Borehole Prognosis

This module provides an evaluation of the expected geological sequence beneath a site to a depth appropriate for the specified use. This interpretation is based on the information available in the surrounding area. Due to natural geological variation the conditions encountered on drilling may differ. This module does not cover the possibility of artesian conditions or gas being encountered. (Information on artesian conditions is included in the 'Groundwater abstraction' and 'Hydrogeology – non abstraction' modules).

Setting:

The site lies at an elevation of about 48 m above Ordnance Datum (OD) on the edge of the village of Crowmarsh Gifford. The proposed borehole site lies about 450 m east of the River Thames that flows approximately north to south at an elevation of about 44 m above OD. There are small drainage ditches in places on the nearby flood plain, and also a longer stream flowing from east to west, about 500 m north of the site

Geology

It is anticipated that the following succession of strata will be encountered in an 150 m deep borehole below the site:

Unit	Typical composition	Potential for difficult ground i.e. possible running sands, possible undermining or possible dissolution	Thickness in metres	Depth in metres to the base of the unit
Artificial ground				
Made Ground	No Made Ground has been identified up to and including the most recent map compilation. However, owing to the development history of the site, it is likely that some Made Ground of limited thickness and variable composition (e.g. construction waste) may be present.		Up to 1	c. 1
Superficial deposits				
Northmoor Sand and Gravel Member (upper facet)	Sand and gravel	Possible running sands	Between 3 and 5	c. 5
Bedrock (below rockhead)				
West Melbury Marly Chalk Formation	Grey marly (clay-rich) chalk with thin limestone beds	Possible dissolution	Up to 2	c. 6
Glauconitic Marl Member	Pale brownish-grey clay-rich chalk marl with grains of glauconite; commonly contains phosphatic pebbles		Up to 2	c. 7

Upper Greensand Formation	Dark green glauconitic sand and sandstone with a clay matrix underlain by whitish, micaceous, calcareous siltstone and fine-grained sandstone with some chert and siliceous sandstone (‘malmstone’)	Possible running sands	About 15	c. 22
Gault Formation	Grey, silty mudstone; silty towards top, gravelly at base		About 60	c. 82
Lower Greensand Group	Coarse-grained, ferruginous, quartzose sand with small quartzite pebbles; locally passes into sandy clay	Possible running sands	5 to 8	c. 88.5
Portland Formation	Sand and limestone	Possible running sands	Up to 2 (if present)	c. 89.5
Kimmeridge Clay Formation	Silty mudstones, some sandy		About 35	c.124.5
Corallian Group	Sand, sandstone, limestone and mudstone	Possible running sands	About 25	c. 149.5
West Walton and Oxford Clay Formations	Mudstone		Over 90	to base

The borehole prognosis presented in the table above is the best estimate based upon available borehole information and regional knowledge. The paucity of deeper boreholes adjacent to the search site mean that much of the prognosis is estimated based upon regional knowledge and therefore carries a degree of uncertainty. Caution should therefore be used when using this prognosis. Additional uncertainty relating to the thickness for specific units where some regional variability is known, is indicated by qualifiers used within the table including ‘up to’ and ‘about’ or ‘if present’. Where uncertainty is indicated, the ‘Depth in Metres to the base of the unit’ is calculated based upon the median thickness within the uncertainty range.

The thickness of the Northmoor Sand and Gravel Member beneath the search site is not known with certainty because there are no boreholes or trial pits at or adjacent to the site that penetrate the entire thickness of the natural deposits. Instead, a thickness of between 3 and 5 m is estimated based upon commonly observed thicknesses (not total thickness) in adjacent boreholes (e.g. SU68NW4) and regional understanding.

Similarly, there is some uncertainty relating to the thickness of specific bedrock units. In particular, the Portland Formation may be either thin or entirely absent from the succession.

The blue line in this table indicates ‘rockhead’, which is the base of superficial deposits. This is the ‘geological rockhead’, as distinct from the ‘engineering rockhead’, which is the base of ‘engineering soil’ (in the sense of BS5930:1999).

For further definitions of stratigraphic terms that appear in the table above, on our maps and in our publications please see ‘The BGS Lexicon’ www.bgs.ac.uk/lexicon

Information on the distribution of contaminated ground is not held by BGS but by the relevant Local Authority.

Potential drilling hazards considered at your site

This section of the report only describes geological hazards that might be directly encountered by drilling at this site.

Running sand conditions hazard

Running sand conditions occur when loosely-packed sand moves as a result of water flowing through the spaces between the sand grains. The pressure of the flowing water reduces the contact between the grains and they are carried along by the flow. Excavations or boreholes in water-saturated sand are likely to encounter running conditions: the sand will tend to flow into the void. This can lead to subsidence of the surrounding ground.

Ground dissolution hazard

Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface.