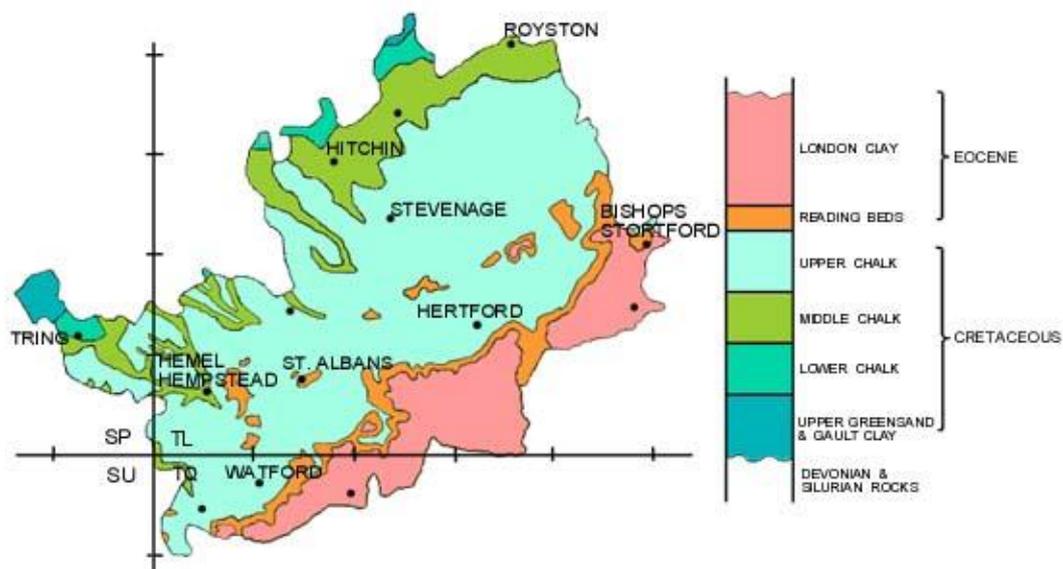


Geology of Hertfordshire

The geology of Hertfordshire is relatively simple, underlain by deposits of the shallow London Basin which tilt to the south east. The oldest rocks are found to the north of the county and the youngest to the south. The county is dominated by the Chalk which forms the Chiltern Hills and broad valleys. The Chalk ranges in age from circa 66 to 100 million years old. Younger 'superficial' deposits have been laid down in the last 2 million years as a result of fluvial or glacial action and these comprise varying mixes of sands, gravels, clays and silt.



The College Lane Campus is underlain mostly by Chalk. The Campus is located on the side of an ancient river valley of the early river Thames, known as the Vale of St Albans. The ancient river deposited superficial deposits on the chalk surface called the Kesgrave Catchment Subgroup, a mixture of sands, gravels and clays, before the river became blocked by an ice sheet and was diverted into the current day Thames valley.

The University recognises that the geological history of the campus strongly influences ground and drainage conditions which are important considerations during any new construction work.

Construction

Prior to commencing development works the University undertakes a number of specialist surveys to better understand the ground conditions. The number of these and the method used is dependent on the risk of the area we are working within.

Surveys begin with a detailed desk based research study whereby potential hazards are identified; we look at historical maps, geological maps, and actual site conditions. The next stage is to undertake a ground investigation using a combination of intrusive and non-intrusive methods to confirm the ground model; the method used is dependent upon the proposed development and site location. In the past the University has used geophysics and a range of drilling techniques to sink boreholes up to 30m deep. The results of the testing give information both on the ground chemistry to assess any risks from a contamination aspect and on geotechnical properties of the ground (e.g. strength) so that a thorough knowledge of ground conditions is achieved.



Fig 1. Cone Penetration Testing truck at Prince Edward Hall



Fig 2. Example of borehole rig at Prince Edward Hall



Fig 3. Example of the Chalk recovered on Campus

The results then allow the University to use the most appropriate construction and foundation techniques to suit those ground conditions. All testing is undertaken to technical standards and best practise and the adoption of techniques is approved through the planning process and building control sign off.

One particular feature of the ground conditions at the campus is the potential for historical chalk mines and the natural predisposition for chalk sinkholes. Chalk was historically mined across Hertfordshire for lime which was used in agricultural production but unfortunately these mines were rarely recorded.

The risk of land instability has received much media coverage over the last winter due to heavy rainfall, however the University and Welwyn Hatfield Borough Council have been aware of the potential for such features for a number of years and much work has been undertaken across Hatfield to better understand the ground conditions. As a result the University ensure that specialist surveys are undertaken for all construction projects and specialist advice is sought to mitigate against this risk. In addition to the work carried out by the University, Welwyn Hatfield Borough Council also undertake their own surveys within Hatfield. Copies of their reports are available on the Welwyn Hatfield Borough Council website.

Summary

Every development site on Campus has its own unique ground conditions which engineers have to overcome and design solutions for, whether it's piling to found in competent chalk rockhead or a raft solution to span over changeable sand and gravel deposits. Any problematic conditions caused by chalk mining or natural dissolution can be remediated by infilling with gravel or grout to restore stability. Any foundation solutions or remediation works are always based on the findings of a thorough ground investigation undertaken by professionals which is regulated through the planning system.

The College Lane Campus has a varied and interesting geological past, from being located in a warm shallow sea when the chalk was deposited ,to being located next a major river valley now long disappeared or sitting at the base of a large ice sheet. An appreciation of the geological past helps engineers to understand the types of ground related issues which could arise on a particular site and this is fundamental in designing developments for the future.