

Bentley Asia-Pacific Projects Reduce Ecological Footprint While Improving Highway Infrastructure Solution

Although infrastructure is fundamental tool for maintaining and improving the quality of life, there is still a critical need for basic infrastructure on a global scale.

Two recent highway projects underway in the Asia-Pacific region exemplify the innovative methods used to address sustainability issues while delivering best-in-class transportation solutions. Technology played a vital role in meeting these goals efficiently and effectively.

This is the new hallmark of sustainable infrastructure projects that meet the needs of society today without compromising the ability of future generations to meet their own needs.

Improving Karnataka State Highways

The second phase of the Karnataka State Highways Improvement Project (KSHIP-II) is part of an ongoing program to improve the state road network capacity, management and maintenance. The first project, initiated in 2001 with \$360 million in funding from the World Bank, repaired and upgraded 2,985 kilometers of state

roads. KSHIP-I was completed in 2007 at a cost of \$474.5 million. The second project, estimated at \$1.1 billion, is improving 3,411 kilometers of highway, with the first two phases to be completed by 2012.

In January 2007, the Public Works Department awarded the project to Scott Wilson India Pvt. Ltd. in joint venture with Scott Wilson Ltd. United Kingdom. Work began in March 2007 with the Phase 1A detailed project reports (DPRs) for 1,447 kilometers of roads, including 443 bridges, six railway crossings,

and nine bypasses for major cities. One of the main objectives was to alleviate the current unsafe and congested conditions by providing better quality roads in a sustainable and environment-friendly manner.

"We have adopted a methodology to assess and predict the potential environmental impacts due to project activity and provide the means for prevention and mitigation of those impacts," said Venkat Sheela, Principal Engineer with Scott Wilson India in Bangalore. "Thus, we are enhancing the project benefits to the overall socio-economic growth of Karnataka State."

KSHIP-II will improve the quality of life for the citizens of Karnataka State by removing transportation barriers to growth, improving mobility and safety, and reducing costs for transportation and distribution of goods and services.

With shorter travel times and fewer vehicles idling in traffic, the project is expected to lower vehicle operating costs and fuel consumption. The consequent reduction in carbon emissions will reduce the state highway system's impact on global warming. The Government of Karnataka is expected to claim carbon credits from the United Nations Framework Convention on Climate



Change valued at \$6 million.

Using Bentley's MXROAD, an advanced modeling tool that enables the rapid and accurate design of all road types, the project team was able to conserve materials by retaining existing pavement in suitable sections, reusing existing soil/pavement as subgrade for new construction, and reducing overlay quantities. These measures will save an estimated \$3 million in Phase 1A alone.

Working within a managed environment, where Bentley solutions enabled rapid analysis of multiple alternative alignments, the project team completed Phase 1A alignment DPRs within 10 months. Upon completion, KSHIP-II will help meet the challenge of sustainability through infrastructure by improving the availability of transportation services in Karnataka State.

Upgrading West Gate Freeway

The Monash-CityLink-West Gate upgrade is being delivered in four

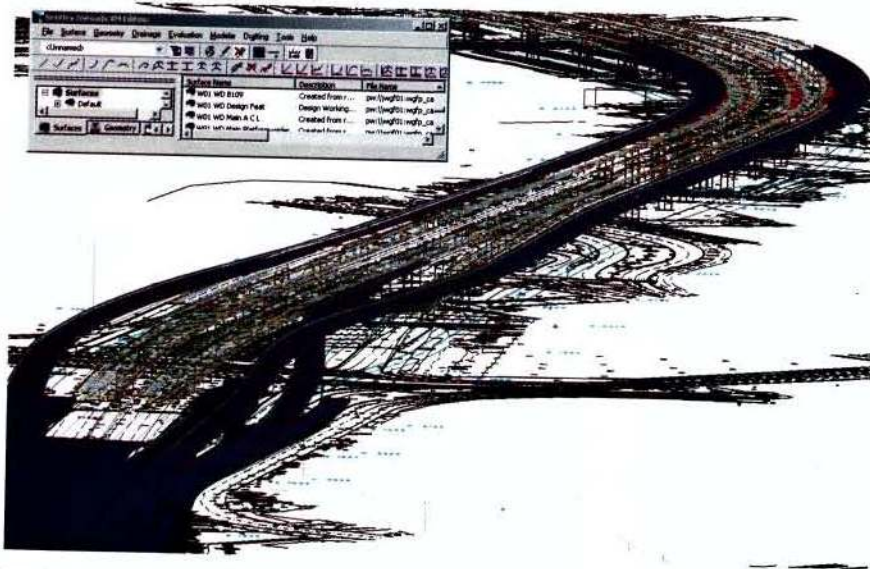
sections through a partnership between VicRoads and Transurban, an infrastructure developer/owner/operator based in Melbourne. Each section, in turn, is being planned, designed and constructed under alliance agreements and design/build contracts. The West Gate Freeway Upgrade Alliance consists of VicRoads, Boulderstone Hornibrook, Thiess, Parsons Brinckerhoff, and Hyder. The Alliance is charged with improving traffic flow and safety on a 5.5-kilometer section of the freeway that has a choke hold on Melbourne city center.

The \$350 million in freeway upgrades include additional lanes in both directions, widening of existing structures, and creation of at least five new bridges – the longest spanning 1.3 kilometers. The major challenge is to reduce the number of merges and lane changes to improve safety, while increasing carrying capacity by about 50%. Designers were under pressure to deliver the design ahead of ongoing construction,

which began in May 2008, as well as to accommodate construction under heavy traffic conditions. Using Bentley solutions, such as ProjectWise for document management and MicroStation for improved productivity, enabled the project team to address these goals in a 3D environment.

The project used recycled crushed concrete in pavement materials, recycled high-density polyethylene drainage pipes along road shoulders, captured storm water runoff for dust suppression, and remediated excavated soil for landscaping. Installation of new, more durable and energy-efficient products will reduce the cost of maintenance and operations over the life of the freeway. These seemingly small measures work together to shrink the ecological footprint of this major transportation improvement program. By improving the services provided by the infrastructure assets, the West Gate Freeway upgrade will help improve the quality of life for the now and future citizens of Victoria.

As society expands infrastructure services to meet basic human needs and improve quality of life, public safety, and security, there is mounting global pressure to simultaneously be good stewards of the planet. Technology solutions played a key role in meeting the sustainability challenge in both of these projects. "Bentley solutions allowed for 'best-for-project' outcomes to be achieved in a collaborative, managed environment."



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