

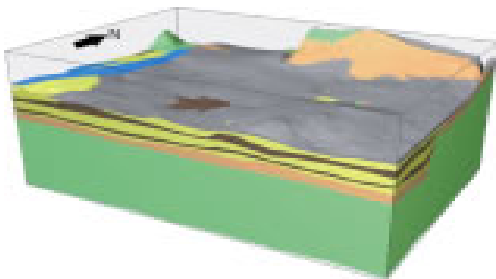
Thames Gateway Project

BACKGROUND

The Thames Gateway Region consists of a 40-mile stretch of land along the River Thames. It is the focus for the biggest building programme to be undertaken in the UK for over 50 years – close to 200,000 homes will be built.

The interdisciplinary Thames Gateway Project will focus on making geoscience information for the Thames Gateway more accessible, relevant and understandable for users involved in the sustainable regeneration and development of the Gateway.

The British Geological Survey (BGS) – a participant in the project - is the world's longest established national geological survey and the UK's premier centre for earth science information and expertise.



3D model of the Dartford Crossing area - compressible peat (brown), shown beneath deposits of clay (yellow), and artificial deposits (grey). Underlying gravel deposits shown in orange, chalk bedrock in green, and the M25 embankment in blue

PROBLEMS

- The Thames Gateway has extensive areas of difficult ground, including soft soils, high groundwater levels and contaminated sites;
- After encountering difficult conditions during construction, the Limehouse Link Road (which connects Central London with Canary Wharf) became the UK's most expensive road at that time;
- Surface water run-off has become a significant issue in urban areas where development has resulted in more hard paved surfaces. Sustainable Urban Drainage Systems (SUDS) such as swales, balancing ponds and porous pavements, mimic natural drainage systems. They can save money, reduce pollution and reduce flood risk. But project designers need to know early on if SUDS techniques will work for them.

SOLUTIONS

- Many BGS programmes of work rely on 3D modelling and visualisation to understand and to represent the geological features and processes that are being surveyed and studied
- Rapid developments in three-dimensional (3D) modelling software provide challenging and exciting possibilities for constructing high-resolution geological models of the shallow sub-surface. Using this new technology (supported by geological and geotechnical archives), permits prediction of the type of rocks that lie beneath our feet, their engineering properties (rock strength, shrink-swell characteristics and compressibility) and hydrogeological properties (permeability, porosity, thickness of the unsaturated zone or the presence of perched water tables)
- 3D modelling of foundation conditions – thus linking rock type with physical properties, such as soil moisture content and compression test data - provides invaluable data at a site such as the Thames Gateway

BENEFITS

- Modelling West Thurrock – a typical Thames Gateway area – split the ground conditions into 6 categories, varying from very compressible (corresponding to peat) to only slightly compressible (engineered ground);
- Chalk underlies the whole area – it weathers to a putty where it meets soil but foundation conditions improve with depth. The 3D foundation model will indicate approximately how deep to go to reach unweathered chalk;
- The effect any development project may have on the environment must be considered at an early stage. For instance, *‘if your project crosses contaminated land, how likely is it that you would contaminate the water table?’*
- The 3D modelling software developed by the British Geological Survey can suggest solutions to such problems – by combining 3D geological models with fluid flow and engineering property models.
- Taking these issues into account early on in a project will ultimately save time and money.

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