Lexington High School delivers a new classroom building with the help of Triumph Modular's modular construction.

16,800 square foot classroom space built in a summer

32 modules and 15 new classrooms for students

Energy efficient with natural light and quality finishes

The Challenge

Lexington High School came to Triumph Modular in need of completing a modular construction project, which entailed delivering a new classroom building over the course of a single summer to meet increasing enrollment and changing student needs. Lexington High School required the addition of 10 new classrooms and a series of special education spaces. The building needed to be: Secure and safe, sustainable, functional, accessible, aesthetically pleasing, cost-effective, productive, and completed within the given timeline.

About Lexington High School

Lexington High School is a public 9-12 high school located in Lexington, Massachusetts, ranked 11th in the state. The student body is 49% male and 51% female, and the total minority enrollment is 39%. Lexington High School is the only High School in Lexington.

Industry: Education

Products & Services: Modular Classroom Building Construction

Triumph
Redefining Modular

The Process

Once programming was complete and the town had approved the money, design work began with the help of TBA Architects. Using modular units as a source of inspiration and embracing technology suitable to unitized construction in a factory, we assembled RFP documents with complete architectural, mechanical, electrical, fire protection, and civil engineering drawings. It was our intent to use modular as a delivery method to get the building the town desired. Design and RFP were completed in a few short months.

The building needed to be ready for occupancy by the start of the 2014 school year. There were only six months from contract signing to occupancy. Site work began in April, modular units were delivered in late June and mid-July, and the building was ready in time. Many latent conditions were uncovered when site-work began – gas lines, water lines, and storm drains not in the previously documented locations; a 10,000 gallon grease trap not known of; and needing to relocate the entire building due to utility company timelines – but the entire team worked together to devise solutions quickly and keep the project on track. The use of modular construction reduced timelines by 30-40% in comparison to conventional construction approaches where the school would be constructed on site.

Lexington High School set high standards for this modular building, and they were carried out as follows:

Secure/Safe: The new building sits in a prominent location of the existing campus. The building needed to allow the students to continue to access the way they were familiar with the rest of the campus, but also able to meet the schools safety and emergency response requirements. This was accomplished by incorporating circulation planning into the overall design process.

Sustainable: Lexington is a Massachusetts Green Community so the building was designed to meet and exceed the requirements of the "Stretch Code" for energy use and mechanical ventilation. One of the ways this was done was by moving the insulative and air barrier layers to the exterior of the wall assembly. This creates a more air-tight envelope and prevents moisture from building up in the wall cavity. Large windows and operable windows were used to take advantage of natural daylight and air. Skylights were used in interior corridor and office spaces to reduce the need for artificial lighting and continue the connection goal of having a connection with outside throughout the building as a number of studies have correlated adequate day lighting and an increase in student performance (+4-5%). The controlled environment of the off-site fabrication facility allowed waste to be held under 2% with off-fall being reused and recycled. Wall, roof, and floor assemblies were built indoors, protecting open assemblies from the elements and helping to preserve indoor environmental quality.

Functional: The modular building needed to provide ten new full sized classrooms and five other specialized classrooms, and all required restrooms and building services on a very tight site. A double loaded corridor flooded with natural light was employed to provide access to the classrooms and punctuated to create gathering and way finding spaces for students and visitors. A site-building corridor connects the modular to the existing building and its configuration allowed the creation of an enclosed courtyard for recreation and educational use. Modular construction allowed the school to accomplish the project across multiple phases, scaling their physical infrastructure proportionally to their enrollment.

Triumph
Redefining Modular

Accessible: Accessibility is not only required, but was intended to make the experience of the building better for all users. Sloped walkways without the need for ramps are used for access to the modular from the exterior and interior. The floor elevation of the modular was set between the existing building floor and exterior grade to allow a gentle slope from all directions. All restrooms are fully accessible, corridors are wide and bright, windows are low allowing views for all users.

Aesthetic: Lexington intends the building to be a solution for 10 to 15 years, but wanted a building that looked permanent and contemporary. TBA designed a rhythmic façade that used colors to accentuate the rhythm of the modular units and further animated the long sides with windows in alternating directions and depths. The idea was not to compete with the bays of the modular units, but to use them to create a building that looked as though it was part of the plan and reference the rhythm of the bays expressed in the existing school.

Cost-Effective: Modular was utilized mostly for the benefits of time and to ease challenging site logistics, however general conditions costs were minimized using this method as standard construction would have struggled to be as continuous with the school needing to stay in operation and area for staging being limited. The connection to the existing building was designed to minimize the need for renovations to the existing building and the resultant spaces were taken advantage of as much as possible.

Productive Goal: The building was designed and fabricated to meet all the same goals as a conventional build but using modular opened up additional options such as the ability to dismantle and reassemble in another location in the school district in the future as student demographics shift and flex. Utilizing modular construction was one means to improve productivity and meet the schools' short timeline. The Bureau of Labor Statistics identifies the construction sector as the only non-farm industry where productivity has fallen since the Second World War, and the National Research Council is currently quantifying the productivity gains delivered by prefabrication.

Other Significant Aspects of the Project: This project was intended to be the first of two phases. The timeline was very short from planning through completion of the building and occupancy. Modular construction was a perfect match for the required speed to occupancy and the ability to phase the project.

By working in a controlled environment, construction activities could happen concurrently, rather than consecutively, compressing the construction timeline.

The Result

The two-phased modular building solution was the end result of several months of collaborative space planning, programming, and site evaluation. The project was completed in August of 2014, and with the use of modular construction, timelines were reduced by 30-40% in comparison to conventional construction timelines. The town of Lexington was able to leverage the advantages of modular construction to combat overcrowding with no sacrifice to quality.

Triumph
Redefining Modular

The modular building is designed and installed for permanent use and offers the high school students an energy efficient classroom with generous natural light and quality finishes. The controlled environment of the off-site fabrication facility allowed waste to be held under 2%, making the project a sustainable one. The building includes a high efficiency HVAC system, corrugated steel sliding on the exterior, and expansive floor to ceiling glass, which allows the classrooms to be illuminated with natural light.

194 Ayer Road, Littleton, Massachusetts 01460
800-727-2813