St. Elizabeths Outdoor Distributed Antenna System
Installation
Design Modification

NCPC Final Design Submission
Submitted by the U.S. General Services Administration
January 14, 2015
# Table of Contents

- **Project Report**  
  3 – 4

- **Previously Approved Antenna and Hub Locations – West Campus Overview**  
  5

- **Proposed Antenna Locations Added – West Campus Overview**  
  6

  **Notes:**
  A. Proposed Location 4 includes a “preferred” and an “alternate” location throughout this presentation.
  B. Includes location key for photo simulations.

- **Proposed Location 4 – Closer View**  
  7

- **Proposed Location 5 – Closer View**  
  8

- **ODAS Antenna Requirements**  
  9

- **Antenna and Ground Cabinet Details**  
  10

- **Proposed Locations 4 and 5 — Elevation Drawings with Photo Simulations**  
  11-13

- **Proposed Antenna Locations Added – West Campus Overview (Slide 6 repeated)**  
  14

- **Proposed Locations 4 and 5 Photo Simulations**  
  15 – 26

- **RF Emissions and Hazard Assessment Study**  
  Appendix (Attachment)
Project Report

Agency Project Manager
US General Services Administration
(GSA Sponsor) Gary Shipley
GSA National Capital Region
301 7th Street Southwest, Washington DC 20407
(202) 260-0692
Gary.Shipley@gsa.gov

Project Summary
This design submission focuses on a design modification of the approved ExteNet Systems, Inc. (“ExteNet”) temporary three node Outdoor Distributed Antenna System (ODAS) installation by adding 2 node locations to provide wireless coverage and capacity for at least three of the major Wireless Service Providers (WSPs). These additional node locations are needed so that coverage and capacity can be extended to wireless network users in the heart of the St. Elizabeths West Campus. One antenna set is to be located on an existing wood utility pole near the east side of the Center Building and is referred to as “Location 4”. The other antenna set is to be located on an existing wood utility pole north of the west side of the Center Building and is referred to as “Location 5”. The hub location that aggregates the signals from all the node locations was formerly approved but that outdoor location is no longer needed. Instead, space within an equipment room inside the Coast Guard Building has been identified and dedicated for this purpose. The temporary nature of the installation may be reconfigured in accordance with campus long term development. The footprint of the ODAS may need to grow in the future due to technological improvements but the purpose of this submission is to seek approval of Node 4 and Node 5.

The ExteNet design for these additional nodes focuses on providing outdoor commercial wireless coverage and capacity for the Phase 2 occupancy area previously approved by NCPC. The proposed coverage area for the ODAS comprises the center portion of the St. Elizabeth’s campus. Federal government agencies use commercial wireless networks to achieve their missions. Without this ODAS, commercial wireless coverage and capacity on the campus will be limited.

Design Information
The proposed ODAS incorporates similar design characteristics found in other historic or visually sensitive deployments. The basic concept involved in these deployments is to conceal or limit the visual impact of the placement of the ODAS node equipment, antennas, and the hub site, given the RF, topology and WSP carrier customer requirements. The optimal RF coverage and capacity is balanced against the number and placement of the nodes and antennas, resulting in the proposed network design herein.

The anticipated technologies and frequencies that will be deployed are 700 MHz LTE, 850 MHz CDMA, EDVO and UMTS, and 1900 MHz CDMA, EDVO, LTE, and UMTS, and 2100 MHz LTE. In order to accommodate these WSP requirements, each of the two additional node placements will require two antennas. Use of existing freestanding wood utility poles for these two locations involves placement of two antennas on a support arm with the equipment placed in an enclosure on the ground. No ground disturbance is required.

The RF Compliance and Assessment Report has analyzed the emission levels of the proposed ODAS antennas and finds them well within the safety standards as required by current FCC regulations. Nodes 4 and 5 are to be placed on existing wood utility poles well above areas where they can be accessed without special equipment. Once the antennas are installed and operational at the sites appropriate signage will be placed to have the site in compliance. It should be noted that these and similar antenna configurations are used extensively in ODAS networks throughout North America.
Project Report (continued)

Relationship to the Master Plan
The design of the Phase 2 Outdoor Antenna Installation is consistent with the intent of the approved St. Elizabeths Master Plan and is in accordance with the St Elizabeths Design Guidelines Parcel 3 Site Development with the St. Elizabeths Design Guidelines Parcel 3 Site Development Standard:

*Large-scale communication equipment will be positioned so as to minimize visibility from within the campus or from vantage points outside the campus... Smaller communication equipment will be confined to less visible areas of the parcel and will be located in a manner that will not damage historic fabric nor adversely affect views or spatial organization. Potential locations for equipment are in the center area and will not be visible from outside the campus.*

Project Schedule
Construction commence: Winter 2015
Construction completion: Winter 2015

Project Budget
As this project is being funded by ExteNet and the WSPs, there is not anticipated to be any funding required from any Federal government source.

Environmental Documentation (EIS)
Visual impacts and the radio frequency emissions impacts from antennas were discussed in the 2008 Final Environmental Impact Statement (FEIS). According to the FEIS, GSA would employ the practice of “prudent avoidance” to reduce the exposure of workers and the public to RF fields. To ensure that this is accomplished a RF EME Compliance and Assessment Report was prepared for this project. The FEIS also discussed minimizing the visual impacts of any antennas placed on site and the locations of the antennas included in this submission were selected to minimize the visual impacts to the extent possible. The RF report and visual quality analysis is included in the submission package. The FEIS for the DHS Headquarters Consolidation at St. Elizabeths dated November 7, 2008 and the Final Master Plan Amendment FEIS for the DHS Headquarters Consolidation at St. Elizabeths dated March 2, 2012 can be referenced at www.stelizabethsdevelopment.com/document center

Historic Preservation Documentation
ExteNet is working with GSA to provide information so that a 106 determination can be made.

Floodplain Management and Protection
A review of the floodplain maps issued by FEMA in September 2010 for the District of Columbia indicate that the limit of work for the antennas is outside both the 100-and 500-year floodplain; no additional documentation is needed to comply with EO 11988.
Antenna node locations 1, 2, and 3, and outdoor hub equipment location 4 were previously approved.
Proposed Antennas: Node Locations 4 & 5 – West Campus Overview

Note: Approved hub location formerly designated as “Location 4” is no longer needed. Hub location space is now being provided in a dedicated equipment room inside the Coast Guard Building. The new designations of “Location 4” and “Location 5” are being proposed as antenna locations. Location 4 includes both a “preferred” and an “alternate” placement.
Proposed Antenna – Location 4

Proposed antenna is to be mounted on an existing wood utility pole which is visible from adjacent buildings and roads. The “Preferred” Location 4 is approximately 50’ away from the edge of the nearby parking lot on the front side of the building, and the “Alternate” Location 4 is approximately 15’ from the edge of that parking lot.
Proposed Antenna – Location 5

Proposed antenna is to be mounted on an existing wood utility pole which is visible from adjacent buildings and roads.
ODAS Antenna Requirements

Omni-Directional RF Antenna

Typical antenna with an integrated radome / shroud for optimal coverage and clean, low-key appearance

Number of Antenna / Transmitters: 2 for Location 4 and 2 for location 5

Photo of Pole Top Antenna

Close-up Photo of Antenna
Proposed Locations 4 and 5 – Antenna and Ground Cabinet Details

Existing wood pole with dual antenna

EQUIPMENT CABINET
GFC-AL-003 ALPHA
EQUIPMENT CABINET WITH SIDE SHROUDS

DIMENSIONED DRAWING

ANTENNA ASSEMBLY
ANT-KT-013 KATHREIN TRI-SECTOR ANTENNA ON POLE WITH CUSTOM METAL ARM AND SHROUDS

DIMENSIONED DRAWING

PHOTO OF THE CABINET

PHOTOS OF THE ANTENNA

2 Units at top of pole for each location
Proposed Location 4 – “Preferred” – Photo Simulation and Elevation

Existing wood pole with dual antennas

Note: Additional utility line is shown extending west (2nd line from the top of the picture).
Proposed Location 4 – “Alternate” – Photo Simulation and Elevation

Existing wood pole with dual antennas

Sheet Notes

1. ANTENNA
   KATHREIN 12-PORT OMNI

2. SHROUD
   CONE SHAPED COVER TO CONCEAL ATTACHMENT AND CABLES – PAINT TO MATCH POLE

3. SUPPORT ARM
   METAL SUPPORT ARM TO PERMIT REQUIRED HORIZONTAL SEPARATION OF ANTENNAS - SHAPE TBD. AS NEEDED TO PROVIDE STRUCTURAL SUPPORT AND CONCEAL CABLE FROM POLE TO SHROUD

4. POLE EXTENSION
   AS NEEDED TO RAISE ANTENNAS 4’ FEET ABOVE EXISTING WIRES

5. WOOD POLE
   WOOD UTILITY POLE WITH APPROXIMATELY 5’-0” BELOW GRADE

6. SURFACE MOUNTED CABLES
   U-GUARD COVER OVER CABLES MOUNTED TO SURFACE OF POLE

7. COAX CABLES

8. EXISTING POWER
   CONNECTION TO EXISTING POWER LINE, 2” CONDUIT TO GROUND FURNITURE.

9. NEW HORIZONTAL AERIAL RUN - NEW FIBER OPTIC
   CONNECTION TO NEW FIBER CABLE. 2” CONDUIT TO GROUND FURNITURE.

10. DISCONNECT
    CONNECT TO NEW FIBER CABLE. 2” CONDUIT TO GROUND FURNITURE.

11. GROUND FURNITURE CABINET
    ALPHA METAL EQUIPMENT CABINET, PAINTED TO MATCH STANDARD COLOR POLE - LOCATE AT EACH NODE TO MINIMIZE VISIBILITY

12. 5” I BEAM STAND OFF

13. 4” CONCRETE PAD

14. DISTANCE FROM POLE TO GFC
    THIS DISTANCE WILL BE CONFIRMED ON SITE, BUT IS TYPICALLY LESS THAN 20’

15. DISTANCE FROM GROUND TO EXISTING WIRES
    VERIFY IN FIELD.

NOTE
   CABINET WILL BE LOCATED CLOSE TO ONE OF THE ADJACENT BUILDINGS TO MINIMIZE THE VISUAL IMPACT

Note: Additional utility line is shown extending west (2nd line from the top of the picture).
Proposed Location 5 – Photo Simulation and Elevation

Existing wood pole with dual antennas

Note: Additional utility line is shown extending in both directions from the pole.
Note: Approved outdoor hub location formerly designated as “Location 4” is no longer needed. Hub location space is now being provided in a dedicated equipment room inside the Coast Guard Building. The new designations of “Location 4” and “Location 5” are being proposed as antenna node locations. Location 4 includes both a “preferred” and an “alternate” placement.
NODE 4 VISIBILITY

Photo A - Preferred: Node 4 is visible looking west near Gate 1

Photo location map
Photo A - Alternate: Node 4 is visible looking west near Gate 1
NODE 4 VISIBILITY

**Photo B:** Node 4 is not visible looking south from road to east point road

Photo location map
Photo C: Node 4 is not visible looking south from this vantage point
NODE 4 VISIBILITY

Photo D: Node 4 is not visible looking south from Point Road curve

Photo location map
NODE 4 VISIBILITY

Photo D: Node 4 is not visible looking south from Point Road curve

Photo location map
Photo E - Preferred: Node 4 is visible looking south from this vantage as shown
Photo E - Alternate: Node 4 is visible looking south from this vantage as shown

Photo location map
Photo F - Preferred: Node 4 is visible looking east from front of Center building
Photo F - Alternate: Node 4 is visible looking east from front of Center building
Photo G: Node 5 is not visible looking west from front of Center building

Photo location map
Photo H: Node 5 is visible looking north from the Coast Guard ceremonial courtyard