

December 22, 2017

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification
812 Providence Pike, Killingly, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the top of an existing 190-foot guyed lattice tower at 812 Providence Pike in Killingly, Connecticut (the “Property”). The tower and Property are owned by Quinebaug Valley Emergency Communications, Inc. (“QVEC”). Cellco’s use of the tower was approved by the Council in 2014. Cellco now intends to replace nine (9) of its existing antennas with three (3) model JAHH-65B-R3B, 700/2100 MHz antennas and three (3) model JAHH-65B-R3B, 850 MHz antennas, at the same level on the tower. Cellco also intends to replace three (3) remote radio heads (“RRHs”) and install six (6) new RRHs behind its antennas. Included in Attachment 1 are specifications for Cellco’s replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Sean Hendricks, Town Manager for the Town of Killingly; Ann-Marie L. Aubrey, Killingly’s Director of Planning and Development; and QVEC, the owner of the Property and the tower.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco’s replacement antennas and RRHs will be installed at the same top level of the 190-foot tower.

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

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

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

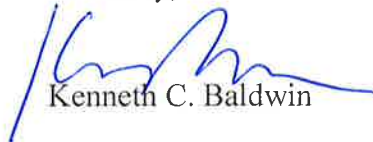
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis included in Attachment 3).

A copy of the parcel map and owner information for the Property is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Sean Hendricks, Town Manager

Ann-Marie L. Aubrey, Director of Planning and Development

Quinebaug Valley Emergency Communications, Inc.

Tim Parks

ATTACHMENT 1



JAHH-65B-R3B

8-port sector antenna, 2x 698–787, 2x 824–894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB(Port 1) and first HB (Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

Electrical Specifications

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	15.8	18.0	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
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*

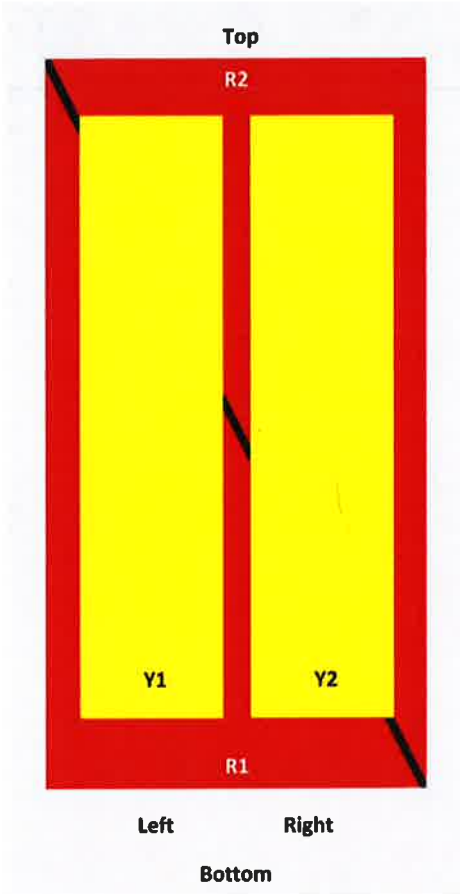
Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2° 14.3	2° 15.0	0° 17.2	0° 17.6	0° 17.7	0° 17.9
	8° 14.3	8° 14.9	5° 17.6	5° 18.2	5° 18.3	5° 18.7
	14° 14.3	14° 15.4	10° 17.6	10° 18.2	10° 18.3	10° 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24
CPR at Sector, dB	11	12	11	11	11	8

* 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

JAHH-65B-R3B

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-798	1-2	1	ANXXXXXXXXXXXXX1
R2	824-894	3-4	2	ANXXXXXXXXXXXXX2
Y1	1695-2360	5-6	3	ANXXXXXXXXXXXXX3
Y2	1695-2360	7-8		

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 – 787 MHz 824 – 894 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	8
RF Connector Quantity, low band	4
RF Connector Quantity, high band	4
RF Connector Interface	4.3-10 Female
Color	Light gray

JAHH-65B-R3B

Grounding Type	RF connector 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	746.0 N @ 150 km/h 167.7 lbf @ 150 km/h
Wind Loading, lateral	243.0 N @ 150 km/h 54.6 lbf @ 150 km/h
Wind Loading, rear	776.0 N @ 150 km/h 174.5 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Length	1828.0 mm 72.0 in
Width	350.0 mm 13.8 in
Depth	208.0 mm 8.2 in
Net Weight, without mounting kit	28.7 kg 63.3 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 Port 5
Internal RET	High band (1) Low band (2)
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	2 female 2 male

Packed Dimensions

Length	1975.0 mm 77.8 in
Width	456.0 mm 18.0 in
Depth	357.0 mm 14.1 in
Shipping Weight	42.0 kg 92.6 lb

Regulatory Compliance/Certifications

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



JAHH-65BR3B

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.

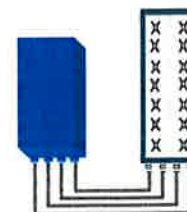


FEATURES

- 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

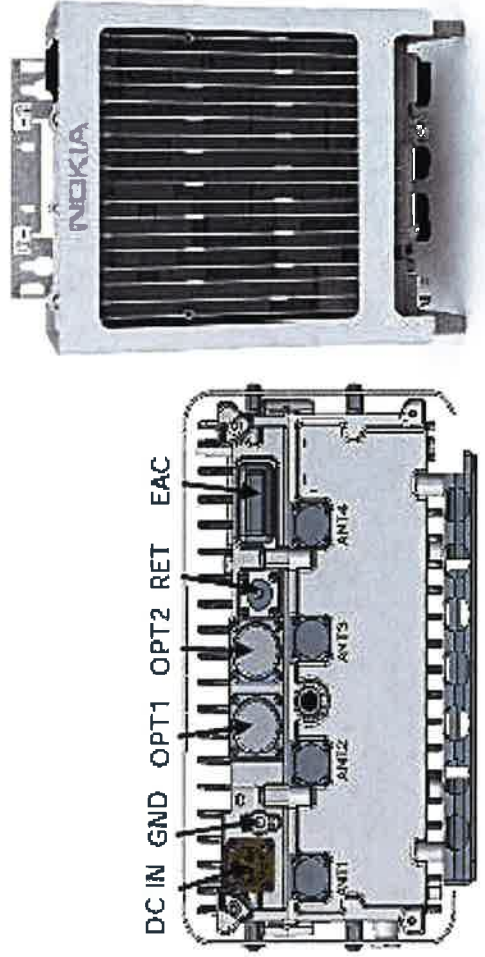
TECHNICAL SPECIFICATIONS

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, -38 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)
Wind load (@150km/h or 93mph)	IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) - 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

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AHCA AirScale RRH 4T4R B5 160W

Supported Frequency bands	3GPP band 5
Frequencies	DL 869-894MHz, UL 824-849MHz
Number of TX/RX paths/pipes	4TX/4RX
Instantaneous Bandwidth IBW	25MHz (Full Band)
Occupied Bandwidth OBW	25MHz (Full Band)
Output Power	4T4R @ 40W / 2T4R @ 60W
RF Sharing	LTE, WCDMA, LTE + NB-IoT supported
256 QAM Back Off	No backoff at 40W and 0.8dB at 60W.
Supply Voltage / Voltage Range	DC-48V / -36V to -60V
Typical Power Consumption	365W [50% ETSI Busy Hour Load at 4TX @ 40W] 529W [100% RF Load at 4 TX @ 40W] 574W [100% RF Load at 4 TX @ 40W with SBT and AISG ON]
Antenna Ports	4 Ports, 4.3-10+
Optical Ports	2x CPRI 9.8 Gbps
ALD Control Interfaces	AISG.0 from ANT1, 2, 3, 4 and RET (Power supply ANT1 and ANT3)
Other Interfaces	External Alarm MDR-26 Serial connector (4 inputs, 1 Output) DC Circular Power Connector



Operational Temperature Range	-40°C to 55°C (with solar cover)
Dimensions (mm)	337 x 295 x 165 (radio only)
Height x width x depth	13.3" x 11.7" x 6.5" 428 x 324 x 208 (with bracket and enclosure) 16.9" x 12.8" x 8.2"
Volume (liters)	16.5
Weight (kg)	16/ 35.3 lb - w/o bracket
Ingress protection class	IP65
Installation options	Pole or Wall, Vertical or Horizontal Book Mount
Surge protection	Class II 5kA

NOKIA

B66a RRH4x45W

Datasheet

Radio Technology

FDD-LTE

Feature description:

- Remote Radio Head 4x45W or 2x90W Switchable via SW

Power Output 4 x 45 W or 2x90W (SW Switchable)
w/o fans

IBW 70MHz

OBW 60 MHz

RF Sharing LTE

Mass/Volume 25.8kg/56.9 lb Weight
655H x 299W x 182D mm
25.8"x11.8"x7.2"
29.7L / 35.5L

Antenna Conf. 4Tx/4Rx

Temperature -40 to 55 °C

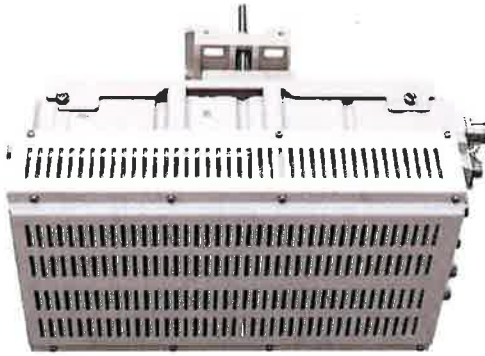
IP class IP65

Input Power DC 48 V

Cooling Natural Convection

Mounting Wall, Pole mount

BBU connection 2x 9.8Gbps SFP(Rate 7 HW ready)



B66a RRH 4x45 – Interfaces

Power:

- Max power: 816W (add 58W for AISG)
- Breaker size: 25A
- Max distance with 6ga power feed and 5.5V drop: 284 feet

RF Interfaces:

- 4.3/10 Connectors
- No monitoring ports(Spectrum analyzer SW takes place of monitoring ports)

AISG:

- Two Smart Bias-T
- One AISG port

B66 Details

- Max power for a single carrier is:
 - 2x60W for 10,15,20 MHz carrier
 - 2x40W for 5 MHz carrier
- Multi-Carrier Support with AWS-1 carriers: 15.1
- Multi-Carrier Support with AWS-3 carriers: 16.2

Carrier power: Multi-carrier

- Assuming 2 Tx power can be assigned per carrier subject to 40W max for 5Mhz, 60W for larger in 2T, cut that power in half for 4T
- Example:B4 (20Mhz) and AWS3 (10MHz)
 - Power can be varied between those two carriers, can go 60W for 20 MHz carrier, 30W for 10 MHz carrier to use the 90W in 2T.
 - It could be 45/45 for 20Mhz/10Mhz if desired.

ATTACHMENT 2

		General		Power		Density							
Site Name: Danielson 2 (Killingly)													
Tower Height: 190Ft													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*T-Mobile	6	1102	145	1900	0.1231	1.0000	1.23%						
*T-Mobile	1	865	145	700	0.0161	0.4667	0.35%						
Verizon PCS	1	0	187	0.0000	1970	1.0000	0.00%						
Verizon Cellular	9	0	187	0.0000	869	0.5793	0.00%						
Verizon 850 LTE	1	3710	187	0.0381	869	0.5793	6.59%						
Verizon AWS	1	8326	187	0.0856	2145	1.0000	8.56%						
Verizon 700	1	2063	187	0.0212	746	0.4973	4.27%						
								20.99%					
* Source: Siting Council													

ATTACHMENT 3



**STRUCTURAL ANALYSIS REPORT
190' GUYED TOWER
KILLINGLY, CONNECTICUT**

Prepared for
Verizon Wireless

**Verizon Site: Danielson 2
Verizon Project #20171656234
Location Code: 468921**

September 7, 2017



APT Project #CT1416060

**STRUCTURAL ANALYSIS REPORT
190' GUYED TOWER
KILLINGLY, CONNECTICUT
prepared for
Verizon Wireless**

EXECUTIVE SUMMARY:

All-Points Technology Corporation, P.C. (APT) performed a condition assessment and structural analysis of this 190-foot guyed tower. The analysis was performed for Verizon Wireless's proposed removal of nine of their existing twelve panel antennas and removal of three existing remote radio heads (RRHs) at 187' and replacement with six panel antennas and nine RRHs as detailed below.

Our analysis indicates the tower meets the requirements of the Connecticut State Building Code with the proposed equipment changes. Evaluation of the existing base foundation and guy anchors was performed from dimensions provided in previous structural analysis reports as listed below. The foundation and anchors were found to be adequately sized for the proposed equipment changes.

INTRODUCTION:

A condition assessment and structural analysis was performed on the above-mentioned communications tower by APT for Verizon Wireless. The tower is located at 812 Providence Pike in Killingly, Connecticut. APT climbed the structure in its entirety on August 21, 2017 to record information regarding physical and dimensional properties of the structure and its appurtenances.

The structural analysis also relied on previous structural analysis reports by Centek Engineering (Project #09059.000, Rev. 1 dated December 6, 2013) and EBI Consulting (Reference #8115000099 dated March 16, 2015).

The structure is a 190-foot, Model 80 galvanized steel guyed tower manufactured by ROHN. The tower is comprised of galvanized pipe legs with angle steel and pipe bracing arranged in K-brace and X-brace configurations. The tower is guyed at four elevations, with a torque arm and double guy wires at the 137' attachment. A tower schematic is provided in Appendix A.

The analysis was performed in accordance with TIA-222-G using the following antenna inventory (proposed equipment changes shown in **bold** text):

Carrier	Antenna	Elev.	Mount	Feed Lines
Verizon	(6) JAHH-65B-R3B & (3) BXA-70063/6 panels, (3) RRH2x60-700 RRHs, (3) RRH2x90-AWS RRHs, (3) RRH4x40-850 RRHs, (2) RDC-3315-PF-48 D-boxes ¹	187'	(3) 12' sector mounts	(2) 1-5/8" hybrid
T-Mobile	(3) LNX-6515DS & (3) RR90-18-00DP panel antennas, (3) TMAs	140'	(3) 3' sidearms	(12) 1-5/8"

¹ Currently six BXA-70063/6 & six BXA-171063/12 panel antennas, three RRH2x40-700 RRHs and two RDC-3315-PF-48 power/fiber distribution boxes (D-boxes).

CONDITION ASSESSMENT:

- **General Observations:** The tower, a galvanized steel structure, appeared to be in sound condition. No signs of movement or overstress of the tower were observed.
- **Legs:** Leg members range from 2" standard to 2.5" extra-strong pipe and are comprised of 50 ksi steel, according to ROHN specifications. Leg members appeared to be in good condition.
- **Bracing:** Bracing members are 1-1/2" tube steel and L1.75" x 3/16" bracing. Bracing and connections were visually observed to the maximum extent practicable. No loose or missing bolts were noted.
- **Antenna Connections:** Antenna mounting hardware appeared to be in good condition, with corrosion resistant hardware and galvanized members prevalent.
- **Splice Connections:** Observed splice bolts and connections appeared to be in sound condition.
- **Guy Cables and Hardware:** Guy cables, torque arms and attachment hardware appeared to be in sound condition.

STRUCTURAL ANALYSIS:

Methodology:

The structural analysis was done in accordance with the Connecticut State Building Code and TIA-222, Revision G (TIA), Structural Standard for Antenna Supporting Structures and Antennas.

The analysis was conducted using a 3-second gust wind speed of 106 miles per hour with no ice and 50-mph with 1" radial ice in accordance with the TIA-222-G standard for this area of Windham County, Connecticut. The following additional design criteria were used:

Structure Class: II
Topographic Category: 1
Exposure Category: B

Analysis Results:

Analysis of the tower was conducted in accordance with the criteria outlined herein with antenna changes as previously described.

The following table summarizes the results of the analysis based on stresses of individual leg and bracing members:

Elevation	Legs	Bracing
175'-190'	22%	48%
160'-175'	20%	31%
140'-160'	64%	36%
120'-140'	77%	67%
100'-120'	66%	19%
80'-100'	79%	24%
60'-80'	61%	15%
40'-60'	68%	34%
20'-40'	73%	29%
0'-20'	73%	29%

Bracing and Splice Bolts:

Connection bolts were evaluated under the proposed loading. All bolts were found to be adequately sized to support the proposed loads.

Guy Cables:

Our analysis indicates all guys are adequately sized to support the proposed equipment.

Base Foundation and Guy Anchors:

Evaluation of the base foundation and guy anchors was performed from dimensions provided in the Centek and EBI structural analysis reports. The foundation and guy anchors were determined to be adequately sized for the proposed changes.

All-Points Technology Corporation

Factored base reactions imposed with the additional antennas were calculated as follows:

<u>Location</u>	<u>Vertical</u>	<u>Horizontal</u>
Base:	128.7 kips	1.0 kips
Inner Guy Anchor:	-11.3 kips	-11.3 kips
Outer Guy Anchor:	-30.0 kips	-18.7 kips

CONCLUSIONS AND RECOMMENDATIONS:

Our structural analysis indicates that the 190-foot guyed tower located at 812 Providence Pike in Killingly, Connecticut meets the requirements of the Connecticut State Building Code with Verizon Wireless's proposed equipment changes.

LIMITATIONS:

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in an undeteriorated condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

All-Points Technology Corporation, P.C. (APT) is not responsible for modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Replacing or strengthening bracing members.
2. Reinforcing vertical members in any manner.
3. Adding or relocating torque arms or guys.
4. Installing antenna mounting gates or side arms.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which is contrary to that which is contained herein, or you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

All-Points Technology Corporation

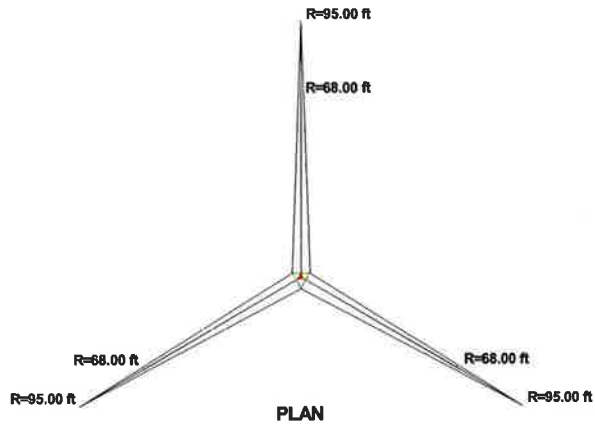
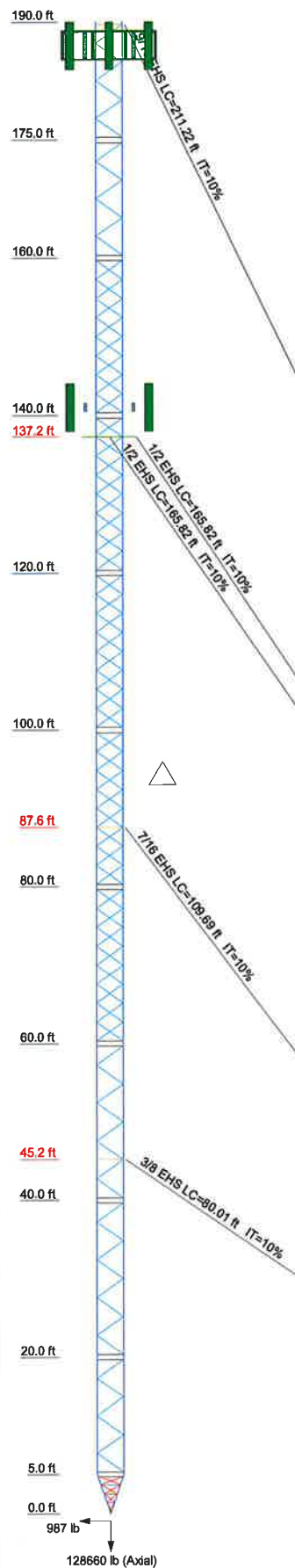
116 Grandview Road
Conway, NH 03818
(603) 496-5853

3 Saddlebrook Drive
Killingworth, CT 06419
(860) 663-1697

Appendix A

Tower Schematic

ROHN 2.5 EH	ROHN 2.5 STD	ROHN 2.5 X-STR	ROHN 2.5 STD
A572-50	A572-50	A53-B-42	A53-B-42
ROHN TS1.5x11 gb	ROHN TS1.5x16 gb	ROHN TS1.5x16 gb	ROHN TS1.5x16 gb
N.A.	N.A.	N.A.	N.A.
ROHN TS1.5x11 gb	ROHN TS1.5x16 gb	ROHN TS1.5x16 gb	ROHN TS1.5x16 gb
4 1/2x3/8	4x5.4	4x5.4	4x5.4
3.4166	56 @ 2.4088	56 @ 2.4088	56 @ 2.4088
489.9	425.5	425.5	425.5
12 @ 2.3784	596.3	596.3	596.3
467.3	521.6	521.6	521.6
425.5	465.1	465.1	465.1
744.9	353.2	353.2	353.2
12 @ 2.3784	661.6	661.6	661.6
467.3	5544.8	5544.8	5544.8
425.5			
744.9			
425.5			
100.0 ft			
87.6 ft			
80.0 ft			
60.0 ft			
45.2 ft			
40.0 ft			
20.0 ft			
5.0 ft			
0.0 ft			
128660 lb (Axial)			
987 lb			
128660 lb (Axial)			



DESIGNED APPURTENANCE LOADING

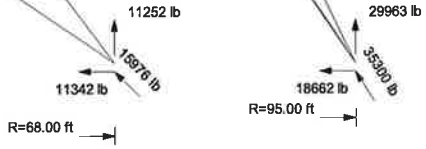
TYPE	ELEVATION	TYPE	ELEVATION
(2) JAHH-65B-R3B (Verizon)	187	Nokia RRH4x40-850 w/bracket (Verizon)	187
(2) JAHH-65B-R3B (Verizon)	187	12' lightweight sector mount (Verizon)	187
(2) JAHH-65B-R3B (Verizon)	187	12' lightweight sector mount (Verizon)	187
BXA-70063/6 (Verizon)	187	12' lightweight sector mount (Verizon)	187
BXA-70063/6 (Verizon)	187	LNX-6515DS-T4M (T-Mobile)	141
BXA-70063/6 (Verizon)	187	LNX-6515DS-T4M (T-Mobile)	141
Raycap RDC-3315-PF-48 J-box (Verizon)	187	LNX-6515DS-T4M (T-Mobile)	141
RFS DB-T1-6Z-8AB-0Z D-box (Verizon)	187	RR90-17-02DP (T-Mobile)	141
ALU RRH2x60-700 w/bracket (Verizon)	187	RR90-17-02DP (T-Mobile)	141
ALU RRH2x60-700 w/bracket (Verizon)	187	RR90-17-02DP (T-Mobile)	141
ALU RRH2x60-700 w/bracket (Verizon)	187	KRY 112 7 1/2 TMA (T-Mobile)	141
ALU RRH2x60-700 w/bracket (Verizon)	187	KRY 112 7 1/2 TMA (T-Mobile)	141
ALU RRH2x90-AWS w/bracket (Verizon)	187	KRY 112 7 1/2 TMA (T-Mobile)	141
ALU RRH2x90-AWS w/bracket (Verizon)	187	3' sidearm (T-Mobile)	140
ALU RRH2x90-AWS w/bracket (Verizon)	187	3' sidearm (T-Mobile)	140
ALU RRH2x90-AWS w/bracket (Verizon)	187	3' sidearm (T-Mobile)	140
Nokia RRH4x40-850 w/bracket (Verizon)	187	6'x2 3/8" Pipe Mount (T-Mobile)	140
Nokia RRH4x40-850 w/bracket (Verizon)	187	6'x2 3/8" Pipe Mount (T-Mobile)	140

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	ROHN 2.5 X-STR	D	L1x1x1/8
B	SR None	E	4 @ 1.125
C	C15x33.9		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-42	42 ksi	63 ksi



ALL REACTIONS ARE FACTORED

All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job: 190' ROHN Model 80 Guyed Tower		
	Project: CT1416060 Danielson 2		
	Client: Verizon	Drawn by: Rob Adair	App'd:
	Code: TIA-222-G	Date: 09/07/17	Scale: N
Path: Z:\Shared\NH\Office\Jobs\190' ROHN Model 80 Guyed Tower\CT1416060 Danielson 2\CT1416060 Danielson 2.dwg			

Appendix B

Photographs

VERIZON WIRELESS
190' GUYED TOWER
KILLINGLY, CONNECTICUT
VERIZON SITE: 468921_DANIELSON 2



Overview photos of 190' guyed tower.



Photos of existing antennas. Verizon Wireless's equipment is top panel array.

VERIZON WIRELESS
190' GUYED TOWER
KILLINGLY, CONNECTICUT
VERIZON SITE: 468921_DANIELSON 2

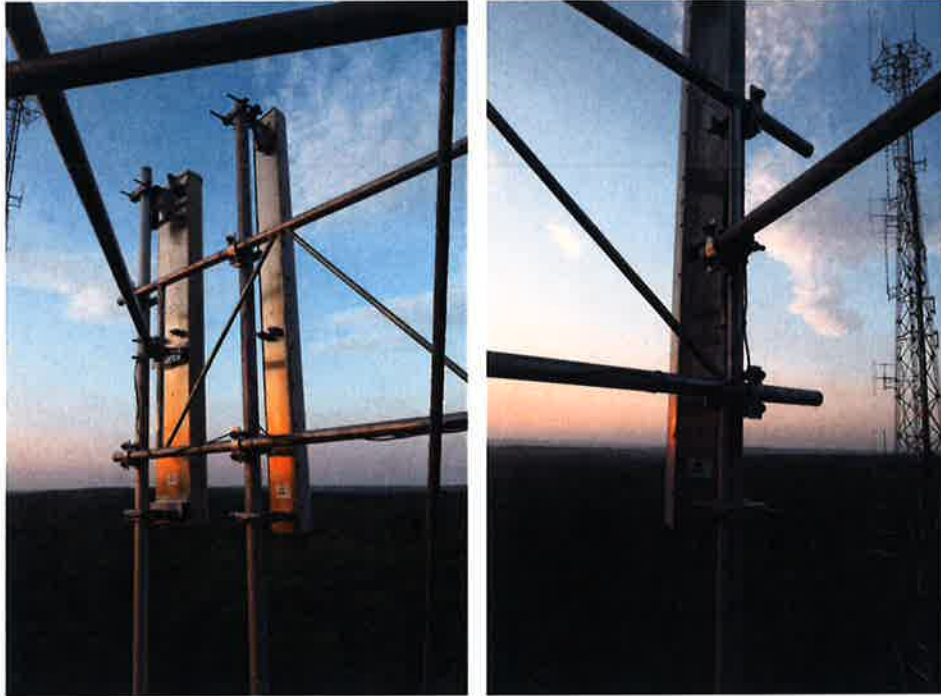


Photo of Verizon's existing feed lines at shelter.



Photo of Verizon Wireless's ice bridge and feed lines.

VERIZON WIRELESS
190' GUYED TOWER
KILLINGLY, CONNECTICUT
VERIZON SITE: 468921_DANIELSON 2



Photos of Verizon's existing antennas and equipment.



Appendix C

Calculations



[ASCE 7 Windspeed](#)
[ASCE 7 Ground Snow Load](#)
[Related Resources](#)
[Sponsors](#)
[About ATC](#)
[Contact](#)

Search Results

Query Date: Thu Sep 07 2017

Latitude: 41.7915

Longitude: -71.8224

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

Risk Category I: 120

Risk Category II: 130

Risk Category III-IV: 140

MRI 10-Year:** 79

MRI 25-Year:** 89

MRI 50-Year:** 97

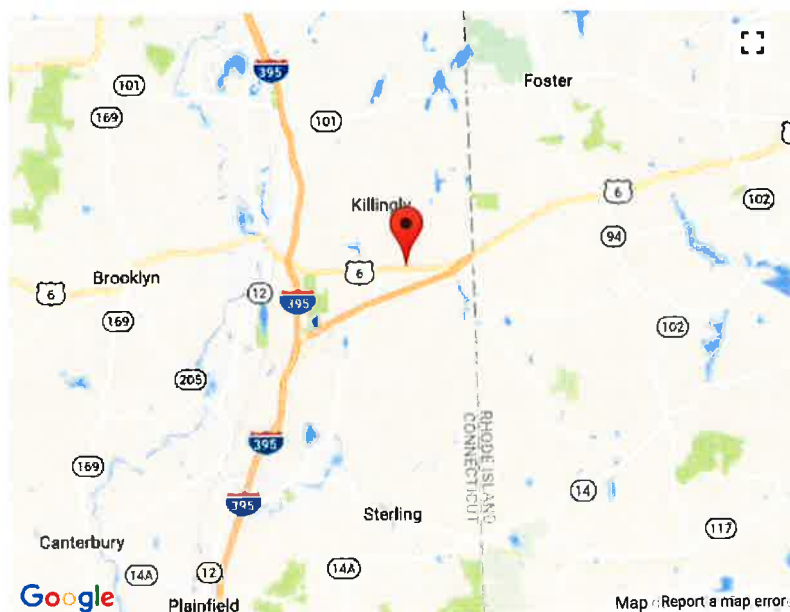
MRI 100-Year:** 105

ASCE 7-05 Windspeed:

106 (3-sec peak gust in mph)

ASCE 7-93 Windspeed:

84 (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](#)

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tnxTower All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job 190' ROHN Model 80 Guyed Tower	Page 1 of 7
	Project CT1416060 Danielson 2	Date 12:16:22 09/07/17
	Client Verizon	Designed by Rob Adair

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 190.00 ft above the ground line.

The face width of the tower is 3.42 ft at the top and tapered at the base.

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

The following design criteria apply:

Basic wind speed of 106 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Deflections calculated using a wind speed of 60 mph.

Pressures are calculated at each section.

Safety factor used in guy design is 1.

Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Guy Data

Guy Elevation	Guy Grade	Guy Size	Initial Tension	%	Guy Modulus	Guy Weight	L_u	Anchor Radius	Anchor Azimuth Adj.	Anchor Elevation	End Fitting Efficiency	
ft			lb		ksi	plf	ft	ft	°	ft	%	
189.635	EHS	A	9/16	3500.00	10%	21000	0.671	211.04	95.00	0.0000	0.00	100%
		B	9/16	3500.00	10%	21000	0.671	211.04	95.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	211.04	95.00	0.0000	0.00	100%
137.226	EHS	A	1/2	2690.00	10%	21000	0.517	165.68	95.00	0.0000	0.00	100%
		B	1/2	2690.00	10%	21000	0.517	165.68	95.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	165.68	95.00	0.0000	0.00	100%
87.5912	EHS	A	7/16	2080.00	10%	21000	0.399	109.60	68.00	0.0000	0.00	100%
		B	7/16	2080.00	10%	21000	0.399	109.60	68.00	0.0000	0.00	100%
		C	7/16	2080.00	10%	21000	0.399	109.60	68.00	0.0000	0.00	100%
45.1824	EHS	A	3/8	1540.00	10%	21000	0.273	79.93	68.00	0.0000	0.00	100%
		B	3/8	1540.00	10%	21000	0.273	79.93	68.00	0.0000	0.00	100%
		C	3/8	1540.00	10%	21000	0.273	79.93	68.00	0.0000	0.00	100%

Guy Elevation	Mount Type	Torque-Arm Spread	Torque-Arm Leg Angle	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
ft		ft	°				
189.635	Corner						
137.226	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C10x15.3
87.5912	Corner						
45.1824	Corner						

Guy Elevation	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
ft								
189.64	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Flat Bar	4 1/2x3/8
137.23	A572-50	Solid Round				A572-50	Flat Bar	

tnxTower All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job	190' ROHN Model 80 Guyed Tower	Page	2 of 7
	Project	CT1416060 Danielson 2	Date	12:16:22 09/07/17
	Client	Verizon	Designed by	Rob Adair

Guy Elevation ft	Diagonal Grade (50 ksi)	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade (50 ksi)	Pull-Off Type	Pull-Off Size
87.59	A572-50	Solid Round			No	A36	Channel	C4x5.4
45.18	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Channel	C4x5.4

Feed Line/Linear Appurtenances

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder	A	No	Ar (CaAa)	190.00 - 5.00	-2.0000	0	1	1	3.0000	3.0000		7.90
1.57" Hybrid fiber-power cable	B	No	Ar (CaAa)	187.00 - 8.00	0.0000	0	2	2	0.5000	1.5700		0.66
Feedline Ladder (Af)	B	No	Af (CaAa)	187.00 - 8.00	0.0000	0	1	1	3.0000	3.0000		8.40
1 5/8 Feedline Ladder (Af)	C	No	Ar (CaAa)	140.00 - 8.00	0.0000	0	12	6	0.5000	1.9800		1.04
Feedline Ladder (Af)	C	No	Af (CaAa)	137.00 - 8.00	0.0000	0	1	1	3.0000	3.0000		8.40

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
(2) JAHH-65B-R3B (Verizon)	A	From Face	3.00	0.0000	187.00	No Ice	9.11	65.00
			0.00			1/2" Ice	9.58	123.08
			0.00			1" Ice	10.05	187.45
(2) JAHH-65B-R3B (Verizon)	B	From Face	3.00	0.0000	187.00	No Ice	9.11	65.00
			0.00			1/2" Ice	9.58	123.08
			0.00			1" Ice	10.05	187.45
(2) JAHH-65B-R3B (Verizon)	C	From Face	3.00	0.0000	187.00	No Ice	9.11	65.00
			0.00			1/2" Ice	9.58	123.08
			0.00			1" Ice	10.05	187.45
BXA-70063/6 (Verizon)	A	From Face	3.00	0.0000	187.00	No Ice	7.57	25.00
			0.00			1/2" Ice	8.02	65.60
			0.00			1" Ice	8.47	112.01
BXA-70063/6 (Verizon)	B	From Face	3.00	0.0000	187.00	No Ice	7.57	25.00
			0.00			1/2" Ice	8.02	65.60
			0.00			1" Ice	8.47	112.01
BXA-70063/6 (Verizon)	C	From Face	3.00	0.0000	187.00	No Ice	7.57	25.00
			0.00			1/2" Ice	8.02	65.60
			0.00			1" Ice	8.47	112.01
Raycap RDC-3315-PF-48 J-box (Verizon)	A	From Face	1.00	0.0000	187.00	No Ice	2.51	30.00
			0.00			1/2" Ice	2.71	52.86
			0.00			1" Ice	2.91	78.84
RFS DB-T1-6Z-8AB-0Z D-box (Verizon)	C	From Face	1.00	0.0000	187.00	No Ice	4.80	45.00
			0.00			1/2" Ice	5.07	81.13
			0.00			1" Ice	5.35	121.22
ALU RRH2x60-700 w/bracket (Verizon)	A	From Face	2.50	0.0000	187.00	No Ice	3.35	60.00
			0.00			1/2" Ice	3.60	83.19
			0.00			1" Ice	3.87	110.02
ALU RRH2x60-700	B	From Face	2.50	0.0000	187.00	No Ice	3.35	60.00

tnxTower All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job	190' ROHN Model 80 Guyed Tower	Page	3 of 7
	Project	CT1416060 Danielson 2	Date	12:16:22 09/07/17
	Client	Verizon	Designed by	Rob Adair

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	lb
w/bracket (Verizon)			0.00	0.00		1/2" Ice	3.60	2.25	83.19
ALU RRH2x60-700	C	From Face	2.50	0.0000	187.00	1" Ice	3.87	2.49	110.02
w/bracket (Verizon)			0.00			No Ice	3.35	2.02	60.00
ALU RRH2x90-AWS	A	From Face	2.50	0.0000	187.00	1/2" Ice	3.60	2.25	83.19
w/bracket (Verizon)			0.00			1" Ice	3.87	2.49	110.02
ALU RRH2x90-AWS	B	From Face	2.50	0.0000	187.00	No Ice	2.58	1.63	80.00
w/bracket (Verizon)			0.00			1/2" Ice	2.79	1.81	100.47
ALU RRH2x90-AWS	C	From Face	2.50	0.0000	187.00	1" Ice	3.01	2.00	124.06
w/bracket (Verizon)			0.00			No Ice	2.58	1.63	80.00
Nokia RRH4x40-850	A	From Face	2.50	0.0000	187.00	1/2" Ice	2.79	1.81	100.47
w/bracket (Verizon)			0.00			1" Ice	3.01	2.00	124.06
Nokia RRH4x40-850	B	From Face	2.50	0.0000	187.00	No Ice	2.58	1.63	80.00
w/bracket (Verizon)			0.00			1/2" Ice	2.79	1.81	100.47
Nokia RRH4x40-850	C	From Face	2.50	0.0000	187.00	1" Ice	3.01	2.00	124.06
w/bracket (Verizon)			0.00			No Ice	2.58	1.63	80.00
12' lightweight sector mount (Verizon)	A	None		0.0000	187.00	1/2" Ice	2.79	1.81	100.47
						1" Ice	3.01	2.00	124.06
12' lightweight sector mount (Verizon)	B	None		0.0000	187.00	No Ice	2.58	1.63	80.00
						1/2" Ice	2.79	1.81	100.47
12' lightweight sector mount (Verizon)	C	None		0.0000	187.00	1" Ice	3.01	2.00	124.06
						No Ice	2.58	1.63	80.00
LNX-6515DS-T4M (T-Mobile)	A	From Face	3.00	0.0000	141.00	1/2" Ice	10.35	5.18	320.00
			0.00			1" Ice	11.89	5.94	575.00
LNX-6515DS-T4M (T-Mobile)	B	From Face	3.00	0.0000	141.00	No Ice	6.67	3.34	225.00
			0.00			1/2" Ice	10.35	5.18	320.00
LNX-6515DS-T4M (T-Mobile)	C	From Face	3.00	0.0000	141.00	1" Ice	11.89	5.94	575.00
			0.00			No Ice	6.67	3.34	225.00
RR90-17-02DP (T-Mobile)	A	From Face	3.00	0.0000	141.00	1/2" Ice	10.35	5.18	320.00
			0.00			1" Ice	11.89	5.94	575.00
RR90-17-02DP (T-Mobile)	B	From Face	3.00	0.0000	141.00	No Ice	4.36	1.97	18.00
			0.00			1/2" Ice	4.70	2.31	40.42
RR90-17-02DP (T-Mobile)	C	From Face	3.00	0.0000	141.00	1" Ice	5.06	2.66	67.36
			0.00			No Ice	4.36	1.97	18.00
KRY 112 7 1/2 TMA (T-Mobile)	A	From Face	2.50	0.0000	141.00	1/2" Ice	4.70	2.31	40.42
			0.00			1" Ice	5.06	2.66	67.36
KRY 112 7 1/2 TMA (T-Mobile)	B	From Face	2.50	0.0000	141.00	No Ice	4.36	1.97	18.00
			0.00			1/2" Ice	4.70	2.31	40.42
KRY 112 7 1/2 TMA (T-Mobile)	C	From Face	2.50	0.0000	141.00	1" Ice	5.06	2.66	67.36
			0.00			No Ice	4.36	1.97	18.00
			0.00			1/2" Ice	4.70	2.31	40.42
			0.00			1" Ice	5.06	2.66	67.36
			0.00			No Ice	0.63	0.39	15.00
			0.00			1/2" Ice	0.74	0.48	20.32
			0.00			1" Ice	0.85	0.58	27.27
			0.00			No Ice	0.63	0.39	15.00
			0.00			1/2" Ice	0.74	0.48	20.32
			0.00			1" Ice	0.85	0.58	27.27

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	Client Verizon	Designed by Rob Adair

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	Placement ft	C _A A _A		Weight lb	
						Front ft ²	Side ft ²		
3' sidearm (T-Mobile)	A	None		0.0000	140.00	No Ice	1.43	0.72	30.00
						1/2" Ice	2.18	1.09	65.00
						1" Ice	2.93	1.47	105.00
3' sidearm (T-Mobile)	B	None		0.0000	140.00	No Ice	1.43	0.72	30.00
						1/2" Ice	2.18	1.09	65.00
						1" Ice	2.93	1.47	105.00
3' sidearm (T-Mobile)	C	None		0.0000	140.00	No Ice	1.43	0.72	30.00
						1/2" Ice	2.18	1.09	65.00
						1" Ice	2.93	1.47	105.00
6'x2 3/8" Pipe Mount (T-Mobile)	A	None		0.0000	140.00	No Ice	1.43	1.43	21.90
						1/2" Ice	1.92	1.92	32.73
						1" Ice	2.29	2.29	47.61
6'x2 3/8" Pipe Mount (T-Mobile)	B	None		0.0000	140.00	No Ice	1.43	1.43	21.90
						1/2" Ice	1.92	1.92	32.73
						1" Ice	2.29	2.29	47.61
6'x2 3/8" Pipe Mount (T-Mobile)	C	None		0.0000	140.00	No Ice	1.43	1.43	21.90
						1/2" Ice	1.92	1.92	32.73
						1" Ice	2.29	2.29	47.61

Solution Summary

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 175	2.057	33	0.0501	0.0391
T2	175 - 160	1.889	33	0.0627	0.0374
T3	160 - 140	1.667	33	0.0705	0.0378
T4	140 - 120	1.375	33	0.0493	0.0392
T5	120 - 100	1.241	33	0.0294	0.0570
T6	100 - 80	1.087	33	0.0443	0.0747
T7	80 - 60	0.902	33	0.0428	0.0881
T8	60 - 40	0.702	37	0.0533	0.0982
T9	40 - 20	0.475	37	0.0501	0.1130
T10	20 - 5	0.268	27	0.0573	0.1200
T11	5 - 0	0.069	27	0.0647	0.1324

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
189.64	Guy	33	2.054	0.0504	0.0390	106443
187.00	(2) JAHH-65B-R3B	33	2.026	0.0526	0.0386	106443
141.00	LNx-6515DS-T4M	33	1.385	0.0508	0.0387	19216
140.00	3' sidearm	33	1.375	0.0493	0.0392	19067
137.23	Guy	33	1.348	0.0451	0.0407	21174
87.59	Guy	33	0.974	0.0436	0.0836	317593
45.18	Guy	37	0.532	0.0510	0.1098	122456

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Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load	Allowable Ratio	Criteria
								Allowable		
T1	190	Leg	A325N	0.7500	4	1249.64	29820.60	0.042 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2843.15	4165.56	0.683 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	340.98	7952.16	0.043 ✓	1	Bolt Shear
T2	175	Leg	A325N	0.7500	4	1060.48	29820.60	0.036 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1787.17	4165.56	0.429 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	390.65	7952.16	0.049 ✓	1	Bolt Shear
T3	160	Bottom Girt	A325N	0.5000	1	848.83	7952.16	0.107 ✓	1	Bolt Shear
		Leg	A325N	0.7500	4	2484.45	29820.60	0.083 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2104.21	7015.68	0.300 ✓	1	Member Bearing
T4	140	Top Girt	A325N	0.5000	1	344.11	7015.68	0.049 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	163.44	7015.68	0.023 ✓	1	Member Bearing
		Leg	A325N	0.7500	4	2239.38	29820.60	0.075 ✓	1	Bolt Tension
T5	120	Diagonal	A325N	0.5000	1	3946.15	7015.68	0.562 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	1950.53	7015.68	0.278 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	466.32	7015.68	0.066 ✓	1	Member Bearing
T6	100	Leg	A325N	0.7500	4	2407.34	29820.60	0.081 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1121.06	7015.68	0.160 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	364.94	7015.68	0.052 ✓	1	Member Bearing
T7	80	Bottom Girt	A325N	0.5000	1	391.59	7015.68	0.056 ✓	1	Member Bearing
		Leg	A325N	0.7500	4	2866.80	29820.60	0.096 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1418.68	7015.68	0.202 ✓	1	Member Bearing
T8	60	Top Girt	A325N	0.5000	1	448.54	7015.68	0.064 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	607.13	7015.68	0.087 ✓	1	Member Bearing
		Leg	A325N	0.7500	4	3042.84	29820.60	0.102 ✓	1	Bolt Tension
T9	40	Diagonal	A325N	0.5000	1	902.72	7015.68	0.129 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	420.87	7015.68	0.060 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	372.83	4165.56	0.090 ✓	1	Member Bearing
T10	20	Leg	A325N	0.7500	4	3330.93	29820.60	0.112 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2039.37	7015.68	0.291 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	527.88	7015.68	0.075 ✓	1	Member Bearing
T9	40	Bottom Girt	A325N	0.5000	1	822.97	7015.68	0.117 ✓	1	Member Bearing
		Leg	A325N	0.7500	4	3544.71	29820.60	0.119 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1702.50	7015.68	0.243 ✓	1	Member Bearing
T10	20	Top Girt	A325N	0.5000	1	621.22	7015.68	0.089 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	134.47	7015.68	0.019 ✓	1	Member Bearing
		Leg	A325N	0.7500	4	3579.32	29820.60	0.120 ✓	1	Bolt Tension
T10	20	Diagonal	A325N	0.5000	1	903.98	7015.68	0.129 ✓	1	Member Bearing

tnxTower All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job	190' ROHN Model 80 Guyed Tower	Page	6 of 7
	Project	CT1416060 Danielson 2	Date	12:16:22 09/07/17
	Client	Verizon	Designed by	Rob Adair

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load Allowable	Allowable Ratio	Criteria
		Top Girt	A325N	0.5000	1	132.34	7015.68	0.019 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	2827.43	7015.68	0.403 ✓	1	Member Bearing

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	190 - 175	Leg Diagonal	ROHN 2.5 EH	3	-16775.30	76719.40	21.9	Pass
			ROHN TS1.5x16 ga	26	-2838.52	5969.72	47.5	Pass
		Bottom Girt	ROHN TS1.5x11 ga	9	-303.91	15031.30	2.0	Pass
							4.3 (b)	
		Guy A@189.635	9/16	477	13792.00	21000.00	65.7	Pass
		Guy B@189.635	9/16	476	13782.70	21000.00	65.6	Pass
		Guy C@189.635	9/16	475	13748.00	21000.00	65.5	Pass
		Top Guy	4 1/2x3/8	4	3680.09	54675.00	6.7	Pass
Pull-Off@189.635								
T2	175 - 160	Leg Diagonal	ROHN 2.5 EH	30	-15000.30	76719.40	19.6	Pass
			ROHN TS1.5x16 ga	38	-1830.19	5969.72	30.7	Pass
		Top Girt	ROHN TS1.5x11 ga	33	-370.57	13553.90	2.7	Pass
							4.9 (b)	
		Bottom Girt	ROHN TS1.5x11 ga	35	-798.24	15031.30	5.3	Pass
					10.7 (b)			
T3	160 - 140	Leg Diagonal	ROHN 2 STD	57	-27897.10	43725.40	63.8	Pass
			ROHN TS1.5x16 ga	67	-2104.21	5864.24	35.9	Pass
			ROHN TS1.5x16 ga	58	344.11	9931.96	3.5	Pass
		Top Girt	ROHN TS1.5x16 ga	63	163.44	9931.96	1.6	Pass
							2.3 (b)	
T4	140 - 120	Leg Diagonal	ROHN 2 STD	114	-33881.10	43813.60	77.3	Pass
			ROHN TS1.5x16 ga	166	-3946.15	5864.24	67.3	Pass
			ROHN TS1.5x16 ga	115	-1888.99	6985.33	27.0	Pass
		Top Girt	ROHN TS1.5x16 ga	120	466.32	9931.96	4.7	Pass
							6.6 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	120	466.32	9931.96	4.7	Pass
							6.6 (b)	
		Guy A@137.226	1/2	486	10980.80	16140.00	68.0	Pass
Guy B@137.226	1/2	482	11096.00	16140.00	68.7	Pass		
Guy C@137.226	1/2	479	11101.10	16140.00	68.8	Pass		
Torque Arm	C10x15.3	485	-3350.98	123455.00	85.1	Pass		
Top@137.226								
T5	120 - 100	Leg Diagonal	ROHN 2 STD	171	-28932.70	43813.60	66.0	Pass
			ROHN TS1.5x16 ga	220	-1121.06	5864.24	19.1	Pass
			ROHN TS1.5x16 ga	172	364.94	9931.96	3.7	Pass
		Top Girt	ROHN TS1.5x16 ga	172	364.94	9931.96	3.7	Pass
							5.2 (b)	
Bottom Girt	ROHN TS1.5x16 ga	177	391.59	9931.96	3.9	Pass		
					5.6 (b)			
T6	100 - 80	Leg Diagonal	ROHN 2 STD	227	-34707.10	43813.60	79.2	Pass
			ROHN TS1.5x16 ga	247	-1418.68	5864.24	24.2	Pass
			ROHN TS1.5x16 ga	230	448.54	9931.96	4.5	Pass
		Top Girt	ROHN TS1.5x16 ga	230	448.54	9931.96	4.5	Pass
							6.4 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	234	607.13	9931.96	6.1	Pass
							8.7 (b)	
		Guy A@87.5912	7/16	495	9432.76	12480.00	75.6	Pass
Guy B@87.5912	7/16	494	9447.19	12480.00	75.7	Pass		
Guy C@87.5912	7/16	490	9447.60	12480.00	75.7	Pass		

tnxTower All-Points Technology Corporation 116 Grandview Road Conway, NH 03818 Phone: (603) 496-5853 FAX: (603) 447-2124	Job	190' ROHN Model 80 Guyed Tower	Page	7 of 7
	Project	CT1416060 Danielson 2	Date	12:16:22 09/07/17
	Client	Verizon	Designed by	Rob Adair

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	θP_{allow} lb	% Capacity	Pass Fail
		Top Guy	C4x5.4	492	3544.38	51516.00	6.9	Pass
T7	80 - 60	Pull-Off@87.5912						
		Leg	ROHN 2 X-STR	284	-36561.40	59911.50	61.0	Pass
		Diagonal	ROHN TS1.5x16 ga	334	-902.72	5864.24	15.4	Pass
		Top Girt	ROHN TS1.5x16 ga	286	420.87	9931.96	4.2	Pass
						6.0 (b)		
		Bottom Girt	ROHN TS1.5x16 ga	290	372.83	9931.96	3.8	Pass
						9.0 (b)		
T8	60 - 40	Leg	ROHN 2.5 STD	341	-39971.10	58406.30	68.4	Pass
		Diagonal	ROHN TS1.5x16 ga	349	-2039.37	5944.25	34.3	Pass
		Top Girt	ROHN TS1.5x16 ga	345	-423.30	7048.85	6.0	Pass
								7.5 (b)
		Bottom Girt	ROHN TS1.5x16 ga	346	822.97	9931.96	8.3	Pass
						11.7 (b)		
		Guy A@45.1824	3/8	501	6760.67	9240.00	73.2	Pass
		Guy B@45.1824	3/8	500	6777.17	9240.00	73.3	Pass
		Guy C@45.1824	3/8	496	6771.92	9240.00	73.3	Pass
		Top Guy	C4x5.4	497	3331.10	51516.00	6.5	Pass
		Pull-Off@45.1824						
T9	40 - 20	Leg	ROHN 2.5 STD	374	-42536.50	58406.30	72.8	Pass
		Diagonal	ROHN TS1.5x16 ga	403	-1702.50	5944.25	28.6	Pass
		Top Girt	ROHN TS1.5x16 ga	376	-526.13	7048.85	7.5	Pass
								8.9 (b)
		Bottom Girt	ROHN TS1.5x16 ga	380	134.47	9931.96	1.4	Pass
						1.9 (b)		
T10	20 - 5	Leg	ROHN 2.5 STD	407	-42998.80	58806.50	73.1	Pass
		Diagonal	ROHN TS1.5x16 ga	416	-877.60	5969.72	14.7	Pass
		Top Girt	ROHN TS1.5x16 ga	411	132.34	9931.96	1.3	Pass
								1.9 (b)
		Bottom Girt	ROHN TS1.5x16 ga	413	2827.43	9931.96	28.5	Pass
						40.3 (b)		
T11	5 - 0	Leg	ROHN 2.5 X-STR	434	-48011.90	93716.70	51.2	Pass
		Top Girt	C15x33.9	436	7400.14	322704.00	2.3	Pass
		Bottom Girt	C15x33.9	440	-3737.67	322704.00	1.2	Pass
		Mid Girt	C15x33.9	443	-908.85	319555.00	0.3	Pass
						Summary		
						Leg (T6)	79.2	Pass
						Diagonal (T4)	67.3	Pass
						Horizontal (T11)	25.0	Pass
						Top Girt (T4)	27.8	Pass
						Bottom Girt (T10)	40.3	Pass
						Mid Girt (T11)	0.3	Pass
						Guy A (T6)	75.6	Pass
						Guy B (T6)	75.7	Pass
						Guy C (T6)	75.7	Pass
						Top Guy Pull-Off (T6)	6.9	Pass
						Torque Arm Top (T4)	85.1	Pass
						Bolt Checks	68.3	Pass
						RATING =	85.1	Pass

All-Points Technology Corp., P.C.

116 Grandview Road
Conway, NH 03818
(603) 496-5853

Client: **Verizon Wireless**
Job: **Killingly, CT**
Calculated By: **R. Adair**

Site: **Danielson 2**
Job No.: **CT1416060**
Date: **06-Sep-17**

References: Navy Design Manual DM 7.2, page 7.2-172
TIA-222, Structural Standards for Towers...

Inner Deadman Anchor Analysis

Program assumes:

Unit weight of concrete =	150 pcf
Submerged unit wt of concrete =	87.5 pcf
Unit weight of soil =	100 pcf
Submerged unit weight of soil =	37.6 pcf
Kp =	3.0

Information to be provided:

phi = Angle of internal friction	phi=	30.0 degrees	(Table 1 Page 7.2-63)
H = Height from ground surface to bottom of anchor	H=	6.0 feet	
w = Depth from ground surface to water table	w=	6.0 feet	
y = Height of trial deadman block	y=	2.0 feet	
x = Width of trial deadman block	x=	4.0 feet	
z = Length of trial deadman block	z=	7.0 feet	
R _H = Horizontal reaction to be resisted	R _H =	11.3 kips	
R _V = Vertical reaction to be resisted	R _V =	11.3 kips	
S.F. = Safety factor to be used	S.F.=	1.00	

Input satisfactory

UPLIFT RESISTANCE:

Overburden Weight =	25.62 kips
Concrete Weight =	8.40 kips
Total Uplift Resistance =	34.02 kips

Block Size Satisfactory

HORIZONTAL RESISTANCE:

Effective stress at top of block =	1200 psf
Effective stress at G.W.T =	1800 psf
Effective stress at bottom of block =	1800 psf
Total Horizontal Resistance=	21.00 kips

Block Size Satisfactory

Volume of Concrete: (per anchor) **2.1 c.y.**

All-Points Technology Corp., P.C.

116 Grandview Road
Conway, NH 03818
(603) 496-5853

Client: **Verizon Wireless**
Job: **Killingly, CT**
Calculated By: **R. Adair**

Site: **Danielson 2**
Job No.: **CT1416060**
Date: **06-Sep-17**

References: Navy Design Manual DM 7.2, page 7.2-172
TIA-222, Structural Standards for Towers...

Outer Deadman Anchor Analysis

Program assumes:

Unit weight of concrete =	150 pcf
Submerged unit wt of concrete =	87.5 pcf
Unit weight of soil =	100 pcf
Submerged unit weight of soil =	37.6 pcf
Kp =	3.0

Information to be provided:

phi = Angle of internal friction	phi=	30.0 degrees	(Table 1 Page 7.2-63)
H = Height from ground surface to bottom of anchor	H=	10.0 feet	
w = Depth from ground surface to water table	w=	10.0 feet	
y = Height of trial deadman block	y=	2.0 feet	
x = Width of trial deadman block	x=	4.0 feet	
z = Length of trial deadman block	z=	7.0 feet	
R _H = Horizontal reaction to be resisted	R _H =	18.7 kips	
R _V = Vertical reaction to be resisted	R _V =	30.0 kips	
S.F. = Safety factor to be used	S.F.=	1.00	

Input satisfactory

UPLIFT RESISTANCE:

Overburden Weight =	97.11 kips
Concrete Weight =	8.40 kips
Total Uplift Resistance =	105.51 kips

Block Size Satisfactory

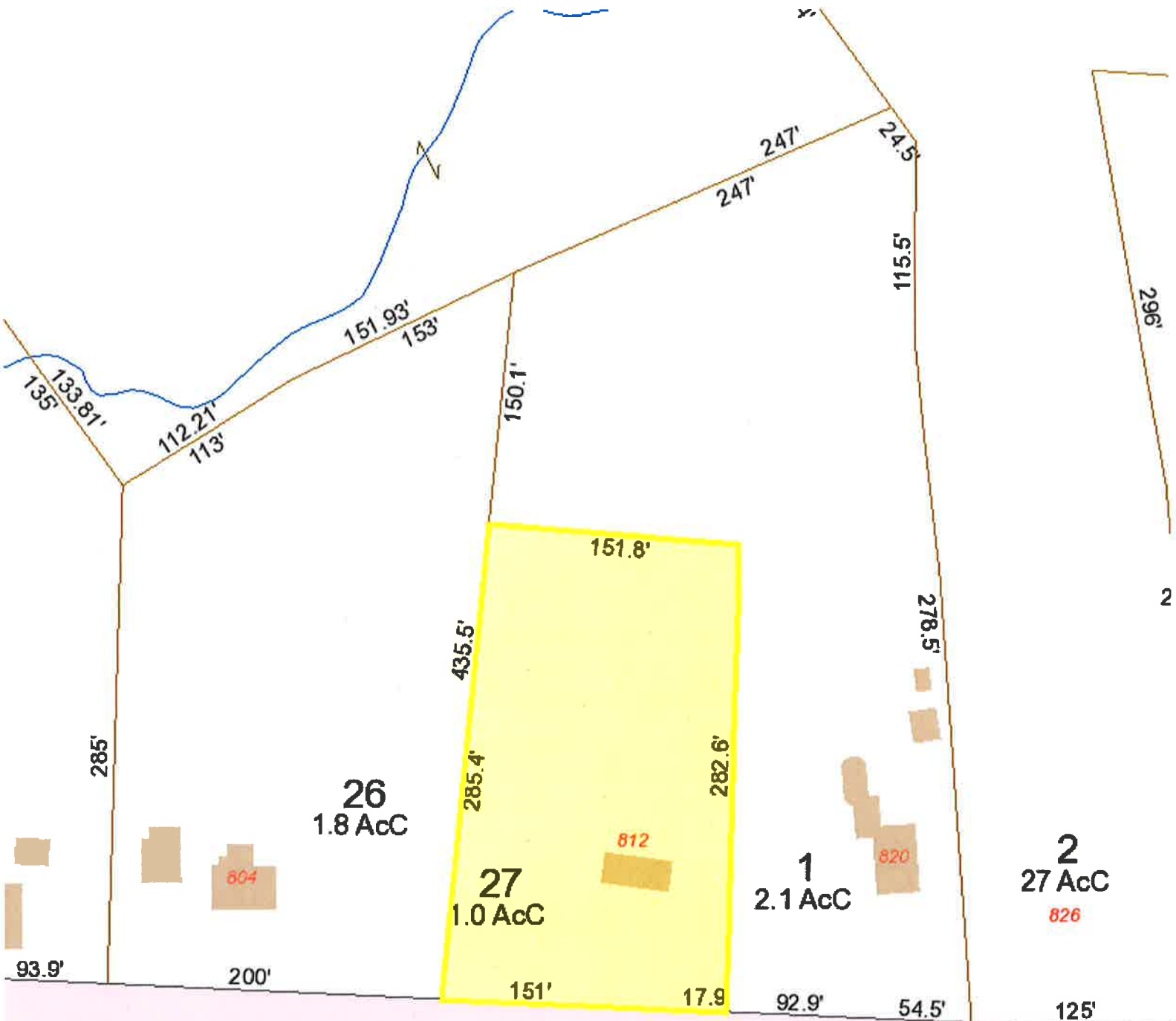
HORIZONTAL RESISTANCE:

Effective stress at top of block =	2400 psf
Effective stress at G.W.T =	3000 psf
Effective stress at bottom of block =	3000 psf
Total Horizontal Resistance=	37.80 kips

Block Size Satisfactory

Volume of Concrete: (per anchor) **2.1 c.y.**

ATTACHMENT 4



Situs : 812 PROVIDENCE PIKE

Map ID: 001389

Class : Charitable Organizations under

Card: 1 of 1

Printed: April 27, 2017

CURRENT OWNER

QUINEBAUG VALLEY EMERGENCY
COMMUNICATIONS INC
1249 HARTFORD PIKE
KILLINGLY CT 06239

GENERAL INFORMATION

Living Units 112
Neighborhood 212-27
Alternate Id 652/315
Vol / Pg 7
District RURAL DEVELOPMENT
Zoning EXEMPT
Class

Property Notes

COMMUNICATION TOWER 20X40 BLDGE
& 1 SHELTER FOR QV/EC THE OTHER
VERIZON - NOT EXEMPT 7200

Land Influence Factors

Type	Size	Influence	%	Value
Primary	AC 1.0000	Traffic	-10	16,200

Total Acres: 1
Spot:

Location:

Assessment Information

	Assessed	Appraised	Cost	Income	Market
Land	11,340	16,200	16,200	0	0
Building	149,660	213,800	213,800	0	0
Total	161,000	230,000	230,000	0	0

Value Flag COST APPROACH Base Date of Value 10/01/2013
TOWER ON SLAB 20000 Effective Date of Value 10/01/2017
Manual Override Reason

Entrance Information

Date	ID	Entry Code	Source
06/19/12	DB	Complete	Other

Permit Information

Date Issued	Number	Price	Purpose	% Complete
03/03/17	25119	500	BLDG	997
02/28/17	25111	21,000	81 CELE	997
05/15/15	23589	3,000	BLDG	997
05/07/15	23567	15,000	72 OREN	997
07/29/14	23078	345,000	51 BLDG	100

Sales/Ownership History

Transfer Date 04/01/96 Price Type 15,000 Land Only

Deed Reference

Deed Type

Grantee

Situs : 812 PROVIDENCE PIKE

Parcel Id: 001389

Class : Charitable Organizations under *

Card: 1 of 1

Printed: April 27, 2017

Building Information

Year Built/Eff Year /
 Building #
 Structure Type
 Identical Units
 Total Units
 Grade
 # Covered Parking
 # Uncovered Parking
 DBA

Building Other Features

Line Type +/- Meas1 Meas2 # Stops Ident Units Line Type +/- Meas1 Meas2 # Stops Ident Units

Interior/Exterior Information

Line Level From - To Int Fin Area Perim Use Type Wall Height Ext Walls Construction Partitions Heating Cooling Plumbing Physical Functional

Interior/Exterior Valuation Detail

Line Area Use Type % Good % Complete Use Value/RCNLD

Outbuilding Data

Line	Type	Yr Blt	Meas1	Meas2	Qty	Area	Grade	Phy Fun	Value
1	Mas Garage	2000	20	40	1	800	D	A	15,710
2	Fence Chai	2000	1	4,000	1	4,000	C	3	6,270
3	Tower Cell	2014	1	160	1	160	C	3	150,400
4	Gar-1s Stq	2015	12	25	1	300	C	3	10,290
5	Gar-1s Stq	2015	12	27	1	324	C	3	11,110



COMMERCIAL PROPERTY RECORD CARD 2017

TOWN OF KILLINGLY

Situs : 812 PROVIDENCE PIKE

Parcel Id: 001389

Class : Charitable Organizations under *

Card: 1 of 1

Printed: April 27, 2017

Additional Property Photos

Situs : 812 PROVIDENCE PIKE

Parcel Id: 001389

Class : Charitable Organizations under

Card: 1 of 1

Printed: April 27, 2017

Income Detail (Includes all Buildings on Parcel)

Use Mod Grp Type	Inc Model ModDescription	Units	Net Area	Income Rate	Econ Adjust	Potential Gross Income	Vac Model Adj	Vac Additional Income	Effective Gross Income	Expense Model %	Expense Adj %	Expense	Other Expenses	Total Expenses	Net Operating Income
---------------------	-----------------------------	-------	----------	-------------	-------------	------------------------	---------------	-----------------------	------------------------	-----------------	---------------	---------	----------------	----------------	----------------------

Apartment Detail - Building 1 of 1

Line	Use Type	Per Bldg	Beds	Baths	Units	Rent	Income
------	----------	----------	------	-------	-------	------	--------

Building Cost Detail - Building 1 of 1

Total Gross Building Area	
Replace, Cost New Less Depr	
Percent Complete	100
Number of Identical Units	
Economic Condition Factor	
Final Building Value	
Value per SF	0.00

Notes - Building 1 of 1

Income Summary (Includes all Building on Parcel)
Total Gross Rent Area
Total Gross Building Area

ATTACHMENT 5



Certificate of Mailing — Firm

Name and Address of Sender

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

TOTAL NO.
of Pieces Listed by Sender

3

TOTAL NO.
of Pieces Received at Post Office™

3

Affix Stamp Here
Postmark with Date of Receipt.

neopost
12/22/2017
US POSTAGE \$002.38
ZIP 06103
04112203380

Postmaster, per (name of receiving employee)

NP

USPS® Tracking Number
Firm-specific Identifier

Address
(Name, Street, City, State, and ZIP Code™)

Postage

Fee

Special Handling

Parcel Airlift

1.

Sean Hendricks, Town Manager
Town of Killingly
172 Main Street
P.O. Box 6000
Killingly, CT 06239-6000

2.

Ann-Marie L. Aubrey, Director of Planning and
Development
Town of Killingly
172 Main Street
P.O. Box 6000
Killingly, CT 06239-6000

3.

Quinebang Valley Emergency
Communications, Inc.
1249 Hartford Pike
East Killingly, CT 06243

4.

5.

6.

