Managing Site Data and the Maintenance of Conceptual Model and Time Series Outputs at a Complex Site Over an Extended Period

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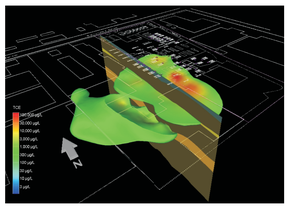
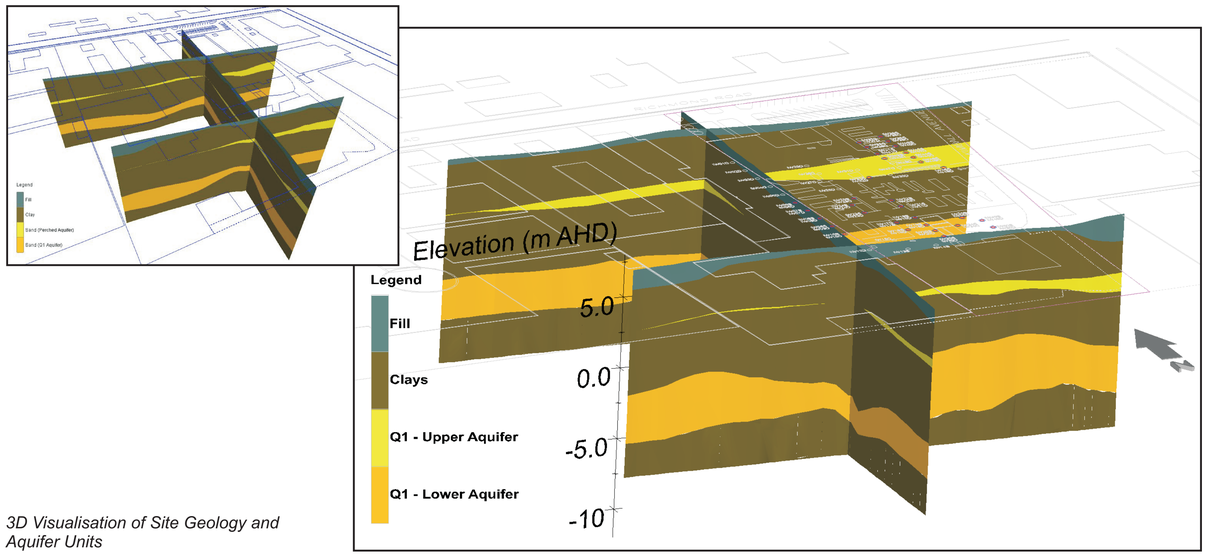
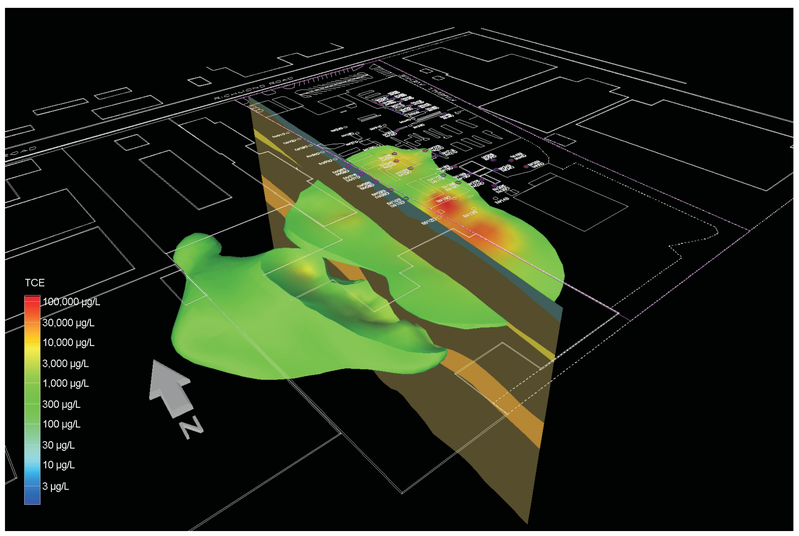


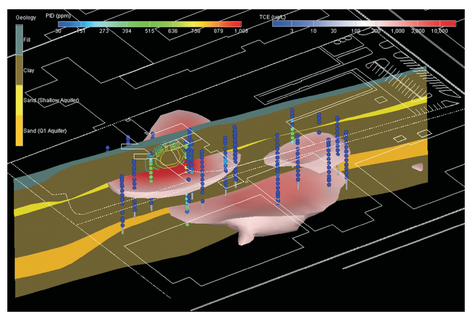
Background

Leakages of TCE and the subsequent groundwater contamination at an industrial facility in Adelaide have led to an ongoing investigation and remediation program conducted since 1999. This work comprised site characterisation and remediation, including borehole drilling, monitoring well installation, soil, groundwater and vapour sampling, laboratory analysis and preliminary in-situ chemical oxidation (ISCO) of impacted media. Over 30 soil bores and 50 monitoring wells have been installed to date, both on and off site, with six groundwater monitoring events being carried out since 2002. Two shallow aquifers have been impacted beneath the site, the first located between 3 and 5 metres below ground level (mbgl) and the second between 8 and 13 mbgl.



3D Visualisation of Site Geology and Aquifer Units





3D Visualisation of Contaminant Distribution in Shallow Aquifers

Approach

To efficiently manage such a large dataset, and to enable efficient production of the required tables, graphs, 3D models, GIS, and other outputs required for conceptual model development, the contaminated site data management system ESDAT was employed.

A rigorous conceptual model of the site and the degradation processes occurring was developed using a combination of chemistry output tables, trend graphs, GIS based maps, and 3D geological and contaminant models. Upon commencement of remediation, these graphical, tabular, and 3D outputs were continually updated to incorporate the latest data and demonstrate the effect of the remediation to both technical and non-technical audiences. It was necessary for the outputs to be easily updated as new data became available, and to ensure a consistent data set was being used in the various software applications employed. The 3D geological and plume model created via direct export to Mining Visualisation System (MVS®) software was one element which continually evolved as further detailed information regarding the complex geology underlying the site was gathered.

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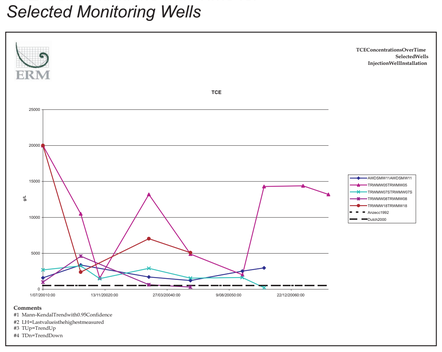
Outcomes

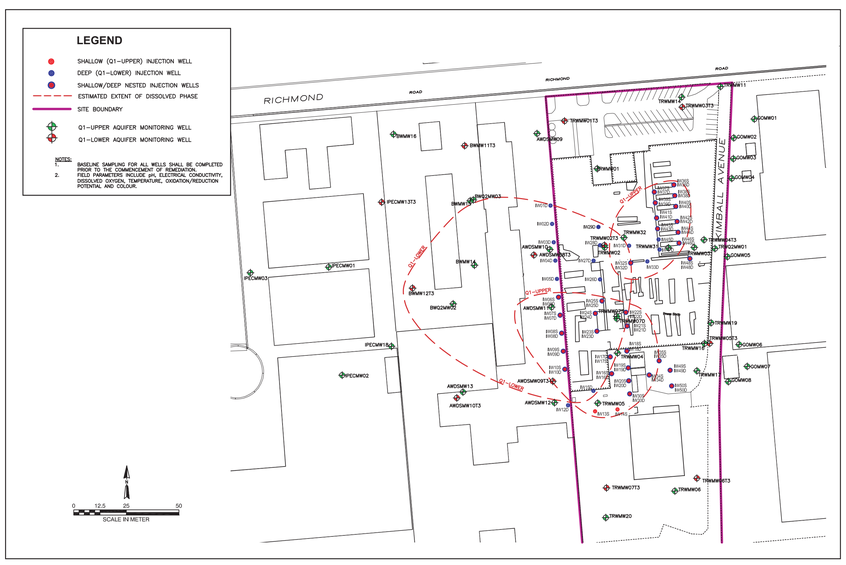
All historical chemistry and geological data was loaded into ESDAT, and ongoing chemical and QA data were directly imported from the laboratory generated electronic deliverables resulting in an accessible, consolidated and consistent data set. The standard outputs from this system, along with its exports to other packages, enabled the outputs to be consistently and efficiently maintained during the project. In particular, the ability to readily visualise the underlying sequences of sands and clays in three dimensions and correlate this with chemistry data allowed a more detailed analysis of pilot trial results and rebound. This knowledge then facilitated the installation of a more accurately targeted injection system for the full scale remediation.

The outputs and quantitative analyses produced using this approach demonstrate how a site analysis integrating the strengths of multiple best-of-breed software applications and a managed dataset can provide insights and efficiencies which may not be achievable by other means. The ability to readily provide updated outputs in a readily understood visual format also facilitated improved communication and engagement with both client and regulator due to the ease with which complex issues and technical aspects of the project could be explained.

TCE Concentrations with Time for Selected Monitoring Wells



Site Plan Showing Contaminant Plumes



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