Independent Assessment
of
Basement Impact Assessment for planning application 2014/0413/P
at
16 Provost Road
London
NW3 4ST
(UPDATED)

for
London Borough of Camden

LBH 4222

August 2014

LBH WEMBLEY

Geotechnical & Environmental

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Foreword-Guidance Notes

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This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH WEMBLEY Geotechnical & Environmental disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

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Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk.

THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

1. Introduction

It is proposed to construct a basement below the front garden/parking area to this Grade 2 Listed three storey detached property accessed from the existing lower ground floor/garden level. The existing front lightwell is to be retained.

1.1 Brief

LBH WEMBLEY Geotechnical & Environmental have been commissioned to provide an Independent assessment of information submitted against the requirements of LDF policy DP27 (but also including CS5, CS14, CS15, CS17, CS18, DP23, DP24, DP25 and DP26 – as stated at paragraphs 1.5 and 1.6 of CPG4) and with reference to the procedures, processes and recommendations of the Arup Report and CPG4 2013.

1.2 Report Structure

This report commences with a description of the LDF policy requirements, and then considers and comments on the submission made and details any concerns in regards to:

1. The level of information provided (including the completeness of the submission and the technical sufficiency of the work carried out)
2. The proposed methodologies in the context of the site and the development proposals
3. The soundness of the evidence presented and the reasonableness of the assessments made.
4. The robustness of the conclusions drawn and the mitigation measures proposed in regard to:
    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
5. Specific details of any further information that is required to enable an assessment to be satisfactorily concluded.

1.3 Information Provided

The information studied comprises the following:

1. Basement Impact Assessment (BIA) Report - by Cooper Associates, Ref: CA4297.02a, dated December 2013.
2. Construction Strategy - by Cooper Associates, Ref: CA4297.04, dated January 2014.
3. Scheme Drawings - by Nagan Johnson, Ref: P0111b dated 10th March 2014, P113b dated 31st January 2014, PRO 102 dated March 2014.
4. Design, Access and Heritage Statement – by Nagan Johnson dated January 2014.
5. Scheme Drawings – by Cooper Associates, Ref: CA4297/B01 Rev A, CA4297/B02 Rev A, dated December 2013.
6. Site Investigation Report – by Southern Testing, Ref: J11866, dated July 2014.

7. LSBUD, National Grid, Thames Water, Virgin Media and BT Openreach asset plans dated May and June 2014.

2. Policy DP27 – Basements and Lightwells

The CPG4 Planning Guidance on Basements and Lightwells refers primarily to Planning Policy DP27 on Basements and Lightwells.

The DP27 Policy reads as follows:

In determining proposals for basement and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, where appropriate. The Council will only permit basement and other underground development that does not cause harm to the built and natural environment and local amenity and does not result in flooding or ground instability. We will require developers to demonstrate by methodologies appropriate to the site that schemes:

a) maintain the structural stability of the building and neighbouring properties;
b) avoid adversely affecting drainage and run-off or causing other damage to the water environment;
c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and we will consider whether schemes:

d) harm the amenity of neighbours;
e) lead to the loss of open space or trees of townscape or amenity value;
f) provide satisfactory landscaping, including adequate soil depth;
g) harm the appearance or setting of the property or the established character of the surrounding area; and
h) protect important archaeological remains.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding. In determining applications for lightwells, the Council will consider whether:

i) the architectural character of the building is protected;
j) the character and appearance of the surrounding area is harmed; and
k) the development results in the loss of more than 50% of the front garden or amenity area.

In addition to DP27, the CPG4 Guidance on Basements and Lightwells also supports the following Local Development Framework policies:

Core Strategies:

- CS5 Managing the impact of growth and development
- CS14 Promoting high quality places and conserving our heritage
- CS15 Protecting and improving our parks and open spaces & encouraging biodiversity
- CS17 Making Camden a safer place
- CS18 Dealing with our waste and encouraging recycling

Development Policies:

- DP23 Water
- DP24 Securing high quality design

- DP25 Conserving Camden's heritage
- DP26 Managing the impact of development on occupiers and neighbours

This report makes some specific further reference to these policies but relies essentially upon the technical guidance provided by the Council in November 2010 to assist developers to ensure that they are meeting the requirements of DP27, which is known as the Camden Geological, Hydrogeological and Hydrological Study, Guidance for Subterranean Development (CGHHS), and was prepared by Arup.

3. Assessment of Adequacy of Information Provided

3.1 Basement Impact Assessment Stages

The methodology described for assessing the impact of a proposed basement with regard to the matters described in DP27 takes the form of a staged approach.

3.1.1 Stage 1: Screening

Screening uses checklists to identify whether there are matters of concern (with regard to hydrogeology, hydrology or ground stability) which should be investigated using a BIA (Section 6.2 and Appendix E of the CGHSS) and is the process for determining whether or not a BIA is required. There are three checklists as follows:

- subterranean (groundwater) flow
- slope stability
- surface flow and flooding

3.1.1.1 Subterranean (Groundwater) Flow

A screening checklist for the impact of the proposed basement on groundwater is included in the BIA (Document 1) and does not identify any issues. Document 6 concludes that the proposed development will not result in any specific issues relating to the hydrogeology of the site.

3.1.1.2 Stability

A screening checklist for the impact of the proposed basement on land stability is included in the BIA (Document 1).

The report identifies that

- **London Clay is the shallowest stratum on the site**
- **A tree will be felled as part of the proposed development**
- **The site is within 5 m of a highway or pedestrian right of way**

3.1.1.3 Surface Flow and Flooding

A screening checklist for the impact of the proposed basement on surface water flow and flooding is included in the BIA (Document 1) and does not identify any issues. Document 6 concludes that the proposed development will not result in any specific issues relating to the hydrology of the site.

3.1.2 Stage 2: Scoping

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHSS).

No scoping stage is described in the BIA, which proceeds directly to an impact assessment.

However, issues that can be reasonably identified from the submission as being of concern have been assigned bold text in the previous sections and are as follows

- **London Clay is the shallowest stratum on the site**
  The Guidance advises that of the at-surface soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- **A tree will be felled as part of the proposed development**
  The guidance advises that the soil moisture deficit associated with felled trees will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect the slope stability. Additionally the binding effect of tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of stability.

- **The site is within 5 m of a highway or pedestrian right of way**
  The guidance advises that excavation for a basement may result in damage to the road, pathway or any underground services buried in trenches beneath the road or pathway.

3.1.3 Stage 3: Site Investigation and Study

Site investigation and study is undertaken to establish the baseline conditions. This can be done by utilising existing information and/or by collecting new information (Section 6.4 of the CGHSS).

A site investigation was undertaken on 25th June 2014, comprising a small diameter window sampler borehole to 6m depth that was fitted with a water monitoring standpipe and two hand-dug trial pits to expose existing foundations.

3.1.4 Stage 4: Impact Assessment

Impact assessment is undertaken to determine the impact of the proposed basement on the baseline conditions, taking into account any mitigation measures proposed (Section 6.5 of the CGHSS).

The submitted BIA (Document 1) includes an Impact Assessment stage, and further discussion of impacts is contained in the site investigation report (Document 6). The assessment can be summarised as follows:

- **London Clay is the shallowest stratum on the site**

The BIA (Document 1) states that *"The works will be done by reducing the ground level locally (by say a maximum of one metre) and then excavating down individually to cast metre wide sections of retaining wall in a hit and miss sequence. The retaining walls will be propped diagonally of the ground, until sufficient is cast to prevent any risk of lateral movement. This will minimise any disruption to adjacent properties. As we are not underpinning the neighbour's buildings and they are at a short distance from our*

proposed works, the neighbour's structures are not at risk. A Hit and Miss construction sequence plan accompanies this report"

- **A tree will be felled as part of the proposed development**

Document 6 reports that a prunus tree formerly stood on the front boundary of the site adjacent to 17 Provost Road and notes the high volume change potential of the clay but concludes that given the depth of the proposed basement no specific precautions are considered necessary with respect to further foundation deepening.

- **The site is within 5 m of a highway or pedestrian right of way**

The BIA states that "*sequential excavation and propped formwork will be used to prevent undermining of the pavement"* and that "*a drainage survey will have established the location of any pipework and CAT scans will be done before any excavation"* and concludes that *"the permanent works will have no impact on the local highway or pedestrian right of way once complete"*

Document 6 advises that *"close attention in design of temporary and permanent propping is required at all times to prevent settlement or excessive lateral yielding of the excavation…"*

3.2 The Audit Process

The audit process is based on reviewing the BIA against the criteria set out in Section 6 of the CGHSS and requires consideration of specific issues:

3.2.1 Qualifications / Credentials of authors

Qualifications required for assessments

Surface flow and flooding	A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: • The "CEng" (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers ("MICE"); or • The "C.WEM" (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.
Subterranean (groundwater) flow	A Hydrogeologist with the "CGeol" (Chartered Geologist) qualification from the Geological Society of London.
Land stability	A Civil Engineer with the "CEng" (Chartered Engineer) qualification from the Engineering Council and specialising in ground engineering; or A Member of the Institution of Civil Engineers ("MICE") and a Geotechnical Specialist as defined by the Site Investigation Steering Group. With demonstrable evidence that the assessments have been made by them in conjunction with an Engineering Geologist with the "CGeol" (Chartered Geologist) qualification from the Geological Society of London.

Check qualifications / credentials of author(s):

Surface flow and flooding: The assessment does meet the requirements if the author is a specialist in flood risk management and surface water drainage.

Subterranean (groundwater) flow: The assessment does arguably meet the requirements in that Document 6 has clearly been prepared with detailed knowledge of the proposed construction methodology.

Stability: The assessment does arguably meet the requirements in that Document 6 has clearly been prepared with detailed knowledge of the proposed construction methodology.

3.2.2 BIA Scope

Check BIA scope against flowcharts (Section 6.2.2 of the CGHSS). The scope of issues of concern has been checked against the flowcharts. The following additional issues of concern were previously identified.

- The potential for the excavation to affect adjacent properties and the adjacent pavement/highway.

The recent site investigation (Document 6), when studied in conjunction with the earlier diagrams shown in the Construction Strategy (Document 2) and the recently submitted further scheme drawings (Document 5), indicates that the existing foundations lie at a sufficient depth, relative to the proposed construction, not to be potentially subject to any loss of support.

- The potential damming effect of the basement upon any near-surface water movement to result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties.

The recent site investigation (Document 6), when studied in conjunction with the Construction Strategy (Document 2) suggests that any near-surface underground surface water flow at the base of the made ground is already blocked by the existing retaining wall and the steps up to the main house and concludes that "*there is negligible risk of the proposed basement walls causing a "damming effect" or mounding of water on the upstream faces*."

3.2.3 Description of Works

Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?

Yes. There is a description provided of the intended use of discrete pin excavations and shoring and more detailed proposals are provided in the recently submitted further scheme drawings (Document 5).

3.2.4 Investigation of Issues

Have the appropriate issues been investigated? This includes assessment of impacts with respect to DP27 including land stability, hydrology, hydrogeology.

Yes.

3.2.5 Mapping Detail

Is the scale of any included maps appropriate? That is, does the map show the whole of the relevant area of study and does it show sufficient detail?

Limited topographical detail of the site and adjacent land and properties has been provided.

3.2.6 Assessment Methodology

Have the issues been investigated using appropriate assessment methodology? (Section 7.2 of the CGHSS).

The BIA has not been prepared in full accordance with the processes and procedures set out in Camden Planning Guidance (CPG4) but is reasonably conclusive.

3.2.7 Mitigation

Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? (Section 5 of the CGHSS)

The Construction Strategy (Document 2) includes a note in Fig 2 and the scheme drawings recently submitted (Document 5) include a note on Section A-A that the existing front boundary wall is to be provided locally with "a *deep mass concrete footing to avoid the new boundary wall bearing onto disturbed ground*". This footing is shown extending to the full depth of the basement and implies that some movement of the soil is expected behind the new basement retaining wall. It is not clear when or how this deep mass footing is to be formed and what effect any movement could have upon the pavement and highway and any buried services located beneath. It is noted from the Construction Strategy (Document 2) that a skip is to be placed on the adjacent pavement and loaded with the soil excavated from the basement.

3.2.8 Monitoring

Has the need for monitoring been addressed and is the proposed monitoring sufficient and adequate? (Section 7.2.3 of the CGHSS)

No proposals for structural monitoring appear to have been made in either the BIA or the Construction Strategy (Document 2) but it is considered that this may well be because no such monitoring was considered necessary.

3.2.9 Residual Impacts after Mitigation

Have the residual (after mitigation) impacts been clearly identified?

The BIA is reasonably clear in asserting that

- there will be "*no impact on the local highway or pedestrian right of way/footpath"*
- the proposed new structure is "*away from the neighbours foundations"* and "*do not extend or underpin the neighbours buildings"*
- the works are "*away from the areas of surface water"*

Document 6 concludes that

- *"the proposed development will not result in any specific issues relating to the hydrogeology and hydrology of the site"*

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

There is a description provided of the intended use of discrete pin excavations and shoring and more detailed proposals are provided in the recently submitted further scheme drawings (Document 5).

4.2 Soundness of Evidence Presented

The submitted evidence appears to be sound.

4.3 Reasonableness of Assessments

The assessments appear to be reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

There is little doubt that, given expert control and construction, the construction of the proposed basement is entirely feasible. The area of potentially greatest uncertainty is the temporary support that is to be provided to the adjacent pavement and highway, particularly if loaded skips are to be placed here, but this will be the responsibility of the appointed contractor, and a detailed method statement in this regard should be prepared by the contractor in due course.

5. Conclusions

The submitted BIA does not wholly reflect the processes and procedures set out in DP27 and CPG4. Nevertheless it is considered that the revised submission does now demonstrate sufficient detail and certainty to ensure accordance with DP27, in respect of:

a. Maintaining the structural stability of the building and any neighbouring properties
b. Avoiding adverse impact on drainage and run-off or causing other damage to the water environment, and
c. Avoiding cumulative impacts on structural stability or the water environment

It is suggested that the temporary works concerns raised in sections 3.2.7 and 4.4 are not a sufficient reason to refuse conditional approval and that these can be addressed by the applicant by way of the submission of an appropriate temporary works method statement for approval prior to the commencement of work.