THIS ESTIMATING PILOT PROGRAM IS READY FOR TAKEOFF

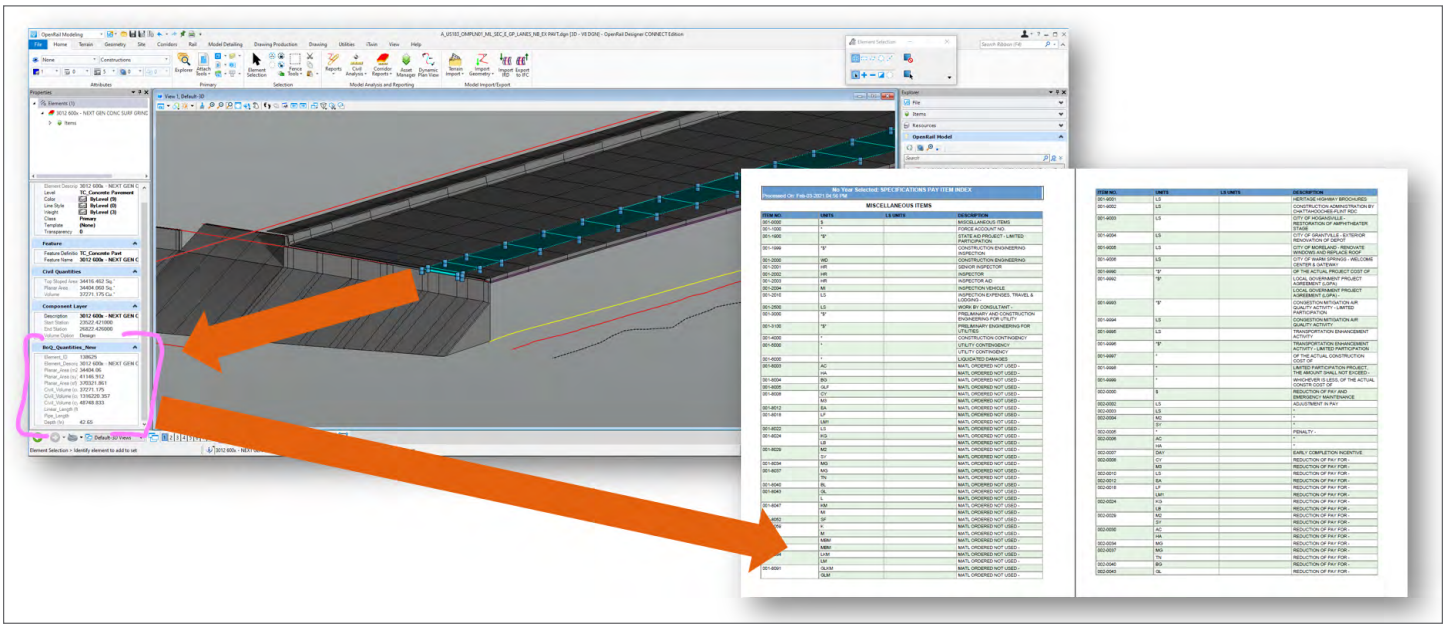
Quantity takeoffs have traditionally been time-intensive and error-prone. Making a design change inevitably results in rework. And when dealing with multiple disciplines, any change has a ripple effect, potentially impacting the entire project. While basic 3D technology is an improvement to older methods that involve 2D plans and manual calculations, that alone doesn't really solve the problem of complex projects that involve multiple integrated workflows.

Arcadis, a global design, engineering and consulting firm, wanted to address that problem, deciding to take the lead in finding a way to increase the accuracy of performing estimating takeoffs while reducing the time and expense of doing so.

GETTING CREATIVE

Pál Porkoláb, Arcadis' U.S.-based BIM Manager, says, "The traditional way of doing takeoffs involves taking 2D drawings and measuring areas based on that — calculating length, volume and so on. You need to create the drawings first, and then you can start figuring the quantities. It's an ineffective process, time-consuming and not particularly accurate."

To address the wastefulness of traditional takeoffs in highway design, Arcadis began looking for a better way of calculating them by considering what other construction sectors were doing. Porkoláb explains, "Our driving factor was to try to adopt processes that are already being used in the vertical building market. We knew that other industries were using



3D model-based takeoffs and that's what we wanted to achieve — to develop a scalable process that could be used for any project."

PROOF OF CONCEPT

Once Arcadis had a general idea of how they would approach the problem, they first needed a proof of concept. While they were initially using several different software applications for various design processes, it was apparent that to get everything working together in a federated model, they needed an integrated design tool. **Bentley Systems software** was their solution of choice.

Arcadis' approach would be focused on a pilot project, a 10-mile section of highway in an urban environment, complete with interchanges and bridges. By using products that worked seamlessly with one another, Arcadis would then have more transparency and precision within their design process. The end goal was to calculate and update takeoffs in real time as changes were being made within any part of the model.

Arcadis used Bentley's **MicroStation**, **OpenBridge** Modeler, **OpenRail** Designer and **OpenRoads** Designer to create a federated model of the corridor. Metadata for each model element would be captured in a project-specific bill of quantities document and any design changes would generate an updated quantity estimate.

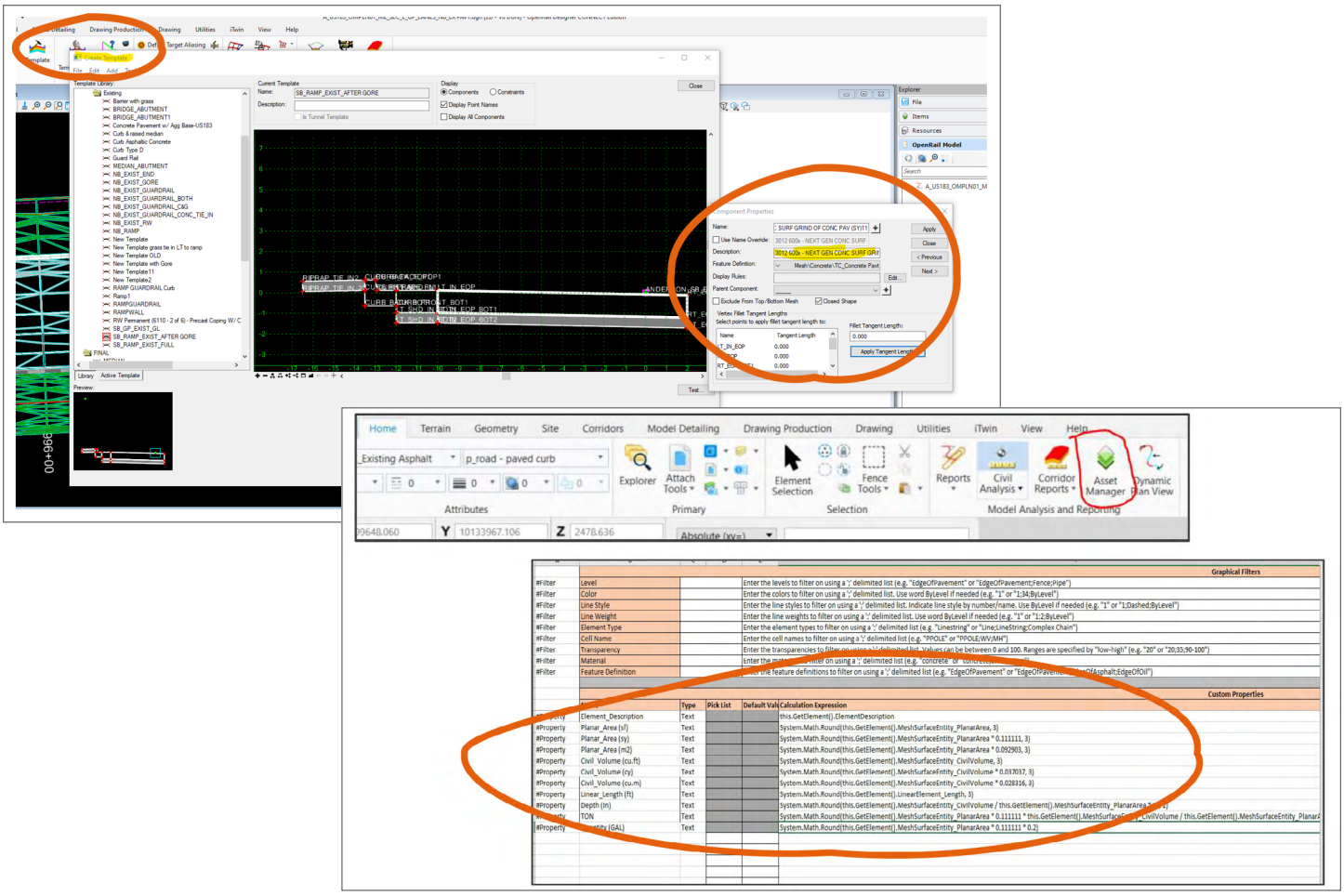
"Once we'd created a 3D representation of the design, we were able to use that to create quantity takeoffs just by pushing a button," says Porkoláb. "Change the design, and we'd just push the button again."

Arcadis had solved its takeoff problem.

TOTAL ACCURACY

During the pilot, Arcadis wrote a small script to further automate the process and found that Bentley was very willing to help them refine their approach.

How precise are the takeoffs generated by the software? Porkoláb says, "They rely on the accuracy of the models. If the models are 100 percent accurate, then the takeoffs are 100 percent accurate."



With the overwhelming success of the pilot project, Arcadis plans to keep using the new takeoff method for future design work, including highway, bridge, drainage design and more. “It’s really a huge improvement to our previous process. We can save 80 percent of the time it used to take us to do quantity estimations — and we can keep getting that benefit of time savings for every project we do in the future.”

Since the pilot program’s completion a year ago, Bentley has continued to make improvements to its software that Arcadis is leveraging for its latest projects, says Porkoláb. When asked what he’s learned from tackling the takeoff problem, he laughs and says, “We simply didn’t expect this level of effectiveness. It’s really a pleasant surprise.”