Independent Review
of
Basement Impact Assessment for planning application 2015/0369/P (UPDATED)
at

44 Dartmouth Park Road
London
NW5 1SN

for
London Borough of Camden

LBH 4322

June 2015

LBH WEMBLEY

Geotechnical & Environmental

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Foreword-Guidance Notes

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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 single storey basement underneath the most of the rear footprint of this detached property.

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

1.3 Information Provided

The information studied comprises the following:

1. Basement Impact Assessment Screening Stage 1 by Card Geotechnics Limited, dated January 2015, Ref: CG/18249 Revision 0
2. Flood Risk Assessment by VKHP-consulting, dated January 2015, Ref: 113715/FRA/01
3. Design and Access Statement by Peter Stern, dated 22nd January 2015, unreferenced
4. Survey drawings of Existing by E.L.S Land Consultants, dated January 2015, Ref: Z079
5. Drawings of Proposed by Peter Stern, dated January and May 2015, Ref: 370/02B pl, 370/03B pl and 370/08B pl, 370/09 pl 370/10B pl, 370/11B pl, 370/12C pl, and 370/12 pl, 370/13B pl, 370/14A pl, 370/15
6. Site Survey by Peter Stern, dated 8th May 2015, Ref: 370/01B pl
7. Construction Method Statement by Constructure Ltd, dated May 2015, Ref: 1393 Rev A
8. Basement Impact Assessment Investigation and Impact Assessment Stages 2, 3 and 4 by Card Geotechnics Limited, dated June 2015, Ref: CG/18249A Revision 0

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 was included in the BIA screening (Document 1).

This identified the following potential issues of concern:

- **The proposed development will result in a change in the proportion of hard-surfaced/paved areas.**

3.1.1.2 Stability

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

This identified the following potential issues of concern:

- **London Clay is the shallowest strata at the site.**
- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
- **The site is within 5m of a highway or pedestrian right of way.**
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**

3.1.1.3 Surface Flow and Flooding

A screening checklist for the impact of the proposed basement on surface water flow and flooding was included in the BIA screening (Document 1).

This identified the following potential issues of concern:

- **The proposed basement development will result in a change in the proportion of hard-surfaced/paved areas.**

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).

Document 8 reviews the initial screening and proceeds to a scoping stage.

The potential issues identified from the screening checklists of Document 1 as being of concern have been assigned bold text in the previous sections and are as follows:

- **The proposed development will result in a change in the proportion of hard-surfaced/paved areas.**

However, the scoping stage in Document 8 notes that:

> "*The rear garden of the site is currently covered in concrete hard-standing and therefore the proportion of hard-standing will not be increased as part of the proposed development."*

This potential issue is therefore not considered further.

- **London Clay is the shallowest strata at 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).

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
  The guidance advises that there are multiple potential impacts depending on the specific setting of the basement development. For example, in terraced properties, the implications of a deepened basement/foundation system on neighbouring properties should be considered.

- **The site is within 5m 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.

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
  The guidance advises that excavation for a basement may result in structural damage to neighbouring properties if there is a significant differential depth between adjacent foundations.

Document 8 additionally notes that:

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**
  The guidance advises that the developer should undertake a Flood Risk Assessment (FRA).

and Document 8 also notes (in response to concerns from neighbours):

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**
  The guidance advises that flow from a spring, well or watercourse may increase or decrease if the groundwater flow regime which supports that water feature is affected by a proposed basement.
  If the flow is diverted, it may result in the groundwater flow finding another location to issue from with new springs forming or old springs being reactivated.
  A secondary impact is on the quality of the water issuing or abstracted from the spring or water well respectively.

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 is reported in Document 8, including four window sample boreholes to 6m and three trial pits to expose existing foundations. Groundwater monitoring standpipes were installed in each of the boreholes and checked a week or so later.

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).

Document 8 includes an impact assessment stage and the following statements made:

- **London Clay is the shallowest strata at the site.**
  "Heave movements: The Head Deposits and London Clay are susceptible to short term heave and time dependant swelling on unloading, which will occur as a result of basement excavation, generating upward ground movements. "

  "*A maximum of 1.8mm of short term leave is predicted to occur beneath the nearest wall of 46 Dartmouth Park Road (Critical Section A-A) and a further 6.3mm long term heave is predicted to give a maximum total heave of 8.1mm.*"

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**
  "Seasonal ground movements: The London Clay is susceptible to seasonal effects of fluctuating moisture content causing the clay to behave in a shrink-swell manner, thus potentially causing seasonal heave and settlement of the foundations. However, as no shared party walls exist at the site the impact of differential settlement from seasonal ground movements is considered to be negligible. "

- **The site is within 5m of a highway or pedestrian right of way.**
  "*Dartmouth Park Road and York Rise are present immediately to the south-east and south-west of the site; however construction works are unlikely to impact the highway assuming good workmanship and well-constructed scheme are carried out.*" (Document 1)

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
  "*In Critical Section A-A, combined ground movements are likely to result in potential damage to the structure of 46 Dartmouth Park Road equivalent to Category 1 'very slight' damage if lateral movements can be limited to a maximum of 9.0mm. Further sensitivity analysis determines that if lateral deflections could be limited to 5.0mm for Critical Section A-A, damage Category 0 'negligible' is not exceeded*"

  "*It is anticipated that total heave movements will have a damage Category 0 negligible effect on properties greater than 5.0m from the property.*"

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**
  "*York Rise which is located adjacent to the site is recorded to have flooding during 1975 and is at risk from surface water flooding. It is understood that a flood risk assessment has been undertaken for the site by others.*"

  "It is considered that the development will have a negligible impact on surface water flow and flooding."

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**
  "The ground investigation has not recorded a consistent 'water table' within the soils on site and levels recorded to date have varied significantly and likely to have been controlled by surface runoff."

  "…the new basement will not have a noticeable effect on groundwater levels or moisture contents within the ground in the vicinity of the site. Flow rates within the soils of any groundwater that may be present generally on site, and that could potentially be established over the long term, would be so slow as to be effectively negligible."

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

Check qualifications / credentials of author(s):

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.

Surface flow and flooding: The report meets the requirements.

Subterranean (groundwater) flow: The report meets the requirements.

Land stability: The report meets the requirements.

3.2.2 BIA Scope

Check BIA scope against flowcharts (Section 6.2.2 of the CGHSS).

The possible presence of a water course has now been considered and the scope of issues is considered reasonable.

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?

A proposed construction methodology has now been presented in Document 7. However, there appears to be some uncertainty of detail regarding the possible use of a sheet piled retaining wall to restrain parts of the basement excavation rather than to use a sequence of pin excavations.

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.

A ground investigation has now been undertaken, along with a ground movement assessment.

The conceptual site model (figure 4 of Document 8) now indicates that the new basement excavation will potentially impact the foundations to No. 46 Dartmouth Park Road.

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?

An architectural section (DD) on drawing 370/15 (Document 5) indicates the configuration of the proposed basement in relation to the neighbouring foundations of No. 46 Dartmouth Park Road.

3.2.6 Assessment Methodology

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

A ground movement assessment has now been undertaken.

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)

A proposed construction methodology has now been presented in Document 7. However, there appears to be some uncertainty of detail regarding the possible use of a sheet piled retaining wall to restrain parts of the basement excavation rather than to use a sequence of pin excavations. The outline construction sequence detailed in Document does not appear to refer to the use of a sheet piled retaining wall, as indicated on the drawings SK01 and SK02, to restrain parts of the basement excavation. The stiffness and propping requirements for this piling do not appear to have been described.

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)

A monitoring strategy is discussed in Document 8.

3.2.9 Residual Impacts after Mitigation

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

Yes.

"*… a damage category of Category 0 "negligible" is predicted, with a limiting horizontal movement on the underpins of some 9mm required to control movements to within Category 1 "very slight*".

"The development is expected to have a negligible impact on surface water flow and flooding."

"The basement excavation will be predominantly within Head Deposits and London Clay, and significant groundwater is not expected to be encountered."

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The proposed construction methodology now been presented in Document 7 appears to be reasonable.

4.2 Soundness of Evidence Presented

A ground investigation has been undertaken and the evidence appears to indicate both the absence of a former river channel within the site and a general absence of ground water seepage. However, only short term monitoring of the groundwater has been so far been undertaken.

4.3 Reasonableness of Assessments

The assessments appear to be reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The present submission includes mitigation measures by way of proposals for potential construction methodologies that are considered appropriate.

5. Conclusions

The original BIA submission did not progress beyond a Stage 1 Screening and it was considered that in order to meet the requirements further information and assessment was required as follows:

- Stage 2 Scoping
- Stage 3 Site Investigation
- Stage 4 Impact Assessment

A new document (Document 8) has now been submitted that includes the above stages.

The submission now includes an assessment of possible impacts and a potential construction sequence and methodology. However, the actual temporary works design and selection is to be decided later by the appointed contractor.

Although lacking in design certainty, given the circumstances of this site it is considered that the revised submission does include sufficient potential mitigation to address the issues 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

However, in order to meet the requirements of DP27 it is considered that further information is required to be submitted and approved either as a condition of planning approval or by a Basement Construction Plan (BCP) secured by a Section 106 agreement:

- A detailed flood risk assessment and a detailed surface water drainage scheme design.
- Additional groundwater monitoring.
- A detailed monitoring and contingency plan.
- The appointment of a suitably qualified engineer to take responsibility for the design of the temporary works.
- A definitive temporary works method statement and sequence.