

COMPANY

David Evans and Associates

LOCATION

Portland, Oregon

SOFTWARE

Autodesk® Infrastructure Design Suite
Autodesk® InfraWorks® 360
Roadway Design for Autodesk® InfraWorks® 360
Autodesk® AutoCAD® Civil 3D

A new road for infrastructure projects

InfraWorks 360 helps David Evans and Associates plan, design, and communicate infrastructure projects

During preliminary design, we usually need to develop and analyze several design alternatives with different options for the alignment, the profile, the road cross section, and so on. InfraWorks 360 and Roadway Design for InfraWorks 360 software lets us do this very quickly and easily, and then manages all of those alternatives for us. In addition, that early-stage design data moves more seamlessly into the Civil 3D detailed design software—so no design information or effort is lost.

—**Daniel Iliyn**
Civil Engineer, Roads & Highways
David Evans and Associates, Inc.



Images courtesy of David Evans and Associates.

The organization

Oregon-based David Evans and Associates (DEA) is a leading provider of design services for transportation, water, land, energy, and marine infrastructure systems. The firm currently has over 1,000 employees working in more than 20 offices throughout the western United States and New York, with a staff that includes engineers, surveyors, hydrographers, planners, landscape architects, and natural resources scientists. DEA has used Autodesk software for many years and currently uses AutoCAD® Civil 3D® software and many other tools within the Autodesk® Infrastructure Design Suite Premium, for detailed infrastructure design. More recently, the firm began using Autodesk InfraWorks® 360 and Roadway Design for InfraWorks 360 for both preliminary design and project visualization.

The challenge

DEA is just finishing the detailed design of a \$30 million dollar transportation project for Oregon's Washington County: the extension of 124th Avenue through unincorporated county land between the cities of Tualatin and Sherwood. The project includes over five miles of new and improved rural and urban roadways, with extensive drainage features and a five-lane bridge spanning a railroad.

"This project will impact many adjacent businesses and home owners," explains Daniel Iliyn, a civil engineer in DEA's Roads and Highways group. As a result, there has been a lot of public interest in the project." In addition, part of the new road goes through the middle of an existing rock quarry, so the roadway will have significant elevation changes requiring numerous rock cuts, walls, and re-grading of adjacent property driveways.

As part of its public outreach effort, the County had already hosted numerous open houses and interested party group meetings. For these informational sessions, DEA developed project visualizations for the County—mostly in the form of traditional 2D plan drawings and strip maps. "It can be difficult for some people to fully understand a project by looking at engineering drawings," remarks Iliyn. In addition, these standard presentation materials are often graphically separated from the project setting, making it even more difficult for a non-technical audience to understand. "At these public meetings, people didn't want to look at strip maps or plan drawings," says Iliyn. "They wanted to see how the project would impact their businesses and neighborhoods, and what it would look like from their driveways or backyards."





Caption

Using InfraWorks 360 to generate project visualizations—be it for preliminary or detailed designs—is easy and the results are very effective. The 3D visualizations are set in the context of the surrounding environment, which adds realism and helps improve the communication of our designs to prospects, clients, project stakeholders, and the public.

—Larry Maeda
AutoCAD Support Specialist
David Evans and Associates, Inc.

The solution

“When we were about 75 percent done with the design, we decided to prepare project visualizations to use in two important upcoming public meetings,” says Iliyn. “At that point, we had just implemented InfraWorks 360 and we decided to pilot the software on this project, knowing that the 3D visualizations we could produce with the software would be a huge improvement over 2D drawings.” But because the project design was well underway, DEA also knew that any visualizations they produced had to exactly reflect their infrastructure design.

So DEA used InfraWorks 360 and Roadway Design for InfraWorks 360 to merge existing-conditions and project design data, generating a 3D infrastructure model of the road design and its surroundings. The firm used this model to produce more compelling project visualizations—including still renderings and fly-through videos of each of the major roadways—for the public meetings.

Model building

The firm began by using the Model Builder tool in InfraWorks 360 to quickly create a base map of the project area. “The Model Builder service in InfraWorks 360 is a really simple way to start your infrastructure model,” says

Iliyn. “In fact, I tried using InfraWorks several years ago—before it contained the Model Builder functionality—and although an existing conditions model could be built, it was a bit more intensive. I used it again for the first time on this project—now with Model Builder—and was very impressed by how easy and quick it was to create the base model.”

From the InfraWorks 360 default map, DEA just zoomed into 124th Avenue, selected the project area, and the software automatically acquired publically-available data and generated a base model of the area that included a digital terrain model (DTM) draped with aerial photo imagery, as well as GIS-based road and building data. DEA then added some of their own existing-conditions GIS, survey data, and DTMs to the model.

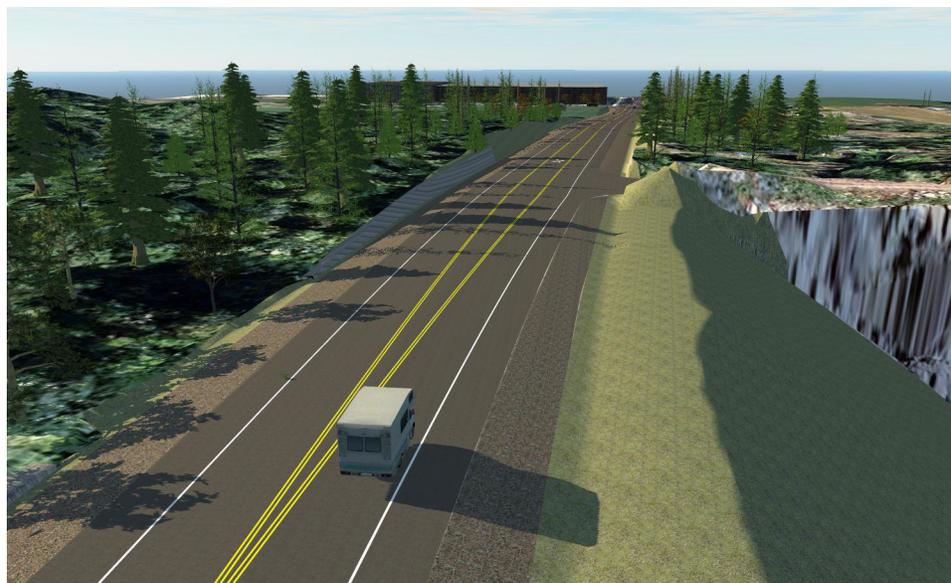
Next, the firm added some of its road design data to the InfraWorks 360 model by importing design surfaces that had been developed in another road design application. DEA also used Roadway Design for InfraWorks 360 to lay down roads on these surfaces, as well as recreate some of its detailed design from scratch. With the design model complete, DEA produced a series of high-resolution project renderings and four drive-through/fly-over videos (one for each major roadway on the project) for the open house meetings.



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One of the biggest benefits of InfraWorks 360 for our firm is the ability to quickly generate proposals, complete with design alternatives and supporting material, without having to perform any preliminary surveying.

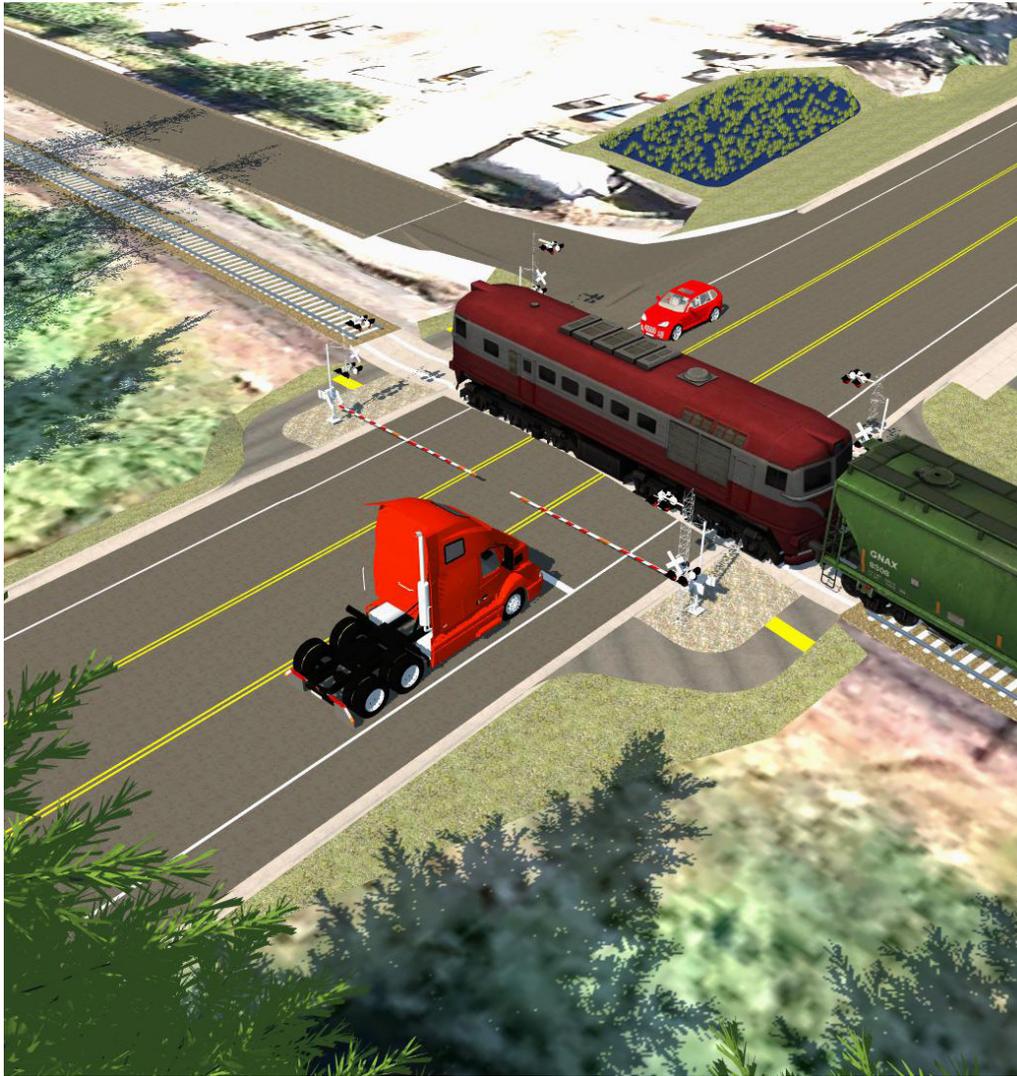
— Daniel Iliyn

Civil Engineer, Roads & Highways
David Evans and Associates, Inc.

The result

“The 3D presentation materials were an instant success with both our client and the public,” says Iliyn. “InfraWorks 360 gave us a new way to clearly communicate the design to the community and other project stakeholders at the meetings, and definitely helped the County move the public engagement process forward. We even had residents coming up to us after the meeting, asking us to zoom into their house and show them what the new roadway would like from their front door or backyard.” In addition, Washington County was so impressed with the InfraWorks 360 renderings and videos that it asked DEA to create similar project visualizations for another roadway project as a tool to keep the project moving forward.

The clarity that Infraworks 360 visualizations brought to the 124th project could have greatly benefitted the preliminary design of the project. “We spent thousands of dollars to create a CNC-machined raised-relief map of the project’s existing topography to help communicate our early designs,” says Iliyn. “We even cut out little strips of paper and draped them over the relief map to represent different alternatives for the alignment. If we had used InfraWorks 360, we could have created scores of high-resolutions images and videos for all the various design alternatives we considered—with actual road design details such as tunnels, embankments, interchanges, road profiles, and drainage. That would have been a much better means of design communication.”



Caption

The benefits

With DEA now using InfraWorks 360 for preliminary design and communication of infrastructure projects, the firm is experiencing benefits for both applications. "Using InfraWorks 360 to generate project visualizations—be it for preliminary or detailed designs—is easy and the results are very effective," says Larry Maeda, an AutoCAD support specialist at DEA. "The 3D visualizations are set in the context of the surrounding environment, which adds realism and helps improve the communication of our designs to prospects, clients, project stakeholders, and the public."

"InfraWorks 360 is a great solution for early stage design, when we have little to no survey data, but still need to push forward with a preliminary proposal," says John Volk, CAD support specialist. "With just a few clicks of the mouse, we can get a base model of existing conditions and go from there."

"During preliminary design, we usually need to develop and analyze several design alternatives with different options for the alignment, the profile, the road cross section, and so on," says Iliyn. "InfraWorks 360 and Roadway Design for InfraWorks 360 software lets us do this very quickly and easily, and then manages all of those alternatives for us. In addition, that early-stage design data moves seamlessly into the Civil 3D detailed design software—so no design information or effort is lost."

For more information, visit www.autodesk.com/infraworks