

COMPANY

**The University of Virginia (UVA)
Health System University Hospital
Expansion**

LOCATION

Virginia, USA

SOFTWARE

Autodesk® ReCap™

Autodesk® Navisworks® Manage

Autodesk® Revit®

Autodesk® BIM 360®

BIM keeps cranes going and helipad open

Model-based collaboration helps hospital safely operate helipad just 30 feet from construction cranes

“The biggest win with a connected BIM approach is communication. The clarity and intelligence of the process brings people together. It’s easier for people to see and discuss what needs to be done and improved. On the UVA project, we were able to fast-track key portions of the project with help from cloud-based Autodesk BIM 360 tools.”

— **John Calvin**
Project Executive
Skanska USA



Southeast rendering of the green roof and exterior skin. Image courtesy of Perkins+Will Architects.

The University of Virginia (UVA) Health System University Hospital Expansion will add 440,000 square feet of space to the most advanced medical facility in the western part of Virginia. With one of the region’s few trauma centers, UVA hospital receives as many as 20 patients via helicopter each day. The expansion brings much-needed capacity to in-patient and emergency services, but hospital operations must also continue as usual throughout construction. The construction manager, Skanska USA, and design team, Perkins+Will, used 3D construction models linked to schedules to deliver the project safely and to keep the hospital’s helipad—located just 30 feet from construction cranes—in normal operation for 22 months.

Safety: a top priority on the ground and in the air

UVA chose Skanska USA for the project because of the firm’s commitment to safety and its use of model-based collaboration to coordinate with the design team during design and preconstruction. For instance, Skanska USA was an early adopter of construction techniques and planning that nearly eliminates the use of ladders, which are at the root of many construction injuries.

Skanska USA made safety the project’s guiding principle, but it had to ensure that this project accounted for the safety of more than just construction workers and construction-site visitors. The team had to plan for the safety of—and ready

access for—faculty members, hospital staff, ambulances, and patients. Plus, the team had to ensure that the UVA's Level 1 Trauma Life Flight team always had a safe path to land and take off—even with cranes working close to the helipad.

“We used BIM [Building Information Modeling] tools—including Revit building-design software, Navisworks project-review software, and BIM 360 cloud services—to model and plan construction,” says John Calvin, project executive for Skanska USA's building operations in Virginia. “For instance, Navisworks helped us sequence and plan construction to minimize the impact to hospital operations. We were also able to go to the executive team and show them 3D sequences of how we planned to deliver the project. Using those same types of 3D Navisworks models, we worked with the helicopter pilots to develop a plan to keep them safe. They could see the landing pad in relation to the cranes before encountering them in a landing or takeoff situation.”

BIM in preconstruction accelerates schedule

From the early project stages, Skanska USA, UVA, and the design team collaborated to coordinate the project and avoid constructability issues.

BIM 360, Revit, and Navisworks were central to this effort, with stakeholders using aggregated, cloud-based models to spot and eliminate clashes before construction. They even pushed design models to the Revit Live architectural visualization service to use virtual reality (VR) to help medical teams see and improve equipment placement.

The team spotted several opportunities to reduce project cost during preconstruction. For example, the team took laser scans of the existing building processed with ReCap reality capture software and blended them with the Revit



Southwest rendering of the exterior skin and cantilevered portion of the hospital patient tower. Image courtesy of Perkins+Will Architects, Skanska USA.

design models. This helped the team eliminate a new shaft that was going to be placed near an existing shaft. The combined ReCap and Revit model showed that the existing shaft could handle the increased load, saving \$200,000.

Construction models stay close with tablets

Using a connected-BIM approach to share 4D project schedules, Skanska USA took the insights gained during preconstruction onto the jobsite with BIM 360. Many of the tradespeople working in the field accessed construction models with on-site tablets. They could see the schedule, communicate issues, and visualize the next steps without having to go to a construction office. Using BIM 360 to analyze crane operations, the team was able to maximize crane picks, radius, weight, and sequencing for efficiency. The similar study helped sequence steel and concrete construction to eliminate more than \$1 million in bracing costs.

“Today, tradespeople are as likely to have a tablet on the jobsite as they are to have a hammer,” says Cody Holder, Skanska USA senior project engineer.

“It’s something you can take advantage of by using BIM 360 for coordination, scheduling, and more. They access the latest information in the cloud instead of accessing potentially outdated models. Tablets and BIM 360 connect people who spend most of their time in the field to BIM.”

Checking the safety box every day

The construction team focused on planning for safety as part of its preconstruction modeling. How is the team doing? With more than 1.3 million hours logged on construction, the team has lost zero days due to incidents.

In a single day, as many as 20 Level 1 Trauma Flights land safely. Perhaps most impressively, the Skanska USA team estimates that heavy BIM preconstruction project analysis and planning will cut the project schedule by as much as months to years as compared to a traditional process that doesn’t involve early construction team involvement