TECHNICAL NOTE

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REVIEW OF GROUNDWATER ASPECTS OF A BIA

Ground and Project Consultants Ltd (GPC) has commissioned Hannah Fraser of H Fraser Consulting Ltd to undertake a review of the groundwater aspects of a basement impact assessment (BIA) for 56A King Henry's Road.

About the author

Hannah Fraser is a chartered geologist and hydrogeologist with 23 years' experience as an environmental consultant.

Documents Reviewed

The following data have been reviewed:

- Ecos Maclean, 2019. 56A King Henry's Road NW3 3RP. Basement Impact Assessment for basement and lightwell construction Ref 18024. Date 21/01/2019
- Drawing No 01 Existing & Proposed Ground Floor Plan
- Drawing No 03 Proposed Basement Plan
- Drawing No 04 Existing & proposed Section A-A
- Drawing No 07 Location Plan

Summary of the pertinent issues

The house faces south onto King Henry's Road. A railway cutting lies on the northern boundary at an elevation approximately 7 m below the terraced rear garden, and approximately 10 m below the level of King Henry's Road. An old (c. 100 years) retaining wall forms the wall of the cutting.

The existing ground floor is designed as a suspended slab on a grid of concrete beams which transfer loads onto existing piled foundations under the party walls (east and west). Fill material is present above the original ground surface. The proposal is to excavate a lower ground floor/basement which is entirely below ground at street level but opens on to a lowered garden level at the rear.

1 trial pit has been dug at the property to a depth of 2 m bgl. The trial pit was left open for two months and no groundwater, perched water or surface water was observed to enter the trial pit. The trial pit encountered stiff brown weathered clay under granular backfill.

The site is reported to be on the boundary of the London Clay and the Hampstead Heath secondary aquifer. The London Clay is classified as unproductive strata by the Environment Agency.

Groundwater is considered to be absent from the site, and the BIA did not identify any risks associated with groundwater.

Adequacy of information provided

Reference to BGS geological map no 256 (North London, Solid and Drift) confirms the site to lie on London Clay. There are no superficial deposits mapped in the vicinity of the site, although Head Deposits are shown in the vicinity. The London Clay is indeed classified as unproductive strata by the Environment Agency.

Trial pits are not suitable for determining the piezometric elevation of groundwater in geological strata. In addition, it is not clear whether the trial pit extended to or below the depth of the proposed basement. The thickness and depth of the strata encountered are not provided, and the description of the Made Ground is not in accordance with BS 5930:2015. The location of the trial pit is not known.

Comments on the BIA

It is not clear to what extent the trial pit provides representative information on the groundwater setting. Further information on the location and depth relative to the proposals is required. The trial pit may be leeward of some structure that obstructed groundwater flow such as a pile wall, or the base of the trial pit may be above the base of the proposed excavation. Confirmation is required.

The London Clay does contain water, but has such a low permeability that water is not transmitted rapidly through it. Groundwater is sometimes present on fissures, sand partings or fractured claystone layers, usually in small volumes but sufficient to cause nuisance in excavations. In this setting, it is likely that the railway cutting provides a line of drainage to which any groundwater present will drain, or an elevation to which hydrostatic pressures will fall. It is therefore reasonably likely that the London Clay is not saturated within the depth of the basement and proposed excavation.

It is not clear however whether the Made Ground is likely to transmit perched water particularly at times of heavy rainfall. It seems highly unlikely that there is never any infiltrating or perched water in the Made Ground, particularly if it comprises granular materials.

No mitigation measures are proposed with respect to groundwater, as groundwater was not considered to be present at the site.

Conclusions

The site investigation data are not sufficient to state with certainty that groundwater will not affect the basement development. However, given the setting in the London Clay and the location of the nearby railway cutting, it is reasonably likely that if groundwater or perched water is present, it can be dealt with through standard construction practices:

- Provision should be made to ensure the excavation is kept dry at all times, by pumping from a sump
- The basement should be waterproofed to guard against soil moisture/groundwater seepage, in accordance with BS8102:2009. This would also provide protection against events such as burst water mains.

It is recommended that further information concerning the trial pit excavated at the site is provided for review.