# McCarthy saves 8 Man-Hours per day using BIM 360 Design during major Washington University construction project

*Leveraging its EBA with Autodesk, McCarthy improved its workflows and BIM execution through the successful partnership*

*Image courtesy: McCarthy Building Co.*

## Overview

McCarthy Building Companies, Inc., headquartered in St. Louis, Missouri, is over 150 years old and is a top 20 ENR general contractor, top 15 Building Informaiton Modeling (BIM) contractor, and top three healthcare builder. The firm is a leader in innovation, construction technology, and lean construction, pushing towards the ultimate goal of becoming the "Best Builder in America." McCarthy's work on the Washington University in St. Louis East End Transformation Project officially started construction May 2017 and will extend into late 2019. The project features eight components — six buildings, one parking garage, and one landscape feature — and at over $240 million, is the largest project on the Washington University Danforth Campus in recent history. The university prides itself on its academic mission of groundbreaking discovery, research, and teaching. The new addition will reflect this mission.

With an established construction company like McCarthy on board, the project was in good hands. From the start, McCarthy worked with the project team to develop a project-wide Building Information Modeling (BIM) Execution Plan to address the needs of this complex project. Leveraging Autodesk® Navisworks®, Autodesk® Point Layout, and Autodesk® BIM 360® Design software (formerly Collaboration for Revit), the customer was able to improve communication and execute project elements seamlessly.

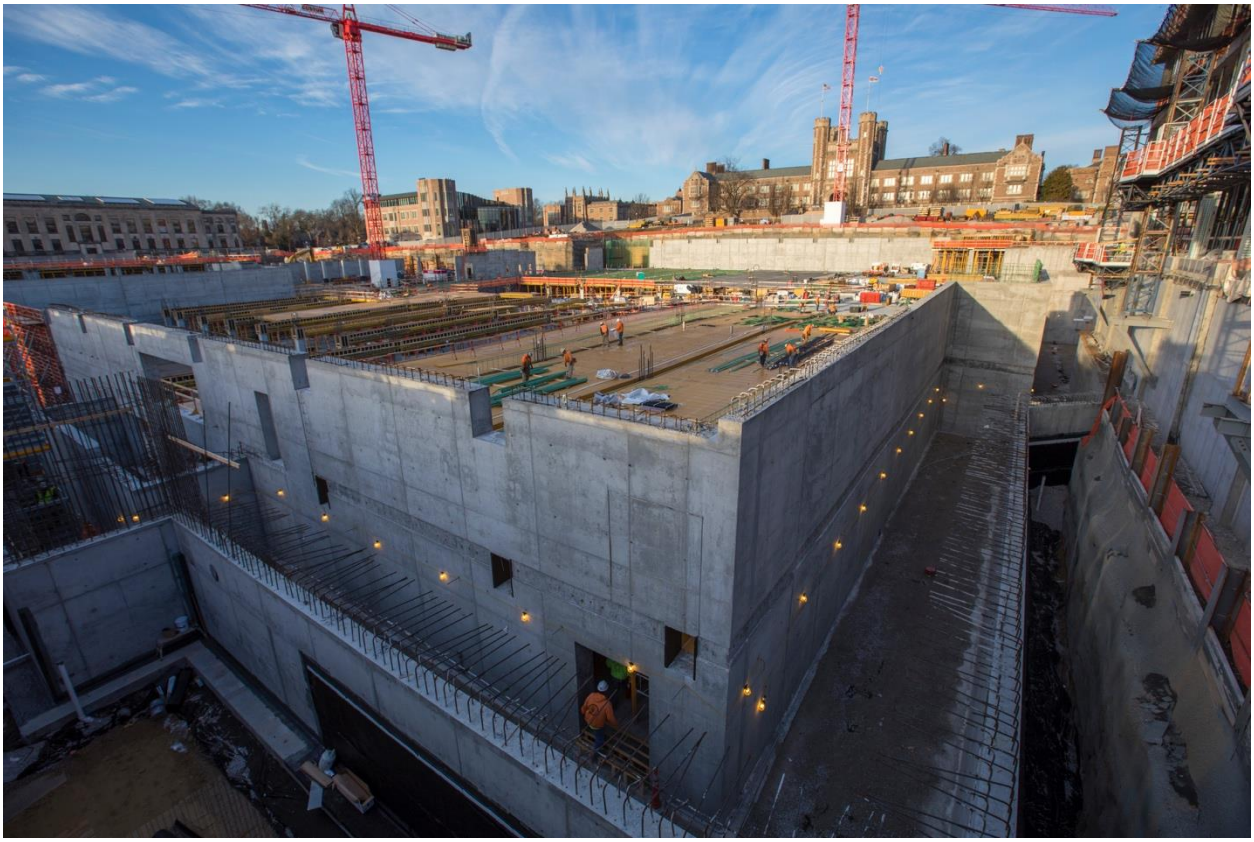


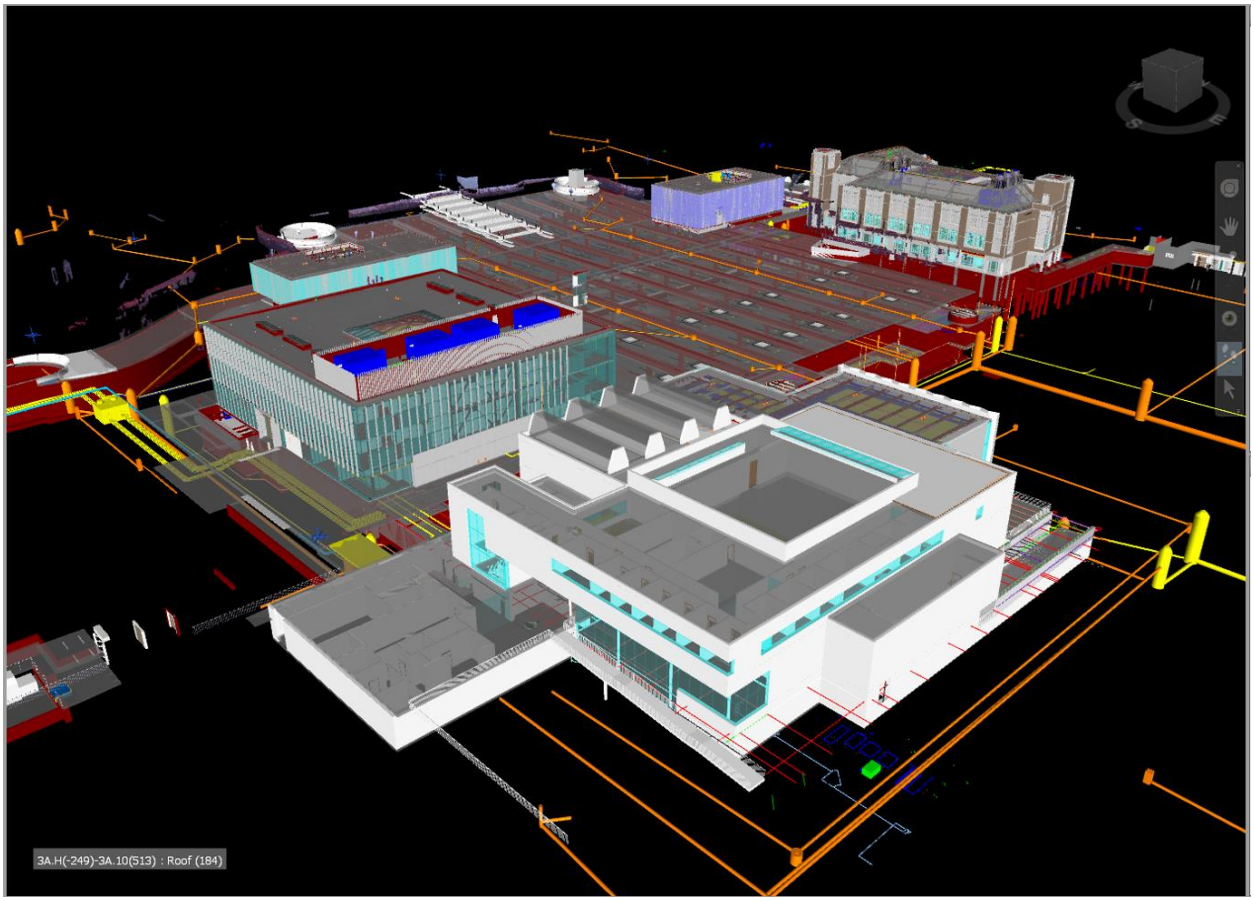
*Image courtesy: McCarthy Building Co.*

## Challenge

As a premier builder, McCarthy's Virtual Design and Construction (VDC) process began with an early BIM execution plan involving all project stakeholders. Early scoping documents communicated the overall process to design team members and trade contractors alike, intending to clearly lay out the expectations of McCarthy and the project owner. The unique East End Transformation was particularly massive, and with so many components, there was little room for error.

Many of the new buildings included high-end architectural designs and finishes. Early in the coordination process, challenges arose that caused the pre-defined workflows and milestones to begin to break down. McCarthy was working with more than 20 design team partners who, at this early stage, were not fully aware of how much their design-intent models were being leveraged to influence coordination, shop drawing review, and concrete placement.

McCarthy knew the success of this project required seamless communication and all team members fully buying into the concept of the model being the Single Source of Truth. The McCarthy team also knew that in order to support the firm's core purpose to be the best builder in America, they must also continually drive to be the best virtual builder in America. McCarthy's approach to construction technology is different than most in the industry – construction technology must add value or it has no place on the project. This philosophy was instrumental in their approach.



*The "Single Source of Truth" model. A Federated Model of nine different .nwf models, translated from Navisworks into one primary .nwf – a very challenging task. Image courtesy: McCarthy Building Co.*

## Solution

Having renewed its Enterprise Business Agreement (EBA) with Autodesk at the beginning of 2018, McCarthy was able to fully leverage its relationship and give all project participants access to Autodesk solutions. Open conversations between the teams led to a more proactive partnership and a definitive strategy for the next three years of the EBA.

McCarthy chose to leverage a unique combination of workflows using Navisworks, Point Layout, and BIM 360 Design. The primary goal in implementing the software and workflows was to seamlessly connect project-wide team members across different regions, keeping everyone connected in real-time.

At the completion of the design phase, McCarthy onboarded 15 team members to multiple platforms and workflows within two months to prepare for successful trade coordination. BIM 360 Design was used to connect project team members across the country in a collaborative environment. Navisworks connected onsite McCarthy team members managing multiple trade coordination meetings weekly. Point Layout was leveraged daily for the dynamic process of model-based, concrete placement.

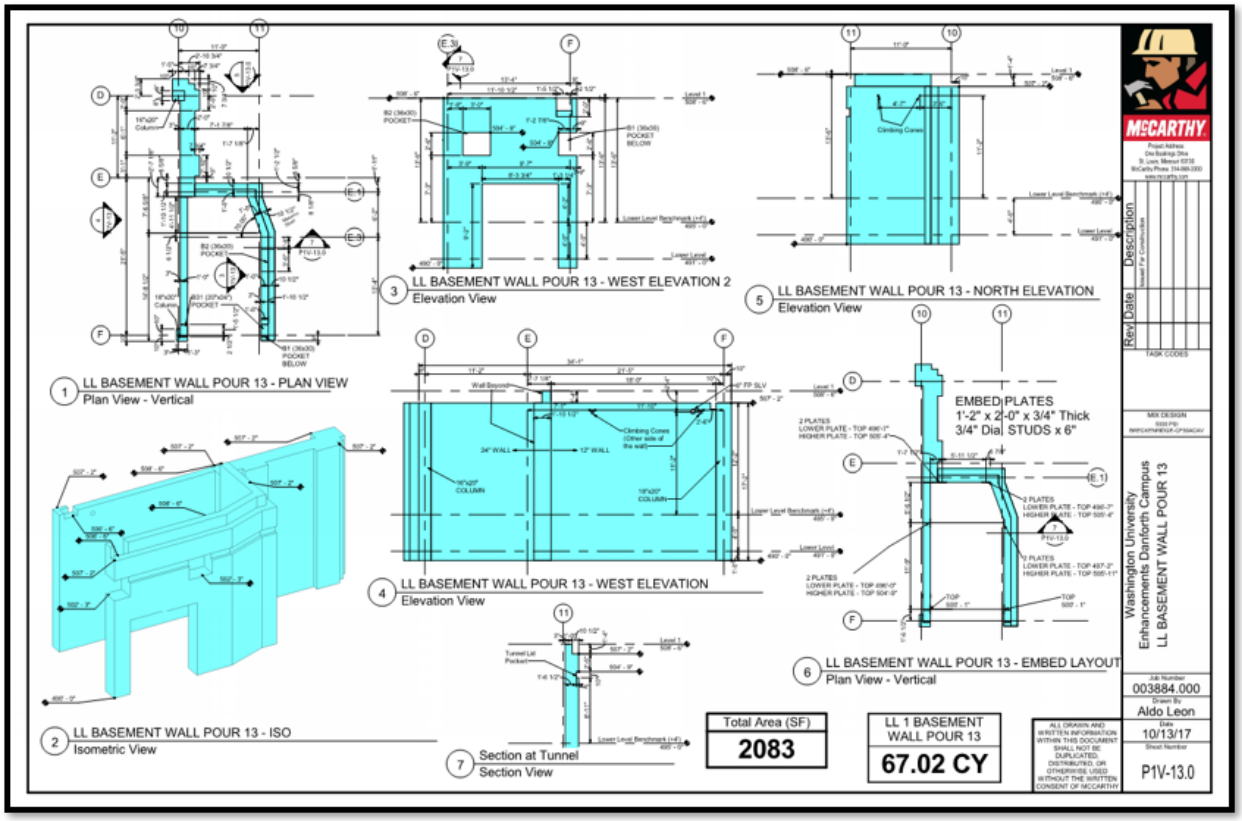


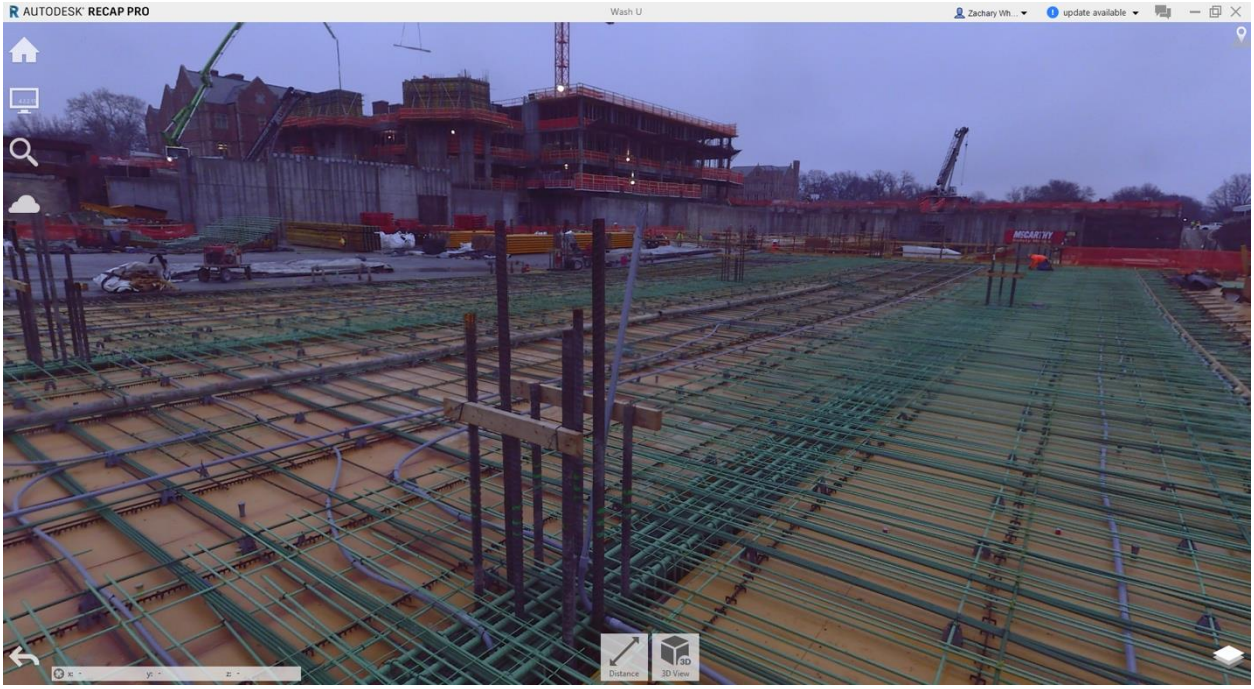

*Image courtesy: McCarthy Building Co.*

## Success

McCarthy self-performed all the concrete for this project and leveraged its internal Concrete Placement Drawings (CPDs) process to ensure a coordinated and effective concrete placement effort. Utilizing BIM 360 Design, multiple project stakeholders were connected to the concrete detailing process prior to the review and approval of CPDs and concrete placement. With this method, McCarthy created, modeled, and detailed a total of 87,810 tons of concrete—or 43,363 Cubic Yards. In total, the team generated 560 CPDs to place this concrete.

The ability to automate the process of calculating concrete pours, rather than hiring one individual to check drawings and generate calculations, translated to an incredible efficiency gain. Ultimately, McCarthy saved four man-hours per pour during the concrete laying process. By using these same methods to prevent future issues, McCarthy saved 10 man-hours per pour.

In tandem with concrete modeling, McCarthy utilized Point Layout to drive their model-based layout process. Point Layout transformed the layout process from a time-intensive, manual effort to a seamless digital workflow. McCarthy saved eight man-hours per day with digital point layout processes.



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As McCarthy planned for BIM execution, the 3D trade coordination process would be critical to the delivery of the project's schedule and quality assurance needs. By implementing this process as a builder-led effort, McCarthy was able to drive value through effective leadership and facilitation among multiple project stakeholders. By implementing these specific workflows, McCarthy was able to anticipate potential issues proactively and outline communication strategies for effective resolution.

With improved collaboration and coordination using Autodesk applications, McCarthy was able to lead and connect design and construction team members to information in real-time. By leveraging engagement with the Autodesk team, McCarthy improved the overall workflow of trade coordination and avoided potential setbacks. Taking a proactive approach and testing new concepts in real-world scenarios, McCarthy saw meaningful improvements to its effective delivery of BIM execution. Without access to the full range of Autodesk solutions, this would not have been possible.

*Image courtesy: McCarthy Building Co.*

*"As a national builder, we know there are a lot of eyes on companies of our size and what we're doing. We are very passionate and intentional about what we put out there for the market to see. We're not putting stuff out there just because it's cool. We're truly trying to test the latest and greatest applications that we believe are most beneficial for us to deliver value to our clients at a higher level…On the Wash U East End Transformation Project, I look at how we leveraged BIM 360 Design, Point Layout, and Navisworks. Without these tools and workflows, our BIM Execution on this project would not have been as effective."*

– **Alex Belkofer, VDC Director, McCarthy Building Companies, Inc.**