0.000%
12	-18454.279	-28923.534	-10164.410	18454.279	28923.534	10164.410	0.000%
13	-10445.024	-28923.534	-17920.044	10445.024	28923.534	17920.044	0.000%
14	0.000	-36204.904	0.000	0.000	36204.904	0.000	0.000%
15	0.000	-36204.904	-17592.754	-0.000	36204.905	17592.783	0.000%
16	8874.881	-36204.904	-15224.684	-8874.881	36204.904	15224.686	0.000%
17	15657.438	-36204.904	-8646.932	-15657.440	36204.904	8646.933	0.000%
18	17943.736	-36204.904	158.798	-17943.766	36204.905	-158.798	0.000%
19	15553.516	-36204.904	8863.250	-15553.518	36204.904	-8863.251	0.000%
20	9065.573	-36204.904	15227.531	-9065.574	36204.904	-15227.533	0.000%
21	0.000	-36204.904	17764.850	-0.000	36204.905	-17764.879	0.000%
22	-9065.573	-36204.904	15227.531	9065.574	36204.904	-15227.533	0.000%
23	-15553.516	-36204.904	8863.250	15553.518	36204.904	-8863.251	0.000%
24	-17943.736	-36204.904	158.798	17943.766	36204.905	-158.798	0.000%
25	-15657.438	-36204.904	-8646.932	15657.440	36204.904	8646.933	0.000%
26	-8874.881	-36204.904	-15224.684	8874.881	36204.904	15224.686	0.000%
27	0.000	-28923.534	-8089.277	0.000	28923.534	8089.280	0.000%
28	4080.088	-28923.534	-7000.017	-4080.088	28923.534	7000.017	0.000%
29	7208.703	-28923.534	-3970.473	-7208.703	28923.534	3970.473	0.000%
30	8256.441	-28923.534	78.808	-8256.444	28923.534	-78.808	0.000%
31	7157.128	-28923.534	4077.826	-7157.129	28923.534	-4077.826	0.000%
32	4174.724	-28923.534	7001.430	-4174.724	28923.534	-7001.430	0.000%
33	0.000	-28923.534	8174.685	0.000	28923.534	-8174.688	0.000%
34	-4174.724	-28923.534	7001.430	4174.724	28923.534	-7001.430	0.000%
35	-7157.128	-28923.534	4077.826	7157.129	28923.534	-4077.826	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
36	-8256.441	-28923.534	78.808	8256.444	28923.534	-78.808	0.000%
37	-7208.703	-28923.534	-3970.473	7208.703	28923.534	3970.473	0.000%
38	-4080.088	-28923.534	-7000.017	4080.088	28923.534	7000.017	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00042341
3	Yes	5	0.0000001	0.00064166
4	Yes	5	0.0000001	0.00067063
5	Yes	4	0.0000001	0.00042730
6	Yes	5	0.0000001	0.00065781
7	Yes	5	0.0000001	0.00067243
8	Yes	4	0.0000001	0.00042956
9	Yes	5	0.0000001	0.00067936
10	Yes	5	0.0000001	0.00065408
11	Yes	4	0.0000001	0.00042733
12	Yes	5	0.0000001	0.00066618
13	Yes	5	0.0000001	0.00064850
14	Yes	4	0.0000001	0.0000001
15	Yes	5	0.0000001	0.00026315
16	Yes	6	0.0000001	0.00009033
17	Yes	6	0.0000001	0.00009340
18	Yes	5	0.0000001	0.00026814
19	Yes	6	0.0000001	0.00009234
20	Yes	6	0.0000001	0.00009390
21	Yes	5	0.0000001	0.00026487
22	Yes	6	0.0000001	0.00009469
23	Yes	6	0.0000001	0.00009196
24	Yes	5	0.0000001	0.00026819
25	Yes	6	0.0000001	0.00009293
26	Yes	6	0.0000001	0.00009110
27	Yes	4	0.0000001	0.00010143
28	Yes	5	0.0000001	0.00006117
29	Yes	5	0.0000001	0.00006690
30	Yes	4	0.0000001	0.00012541
31	Yes	5	0.0000001	0.00006272
32	Yes	5	0.0000001	0.00006582
33	Yes	4	0.0000001	0.00010347
34	Yes	5	0.0000001	0.00006735
35	Yes	5	0.0000001	0.00006204
36	Yes	4	0.0000001	0.00012547
37	Yes	5	0.0000001	0.00006595
38	Yes	5	0.0000001	0.00006258

Maximum Tower Deflections - Service Wind

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

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.04	39.450	36	2.238	0.006
L2	94.957 - 45.037	19.210	36	1.873	0.002
L3	49.954 - 0	5.310	36	0.983	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.000	5' x 4" Horizontal Tube	36	38.502	2.231	0.006	16539
125.000	PiROD 13' Platform w/handrail	36	32.382	2.175	0.005	11025
119.000	2.5' foot dish	36	29.609	2.139	0.004	7875
115.000	PiROD 15' Low Profile Platform (Monopole)	36	27.791	2.111	0.004	6614
110.000	5' x 4" Horizontal Tube	36	25.559	2.068	0.003	5511
100.000	PiROD 15' Platform with handrail	36	21.268	1.951	0.003	4139
90.000	PiROD 15' Platform with handrail	36	17.267	1.783	0.002	3405

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.04	100.661	11	5.714	0.014
L2	94.957 - 45.037	49.051	11	4.783	0.006
L3	49.954 - 0	13.569	11	2.511	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.000	5' x 4" Horizontal Tube	11	98.245	5.691	0.014	6594
125.000	PiROD 13' Platform w/handrail	11	82.641	5.527	0.011	4395
119.000	2.5' foot dish	11	75.573	5.431	0.010	3138
115.000	PiROD 15' Low Profile Platform (Monopole)	11	70.936	5.356	0.009	2635
110.000	5' x 4" Horizontal Tube	11	65.245	5.247	0.009	2194
100.000	PiROD 15' Platform with handrail	11	54.301	4.965	0.007	1646
90.000	PiROD 15' Platform with handrail	11	44.095	4.576	0.005	1351

Base Plate Design Data

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Plate Thickness	Number of Anchor Bolts	Anchor Bolt Size	Actual Allowable Ratio Bolt Tension	Actual Allowable Ratio Bolt Compression	Actual Allowable Ratio Plate Stress	Actual Allowable Ratio Stiffener Stress	Controlling Condition	Ratio
in		in	lb	lb	ksi	ksi		
1.750	12	2.250	159063.141	163880.036	114.084		Plate	2.54 X
			131210.581	217809.564	45.000			
			1.21	0.75	2.54			

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _a	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	lb	lb	P _a
L1	140 - 91.04 (1)	TP27.18x18x0.188	48.960	140.000	180.2	4.597	15.627	-8877.980	71843.203	0.124
L2	91.04 - 45.037 (2)	TP35.3x26.071x0.313	49.920	140.000	138.9	7.744	33.801	-18104.900	261749.000	0.069
L3	45.037 - 0 (3)	TP43x33.766x0.375	49.954	140.000	111.0	12.115	50.734	-28901.400	614640.000	0.047

Pole Bending Design Data

Section No.	Elevation	Size	Actual M _x	Actual f _{bx}	Allow. F _{bx}	Ratio f _{bx} /F _{bx}	Actual M _y	Actual f _{by}	Allow. F _{by}	Ratio f _{by} /F _{by}
	ft		lb-ft	ksi	ksi		lb-ft	ksi	ksi	
L1	140 - 91.04 (1)	TP27.18x18x0.188	264222.500	-31.292	39.000	0.802	0.000	0.000	39.000	0.000
L2	91.04 - 45.037 (2)	TP35.3x26.071x0.313	1052708.333	-44.500	39.000	1.141	0.000	0.000	39.000	0.000
L3	45.037 - 0 (3)	TP43x33.766x0.375	2058766.667	-46.340	39.000	1.188	0.000	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation	Size	Ratio P	Ratio f _{bx}	Ratio f _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft		P _a	F _{bx}	F _{by}			
L1	140 - 91.04 (1)	TP27.18x18x0.188	0.124	0.802	0.000	0.926	1.333	H1-3 ✓
L2	91.04 - 45.037 (2)	TP35.3x26.071x0.313	0.069	1.141	0.000	1.210	1.333	H1-3 ✓
L3	45.037 - 0 (3)	TP43x33.766x0.375	0.047	1.188	0.000	1.235	1.333	H1-3 ✓

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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail
L1	140 - 91.04	Pole	TP27.18x18x0.188	1	-8877.980	95766.986	69.5	Pass
L2	91.04 - 45.037	Pole	TP35.3x26.071x0.313	2	-18104.900	348911.403	90.8	Pass
L3	45.037 - 0	Pole	TP43x33.766x0.375	3	-28901.400	819315.086	92.7	Pass
Summary								
Pole (L3)							92.7	Pass
Base Plate							190.2	Fail X
RATING =							190.2	Fail X



To: Maxton
From: Frantz Pierre – Radio Frequency Engineer
Cc: Micah Hawthorne
Subject: Power Density Report for CT-HFD0037
Date: March 11, 2010

1. Introduction:

This report is the result of Electromagnetic Field Intensities (EMF – Power Densities) study for the Clearwire broadband antenna installation on a Self Support Tower at 60 Adams St, Manchester, CT, 06040. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location:

2: Discussion:

The following assumptions were used in the calculations:

- 1) The emissions from Clearwire transmitters are in the (2496 – 2960) Frequency Band
- 2) The emissions from the Clearwire Microwave dishes are in the 11 GHz Frequency Band
- 3) The model number for Clearwire Antenna is Argus LLPX310R
- 4) The model number for the Microwave dish is Andrew VHLP2-11 with 24” Diameter.
- 5) The Clearwire Panel antenna centerline is 115 feet.
- 6) The Clearwire Microwave dish centerline is 115 feet.
- 7) The Maximum Transmit power from any Clearwire panel antenna is 251 Watts Effective Isotropic Radiated Power (EiRP) assuming 2 channels per sector.
- 8) The Maximum Transmit power from any Clearwire Microwave Dish is 346 Watts Effective Isotropic Radiated Power (EiRP) assuming 1 channel per dish.
- 9) All antennas are simultaneously transmitting and receiving 24 hours per day.
- 10) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in “FCC OET Bulletin 65, Edition 97-01” were used with the above information to perform the calculations.

3: Conclusion:

Based on the above worst case assumptions, the power density calculation from the Clearwire antenna installation on a Steel Monopole at 60 Adams St, Manchester, CT is 0.003667 mW/cm². This value represents 0.37% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm²) set forth in the FCC/ANSI/IEEE C95-1-1991. Furthermore, the proposed antenna location for Clearwire will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.

The combined Power Density from all other carriers is 66.3 %. The combined Power Density for this site is 66.67% of the M.P.E. standard.