

MABC Case Study: Colonial Heights Public Schools

Virginia Public School District Addresses Extreme Connectivity Challenges



Case Study courtesy of
MABC

Challenge

Colonial Heights Public Schools needed a reliable cellular solution to fix poor coverage and keep staff connected across all campuses.

Solution

CEL-FI QUATRA 4000

Installation

Performed by MABC's installation team over two weeks, coordinated with school Director of IT, Mike Zaweski and facilities staff to avoid classroom disruptions.

Results

- Full coverage across both campuses for all major carriers. Verizon, AT&T, and T-Mobile
- Improved communication for teachers, administrators, and security personnel.
- Enhanced safety—staff can reliably make and receive calls indoors.

Colonial Heights Public Schools, located in Colonial Heights, Virginia, needed reliable cellular coverage across multiple campuses ranging from approximately 88,000 to 140,000 square feet. The district's schools - constructed primarily of concrete, brick, and low-emissivity (low-E) glass—created a perfect storm for poor indoor cell signal. Even outdoors, coverage from major carriers was inconsistent due to distance from nearby towers and the area's topography.

Administrators, teachers, and security staff struggled to place or receive calls inside classrooms and offices, creating safety concerns during emergencies and day-to-day operational inefficiencies. The district's technology team recognized that a modern solution was needed to ensure staff could stay connected anywhere on campus regardless of carrier.

Solution

To resolve the district's cellular coverage challenges, MABC Technology Solutions designed and installed Nextivity CEL-FI QUATRA 4000 systems supporting all three major carriers -Verizon, AT&T, and T-Mobile - across two campuses: Tussing Elementary School and Colonial Heights High School.



**“
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believe it.
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the difference.
”**



How It Works

Unlike wideband amplifiers that simply “boost” signal indiscriminately, the CEL-FI QUATRA system digitally captures the outdoor signal from each carrier using a donor antenna, cleans and amplifies it using Nextivity’s IntelliBoost® signal processing, and delivers it indoors via Category 6 cabling to multiple Coverage Units (CUs) strategically placed throughout the building. These CUs broadcast clear, carrier-specific cellular signal to all areas turning dead zones into strong, reliable coverage zones without interfering with the macro network.

Timeline of Project

- **Site Survey:** Completed by MABC’s certified RF engineers using the Nextivity Compass XR tool. Surveys of both schools were completed in less than two days, identifying key problem areas and ideal donor antenna locations.
- **Design:** Conducted by MABC’s in-house engineering team. Final RF design and link budget analysis were completed within five business days.
- **Installation:** Performed by MABC’s installation team over two weeks, coordinated with school Director of IT, Mike Zaweski and facilities staff to avoid classroom disruptions.

Narrative

The initial RF survey revealed that much of Tussing Elementary School had virtually no detectable indoor cellular signal—especially in administrative offices and lower-level classrooms. Colonial Heights High School presented similar challenges, with strong exterior construction blocking signals and creating complete dead zones in interior hallways and the gymnasium.

To overcome these challenges, MABC designed a multi-carrier, campus-specific QUATRA solution. Each school received three donor antennas (one antenna per carrier) mounted on the roof to capture outdoor signals from nearby towers. Inside, MABC installed multiple Network Units (NUs) and Fiber Network Units each serving up to six Coverage Units (CUs) connected via structured Cat6 cabling. The CUs were placed in hallways, auditoriums, and other high-traffic areas to ensure even signal distribution throughout the schools.

This design allowed MABC to deliver consistent coverage across all three carriers with zero interference and minimal equipment footprint. The installation required no ceiling tile removal in classrooms and was completed without disrupting school operations.

Results

After activation, both schools experienced an immediate transformation in connectivity. Staff and administrators noticed that their phones began receiving calls and texts instantly - many in areas that had previously been unreachable.

“MABC was able to provide reliable cellular service for students, staff, visitors and emergency services,” said Mike Zaweski, Director of IT for Colonial Heights Public Schools. “They delivered exactly what they promised and communicated excellently throughout the process. The project ultimately provides another layer of safety and security for students and staff.”