LACCD Sets BIM Standard on the Largest Bond Construction Program in the United States

Bentley’s Connected Data Environment to Save USD 12 Million on Ambitious Sustainable Building Project

A BIM Commitment

The largest community college district in the United States, with nine colleges spanning 882 square miles, Los Angeles Community College District (LACCD) has educated more than 3 million students over the past 77 years. Currently enrolling more than 225,000 students annually, 80 percent of whom come from underserved populations, LACCD received funding through taxpayer-approved bonds and the State of California to launch its BuildLACCD project. With a goal to expand the capacity and efficiency of the school while targeting zero-energy usage, the USD 6 billion sustainable building project will modernize and improve campus facilities to enhance opportunities for students from lower income communities, enabling them to successfully compete in the 21st century economy.

Beginning in the early 2000s, the bond programs called for designing and constructing more than 65 new buildings and remodeling many others. The first two phases were traditional design-build projects, while the final phase of this 14-year ambitious campus transformation mandated a BIM approach, requiring that each building be modeled in 3D and managed using BIM processes. To meet this requirement and compliance, LACCD needed flexible, interoperable technology.

LACCD’s comprehensive BIM standards designated approved software for every function performed on the design-build projects and required i-models for each building to incorporate all data and disciplines, improving coordination among multiple entities. As part of the standardized solution, Bentley applications (including ProjectWise, AECOsim Building Designer, Descartes, MicroStation, and Bentley Navigator) are used by hundreds of project participants—from architects and designers to construction managers and consultants—to create, analyze, and manipulate the 3D models. However, “the reality is that this technology implementation is just one simple, single component of a complete system,” explained Troy Barbu, BIM manager for LACCD. To bring all the information together, facilitate accurate data sharing, and optimize collaboration among these project stakeholders, LACCD required a connected data environment, adhering to standards and specifications that could ensure successful project delivery.

Fast Facts

• LACCD implemented ProjectWise as the connected data environment to coordinate over 500 project participants and manage more than five terabytes of data.
• Integrating Bentley Navigator for coordination review and clash resolution enhanced the 3D collaborative environment for better understanding of ongoing designs.
• ProjectWise delivered a connected data environment for data exchange and information management, which is estimated to save USD 12 million in labor costs.
• i-models provide LACCD Facilities and Campus Project Departments access to the intelligent project data for operations, maintenance, and future planning.
• Using innovative designs and energy-efficient technology enabled LACCD to deliver LEED-certified buildings achieving net-zero energy usage.

Working in a Connected Data Environment

To ensure collaboration and performance, integrating people, data, standards, and processes throughout the project lifecycle, LACCD leveraged ProjectWise as the common interface and foundation for its standardized, collaborative BIM approach. LACCD’s BIM standards required ProjectWise as the central repository for all information, including models, drawings, specifications, photographs, and all other project data. “ProjectWise acts as the system that aligns all of the information into one source. It becomes the foundation for all drawings, data, models, and documents for this project,” stated Barbu.

Currently housing more than 3 million files and 390,000 data folders totaling five terabytes of data, ProjectWise enabled the hundreds of stakeholders and project firms to coordinate efficiently and effectively, providing real-time access to project information in a controlled environment. Integrating Bentley Navigator and Navigator Mobile to incorporate i-models further enhanced information mobility and accessibility while preserving data integrity and accuracy. The interoperability of Bentley software provided a connected...
3D environment where participants could better understand, review, redline, and share feedback on ongoing designs throughout the entire project lifecycle.

**Harnessing Project Data for Building Operations and Lifecycle Management**

When LACCD created its BIM standards, they not only wanted to meet the BIM mandate to create the 3D models, but also went a step further to capture as much data associated with the assets in the planning and design phase so it could be utilized by facility directors and campus project directors for maintenance and operations.

With ProjectWise as the unified repository, all data is stored for use throughout design and construction of the facilities, and remains preserved throughout the lifecycle of every building for operations and maintenance.

Barbu posed the question, "How can I take data that happens during design and construction of a building and really harness it for building operations?" The ability to bring the geospatial and GIS metadata together in ProjectWise provided a database representation of each building’s lifecycle and enabled access to the data via folder structure, comprehensive searches using searchable metadata parameters, or spatially from the campus map.

On a macro level, within each building folder, users can see the building spatially in addition to all the associated as-built documentation files and maintenance and operations documents.

Using i-models provides more detailed access to the individual equipment for each of the buildings, indicating equipment location and all the information associated with that piece of equipment. Together, these solutions present a clear representation of a building lifecycle, and using ProjectWise provides the transparent environment for ongoing data management of all nine college campus facilities.

**BIM Methodology Delivers Cost Savings**

Working in a collaborative 3D environment using Bentley’s BIM advancements enhanced project coordination and was instrumental in implementing LACCD’s BIM standards. LACCD relied on ProjectWise as the cornerstone of project and data management providing an access-controlled, transparent, workflow-based system that served as a connected data environment for all project information. The use of i-models enhanced information flow of BIM models and standards in a transparent format and ensured accurate data exchange and data integrity. Integrating Bentley Navigator to work with the 3D i-models streamlined BIM review processes and issue resolution, while Navigator Mobile allowed project stakeholders and participants to view information and resolve issues from the office or in the field. The interoperability of Bentley applications provided LACCD a 3D connected system that facilitated real-time, improved information sharing and better document version control. This helped to reduce rework and costs equivalent to 12 percent in labor savings and USD 12 million in cost savings.

Furthermore, LACCD’s comprehensive BIM methodology enabled project teams to incorporate solar energy and use low-cost electricity during off-peak hours to reduce energy consumption ensuring delivery of sustainable, cutting-edge, LEED-certified buildings. LACCD saved USD 2.2 million in overall utilities, with a USD 1.3 million reduction in terms of photovoltaics, resulting in 12.2 percent annual renewable electrical consumption.

Using Bentley technology, LACCD created a system that is agile, mobile, quantifiable, and accessible to support the information needs of the individuals and firms responsible for building, operating, and maintaining the modernized campus facilities. “We developed a system that doubled capacity with more efficiencies serving 150,000 students, and ProjectWise was at the center of it,” stated LACCD maintenance and operations standards coordinator James Conway-Juarbe.

The construction program will fulfill the objective of expanding LACCD’s capacity and efficiency, enabling the district to prepare more students for careers and/or transfer to four-year universities.