

Appendix G

Hydrological Impact Assessment

4 GROUNDWATER SCREENING

4.1 Screening Assessment

The London Borough of Camden guidance suggests that any development proposal that includes a subterranean basement should be screened to determine whether or not a full Basement Impact Assessment is required.

The following comments are designed to contribute to this initial screening exercise.

HGE has modelled the site using both our own archive and historic BGS boreholes. Details of groundwater strikes and the on going monitoring have also been used, in conjunction with online mapping resources to develop this model, links to which are included in the appendix.

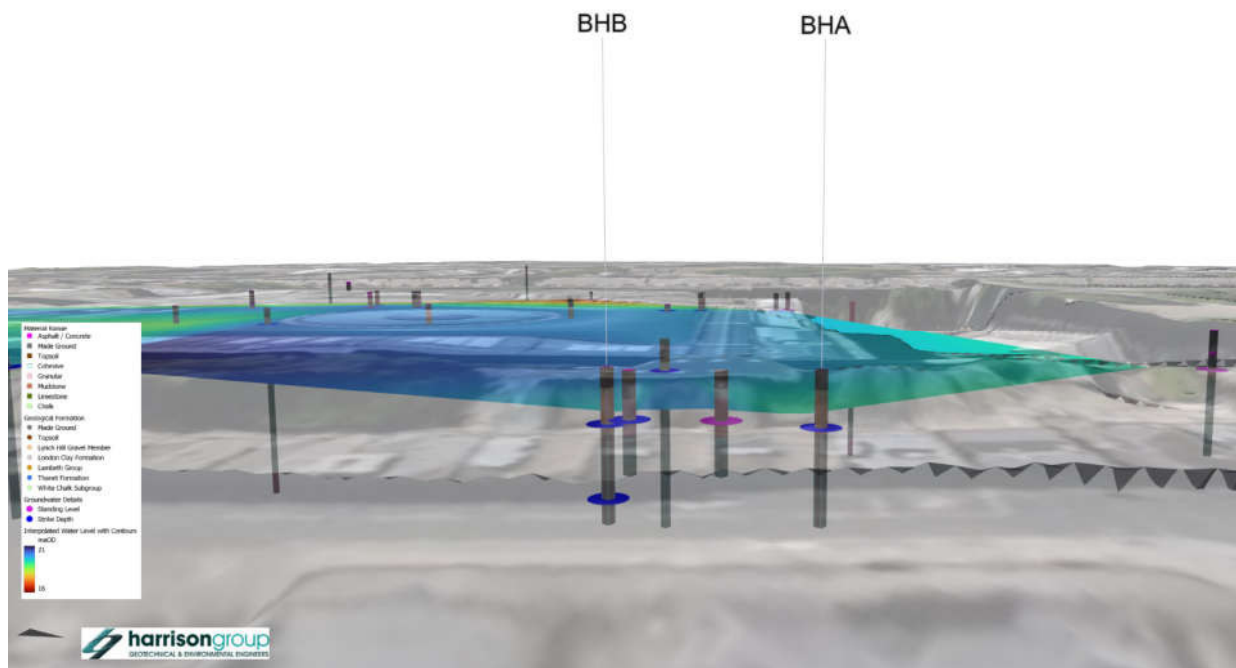


Figure 4.1a Ground model showing contoured phreatic surface.

The above figure shows the phreatic surface modelled from nearby borehole logs and our ongoing monitoring programme. In the wider area the groundwater is shown dipping very slightly to the west, albeit with a gradient magnitude of <0.01 , although this is largely influenced by a single historic borehole (TQ28SE778) which may represent an outlier. In the area of the East Road Building the groundwater is shown as largely level / dipping very gently to the north.

We have also modelled the interface between the Terrace Gravel and the underlying London Clay as the groundwater flows through and is perched within the granular unit.

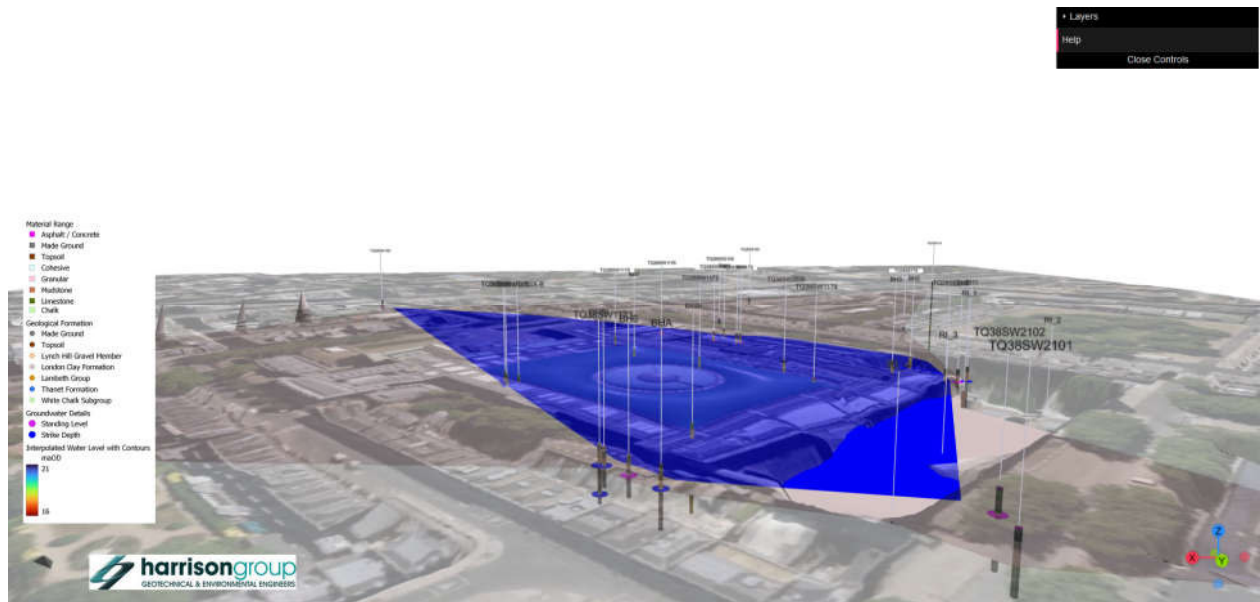


Figure 4.1b Ground model showing Terrace Gravel / London Clay interface beneath the groundwater level.

In and around the subject site the interface between these two horizons is relatively flat, around 22m to 23m AOD with no significant features being evident.

A number of screening tools are included in the Guidance for Subterranean Development prepared by Arup and reference has been made to these. These consist of a series of questions with a screening flow chart relating to groundwater flow, land stability and surface water flow.

In addition to the information presented above and our groundwater model we have referenced ABAs drawing Nos. in preparing the following.

- BMERB-AB-XX-00-DR-S-0009-P01 - Basement Plan
- BMERB-AB-XX-01-DR-S-0010-P01 - Ground Floor Plan
- BMERB-AB-XX-XX-DR-S-0015-P01 - Proposed Structure - Section A

4.1.1 Subterranean (ground water) flow screening developments

Question	Response
1a. Is the site located directly above an aquifer?	Yes – Secondary A aquifer (Lynch Hill Gravel Member) although it is noted that Camden Planning Guidance “Basement” January 2021 classes all areas where the London Clay does not outcrop as aquifers.
1b. Will the proposed basement extend beneath the water table surface?	Unknown – The proposed basement design is not expected to extend beneath the water table, however piled foundations may.
2. Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No known river, pond, reservoir, spring or well within 100 m of the site.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No - The basement does not extend beyond the footprint of the existing building.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No - Development should not result in additional surface water discharge. It is assumed that any surface water will be discharged via existing surface water sewers.

6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?	Not to our understanding.
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Table 4.1.1: Summary of Slope Stability and Subterranean Developments.

The above assessment has identified the following potential issues that need to be assessed:

- The site is underlain by a Secondary “A” Aquifer
- While the basement would not extend beneath the groundwater table elements of its foundations e.g., piles may.

4.1.2 Stability Screening Assessment

Question	Response
1. Does the existing site include slopes, natural or manmade, greater than 7°? (approximately 1 in 8)	No although some small garden retaining walls border the site to the east (Rear of Monague St.)
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°? (approximately 1 in 8)	No.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°? (approximately 1 in 8)	No.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°? (approximately 1 in 8)	No.
5. Is the London Clay the shallowest strata at the site?	No – The Lynch Hill Gravel Member is known to be present from historical borehole information. Varied Made Ground is also expected to be present.
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained? (Note that consent is required from LB Camden to undertake work to any tree/s in a Conservation Area if the tree is over certain dimensions.)	No – However, mature trees with a TPO are located in close proximity to the site.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	No - Unlikely given our understanding of the near surface geology.
8. Is the site within 100m of a watercourse or potential spring line?	No.
9. Is the site within an area of previously worked ground?	No.
10. Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	Yes – Secondary A aquifer (Lynch Hill Gravel Member). The proposed basement design is not expected to extend beneath the water table, however piled foundations may.
11. Is the site within 50m of Hampstead Heath ponds?	No.
12. Is the site within 5m of a highway or pedestrian right of way?	No – However, the site borders and is accessed via a private service road within the grounds of the British Museum.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown – We understand that neighbouring properties have existing basements. The proposed works therefore would not necessarily increase, and may even decrease, the differential depths of any foundations.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g., railway lines?	No.

Table 4.1.2: Stability Screening Assessment.

The above assessment has identified the following potential issues that need to be considered:

- The site is underlain by a Secondary “A” Aquifer.
- The foundation arrangement and extent of basements under adjacent properties needs to be determined and given due consideration.

4.1.3 Surface Flow and Flooding Screening Assessment

Question	Response
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No.
2. As part of the proposed site drainage, will surface water flows (e.g., volume of rainfall and peak run-off) be materially changed from the existing route?	No.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No - The basement does not extend beyond the footprint of the existing building.
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No.
5. Will the proposed basement result in changes to the quantity of surface water being received by adjacent properties or downstream watercourses?	No.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	No for the site itself, although the Camden SFRA indicates that the site is within a Critical Drainage Area (CDA) Group3 _005 and that the land directly adjacent to the site has a medium risk of flooding from surface water.

Table 4.1.3: Surface Flow and Flood Screening Assessment

The above assessment has not identified any potential issues that need further consideration.

4.2 Conclusions

The basement development is modest in size such that it does not extend beyond the footprint of the building and is no deeper than one full story below ground level (approximately 3m in depth).

The initial screening assessment has identified a number of potential impacts which require further consideration. The table below summarises these and details the possible consequences.

Potential Impact	Possible Consequence
The site is situated over a secondary “A” Aquifer (Terrace Gravel)	Altering groundwater flows including dewatering of excavations during construction can result in the removal of fines leading to ground settlement. The zone of settlement will extend over the dewatering zone, and thus could extend beyond a site boundary and affect neighbouring structures. Conversely, an increase in water levels can have a detrimental effect on stability. The construction of the basement should be designed to minimize any requirement for dewatering.
Will the proposed basement extend beneath the water table surface?	We understand that the basement itself is to be constructed above the groundwater table. However, if a piled retaining wall is utilised as part of the construction, then this may extend below the groundwater level altering the direction of groundwater flow. As a detached structure of limited footprint, we would expect any groundwater to flow around the structure with minimal effect.
The proposed basement may significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown – We understand that neighbouring properties have existing basements the extents of which are not all known. Where doubt exists the extents of these structures should be ascertained, and any new structures be designed in such a way that additional loadings both of these structures and their founding soils are limited. A Ground Movement Analysis (GMA) should be carried as part of the design process.

Table 4.2 Summary of findings of initial screening assessment.

In summary it is concluded that the development will not result in any specific issues relating to hydrogeology and hydrology of the site. It is assumed that suitable and appropriate construction methods will be adopted to ensure that there will not be any negative impacts on the groundwater, slope stability or effects on adjacent properties or public highways.

Dependent upon discussions with the regulatory authority it may be that additional documentation and /or a site specific ground investigation will be required to satisfy planning considerations and support some of the assumptions made as part of this appraisal.