

Alice West Fleet School

Largest Net Zero Energy School in the U.S. Achieves Excellent Indoor Air Quality



About the School

Constructed in 2019, the Alice West Fleet Elementary School is a 110,000 ft² facility accommodating 725 students in Pre-K through 5th grade. This highly rated school in Arlington, VA serves a diverse community, striving to provide a collaborative and inclusive environment while maintaining high standards for academic success. The school is named for a trailblazing Black educator who taught in Arlington schools for over 30 years, breaking numerous barriers during her career and demonstrating a deep commitment to improving her community.

The largest net zero energy school in the U.S., the Fleet school has received multiple design awards, including the ASHRAE National Technology Award (second place) and the USGBC National Capital Region Green School Award. The innovative 4-story building, built on a former parking lot, makes use of solar and geothermal energy as well as many energy conservation technologies, including enVerid HVAC Load Reduction[®] (HLR) air scrubbing modules. The facility was designed in keeping with the WELL Building Standard and to achieve LEED Platinum[®] certification, ensuring optimal energy performance and a healthy learning environment.

The Challenge

The primary project goal was to deliver a net zero design with excellent indoor air quality. The design team at engineering firm CMTA also wanted to reduce the maintenance burden on the Arlington Public Schools district. The challenge was meeting stringent indoor air quality requirements, which often necessitate more outside air, while minimizing energy impact to get to net zero energy.

CUSTOMER: Arlington Public Schools

CHALLENGES: Providing the best-in-class indoor air quality for students and optimizing building energy consumption

SOLUTION: 3 enVerid HLR modules were installed to scrub for all indoor contaminants, reduce ventilation load, and provide best-in-class indoor air quality

RESULTS:

- \$304,680 cost savings over 20 years
- 137,488 kWh in annual energy savings resulting in \$15,234 in annual energy cost savings
- 112-ton reduction in peak cooling load
- Best-in-class indoor air quality resulting in CO₂ levels around 800 ppm (15% improvement relative to typical schools)

ENGINEER: CMTA

SALES REPRESENTATIVES: HAVTECH

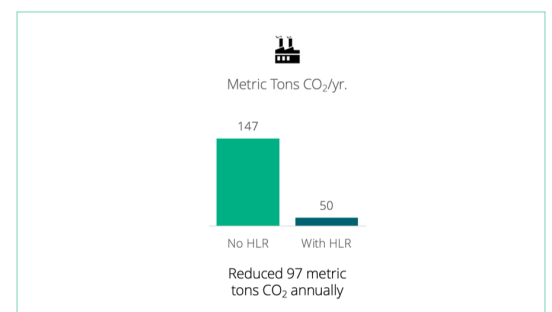
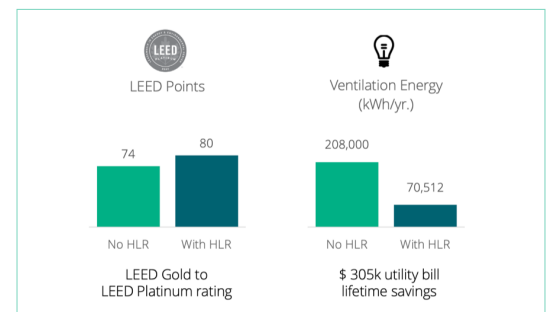
LOCATION: Arlington, VA

DEPLOYED: 2019

SQUARE FOOTAGE: 110,000 ft²



Figure 1: Alice West Fleet School



The Solution

To achieve the stringent indoor air quality requirements of WELL and LEED most energy efficiently, the design team integrated three enVerid HLR air scrubbing modules with a dedicated outdoor air system (DOAS). The HLR modules are used to clean indoor air so that less ventilation energy is needed to condition large volumes of hot and humid outside air to dilute indoor air contaminants such as carbon dioxide and formaldehyde.

“Balancing the requirement for improved indoor air quality and energy efficiency is always at the forefront of our mind” says CMTA Mechanical Engineer Brice Watson, P.E. “For Fleet Elementary School, we were looking for options to enhance IAQ to improve the health of the building and students’ ability to learn, but we needed to do it energy efficiently. We found that enVerid’s HLR air scrubbers could be used to achieve this increased IAQ with less outside air, reducing the energy used.”

In CMTA’s mechanical system design, indoor air from the relief air stream passes through the HLR modules to remove CO₂, formaldehyde, and VOCs from the air stream. This cleaned air is then mixed with outside air from the DOAS to provide building occupants with the cleanest air possible while delivering ventilation energy savings to achieve net zero energy.

Savings of \$304,680

By cleaning indoor air of all ASHRAE and LEED-designated contaminants of concern, the HLR air scrubbers safely reduce the amount of energy used to condition outside air while providing best-in-class indoor air quality. In fact, **Fleet uses nearly 68% less energy than a school built using the baseline energy code** because of the various design strategies used to achieve net zero energy. Over the twenty-year life of the air scrubbing equipment, the HLR modules alone will deliver \$304,680 in ventilation energy savings.

Optimizing Indoor Air Quality

The building’s indoor air quality is vastly improved by the reduction of CO₂, VOCs, and formaldehyde to concentration levels below LEED, ASHRAE and WELL targets. Scrubbed indoor air is mixed with incoming outdoor air, resulting in a reduction in pollutants (as well as pollen and other contaminants) brought in from outside as well as reducing VOCs from building materials and CO₂ from people breathing in the building. Says CMTA Partner Ray Beaufait, “The fact that enVerid’s air scrubbers can remove CO₂ from indoor air was especially appealing since the educational community puts great stock in the [research](#) that finds lower CO₂ levels leads to improved cognitive function in students.”



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Brice Watson, P.E. Mechanical Engineer, CMTA



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**Ray Beaufait
Partner, CMTA**