

extension may be largely differential. In this regard, in the context of considering the potential use of a piled foundation solution it should be appreciated that it would be relatively unusual to adopt a different solution for the extension than for the original building, however, this could possibly reduce the potential for differential settlement of the new extension relative to the existing building.

All designs and site works should be assessed and supervised by a suitably qualified Engineer.

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## 5.5 Ground Floor Slabs

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The design of the ground floor slabs for the proposed development should afford consideration to the plastic nature of the subsoils in the context of the potential influence of any existing trees or proposed planting within the possible zone of influence of the proposed extensions, together with the typical thickness of Made Ground or disturbed ground exceeding 1.50 m depth.

Given the above considerations, suspended ground floor slabs are expected to provide the most secure engineering solution in this context.

Whilst the present scope of work has not included a ground gas risk assessment, it would be considered prudent to match the ground gas measures included within the original building. In this context, based on the results of the gas monitoring visits undertaken at the time of construction of the care home (Ref. 5), Dunelm made a recommendation for ground gas protection measures in line with Characteristic Situation 2, potentially requiring an upgrade to a hydrocarbon proof membrane dependent on any mobile contamination being revealed during future investigation / development works.

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## 5.6 Soakaway Drainage

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In-situ soil infiltration testing was undertaken at trial pit TP1 for feasibility purposes. Due to the thickness of Made Ground deposits, the initial excavation was extended by means of window sample drilling to progress the hole into natural soils for the purpose of the testing.

As such, whilst the testing methodology was undertaken in general accordance with BRE Digest 365 guidance (Ref. 7), the diameter of the bored section of the hole does not conform to the requirements therein. The lower 250 mm of the hole was within undisturbed Gault Formation deposits. Clean water was supplied to the hole from pre-filled 25 litre containers and the drop in the water level monitored over time. Provision had been made for up to three fills, in line with the relevant guidance, however, as described below, due to constraints imposed by the soil properties this was not possible.

The results of the infiltration test together with a graphical presentation of the monitoring data are included in Appendix F. An infiltration rate of  $7.13 \times 10^{-7}$  was calculated based on a single incomplete fill, i.e. a rate based on the recorded drop in water level, noting that the test horizon straddles Made Ground and potentially disturbed Gault Formation, and it is likely that the majority of the observed infiltration is likely to have been into these marginally more permeable strata.

The drainage characteristics correlate closely with the ground conditions established by the investigation, whereby inhibited drainage was encountered within the predominantly cohesive subsoils, and this is reflected by the lack of success of the infiltration testing.

Moreover, a groundwater seepage was encountered in a single location during the fieldwork, rising to a standing level of 1.90 m BEGL. In this regard, the EA normally requires that a traditional soakaway system is constructed within natural ground with its base at least 1.0 m above the groundwater table and sited at least 5.0 m from any existing or proposed structures, which would not be possible given the succession of strata revealed by the investigation and the proposed configuration of the site.

Given the cohesive nature of the Gault Formation, in addition to the restrictions imposed by the depth of Made Ground in the context of the groundwater conditions established by the investigation, it is considered that conventional soakaway drainage would not be successful at the site.

Alternative solutions, such as attenuated discharge to the public sewer, subject to the agreement of the local water authority, or utilising the existing drainage network on-site may prove most practical. It is recommended that an experienced Drainage Engineer is consulted for any final design work.

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## **5.7 Aggressive Chemical Environment for Concrete**

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The aggressive chemical environment for concrete (ACEC) for the site has been estimated using the methodology described in BRE Special Digest 1 (Ref. 6).

Concentrations of water-soluble sulphate, total sulphate and total potential sulphate (TPS), together with pH values have been measured in five samples, recovered from the encountered soils.

Comparison between the TPS and acid soluble sulphate concentrations indicates that pyrite is unlikely to be present as none of the samples recorded oxidisable sulphate above 0.3 %.

Based on the mean of the two highest water-soluble sulphate and lowest pH values determined, assuming mobile groundwater in the absence of long-term monitoring, concrete conforming to ACEC Class AC-1, with a design class of DS-1 would be expected to perform satisfactorily below ground level.