STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
A PETITION OF CELLCO PARTNERSHIP	:	SUB-PETITION NO. 1133
D/B/A VERIZON WIRELESS FOR A	:	58 MONTANO ROAD
DECLARATORY RULING FOR	:	GLASTONBURY, CT
APPROVAL OF AN ELIGIBLE FACILITY	:	
REQUEST FOR MODIFICATIONS TO AN	:	
EXISTING TELECOMMUNICATIONS	:	
TOWER AT 58 MONTANO ROAD,	:	
GLASTONBURY, CONNECTICUT	:	JULY 2, 2015

SUB-PETITION FOR DECLARATORY RULING:
ELIGIBLE FACILITIES REQUEST FOR MODIFICATIONS
THAT WILL NOT SUBSTANTIALLY CHANGE THE
PHYSICAL DIMENSIONS OF AN EXISTING TOWER

I. Introduction

Pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C. § 1455(a) ("Section 6409(a)") and the October 21, 2014 Report and Order (FCC-14-533) issued by the Federal Communications Commission ("FCC") (the "FCC Order"), Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby petitions the Connecticut Siting Council (the "Council") for a declaratory ruling ("Sub-Petition") that the proposed modifications to an existing SBA Towers Inc. ("SBA") tower at 58 Montano Road in Glastonbury, Connecticut constitutes an Eligible Facilities Request ("EFR") under the FCC Order. Cellco has designated this site as its "Glastonbury Nepsic Facility".

II. Factual Background

SBA maintains a 120-foot monopole tower in the easterly portion on a 1.3-acre parcel at 58 Montano Road in Glastonbury (the "Property"). The Council approved this tower in Docket No. 359. *See* Attachment 1 – Site Vicinity Map and Site Schematic (Aerial Photograph). The

existing tower is shared by T-Mobile with antennas at the 117-foot level, Clearwire with antennas at the 110-foot level and AT&T with antennas at the 100-foot level. Equipment associated with the T-Mobile, Clearwire and AT&T antennas is located within a 50' x 50' fenced compound area.

III. Proposed Glastonbury Nepsic Facility

Cellco intends to install a total of twelve (12) antennas and nine (9) remote radio heads ("RRHs") on a low-profile antenna platform at the 90-foot level on the tower. Equipment associated with Cellco's antennas and a diesel-fueled back-up generator will be located inside a 12' x 26' shelter located in the northwest portion of the facility compound. Power and telephone service will extend from the existing utility backboard at the tower site. Project Plans for Cellco's Glastonbury Nepsic Facility are included in Attachment 2. Specifications for Cellco's antennas and RRHs are included in Attachment 3. A Structural Analysis confirming that the SBA tower can accommodate Cellco's proposed modifications is included in Attachment 4.

IV. Discussion

A. The Proposed Modification Will Not Cause a Substantial Change to the Physical Dimensions of the Existing Tower or Base Station

Section 6409(a) provides, in relevant part, that "a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station." Pursuant to the FCC Order, the proposed modification does not substantially change the physical dimensions of the tower or base station if the following criteria are satisfied.

1. *The proposed modified facility will not increase the height of the tower by more than ten (10) percent or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty (20) feet, whichever is greater.* Cellco

proposes to install its antennas and RRHs at the 90-foot level on the existing 120-foot tower.

2. *The proposed facility will not protrude from the edge of the structure more than six (6) feet.* The proposed antennas and RRHs will protrude approximately 5'-7" from the face of the tower.

3. *The proposed facility does not involve installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets.* Cellco intends to install a single equipment shelter to house its radio equipment and back-up power supply.

4. *The proposed facility does not entail any excavation or deployment outside the current site of the base station.* All of Cellco's site improvements will occur within the limits of the existing fenced compound area.

5. *The proposed facility does not defeat the existing concealment elements of the base station.* None of the existing antennas on the SBA tower are concealed in any fashion. Cellco's antennas will not be concealed.

6. *The proposed facility complies with conditions associated with the prior approval of construction or modification of the base station.* Cellco's proposed shared use of the SBA tower is consistent with the Docket No. 359 Decision and Order and the Council's tower sharing policies.

B. FCC Compliance

Operation of Cellco's facility will not increase the radio frequency ("RF") emissions at the SBA tower site to a level at or above the FCC Safety standard. A cumulative General Power Density table, including Cellco's proposed antennas is included in Attachment 5.

C. Notice to the Town, Property Owner and Abutting Landowners

On July 2, 2015, a copy of this Sub-Petition was sent to the Glastonbury Town Manager, Richard Johnson and Rosa Marie Shaw, the owner of the Property. *See* Attachment 6.

A copy of this Sub-Petition was also sent to each owner of land that abuts the Property. A sample abutter's cover letter and the list of those abutting landowners who were sent notice and a copy of the Sub-Petition is included in Attachment 7.

V. Conclusion

Based on the information provided above, Cellco respectfully submits that the proposed modification of the existing base station at the Property constitutes an "eligible facilities request" under Section 6409(a) and the FCC Order.

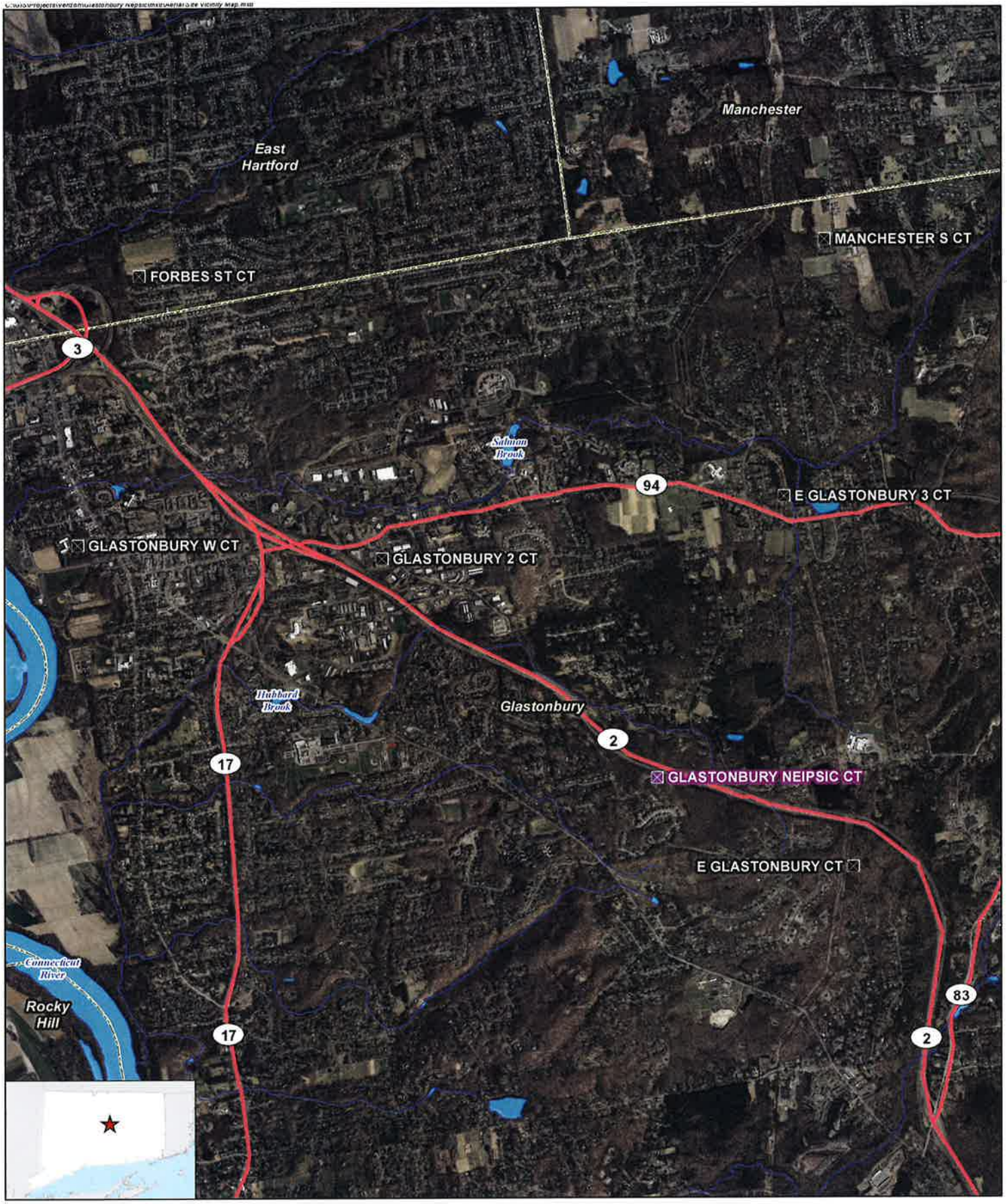
Respectfully submitted,

CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS

By _____

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597
(860) 275-8200
Its Attorneys

ATTACHMENT 1



Legend

- Proposed Verizon Wireless Facility
- Surrounding Verizon Wireless Facilities
- Municipal Boundary
- Watercourse
- Waterbody
- Major Road

Site Vicinity Map

Proposed Wireless
Telecommunications Facility
Glastonbury Neipsic
58 Montano Road
Glastonbury, Connecticut

verizon wireless

ALL-POINTS

Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 3,000 feet
Map Date: June 2015

3,000 1,500 0 3,000 Feet

Legend

- Proposed Facility Layout
- Existing Fenced Compound
- Approximate Host Property Boundary
- Approximate Parcel Boundary (CTDEEP GIS)

N
W E
S

50 25 0 50
Feet

Map Notes:
Base Map Source: ESRI World Imagery; Microsoft 3/28/2011
Map Scale: 1 inch = 75 feet
Map Date: June 2015

Site Schematic

Proposed Wireless
Telecommunications Facility
Glastonbury Neipsic
58 Montano Road
Glastonbury, Connecticut

verizon wireless

ALL POINTS

ATTACHMENT 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

GLASTONBURY NEIPSIC

58 MONTANO ROAD

GLASTONBURY, CT 06033

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 58 MONTANO ROAD, GLASTONBURY, CT 06033

1. Head northeast on E River Dr	0.9 mi
2. Merge left onto I-84 E toward CT-2 E/Norwich	0.2 mi
3. Merge onto CT-2 via exit 55 toward Norwich/new london	4.4 mi
4. Merge onto CT-17 via exit 7 on left toward Portland	0.8 mi
5. Turn slight left to take the New London Tpke ramp toward Glastonbury	0.5 mi
6. Merge onto New London Tpke	1.2 mi
7. Turn left onto Hale Road	0.5 mi
8. Turn left onto Montano Road	0.6 mi

GENERAL NOTES

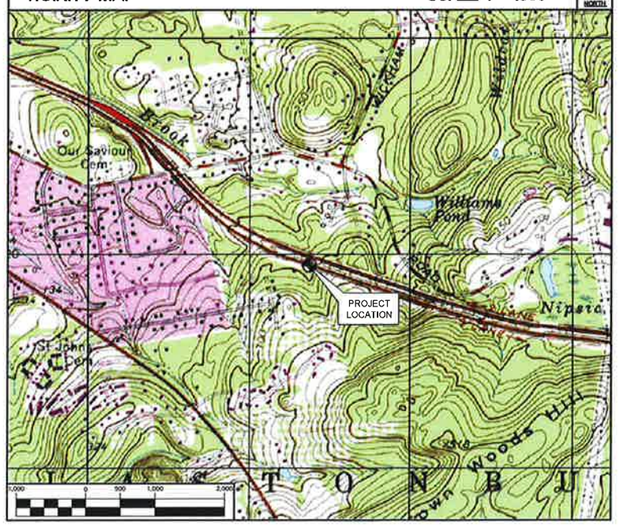
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A ±12'x26' PREFABRICATED WIRELESS EQUIPMENT SHELTER ON A CONCRETE FOUNDATION, ALL OF WHICH ARE LOCATED WITHIN THE EXISTING WIRELESS COMMUNICATIONS LEASE AREA.
2. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED ON AN EXISTING 120' TALL MONOPOLE TOWER AT A CENTERLINE ELEVATION OF 90' A.G.L.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE PROPOSED EQUIPMENT SHELTER FROM AN EXISTING UTILITY BACKBOARD LOCATED ADJACENT TO FENCED COMPOUND.
4. FINAL DESIGN FOR TOWER AND ANTENNA MOUNTS SHALL BE INCLUDED IN THE D&M PLANS.
5. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	GLASTONBURY NEPSIC
SITE ADDRESS:	58 MONTANO ROAD GLASTONBURY, CT 06033
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
CONTACT PERSON:	STEVE SCHADLER CELLCO PARTNERSHIP (508) 887-0357
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN, ESQ. ROBINSON & COLE (860) 275-8345
TOWER COORDINATES:	LATITUDE: 41°-41'-58.0"N LONGITUDE: 72°-33'-50.4"W GROUND ELEVATION: ±260'AMSL COORDINATES & GROUND ELEVATION ARE REFERENCED FROM THE CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

PROFESSIONAL ENGINEER SEAL

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	06/30/15	KAW	DMD	ISSUED FOR CSC
3	05/28/15	DMD	CFC	ISSUED FOR CSC - REVISED FOR ABUTTERS MAP AND NEW ANTENNA REC.
2	05/12/15	KAW	DMD	ISSUED FOR CSC - REVISED TO MATCH NEW ANTENNA REC.
1	08/29/14	HMR	DMD	ISSUED FOR CSC
0	08/14/14	HMR	DMD	ISSUED FOR CSC - CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

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Centered on Solutions
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Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

GLASTONBURY NEIPSIC

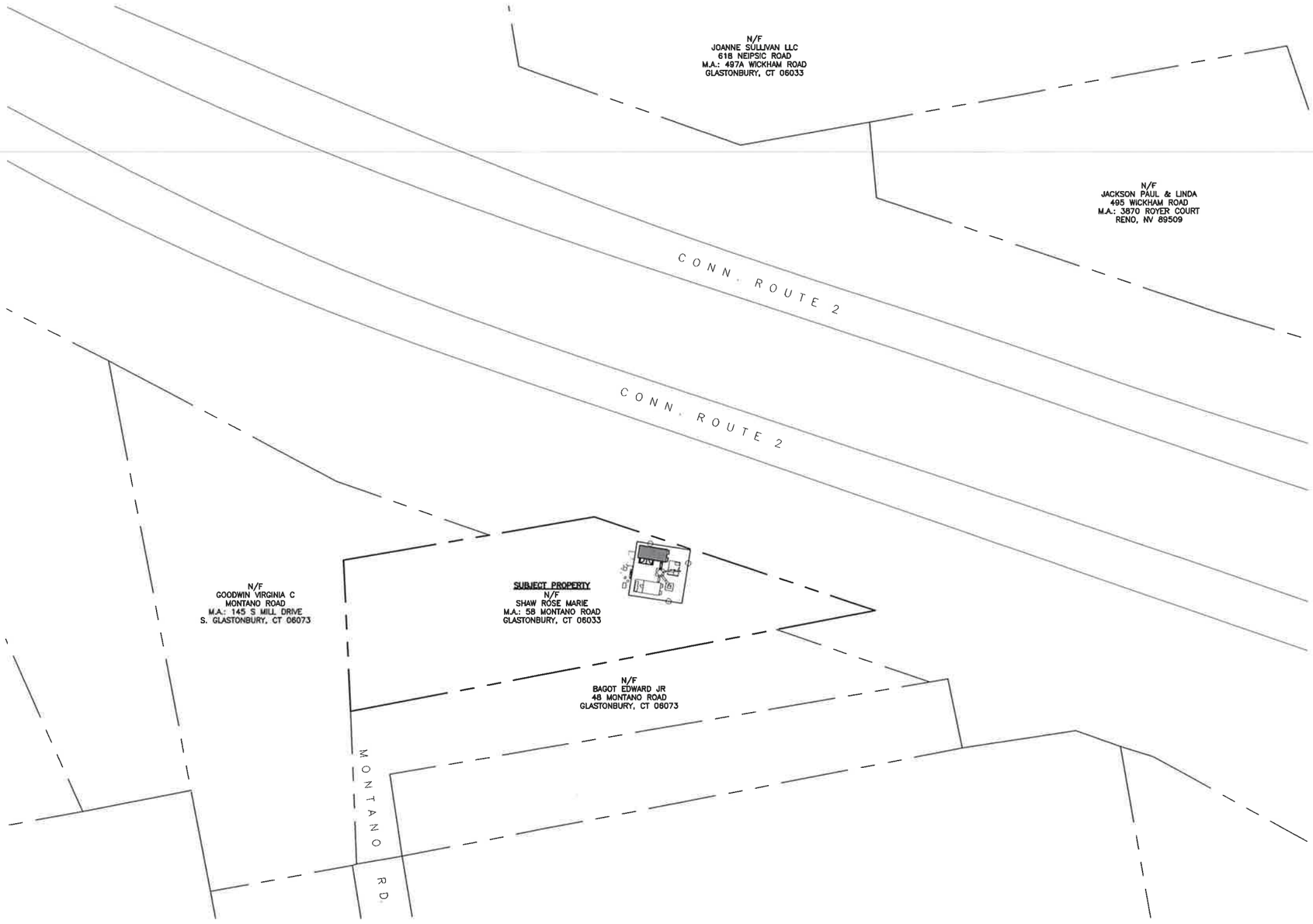
58 MONTANO ROAD
GLASTONBURY, CT06033

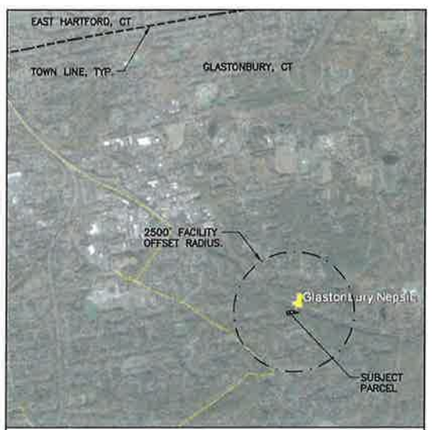
DATE: 08/13/14
SCALE: AS NOTED
JOB NO. 14126.000

TITLE SHEET

T-1

Sheet No. 1 of 3





MUNICIPALITY NOTIFICATION LIMIT MAP

1 / C-1 ABUTTERS MAP
SCALE: 1" = 50'

APPROXIMATE NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

MAP REFERENCE NOTE:

PROPERTY LINES AND PARCEL OWNERSHIP INFORMATION CONTAINED HEREIN REFERENCED FROM TOWN OF GLASTONBURY GIS ON-LINE DATABASE.

PROFESSIONAL ENGINEER SEAL

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	06/30/15	KAW	DMD	ISSUED FOR CSC
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1	06/29/14	HMR	DMD	ISSUED FOR CSC
0	06/14/14	HMR	DMD	ISSUED FOR CSC - CLIENT REVIEW

Cellco Partnership d/b/a Verizon Wireless

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Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

GLASTONBURY NEIPSIC

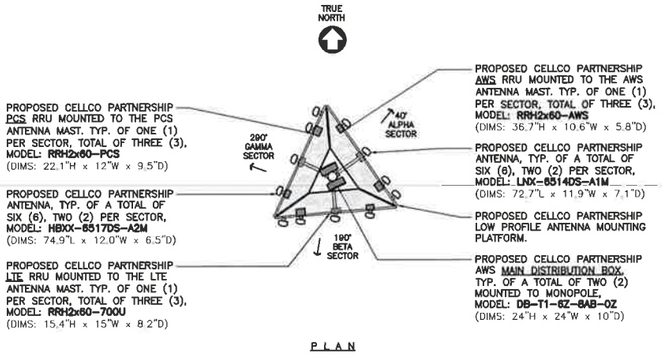
58 MONTANO ROAD
GLASTONBURY, CT06033

DATE: 06/13/14
SCALE: AS NOTED
JOB NO. 14126.000

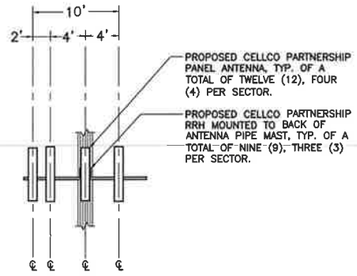
ABUTTERS MAP

C-1

Sheet No. 2 of 3



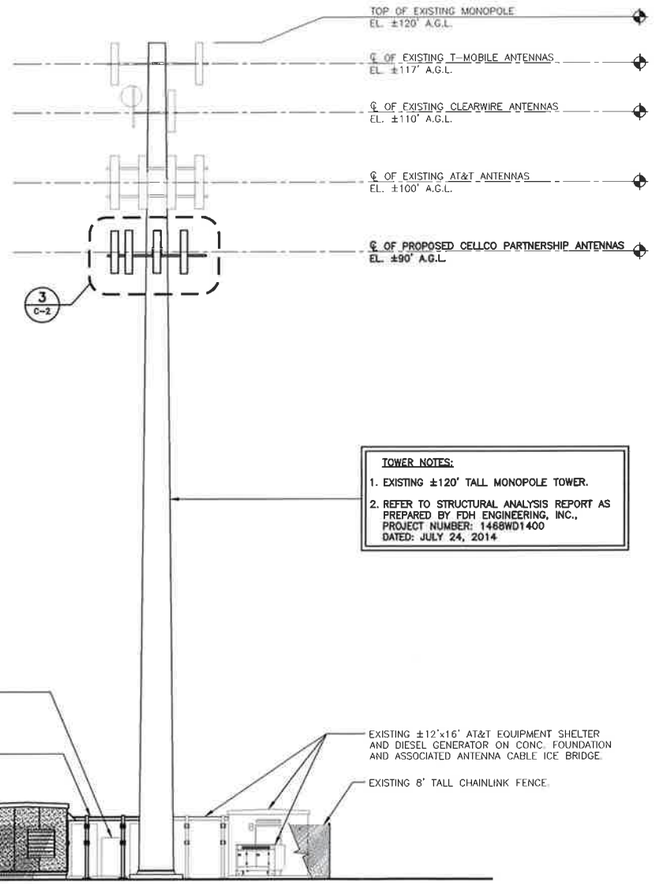
PLAN

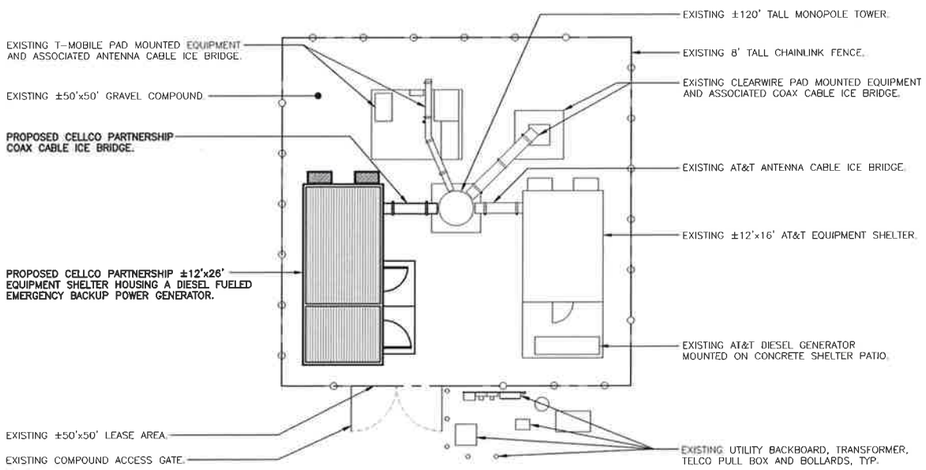


ELEVATION

3 / C-2 ANTENNA MOUNTING CONFIGURATION

NOT TO SCALE





1 / C-2 COMPOUND PLAN

SCALE: 1" = 10'

APPROXIMATE NORTH

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

2 / C-2 WEST ELEVATION

SCALE: 1" = 10'

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	06/30/15	KAW	DMD	ISSUED FOR CSC
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1	08/29/14	HMR	DMD	ISSUED FOR CSC
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GLASTONBURY NEIPSIC

58 MONTANO ROAD
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DATE: 06/13/14
SCALE: AS NOTED
JOB NO. 14126.000

COMPOUND PLAN AND ELEVATION

C-2

Sheet No. 3 of 3

ATTACHMENT 3

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 15.7 5 ° | 15.7 10 ° | 15.3	0 ° | 15.9 5 ° | 15.8 10 ° | 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®

Product Specifications

LNX-6514DS-VTM

Operating Frequency Band	698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	180.5 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	14.2 kg | 31.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4	0 ° | 18.4	0 ° | 18.7
	3 ° | 18.7	3 ° | 18.7	3 ° | 18.9
	6 ° | 18.4	6 ° | 18.5	6 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

HBXX-6517DS-VTM

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1903.0 mm | 74.9 in
Width	305.0 mm | 12.0 in
Net Weight	19.5 kg | 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

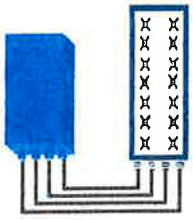
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

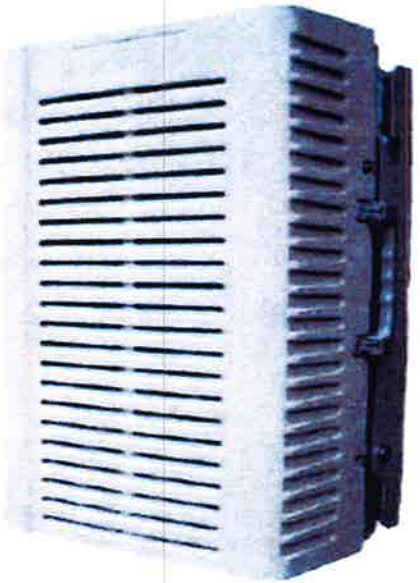
Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (In 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)



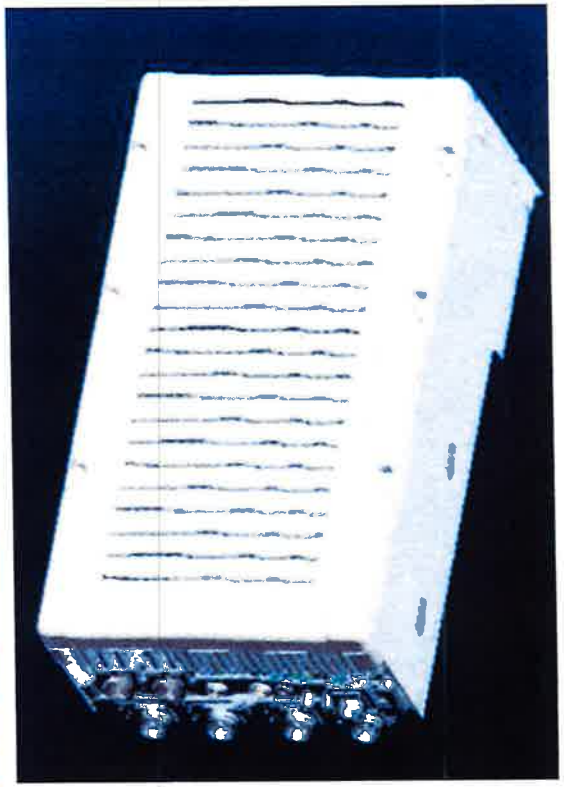
** Not a Verizon Wireless deployed product

Alcatel·Lucent

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



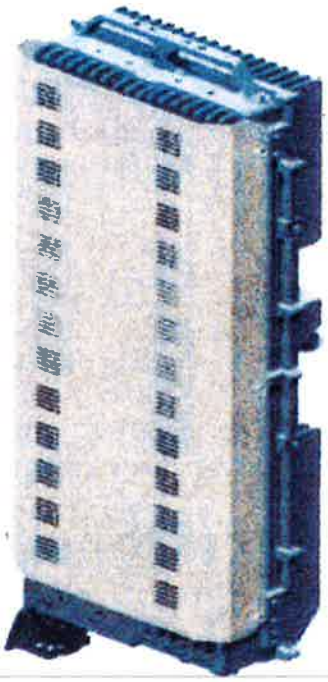
**- Includes solar shield but not mounting brackets (8 lbs.)

Alcatel·Lucent

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET

RRH2x60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

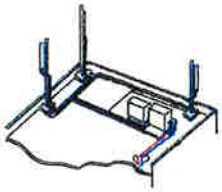
The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

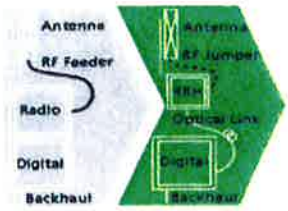
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

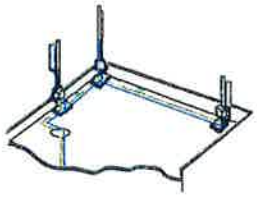
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control
- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights
- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data
- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics
- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity
- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications
- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data
- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

AT THE SPEED OF IDEAS™

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX² accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

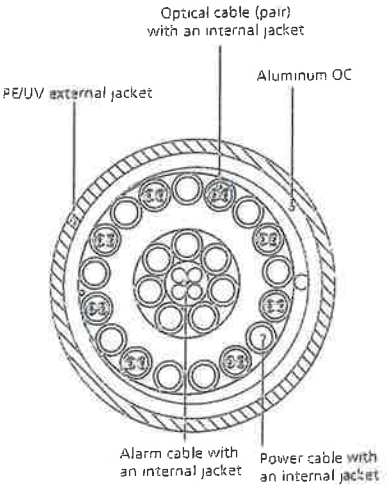


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 4

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 119 ft SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13555-S

Customer Site Name: Montano

Carrier Name: Verizon

Carrier Site Number: N/A

Carrier Site Name: Glastonbury Nepsic, CT

Site Location: 58A Montano Road

Glastonbury, Connecticut

Hartford County

Latitude: 41.699444

Longitude: -72.564000

Analysis Result:

Max Structural Usage: 46.0% [Pass]

Max Foundation Usage: 52% [Pass]

Report Prepared By : Jarryd Tibbetts

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Introduction

The purpose of this report is to summarize the analysis results on the 119 ft SABRE Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawing prepared by Sabre, Job #09-11137 dated 11/19/08
Foundation Drawing	Foundation Drawing prepared by Sabre, Job #09-11137 dated 11/19/08
Geotechnical Report	Geotechnical Report prepared by TES, Project #082695.01 dated 10/27/08
Modification Drawings	N/A

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F. In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Basic Wind Speed Used in the Analysis:	80.0 mph (Fastest mile)
Basic Wind Speed with Ice:	69 mph (Fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-F / 2005 Connecticut State Building Code

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	117.0	3	Ericsson - AIR 21 B2A B4P - Panel	Low Profile Platform	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
2		3	Ericsson - AIR 21 B4A B2P - Panel			
3		3	Ericsson - KRY 112 144/1 - TMA/TTA			
4	110.0	3	Argus - LLPX310R - Panel	Pipe Mounts	(2) 1/2" (3) 1/4" (3) 5/8"	Clearwire
5		1	Andrew - VHLP2-18 - Dish			
6		1	Andrew - VHLP2.5-18 - Dish			
7	100.0	4	Raycap - DC6-48-60-18-8F - Squid	Platform w/ Hand Rail	(2) 1/2" Fiber (8) 3/4" DC (3) 3/8" RET	New Cingular
8		12	CCI - HPA-65R-BUU-H8 - Panel			
9		3	Ericcson - RRU E2 - RRU			
10		3	Ericsson - RRU-32 - RRU			
11		9	Ericsson - RRUS 11 - RRU			
12		6	Ericsson - RRUS 12 - RRU			
13		6	Ericsson - RRUS A2 - RRU			
15	90.0	2	RFS - DB-T1-6Z-8AB-0Z - ODU	Low Profile Platform	(2) 1 5/8" Hybrid	Verizon
16		6	Andrew - HBXX-6517DS-A2M - Panel			
17		6	Andrew - LNX-6514DS-A1M - Panel			
18		3	Alcatel Lucent - RRH2x40-07-U - RRH			
19		3	Alcatel Lucent - RRH2X60-AWS - RRH			
20		3	Alcatel Lucent - RRH2x60-PCS - RRH			

Proposed Antennas, Mounts and Transmission Lines

Information pertaining to the proposed antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
14	90.0	3	Alcatel Lucent - B13 RRH4x30 - RRH	Low Profile Platform	(2) 1 5/8" Hybrid	Verizon
15		2	RFS - DB-T1-6Z-8AB-0Z - ODU			
16		6	Andrew - HBXX-6517DS-A2M - Panel			
17		6	Andrew - LNX-6514DS-A1M - Panel			
19		3	Alcatel Lucent - RRH2X60-AWS - RRH			
20		3	Alcatel Lucent - RRH2x60-PCS - RRH			

All transmission lines are considered running inside of the pole shafts.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**46.0%**	**44.0%**	**38.9%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	5405.0	52.8	60.8
Analysis Reactions	2285.7	26.3	40.7
% of Design Reactions	42.3%	49.8%	66.9%

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 0.6051 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-F Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed or/and ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Stress 46.0% at 0.0ft

Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

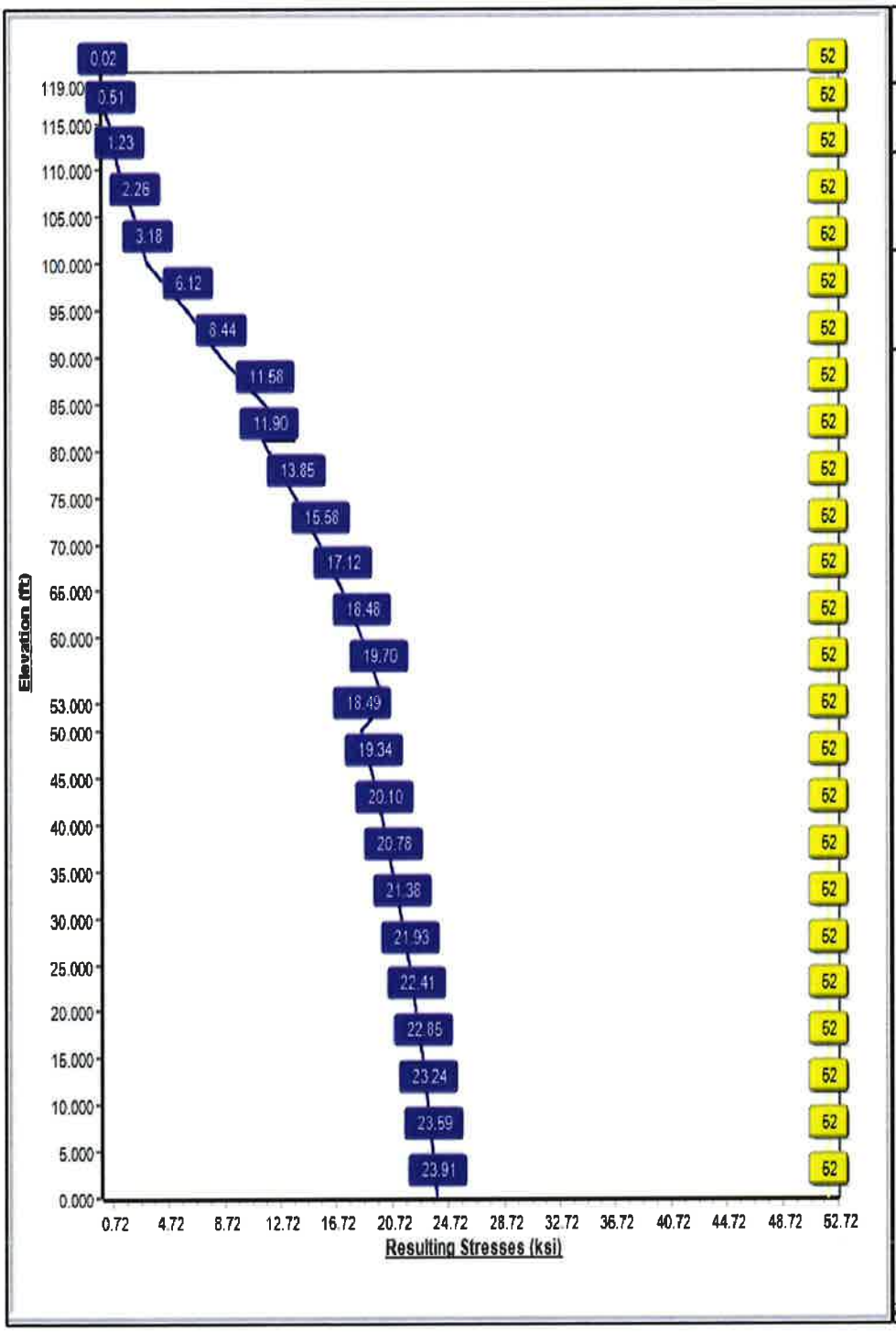
Tower Engineering Solutions

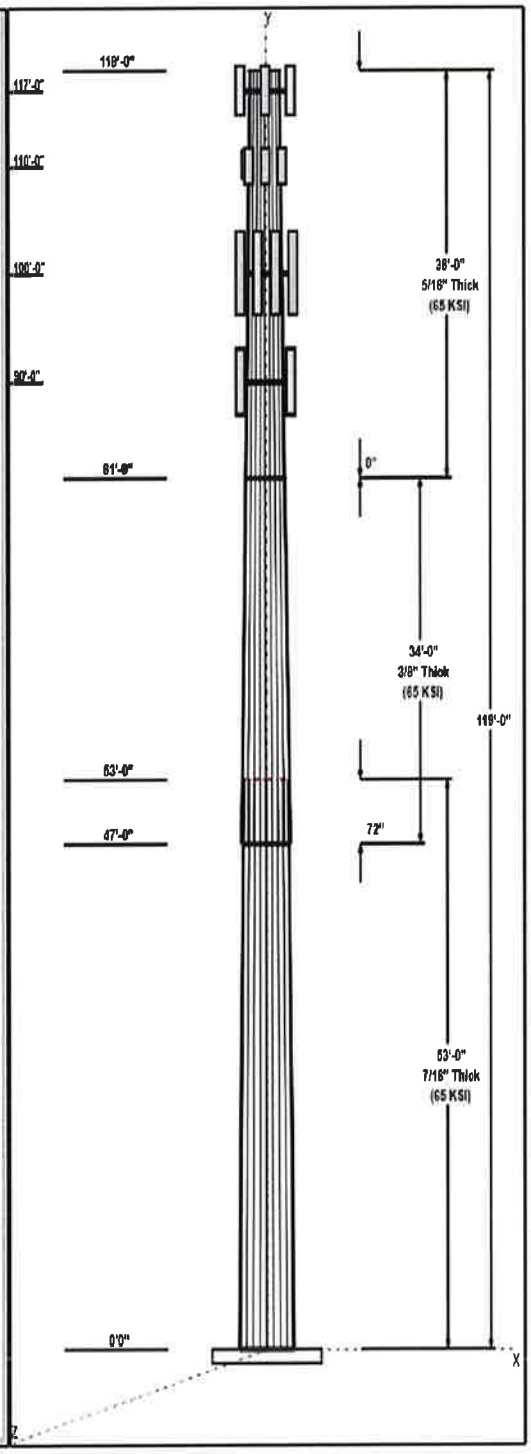
Dead Load Factor: 1.00
Wind Load Factor: 1.00

52 Alllowable Stress
24 Resulting Stress

Load Case : 80 mph Wind with 0 in Ice

Iterations: 17





Structure: CT13555-S-SBA

Type: Tapered
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.26403

6/25/2015

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.00	44.82	58.81	0.438		0.26403	65
2	34.00	38.17	47.15	0.375	Slip	0.26403	65
3	38.00	28.14	38.17	0.313	Butt	0.26403	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
117.00	117.00	1	6' Lightning rod	
117.00	117.00	3	AIR 21 B2A B4P	T-Mobile
117.00	117.00	3	AIR 21 B4A B2P	T-Mobile
117.00	117.00	3	KRY 112 144/1	T-Mobile
117.00	117.00	1	Low Profile Platform	T-Mobile
110.00	110.00	1	Flush Mount	Clearwire
110.00	110.00	3	LLPX310R	Clearwire
110.00	110.00	1	VHLP2-18	Clearwire
110.00	110.00	1	VHLP2.5-18	Clearwire
100.00	100.00	4	DC6-48-60-18-8F	New Cingular
100.00	100.00	12	HPA-65R-BUU-H8	New Cingular
100.00	100.00	1	Platform w/ Hand Rail	New Cingular
100.00	100.00	3	RRU E2	New Cingular
100.00	100.00	3	RRU-32	New Cingular
100.00	100.00	9	RRUS 11	New Cingular
100.00	100.00	6	RRUS 12	New Cingular
100.00	100.00	6	RRUS A2	New Cingular
90.00	90.00	3	B13 RRH4x30	Verizon
90.00	90.00	2	DB-T1-6Z-8AB-0Z	Verizon
90.00	90.00	6	HBXX-6517DS-A2M	Verizon
90.00	90.00	6	LNX-6514DS-A1M	Verizon
90.00	90.00	1	Low Profile Platform	Verizon
90.00	90.00	3	RRH2X60-AWS	Verizon
90.00	90.00	3	RRH2x60-PCS	Verizon

Linear Appurtenances

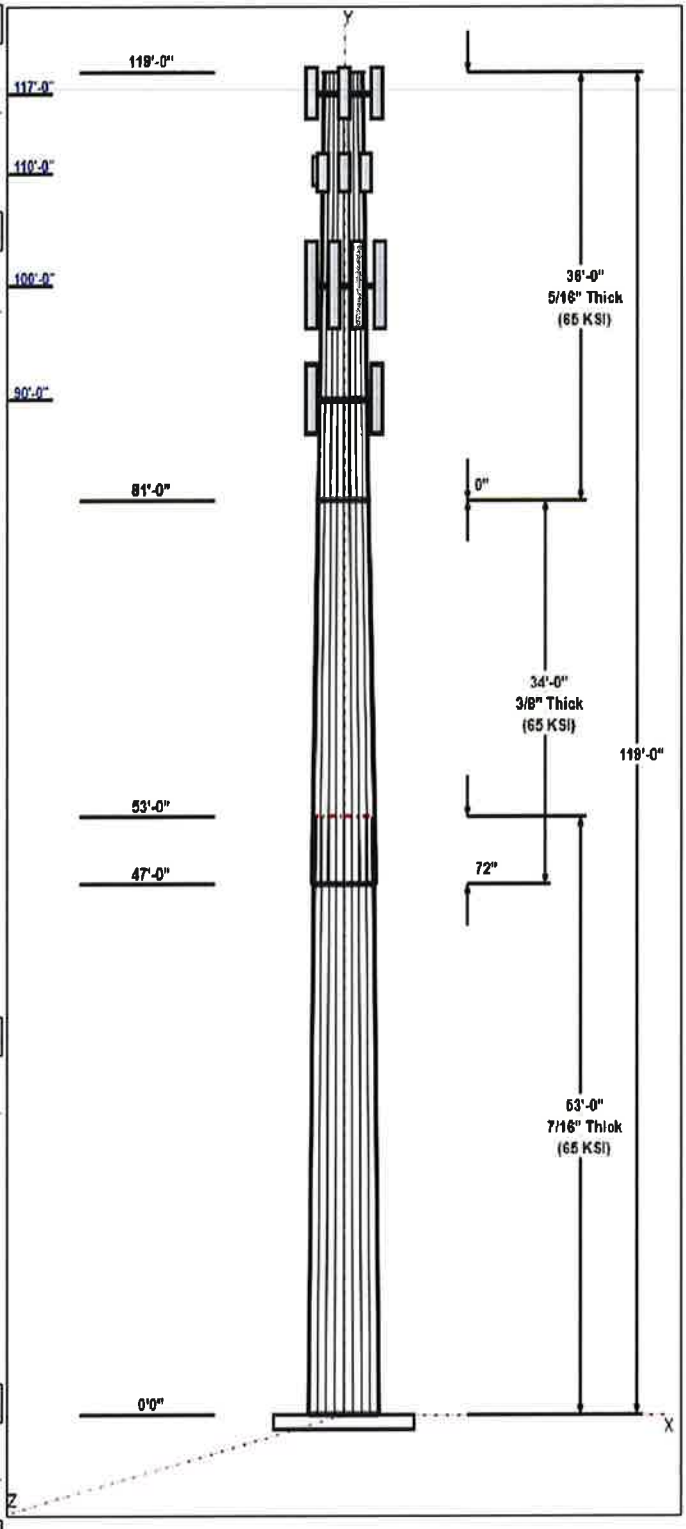
Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	117.00	Inside	1 5/8" Coax	T-Mobile
0.00	117.00	Inside	1 5/8" Hybrid Cable	T-Mobile
0.00	110.00	Inside	1/2" Coax	Clearwire
0.00	110.00	Inside	1/4" Coax	Clearwire
0.00	110.00	Inside	5/8" Hybrid Cable	Clearwire
0.00	100.00	Inside	1/2" Coax	New Cingular
0.00	100.00	Inside	3/4" DC	New Cingular
0.00	100.00	Inside	3/8" Fiber	New Cingular
0.00	90.00	Inside	1 5/8" Hybrid Cable	Verizon

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
20	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry



3.2500 66.0 50.0 5

Reactions

Load Case	Moment	Shear	Axial
80 mph Wind with 0" Ice	2285.7	26.3	33.7
69.28 mph Wind with 0.5" Ice	1843.0	21.0	40.7
50 mph Wind with 0" Ice	893.0	10.3	33.7

Shaft Properties

Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 4	

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.000	0.4375	65		0.00	12,866
2	18	34.000	0.3750	65	Slip	72.00	5,823
3	18	38.000	0.3125	65	Flange	0.00	4,212
					Total Shaft Weight:		**22,901**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	58.81	0.00	81.05	34893.72	22.29	134.4	44.82	53.00	61.62	15333.6	16.65	102.4	0.264034
2	47.15	47.00	55.67	15389.65	20.75	125.7	38.17	81.00	44.99	8120.67	16.53	101.7	0.264034
3	38.17	81.00	37.55	6800.85	20.12	122.1	28.14	119.0	27.60	2700.33	14.46	90.04	0.264034

Loading Summary

Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	117.0	6' Lightning rod	1	6.50	0.38	1.00	11.80	0.980	1.00	0.00	0.00
2	117.0	AIR 21 B2A B4P	3	91.50	6.58	0.86	129.20	6.970	0.87	0.00	0.00
3	117.0	AIR 21 B4A B2P	3	90.40	6.58	0.86	128.10	6.970	0.87	0.00	0.00
4	117.0	KRY 112 144/1	3	11.00	0.41	0.70	14.10	0.550	0.72	0.00	0.00
5	117.0	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.00	1.00	0.00	0.00
6	110.0	Flush Mount	1	350.00	5.00	1.00	450.00	6.000	1.00	0.00	0.00
7	110.0	LLPX310R	3	28.60	4.83	0.75	54.50	5.360	0.77	0.00	0.00
8	110.0	VHLP2-18	1	27.00	4.68	1.00	55.00	5.050	1.00	0.00	0.00
9	110.0	VHLP2.5-18	1	47.60	8.43	1.00	97.00	8.920	1.00	0.00	0.00
10	100.0	DC6-48-60-18-8F	4	31.80	1.47	1.00	49.50	1.670	1.00	0.00	0.00
11	100.0	HPA-65R-BUU-H8	12	68.00	13.30	0.80	137.00	13.90	0.82	0.00	0.00
12	100.0	Platform w/ Hand Rail	1	1600.00	40.00	1.00	2200.00	40.00	1.00	0.00	0.00
13	100.0	RRU E2	3	21.20	1.86	0.62	31.40	2.150	0.64	0.00	0.00
14	100.0	RRU-32	3	77.00	3.87	0.87	103.50	4.300	0.88	0.00	0.00
15	100.0	RRUS 11	9	50.70	2.94	0.76	66.00	3.140	0.78	0.00	0.00
16	100.0	RRUS 12	6	57.30	3.27	0.70	73.00	3.480	0.72	0.00	0.00
17	100.0	RRUS A2	6	21.20	1.86	0.62	31.40	2.150	0.64	0.00	0.00
18	90.00	B13 RRH4x30	3	57.20	2.52	0.88	72.45	2.710	0.88	0.00	0.00
19	90.00	DB-T1-6Z-8AB-0Z	2	44.00	5.60	1.00	71.06	5.870	1.00	0.00	0.00
20	90.00	HBXX-6517DS-A2M	6	47.00	8.74	0.80	93.81	9.230	0.80	0.00	0.00
21	90.00	LNX-6514DS-A1M	6	38.80	8.41	0.82	85.41	8.890	0.82	0.00	0.00
22	90.00	Low Profile Platform	1	1500.00	25.00	1.00	1800.00	27.00	1.00	0.00	0.00
23	90.00	RRH2X60-AWS	3	55.00	3.78	0.77	75.35	4.050	0.78	0.00	0.00
24	90.00	RRH2x60-PCS	3	55.00	2.35	0.78	67.79	2.530	0.79	0.00	0.00
		Totals:	**85**	**8,965.10**			**12,722.81**				

Linear Appurtenances

			No Ice		Ice		
Bottom Elev. (ft)	Top Elev. (ft)	Description	Weight (lb/ft)	CaAa (sf/ft)	Weight (lb/ft)	CaAa (sf/ft)	Exposed
0.00	117.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	117.0	(1) 1 5/8" Hybrid Cable	3.30	0.00	0.00	0.00	Inside
0.00	110.0	(2) 1/2" Coax	0.16	0.00	0.00	0.00	Inside
0.00	110.0	(3) 1/4" Coax	0.04	0.00	0.00	0.00	Inside
0.00	110.0	(3) 5/8" Hybrid Cable	1.56	0.00	0.00	0.00	Inside
0.00	100.0	(2) 1/2" Coax	0.48	0.00	0.00	0.00	Inside
0.00	100.0	(8) 3/4" DC	4.80	0.00	0.00	0.00	Inside
0.00	100.0	(3) 3/8" Fiber	0.48	0.00	0.00	0.00	Inside
0.00	90.00	(2) 1 5/8" Hybrid Cable	6.60	0.00	0.00	0.00	Inside
		Totals:	**1,871.93**		**0.00**		

Shaft Section Properties

Structure: CT13555-S-SBA
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)
Increment Length: 5 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015

TES Tower Engineering Solutions

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.4375	58.810	81.055	34893.7	22.29	134.42	65	52	0.0
5.00		0.4375	57.490	79.221	32579.4	21.76	131.41	65	52	1363.5
10.00		0.4375	56.170	77.388	30369.7	21.23	128.39	65	52	1332.3
15.00		0.4375	54.849	75.555	28262.2	20.70	125.37	65	52	1301.1
20.00		0.4375	53.529	73.722	26254.6	20.16	122.35	65	52	1269.9
25.00		0.4375	52.209	71.889	24344.4	19.63	119.34	65	52	1238.7
30.00		0.4375	50.889	70.056	22529.1	19.10	116.32	65	52	1207.5
35.00		0.4375	49.569	68.223	20806.4	18.57	113.30	65	52	1176.3
40.00		0.4375	48.249	66.389	19173.9	18.04	110.28	65	52	1145.1
45.00		0.4375	46.928	64.556	17629.0	17.50	107.27	65	52	1113.9
47.00	Bot - Section 2	0.4375	46.400	63.823	17035.1	17.29	106.06	65	52	436.8
50.00		0.4375	45.608	62.723	16169.5	16.97	104.25	65	52	1209.4
53.00	Top - Section 1	0.3750	45.566	53.787	13878.3	20.01	121.51	65	52	1188.6
55.00		0.3750	45.038	53.158	13397.5	19.77	120.10	65	52	363.9
60.00		0.3750	43.718	51.587	12244.2	19.15	116.58	65	52	891.1
65.00		0.3750	42.398	50.016	11159.1	18.53	113.06	65	52	864.3
70.00		0.3750	41.078	48.445	10140.1	17.90	109.54	65	52	837.6
75.00		0.3750	39.757	46.873	9185.1	17.28	106.02	65	52	810.9
80.00		0.3750	38.437	45.302	8292.0	16.66	102.50	65	52	784.1
81.00	Top - Section 2	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	153.6
81.00	Bot - Section 3	0.3750	38.173	44.988	8120.7	16.54	101.80	65	52	
85.00		0.3125	37.117	36.504	6247.4	19.53	118.77	65	52	504.0
90.00		0.3125	35.797	35.195	5599.0	18.79	114.55	65	52	609.9
95.00		0.3125	34.477	33.886	4997.0	18.04	110.33	65	52	587.7
100.00		0.3125	33.157	32.576	4439.8	17.30	106.10	65	52	565.4
105.00		0.3125	31.836	31.267	3925.7	16.55	101.88	65	52	543.1
110.00		0.3125	30.516	29.957	3452.9	15.81	97.65	65	52	520.8
115.00		0.3125	29.196	28.648	3019.6	15.06	93.43	65	52	498.6
117.00		0.3125	28.668	28.124	2857.0	14.77	91.74	65	52	193.2
119.00		0.3125	28.140	27.600	2700.3	14.47	90.05	65	52	189.6
										22901.0

Wind Loading - Shaft

Structure: CT13555-S-SBA
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

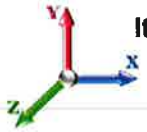
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 17

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	16.384	27.69	392.07	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	16.384	27.69	383.27	0.650	0.000	5.00	24.229	15.75	436.1	0.0	1363.5
10.00		0.00	1.00	16.384	27.69	374.46	0.650	0.000	5.00	23.679	15.39	426.2	0.0	1332.3
15.00		0.00	1.00	16.384	27.69	365.66	0.650	0.000	5.00	23.129	15.03	416.3	0.0	1301.1
20.00		0.00	1.00	16.384	27.69	356.86	0.650	0.000	5.00	22.579	14.68	406.4	0.0	1269.9
25.00		0.00	1.00	16.384	27.69	348.06	0.650	0.000	5.00	22.029	14.32	396.5	0.0	1238.7
30.00		0.00	1.00	16.384	27.69	339.26	0.650	0.000	5.00	21.479	13.96	386.6	0.0	1207.5
35.00		0.00	1.02	16.662	28.16	333.25	0.650	0.000	5.00	20.929	13.60	383.1	0.0	1176.3
40.00		0.00	1.06	17.310	29.25	330.62	0.650	0.000	5.00	20.379	13.25	387.5	0.0	1145.1
45.00		0.00	1.09	17.902	30.25	327.03	0.650	0.000	5.00	19.829	12.89	389.9	0.0	1113.9
47.00	Bot - Section 2	0.00	1.11	18.126	30.63	325.37	0.650	0.000	2.00	7.777	5.06	154.9	0.0	436.8
50.00		0.00	1.13	18.449	31.18	322.65	0.650	0.000	3.00	11.689	7.60	236.9	0.0	1209.4
53.00	Top - Section 1	0.00	1.14	18.759	31.70	319.70	0.650	0.000	3.00	11.491	7.47	236.8	0.0	1188.6
55.00		0.00	1.16	18.959	32.04	322.98	0.650	0.000	2.00	7.550	4.91	157.2	0.0	363.9
60.00		0.00	1.19	19.436	32.85	317.44	0.650	0.000	5.00	18.491	12.02	394.8	0.0	891.1
65.00		0.00	1.21	19.885	33.61	311.39	0.650	0.000	5.00	17.941	11.66	391.9	0.0	864.3
70.00		0.00	1.24	20.311	34.33	304.91	0.650	0.000	5.00	17.391	11.30	388.0	0.0	837.6
75.00		0.00	1.26	20.715	35.01	298.03	0.650	0.000	5.00	16.841	10.95	383.2	0.0	810.9
80.00		0.00	1.29	21.101	35.66	290.80	0.650	0.000	5.00	16.291	10.59	377.6	0.0	784.1
81.00	Top - Section 2	0.00	1.29	21.176	35.79	289.32	0.650	0.000	1.00	3.192	2.07	74.3	0.0	153.6
85.00		0.00	1.31	21.469	36.28	283.26	0.650	0.000	4.00	12.548	8.16	295.9	0.0	504.0
90.00	Appurtenance(s)	0.00	1.33	21.823	36.88	275.42	0.650	0.000	5.00	15.190	9.87	364.2	0.0	609.9
95.00		0.00	1.35	22.163	37.45	267.32	0.650	0.000	5.00	14.640	9.52	356.4	0.0	587.7
100.00	Appurtenance(s)	0.00	1.37	22.490	38.01	258.98	0.650	0.000	5.00	14.090	9.16	348.1	0.0	565.4
105.00		0.00	1.39	22.806	38.54	250.41	0.650	0.000	5.00	13.540	8.80	339.2	0.0	543.1
110.00	Appurtenance(s)	0.00	1.41	23.111	39.06	241.62	0.650	0.000	5.00	12.990	8.44	329.8	0.0	520.8
115.00		0.00	1.43	23.406	39.56	232.64	0.650	0.000	5.00	12.440	8.09	319.9	0.0	498.6
117.00	Appurtenance(s)	0.00	1.44	23.522	39.75	229.00	0.650	0.000	2.00	4.822	3.13	124.6	0.0	193.2
119.00		0.00	1.44	23.636	39.94	225.32	0.650	0.000	2.00	4.734	3.08	122.9	0.0	189.6
								Totals:	**119.00**			**9,025.0**		**22,901.0**

Discrete Appurtenance Forces

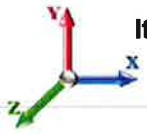
Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 17

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	90.00	B13 RRH4x30	3	21.823	36.881	0.88	6.62	171.60	0.000	0.000	243.97	0.00	0.00
2	90.00	DB-T1-6Z-8AB-0Z	2	21.823	36.881	1.00	11.20	88.00	0.000	0.000	413.07	0.00	0.00
3	90.00	HBXX-6517DS-A2M	6	21.823	36.881	0.80	41.95	282.00	0.000	0.000	1547.22	0.00	0.00
4	90.00	LNX-6514DS-A1M	6	21.823	36.881	0.82	41.43	232.80	0.000	0.000	1527.89	0.00	0.00
5	90.00	Low Profile Platform	1	21.823	36.881	1.00	25.00	1500.00	0.000	0.000	922.02	0.00	0.00
6	90.00	RRH2X60-AWS	3	21.823	36.881	0.77	8.74	165.00	0.000	0.000	322.45	0.00	0.00
7	90.00	RRH2x60-PCS	3	21.823	36.881	0.78	5.52	165.00	0.000	0.000	203.59	0.00	0.00
8	100.00	DC6-48-60-18-8F	4	22.490	38.008	1.00	5.88	127.20	0.000	0.000	223.49	0.00	0.00
9	100.00	HPA-65R-BUU-H8	12	22.490	38.008	0.80	127.68	816.00	0.000	0.000	4852.85	0.00	0.00
10	100.00	Platform w/ Hand Rail	1	22.490	38.008	1.00	40.00	1600.00	0.000	0.000	1520.32	0.00	0.00
11	100.00	RRU E2	3	22.490	38.008	0.62	3.46	63.60	0.000	0.000	131.49	0.00	0.00
12	100.00	RRU-32	3	22.490	38.008	0.87	10.10	231.00	0.000	0.000	383.91	0.00	0.00
13	100.00	RRUS 11	9	22.490	38.008	0.76	20.11	456.30	0.000	0.000	764.32	0.00	0.00
14	100.00	RRUS 12	6	22.490	38.008	0.70	13.73	343.80	0.000	0.000	522.00	0.00	0.00
15	100.00	RRUS A2	6	22.490	38.008	0.62	6.92	127.20	0.000	0.000	262.98	0.00	0.00
16	110.00	Flush Mount	1	23.111	39.057	1.00	5.00	350.00	0.000	0.000	195.29	0.00	0.00
17	110.00	LLPX310R	3	23.111	39.057	0.75	10.87	85.80	0.000	0.000	424.45	0.00	0.00
18	110.00	VHLP2-18	1	23.111	39.057	1.00	4.68	27.00	0.000	0.000	182.79	0.00	0.00
19	110.00	VHLP2.5-18	1	23.111	39.057	1.00	8.43	47.60	0.000	0.000	329.25	0.00	0.00
20	117.00	6' Lightning rod	1	23.522	39.752	1.00	0.38	6.50	0.000	0.000	15.11	0.00	0.00
21	117.00	AIR 21 B2A B4P	3	23.522	39.752	0.86	16.98	274.50	0.000	0.000	674.84	0.00	0.00
22	117.00	AIR 21 B4A B2P	3	23.522	39.752	0.86	16.98	271.20	0.000	0.000	674.84	0.00	0.00
23	117.00	KRY 112 144/1	3	23.522	39.752	0.70	0.86	33.00	0.000	0.000	34.23	0.00	0.00
24	117.00	Low Profile Platform	1	23.522	39.752	1.00	22.00	1500.00	0.000	0.000	874.54	0.00	0.00
						Totals:		**8,965.10**			**17,246.90**		

Total Applied Force Summary

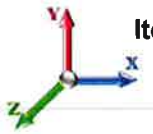
Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 17

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		436.07	1455.78	0.00	0.00
10.00		426.17	1424.60	0.00	0.00
15.00		416.27	1393.41	0.00	0.00
20.00		406.37	1362.22	0.00	0.00
25.00		396.47	1331.03	0.00	0.00
30.00		386.57	1299.84	0.00	0.00
35.00		383.06	1268.65	0.00	0.00
40.00		387.49	1237.46	0.00	0.00
45.00		389.94	1206.27	0.00	0.00
47.00		154.86	473.78	0.00	0.00
50.00		236.89	1264.82	0.00	0.00
53.00		236.78	1243.97	0.00	0.00
55.00		157.24	400.84	0.00	0.00
60.00		394.78	983.39	0.00	0.00
65.00		391.90	956.66	0.00	0.00
70.00		388.01	929.92	0.00	0.00
75.00		383.22	903.19	0.00	0.00
80.00		377.60	876.46	0.00	0.00
81.00		74.25	172.08	0.00	0.00
85.00		295.94	577.85	0.00	0.00
90.00	(24) appurtenances	5544.36	3306.67	0.00	0.00
95.00		356.43	646.99	0.00	0.00
100.00	(44) appurtenances	9009.47	4389.81	0.00	0.00
105.00		339.21	573.63	0.00	0.00
110.00	(6) appurtenances	1461.56	1061.75	0.00	0.00
115.00		319.86	520.25	0.00	0.00
117.00	(11) appurtenances	2398.15	2287.06	0.00	0.00
119.00		122.91	189.62	0.00	0.00
	Totals:	**26,271.85**	**33,737.99**	**0.00**	**0.00**

Resulting Forces and Deflections

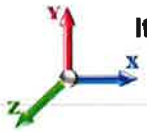
Structure: CT13555-S-SB
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 17

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-26.298	-33.716	0.000	0.000	0.000	-2285.7	0.000	0.000	0.000	0.000	0.000
5.00	-25.912	-32.220	0.000	0.000	0.000	-2154.2	-0.049	0.000	0.049	-0.091	0.000
10.00	-25.532	-30.756	0.000	0.000	0.000	-2024.6	-0.194	0.000	0.194	-0.182	0.000
15.00	-25.157	-29.323	0.000	0.000	0.000	-1897.0	-0.434	0.000	0.434	-0.274	0.000
20.00	-24.788	-27.924	0.000	0.000	0.000	-1771.2	-0.771	0.000	0.771	-0.366	0.000
25.00	-24.425	-26.556	0.000	0.000	0.000	-1647.3	-1.204	0.000	1.204	-0.459	0.000
30.00	-24.068	-25.221	0.000	0.000	0.000	-1525.1	-1.735	0.000	1.735	-0.551	0.000
35.00	-23.710	-23.918	0.000	0.000	0.000	-1404.8	-2.363	0.000	2.363	-0.644	0.000
40.00	-23.344	-22.648	0.000	0.000	0.000	-1286.2	-3.087	0.000	3.087	-0.736	0.000
45.00	-22.962	-21.422	0.000	0.000	0.000	-1169.5	-3.907	0.000	3.907	-0.827	0.000
47.00	-22.817	-20.932	0.000	0.000	0.000	-1123.6	-4.262	0.000	4.262	-0.864	0.000
50.00	-22.579	-19.650	0.000	0.000	0.000	-1055.2	-4.823	0.000	4.823	-0.918	0.000
53.00	-22.336	-18.392	0.000	0.000	0.000	-987.46	-5.418	0.000	5.418	-0.972	0.000
55.00	-22.192	-17.969	0.000	0.000	0.000	-942.79	-5.833	0.000	5.833	-1.008	0.000
60.00	-21.807	-16.958	0.000	0.000	0.000	-831.83	-6.941	0.000	6.941	-1.102	0.000
65.00	-21.420	-15.976	0.000	0.000	0.000	-722.80	-8.146	0.000	8.146	-1.193	0.000
70.00	-21.034	-15.025	0.000	0.000	0.000	-615.70	-9.442	0.000	9.442	-1.278	0.000
75.00	-20.649	-14.104	0.000	0.000	0.000	-510.53	-10.825	0.000	10.825	-1.357	0.000
80.00	-20.259	-13.222	0.000	0.000	0.000	-407.29	-12.286	0.000	12.286	-1.428	0.000
81.00	-20.188	-13.041	0.000	0.000	0.000	-387.03	-12.587	0.000	12.587	-1.442	0.000
85.00	-19.889	-12.451	0.000	0.000	0.000	-306.28	-13.817	0.000	13.817	-1.490	0.000
90.00	-14.267	-9.281	0.000	0.000	0.000	-206.83	-15.412	0.000	15.412	-1.549	0.000
95.00	-13.899	-8.635	0.000	0.000	0.000	-135.50	-17.060	0.000	17.060	-1.592	0.000
100.00	-4.771	-4.498	0.000	0.000	0.000	-66.009	-18.745	0.000	18.745	-1.621	0.000
105.00	-4.417	-3.934	0.000	0.000	0.000	-42.153	-20.453	0.000	20.453	-1.638	0.000
110.00	-2.926	-2.914	0.000	0.000	0.000	-20.069	-22.175	0.000	22.175	-1.649	0.000
115.00	-2.591	-2.403	0.000	0.000	0.000	-5.439	-23.906	0.000	23.906	-1.655	0.000
117.00	-0.128	-0.186	0.000	0.000	0.000	-0.256	-24.599	0.000	24.599	-1.655	0.000
119.00	-0.123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.292	-1.655	0.000

Resulting Stresses

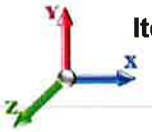
Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 17

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.42	0.65	0.00	0.00	0.00	23.47	23.91	52.0	0.460
5.00	0.41	0.66	0.00	0.00	0.00	23.16	23.59	52.0	0.454
10.00	0.40	0.66	0.00	0.00	0.00	22.81	23.24	52.0	0.447
15.00	0.39	0.67	0.00	0.00	0.00	22.43	22.85	52.0	0.440
20.00	0.38	0.68	0.00	0.00	0.00	22.00	22.41	52.0	0.431
25.00	0.37	0.68	0.00	0.00	0.00	21.52	21.93	52.0	0.422
30.00	0.36	0.69	0.00	0.00	0.00	20.99	21.38	52.0	0.411
35.00	0.35	0.70	0.00	0.00	0.00	20.39	20.78	52.0	0.400
40.00	0.34	0.71	0.00	0.00	0.00	19.72	20.10	52.0	0.387
45.00	0.33	0.72	0.00	0.00	0.00	18.97	19.34	52.0	0.372
47.00	0.33	0.72	0.00	0.00	0.00	18.65	19.02	52.0	0.366
50.00	0.31	0.73	0.00	0.00	0.00	18.13	18.49	52.0	0.356
53.00	0.34	0.84	0.00	0.00	0.00	19.75	20.15	52.0	0.388
55.00	0.34	0.84	0.00	0.00	0.00	19.31	19.70	52.0	0.379
60.00	0.33	0.85	0.00	0.00	0.00	18.10	18.48	52.0	0.356
65.00	0.32	0.86	0.00	0.00	0.00	16.73	17.12	52.0	0.329
70.00	0.31	0.88	0.00	0.00	0.00	15.20	15.58	52.0	0.300
75.00	0.30	0.89	0.00	0.00	0.00	13.46	13.85	52.0	0.266
80.00	0.29	0.90	0.00	0.00	0.00	11.50	11.90	52.0	0.229
81.00	0.29	0.90	0.00	0.00	0.00	11.08	11.48	52.0	0.221
81.00	0.29	0.90	0.00	0.00	0.00	11.08	11.48	52.0	0.264
85.00	0.34	1.10	0.00	0.00	0.00	11.09	11.58	52.0	0.223
90.00	0.26	0.82	0.00	0.00	0.00	8.06	8.44	52.0	0.162
95.00	0.25	0.83	0.00	0.00	0.00	5.70	6.12	52.0	0.118
100.00	0.14	0.30	0.00	0.00	0.00	3.00	3.18	52.0	0.061
105.00	0.13	0.28	0.00	0.00	0.00	2.08	2.26	52.0	0.044
110.00	0.10	0.20	0.00	0.00	0.00	1.08	1.23	52.0	0.024
115.00	0.08	0.18	0.00	0.00	0.00	0.32	0.51	52.0	0.010
117.00	0.01	0.01	0.00	0.00	0.00	0.02	0.03	52.0	0.001
119.00	0.00	0.01	0.00	0.00	0.00	0.00	0.02	52.0	0.000

Wind Loading - Shaft

Structure: CT13555-S-SBA
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

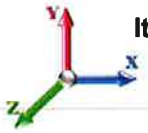
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015
Page: 12

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 17

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	12.287	20.77	339.53	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	12.287	20.77	331.91	0.650	0.500	5.00	24.646	16.02	332.7	178.9	1542.4
10.00		0.00	1.00	12.287	20.77	324.29	0.650	0.500	5.00	24.096	15.66	325.2	174.9	1507.1
15.00		0.00	1.00	12.287	20.77	316.66	0.650	0.500	5.00	23.546	15.30	317.8	170.8	1471.9
20.00		0.00	1.00	12.287	20.77	309.04	0.650	0.500	5.00	22.996	14.95	310.4	166.7	1436.6
25.00		0.00	1.00	12.287	20.77	301.42	0.650	0.500	5.00	22.446	14.59	303.0	162.6	1401.3
30.00		0.00	1.00	12.287	20.77	293.80	0.650	0.500	5.00	21.895	14.23	295.5	158.6	1366.1
35.00		0.00	1.02	12.496	21.12	288.59	0.650	0.500	5.00	21.345	13.87	293.0	154.5	1330.8
40.00		0.00	1.06	12.982	21.94	286.32	0.650	0.500	5.00	20.795	13.52	296.5	150.4	1295.6
45.00		0.00	1.09	13.426	22.69	283.21	0.650	0.500	5.00	20.245	13.16	298.6	146.4	1260.3
47.00	Bot - Section 2	0.00	1.11	13.594	22.97	281.77	0.650	0.500	2.00	7.944	5.16	118.6	57.9	494.7
50.00		0.00	1.13	13.836	23.38	279.42	0.650	0.500	3.00	11.939	7.76	181.5	86.8	1296.2
53.00	Top - Section 1	0.00	1.14	14.068	23.78	276.86	0.650	0.500	3.00	11.741	7.63	181.4	85.3	1273.9
55.00		0.00	1.16	14.218	24.03	279.70	0.650	0.500	2.00	7.717	5.02	120.5	56.2	420.1
60.00		0.00	1.19	14.576	24.63	274.90	0.650	0.500	5.00	18.908	12.29	302.7	136.4	1027.5
65.00		0.00	1.21	14.913	25.20	269.67	0.650	0.500	5.00	18.357	11.93	300.7	132.4	996.7
70.00		0.00	1.24	15.232	25.74	264.05	0.650	0.500	5.00	17.807	11.57	298.0	128.3	965.9
75.00		0.00	1.26	15.536	26.26	258.10	0.650	0.500	5.00	17.257	11.22	294.5	124.2	935.1
80.00		0.00	1.29	15.825	26.74	251.84	0.650	0.500	5.00	16.707	10.86	290.4	120.1	904.3
81.00	Top - Section 2	0.00	1.29	15.881	26.84	250.55	0.650	0.500	1.00	3.275	2.13	57.1	23.9	177.5
85.00		0.00	1.31	16.101	27.21	245.30	0.650	0.500	4.00	12.882	8.37	227.8	92.9	596.9
90.00	Appurtenance(s)	0.00	1.33	16.366	27.66	238.52	0.650	0.500	5.00	15.607	10.14	280.6	112.0	721.9
95.00		0.00	1.35	16.621	28.09	231.50	0.650	0.500	5.00	15.057	9.79	274.9	107.9	695.6
100.00	Appurtenance(s)	0.00	1.37	16.866	28.50	224.27	0.650	0.500	5.00	14.507	9.43	268.8	103.9	669.2
105.00		0.00	1.39	17.103	28.90	216.85	0.650	0.500	5.00	13.957	9.07	262.2	99.8	642.9
110.00	Appurtenance(s)	0.00	1.41	17.332	29.29	209.25	0.650	0.500	5.00	13.407	8.71	255.3	95.7	616.5
115.00		0.00	1.43	17.554	29.67	201.47	0.650	0.500	5.00	12.857	8.36	247.9	91.6	590.2
117.00	Appurtenance(s)	0.00	1.44	17.640	29.81	198.31	0.650	0.500	2.00	4.989	3.24	96.7	36.0	229.2
119.00		0.00	1.44	17.726	29.96	195.13	0.650	0.500	2.00	4.901	3.19	95.4	35.4	225.0
								Totals:	**119.00**			**6,927.9**		**26,091.4**

Discrete Appurtenance Forces

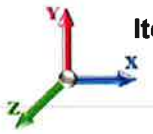
Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

TES Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 17

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	90.00	B13 RRH4x30	3	16.366	27.659	0.88	7.16	217.35	0.000	0.000	198.11	0.00	0.00
2	90.00	DB-T1-6Z-8AB-0Z	2	16.366	27.659	1.00	11.74	142.12	0.000	0.000	324.72	0.00	0.00
3	90.00	HBXX-6517DS-A2M	6	16.366	27.659	0.80	44.47	562.86	0.000	0.000	1230.00	0.00	0.00
4	90.00	LNX-6514DS-A1M	6	16.366	27.659	0.82	43.90	512.46	0.000	0.000	1214.20	0.00	0.00
5	90.00	Low Profile Platform	1	16.366	27.659	1.00	27.00	1800.00	0.000	0.000	746.79	0.00	0.00
6	90.00	RRH2X60-AWS	3	16.366	27.659	0.78	9.51	226.05	0.000	0.000	263.13	0.00	0.00
7	90.00	RRH2x60-PCS	3	16.366	27.659	0.79	6.02	203.37	0.000	0.000	166.48	0.00	0.00
8	100.00	DC6-48-60-18-8F	4	16.866	28.504	1.00	6.68	198.00	0.000	0.000	190.41	0.00	0.00
9	100.00	HPA-65R-BUU-H8	12	16.866	28.504	0.82	136.78	1644.00	0.000	0.000	3898.70	0.00	0.00
10	100.00	Platform w/ Hand Rail	1	16.866	28.504	1.00	40.00	2200.00	0.000	0.000	1140.17	0.00	0.00
11	100.00	RRU E2	3	16.866	28.504	0.64	4.13	94.20	0.000	0.000	117.67	0.00	0.00
12	100.00	RRU-32	3	16.866	28.504	0.88	11.35	310.50	0.000	0.000	323.58	0.00	0.00
13	100.00	RRUS 11	9	16.866	28.504	0.78	22.04	594.00	0.000	0.000	628.31	0.00	0.00
14	100.00	RRUS 12	6	16.866	28.504	0.72	15.03	438.00	0.000	0.000	428.52	0.00	0.00
15	100.00	RRUS A2	6	16.866	28.504	0.64	8.26	188.40	0.000	0.000	235.33	0.00	0.00
16	110.00	Flush Mount	1	17.332	29.291	1.00	6.00	450.00	0.000	0.000	175.75	0.00	0.00
17	110.00	LLPX310R	3	17.332	29.291	0.77	12.38	163.50	0.000	0.000	362.67	0.00	0.00
18	110.00	VHLP2-18	1	17.332	29.291	1.00	5.05	55.00	0.000	0.000	147.92	0.00	0.00
19	110.00	VHLP2.5-18	1	17.332	29.291	1.00	8.92	97.00	0.000	0.000	261.28	0.00	0.00
20	117.00	6' Lightning rod	1	17.640	29.812	1.00	0.98	11.80	0.000	0.000	29.22	0.00	0.00
21	117.00	AIR 21 B2A B4P	3	17.640	29.812	0.87	18.19	387.60	0.000	0.000	542.33	0.00	0.00
22	117.00	AIR 21 B4A B2P	3	17.640	29.812	0.87	18.19	384.30	0.000	0.000	542.33	0.00	0.00
23	117.00	KRY 112 144/1	3	17.640	29.812	0.72	1.19	42.30	0.000	0.000	35.42	0.00	0.00
24	117.00	Low Profile Platform	1	17.640	29.812	1.00	27.00	1800.00	0.000	0.000	804.92	0.00	0.00
						Totals:		**12,722.81**			**14,007.95**		

Total Applied Force Summary

Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 14	

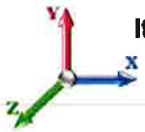
Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Iterations: 17

Dead Load Factor 1.00

Wind Load Factor 1.00



Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		332.66	1634.72	0.00	0.00
10.00		325.23	1599.46	0.00	0.00
15.00		317.81	1564.20	0.00	0.00
20.00		310.38	1528.94	0.00	0.00
25.00		302.96	1493.67	0.00	0.00
30.00		295.54	1458.41	0.00	0.00
35.00		293.00	1423.15	0.00	0.00
40.00		296.55	1387.89	0.00	0.00
45.00		298.58	1352.62	0.00	0.00
47.00		118.63	531.66	0.00	0.00
50.00		181.45	1351.57	0.00	0.00
53.00		181.44	1329.25	0.00	0.00
55.00		120.53	457.05	0.00	0.00
60.00		302.74	1119.83	0.00	0.00
65.00		300.73	1089.03	0.00	0.00
70.00		297.97	1058.22	0.00	0.00
75.00		294.51	1027.41	0.00	0.00
80.00		290.43	996.61	0.00	0.00
81.00		57.14	195.95	0.00	0.00
85.00		227.84	670.71	0.00	0.00
90.00	(24) appurtenances	4424.01	4478.48	0.00	0.00
95.00		274.91	754.92	0.00	0.00
100.00	(44) appurtenances	7231.47	6395.67	0.00	0.00
105.00		262.22	673.41	0.00	0.00
110.00	(6) appurtenances	1202.87	1412.56	0.00	0.00
115.00		247.91	611.89	0.00	0.00
117.00	(11) appurtenances	2050.89	2863.86	0.00	0.00
119.00		95.43	224.97	0.00	0.00
	Totals:	**20,935.84**	**40,686.12**	**0.00**	**0.00**

Resulting Forces and Deflections

Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 15	

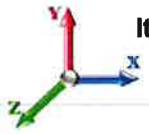
TES Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Iterations: 17

Dead Load Factor 1.00

Wind Load Factor 1.00



Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-20.962	-40.672	0.000	0.000	0.000	-1843.0	0.000	0.000	0.000	0.000	0.000
5.00	-20.678	-39.011	0.000	0.000	0.000	-1738.2	-0.040	0.000	0.040	-0.073	0.000
10.00	-20.398	-37.386	0.000	0.000	0.000	-1634.8	-0.156	0.000	0.156	-0.147	0.000
15.00	-20.122	-35.797	0.000	0.000	0.000	-1532.8	-0.350	0.000	0.350	-0.221	0.000
20.00	-19.849	-34.244	0.000	0.000	0.000	-1432.2	-0.622	0.000	0.622	-0.295	0.000
25.00	-19.580	-32.726	0.000	0.000	0.000	-1332.9	-0.972	0.000	0.972	-0.370	0.000
30.00	-19.315	-31.245	0.000	0.000	0.000	-1235.0	-1.401	0.000	1.401	-0.445	0.000
35.00	-19.049	-29.799	0.000	0.000	0.000	-1138.5	-1.908	0.000	1.908	-0.520	0.000
40.00	-18.776	-28.390	0.000	0.000	0.000	-1043.2	-2.494	0.000	2.494	-0.595	0.000
45.00	-18.487	-27.024	0.000	0.000	0.000	-949.38	-3.157	0.000	3.157	-0.669	0.000
47.00	-18.379	-26.482	0.000	0.000	0.000	-912.40	-3.444	0.000	3.444	-0.699	0.000
50.00	-18.200	-25.119	0.000	0.000	0.000	-857.27	-3.898	0.000	3.898	-0.743	0.000
53.00	-18.016	-23.780	0.000	0.000	0.000	-802.67	-4.380	0.000	4.380	-0.787	0.000
55.00	-17.911	-23.308	0.000	0.000	0.000	-766.64	-4.716	0.000	4.716	-0.816	0.000
60.00	-17.620	-22.170	0.000	0.000	0.000	-677.08	-5.613	0.000	5.613	-0.893	0.000
65.00	-17.328	-21.064	0.000	0.000	0.000	-588.98	-6.588	0.000	6.588	-0.966	0.000
70.00	-17.035	-19.992	0.000	0.000	0.000	-502.34	-7.639	0.000	7.639	-1.036	0.000
75.00	-16.742	-18.952	0.000	0.000	0.000	-417.17	-8.760	0.000	8.760	-1.100	0.000
80.00	-16.443	-17.952	0.000	0.000	0.000	-333.46	-9.945	0.000	9.945	-1.158	0.000
81.00	-16.390	-17.749	0.000	0.000	0.000	-317.01	-10.189	0.000	10.189	-1.170	0.000
85.00	-16.161	-17.071	0.000	0.000	0.000	-251.46	-11.188	0.000	11.188	-1.209	0.000
90.00	-11.651	-12.681	0.000	0.000	0.000	-170.65	-12.483	0.000	12.483	-1.258	0.000
95.00	-11.366	-11.926	0.000	0.000	0.000	-112.40	-13.821	0.000	13.821	-1.294	0.000
100.00	-3.992	-5.696	0.000	0.000	0.000	-55.573	-15.191	0.000	15.191	-1.317	0.000
105.00	-3.715	-5.028	0.000	0.000	0.000	-35.614	-16.579	0.000	16.579	-1.332	0.000
110.00	-2.480	-3.644	0.000	0.000	0.000	-17.038	-17.980	0.000	17.980	-1.342	0.000
115.00	-2.218	-3.038	0.000	0.000	0.000	-4.638	-19.388	0.000	19.388	-1.346	0.000
117.00	-0.101	-0.223	0.000	0.000	0.000	-0.201	-19.952	0.000	19.952	-1.346	0.000
119.00	-0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.516	-1.347	0.000

Resulting Stresses

Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16	

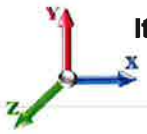
Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Iterations: 17

Dead Load Factor 1.00

Wind Load Factor 1.00



Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.50	0.52	0.00	0.00	0.00	18.92	19.45	52.0	0.374
5.00	0.49	0.53	0.00	0.00	0.00	18.69	19.20	52.0	0.369
10.00	0.48	0.53	0.00	0.00	0.00	18.42	18.93	52.0	0.364
15.00	0.47	0.54	0.00	0.00	0.00	18.12	18.62	52.0	0.358
20.00	0.46	0.54	0.00	0.00	0.00	17.79	18.28	52.0	0.352
25.00	0.46	0.55	0.00	0.00	0.00	17.42	17.90	52.0	0.344
30.00	0.45	0.56	0.00	0.00	0.00	17.00	17.47	52.0	0.336
35.00	0.44	0.56	0.00	0.00	0.00	16.53	16.99	52.0	0.327
40.00	0.43	0.57	0.00	0.00	0.00	15.99	16.45	52.0	0.316
45.00	0.42	0.58	0.00	0.00	0.00	15.40	15.85	52.0	0.305
47.00	0.41	0.58	0.00	0.00	0.00	15.14	15.59	52.0	0.300
50.00	0.40	0.58	0.00	0.00	0.00	14.73	15.17	52.0	0.292
53.00	0.44	0.68	0.00	0.00	0.00	16.06	16.54	52.0	0.318
55.00	0.44	0.68	0.00	0.00	0.00	15.70	16.18	52.0	0.311
60.00	0.43	0.69	0.00	0.00	0.00	14.73	15.21	52.0	0.293
65.00	0.42	0.70	0.00	0.00	0.00	13.63	14.11	52.0	0.271
70.00	0.41	0.71	0.00	0.00	0.00	12.40	12.87	52.0	0.248
75.00	0.40	0.72	0.00	0.00	0.00	11.00	11.47	52.0	0.221
80.00	0.40	0.73	0.00	0.00	0.00	9.42	9.90	52.0	0.190
81.00	0.39	0.73	0.00	0.00	0.00	9.08	9.56	52.0	0.184
81.00	0.39	0.73	0.00	0.00	0.00	9.08	9.56	52.0	0.220
85.00	0.47	0.89	0.00	0.00	0.00	9.10	9.69	52.0	0.186
90.00	0.36	0.67	0.00	0.00	0.00	6.65	7.10	52.0	0.137
95.00	0.35	0.68	0.00	0.00	0.00	4.72	5.21	52.0	0.100
100.00	0.17	0.25	0.00	0.00	0.00	2.53	2.74	52.0	0.053
105.00	0.16	0.24	0.00	0.00	0.00	1.76	1.96	52.0	0.038
110.00	0.12	0.17	0.00	0.00	0.00	0.92	1.08	52.0	0.021
115.00	0.11	0.16	0.00	0.00	0.00	0.27	0.47	52.0	0.009
117.00	0.01	0.01	0.00	0.00	0.00	0.01	0.02	52.0	0.000
119.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Wind Loading - Shaft

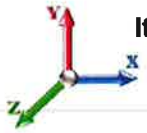
Structure: CT13555-S-SBA
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015
Page: 17

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 17

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	6.400	10.82	245.04	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	239.54	0.650	0.000	5.00	24.229	15.75	170.3	0.0	1363.5
10.00		0.00	1.00	6.400	10.82	234.04	0.650	0.000	5.00	23.679	15.39	166.5	0.0	1332.3
15.00		0.00	1.00	6.400	10.82	228.54	0.650	0.000	5.00	23.129	15.03	162.6	0.0	1301.1
20.00		0.00	1.00	6.400	10.82	223.04	0.650	0.000	5.00	22.579	14.68	158.7	0.0	1269.9
25.00		0.00	1.00	6.400	10.82	217.54	0.650	0.000	5.00	22.029	14.32	154.9	0.0	1238.7
30.00		0.00	1.00	6.400	10.82	212.04	0.650	0.000	5.00	21.479	13.96	151.0	0.0	1207.5
35.00		0.00	1.02	6.509	11.00	208.28	0.650	0.000	5.00	20.929	13.60	149.6	0.0	1176.3
40.00		0.00	1.06	6.762	11.43	206.64	0.650	0.000	5.00	20.379	13.25	151.4	0.0	1145.1
45.00		0.00	1.09	6.993	11.82	204.39	0.650	0.000	5.00	19.829	12.89	152.3	0.0	1113.9
47.00	Bot - Section 2	0.00	1.11	7.080	11.97	203.35	0.650	0.000	2.00	7.777	5.06	60.5	0.0	436.8
50.00		0.00	1.13	7.207	12.18	201.66	0.650	0.000	3.00	11.689	7.60	92.5	0.0	1209.4
53.00	Top - Section 1	0.00	1.14	7.328	12.38	199.81	0.650	0.000	3.00	11.491	7.47	92.5	0.0	1188.6
55.00		0.00	1.16	7.406	12.52	201.87	0.650	0.000	2.00	7.550	4.91	61.4	0.0	363.9
60.00		0.00	1.19	7.592	12.83	198.40	0.650	0.000	5.00	18.491	12.02	154.2	0.0	891.1
65.00		0.00	1.21	7.768	13.13	194.62	0.650	0.000	5.00	17.941	11.66	153.1	0.0	864.3
70.00		0.00	1.24	7.934	13.41	190.57	0.650	0.000	5.00	17.391	11.30	151.6	0.0	837.6
75.00		0.00	1.26	8.092	13.68	186.27	0.650	0.000	5.00	16.841	10.95	149.7	0.0	810.9
80.00		0.00	1.29	8.242	13.93	181.75	0.650	0.000	5.00	16.291	10.59	147.5	0.0	784.1
81.00	Top - Section 2	0.00	1.29	8.272	13.98	180.82	0.650	0.000	1.00	3.192	2.07	29.0	0.0	153.6
85.00		0.00	1.31	8.387	14.17	177.04	0.650	0.000	4.00	12.548	8.16	115.6	0.0	504.0
90.00	Appurtenance(s)	0.00	1.33	8.525	14.41	172.14	0.650	0.000	5.00	15.190	9.87	142.2	0.0	609.9
95.00		0.00	1.35	8.657	14.63	167.08	0.650	0.000	5.00	14.640	9.52	139.2	0.0	587.7
100.00	Appurtenance(s)	0.00	1.37	8.785	14.85	161.86	0.650	0.000	5.00	14.090	9.16	136.0	0.0	565.4
105.00		0.00	1.39	8.908	15.06	156.50	0.650	0.000	5.00	13.540	8.80	132.5	0.0	543.1
110.00	Appurtenance(s)	0.00	1.41	9.028	15.26	151.01	0.650	0.000	5.00	12.990	8.44	128.8	0.0	520.8
115.00		0.00	1.43	9.143	15.45	145.40	0.650	0.000	5.00	12.440	8.09	124.9	0.0	498.6
117.00	Appurtenance(s)	0.00	1.44	9.188	15.53	143.12	0.650	0.000	2.00	4.822	3.13	48.7	0.0	193.2
119.00		0.00	1.44	9.233	15.60	140.83	0.650	0.000	2.00	4.734	3.08	48.0	0.0	189.6
								Totals:	**119.00**			**3,525.4**		**22,901.0**

Discrete Appurtenance Forces

Structure: CT13555-S-SB
Site Name: Montano
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

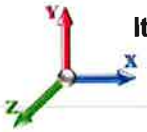
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/25/2015

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 17

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	90.00	B13 RRH4x30	3	8.525	14.407	0.88	6.62	171.60	0.000	0.000	95.30	0.00	0.00
2	90.00	DB-T1-6Z-8AB-0Z	2	8.525	14.407	1.00	11.20	88.00	0.000	0.000	161.35	0.00	0.00
3	90.00	HBXX-6517DS-A2M	6	8.525	14.407	0.80	41.95	282.00	0.000	0.000	604.38	0.00	0.00
4	90.00	LNX-6514DS-A1M	6	8.525	14.407	0.82	41.43	232.80	0.000	0.000	596.83	0.00	0.00
5	90.00	Low Profile Platform	1	8.525	14.407	1.00	25.00	1500.00	0.000	0.000	360.16	0.00	0.00
6	90.00	RRH2X60-AWS	3	8.525	14.407	0.77	8.74	165.00	0.000	0.000	125.96	0.00	0.00
7	90.00	RRH2x60-PCS	3	8.525	14.407	0.78	5.52	165.00	0.000	0.000	79.53	0.00	0.00
8	100.00	DC6-48-60-18-8F	4	8.785	14.847	1.00	5.88	127.20	0.000	0.000	87.30	0.00	0.00
9	100.00	HPA-65R-BUU-H8	12	8.785	14.847	0.80	127.68	816.00	0.000	0.000	1895.64	0.00	0.00
10	100.00	Platform w/ Hand Rail	1	8.785	14.847	1.00	40.00	1600.00	0.000	0.000	593.87	0.00	0.00
11	100.00	RRU E2	3	8.785	14.847	0.62	3.46	63.60	0.000	0.000	51.36	0.00	0.00
12	100.00	RRU-32	3	8.785	14.847	0.87	10.10	231.00	0.000	0.000	149.96	0.00	0.00
13	100.00	RRUS 11	9	8.785	14.847	0.76	20.11	456.30	0.000	0.000	298.56	0.00	0.00
14	100.00	RRUS 12	6	8.785	14.847	0.70	13.73	343.80	0.000	0.000	203.91	0.00	0.00
15	100.00	RRUS A2	6	8.785	14.847	0.62	6.92	127.20	0.000	0.000	102.73	0.00	0.00
16	110.00	Flush Mount	1	9.028	15.257	1.00	5.00	350.00	0.000	0.000	76.28	0.00	0.00
17	110.00	LLPX310R	3	9.028	15.257	0.75	10.87	85.80	0.000	0.000	165.80	0.00	0.00
18	110.00	VHLP2-18	1	9.028	15.257	1.00	4.68	27.00	0.000	0.000	71.40	0.00	0.00
19	110.00	VHLP2.5-18	1	9.028	15.257	1.00	8.43	47.60	0.000	0.000	128.61	0.00	0.00
20	117.00	6' Lightning rod	1	9.188	15.528	1.00	0.38	6.50	0.000	0.000	5.90	0.00	0.00
21	117.00	AIR 21 B2A B4P	3	9.188	15.528	0.86	16.98	274.50	0.000	0.000	263.61	0.00	0.00
22	117.00	AIR 21 B4A B2P	3	9.188	15.528	0.86	16.98	271.20	0.000	0.000	263.61	0.00	0.00
23	117.00	KRY 112 144/1	3	9.188	15.528	0.70	0.86	33.00	0.000	0.000	13.37	0.00	0.00
24	117.00	Low Profile Platform	1	9.188	15.528	1.00	22.00	1500.00	0.000	0.000	341.62	0.00	0.00
						Totals:		**8,965.10**			**6,737.07**		

Total Applied Force Summary

Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 19	

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 17

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		170.34	1455.78	0.00	0.00
10.00		166.47	1424.60	0.00	0.00
15.00		162.61	1393.41	0.00	0.00
20.00		158.74	1362.22	0.00	0.00
25.00		154.87	1331.03	0.00	0.00
30.00		151.00	1299.84	0.00	0.00
35.00		149.63	1268.65	0.00	0.00
40.00		151.37	1237.46	0.00	0.00
45.00		152.32	1206.27	0.00	0.00
47.00		60.49	473.78	0.00	0.00
50.00		92.53	1264.82	0.00	0.00
53.00		92.49	1243.97	0.00	0.00
55.00		61.42	400.84	0.00	0.00
60.00		154.21	983.39	0.00	0.00
65.00		153.09	956.66	0.00	0.00
70.00		151.57	929.92	0.00	0.00
75.00		149.70	903.19	0.00	0.00
80.00		147.50	876.46	0.00	0.00
81.00		29.01	172.08	0.00	0.00
85.00		115.60	577.85	0.00	0.00
90.00	(24) appurtenances	2165.76	3306.67	0.00	0.00
95.00		139.23	646.99	0.00	0.00
100.00	(44) appurtenances	3519.32	4389.81	0.00	0.00
105.00		132.50	573.63	0.00	0.00
110.00	(6) appurtenances	570.92	1061.75	0.00	0.00
115.00		124.94	520.25	0.00	0.00
117.00	(11) appurtenances	936.78	2287.06	0.00	0.00
119.00		48.01	189.62	0.00	0.00
	Totals:	**10,262.44**	**33,737.99**	**0.00**	**0.00**

Resulting Forces and Deflections

Structure:	CT13555-S-SB	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 20	

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 17

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-10.273	-33.735	0.000	0.000	0.000	-892.98	0.000	0.000	0.000	0.000	0.000
5.00	-10.122	-32.273	0.000	0.000	0.000	-841.61	-0.019	0.000	0.019	-0.035	0.000
10.00	-9.973	-30.842	0.000	0.000	0.000	-791.00	-0.076	0.000	0.076	-0.071	0.000
15.00	-9.827	-29.443	0.000	0.000	0.000	-741.14	-0.170	0.000	0.170	-0.107	0.000
20.00	-9.683	-28.075	0.000	0.000	0.000	-692.00	-0.301	0.000	0.301	-0.143	0.000
25.00	-9.541	-26.738	0.000	0.000	0.000	-643.59	-0.470	0.000	0.470	-0.179	0.000
30.00	-9.402	-25.433	0.000	0.000	0.000	-595.88	-0.678	0.000	0.678	-0.215	0.000
35.00	-9.262	-24.159	0.000	0.000	0.000	-548.87	-0.923	0.000	0.923	-0.251	0.000
40.00	-9.120	-22.917	0.000	0.000	0.000	-502.56	-1.206	0.000	1.206	-0.287	0.000
45.00	-8.970	-21.707	0.000	0.000	0.000	-456.96	-1.527	0.000	1.527	-0.323	0.000
47.00	-8.914	-21.231	0.000	0.000	0.000	-439.02	-1.665	0.000	1.665	-0.337	0.000
50.00	-8.821	-19.964	0.000	0.000	0.000	-412.28	-1.884	0.000	1.884	-0.359	0.000
53.00	-8.726	-18.718	0.000	0.000	0.000	-385.82	-2.117	0.000	2.117	-0.380	0.000
55.00	-8.670	-18.313	0.000	0.000	0.000	-368.37	-2.279	0.000	2.279	-0.394	0.000
60.00	-8.520	-17.326	0.000	0.000	0.000	-325.02	-2.712	0.000	2.712	-0.431	0.000
65.00	-8.369	-16.365	0.000	0.000	0.000	-282.42	-3.182	0.000	3.182	-0.466	0.000
70.00	-8.218	-15.432	0.000	0.000	0.000	-240.57	-3.689	0.000	3.689	-0.499	0.000
75.00	-8.068	-14.526	0.000	0.000	0.000	-199.48	-4.229	0.000	4.229	-0.530	0.000
80.00	-7.916	-13.649	0.000	0.000	0.000	-159.14	-4.800	0.000	4.800	-0.558	0.000
81.00	-7.888	-13.475	0.000	0.000	0.000	-151.23	-4.918	0.000	4.918	-0.563	0.000
85.00	-7.772	-12.896	0.000	0.000	0.000	-119.68	-5.398	0.000	5.398	-0.582	0.000
90.00	-5.575	-9.610	0.000	0.000	0.000	-80.823	-6.022	0.000	6.022	-0.605	0.000
95.00	-5.431	-8.963	0.000	0.000	0.000	-52.948	-6.666	0.000	6.666	-0.622	0.000
100.00	-1.864	-4.612	0.000	0.000	0.000	-25.794	-7.324	0.000	7.324	-0.633	0.000
105.00	-1.726	-4.040	0.000	0.000	0.000	-16.472	-7.991	0.000	7.991	-0.640	0.000
110.00	-1.143	-2.984	0.000	0.000	0.000	-7.842	-8.664	0.000	8.664	-0.644	0.000
115.00	-1.013	-2.465	0.000	0.000	0.000	-2.125	-9.341	0.000	9.341	-0.647	0.000
117.00	-0.050	-0.189	0.000	0.000	0.000	-0.100	-9.612	0.000	9.612	-0.647	0.000
119.00	-0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.883	-0.647	0.000

Resulting Stresses

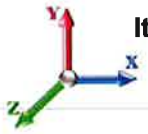
Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015
Site Name:	Montano	**Exposure:**	C	
Height:	119.00 (ft)	**Gh:**	1.69	
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 17

	Applied Stresses								
Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.42	0.26	0.00	0.00	0.00	9.17	9.60	52.0	0.185
5.00	0.41	0.26	0.00	0.00	0.00	9.05	9.47	52.0	0.182
10.00	0.40	0.26	0.00	0.00	0.00	8.91	9.32	52.0	0.179
15.00	0.39	0.26	0.00	0.00	0.00	8.76	9.16	52.0	0.176
20.00	0.38	0.26	0.00	0.00	0.00	8.60	8.99	52.0	0.173
25.00	0.37	0.27	0.00	0.00	0.00	8.41	8.79	52.0	0.169
30.00	0.36	0.27	0.00	0.00	0.00	8.20	8.58	52.0	0.165
35.00	0.35	0.27	0.00	0.00	0.00	7.97	8.33	52.0	0.160
40.00	0.35	0.28	0.00	0.00	0.00	7.70	8.06	52.0	0.155
45.00	0.34	0.28	0.00	0.00	0.00	7.41	7.76	52.0	0.149
47.00	0.33	0.28	0.00	0.00	0.00	7.29	7.63	52.0	0.147
50.00	0.32	0.28	0.00	0.00	0.00	7.09	7.42	52.0	0.143
53.00	0.35	0.33	0.00	0.00	0.00	7.72	8.09	52.0	0.156
55.00	0.34	0.33	0.00	0.00	0.00	7.54	7.91	52.0	0.152
60.00	0.34	0.33	0.00	0.00	0.00	7.07	7.43	52.0	0.143
65.00	0.33	0.34	0.00	0.00	0.00	6.54	6.89	52.0	0.133
70.00	0.32	0.34	0.00	0.00	0.00	5.94	6.28	52.0	0.121
75.00	0.31	0.35	0.00	0.00	0.00	5.26	5.60	52.0	0.108
80.00	0.30	0.35	0.00	0.00	0.00	4.49	4.83	52.0	0.093
81.00	0.30	0.35	0.00	0.00	0.00	4.33	4.67	52.0	0.090
81.00	0.30	0.35	0.00	0.00	0.00	4.33	4.67	52.0	0.107
85.00	0.35	0.43	0.00	0.00	0.00	4.33	4.74	52.0	0.091
90.00	0.27	0.32	0.00	0.00	0.00	3.15	3.47	52.0	0.067
95.00	0.26	0.32	0.00	0.00	0.00	2.23	2.55	52.0	0.049
100.00	0.14	0.12	0.00	0.00	0.00	1.17	1.33	52.0	0.026
105.00	0.13	0.11	0.00	0.00	0.00	0.81	0.96	52.0	0.019
110.00	0.10	0.08	0.00	0.00	0.00	0.42	0.54	52.0	0.010
115.00	0.09	0.07	0.00	0.00	0.00	0.13	0.24	52.0	0.005
117.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	52.0	0.000
119.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Structure:	CT13555-S-SBA	**Code:**	EIA/TIA-222-F	6/25/2015	
Site Name:	Montano	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
80 mph Wind with 0" Ice	26.3	0.00	33.72	0.00	0.00	2285.74
69.28 mph Wind with 0.5" Ice	21.0	0.00	40.67	0.00	0.00	1843.01
50 mph Wind with 0" Ice	10.3	0.00	33.73	0.00	0.00	892.98

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
80 mph Wind with 0" Ice	0.42	0.65	0.00	0.00	0.00	23.47	23.91	52.0	0.00	0.460
69.28 mph Wind with 0.5" Ice	0.50	0.52	0.00	0.00	0.00	18.92	19.45	52.0	0.00	0.374
50 mph Wind with 0" Ice	0.42	0.26	0.00	0.00	0.00	9.17	9.60	52.0	0.00	0.185

Monopole Mat Foundation Design

			Date: 6/25/2015
Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-F
Site Name:	Montano	Structure Height (Ft.):	119
Site Nmber:	CT13555-S-SBA	Engineer Name:	J. Tibbetts
Engr. Number:	16264	Engineer Login ID:	TES

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

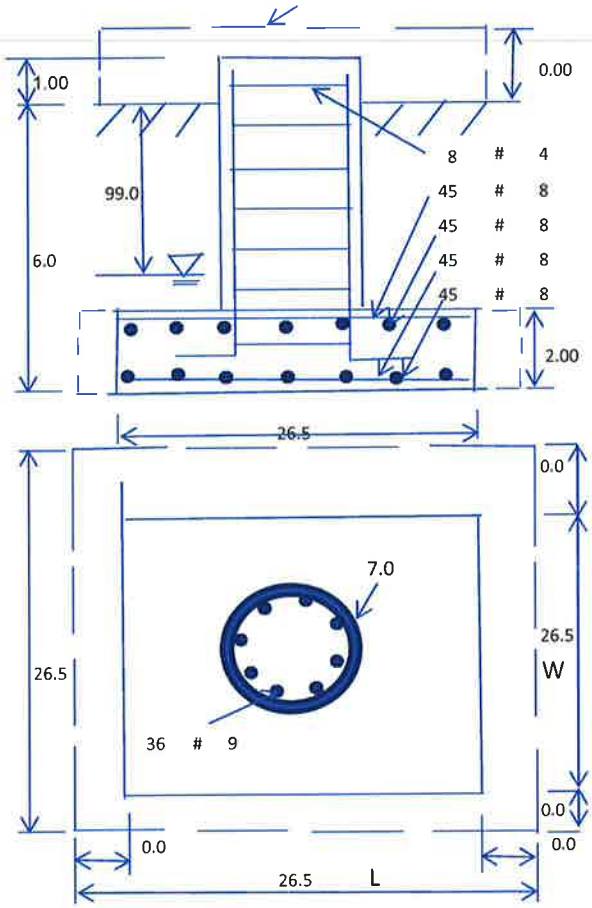
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	40.7	Shear Force (Kips):	26.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2285.7

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	6.0
Pier Height A. G. (ft.):	1.00	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	26.5	Width of Pad (ft.):	26.5
Final Length of pad (ft)	26.5	Final width of pad (ft):	26.5
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	45	Qty. of Rebar in Pad (W):	45	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	45	Qty. of Rebar in Pad (W):	45	

Soil Design Parameters:

Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	3500	Allowable Skin Friction:	1200	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hori. force for O.T.M.:	No	Reduction factor on the maximum soil bearing pressure:			1.00	

Foundation Analysis and Design:

Total Dry Soil Volume (cu. Ft.):	2655.06	Total Dry Soil Weight (Kips):	292.06
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	292.06	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1596.92	Total Dry Concrete Weight (Kips):	239.54
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	239.54	Total Vertical Load on Base (Kips):	572.30

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1304	<	Allowable Soil Bearing (psf):	3500	0.37	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	5055.3	>	Applied Momont (kips-ft):	2470	0.49	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.07	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.30		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.00		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	6090.2	>	Design Factored Moment (Mu, Kips-F	3142.4	0.52	OK!
Calculated Shear Capacity (Kips):	660.1	>	Design Factored Shear (Kips):	34.2	0.05	OK!
Calculated Tension Capacity (Tn, Kips):	1944.0	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9734.2	>	Design Factored Axial Load (Pu Kips):	52.9	0.01	OK!
Moment & Axial Strength Combination(Pu/Pn+Mu/Mn):	0.52	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.006		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	618.4	>	One-Way Factored Shear (L-D. Kips):	192.5	0.31	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	618.4	>	One-Way Factored Shear (W-D., Kips)	192.5	0.31	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	711.3	>	One-Way Factored Shear (C-C, Kips):	252.7	0.36	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0055	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0055		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	3121.7	>	Moment at Bottom (L-Direct. K-Ft):	595.5	0.19	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	3121.7	>	Moment at Bottom (W-Direct. K-Ft):	595.5	0.19	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	4363.5	>	Moment at Bottom (C-C Dir. K-Ft):	842.1	0.19	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0055	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0055		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	3121.7	>	Moment at the top (L-Dir Kips-Ft):	451.5	0.14	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	3121.7	>	Moment at the top (W-Dir Kips-Ft):	451.5	0.14	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	4363.5	>	Moment at the top (C-C Direc. K-Ft):	554.3	0.13	OK!

Pier Foundation Design For Monopole

			Date: 6/25/2015
Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-F
Site Name:	Montano	Structure Height (Ft.):	119
Site Number:	CT13555-S-SBA	Engineer Name:	J. Tibbetts
Engr. Number:	16264	Engineer Login ID:	TES

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	40.7	Shear Force (Kips):	26.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2285.7

Foundation Geometries:

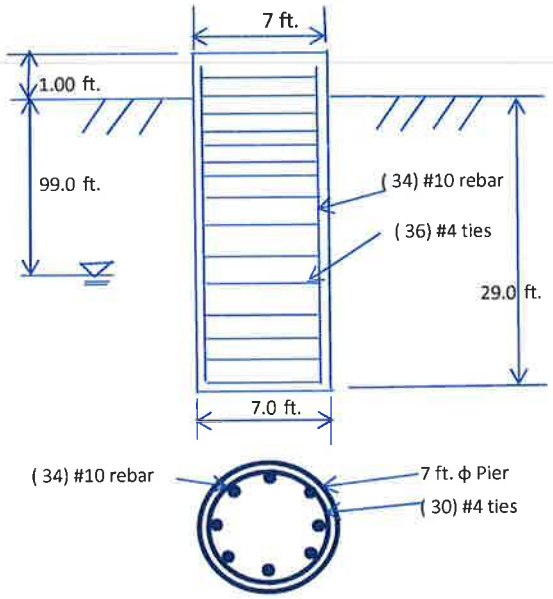
Mods required -Yes/No ?:	No			ft.
Diameter of Pier (ft.):	7.0	Depth of Base B. G. S. :	29.0	ft.
Pier Height A. G. (ft.):	1.00			

Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	60	ksi
Vertical Rebar Size #:	10	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	34	Tie Spacing:	12.0	in.
Concrete Cover (in.):	3	Concrete unit weight:	150.0	pcf

Soil Design Parameters:

Water Table B.G.S. (ft):	99.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.0	Pullout failure Angle:	30	(°)
Skin Frictions are to be obtained from:		Soil Report		



Monopole Pier Foundation

Depth of Layers (ft) Top	Depth of Layers (ft) Bottom	γ_{soil} (pcf)	ϕ (°)	Cohesion (psf)	Allowable Skin Friction (psf)	Allowable Bearing (psf)	Soil Types
0.0	3.0	100	0	0	0	0	Sand
3.0	25.0	110	33	0	500	3000	Sand
25.0	50.0	105	30	0	800	4000	Sand
50.0	55.0	100	30	0	800	4000	Sand

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Total Dry Soil Volume from Conical Failure (cu. Ft.):	13814	Dry Soil Weight from Conical Failure:	1468	Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	0	Buoyant Soil Weight from Conical Failure (K	0	Kips
Total Dry Concrete Volume (cu. Ft.):	1155	Total Dry Concrete Weight:	173.2	Kips
Total Buoyant Concrete Volume (cu. Ft.):	0.0	Total Buoyant Concrete Weight:	0.00	Kips
Total Effective Concrete Weight (Kips):	173.2	Total Effective Soil Weight:	1468.0	Kips
Total Effective Vertical Load on Base (Kips):	95.3			

Check Soil Capacities:

					Usage	
Allowable Foundation Overturning Resistance (kips-ft.):	7161.6	>	Applied Momont (kips-ft):	2824	0.39	OK!
Factor of Safety of Passive Soil Resistance against Moment:	5.07	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75	
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.30	

Reinforcing Concrete Pier:

					Usage	
Vertical Steel Rebar Area (sq. in./each):	1.27		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	7293	>	Design Factored Moment (Mu, K-Ft):	3120.2	0.43	OK!
Calculated Shear Capacity (Kips):	1120.9	>	Design Factored Shear (Kips):	285.1	0.25	OK!
Calculated Tension Capacity (Tn, Kips):	2331.7	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9722	>	Design Factored Axial Load (Pu Kips):	52.9	0.01	OK!
Moment & Axial Strength Combination(Tu/Tn+Mu/Mn):	0.43	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.	
Pier Reinforcement Ratio:	0.008	Reinforcement Ratio is satisfied per ACI				

ATTACHMENT 5

	General	Power	Density					
Site Name: Glastonbury Neipsic								
Tower Height: 120Ft.								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*T-Mobile LTE	2	24	117	0.0013	2100	1.0000	0.13%	
*T-Mobile GSM/UMTS	2	12	117	0.0006	1950	1.0000	0.06%	
*T-Mobile UMTS	2	12	117	0.0006	2100	1.0000	0.06%	
*Clearwire	2	153	110	0.0091	2496	1.0000	0.91%	
*Clearwire	1	211	110	0.0063	11 GHz	1.0000	0.63%	
*AT&T UMTS	2	500	100	0.0360	850	0.5667	6.35%	
*AT&T UMTS	2	500	100	0.0360	1900	1.0000	3.60%	
*AT&T LTE	2	500	100	0.0360	700	0.4667	7.70%	
*AT&T LTE	1	500	100	0.0180	850	0.5667	3.17%	
*AT&T LTE	2	500	100	0.0360	1900	1.0000	3.60%	
*AT&T LTE	1	500	100	0.0180	2300	1.0000	1.80%	
Verizon PCS	**0**	**470**	**90**	**0.0000**	**1970**	**1.0000**	**0.00%**	
Verizon Cellular	**0**	**422**	**90**	**0.0000**	**869**	**0.5793**	**0.00%**	
Verizon AWS	**1**	**3500**	**90**	**0.1554**	**2145**	**1.0000**	**15.54%**	
Verizon 700	**1**	**2100**	**90**	**0.0932**	**746**	**0.4973**	**18.75%**	
								62.28%
* Source: Siting Council								

ATTACHMENT 6

Robinson + Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

July 2, 2015

Via Certificate of Mailing

Richard J. Johnson, Town Manager
Town of Glastonbury
2155 Main Street
P.O. Box 6523
Glastonbury, CT 06033-6523

Re: **Proposed Modifications to Telecommunications Facility at 58 Montano Road, Glastonbury, Connecticut**

Dear Mr. Johnson:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to share the wireless telecommunications facility at 58 Montano Road in Glastonbury (the "Property"). Cellco plans to install twelve (12) antennas and nine (9) remote radio heads on a low-profile platform at the 90-foot level on the 120-foot tower at the Property. Equipment associated with Cellco's antennas and a back-up generator will be located inside a 12' x 26' shelter within the existing tower compound.

As presented in the Sub-Petition, the proposed "small cell" facility improvements at the Property constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent a copy of this Sub-Petition.

Robinson+Cole

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

Robinson + Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

July 2, 2015

Via Certificate of Mailing

Rosa Marie Shaw
58A Montano Drive
Glastonbury, CT 06033

Re: **Proposed Modifications to Telecommunications Facility at 58 Montano Road, Glastonbury, Connecticut**

Dear Ms. Shaw:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to share the wireless telecommunications facility at 58 Montano Road in Glastonbury (the "Property"). Cellco plans to install twelve (12) antennas and nine (9) remote radio heads on a low-profile platform at the 90-foot level on the 120-foot tower at the Property. Equipment associated with Cellco's antennas and a back-up generator will be located inside a 12' x 26' shelter within the existing tower compound.

As presented in the Sub-Petition, the proposed "small cell" facility improvements at the Property constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent a copy of this Sub-Petition.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

ATTACHMENT 7

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

July 2, 2015

Via Certificate of Mailing

«Name_and_Address»

Re: **Sub-Petition for Declaratory Ruling Filed with the Connecticut Siting Council for Modifications to a Telecommunications Facility at 58 Montano Road, Glastonbury, Connecticut**

Dear «Salutation»:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to share the wireless telecommunications facility at 58 Montano Road in Glastonbury (the "Property"). Cellco plans to install twelve (12) antennas and nine (9) remote radio heads on a low-profile platform at the 90-foot level on the 120-foot tower at the Property. Equipment associated with Cellco's antennas and a back-up generator will be located inside a 12' x 26' shelter within the existing tower compound.

The facility improvements constitute a eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation Act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the Sub-Petition.

This notice is being sent to you because you are listed as an owner of land that abuts the Property. If you have any questions regarding the Sub-Petition, the Council's process for reviewing the Sub-Petition or the details of the filing itself, please feel free to contact me at the number listed above. You may also contact the Council directly at 860-827-2935.

Sincerely,

Kenneth C. Baldwin

Attachment

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS

ABUTTERS LIST
MAP G7/BLOCK 4480/LOT S0021

58 MONTANO ROAD
GLASTONBURY, CONNECTICUT

	Map/Block/Lot	Property Address	Owner and Mailing Address
1.	G7/4480/N0041	Montano Road	Virginia C. Goodwin 145 S. Mill Drive South Glastonbury, CT 06073
2.	G7/4480/S0022	48 Montano Road	Edward Bagot, Jr. 48 Montano Road Glastonbury, CT 06033
3.	G7/4740/S16	618 Neipsic Road	Joanne Sullivan LLC 497A Wickham Road Glastonbury, CT 06033
4.	G7/7580/S19	495 Wickham Road	Paul & Linda Jackson 3870 Royer Court Reno, NV 89509