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Dear Ms Scarisbrick

Re: AUDIT OF BASEMENT IMPACT ASSESSMENT FOR 1 GAYTON ROAD, NW3

Further to your instruction, we have now completed our audit of the Basement Impact Assessment (BIA) relating to the proposed extension of an existing basement at the above site and this letter forms our report on the review.

1.0 INTRODUCTION

Geotechnical and Environmental Associates limited has been instructed by London Borough of Camden (LBC) to undertake an independent audit of a BIA for the above site and an assessment of the completeness of the submission in satisfying the requirements of Camden Planning Guidance 4.

Specifically LBC has requested that GEA provide opinion so as to ensure that:

1. *The submission contains a Basement Impact Assessment, which has been prepared in accordance with the processes and procedures set out in Camden Planning Guidance 4 2013.*
2. *The methodologies have been appropriate to the scale of the proposals and the nature of the site.*
3. *The conclusions have been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of conservative engineering values/estimates.*
4. *The conclusions are sufficiently robust and accurate and are accompanied by sufficiently detailed amelioration/mitigation measures to ensure that the grant of planning permission would accord with DP27, in respect of*
 - a. *maintaining the structural stability of the building and any neighbouring properties*
 - b. *avoiding adversely affecting drainage and run-off or causing other damage to the water environment and*
 - c. *avoiding cumulative impacts on structural stability or the water environment in the local area.*

1.1 The Proposed Development

The site is located on Gayton Road close to its junction with Hampstead High Street. The proposed development comprises the deepening of an existing basement by around 0.5 m along with its extension to the rear of the property. Conventional reinforced concrete underpinning of existing boundary walls is proposed and new pad and strip foundations are proposed to support a relatively small three-storey extension of the above ground structure. It is noted that a roughly 5.0 m deep basement has recently been constructed at the adjoining site to the south.

1.2 Documentation

The BIA has been prepared by The Morton Partnership, referenced PC/14748-BIA, and dated January 2014. It includes drawings by Stephen Brandes Architects and a site investigation by KF Geotechnical referenced G/121326/001 dated January 2014.

2.0 AUDIT OF THE BASEMENT IMPACT ASSESSMENT

2.1 Qualifications and Procedure

The audit has been undertaken by Martin Cooper, a Chartered Civil Engineer (CEng) and Member of the Institution of Civil Engineers (MICE) with over 24 years of experience in the geotechnical industry in conjunction with Steve Branch, a Chartered Geologist (CGeol) with over 28 years of experience of the geotechnical industry and with specific knowledge and experience of the ground and groundwater conditions in the London Borough of Camden.

The review has been carried out by reviewing the BIA in the light of the CPG4 flow chart processes and making additional comment on the sufficiency or inadequacy of information provided where necessary.

2.2 Overview

Whilst the BIA is considered to have generally followed the procedures and protocols of CPG4, there are a number of items that do not appear to fulfil its requirements and there are a number of inadequacies in the information provided. These are discussed in more detail below and referenced by the section number in the BIA.

2.3 Author Qualification

The Morton Partnership BIA does not list the name or professional qualifications of its author or authors. Whilst it is suspected that appropriately qualified personnel have compiled the report, there is no evidence of such and it cannot be confirmed that the requirements of Section 2.10 of CPG4 have been met.

2.4 Development Proposals

The detail of the proposed development is set out in Sections 1.0 to 4.0 and provides an adequate explanation of the current and proposed layouts.

2.5 Setting of the site

The topographical, geological and hydrogeological setting is discussed in Section Nos 5.0 to 10.0 but there are incorrect statements within these sections. Section 8.1 of the BIA refers to the KF Geotechnical site investigation report and confirms that the underlying strata are consistent with the Claygate Beds. Section 9.1 states that “from a hydrogeological perspective this is considered to be unproductive strata due to its low permeability”. The Claygate Beds are, in fact, classified by the Environment Agency as a Secondary ‘A’ Aquifer defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. This is also shown on the Camden Aquifer Designation Map that forms Figure 2 in Appendix 1 of the BIA.

2.6 Screening

Section 11.0 of the BIA deals with screening and Section 11.1 considers groundwater flow. Question 1a of Figure 1 in CPG4 asks “*Is the site located directly above an aquifer?*” and Question 1b asks “*Will the proposed basement extend beneath the water table surface?*” The BIA

answers both of these questions as no. These answers are deemed to be incorrect on the basis of the comments in Section 2.5 above and this matter needs to be taken through to the scoping stage.

Section 11.2 considers ground stability and in general we are inclined to agree with the answers provided. However Question 10 of Figure 2 in CPG4 asks *“Is the site within an aquifer? If so, will the proposed basement extend below the water table such that dewatering may be required during construction?”*. The BIA records the answer ‘no’ in respect of the site being within an aquifer and dewatering requirements. This matter has been discussed in Section 2.5 above and further appraisal of this issue is required when groundwater monitoring results become available. The answer to Question 13, *“Will the depth of the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?”* is considered to be strictly correct in that the underpinning is outside the building envelope of No 2 Gayton Road. However the deepening of the basement against the party wall, the underpinning of the northern wall just beyond the party wall and the exposure of the rear face of the basement to Vine Cottage south of the site are considered sufficient to question the statement in Section 11.2.2 that there is ‘no change to the existing conditions with regard to land stability’.

Section 11.3 considers the effect on surface flow and flooding; we are in agreement with the BIA findings in the respect.

2.7 Scoping

The review of the BIA suggests that both groundwater flow and ground stability should have been detailed in the scoping stage and considered further in the ground investigation stage.

2.8 Site Investigation and Study

It is recognised that the scope of the site investigation undertaken was limited by access restrictions. The KF Geotechnical site investigation comprised three trial pits to determine existing foundations and a single borehole advanced using a hand auger to a maximum depth of 2.9 m whereupon the borehole was terminated due to collapse. From the Architect’s drawings, it appears that the proposed basement depth extends to at least 3.0 m below the existing ground level and is therefore beyond the maximum depth investigated. Further, soil strength has been determined solely by hand shear vane testing, which is not considered an appropriate means of determining the strength of fissured clay. Despite a standpipe having been installed within the borehole, no groundwater monitoring results have been provided.

Notwithstanding the access restrictions we consider that the investigation could have been carried out by powered portable equipment that would have provided information on the soils below the proposed depth of the basement. The absence of such information is considered to be a fundamental shortcoming in the investigation.

Section 7.2.2 of LBC document Camden Geological, hydrogeological and hydrological study¹ notes that *“boreholes and / or trial pits should extend to a depth at least that of the proposed basement structure and foundations and typically further”*. In addition it states that *“monitoring of groundwater levels over a period of time is therefore necessary”*. On this basis the site investigation is considered to be insufficient for the design of the proposed basement. There does not appear to have been any groundwater monitoring following the intrusive work and there is no indication of soil strength at the depth at which the underpinned foundations will bear and below.

Section 13.3 provides a bearing capacity for the proposed foundations of 200 kN/m². This value, which was put forward in the site investigation report, was considered reasonable for a reinforced concrete raft by the Morton Partnership in the BIA. It is our opinion, however, that such a value is rather high for pad or strip foundations bearing at that depth particularly with no soil strength test results in the soil zone beneath the foundations. In any case it is considered too high for a raft foundation and could lead to significant ground movement.

¹ Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development*. For London Borough of Camden November 2010

2.9 Impact Assessment

Section 14.1 of the BIA concludes that the proposed basement will have negligible effect on groundwater, surface water and flooding at the site. We suspect that this conclusion is probably correct but further justification is required in respect of potential groundwater inflow during construction and the effect of the proposed development on the current groundwater situation. Section 14.4 proposes that groundwater observation should take place during basement construction but we consider that the groundwater regime should be established before excavation.

Section No 14.3 states that the ground movements that may be generated will give rise to a Category 0 (negligible damage) assessment for the adjacent properties. Given the size and nature of the proposed basement, in effect an extension of the existing basement, constructed alongside an adjacent much deeper basement next door, this may well be correct. However there will be ground movements associated with heave, underpinning and excavation and there are no calculations to support the negligible damage assertion.

The appendices of the BIA are considered to contain sufficient existing and proposed drawings to define the proposed construction and Drawing Nos 14748/P/01A and 02A show the construction methodology. This appears to be generally satisfactory for the purpose of the BIA although some further comment would be useful surrounding the lightwell in the southwestern corner. At this location it appears that this scheme exposes the rear face of the Vine Cottage retaining wall but there does not appear to be any comment on the how the structural stability of that wall will be maintained.

3.0 SUMMARY

This audit has found that the Basement Impact Assessment for the proposed development falls short of the requirements of CPG4 although it follows the general methodology. Further information is required before the assessment could be considered as being satisfactory. The information required is summarised below.

- confirmation that the professional qualifications of the BIA author(s) meet the requirements of CPG4;
- reconsideration of the groundwater regime and mitigation measures;
- additional comment in respect of allowable bearing pressures adopted;
- justification of the 'negligible damage' assertion in respect of ground movement and damage assessment; and
- comment in respect of the exposure of the rear face of the basement wall to Vine Cottage.

We trust that the foregoing comments are sufficient for your needs and we would be pleased to discuss the findings in more detail if required and to provide any additional assistance that may be necessary.

Yours sincerely

GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES



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