

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

ORIGINAL

August 24, 2010

RECEIVED  
AUG 24 2010  
CONNECTICUT  
SITING COUNCIL

*Via Hand Delivery*

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

Re: **Notice of Exempt Modification – Antenna Swap  
8 Ferris Road, Newtown, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 98-foot level of the existing 118-foot tower at the above-referenced address. The tower is owned by TowerCo. The Council approved Cellco’s use of this tower in 2002. Cellco now intends to modify its installation by replacing ten (10) of its twelve (12) antennas with four (4) model DB846H80E-SX cellular antennas; three (3) model MG D3-800T0 PCS antennas; and three (3) model P65-16-XL-2 LTE antennas, all at the same 98-foot level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to E. Patricia Llodra, First Selectwoman for the Town of Newtown. A copy of this letter is also being sent to Erich and Patricia Gertsch, the owners of the property on which the tower is located.

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

1. The proposed modifications will not result in any increase in the height of the existing tower. Cellco’s antennas will be located at the same 98-foot level on the existing tower.



Law Offices

BOSTON

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# ROBINSON & COLE LLP

Linda Roberts  
August 24, 2010  
Page 2

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

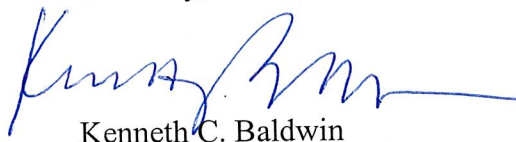
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

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

A Structural Analysis Report was completed and confirms that the tower, with certain modifications, and the tower foundation can support Cellco's proposed antenna modification. Attached behind Tab 3 is a copy of the Structural Analysis and structural upgrade design plans for the tower.

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

E. Patricia Llodra, Newtown First Selectwoman  
Erich and Patricia Gertsch  
Sandy M. Carter



# Vertically Polarized Directed Dipole® Panel Antennas



80° HORIZONTAL BEAMWIDTH

806 - 960 MHz

HORIZONTAL BEAMWIDTH	80°	80°	80°
FREQUENCY RANGE	806-960 MHz 12.3 & 12.5 dBd / 6° Tilt	806-896 MHz 12.5 dBd / 0-16° Tilt	806-896 MHz 14 dBd / 0° Tilt
MODEL	844H80T6E-XY	844G80VTA-SX	DB846H80E-SX
TYPE	Directed Dipole®	Directed Dipole®	Directed Dipole®
<b>ELECTRICAL SPECIFICATIONS</b>			
Frequency Range (MHz)	806-896	870-960	806-896
Gain (dBd/dBi)	12.3 / 14.4	12.5 / 14.6	14 / 16.1
Horizontal Beamwidth (Deg.)	80	80	80
Elevation Beamwidth (Deg.)	15	15	10
USLS (dB)	>15	>15	>15
Null Fill (dB) – Below Peak	N/A	N/A	N/A
Beam Tilt (Deg.)	6	6	0
VSWR	<1.5:1	<1.5:1	<1.5:1
Front-To-Back Ratio (dB)	40	40	35
Isolation (dB)	N/A	N/A	40
Max. Input Power (Watts)	500	500	N/A
Polarization	Vertical	Vertical	Vertical
Connector Location	Back	Back	Back
Connector Type	7-16 DIN - Female	7-16 DIN - Female	7-16 DIN - Female
Optional Connectors	N/A	N/A	N/A
<b>MECHANICAL SPECIFICATIONS</b>			
Length (inch/mm)	48 / 1,219	48 / 1,219	48 / 1,219
Width (inch/mm)	6.5 / 165	6.5 / 165	72 / 1,829
Depth (inch/mm)	8 / 203	8 / 203	10 / 254
Net Weight (lbs/kg)	14 / 6.3	14 / 6.3	8.5 / 216
Max. Flat Plate Area (ft²/m²)	1.08 / 0.10	1.08 / 0.10	11.5 / 5.2
Max. Wind Load at 100 mph (lbf/N)	59 / 262	59 / 262	53 / 233
Max. Wind Speed (mph/kmh)	125 / 201	125 / 201	125 / 201
Radome Material	ABS, UV Resistant	ABS, UV Resistant	ABS, UV Resistant
Reflector Material	Pass. Aluminum	Pass. Aluminum	Pass. Aluminum
Radiator Material	Brass	Brass	Aluminum
Hardware Material	Galvanized Steel	Galvanized Steel	Galvanized Steel
Color	Light Gray	Light Gray	Light Gray
Std. Mounting Hardware	DB380	DB380	DB380
Optional Downtilt Kit	DB5083	DB5083	DB5083
Optional Special Mounting	DB5084-AZ	DB5084-AZ	DB5084-AZ

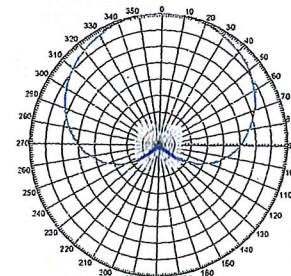
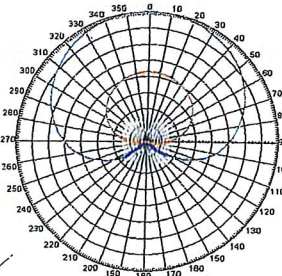
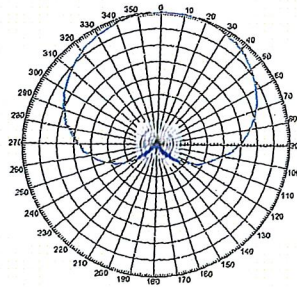
Specifications are subject to change. Please see our website for the latest information.

844H80T6E-XY

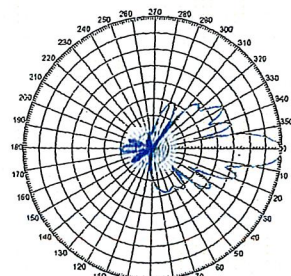
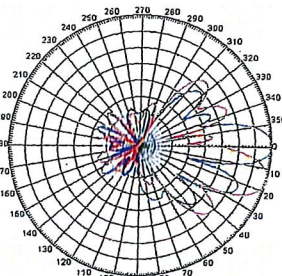
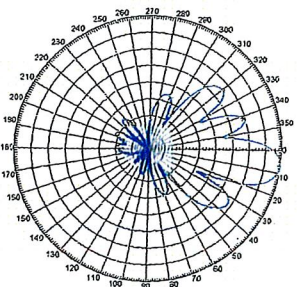
844G80VTA-SX

DB846H80E-SX

Azimuth Pattern



Elevation Pattern



Scale: 10° radials, 5 dB per division

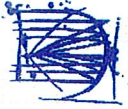
X P o l

V E R T I C A L  
D i r e c t e d D i p o l e ®

V E R T I C A L  
P a n e l

O m n i

Y a g i



# SINGLE-BAND PANEL ANTENNA

BROADBAND 1700-2170 MHz

## MGD3-800TX

1710-1880	1850-1990	1920-2170
H66° V7.2°	H64° V6.6°	H63° V6.3°
Fixed Tilt 0°, 2°, 4°, 6°	Fixed Tilt 0°, 2°, 4°, 6°	Fixed Tilt 0°, 2°, 4°, 6°

### ELECTRICAL SPECIFICATIONS

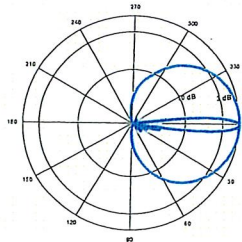
BROADBAND 1710-2170 MHz

Antenna Model	MGD3-800TX		
	1710 - 1880	1850 - 1990	1920 - 2170
Polarization	± 45°		
Frequency	1710 - 1880	1850 - 1990	1920 - 2170
Horizontal Beamwidth	66°	64°	63°
Vertical Beamwidth	7.2°	6.6°	6.3°
Gain (dBi)	17.9	18	18.5
Vertical Electrical Tilt	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°	FIXED 0°, 2°, 4°, 6°
Upper Sidelobe Suppression for the 1 <sup>st</sup> lobe above main beam (dB)	20	20	20
Front-to-Back Ratio /Cpol @ ± 20° (dB)	> 30	> 30	> 30
VSWR	< 1.4 : 1	< 1.4 : 1	< 1.4 : 1
Cross Polar Ratio @ ± 60° (dB)	> 10	> 10	> 10
Isolation Between Ports (dB)	> 30	> 30	> 30
Maximum Power Per Input (W)	250		
Intermodulation (dBc)	< -150		
Impedance (Ω)	50		

### MECHANICAL SPECIFICATIONS

Connectors	2 X 7/16 Female
Connector Position	Bottom
Survival Wind Speed mph (km/h)	124 (200)
Front Windload lbs (N) @ 160 km/h	83 (370)
Lateral Windload lbs (N) @ 160 km/h	38 (170)
Radome Color	Grey, paintable
Temperature Range F (°C)	-67° to 140° (-55° to +60°)
Humidity	100%
Antenna Weight lbs (kg)	15.43 (7)
Antenna Dimension in (mm) H X W X D	53 X 6.29 X 3.54 (1340 X 160 X 90)

H&V Pattern



RYMSA Telecom Group (Headquarters)

**RYMSA**  
TELECOM GROUP  
www.rymsawireless.com

RYMSA México:  
Ph: + 52 55 1 212...  
RYMSA Wireless U.S.A. St. Louis, Mo.  
+ 1 314 777 1234

**P65-15-XL-2**

**Very Low Broadband Antennas**

POLARIZATION: Dual linear ±45°  
 FREQUENCY (MHz): 698-894  
 HORIZONTAL BEAM WIDTH (°): 65  
 GAIN (dBi/dBd): 14.5/12.4  
 TILT: 2  
 LENGTH: 48"

**ELECTRICAL SPECIFICATIONS\***

	698-806	698-894	806-894
Frequency range (MHz)			
Frequency band (MHz)	698-806	698-894	806-894
Gain (dBi/dBd)	14.0/11.9		14.5/12.4
Polarization		Dual Linear +/- 45	
Nominal Impedance (Ω)		50	
VSWR		< 1.33:1	
Horizontal beam width, -3 dB (°)	68		65
Vertical beam width, -3 dB (°)	16.5		15.5
Electrical down tilt (°)		2	
Side lobe suppression, vertical 1st upper (dB)	> 15		> 15
Tracking, horizontal plane ±60° (dB)	< 2		< 2
Isolation between inputs (dB)	> 30		> 30
First null fill (dB)	-		-
Vertical beam squint (°)	< 0.5		< 0.5
Front to back ratio (dB)	> 30		> 30
Front to back ratio, total power (dB)	> 25		> 25
Cross polar discrimination (XPD) 0° (dB)	> 15		> 15
Cross polar discrimination (XPD) ±60° (dB)	> 10		> 10
IM3, 2xTx@43dBm (dBc)		-153	
Power handling, average per input (W)		400	
Power handling, average total (W)		800	

**MECHANICAL SPECIFICATIONS\***

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, in (mm)	48"x12"x5" (1219x305x125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, lbs (kg)	33 (15)
Weight, without brackets, lbs (kg)	22 (10)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.0 (N)	920
Maximum operational wind speed, mph (m/s)	100 (45)
Survival wind speed, mph (m/s)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Packet size, HxWxD, in (mm)	58" x 16" x 10" (1475 x 400 x 255)
Radome colour	Light Grey
Shipping weight, lbs (kg)	44 (20)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

\*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

**ANTENNA PATTERNS\***

For detailed patterns visit <http://www.powerwave.com/rpa/>.



May 7, 2010

**Mr. Stephen Rambeau**  
TowerCo, LLC  
5000 Valleystone Drive  
Cary, NC 27519  
(919) 653-5722

Vertical Solutions, Inc.  
PO Box 579  
Holly Springs, NC 27540  
(888) 321-6167  
[operations@verticalsolutions-inc.com](mailto:operations@verticalsolutions-inc.com)

**Subject:** Rigorous Structural Analysis

**Carrier Designation** Verizon Wireless, Reconfiguration  
Site Number: N/A  
Site Name: Newtown West, CT

**TowerCo Designation** Site Number: CT2008  
Site Name: Newtown-Ferris Rd

**Engineering Firm Designation** Vertical Solutions Project: 100188.05Rev 0

**Site Data** 8 Ferris Road, Newtown, Fairfield County, CT 06470  
Latitude: N41° 23' 23.09"±; Longitude: W073° 20' 18.40"±  
Elevation: 783 ft±, Topography Category: 1;  
Exposure Category: "C"; Structure Class II  
118-ft Self Supporting Pole Structure (Monopole)

Dear Mr. Rambeau,

To your request, we present our structural analysis.

Our work indicates that with the proposed appurtenance configuration, the tower and foundation will satisfy the structural strength requirements of TIA/EIA-222-F-1996, *Structural Standards for Steel Antenna Towers and Supporting Structures* (industry standard) and the 2006 *International Building Code* (local building code) for:

- 85-mph fastest mile basic wind speed
- 75-mph fastest mile basic wind speed with ½" radial ice

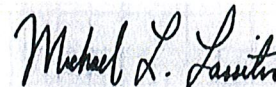
All equipment and modifications proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We trust you find our work satisfactory. Please do not hesitate to call should you have any questions.

Sincerely,



Eric S. Stover, E.I.  
Structural Engineer-In-Training



Michael L. Lassiter, S.E., P.E., C.W.I.  
Structural Engineer, Civil Engineer, Certified Weld Inspector  
& President  
CT PE License: 25064

MAY 07 2010

**Table 1: Existing, Proposed and Reserved Appurtenance Configuration**

Elevation (AGL, ft)	Carrier	Mount	Equipment	Coax	Location <sup>1</sup>
130	Town of Newtown	Pipe off of Platform at 118'	(1) Decibel DB222	(1) 7/8	Inside
118			(1) Telewave ANT150D	(1) 7/8	Inside
118.75	Sprint Nextel	Low Profile Platform	(9) Decibel DB844H90E-XY	(9) 7/8	Inside
105 <sup>2</sup>	Sprint Nextel (Design)	Low Profile Platform	(12) DAPA 48000	(12) 1 5/8	Inside
	Sprint Nextel (Existing)		(6) Decibel DB980H90E-M	(6) 1 5/8	Inside
98 <sup>3</sup>	Verizon Wireless	Low Profile Platform	(3) Powerwave P65-16-XL-2 (4) Andrew DB846H80E-SX (2) RFS APL868013 (3) RYMSA Wireless MG D3-800TX	(12) 1 5/8	Inside <sup>4</sup>
91	AT&T	Low Profile Platform	(3) Powerwave 7770 (3) Andrew DR65-19-00DPQ (6) LGP 21401 TMAs	(28) 7/8	Inside
81	T-Mobile	Low Profile Platform	(6) RFS APX16DWV-16DWV (6) S20057A1 TMAs	(24) 7/8	Inside
75	Sprint Nextel	Flush	(1) GPS	(1) 1/2	Outside

1 - See coax configuration plan, QP-P for coax locations.

2\_Existing Loading [EPA(A) = 24.4 sq ft]; Design Loading [EPA(A) = 76.8 sq ft]; Maximum Loading [EPA(A) = 92.4 sq ft]; Design loading used in analysis.

3\_(10) Existing antennas will be removed and replaced with the proposed antennas.

4\_There are existing hand hole rims at +/-102-ft elevations

**Table 2: Tower Structure Results – Percent Capacity Utilized:**

Elevation (ft)	Shaft	Result	Connections	Result
118 to 91.3	44	O. K.	--	--
91.3 to 45.13	81	O. K.	--	--
45.13 to 0	81	O. K.	79	O. K.

1 -Utilization of 105% or less considered acceptable.

**Table 3: Foundation Results, Percent Capacity Utilized**

Component	Design Reactions	Analysis Reactions	Percent Utilized	Result
Moment (k-ft)	2006	1860	93	O. K.
Shear (kips)	22.0	21	95	O. K.

Attachments:

- Project History
- Coax configuration plan, Sheet QP-P
- Program input and output
- Base Plate and Anchor Rod

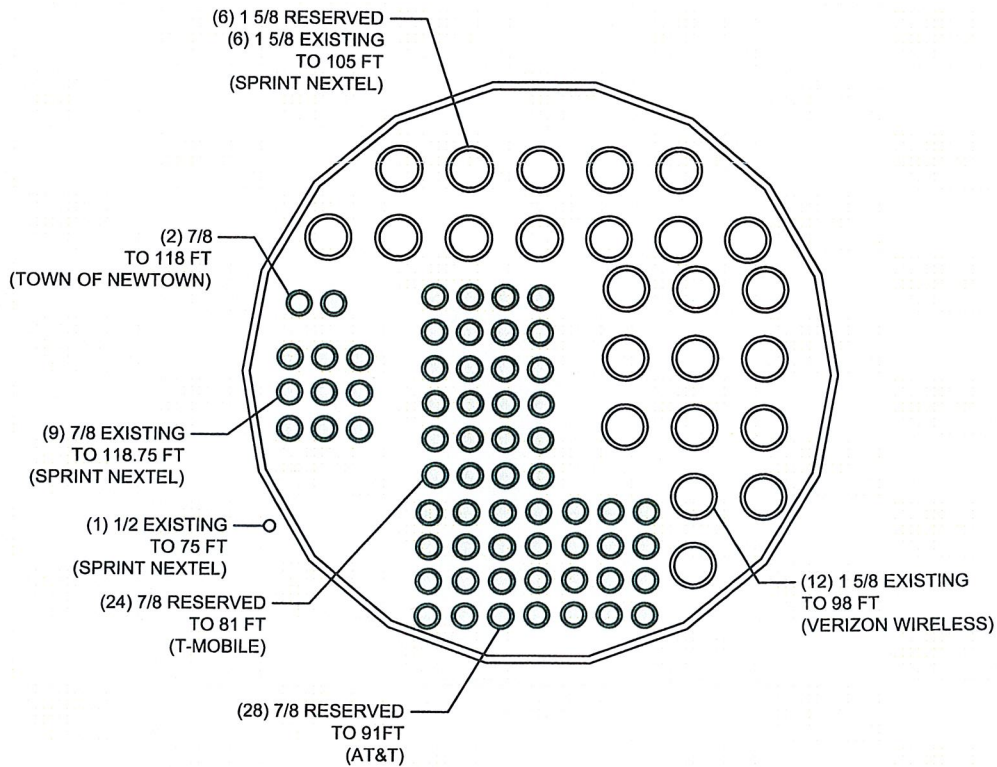




**Project History, 100188.01, CT2008 Newtown-Ferris Rd**

TowerCo Doc ID:	File	By: / For:	Description
242372	19990607_GEO_CT2008.pdf	Applied Earth Technologies / Herbst - Musciano	Geotechnical Investigation Report
242370	19990629_TFDC_CT2008.pdf	Engineered Endeavors Inc. / Nextel	Tower and Foundation Design Calculations
242396	20020308_SAR_CT2008.pdf	Engineered Endeavors Inc. / Sprint PCS	Structural Analysis
506182	20030731_PEL_CT2008.pdf	Engineered Endeavors Inc. / Town of Newtown	PE Letter
470864	20061025_SAR_CT2008.pdf	Semaan Engineering / Sprint USA	Structural Analysis
242404	20080708_SAR_CT2008.pdf	Semaan Engineering / Sprint USA	Structural Analysis
714947	20081102_TEP_CT2008.pdf	SiteMaster / TowerCo	Tower Elevation Profile
719728	20081102_SIR_CT2008.pdf	SiteMaster / TowerCo	Site Inspection Report
---	20100129_CTA_CT2008.doc	Verizon Wireless / TowerCo	Reconfiguration Application
---	20100201_COR_CT2008.mht	TowerCO / Vertical Solutions Inc	Correspondence, Email

**Table Note:**  
Files name format YYYYMMDD-XXX-ZZZZZZ.pdf  
Where:  
YYYY=year  
MM=month  
DD=day published/issued  
XXX=file descriptor  
ZZZZZ=TowerCo Site ID



# COAX CONFIGURATION PLAN AT 81-FT

SCALE: 1 1/2" = 1'-0"

DRAWN BY:	HRS	CHECKED BY:	HRS
SHEET NUMBER:	QP-P		REVISION:
			0
REV	0	DATE	02/09/2010
			VSI #: 100188.01

PREPARED FOR:	

5000 Valley Stone Drive  
Cary, NC 27519  
Office: (919) 469-5559  
Fax: (919) 469-5530  
www.towerco.com

PROJECT NAME:  
**Newtown-Ferris Rd**

TOWERCO JOB #:  
**CT2008**

PREPARED BY:

2002 Production Drive  
Apex, NC 27539  
Office: (888) 321-6167  
Fax: (919) 321-1768  
www.verticalsolutions-inc.com

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
DB222 (Newton)	130	(2) APL868013 w/Mount Pipe (Verizon)	98
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	118.75	RYMSA Wireless MG D3-800TX (Verizon)	98
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	118.75	RYMSA Wireless MG D3-800TX (Verizon)	98
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	118.75	RYMSA Wireless MG D3-800TX (Verizon)	98
PIROD 13' Low Profile Platform (Sprint / Nextel)	118	(2) Powerwave LGP2140X (ATTI)	91
Telewave ANT150D (Newton)	118	(2) Powerwave LGP2140X (ATTI)	91
PIROD 13' Low Profile Platform (Sprint Nextel (Reserved))	105	7770.00 (ATTI)	91
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	105	7770.00 (ATTI)	91
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	105	(2) Powerwave LGP2140X (ATTI)	91
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	105	DR65-19-00DPQ w/Mount Pipe (ATTI)	91
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	98	DR65-19-00DPQ w/Mount Pipe (ATTI)	91
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	98	DR65-19-00DPQ w/Mount Pipe (ATTI)	91
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	98	PIROD 13' Low Profile Platform (ATTI)	91
PIROD 13' Low Profile Platform (Verizon)	98	(2) APX16DWW-16DWW w/MP (T-Mobile)	81
(2) DB846H80E-SX w/Mount Pipe (Verizon)	98	(2) 12" x 6" x 2" TMA (T-Mobile)	81
(2) DB846H80E-SX w/Mount Pipe (Verizon)	98	(2) 12" x 6" x 2" TMA (T-Mobile)	81
		(2) 12" x 6" x 2" TMA (T-Mobile)	81
		PIROD 13' Low Profile Platform (T-Mobile)	81
		(2) APX16DWW-16DWW w/MP (T-Mobile)	81
		(2) APX16DWW-16DWW w/MP (T-Mobile)	81
		GPS (Sprint Nextel)	75

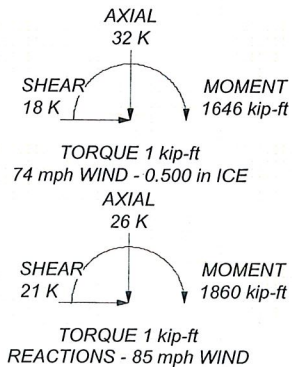
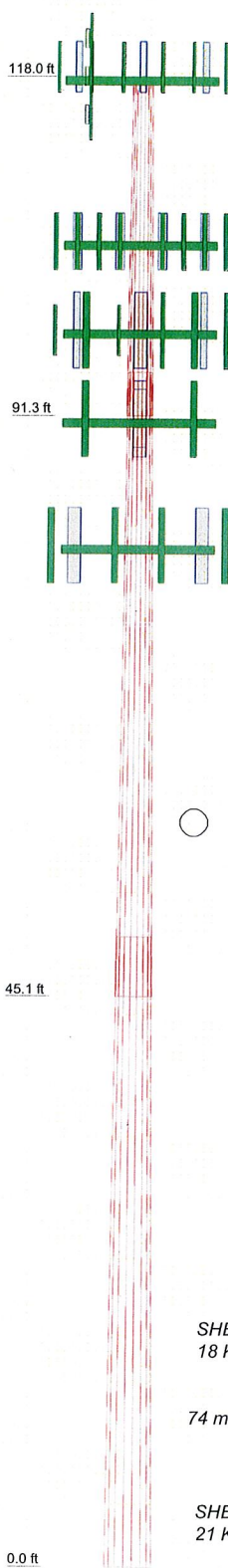
**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield 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. TOWER RATING: 80.7%

Section 1	Length (ft) 26.710	Number of Sides 18	Thickness (in) 0.188	Socket Length (ft) 3.417	Top Dia (in) 17.000	Bot Dia (in) 23.220	Grade	Weight (K) 1.1
Section 2	Length (ft) 49.580	Number of Sides 18	Thickness (in) 0.313	Socket Length (ft) 4.750	Top Dia (in) 22.049	Bot Dia (in) 33.480	Grade A572-65	Weight (K) 4.6
Section 3	Length (ft) 49.877	Number of Sides 18	Thickness (in) 0.375	Socket Length (ft) 31.760	Top Dia (in) 43.250	Bot Dia (in)	Grade	Weight (K) 7.5
								13.2



**TowerCo**

**TowerCo**  
 5000 Valley Stone Drive  
 Cary, NC 27519  
 Phone: (919) 469-5559  
 FAX: (919) 469-5530

Job: <b>CT2008</b>	Project: <b>SAR</b>	Client: <b>Owner</b>	Drawn by: <b>estover</b>	App'd:
Code: <b>TIA/EIA-222-F</b>	Date: <b>05/07/10</b>	Scale: <b>NTS</b>	Dwg No. <b>E-1</b>	
Path: L:\2010\0188_Newtown-Feris Rd_CDT\Task3-9_Model\RI\SACT\2008-ERP.ed				

<b>RISATower</b>  <b>TowerCo</b> 5000 Valley Stone Drive Cary, NC 27519 Phone: (919) 469-5559 FAX: (919) 469-5530	Job	CT2008	Page	1 of 7
	Project	SAR	Date	11:31:58 05/07/10
	Client	Owner	Designed by	estover

## 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 Fairfield 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.

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

## 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	118.000-91.290	26.710	3.417	18	17.000	23.220	0.188	0.750	A572-65 (65 ksi)
L2	91.290-45.127	49.580	4.750	18	22.049	33.480	0.313	1.250	A572-65 (65 ksi)
L3	45.127-0.000	49.877		18	31.760	43.250	0.375	1.500	A572-65 (65 ksi)

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### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	<i>l</i> in <sup>4</sup>	<i>r</i> in	<i>C</i> in	<i>I/C</i> in <sup>3</sup>	<i>J</i> in <sup>4</sup>	<i>It/Q</i> in <sup>2</sup>	<i>w</i> in	<i>w/t</i>
L1	17.262	10.006	357.308	5.968	8.636	41.374	715.086	5.004	2.662	14.197
	23.578	13.707	918.690	8.177	11.796	77.883	1838.588	6.855	3.757	20.036
L2	23.189	21.560	1287.016	7.717	11.201	114.901	2575.726	10.782	3.331	10.658
	33.996	32.898	4572.278	11.774	17.008	268.834	9150.572	16.452	5.342	17.096
L3	33.361	37.356	4648.763	11.142	16.134	288.134	9303.644	18.681	4.930	13.146
	43.917	51.032	11851.902	15.221	21.971	539.434	23719.398	25.521	6.952	18.539

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor <i>A<sub>f</sub></i>	Adjust. Factor <i>A<sub>r</sub></i>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft <sup>2</sup>	in						
L1 118.000-91.290				1	1	1		
L2 91.290-45.127				1	1	1		
L3 45.127-0.000				1	1	1		

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		<i>C<sub>AA</sub></i> ft <sup>2</sup> /ft	Weight plf
LDF5-50A (7/8 FOAM) (Sprint / Nextel)	C	No	Inside Pole	118.000 - 0.000	9	No Ice	0.000	0.330
LDF7-50A (1-5/8 FOAM) (Sprint / Nextel)	C	No	Inside Pole	105.000 - 0.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
LDF5-50A (7/8 FOAM) (Newton)	C	No	Inside Pole	118.000 - 0.000	2	No Ice	0.000	0.330
						1/2" Ice	0.000	0.330
LDF5-50A (7/8 FOAM) (AT&T)	C	No	Inside Pole	91.000 - 0.000	28	No Ice	0.000	0.330
						1/2" Ice	0.000	0.330
LDF7-50A (1-5/8 FOAM) (Verizon)	C	No	Inside Pole	98.000 - 0.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
LDF5-50A (7/8 FOAM) (T-Mobile)	C	No	Inside Pole	81.000 - 0.000	24	No Ice	0.000	0.330
						1/2" Ice	0.000	0.330
LDF4P-50A (1/2 FOAM) (Sprint / Nextel)	C	No	CaAa (Out Of Face)	75.000 - 0.000	1	No Ice	0.063	0.150
						1/2" Ice	0.163	0.840

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	<i>A<sub>R</sub></i> ft <sup>2</sup>	<i>A<sub>F</sub></i> ft <sup>2</sup>	<i>C<sub>AA</sub></i> In Face ft <sup>2</sup>	<i>C<sub>AA</sub></i> Out Face ft <sup>2</sup>	Weight K
L1	118.000-91.290	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	0.298
L2	91.290-45.127	A	0.000	0.000	0.000	0.000	0.000

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Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L3	45.127-0.000	B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.882	1.789
		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	2.843	1.833

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	118.000-91.290	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	0.298
L2	91.290-45.127	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	4.869	1.809
L3	45.127-0.000	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	7.356	1.864

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	A	From Leg	4.000	0.000	118.750	No Ice	3.579	5.396	0.036
			0.000			1/2" Ice	4.201	6.491	0.077
			0.000						
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	B	From Leg	4.000	0.000	118.750	No Ice	3.579	5.396	0.036
			0.000			1/2" Ice	4.201	6.491	0.077
			0.000						
(3) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	C	From Leg	4.000	0.000	118.750	No Ice	3.579	5.396	0.036
			0.000			1/2" Ice	4.201	6.491	0.077
			0.000						
PiROD 13' Low Profile Platform (Sprint / Nextel)	C	None		0.000	118.000	No Ice	15.700	15.700	1.300
						1/2" Ice	20.100	20.100	1.765
*** DB222 (Newton)	A	From Leg	4.000	0.000	130.000	No Ice	1.600	1.600	0.016
			0.000			1/2" Ice	2.880	2.880	0.021
			0.000						
Telewave ANT150D (Newton)	C	From Leg	4.000	0.000	118.000	No Ice	9.064	9.064	0.032
			0.000			1/2" Ice	9.837	9.837	0.118
			0.000						
*** 7770.00 (AT&T)	A	From Leg	4.000	0.000	91.000	No Ice	5.882	2.928	0.035
			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
7770.00 (AT&T)	B	From Leg	4.000	0.000	91.000	No Ice	5.882	2.928	0.035
			0.000	0.000		1/2" Ice	6.314	3.273	0.068
7770.00 (AT&T)	C	From Leg	4.000	0.000	91.000	No Ice	5.882	2.928	0.035
			0.000	0.000		1/2" Ice	6.314	3.273	0.068
(2) Powerwave LGP2140X (AT&T)	A	From Leg	4.000	0.000	91.000	No Ice	1.288	0.364	0.014
			0.000	0.000		1/2" Ice	1.445	0.479	0.021
(2) Powerwave LGP2140X (AT&T)	B	From Leg	4.000	0.000	91.000	No Ice	1.288	0.364	0.014
			0.000	0.000		1/2" Ice	1.445	0.479	0.021
(2) Powerwave LGP2140X (AT&T)	C	From Leg	4.000	0.000	91.000	No Ice	1.288	0.364	0.014
			0.000	0.000		1/2" Ice	1.445	0.479	0.021
***									
(2) APX16DWV-16DWV w/MP (T-Mobile)	A	From Leg	4.000	0.000	81.000	No Ice	6.837	3.190	0.036
			0.000	0.000		1/2" Ice	7.305	3.822	0.079
(2) APX16DWV-16DWV w/MP (T-Mobile)	B	From Leg	4.000	0.000	81.000	No Ice	6.837	3.190	0.036
			0.000	0.000		1/2" Ice	7.305	3.822	0.079
(2) APX16DWV-16DWV w/MP (T-Mobile)	C	From Leg	4.000	0.000	81.000	No Ice	6.837	3.190	0.036
			0.000	0.000		1/2" Ice	7.305	3.822	0.079
(2) 12" x 6" x 2" TMA (T-Mobile)	A	From Leg	4.000	0.000	81.000	No Ice	0.700	0.233	0.010
			0.000	0.000		1/2" Ice	0.821	0.328	0.014
(2) 12" x 6" x 2" TMA (T-Mobile)	B	From Leg	4.000	0.000	81.000	No Ice	0.700	0.233	0.010
			0.000	0.000		1/2" Ice	0.821	0.328	0.014
(2) 12" x 6" x 2" TMA (T-Mobile)	C	From Leg	4.000	0.000	81.000	No Ice	0.700	0.233	0.010
			0.000	0.000		1/2" Ice	0.821	0.328	0.014
PiROD 13' Low Profile Platform (T-Mobile)	C	None		0.000	81.000	No Ice	15.700	15.700	1.300
						1/2" Ice	20.100	20.100	1.765
***									
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	A	From Leg	4.000	0.000	98.000	No Ice	8.637	5.779	0.059
			0.000	0.000		1/2" Ice	9.290	6.949	0.119
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	B	From Leg	4.000	0.000	98.000	No Ice	8.637	5.779	0.059
			0.000	0.000		1/2" Ice	9.290	6.949	0.119
Powerwave P65-16-XL-2 with Mount Pipe (Verizon)	C	From Leg	4.000	0.000	98.000	No Ice	8.637	5.779	0.059
			0.000	0.000		1/2" Ice	9.290	6.949	0.119
PiROD 13' Low Profile Platform (Verizon)	C	None		0.000	98.000	No Ice	15.700	15.700	1.300
						1/2" Ice	20.100	20.100	1.765
***									
***									
(2) DB846H80E-SX w/Mount Pipe (Verizon)	A	From Leg	4.000	0.000	98.000	No Ice	5.321	7.725	0.041
			0.000	0.000		1/2" Ice	5.874	8.915	0.096
(2) DB846H80E-SX w/Mount Pipe	B	From Leg	4.000	0.000	98.000	No Ice	5.321	7.725	0.041
			0.000	0.000		1/2" Ice	5.874	8.915	0.096

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
(Verizon)			0.000						
(2) APL868013 w/Mount Pipe	C	From Leg	4.000	0.000	98.000	No Ice	3.579	5.396	0.032
(Verizon)			0.000			1/2" Ice	4.201	6.491	0.073
RYMSA Wireless MG D3-800TX	A	From Leg	4.000	0.000	98.000	No Ice	4.176	3.994	0.035
(Verizon)			0.000			1/2" Ice	4.591	4.773	0.070
RYMSA Wireless MG D3-800TX	B	From Leg	4.000	0.000	98.000	No Ice	4.176	3.994	0.035
(Verizon)			0.000			1/2" Ice	4.591	4.773	0.070
RYMSA Wireless MG D3-800TX	C	From Leg	4.000	0.000	98.000	No Ice	4.176	3.994	0.035
(Verizon)			0.000			1/2" Ice	4.591	4.773	0.070
***			0.000						
PiROD 13' Low Profile Platform	C	None		0.000	105.000	No Ice	15.700	15.700	1.300
(Sprint Nextel (Reserved))						1/2" Ice	20.100	20.100	1.765
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	A	From Leg	4.000	0.000	105.000	No Ice	5.116	3.486	0.044
			0.000			1/2" Ice	5.788	4.537	0.082
			0.000						
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	B	From Leg	4.000	0.000	105.000	No Ice	5.116	3.486	0.044
			0.000			1/2" Ice	5.788	4.537	0.082
			0.000						
(4) 48000 w/Mount Pipe (Sprint Nextel (Reserved))	C	From Leg	4.000	0.000	105.000	No Ice	5.116	3.486	0.044
			0.000			1/2" Ice	5.788	4.537	0.082
			0.000						
DR65-19-00DPQ w/Mount Pipe (AT&T)	A	From Leg	4.000	0.000	91.000	No Ice	8.637	5.196	0.058
			0.000			1/2" Ice	9.290	6.360	0.115
			0.000						
DR65-19-00DPQ w/Mount Pipe (AT&T)	B	From Leg	4.000	0.000	91.000	No Ice	8.637	5.196	0.058
			0.000			1/2" Ice	9.290	6.360	0.115
			0.000						
DR65-19-00DPQ w/Mount Pipe (AT&T)	C	From Leg	4.000	0.000	91.000	No Ice	8.637	5.196	0.058
			0.000			1/2" Ice	9.290	6.360	0.115
			0.000						
PiROD 13' Low Profile Platform (AT&T)	C	None		0.000	91.000	No Ice	15.700	15.700	1.300
						1/2" Ice	20.100	20.100	1.765
GPS (Sprint Nextel)	C	None		0.000	75.000	No Ice	0.466	0.128	0.004
						1/2" Ice	0.561	0.193	0.007

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>n</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P/P <sub>a</sub>
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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P P <sub>a</sub>
L1	118 - 91.29 (1)	TP23.22x17x0.188	26.710	0.000	0.0	39.000	13.234	-5.595	516.114	0.011
L2	91.29 - 45.1267 (2)	TP33.48x22.049x0.313	49.580	0.000	0.0	39.000	31.812	-14.836	1240.660	0.012
L3	45.1267 - 0 (3)	TP43.25x31.76x0.375	49.877	0.000	0.0	39.000	51.032	-25.625	1990.250	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	118 - 91.29 (1)	TP23.22x17x0.188	134.882	22.303	39.000	0.572	0.000	0.000	39.000	0.000
L2	91.29 - 45.1267 (2)	TP33.48x22.049x0.313	868.208	41.459	39.000	1.063	0.000	0.000	39.000	0.000
L3	45.1267 - 0 (3)	TP43.25x31.76x0.375	1859.78	41.372	39.000	1.061	0.000	0.000	39.000	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	118 - 91.29 (1)	TP23.22x17x0.188	11.347	0.857	26.000	0.066	0.312	0.025	26.000	0.001
L2	91.29 - 45.1267 (2)	TP33.48x22.049x0.313	18.509	0.582	26.000	0.045	0.311	0.007	26.000	0.000
L3	45.1267 - 0 (3)	TP43.25x31.76x0.375	21.266	0.417	26.000	0.032	0.310	0.003	26.000	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P $\frac{P}{P_a}$	Ratio f <sub>bx</sub> $\frac{f_{bx}}{F_{bx}}$	Ratio f <sub>by</sub> $\frac{f_{by}}{F_{by}}$	Ratio f <sub>v</sub> $\frac{f_v}{F_v}$	Ratio f <sub>vt</sub> $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	118 - 91.29 (1)	0.011	0.572	0.000	0.066	0.001	0.584	1.333	H1-3+VT ✓
L2	91.29 - 45.1267 (2)	0.012	1.063	0.000	0.045	0.000	1.076	1.333	H1-3+VT ✓
L3	45.1267 - 0 (3)	0.013	1.061	0.000	0.032	0.000	1.074	1.333	H1-3+VT ✓

### Section Capacity Table

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail	
L1	118 - 91.29	Pole	TP23.22x17x0.188	1	-5.595	687.980	43.8	Pass	
L2	91.29 - 45.1267	Pole	TP33.48x22.049x0.313	2	-14.836	1653.800	80.7	Pass	
L3	45.1267 - 0	Pole	TP43.25x31.76x0.375	3	-25.625	2653.003	80.6	Pass	
							Summary		
							Pole (L2)	80.7	Pass
							<b>RATING =</b>	<b>80.7</b>	<b>Pass</b>

**FLANGE PLATE DESIGN, DEFORMATION METHOD (DIFFERENT AREAS)**

**Input -** M := 1860·kip·ft = moment at top of flange plate  
 P := 26·kip = axial load (use zero if base plate is grouted)  
 F<sub>y</sub> := 60·ksi = yield stress of flange plate  
 b<sub>eff</sub> := 11.322·in = effective width of flange plate in flexure  
 t := 1.75·in = thickness of flange plate  
 ASI := 133·% = allowable stress increase

**CONSTANTS:**

psi ≡  $\frac{\text{lb}}{\text{in}^2}$   
 ksi ≡ 1000·psi  
 kip ≡ 1000·lb

$$Q := \begin{pmatrix} 2 \\ 4 \\ 4 \\ 2 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \quad d := \begin{pmatrix} 2 \cdot 12 + 2 \\ 1 \cdot 12 + 10 + \frac{1}{2} \\ 1 \cdot 12 + 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in} \quad A_{\text{stiff}} := \begin{pmatrix} 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in}^2$$

$$A_{\text{stress}} := \begin{pmatrix} 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in}^2 \quad F_t := \begin{pmatrix} 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{ksi}$$

$$\sum \vec{Q} = 12 \quad \text{sumQAd} := \sum \left( \overrightarrow{Q \cdot d^2 \cdot A_{\text{stiff}}} \right)$$

$$\text{sumQAd} = 16131 \cdot \text{in}^4$$

$$R := \frac{M \cdot \left( \overrightarrow{d \cdot A_{\text{stiff}}} \right)}{\text{sumQAd}} + \frac{P \cdot A_{\text{stiff}}}{\sum \left( A_{\text{stiff}} \cdot Q \right)}$$

$$f_t := \left( \frac{R}{A_{\text{stress}}} \right) \quad r := \left( \frac{f_t}{\text{ASI} \cdot F_t} \right)$$

$$R = \begin{pmatrix} 145.3 \\ 126.1 \\ 73.8 \\ 2.2 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \end{pmatrix} \cdot \text{kip} \quad f_t = \begin{pmatrix} 44.7 \\ 38.8 \\ 22.7 \\ 0.7 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \end{pmatrix} \cdot \text{ksi} \quad r = \begin{pmatrix} 75 \\ 65 \\ 38 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \%$$

Q = quantity of fasteners

d = distance from center

A = area of fastener

F<sub>t</sub> = allowable tension stress



**BASE PLATE DESIGN (with stiffener plates, no grout), TIA-222-F**

**Input -**  $P_{max} := \frac{195}{2} \cdot \text{kip}$  = ultimate tension in anchor rod  
 $x := 3 \cdot \text{in}$  = distance from centerline of stiffener plate to center of anchor rod  
 $y := 4.375 \cdot \text{in}$  = distance from shaft wall to center of anchor rod  
 $t := 1.75 \cdot \text{in}$  = thickness of base plate  
 $F_y := 60 \cdot \text{ksi}$  = minimum specified yield strength  
 $k := 3 \cdot \text{in}$  = distance from center of anchor rod to edge of base plate

**CONSTANTS:**

$\text{psi} \equiv \frac{\text{lb}}{\text{in}^2}$   
 $\text{ksi} \equiv 1000 \cdot \text{psi}$   
 $\text{kip} \equiv 1000 \cdot \text{lb}$

$$I_x := \frac{2 \cdot x \cdot t^3}{12} \quad k_x := \frac{3 \cdot I_x}{y^3} \quad S_x := \frac{I_x}{\left(\frac{t}{2}\right)}$$

$$I_y := \frac{(y + k) \cdot t^3}{12} \quad k_y := \frac{3 \cdot I_y}{x^3} \quad S_y := \frac{I_y}{\left(\frac{t}{2}\right)}$$

$$M_{xMax} := \frac{k_x}{k_x + 2k_y} \cdot P_{max} \cdot y \quad M'_{xAll} := F_y \cdot S_x \quad r_x := \frac{M_{xMax}}{M'_{xAll}} \quad r_x = 27\%$$

$$M_{yMax} := \frac{k_y}{k_x + 2k_y} \cdot P_{max} \cdot x \quad M'_{yAll} := F_y \cdot S_y \quad r_y := \frac{M_{yMax}}{M'_{yAll}} \quad r_y = 57\%$$

$$r := \sqrt{r_x^2 + r_y^2} \quad r = 63\%$$

$$P_{Shaft} := \frac{k_x}{k_x + 2k_y} \cdot P_{max} \quad P_{Shaft} = 11.3 \cdot \text{kip}$$

$$P_{Stiff} := \frac{k_y}{k_x + 2k_y} \cdot P_{max} \quad P_{Stiff} = 43.1 \cdot \text{kip}$$



**STIFFENER DESIGN, TIA-222-F:  
(fillet welds vertical, CJP bottom)**

VSI Job No.: 100188  
Date: 05/7/10  
Calculated by: ESS

**Input - PROPERTIES AND FORCES:**

- $P_{max} := 97.5 \cdot \text{kip}$  = Factored force in stiffener plate
- $y := 4.375 \cdot \text{in}$  = distance from flat to center of anchor rod
- $t_{VW} := 0.375 \cdot \text{in}$  = thickness of vertical weld
- $L_{VW} := 16 \cdot \text{in}$  = length of vertical weld (length of stiffener plate)
- $L_{HW} := 7 \cdot \text{in}$  = length of horizontal weld (bottom width of stiffener plate)
- $t_{SP} := 0.5 \cdot \text{in}$  = thickness of stiffener plate
- $F_y := 50 \cdot \text{ksi}$  = yield stress of stiffener plate material
- $F_u := 70 \cdot \text{ksi}$  = ultimate stress of weld electrode

**CONSTANTS:**

- $\Psi = 1$
- $\text{psi} = \frac{\text{lb}}{\text{in}^2}$      $\text{ksi} = 1000 \cdot \text{psi}$
- $\text{kip} = 1000 \cdot \text{lb}$
- $E = 29000 \cdot \text{ksi}$

$$V_y := P_{max}$$

$$V_y = 98 \cdot \text{kip}$$

$$M_{yMax} := P_{max} \cdot y$$

$$M_{yMax} = 427 \cdot \text{kip} \cdot \text{in}$$

$$T_x := P_{max}$$

$$T_x = 98 \cdot \text{kip}$$

$$M_{xMax} := P_{max} \cdot y$$

$$M_{xMax} = 427 \cdot \text{kip} \cdot \text{in}$$

$$V'_{yAll} := 2 \cdot \frac{4}{3} \cdot 0.30 F_u \cdot 0.707 \cdot t_{VW} \cdot L_{VW}$$

$$V'_{yAll} = 238 \cdot \text{kip}$$

$$r_v := \frac{V_y}{V'_{yAll}}$$

$$r_v = 41.0\%$$

$$S_y := \frac{2 \cdot 0.707 t_{VW} \cdot L_{VW}^2}{6}$$

$$M'_{yAll} := \frac{4}{3} \cdot 0.30 F_u \cdot S_y$$

$$M'_{yAll} = 633 \cdot \text{kip} \cdot \text{in}$$

$$r_{fy} := \frac{M_{yMax}}{M'_{yAll}}$$

$$r_{fy} = 67.0\%$$

$$r_{vf} := \sqrt{r_v^2 + r_{fy}^2}$$

$$r_{vf} = 79.0\%$$

$$T'_{xAll} := \frac{4}{3} \cdot 0.60 \cdot F_y \cdot t_{SP} \cdot L_{HW}$$

$$T'_{xAll} = 140 \cdot \text{kip}$$

$$r_t := \frac{T_x}{T'_{xAll}}$$

$$r_t = 70.0\%$$

PLANS PREPARED FOR:



5000 VALLEYSTONE DRIVE  
CARY, NC 27519  
(919) 653-5704

PROJECT INFORMATION:

**NEWTON-FERRIS RD.  
CT2008**

8 FERRIS ROAD  
NEWTON, CT 06470  
(FAIRFIELD COUNTY)

PLANS PREPARED BY:



2002 PRODUCTION DRIVE  
APEX, NC 27539  
OFFICE: (888) 321-6167  
www.verticalsolutions-inc.com

REV	DATE	CONSTRUCTION	ISSUED FOR
0	05-07-10	CONSTRUCTION	

DRAWN BY: CLS CHECKED BY: ESS

SHEET TITLE:

**TITLE SHEET**

SHEET NUMBER:

**T-1**

REVISION:

0

VSI #: 00188.08

SEAL:



May 7, 2010

**PROJECT DESCRIPTION:**

STRUCTURAL UPGRADE

**TOWER TYPE:**

118' SELF-SUPPORTING POLE STRUCTURE

**AREA OF CONSTRUCTION:**

**PROJECT INFORMATION**



**CONNECTICUT  
ONE CALL**  
CALL BEFORE YOU DIG  
1-800-922-4465

**ONE CALL**

SHEET	DESCRIPTION	REV
T-1	TITLE SHEET	0
N-1	PROJECT NOTES	0
N-2	PROJECT NOTES & BILL OF MATERIALS	0
S-1	TOWER ELEVATION AND MODIFICATION SCHEDULE	0
S-2	CONSTRUCTION & FABRICATION DETAILS	0

**INDEX OF SHEETS**

PROJECT INFORMATION:

PROJECT NAME:

**NEWTON-FERRIS RD.  
CT2008**

PROJECT LOCATION:

**8 FERRIS ROAD  
NEWTON, CT 06470  
(FAIRFIELD COUNTY)**

LATITUDE N41° 23' 23.08"  
LONGITUDE W73° 20' 18.40"  
GROUND ELEVATION 783'

**2-C CERTIFICATION (REF: TOWERCO)**

**SITE CONSTRUCTION MANAGER:**

TOWERCO  
5000 VALLEYSTONE DRIVE  
CARY, NC 27519  
DWAYNE LYERLY  
CONTACT  
PHONE (919) 653-5704

**SITE APPLICANT:**

CELLCO dba VERIZON WIRELESS  
180 WASHINGTON VALLEY RD.  
BEDMINSTER, NJ 07821  
KEISHA FRITH  
CONTACT  
PHONE (860) 803-8238

**SURVEYOR:**

N/A  
N/A  
N/A  
N/A  
N/A  
N/A

**CIVIL ENGINEER:**

VERTICAL SOLUTIONS  
2002 PRODUCTION DRIVE  
APEX, NC 27539  
MIKE LASSITER  
CONTACT  
PHONE (888) 321-6167

**ELECTRICAL ENGINEER:**

N/A  
N/A  
N/A  
N/A  
N/A  
N/A

**PROPERTY INFORMATION:**

NEWTON-FERRIS RD.  
8 FERRIS ROAD  
NEWTON, CT 06470  
CRAIG HARTMAN  
CONTACT  
PHONE (817) 733-6007

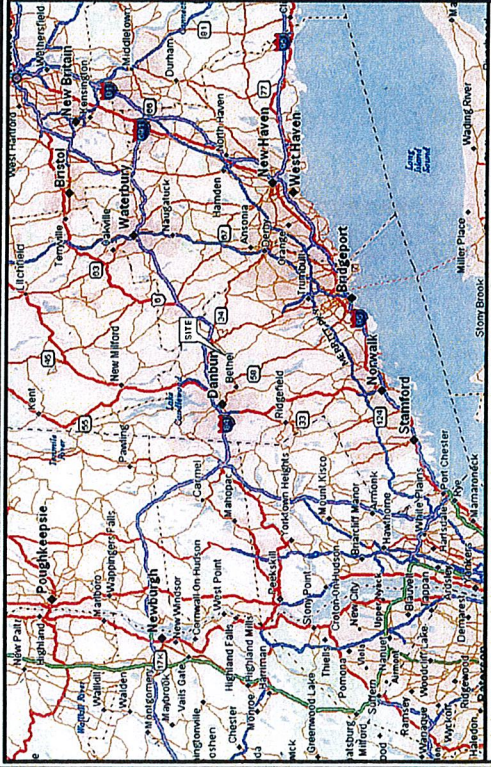
**UTILITIES:**

N/A  
POWER COMPANY  
CONTACT  
PHONE N/A

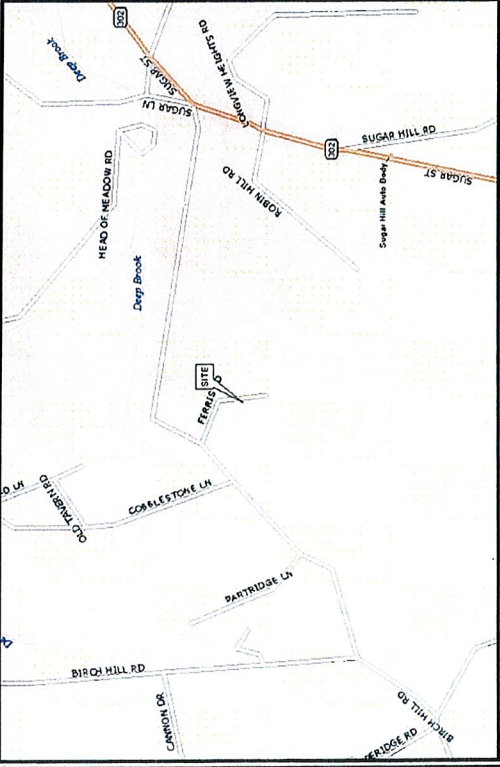
**TELEPHONE COMPANY:**

N/A  
CONTACT  
PHONE N/A  
PHONE # NEAR SITE  
N/A

**CONTACT INFORMATION**



**PROXIMITY MAP**



**LOCATION MAP**

START AT DANBURY GO STRAIGHT (ENE) ON CHAPEL PL. IN 0.08 MI TURN LEFT (NWT) ONTO SR 53 (MAIN ST). IN 0.80 MI TURN RT (ENE) ONTO I-84 E. GOVERNOR JOHN DAVIS LODGE TRAVEL BUS 7/US 202) RAMP. IN 6.86 MI KEEP FT (E) ONTO SR 25 (HAWLEYVILLE RD) RAMP 8. IN 0.11 MI KEEP FT (ESE) ON SR 25 (HAWLEYVILLE RD) RAMP. IN 0.03 MI GO STRAIGHT (S) ONTO SR 25 (HAWLEYVILLE RD). IN 0.48 MI KEEP LEFT (SW) ONTO US 6 (SHEMOUNT PLEASANT RD). IN 0.10 MI TURN LEFT (SSE) ONTO TAUNDRIGHT HILL RD. IN 0.77 MI TURN LEFT (ENE) ONTO TAYLOR HILL RD. IN 0.26 MI KEEP RT (S) ONTO CORBETT HILL RD. IN 0.42 MI TURN LEFT (SSE) ONTO LASHFORD LN. IN 0.26 MI KEEP RT (S) ONTO FERRIS RD. IN 0.11 MI FINISH AT SITE.

**DRIVING DIRECTIONS**

**GENERAL NOTES:**

- ALL REFERENCES TO TOWER OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED AS TOWERCO OR ITS DESIGNATED REPRESENTATIVE.
- ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK AND SHALL BE DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE HAS THE NECESSARY EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.
- THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH TIA/EIA-222-F-1996, FOR A 65 MPH (FASTEST WIND) BASIC WIND SPEED. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, 2006 EDITION.
- UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
- ALL PRODUCT MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERCEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE MODIFICATION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE-DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
- ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING. ERECTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES AND PROCEDURES.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE AND LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
- BILL OF MATERIALS AND PART NUMBERS LISTED ON THE CONSTRUCTION DRAWINGS ARE INTENDED TO AID THE CONTRACTOR/OWNER. CONTRACTOR/OWNER SHALL VERIFY PARTS AND QUANTITIES WITH THE MANUFACTURER PRIOR TO BIDDING AND/OR ORDERING MATERIALS.
- CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNING AGENCIES.
- ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- 24 HOURS BEFORE THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
- THE CONTRACTOR SHALL REWORK (DRY, SCARIFY, ETC.) ALL MATERIAL NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE. IF THE MATERIAL REMAINS UNSUITABLE AFTER REWORKING, THE CONTRACTOR SHALL UNDERCUT THIS MATERIAL AND REPLACE IT WITH APPROVED MATERIAL. IF PAVING IS TO BE DONE, ALL SUBGRADES SHALL BE PROFFERED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK PRIOR TO PAVING. ANY SOFT MATERIAL SHALL BE REMOVED OR REPLACED.
- THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
- ALL DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

**STRUCTURAL STEEL NOTES:**

- THE FABRICATION AND SECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATION FOR THE MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.
- UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
  - ALL SHAPES SHALL BE ASTM A572-50, PLATES A36, TUBES A500-C, PIPES A500-C
  - ALL BOLTS SHALL BE GALVANIZED A325 HIGH STRENGTH BOLTS.
  - ALL NUTS SHALL BE CARBON AND ALLOY STEEL NUTS.
  - ALL WASHERS SHALL BE ASTM F436 HARDENED STEEL WASHERS.
- ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.
- HOLDS SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER.
- HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED. AFTER FABRICATION WHERE PRACTICABLE GALVANIZING: ASTM A123, ASTM A153/153M OR ASTM A653/653M, G90, AS APPLICABLE.
- REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM OR BY APPLICATION OF STICK OR THICK PASTE MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN SURFACES TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED. WELDS TO BE REPAIRED TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTE; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.
- A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
- DO NOT OVER TORQUE ASSEMBLY BOLTS. GALVANIZING ON BOLT NUTS AND STEEL PARTS MAY ACT AS A LUBRICANT, THIS OVER TIGHTENING MAY OCCUR AND MAY CAUSE BOLTS TO CRACK AND SNAP OFF.

**BOLT TIGHTENING PROCEDURE:**

- TIGHTEN FLANGE BOLTS BY AISC- "TURN OF THE NUT" METHOD, USING THE CHART BELOW:
 

BOLT LENGTHS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
3/4" BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
7/8" BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1" BOLTS UP TO AND INCLUDING 4.5 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/8" BOLTS UP TO AND INCLUDING 5.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/4" BOLTS UP TO AND INCLUDING 5.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/2" BOLTS UP TO AND INCLUDING 6.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT

BOLT LENGTH OVER FOUR DIA. BUT NOT EXCEEDING 8 DIA.  
 3/4" BOLTS 4.25 TO 6.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT  
 7/8" BOLTS 4.25 TO 7.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT  
 1" BOLTS 4.25 TO 8.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT  
 1-1/8" BOLTS 4.75 TO 9.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT  
 1-1/4" BOLTS 5.25 TO 10.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT  
 1-1/2" BOLTS 6.25 TO 12.0 INCH LENGTH +1/2 TURN BEYOND SNUG TIGHT
- SPRUE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8(d)(1) OF THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:
 

\*FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND BE TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8(d)(1) THROUGH 8(d)(4).

8(d)(1) TURN-OF-THE-NUT TIGHTENING

BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN THE PILES OF A JOINT ARE IN FIRM CONTACT. THIS MAY BE OBTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH. SNUG TIGHTENING SHALL PROGRESS SYSTEMATICALLY UNTIL ALL THE BOLTS ARE SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. BOLTS WHICH ARE SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.



BEFORE 1/3 TURN



AFTER 1/3 TURN

PLANS PREPARED FOR:

**TowerCo**  
 5000 VALLEYSTONE DRIVE  
 CARY, NC 27519  
 (919) 653-5704

PROJECT INFORMATION:  
**NEWTON-FERRIS RD.  
 CT2008**  
 8 FERRIS ROAD  
 NEWTON, CT 06470  
 (FAIRFIELD COUNTY)

PLANS PREPARED BY:

**vertical solutions**  
 2002 PRODUCTION DRIVE  
 APEX, NC 27539  
 OFFICE: (888) 321-6167  
 www.verticalsolutions-inc.com

0	05-07-10	CONSTRUCTION	
REV	DATE	ISSUED FOR:	
DRAWN BY: CLS	CHECKED BY: ESS		

**PROJECT NOTES**

SHEET NUMBER:  
**N-1**  
 REVISION: 0  
 VSI #: 10018809

SEAL:

May 7, 2010

REV	DATE	ISSUED FOR:	CHECKED BY:
0	05-07-10	CONSTRUCTION	E55
DRAWN BY: CLS			
SHEET TITLE:			

**PROJECT NOTES & BILL OF MATERIALS**

SHEET NUMBER: **N-2** REVISION: **0**  
VSI #: 100169.03



**SPECIAL INSPECTION**

- A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH IBC 2006, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
  - STRUCTURAL WELDING
  - HIGH STRENGTH BOLTS
- THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH IBC 2006, SECTION 1704. UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM SUCH WORK WITHOUT THE SPECIAL INSPECTIONS.

**FIELD BOLTS**

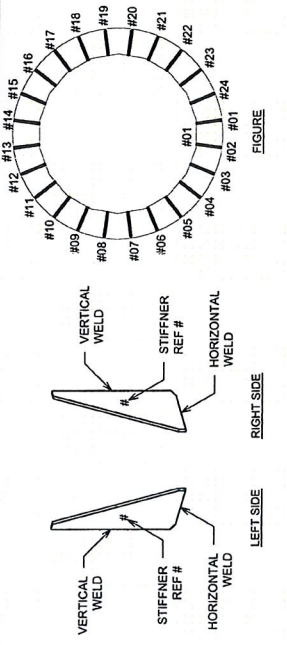
- ALL STITCH, SPlice & TERMINATION BOLTS ARE 20 mm ONESIDE BOLTS BY AJAX.
  - BOLTS SHALL MEET AS 1252, PROPERTY CLASS 8.8 (SIMILAR TO ASTM A325M)
  - Fu = 120 ksi
- EACH BOLT SHALL INCLUDE A 29 mm O.D. BY 20 mm I.D. SLEEVE ( Fu=120 ksi )
- BOLT HOLES SHALL BE 31 mm MAXIMUM.

**PHOTO CHECKLIST**

- CONTRACTOR SHALL SUBMIT THE FOLLOWING PHOTOS TO VERTICAL SOLUTIONS. IF PHOTOS DON'T MEET THE SATISFACTION OF OWNER OR ENGINEER OF RECORD, CONTRACTOR SHALL RETURN TO SITE AT HIS OWN EXPENSE TO OBTAIN ADDITIONAL PHOTOS. AS AN ALTERNATE, CONTRACTOR MAY RETAIN VERTICAL SOLUTIONS TO EXECUTE AN INSPECTION FOR A FEE. TOWERCO MAY ALSO ELECT TO RETAIN VERTICAL SOLUTIONS IF CONTRACTOR SCHEDULE DOES NOT MEET PROJECT TIMELINE. CONTACT inspection@verticalsolutions-inc.com FOR FEE AMOUNT AND / OR SCHEDULE.

**STIFFNER PLATES - SELF SUPPORTING POLE STRUCTURE**

COMPLETE (Y/N)	PHOTOGRAPHS DESCRIPTION
	LABEL AND PHOTO EACH STIFFNER PLATE EACH SIDE AFTER WELDING AND PRIOR TO COLD GALVANIZING.
	LABEL AND PHOTO EACH STIFFNER PLATE EACH SIDE AFTER COLD GALVANIZING.



**BILL OF MATERIALS - MONOPOLE REINFORCEMENT**

MARK NO.	DESCRIPTION	SIZE	QTY
SP	STIFFENER PLATE	A572-50 R 1/2" x 7' x 16"	24
	WELD ELECTRODE	E70XX	TBD

**APPLICABLE CODES AND STANDARDS**

- TIA/EIA STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, 222-F 1996 EDITION.
- 2006 INTERNATIONAL BUILDING CODE.
- ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-99.
- CRSI: CONCRETE REINFORCING STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, LATEST EDITION.
- AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
- AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE, LATEST EDITION.

**STRUCTURAL STEEL**

- ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATIONS, LATEST EDITION.
- ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
- ALL U-BOLTS SHALL BE ASTM A307 OR EQUIVALENT, WITH LOCKING DEVICE, UNLESS NOTED OTHERWISE.

**WELDING**

- ALL WELDING SHALL BE PERFORMED BY WELDERS CURRENTLY STATE OR AWS CERTIFIED TO THE AWS D1.1 STRUCTURAL WELDING CODE, LATEST EDITION.
- ALL FIELD WELDING SHALL UTILIZE LOW HYDROGEN ELECTRODES.
- PRIOR TO FIELD WELDING, GRIND OFF GALVANIZING TO 1/2" BEYOND ALL FIELD WELD SURFACES.
- ALL FIELD CUT, FIELD WELDED, OR DAMAGED GALVANIZING SURFACES SHALL BE REPAIRED WITH ZINC RICH PAINT (85% ZINC CONTENT) PER ASTM A780.
- PRIOR TO FIELD WELDING, CONTRACTOR SHALL CLEAR THE INTERIOR OF MONOPOLE OF FLAMMABLE DEBRIS. COAXIAL CABLE SHALL BE SHIFTED AWAY FROM PROXIMITY OF THE WELD AND/OR COVERED WITH A HEAT RESISTANT BLANKET.

**PAINT**

- CLEAN AND PAINT PROPOSED STEEL ACCORDING TO FAA ADVISORY CIRCULAR AC 70/7460-1K.

**REINFORCEMENT STEEL**

- ALL REINFORCEMENT BARS ARE ASTM A572 GRADE 50, Fy = 50 ksi, Fu = 65 ksi.

**FIELD WELDS**

- ALL FIELD WELDS SHALL BE MADE WITH E70XX WELD RODS.

**GENERAL NOTES:**

- ALL METHODS, MATERIAL AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICES.
- ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
- ANY SUBSTITUTIONS MUST CONFORM TO THE REQUIREMENTS OF THE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
- ANY MANUFACTURED DESIGN ELEMENTS MUST CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. THESE DESIGN ELEMENTS MUST BE STAMPED BY AN ENGINEER PROFESSIONALLY REGISTERED IN THE STATE OF THE PROJECT, AND SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL PRIOR TO FABRICATION.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
- ANY STEEL WHICH HAS BEEN FIELD CUT OR WELDED SHALL BE COLD GALVANIZED WITH 85% ZINC RICH PAINT PER ASTM A780.
- CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.



PLANS PREPARED FOR:



5000 VALLEYSTONE DRIVE  
CARY, NC 27519  
(919) 653-5704

PROJECT INFORMATION:

**NEWTON-FERRIS RD.  
CT2008**

8 FERRIS ROAD  
NEWTON, CT 06470  
(FAIRFIELD COUNTY)

PLANS PREPARED BY:



2002 PRODUCTION DRIVE  
APEX, NC 27539  
OFFICE: (888) 321-8167  
www.verticalsolutions-inc.com

REV	DATE	ISSUED FOR:
0	05-07-10	CONSTRUCTION
DRAWN BY: CLS		
CHECKED BY: ESS		

SHEET TITLE:  
**TOWER ELEVATION  
AND MODIFICATION  
SCHEDULE**

SHEET NUMBER:	<b>S-1</b>
REVISION:	<b>0</b>
V51 #:	10010609

SEAL:



May 7, 2010

**MODIFICATION DESIGN PROVISIONS**

THIS MODIFICATION DESIGN IS BASED ON VERTICAL SOLUTIONS STRUCTURAL ANALYSIS REPORT, V51 JOB #100186.09 REV 0 DATED MAY 07, 2010. THIS REPORT IS BASED ON A SPECIFIC ANTENNA AND COAX CONFIGURATION. SEE SHEET N-1 FOR ANTENNA AND COAX LOADING. ANY OTHER ANTENNA CONFIGURATION REQUIRES REVIEW BY VERTICAL SOLUTIONS.

**CONSTRUCTION INTERFERENCES**

EXISTING AND PROPOSED ANTENNAS, MOUNTS, COAX, AND HAND-HOLE RIMS ARE NOT SHOWN FOR CLARITY. CONTRACTOR SHALL COORDINATE WITH THE TOWER OWNER WITH RESPECT TO INTERFERENCES TO REINFORCEMENT. CONTRACTOR SHALL FIELD VERIFY TOWER DIMENSION PRIOR TO FABRICATION.

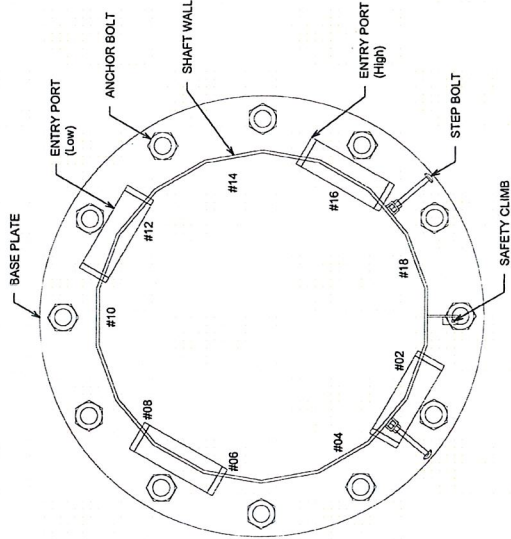
**FIELD VERIFICATION**

FIELD VERIFICATION COMPLETED BY VERTICAL SOLUTIONS, INC. PRE-MODIFICATION INSPECTION REPORT, JOB #100186.09, DATED, APRIL 28, 2010.

**MODIFICATION SCHEDULE**

NO. MODIFICATION DESCRIPTION

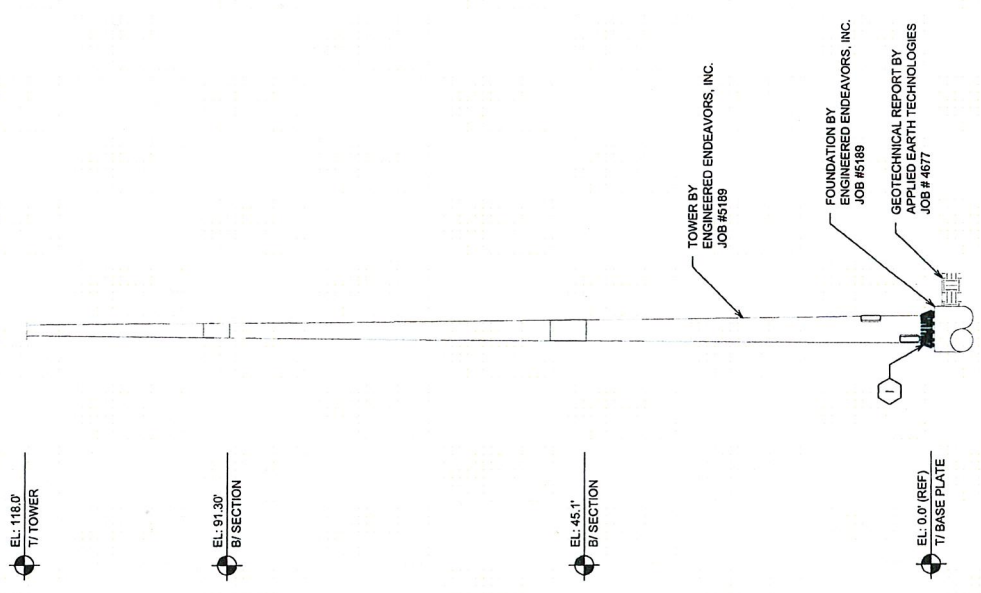
- 1 INSTALL (24) STIFFENER PLATES. SEE SHEET S-2.
- 2 CONTRACTOR SHALL PROVIDE CONSTRUCTION PROGRESS PHOTOS, AS WELL AS PROJECT COMPLETION PHOTOS, ALONG WITH STEEL & CONCRETE CERTIFICATION FOR VERTICAL SOLUTIONS, INC. TO COMPLETE A POST MODIFICATION LETTER. SEE SHEET N-2.



**SECTION @ BASE 0.0'**

SCALE: 3/4" = 1'-0"

NOTE:  
1. #XX DENOTES FLAT NUMBER



**TOWER ELEVATION**

SCALE: 1/16" = 1'-0"

SECTION	03	02	01
LENGTH (ft)	49.877	49.580	26.710
# SIDES	18	18	18
THICK (in)	0.375	0.313	0.188
LAP SPLICE (ft)	4.75		3.42
TOP DIA. (in)	31.760	22.049	17.000
BOT DIA. (in)	43.250	33.480	23.220
GRADE			A572-65

EL: 118.0'  
T/TOWER

EL: 91.30'  
B/SECTION

EL: 45.1'  
B/SECTION

EL: 0.0' (REF)  
T/BASE PLATE

PLANS PREPARED FOR:  
**TowerCo**  
 5000 VALLEYSTONE DRIVE  
 CARY, NC 27513  
 (919) 553-5704

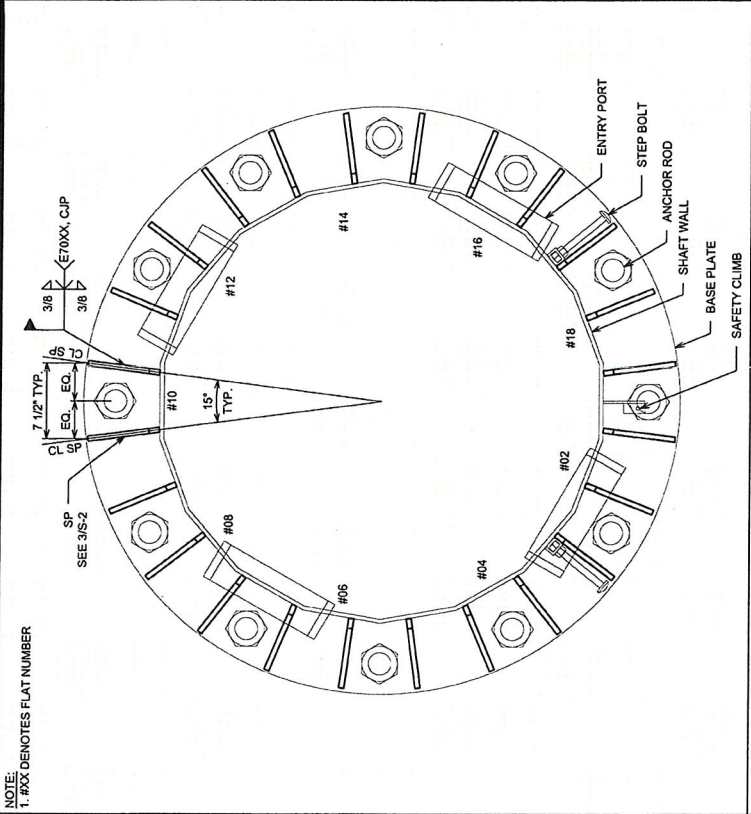
PROJECT INFORMATION:  
**NEWTON-FERRIS RD.  
 CT2008**  
 8 FERRIS ROAD  
 NEWTON, CT 06470  
 (FAIRFIELD COUNTY)

PLANS PREPARED BY:  
**vertical solutions**  
 2002 PRODUCTION DRIVE  
 APEX, NC 27539  
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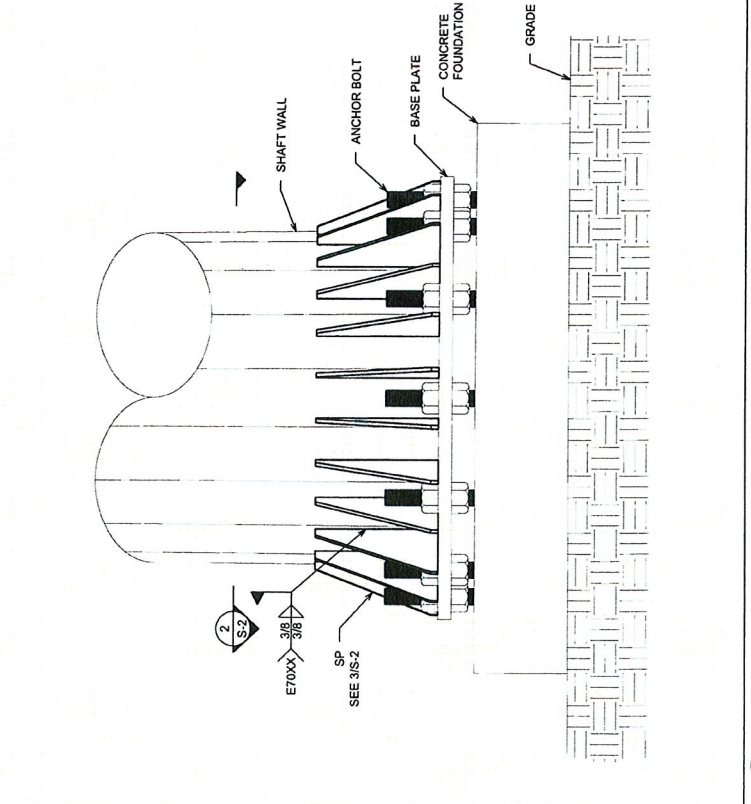
REV	DATE	ISSUED FOR:	DRAWN BY:	CL5	CHECKED BY:	E55
0	05-07-10	CONSTRUCTION				

SHEET TITLE:  
**CONSTRUCTION & FABRICATION DETAILS**

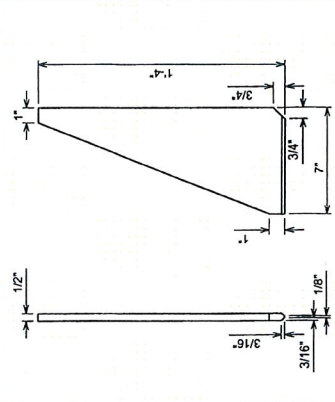
SHEET NUMBER:  
**S-2**  
 REVISION:  
 0  
 V51 #1 100100.CAD



**2 SP LAYOUT - PLAN**  
 SCALE: 1" = 1'-0"



**1 SP LAYOUT - ELEV**  
 SCALE: 3/4" = 1'-0"



**3 SP DETAIL**  
 SCALE: 1 1/2" = 1'-0"