Robinson+Cole

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Also admitted in Massachusetts

December 4, 2015

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
154 Sayles Avenue, Putnam, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 147-foot level of the existing 175-foot tower at 154 Sayles Avenue in Putnam, Connecticut (the "Property"). The tower is owned SBA Communications Corporation ("SBA"). Cellco's use of the tower was approved by the Council in 1999. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D65B, 1900 MHz antennas and three (3) model SBNHH-1D65B, 700/2100 MHz antennas, at the same 147-foot level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") with three (3) newer model RRHs and install six (6) new RRHs and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Anthony Falzarano, Mayor for the Town of Putnam. A copy of this letter is also being sent to William Moser and Ronald Blain, the owners of the Property and SBA, the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be attached to the existing T-Arm mounts at the 147-foot level of the tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

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

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Post-Mod Structural Analysis Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Mayor Anthony Falzarano, Town of Putnam
William Moser and Ronald Blain
SBA
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* 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® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.0 kg | 68.3 lb

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

Product Specifications

SBNHH-1D65B

BSAMNT-1 — Wide Profile Antenna 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.

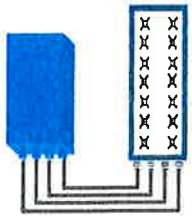
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the 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	2 Branch RX – LA6.0.1
	1900A HW version	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)

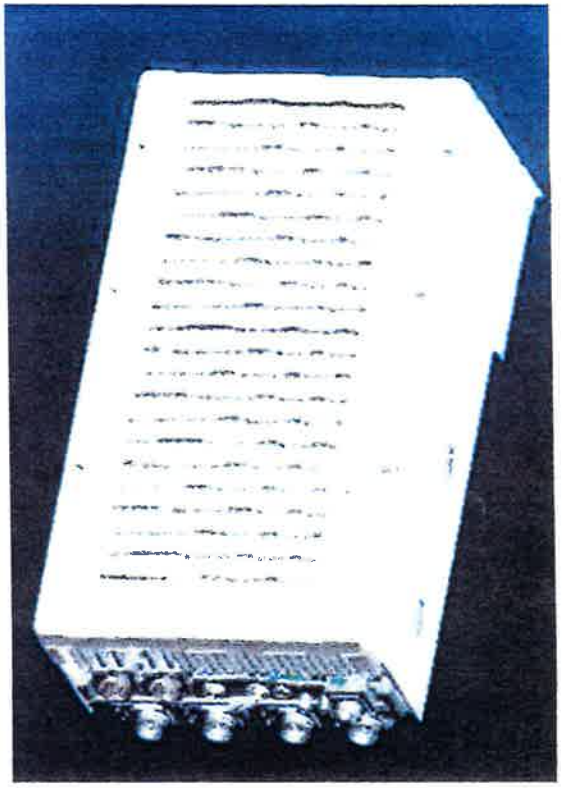
** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

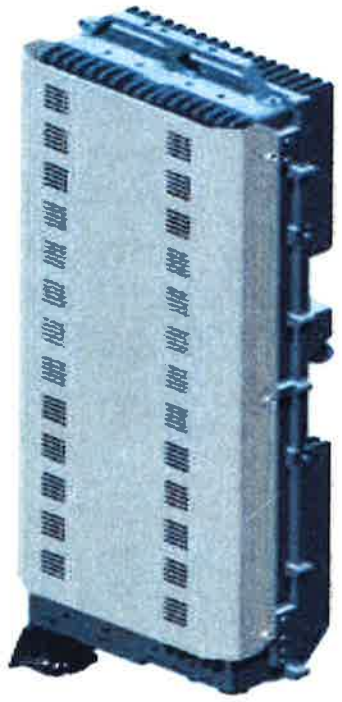
	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	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
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.

SUPERIOR RF PERFORMANCE

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.

OPTIMIZED TCO

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.

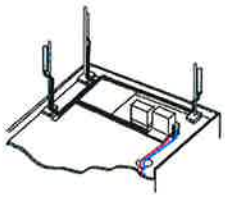
EASY INSTALLATION

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.

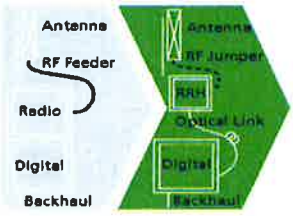
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

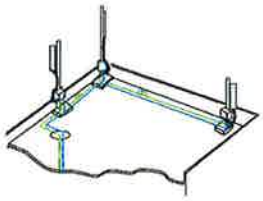
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- 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

BENEFITS

- 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.

TECHNICAL SPECIFICATIONS

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

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 CELLFLEX® 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)

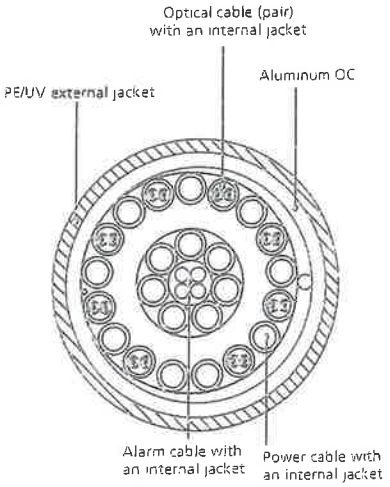


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Putnam								
Tower Height: 175'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	134	0.0248	880	0.5867	0.42%	
*AT&T UMTS	2	875	134	0.0384	1900	1.0000	0.38%	
*AT&T GSM	1	283	134	0.0062	880	0.5867	0.11%	
*AT&T GSM	4	525	134	0.0461	1900	1.0000	0.46%	
*AT&T LTE	1	1771	134	0.0389	734	0.4893	0.79%	
*MetroPCS	3	444	124	0.0344	2140	1.0000	0.34%	
*Sprint CDMA/LTE	4	625	180	0.0297	1900	1.0000	0.30%	
*Nextel	9	100	159	0.0138	858	0.5720	0.24%	
*VoiceStream	4	277	187	0.0122	1930	1.0000	0.12%	
Verizon	**11**	**421**	**147**	**0.0771**	**1970**	**1.0000**	**7.71%**	
Verizon	**9**	**231**	**147**	**0.0346**	**869**	**0.5793**	**5.97%**	
Verizon	**1**	**2302**	**147**	**0.0383**	**2145**	**1.0000**	**3.83%**	
Verizon	**1**	**818**	**147**	**0.0136**	**746**	**0.4973**	**2.74%**	
								23.4%
* Source: Siting Council								

ATTACHMENT 3

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

Post-Mod Structural Analysis Report

Existing 175 ft Nudd Corporation Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT00680-S

Customer Site Name: Putnam

Carrier Name: Verizon

Carrier Site Number: N/A

Carrier Site Name: Putnam Ct

Site Location: 154 Sayle Avenue

Putnam, Connecticut

Windham County

Latitude: 41.929449

Longitude: -71.886272

Analysis Result:

Max Structural Usage: 89.1% [Pass]

Max Foundation Usage: 56% [Pass]

Report Prepared By : Jarryd Tibbetts

Introduction

The purpose of this report is to summarize the analysis results on the 175 ft Nudd Corporation Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any existing modification listed under Sources of Information was assumed completed and was included in this analysis.

The proposed modification by **TES** listed under Sources of Information was considered completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawing prepared by Fred A. Nudd, Drawing #98-6220-1 dated 11/12/98
Foundation Drawing	Foundation Drawing prepared by Fred A. Nudd, Drawing #98-6220-2 dated 11/12/98
Geotechnical Report	Geotechnical Report prepared by Jaworski Geotech, Project #C98291G dated 8/4/98
Existing Modification	Modification Drawing prepared by o2wirelss Solutions, Job #2230-019 dated 5/30/02 Modification Drawing prepared by FDH, Project #12-01602E S2 dated 4/30/12
Proposed Modification	**TES** Job # 17447

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:	85.0 mph (Fastest mile)
Basic Wind Speed with Ice:	74 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	191.5	3	EMS - DR65-18-02DPL2Q - Panel	(3) 24' x 4.5" Pipe Mounts	(12) 1 5/8"	T-Mobile
2	188.5	6	Andrew - E15S09P9402 - TMA/TTA			
3	179.0	6	Decibel - DB980H90 - Panel	(3) T-Arms	(6) 1 5/8"	Sprint
5	147.0	3	Amphenol - BXA-70063-6CF-EDIN-X - Panel	(3) T-Arms	(12) 1 5/8" (1) 1 5/8" Fiber	Verizon
6		3	Amphenol - BXA-80080-4CF-EDIN-X - Panel			
8		3	Antel - BXA-171085-12BF-EDIN-X - Panel			
10		3	Antel - BXA-171063-12CF-EDIN-X - Panel			
11		6	RFS Celwave - FD9R6004/2C-3L - Diplexer			
14		1	RFS Celwave - DB-T1-6Z-8AB-0Z - Distribution Box			
15	144.0	3	Alcatel Lucent - RRH2x40-AWS - RRU			
16	137.5	6	Powerwave - 7770.00 - Panel	(3) T-Arms	(12) 1 5/8" (2) 3/4" DC Power (1) 7/16" Fiber (1) 1/2" RET	AT&T
17		3	KMW - AM-X-CD-17-65-00T-RET - Panel			
18		1	Nokia - CS72188.01			
19		6	Powerwave - LGP21901			
20	137.0	6	Powerwave - LGP21401			
21	134.0	6	Ericson - RRUS 11 - RRU	Ring Mount		
22		1	Raycap - DC2-48-60-8-18F			
23	55.5	1	GPS	(1) Standoff	(1) 1/2"	Sprint

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of 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
6	147.0	3	Amphenol - BXA-70063-6CF-EDIN-X - Panel	(3) T-Arms	(11) 1 5/8" (2) 1 5/8" Fiber	Verizon
7		3	Amphenol - BXA-80080-4CF-EDIN-X - Panel			
8		6	Commscope - SBNHH-1D65B - Panel			
9		6	RFS Celwave - FD9R6004/2C-3L - Diplexer			
12		2	RFS Celwave - DB-T1-6Z-8AB-0Z - Distribution Box			
13	144.0	3	Alcatel Lucent - RRH2X60-AWS - RRU			
14		3	Alcatel Lucent - RRH2X60-PCS - RRU			
15		3	Alcatel Lucent - RRH2X60-700 - RRU			

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:	**89.1%**	**69.7%**	**89.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	4613.4	40.1	45.8

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 1.9137 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the structure and its foundation will be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the design ANSI/TIA/EIA 222-F standards under a basic wind speed of 85 mph no ice and 74 mph with 1/2" radial ice after the following proposed modification is successfully completed.

- Proposed modification design drawing by **TES** Job # 17447

Pre-Mod Installation Determination

We have also checked this tower to determine if the proposed Verizon equipment loading can be installed prior to the completion of the required modifications. We ran a reduced wind loading case as required by TIA-1019 considering a construction period of no more than 6 months.

The tower and foundations passed, so the Carrier can proceed and install their proposed loading prior to the mods completion. Please be aware that this approval is being provided and is based on the method outlined in TIA-1019. This approval is not a blanket approval and there is still a risk that the tower will experience a wind event that cannot be predicted by TIA-1019 or our Engineers. In the event of an unforeseen wind event, Tower Engineering Solutions will not be liable nor responsible for damage to the tower or the Carriers equipment. Additionally, the tower cannot go beyond the 6 month construction period without the modifications being completed. If the modifications cannot be completed within 6 months from the completed installation of the Carrier's proposed equipment, TES must be notified immediately for further review.

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 89.1% at 38.0ft

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

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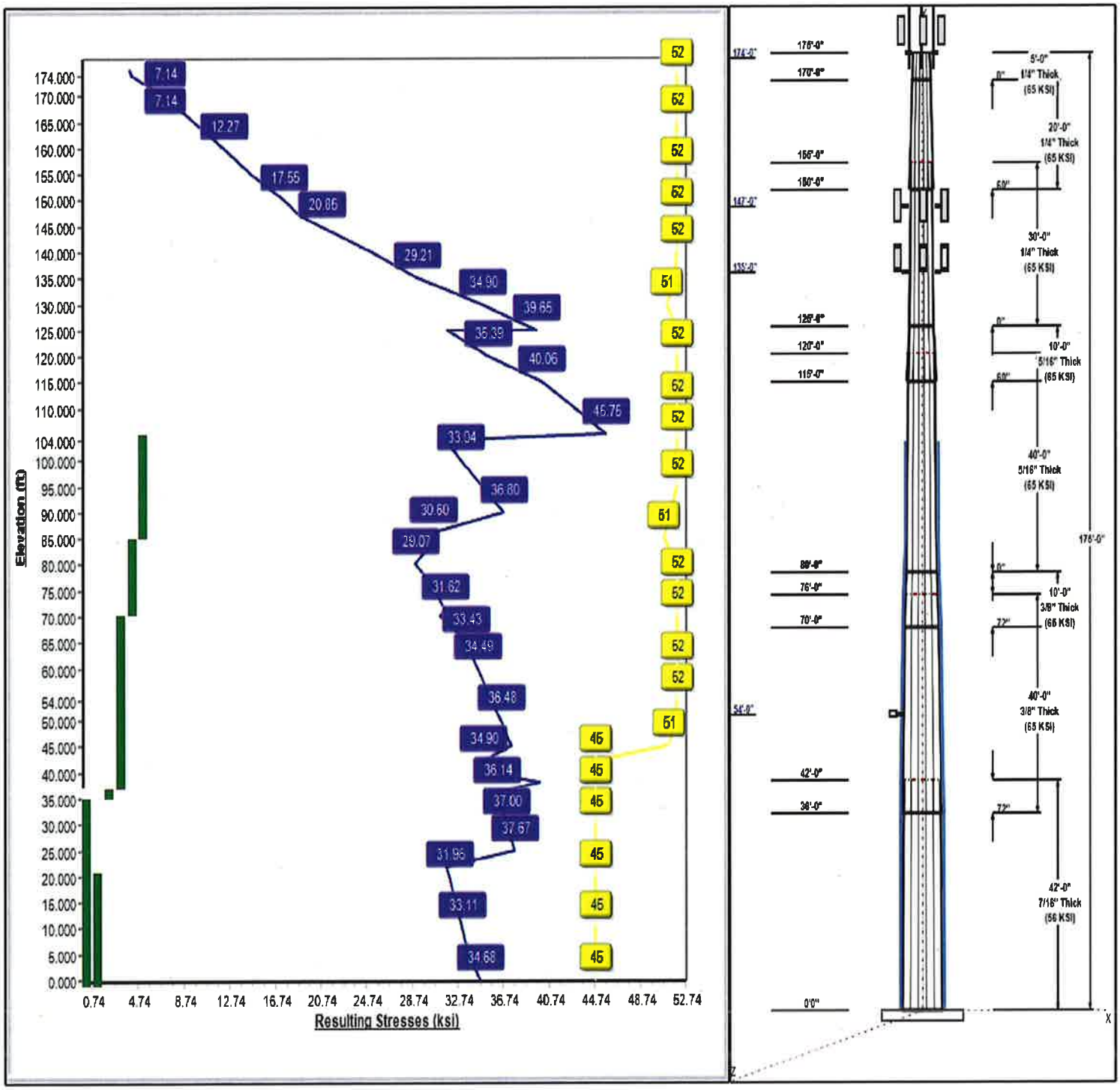
Dead Load Factor:	1.00	**Iterations:**	24
Wind Load Factor:	1.00		

45 Alllowable Stress

40 Resulting Stress

Load Case : 85 mph Wind with 0 in Ice



Structure: CT00680-S-SBA

Type: Custom
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 12 Sided
Taper: 1.15000

9/28/2015

IES Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	42.00	45.88	54.00	0.438		0.19338	56
2	40.00	40.05	47.79	0.375	Slip	0.19338	65
3	10.00	40.03	41.96	0.375	Slip	0.19338	65
4	40.00	32.29	40.03	0.313	Butt	0.19338	65
5	10.00	31.95	33.89	0.313	Slip	0.19338	65
6	30.00	26.15	31.95	0.250	Butt	0.19338	65
7	20.00	23.75	27.62	0.250	Slip	0.19338	65
8	5.00	18.00	23.75	0.250	Butt	1.15000	65

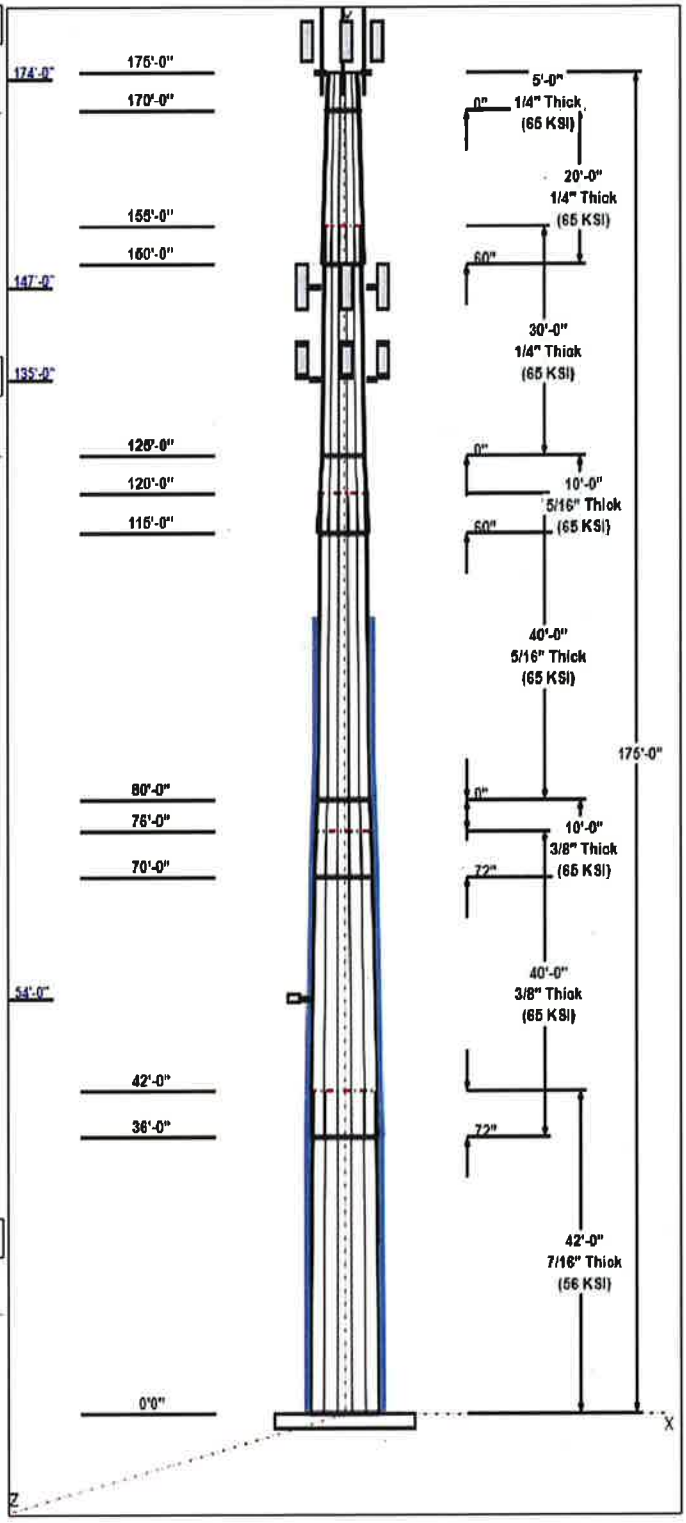
Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
175.00	183.00	3	Coax	T-Mobile
175.00	179.00	6	DB980H90	Sprint
175.00	191.50	3	DR65-18-02DPL2Q	T-Mobile
175.00	188.50	6	E15S09P94	T-Mobile
175.00	175.00	3	T-Arms	Sprint
174.00	184.00	3	4.5" x 24 FT Pipe	T-Mobile
147.00	147.00	3	BXA-70063-6CF-EDIN-X	Verizon
147.00	147.00	3	BXA-80080-4CF-EDIN-X	Verizon
147.00	147.00	2	DB-T1-6Z-8AB-0Z	Verizon
147.00	147.00	6	FD9R6004/2C-3L (3.1 lbs)	Verizon
147.00	144.00	3	RRH2X60-AWS	Verizon
147.00	144.00	3	RRH2X60-AWS	Verizon
147.00	144.00	3	RRH2X60-PCS	Verizon
147.00	147.00	6	SBNHH-1D65B	Verizon
147.00	147.00	3	T-Arms	Verizon
135.00	137.50	6	7770.00	AT&T
135.00	137.50	3	AM-X-CD-17-65-00T-RET	AT&T
135.00	137.50	1	CS72188.01	AT&T
135.00	137.00	6	LGP21401	AT&T
135.00	137.50	6	LGP21901	AT&T
135.00	135.00	3	T-Arms	AT&T
133.00	134.00	1	DC2-48-60-8-18F-02	AT&T
133.00	133.00	1	Flush Mount	AT&T
133.00	134.00	6	RRUS 11	AT&T
54.00	54.00	1	GPS	Sprint
54.00	54.00	1	Standoff	Sprint

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	175.00	Inside	1 5/8" Coax	T-Mobile
0.00	175.00	Inside	1 5/8" Coax	Sprint
0.00	147.00	Inside	1 5/8" Coax	Verizon
0.00	147.00	Inside	1 5/8" Hybrid	Verizon
0.00	135.00	Inside	1 5/8" Coax	AT&T
0.00	135.00	Inside	1/2" Coax	AT&T
0.00	135.00	Inside	3/4" DC	AT&T
0.00	105.00	Outside	3" Chanel	
0.00	54.00	Inside	1/2" Coax	Sprint

Anchor Bolts



Qty	Specifications	Grade (ksi)	Arrangement
18	2.00" A687	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	67.0	50.0	Round

Reactions

Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	4613.4	40.1	38.9
73.61 mph Wind with 0.5" Ice	3681.8	31.5	45.8
50 mph Wind with 0" Ice	1598.0	13.9	38.9

Structure: CT00680-S-SBA - Coax Line Placement

Type: Monopole
Site Name: Putnam
Height: 175.00 (ft)

9/28/2015

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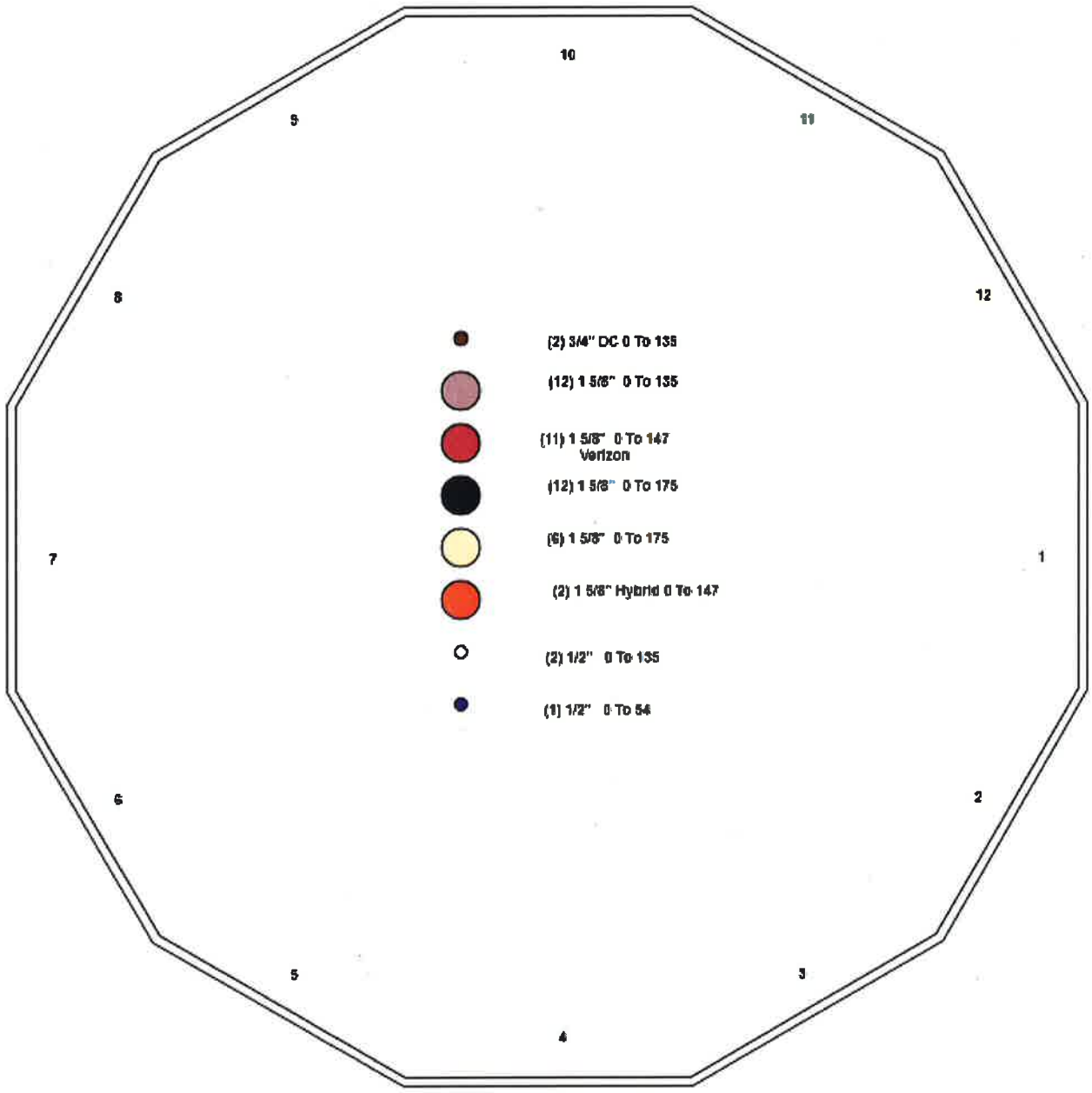

Shaft Properties

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	12	42.000	0.4375	56		0.00	9,966
2	12	40.000	0.3750	65	Slip	72.00	7,157
3	12	10.000	0.3750	65	Slip	72.00	1,669
4	12	40.000	0.3125	65	Flange	0.00	4,910
5	12	10.000	0.3125	65	Slip	60.00	1,116
6	12	30.000	0.2500	65	Flange	0.00	2,367
7	12	20.000	0.2500	65	Slip	60.00	1,393
8	12	5.000	0.2500	65	Flange	0.00	282
					Total Shaft Weight:		**28,861**

	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	54.00	0.00	75.46	27631.37	30.92	123.4	45.88	42.00	64.01	16871.2	25.95	104.8	0.193382
2	47.79	36.00	57.25	16427.51	32.00	127.4	40.05	76.00	47.91	9627.65	26.47	106.8	0.193382
3	41.96	70.00	50.22	11086.25	27.84	111.9	40.03	80.00	47.88	9610.54	26.45	106.7	0.193382
4	40.03	80.00	39.97	8046.71	32.17	128.0	32.29	120.0	32.18	4201.39	25.54	103.3	0.193382
5	33.89	115.0	33.78	4860.52	26.91	108.4	31.95	125.0	31.84	4068.08	25.25	102.2	0.193382
6	31.95	125.0	25.52	3273.79	32.10	127.8	26.15	155.0	20.85	1785.33	25.88	104.6	0.193382
7	27.62	150.0	22.03	2106.17	27.45	110.4	23.75	170.0	18.92	1333.48	23.31	95	0.193382
8	23.75	170.0	18.92	1333.48	23.31	95	18.00	175.0	14.29	574.61	17.14	72	1.150000

Additional Steel

							Intermediate Connectors		Termination Connectors			
Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Fu (ksi)	Offset (in)	Description	Spacing (in)	Description	Spacing (in)	Lower Qty	Upper Qty
0.00	36.00	3	PLT C10x30(1.5" Hole)	65	80	0.00	AJM20&sleeve	0.00	AJM20&sleeve	3.00		
0.00	22.00	3	PLT C10x30(1.5" Hole)	65	80	0.00	AJM20&sleeve	24.00	AJM20&sleeve	3.00		
36.00	38.00	3	LNP LP6X100-G-10TT	65	80	0.00	5/8" Hollo Bolt	24.00	5/8" Hollo Bolt	3.00	11	11
38.00	71.25	3	PLT C10x30(1.5" Hole)	65	80	0.00	AJM20&sleeve	24.00	AJM20&sleeve	3.00		
71.25	86.00	3	PLT C10x30(1.5" Hole)	65	80	0.00	AJM20&sleeve	24.00	AJM20&sleeve	3.00		
86.00	104.0	3	PLT C10x15.3(1.5"	65	80	0.00	AJM20&sleeve	24.00	AJM20&sleeve	3.00		

Loading Summary

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 6	

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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	175.0	Coax	3	62.00	3.20	1.00	100.00	4.000	1.00	0.00	8.00
2	175.0	DB980H90	6	8.50	3.80	0.73	0.00	4.370	0.75	0.00	4.00
3	175.0	DR65-18-02DPL2Q	3	24.00	6.30	0.67	0.00	6.950	0.69	0.00	16.50
4	175.0	E15S09P94	6	14.60	0.66	0.75	19.50	0.840	0.75	0.00	13.50
5	175.0	T-Arms	3	242.00	11.00	0.75	301.00	11.13	0.75	0.00	0.00
6	174.0	4.5" x 24 FT Pipe	3	259.20	10.80	1.00	332.50	13.25	1.00	0.00	10.00
7	147.0	BXA-70063-6CF-EDIN-X	3	17.00	7.73	0.77	56.54	8.190	0.77	0.00	0.00
8	147.0	BXA-80080-4CF-EDIN-X	3	12.00	3.69	0.88	34.60	4.010	0.88	0.00	0.00
9	147.0	DB-T1-6Z-8AB-0Z	2	44.00	5.60	1.00	71.05	5.870	1.00	0.00	0.00
10	147.0	FD9R6004/2C-3L (3.1 lbs)	6	3.10	0.37	0.63	4.80	0.440	0.66	0.00	0.00
11	147.0	RRH2X60-AWS	3	60.00	3.96	0.76	80.10	4.230	0.78	0.00	-3.00
12	147.0	RRH2X60-AWS	3	60.00	3.96	0.76	80.10	4.230	0.78	0.00	-3.00
13	147.0	RRH2X60-PCS	3	55.00	2.57	0.89	70.90	2.760	0.90	0.00	-3.00
14	147.0	SBNHH-1D65B	6	50.71	8.30	0.82	96.76	8.770	0.82	0.00	0.00
15	147.0	T-Arms	3	242.00	11.00	0.75	301.00	11.13	0.75	0.00	0.00
16	135.0	7770.00	6	35.00	5.88	0.73	0.00	6.530	0.75	0.00	2.50
17	135.0	AM-X-CD-17-65-00T-RET	3	30.80	11.31	0.75	63.00	6.100	0.77	0.00	2.50
18	135.0	CS72188.01	1	17.60	1.43	0.65	25.70	1.680	0.67	0.00	2.50
19	135.0	LGP21401	6	14.10	1.29	0.75	21.20	1.530	0.77	0.00	2.00
20	135.0	LGP21901	6	5.50	0.23	0.75	7.70	0.340	0.77	0.00	2.50
21	135.0	T-Arms	3	242.00	11.00	0.75	301.00	11.13	0.77	0.00	0.00
22	133.0	DC2-48-60-8-18F-02	1	14.50	2.92	1.00	32.60	3.270	1.00	0.00	1.00
23	133.0	Flush Mount	1	350.00	5.00	1.00	450.00	6.000	1.00	0.00	0.00
24	133.0	RRUS 11	6	50.70	2.94	0.76	66.00	3.140	0.78	0.00	1.00
25	54.00	GPS	1	10.00	1.00	1.00	18.00	1.250	1.00	0.00	0.00
26	54.00	Standoff	1	40.00	2.63	1.00	63.00	4.340	1.00	0.00	0.00
		Totals:	**91**	**5,531.36**			**7,189.38**				

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	175.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	175.0	(6) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	147.0	(11) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	147.0	(2) 1 5/8" Hybrid	3.30	0.00	0.00	0.00	Inside
0.00	135.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
0.00	135.0	(2) 1/2" Coax	0.32	0.00	0.00	0.00	Inside
0.00	135.0	(2) 3/4" DC	1.20	0.00	0.00	0.00	Inside
0.00	105.0	(3) 3" Chanel	0.00	0.30	10.00	0.35	Outside
0.00	54.00	(1) 1/2" Coax	0.16	0.00	0.00	0.00	Inside
		Totals:	**1,356.22**		**1,050.00**		

Shaft Section Properties

Structure: CT00680-S-SBA
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

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

9/28/2015

Tower Engineering Solutions

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ixp (in^4)	Additional Reinforcing Iyp (in^4)	Additional Reinforcing Weight (lb)
0.00	RB1 RB2	0.4375	54.000	75.456	27631.4	30.93	123.43	56	45	0.0	52.92	24301.7	17345.	0.0
5.00		0.4375	53.033	74.094	26161.8	30.34	121.22	56	45	1272.2	52.92	23473.1	16754.	264.6
10.00		0.4375	52.066	72.732	24745.3	29.74	119.01	56	45	1249.0	52.92	22658.9	16173.	264.6
15.00		0.4375	51.099	71.370	23380.9	29.15	116.80	56	45	1225.9	52.92	21859.1	15603.	264.6
20.00		0.4375	50.132	70.008	22067.5	28.56	114.59	56	45	1202.7	52.92	21073.7	15042.	264.6
22.00	RT2	0.4375	49.746	69.463	21556.3	28.32	113.70	56	45	474.6	52.92	20763.6	14821.	105.8
25.00		0.4375	49.165	68.645	20804.3	27.97	112.38	56	45	704.9	26.46	8743.1	8743.1	79.4
30.00		0.4375	48.199	67.283	19590.3	27.38	110.17	56	45	1156.3	26.46	8417.8	8417.8	132.3
35.00		0.4375	47.232	65.921	18424.4	26.78	107.96	56	45	1133.2	26.46	8098.6	8098.6	132.3
36.00	Bot - Section 2	0.4375	47.038	65.649	18196.9	26.67	107.52	56	45	223.9	26.46	8035.5	8035.5	26.5
38.00	RT3 RB4	0.4375	46.651	65.104	17747.6	26.43	106.63	56	45	833.0	18.00	5298.8	5298.8	122.5
40.00		0.4375	46.265	64.559	17305.7	26.19	105.75	56	45	826.1	26.46	8027.9	8027.9	52.9
42.00	Top - Section 1	0.3750	46.628	55.850	15250.7	31.17	124.34	65	45	819.2	26.46	7902.5	7902.5	52.9
45.00		0.3750	46.048	55.150	14684.0	30.76	122.79	65	51	566.6	26.46	7716.3	7716.3	79.4
50.00		0.3750	45.081	53.982	13771.1	30.07	120.22	65	52	928.4	26.46	7410.9	7410.9	132.3
54.00		0.3750	44.307	53.048	13068.5	29.52	118.15	65	52	728.4	26.46	7171.0	7171.0	105.8
55.00		0.3750	44.114	52.815	12896.7	29.38	117.64	65	52	180.1	26.46	7111.6	7111.6	26.5
60.00		0.3750	43.147	51.647	12060.2	28.69	115.06	65	52	888.7	26.46	6818.6	6818.6	132.3
65.00		0.3750	42.180	50.480	11260.6	28.00	112.48	65	52	868.8	26.46	6531.8	6531.8	132.3
70.00	Bot - Section 3	0.3750	41.213	49.312	10497.2	27.30	109.90	65	52	848.9	26.46	6251.1	6251.1	132.3
71.25	RT4 RB5	0.3750	40.972	49.020	10311.9	27.13	109.26	65	52	422.1	26.46	6397.9	6397.9	33.1
75.00		0.3750	40.246	48.145	9769.1	26.61	107.32	65	52	1251.4	26.46	6189.0	6189.0	99.2
76.00	Top - Section 2	0.3750	40.803	48.817	10184.0	27.01	108.81	65	52	329.9	26.46	6133.9	6133.9	26.5
80.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	658.1	26.46	5915.9	5915.9	105.8
80.00	Bot - Section 4	0.3750	40.029	47.883	9610.5	26.46	106.75	65	52					
85.00		0.3125	39.063	38.992	7473.2	31.35	125.00	65	51	671.7	26.46	5649.0	5649.0	132.3
86.00	RT5 RB6	0.3125	38.869	38.798	7361.9	31.18	124.38	65	51	132.4	26.46	5596.3	5596.3	26.5
90.00		0.3125	38.096	38.019	6927.6	30.52	121.91	65	51	522.8	13.47	2915.4	2915.4	53.9
95.00		0.3125	37.129	37.046	6409.3	29.69	118.81	65	52	638.6	13.47	2781.6	2781.6	67.4
100.00		0.3125	36.162	36.073	5917.4	28.86	115.72	65	52	622.0	13.47	2650.9	2650.9	67.4
104.00	RT6	0.3125	35.388	35.295	5542.6	28.20	113.24	65	52	485.7	13.47	2548.7	2548.7	53.9
105.00		0.3125	35.195	35.100	5451.4	28.03	112.62	65	52	119.8				
110.00		0.3125	34.228	34.127	5010.5	27.20	109.53	65	52	588.9				
115.00	Bot - Section 5	0.3125	33.261	33.154	4594.1	26.38	106.44	65	52	572.4				
120.00	Top - Section 4	0.3125	32.919	32.810	4452.6	26.08	105.34	65	52	1122.3				
125.00	Top - Section 5	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	550.0				
125.00	Bot - Section 6	0.3125	31.952	31.837	4068.1	25.25	102.25	65	52					
130.00		0.2500	30.985	24.742	2983.3	31.07	123.94	65	51	427.6				
133.00		0.2500	30.405	24.275	2817.5	30.44	121.62	65	52	250.2				
135.00		0.2500	30.018	23.964	2710.5	30.03	120.07	65	52	164.1				
140.00		0.2500	29.051	23.185	2454.9	28.99	116.21	65	52	401.1				
145.00		0.2500	28.085	22.407	2215.8	27.96	112.34	65	52	387.8				
147.00		0.2500	27.698	22.095	2124.7	27.54	110.79	65	52	151.4				
150.00	Bot - Section 7	0.2500	27.118	21.628	1992.8	26.92	108.47	65	52	223.2				
155.00	Top - Section 6	0.2500	26.651	21.253	1890.7	26.42	106.60	65	52	729.6				
160.00		0.2500	25.684	20.474	1690.5	25.38	102.74	65	52	355.0				
165.00		0.2500	24.717	19.696	1504.9	24.35	98.87	65	52	341.7				
170.00	Top - Section 7	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	328.5				
170.00	Bot - Section 8	0.2500	23.750	18.918	1333.5	23.31	95.00	65	52					
174.00		0.2500	19.150	15.214	693.7	18.38	76.60	65	52	232.3				
175.00		0.2500	18.000	14.289	574.6	17.15	72.00	65	52	50.2				

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ixp (in^4)	Additional Reinforcing Iyp (in^4)	Additional Reinforcing Weight (lb)
								Total Weight		28861.4				3169.7

Wind Loading - Shaft

Structure: CT00680-S-SBA
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

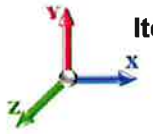
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/28/2015

TES Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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	RB1 RB2	0.00	1.00	18.496	31.26	382.50	1.030	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	375.65	1.030	0.000	5.00	22.299	22.97	717.9	0.0	1801.4
10.00		0.00	1.00	18.496	31.26	368.80	1.030	0.000	5.00	21.896	22.55	705.0	0.0	1778.2
15.00		0.00	1.00	18.496	31.26	361.95	1.030	0.000	5.00	21.493	22.14	692.0	0.0	1755.1
20.00		0.00	1.00	18.496	31.26	355.10	1.030	0.000	5.00	21.090	21.72	679.0	0.0	1731.9
22.00	RT2	0.00	1.00	18.496	31.26	352.36	1.030	0.000	2.00	8.323	8.57	268.0	0.0	686.3
25.00		0.00	1.00	18.496	31.26	348.26	1.030	0.000	3.00	12.364	12.73	398.1	0.0	863.7
30.00		0.00	1.00	18.496	31.26	341.41	1.030	0.000	5.00	20.284	20.89	653.1	0.0	1420.9
35.00		0.00	1.02	18.810	31.79	337.38	1.030	0.000	5.00	19.881	20.48	650.9	0.0	1397.8
36.00	Bot - Section 2 RT1	0.00	1.03	18.962	32.05	337.35	1.030	0.000	1.00	3.928	4.05	129.6	0.0	276.8
38.00	RT3 RB4	0.00	1.04	19.257	32.54	337.18	1.030	0.000	2.00	7.932	8.17	265.9	0.0	1078.0
40.00		0.00	1.06	19.541	33.02	336.84	1.030	0.000	2.00	7.868	8.10	267.6	0.0	931.9
42.00	Top - Section 1	0.00	1.07	19.815	33.49	336.36	1.030	0.000	2.00	7.804	8.04	269.2	0.0	925.0
45.00		0.00	1.09	20.210	34.15	340.95	1.030	0.000	3.00	11.584	11.93	407.5	0.0	725.3
50.00		0.00	1.13	20.827	35.20	338.85	1.030	0.000	5.00	18.985	19.55	688.3	0.0	1193.0
54.00	Appurtenance(s)	0.00	1.15	21.291	35.98	336.72	1.030	0.000	4.00	14.898	15.34	552.1	0.0	940.1
55.00		0.00	1.16	21.402	36.17	336.13	1.030	0.000	1.00	3.684	3.79	137.3	0.0	233.0
60.00		0.00	1.19	21.941	37.08	332.87	1.030	0.000	5.00	18.179	18.72	694.3	0.0	1153.3
65.00		0.00	1.21	22.449	37.94	329.16	1.030	0.000	5.00	17.777	18.31	694.6	0.0	1133.4
70.00	Bot - Section 3	0.00	1.24	22.929	38.75	325.03	1.030	0.000	5.00	17.374	17.89	693.4	0.0	1113.5
71.25	RT4 RB5	0.00	1.25	23.045	38.95	323.95	1.030	0.000	1.25	4.359	4.49	174.8	0.0	488.3
75.00		0.00	1.26	23.386	39.52	320.55	1.030	0.000	3.75	12.925	13.31	526.1	0.0	1449.9
76.00	Top - Section 2	0.00	1.27	23.474	39.67	319.62	1.030	0.000	1.00	3.408	3.51	139.3	0.0	382.9
80.00	Top - Section 3	0.00	1.29	23.821	40.26	321.78	1.030	0.000	4.00	13.472	13.88	558.6	0.0	869.8
85.00		0.00	1.31	24.237	40.96	316.74	1.030	0.000	5.00	16.477	16.97	695.2	0.0	936.3
86.00	RT5 RB6	0.00	1.31	24.318	41.10	315.70	1.030	0.000	1.00	3.247	3.34	137.5	0.0	185.3
90.00		0.00	1.33	24.636	41.63	311.43	1.030	0.000	4.00	12.827	13.21	550.1	0.0	630.5
95.00		0.00	1.35	25.020	42.28	305.88	1.030	0.000	5.00	15.672	16.14	682.5	0.0	773.3
100.00		0.00	1.37	25.389	42.91	300.10	1.030	0.000	5.00	15.269	15.73	674.8	0.0	756.7
104.00	RT6	0.00	1.39	25.675	43.39	295.33	1.030	0.000	4.00	11.925	12.28	533.0	0.0	593.5
105.00		0.00	1.39	25.745	43.51	294.12	1.030	0.000	1.00	2.941	3.03	131.8	0.0	119.8
110.00		0.00	1.41	26.090	44.09	287.95	1.030	0.000	5.00	14.463	14.90	656.8	0.0	588.9
115.00	Bot - Section 5	0.00	1.43	26.423	44.66	281.60	1.030	0.000	5.00	14.060	14.48	646.7	0.0	572.4
120.00	Top - Section 4	0.00	1.45	26.747	45.20	275.08	1.030	0.000	5.00	13.918	14.34	648.0	0.0	1122.3
125.00	Top - Section 5	0.00	1.46	27.060	45.73	273.76	1.030	0.000	5.00	13.515	13.92	636.6	0.0	550.0
130.00		0.00	1.48	27.365	46.25	266.97	1.030	0.000	5.00	13.112	13.51	624.6	0.0	427.6
133.00	Appurtenance(s)	0.00	1.49	27.544	46.55	262.82	1.030	0.000	3.00	7.674	7.90	367.9	0.0	250.2
135.00	Appurtenance(s)	0.00	1.50	27.662	46.75	260.03	1.030	0.000	2.00	5.035	5.19	242.5	0.0	164.1
140.00		0.00	1.51	27.951	47.24	252.97	1.030	0.000	5.00	12.306	12.68	598.7	0.0	401.1
145.00		0.00	1.53	28.233	47.71	245.78	1.030	0.000	5.00	11.903	12.26	585.0	0.0	387.8
147.00	Appurtenance(s)	0.00	1.53	28.343	47.90	242.87	1.030	0.000	2.00	4.649	4.79	229.3	0.0	151.4
150.00	Bot - Section 7	0.00	1.54	28.507	48.18	238.47	1.030	0.000	3.00	6.852	7.06	340.0	0.0	223.2
155.00	Top - Section 6	0.00	1.56	28.776	48.63	231.04	1.030	0.000	5.00	11.306	11.65	566.3	0.0	729.6
160.00		0.00	1.57	29.038	49.07	227.95	1.030	0.000	5.00	10.903	11.23	551.1	0.0	355.0
165.00		0.00	1.58	29.294	49.51	220.34	1.030	0.000	5.00	10.500	10.82	535.4	0.0	341.7
170.00	Top - Section 7	0.00	1.60	29.545	49.93	212.62	1.030	0.000	5.00	10.097	10.40	519.3	0.0	328.5
174.00	Appurtenance(s)	0.00	1.61	29.742	50.26	172.01	1.030	0.000	4.00	7.150	7.36	370.2	0.0	232.3
175.00	Appurtenance(s)	0.00	1.61	29.791	50.35	161.81	1.030	0.000	1.00	1.548	1.59	80.3	0.0	50.2

Wind Loading - Shaft

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 10	

Totals:	**175.00**	**22,566.3**	**35,200.9**

Discrete Appurtenance Forces

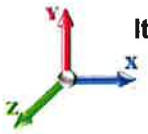
Structure: CT00680-S-SB
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

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

9/28/2015
Page: 11

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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	175.00	E15S09P94	6	30.430	51.427	0.75	2.97	87.60	0.000	13.500	152.74	0.00	2061.97
2	175.00	DR65-18-02DPL2Q	3	30.568	51.660	0.67	12.66	72.00	0.000	16.500	654.17	0.00	10793.75
3	175.00	DB980H90	6	29.984	50.673	0.73	16.64	51.00	0.000	4.000	843.40	0.00	3373.60
4	175.00	Coax	3	30.174	50.994	1.00	9.60	186.00	0.000	8.000	489.54	0.00	3916.33
5	175.00	T-Arms	3	29.791	50.347	0.75	24.75	726.00	0.000	0.000	1246.08	0.00	0.00
6	174.00	4.5" x 24 FT Pipe	3	30.221	51.073	1.00	32.40	777.60	0.000	10.000	1654.78	0.00	16547.76
7	147.00	RRH2X60-AWS	3	28.177	47.619	0.76	9.03	180.00	0.000	-3.000	429.94	0.00	-1289.82
8	147.00	DB-T1-6Z-8AB-0Z	2	28.343	47.900	1.00	11.20	88.00	0.000	0.000	536.48	0.00	0.00
9	147.00	FD9R6004/2C-3L (3.1 lbs)	6	28.343	47.900	0.63	1.40	18.60	0.000	0.000	66.89	0.00	0.00
10	147.00	T-Arms	3	28.343	47.900	0.75	24.75	726.00	0.000	0.000	1185.53	0.00	0.00
11	147.00	RRH2X60-AWS	3	28.177	47.619	0.76	9.03	180.00	0.000	-3.000	429.94	0.00	-1289.82
12	147.00	RRH2X60-PCS	3	28.177	47.619	0.89	6.88	165.00	0.000	-3.000	327.49	0.00	-982.47
13	147.00	SBNHH-1D65B	6	28.343	47.900	0.82	40.94	304.26	0.000	0.000	1960.82	0.00	0.00
14	147.00	BXA-80080-4CF-EDIN-X	3	28.343	47.900	0.88	9.72	36.00	0.000	0.000	465.56	0.00	0.00
15	147.00	BXA-70063-6CF-EDIN-X	3	28.343	47.900	0.77	17.83	51.00	0.000	0.000	854.21	0.00	0.00
16	135.00	CS72188.01	1	27.807	46.994	0.65	0.93	17.60	0.000	2.500	43.68	0.00	109.20
17	135.00	7770.00	6	27.807	46.994	0.73	25.75	210.00	0.000	2.500	1210.32	0.00	3025.79
18	135.00	AM-X-CD-17-65-00T-RET	3	27.807	46.994	0.75	25.45	92.40	0.000	2.500	1195.89	0.00	2989.73
19	135.00	LGP21401	6	27.778	46.946	0.75	5.80	84.60	0.000	2.000	272.52	0.00	545.04
20	135.00	LGP21901	6	27.807	46.994	0.75	1.04	33.00	0.000	2.500	48.64	0.00	121.60
21	135.00	T-Arms	3	27.662	46.749	0.75	24.75	726.00	0.000	0.000	1157.03	0.00	0.00
22	133.00	RRUS 11	6	27.603	46.650	0.76	13.41	304.20	0.000	1.000	625.40	0.00	625.40
23	133.00	Flush Mount	1	27.544	46.550	1.00	5.00	350.00	0.000	0.000	232.75	0.00	0.00
24	133.00	DC2-48-60-8-18F-02	1	27.603	46.650	1.00	2.92	14.50	0.000	1.000	136.22	0.00	136.22
25	54.00	Standoff	1	21.291	35.981	1.00	2.63	40.00	0.000	0.000	94.63	0.00	0.00
26	54.00	GPS	1	21.291	35.981	1.00	1.00	10.00	0.000	0.000	35.98	0.00	0.00
						Totals:		**5,531.36**			**16,350.63**		

Total Applied Force Summary

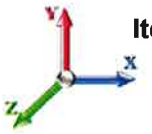
Structure: CT00680-S-SB
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

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

9/28/2015

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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		764.81	1582.52	0.00	0.00
10.00		751.84	1559.34	0.00	0.00
15.00		738.87	1536.16	0.00	0.00
20.00		725.90	1512.99	0.00	0.00
22.00		286.73	598.71	0.00	0.00
25.00		426.20	811.73	0.00	0.00
30.00		699.96	1334.34	0.00	0.00
35.00		698.63	1311.16	0.00	0.00
36.00		139.26	259.45	0.00	0.00
38.00		285.42	973.74	0.00	0.00
40.00		287.45	897.28	0.00	0.00
42.00		289.26	890.39	0.00	0.00
45.00		438.27	673.36	0.00	0.00
50.00		741.09	1106.38	0.00	0.00
54.00	(2) appurtenances	725.92	920.80	0.00	0.00
55.00		148.11	215.55	0.00	0.00
60.00		749.95	1065.85	0.00	0.00
65.00		751.55	1045.99	0.00	0.00
70.00		751.55	1026.12	0.00	0.00
71.25		189.45	466.41	0.00	0.00
75.00		570.59	1384.32	0.00	0.00
76.00		151.17	365.38	0.00	0.00
80.00		606.93	799.85	0.00	0.00
85.00		756.62	848.89	0.00	0.00
86.00		149.78	167.79	0.00	0.00
90.00		600.05	612.58	0.00	0.00
95.00		745.95	750.83	0.00	0.00
100.00		739.16	734.27	0.00	0.00
104.00		585.03	575.50	0.00	0.00
105.00		144.85	128.75	0.00	0.00
110.00		656.84	633.82	0.00	0.00
115.00		646.70	617.26	0.00	0.00
120.00		647.98	1167.22	0.00	0.00
125.00		636.60	594.86	0.00	0.00
130.00		624.59	472.48	0.00	0.00
133.00	(8) appurtenances	1362.30	945.83	0.00	761.62
135.00	(25) appurtenances	4170.54	1345.70	0.00	6791.36
140.00		598.75	433.19	0.00	0.00
145.00		584.98	419.95	0.00	0.00
147.00	(32) appurtenances	6486.21	1913.13	0.00	-3562.11
150.00		340.01	229.41	0.00	0.00
155.00		566.31	739.97	0.00	0.00
160.00		551.11	365.37	0.00	0.00
165.00		535.43	352.12	0.00	0.00
170.00		519.30	338.88	0.00	0.00
174.00	(3) appurtenances	2024.95	1018.21	0.00	16547.76
175.00	(21) appurtenances	3466.20	1174.88	0.00	20145.64

Total Applied Force Summary

Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Totals:	**40,059.13**	**38,918.73**	**0.00**	**40,684.27**

Resulting Forces and Deflections

Structure: CT00680-S-SB
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

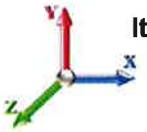
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/28/2015

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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	-40.108	-38.868	0.000	0.000	0.000	-4613.4	0.000	0.000	0.000	0.000	0.000
5.00	-39.434	-37.188	0.000	0.000	0.000	-4412.8	-0.077	0.000	0.077	-0.143	0.000
10.00	-38.765	-35.535	0.000	0.000	0.000	-4215.7	-0.303	0.000	0.303	-0.286	0.000
15.00	-38.101	-33.908	0.000	0.000	0.000	-4021.9	-0.678	0.000	0.678	-0.429	0.000
20.00	-37.419	-32.336	0.000	0.000	0.000	-3831.3	-1.204	0.000	1.204	-0.572	0.000
22.00	-37.166	-31.694	0.000	0.000	0.000	-3756.5	-1.456	0.000	1.456	-0.630	0.000
25.00	-36.800	-30.804	0.000	0.000	0.000	-3645.0	-1.880	0.000	1.880	-0.717	0.000
30.00	-36.169	-29.371	0.000	0.000	0.000	-3461.0	-2.722	0.000	2.722	-0.888	0.000
35.00	-35.498	-28.009	0.000	0.000	0.000	-3280.2	-3.744	0.000	3.744	-1.059	0.000
36.00	-35.380	-27.720	0.000	0.000	0.000	-3244.7	-3.970	0.000	3.970	-1.094	0.000
38.00	-35.110	-26.707	0.000	0.000	0.000	-3173.9	-4.443	0.000	4.443	-1.163	0.000
40.00	-34.836	-25.771	0.000	0.000	0.000	-3103.7	-4.947	0.000	4.947	-1.241	0.000
42.00	-34.564	-24.836	0.000	0.000	0.000	-3034.0	-5.482	0.000	5.482	-1.310	0.000
45.00	-34.170	-24.088	0.000	0.000	0.000	-2930.3	-6.338	0.000	6.338	-1.413	0.000
50.00	-33.465	-22.907	0.000	0.000	0.000	-2759.5	-7.915	0.000	7.915	-1.593	0.000
54.00	-32.748	-21.956	0.000	0.000	0.000	-2625.6	-9.312	0.000	9.312	-1.738	0.000
55.00	-32.634	-21.683	0.000	0.000	0.000	-2592.9	-9.680	0.000	9.680	-1.775	0.000
60.00	-31.914	-20.544	0.000	0.000	0.000	-2429.7	-11.634	0.000	11.634	-1.953	0.000
65.00	-31.185	-19.429	0.000	0.000	0.000	-2270.1	-13.775	0.000	13.775	-2.130	0.000
70.00	-30.430	-18.375	0.000	0.000	0.000	-2114.2	-16.099	0.000	16.099	-2.306	0.000
71.25	-30.249	-17.871	0.000	0.000	0.000	-2076.2	-16.709	0.000	16.709	-2.350	0.000
75.00	-29.643	-16.470	0.000	0.000	0.000	-1962.7	-18.606	0.000	18.606	-2.479	0.000
76.00	-29.501	-16.067	0.000	0.000	0.000	-1933.1	-19.129	0.000	19.129	-2.514	0.000
80.00	-28.898	-15.221	0.000	0.000	0.000	-1815.1	-21.293	0.000	21.293	-2.649	0.000
85.00	-28.126	-14.362	0.000	0.000	0.000	-1670.6	-24.152	0.000	24.152	-2.809	0.000
86.00	-27.990	-14.158	0.000	0.000	0.000	-1642.5	-24.744	0.000	24.744	-2.845	0.000
90.00	-27.401	-13.493	0.000	0.000	0.000	-1530.5	-27.187	0.000	27.187	-2.984	0.000
95.00	-26.662	-12.686	0.000	0.000	0.000	-1393.5	-30.425	0.000	30.425	-3.195	0.000
100.00	-25.920	-11.913	0.000	0.000	0.000	-1260.2	-33.880	0.000	33.880	-3.401	0.000
104.00	-25.321	-11.331	0.000	0.000	0.000	-1156.5	-36.797	0.000	36.797	-3.561	0.000
105.00	-25.200	-11.140	0.000	0.000	0.000	-1131.2	-37.547	0.000	37.547	-3.601	0.000
110.00	-24.553	-10.433	0.000	0.000	0.000	-1005.2	-41.468	0.000	41.468	-3.880	0.000
115.00	-23.909	-9.754	0.000	0.000	0.000	-882.50	-45.674	0.000	45.674	-4.148	0.000
120.00	-23.213	-8.538	0.000	0.000	0.000	-762.96	-50.153	0.000	50.153	-4.403	0.000
125.00	-22.563	-7.908	0.000	0.000	0.000	-646.89	-54.890	0.000	54.890	-4.641	0.000
130.00	-21.924	-7.422	0.000	0.000	0.000	-534.08	-59.859	0.000	59.859	-4.848	0.000
133.00	-20.498	-6.555	0.000	0.000	0.000	-467.55	-62.950	0.000	62.950	-4.991	0.000
135.00	-16.240	-5.540	0.000	0.000	0.000	-419.76	-65.058	0.000	65.058	-5.082	0.000
140.00	-15.621	-5.111	0.000	0.000	0.000	-338.56	-70.483	0.000	70.483	-5.281	0.000
145.00	-15.009	-4.718	0.000	0.000	0.000	-260.46	-76.102	0.000	76.102	-5.454	0.000
147.00	-8.374	-3.423	0.000	0.000	0.000	-230.44	-78.398	0.000	78.398	-5.517	0.000
150.00	-8.020	-3.212	0.000	0.000	0.000	-205.31	-81.888	0.000	81.888	-5.605	0.000
155.00	-7.389	-2.516	0.000	0.000	0.000	-165.22	-87.821	0.000	87.821	-5.737	0.000
160.00	-6.808	-2.195	0.000	0.000	0.000	-128.27	-93.883	0.000	93.883	-5.854	0.000
165.00	-6.242	-1.891	0.000	0.000	0.000	-94.238	-100.05	0.000	100.055	-5.948	0.000
170.00	-5.691	-1.602	0.000	0.000	0.000	-63.030	-106.31	0.000	106.315	-6.022	0.000
174.00	-3.571	-0.802	0.000	0.000	0.000	-23.717	-111.37	0.000	111.371	-6.066	0.000
175.00	-3.466	0.000	0.000	0.000	0.000	-20.146	0.000	0.000	112.641	-6.075	0.000

Resulting Stresses

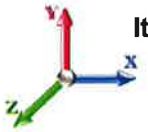
Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015
Site Name:	Putnam	**Exposure:**	C	
Height:	175.00 (ft)	**Gh:**	1.69	
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 24

	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	0.52	1.08	0.00	0.00	0.00	34.16	34.68	44.8	0.774
5.00	0.50	1.08	0.00	0.00	0.00	33.64	33.64	44.8	0.751
10.00	0.49	1.08	0.00	0.00	0.00	33.11	33.11	44.8	0.739
15.00	0.48	1.08	0.00	0.00	0.00	32.55	32.55	44.8	0.726
20.00	0.46	1.09	0.00	0.00	0.00	31.96	31.96	44.8	0.713
22.00	0.46	1.09	0.00	0.00	0.00	31.73	31.73	44.8	0.708
25.00	0.45	1.09	0.00	0.00	0.00	37.67	37.67	44.8	0.841
30.00	0.44	1.09	0.00	0.00	0.00	37.00	37.00	44.8	0.826
35.00	0.42	1.09	0.00	0.00	0.00	36.28	36.28	44.8	0.810
36.00	0.42	1.09	0.00	0.00	0.00	36.14	36.14	44.8	0.807
38.00	0.41	1.10	0.00	0.00	0.00	39.91	39.91	44.8	0.891
40.00	0.40	1.10	0.00	0.00	0.00	35.21	35.21	44.8	0.786
42.00	0.44	1.26	0.00	0.00	0.00	34.90	34.90	44.8	0.779
45.00	0.44	1.26	0.00	0.00	0.00	37.42	37.42	51.3	0.730
50.00	0.42	1.26	0.00	0.00	0.00	36.48	36.48	51.8	0.704
54.00	0.41	1.25	0.00	0.00	0.00	35.70	35.70	52.0	0.687
55.00	0.41	1.26	0.00	0.00	0.00	35.51	35.51	52.0	0.683
60.00	0.40	1.26	0.00	0.00	0.00	34.49	34.49	52.0	0.663
65.00	0.38	1.26	0.00	0.00	0.00	33.43	33.43	52.0	0.643
70.00	0.37	1.25	0.00	0.00	0.00	31.22	31.22	52.0	0.600
71.25	0.36	1.25	0.00	0.00	0.00	31.62	31.62	52.0	0.608
75.00	0.34	1.25	0.00	0.00	0.00	30.75	30.75	52.0	0.591
76.00	0.33	1.23	0.00	0.00	0.00	30.51	30.51	52.0	0.587
80.00	0.32	1.23	0.00	0.00	0.00	29.07	29.07	52.0	0.559
85.00	0.37	1.47	0.00	0.00	0.00	30.89	30.89	50.8	0.608
86.00	0.36	1.47	0.00	0.00	0.00	30.60	30.60	50.9	0.601
90.00	0.35	1.46	0.00	0.00	0.00	36.80	36.80	51.5	0.715
95.00	0.34	1.46	0.00	0.00	0.00	34.97	34.97	52.0	0.673
100.00	0.33	1.46	0.00	0.00	0.00	33.04	33.04	52.0	0.635
104.00	0.32	1.46	0.00	0.00	0.00	31.42	31.74	52.0	0.610
105.00	0.32	1.46	0.00	0.00	0.00	45.37	45.75	52.0	0.880
110.00	0.31	1.46	0.00	0.00	0.00	42.66	43.04	52.0	0.828
115.00	0.29	1.47	0.00	0.00	0.00	39.69	40.06	52.0	0.770
120.00	0.26	1.44	0.00	0.00	0.00	35.04	35.39	52.0	0.681
125.00	0.25	1.44	0.00	0.00	0.00	31.56	31.91	52.0	0.614
125.00	0.25	1.44	0.00	0.00	0.00	31.56	31.91	52.0	0.763
130.00	0.30	1.80	0.00	0.00	0.00	34.46	34.90	51.0	0.684
133.00	0.27	1.72	0.00	0.00	0.00	31.34	31.75	51.5	0.616
135.00	0.23	1.38	0.00	0.00	0.00	28.88	29.21	51.8	0.563
140.00	0.22	1.37	0.00	0.00	0.00	24.89	25.22	52.0	0.485
145.00	0.21	1.36	0.00	0.00	0.00	20.51	20.85	52.0	0.401
147.00	0.15	0.77	0.00	0.00	0.00	18.66	18.86	52.0	0.363
150.00	0.15	0.75	0.00	0.00	0.00	17.35	17.55	52.0	0.338
155.00	0.12	0.71	0.00	0.00	0.00	14.47	14.64	52.0	0.281
160.00	0.11	0.68	0.00	0.00	0.00	12.11	12.27	52.0	0.236
165.00	0.10	0.64	0.00	0.00	0.00	9.61	9.77	52.0	0.188
170.00	0.08	0.61	0.00	0.00	0.00	6.97	7.14	52.0	0.137

Resulting Stresses

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

170.00	0.08	0.61	0.00	0.00	0.00	6.97	7.14	52.0	0.137
174.00	0.05	0.48	0.00	0.00	0.00	4.07	4.20	52.0	0.081
175.00	0.00	0.49	0.00	0.00	0.00	3.92	4.01	52.0	0.077

Wind Loading - Shaft

Structure: CT00680-S-SBA
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

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

9/28/2015
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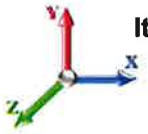
Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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	RB1 RB2	0.00	1.00	13.871	23.44	331.25	1.030	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	325.31	1.030	0.500	5.00	22.715	23.40	548.5	167.6	1969.0
10.00		0.00	1.00	13.871	23.44	319.38	1.030	0.500	5.00	22.312	22.98	538.7	164.6	1942.8
15.00		0.00	1.00	13.871	23.44	313.45	1.030	0.500	5.00	21.909	22.57	529.0	161.5	1916.6
20.00		0.00	1.00	13.871	23.44	307.52	1.030	0.500	5.00	21.507	22.15	519.3	158.5	1890.4
22.00	RT2	0.00	1.00	13.871	23.44	305.15	1.030	0.500	2.00	8.490	8.74	205.0	62.9	749.2
25.00		0.00	1.00	13.871	23.44	301.59	1.030	0.500	3.00	12.614	12.99	304.6	93.3	957.0
30.00		0.00	1.00	13.871	23.44	295.66	1.030	0.500	5.00	20.701	21.32	499.8	152.5	1573.4
35.00		0.00	1.02	14.106	23.84	292.17	1.030	0.500	5.00	20.298	20.91	498.4	149.4	1547.2
36.00	Bot - Section 2 RT1	0.00	1.03	14.220	24.03	292.15	1.030	0.500	1.00	4.011	4.13	99.3	29.8	306.5
38.00	RT3 RB4	0.00	1.04	14.442	24.41	291.99	1.030	0.500	2.00	8.099	8.34	203.6	60.0	1137.9
40.00		0.00	1.06	14.655	24.77	291.70	1.030	0.500	2.00	8.035	8.28	205.0	59.5	991.4
42.00	Top - Section 1	0.00	1.07	14.861	25.11	291.29	1.030	0.500	2.00	7.970	8.21	206.2	59.0	984.0
45.00		0.00	1.09	15.156	25.61	295.26	1.030	0.500	3.00	11.834	12.19	312.2	87.4	812.8
50.00		0.00	1.13	15.620	26.40	293.45	1.030	0.500	5.00	19.402	19.98	527.5	142.7	1335.7
54.00	Appurtenance(s)	0.00	1.15	15.967	26.98	291.60	1.030	0.500	4.00	15.231	15.69	423.3	112.2	1052.3
55.00		0.00	1.16	16.051	27.13	291.09	1.030	0.500	1.00	3.768	3.88	105.3	27.9	261.0
60.00		0.00	1.19	16.455	27.81	288.27	1.030	0.500	5.00	18.596	19.15	532.6	136.6	1289.9
65.00		0.00	1.21	16.836	28.45	285.05	1.030	0.500	5.00	18.193	18.74	533.2	133.6	1267.0
70.00	Bot - Section 3	0.00	1.24	17.196	29.06	281.48	1.030	0.500	5.00	17.790	18.32	532.5	130.6	1244.1
71.25	RT4 RB5	0.00	1.25	17.283	29.21	280.54	1.030	0.500	1.25	4.463	4.60	134.3	33.0	521.3
75.00		0.00	1.26	17.538	29.64	277.60	1.030	0.500	3.75	13.237	13.63	404.1	97.4	1547.3
76.00	Top - Section 2	0.00	1.27	17.605	29.75	276.79	1.030	0.500	1.00	3.492	3.60	107.0	25.9	408.7
80.00	Top - Section 3	0.00	1.29	17.865	30.19	278.66	1.030	0.500	4.00	13.805	14.22	429.3	101.5	971.3
85.00		0.00	1.31	18.177	30.72	274.29	1.030	0.500	5.00	16.894	17.40	534.5	123.9	1060.1
86.00	RT5 RB6	0.00	1.31	18.238	30.82	273.39	1.030	0.500	1.00	3.330	3.43	105.7	24.6	209.9
90.00		0.00	1.33	18.476	31.22	269.70	1.030	0.500	4.00	13.161	13.56	423.3	96.7	727.2
95.00		0.00	1.35	18.764	31.71	264.89	1.030	0.500	5.00	16.088	16.57	525.5	117.8	891.1
100.00		0.00	1.37	19.041	32.18	259.89	1.030	0.500	5.00	15.686	16.16	519.9	114.8	871.5
104.00	RT6	0.00	1.39	19.255	32.54	255.76	1.030	0.500	4.00	12.258	12.63	410.9	89.9	683.3
105.00		0.00	1.39	19.308	32.63	254.71	1.030	0.500	1.00	3.024	3.12	101.6	22.3	142.1
110.00		0.00	1.41	19.566	33.07	249.36	1.030	0.500	5.00	14.880	15.33	506.8	108.7	697.6
115.00	Bot - Section 5	0.00	1.43	19.816	33.49	243.86	1.030	0.500	5.00	14.477	14.91	499.4	105.7	678.1
120.00	Top - Section 4	0.00	1.45	20.059	33.90	238.22	1.030	0.500	5.00	14.334	14.76	500.5	104.6	1226.9
125.00	Top - Section 5	0.00	1.46	20.294	34.30	237.07	1.030	0.500	5.00	13.932	14.35	492.1	101.6	651.5
130.00		0.00	1.48	20.523	34.68	231.19	1.030	0.500	5.00	13.529	13.93	483.3	98.6	526.1
133.00	Appurtenance(s)	0.00	1.49	20.657	34.91	227.60	1.030	0.500	3.00	7.924	8.16	284.9	58.1	308.2
135.00	Appurtenance(s)	0.00	1.50	20.745	35.06	225.19	1.030	0.500	2.00	5.202	5.36	187.8	38.2	202.4
140.00		0.00	1.51	20.962	35.43	219.07	1.030	0.500	5.00	12.723	13.10	464.2	92.5	493.6
145.00		0.00	1.53	21.173	35.78	212.84	1.030	0.500	5.00	12.320	12.69	454.1	89.5	477.3
147.00	Appurtenance(s)	0.00	1.53	21.256	35.92	210.32	1.030	0.500	2.00	4.815	4.96	178.2	35.3	186.7
150.00	Bot - Section 7	0.00	1.54	21.379	36.13	206.51	1.030	0.500	3.00	7.102	7.31	264.3	51.9	275.0
155.00	Top - Section 6	0.00	1.56	21.581	36.47	200.08	1.030	0.500	5.00	11.723	12.07	440.4	85.0	814.6
160.00		0.00	1.57	21.777	36.80	197.41	1.030	0.500	5.00	11.320	11.66	429.1	82.0	436.9
165.00		0.00	1.58	21.969	37.13	190.81	1.030	0.500	5.00	10.917	11.24	417.5	78.9	420.7
170.00	Top - Section 7	0.00	1.60	22.158	37.45	184.13	1.030	0.500	5.00	10.514	10.83	405.5	75.9	404.4
174.00	Appurtenance(s)	0.00	1.61	22.305	37.70	148.96	1.030	0.500	4.00	7.483	7.71	290.6	49.2	281.5
175.00	Appurtenance(s)	0.00	1.61	22.342	37.76	140.13	1.030	0.500	1.00	1.631	1.68	63.4	11.6	61.8

Wind Loading - Shaft

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 19	

Totals:	**175.00**	**17,382.2**	**39,405.6**

Discrete Appurtenance Forces

Structure: CT00680-S-SB
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

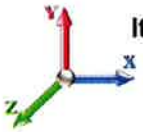
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/28/2015

TES Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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	175.00	E15S09P94	6	22.821	38.568	0.75	3.78	117.00	0.000	13.500	145.79	0.00	1968.13
2	175.00	DR65-18-02DPL2Q	3	22.925	38.742	0.69	14.39	0.00	0.000	16.500	557.37	0.00	9196.58
3	175.00	DB980H90	6	22.487	38.002	0.75	19.66	0.00	0.000	4.000	747.32	0.00	2989.27
4	175.00	Coax	3	22.629	38.243	1.00	12.00	300.00	0.000	8.000	458.92	0.00	3671.34
5	175.00	T-Arms	3	22.342	37.758	0.75	25.04	903.00	0.000	0.000	945.55	0.00	0.00
6	174.00	4.5" x 24 FT Pipe	3	22.664	38.303	1.00	39.75	997.50	0.000	10.000	1522.53	0.00	15225.34
7	147.00	RRH2X60-AWS	3	21.131	35.712	0.78	9.90	240.30	0.000	-3.000	353.48	0.00	-1060.45
8	147.00	DB-T1-6Z-8AB-0Z	2	21.256	35.923	1.00	11.74	142.10	0.000	0.000	421.74	0.00	0.00
9	147.00	FD9R6004/2C-3L (3.1 lbs)	6	21.256	35.923	0.66	1.75	28.80	0.000	0.000	62.97	0.00	0.00
10	147.00	T-Arms	3	21.256	35.923	0.75	25.04	903.00	0.000	0.000	899.60	0.00	0.00
11	147.00	RRH2X60-AWS	3	21.131	35.712	0.78	9.90	240.30	0.000	-3.000	353.48	0.00	-1060.45
12	147.00	RRH2X60-PCS	3	21.131	35.712	0.90	7.43	212.70	0.000	-3.000	265.24	0.00	-795.72
13	147.00	SBNHH-1D65B	6	21.256	35.923	0.82	43.36	580.56	0.000	0.000	1557.58	0.00	0.00
14	147.00	BXA-80080-4CF-EDIN-X	3	21.256	35.923	0.88	10.56	103.80	0.000	0.000	379.43	0.00	0.00
15	147.00	BXA-70063-6CF-EDIN-X	3	21.256	35.923	0.77	18.99	169.62	0.000	0.000	682.27	0.00	0.00
16	135.00	CS72188.01	1	20.854	35.244	0.67	1.13	25.70	0.000	2.500	39.67	0.00	99.18
17	135.00	7770.00	6	20.854	35.244	0.75	29.38	0.00	0.000	2.500	1035.64	0.00	2589.10
18	135.00	AM-X-CD-17-65-00T-RET	3	20.854	35.244	0.77	14.09	189.00	0.000	2.500	496.62	0.00	1241.55
19	135.00	LGP21401	6	20.833	35.207	0.77	7.07	127.20	0.000	2.000	248.87	0.00	497.73
20	135.00	LGP21901	6	20.854	35.244	0.77	1.57	46.20	0.000	2.500	55.36	0.00	138.40
21	135.00	T-Arms	3	20.745	35.060	0.77	25.71	903.00	0.000	0.000	901.39	0.00	0.00
22	133.00	RRUS 11	6	20.701	34.985	0.78	14.70	396.00	0.000	1.000	514.11	0.00	514.11
23	133.00	Flush Mount	1	20.657	34.910	1.00	6.00	450.00	0.000	0.000	209.46	0.00	0.00
24	133.00	DC2-48-60-8-18F-02	1	20.701	34.985	1.00	3.27	32.60	0.000	1.000	114.40	0.00	114.40
25	54.00	Standoff	1	15.967	26.984	1.00	4.34	63.00	0.000	0.000	117.11	0.00	0.00
26	54.00	GPS	1	15.967	26.984	1.00	1.25	18.00	0.000	0.000	33.73	0.00	0.00
						Totals:		**7,189.38**			**13,119.64**		

Total Applied Force Summary

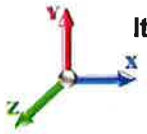
Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 24

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		589.50	1800.10	0.00	0.00
10.00		579.77	1773.90	0.00	0.00
15.00		570.04	1747.70	0.00	0.00
20.00		560.31	1721.50	0.00	0.00
22.00		221.40	681.63	0.00	0.00
25.00		329.18	935.02	0.00	0.00
30.00		540.86	1536.79	0.00	0.00
35.00		540.13	1510.59	0.00	0.00
36.00		107.70	299.22	0.00	0.00
38.00		220.69	1053.72	0.00	0.00
40.00		222.30	976.77	0.00	0.00
42.00		223.75	969.40	0.00	0.00
45.00		339.12	790.80	0.00	0.00
50.00		573.71	1299.08	0.00	0.00
54.00	(2) appurtenances	611.96	1104.02	0.00	0.00
55.00		114.76	253.49	0.00	0.00
60.00		581.31	1252.49	0.00	0.00
65.00		582.95	1229.60	0.00	0.00
70.00		583.37	1206.71	0.00	0.00
71.25		147.04	511.95	0.00	0.00
75.00		443.02	1519.25	0.00	0.00
76.00		117.41	401.24	0.00	0.00
80.00		471.57	941.36	0.00	0.00
85.00		588.29	1022.74	0.00	0.00
86.00		116.52	202.44	0.00	0.00
90.00		466.98	749.24	0.00	0.00
95.00		580.97	918.63	0.00	0.00
100.00		576.19	899.05	0.00	0.00
104.00		456.43	705.38	0.00	0.00
105.00		113.06	161.10	0.00	0.00
110.00		506.79	742.53	0.00	0.00
115.00		499.37	722.95	0.00	0.00
120.00		500.50	1271.84	0.00	0.00
125.00		492.14	696.45	0.00	0.00
130.00		483.30	571.04	0.00	0.00
133.00	(8) appurtenances	1122.90	1213.78	0.00	628.51
135.00	(25) appurtenances	2965.40	1511.42	0.00	4565.96
140.00		464.24	525.70	0.00	0.00
145.00		454.07	509.43	0.00	0.00
147.00	(32) appurtenances	5153.97	2820.76	0.00	-2916.62
150.00		264.30	281.29	0.00	0.00
155.00		440.36	824.97	0.00	0.00
160.00		429.10	447.34	0.00	0.00
165.00		417.48	431.07	0.00	0.00
170.00		405.52	414.80	0.00	0.00
174.00	(3) appurtenances	1813.09	1287.32	0.00	15225.34
175.00	(21) appurtenances	2918.38	1383.86	0.00	17825.33

Total Applied Force Summary

Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Totals:	**31,501.22**	**45,831.46**	**0.00**	**35,328.52**

Resulting Forces and Deflections

Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

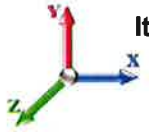
TES Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 24

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	-31.547	-45.799	0.000	0.000	0.000	-3681.7	0.000	0.000	0.000	0.000	0.000
5.00	-31.043	-43.938	0.000	0.000	0.000	-3524.0	-0.061	0.000	0.061	-0.114	0.000
10.00	-30.542	-42.105	0.000	0.000	0.000	-3368.8	-0.242	0.000	0.242	-0.228	0.000
15.00	-30.044	-40.300	0.000	0.000	0.000	-3216.1	-0.542	0.000	0.542	-0.342	0.000
20.00	-29.526	-38.542	0.000	0.000	0.000	-3065.9	-0.962	0.000	0.962	-0.457	0.000
22.00	-29.337	-37.832	0.000	0.000	0.000	-3006.8	-1.163	0.000	1.163	-0.503	0.000
25.00	-29.066	-36.848	0.000	0.000	0.000	-2918.8	-1.502	0.000	1.502	-0.573	0.000
30.00	-28.592	-35.249	0.000	0.000	0.000	-2773.5	-2.175	0.000	2.175	-0.710	0.000
35.00	-28.080	-33.705	0.000	0.000	0.000	-2630.5	-2.992	0.000	2.992	-0.847	0.000
36.00	-27.992	-33.387	0.000	0.000	0.000	-2602.4	-3.173	0.000	3.173	-0.875	0.000
38.00	-27.788	-32.309	0.000	0.000	0.000	-2546.4	-3.552	0.000	3.552	-0.931	0.000
40.00	-27.581	-31.307	0.000	0.000	0.000	-2490.9	-3.955	0.000	3.955	-0.993	0.000
42.00	-27.377	-30.309	0.000	0.000	0.000	-2435.7	-4.384	0.000	4.384	-1.049	0.000
45.00	-27.082	-29.471	0.000	0.000	0.000	-2353.6	-5.069	0.000	5.069	-1.131	0.000
50.00	-26.545	-28.124	0.000	0.000	0.000	-2218.2	-6.332	0.000	6.332	-1.276	0.000
54.00	-25.942	-27.002	0.000	0.000	0.000	-2112.0	-7.451	0.000	7.451	-1.393	0.000
55.00	-25.861	-26.712	0.000	0.000	0.000	-2086.1	-7.746	0.000	7.746	-1.422	0.000
60.00	-25.311	-25.412	0.000	0.000	0.000	-1956.7	-9.312	0.000	9.312	-1.566	0.000
65.00	-24.753	-24.138	0.000	0.000	0.000	-1830.2	-11.028	0.000	11.028	-1.708	0.000
70.00	-24.168	-22.913	0.000	0.000	0.000	-1706.4	-12.893	0.000	12.893	-1.850	0.000
71.25	-24.032	-22.376	0.000	0.000	0.000	-1676.2	-13.383	0.000	13.383	-1.886	0.000
75.00	-23.561	-20.846	0.000	0.000	0.000	-1586.1	-14.905	0.000	14.905	-1.990	0.000
76.00	-23.455	-20.421	0.000	0.000	0.000	-1562.5	-15.325	0.000	15.325	-2.018	0.000
80.00	-22.990	-19.449	0.000	0.000	0.000	-1468.7	-17.063	0.000	17.063	-2.127	0.000
85.00	-22.388	-18.419	0.000	0.000	0.000	-1353.8	-19.360	0.000	19.360	-2.257	0.000
86.00	-22.287	-18.194	0.000	0.000	0.000	-1331.4	-19.836	0.000	19.836	-2.286	0.000
90.00	-21.833	-17.410	0.000	0.000	0.000	-1242.2	-21.799	0.000	21.799	-2.399	0.000
95.00	-21.262	-16.454	0.000	0.000	0.000	-1133.1	-24.403	0.000	24.403	-2.570	0.000
100.00	-20.685	-15.529	0.000	0.000	0.000	-1026.8	-27.185	0.000	27.185	-2.738	0.000
104.00	-20.215	-14.818	0.000	0.000	0.000	-944.07	-29.534	0.000	29.534	-2.868	0.000
105.00	-20.128	-14.617	0.000	0.000	0.000	-923.85	-30.138	0.000	30.138	-2.901	0.000
110.00	-19.637	-13.825	0.000	0.000	0.000	-823.21	-33.299	0.000	33.299	-3.129	0.000
115.00	-19.147	-13.060	0.000	0.000	0.000	-725.03	-36.694	0.000	36.694	-3.349	0.000
120.00	-18.613	-11.754	0.000	0.000	0.000	-629.30	-40.314	0.000	40.314	-3.559	0.000
125.00	-18.113	-11.033	0.000	0.000	0.000	-536.23	-44.146	0.000	44.146	-3.756	0.000
130.00	-17.619	-10.451	0.000	0.000	0.000	-445.67	-48.171	0.000	48.171	-3.928	0.000
133.00	-16.430	-9.290	0.000	0.000	0.000	-392.19	-50.677	0.000	50.677	-4.048	0.000
135.00	-13.381	-7.965	0.000	0.000	0.000	-354.76	-52.389	0.000	52.389	-4.124	0.000
140.00	-12.900	-7.439	0.000	0.000	0.000	-287.86	-56.797	0.000	56.797	-4.292	0.000
145.00	-12.421	-6.945	0.000	0.000	0.000	-223.36	-61.370	0.000	61.370	-4.440	0.000
147.00	-7.068	-4.526	0.000	0.000	0.000	-198.52	-63.240	0.000	63.240	-4.494	0.000
150.00	-6.789	-4.255	0.000	0.000	0.000	-177.31	-66.086	0.000	66.086	-4.570	0.000
155.00	-6.290	-3.457	0.000	0.000	0.000	-143.37	-70.930	0.000	70.930	-4.684	0.000
160.00	-5.831	-3.037	0.000	0.000	0.000	-111.91	-75.886	0.000	75.886	-4.786	0.000
165.00	-5.382	-2.636	0.000	0.000	0.000	-82.765	-80.939	0.000	80.939	-4.868	0.000
170.00	-4.944	-2.252	0.000	0.000	0.000	-55.856	-86.068	0.000	86.068	-4.934	0.000
174.00	-3.027	-1.125	0.000	0.000	0.000	-20.853	-90.214	0.000	90.214	-4.973	0.000
175.00	-2.918	0.000	0.000	0.000	0.000	-17.825	0.000	0.000	91.255	-4.981	0.000

Resulting Forces and Deflections

Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 24	

TES Tower Engineering Solutions

Resulting Stresses

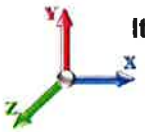
Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 24

	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	0.61	0.85	0.00	0.00	0.00	27.26	27.87	44.8	0.622
5.00	0.59	0.85	0.00	0.00	0.00	26.87	26.87	44.8	0.600
10.00	0.58	0.85	0.00	0.00	0.00	26.45	26.45	44.8	0.591
15.00	0.56	0.86	0.00	0.00	0.00	26.03	26.03	44.8	0.581
20.00	0.55	0.86	0.00	0.00	0.00	25.58	25.58	44.8	0.571
22.00	0.54	0.86	0.00	0.00	0.00	25.40	25.40	44.8	0.567
25.00	0.54	0.86	0.00	0.00	0.00	30.17	30.17	44.8	0.673
30.00	0.52	0.86	0.00	0.00	0.00	29.65	29.65	44.8	0.662
35.00	0.51	0.87	0.00	0.00	0.00	29.10	29.10	44.8	0.650
36.00	0.51	0.87	0.00	0.00	0.00	28.99	28.99	44.8	0.647
38.00	0.50	0.87	0.00	0.00	0.00	32.02	32.02	44.8	0.715
40.00	0.48	0.87	0.00	0.00	0.00	28.26	28.26	44.8	0.631
42.00	0.54	1.00	0.00	0.00	0.00	28.02	28.02	44.8	0.625
45.00	0.53	1.00	0.00	0.00	0.00	30.05	30.05	51.3	0.586
50.00	0.52	1.00	0.00	0.00	0.00	29.33	29.33	51.8	0.566
54.00	0.51	0.99	0.00	0.00	0.00	28.72	28.72	52.0	0.552
55.00	0.51	0.99	0.00	0.00	0.00	28.57	28.57	52.0	0.549
60.00	0.49	1.00	0.00	0.00	0.00	27.78	27.78	52.0	0.534
65.00	0.48	1.00	0.00	0.00	0.00	26.95	26.95	52.0	0.518
70.00	0.46	1.00	0.00	0.00	0.00	25.20	25.20	52.0	0.485
71.25	0.46	1.00	0.00	0.00	0.00	25.53	25.53	52.0	0.491
75.00	0.43	0.99	0.00	0.00	0.00	24.85	24.85	52.0	0.478
76.00	0.42	0.98	0.00	0.00	0.00	24.67	24.67	52.0	0.474
80.00	0.41	0.98	0.00	0.00	0.00	23.52	23.52	52.0	0.452
85.00	0.47	1.17	0.00	0.00	0.00	25.03	25.03	50.8	0.493
86.00	0.47	1.17	0.00	0.00	0.00	24.81	24.81	50.9	0.487
90.00	0.46	1.17	0.00	0.00	0.00	29.87	29.87	51.5	0.580
95.00	0.44	1.17	0.00	0.00	0.00	28.43	28.43	52.0	0.547
100.00	0.43	1.17	0.00	0.00	0.00	26.92	26.92	52.0	0.518
104.00	0.42	1.16	0.00	0.00	0.00	25.65	26.07	52.0	0.501
105.00	0.42	1.17	0.00	0.00	0.00	37.05	37.52	52.0	0.722
110.00	0.41	1.17	0.00	0.00	0.00	34.93	35.39	52.0	0.681
115.00	0.39	1.17	0.00	0.00	0.00	32.61	33.06	52.0	0.636
120.00	0.36	1.15	0.00	0.00	0.00	28.90	29.33	52.0	0.564
125.00	0.35	1.16	0.00	0.00	0.00	26.16	26.58	52.0	0.511
125.00	0.35	1.16	0.00	0.00	0.00	26.16	26.58	52.0	0.635
130.00	0.42	1.45	0.00	0.00	0.00	28.75	29.28	51.0	0.574
133.00	0.38	1.38	0.00	0.00	0.00	26.29	26.78	51.5	0.520
135.00	0.33	1.13	0.00	0.00	0.00	24.41	24.82	51.8	0.479
140.00	0.32	1.13	0.00	0.00	0.00	21.16	21.57	52.0	0.415
145.00	0.31	1.13	0.00	0.00	0.00	17.59	18.00	52.0	0.346
147.00	0.20	0.65	0.00	0.00	0.00	16.08	16.32	52.0	0.314
150.00	0.20	0.64	0.00	0.00	0.00	14.99	15.22	52.0	0.293
155.00	0.16	0.60	0.00	0.00	0.00	12.55	12.76	52.0	0.245
160.00	0.15	0.58	0.00	0.00	0.00	10.56	10.76	52.0	0.207
165.00	0.13	0.56	0.00	0.00	0.00	8.44	8.63	52.0	0.166
170.00	0.12	0.53	0.00	0.00	0.00	6.18	6.37	52.0	0.122

Resulting Stresses

Structure:	CT00680-S-SBA			**Code:**	EIA/TIA-222-F		9/28/2015		
Site Name:	Putnam			**Exposure:**	C				
Height:	175.00 (ft)			**Gh:**	1.69				
Base Elev:	0.000 (ft)			**Struct Class:**	II		Page: 26		

170.00	0.12	0.53	0.00	0.00	0.00	6.18	6.37	52.0	0.122
174.00	0.07	0.40	0.00	0.00	0.00	3.58	3.72	52.0	0.071
175.00	0.00	0.41	0.00	0.00	0.00	3.47	3.54	52.0	0.068

Wind Loading - Shaft

Structure: CT00680-S-SBA
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

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

9/28/2015

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00

Iterations: 23

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	RB1 RB2	0.00	1.00	6.400	10.82	225.00	1.030	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	220.97	1.030	0.000	5.00	22.299	22.97	248.4	0.0	1801.4
10.00		0.00	1.00	6.400	10.82	216.94	1.030	0.000	5.00	21.896	22.55	243.9	0.0	1778.2
15.00		0.00	1.00	6.400	10.82	212.91	1.030	0.000	5.00	21.493	22.14	239.4	0.0	1755.1
20.00		0.00	1.00	6.400	10.82	208.88	1.030	0.000	5.00	21.090	21.72	235.0	0.0	1731.9
22.00	RT2	0.00	1.00	6.400	10.82	207.27	1.030	0.000	2.00	8.323	8.57	92.7	0.0	686.3
25.00		0.00	1.00	6.400	10.82	204.86	1.030	0.000	3.00	12.364	12.73	137.7	0.0	863.7
30.00		0.00	1.00	6.400	10.82	200.83	1.030	0.000	5.00	20.284	20.89	226.0	0.0	1420.9
35.00		0.00	1.02	6.509	11.00	198.46	1.030	0.000	5.00	19.881	20.48	225.2	0.0	1397.8
36.00	Bot - Section 2 RT1	0.00	1.03	6.561	11.09	198.44	1.030	0.000	1.00	3.928	4.05	44.9	0.0	276.8
38.00	RT3 RB4	0.00	1.04	6.663	11.26	198.34	1.030	0.000	2.00	7.932	8.17	92.0	0.0	1078.0
40.00		0.00	1.06	6.762	11.43	198.14	1.030	0.000	2.00	7.868	8.10	92.6	0.0	931.9
42.00	Top - Section 1	0.00	1.07	6.857	11.59	197.86	1.030	0.000	2.00	7.804	8.04	93.1	0.0	925.0
45.00		0.00	1.09	6.993	11.82	200.56	1.030	0.000	3.00	11.584	11.93	141.0	0.0	725.3
50.00		0.00	1.13	7.207	12.18	199.32	1.030	0.000	5.00	18.985	19.55	238.2	0.0	1193.0
54.00	Appurtenance(s)	0.00	1.15	7.367	12.45	198.07	1.030	0.000	4.00	14.898	15.34	191.0	0.0	940.1
55.00		0.00	1.16	7.406	12.52	197.72	1.030	0.000	1.00	3.684	3.79	47.5	0.0	233.0
60.00		0.00	1.19	7.592	12.83	195.81	1.030	0.000	5.00	18.179	18.72	240.3	0.0	1153.3
65.00		0.00	1.21	7.768	13.13	193.62	1.030	0.000	5.00	17.777	18.31	240.4	0.0	1133.4
70.00	Bot - Section 3	0.00	1.24	7.934	13.41	191.20	1.030	0.000	5.00	17.374	17.89	239.9	0.0	1113.5
71.25	RT4 RB5	0.00	1.25	7.974	13.48	190.56	1.030	0.000	1.25	4.359	4.49	60.5	0.0	488.3
75.00		0.00	1.26	8.092	13.68	188.56	1.030	0.000	3.75	12.925	13.31	182.1	0.0	1449.9
76.00	Top - Section 2	0.00	1.27	8.123	13.73	188.01	1.030	0.000	1.00	3.408	3.51	48.2	0.0	382.9
80.00	Top - Section 3	0.00	1.29	8.242	13.93	189.28	1.030	0.000	4.00	13.472	13.88	193.3	0.0	869.8
85.00		0.00	1.31	8.387	14.17	186.32	1.030	0.000	5.00	16.477	16.97	240.5	0.0	936.3
86.00	RT5 RB6	0.00	1.31	8.415	14.22	185.70	1.030	0.000	1.00	3.247	3.34	47.6	0.0	185.3
90.00		0.00	1.33	8.525	14.41	183.19	1.030	0.000	4.00	12.827	13.21	190.3	0.0	630.5
95.00		0.00	1.35	8.657	14.63	179.93	1.030	0.000	5.00	15.672	16.14	236.2	0.0	773.3
100.00		0.00	1.37	8.785	14.85	176.53	1.030	0.000	5.00	15.269	15.73	233.5	0.0	756.7
104.00	RT6	0.00	1.39	8.884	15.01	173.73	1.030	0.000	4.00	11.925	12.28	184.4	0.0	593.5
105.00		0.00	1.39	8.908	15.06	173.01	1.030	0.000	1.00	2.941	3.03	45.6	0.0	119.8
110.00		0.00	1.41	9.028	15.26	169.38	1.030	0.000	5.00	14.463	14.90	227.3	0.0	588.9
115.00	Bot - Section 5	0.00	1.43	9.143	15.45	165.65	1.030	0.000	5.00	14.060	14.48	223.8	0.0	572.4
120.00	Top - Section 4	0.00	1.45	9.255	15.64	161.81	1.030	0.000	5.00	13.918	14.34	224.2	0.0	1122.3
125.00	Top - Section 5	0.00	1.46	9.363	15.82	161.03	1.030	0.000	5.00	13.515	13.92	220.3	0.0	550.0
130.00		0.00	1.48	9.469	16.00	157.04	1.030	0.000	5.00	13.112	13.51	216.1	0.0	427.6
133.00	Appurtenance(s)	0.00	1.49	9.531	16.11	154.60	1.030	0.000	3.00	7.674	7.90	127.3	0.0	250.2
135.00	Appurtenance(s)	0.00	1.50	9.572	16.18	152.96	1.030	0.000	2.00	5.035	5.19	83.9	0.0	164.1
140.00		0.00	1.51	9.672	16.35	148.80	1.030	0.000	5.00	12.306	12.68	207.2	0.0	401.1
145.00		0.00	1.53	9.769	16.51	144.57	1.030	0.000	5.00	11.903	12.26	202.4	0.0	387.8
147.00	Appurtenance(s)	0.00	1.53	9.807	16.57	142.86	1.030	0.000	2.00	4.649	4.79	79.4	0.0	151.4
150.00	Bot - Section 7	0.00	1.54	9.864	16.67	140.28	1.030	0.000	3.00	6.852	7.06	117.7	0.0	223.2
155.00	Top - Section 6	0.00	1.56	9.957	16.83	135.91	1.030	0.000	5.00	11.306	11.65	196.0	0.0	729.6
160.00		0.00	1.57	10.048	16.98	134.09	1.030	0.000	5.00	10.903	11.23	190.7	0.0	355.0
165.00		0.00	1.58	10.136	17.13	129.61	1.030	0.000	5.00	10.500	10.82	185.3	0.0	341.7
170.00	Top - Section 7	0.00	1.60	10.223	17.28	125.07	1.030	0.000	5.00	10.097	10.40	179.7	0.0	328.5
174.00	Appurtenance(s)	0.00	1.61	10.291	17.39	101.18	1.030	0.000	4.00	7.150	7.36	128.1	0.0	232.3
175.00	Appurtenance(s)	0.00	1.61	10.308	17.42	95.18	1.030	0.000	1.00	1.548	1.59	27.8	0.0	50.2

Wind Loading - Shaft

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 28	

Totals:	**175.00**	**7,808.4**	**35,200.9**

Discrete Appurtenance Forces

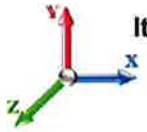
Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 23

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	175.00	E15S09P94	6	10.530	17.795	0.75	2.97	87.60	0.000	13.500	52.85	0.00	713.48
2	175.00	DR65-18-02DPL2Q	3	10.577	17.875	0.67	12.66	72.00	0.000	16.500	226.36	0.00	3734.86
3	175.00	DB980H90	6	10.375	17.534	0.73	16.64	51.00	0.000	4.000	291.83	0.00	1167.34
4	175.00	Coax	3	10.441	17.645	1.00	9.60	186.00	0.000	8.000	169.39	0.00	1355.13
5	175.00	T-Arms	3	10.308	17.421	0.75	24.75	726.00	0.000	0.000	431.17	0.00	0.00
6	174.00	4.5" x 24 FT Pipe	3	10.457	17.672	1.00	32.40	777.60	0.000	10.000	572.59	0.00	5725.87
7	147.00	RRH2X60-AWS	3	9.750	16.477	0.76	9.03	180.00	0.000	-3.000	148.77	0.00	-446.31
8	147.00	DB-T1-6Z-8AB-0Z	2	9.807	16.574	1.00	11.20	88.00	0.000	0.000	185.63	0.00	0.00
9	147.00	FD9R6004/2C-3L (3.1 lbs)	6	9.807	16.574	0.63	1.40	18.60	0.000	0.000	23.14	0.00	0.00
10	147.00	T-Arms	3	9.807	16.574	0.75	24.75	726.00	0.000	0.000	410.22	0.00	0.00
11	147.00	RRH2X60-AWS	3	9.750	16.477	0.76	9.03	180.00	0.000	-3.000	148.77	0.00	-446.31
12	147.00	RRH2X60-PCS	3	9.750	16.477	0.89	6.88	165.00	0.000	-3.000	113.32	0.00	-339.95
13	147.00	SBNHH-1D65B	6	9.807	16.574	0.82	40.94	304.26	0.000	0.000	678.48	0.00	0.00
14	147.00	BXA-80080-4CF-EDIN-X	3	9.807	16.574	0.88	9.72	36.00	0.000	0.000	161.09	0.00	0.00
15	147.00	BXA-70063-6CF-EDIN-X	3	9.807	16.574	0.77	17.83	51.00	0.000	0.000	295.57	0.00	0.00
16	135.00	CS72188.01	1	9.622	16.261	0.65	0.93	17.60	0.000	2.500	15.11	0.00	37.79
17	135.00	7770.00	6	9.622	16.261	0.73	25.75	210.00	0.000	2.500	418.79	0.00	1046.99
18	135.00	AM-X-CD-17-65-00T-RET	3	9.622	16.261	0.75	25.45	92.40	0.000	2.500	413.80	0.00	1034.51
19	135.00	LGP21401	6	9.612	16.244	0.75	5.80	84.60	0.000	2.000	94.30	0.00	188.59
20	135.00	LGP21901	6	9.622	16.261	0.75	1.04	33.00	0.000	2.500	16.83	0.00	42.08
21	135.00	T-Arms	3	9.572	16.176	0.75	24.75	726.00	0.000	0.000	400.36	0.00	0.00
22	133.00	RRUS 11	6	9.551	16.142	0.76	13.41	304.20	0.000	1.000	216.40	0.00	216.40
23	133.00	Flush Mount	1	9.531	16.107	1.00	5.00	350.00	0.000	0.000	80.54	0.00	0.00
24	133.00	DC2-48-60-8-18F-02	1	9.551	16.142	1.00	2.92	14.50	0.000	1.000	47.13	0.00	47.13
25	54.00	Standoff	1	7.367	12.450	1.00	2.63	40.00	0.000	0.000	32.74	0.00	0.00
26	54.00	GPS	1	7.367	12.450	1.00	1.00	10.00	0.000	0.000	12.45	0.00	0.00
						Totals:		**5,531.36**			**5,657.66**		

Total Applied Force Summary

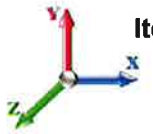
Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 30	

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 23

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		264.64	1582.52	0.00	0.00
10.00		260.15	1559.34	0.00	0.00
15.00		255.66	1536.16	0.00	0.00
20.00		251.18	1512.99	0.00	0.00
22.00		99.21	598.71	0.00	0.00
25.00		147.47	811.73	0.00	0.00
30.00		242.20	1334.34	0.00	0.00
35.00		241.74	1311.16	0.00	0.00
36.00		48.19	259.45	0.00	0.00
38.00		98.76	973.74	0.00	0.00
40.00		99.46	897.28	0.00	0.00
42.00		100.09	890.39	0.00	0.00
45.00		151.65	673.36	0.00	0.00
50.00		256.43	1106.38	0.00	0.00
54.00	(2) appurtenances	251.18	920.80	0.00	0.00
55.00		51.25	215.55	0.00	0.00
60.00		259.50	1065.85	0.00	0.00
65.00		260.05	1045.99	0.00	0.00
70.00		260.05	1026.12	0.00	0.00
71.25		65.55	466.41	0.00	0.00
75.00		197.44	1384.32	0.00	0.00
76.00		52.31	365.38	0.00	0.00
80.00		210.01	799.85	0.00	0.00
85.00		261.80	848.89	0.00	0.00
86.00		51.83	167.79	0.00	0.00
90.00		207.63	612.58	0.00	0.00
95.00		258.12	750.83	0.00	0.00
100.00		255.77	734.27	0.00	0.00
104.00		202.43	575.50	0.00	0.00
105.00		50.12	128.75	0.00	0.00
110.00		227.28	633.82	0.00	0.00
115.00		223.77	617.26	0.00	0.00
120.00		224.21	1167.22	0.00	0.00
125.00		220.28	594.86	0.00	0.00
130.00		216.12	472.48	0.00	0.00
133.00	(8) appurtenances	471.38	945.83	0.00	263.54
135.00	(25) appurtenances	1443.09	1345.70	0.00	2349.95
140.00		207.18	433.19	0.00	0.00
145.00		202.42	419.95	0.00	0.00
147.00	(32) appurtenances	2244.36	1913.13	0.00	-1232.56
150.00		117.65	229.41	0.00	0.00
155.00		195.96	739.97	0.00	0.00
160.00		190.69	365.37	0.00	0.00
165.00		185.27	352.12	0.00	0.00
170.00		179.69	338.88	0.00	0.00
174.00	(3) appurtenances	700.67	1018.21	0.00	5725.87
175.00	(21) appurtenances	1199.38	1174.88	0.00	6970.81

Total Applied Force Summary

Structure:	CT00680-S-SB	**Code:**	EIA/TIA-222-F	9/28/2015
Site Name:	Putnam	**Exposure:**	C	
Height:	175.00 (ft)	**Gh:**	1.69	
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 31

Tower Engineering Solutions

Totals:	**13,861.29**	**38,918.73**	**0.00**	**14,077.60**

Resulting Forces and Deflections

Structure: CT00680-S-SB
Site Name: Putnam
Height: 175.00 (ft)
Base Elev: 0.000 (ft)

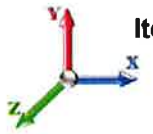
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/28/2015

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 23

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	-13.877	-38.913	0.000	0.000	0.000	-1598.0	0.000	0.000	0.000	0.000	0.000
5.00	-13.644	-37.318	0.000	0.000	0.000	-1528.6	-0.027	0.000	0.027	-0.049	0.000
10.00	-13.413	-35.748	0.000	0.000	0.000	-1460.4	-0.105	0.000	0.105	-0.099	0.000
15.00	-13.184	-34.201	0.000	0.000	0.000	-1393.3	-0.235	0.000	0.235	-0.148	0.000
20.00	-12.948	-32.681	0.000	0.000	0.000	-1327.4	-0.417	0.000	0.417	-0.198	0.000
22.00	-12.860	-32.077	0.000	0.000	0.000	-1301.5	-0.504	0.000	0.504	-0.218	0.000
25.00	-12.734	-31.256	0.000	0.000	0.000	-1262.9	-0.651	0.000	0.651	-0.248	0.000
30.00	-12.516	-29.910	0.000	0.000	0.000	-1199.2	-0.943	0.000	0.943	-0.308	0.000
35.00	-12.285	-28.592	0.000	0.000	0.000	-1136.6	-1.297	0.000	1.297	-0.367	0.000
36.00	-12.244	-28.329	0.000	0.000	0.000	-1124.4	-1.375	0.000	1.375	-0.379	0.000
38.00	-12.150	-27.351	0.000	0.000	0.000	-1099.9	-1.539	0.000	1.539	-0.403	0.000
40.00	-12.056	-26.449	0.000	0.000	0.000	-1075.6	-1.714	0.000	1.714	-0.430	0.000
42.00	-11.962	-25.553	0.000	0.000	0.000	-1051.5	-1.899	0.000	1.899	-0.454	0.000
45.00	-11.827	-24.871	0.000	0.000	0.000	-1015.6	-2.196	0.000	2.196	-0.489	0.000
50.00	-11.584	-23.756	0.000	0.000	0.000	-956.49	-2.742	0.000	2.742	-0.552	0.000
54.00	-11.336	-22.831	0.000	0.000	0.000	-910.16	-3.226	0.000	3.226	-0.602	0.000
55.00	-11.297	-22.609	0.000	0.000	0.000	-898.82	-3.354	0.000	3.354	-0.615	0.000
60.00	-11.049	-21.534	0.000	0.000	0.000	-842.34	-4.031	0.000	4.031	-0.677	0.000
65.00	-10.797	-20.480	0.000	0.000	0.000	-787.09	-4.773	0.000	4.773	-0.738	0.000
70.00	-10.536	-19.450	0.000	0.000	0.000	-733.11	-5.579	0.000	5.579	-0.799	0.000
71.25	-10.474	-18.979	0.000	0.000	0.000	-719.94	-5.790	0.000	5.790	-0.814	0.000
75.00	-10.265	-17.593	0.000	0.000	0.000	-680.66	-6.448	0.000	6.448	-0.859	0.000
76.00	-10.217	-17.223	0.000	0.000	0.000	-670.39	-6.629	0.000	6.629	-0.871	0.000
80.00	-10.009	-16.418	0.000	0.000	0.000	-629.53	-7.379	0.000	7.379	-0.918	0.000
85.00	-9.742	-15.568	0.000	0.000	0.000	-579.48	-8.371	0.000	8.371	-0.973	0.000
86.00	-9.696	-15.396	0.000	0.000	0.000	-569.74	-8.576	0.000	8.576	-0.986	0.000
90.00	-9.493	-14.777	0.000	0.000	0.000	-530.96	-9.423	0.000	9.423	-1.034	0.000
95.00	-9.239	-14.019	0.000	0.000	0.000	-483.50	-10.546	0.000	10.546	-1.108	0.000
100.00	-8.983	-13.280	0.000	0.000	0.000	-437.30	-11.744	0.000	11.744	-1.179	0.000
104.00	-8.776	-12.704	0.000	0.000	0.000	-401.37	-12.756	0.000	12.756	-1.235	0.000
105.00	-8.736	-12.568	0.000	0.000	0.000	-392.59	-13.016	0.000	13.016	-1.248	0.000
110.00	-8.514	-11.925	0.000	0.000	0.000	-348.92	-14.376	0.000	14.376	-1.345	0.000
115.00	-8.293	-11.300	0.000	0.000	0.000	-306.35	-15.835	0.000	15.835	-1.438	0.000
120.00	-8.054	-10.127	0.000	0.000	0.000	-264.88	-17.390	0.000	17.390	-1.527	0.000
125.00	-7.830	-9.528	0.000	0.000	0.000	-224.61	-19.034	0.000	19.034	-1.610	0.000
130.00	-7.610	-9.054	0.000	0.000	0.000	-185.46	-20.759	0.000	20.759	-1.681	0.000
133.00	-7.117	-8.118	0.000	0.000	0.000	-162.37	-21.832	0.000	21.832	-1.731	0.000
135.00	-5.639	-6.811	0.000	0.000	0.000	-145.79	-22.564	0.000	22.564	-1.762	0.000
140.00	-5.426	-6.379	0.000	0.000	0.000	-117.59	-24.448	0.000	24.448	-1.832	0.000
145.00	-5.214	-5.962	0.000	0.000	0.000	-90.464	-26.399	0.000	26.399	-1.892	0.000
147.00	-2.909	-4.123	0.000	0.000	0.000	-80.036	-27.196	0.000	27.196	-1.914	0.000
150.00	-2.787	-3.896	0.000	0.000	0.000	-71.308	-28.409	0.000	28.409	-1.944	0.000
155.00	-2.568	-3.161	0.000	0.000	0.000	-57.375	-30.470	0.000	30.470	-1.990	0.000
160.00	-2.366	-2.801	0.000	0.000	0.000	-44.535	-32.576	0.000	32.576	-2.031	0.000
165.00	-2.170	-2.455	0.000	0.000	0.000	-32.704	-34.720	0.000	34.720	-2.063	0.000
170.00	-1.979	-2.122	0.000	0.000	0.000	-21.854	-36.895	0.000	36.895	-2.089	0.000
174.00	-1.242	-1.130	0.000	0.000	0.000	-8.212	-38.652	0.000	38.652	-2.104	0.000
175.00	-1.199	0.000	0.000	0.000	0.000	-6.971	0.000	0.000	39.093	-2.107	0.000

Resulting Stresses

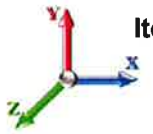
Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 34	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 23

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	0.52	0.37	0.00	0.00	0.00	11.83	12.35	44.8	0.276
5.00	0.50	0.37	0.00	0.00	0.00	11.65	11.65	44.8	0.260
10.00	0.49	0.37	0.00	0.00	0.00	11.47	11.47	44.8	0.256
15.00	0.48	0.38	0.00	0.00	0.00	11.28	11.28	44.8	0.252
20.00	0.47	0.38	0.00	0.00	0.00	11.07	11.07	44.8	0.247
22.00	0.46	0.38	0.00	0.00	0.00	10.99	10.99	44.8	0.245
25.00	0.46	0.38	0.00	0.00	0.00	13.05	13.05	44.8	0.291
30.00	0.44	0.38	0.00	0.00	0.00	12.82	12.82	44.8	0.286
35.00	0.43	0.38	0.00	0.00	0.00	12.57	12.57	44.8	0.281
36.00	0.43	0.38	0.00	0.00	0.00	12.52	12.52	44.8	0.280
38.00	0.42	0.38	0.00	0.00	0.00	13.83	13.83	44.8	0.309
40.00	0.41	0.38	0.00	0.00	0.00	12.20	12.20	44.8	0.272
42.00	0.46	0.44	0.00	0.00	0.00	12.10	12.10	44.8	0.270
45.00	0.45	0.44	0.00	0.00	0.00	12.97	12.97	51.3	0.253
50.00	0.44	0.44	0.00	0.00	0.00	12.64	12.64	51.8	0.244
54.00	0.43	0.43	0.00	0.00	0.00	12.38	12.38	52.0	0.238
55.00	0.43	0.43	0.00	0.00	0.00	12.31	12.31	52.0	0.237
60.00	0.42	0.43	0.00	0.00	0.00	11.96	11.96	52.0	0.230
65.00	0.41	0.43	0.00	0.00	0.00	11.59	11.59	52.0	0.223
70.00	0.39	0.43	0.00	0.00	0.00	10.82	10.82	52.0	0.208
71.25	0.39	0.43	0.00	0.00	0.00	10.97	10.97	52.0	0.211
75.00	0.37	0.43	0.00	0.00	0.00	10.66	10.66	52.0	0.205
76.00	0.35	0.43	0.00	0.00	0.00	10.58	10.58	52.0	0.204
80.00	0.34	0.42	0.00	0.00	0.00	10.08	10.08	52.0	0.194
85.00	0.40	0.51	0.00	0.00	0.00	10.72	10.72	50.8	0.211
86.00	0.40	0.51	0.00	0.00	0.00	10.62	10.62	50.9	0.208
90.00	0.39	0.51	0.00	0.00	0.00	12.76	12.76	51.5	0.248
95.00	0.38	0.51	0.00	0.00	0.00	12.13	12.13	52.0	0.233
100.00	0.37	0.51	0.00	0.00	0.00	11.46	11.46	52.0	0.220
104.00	0.36	0.51	0.00	0.00	0.00	10.90	11.26	52.0	0.217
105.00	0.36	0.51	0.00	0.00	0.00	15.74	16.13	52.0	0.310
110.00	0.35	0.51	0.00	0.00	0.00	14.81	15.18	52.0	0.292
115.00	0.34	0.51	0.00	0.00	0.00	13.78	14.15	52.0	0.272
120.00	0.31	0.50	0.00	0.00	0.00	12.16	12.50	52.0	0.240
125.00	0.30	0.50	0.00	0.00	0.00	10.96	11.29	52.0	0.217
125.00	0.30	0.50	0.00	0.00	0.00	10.96	11.29	52.0	0.270
130.00	0.37	0.62	0.00	0.00	0.00	11.97	12.38	51.0	0.243
133.00	0.33	0.60	0.00	0.00	0.00	10.88	11.27	51.5	0.219
135.00	0.28	0.48	0.00	0.00	0.00	10.03	10.35	51.8	0.200
140.00	0.28	0.48	0.00	0.00	0.00	8.64	8.96	52.0	0.172
145.00	0.27	0.47	0.00	0.00	0.00	7.12	7.43	52.0	0.143
147.00	0.19	0.27	0.00	0.00	0.00	6.48	6.68	52.0	0.129
150.00	0.18	0.26	0.00	0.00	0.00	6.03	6.22	52.0	0.120
155.00	0.15	0.25	0.00	0.00	0.00	5.02	5.19	52.0	0.100
160.00	0.14	0.23	0.00	0.00	0.00	4.20	4.36	52.0	0.084
165.00	0.12	0.22	0.00	0.00	0.00	3.34	3.48	52.0	0.067
170.00	0.11	0.21	0.00	0.00	0.00	2.42	2.56	52.0	0.049

Resulting Stresses

Structure:	CT00680-S-SBA	**Code:**	EIA/TIA-222-F	9/28/2015	
Site Name:	Putnam	**Exposure:**	C		
Height:	175.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 35	

170.00	0.11	0.21	0.00	0.00	0.00	2.42	2.56	52.0	0.049
174.00	0.07	0.17	0.00	0.00	0.00	1.41	1.51	52.0	0.029
175.00	0.00	0.17	0.00	0.00	0.00	1.36	1.39	52.0	0.027

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
85 mph Wind with 0" Ice	40.1	0.00	38.87	0.00	0.00	4613.43
73.61 mph Wind with 0.5" Ice	31.5	0.00	45.80	0.00	0.00	3681.78
50 mph Wind with 0" Ice	13.9	0.00	38.91	0.00	0.00	1598.01

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
85 mph Wind with 0" Ice	0.41	1.10	0.00	0.00	0.00	39.91	39.91	44.8	38.00	0.891
73.61 mph Wind with 0.5" Ice	0.42	1.17	0.00	0.00	0.00	37.05	37.52	52.0	105.00	0.722
50 mph Wind with 0" Ice	0.36	0.51	0.00	0.00	0.00	15.74	16.13	52.0	105.00	0.310

Additional Steel Summary

			Intermediate Connectors				Upper Termination		Lower Termination			Max Member			
Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	V (kips)	Shear Allow (kips)	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Ta (kips)	Pa (kips)	Ratio
0.0	36.0	(3) PLT-C10x30(1.5" Hole)	292.8	0.00	0.0	322.2	10	0	305.2	0	0	338.5	416.6	458.6	0.813
0.0	22.0	(3) PLT-C10x30(1.5" Hole)	218.4	5.24	33.0	264.8	9	0	285.5	0	0	285.5	416.6	431.9	0.685
36.0	38.0	(3) LNP-LP6X100-G-10TT	221.2	5.31	22.5	239.9	11	11	239.6	2	11	240.0	260.0	257.3	0.932
38.0	71.3	(3) PLT-C10x30(1.5" Hole)	350.5	8.41	33.0	288.7	0	0	321.6	2	0	333.9	416.6	431.9	0.802
71.3	86.0	(3) PLT-C10x30(1.5" Hole)	391.1	9.39	33.0	275.3	0	0	288.7	0	0	288.7	416.6	431.9	0.693
86.0	104.0	(3) PLT-C10x15.3(1.5" Hole)	391.1	9.39	33.0	149.6	5	0	180.4	0	0	180.4	220.3	220.9	0.819

Monopole Mat Foundation Design

				Date
				9/28/2015
	Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-F
	Site Name:	Putnam	Structure Height (Ft.):	175
	Site Number:	CT00680-S-SBA	Engineer Name:	J. Tibbetts
	Engr. Number:	17447	Engineer Login ID:	TES

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

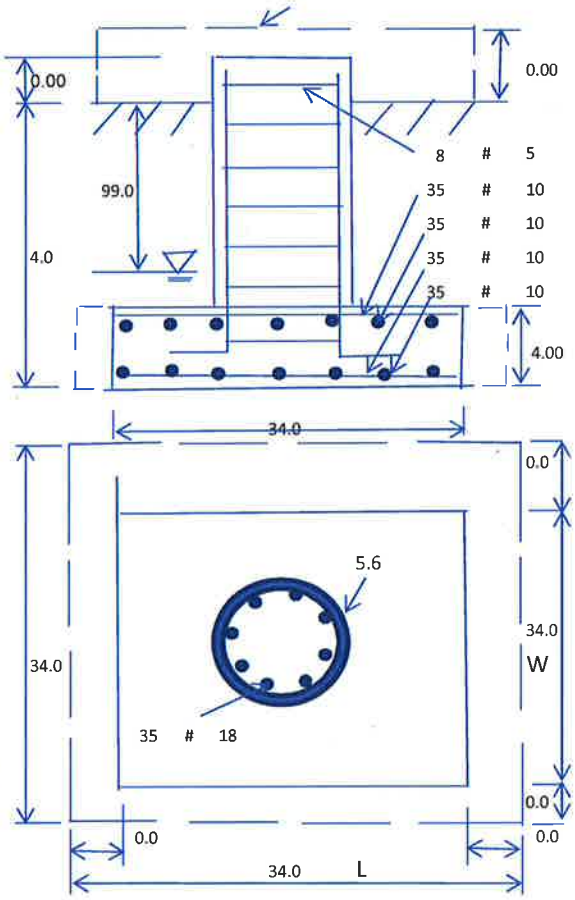
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	45.9	Shear Force (Kips):	40.0
Uplift Force (Kips):	0.0	Moment (Kips-ft):	4564.1

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	5.6	Depth of Base BG (ft.):	4.0
Pier Height A. G. (ft.):	0.00	Thickness of Pad (ft):	4.00
Length of Pad (ft.):	34	Width of Pad (ft.):	34
Final Length of pad (ft)	34.0	Final width of pad (ft):	34.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	18	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	35	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	10	
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):	35	Qty. of Rebar in Pad (W):	35	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	

Soil Design Parameters:

Soil Unit Weight (pcf):	100.0	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):	40000	Allowable Skin Friction:	0	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.):	0.00	Total Dry Soil Weight (Kips):	0.00
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.00	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	4624.12	Total Dry Concrete Weight (Kips):	693.62
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	693.62	Total Vertical Load on Base (Kips):	739.52

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1282	<	Allowable Soil Bearing (psf):	40000	0.03	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	8381.2	>	Applied Momont (kips-ft):	4724	0.56	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.66	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):	4.00		Tie / Stirrup Area (sq. in./each):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	14212.6	>	Design Factored Moment (Mu, Kips-Ft	4564.1	0.32	OK!
Calculated Shear Capacity (Kips):	622.0	>	Design Factored Shear (Kips):	52.0	0.08	OK!
Calculated Tension Capacity (Tn, Kips):	7560.0	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	4489.4	>	Design Factored Axial Load (Pu Kips):	59.7	0.01	OK!
Moment & Axial Strength Combination:	0.32	OK!	Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.040	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	1487.5	>	One-Way Factored Shear (L-D. Kips):	340.9	0.23	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1487.5	>	One-Way Factored Shear (W-D., Kips):	340.9	0.23	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1859.3	>	One-Way Factored Shear (C-C, Kips):	497.1	0.27	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0025	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0025		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	8619.7	>	Moment at Bottom (L-Direct. K-Ft):	1378.0	0.16	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	8619.7	>	Moment at Bottom (W-Direct. K-Ft):	1378.0	0.16	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	12142.5	>	Moment at Bottom (C-C Dir. K-Ft):	1948.7	0.16	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0025	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0025		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	8619.7	>	Moment at the top (L-Dir Kips-Ft):	85.8	0.01	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	8619.7	>	Moment at the top (W-Dir Kips-Ft):	85.8	0.01	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	12142.5	>	Moment at the top (C-C Direc. K-Ft):	1406.3	0.12	OK!