Restricted Environment Motorway/ Interchange Design

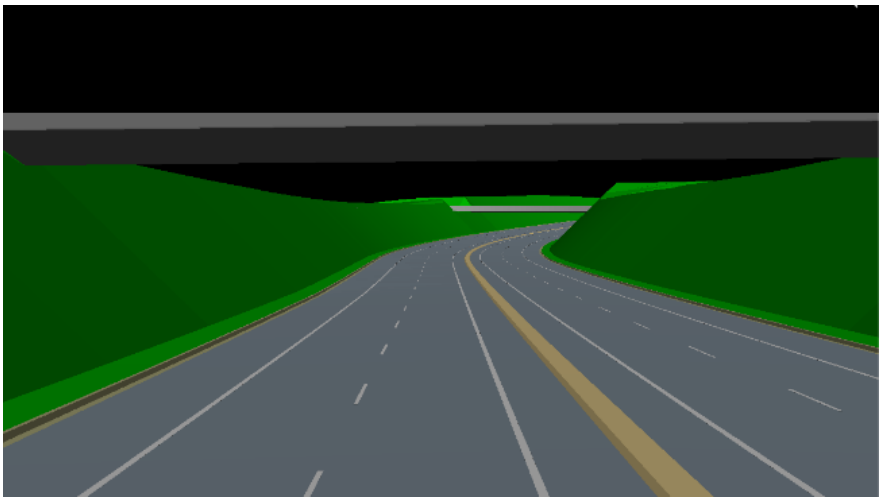
Traffic Design Group
George Eivers

SCOPE:

To assess whether a 1.6km long motorway and associated interchange could be designed to avoid specific horizontal and vertical restrictions.

12d DIMENSIONS:

- Road design



Project Summary

Traffic Design Group was given the job of assessing whether a 1.6km long motorway and associated interchange could be designed to avoid specific horizontal and vertical restrictions.

An existing road required upgrading to motorway standard, including an interchange, following the placement of other infrastructure. The motorway needed to be able to circumvent future developments and pass under an aviation flight path, while still meeting design standards. 12d Model software was selected for this task.

The Challenge

In order to establish a feasible alignment, the design needed to take into account the curve radii as well as design speed to determine super elevation. Applying super elevation modified the vertical alignment and required transition curves, which modified the horizontal alignment.

This resulted in an iterative design process, which would have been very time consuming to work with.

The team also had the problem of how to present the solution to a layperson simply and quickly.

The Solution

Using super alignments and the Apply Many function, they added each road and structure to the model in 12d.

When adding the motorway, they input the super elevation and transition curve information; often this would mean the 'horizontal geometry is not solved', but by simply moving the curve apex a satisfactory alignment could be quickly and easily be established. This relatively fundamental aspect of 12d Model proved invaluable in quickly generating geometrically correct options.

Result

The team was able to present the client with output from their analysis using the drive-through functionality in 12d Model, which

"...was invaluable. Without an aerial to drape, the sky dome seemed out of place thus we shaded the tin and extruded roadmarking onto the new alignment to simulate the preferred option."

—George Eivers, Traffic Design Group

For more information

To find out more about how you can create better designs faster with the 12d Model solution for civil engineering design, visit www.12d.com.

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12d® Model

Roads and Highways

12d Model's design option is the smarter solution for the design, modification and maintenance of Road and Highway projects.

Enjoy advanced 3D tools to design local and major roads, intersections, roundabouts, highways, interchanges and much more.

Ports and Dredging

12d Model is the solution for port infrastructure and dredging, easily managing the very large datasets and complex volume calculations often required by these projects.

A complete range of flexible and customisable volume calculation tools allow teams to extract and present the information quickly and easily.

Land Development

12d Model is the most versatile solution for the creation of sustainable land development projects, including residential, commercial and industrial developments, recreational areas, landfills, and agriculture projects.

Easily manage all aspects of your land development project from earthwork quantities, road design utilities and drainage design.

Airport Infrastructure

12d Model provides a solution for the design, construction and analysis of new airports, as well as the upgrade and maintenance of existing runways and airport infrastructure.

Easily manage large airport infrastructure projects and share data across multi-disciplinary teams.

Rail

12d Track has been specifically designed for the survey, design and construction of light, heavy and high speed rail projects.

Extensive railway tools in 12d Track allow the rail designer to quickly and easily design their projects. These options are built on the existing 3D modelling and design tools available in 12d Model.

Mining Infrastructure

12d Model's powerful set of exploration, site investigation, survey and analysis tools are crucial for the initial design, construction and ongoing operation of mining projects.

Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.

Drainage, Sewer and Utilities

12d Model provides comprehensive tools for the design, analysis and optimisation of stormwater and sewer projects using rational, dynamic (hydrograph) and 2d drainage methods.

Powerful clash detection management allows for efficient 3D modelling of service networks such as gas, electricity, telecommunications and water prior to construction.

Surveying

12d Model is a complete surveying package providing the tools to manage all facets of surveyed data including LIDAR, topographical, as-built, conformance, traversing, geodetics, data mapping, labelling and much more.

The 12d Field option runs on a ruggedized tablet and gives the user access to full 12d Model functionality, allowing you to take the entire project into the field with the most comprehensive pick-up and set-out tools.

Oil and Gas

12d Model assists with the design, construction and mapping of oil and gas pipelines, original site exploration and the wide range of infrastructure required for oil and gas projects.

Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.

Construction

12d Model is the ultimate software for construction with powerful set-out options, direct interfaces to machine control and detailed conformance reporting and auditing.

Manage 3D data and control volumes, quantities and progress claims with 12d Model. Set-out your project and undertake conformance and as-built surveys live on-site using 12d Field.

Rivers, Dams and Hydrology

12d Model handles very large datasets and interfaces with a wide range of analysis packages, making it perfect for flood studies and the management of rivers and dams.

12d has partnered with industry leading analysis software, allowing users to apply 2D drainage analysis from within 12d Model.

Environmental

12d Model's ability to handle very large datasets combined with flexible and comprehensive 3D analysis and modeling tools make it perfect for a wide variety of environmental projects.

Existing workflows can adopt 12d Model easily as it allows users to directly interface with GIS systems and most software packages and file formats.

Why Choose 12d?

- **Powerful data processing & intelligent functionality.**
- **Modular, easy to update & completely customisable.**
- **Seamless integration with major industry software and hardware.**
- **Used in over 55 countries worldwide.**
- **Friendly support & training from industry experts.**

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