CITY OF CHARLOTTESVILLE
"A World Class City"

Department of Neighborhood Development Services

City Hall Post Office Box 911
Charlottesville, Virginia 22902
Telephone 434-970-3182
Fax 434-970-3359
www.charlottesville.org

November 22, 2010

Verizon Wireless
c/o Stephen Waller
536 Pantops Center, PMB# 405
Charlottesville, VA 22911

RE: Certificate of Appropriateness Application
BAR 10-11-03
819 ~~801~~ West Main Street
Tax Map 32 Parcel 144.2
Verizon Wireless c/o Stephen Walker, Applicant/ Norfolk Southern Railroad Co., Owner
Add four new antennas to an existing cell phone tower

Dear Mr. Waller,

The above referenced project was discussed before a meeting of the City of Charlottesville Board of Architectural Review (BAR) on November 16, 2010.

The BAR approved (8-0) adding four new antennas at 185 feet, and adding cross bracing between 125-131 feet levels as submitted.

In accordance with Charlottesville City Code 34-285(b), this decision may be appealed to the City Council in writing within ten working days of the date of the decision. Written appeals, including the grounds for an appeal, the procedure(s) or standard(s) alleged to have been violated or misapplied by the BAR, and/or any additional information, factors or opinions the applicant deems relevant to the application, should be directed to Paige Barfield, Clerk of the City Council, PO Box 911, Charlottesville, VA 22902.

This certificate of appropriateness shall expire in one year (November 16, 2011), unless within that time period you have either: been issued a building permit for construction of the improvements if one is required, or if no building permit is required, commenced construction. You may request an extension of the certificate of appropriateness *before this approval expires* for one additional year for reasonable cause.

CITY OF CHARLOTTESVILLE
BOARD OF ARCHITECTURAL REVIEW
STAFF REPORT
November 16, 2010

Certificate of Appropriateness Application
BAR 10-11-03
819 ~~801~~ West Main Street
Tax Map 32 Parcel 144.2
Verizon Wireless c/o Stephen Walker, Applicant/ Norfolk Southern Railroad Co., Owner
Add four new antennas to an existing cell phone tower

Background

This property is located in the West Main Street ADC District. The radio tower is a non-conforming use. The zoning is Mixed Use – West Main North Corridor.

April 18, 2006 - The BAR approved (7-0) an Alltel emergency generator with diesel fuel tank next to the radio tower and within an existing chain link fence that marks the leased area. The application included approximately 55 feet of brown slat screening on a portion of the existing chain link fence.

November 28, 2006 - The BAR voted (9-0) to approve the request to install an 80" x 17" x 16" antenna on an existing Norfolk Southern tower and a 25 sq. ft. concrete pad to house a 31" x 30" x 84" cabinet with ice bridge above.

Application

The applicant is seeking to install four new antennas and also structural cross bracing to an existing tower.

The applicant is seeking to install four (not six) new antennas to an existing 225' tower. The new antennas are 48.7" x 7.5" and will be located on vacant pipe mounts at the 185' height. They will be located beside an array of six existing antennas at the same height.

A structural analysis report to determine the capacity of the tower upon adding four antennas indicated that the tower superstructure and foundation are sufficient for the proposed loading. However, the report assumes modifications to the tower in the form of replacing structural steel cross members extending between the 125' level and the 131' level.

A previously approved plan to locate six antennas at the 140' height has been abandonned. Additionally, no new ground equipment will be required to accommodate this modification.

Discussion

Review Criteria Generally

Sec. 34-284(b) of the City Code states that,
In considering a particular application the BAR shall approve the application unless it finds:
(1) That the proposal does not meet specific standards set forth within this division or applicable provisions of the Design Guidelines established by the board pursuant to Sec.34-288(6); and

(2) The proposal is incompatible with the historic, cultural or architectural character of the district in which the property is located or the protected property that is the subject of the application.

Pertinent Standards for Review of Construction and Alterations include:

(1) Whether the material, texture, color, height, scale, mass and placement of the proposed addition, modification or construction are visually and architecturally compatible with the site and the applicable design control district;
(2) The harmony of the proposed change in terms of overall proportion and the size and placement of entrances, windows, awnings, exterior stairs and signs;
(3) The Secretary of the Interior Standards for Rehabilitation set forth within the Code of Federal Regulations (36 C.F.R. §67.7(b)), as may be relevant;
(4) The effect of the proposed change on the historic district neighborhood;
(5) The impact of the proposed change on other protected features on the property, such as gardens, landscaping, fences, walls and walks;
(6) Whether the proposed method of construction, renovation or restoration could have an adverse impact on the structure or site, or adjacent buildings or structures;
(8) Any applicable provisions of the City's Design Guidelines.

Pertinent Design Review Guidelines

Site Design and Elements
P. 2.7 Utilities and other Site Appurtenances
1. Place overhead wires, utility poles and meters, antennae, trash containers, and exterior heat exchangers in locations where they are least likely to detract from the character of the site.
2. Encourage the installation of utility services underground.
3. Screen utilities and other site elements with fences, walls or plantings.
4. Antennae and communication dishes should be placed in inconspicuous rooftop locations.
5. Screen all rooftop mechanical equipment with a wall of a material harmonious with the building or structure.

Recommendations

The pertinent zoning section on Telecommunication Facilities states:

Sec. 34-1073. Facilities by district.
(a) Within the city's historic and entrance corridor overlay districts:
(1) The following shall be permitted uses: antennae or microcells mounted on existing communications towers established prior to February 20, 2001; attached communications facilities utilizing utility poles or other electric transmission facilities as the attachment structure; and other attached communications facilities if such other attached communications facilities are not visible from any adjacent street or property.
(2) The following shall be prohibited uses: attached communications facilities where such facilities are visible from any adjacent street or property, and communications facilities utilizing alternative tower, monopole tower, guyed tower, lattice tower and self-supporting tower support structures.

This is a permitted use; there are existing antennas in this location; and there is no way to screen the tower. Staff recommends approval.

Suggested Motion

Having considered the standards set forth within the City Code, including City Design Guidelines for Site Design and Elements, I move to find that the proposed new antennas satisfy the BAR's criteria and are compatible with other properties in this district, and that the BAR approves the application as submitted.

Board of Architectural Review (BAR)
Certificate of Appropriateness

Please Return To: City of Charlottesville
Department of Neighborhood Development Services
P.O. Box 911, City Hall
Charlottesville, Virginia 22902
Telephone (434) 970-3130 Fax (434) 970-3359

RECEIVED
OCT 26 2010
NEIGHBORHOOD DEVELOPMENT SERVICES

Please submit ten (10) copies of application form and all attachments.
For a new construction project, please include $350 application fee. For all other projects requiring BAR approval, please include $100 application fee. For both types of projects, the applicant must pay $1.00 per required mail notice to property owners. The applicant will receive an invoice for these notices, and project approval is not final until the invoice has been paid. For projects that require only administrative approval, please include $100 administrative fee. Checks payable to the City of Charlottesville.
The BAR meets the third Tuesday of the month.
Deadline for submittals is Tuesday 3 weeks prior to next BAR meeting by 4 p.m.

Information on Subject Property
Physical Street Address: West Main St. and 7-½ St. NW (Norfolk Southern R-O-W)
City Tax Map/Parcel: 320144200

Name of Historic District or Property: West Main Street
Do you intend to apply for Federal or State Tax Credits for this project? No

Applicant
Name: Verizon Wireless c/o Stephen Waller
Address: 536 Pantops Center, PMB #405 Charlottesville, VA 22911
Email: Stephen.waller@gdnsites.com
Phone: (W) 434-825-0617 (H) _____
FAX: 757-282-5811

Signature of Applicant
I hereby attest that the information I have provided is, to the best of my knowledge, correct. (Signature also denotes commitment to pay invoice for required mail notices.)

Signature 10/26/10 Date

Property Owner (if not applicant)
Name: Norfolk Southern Railroad Co.
Address: 1200 Peachtree Street NE Atlanta, GA 30309
Email: _____
Phone: (W) _____ (H) _____
FAX: _____

Property Owner Permission (if not applicant)
I have read this application and hereby give my consent to its submission.

Signature Date

Description of Proposed Work (attach separate narrative if necessary): Addition of 6 antennas on an existing tower at the 185-foot level, with existing antennas installed by Alltel prior to merger.

Attachments (see reverse side for submittal requirements): _____

For Office Use Only
Received by: S. Barnore
Fee paid: $100.00 Cash/Ck. # 1098
Date Received: 10/26/2010

Approved/Disapproved by: _____
Date: _____
Conditions of approval: _____

P10-0137

VERTICAL STRUCTURES, INC.

September 17, 2010

Mr. Stephen Waller
GDNsites
536 Pantops Center, PMB# 405
Charlottesville, VA 22911
(434) 825-0617

Subject:

Structural Analysis Report
Verizon Wireless Co-Locate
Verizon Wireless Site Name: Charlottesville DT
Verizon Wireless Site Number: 301
Norfolk Southern Site Name: Charlottesville Downtown
Norfolk Southern Site Number: KLQ98
225' Self-Supporting Tower
Vertical Structures Job Number: 2010-999-099

Dear Mr. Waller

Vertical Structures is pleased to provide you with the results of the structural analysis performed on the 225' tall self-supporting tower at the Charlottesville Downtown site in Virginia. The purpose of the analysis was to determine the capacity of the tower upon adding four (4) proposed Antel BXA-185063/8CFx2 panel antennas mounted on three (3) existing T-Frames at 183' for Verizon Wireless when combined with the existing equipment on the structure. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a 70 MPH basic "fastest mile" wind speed, equivalent to an 84 MPH basic "3-second gust" wind speed per IBC Equation 16-34.

Based on our analysis we have determined the tower superstructure and foundation are sufficient for the proposed loading.

Vertical Structures appreciates the opportunity to provide this report and our continuing professional services. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Chris Sandlin, P.E.
Project Engineer

COMMONWEALTH OF VIRGINIA
JOHN IRVING MATHIS
Lic. No. 016211
PROFESSIONAL ENGINEER
9/17/10

verizonwireless

October 26, 2010

Mary Joy Scala
Preservation and Design Planner
City of Charlottesville
610 East Market Street
Charlottesville, VA 22902

RE: Architectural Review Board Application – Verizon Wireless Proposal – Downtown Charlottesville Tower Modifications

Dear Ms. Scala,

Alltel Communications Inc., trading as Verizon Wireless ("Verizon") is proposing the placement of four (4) additional antennas on the existing lattice tower located at 7-1/2 Street and West Main Street, located within the Norfolk Southern Railroad Right-of-Way. The property is identified by Tax Map #32144200. Verizon has entered into an agreement with the Norfolk Southern Railroad regarding the proposed new facilities to support integration of Verizon Wireless Personal Communications System (PCS) network with Alltel's Cellular network that was in place prior to a merger between the two companies. The proposed changes will provide upgraded service within the downtown area in the City of Charlottesville.

The 4 proposed new Anphenol Antel Model #: BXA-185063/8BF panel antennas are 48.7" x 7.5" in size and they will be located on the existing 225' self support tower at the 185', beside six (6) of the existing antennas on the tower. Because there is adequate space on beside the mounting pipes beside the existing antennas, Verizon Wireless will no longer need to install a totally new array of antennas as was proposed and approved by the BAR in March of 2008. Additionally, no new ground equipment will be required to accommodate this modification.

Please see attached tower structural analysis prepared by Vertical Structures Inc. group, which was prepared to determine structural capacity of the existing tower. Vertical Structures determined the tower was slightly overstressed and will require the replacement of structural steel cross members extending between the 125' level and 131' level on the tower.

Verizon Wireless respectfully requests the approval of the proposed Architectural Review Board Application. If further information is required for the review of the application, please feel free to contact me at 434-825-0617 or by e-mail at stephen.waller@gdnsites.com

Sincerely,

Stephen Waller, AICP
GDNSites,
Consultants to Verizon Wireless

verizonwireless

Ordinance Justification

Per Section 34-282 of the City of Charlottesville Zoning Ordinance the following information and exhibits are to be submitted along with each application to the Board of Architectural Review (BAR):

(1) Detailed and clear descriptions of any proposed changes in the exterior features of the subject property, including but not limited to the following: the general design, arrangement, texture, materials, plantings and colors to be used, the type of windows, exterior doors, lights, landscaping, parking, signs, and other exterior fixtures and appurtenances. The relationship of the proposed change to surrounding properties will also be shown.
All work is to be performed on the tower and will consist of replacement cross-members and the proposed antennas, on existing mounting pipes. There will be no additional ground facilities, clearing or grading. Please see the attached elevation sketch identifying the proposed additions to Verizon Wireless' antennas on the tower.

(2) Photographs of the subject property and photographs of the buildings on contiguous properties.
Please see attached photographs taken from several locations surrounding the existing tower and pictures of the existing tower compound area.

(3) Samples to show the nature, texture and color of materials proposed.
Please see attached antenna spec sheet, the color of the proposed antennas will be gray, similar to the existing ones

(4) The history of an existing building or structure, if requested by the BAR or Staff.
The existing tower was built in the late 60's and has been used primarily for Railroad Communications, but over the last fifteen years or so, the tower has been used by other wireless communication carriers which include Alltel and nTelos. Verizon Wireless had originally been approved to install the companies own separate set of antennas at the 140-foot level. However, due to the merger between the two companies these new antennas will now be placed at the same height as the existing Alltel antennas.

(5) For new construction and projects proposing expansion of the footprint of an existing building: a three-dimensional model (in physical or digital form) depicting the site, and all buildings and structures to be located thereon, as it will appear upon completion of the work that is the subject of the application.
This project does not necessitate any expansion of the footprint of the existing tower compound or building square footage.

(6) In the case of a demolition request where structural integrity is at issue the applicant shall provide a structural evaluation and cost estimates for rehabilitation, prepared by a professional engineer. The BAR may waive the requirement for a structural evaluation and cost estimates in the case of emergency, or if it determines that the building or structure proposed for demolition is not historically, architecturally or culturally significant under the criteria set forth in Section 34-274.
This proposal does not require the demolition of any existing structures.

Chapter three (3), Section O (New Construction and Additions) of the Charlottesville Architectural Design Control Districts Design Guidelines suggests the following careful consideration be taken when additions are made in historic Districts:

1. Function and Size
2. Location
3. Design
4. Replication of Style
5. Materials and Features
6. Attachment to Existing Building

Section 34-1073(a) (Facilities by District) of the City of Charlottesville Zoning Ordinance permits antenna or microcells attached to existing structures within the city's historic and entrance corridor overlay districts. Section 34-1080(a) (Visibility and Placement) states that where such facilities are visible from adjacent properties or public rights of away, the communication facilities shall be located as to blend in with the existing structure to the maximum extent feasible, through measures such as screening or the use of neutral colors. Additionally, Section 34-1074(a) (Height) restricts the total height that a communication facility can extend above the original height of the existing attachment structure to twenty (20) feet. The design of the proposed communications facility complies with each of the above-mentioned requirements.

Verizon Wireless is confident that the proposed antenna upgrages are in compliance with the City of Charlottesville's Zoning Ordinance and Architectural Design Control Districts Design Guidelines to design a facility that is in accordance with the West Main Street District's guidelines for scale, size, design, screening, and color. The proposed antenna facility meets all of the proposed requirements for the district and will not create a detrimental impact upon the district. This is because there will be no additional ground disturbance or construction and all work will be done on the existing tower without increasing its height.

WEI
Geotechnical
Engineers

September 15, 2010

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, Kentucky 40475

Subject: **Geotechnical Summary**
SITE NAME: NORFOLK SOUTHERN CHARLOTTESVILLE DOWNTOWN
810-B West Main Street
Charlottesville, Virginia 22903
Existing 225-ft Self-Support Tower
WEI Project No. 2010-1211

Our geotechnical analysis has been completed for the above-referenced tower based exclusively on information provided to us by Vertical Structures. The purpose of the following report is to summarize the subsurface conditions encountered during Vertical Structures field exploration conducted on September 4, 2010 and to provide geotechnical parameters for structural evaluation of the existing tower foundation system.

As always, we appreciate the opportunity to be of service to you. Please feel free to contact us with any questions or if you need additional assistance.

Respectfully Submitted,
WILKINSON ENGINEERING

Chip Wilkinson

Chip Wilkinson, P.E.
Geotechnical Engineer

503 Washburn Avenue, Suite 204
Louisville, Kentucky 40222

WILKINSON ENGINEERING
wilkinson.engineering@insightbb.com

502-773-0181 (Office)
502-587-6572 (Fax)

GEOTECHNICAL SUMMARY
NORFOLK SOUTHERN – CHARLOTTESVILLE DOWNTOWN

STRUCTURAL LOADS (BASE REACTIONS)

Based on information received from Vertical Structures, the structural loads/base reactions are as follows:

Vertical (Compression) Load (kips)	Uplift (Tension) Load (kips)	Horizontal Shear (kips)
181.5	-134.2	21.1

EXISTING FOUNDATION SYSTEM

Based on information received from Vertical Structures, the foundation system is comprised of three (3) 2-ft square x 14-ft tall formed concrete piers (tapering to 3-ft square near the base) rising 2 ft above grade supported on 8.75-ft square x 2-ft thick individual concrete pads founded 14 feet below grade.

GEOTECHNICAL RECOMMENDATIONS

Based on the soil samples received from Vertical Structures, the following net design parameters may be used to evaluate the capacity of the existing foundation system. A factor of safety on the order of 2 to 3 should be applied to the bearing pressure value provided below. The cohesion, internal angle of friction, unit weight, passive earth pressure coefficient (K_P) and sliding friction coefficient values given in the following table are based on our observations of the soil samples along with published values and our past experience with similar soil types. These values should, therefore, be considered approximate.

Tower Foundation - Ultimate Design Parameters

Depth (feet)	Soil Description	Unit Weight (pcf)	Passive Earth Pressure Coefficient	Ultimate Bearing Pressure (psf)	Sliding Friction Coefficient @ Base	Internal Angle of Friction (Degrees)	Cohesion (psf)
0 – 3	Reddish Brown Clayey Fine Sand	110	-	Ignore	-	-	-
3 - 15	Reddish Brown Clayey Fine Sand	110	K_P = 3.0	12,000 @ 14 ft	0.35	30	0

QUALIFICATIONS

The analysis and recommendations presented in this report are based solely upon the information received from Vertical Structures. This report has been prepared for the exclusive use of **Vertical Structures, Inc.** and **Norfolk Southern** for specific application to the project discussed herein and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. In the event that changes in the nature or design as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless **Wilkinson Engineering** reviews the changes and either verifies or modifies the conclusions of this report in writing.

The scope of services for this project does not include either specifically or by implication any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.

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Slant +/- 45° Dual Polarized, Panel 63° / 18.5 dBi

BXA-185063/8BF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1236 mm	48.7 in
Width	191 mm	7.5 in
Depth	105 mm	4.1 in
Depth with t-bracket	133 mm	5.2 in
4) Weight	5 kg	11.0 lbs
Wind Area		
Fore/Aft	0.24 m^2	2.6 ft^2
Side	0.16 m^2	1.7 ft^2
Rated Wind Velocity (Safety factor 2.0)	>274 km/hr	>170 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	354 N	80 lbs
Side	242 N	55 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtilt bracket kit includes the mounting bracket kit.

Electrical specifications

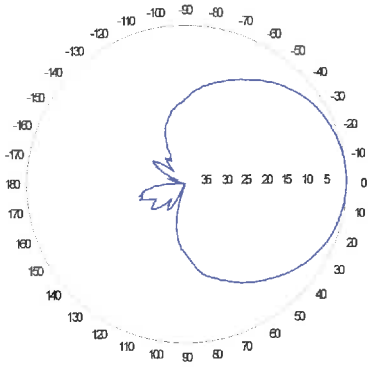
	Frequency Range	1850-1990 MHz
	Impedance	50Ω
3)	Connector(s)	NE or E-DIN 2 ports / bottom or center
1)	VSWR	≤ 1.4:1
	Polarization	Slant ± 45°
1)	Isolation Between Ports	< -25 dB
1)	Gain	18.5 dBi
2)	Power Rating	250 W
1)	Half Power Angle	
	H-Plane	63°
	E-Plane	7°
1)	Electrical Downtilt	0°
1)	Null Fill	5%
	Lightning Protection	Direct Ground

Patented Dipole Design: U.S. Patent No. 6,597,324 B2

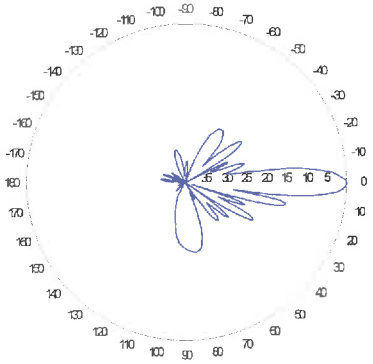
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation pattern[1)]



Horizontal



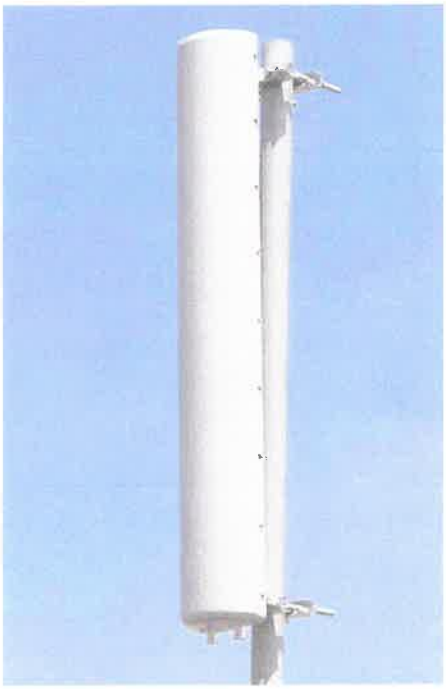
Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.

BF Denotes a Bottom-Fed Connector.

1850-1990 MHz



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

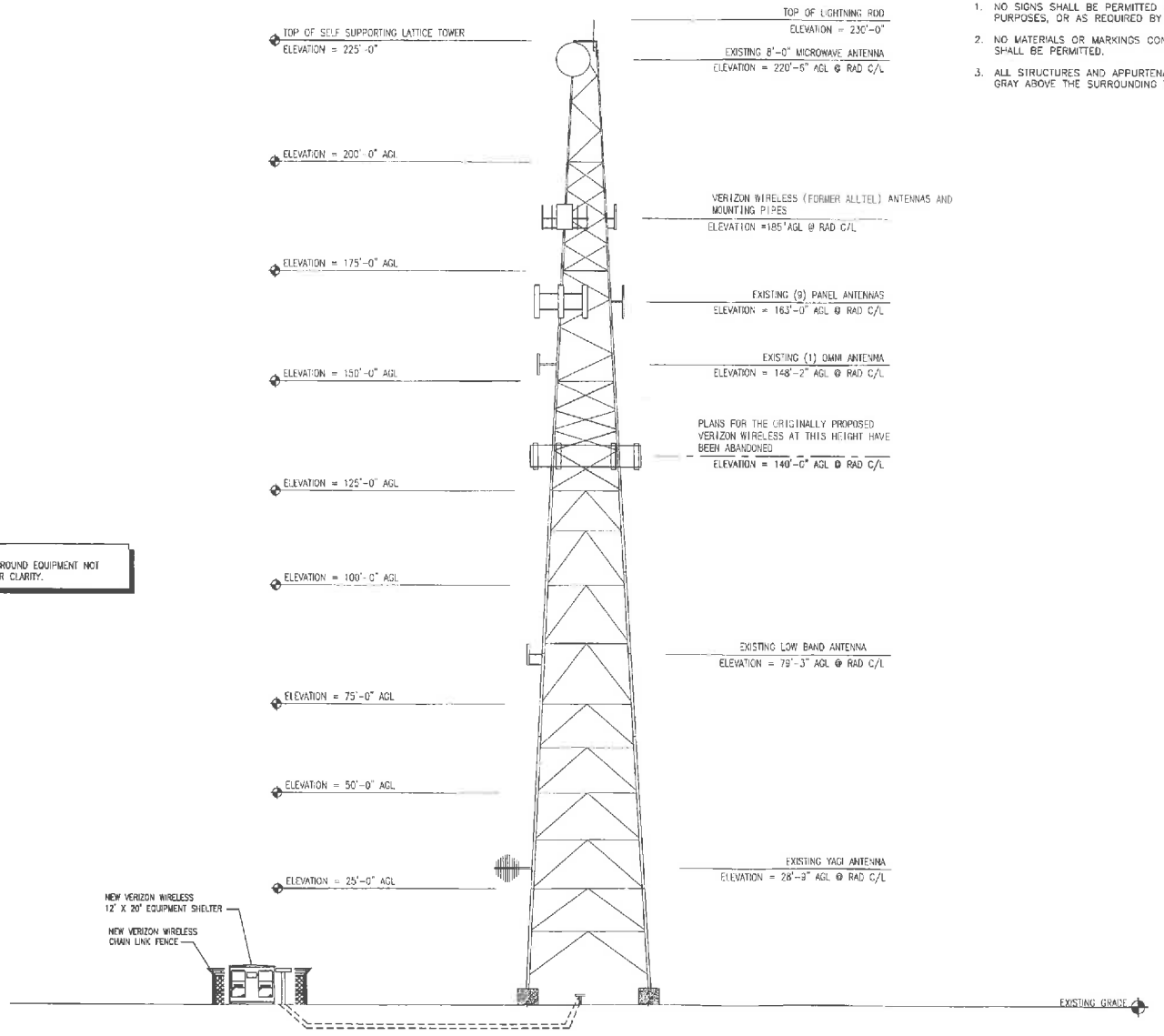
Antenna can be ordered with bottom-fed or center-fed connectors.

Bottom-fed: BXA-185063/8BF + (NE or E-DIN)
Center-fed: BXA-185063/8CF + (NE or E-DIN)

Amphenol Antel, Inc.
The Antenna Technology Company

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Revision Date: 7/11/07



NOTE:
EXISTING GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

ELEVATION VIEW

NOT TO SCALE

SITE NOTES

1. NO SIGNS SHALL BE PERMITTED EXCEPT AS MAY BE REQUIRED FOR PUBLIC SAFETY PURPOSES, OR AS REQUIRED BY THE FAA OR FCC.
2. NO MATERIALS OR MARKINGS CONTAINING ANY ADVERTISING OR ADVERTISEMENT SHALL BE PERMITTED.
3. ALL STRUCTURES AND APPURTENANCES SHALL BE GALVANIZED FINISH OR PAINTED GRAY ABOVE THE SURROUNDING TREELINE.

CLARK•NEXSEN
Architecture & Engineering
5510 CHEROKEE AVENUE SUITE 110
ALEXANDRIA, VIRGINIA 22312
703-256-5344 FAX 703-256-6622
WWW.CLARKNEXSEN.COM

verizon wireless
1831 RADY COURT
RICHMOND, VA 23222

SITE INFO:

DOWNTOWN CHARLOTTESVILLE

COLLOCATE SELF SUPPORT TOWER

WEST MAIN STREET
CHARLOTTESVILLE, VA
22911
ALBEMARLE COUNTY

DESIGN:	SPF
DRAWN:	MSA
REVIEW:	SPF
TTV DATE:	07/19/07
COMM. NO.	25672.09

SHEET NAME:

ELEVATION VIEW

SHEET NO.:

C-3

VERTICAL STRUCTURES, INC.

RECEIVED
OCT 26 2010
NEIGHBORHOOD DEVELOPMENT SERVICES

August 19, 2010

Mr. Stephen Waller
GDNsites
536 Pantops Center, PMB# 405
Charlottesville, VA 22911
(434) 825-0617

Subject:

Tower Rework Drawings
Verizon Wireless Co-Locate
Verizon Wireless Site Name: Charlottesville DT
Verizon Wireless Site Number: 301
Norfolk Southern Site Name: Charlottesville Downtown
Norfolk Southern Site Number: KLQ98
225' Self-Supporting Tower
Vertical Structures Job Number: 2010-999-099

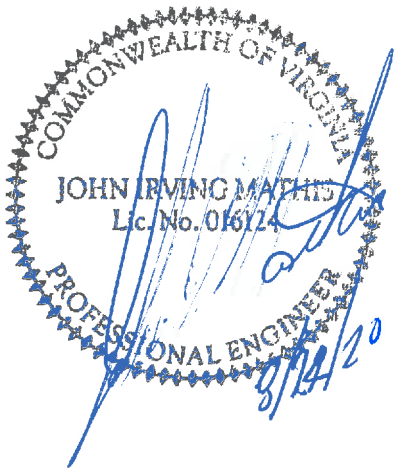
Dear Mr. Waller

Vertical Structures is pleased to submit these drawings for modifying the 225' tall self-supporting tower at the Charlottesville Downtown site in Virginia.

Vertical Structures appreciates the opportunity to provide this report and our continuing professional services. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Chris Sandlin, P.E.
Project Engineer



Upon completion of construction, please contact me for an inspection of the improvements included in this application.

If you have any questions, please contact me at 434-970-3130 or scala@charlottesville.org.

Sincerely yours,

Mary Joy Scala, AICP
Preservation and Design Planner

cc
Norfolk Southern Railroad Co.
1200 Peachtree Street NE
Atlanta, GA 30309

Maynard Sipe
LeClair Ryan
123 E Main Street Suite 800
Charlottesville, VA 22902

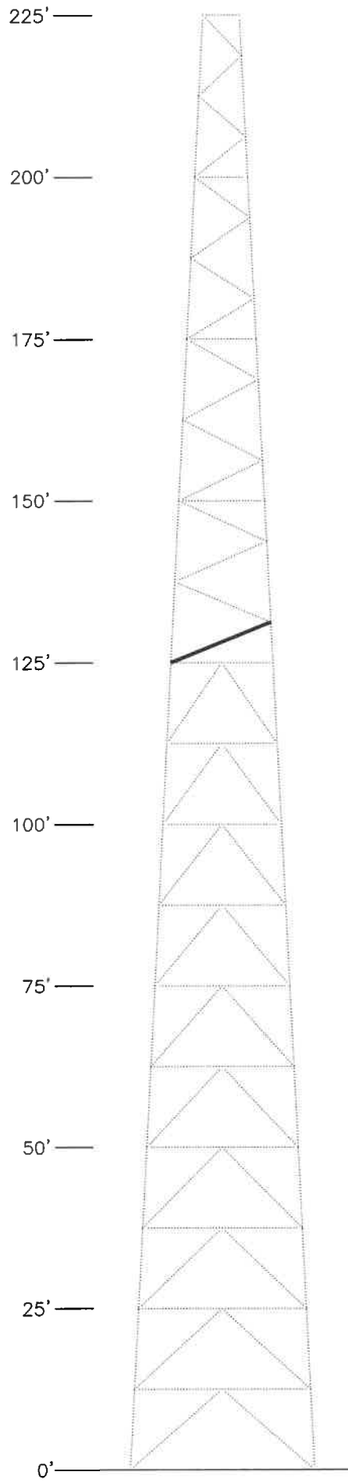


TABLE OF CONTENTS	
SHEET NO.	DESCRIPTION
SHEET 1	MASTER DRAWING INCLUDING NOTES
SHEET 2	DIAGONAL REPLACEMENT (131' – 125')

STRUCTURAL MODIFICATIONS:

THIS DRAWING DEPICTS THE REWORK REQUIRED TO REMEDY THE DEFICIENCIES FOUND IN THE CHARLOTTESVILLE DT, VA TOWER PER THE REPORT PUBLISHED BY VERTICAL STRUCTURES ON 6–9–10, JOB# 2010–999–065.

A. REINFORCE THE DIAGONALS BETWEEN 131.25' AND 125'.

TECHNICAL SPECIFICATION NOTES:

1. **CONTRACTOR: CALL VERTICAL STRUCTURES AT (859) 624–8360 TO MAKE SURE YOU HAVE THE LATEST REVISION OF THIS DRAWING.**
2. CONTACT THE ENGINEER CONCERNING ANY CHANGES OR MODIFICATIONS THAT MAY BE REQUIRED DUE TO THE EXISTING CONDITIONS.
3. ALL BOLTS 1/2" OR LESS TO BE INSTALLED WITH H OR 2H NUTS.
4. ALL BOLTS GREATER THAN 1/2" TO BE INSTALLED WITH 2H NUTS.
5. LOCKING MECHANISM FOR BOLTS TO BE PALNUTS OR LOCKWASHERS.
6. ALL U–BOLTS TO BE INSTALLED WITH 2H NUTS AND LOCKWASHERS.
7. ANY HARDWARE REMOVED FROM THE EXISTING TOWER MUST BE REPLACED WITH NEW HARDWARE OF EQUAL SIZE AND QUALITY UNLESS NOTED OTHERWISE.
8. AFTER FIELD MODIFICATIONS OF ANY STEEL MEMBERS, COAT EXPOSED STEEL SURFACES WITH TWO COATS OF SHERWIN WILLIAMS PART #143–0255 ZINC CLAD COATING, CONTAINING 97% ZINC DUST TO RESTORE THE GALVANIZED PROTECTION ON THE MEMBERS. IF REQUIRED, PAINT ALL AREAS AFFECTED OR NEW STEEL WITH MATCHING TOWER PAINT.
9. FINISHING SPECIFICATIONS – ALL MATERIAL TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:
   A. FABRICATED MATERIAL – ASTM A123.
   B. HARDWARE – ASTM A153.
   C. GUY WIRE – ASTM A475
10. ELEVATIONS SHOWN ARE NOMINAL AND NOT EXACT.
11. ALL WELDING TO BE DONE IN ACCORDANCE WITH AWS D1.1 STRUCTURAL WELDING CODE. ALL WELDING TO BE DONE BY AWS CERTIFIED WELDER USING E70XX RODS.

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	8–9–10	JAC

VERTICAL STRUCTURES, INC.
P.O. Box 1496
Richmond, KY 40476
Phone: (859) 624-8360
Fax: (859) 624-8369
Email: engineering@verticalstructures.com

FOR

GDNsites

2010 MODIFICATIONS
TOWER REWORK FOR A
225' SELF–SUPPORTING TOWER
SITE: CHARLOTTESVILLE DT, VA

DRAFTSPERSON:	DATE
J. COMBS	8–9–10
CHK'D BY: SWH	DATE
ENGR: CS	DATE

SHEET 1 OF 2 | B TA2010999099–T1 | SCALE: NONE

ELEV. 150'

EXISTING TOWER STRUCTURE

ELEV. 131'

BOLT, 3/4" X 2 1/4"

LENGTH

L/2

L/2

B T2

VS-8182 N.S. & F.S.

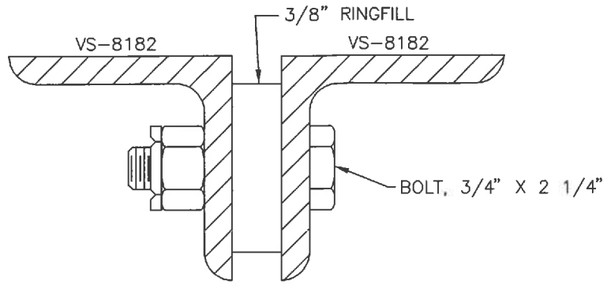
BOLT, 3/4" X 2 1/4"

BOLT, 3/4" X 2 1/4" W/ 1- 3/8" STEEL RINGFILL

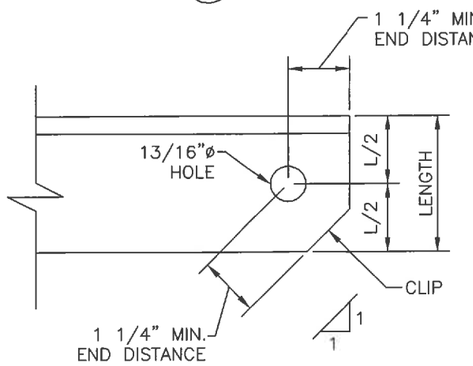
ELEV. 125'

A T2 ELEVATION VIEW

BILL OF MATERIALS			
MARK NO.	QTY.	DESCRIPTION	MATERIAL GRADE
VS-8182	6	DIAGONAL, L 3" X 3" X 1/4"	ASTM A36
XX3422	9	BOLT, 3/4" X 2 1/4"	ASTM A325
XY0069	3	STEEL RINGFILL, 3/8" THICK	-



B T2 SECTION



C T2 END DETAIL VS-8182

REV.	DESCRIPTION	DATE	BY
A	ORIGINAL RELEASE	8-9-10	JAC

VERTICAL STRUCTURES, INC.

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2010 MODIFICATIONS
TOWER REWORK FOR A
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SITE: CHARLOTTESVILLE DT, VA

DRAFTSPERSON:	DATE
J. COMBS	8-9-10
CHK'D BY: SWH	DATE
ENGR: CS	DATE

SHEET 2 OF 2 | B TA2010999099-T2 | SCALE: NONE

VERTICAL STRUCTURES, INC.

RECEIVED
OCT 26 2010
NEIGHBORHOOD DEVELOPMENT SERVICES

June 9, 2010

Mr. Stephen Waller
GDNsites
536 Pantops Center, PMB# 405
Charlottesville, VA 22911
(434) 825-0617

Subject:

Structural Analysis Report
Verizon Wireless Co-Locate
Verizon Wireless Site Name: Charlottesville DT
Verizon Wireless Site Number: 301
Norfolk Southern Site Name: Charlottesville Downtown
Norfolk Southern Site Number: KLQ98
225' Self-Supporting Tower
Vertical Structures Job Number: 2010-999-065

Dear Mr. Waller

Vertical Structures is pleased to provide you with the results of the structural analysis performed on the 225' tall self-supporting tower at the Charlottesville Downtown site in Virginia. The purpose of the analysis was to determine the capacity of the tower upon adding four (4) proposed Antel BXA-185063/8CFx2 panel antennas mounted on three (3) existing T-Frames at 183' for Verizon Wireless when combined with the existing equipment on the structure. This analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a 70 MPH basic "fastest mile" wind speed, equivalent to an 84 MPH basic "3-second gust" wind speed per IBC Equation 16-34.

Based on our analysis we have determined the tower superstructure is insufficient for the proposed loading. Due to a complete lack of subsurface information, the foundation could not be analyzed in this study.

Vertical Structures appreciates the opportunity to provide this report and our continuing professional services. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Chris Sandlin, P.E.
Project Engineer

COMMONWEALTH OF VIRGINIA
JOHN IRVING MATHIS
Lic. No. 016114
PROFESSIONAL ENGINEER
6/11/10

TABLE OF CONTENTS

INTRODUCTION

The subject tower is located in Charlottesville, Virginia. The 225' tall self-supporting tower is constructed of pipe legs with pipe k-bracing up to 125' and pipe z-bracing between 125' and 225'. The tower has been previously reinforced; however, part of the reinforcement was considered to be ineffective.

ANALYSIS CRITERIA

The Charlottesville Downtown tower was analyzed in accordance with the current EIA-222-F publication, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures." The proposed and existing antennas, feedlines and mounts considered in this analysis are listed in Table 1. Applied forces in this study were derived from a 70 MPH basic "fastest mile" wind speed with no ice and a reduced 61 MPH basic "fastest mile" wind speed with a 1/2" of radial ice accumulation. The original design loads are not available. All feedlines are assumed to be routed in accordance with the drawings in Appendix B.

Table 1 – Proposed and Existing Loads

Mount Elevation	Carrier Name	Status	Antennas	Mounts	Feedlines
221'		Existing	(1) Andrew D8E-21 Dish	(1) Face Mount	(1) EW63 W/G
183'	Verizon Wireless	**Proposed**	**(4) Antel BXA-185063/8CFx2 Panels**	(3) 15' T-Frames	**(4) 1 5/8" Coax**
		Existing	(3) Decibel DB846H90E-SX Panels		(15) 1 5/8" Coax (3) 7/8" Coax
			(3) Decibel 876QSC90-XC Panels		
159'		Existing	(9) Antel RWA-80015 Panels	(3) 11' Lightweight T-Frames	(9) 1 5/8" Coax
150'		Existing	(1) 5' Omni, w/ TMA	(1) 5' Sidearm	(1) 1 1/2" O.D. Cable Bundle
79'		Existing	(1) Scala Groundplane Antenna	(1) 7' Sidearm	(1) 5/8" Cable
30'		Existing	(1) Scala CL-FM Antenna	(1) Pipe mount	(1) 3/8" Cable

ANALYSIS PROCEDURE

Table 2 – Resources Utilized

Resource	Remarks
Proposed Loading	CitySwitch Collocation Application Dated 'April 20, 2010'
Existing Loading	Vertical Structures 'June 2, 2010' Tower Audit
Tower Information	Vertical Structures 'June 2, 2010' Tower Audit

Analysis Methods

RISA Tower (Version 5.4), a commercially available software program, was used to create a three-dimensional model of the tower and calculate member stresses for various dead, live, wind, and ice load cases. All loads were computed in accordance with the ANSI/TIA/EIA-222-F or the local building code requirements. Selected output from the analysis is included in Appendix A.

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 manufacturer's specifications.
3. The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Table 1 and any referenced drawings.
4. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222-F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and Vertical Structures should be allowed to review any new information to determine its effect on the structural integrity of the tower.

ANALYSIS RESULTS

The Charlottesville Downtown tower superstructure is found to be inadequate for the intended loading at the wind and ice conditions considered. Due to a complete lack of subsurface information the foundation was not analyzed in this study. Table 3 summarizes the condition of the tower. Capacities up to 105% are considered acceptable based on the analysis procedures used.

Table 3 – Tower Component Capacities

Section Number	Elevation	Percent Capacity Used		
		Leg	Diagonal	Horizontal
1	225' – 200'	22.3	21.9	3.9
2	200' – 175'	32.8	70.7	4.1
3	175' – 150'	69.2	69.9	2.1
4	150' – 125'	61.4	109.8	4.3
5	125' – 100'	75.5	85.0	88.3
6 – 7	100' – 75'	98.4	101.5	74.4
8	75'– 50'	76.5	73.3	80.1
9	50' – 25'	91.5	76.9	61.5
10 – 11	25' – 0'	56.5	80.2	57.6
Anchor Bolts - Tension			47.5	
Foundation			Unknown	

Required Modifications

Modification (A) is required to remedy the deficiencies identified in this analysis. If requested, Vertical Structures will supply the construction drawings and materials necessary to make the required modifications.

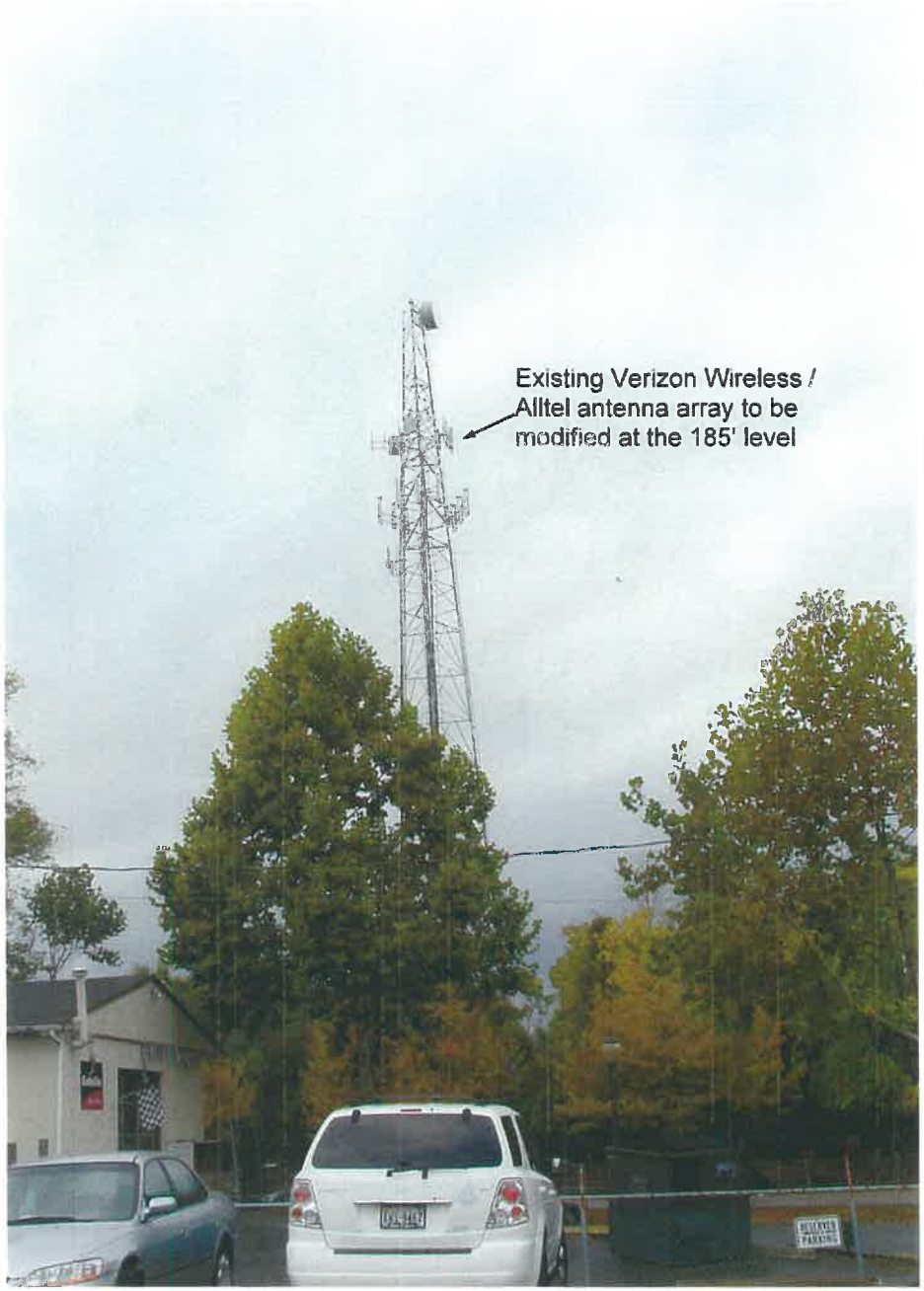
(A) Reinforce the diagonals between 131.25' and 125'.

Views of the Existing Verizon Wireless Antennas and Open Mounts

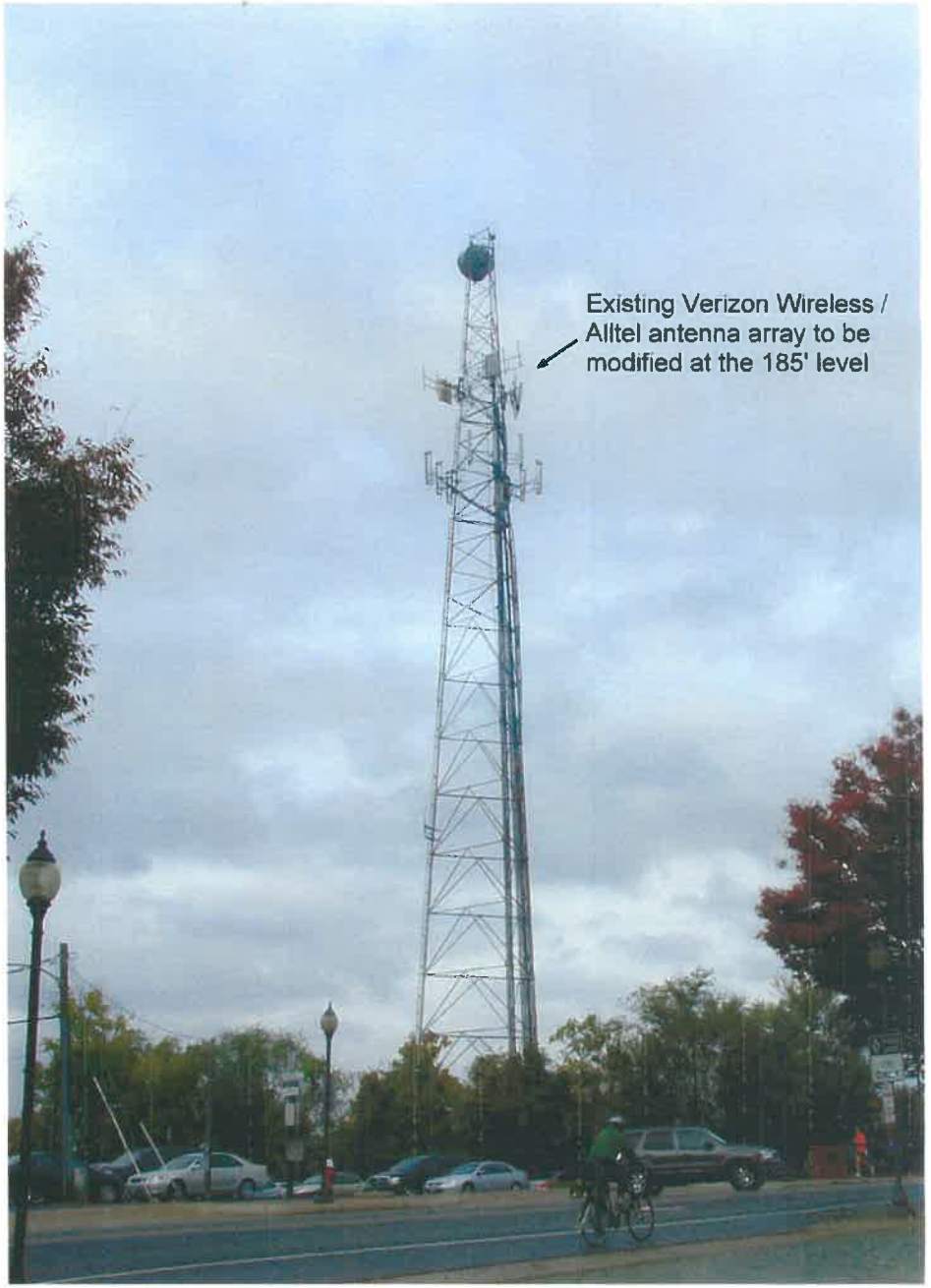
View of the tower from the west, adjacent to 10th Street

View of the tower from the north, near the intersection of 8th Street and Hardy Drive

Downton Charlottesville Verizon Wireless (former Alltel) - Tower and Antenna Photos



View of tower and antennas from the East side of 8th Street



View of the tower from the South side of West Main Street