Finding The Right Data Faster For Smarter Construction

Written by: Kathleen Kewley, Director, AEC Global Business Development, Esri

With megaprojects becoming more complex, data analytics has to be more precise.

American football stadiums are never done being built. Depending on the night of the week, the season, or circumstance, they could be converted into a concert venue, a hockey rink, even a staging area for emergency evacuations.

In the past, those shifts might have sent stadium operators scrambling to stay on schedule and within budget.

Now, they're getting smarter. Forward-thinking executives are finding new ways to look at the data they've long received from architects, engineers, and contractors before, during, and after construction. They're anchoring that data to the real-world. They're building 3D models and interactive maps with that data to simulate their next moves before they make them.

It's how they arrange the best seating for game views, position a concert stage for optimal acoustics and visibility, and ensure steady crowd flow no matter the event or potential emergency.

Stadium operators are constructing these data-rich resources for decision making by using two technologies, long used separately but recently combined: building information modeling (BIM) and a geographic information system (GIS). BIM shows a 3D model of what's been built and GIS maps it in the real world. With BIM and GIS together, there is no more guesswork, just smart planning and execution.

FOCUSED ON THE NEXT EVENT

The operators of one stadium — home to a team with more Super Bowl rings than can fit on one hand — use BIM and GIS to maximize the number of days the venue earns revenue. In preparation for their next event, they explore their stadium virtually, simulating what might need to go where before physically moving a single asset.

The virtual rehearsal prevents costly errors — especially when there's no time for mistakes.

"They have to turn and burn. They've got to get onto the next thing," said Symetri's Chief Business Development Officer Scott Bailey.

Owners of construction projects want predictability, not surprise fixes and cost overruns. So, Bailey and his team work

with stadium operators and other facility managers to leverage their asset data and facility designs in ways that improve operations. They use GIS maps to tie BIM data and models to exact locations and give operators the tools to simulate design changes.

"They're looking at data about assets and facilities — data that has been collected by AEC crews but often gets overlooked by project owners," Bailey said. "Seeing that data in the context of location, on a GIS map, is helping them have more predictability into the future."

For stadium operators this approach has another business advantage, according to Bailey. "The ability to provide contextual data to event promotors is an edge many venue owners cannot provide today."

Stadium operators are hardly the only ones looking for more predictability. It's something every construction team and project owner needs, including those working on massive infrastructure projects around the world.

FROM STADIUMS TO SUBWAYS

The same technique of combining GIS and BIM is showing up in a variety of construction projects. With it, crews are visualizing progress, detecting clashes, and monitoring resource usage in real time.

In Paris, for example, tens of thousands of workers below the city's streets are using GIS and BIM every day to build the $41 billion Grand Paris Express. They are preventing potential costly mistakes by seeing disruptions before they happen. They are sequencing deliveries and construction more precisely. That precision, which helps better anticipate what comes next and where, is valuable in any project where building smarter and faster is a priority. It's especially valuable for a project this complex.

Adding 124 miles of new tunnels and 68 stations to the subway requires everyone involved — the construction crews, designers, city officials, lighting installers, engineers, and community members — to be on the same page. Despite having different technical skills, they all need to be able to tap into the same trusted data at a moment's notice.

Shared dashboards, visualizations, and the models of what's being built where, makes the information more accessible to more people. When the data is seen by the people who need it, when they need it, they can do their jobs better and faster.

By modeling all available data together, in the context of location, everyone can see building plans as they would exist in the real world, down to every wire and water connection.

By integrating scheduling data with location data, planners can identify conflicts before construction begins. The GIS-BIM combination is helping spot where concrete pouring, electrical installation, and track construction may clash with surroundings — or each other. And it helps them create solutions before problems happen.

That's not insignificant considering correcting for mistakes on construction sites accounts for 12% of a project's cost on average.

CREATING CONSTRUCTION PREDICTABILITY IN PERU

The common operating picture of a location-specific project model gives everyone the same necessary information whether they're on the jobsite or in the office.

In South America, that unified view has been scaled to a project that spans an area four times larger than New York City.

Leaders in Peru have been overseeing a massive re-envisioning of their flood mitigation infrastructure since catastrophic El Nino-caused flooding in 2017. The project includes rebuilding numerous coastal river basins to protect people from future storms as well as building evacuation channels and containment dikes.

The enormity, though, hasn't been a limiting factor. A combined GIS and BIM system enabled numerous team members and public stakeholders to view project information and collaborate without needing anything more than to open a web page. That's made the megaproject more agile. With easier access to digitized and organized data, stakeholders can make decisions more quickly and effectively.

It's also made it possible to see where things might go wrong before they do. In a location with as much history as Peru, ensuring the preservation of archaeological resources

is crucial. With GIS and BIM working together, the team can simulate if and where their infrastructure fixes might have unintended consequences. For instance, they can spot environmental impacts or potential damage to resources and recalibrate their work in response.

Being able to weigh costs and impacts in advance results in smarter long-term solutions. That proactive risk mitigation is supercharged with AI-powered GIS maps and dashboards that provide real-time visibility into changing conditions. Teams track assets, analyze land use changes, assess natural resources, and detect infrastructure issues for immediate, informed decisions.

FASTER WORK WITH SMARTER RESULTS

Whether transforming stadiums overnight, building subways beneath busy cities, or safeguarding communities from natural disasters, construction teams using GIS and BIM together gain a shared, real-time view of projects. And they are reducing errors, improving coordination, and accelerating delivery.

The result is more than faster project delivery. It's smarter infrastructure that stands the test of time. As more facility owners and construction teams embrace integrated technologies, the industry moves closer to a future where predictability is the norm — not the exception.

About the Author

Kathleen Kewley is the director of AEC global business development at Esri. She has over 20 years of professional experience working with executive leadership of global engineering, architecture, consulting, and construction firms. Prior to joining Esri, Kathleen spent 10 years at Autodesk where she helped leaders in the AEC industry transition to 3D geospatial and building information modeling.

About the Article

Reprinted from Construction Executive, January, 2026, a publication of Associated Builders and Contractors. Associated Builders and Contractors is a national construction industry trade association representing more than 21,000 members. Based on the merit shop philosophy, ABC helps its members develop people, win work, and deliver work safely, ethically, and profitably for the betterment of the communities in which they work.