Timmons Group

Customer Success Story

AutoCAD® Civil 3D®

With Civil 3D, we work faster and produce a better design than our competition. That translates into happy clients and a distinct advantage to us in a very competitive marketplace.

—Chris Dodson
Environmental Services Manager
Timmons Group

Deliver better designs.

For complex sustainable design projects, Timmons Group adopts AutoCAD® Civil 3D® —Autodesk BIM software for civil engineers.

Existing stream channel.

Project Summary

Timmons Group provides a full range of civil engineering, design consulting, and planning services to clients throughout Virginia and North Carolina. Since 1953, Timmons Group has completed thousands of major design projects, won numerous awards, and ranked on Engineering News Record's list of Top 500 Design Firms almost 20 times since 1988. For the past 15 years, the firm has also developed significant expertise in sustainable design services, including LEED® accreditation, pollution control, stream assessment, and stream and wetland restoration. As the market for these services grew, Timmons Group engineers determined that their previous design software did not provide the clarity necessary to accurately represent complex natural environments. "In addition, we needed a product that enabled us to more easily manipulate our designs at any time," says Rebecca Draucker, P.E., environmental project manager. As a result, in 2006 Timmons Group began migrating to AutoCAD Civil 3D, the Autodesk building information modeling (BIM) software purpose-built for civil engineering.

The Challenge

Within the environmental services practice, the firm's first exclusive Civil 3D project was the compensatory mitigation stream design for Magnolia Green in Chesterfield County, Virginia. Zoned for up to 4,886 residential units, this mixed-use development will significantly increase the load on the site's existing stream channels.

To complete the environmental permitting process, Timmons Group must use natural channel design techniques to mitigate the development's impact on the channels. "Currently, the streams are actively degrading and eroding the existing channels," says Draucker. By providing compensatory mitigation onsite, Timmons Group will enable the client to avoid purchasing costly mitigation banking credits.

The firm's goal is to increase the overall flow capacity, while stabilizing the eroding channels and mimicking natural channels with their complex riffle, run, pool, and glide sequences. Timmons Group will also create a digital site model suitable for volumetric analysis and use with GPS-controlled construction equipment. While meeting these goals, the team must stay under budget and on schedule.

Autodesk®

The county approved plans for the first 3,000 linear feet of channel in only six weeks—without a single comment.

The Solution

Senior environmental designer, Ken Hoen, tackled the initial Civil 3D implementation. Although he had to invest time up front to learn the new software, it was worth the effort. “Streams represent a complex geometry that is extremely difficult to represent by hand or with 2D tools,” says Hoen. “Civil 3D freed us up to run with our ideas and make the streams appear exactly as we wanted.”

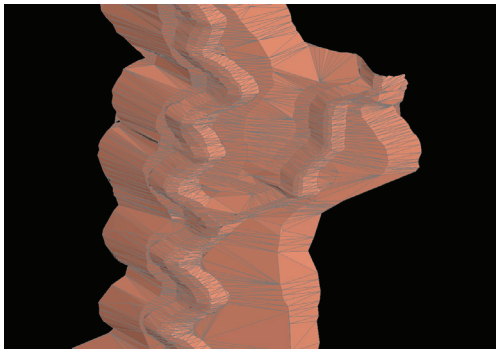
Applying natural, or green, channel design principles, Timmons Group used Civil 3D to draw sections of the stream and create Civil 3D assemblies representing key features, such as riffles, pools, thalwegs, banks, and flood plains. From this preliminary work, the designer created a realistic corridor model of the proposed stream channels.

Next, team members produced multiple what-if scenarios, analyzed the potential water flow, and changed the design accordingly, selecting options that minimized environmental impact, improved stream hydrology, and restored habitats for local flora and fauna.

Because Civil 3D and its parametric change engine instantly reflected changes made in one place throughout the entire model, the team had tremendous confidence that the plans were solid. In fact, only six weeks after submission, county officials approved plans for the first 3,000 linear feet of the channel without a single comment. “That has never happened before,” says Chris Dodson, environmental services manager.

Using Civil 3D, the transition between plan, production, and construction is virtually seamless. When bidding begins in late 2008, Timmons Group will further leverage data from the Civil 3D model to communicate important project information to the specialty stream restoration contractors. “The Civil 3D model will help enable them to provide more accurate bids,” says Hoen. “And once construction begins in summer of 2009, we will be able to work together much more efficiently—minimizing unrealistic change orders.”

During construction, the contractors will be able to load a variant of the Civil 3D model onto GPS-controlled construction equipment. “The machine operators will actually be able to see the model on their equipment, helping them grade more accurately and minimize field surveying,” says Hoen.

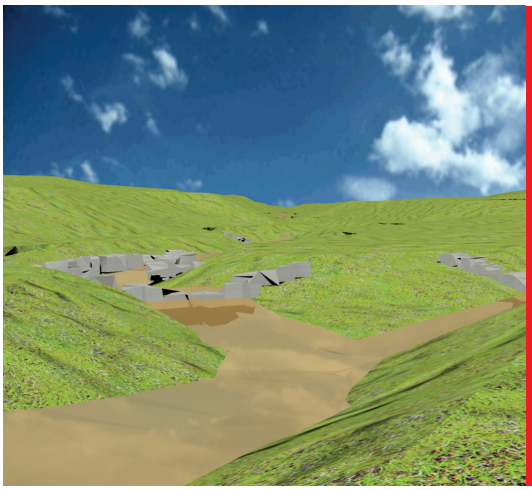


Proposed corridor model.

The Result

Currently, the firm’s environmental services practice is on track to complete phase two of the Magnolia Green project on schedule and within budget. “As a firm, we have already completed 10 projects with Civil 3D—five within our department alone,” says Dodson. “Over the next few years, our entire firm will make the switch.”

For more information about AutoCAD Civil 3D software, please visit www.autodesk.com/civil3d.



Using AutoCAD Civil 3D, we easily resolved all of the compensatory mitigation within the project limits. That reduced the client’s cost by more than 50 percent because they did not have to purchase costly mitigation bank credits from an outside vendor.

—Rebecca Draucker, P.E.
Environmental Project Manager
Timmons Group

On the left: Proposed corridor model

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