Robinson+Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

September 8, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
**153 Forbes Avenue, New Haven, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a telecommunications facility on the roof of the building at 153 Forbes Avenue in New Haven Connecticut (the "Property"). The Council approved Cellco's use of this facility in 1990 (Petition No. 329) and, therefore, retains jurisdiction over this façade-mounted installation. Cellco's Forbes Street facility consists of twelve (12) wireless telecommunications antennas on the existing building at a centerline height of 70'-10" above ground level.

Cellco now intends to modify its facility by replacing six (6) of its antennas with three (3) model SBNHH-1D45B, 700 MHz antennas and three (3) model SBNHH-1D45B, 2100 MHz antennas, at the same locations and at the same height as the existing antennas on the building. Cellco also intends to install three (3) remote radio heads ("RRHs"), behind its 700 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being sent to New Haven Mayor, Toni Harp. A copy of this letter is also being sent to C&D Investments LLC, the owner of the Property.

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

15162666-v1

Robinson+Cole



1. The proposed modifications will not result in an increase in the height of the existing structure or the antennas on the existing structure. Cellco's replacement antennas and RRHs will remain at a centerline height of 70'-10" above ground level.

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. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions standards established by the FCC.

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

6. The building façade can support Cellco's proposed modifications. (*See* Structural Evaluation Letter included in Attachment 3).

A copy of the City Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Toni Harp, New Haven Mayor
C&D Investments LLC
Tim Parks

# ATTACHMENT 1

# Product Specifications

COMMSCOPE®

## SBNHH-1D45B

**Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 45° horizontal beamwidth, internal RETs.**

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

## Electrical Specifications

| Frequency Band, MHz | 698–806 | 806–896 | 1695–1880 | 1850–1990 | 1920–2200 | 2300–2360 |
|---|---|---|---|---|---|---|
| Gain, dBi | 16.9 | 17.6 | 19.6 | 20.1 | 20.5 | 21.0 |
| Beamwidth, Horizontal, degrees | 47 | 43 | 45 | 42 | 42 | 39 |
| Beamwidth, Vertical, degrees | 12.4 | 11.4 | 5.8 | 5.3 | 5.1 | 4.5 |
| Beam Tilt, degrees | 0–14 | 0–14 | 0–8 | 0–8 | 0–8 | 0–8 |
| USLS (First Lobe), dB | 16 | 16 | 18 | 17 | 17 | 16 |
| Front-to-Back Ratio at 180°, dB | 34 | 33 | 35 | 37 | 37 | 39 |
| 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 | 16.6 | 17.3 | 19.2 | 19.8 | 20.1 | 20.8 |
| Gain by all Beam Tilts Tolerance, dB | ±0.4 | ±0.3 | ±0.5 | ±0.4 | ±0.5 | ±0.4 |
| Gain by Beam Tilt, average, dBi | 0 ° \| 16.6 | 0 ° \| 17.3 | 0 ° \| 19.3 | 0 ° \| 19.9 | 0 ° \| 20.1 | 0 ° \| 20.7 |
| | 7 ° \| 16.7 | 7 ° \| 17.4 | 4 ° \| 19.3 | 4 ° \| 19.9 | 4 ° \| 20.2 | 4 ° \| 20.9 |
| | 14 ° \| 16.4 | 14 ° \| 17.1 | 8 ° \| 19.0 | 8 ° \| 19.6 | 8 ° \| 20.0 | 8 ° \| 20.4 |
| Beamwidth, Horizontal Tolerance, degrees | ±1.5 | ±2.8 | ±2.1 | ±1.7 | ±1 | ±1.7 |
| Beamwidth, Vertical Tolerance, degrees | ±0.8 | ±0.6 | ±0.3 | ±0.2 | ±0.4 | ±0.1 |
| USLS, beampeak to 20° above beampeak, dB | 19 | 23 | 16 | 15 | 16 | 16 |
| Front-to-Back Total Power at 180° ± 30°, dB | 24 | 24 | 28 | 30 | 31 | 30 |
| CPR at Boresight, dB | 28 | 29 | 23 | 24 | 20 | 19 |
| CPR at 10 dB Horizontal Beamwidth, dB | 13 | 17 | 13 | 13 | 13 | 13 |

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

## General Specifications

| | |
|---|---|
| Antenna Type | Sector with internal RET |
| Band | Multiband |
| Brand | DualPol® |
| Operating Frequency Band | 1695 – 2360 MHz \| 698 – 896 MHz |
| Performance Note | Outdoor usage |

## Mechanical Specifications

| | |
|---|---|
| Color | Light gray |
| Lightning Protection | dc Ground |

©2016 CommScope, Inc. All rights reserved. All trademarks identified by ® or ™ are registered trademarks, respectively, of CommScope.
All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: July 7, 2016

# Product Specifications

COMMSCOPE®

SBNHH-1D45B

| | |
|---|---|
| Radiator Material | Aluminum \| Low loss circuit board |
| Radome Material | Fiberglass, UV resistant |
| Reflector Material | Aluminum |
| RF Connector Interface | 7-16 DIN Female |
| RF Connector Location | Bottom |
| RF Connector Quantity, total | 6 |
| Wind Loading, frontal | 1038.0 N @ 150 km/h<br>233.4 lbf @ 150 km/h |
| Wind Loading, lateral | 234.0 N @ 150 km/h<br>52.6 lbf @ 150 km/h |
| Wind Loading, rear | 1091.0 N @ 150 km/h<br>245.3 lbf @ 150 km/h |
| Wind Speed, maximum | 241 km/h \| 150 mph |

## Dimensions

| | |
|---|---|
| Depth | 178.0 mm \| 7.0 in |
| Length | 1829.0 mm \| 72.0 in |
| Width | 457.0 mm \| 18.0 in |
| Net Weight, without mounting kit | 29.2 kg \| 64.4 lb |

## Remote Electrical Tilt (RET) Information

| | |
|---|---|
| Input Voltage | 10–30 Vdc |
| Internal RET | High band (2) \| 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

| | |
|---|---|
| Depth | 311.0 mm \| 12.2 in |
| Length | 1950.0 mm \| 76.8 in |
| Width | 567.0 mm \| 22.3 in |
| Shipping Weight | 42.5 kg \| 93.7 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 |

©2016 CommScope, Inc. All rights reserved. All trademarks identified by ® or ™ are registered trademarks, respectively, of CommScope.
All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: July 7, 2016

# Product Specifications

COMMSCOPE®

SBNHH-1D45B

## 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 |

©2016 CommScope, Inc. All rights reserved. All trademarks identified by ® or ™ are registered trademarks, respectively, of CommScope.
All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: July 7, 2016

# ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

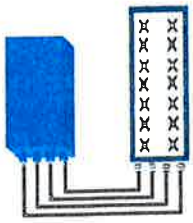
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

## FEATURES

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

## BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

## TECHNICAL SPECIFICATIONS

| Features & performance | |
|---|---|
| Number of TX/RX paths | 4 duplexed (either 4T4R or 2T4R by SW) |
| Frequency band | U700 (C) (3GPP bands 13):<br>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.)<br>Volume in L<br>Weight in kg (lb) (w/o mounting HW) | 550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)<br>38 (with solar shield)<br>26 (57.2) (with solar shield) |
| DC voltage range<br>DC power consumption | -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption<br>550W typical @100% RF load ( in 2Tx or 4TX mode) |
| Environmental conditions<br><br>Wind load (@150km/h or 93mph) | -40°C (-40°F) /+55°C (+131°F)<br>IP65<br>Frontal: <200N / Lateral : <150N |
| Antenna ports | 4 ports 7/16 DIN female (50 ohms)<br>VSWR < 1.5 |
| CPRI ports | 2 CPRI ports (HW ready for Rate7, 9.8 Gbps)<br>SFP single mode dual fiber |
| AISG interfaces | 1 AISG2.0 output (RS485)<br>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 |

**www.alcatel-lucent.com** Alcatel, Lucent, Alcatel-Lucent and the Alcatel-Lucent logo are trademarks of Alcatel-Lucent. All other trademarks are the property of their respective owners. The information presented is subject to change without notice. Alcatel-Lucent assumes no responsibility for inaccuracies contained herein.
**Copyright © 2014 Alcatel-Lucent. All Rights Reserved**

# Product Data Sheet HB158-1-08U8-S8J18

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

### Product Description

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

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

Figure 1: HYBRIFLEX Series

### Features/Benefits

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

### Technical Specifications

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

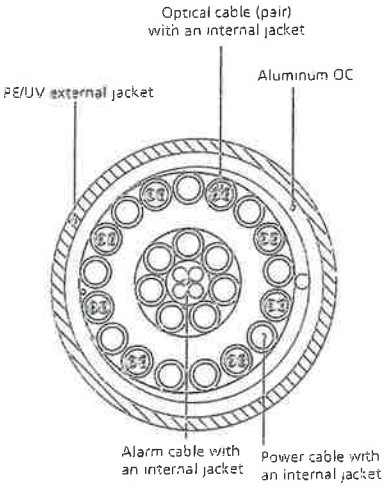



Figure 2: Construction Detail

* This data is provisional and subject to change



All information contained in the present datasheet is subject to confirmation at time of ordering.

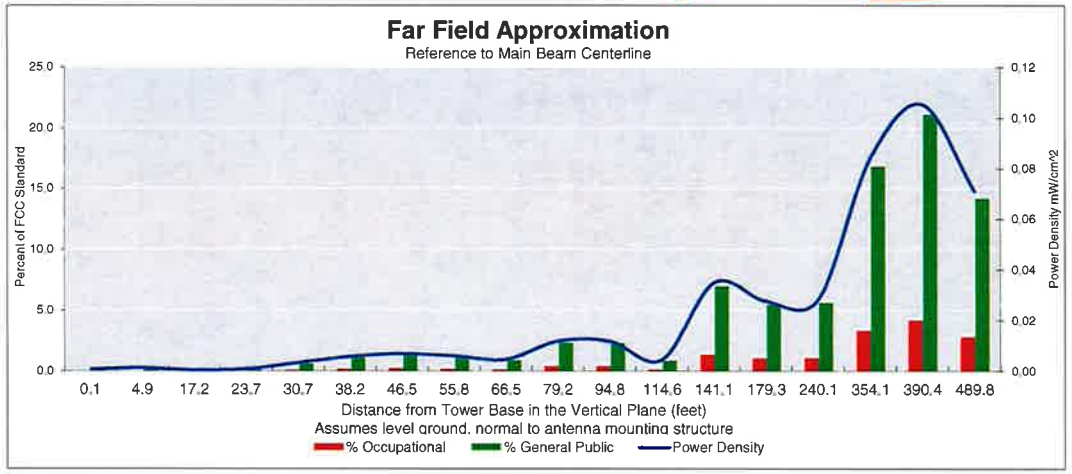
# ATTACHMENT 2

Far Field Approximation
with downtilt variation

**Estimated Radiated Emission**
**Single Emitter Far Field Model**
**Dipole/Wire/Yagi Antenna Types**

| | |
|---|---|
| Location: | **NEW HAVEN E CT** |
| Site #: | 2-0207 |
| Date: | 08/29/16 |
| Name: | Jaime Laredo |
| File Name: | NEW HAVEN E CT - FF POWER (LTE-700).xlsx |

| | |
|---|---|
| Operating Freq. (MHz): | **746.0** |
| Antenna Height (ft): | **71.8** |
| Antenna Gain (dBi): | **16.8** |
| Antenna Size (in.): | **72.0** |
| Downtilt (degrees): | **6.0** |
| Feedline Loss (dB): | **0.0** |
| ERP (W): | **1656.9** |
| No. of Channels: | **1** |




| Calc Angle | 90.0 | 86.0 | 76.0 | 71.0 | 66.0 | 61.0 | 56.0 | 51.0 | 46.0 | 41.0 | 36.0 | 31.0 | 26.0 | 21.0 | 16.0 | 11.0 | 10.0 | 8.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solve for r, dx to antenna | 68.8 | 69.0 | 70.9 | 72.8 | 75.3 | 78.7 | 83.0 | 88.6 | 95.7 | 104.9 | 117.1 | 133.6 | 157.0 | 192.1 | 249.7 | 360.8 | 396.4 | 494.6 |
| Distance from Antenna Structure Base in Horizontal plane | 0.1 | 4.9 | 17.2 | 23.7 | 30.7 | 38.2 | 46.5 | 55.8 | 66.5 | 79.2 | 94.8 | 114.6 | 141.1 | 179.3 | 240.1 | 354.1 | 390.4 | 489.8 |
| Angle from Main Beam (reference to horizontal plane) | 90 | 80 | 70 | 65 | 60 | 55 | 50 | 45 | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 4 | 2 |
| dB down from centerline (referenced to centerline) | 36.76 | 34.35 | 38.52 | 35.34 | 29.54 | 26.8 | 25.59 | 25.63 | 25.99 | 21.21 | 20.29 | 23.24 | 13.03 | 12.3 | 9.92 | 2 | 0.2 | 0 |
| Reflection Coefficient (1 to 4, 2.56 typical) | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 |
| Power Density (mW/cm^2) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.04 | 0.03 | 0.03 | 0.08 | 0.11 | 0.07 |
| Percent of Occupational Standard | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.3 | 0.2 | 0.2 | 0.5 | 0.5 | 0.2 | 1.4 | 1.1 | 1.1 | 3.4 | 4.2 | 2.9 |
| Percent of General Population Standard | 0.2 | 0.3 | 0.1 | 0.2 | 0.7 | 1.2 | 1.4 | 1.2 | 1.0 | 2.4 | 2.4 | 0.9 | 7.0 | 5.6 | 5.7 | 16.9 | 21.2 | 14.3 |

Antenna Type: **SBNHH-1D45B**

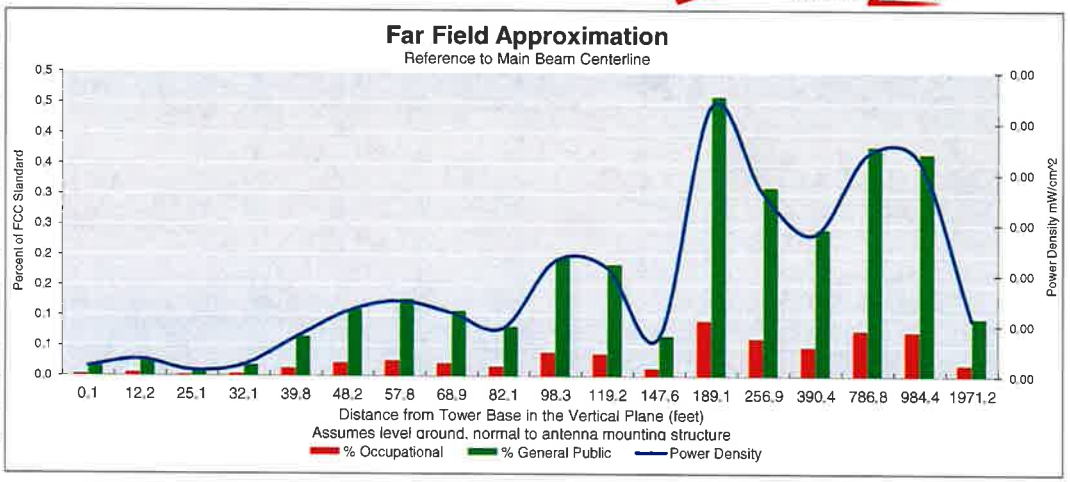
Max%: **21.21%**

Far Field Approximation
with downtilt variation

**Estimated Radiated Emission**
**Single Emitter Far Field Model**
**Dipole/Wire/Yagi Antenna Types**

| | |
|---|---|
| Location: | **NEW HAVEN E CT** |
| Site #: | 2-0207 |
| Date: | 08/29/16 |
| Name: | Jaime Laredo |
| File Name: | NEW HAVEN E CT - FF POWER (Cellular).xlsx |

| | |
|---|---|
| Operating Freq. (MHz): | **869.0** |
| Antenna Height (ft): | **71.8** |
| Antenna Gain (dBi): | **15.2** |
| Antenna Size (in.): | **47.4** |
| Downtilt (degrees): | **0.0** |
| Feedline Loss (dB): | **0.0** |
| ERP (W): | **301.8** |
| No. of Channels: | **9** |




| Calc Angle | 90.0 | 80.0 | 70.0 | 65.0 | 60.0 | 55.0 | 50.0 | 45.0 | 40.0 | 35.0 | 30.0 | 25.0 | 20.0 | 15.0 | 10.0 | 5.0 | 4.0 | 2.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solve for r, dx to antenna | 68.8 | 69.9 | 73.2 | 75.9 | 79.5 | 84.0 | 89.8 | 97.3 | 107.1 | 120.0 | 137.7 | 162.9 | 201.3 | 266.0 | 396.4 | 789.8 | 986.8 | 1972.4 |
| Distance from Antenna Structure Base in Horizontal plane | 0.1 | 12.2 | 25.1 | 32.1 | 39.8 | 48.2 | 57.8 | 68.9 | 82.1 | 98.3 | 119.2 | 147.6 | 189.1 | 256.9 | 390.4 | 786.8 | 984.4 | 1971.2 |
| Angle from Main Beam (reference to horizontal plane) | 90 | 80 | 70 | 65 | 60 | 55 | 50 | 45 | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 4 | 2 |
| dB down from centerline (referenced to centerline) | 36.76 | 34.35 | 38.52 | 35.34 | 29.54 | 26.8 | 25.59 | 25.63 | 25.99 | 21.21 | 20.29 | 23.24 | 13.03 | 12.3 | 9.92 | 2 | 0.2 | 0 |
| Reflection Coefficient (1 to 4, 2.56 typical) | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 |
| Power Density (mW/cm^2) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Percent of Occupational Standard | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 |
| Percent of General Population Standard | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.5 | 0.3 | 0.2 | 0.4 | 0.4 | 0.1 |

Antenna Type: **BXA-80063-4CF**

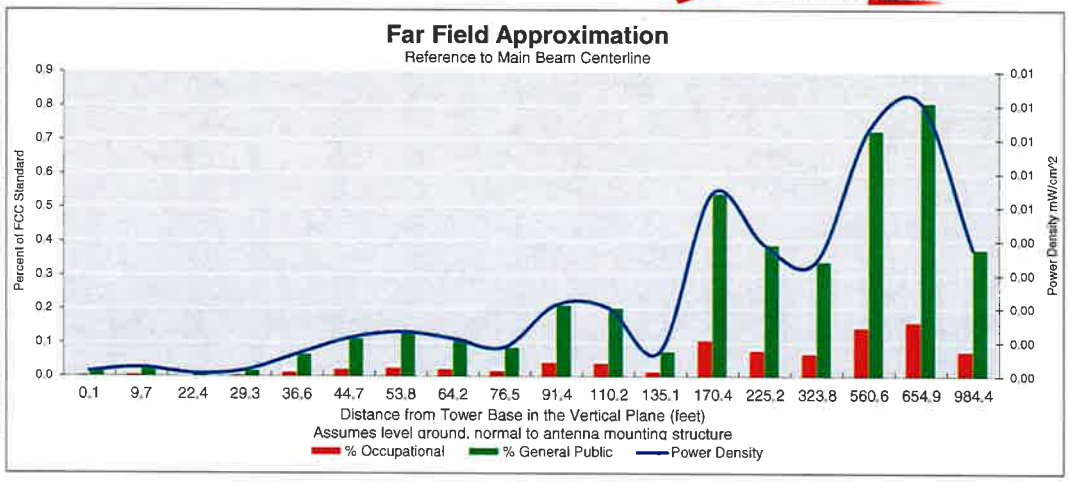
Max%: **0.46%**

Far Field Approximation
with downtilt variation

**Estimated Radiated Emission**
**Single Emitter Far Field Model**
**Dipole/Wire/Yagi Antenna Types**

| | |
|---|---|
| Location: | **NEW HAVEN E CT** |
| Site #: | 2-0207 |
| Date: | 08/29/16 |
| Name: | Jaime Laredo |
| File Name: | NEW HAVEN E CT - FF POWER (PCS).xlsx |

| | |
|---|---|
| Operating Freq. (MHz): | **1970.0** |
| Antenna Height (ft): | **71.8** |
| Antenna Gain (dBi): | **17.1** |
| Antenna Size (in.): | **48.5** |
| Downtilt (degrees): | **2.0** |
| Feedline Loss (dB): | **0.0** |
| ERP (W): | **329.5** |
| No. of Channels: | **7** |




| Calc Angle | 90.0 | 82.0 | 72.0 | 67.0 | 62.0 | 57.0 | 52.0 | 47.0 | 42.0 | 37.0 | 32.0 | 27.0 | 22.0 | 17.0 | 12.0 | 7.0 | 6.0 | 4.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solve for r, dx to antenna | 68.8 | 69.5 | 72.4 | 74.8 | 77.9 | 82.1 | 87.3 | 94.1 | 102.9 | 114.4 | 129.9 | 151.6 | 183.7 | 235.4 | 331.1 | 564.8 | 658.5 | 986.8 |
| Distance from Antenna Structure Base in Horizontal plane | 0.1 | 9.7 | 22.4 | 29.3 | 36.6 | 44.7 | 53.8 | 64.2 | 76.5 | 91.4 | 110.2 | 135.1 | 170.4 | 225.2 | 323.8 | 560.6 | 654.9 | 984.4 |
| Angle from Main Beam (reference to horizontal plane) | 90 | 80 | 70 | 65 | 60 | 55 | 50 | 45 | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 4 | 2 |
| dB down from centerline (referenced to centerline) | 36.76 | 34.35 | 38.52 | 35.34 | 29.54 | 26.8 | 25.59 | 25.63 | 25.99 | 21.21 | 20.29 | 23.24 | 13.03 | 12.3 | 9.92 | 2 | 0.2 | 0 |
| Reflection Coefficient (1 to 4, 2.56 typical) | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 |
| Power Density (mW/cm^2) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 |
| Percent of Occupational Standard | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| Percent of General Population Standard | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.5 | 0.4 | 0.3 | 0.7 | 0.8 | 0.4 |

Antenna Type: **BXA-171063-8BF**

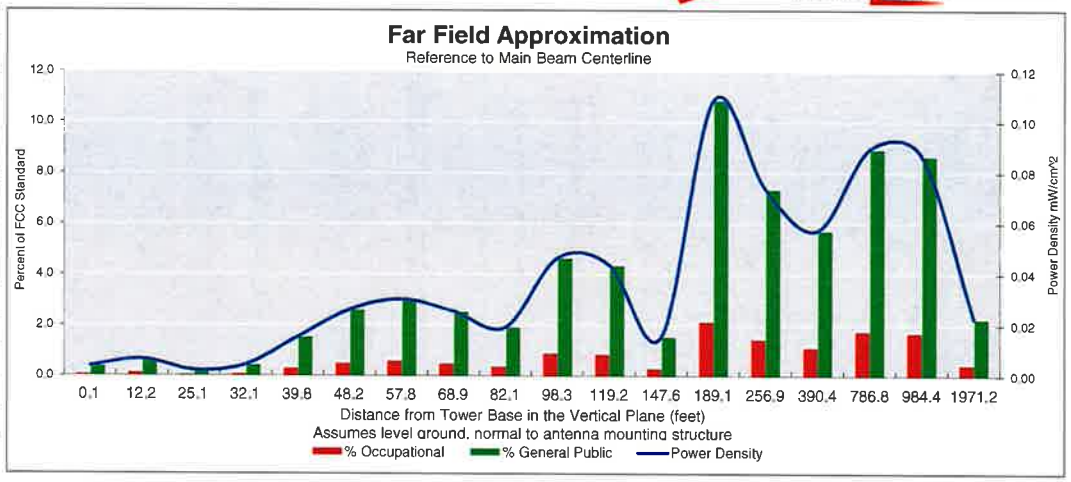
Max%: **0.81%**

Far Field Approximation
with downtilt variation

**Estimated Radiated Emission**
**Single Emitter Far Field Model**
**Dipole/Wire/Yagi Antenna Types**

| | |
|---|---|
| Location: | NEW HAVEN E CT |
| Site #: | 2-0207 |
| Date: | 08/29/16 |
| Name: | Jaime Laredo |
| File Name: | NEW HAVEN E CT - FF POWER (LTE-AWS).xlsx |

| | |
|---|---|
| Operating Freq. (MHz): | **2145.0** |
| Antenna Height (ft): | **71.8** |
| Antenna Gain (dBi): | **20.4** |
| Antenna Size (in.): | **72.0** |
| Downtilt (degrees): | **0.0** |
| Feedline Loss (dB): | **0.0** |
| ERP (W): | **3706.4** |
| No. of Channels: | **1** |




| Calc Angle | 90.0 | 80.0 | 70.0 | 65.0 | 60.0 | 55.0 | 50.0 | 45.0 | 40.0 | 35.0 | 30.0 | 25.0 | 20.0 | 15.0 | 10.0 | 5.0 | 4.0 | 2.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solve for r, dx to antenna | 68.8 | 69.9 | 73.2 | 75.9 | 79.5 | 84.0 | 89.8 | 97.3 | 107.1 | 120.0 | 137.7 | 162.9 | 201.3 | 266.0 | 396.4 | 789.8 | 986.8 | 1972.4 |
| Distance from Antenna Structure Base in Horizontal plane | 0.1 | 12.2 | 25.1 | 32.1 | 39.8 | 48.2 | 57.8 | 68.9 | 82.1 | 98.3 | 119.2 | 147.6 | 189.1 | 256.9 | 390.4 | 786.8 | 984.4 | 1971.2 |
| Angle from Main Beam (reference to horizontal plane) | 90 | 80 | 70 | 65 | 60 | 55 | 50 | 45 | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 4 | 2 |
| dB down from centerline (referenced to centerline) | 36.76 | 34.35 | 38.52 | 35.34 | 29.54 | 26.8 | 25.59 | 25.63 | 25.99 | 21.21 | 20.29 | 23.24 | 13.03 | 12.3 | 9.92 | 2 | 0.2 | 0 |
| Reflection Coefficient (1 to 4, 2.56 typical) | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 | 2.56 |
| Power Density (mW/cm^2) | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.03 | 0.03 | 0.03 | 0.02 | 0.05 | 0.04 | 0.02 | 0.11 | 0.07 | 0.06 | 0.09 | 0.09 | 0.02 |
| Percent of Occupational Standard | 0.1 | 0.1 | 0.0 | 0.1 | 0.3 | 0.5 | 0.6 | 0.5 | 0.4 | 0.9 | 0.9 | 0.3 | 2.2 | 1.5 | 1.1 | 1.8 | 1.7 | 0.5 |
| Percent of General Population Standard | 0.4 | 0.7 | 0.2 | 0.4 | 1.6 | 2.6 | 3.0 | 2.6 | 1.9 | 4.7 | 4.4 | 1.6 | 10.9 | 7.4 | 5.7 | 9.0 | 8.7 | 2.3 |

Antenna Type: **SBNHH-1D45B**

Max%: **10.88%**

# ATTACHMENT 3

CENTEK engineering

Centered on Solutions™

August 3, 2016

Mr. Tom Nolan
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

*Re: Structural Evaluation Letter ~ Antenna Upgrade*
*Verizon Wireless Site Ref ~ New Haven East*
*153 Forbes Avenue*
*New Haven, CT 06512*

*Centek Project No. 16001.23*

Dear Mr. Nolan,

Centek Engineering Inc. has reviewed the proposed Verizon Wireless antenna upgrade at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing 74-ft +/- tall host building to support the proposed modified antenna configuration. The existing installation consists of three (3) antenna sectors pipe mounted to the façade of the host building. The review considered the effects of wind load, dead load, ice load and seismic forces in accordance with the 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. **In order to accommodate the proposed Gamma azimuth orientation the existing Gamma PCS panel antenna shall be required to be relocated. Refer to DE-1 thru DE-7 dated 08/03/16 for mounting details.**

The existing, proposed and future Verizon Wireless loads considered in this analysis consist of the following:

- Verizon (Existing to be Remain):
  Antennas: Three (3) Antel BXA-171063-8BF panel antennas, three (3) Antel BXA-80063-4CF panel antennas, three (3) Alcatal-Lucent RRH2x40-AWS Remote Radio Heads and three (3) RFS DB-E1-3B-8AB-0Z sector distribution boxes pipe mounted to the façade of the host building with a RAD center elevation of 71-ft 10-in +/- AGL.
  Coax: Twelve (12) 1-5/8-in dia. coaxial cables routed within existing cable tray system.
- Verizon (Existing to be Remove):
  Antennas: Three (3) Antel BXA-171063-8BF panel antennas and three (3) Antel BXA-70040-6CF panel antennas pipe mounted to the façade of the host building with a RAD center elevation of 71-ft 10-in +/- AGL.
- **Verizon (Proposed):**
  **Antennas: Six (6) Commscope SBNHH-1D45B panel antennas pipe mounted to the façade of the host building with a RAD center elevation of 71-ft 10-in +/- AGL.**
- **Verizon (Proposed):**
  **Appurtenances: Three (3) Alcatel-Lucent RRH2x60-700U Remote Radio Heads mounted to the interior façade of the host building steeple on three (3) proposed structural steel support frames.**
  **Cables: One (1) 1-1/4" dia. Hybriflex Fiber jumper cables routed from the main distribution box to the sector distribution boxes. (All cables to follow the route of the existing cable tray system).**

The proposed antenna installation meets the requirements of the 2005 Connecticut State Building Code considering the basic wind speed (3-second gust) of 110 mph as required in Appendix K of the Connecticut supplement per Table 1609.3.1. Our findings are based on the assumption that the hosting structure, all structural members and appurtenances were properly designed, detailed, fabricated, installed and have been properly maintained since erection.

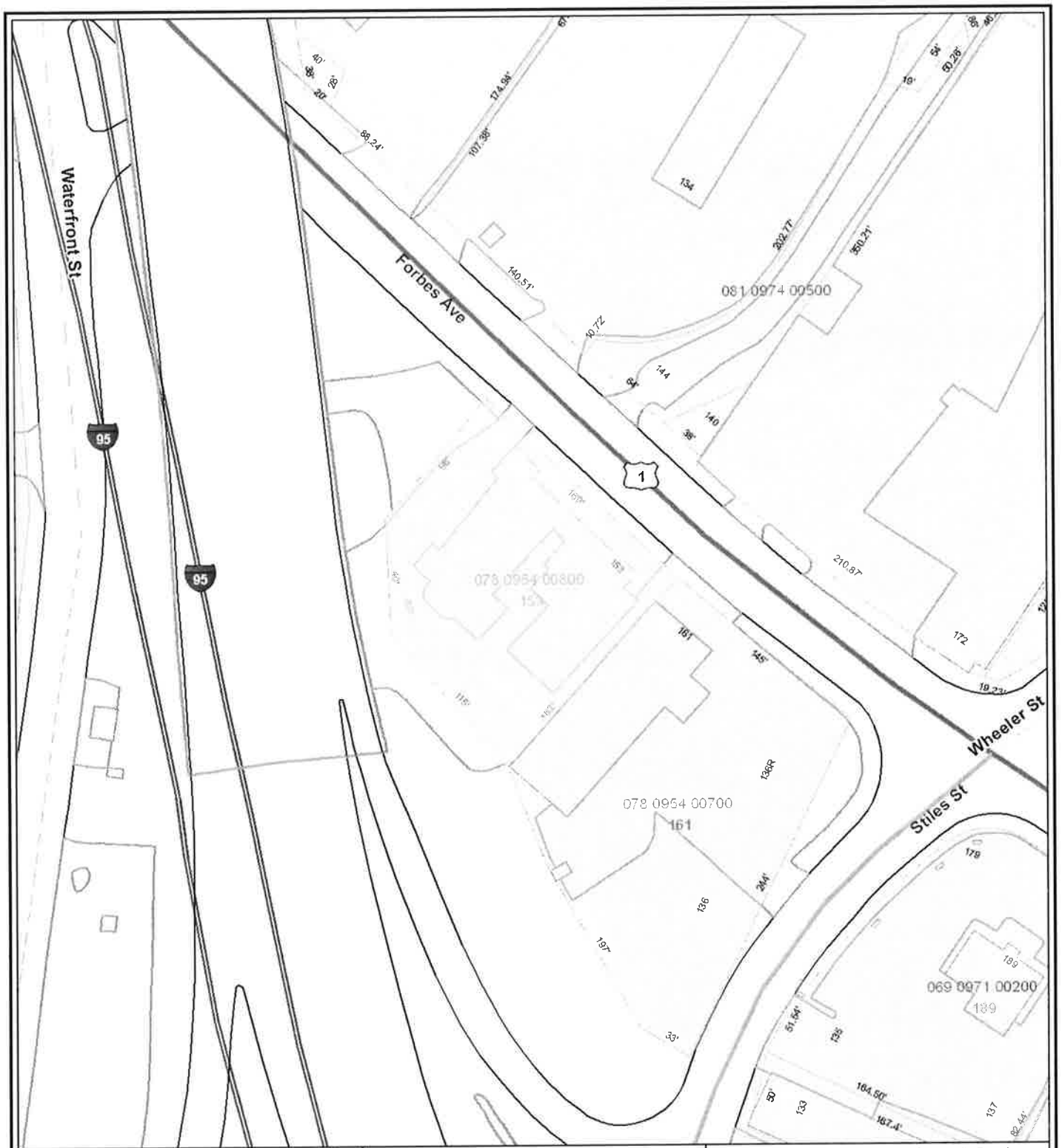
In conclusion, the proposed Verizon antenna upgrade will not negatively impact the structural integrity of the existing antenna support structure or host building. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 18884
LICENSED
PROFESSIONAL ENGINEER

# ATTACHMENT 4




City of New Haven, Connecticut
Toni N. Harp, Mayor

New Haven All-America City 2003

Produced by the
Office of Information Technology
Geographic Data Viewer

Fire Station
Police Station
PD Headquaters
Substation
Health Centers
Hospital
Library
Schools
Administration
Food Service
Private School
Public School
Railroad
Railroad Track
Abandoned Railroad Trac
Waterway
Lake - Pond
River
Shoreline
Stream
Wetland
Airport Runway
City Boundary Line
Developable Properties
Parks
Park
Triangle
Golf Course
Land Trust Preserves
Airport boundary
Parcel
Shoreline

This map is intended for illustrative and Community-Based Planning processes. Every reasonable effort has been made to assure the accuracy of the map and data provided; nevertheless, some information may not be accurate. The City of New Haven assumes no responsibility arising from the use of this information.

No warranty is made by the City of New Haven as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data compiled from various sources. Spatial information may not meet national map accuracy standards. This information may be updated without notification.

**Scale: 1" = 89 ft**

**Created: September 7, 2016**

N

# 153 FORBES AV

| | | | |
|---|---|---|---|
| **Location** | 153 FORBES AV | **Mblu** | 078/ 0954/ 00800/ / |
| **Acct#** | 078 0954 00800 | **Owner** | C & D INVESTMENTS INC |
| **Assessment** | $729,050 | **Appraisal** | $1,041,500 |
| **PID** | 3557 | **Building Count** | 1 |

## Current Value

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2015 | $957,700 | $83,800 | $1,041,500 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2015 | $670,390 | $58,660 | $729,050 |

## Owner of Record

| | | | |
|---|---|---|---|
| **Owner** | C & D INVESTMENTS INC | **Sale Price** | $500,000 |
| **Co-Owner** | | **Certificate** | |
| **Address** | 153 FORBES AV<br>NEW HAVEN, CT 06512 | **Book & Page** | 8149/ 43 |
| | | **Sale Date** | 02/07/2008 |
| | | **Instrument** | 10 |

## Ownership History

| Ownership History | | | | | |
|---|---|---|---|---|---|
| **Owner** | **Sale Price** | **Certificate** | **Book & Page** | **Instrument** | **Sale Date** |
| C & D INVESTMENTS INC | $500,000 | | 8149/ 43 | 10 | 02/07/2008 |
| CANESTRI LOUIS P | $0 | | 7167/ 264 | 2 | 04/29/2005 |
| CANESTRI LOUIS P | $0 | | | | 03/15/1967 |

## Building Information

### Building 1 : Section 1

| | |
|---|---|
| **Year Built:** | 1900 |
| **Living Area:** | 11,214 |
| **Replacement Cost:** | $1,425,716 |
| **Building Percent Good:** | 45 |
| **Replacement Cost Less Depreciation:** | $641,600 |

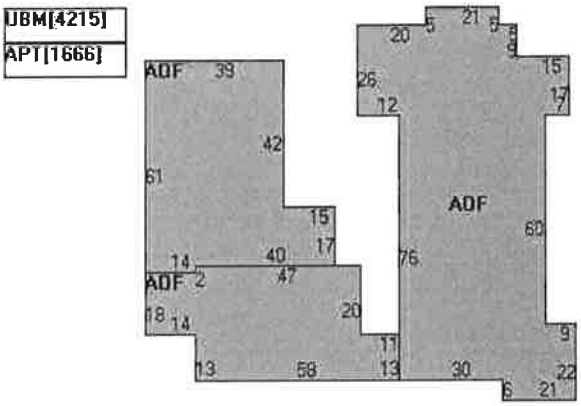
| Building Attributes | |
|---|---|
| **Field** | **Description** |
| STYLE | Mix Off Apt |
| MODEL | Commercial |
| Grade | Ave/Good |
| Stories: | 1 |
| Occupancy | 3 |
| Exterior Wall 1 | Stone |
| Exterior Wall 2 | |
| Roof Structure | Gable/Hip |
| Roof Cover | Slate |
| Interior Wall 1 | Drywall/Plaste |
| Interior Wall 2 | |
| Interior Floor 1 | Carpet |
| Interior Floor 2 | Vinyl/Asphalt |
| Heating Fuel | Oil/Gas |
| Heating Type | Hot Water |
| AC Type | Central |
| Bldg Use | MIXED USE MDL-94 |
| Total Rooms | |
| Total Bedrms | 00 |
| Total Baths | 0 |
| NBHD Code | |
| 1st Floor Use: | 3030 |
| Heat/AC | HEAT/AC SPLIT |
| Frame Type | MASONRY |
| Baths/Plumbing | AVERAGE |
| Ceiling/Wall | CEIL & WALLS |
| Rooms/Prtns | AVERAGE |
| Wall Height | 20 |
| % Comn Wall | |

## Building Photo

Building Photo

(http://images.vgsi.com/photos/NewHavenCTPhotos//\00\05\2:

## Building Layout




| Building Sub-Areas (sq ft) | | | Legend |
|---|---|---|---|
| **Code** | **Description** | **Gross Area** | **Living Area** |
| AOF | Office | 9,548 | 9,548 |
| APT | Apartment | 1,666 | 1,666 |
| UBM | Unfinished Basement | 4,215 | 0 |
| | | 15,429 | 11,214 |

## Extra Features

| Extra Features | Legend |
|---|---|
| No Data for Extra Features | |

## Land

### Land Use

### Land Line Valuation

| | | | |
|---|---|---|---|
| **Use Code** | 3030 | **Size (Acres)** | 0.59 |
| **Description** | MIXED USE MDL-94 | **Frontage** | 0 |
| **Zone** | IH | **Depth** | 0 |
| **Neighborhood** | IND5 | **Assessed Value** | $58,660 |
| **Alt Land Appr** | No | **Appraised Value** | $83,800 |
| **Category** | | | |

## Outbuildings

| Outbuildings | | | | | | Legend |
|---|---|---|---|---|---|---|
| **Code** | **Description** | **Sub Code** | **Sub Description** | **Size** | **Value** | **Bldg #** |
| SHD1 | SHED FRAME | | | 312 S.F. | $2,100 | 1 |
| PAV1 | PAVING-ASPHALT | | | 4000 S.F. | $4,000 | 1 |
| | CELL LEASE | | | 1 | $250,000 | 1 |
| BBS | BILLBOARD LOCATION | | | 1 UNITS | $60,000 | 1 |

## Valuation History

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2014 | $919,700 | $83,800 | $1,003,500 |
| 2013 | $919,700 | $83,800 | $1,003,500 |
| 2012 | $919,700 | $83,800 | $1,003,500 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2014 | $643,790 | $58,660 | $702,450 |
| 2013 | $643,790 | $58,660 | $702,450 |
| 2012 | $643,790 | $58,660 | $702,450 |

(c) 2016 Vision Government Solutions, Inc. All rights reserved.