



EastLink Tollway Project

GIS Puts Road Construction Project in the Fast Lane

CASE STUDY



CHALLENGE

Large road construction project needed a way to host, manage, and disseminate data to multiple groups and work sites.

RESULTS

- GIS services provide multiple solutions despite limited resources.
- Enterprise GIS solution contributed to a 10 percent reduction in project cost.
- Cartographic map production was 50 percent faster.
- Project cost avoidance and savings were in excess of \$100,000 per year.
- Faster access to accurate, timely, and multiple layers of data was achieved.

"We knew that our GIS solution needed to provide high-quality cartographic capabilities, supply timely and accurate data to stakeholders, integrate with other corporate systems, be simple to use, be put into service by existing staff, and—most important—be cost-effective."

Jason Clark, Project GIS Manager

By connecting the Eastern Freeway in Melbourne's east to the Frankston Freeway in the city's southeast, Australia's EastLink tollway has provided an affordable travel option for more than 200,000 Melbournians each day. With a 1.6-kilometer twin tunnel; 17 interchanges; and 90 road, creek, and pedestrian bridges, the tollway spans 45 kilometers. Billed as Australia's largest road project to date, EastLink was constructed over a 42-month period by a joint partnership between engineering companies Thiess Pty Ltd and John Holland Pty Ltd.

The Challenge

EastLink became a large operation virtually overnight. With a workforce of 2,500 people, 1 project office, 6 regional offices, and 28 site offices, the timely dissemination of information was crucial. The communication and retention of continuous incoming data relating to design, survey, the environment, construction, community feedback, and planning became of consequential importance. Four months after the first stone was turned, Thiess and John Holland identified a geographic information system (GIS) as an ideal solution to host the myriad of location-based and textual data produced by a project of EastLink's size.

"We knew that our GIS solution needed to provide high-quality cartographic capabilities, supply timely and accurate data to stakeholders, integrate with other corporate systems, be simple to use, be put into service by existing staff, and—most important—be cost-effective," says Jason Clark, GIS manager on the project.

"The GIS' interoperability with computer-aided design [CAD] files was also of a major concern, since CAD is the data format for designing and engineering the EastLink infrastructure."



Thiess and John Holland used GIS to communicate and answer environmental and community-related inquiries about the construction of EastLink.

Learn more at esri.com/transportation.

EastLink Tollway Project

Esri SOFTWARE USED

ArcGIS Desktop
ArcGIS Publisher
ArcReader™
ArcPad
3D Analyst

OTHER SOFTWARE USED

Microsoft® SQL Server®
CorelDRAW®

DATA USED

Project Derived
VicMap Property

HARDWARE

Database Server:
Dell® PowerEdge® 1850,
dual processors, 2 GB memory,
Windows® 2003 Server,
280 GB storage

FOR MORE INFORMATION



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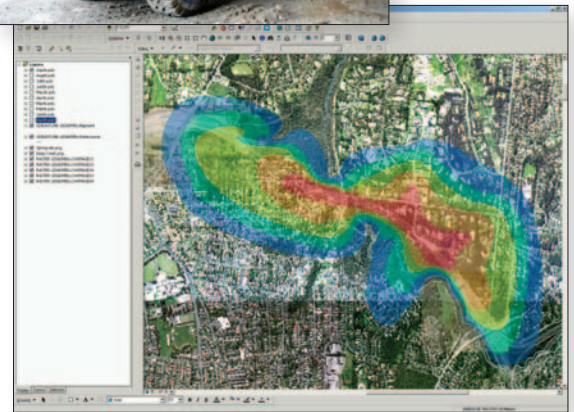
The Solution

Esri Australia Pty. Ltd.'s solution was selected as the best for the project's requirements because it provided the greatest interoperability with CAD files and delivered all the required functionality. Together, Esri, Thiess, and John Holland created and implemented an innovative, multistaged GIS strategy. The implementation included the procurement of new office and field hardware and software, the translation and integration of CAD data into an Esri® geodatabase, and the development of Web-enabled applications using ArcSDE® technology for publishing data across the project's enterprise.

Technical specifications, data models, data dictionaries, and symbol dictionaries defining the GIS data and map products were produced. With limited resources, the main focus of GIS services targeted the requirements of the environment, community, property, safety, completions, and tunnel groups. Training manuals were prepared and training courses carried out to equip and educate the key project staff on how to use the GIS applications.

The Results

The use of GIS within the EastLink project delivered a number of benefits such as a 10 percent reduction in project cost, 50 percent improvement in cartographic map production, an automated spatial data workflow, faster staff access to timely and multilayered data, and improved reporting capabilities. Automated data validation and quicker editing of features helped reduce erroneous data entry, ensuring more accurate data, while the time required to locate and collate information in the system was dramatically reduced by 80 percent. Staff with very little or no previous GIS experience became familiar with using the GIS applications. EastLink project staff reported that the maps produced using GIS were much clearer and simpler to use compared with the preceding plans produced from CAD packages. Thiess and John Holland's environmental group used ArcPad® for easier field data collection and monitoring, while the tunnel group used customized ArcPad forms for tunnel face mapping and ArcGIS® 3D Analyst™ to create water monitoring models throughout tunnel construction. Furthermore, Thiess and John Holland's GIS strategy assisted in cutting EastLink's construction time from 48 months to 42 months, thus contributing to a significant project cost savings.



GIS was used to illustrate and monitor how tunneling activities affected the water table.

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