CASE STUDY

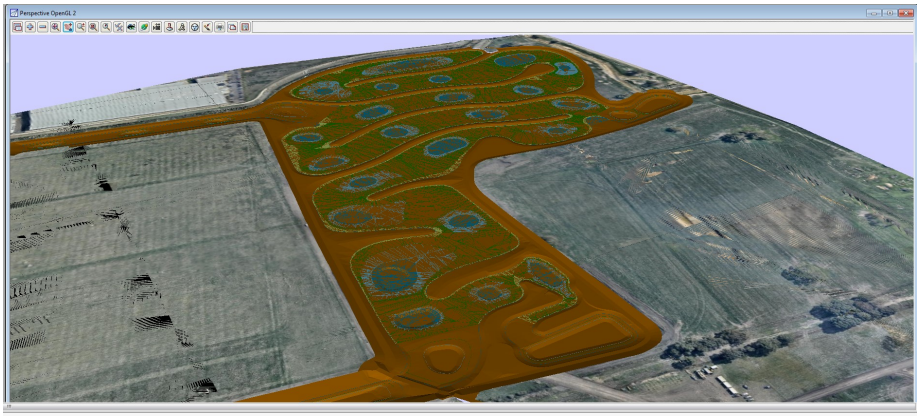
Taylors Road Retarding Basin

Dalton Consulting Engineers
Retarding Basin

END USER: Richard Sosenko
CLIENT: Dalton Consulting Engineers

12d DIMENSIONS:

Three Waters



Depth Colouring of TIN in Visualisation View

Project Summary

Taylors Road Retarding Basin—achieving compliance.

The Challenge

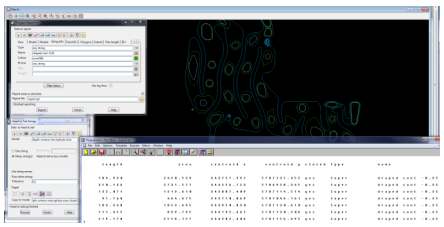
The Taylors Road Retarding Basin covers an area of 16 hectares, and is designed to provide attenuation and treatment for a number of local catchments. The Basin flows from Lyndhurst Drain and along the upgraded Eastern Contour Drain channel. Because of its location within Melbourne Water's Lyndhurst Drainage Scheme, it needs to meet Melbourne Water's 'Deemed to Comply' design criteria. Richard Sosenko – a Civil Engineer with Dalton Consulting Engineers – spoke to 12d about the challenges of meeting these criteria, and how he and his team achieved compliance with the help of 12d Model software.

In order to provide optimal water treatment, Retarding Basins are designed to have varying depths with different planting bands. One of the biggest challenges in designing a retarding basin of this nature is to get the correct mix of depths in accordance with Melbourne Water criteria:

- Shallow Marsh Zone (Natural Water Level to -0.15m)
- Deep Marsh Zone (-0.15m to -0.35m)
- Submerged Marsh Zone (-0.35m to -0.7m)
- Open Water Zone (-0.7m +)

This process requires a number of iterations to ensure a minimum area of 80% is achieved for shallow and deep marsh, known as the macrophyte zone (main water body).

Given the size of the job, it was important that a stable, quick and dynamic platform was used to ensure outputs could be done quickly (due to the repetitive nature). To assist with approval from Melbourne Water, it was important that the final outputs could be generated and shared in a client friendly format. In addition, because of safety and maintenance issues, it was important that minimum batter slopes were achieved within the Retarding Basin area.



Area of depth contours

For more information

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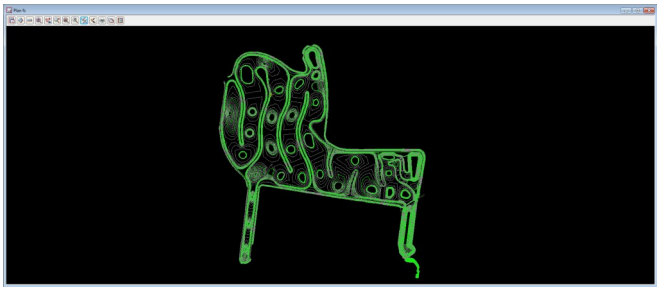
12d Model

The Solution

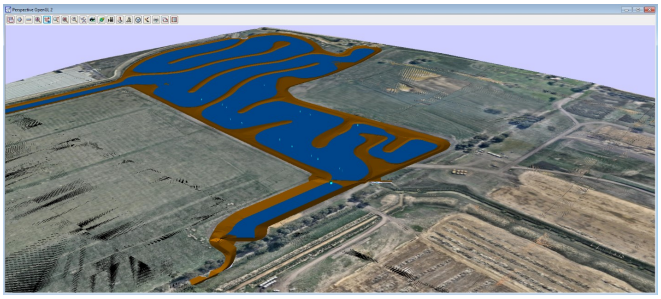
The Natural Water Level (NWL) TIN was created at a fixed height of RL6.5 as calculated from flood analysis. The proposed retarding basin (RB) TIN was then created by producing 3D strings to model the sediment ponds (1.5m max depth below NWL), inlet pools (1.5m max depth below NWL), and intermediate pools (1.2m max depth below NWL) based on batter slopes, as specified in Melbourne Water's design criteria. The depth between the NWL TIN and the RB TIN was analysed, and depth faces/colouring outputted to both plan and perspective views to illustrate to Melbourne Water the different zone depths. Depth contours were also outputted based on these different zones/depths, and the plan area of these depth contours calculated to show the overall percentage of depths for each zone.

A slope analysis (set with minimum and maximum crossfalls) was then run on the RB TIN to show any grades within the macrophyte zone that were flatter than 1 in 150. This quickly identified areas where the batters required remodelling.

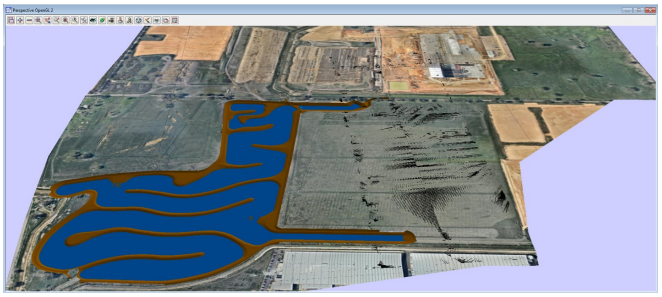
Due to the number of design amendments and iterations, the above process (retriangulating TINs, depth colouring/FACES, slope analysis, etc.) was written as a chain and re-run each time the RB TIN was updated.



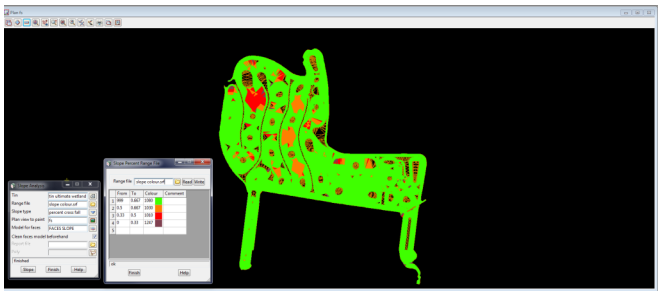
Triangulation of TIN Data



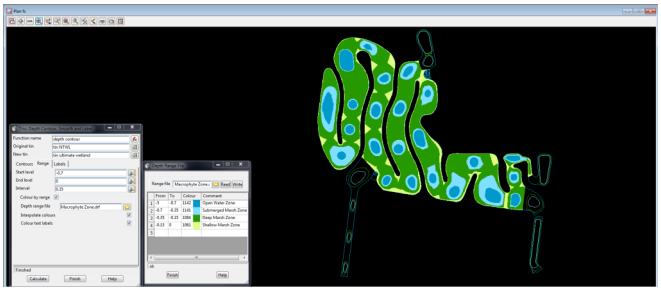
Wetland Visualisation looking North-West



Wetland Visualisation looking East



Slope Analysis



Depth Colouring of TIN to show different Depths

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

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

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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.

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

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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.

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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.

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- **Modular, easy to update & completely customisable.**
- **Seamless integration with major industry software and hardware.**
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