

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:

A PETITION OF CELLCO PARTNERSHIP	:	SUB-PETITION NO. 1133
D/B/A VERIZON WIRELESS FOR A	:	122 ROUTE 6
DECLARATORY RULING FOR APPROVAL	:	ANDOVER, CT
OF AN ELIGIBLE FACILITY REQUEST FOR	:	
MODIFICATIONS TO AN EXISTING	:	
TELECOMMUNICATIONS TOWER AT 122	:	
ROUTE 6, ANDOVER, CONNECTICUT	:	JUNE 26, 2018

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

I. Introduction

Pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C. § 1455(a) (“Section 6409(a)”) and the October 21, 2014 Report and Order (FCC-14-153) issued by the Federal Communications Commission (“FCC”) (the “FCC Order”), Cellco Partnership d/b/a Verizon Wireless (“Cellco”) hereby petitions the Connecticut Siting Council (the “Council”) for a declaratory ruling (“Sub-Petition”) that the proposed modifications to an existing Crown Atlantic (“Crown”) tower at 122 Route 6 (a/k/a Jonathan Trumbull Highway) in Andover, Connecticut constitutes an Eligible Facilities Request (“EFR”) under the FCC Order. Cellco has designated this site as its “Coventry West Facility”.

II. Factual Background

Crown maintains a 150-foot tower on a 67.13-acre parcel at 122 Route 6 in Andover, Connecticut (the “Property”). This tower was approved by the Council in Docket No. 242. *See Attachment 1 – Site Vicinity Map and Site Schematic (Aerial Photograph)*. AT&T currently maintains antennas at the 150-foot level on the tower and T-Mobile maintains antennas at the

140-foot level on the tower. Equipment associated with the AT&T and T-Mobile antennas is located near the base of the tower within a fenced facility compound.

III. Cellco's Proposed Coventry West Facility

Cellco intends to install a total of six (6) antennas and nine (9) remote radio heads ("RRHs") in a cluster-mounted configuration at a height of 130 feet above ground level ("AGL") on the Crown tower. Cellco will also install an equipment cabinet and a 30 kW diesel-fueled back-up generator on a concrete pad near the base of the tower. Power and telephone service to Cellco's equipment will extend from the existing utility backboard at the tower site. Project Plans for the proposed Coventry West Facility are included in Attachment 2. Specifications for Cellco's antennas, RRHs and back-up generator are included in Attachment 3. A Structural Analysis Report confirming that the tower can accommodate Cellco's proposed modifications is included in Attachment 4.

IV. Discussion

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

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

1. *The proposed modified facility will not increase the height of the tower by more than ten (10) percent or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty (20) feet, whichever is greater.* Cellco proposes to install its antennas and RRHs at a height of 130 feet AGL on the existing 150-foot

tower.

2. *The proposed facility will not protrude from the edge of the structure more than six (6) feet.* The proposed antennas and RRHs will not protrude more than six (6) feet from the face of the monopole

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

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

5. *The proposed facility does not defeat the existing concealment elements of the base station.* The Crown tower does not currently maintain any concealment elements other than the antenna mounting configuration. Cellco's antenna mounting configuration is consistent with that of the existing carriers on the tower.

6. *The proposed facility complies with conditions associated with the prior approval of construction or modification of the base station.* The Crown tower was approved by the Council (Docket No. 242). Cellco's proposed shared use of this tower is consistent with the Council's conditions of the approval.

B. FCC Compliance

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

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

On June 26, 2018, a copy of this Sub-Petition was sent to Andover's First Selectman, Robert Burbank; John Valente, Andover's Zoning Agent; ASC Real Estate Inc., the owners of the Property; and Crown, the tower owner. Copies of the letters sent to Mr. Burbank, Mr. Valente, ASC Real Estate Inc. and Crown are included in Attachment 6. A copy of this Sub-Petition was also sent to each owner of land that abuts the Property. A sample abutter's cover letter and the list of those abutting landowners who were sent notice and a copy of the Sub-Petition is included in Attachment 7.

V. Conclusion

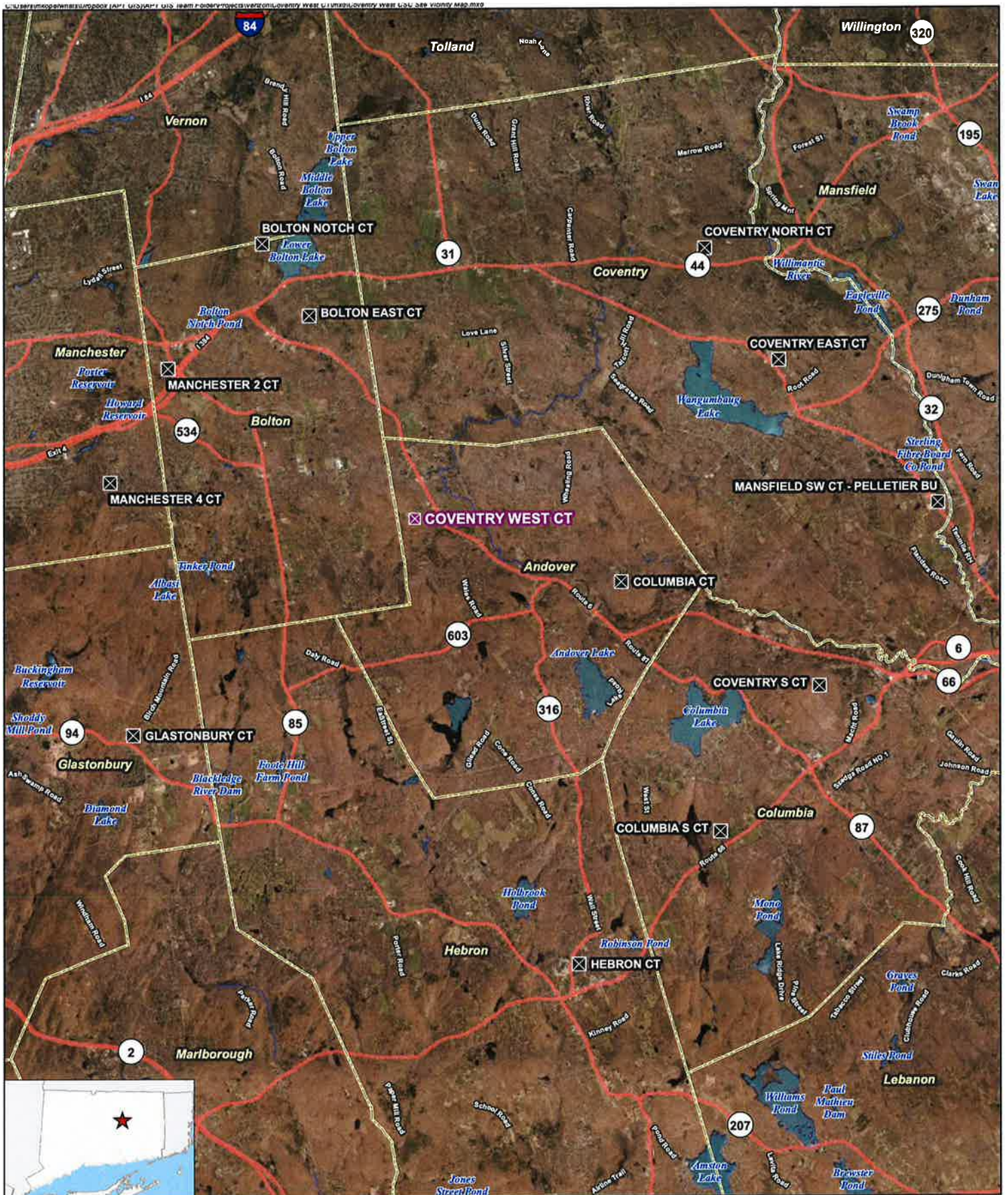
Based on the information provided above, Cellco respectfully submits that the proposed modification of the existing base station at the Property constitutes an "eligible facilities request" under Section 6409(a) and the FCC Order.

Respectfully submitted,

CELLCO PARTNERSHIP d/b/a VERIZON
WIRELESS

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

ATTACHMENT 1



- Legend**
- ✕ Proposed Verizon Wireless Facility
 - ✕ Surrounding Verizon Wireless Facilities
 - ▭ Municipal Boundary

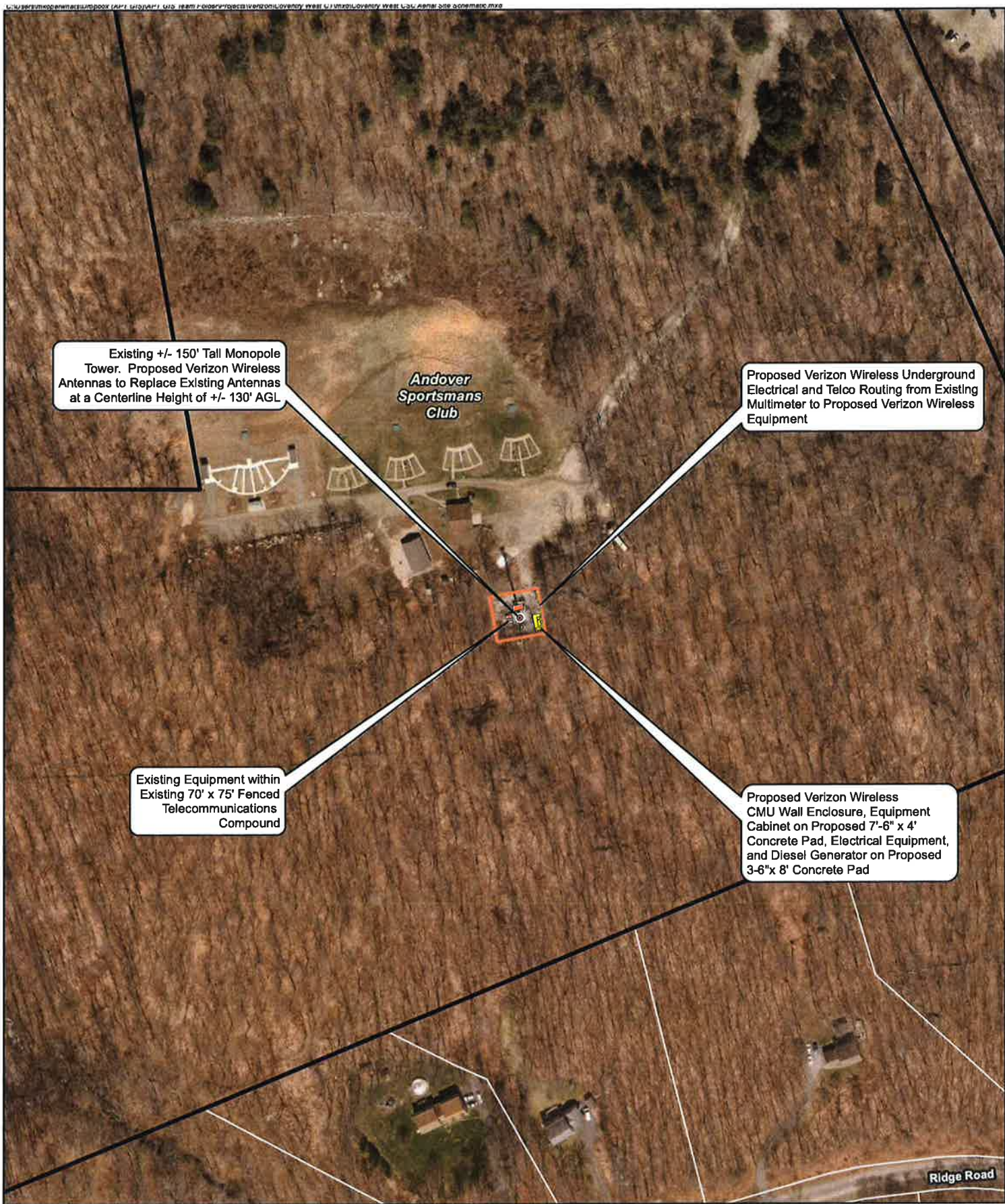
Site Vicinity Map

Proposed Wireless
Telecommunications Facility
Coventry West CT
122 Jonathan Trumbull Highway
Andover, Connecticut



Base Map Source: CT ECO 2016 Aerial Imagery
Map Scale: 1 inch = 9,000 feet
Map Date: June 2018





- Legend**
- Existing Monopole Tower (By Others)
 - Proposed Verizon Wireless Equipment
 - - - Proposed Verizon Wireless Telco/Electrical
 - Existing Equipment (By Others)
 - Existing Compound (By Others)

□ Subject Property
 Approximate Parcel Boundary (CTDEEP GIS Parcels Last Updated 2010)



Site Schematic

Proposed Wireless Telecommunications Facility
 Coventry West CT
 122 Jonathan Trumbull Highway
 Andover, Connecticut

Map Notes:
 Base Map Source: CT ECO 2016 Aerial Imagery
 Map Scale: 1 inch = 200 feet
 Map Date: June 2018



ATTACHMENT 2

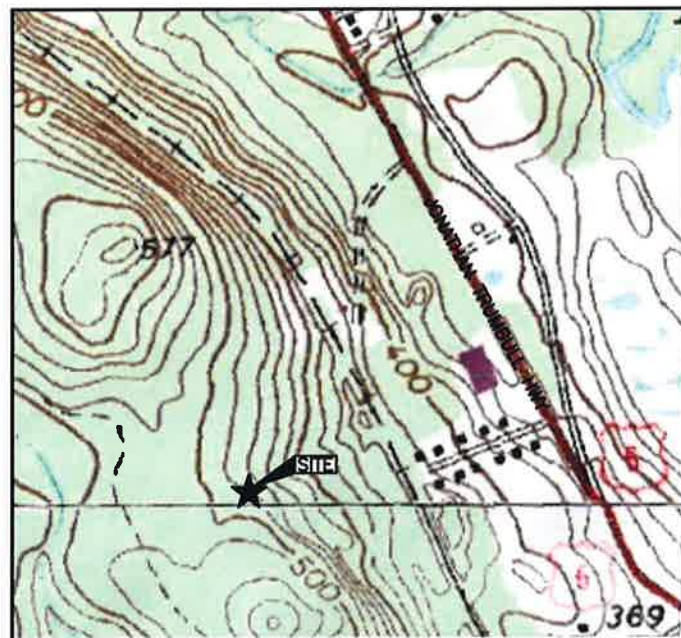
CELLCO PARTNERSHIP

d.b.a. **verizon**✓

WIRELESS COMMUNICATIONS FACILITY

COVENTRY WEST CT

122 JONATHAN TRUMBULL HWY
ANDOVER, CT. 06232



VICINITY MAP SCALE: 1"=500'

DIRECTIONS TO SITE:

DEPART ALEXANDER DRIVE TOWARD BARNES INDUSTRIAL ROAD S
TURN RIGHT ONTO BARNES INDUSTRIAL ROAD S
TURN LEFT ONTO CT-68 - TAKE RAMP RIGHT TOWARD MERIDEN
TURN RIGHT ONTO US-5/N COLONY RD
TAKE RAMP RIGHT FOR CT-15 NORTH TOWARD HARTFORD
AT EXIT 68N-E, TAKE RAMP RIGHT FOR I-91 NORTH TOWARD HARTFORD/MIDDLETOWN
AT EXIT 29, TAKE RAMP RIGHT FOR CT-15 NORTH/US-5 NORTH
TOWARD BOSTON/E HARTFORD
KEEP STRAIGHT ONTO CT-15 N
KEEP STRAIGHT ONTO I-84 E/US-6E - TAKE RAMP RIGHT FOR I-384E
ROAD NAME CHANGES TO US-44 E/US-6 E
KEEP STRAIGHT ONTO US-6 E/HOPRIVER RD
DESTINATION IS ON THE RIGHT
ANDOVER SPORTSMANS CLUB - 122 JONATHAN TRUMBULL HWY ANDOVER, CT 06232

CONSULTANT TEAM	
PROJECT ENGINEER	
HUDSON DESIGN GROUP, LLC 1600 OSGOOD STREET BUILDING 20 NORTH, SUITE 3090 NORTH ANDOVER, MA 01845 TEL: 1-(978)-557-5553 FAX: 1-(978)-336-5586	
MEP ENGINEER	
HUDSON DESIGN GROUP, LLC 45 BEECHWOOD DRIVE NORTH ANDOVER, MA 01845 TEL: 1-(978)-557-5553 FAX: 1-(978)-336-5586	

PROJECT SUMMARY	
SITE NAME:	COVENTRY WEST CT
SITE ADDRESS:	122 JONATHAN TRUMBULL HWY ANDOVER, CT 06232
PROPERTY OWNER:	ASC REAL ESTATE INC ANDOVER SPORTSMANS CLUB P.O. BOX 122 ANDOVER, CT 06232
APPLICANT:	CELLCO PARTNERSHIP d/b/a VERIZON 20 ALEXANDER DRIVE WALLINGFORD, CT 06492
SITE ACQUISITION CONTACT:	ERIC CAMPBELL SAI GROUP, LLC. 225 CEDAR STREET, SUITE 118 MARLBOROUGH, MA 01752
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN ESQ. ROBINSON + COLE LLP (860)275-8345
LATITUDE:	N41° 45' 0.46"
LONGITUDE:	W72° 24' 09.63"

SCOPE OF WORK INFO.	
VERIZON WIRELESS IS PROPOSING TO INSTALL THE FOLLOWING IMPROVEMENTS TO THE EXISTING TELECOMMUNICATION SITE:	
<ul style="list-style-type: none"> NEW PANEL ANTENNAS: (2) ANTENNA PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (6) ANTENNAS. NEW RRHs: (3) RRHs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (9) RRHs NEW JUNCTION BOXES: (2) JUNCTION BOXES IN TOTAL ITEMS LISTED ABOVE TO BE MOUNTED ON EXISTING MONOPOLE. 	
<ul style="list-style-type: none"> NEW EQUIPMENT CABINETS: (1) CABINET & (1) GENERATOR ON PROPOSED CONCRETE PADS NEW POWER AND TELEPHONE SERVICES WILL BE ROUTED UNDERGROUND FROM EXISTING METER CENTER AND HOFFMAN BOX TO PROPOSED H-FRAME. 	
ITEMS LISTED ABOVE TO BE INSTALLED WITHIN EXISTING 70'x75' FENCED COMPOUND.	

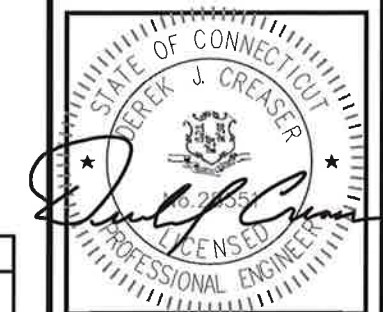
SHEET INDEX	
SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
C-1	ABUTTERS MAP
A-1	COMPOUND PLAN & ELEVATION
A-2	FOUNDATION DETAILS

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon✓

HUDSON
Design Group LLC

45 BEECHWOOD DRIVE TEL: (978) 557-5553
N. ANDOVER, MA 01845 FAX: (978) 336-5586



CHECKED BY: DJR

APPROVED BY: DPH

SUBMITTALS

NO.	DATE	REVISION	BY
2	06/22/18	REVISED PER COMMENTS	KAM
1	06/18/18	REVISED PER COMMENTS	KAM
0	06/02/15	ISSUED FOR REVIEW	DJM

SITE NAME:
COVENTRY WEST CT

SITE ADDRESS:
122 JONATHAN TRUMBULL HWY
ANDOVER, CT. 06232

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



45 BEECHWOOD DRIVE N. ANDOVER, MA 01845 TEL: (978) 537-5553 FAX: (978) 336-5586



CHECKED BY: DJR

APPROVED BY: DPH

SUBMITTALS

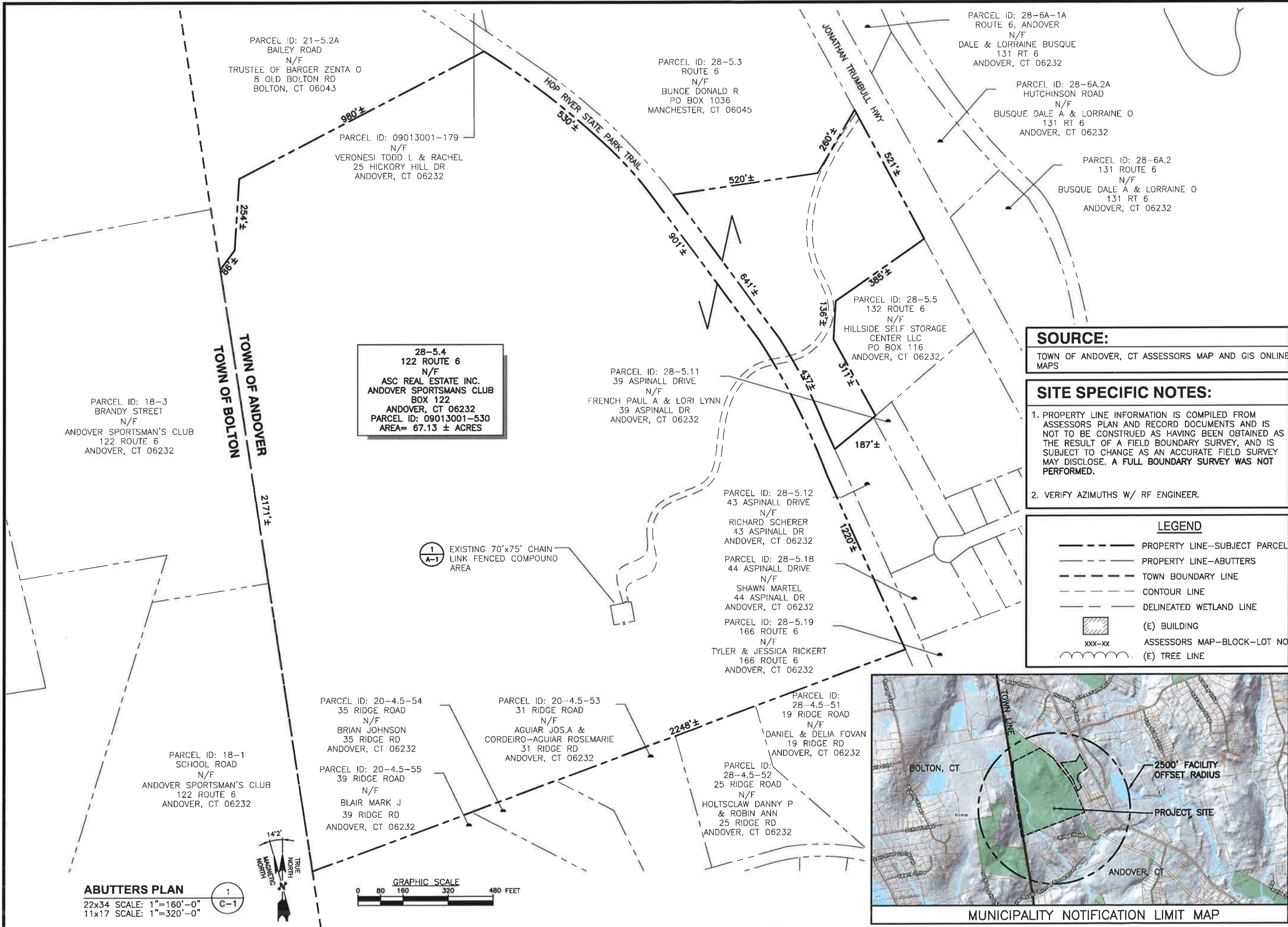
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SHEET TITLE
ABUTTERS MAP

SHEET NUMBER
C-1



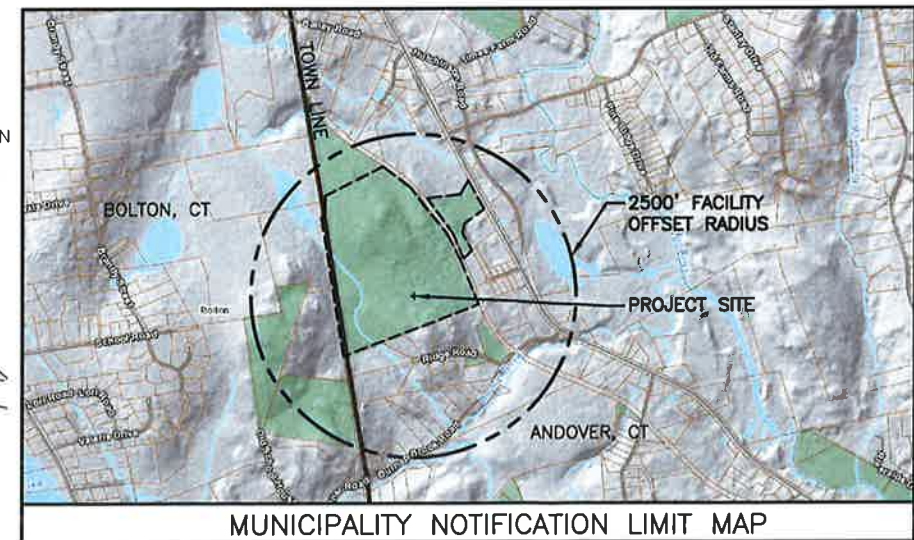
SOURCE:
TOWN OF ANDOVER, CT ASSESSORS MAP AND GIS ONLINE MAPS

SITE SPECIFIC NOTES:

- PROPERTY LINE INFORMATION IS COMPILED FROM ASSESSORS PLAN AND RECORD DOCUMENTS AND IS NOT TO BE CONSTRUED AS HAVING BEEN OBTAINED AS THE RESULT OF A FIELD BOUNDARY SURVEY, AND IS SUBJECT TO CHANGE AS AN ACCURATE FIELD SURVEY MAY DISCLOSE. A FULL BOUNDARY SURVEY WAS NOT PERFORMED.
- VERIFY AZIMUTHS W/ RF ENGINEER.

LEGEND

- PROPERTY LINE—SUBJECT PARCEL
- PROPERTY LINE—ABUTTERS
- TOWN BOUNDARY LINE
- CONTOUR LINE
- DELINEATED WETLAND LINE
- (E) BUILDING
- ASSESSORS MAP—BLOCK—LOT NO
- (E) TREE LINE



MUNICIPALITY NOTIFICATION LIMIT MAP

28-5.4
122 ROUTE 6
N/F
ASC REAL ESTATE INC.
ANDOVER SPORTSMAN'S CLUB
BOX 122
ANDOVER, CT 06232
PARCEL ID: 09013001-530
AREA= 67.13 ± ACRES

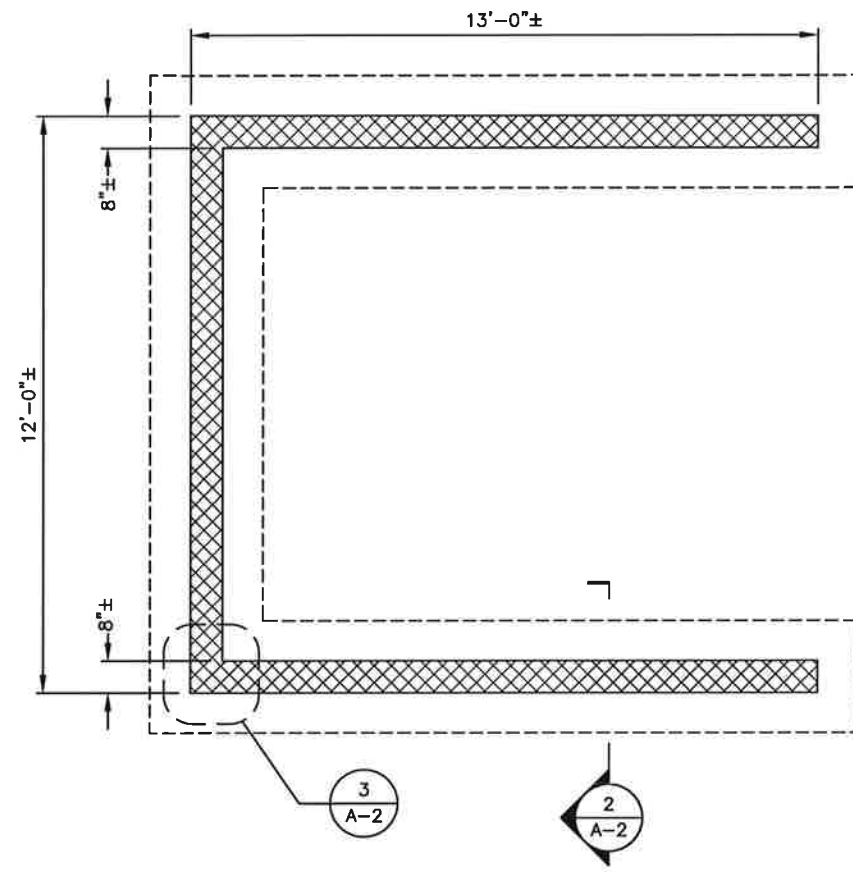
1
A-1
EXISTING 70'x75' CHAIN LINK FENCED COMPOUND AREA



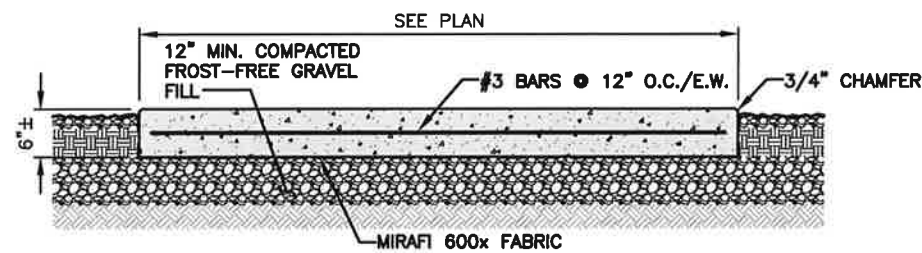
ABUTTERS PLAN
22x34 SCALE: 1"=160'-0"
11x17 SCALE: 1"=320'-0"
1
C-1

FOUNDATION NOTES & CONCRETE SPECIFICATIONS:

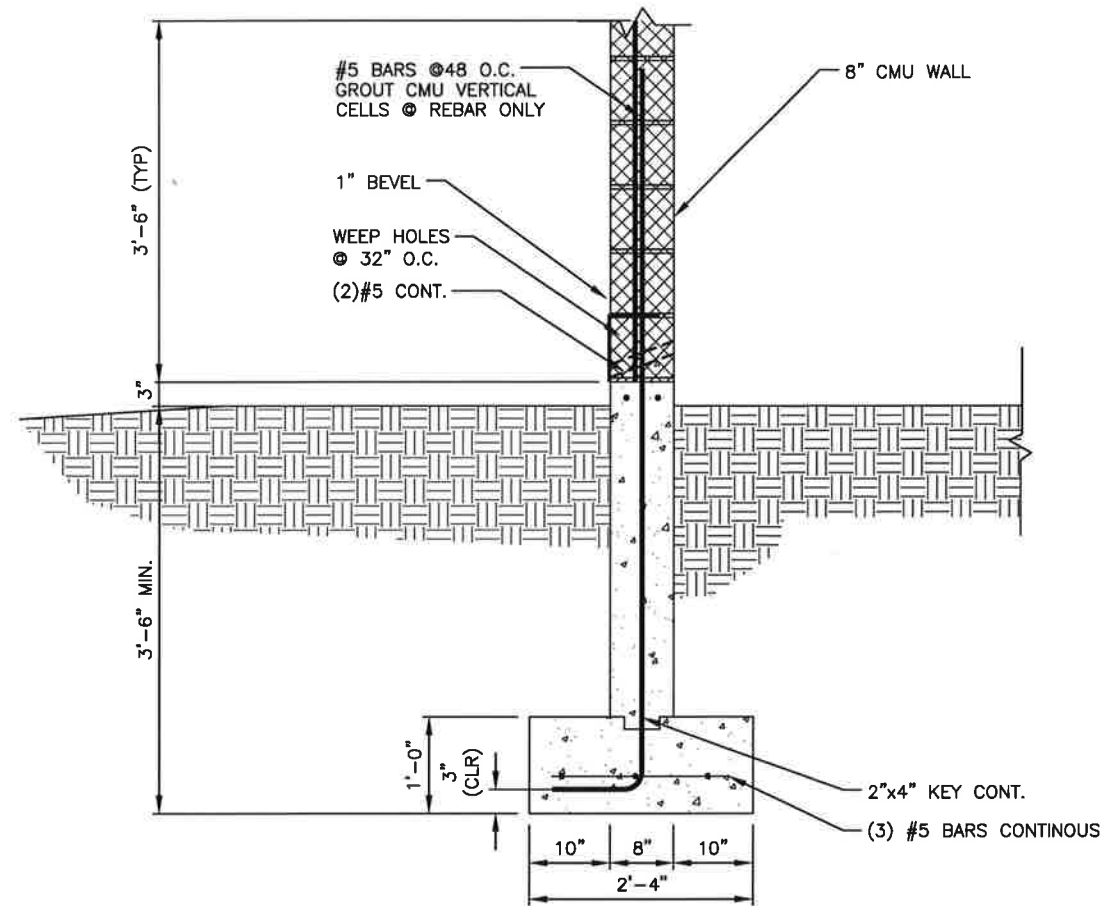
- FOUNDATION AREA SHALL BE EXCAVATED TO THE DEPTH AND DIMENSIONS SHOWN ON THE PLANS. EXISTING LEDGE AND ALL OTHER EXISTING UNSUITABLE MATERIAL SHALL BE REMOVED AND LEGALLY DISPOSED OF OFF-SITE. THE SUBGRADE SHALL BE ROLLED WITH A 1-TON, VIBRATORY, WALK-BEHIND ROLLER AT A SPEED OF LESS THAN 2 FPS, 6 PASSES MINIMUM, TO PROVIDE UNYIELDING SURFACE.
- UNDERCUT SOFT OR "WEAVING" AREAS A MINIMUM OF 12 INCHES DEEP. BACKFILL UNDERCUT AREA WITH FILL MEETING THE SPECIFICATIONS OF STRUCTURAL FILL.
- CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'_c)=4000 psi. CONCRETE TO BE AIR ENTRAINED, DESIRED AIR CONTENT TO BE 6% (PLUS OR MINUS 2%)
- REINFORCING BAR TO BE ASTM A615 GRADE 60.
- WELDED WIRE FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A185. WIRES FOR FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A82.
- ALL REINFORCING TO HAVE MINIMUM CONCRETE COVER PER ACI SPECIFICATIONS.
- ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL CONFORM TO LATEST EDITION OF ACI 318 AND APPLICABLE STATE BUILDING CODE.



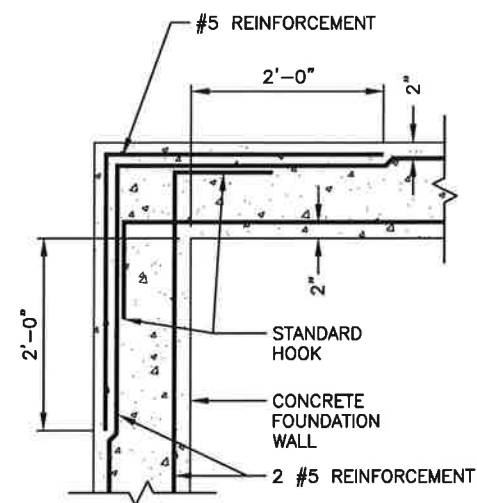
REINFORCED FOUNDATION PLAN
 22x34 SCALE: 1/2"=1'-0"
 11x17 SCALE: 1/4"=1'-0"



CONCRETE PAD DETAIL
 22x34 SCALE: N.T.S.



FOUNDATION DETAIL
 22x34 SCALE: 3/4"=1'-0"
 11x17 SCALE: 3/8"=1'-0"



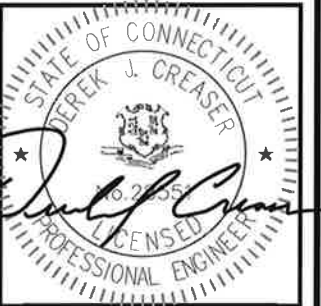
FOUNDATION CORNER DETAIL
 22x34 SCALE: 3/4"=1'-0"
 11x17 SCALE: 3/8"=1'-0"

PREPARED FOR: CELCO PARTNERSHIP D.B.A.

verizon

HUDSON
 Design Group LLC

45 BEECHWOOD DRIVE N. ANDOVER, MA 01845 TEL: (978) 557-5553 FAX: (978) 336-5586



CHECKED BY: DJR

APPROVED BY: DPH

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 ANDOVER, CT. 06232

SHEET TITLE
FOUNDATION DETAILS

SHEET NUMBER
A-2

ATTACHMENT 3



SBNHH-1D65B

6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x 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
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
	0° 14.6	0° 14.5	0° 17.4	0° 17.8	0° 18.1	0° 18.2
Gain by Beam Tilt, average, dBi	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

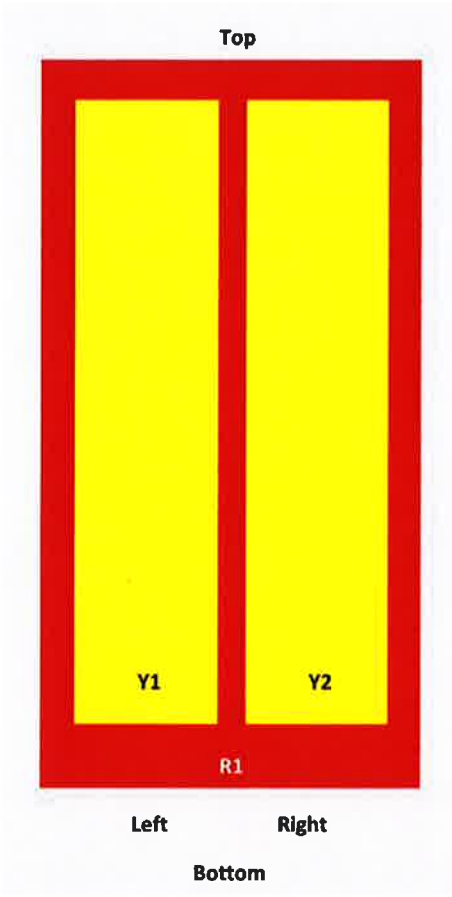
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

Array Layout

SBNHH-1D65B

SBNHH 65

Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	ANXXXXXXXXXXXXXXXXX.1
Y1	1695-2360	3-4	2	ANXXXXXXXXXXXXXXXXX.2
Y2	1695-2360	5-6		



View from the front of the antenna
(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band	1695 – 2360 MHz 698 – 896 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	6
RF Connector Quantity, low band	2
RF Connector Quantity, high band	4
RF Connector Interface	7-16 DIN Female

SBNHH-1D65B

Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Length	1851.0 mm 72.9 in
Width	301.0 mm 11.9 in
Depth	180.0 mm 7.1 in
Net Weight, without mounting kit	18.4 kg 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (1) Low band (1)
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

Packed Dimensions

Length	2025.0 mm 79.7 in
Width	390.0 mm 15.4 in
Depth	296.0 mm 11.7 in
Shipping Weight	31.0 kg 68.3 lb

Regulatory Compliance/Certifications

Agency

RoHS 2011/65/EU
China RoHS SJ/T 11364-2006
ISO 9001:2008

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)
Designed, manufactured and/or distributed under this quality management system



SBNHH-1D65B

Included Products

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.

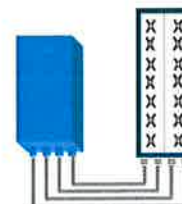


FEATURES

- 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

TECHNICAL SPECIFICATIONS

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.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -36 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (in 2Tx or 4Tx mode)
Environmental conditions	-40°C (-40°F) /+55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	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

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ALCATEL-LUCENT B25 RRH4X30

Alcatel-Lucent Band 25 Remote Radio Head 4x30W is the new 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 B25 RRH4x30 allows operators to have a compact radio solution to deploy LTE in the PCS band (1.9 GHz, 3GPP band 25), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B25 RRH4x30 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, LTE carriers from 3 MHz up to 20 MHz and up to 65 MHz instantaneous bandwidth.

The Alcatel-Lucent B25 RRH4x30 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 B25 RRH4x30 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.

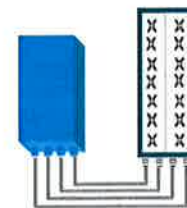


FEATURES

- Supporting LTE in 1.9 GHz band (PCS, 3GPP band 2 & 25)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- Ready for 3, 5, 10, 15 or 20MHz LTE carrier operation with 4Rx Diversity
- Ready to support up to 4 carriers anywhere in 65MHz instantaneous bandwidth
- Convection-cooled (fan-less)
- Supports AISG 2.0 devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in PCS band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Full flexibility for multiple carriers operation over entire PCS spectrum
- Improves downlink spectral efficiency and cell edge throughput through MIMO4
- Increases LTE coverage thanks to 4-way Rx 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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2)	2.0 dB typ. (<2.5 dB max)
RX Diversity scheme	2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.)	538 x 304 x 182 (21.2" x 12.0" x 7.2")
Volume (w/ solar shield) in L	30
Weight (w/ solar shield) in kg (lb)	24 (53)
DC voltage range	-40.5 to -57V at full performance. -38 to -57V with relaxation on power consumption
DC power consumption	580W typical @100% RF load
Environmental conditions	-40°C (-40°F) /+55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5 (> 14dB)
CPRI ports	2 CPRI ports (HW ready for Rate7 / 9.8 Gbps)
AISG interfaces	1 AISG2.0 output (RS485), +24V/2A DC power Integrated Smart Bias Tees (x2)
Misc. Interfaces	1 external alarms connector (4 alarms) 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

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ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 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. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.



The Alcatel-Lucent B66a RRH4x45 is a compact (near zero-footprint) solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

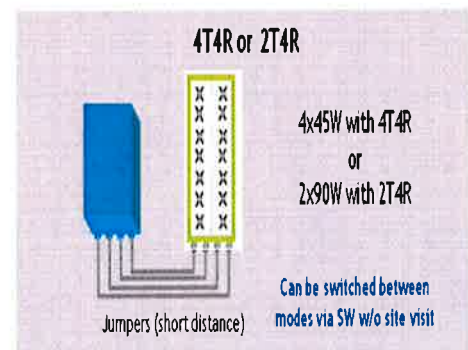
Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz 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 AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



TECHNICAL SPECIFICATIONS

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz - 4 LTE MIMO carriers (in 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure - RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) - 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield)
Volume in Liters	35.5 (with solar shield) 29.7 (without solar shield)
Weight in kg (lb) (w/o mounting HW)	25.8kg (56.8lb) (with solar shield)
DC voltage range	Nominal: -48V, -48.5 to -57V at full performance; -38 to -57V with relaxation on power consumption
DC power consumption	750W typical @100% RF load (in 2Tx or 4Tx mode); Add 88W for 2A*29V for AISG
Environmental conditions	-40°C (-40°F) / +55°C (+131°F)
Wind load (@180km/h or 93mph)	UL50E Type 4 Enclosure 250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.2-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

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SD030

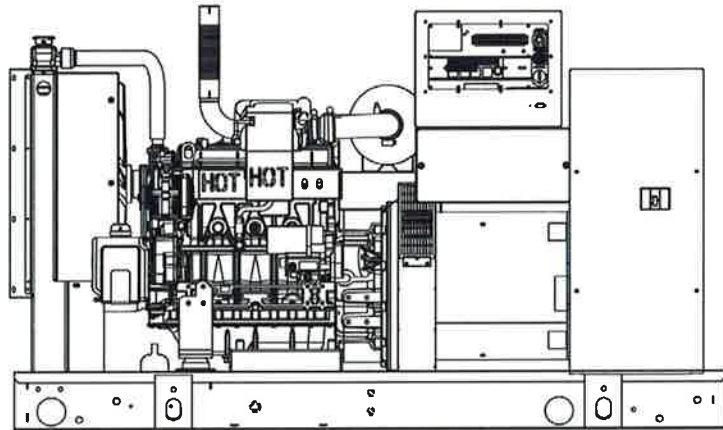
2.4L

Industrial Diesel Generator Set

EPA Certified Stationary Emergency

Standby Power Rating
30 kW 38 kVA 60 Hz

Prime Power Rating*
27 kW 34 kVA 60 Hz



*Built in the USA using domestic and foreign parts

Image used for illustration purposes only

*EPA Certified Prime ratings are not available in the U.S. or its Territories

Codes and Standards

Generac products are designed to the following standards:



UL2200, UL508, UL142, UL498



NFPA70, 99, 110, 37



NEC700, 701, 702, 708



ISO9001, 8528, 3046, 7637, Pluses #2b, 4



NEMA ICS10, MG1, 250, ICS6, AB1



ANSI C62.41
American National Standards Institute

Powering Ahead

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SD030

Standard Features

ENGINE SYSTEM

General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Critical Exhaust Silencer (enclosed only)
- Factory Filled Oil
- Radiator Duct Adapter (open set only)

Fuel System

- Fuel lockoff solenoid
- Primary fuel filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene glycol antifreeze
- 120 VAC Coolant Heater

Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Solenoid activated starter motor
- Rubber-booted engine electrical connections

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 leads (3-phase, non 600 V)
- Class H insulation material
- Vented rotor
- 2/3 pitch
- Skewed stator
- Auxiliary voltage regulator power winding
- Amortisseur winding
- Brushless Excitation
- Sealed Bearings
- Automated manufacturing (winding, insertion, lacing, varnishing)
- Rotor dynamically spin balanced (get tolerance)
- Full load capacity alternator
- Protective thermal switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Silencer Heat Shield
- Wrapped Exhaust Piping
- Silencer housed in discharge hood (enclosed only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Limited Warranty (Prime rated units)
- Silencer mounted in the discharge hood (enclosed only)

ENCLOSURE (if selected)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

TANKS (if selected)

- UL 142
- Double wall
- Vents
- Sloped top
- Sloped bottom
- Factory pressure tested (2 psi)
- Rupture basin alarm
- Fuel level
- Check valve in supply and return lines
- Rhino Coat™ - Textured polyester powder coat
- Stainless hardware

CONTROL SYSTEM



Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run

- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection
- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Low Fuel Pressure Alarm
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

SD030

Configurable Options

ENGINE SYSTEM

- General
- Oil Make-Up System
- Oil Heater
- Industrial Exhaust Silencer

Fuel System

- Flexible fuel lines
- Primary fuel filter

Engine Electrical System

- 10A UL battery charger
- 2.5A UL battery charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater
- Tropical coating
- Permanent Magnet Excitation

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET

- Gen-Link Communications Software (English Only)
- 8 Load Position Load Center
- 2 Year Extended Warranty
- 5 Year Warranty
- 5 Year Extended Warranty

ENCLOSURE

- Weather Protected
- Level 1 Sound Attenuation
- Level 2 Sound Attenuation
- Steel Enclosure
- Aluminum Enclosure
- 150 MPH Wind Kit
- 12 VDC Enclosure Lighting Kit
- 120 VAC Enclosure Lighting Kit
- AC/DC Enclosure Lighting Kit
- Door Alarm Switch

TANKS (Size on last page)

- Electrical Fuel Level
- Mechanical Fuel Level
- 54 Gal (204.4 L) Usable Capacity
- 132 Gal (499.7 L) Usable Capacity
- 211 Gal (798.7 L) Usable Capacity
- 300 Gal (1135.6 L) Usable Capacity
- 8" Vent Extension
- 13" Vent Extension
- 19" Vent Extension

CONTROL SYSTEM

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> 21-Light Remote Annunciator <input type="checkbox"/> Remote Relay Panel (8 or 16) <input type="checkbox"/> Oil Temperature Sender with Indication Alarm <input type="checkbox"/> Remote E-Stop (Break Glass-Type, Surface Mount) | <ul style="list-style-type: none"> <input type="checkbox"/> Remote E-Stop (Red Mushroom-Type, Surface Mount) <input type="checkbox"/> Remote E-Stop (Red Mushroom-Type, Flush Mount) <input type="checkbox"/> Remote Communication - Modem | <ul style="list-style-type: none"> <input type="checkbox"/> Remote Communication - Ethernet <input type="checkbox"/> 10A Run Relay <input type="checkbox"/> Ground fault indication and protection functions |
|--|---|---|

Engineered Options

ENGINE SYSTEM

- Coolant heater ball valves
- Block Heaters
- Fluid containment pans

CONTROL SYSTEM

- Spare inputs (x4) / outputs (x4) - H Panel Only
- Battery Disconnect Switch

ALTERNATOR SYSTEM

- 3rd Breaker System

GENERATOR SET

- Special Testing
- IBC Seismic Certification

ENCLOSURE

- Motorized Dampers
- Door switched for intrusion alert
- Enclosure ambient heaters

TANKS

- Overfill protection valve
- UL2085 Tank
- ULC S-601 Tank
- Stainless Steel Tank
- Special Fuel Tanks (MIDEQ and FL DEP/DERM, etc.)
- Vent Extensions

Rating Definitions

Standby – Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime – Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications.

Power ratings in accordance with ISO 8528-1, Second Edition dated 2005-06-01, definitions for Prime Power (PRP) and Emergency Standby Power (ESP).

SD030

application and engineering data

ENGINE SPECIFICATIONS

General

Make	Generac
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emissions Data Sheet
Cylinder #	4
Type	In-Line
Displacement - L (cu in)	2.4 (146.46)
Bore - mm (in)	90 (3.54)
Stroke - mm (in)	94 (3.70)
Compression Ratio	21.3:1
Intake Air Method	Turbocharged
Cylinder Head Type	Cast Iron
Piston Type	Aluminum

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	± 0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full Flow
Crankcase Capacity - L (qts)	6.2 (6.52)

Cooling System

Cooling System Type	Closed Recovery
Water Pump Flow	Pre-Lubed, Self Sealing
Fan Type	Pusher
Fan Speed (rpm)	2698
Fan Diameter mm (in)	560 (22)
Coolant Heater Wattage	1500
Coolant Heater Standard Voltage	120 VAC

Fuel System

Fuel Type	Ultra Low Sulfur Diesel Fuel
Fuel Specifications	ASTM
Fuel Filtering (microns)	5
Fuel Inject Pump	Distribution Injection Pump
Fuel Pump Type	Engine Driven Gear
Injector Type	Mechanical
Fuel Supply Line - mm (in)	7.94 (0.31)
Fuel Return Line - mm (in)	7.94 (0.31)

Engine Electrical System

System Voltage	12 VDC
Battery Charging Alternator	Std
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	390
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	< 5%
Telephone Interference Factor (TIF)	< 50
Standard Excitation	Synchronous
Bearings	Single Sealed Cartridge
Coupling	Direct, Flexible Disc
Load Capacity - Standby	100%
Prototype Short Circuit Test	Yes

Voltage Regulator Type	Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	± 0.25%

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operating data

POWER RATINGS

	Standby	
Single-Phase 120/240 VAC @1.0pf	30 kW	Amps: 125
Three-Phase 120/208 VAC @0.8pf	30 kW	Amps: 104
Three-Phase 120/240 VAC @0.8pf	30 kW	Amps: 90
Three-Phase 277/480 VAC @0.8pf	30 kW	Amps: 46
Three-Phase 346/600 VAC @0.8pf	30 kW	Amps: 36

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

Alternator	kW	480 VAC						208/240 VAC					
		10%	15%	20%	25%	30%	35%	10%	15%	20%	25%	30%	35%
Standard	35	24	36	48	60	72	84	18	27	36	45	54	63
Upsize 1	40	27	41	54	68	81	95	20	31	41	51	61	71
Upsize 2	50	34	52	69	86	103	120	26	39	52	65	77	90

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)		Diesel - gph (lph)	
3 (1)		Percent Load	gph (lph)
Total Fuel Pump Flow (Combustion + Return)		25%	0.92 (3.5)
4.5 gph		50%	1.45 (5.5)
		75%	1.96 (7.4)
		100%	2.74 (10.4)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

	Standby	
Coolant Flow per Minute	gpm (lpm)	10 (38)
Coolant System Capacity	gal (L)	2.8 (10.95)
Heat Rejection to Coolant	BTU/hr	111,000
Inlet Air	cfm (m3/hr)	4,500 (7647)
Max. Operating Radiator Air Temp	F° (C°)	122 (50)
Max. Ambient Temperature (before derate)	F° (C°)	104 (40)
Maximum Radiator Backpressure	in H ₂ O	0.5

COMBUSTION AIR REQUIREMENTS

	Standby
Flow at Rated Power cfm (m3/min)	90 (2.55)

ENGINE

	Standby	
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	49
Piston Speed	ft/min (m/min)	1110 (338)
BMEP	psi	153

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

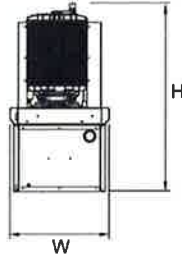
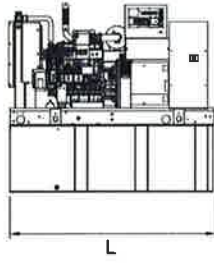
EXHAUST

	Standby	
Exhaust Flow (Rated Output)	cfm (m³/min)	230 (391)
Max. Backpressure (Post Silencer)	inHg (Kpa)	1.5 (5.1)
Exhaust Temp (Rated Output)	°F (°C)	850 (454)
Exhaust Outlet Size (Open Set)	mm (in)	63.5 (2.5)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO9046, BS5514, ISO8528 and DIN6271 standards.

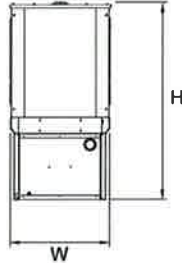
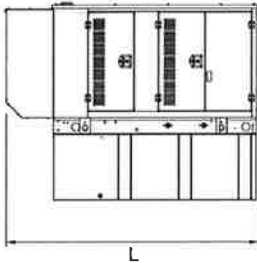
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dimensions and weights*



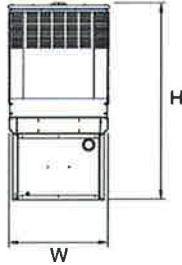
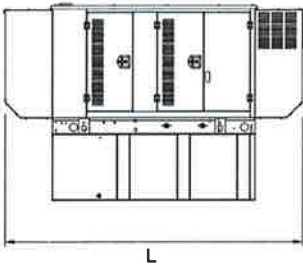
OPEN SET

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Tank & Open Set	
			Steel	Aluminum
NO TANK	-	76 (1930.4) x 38 (914.4) x 46 (1168.4)	2060 (934)	
20	54 (204.4)	76 (1930.4) x 38 (914.4) x 59 (1498.6)	2540 (1152)	
48	132 (499.7)	76 (1930.4) x 38 (914.4) x 71 (1803.4)	2770 (1257)	
77	211 (798.7)	76 (1930.4) x 38 (914.4) x 83 (2108.2)	2979 (1351)	
109	300 (1135.6)	93 (2362.2) x 38 (914.4) x 87 (2209.8)	3042 (1380)	



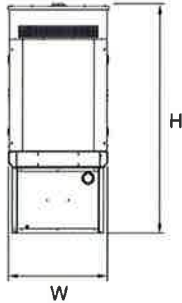
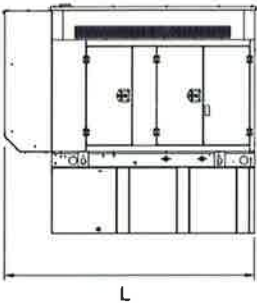
STANDARD ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	95 (2413) x 38 (965.2) x 50 (1270)	302 (137)	191 (87)
20	54 (204.4)	95 (2413) x 38 (965.2) x 63 (1600.2)		
48	132 (499.7)	95 (2413) x 38 (965.2) x 75 (1905)		
77	211 (798.7)	95 (2413) x 38 (965.2) x 87 (2209.8)		
109	300 (1135.6)	95 (2413) x 38 (965.2) x 91 (2311.4)		



LEVEL 1 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	113 (2870.2) x 38 (965.2) x 50 (1270)	455 (206)	288 (131)
20	54 (204.4)	113 (2870.2) x 38 (965.2) x 63 (1600.2)		
48	132 (499.7)	113 (2870.2) x 38 (965.2) x 75 (1905)		
77	211 (798.7)	113 (2870.2) x 38 (965.2) x 87 (2209.8)		
109	300 (1135.6)	113 (2870.2) x 38 (965.2) x 91 (2311.4)		



LEVEL 2 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	95 (2413) x 38 (965.2) x 62 (1574.8)	460 (209)	291 (132)
20	54 (204.4)	95 (2413) x 38 (965.2) x 75 (1905)		
48	132 (499.7)	95 (2413) x 38 (965.2) x 87 (2209.8)		
77	211 (798.7)	95 (2413) x 38 (965.2) x 99 (2514.6)		
109	300 (1135.6)	95 (2413) x 38 (965.2) x 103 (2616.2)		

*All measurements are approximate and for estimation purposes only. Sound dBA can be found on the sound data sheet. Enclosure Only weight is added to Tank & Open Set weight to determine total weight.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

Generac Power Systems, Inc. • S45 W29290 HWY. 59, Waukesha, WI 53189 • generac.com

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ATTACHMENT 4

Date: November 09, 2016

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

JACOBS®

Jacobs Engineering Group, Inc.
5449 Bells Ferry Rd
Acworth, GA 30102
(770) 701-2500

Subject: Structural Analysis Report

Carrier Designation: Verizon Wireless Co-Locate
Carrier Site Name: Coventry West, CT

Crown Castle Designation: Crown Castle BU Number: 842856
Crown Castle Site Name: ANDOVER NORTH
Crown Castle JDE Job Number: 335610
Crown Castle Work Order Number: 1317391
Crown Castle Application Number: 297317 Rev. 10

Engineering Firm Designation: Jacobs Engineering Group, Inc. Project Number: 1317391

Site Data: 122 JONATHAN TRUMBULL HIGHWAY (ROUTE 6),
ANDOVER, Tolland County, CT
Latitude 41° 45' 0.46", Longitude -72° 24' 9.63"
149 Foot - Monopole Tower

Dear Charles McGuirt,

Jacobs Engineering Group, Inc. is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 968334, in accordance with application 297317, revision 10.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Existing + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

We at Jacobs Engineering Group, Inc. appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by:



Christian C. Comandante
Structural Engineer

tnxTower Report - version 7.0.7.0



Reviewed by:

Mathew E. Watkins, P.E.
Engineering Project Manager

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1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in November of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 1 inch ice thickness and 60 mph under service loads, exposure category C.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	alcatel lucent	B13 RRH4X30-4R	2	1-5/8	-
		3	alcatel lucent	B25 RRH4X30			
		3	alcatel lucent	B66A RRH4X45			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		2	raycap	RCMDC-3315-PF-48			
		1	tower mounts	Side Arm Mount [SO 101-3]			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	151.0	3	ericsson	RRUS-11	6	1/2 7/8 1-1/4	1
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP17201			
		6	powerwave technologies	LGP21901			
		1	raycap	DC6-48-60-18-8F			
	149.0	tower mounts	T-Arm Mount [TA 702-3]				
140.0	140.0	3	commscope	ATBT-BOTTOM-24V	12	1/4 1-5/8	1
		3	commscope	LNx-6515DS-VTM w/ Mount Pipe			
		3	rfs celwave	APX16PV-16PVL w/ Mount Pipe			
		6	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Side Arm Mount [SO 101-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	2
		1	tower mounts	Pipe Mount [PM 602-3]			

Notes:

- 1) Existing Equipment
- 2) Abandoned Equipment to be removed; not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
Unknown						

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	EEI	4713188	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	4529267	CCISITES
4-GEOTECHNICAL REPORTS	VN Engineers	4713186	CCISITES
4-POST-MODIFICATION INSPECTION	GPD	4713189	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	6003147	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD	4713190	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Crown Castle	5760149	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.7.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Jacobs Engineering Group, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
149 - 144	Pole	TP22.426x21.5x0.1875	Pole	5.5	Pass
144 - 139	Pole	TP23.352x22.426x0.1875	Pole	10.1	Pass
139 - 134	Pole	TP24.278x23.352x0.1875	Pole	16.6	Pass
134 - 129	Pole	TP25.204x24.278x0.1875	Pole	23.5	Pass
129 - 127.39	Pole	TP26.202x25.204x0.1875	Pole	26.5	Pass
127.39 - 122.39	Pole	TP26.043x25.128x0.1875	Pole	36.1	Pass
122.39 - 117.39	Pole	TP26.958x26.043x0.1875	Pole	44.5	Pass
117.39 - 112.39	Pole	TP27.873x26.958x0.1875	Pole	52.3	Pass
112.39 - 107.39	Pole	TP28.788x27.873x0.1875	Pole	59.6	Pass
107.39 - 102.39	Pole	TP29.703x28.788x0.1875	Pole	66.6	Pass
102.39 - 98.5	Pole	TP30.414x29.703x0.1875	Pole	71.7	Pass
98.5 - 98.25	Pole + Reinf.	TP30.46x30.414x0.3438	Reinf. 1 Tension Rupture	58.7	Pass
98.25 - 93.25	Pole + Reinf.	TP31.375x30.46x0.3375	Reinf. 1 Tension Rupture	63.8	Pass
93.25 - 88.25	Pole + Reinf.	TP32.29x31.375x0.3313	Reinf. 1 Tension Rupture	68.7	Pass
88.25 - 83.87	Pole + Reinf.	TP33.96x32.29x0.3313	Reinf. 1 Tension Rupture	72.8	Pass
83.87 - 78.13	Pole	TP33.763x32.716x0.25	Pole	64.9	Pass
78.13 - 73.13	Pole	TP34.675x33.763x0.25	Pole	68.4	Pass
73.13 - 68.13	Pole	TP35.586x34.675x0.25	Pole	71.7	Pass
68.13 - 63.13	Pole	TP36.497x35.586x0.25	Pole	74.9	Pass
63.13 - 58.13	Pole	TP37.408x36.497x0.25	Pole	77.9	Pass
58.13 - 57.25	Pole	TP37.568x37.408x0.25	Pole	78.5	Pass
57.25 - 57	Pole + Reinf.	TP37.614x37.568x0.4188	Reinf. 2 Tension Rupture	66.0	Pass
57 - 52	Pole + Reinf.	TP38.525x37.614x0.4125	Reinf. 2 Tension Rupture	68.4	Pass
52 - 48.76	Pole + Reinf.	TP40.121x38.525x0.4125	Reinf. 2 Tension Rupture	69.9	Pass
48.76 - 42.24	Pole	TP39.803x38.616x0.3125	Pole	65.3	Pass
42.24 - 37.24	Pole	TP40.714x39.803x0.3125	Pole	67.2	Pass
37.24 - 32.24	Pole	TP41.625x40.714x0.3125	Pole	68.9	Pass
32.24 - 27.24	Pole	TP42.536x41.625x0.3125	Pole	70.6	Pass
27.24 - 22.24	Pole	TP43.447x42.536x0.3125	Pole	72.3	Pass
22.24 - 17.24	Pole	TP44.358x43.447x0.3125	Pole	73.9	Pass
17.24 - 12.24	Pole	TP45.269x44.358x0.3125	Pole	75.4	Pass
12.24 - 7.24	Pole	TP46.18x45.269x0.3125	Pole	76.9	Pass
7.24 - 2.24	Pole	TP47.091x46.18x0.3125	Pole	78.4	Pass
2.24 - 0	Pole	TP47.5x47.091x0.3125	Pole	79.0	Pass
				Summary	
			Pole	79.0	Pass
			Reinforcement	72.8	Pass
			Overall	79.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	65.5	Pass
1	Base Plate	0	74.7	Pass
1	Base Foundation Structural	0	67.4	Pass
1	Base Foundation Soil Interaction	0	50.8	Pass

Structure Rating (max from all components) =	79.0%
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Notes:

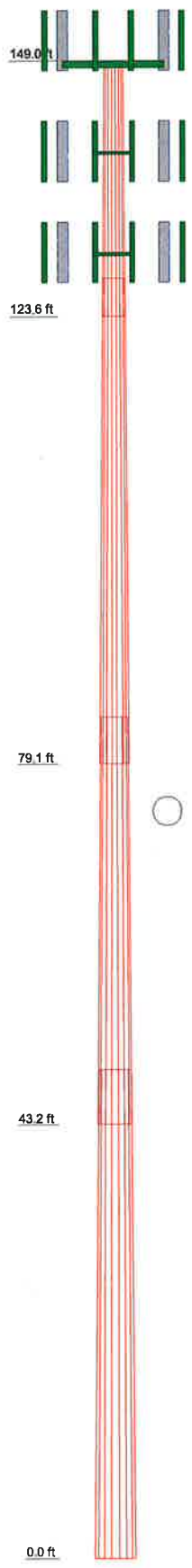
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	254-11/16"	18	0.1875	3'-9-3/8"	21.5000	26.2021	A572-65	1.2
2	483-1/8"	18	0.1875	4'-8-7/8"	25.1277	33.9598	A572-65	2.9
3	407-9/16"	18	0.2500	5'-6-1/4"	32.7165	40.1211	A572-65	4.0
4	48'-9-1/8"	18	0.3125	38.6159	47.5000		A572-65	7.0
								15.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3" x 5/8" lightning rod	149	LNX-6515DS-VTM w/ Mount Pipe	140
7770.00 w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	140
7770.00 w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
7770.00 w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
(2) LGP17201	149	Side Arm Mount [SO 101-3]	140
(2) LGP17201	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP17201	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP21901	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP21901	149	B25 RRH4X30	130
(2) LGP21901	149	B25 RRH4X30	130
RRUS-11	149	B25 RRH4X30	130
RRUS-11	149	B13 RRH4X30-4R	130
DC6-48-60-18-8F	149	B25 RRH4X30	130
T-Arm Mount [TA 702-3]	149	B13 RRH4X30-4R	130
APX16PV-16PVL w/ Mount Pipe	140	B13 RRH4X30-4R	130
APX16PV-16PVL w/ Mount Pipe	140	B66A RRH4X45	130
APX16PV-16PVL w/ Mount Pipe	140	B66A RRH4X45	130
LNX-6515DS-VTM w/ Mount Pipe	140	B66A RRH4X45	130
		RCMDC-3315-PF-48	130
		RCMDC-3315-PF-48	130
		Side Arm Mount [SO 101-3]	130

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0'

Jacobs Engineering Group, Inc.

5449 Bells Ferry Rd
 Acworth, GA 30102
 Phone: (770) 701-2500
 FAX: (770) 701-2501

Job: **ANDOVER NORTH**

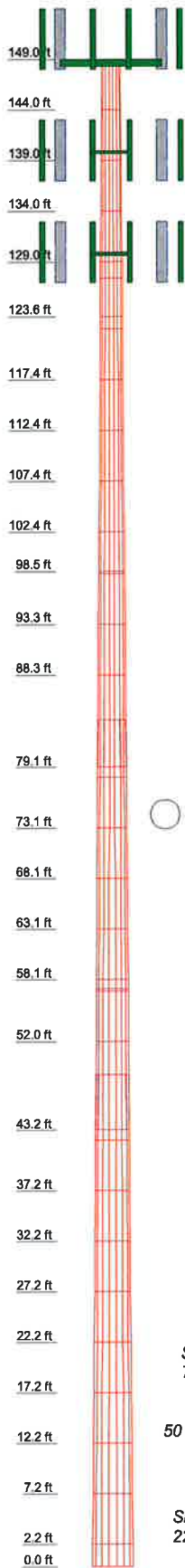
Project: **BUB42856 WO1317391**

Client: **Crown Castle** Drawn by: **Christian C. Comandante** App'd:

Code: **TIA-222-G** Date: **11/09/16** Scale: **N**

Path: **D:\Users\cchris\OneDrive\Documents\ANDOVER NORTH\1317391\Drawings\BUB42856 WO1317391.dwg** Dwg No. **1**

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
2	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
3	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
4	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
5	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
6	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
7	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
8	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
9	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
10	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
11	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
12	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
13	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
14	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
15	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
16	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
17	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
18	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
19	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
20	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
21	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
22	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
23	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
24	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
25	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
26	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
27	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
28	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
29	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
30	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
31	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
32	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
33	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2
34	5	5	0.1875	39-3/8"	31.3753	32.2903	A572-65	0.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3' x 5/8" lightning rod	149	LNX-6515DS-VTM w/ Mount Pipe	140
7770.00 w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	140
7770.00 w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
7770.00 w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	(2) ATMAA1412D-1A20	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
AM-X-CD-16-65-00T-RET w/ Mount Pipe	149	ATBT-BOTTOM-24V	140
(2) LGP17201	149	Slide Arm Mount [SO 101-3]	140
(2) LGP17201	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP17201	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP21901	149	(2) SBNHH-1D65B w/ Mount Pipe	130
(2) LGP21901	149	B25 RRH4X30	130
(2) LGP21901	149	B25 RRH4X30	130
RRUS-11	149	B25 RRH4X30	130
RRUS-11	149	B13 RRH4X30-4R	130
RRUS-11	149	B13 RRH4X30-4R	130
DC6-46-60-18-8F	149	B13 RRH4X30-4R	130
T-Arm Mount [TA 702-3]	149	B66A RRH4X45	130
APX16PV-16PVL w/ Mount Pipe	140	B66A RRH4X45	130
APX16PV-16PVL w/ Mount Pipe	140	B66A RRH4X45	130
APX16PV-16PVL w/ Mount Pipe	140	RCMDC-3315-PF-48	130
LNX-6515DS-VTM w/ Mount Pipe	140	RCMDC-3315-PF-48	130
		Slide Arm Mount [SO 101-3]	130

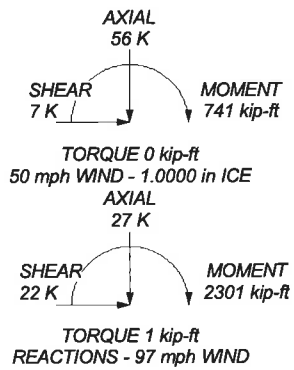
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0'

ALL REACTIONS ARE FACTORED



Jacobs Engineering Group, Inc.
 5449 Bells Ferry Rd
 Acworth, GA 30102
 Phone: (770) 701-2500
 FAX: (770) 701-2501

Job: **ANDOVER NORTH**
 Project: **BUB42856 WO1317391**
 Client: **Crown Castle** Drawn by: **Christian C. Comandante** App'd:
 Code: **TIA-222-G** Date: **11/09/16** Scale: **N**
 Path:

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 1) Tower is located in Tolland County, Connecticut.
- 2) Basic wind speed of 97 mph.
- 3) Structure Class II.
- 4) Exposure Category C.
- 5) Topographic Category 1.
- 6) Crest Height 0'.
- 7) Nominal ice thickness of 1.0000 in.
- 8) Ice thickness is considered to increase with height.
- 9) Ice density of 56 pcf.
- 10) A wind speed of 50 mph is used in combination with ice.
- 11) Temperature drop of 50 °F.
- 12) Deflections calculated using a wind speed of 60 mph.
- 13) A non-linear (P-delta) analysis was used.
- 14) Pressures are calculated at each section.
- 15) Stress ratio used in pole design is 1.
- 16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149'-144'	5'	0'	18	21.5000	22.4260	0.1875	0.7500	A572-65 (65 ksi)
L2	144'-139'	5'	0'	18	22.4260	23.3521	0.1875	0.7500	A572-65 (65 ksi)
L3	139'-134'	5'	0'	18	23.3521	24.2781	0.1875	0.7500	A572-65 (65 ksi)
L4	134'-129'	5'	0'	18	24.2781	25.2042	0.1875	0.7500	A572-65 (65 ksi)
L5	129'-123'7- 5/16"	5'4-11/16"	3'9-3/8"	18	25.2042	26.2021	0.1875	0.7500	A572-65 (65 ksi)
L6	123'7-5/16"- 122'4-11/16"	5'	0'	18	25.1277	26.0428	0.1875	0.7500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L7	122'4-11/16"- 117'4-11/16"	5'	0'	18	26.0428	26.9578	0.1875	0.7500	A572-65 (65 ksi)
L8	117'4-11/16"- 112'4-11/16"	5'	0'	18	26.9578	27.8729	0.1875	0.7500	A572-65 (65 ksi)
L9	112'4-11/16"- 107'4-11/16"	5'	0'	18	27.8729	28.7879	0.1875	0.7500	A572-65 (65 ksi)
L10	107'4-11/16"- 102'4-11/16"	5'	0'	18	28.7879	29.7029	0.1875	0.7500	A572-65 (65 ksi)
L11	102'4-11/16"- 98'6"	3'10-11/16"	0'	18	29.7029	30.4145	0.1875	0.7500	A572-65 (65 ksi)
L12	98'6"-98'3"	3"	0'	18	30.4145	30.4602	0.3438	1.3750	A572-65 (65 ksi)
L13	98'3"-93'3"	5'	0'	18	30.4602	31.3753	0.3375	1.3500	A572-65 (65 ksi)
L14	93'3"-88'3"	5'	0'	18	31.3753	32.2903	0.3312	1.3250	A572-65 (65 ksi)
L15	88'3"-79'1- 9/16"	9'1-7/16"	4'8-7/8"	18	32.2903	33.9598	0.3312	1.3250	A572-65 (65 ksi)
L16	79'1-9/16"- 78'1-9/16"	5'8-7/8"	0'	18	32.7165	33.7634	0.2500	1.0000	A572-65 (65 ksi)
L17	78'1-9/16"- 73'1-9/16"	5'	0'	18	33.7634	34.6746	0.2500	1.0000	A572-65 (65 ksi)
L18	73'1-9/16"- 68'1-9/16"	5'	0'	18	34.6746	35.5859	0.2500	1.0000	A572-65 (65 ksi)
L19	68'1-9/16"- 63'1-9/16"	5'	0'	18	35.5859	36.4971	0.2500	1.0000	A572-65 (65 ksi)
L20	63'1-9/16"- 58'1-9/16"	5'	0'	18	36.4971	37.4083	0.2500	1.0000	A572-65 (65 ksi)
L21	58'1-9/16"- 57'3"	10-9/16"	0'	18	37.4083	37.5683	0.2500	1.0000	A572-65 (65 ksi)
L22	57'3"-57'	3"	0'	18	37.5683	37.6138	0.4188	1.6750	A572-65 (65 ksi)
L23	57'-52'	5'	0'	18	37.6138	38.5250	0.4125	1.6500	A572-65 (65 ksi)
L24	52'-43'2-7/8"	8'9-1/8"	5'6-1/4"	18	38.5250	40.1211	0.4125	1.6500	A572-65 (65 ksi)
L25	43'2-7/8"-42'2- 7/8"	6'6-1/4"	0'	18	38.6159	39.8031	0.3125	1.2500	A572-65 (65 ksi)
L26	42'2-7/8"-37'2- 7/8"	5'	0'	18	39.8031	40.7142	0.3125	1.2500	A572-65 (65 ksi)
L27	37'2-7/8"-32'2- 7/8"	5'	0'	18	40.7142	41.6252	0.3125	1.2500	A572-65 (65 ksi)
L28	32'2-7/8"-27'2- 7/8"	5'	0'	18	41.6252	42.5362	0.3125	1.2500	A572-65 (65 ksi)
L29	27'2-7/8"-22'2- 7/8"	5'	0'	18	42.5362	43.4473	0.3125	1.2500	A572-65 (65 ksi)
L30	22'2-7/8"-17'2- 7/8"	5'	0'	18	43.4473	44.3583	0.3125	1.2500	A572-65 (65 ksi)
L31	17'2-7/8"-12'2- 7/8"	5'	0'	18	44.3583	45.2694	0.3125	1.2500	A572-65 (65 ksi)
L32	12'2-7/8"-7'2- 7/8"	5'	0'	18	45.2694	46.1804	0.3125	1.2500	A572-65 (65 ksi)
L33	7'2-7/8"-2'2- 7/8"	5'	0'	18	46.1804	47.0915	0.3125	1.2500	A572-65 (65 ksi)
L34	2'2-7/8"-0'	2'2-7/8"		18	47.0915	47.5000	0.3125	1.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	21.8317	12.6836	727.8616	7.5659	10.9220	66.6418	1456.6810	6.3430	3.4540	18.421
	22.7720	13.2347	826.9226	7.8947	11.3924	72.5853	1654.9333	6.6186	3.6170	19.291
L2	22.7720	13.2347	826.9226	7.8947	11.3924	72.5853	1654.9333	6.6186	3.6170	19.291
	23.7123	13.7858	934.5870	8.2234	11.8629	78.7826	1870.4037	6.8942	3.7800	20.16
L3	23.7123	13.7858	934.5870	8.2234	11.8629	78.7826	1870.4037	6.8942	3.7800	20.16

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L4	24.6527	14.3369	1051.2130	8.5522	12.3333	85.2337	2103.8091	7.1698	3.9430	21.029
	24.6527	14.3369	1051.2130	8.5522	12.3333	85.2337	2103.8091	7.1698	3.9430	21.029
L5	25.5930	14.8881	1177.1589	8.8809	12.8037	91.9388	2355.8667	7.4454	4.1059	21.898
	25.5930	14.8881	1177.1589	8.8809	12.8037	91.9388	2355.8667	7.4454	4.1059	21.898
L6	26.6063	15.4819	1323.7230	9.2352	13.3107	99.4483	2649.1877	7.7424	4.2816	22.835
	26.2171	14.8426	1166.4003	8.8538	12.7649	91.3756	2334.3353	7.4227	4.0925	21.827
L7	26.4445	15.3871	1299.5516	9.1786	13.2297	98.2296	2600.8133	7.6950	4.2535	22.685
	26.4445	15.3871	1299.5516	9.1786	13.2297	98.2296	2600.8133	7.6950	4.2535	22.685
L8	27.3737	15.9317	1442.4693	9.5035	13.6946	105.3314	2886.8366	7.9674	4.4146	23.544
	27.3737	15.9317	1442.4693	9.5035	13.6946	105.3314	2886.8366	7.9674	4.4146	23.544
L9	28.3029	16.4763	1595.4988	9.8283	14.1594	112.6811	3193.0970	8.2397	4.5756	24.403
	28.3029	16.4763	1595.4988	9.8283	14.1594	112.6811	3193.0970	8.2397	4.5756	24.403
L10	29.2320	17.0208	1758.9858	10.1531	14.6243	120.2786	3520.2862	8.5120	4.7367	25.262
	29.2320	17.0208	1758.9858	10.1531	14.6243	120.2786	3520.2862	8.5120	4.7367	25.262
L11	30.1612	17.5654	1933.2760	10.4780	15.0891	128.1240	3869.0959	8.7844	4.8977	26.121
	30.1612	17.5654	1933.2760	10.4780	15.0891	128.1240	3869.0959	8.7844	4.8977	26.121
L12	30.8837	17.9888	2076.4924	10.7306	15.4506	134.3959	4155.7172	8.9961	5.0230	26.789
	30.8837	32.8091	3748.1713	10.6751	15.4506	242.5913	7501.2745	16.4076	4.7480	13.812
L13	30.9301	32.8590	3765.3057	10.6914	15.4738	243.3342	7535.5658	16.4326	4.7560	13.836
	30.9301	32.2682	3699.1476	10.6936	15.4738	239.0587	7403.1627	16.1372	4.7670	14.124
L14	31.8593	33.2485	4046.5999	11.0184	15.9386	253.8861	8098.5244	16.6274	4.9280	14.602
	31.8593	32.6393	3974.0626	11.0206	15.9386	249.3350	7953.3544	16.3228	4.9390	14.91
L15	32.7885	33.6014	4335.9362	11.3455	16.4035	264.3302	8677.5777	16.8039	5.1001	15.397
	32.7885	33.6014	4335.9362	11.3455	16.4035	264.3302	8677.5777	16.8039	5.1001	15.397
L16	34.4837	35.3566	5051.5503	11.9381	17.2516	292.8167	10109.747	17.6817	5.3939	16.284
	34.0992	25.7621	3430.7521	11.5256	16.6200	206.4236	6866.0184	12.8835	5.3181	21.272
L17	34.2843	26.5929	3773.4679	11.8973	17.1518	220.0040	7551.9011	13.2990	5.5024	22.009
	34.2843	26.5929	3773.4679	11.8973	17.1518	220.0040	7551.9011	13.2990	5.5024	22.009
L18	35.2096	27.3160	4089.7123	12.2207	17.6147	232.1758	8184.8059	13.6606	5.6627	22.651
	35.2096	27.3160	4089.7123	12.2207	17.6147	232.1758	8184.8059	13.6606	5.6627	22.651
L19	36.1348	28.0390	4423.1497	12.5442	18.0776	244.6754	8852.1195	14.0222	5.8231	23.292
	36.1348	28.0390	4423.1497	12.5442	18.0776	244.6754	8852.1195	14.0222	5.8231	23.292
L20	37.0601	28.7621	4774.2353	12.8677	18.5405	257.5027	9554.7527	14.3838	5.9835	23.934
	37.0601	28.7621	4774.2353	12.8677	18.5405	257.5027	9554.7527	14.3838	5.9835	23.934
L21	37.9854	29.4851	5143.4243	13.1912	19.0034	270.6578	10293.616	14.7454	6.1439	24.575
	37.9854	29.4851	5143.4243	13.1912	19.0034	270.6578	10293.616	14.7454	6.1439	24.575
L22	38.1478	29.6120	5210.1263	13.2480	19.0847	273.0006	10427.108	14.8088	6.1720	24.688
	38.1478	49.3759	8609.1083	13.1881	19.0847	451.1007	17229.544	24.6926	5.8750	14.03
L23	38.1941	49.4364	8640.8225	13.2042	19.1078	452.2140	17293.014	24.7229	5.8830	14.049
	38.1941	48.7067	8516.1466	13.2065	19.1078	445.6891	17043.498	24.3580	5.8940	14.289
L24	39.1193	49.8998	9157.3933	13.5300	19.5707	467.9130	18326.836	24.9546	6.0544	14.677
	39.1193	49.8998	9157.3933	13.5300	19.5707	467.9130	18326.836	24.9546	6.0544	14.677
L25	40.7400	51.9895	10356.715	14.0966	20.3815	508.1425	20727.058	25.9997	6.3353	15.358
	40.2321	37.9922	7042.1717	13.5977	19.6169	358.9853	14093.609	18.9997	6.2464	19.988
L26	40.4171	39.1697	7717.4872	14.0192	20.2200	381.6763	15445.129	19.5886	6.4553	20.657
	40.4171	39.1697	7717.4872	14.0192	20.2200	381.6763	15445.129	19.5886	6.4553	20.657
L27	41.3422	40.0734	8264.0283	14.3426	20.6828	399.5606	16538.930	20.0405	6.6157	21.17
	41.3422	40.0734	8264.0283	14.3426	20.6828	399.5606	16538.930	20.0405	6.6157	21.17
L28	42.2673	40.9770	8835.7823	14.6660	21.1456	417.8544	17683.190	20.4924	6.7760	21.683
	42.2673	40.9770	8835.7823	14.6660	21.1456	417.8544	17683.190	20.4924	6.7760	21.683
L29	43.1924	41.8807	9433.3177	14.9894	21.6084	436.5577	18879.047	20.9443	6.9364	22.196
	43.1924	41.8807	9433.3177	14.9894	21.6084	436.5577	18879.047	20.9443	6.9364	22.196

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
	44.1175	42.7843	10057.203 0	15.3128	22.0712	455.6705	20127.639 6	21.3962	7.0967	22.71
L30	44.1175	42.7843	10057.203 0	15.3128	22.0712	455.6705	20127.639 6	21.3962	7.0967	22.71
	45.0426	43.6880	10708.006 9	15.6363	22.5340	475.1927	21430.103 7	21.8481	7.2571	23.223
L31	45.0426	43.6880	10708.006 9	15.6363	22.5340	475.1927	21430.103 7	21.8481	7.2571	23.223
	45.9677	44.5916	11386.297 8	15.9597	22.9968	495.1245	22787.578 0	22.3000	7.4174	23.736
L32	45.9677	44.5916	11386.297 8	15.9597	22.9968	495.1245	22787.578 0	22.3000	7.4174	23.736
	46.8928	45.4952	12092.644 3	16.2831	23.4596	515.4657	24201.200 5	22.7519	7.5778	24.249
L33	46.8928	45.4952	12092.644 3	16.2831	23.4596	515.4657	24201.200 5	22.7519	7.5778	24.249
	47.8179	46.3989	12827.615 0	16.6065	23.9225	536.2164	25672.108 8	23.2038	7.7381	24.762
L34	47.8179	46.3989	12827.615 0	16.6065	23.9225	536.2164	25672.108 8	23.2038	7.7381	24.762
	48.2328	46.8041	13166.650 3	16.7516	24.1300	545.6548	26350.625 6	23.4065	7.8100	24.992

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft ²	in							
L1 149'-144'				1	1	1			
L2 144'-139'				1	1	1			
L3 139'-134'				1	1	1			
L4 134'-129'				1	1	1			
L5 129'- 123'7-5/16"				1	1	1			
L6 123'7- 5/16"-122'4- 11/16"				1	1	1			
L7 122'4- 11/16"-117'4- 11/16"				1	1	1			
L8 117'4- 11/16"-112'4- 11/16"				1	1	1			
L9 112'4- 11/16"-107'4- 11/16"				1	1	1			
L10 107'4- 11/16"-102'4- 11/16"				1	1	1			
L11 102'4- 11/16"-98'6"				1	1	1			
L12 98'6"- 98'3"				1	1	0.959146			
L13 98'3"- 93'3"				1	1	0.964289			
L14 93'3"- 88'3"				1	1	0.970368			
L15 88'3"- 79'1-9/16"				1	1	0.96048			
L16 79'1- 9/16"-78'1- 9/16"				1	1	1			
L17 78'1- 9/16"-73'1- 9/16"				1	1	1			
L18 73'1- 9/16"-68'1- 9/16"				1	1	1			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L19 68'1-9/16"-63'1-9/16"				1	1	1			
L20 63'1-9/16"-58'1-9/16"				1	1	1			
L21 58'1-9/16"-57'3"				1	1	1			
L22 57'3"-57'				1	1	0.963841			
L23 57'-52'				1	1	0.969381			
L24 52'-43'2-7/8"				1	1	0.963834			
L25 43'2-7/8"-42'2-7/8"				1	1	1			
L26 42'2-7/8"-37'2-7/8"				1	1	1			
L27 37'2-7/8"-32'2-7/8"				1	1	1			
L28 32'2-7/8"-27'2-7/8"				1	1	1			
L29 27'2-7/8"-22'2-7/8"				1	1	1			
L30 22'2-7/8"-17'2-7/8"				1	1	1			
L31 17'2-7/8"-12'2-7/8"				1	1	1			
L32 12'2-7/8"-7'2-7/8"				1	1	1			
L33 7'2-7/8"-2'2-7/8"				1	1	1			
L34 2'2-7/8"-0'				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	plf
Safety Line 3/8	A	Surface Ar (CaAa)	149' - 0'	1	1	0.000 0.000	0.3750		0.22
***** Modification Plates *****									
*** Top and Bottom Elevation ***									
CCI-65FP-045100	A	Surface Af (CaAa)	95'6" - 80'6"	1	1	0.300 0.300	4.5000	20.0000	0.00
CCI-65FP-045100	B	Surface Af (CaAa)	95'6" - 80'6"	1	1	0.300 0.300	4.5000	20.0000	0.00
CCI-65FP-045100	C	Surface Af (CaAa)	95'6" - 80'6"	1	1	0.300 0.300	4.5000	20.0000	0.00
**									
CCI-65FP-060100	A	Surface Af (CaAa)	59'9" - 44'9"	1	1	0.200 0.200	6.0000	15.0000	0.00
CCI-65FP-060100	B	Surface Af (CaAa)	59'9" - 44'9"	1	1	0.200 0.200	6.0000	15.0000	0.00
CCI-65FP-060100	C	Surface Af (CaAa)	59'9" - 44'9"	1	1	0.200 0.200	6.0000	15.0000	0.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA} A		Weight
						ft ² /ft	plf	
LDF4-50A(1/2")	B	No	Inside Pole	149' - 5'	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
LDF5-50A(7/8")	B	No	Inside Pole	149' - 5'	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LDF6-50A(1-1/4")	B	No	Inside Pole	149' - 5'	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
LDF1-50A(1/4")	A	No	Inside Pole	140' - 5'	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
AVA7-50(1-5/8")	A	No	Inside Pole	140' - 5'	3	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
LDF7-50A(1-5/8")	A	No	Inside Pole	140' - 5'	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
HB158-1-13U6-S6F18(1-5/8")	A	No	Inside Pole	130' - 5'	2	No Ice	0.00	1.90
						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
**** Modification Plates ****								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} A In Face ft ²	C _{AA} A Out Face ft ²	Weight K
L1	149'-144'	A	0.000	0.000	0.188	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L2	144'-139'	A	0.000	0.000	0.188	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L3	139'-134'	A	0.000	0.000	0.188	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L4	134'-129'	A	0.000	0.000	0.188	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L5	129'-123'7-5/16"	A	0.000	0.000	0.202	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L6	123'7-5/16"- 122'4-11/16"	A	0.000	0.000	0.046	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L7	122'4-11/16"- 117'4-11/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L8	117'4-11/16"- 112'4-11/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L9	112'4-11/16"- 107'4-11/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L10	107'4-11/16"- 102'4-11/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L11	102'4-11/16"- 98'6"	A	0.000	0.000	0.146	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L12	98'6"-98'3"	A	0.000	0.000	0.009	0.000	0.00

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L13	98'3"-93'3"	A	0.000	0.000	1.875	0.000	0.07
		B	0.000	0.000	1.688	0.000	0.02
		C	0.000	0.000	1.688	0.000	0.00
L14	93'3"-88'3"	A	0.000	0.000	3.938	0.000	0.07
		B	0.000	0.000	3.750	0.000	0.02
		C	0.000	0.000	3.750	0.000	0.00
L15	88'3"-79'1-9/16"	A	0.000	0.000	6.155	0.000	0.12
		B	0.000	0.000	5.813	0.000	0.04
		C	0.000	0.000	5.813	0.000	0.00
L16	79'1-9/16"-78'1-9/16"	A	0.000	0.000	0.037	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L17	78'1-9/16"-73'1-9/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L18	73'1-9/16"-68'1-9/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L19	68'1-9/16"-63'1-9/16"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L20	63'1-9/16"-58'1-9/16"	A	0.000	0.000	1.810	0.000	0.07
		B	0.000	0.000	1.622	0.000	0.02
		C	0.000	0.000	1.622	0.000	0.00
L21	58'1-9/16"-57'3"	A	0.000	0.000	0.911	0.000	0.01
		B	0.000	0.000	0.878	0.000	0.00
		C	0.000	0.000	0.878	0.000	0.00
L22	57'3"-57'	A	0.000	0.000	0.259	0.000	0.00
		B	0.000	0.000	0.250	0.000	0.00
		C	0.000	0.000	0.250	0.000	0.00
L23	57'-52'	A	0.000	0.000	5.188	0.000	0.07
		B	0.000	0.000	5.000	0.000	0.02
		C	0.000	0.000	5.000	0.000	0.00
L24	52'-43'2-7/8"	A	0.000	0.000	7.578	0.000	0.12
		B	0.000	0.000	7.250	0.000	0.04
		C	0.000	0.000	7.250	0.000	0.00
L25	43'2-7/8"-42'2-7/8"	A	0.000	0.000	0.037	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L26	42'2-7/8"-37'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L27	37'2-7/8"-32'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L28	32'2-7/8"-27'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L29	27'2-7/8"-22'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L30	22'2-7/8"-17'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L31	17'2-7/8"-12'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L32	12'2-7/8"-7'2-7/8"	A	0.000	0.000	0.188	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L33	7'2-7/8"-2'2-7/8"	A	0.000	0.000	0.188	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L34	2'-7/8"-0'	A	0.000	0.000	0.084	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	149'-144'	A	2.321	0.000	0.000	2.509	0.000	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	144'-139'	A	2.313	0.000	0.000	2.501	0.000	0.05
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L3	139'-134'	A	2.305	0.000	0.000	2.493	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L4	134'-129'	A	2.296	0.000	0.000	2.484	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L5	129'-123'7-5/16"	A	2.287	0.000	0.000	2.667	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.00
L6	123'7-5/16"- 122'4-11/16"	A	2.281	0.000	0.000	0.606	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
L7	122'4-11/16"- 117'4-11/16"	A	2.275	0.000	0.000	2.463	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L8	117'4-11/16"- 112'4-11/16"	A	2.266	0.000	0.000	2.453	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L9	112'4-11/16"- 107'4-11/16"	A	2.256	0.000	0.000	2.443	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L10	107'4-11/16"- 102'4-11/16"	A	2.245	0.000	0.000	2.433	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L11	102'4-11/16"- 98'6"	A	2.235	0.000	0.000	1.884	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L12	98'6"-98'3"	A	2.231	0.000	0.000	0.121	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L13	98'3"-93'3"	A	2.225	0.000	0.000	5.006	0.000	0.16
		B		0.000	0.000	2.593	0.000	0.08
		C		0.000	0.000	2.593	0.000	0.06
L14	93'3"-88'3"	A	2.213	0.000	0.000	8.158	0.000	0.22
		B		0.000	0.000	5.757	0.000	0.15
		C		0.000	0.000	5.757	0.000	0.12
L15	88'3"-79'1-9/16"	A	2.195	0.000	0.000	13.257	0.000	0.37
		B		0.000	0.000	8.911	0.000	0.23
		C		0.000	0.000	8.911	0.000	0.19
L16	79'1-9/16"-78'1- 9/16"	A	2.181	0.000	0.000	0.476	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L17	78'1-9/16"-73'1- 9/16"	A	2.173	0.000	0.000	2.360	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L18	73'1-9/16"-68'1- 9/16"	A	2.158	0.000	0.000	2.346	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L19	68'1-9/16"-63'1- 9/16"	A	2.142	0.000	0.000	2.330	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L20	63'1-9/16"-58'1- 9/16"	A	2.125	0.000	0.000	4.419	0.000	0.13
		B		0.000	0.000	2.106	0.000	0.05
		C		0.000	0.000	2.106	0.000	0.03
L21	58'1-9/16"-57'3"	A	2.115	0.000	0.000	1.542	0.000	0.03
		B		0.000	0.000	1.138	0.000	0.02
		C		0.000	0.000	1.138	0.000	0.02
L22	57'3"-57'	A	2.113	0.000	0.000	0.439	0.000	0.01
		B		0.000	0.000	0.324	0.000	0.01

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L23	57'-52'	C		0.000	0.000	0.324	0.000	0.00
		A	2.103	0.000	0.000	8.770	0.000	0.19
		B		0.000	0.000	6.479	0.000	0.12
		C		0.000	0.000	6.479	0.000	0.09
L24	52'-43'2-7/8"	A	2.075	0.000	0.000	13.337	0.000	0.31
		B		0.000	0.000	9.375	0.000	0.18
		C		0.000	0.000	9.375	0.000	0.13
L25	43'2-7/8"-42'2-7/8"	A	2.052	0.000	0.000	0.452	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L26	42'2-7/8"-37'2-7/8"	A	2.037	0.000	0.000	2.225	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L27	37'2-7/8"-32'2-7/8"	A	2.010	0.000	0.000	2.198	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L28	32'2-7/8"-27'2-7/8"	A	1.979	0.000	0.000	2.167	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L29	27'2-7/8"-22'2-7/8"	A	1.943	0.000	0.000	2.131	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L30	22'2-7/8"-17'2-7/8"	A	1.900	0.000	0.000	2.087	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L31	17'2-7/8"-12'2-7/8"	A	1.845	0.000	0.000	2.033	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L32	12'2-7/8"-7'2-7/8"	A	1.770	0.000	0.000	1.958	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L33	7'2-7/8"-2'2-7/8"	A	1.647	0.000	0.000	1.835	0.000	0.05
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
L34	2'2-7/8"-0'	A	1.426	0.000	0.000	0.723	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	149'-144'	-0.0478	-0.0276	-0.4417	-0.2550
L2	144'-139'	-0.0478	-0.0276	-0.4463	-0.2577
L3	139'-134'	-0.0478	-0.0276	-0.4505	-0.2601
L4	134'-129'	-0.0478	-0.0276	-0.4543	-0.2623
L5	129'-123'7-5/16"	-0.0478	-0.0276	-0.4580	-0.2644
L6	123'7-5/16"-122'4-11/16"	-0.0478	-0.0276	-0.4591	-0.2650
L7	122'4-11/16"-117'4-11/16"	-0.0479	-0.0276	-0.4602	-0.2657
L8	117'4-11/16"-112'4-11/16"	-0.0479	-0.0276	-0.4630	-0.2673
L9	112'4-11/16"-107'4-11/16"	-0.0479	-0.0276	-0.4655	-0.2688
L10	107'4-11/16"-102'4-11/16"	-0.0479	-0.0276	-0.4677	-0.2700
L11	102'4-11/16"-98'6"	-0.0479	-0.0276	-0.4695	-0.2710
L12	98'6"-98'3"	-0.0479	-0.0276	-0.4702	-0.2715
L13	98'3"-93'3"	-0.0346	-0.0200	-0.3252	-0.1878
L14	93'3"-88'3"	-0.0262	-0.0152	-0.2392	-0.1381
L15	88'3"-79'1-9/16"	-0.0286	-0.0165	-0.2628	-0.1517
L16	79'1-9/16"-78'1-9/16"	-0.0479	-0.0276	-0.4757	-0.2747
L17	78'1-9/16"-73'1-	-0.0479	-0.0276	-0.4740	-0.2737

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L18	73'1-9/16"-68'1-9/16"	-0.0479	-0.0276	-0.4743	-0.2738
L19	68'1-9/16"-63'1-9/16"	-0.0479	-0.0276	-0.4743	-0.2738
L20	63'1-9/16"-58'1-9/16"	-0.0366	-0.0211	-0.3590	-0.2072
L21	58'1-9/16"-57'3"	-0.0248	-0.0143	-0.2396	-0.1384
L22	57'3"-57'	-0.0248	-0.0143	-0.2398	-0.1385
L23	57'-52'	-0.0249	-0.0144	-0.2408	-0.1390
L24	52'-43'2-7/8"	-0.0276	-0.0159	-0.2650	-0.1530
L25	43'2-7/8"-42'2-7/8"	-0.0479	-0.0277	-0.4721	-0.2726
L26	42'2-7/8"-37'2-7/8"	-0.0479	-0.0277	-0.4670	-0.2696
L27	37'2-7/8"-32'2-7/8"	-0.0479	-0.0277	-0.4642	-0.2680
L28	32'2-7/8"-27'2-7/8"	-0.0479	-0.0277	-0.4606	-0.2659
L29	27'2-7/8"-22'2-7/8"	-0.0479	-0.0277	-0.4559	-0.2632
L30	22'2-7/8"-17'2-7/8"	-0.0479	-0.0277	-0.4497	-0.2597
L31	17'2-7/8"-12'2-7/8"	-0.0479	-0.0277	-0.4413	-0.2548
L32	12'2-7/8"-7'2-7/8"	-0.0479	-0.0277	-0.4289	-0.2476
L33	7'2-7/8"-2'2-7/8"	-0.0479	-0.0277	-0.4070	-0.2350
L34	2'2-7/8"-0'	-0.0479	-0.0277	-0.3650	-0.2107

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	1	Safety Line 3/8	144.00 - 149.00	1.0000	1.0000
L2	1	Safety Line 3/8	139.00 - 144.00	1.0000	1.0000
L3	1	Safety Line 3/8	134.00 - 139.00	1.0000	1.0000
L4	1	Safety Line 3/8	129.00 - 134.00	1.0000	1.0000
L5	1	Safety Line 3/8	123.61 - 129.00	1.0000	1.0000
L7	1	Safety Line 3/8	117.39 - 122.39	1.0000	1.0000
L8	1	Safety Line 3/8	112.39 - 117.39	1.0000	1.0000
L9	1	Safety Line 3/8	107.39 - 112.39	1.0000	1.0000
L10	1	Safety Line 3/8	102.39 - 107.39	1.0000	1.0000
L11	1	Safety Line 3/8	98.50 - 102.39	1.0000	1.0000
L12	1	Safety Line 3/8	98.25 - 98.50	1.0000	1.0000
L13	1	Safety Line 3/8	93.25 - 98.25	1.0000	1.0000
L13	12	CCI-65FP-045100	93.25 - 95.50	1.0000	1.0000
L13	13	CCI-65FP-045100	93.25 - 95.50	1.0000	1.0000
L13	14	CCI-65FP-045100	93.25 - 95.50	1.0000	1.0000
L14	1	Safety Line 3/8	88.25 - 93.25	1.0000	1.0000
L14	12	CCI-65FP-045100	88.25 - 93.25	1.0000	1.0000
L14	13	CCI-65FP-045100	88.25 - 93.25	1.0000	1.0000
L14	14	CCI-65FP-045100	88.25 - 93.25	1.0000	1.0000
L15	1	Safety Line 3/8	79.13 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L15	12	CCI-65FP-045100	88.25	1.0000	1.0000
L15	13	CCI-65FP-045100	80.50 - 88.25	1.0000	1.0000
L15	14	CCI-65FP-045100	80.50 - 88.25	1.0000	1.0000
L17	1	Safety Line 3/8	73.13 - 78.13	1.0000	1.0000
L18	1	Safety Line 3/8	68.13 - 73.13	1.0000	1.0000
L19	1	Safety Line 3/8	63.13 - 68.13	1.0000	1.0000
L20	1	Safety Line 3/8	58.13 - 63.13	1.0000	1.0000
L20	16	CCI-65FP-060100	58.13 - 59.75	1.0000	1.0000
L20	17	CCI-65FP-060100	58.13 - 59.75	1.0000	1.0000
L20	18	CCI-65FP-060100	58.13 - 59.75	1.0000	1.0000
L21	1	Safety Line 3/8	57.25 - 58.13	1.0000	1.0000
L21	16	CCI-65FP-060100	57.25 - 58.13	1.0000	1.0000
L21	17	CCI-65FP-060100	57.25 - 58.13	1.0000	1.0000
L21	18	CCI-65FP-060100	57.25 - 58.13	1.0000	1.0000
L22	1	Safety Line 3/8	57.00 - 57.25	1.0000	1.0000
L22	16	CCI-65FP-060100	57.00 - 57.25	1.0000	1.0000
L22	17	CCI-65FP-060100	57.00 - 57.25	1.0000	1.0000
L22	18	CCI-65FP-060100	57.00 - 57.25	1.0000	1.0000
L23	1	Safety Line 3/8	52.00 - 57.00	1.0000	1.0000
L23	16	CCI-65FP-060100	52.00 - 57.00	1.0000	1.0000
L23	17	CCI-65FP-060100	52.00 - 57.00	1.0000	1.0000
L23	18	CCI-65FP-060100	52.00 - 57.00	1.0000	1.0000
L24	1	Safety Line 3/8	43.24 - 52.00	1.0000	1.0000
L24	16	CCI-65FP-060100	44.75 - 52.00	1.0000	1.0000
L24	17	CCI-65FP-060100	44.75 - 52.00	1.0000	1.0000
L24	18	CCI-65FP-060100	44.75 - 52.00	1.0000	1.0000
L26	1	Safety Line 3/8	37.24 - 42.24	1.0000	1.0000
L27	1	Safety Line 3/8	32.24 - 37.24	1.0000	1.0000
L28	1	Safety Line 3/8	27.24 - 32.24	1.0000	1.0000
L29	1	Safety Line 3/8	22.24 - 27.24	1.0000	1.0000
L30	1	Safety Line 3/8	17.24 - 22.24	1.0000	1.0000
L31	1	Safety Line 3/8	12.24 - 17.24	1.0000	1.0000
L32	1	Safety Line 3/8	7.24 - 12.24	1.0000	1.0000
L33	1	Safety Line 3/8	2.24 - 7.24	1.0000	1.0000
L34	1	Safety Line 3/8	0.00 - 2.24	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
3' x 5/8" lightning rod	C	None		0.0000	149'	No Ice	0.19	0.19	0.03
						1/2" Ice	0.48	0.48	0.03
						Ice	0.67	0.67	0.04
						1" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	149'	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	149'	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	149'	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						Ice	6.61	5.71	0.16
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	149'	No Ice	8.26	6.30	0.07
						1/2" Ice	8.82	7.48	0.14
						Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	149'	No Ice	8.26	6.30	0.07
						1/2" Ice	8.82	7.48	0.14
						Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	149'	No Ice	8.26	6.30	0.07
						1/2" Ice	8.82	7.48	0.14
						Ice	9.35	8.37	0.21
						1" Ice			
(2) LGP17201	A	From Leg	4.00 0' 2'	0.0000	149'	No Ice	1.67	0.47	0.03
						1/2" Ice	1.83	0.57	0.04
						Ice	2.00	0.68	0.06
						1" Ice			
(2) LGP17201	B	From Leg	4.00 0' 2'	0.0000	149'	No Ice	1.67	0.47	0.03
						1/2" Ice	1.83	0.57	0.04
						Ice	2.00	0.68	0.06
						1" Ice			
(2) LGP17201	C	From Leg	4.00 0' 2'	0.0000	149'	No Ice	1.67	0.47	0.03
						1/2" Ice	1.83	0.57	0.04
						Ice	2.00	0.68	0.06
						1" Ice			
(2) LGP21901	A	From Leg	4.00 0' 2'	0.0000	149'	No Ice	0.23	0.16	0.01
						1/2" Ice	0.29	0.21	0.01
						Ice	0.36	0.28	0.01
						1" Ice			
(2) LGP21901	B	From Leg	4.00 0' 2'	0.0000	149'	No Ice	0.23	0.16	0.01
						1/2" Ice	0.29	0.21	0.01
						Ice	0.36	0.28	0.01
						1" Ice			
(2) LGP21901	C	From Leg	4.00 0' 2'	0.0000	149'	No Ice	0.23	0.16	0.01
						1/2" Ice	0.29	0.21	0.01
						Ice	0.36	0.28	0.01
						1" Ice			
RRUS-11	A	From Leg	4.00 0' 2'	0.0000	149'	No Ice	2.52	1.07	0.06
						1/2" Ice	2.72	1.21	0.07
						Ice	2.92	1.36	0.10
						1" Ice			
RRUS-11	B	From Leg	4.00 0' 2'	0.0000	149'	No Ice	2.52	1.07	0.06
						1/2" Ice	2.72	1.21	0.07
						Ice	2.92	1.36	0.10
						1" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
RRUS-11	C	From Leg	4.00	0.0000	149'	No Ice	2.52	1.07	0.06
			0'			1/2"	2.72	1.21	0.07
			2'			Ice	2.92	1.36	0.10
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	149'	No Ice	0.92	0.92	0.03
			0'			1/2"	1.46	1.46	0.05
			2'			Ice	1.64	1.64	0.07
						1" Ice			
T-Arm Mount [TA 702-3]	C	None		0.0000	149'	No Ice	5.64	5.64	0.34
						1/2"	6.55	6.55	0.43
						Ice	7.46	7.46	0.52
						1" Ice			
*** 140 *** APX16PV-16PVL w/ Mount Pipe	A	From Leg	4.00	0.0000	140'	No Ice	6.27	3.27	0.06
			0'			1/2"	6.70	3.97	0.10
			0'			Ice	7.13	4.64	0.16
						1" Ice			
APX16PV-16PVL w/ Mount Pipe	B	From Leg	4.00	0.0000	140'	No Ice	6.27	3.27	0.06
			0'			1/2"	6.70	3.97	0.10
			0'			Ice	7.13	4.64	0.16
						1" Ice			
APX16PV-16PVL w/ Mount Pipe	C	From Leg	4.00	0.0000	140'	No Ice	6.27	3.27	0.06
			0'			1/2"	6.70	3.97	0.10
			0'			Ice	7.13	4.64	0.16
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	140'	No Ice	11.68	9.84	0.08
			0'			1/2"	12.40	11.37	0.17
			0'			Ice	13.14	12.91	0.27
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	140'	No Ice	11.68	9.84	0.08
			0'			1/2"	12.40	11.37	0.17
			0'			Ice	13.14	12.91	0.27
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	140'	No Ice	11.68	9.84	0.08
			0'			1/2"	12.40	11.37	0.17
			0'			Ice	13.14	12.91	0.27
						1" Ice			
(2) ATMAA1412D-1A20	A	From Leg	4.00	0.0000	140'	No Ice	1.00	0.41	0.01
			0'			1/2"	1.13	0.50	0.02
			0'			Ice	1.26	0.59	0.03
						1" Ice			
(2) ATMAA1412D-1A20	B	From Leg	4.00	0.0000	140'	No Ice	1.00	0.41	0.01
			0'			1/2"	1.13	0.50	0.02
			0'			Ice	1.26	0.59	0.03
						1" Ice			
(2) ATMAA1412D-1A20	C	From Leg	4.00	0.0000	140'	No Ice	1.00	0.41	0.01
			0'			1/2"	1.13	0.50	0.02
			0'			Ice	1.26	0.59	0.03
						1" Ice			
ATBT-BOTTOM-24V	A	From Leg	4.00	0.0000	140'	No Ice	0.10	0.06	0.00
			0'			1/2"	0.15	0.10	0.00
			0'			Ice	0.20	0.15	0.01
						1" Ice			
ATBT-BOTTOM-24V	B	From Leg	4.00	0.0000	140'	No Ice	0.10	0.06	0.00
			0'			1/2"	0.15	0.10	0.00
			0'			Ice	0.20	0.15	0.01
						1" Ice			
ATBT-BOTTOM-24V	C	From Leg	4.00	0.0000	140'	No Ice	0.10	0.06	0.00
			0'			1/2"	0.15	0.10	0.00
			0'			Ice	0.20	0.15	0.01
						1" Ice			
Side Arm Mount [SO 101-3]	C	None		0.0000	140'	No Ice	7.50	7.50	0.25
						1/2"	8.90	8.90	0.33
						Ice	10.30	10.30	0.41
						1" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
*** 130 ***									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	130'	No Ice	8.29	7.00	0.08
			0'			1/2"	8.85	8.19	0.14
			0'			Ice	9.37	9.08	0.22
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.0000	130'	No Ice	8.29	7.00	0.08
			0'			1/2"	8.85	8.19	0.14
			0'			Ice	9.37	9.08	0.22
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	130'	No Ice	8.29	7.00	0.08
			0'			1/2"	8.85	8.19	0.14
			0'			Ice	9.37	9.08	0.22
B25 RRH4X30	A	From Leg	4.00	0.0000	130'	No Ice	2.20	1.74	0.06
			0'			1/2"	2.39	1.92	0.08
			0'			Ice	2.59	2.11	0.10
B25 RRH4X30	B	From Leg	4.00	0.0000	130'	No Ice	2.20	1.74	0.06
			0'			1/2"	2.39	1.92	0.08
			0'			Ice	2.59	2.11	0.10
B25 RRH4X30	C	From Leg	4.00	0.0000	130'	No Ice	2.20	1.74	0.06
			0'			1/2"	2.39	1.92	0.08
			0'			Ice	2.59	2.11	0.10
B13 RRH4X30-4R	A	From Leg	4.00	0.0000	130'	No Ice	2.16	1.62	0.06
			0'			1/2"	2.35	1.79	0.08
			0'			Ice	2.55	1.97	0.10
B13 RRH4X30-4R	B	From Leg	4.00	0.0000	130'	No Ice	2.16	1.62	0.06
			0'			1/2"	2.35	1.79	0.08
			0'			Ice	2.55	1.97	0.10
B13 RRH4X30-4R	C	From Leg	4.00	0.0000	130'	No Ice	2.16	1.62	0.06
			0'			1/2"	2.35	1.79	0.08
			0'			Ice	2.55	1.97	0.10
B66A RRH4X45	A	From Leg	4.00	0.0000	130'	No Ice	2.58	1.63	0.07
			0'			1/2"	2.79	1.81	0.09
			0'			Ice	3.01	2.00	0.11
B66A RRH4X45	B	From Leg	4.00	0.0000	130'	No Ice	2.58	1.63	0.07
			0'			1/2"	2.79	1.81	0.09
			0'			Ice	3.01	2.00	0.11
B66A RRH4X45	C	From Leg	4.00	0.0000	130'	No Ice	2.58	1.63	0.07
			0'			1/2"	2.79	1.81	0.09
			0'			Ice	3.01	2.00	0.11
RCMDC-3315-PF-48	A	From Leg	4.00	0.0000	130'	No Ice	3.71	2.19	0.02
			0'			1/2"	3.95	2.39	0.05
			0'			Ice	4.20	2.61	0.09
RCMDC-3315-PF-48	C	From Leg	4.00	0.0000	130'	No Ice	3.71	2.19	0.02
			0'			1/2"	3.95	2.39	0.05
			0'			Ice	4.20	2.61	0.09
Side Arm Mount [SO 101-3]	C	None		0.0000	130'	No Ice	7.50	7.50	0.25
						1/2"	8.90	8.90	0.33
						Ice	10.30	10.30	0.41
						1" Ice			

*** 130 Abandoned ***

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 144	Pole	Max Tension	26	0.00	-0.00	-0.00
			Max. Compression	26	-5.66	0.04	0.75
			Max. Mx	20	-1.31	22.97	0.15
			Max. My	2	-1.30	0.00	23.14
			Max. Vy	20	-3.65	22.97	0.15
			Max. Vx	2	-3.65	0.00	23.14
			Max. Torque	20			-0.27
			Max Tension	1	0.00	0.00	0.00
L2	144 - 139	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	139 - 134	Pole	Max. Compression	26	-10.44	0.08	0.78
			Max. Mx	20	-2.17	44.88	0.15
			Max. My	2	-2.17	0.00	45.06
			Max. Vy	20	-6.76	44.88	0.15
			Max. Vx	2	-6.76	0.00	45.06
			Max. Torque	20			-0.27
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.23	0.13	0.81
			Max. Mx	20	-2.51	79.64	0.15
			Max. My	2	-2.51	0.01	79.82
L4	134 - 129	Pole	Max. Vy	20	-7.15	79.64	0.15
			Max. Vx	2	-7.15	0.01	79.82
			Max. Torque	20			-0.27
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.82	1.06	1.36
			Max. Mx	20	-4.10	120.06	0.15
			Max. My	2	-4.09	0.03	120.24
			Max. Vy	20	-11.13	120.06	0.15
			Max. Vx	2	-11.17	0.03	120.24
			Max. Torque	18			-0.71
L5	129 - 123.612	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.09	1.08	1.37
			Max. Mx	20	-4.23	138.10	0.10
			Max. My	2	-4.22	-0.02	138.34
			Max. Vy	20	-11.26	138.10	0.10
			Max. Vx	2	-11.30	-0.02	138.34
			Max. Torque	18			-0.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.48	1.13	1.42
			Max. Mx	20	-4.86	195.50	-0.05
L6	123.612 - 122.388	Pole	Max. My	2	-4.85	-0.18	195.93
			Max. Vy	20	-11.70	195.50	-0.05
			Max. Vx	2	-11.74	-0.18	195.93
			Max. Torque	18			-0.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.35	1.19	1.46
			Max. Mx	20	-5.30	255.00	-0.21
			Max. My	2	-5.29	-0.34	255.62
			Max. Vy	20	-12.11	255.00	-0.21
			Max. Vx	2	-12.14	-0.34	255.62
L7	122.388 - 117.388	Pole	Max. Torque	18			-0.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.24	1.25	1.51
			Max. Mx	20	-5.75	316.54	-0.37
			Max. My	2	-5.74	-0.50	317.36
			Max. Vy	20	-12.52	316.54	-0.37
			Max. Vx	2	-12.56	-0.50	317.36
			Max. Torque	18			-0.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22.16	1.31	1.55
L8	117.388 - 112.388	Pole	Max. Mx	20	-6.23	380.16	-0.53
			Max. My	2	-6.22	-0.66	381.16
			Max. Vy	20	-12.93	380.16	-0.53
			Max. Vx	2	-12.97	-0.66	381.16
			Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.09	1.37	1.59
			Max. Mx	20	-6.72	445.85	-0.69
			Max. My	2	-6.72	-0.82	447.05
			Max. Vy	20	-13.35	445.85	-0.69
L9	112.388 - 107.388	Pole	Max. Vx	2	-13.39	-0.82	447.05
			Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22.16	1.31	1.55
			Max. Mx	20	-6.23	380.16	-0.53
			Max. My	2	-6.22	-0.66	381.16
			Max. Vy	20	-12.93	380.16	-0.53
			Max. Vx	2	-12.97	-0.66	381.16
			Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
L10	107.388 - 102.388	Pole	Max. Compression	26	-23.09	1.37	1.59
			Max. Mx	20	-6.72	445.85	-0.69
			Max. My	2	-6.72	-0.82	447.05
			Max. Vy	20	-13.35	445.85	-0.69
			Max. Vx	2	-13.39	-0.82	447.05
			Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.09	1.37	1.59
			Max. Mx	20	-6.72	445.85	-0.69
			Max. My	2	-6.72	-0.82	447.05
L11	102.388 -	Pole	Max. Vy	20	-13.35	445.85	-0.69
			Max. Vx	2	-13.39	-0.82	447.05
			Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.09	1.37	1.59
			Max. Mx	20	-6.72	445.85	-0.69
			Max. My	2	-6.72	-0.82	447.05
			Max. Vy	20	-13.35	445.85	-0.69
			Max. Vx	2	-13.39	-0.82	447.05
			Max. Torque	18			-0.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	98.5		Max. Compression	26	-23.83	1.41	1.62
			Max. Mx	20	-7.12	498.39	-0.82
			Max. My	2	-7.11	-0.95	499.74
			Max. Vy	20	-13.68	498.39	-0.82
			Max. Vx	2	-13.72	-0.95	499.74
			Max. Torque	18			-0.70
L12	98.5 - 98.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.90	1.41	1.63
			Max. Mx	20	-7.17	501.81	-0.83
			Max. My	2	-7.16	-0.96	503.17
			Max. Vy	20	-13.70	501.81	-0.83
			Max. Vx	2	-13.74	-0.96	503.17
			Max. Torque	18			-0.70
L13	98.25 - 93.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.31	1.47	1.67
			Max. Mx	20	-7.93	571.46	-0.99
			Max. My	2	-7.92	-1.12	573.01
			Max. Vy	20	-14.16	571.46	-0.99
			Max. Vx	2	-14.20	-1.12	573.01
			Max. Torque	18			-0.70
L14	93.25 - 88.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.94	1.53	1.71
			Max. Mx	20	-8.71	643.60	-1.15
			Max. My	2	-8.70	-1.28	645.38
			Max. Vy	20	-14.70	643.60	-1.15
			Max. Vx	2	-14.75	-1.28	645.38
			Max. Torque	18			-0.70
L15	88.25 - 79.1276	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.34	1.58	1.74
			Max. Mx	20	-9.40	708.89	-1.29
			Max. My	2	-9.39	-1.42	710.94
			Max. Vy	20	-15.14	708.89	-1.29
			Max. Vx	2	-15.20	-1.42	710.94
			Max. Torque	18			-0.70
L16	79.1276 - 78.1276	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.07	1.65	1.79
			Max. Mx	20	-10.80	797.66	-1.48
			Max. My	2	-10.79	-1.61	800.13
			Max. Vy	20	-15.76	797.66	-1.48
			Max. Vx	2	-15.84	-1.61	800.13
			Max. Torque	18			-0.70
L17	78.1276 - 73.1276	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.25	1.71	1.83
			Max. Mx	20	-11.51	877.50	-1.64
			Max. My	2	-11.50	-1.77	880.37
			Max. Vy	20	-16.19	877.50	-1.64
			Max. Vx	2	-16.27	-1.77	880.37
			Max. Torque	18			-0.70
L18	73.1276 - 68.1276	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.46	1.76	1.87
			Max. Mx	20	-12.24	959.51	-1.81
			Max. My	2	-12.24	-1.94	962.78
			Max. Vy	20	-16.63	959.51	-1.81
			Max. Vx	2	-16.71	-1.94	962.78
			Max. Torque	18			-0.70
L19	68.1276 - 63.1276	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.68	1.82	1.90
			Max. Mx	20	-13.00	1043.70	-1.97
			Max. My	2	-12.99	-2.10	1047.36
			Max. Vy	20	-17.06	1043.70	-1.97
			Max. Vx	2	-17.14	-2.10	1047.36

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L20	63.1276 - 58.1276	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.03	1.86	1.93
			Max. Mx	20	-13.77	1130.03	-2.14
			Max. My	2	-13.76	-2.26	1134.09
			Max. Vy	20	-17.49	1130.03	-2.14
			Max. Vx	2	-17.57	-2.26	1134.09
L21	58.1276 - 57.25	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.30	1.87	1.93
			Max. Mx	20	-13.91	1145.40	-2.16
			Max. My	2	-13.90	-2.29	1149.53
			Max. Vy	20	-17.56	1145.40	-2.16
			Max. Vx	2	-17.64	-2.29	1149.53
L22	57.25 - 57	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.39	1.88	1.94
			Max. Mx	20	-13.97	1149.79	-2.17
			Max. My	2	-13.97	-2.30	1153.94
			Max. Vy	20	-17.58	1149.79	-2.17
			Max. Vx	2	-17.66	-2.30	1153.94
L23	57 - 52	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.31	1.92	1.96
			Max. Mx	20	-15.09	1238.86	-2.33
			Max. My	2	-15.09	-2.46	1243.41
			Max. Vy	20	-18.05	1238.86	-2.33
			Max. Vx	2	-18.13	-2.46	1243.41
L24	52 - 43.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.54	1.95	1.98
			Max. Mx	20	-15.83	1297.85	-2.44
			Max. My	2	-15.82	-2.57	1302.66
			Max. Vy	20	-18.35	1297.85	-2.44
			Max. Vx	2	-18.43	-2.57	1302.66
L25	43.2422 - 42.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.39	2.01	2.01
			Max. Mx	20	-18.14	1419.57	-2.65
			Max. My	2	-18.14	-2.78	1424.89
			Max. Vy	20	-19.01	1419.57	-2.65
			Max. Vx	2	-19.09	-2.78	1424.89
L26	42.2422 - 37.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.87	2.06	2.04
			Max. Mx	20	-19.13	1515.60	-2.82
			Max. My	2	-19.13	-2.94	1521.32
			Max. Vy	20	-19.42	1515.60	-2.82
			Max. Vx	2	-19.50	-2.94	1521.32
L27	37.2422 - 32.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.37	2.10	2.07
			Max. Mx	20	-20.14	1613.66	-2.98
			Max. My	2	-20.14	-3.11	1619.78
			Max. Vy	20	-19.82	1613.66	-2.98
			Max. Vx	2	-19.90	-3.11	1619.78
L28	32.2422 - 27.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.90	2.15	2.09
			Max. Mx	20	-21.18	1713.70	-3.14
			Max. My	2	-21.17	-3.27	1720.21
			Max. Vy	20	-20.21	1713.70	-3.14
			Max. Vx	2	-20.29	-3.27	1720.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L29	27.2422 - 22.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.44	2.19	2.12
			Max. Mx	20	-22.23	1815.64	-3.31
			Max. My	2	-22.23	-3.43	1822.54
			Max. Vy	20	-20.58	1815.64	-3.31
			Max. Vx	2	-20.66	-3.43	1822.54
L30	22.2422 - 17.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.99	2.24	2.15
			Max. Mx	20	-23.31	1919.39	-3.47
			Max. My	2	-23.31	-3.59	1926.68
			Max. Vy	20	-20.94	1919.39	-3.47
			Max. Vx	2	-21.02	-3.59	1926.68
L31	17.2422 - 12.2422	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.56	2.28	2.17
			Max. Mx	20	-24.41	2024.85	-3.63
			Max. My	2	-24.41	-3.75	2032.53
			Max. Vy	20	-21.27	2024.85	-3.63
			Max. Vx	2	-21.34	-3.75	2032.53
L32	12.2422 - 7.24219	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.13	2.32	2.19
			Max. Mx	20	-25.53	2131.95	-3.79
			Max. My	2	-25.53	-3.91	2140.02
			Max. Vy	20	-21.60	2131.95	-3.79
			Max. Vx	2	-21.67	-3.91	2140.02
L33	7.24219 - 2.24219	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.63	2.36	2.22
			Max. Mx	20	-26.61	2240.70	-3.95
			Max. My	2	-26.61	-4.07	2249.16
			Max. Vy	20	-21.93	2240.70	-3.95
			Max. Vx	2	-22.00	-4.07	2249.16
L34	2.24219 - 0	Pole	Max. Torque	18			-0.70
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.26	2.37	2.22
			Max. Mx	20	-27.08	2290.01	-4.02
			Max. My	2	-27.08	-4.14	2298.63
			Max. Vy	20	-22.08	2290.01	-4.02
			Max. Vx	2	-22.15	-4.14	2298.63

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	28	56.26	-3.46	6.00
	Max. H _x	20	27.09	22.06	-0.03
	Max. H _z	2	27.09	-0.03	22.14
	Max. M _x	2	2298.63	-0.03	22.14
	Max. M _z	8	2289.68	-22.06	0.03
	Max. Torsion	6	0.70	-19.16	11.10
	Min. Vert	7	20.32	-19.16	11.10
	Min. H _x	8	27.09	-22.06	0.03
	Min. H _z	14	27.09	0.03	-22.14
	Min. M _x	14	-2298.07	0.03	-22.14
	Min. M _z	20	-2290.01	22.06	-0.03

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Torsion	18	-0.70	19.16	-11.10

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	22.58	0.00	0.00	-0.22	0.13	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	27.09	0.03	-22.14	-2298.63	-4.14	-0.47
0.9 Dead+1.6 Wind 0 deg - No Ice	20.32	0.03	-22.14	-2276.75	-4.14	-0.47
1.2 Dead+1.6 Wind 30 deg - No Ice	27.09	11.08	-19.19	-1993.01	-1150.35	-0.67
0.9 Dead+1.6 Wind 30 deg - No Ice	20.32	11.08	-19.19	-1974.03	-1139.47	-0.67
1.2 Dead+1.6 Wind 60 deg - No Ice	27.09	19.16	-11.10	-1153.18	-1988.12	-0.70
0.9 Dead+1.6 Wind 60 deg - No Ice	20.32	19.16	-11.10	-1142.16	-1969.30	-0.69
1.2 Dead+1.6 Wind 90 deg - No Ice	27.09	22.06	-0.03	-4.58	-2289.68	-0.53
0.9 Dead+1.6 Wind 90 deg - No Ice	20.32	22.06	-0.03	-4.46	-2267.99	-0.53
1.2 Dead+1.6 Wind 120 deg - No Ice	27.09	19.13	11.04	1145.19	-1983.85	-0.23
0.9 Dead+1.6 Wind 120 deg - No Ice	20.32	19.13	11.04	1134.40	-1965.07	-0.23
1.2 Dead+1.6 Wind 150 deg - No Ice	27.09	11.00	19.12	1984.93	-1141.04	0.14
0.9 Dead+1.6 Wind 150 deg - No Ice	20.32	11.00	19.12	1966.16	-1130.25	0.14
1.2 Dead+1.6 Wind 180 deg - No Ice	27.09	-0.03	22.14	2298.07	4.46	0.47
0.9 Dead+1.6 Wind 180 deg - No Ice	20.32	-0.03	22.14	2276.33	4.37	0.46
1.2 Dead+1.6 Wind 210 deg - No Ice	27.09	-11.08	19.19	1992.46	1150.66	0.67
0.9 Dead+1.6 Wind 210 deg - No Ice	20.32	-11.08	19.19	1973.62	1139.71	0.67
1.2 Dead+1.6 Wind 240 deg - No Ice	27.09	-19.16	11.10	1152.62	1988.44	0.70
0.9 Dead+1.6 Wind 240 deg - No Ice	20.32	-19.16	11.10	1141.75	1969.53	0.69
1.2 Dead+1.6 Wind 270 deg - No Ice	27.09	-22.06	0.03	4.02	2290.01	0.54
0.9 Dead+1.6 Wind 270 deg - No Ice	20.32	-22.06	0.03	4.05	2268.23	0.53
1.2 Dead+1.6 Wind 300 deg - No Ice	27.09	-19.13	-11.04	-1145.75	1984.18	0.23
0.9 Dead+1.6 Wind 300 deg - No Ice	20.32	-19.13	-11.04	-1134.81	1965.31	0.23
1.2 Dead+1.6 Wind 330 deg - No Ice	27.09	-11.00	-19.12	-1985.49	1141.36	-0.14
0.9 Dead+1.6 Wind 330 deg - No Ice	20.32	-11.00	-19.12	-1966.58	1130.49	-0.14
1.2 Dead+1.0 Ice+1.0 Temp	56.26	-0.00	-0.00	-2.22	2.37	0.00
1.2 Dead+1.0 Wind 0 deg+ 1.0 Ice+1.0 Temp	56.26	0.01	-6.81	-732.11	1.60	-0.14
1.2 Dead+1.0 Wind 30 deg+ 1.0 Ice+1.0 Temp	56.26	3.46	-6.00	-643.73	-367.85	-0.23
1.2 Dead+1.0 Wind 60 deg+ 1.0 Ice+1.0 Temp	56.26	5.90	-3.41	-367.96	-629.12	-0.25
1.2 Dead+1.0 Wind 90 deg+ 1.0 Ice+1.0 Temp	56.26	6.81	-0.01	-3.18	-726.95	-0.21

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	56.26	5.89	3.40	361.84	-628.26	-0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	56.26	3.40	5.90	629.81	-361.50	0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	56.26	-0.01	6.81	727.48	3.33	0.14
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	56.26	-3.46	6.00	639.10	372.79	0.23
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	56.26	-5.90	3.41	363.33	634.05	0.25
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	56.26	-6.81	0.01	-1.45	731.88	0.21
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	56.26	-5.89	-3.40	-366.46	633.19	0.11
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	56.26	-3.40	-5.90	-634.44	366.43	-0.02
Dead+Wind 0 deg - Service	22.58	0.01	-4.74	-489.77	-0.78	-0.10
Dead+Wind 30 deg - Service	22.58	2.37	-4.11	-424.68	-244.92	-0.15
Dead+Wind 60 deg - Service	22.58	4.10	-2.37	-245.80	-423.36	-0.15
Dead+Wind 90 deg - Service	22.58	4.72	-0.01	-1.15	-487.59	-0.12
Dead+Wind 120 deg - Service	22.58	4.09	2.36	243.74	-422.45	-0.05
Dead+Wind 150 deg - Service	22.58	2.35	4.09	422.60	-242.93	0.03
Dead+Wind 180 deg - Service	22.58	-0.01	4.74	489.31	1.05	0.10
Dead+Wind 210 deg - Service	22.58	-2.37	4.11	424.21	245.19	0.15
Dead+Wind 240 deg - Service	22.58	-4.10	2.37	245.33	423.63	0.15
Dead+Wind 270 deg - Service	22.58	-4.72	0.01	0.68	487.86	0.12
Dead+Wind 300 deg - Service	22.58	-4.09	-2.36	-244.21	422.72	0.05
Dead+Wind 330 deg - Service	22.58	-2.35	-4.09	-423.07	243.20	-0.03

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-22.58	0.00	0.00	22.58	0.00	0.000%
2	0.03	-27.09	-22.14	-0.03	27.09	22.14	0.000%
3	0.03	-20.32	-22.14	-0.03	20.32	22.14	0.000%
4	11.08	-27.09	-19.19	-11.08	27.09	19.19	0.000%
5	11.08	-20.32	-19.19	-11.08	20.32	19.19	0.000%
6	19.16	-27.09	-11.10	-19.16	27.09	11.10	0.000%
7	19.16	-20.32	-11.10	-19.16	20.32	11.10	0.000%
8	22.06	-27.09	-0.03	-22.06	27.09	0.03	0.000%
9	22.06	-20.32	-0.03	-22.06	20.32	0.03	0.000%
10	19.13	-27.09	11.04	-19.13	27.09	-11.04	0.000%
11	19.13	-20.32	11.04	-19.13	20.32	-11.04	0.000%
12	11.00	-27.09	19.12	-11.00	27.09	-19.12	0.000%
13	11.00	-20.32	19.12	-11.00	20.32	-19.12	0.000%
14	-0.03	-27.09	22.14	0.03	27.09	-22.14	0.000%
15	-0.03	-20.32	22.14	0.03	20.32	-22.14	0.000%
16	-11.08	-27.09	19.19	11.08	27.09	-19.19	0.000%
17	-11.08	-20.32	19.19	11.08	20.32	-19.19	0.000%
18	-19.16	-27.09	11.10	19.16	27.09	-11.10	0.000%
19	-19.16	-20.32	11.10	19.16	20.32	-11.10	0.000%
20	-22.06	-27.09	0.03	22.06	27.09	-0.03	0.000%
21	-22.06	-20.32	0.03	22.06	20.32	-0.03	0.000%
22	-19.13	-27.09	-11.04	19.13	27.09	11.04	0.000%
23	-19.13	-20.32	-11.04	19.13	20.32	11.04	0.000%
24	-11.00	-27.09	-19.12	11.00	27.09	19.12	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
25	-11.00	-20.32	-19.12	11.00	20.32	19.12	0.000%
26	0.00	-56.26	0.00	0.00	56.26	0.00	0.000%
27	0.01	-56.26	-6.81	-0.01	56.26	6.81	0.000%
28	3.46	-56.26	-6.00	-3.46	56.26	6.00	0.000%
29	5.90	-56.26	-3.41	-5.90	56.26	3.41	0.000%
30	6.81	-56.26	-0.01	-6.81	56.26	0.01	0.000%
31	5.89	-56.26	3.40	-5.89	56.26	-3.40	0.000%
32	3.40	-56.26	5.90	-3.40	56.26	-5.90	0.000%
33	-0.01	-56.26	6.81	0.01	56.26	-6.81	0.000%
34	-3.46	-56.26	6.00	3.46	56.26	-6.00	0.000%
35	-5.90	-56.26	3.41	5.90	56.26	-3.41	0.000%
36	-6.81	-56.26	0.01	6.81	56.26	-0.01	0.000%
37	-5.89	-56.26	-3.40	5.89	56.26	3.40	0.000%
38	-3.40	-56.26	-5.90	3.40	56.26	5.90	0.000%
39	0.01	-22.58	-4.74	-0.01	22.58	4.74	0.000%
40	2.37	-22.58	-4.11	-2.37	22.58	4.11	0.000%
41	4.10	-22.58	-2.37	-4.10	22.58	2.37	0.000%
42	4.72	-22.58	-0.01	-4.72	22.58	0.01	0.000%
43	4.09	-22.58	2.36	-4.09	22.58	-2.36	0.000%
44	2.35	-22.58	4.09	-2.35	22.58	-4.09	0.000%
45	-0.01	-22.58	4.74	0.01	22.58	-4.74	0.000%
46	-2.37	-22.58	4.11	2.37	22.58	-4.11	0.000%
47	-4.10	-22.58	2.37	4.10	22.58	-2.37	0.000%
48	-4.72	-22.58	0.01	4.72	22.58	-0.01	0.000%
49	-4.09	-22.58	-2.36	4.09	22.58	2.36	0.000%
50	-2.35	-22.58	-4.09	2.35	22.58	4.09	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00013162
3	Yes	5	0.00000001	0.00005489
4	Yes	6	0.00000001	0.00036500
5	Yes	6	0.00000001	0.00010318
6	Yes	6	0.00000001	0.00037722
7	Yes	6	0.00000001	0.00010730
8	Yes	5	0.00000001	0.00025375
9	Yes	5	0.00000001	0.00010688
10	Yes	6	0.00000001	0.00036653
11	Yes	6	0.00000001	0.00010414
12	Yes	6	0.00000001	0.00036692
13	Yes	6	0.00000001	0.00010432
14	Yes	5	0.00000001	0.00022711
15	Yes	5	0.00000001	0.00009596
16	Yes	6	0.00000001	0.00037699
17	Yes	6	0.00000001	0.00010721
18	Yes	6	0.00000001	0.00036461
19	Yes	6	0.00000001	0.00010310
20	Yes	5	0.00000001	0.00015748
21	Yes	5	0.00000001	0.00006563
22	Yes	6	0.00000001	0.00037105
23	Yes	6	0.00000001	0.00010558
24	Yes	6	0.00000001	0.00036980
25	Yes	6	0.00000001	0.00010523
26	Yes	4	0.00000001	0.00057054
27	Yes	7	0.00000001	0.00017015
28	Yes	7	0.00000001	0.00025791
29	Yes	7	0.00000001	0.00025737
30	Yes	7	0.00000001	0.00016823
31	Yes	7	0.00000001	0.00024992
32	Yes	7	0.00000001	0.00025085
33	Yes	7	0.00000001	0.00016820
34	Yes	7	0.00000001	0.00026134
35	Yes	7	0.00000001	0.00025330

36	Yes	7	0.00000001	0.00017002
37	Yes	7	0.00000001	0.00025836
38	Yes	7	0.00000001	0.00025813
39	Yes	4	0.00000001	0.00040263
40	Yes	5	0.00000001	0.00014036
41	Yes	5	0.00000001	0.00015420
42	Yes	4	0.00000001	0.00044970
43	Yes	5	0.00000001	0.00014193
44	Yes	5	0.00000001	0.00014254
45	Yes	4	0.00000001	0.00042281
46	Yes	5	0.00000001	0.00015386
47	Yes	5	0.00000001	0.00013976
48	Yes	4	0.00000001	0.00042757
49	Yes	5	0.00000001	0.00014748
50	Yes	5	0.00000001	0.00014623

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	24.166	40	1.4057	0.0022
L2	144 - 139	22.696	40	1.4000	0.0021
L3	139 - 134	21.236	40	1.3886	0.0020
L4	134 - 129	19.791	40	1.3694	0.0019
L5	129 - 123.612	18.371	40	1.3426	0.0018
L6	127.388 - 122.388	17.920	40	1.3320	0.0017
L7	122.388 - 117.388	16.536	40	1.3063	0.0016
L8	117.388 - 112.388	15.193	40	1.2563	0.0014
L9	112.388 - 107.388	13.907	40	1.1990	0.0012
L10	107.388 - 102.388	12.685	40	1.1358	0.0011
L11	102.388 - 98.5	11.531	40	1.0676	0.0009
L12	98.5 - 98.25	10.684	40	1.0119	0.0008
L13	98.25 - 93.25	10.631	40	1.0099	0.0008
L14	93.25 - 88.25	9.596	40	0.9677	0.0007
L15	88.25 - 79.1276	8.605	40	0.9232	0.0007
L16	83.8724 - 78.1276	7.777	40	0.8832	0.0006
L17	78.1276 - 73.1276	6.734	40	0.8448	0.0006
L18	73.1276 - 68.1276	5.883	40	0.7800	0.0005
L19	68.1276 - 63.1276	5.101	40	0.7143	0.0004
L20	63.1276 - 58.1276	4.387	40	0.6480	0.0004
L21	58.1276 - 57.25	3.744	40	0.5813	0.0003
L22	57.25 - 57	3.638	40	0.5696	0.0003
L23	57 - 52	3.608	40	0.5676	0.0003
L24	52 - 43.2422	3.035	40	0.5265	0.0003
L25	48.7578 - 42.2422	2.687	40	0.4998	0.0003
L26	42.2422 - 37.2422	2.026	40	0.4624	0.0002
L27	37.2422 - 32.2422	1.571	40	0.4065	0.0002
L28	32.2422 - 27.2422	1.175	40	0.3508	0.0002
L29	27.2422 - 22.2422	0.837	40	0.2954	0.0001
L30	22.2422 - 17.2422	0.556	40	0.2403	0.0001
L31	17.2422 - 12.2422	0.333	40	0.1855	0.0001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L32	12.2422 - 7.24219	0.168	40	0.1311	0.0001
L33	7.24219 - 2.24219	0.058	40	0.0772	0.0000
L34	2.24219 - 0	0.006	40	0.0238	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	3' x 5/8" lightning rod	40	24.166	1.4057	0.0022	33238
140'	APX16PV-16PVL w/ Mount Pipe	40	21.527	1.3915	0.0020	20816
130'	(2) SBNHH-1D65B w/ Mount Pipe	40	18.653	1.3489	0.0018	10601

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 144	113.197	4	6.5932	0.0103
L2	144 - 139	106.330	4	6.5673	0.0097
L3	139 - 134	99.504	4	6.5145	0.0093
L4	134 - 129	92.750	4	6.4256	0.0089
L5	129 - 123.612	86.108	4	6.3002	0.0084
L6	127.388 - 122.388	83.996	4	6.2508	0.0081
L7	122.388 - 117.388	77.523	4	6.1305	0.0075
L8	117.388 - 112.388	71.242	4	5.8965	0.0066
L9	112.388 - 107.388	65.223	4	5.6282	0.0057
L10	107.388 - 102.388	59.497	4	5.3320	0.0050
L11	102.388 - 98.5	54.092	4	5.0127	0.0043
L12	98.5 - 98.25	50.124	4	4.7513	0.0038
L13	98.25 - 93.25	49.876	4	4.7418	0.0038
L14	93.25 - 88.25	45.022	4	4.5440	0.0034
L15	88.25 - 79.1276	40.381	4	4.3353	0.0031
L16	83.8724 - 78.1276	36.498	4	4.1475	0.0029
L17	78.1276 - 73.1276	31.605	4	3.9675	0.0027
L18	73.1276 - 68.1276	27.614	4	3.6631	0.0023
L19	68.1276 - 63.1276	23.943	4	3.3547	0.0020
L20	63.1276 - 58.1276	20.596	4	3.0434	0.0017
L21	58.1276 - 57.25	17.575	4	2.7302	0.0015
L22	57.25 - 57	17.079	4	2.6754	0.0014
L23	57 - 52	16.939	4	2.6659	0.0014
L24	52 - 43.2422	14.250	4	2.4727	0.0013
L25	48.7578 - 42.2422	12.614	4	2.3472	0.0012
L26	42.2422 - 37.2422	9.514	4	2.1717	0.0011
L27	37.2422 - 32.2422	7.378	4	1.9091	0.0009
L28	32.2422 - 0	5.516	4	1.6475	0.0008

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L29	27.2422	3.928	4	1.3870	0.0006
L30	27.2422 - 22.2422	2.611	4	1.1281	0.0005
L31	22.2422 - 17.2422	1.565	4	0.8710	0.0004
L32	17.2422 - 12.2422	0.787	4	0.6157	0.0003
L33	12.2422 - 7.24219	0.274	4	0.3626	0.0001
L34	7.24219 - 2.24219	0.026	4	0.1117	0.0000
	2.24219 - 0				

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149'	3' x 5/8" lightning rod	4	113.197	6.5932	0.0104	7438
140'	APX16PV-16PVL w/ Mount Pipe	4	100.864	6.5279	0.0095	4613
130'	(2) SBNHH-1D65B w/ Mount Pipe	4	87.425	6.3297	0.0086	2328

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	149 - 144 (1)	TP22.426x21.5x0.1875	5'	0'	0.0	13.234	-1.30	937.55	0.001
L2	144 - 139 (2)	TP23.3521x22.426x0.1875	5'	0'	0.0	13.785	-2.17	963.91	0.002
L3	139 - 134 (3)	TP24.2781x23.3521x0.1875	5'	0'	0.0	14.336	-2.51	989.25	0.003
L4	134 - 129 (4)	TP25.2042x24.2781x0.1875	5'	0'	0.0	14.888	-4.09	1013.58	0.004
L5	129 - 123.612 (5)	TP26.2021x25.2042x0.1875	5'-11/16"	0'	0.0	15.065	-4.22	1021.20	0.004
L6	123.612 - 122.388 (6)	TP26.0428x25.1277x0.1875	5'	0'	0.0	15.387	-4.85	1034.73	0.005
L7	122.388 - 117.388 (7)	TP26.9578x26.0428x0.1875	5'	0'	0.0	15.931	-5.28	1056.87	0.005
L8	117.388 - 112.388 (8)	TP27.8729x26.9578x0.1875	5'	0'	0.0	16.476	-5.74	1078.01	0.005
L9	112.388 - 107.388 (9)	TP28.7879x27.8729x0.1875	5'	0'	0.0	17.020	-6.22	1098.17	0.006
L10	107.388 - 102.388 (10)	TP29.7029x28.7879x0.1875	5'	0'	0.0	17.565	-6.71	1117.33	0.006
L11	102.388 - 98.5 (11)	TP30.4145x29.7029x0.1875	3'-10-11/16"	0'	0.0	17.988	-7.11	1131.55	0.006
L12	98.5 - 98.25 (12)	TP30.4602x30.4145x0.3438	3"	0'	0.0	32.859	-7.16	2441.26	0.003
L13	98.25 - 93.25 (13)	TP31.3753x30.4602x0.3375	5'	0'	0.0	33.248	-7.92	2470.19	0.003
L14	93.25 - 88.25 (14)	TP32.2903x31.3753x0.3313	5'	0'	0.0	33.601	-8.70	2496.41	0.003
L15	88.25 - 79.1276 (15)	TP33.9598x32.2903x0.3313	9'-7/16"	0'	0.0	34.443	-9.39	2558.99	0.004

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L16	79.1276 - 78.1276 (16)	TP33.7634x32.7165x0.25	5'8-7/8"	0'	0.0	26.592 9	-10.78	1807.31	0.006
L17	78.1276 - 73.1276 (17)	TP34.6746x33.7634x0.25	5'	0'	0.0	27.316 0	-11.50	1837.91	0.006
L18	73.1276 - 68.1276 (18)	TP35.5859x34.6746x0.25	5'	0'	0.0	28.039 0	-12.23	1867.52	0.007
L19	68.1276 - 63.1276 (19)	TP36.4971x35.5859x0.25	5'	0'	0.0	28.762 1	-12.99	1896.14	0.007
L20	63.1276 - 58.1276 (20)	TP37.4083x36.4971x0.25	5'	0'	0.0	29.485 1	-13.76	1923.79	0.007
L21	58.1276 - 57.25 (21)	TP37.5683x37.4083x0.25	10- 9/16"	0'	0.0	29.612 0	-13.90	1928.54	0.007
L22	57.25 - 57 (22)	TP37.6138x37.5683x0.41 88	3"	0'	0.0	49.436 4	-13.96	3672.88	0.004
L23	57 - 52 (23)	TP38.525x37.6138x0.412 5	5'	0'	0.0	49.899 8	-15.08	3707.31	0.004
L24	52 - 43.2422 (24)	TP40.1211x38.525x0.412 5	8'9-1/8"	0'	0.0	50.673 4	-15.82	3764.78	0.004
L25	43.2422 - 42.2422 (25)	TP39.8031x38.6159x0.31 25	6'6-1/4"	0'	0.0	39.169 8	-18.14	2718.14	0.007
L26	42.2422 - 37.2422 (26)	TP40.7142x39.8031x0.31 25	5'	0'	0.0	40.073 4	-19.13	2759.08	0.007
L27	37.2422 - 32.2422 (27)	TP41.6252x40.7142x0.31 25	5'	0'	0.0	40.977 0	-20.14	2799.04	0.007
L28	32.2422 - 27.2422 (28)	TP42.5362x41.6252x0.31 25	5'	0'	0.0	41.880 7	-21.17	2838.02	0.007
L29	27.2422 - 22.2422 (29)	TP43.4473x42.5362x0.31 25	5'	0'	0.0	42.784 3	-22.23	2876.01	0.008
L30	22.2422 - 17.2422 (30)	TP44.3583x43.4473x0.31 25	5'	0'	0.0	43.688 0	-23.31	2913.03	0.008
L31	17.2422 - 12.2422 (31)	TP45.2694x44.3583x0.31 25	5'	0'	0.0	44.591 6	-24.41	2949.06	0.008
L32	12.2422 - 7.24219 (32)	TP46.1804x45.2694x0.31 25	5'	0'	0.0	45.495 2	-25.53	2984.12	0.009
L33	7.24219 - 2.24219 (33)	TP47.0915x46.1804x0.31 25	5'	0'	0.0	46.398 9	-26.61	3018.19	0.009
L34	2.24219 - 0 (34)	TP47.5x47.0915x0.3125	2'2-7/8"	0'	0.0	46.804 1	-27.08	3033.15	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{rx} kip-ft	Ratio M _{ux} / φM _{rx}	M _{uy} kip-ft	φM _{ry} kip-ft	Ratio M _{uy} / φM _{ry}
L1	149 - 144 (1)	TP22.426x21.5x0.1875	23.14	428.50	0.054	0.00	428.50	0.000
L2	144 - 139 (2)	TP23.3521x22.426x0.187 5	45.06	459.04	0.098	0.00	459.04	0.000
L3	139 - 134 (3)	TP24.2781x23.3521x0.18 75	79.82	490.09	0.163	0.00	490.09	0.000
L4	134 - 129 (4)	TP25.2042x24.2781x0.18 75	120.24	521.60	0.231	0.00	521.60	0.000
L5	129 - 123.612 (5)	TP26.2021x25.2042x0.18 75	138.34	531.84	0.260	0.00	531.84	0.000
L6	123.612 - 122.388 (6)	TP26.0428x25.1277x0.18 75	195.99	550.47	0.356	0.00	550.47	0.000
L7	122.388 - 117.388 (7)	TP26.9578x26.0428x0.18 75	255.77	582.28	0.439	0.00	582.28	0.000
L8	117.388 - 112.388 (8)	TP27.8729x26.9578x0.18 75	317.60	614.38	0.517	0.00	614.38	0.000
L9	112.388 - 107.388 (9)	TP28.7879x27.8729x0.18 75	381.50	646.69	0.590	0.00	646.69	0.000
L10	107.388 - 102.388 (10)	TP29.7029x28.7879x0.18 75	447.49	679.16	0.659	0.00	679.16	0.000
L11	102.388 - 98.5 (11)	TP30.4145x29.7029x0.18 75	500.24	704.49	0.710	0.00	704.49	0.000

Section No.	Elevation ft	Size	M_{lx}	ϕM_{rx}	Ratio	M_{ly}	ϕM_{ry}	Ratio
			kip-ft	kip-ft	$\frac{M_{lx}}{\phi M_{rx}}$	kip-ft	kip-ft	$\frac{M_{ly}}{\phi M_{ry}}$
L12	98.5 - 98.25 (12)	TP30.4602x30.4145x0.34 38	503.68	1506.54	0.334	0.00	1506.54	0.000
L13	98.25 - 93.25 (13)	TP31.3753x30.4602x0.33 75	573.61	1571.88	0.365	0.00	1571.88	0.000
L14	93.25 - 88.25 (14)	TP32.2903x31.3753x0.33 13	646.08	1636.53	0.395	0.00	1636.53	0.000
L15	88.25 - 79.1276 (15)	TP33.9598x32.2903x0.33 13	711.72	1720.04	0.414	0.00	1720.04	0.000
L16	79.1276 - 78.1276 (16)	TP33.7634x32.7165x0.25	801.03	1246.00	0.643	0.00	1246.00	0.000
L17	78.1276 - 73.1276 (17)	TP34.6746x33.7634x0.25	881.38	1301.79	0.677	0.00	1301.79	0.000
L18	73.1276 - 68.1276 (18)	TP35.5859x34.6746x0.25	963.89	1358.03	0.710	0.00	1358.03	0.000
L19	68.1276 - 63.1276 (19)	TP36.4971x35.5859x0.25	1048.58	1414.66	0.741	0.00	1414.66	0.000
L20	63.1276 - 58.1276 (20)	TP37.4083x36.4971x0.25	1135.42	1471.62	0.772	0.00	1471.62	0.000
L21	58.1276 - 57.25 (21)	TP37.5683x37.4083x0.25	1150.88	1481.64	0.777	0.00	1481.64	0.000
L22	57.25 - 57 (22)	TP37.6138x37.5683x0.41 88	1155.29	2799.77	0.413	0.00	2799.77	0.000
L23	57 - 52 (23)	TP38.525x37.6138x0.412 5	1244.86	2896.97	0.430	0.00	2896.97	0.000
L24	52 - 43.2422 (24)	TP40.1211x38.525x0.412 5	1304.18	2987.97	0.436	0.00	2987.97	0.000
L25	43.2422 - 42.2422 (25)	TP39.8031x38.6159x0.31 25	1426.56	2207.17	0.646	0.00	2207.17	0.000
L26	42.2422 - 37.2422 (26)	TP40.7142x39.8031x0.31 25	1523.08	2292.50	0.664	0.00	2292.50	0.000
L27	37.2422 - 32.2422 (27)	TP41.6252x40.7142x0.31 25	1621.65	2378.55	0.682	0.00	2378.55	0.000
L28	32.2422 - 27.2422 (28)	TP42.5362x41.6252x0.31 25	1722.18	2465.26	0.699	0.00	2465.26	0.000
L29	27.2422 - 22.2422 (29)	TP43.4473x42.5362x0.31 25	1824.62	2552.56	0.715	0.00	2552.56	0.000
L30	22.2422 - 17.2422 (30)	TP44.3583x43.4473x0.31 25	1928.87	2640.42	0.731	0.00	2640.42	0.000
L31	17.2422 - 12.2422 (31)	TP45.2694x44.3583x0.31 25	2034.82	2728.75	0.746	0.00	2728.75	0.000
L32	12.2422 - 7.24219 (32)	TP46.1804x45.2694x0.31 25	2142.42	2817.53	0.760	0.00	2817.53	0.000
L33	7.24219 - 2.24219 (33)	TP47.0915x46.1804x0.31 25	2251.65	2906.68	0.775	0.00	2906.68	0.000
L34	2.24219 - 0 (34)	TP47.5x47.0915x0.3125	2301.18	2946.77	0.781	0.00	2946.77	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	ϕV_n	Ratio	Actual	ϕT_n	Ratio
			V_u K	K	$\frac{V_u}{\phi V_n}$	T_u kip-ft	kip-ft	$\frac{T_u}{\phi T_n}$
L1	149 - 144 (1)	TP22.426x21.5x0.1875	3.65	466.08	0.008	0.00	858.04	0.000
L2	144 - 139 (2)	TP23.3521x22.426x0.187 5	6.76	479.36	0.014	0.00	919.21	0.000
L3	139 - 134 (3)	TP24.2781x23.3521x0.18 75	7.15	492.13	0.015	0.00	981.38	0.000
L4	134 - 129 (4)	TP25.2042x24.2781x0.18 75	11.17	506.79	0.022	0.47	1044.47	0.000
L5	129 - 123.612 (5)	TP26.2021x25.2042x0.18 75	11.30	510.60	0.022	0.47	1064.98	0.000
L6	123.612 - 122.388 (6)	TP26.0428x25.1277x0.18 75	11.75	517.37	0.023	0.68	1102.28	0.001
L7	122.388 - 117.388 (7)	TP26.9578x26.0428x0.18 75	12.16	528.43	0.023	0.68	1165.99	0.001

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L8	117.388 - 112.388 (8)	TP27.8729x26.9578x0.1875	12.58	539.01	0.023	0.68	1230.26	0.001
L9	112.388 - 107.388 (9)	TP28.7879x27.8729x0.1875	12.99	549.08	0.024	0.68	1294.96	0.001
L10	107.388 - 102.388 (10)	TP29.7029x28.7879x0.1875	13.41	558.67	0.024	0.68	1359.98	0.000
L11	102.388 - 98.5 (11)	TP30.4145x29.7029x0.1875	13.74	565.77	0.024	0.68	1410.71	0.000
L12	98.5 - 98.25 (12)	TP30.4602x30.4145x0.3438	13.76	1220.63	0.011	0.68	3016.77	0.000
L13	98.25 - 93.25 (13)	TP31.3753x30.4602x0.3375	14.22	1235.10	0.012	0.68	3147.59	0.000
L14	93.25 - 88.25 (14)	TP32.2903x31.3753x0.3313	14.77	1248.21	0.012	0.68	3277.07	0.000
L15	88.25 - 79.1276 (15)	TP33.9598x32.2903x0.3313	15.22	1279.50	0.012	0.68	3444.29	0.000
L16	79.1276 - 78.1276 (16)	TP33.7634x32.7165x0.25	15.86	903.66	0.018	0.68	2495.04	0.000
L17	78.1276 - 73.1276 (17)	TP34.6746x33.7634x0.25	16.29	918.95	0.018	0.68	2606.78	0.000
L18	73.1276 - 68.1276 (18)	TP35.5859x34.6746x0.25	16.73	933.76	0.018	0.68	2719.39	0.000
L19	68.1276 - 63.1276 (19)	TP36.4971x35.5859x0.25	17.16	948.07	0.018	0.68	2832.78	0.000
L20	63.1276 - 58.1276 (20)	TP37.4083x36.4971x0.25	17.59	961.89	0.018	0.67	2946.82	0.000
L21	58.1276 - 57.25 (21)	TP37.5683x37.4083x0.25	17.66	964.27	0.018	0.67	2966.90	0.000
L22	57.25 - 57 (22)	TP37.6138x37.5683x0.4188	17.68	1836.44	0.010	0.67	5606.39	0.000
L23	57 - 52 (23)	TP38.525x37.6138x0.4125	18.15	1853.65	0.010	0.67	5801.02	0.000
L24	52 - 43.2422 (24)	TP40.1211x38.525x0.4125	18.45	1882.39	0.010	0.67	5983.26	0.000
L25	43.2422 - 42.2422 (25)	TP39.8031x38.6159x0.3125	19.11	1359.07	0.014	0.67	4419.73	0.000
L26	42.2422 - 37.2422 (26)	TP40.7142x39.8031x0.3125	19.52	1379.54	0.014	0.67	4590.61	0.000
L27	37.2422 - 32.2422 (27)	TP41.6252x40.7142x0.3125	19.92	1399.52	0.014	0.67	4762.92	0.000
L28	32.2422 - 27.2422 (28)	TP42.5362x41.6252x0.3125	20.31	1419.01	0.014	0.67	4936.54	0.000
L29	27.2422 - 22.2422 (29)	TP43.4473x42.5362x0.3125	20.68	1438.01	0.014	0.67	5111.37	0.000
L30	22.2422 - 17.2422 (30)	TP44.3583x43.4473x0.3125	21.04	1456.52	0.014	0.67	5287.28	0.000
L31	17.2422 - 12.2422 (31)	TP45.2694x44.3583x0.3125	21.37	1474.53	0.014	0.67	5464.18	0.000
L32	12.2422 - 7.24219 (32)	TP46.1804x45.2694x0.3125	21.69	1492.06	0.015	0.67	5641.95	0.000
L33	7.24219 - 2.24219 (33)	TP47.0915x46.1804x0.3125	22.02	1509.09	0.015	0.67	5820.47	0.000
L34	2.24219 - 0 (34)	TP47.5x47.0915x0.3125	22.17	1516.57	0.015	0.67	5900.75	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 144 (1)	0.001	0.054	0.000	0.008	0.000	0.055	1.000	4.8.2 ✓
L2	144 - 139 (2)	0.002	0.098	0.000	0.014	0.000	0.101	1.000	4.8.2 ✓

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L3	139 - 134 (3)	0.003	0.163	0.000	0.015	0.000	0.166	1.000	4.8.2 ✓
L4	134 - 129 (4)	0.004	0.231	0.000	0.022	0.000	0.235	1.000	4.8.2 ✓
L5	129 - 123.612 (5)	0.004	0.260	0.000	0.022	0.000	0.265	1.000	4.8.2 ✓
L6	123.612 - 122.388 (6)	0.005	0.356	0.000	0.023	0.001	0.361	1.000	4.8.2 ✓
L7	122.388 - 117.388 (7)	0.005	0.439	0.000	0.023	0.001	0.445	1.000	4.8.2 ✓
L8	117.388 - 112.388 (8)	0.005	0.517	0.000	0.023	0.001	0.523	1.000	4.8.2 ✓
L9	112.388 - 107.388 (9)	0.006	0.590	0.000	0.024	0.001	0.596	1.000	4.8.2 ✓
L10	107.388 - 102.388 (10)	0.006	0.659	0.000	0.024	0.000	0.665	1.000	4.8.2 ✓
L11	102.388 - 98.5 (11)	0.006	0.710	0.000	0.024	0.000	0.717	1.000	4.8.2 ✓
L12	98.5 - 98.25 (12)	0.003	0.334	0.000	0.011	0.000	0.337	1.000	4.8.2 ✓
L13	98.25 - 93.25 (13)	0.003	0.365	0.000	0.012	0.000	0.368	1.000	4.8.2 ✓
L14	93.25 - 88.25 (14)	0.003	0.395	0.000	0.012	0.000	0.398	1.000	4.8.2 ✓
L15	88.25 - 79.1276 (15)	0.004	0.414	0.000	0.012	0.000	0.418	1.000	4.8.2 ✓
L16	79.1276 - 78.1276 (16)	0.006	0.643	0.000	0.018	0.000	0.649	1.000	4.8.2 ✓
L17	78.1276 - 73.1276 (17)	0.006	0.677	0.000	0.018	0.000	0.684	1.000	4.8.2 ✓
L18	73.1276 - 68.1276 (18)	0.007	0.710	0.000	0.018	0.000	0.717	1.000	4.8.2 ✓
L19	68.1276 - 63.1276 (19)	0.007	0.741	0.000	0.018	0.000	0.748	1.000	4.8.2 ✓
L20	63.1276 - 58.1276 (20)	0.007	0.772	0.000	0.018	0.000	0.779	1.000	4.8.2 ✓
L21	58.1276 - 57.25 (21)	0.007	0.777	0.000	0.018	0.000	0.784	1.000	4.8.2 ✓
L22	57.25 - 57 (22)	0.004	0.413	0.000	0.010	0.000	0.417	1.000	4.8.2 ✓
L23	57 - 52 (23)	0.004	0.430	0.000	0.010	0.000	0.434	1.000	4.8.2 ✓
L24	52 - 43.2422 (24)	0.004	0.436	0.000	0.010	0.000	0.441	1.000	4.8.2 ✓
L25	43.2422 - 42.2422 (25)	0.007	0.646	0.000	0.014	0.000	0.653	1.000	4.8.2 ✓
L26	42.2422 - 37.2422 (26)	0.007	0.664	0.000	0.014	0.000	0.672	1.000	4.8.2 ✓
L27	37.2422 - 32.2422 (27)	0.007	0.682	0.000	0.014	0.000	0.689	1.000	4.8.2 ✓
L28	32.2422 - 27.2422 (28)	0.007	0.699	0.000	0.014	0.000	0.706	1.000	4.8.2 ✓
L29	27.2422 - 22.2422 (29)	0.008	0.715	0.000	0.014	0.000	0.723	1.000	4.8.2 ✓
L30	22.2422 - 17.2422 (30)	0.008	0.731	0.000	0.014	0.000	0.739	1.000	4.8.2 ✓
L31	17.2422 - 12.2422 (31)	0.008	0.746	0.000	0.014	0.000	0.754	1.000	4.8.2 ✓
L32	12.2422 - 7.24219 (32)	0.009	0.760	0.000	0.015	0.000	0.769	1.000	4.8.2 ✓

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
L33	7.24219 - 2.24219 (33)	0.009	0.775	0.000	0.015	0.000	0.784	1.000	4.8.2 ✓
L34	2.24219 - 0 (34)	0.009	0.781	0.000	0.015	0.000	0.790	1.000	4.8.2 ✓

Section Capacity Table

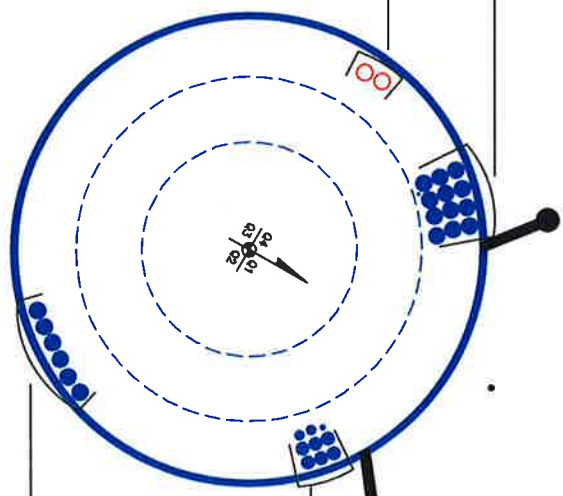
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	149 - 144	Pole	TP22.426x21.5x0.1875	1	-1.30	937.55	5.5	Pass	
L2	144 - 139	Pole	TP23.3521x22.426x0.1875	2	-2.17	963.91	10.1	Pass	
L3	139 - 134	Pole	TP24.2781x23.3521x0.1875	3	-2.51	989.25	16.6	Pass	
L4	134 - 129	Pole	TP25.2042x24.2781x0.1875	4	-4.09	1013.58	23.5	Pass	
L5	129 - 123.612	Pole	TP26.2021x25.2042x0.1875	5	-4.22	1021.20	26.5	Pass	
L6	123.612 - 122.388	Pole	TP26.0428x25.1277x0.1875	6	-4.85	1034.73	36.1	Pass	
L7	122.388 - 117.388	Pole	TP26.9578x26.0428x0.1875	7	-5.28	1056.87	44.5	Pass	
L8	117.388 - 112.388	Pole	TP27.8729x26.9578x0.1875	8	-5.74	1078.01	52.3	Pass	
L9	112.388 - 107.388	Pole	TP28.7879x27.8729x0.1875	9	-6.22	1098.17	59.6	Pass	
L10	107.388 - 102.388	Pole	TP29.7029x28.7879x0.1875	10	-6.71	1117.33	66.5	Pass	
L11	102.388 - 98.5	Pole	TP30.4145x29.7029x0.1875	11	-7.11	1131.55	71.7	Pass	
L12	98.5 - 98.25	Pole	TP30.4602x30.4145x0.3438	12	-7.16	2441.26	33.7	Pass	
L13	98.25 - 93.25	Pole	TP31.3753x30.4602x0.3375	13	-7.92	2470.19	36.8	Pass	
L14	93.25 - 88.25	Pole	TP32.2903x31.3753x0.3313	14	-8.70	2496.41	39.8	Pass	
L15	88.25 - 79.1276	Pole	TP33.9598x32.2903x0.3313	15	-9.39	2558.99	41.8	Pass	
L16	79.1276 - 78.1276	Pole	TP33.7634x32.7165x0.25	16	-10.78	1807.31	64.9	Pass	
L17	78.1276 - 73.1276	Pole	TP34.6746x33.7634x0.25	17	-11.50	1837.91	68.4	Pass	
L18	73.1276 - 68.1276	Pole	TP35.5859x34.6746x0.25	18	-12.23	1867.52	71.7	Pass	
L19	68.1276 - 63.1276	Pole	TP36.4971x35.5859x0.25	19	-12.99	1896.14	74.8	Pass	
L20	63.1276 - 58.1276	Pole	TP37.4083x36.4971x0.25	20	-13.76	1923.79	77.9	Pass	
L21	58.1276 - 57.25	Pole	TP37.5683x37.4083x0.25	21	-13.90	1928.54	78.4	Pass	
L22	57.25 - 57	Pole	TP37.6138x37.5683x0.4188	22	-13.96	3672.88	41.7	Pass	
L23	57 - 52	Pole	TP38.525x37.6138x0.4125	23	-15.08	3707.31	43.4	Pass	
L24	52 - 43.2422	Pole	TP40.1211x38.525x0.4125	24	-15.82	3764.78	44.1	Pass	
L25	43.2422 - 42.2422	Pole	TP39.8031x38.6159x0.3125	25	-18.14	2718.14	65.3	Pass	
L26	42.2422 - 37.2422	Pole	TP40.7142x39.8031x0.3125	26	-19.13	2759.08	67.2	Pass	
L27	37.2422 - 32.2422	Pole	TP41.6252x40.7142x0.3125	27	-20.14	2799.04	68.9	Pass	
L28	32.2422 - 27.2422	Pole	TP42.5362x41.6252x0.3125	28	-21.17	2838.02	70.6	Pass	
L29	27.2422 - 22.2422	Pole	TP43.4473x42.5362x0.3125	29	-22.23	2876.01	72.3	Pass	
L30	22.2422 - 17.2422	Pole	TP44.3583x43.4473x0.3125	30	-23.31	2913.03	73.9	Pass	
L31	17.2422 - 12.2422	Pole	TP45.2694x44.3583x0.3125	31	-24.41	2949.06	75.4	Pass	
L32	12.2422 - 7.24219	Pole	TP46.1804x45.2694x0.3125	32	-25.53	2984.12	76.9	Pass	
L33	7.24219 - 2.24219	Pole	TP47.0915x46.1804x0.3125	33	-26.61	3018.19	78.4	Pass	
L34	2.24219 - 0	Pole	TP47.5x47.0915x0.3125	34	-27.08	3033.15	79.0	Pass	
							Summary		
							Pole (L34)	79.0	Pass
							RATING =	79.0	Pass

APPENDIX B
BASE LEVEL DRAWING



(INSTALLED)
 (1) 1/4" TO 140 FT LEVEL
 (12) 1-5/8" TO 140 FT LEVEL

(PROPOSED)
 (2) 1-5/8" TO 130 FT LEVEL



(INSTALLED)
 (1) 1/4" TO 140 FT LEVEL
 (1) 1/2" TO 140 FT LEVEL
 (6) 1-1/4" TO 140 FT LEVEL

(ABANDONED-TO BE REMOVED)
 (0) 1-5/8" TO 130 FT LEVEL

BUSINESS UNIT: 642856 TOWER ID: C_BASLEVEL

BASE LEVEL DRAWING

PLOT DATE: 07/2016 FILE NAME: 642856_BASLEVEL.dwg

1" = 1'-0" 1

CROWN REGION ADDRESS
 USA

11/6/2014	150425	PER WORK ORDER	00072
8/3/2016	150425	PER WORK ORDER	00378
3/6/2018	150425	PER WORK ORDER	00790
10/11/2018	150425	PER WORK ORDER	118334
05/07/20	150425	PER WORK ORDER	121803
01/20/20	150425	PER WORK ORDER	124429

DRAWN BY: VAL
 CHECKED BY:
 DRAWING DATE: 11/06/14

SITE NUMBER:
 SITE NAME:
 ANDOVER NORTH
 BUSINESS UNIT NUMBER:
 642856
 SITE ADDRESS:
 22 SCOTTIA TRAIL (RURAL HIGHWAY INROUTE 6)
 ANDOVER, CT 06020
 7000000000
 USA
 SHEET TITLE:
BASE LEVEL
 SHEET NUMBER:
A1-0

APPENDIX C
ADDITIONAL CALCULATIONS

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	149 - 144	5		18	21.500	22.426	0.1875	A572-65	1.000
2	144 - 139	5		18	22.426	23.352	0.1875	A572-65	1.000
3	139 - 134	5		18	23.352	24.278	0.1875	A572-65	1.000
4	134 - 129	5		18	24.278	25.204	0.1875	A572-65	1.000
5	129 - 127.388	5.388021	3.776042	18	25.204	26.202	0.1875	A572-65	1.000
6	127.388 - 122.388	5		18	25.128	26.043	0.1875	A572-65	1.000
7	122.388 - 117.388	5		18	26.043	26.958	0.1875	A572-65	1.000
8	117.388 - 112.388	5		18	26.958	27.873	0.1875	A572-65	1.000
9	112.388 - 107.388	5		18	27.873	28.788	0.1875	A572-65	1.000
10	107.388 - 102.388	5		18	28.788	29.703	0.1875	A572-65	1.000
11	102.388 - 98.5	3.888021		18	29.703	30.414	0.1875	A572-65	1.000
12	98.5 - 98.25	0.25		18	30.414	30.460	0.34375	A572-65	0.959
13	98.25 - 93.25	5		18	30.460	31.375	0.3375	A572-65	0.964
14	93.25 - 88.25	5		18	31.375	32.290	0.33125	A572-65	0.970
15	88.25 - 83.8724	9.122396	4.744792	18	32.290	33.960	0.33125	A572-65	0.960
16	83.8724 - 78.1276	5.744792		18	32.716	33.763	0.25	A572-65	1.000
17	78.1276 - 73.1276	5		18	33.763	34.675	0.25	A572-65	1.000
18	73.1276 - 68.1276	5		18	34.675	35.586	0.25	A572-65	1.000
19	68.1276 - 63.1276	5		18	35.586	36.497	0.25	A572-65	1.000
20	63.1276 - 58.1276	5		18	36.497	37.408	0.25	A572-65	1.000
21	58.1276 - 57.25	0.877604		18	37.408	37.568	0.25	A572-65	1.000
22	57.25 - 57	0.25		18	37.568	37.614	0.41875	A572-65	0.964
23	57 - 52	5		18	37.614	38.525	0.4125	A572-65	0.969
24	52 - 48.75781	8.757812	5.515625	18	38.525	40.121	0.4125	A572-65	0.964
25	48.75781 - 42.24219	6.515625		18	38.616	39.803	0.3125	A572-65	1.000
26	42.24219 - 37.24219	5		18	39.803	40.714	0.3125	A572-65	1.000
27	37.24219 - 32.24219	5		18	40.714	41.625	0.3125	A572-65	1.000
28	32.24219 - 27.24219	5		18	41.625	42.536	0.3125	A572-65	1.000
29	27.24219 - 22.24219	5		18	42.536	43.447	0.3125	A572-65	1.000
30	22.24219 - 17.24219	5		18	43.447	44.358	0.3125	A572-65	1.000
31	17.24219 - 12.24219	5		18	44.358	45.269	0.3125	A572-65	1.000
32	12.24219 - 7.242188	5		18	45.269	46.180	0.3125	A572-65	1.000
33	7.242188 - 2.242188	5		18	46.180	47.091	0.3125	A572-65	1.000
34	2.242188 - 0	2.242188		18	47.091	47.500	0.3125	A572-65	1.000

TNX Section Forces

Increment (ft):		5	TNX Output		
	Section Height (ft)	P _u (K)	M _{ux} (kip-ft)	V _u (K)	
1	149 - 144	1.3043	23.145	3.6493	
2	144 - 139	2.1663	45.06	6.7568	
3	139 - 134	2.5083	79.819	7.1496	
4	134 - 129	4.0917	120.24	11.165	
5	129 - 127.388	4.2192	138.34	11.297	
6	127.388 - 122.388	4.8491	195.99	11.755	
7	122.388 - 117.388	5.2848	255.77	12.163	
8	117.388 - 112.388	5.7407	317.6	12.576	
9	112.388 - 107.388	6.2172	381.5	12.992	
10	107.388 - 102.388	6.7138	447.49	13.41	
11	102.388 - 98.5	7.1113	500.24	13.738	
12	98.5 - 98.25	7.1589	503.68	13.759	
13	98.25 - 93.25	7.921	573.61	14.222	
14	93.25 - 88.25	8.6966	646.08	14.773	
15	88.25 - 83.8724	9.3917	711.72	15.223	
16	83.8724 - 78.1276	10.785	801.03	15.857	
17	78.1276 - 73.1276	11.499	881.38	16.294	
18	73.1276 - 68.1276	12.233	963.9	16.728	
19	68.1276 - 63.1276	12.987	1048.6	17.16	
20	63.1276 - 58.1276	13.762	1135.4	17.589	
21	58.1276 - 57.25	13.902	1150.9	17.662	
22	57.25 - 57	13.964	1155.3	17.682	
23	57 - 52	15.084	1244.9	18.153	
24	52 - 48.75781	15.823	1304.2	18.452	
25	48.75781 - 42.24219	18.136	1426.6	19.109	
26	42.24219 - 37.24219	19.126	1523.1	19.521	
27	37.24219 - 32.24219	20.139	1621.6	19.922	
28	32.24219 - 27.24219	21.174	1722.2	20.311	
29	27.24219 - 22.24219	22.23	1824.6	20.684	
30	22.24219 - 17.24219	23.309	1928.9	21.036	
31	17.24219 - 12.24219	24.409	2034.8	21.365	
32	12.24219 - 7.242188	25.53	2142.4	21.695	
33	7.242188 - 2.242188	26.611	2251.7	22.024	
34	2.242188 - 0	27.08	2301.2	22.173	

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
149 - 144	Pole	TP22.426x21.5x0.1875	Pole	5.5%	Pass
144 - 139	Pole	TP23.352x22.426x0.1875	Pole	10.1%	Pass
139 - 134	Pole	TP24.278x23.352x0.1875	Pole	16.6%	Pass
134 - 129	Pole	TP25.204x24.278x0.1875	Pole	23.5%	Pass
129 - 127.39	Pole	TP26.202x25.204x0.1875	Pole	26.5%	Pass
127.39 - 122.39	Pole	TP26.043x25.128x0.1875	Pole	36.1%	Pass
122.39 - 117.39	Pole	TP26.958x26.043x0.1875	Pole	44.5%	Pass
117.39 - 112.39	Pole	TP27.873x26.958x0.1875	Pole	52.3%	Pass
112.39 - 107.39	Pole	TP28.788x27.873x0.1875	Pole	59.6%	Pass
107.39 - 102.39	Pole	TP29.703x28.788x0.1875	Pole	66.6%	Pass
102.39 - 98.5	Pole	TP30.414x29.703x0.1875	Pole	71.7%	Pass
98.5 - 98.25	Pole + Reinf.	TP30.46x30.414x0.3438	Reinf. 1 Tension Rupture	58.7%	Pass
98.25 - 93.25	Pole + Reinf.	TP31.375x30.46x0.3375	Reinf. 1 Tension Rupture	63.8%	Pass
93.25 - 88.25	Pole + Reinf.	TP32.29x31.375x0.3313	Reinf. 1 Tension Rupture	68.7%	Pass
88.25 - 83.87	Pole + Reinf.	TP33.96x32.29x0.3313	Reinf. 1 Tension Rupture	72.8%	Pass
83.87 - 78.13	Pole	TP33.763x32.716x0.25	Pole	64.9%	Pass
78.13 - 73.13	Pole	TP34.675x33.763x0.25	Pole	68.4%	Pass
73.13 - 68.13	Pole	TP35.586x34.675x0.25	Pole	71.7%	Pass
68.13 - 63.13	Pole	TP36.497x35.586x0.25	Pole	74.9%	Pass
63.13 - 58.13	Pole	TP37.408x36.497x0.25	Pole	77.9%	Pass
58.13 - 57.25	Pole	TP37.568x37.408x0.25	Pole	78.5%	Pass
57.25 - 57	Pole + Reinf.	TP37.614x37.568x0.4188	Reinf. 2 Tension Rupture	66.0%	Pass
57 - 52	Pole + Reinf.	TP38.525x37.614x0.4125	Reinf. 2 Tension Rupture	68.4%	Pass
52 - 48.76	Pole + Reinf.	TP40.121x38.525x0.4125	Reinf. 2 Tension Rupture	69.9%	Pass
48.76 - 42.24	Pole	TP39.803x38.616x0.3125	Pole	65.3%	Pass
42.24 - 37.24	Pole	TP40.714x39.803x0.3125	Pole	67.2%	Pass
37.24 - 32.24	Pole	TP41.625x40.714x0.3125	Pole	68.9%	Pass
32.24 - 27.24	Pole	TP42.536x41.625x0.3125	Pole	70.6%	Pass
27.24 - 22.24	Pole	TP43.447x42.536x0.3125	Pole	72.3%	Pass
22.24 - 17.24	Pole	TP44.358x43.447x0.3125	Pole	73.9%	Pass
17.24 - 12.24	Pole	TP45.269x44.358x0.3125	Pole	75.4%	Pass
12.24 - 7.24	Pole	TP46.18x45.269x0.3125	Pole	76.9%	Pass
7.24 - 2.24	Pole	TP47.091x46.18x0.3125	Pole	78.4%	Pass
2.24 - 0	Pole	TP47.5x47.091x0.3125	Pole	79.0%	Pass
				Summary	
			Pole	79.0%	Pass
			Reinforcement	72.8%	Pass
			Overall	79.0%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
149 - 144	827	n/a	827	13.23	n/a	13.23	5.5%		
144 - 139	934	n/a	934	13.79	n/a	13.79	10.1%		
139 - 134	1051	n/a	1051	14.34	n/a	14.34	16.6%		
134 - 129	1177	n/a	1177	14.89	n/a	14.89	23.5%		
129 - 127.39	1219	n/a	1219	15.07	n/a	15.07	26.5%		
127.39 - 122.39	1299	n/a	1299	15.39	n/a	15.39	36.1%		
122.39 - 117.39	1442	n/a	1442	15.93	n/a	15.93	44.5%		
117.39 - 112.39	1595	n/a	1595	16.48	n/a	16.48	52.3%		
112.39 - 107.39	1758	n/a	1758	17.02	n/a	17.02	59.6%		
107.39 - 102.39	1933	n/a	1933	17.56	n/a	17.56	66.6%		
102.39 - 98.5	2076	n/a	2076	17.99	n/a	17.99	71.7%		
98.5 - 98.25	2085	1682	3767	18.02	13.50	31.52	39.3%	58.7%	
98.25 - 93.25	2280	1781	4061	18.56	13.50	32.06	43.4%	63.8%	
93.25 - 88.25	2487	1882	4369	19.10	13.50	32.60	47.5%	68.7%	
88.25 - 83.87	2678	1973	4651	19.58	13.50	33.08	51.0%	72.8%	
83.87 - 78.13	3772	n/a	3772	26.59	n/a	26.59	64.9%		
78.13 - 73.13	4088	n/a	4088	27.31	n/a	27.31	68.4%		
73.13 - 68.13	4422	n/a	4422	28.04	n/a	28.04	71.7%		
68.13 - 63.13	4772	n/a	4772	28.76	n/a	28.76	74.9%		
63.13 - 58.13	5142	n/a	5142	29.48	n/a	29.48	77.9%		
58.13 - 57.25	5208	n/a	5208	29.61	n/a	29.61	78.5%		
57.25 - 57	5227	3383	8610	29.65	18.00	47.65	47.1%		66.0%
57 - 52	5619	3543	9162	30.37	18.00	48.37	49.3%		68.4%
52 - 48.76	5883	3649	9532	30.84	18.00	48.84	50.8%		69.9%
48.76 - 42.24	7715	n/a	7715	39.17	n/a	39.17	65.3%		
42.24 - 37.24	8261	n/a	8261	40.07	n/a	40.07	67.2%		
37.24 - 32.24	8833	n/a	8833	40.98	n/a	40.98	68.9%		
32.24 - 27.24	9430	n/a	9430	41.88	n/a	41.88	70.6%		
27.24 - 22.24	10054	n/a	10054	42.78	n/a	42.78	72.3%		
22.24 - 17.24	10704	n/a	10704	43.69	n/a	43.69	73.9%		
17.24 - 12.24	11382	n/a	11382	44.59	n/a	44.59	75.4%		
12.24 - 7.24	12088	n/a	12088	45.49	n/a	45.49	76.9%		
7.24 - 2.24	12823	n/a	12823	46.40	n/a	46.40	78.4%		
2.24 - 0	13162	n/a	13162	46.80	n/a	46.80	79.0%		

Note: Section capacity checked in 5 degree increments.

Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	842856
Site Name:	Andover North
App #:	297317 Rev.10
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	12
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	56 in

Plate Data	
Diam:	62 in
Thick:	1.5 in
Grade:	60 ksi
Single-Rod B-eff:	12.56 in

Stiffener Data (Welding at both sides)	
Config:	3 *
Weld Type:	Both
Groove Depth:	0.375 in **
Groove Angle:	45 degrees
Fillet H. Weld:	0.25 in
Fillet V. Weld:	0.3125 in
Width:	6.5 in
Height:	13 in
Thick:	0.75 in
Notch:	0.75 in
Grade:	50 ksi
Weld str.:	70 ksi
Clear Space between Stiffeners (b):	5.5 in

Pole Data	
Diam:	47.5 in
Thick:	0.3125 in
Grade:	65 ksi
# of Sides:	18 "0" IF Round
Fu	80 ksi
Reinf. Fillet Weld	0 "0" if None

Reactions	
Mu:	2301 ft-kips
Axial, Pu:	27 kips
Shear, Vu:	22 kips
Eta Factor, η	0.5 TIA G (Fig. 4-4)

If No stiffeners, Criteria: **AISC LRFD** <-Only Applicable to Unstiffened Cases

Anchor Rod Results
 Max Rod (Cu+ Vu/η): 170.3 Kips
 Allowable Axial, Φ*Fu*Anet: 260.0 Kips
 Anchor Rod Stress Ratio: 65.5% **Pass**

Stiffened
AISC LRFD
φ*Tn

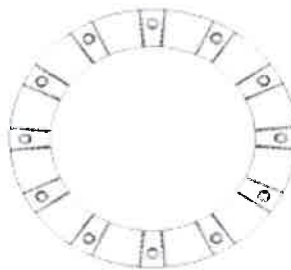
Base Plate Results
 Base Plate Stress: 40.3 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 74.7% **Pass**

Flexural Check
 Y.L. Length: N/A, Roark

Stiffened
AISC LRFD
φ*Fy
Y.L. Length: N/A, Roark

Stiffener Results
 Horizontal Weld : 36.4% **Pass**
 Vertical Weld: 47.3% **Pass**
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 18.6% **Pass**
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 37.8% **Pass**
 Plate Comp. (AISC Bracket): 50.1% **Pass**

Pole Results
 Pole Punching Shear Check: 18.6% **Pass**



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: 842856
Site Name: Andover North
App #: 297317 Rev.10

Loads Already Factored

For P (DL)	1.2	<----Disregard
For P,V, and M (WL)	1.35	<----Disregard

Pad & Pier Data

Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	6.5	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	20.5	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	6.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	33.18	ft^2
Pier Height:	4.50	ft
Soil (above pad) Height:	3.50	ft

Soil Parameters

Unit Weight, γ :	115.0	pcf
Ultimate Bearing Capacity, q_n :	12.00	ksf
Strength Reduct. factor, ϕ :	0.75	
Angle of Friction, Φ :	30.0	degrees
Undrained Shear Strength, C_u :	0.00	ksf
Allowable Bearing: $\phi * q_n$:	9.00	ksf
Passive Pres. Coeff., K_p	3.00	

Forces/Moments due to Wind and Lateral Soil

Minimum of ($\phi * \text{Ultimate Pad Passive Force, } V_u$):	22.0	kips
Pad Force Location Above D:	1.35	ft
ϕ (Passive Pressure Moment):	29.70	ft-kips
Factored O.T. M(WL), "1.6W":	2466.0	ft-kips
Factored OT (MW-Msoil), M1	2436.30	ft-kips

Resistance due to Foundation Gravity

Soil Wedge Projection grade, a:	2.02	ft
Sum of Soil Wedges Wt:	19.62	kips
Soil Wedges ecc, K1:	7.33	ft
Ftg+Soil above Pad wt:	367.3	kips
Unfactored (Total ftg-soil Wt):	386.92	kips
1.2D. No Soil Wedges.	467.77	kips
0.9D. With Soil Wedges	368.48	kips

Resistance due to Cohesion (Vertical)

$\phi * (1/2 * C_u)$ (Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces

TIA Revision:	G	<--Pull Down
Factored DL Axial, PDu:	27	kips
Factored WL Axial, PWu:	0	kips
Factored WL Shear, Vu:	22	kips
Factored WL Moment, Mu:	2301	ft-kips

Load Factor	Shaft Factored Loads		
1.00	1.2D+1.6W, Pu:	27	kips
0.90	0.9D+1.6W, Pu:	20.25	kips
1.00	Vu:	22	kips
	Mu:	2301	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	467.77	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	2436.30	ft-kips

Orthogonal Direction:

$$\begin{aligned} \text{ecc1} &= M1/P1 = 5.21 \text{ ft} \\ \text{Orthogonal } q_u &= 2.26 \text{ ksf} \\ q_u/\phi * q_n \text{ Ratio} &= 25.14\% \text{ Pass} \end{aligned}$$

Diagonal Direction:

$$\begin{aligned} \text{ecc2} &= (0.707M1)/P1 = 3.68 \text{ ft} \\ \text{Diagonal } q_u &= 2.71 \text{ ksf} \\ q_u/\phi * q_n \text{ Ratio} &= 30.12\% \text{ Pass} \end{aligned}$$

Run

<-- Press Upon Completing All Input

Overtuning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	368.48	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	2306.92	ft-kips

$$\begin{aligned} \text{Orthogonal ecc3} &= M2/P2 = 6.26 \text{ ft} \\ \text{Ortho Non Bearing Length, NBL} &= 12.52 \text{ ft} \\ \text{Orthogonal } q_u &= 2.25 \text{ ksf} \\ \text{Diagonal } q_u &= 2.72 \text{ ksf} \end{aligned}$$

Max Reaction Moment (ft-kips) so that $q_u = \phi * q_n = 100\%$ Capacity Rating

Actual M:	2301.00		
M Orthogonal:	3416.08	67.36%	Pass
M Diagonal:	3416.08	67.36%	Pass

Project Name:	Andover North
Project Number:	842856
Job Number:	WO 1317391
Date:	11/9/2016



Created On:	6/3/2014
Checked By:	DW
Revised On:	3/4/2015
Revision No.:	1.6

Monopole Pad & Pier Foundation

Foundation Parameters

Load	
Code	G
Axial	27 kips
Shear	22 kips
Moment	2301 k-ft
Soil Unit Weight	115 pcf
Friction Angle	30
Cohesion	0 psf

Material	
Concrete Strength (F'c)	4000 psi
Concrete Density	150 pcf
Rebar Tensile (Fy)	60 ksi
Clear Cover	3 in

Pad	
Thickness	3 ft
Bearing Depth	6.5 ft
Width	20.5 ft
Rebar Size	8
Rebar Quantity	25

Pier	
Pier type	Circle
Diameter	6.5 ft
Height above Grade	1 ft
Rebar Size	8
Rebar Quantity	40
Tie Size	4
Tie C/C Spacing	12 in

Structural Checks

Pad Beam Shear Capacity	735.1 kips
Pad Beam Shear	213.5 kips
Pad Beam Shear Check	29.0% Pass

Pad Bending Moment Capacity	2736.6 k-ft
Pad Bending Moment	919.3 k-ft
Pad Bending Moment Check	33.6% Pass

Punching Shear Capacity	2056.0 kips
Punching Shear	237.1 kips
Punching Shear Check	11.5% Pass

Pad-Pier Bearing Capacity	21120.4 kips
Pad-Pier Bearing	467.8 kips
Pad-Pier Bearing Check	2.2% Pass

Pier Beam Shear Capacity	439.1 kips
Pier Beam Shear	22.0 kips
Pier Beam Shear Check	5.0% Pass

Pier Bending Moment Capacity	4710.4 k-ft
Pier Bending Moment	2394.6 k-ft
Pier Bending Moment Check	50.8% Pass



Search Results

Query Date: Tue Nov 08 2016
Latitude: 41.7501
Longitude: -72.4027

ASCE 7-10 Windspeeds (3-sec peak gust in mph*):

Risk Category I: 115
Risk Category II: 126
Risk Category III-IV: 135
MRI** 10-Year: 77
MRI** 25-Year: 87
MRI** 50-Year: 94
MRI** 100-Year: 102

ASCE 7-05 Windspeed:
102 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
82 (fastest mile in mph)



*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

 [Print your results](#)

WINDSPEED WEBSITE DISCLAIMER

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the windspeed report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the windspeed report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the windspeed load report.

ATTACHMENT 5

Site Name: Coventry W Tower Height: 150Ft		General		Power		Density							
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T	2	565	149	880	0.0199	0.5867	0.34%						
*AT&T	2	875	149	1900	0.0308	1.0000	0.31%						
*AT&T	1	283	149	880	0.0050	0.5867	0.08%						
*AT&T	4	525	149	1900	0.0369	1.0000	0.37%						
*AT&T	1	1313	149	734	0.0231	0.4893	0.47%						
*T-Mobile	1	865	140	700	0.0173	0.4667	0.37%						
*T-Mobile	6	1706	140	1900/2100	0.2050	1.0000	2.05%						
*Pocket (now MetroPCS)	3	631	130	2130	0.0443	1.0000	0.44%						
VZW PCS	0	0	130	0.0000	1970	1.0000	0.00%						
VZW Cellular	0	0	130	0.0000	869	0.5793	0.00%						
VZW AWS	1	7952	130	0.1692	2145	1.0000	16.92%						
VZW 700	1	2262	130	0.0481	746	0.4973	9.68%						

ATTACHMENT 6

June 26, 2018

Via Certificate of Mailing

Robert Burbank, First Selectman
Town of Andover
17 School Road
Andover, CT 06232

**Re: Proposed Shared Use of an Existing Telecommunications Facility at 122 Route 6,
Andover, Connecticut**

Dear Mr. Burbank:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to share the existing telecommunications facility at 122 Route 6 in Andover (the “Property”). Cellco intends to install six (6) antennas and nine (9) remote radio heads on the existing tower at a height of 130 feet above ground level. An equipment cabinet and a back-up generator will be located on a concrete pad near the base of the tower, within the existing facility compound.

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

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

Robinson + Cole

Robert Burbank, First Selectman
June 26, 2018
Page 2

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

Sincerely,



Kenneth C. Baldwin

Attachment

June 26, 2018

Via Certificate of Mailing

John Valente, Zoning Agent
Town of Andover
17 School Road
Andover, CT 06232

Re: **Proposed Shared Use of an Existing Telecommunications Facility at 122 Route 6, Andover, Connecticut**

Dear Mr. Valente:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to share the existing telecommunications facility at 122 Route 6 in Andover (the “Property”). Cellco intends to install six (6) antennas and nine (9) remote radio heads on the existing tower at a height of 130 feet above ground level. An equipment cabinet and a back-up generator will be located on a concrete pad near the base of the tower, within the existing facility compound.

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Robinson + Cole

John Valente, Zoning Agent
June 26, 2018
Page 2

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

Sincerely,



Kenneth C. Baldwin

Attachment

June 26, 2018

Via Certificate of Mailing

ASC Real Estate Inc.
Andover Sportsman's Club
P.O. Box 122
Andover, CT 06232

Re: **Proposed Shared Use of an Existing Telecommunications Facility at 122 Route 6, Andover, Connecticut**

Dear Sir or Madam:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to share the existing telecommunications facility at 122 Route 6 in Andover (the "Property"). Cellco intends to install six (6) antennas and nine (9) remote radio heads on the existing tower at a height of 130 feet above ground level. An equipment cabinet and a back-up generator will be located on a concrete pad near the base of the tower, within the existing facility compound.

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

18118118-v1

Robinson+Cole

ASC Real Estate Inc.

June 26, 2018

Page 2

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Ken Baldwin', written in a cursive style.

Kenneth C. Baldwin

Attachment

June 26, 2018

Via Electronic Mail (heather.hilton@crowncastle.com)

Crown Castle
c/o Heather Hilton
3530 Toringdon Way
Charlotte, NC 28277

**Re: Proposed Shared Use of an Existing Telecommunications Facility at 122 Route 6,
Andover, Connecticut**

Dear Ms. Hilton:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to share the existing telecommunications facility at 122 Route 6 in Andover (the “Property”). Cellco intends to install six (6) antennas and nine (9) remote radio heads on the existing tower at a height of 130 feet above ground level. An equipment cabinet and a back-up generator will be located on a concrete pad near the base of the tower, within the existing facility compound.

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

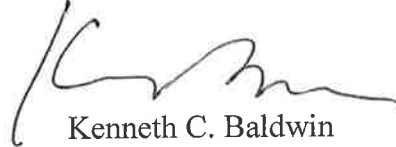
18118143-v1

Robinson+Cole

Crown Castle
June 26, 2018
Page 2

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

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Baldwin', written over a light blue horizontal line.

Kenneth C. Baldwin

Attachment

ATTACHMENT 7

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

June 26, 2018

Via Certificate of Mailing

«Name_and_Address»

**Re: Proposed Shared Use of an Existing Telecommunications Facility at 122 Route 6,
Andover, Connecticut**

Dear «Salutation»:

This firm represents Cellco Partnership d/b/a Verizon Wireless (“Cellco”). Today, Cellco filed a Sub-Petition for Declaratory Ruling (“Sub-Petition”) with the Connecticut Siting Council (“Council”) seeking approval to share the existing telecommunications facility at 122 Route 6 in Andover (the “Property”). Cellco intends to install six (6) antennas and nine (9) remote radio heads on the existing tower at a height of 130 feet above ground level. An equipment cabinet and a back-up generator will be located on a concrete pad near the base of the tower, within the existing facility compound.

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June 26, 2018

Page 2

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin", written in a cursive style.

Kenneth C. Baldwin

Attachment

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS

ABUTTERS LIST

**122 ROUTE 6 (JONATHAN TRUMBULL HIGHWAY)
ANDOVER, CONNECTICUT**

ANDOVER

	<u>Property Address</u>	<u>Owner and Mailing Address</u>
1.	Route 6	Dale A. and Lorraine O. Busque 131 Route 6 Andover, CT 06232
2.	Hutchinson Road	Dale A. and Lorraine O. Busque 131 Route 6 Andover, CT 06232
3.	131 Route 6	Dale A. and Lorraine O. Busque 131 Route 6 Andover, CT 06232
4.	132 Route 6	Hillside Self Storage Center LLC P.O. Box 116 Andover, CT 06232
5.	39 Aspinall Drive	Paul A. and Lori Lynn French 39 Aspinall Drive Andover, CT 06232
6.	43 Aspinall Drive	Richard Scherer 43 Aspinall Drive Andover, CT 06232
7.	44 Aspinall Drive	Shawn Martel 44 Aspinall Drive Andover, CT 06232
8.	166 Route 6	Tyler and Jessica Rickert 166 Route 6 Andover, CT 06232
9.	19 Ridge Road	Daniel J. and Delia Foran 19 Ridge Road Andover, CT 06232

	<u>Property Address</u>	<u>Owner and Mailing Address</u>
10.	25 Ridge Road	Danny P. and Robin Ann Holtsclaw 25 Ridge Road Andover, CT 06232
11.	31 Ridge Road	Joseph A. Aquiar and Rosemarie Cordiero-Aguiar 31 Ridge Road Andover, CT 06232
12.	35 Ridge Road	Brian Johnson 35 Ridge Road Andover, CT 06232
13.	39 Ridge Road	Mark J. Blair 39 Ridge Road Andover, CT 06232
14.	Bailey Road	Zenta Barger, Trustee 8 Odd Bolton Road Bolton, CT 06043
15.	Route 6	Donald R. Bunce P.O. Box 1036 Manchester, CT 06045
16.	25 Hickory Hill Drive	Todd L. and Rachel Veronesi 25 Hickory Hill Drive Andover, CT 06232

BOLTON

	<u>Property Address</u>	<u>Owner and Mailing Address</u>
1.	Brandy Street	Andover Sportsman's Club 122 Route 6 Andover, CT 06232
2.	School Road	ASC Inc. Box 122 Andover, CT 06232