Independent Review
of
Basement Impact Assessment for planning application 2014/6935/P
at

11 Princess Road
London
NW1 8JR

for
London Borough of Camden

LBH 4309

February 2015

LBH WEMBLEY

Geotechnical & Environmental

Project No: LBH 4309

Report Ref: **LBH 4309 Ver 1.0**

Date: 16th February 2015

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GENERAL

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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.

VALIDITY

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 new two storey house with basement at the rear of an existing pub. This will involve the demolition of existing low level structures at the rear of the site and the use of part of the beer garden/terrace associated with the adjoining pub, The Albert.

The Albert is recorded as being a three storey building with basement below at the end of a row of terraced residences of mainly four or five storeys.

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 Volume 1 and 2 by Create Consulting Engineers Ltd, dated June 2014, Ref: RM/GL/P14-678/01_Rev A
2. Construction Management Plan by Create Consulting Engineers Ltd, dated October 2014, Ref: MA/CS/P14-678/03
3. Design & Access Statement by Brooks/Murray Architects, undated, unreferenced
4. Arboricultural and Planning Impact Report by Ashmore Arboricultural Services Limited, dated 29th March 2014, Ref: ASH/PW/3029:14

5. Heritage Statement by Architectural History Practice (AHP), dated September 2014, unreferenced
6. Planning Statement of on behalf of TLX Capital Ltd by KR Planning, October 2014, unreferenced
7. Drawings of Existing by Brooks/Murray Architects, dated April 2014, Ref: 985.03-P-001, 985.03-P-002, 985.03-P-009, 985.03-P-010, 985.03-P-050 to -052, 985.03-P-080
8. Drawings of Proposed by Brooks/Murray Architects, dated April 2014, Ref: 985.03-P2-101A, 985.03-P2-109B, 985.03-P2-110B, 985.03-P2-150B to -152B, 985.03-P2-153A, 985.03-P2-180B, 985.03-P2-181B

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).

This identifies the following potential issues of concern:

- **The proposed basement will extend beneath the water table surface.**
- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**
- **More surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS).**

3.1.1.2 Slope Stability

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

This identifies the following potential issues of concern:

- **The proposed re-profiling of landscaping at the site changes slopes at the property boundary to more than 7 degrees.**
- **London Clay is the shallowest strata at the site.**
- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
- **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 100m of a watercourse of a potential spring line.**
- **The site is within 5m 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).

This identifies the following potential issues of concern:

- **The proposed basement development will result in a change in the proportion of hard-surfaced/paved areas.**
- **The site is in an area known to be at risk from surface water flooding**

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).

Checklists have been provided in the BIA and there is scoping stage described in the BIA.

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

- **The proposed basement will extend beneath the water table surface.**
  The guidance advises that dewatering can cause ground settlement. The zone of settlement will extend for 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 groundwater flow regime may be altered by the proposed basement. Changes in flow regime could potentially cause the groundwater level within the zone encompassed by the new flow route to increase or decrease locally. For existing nearby structures then the degree of dampness or seepage may potentially increase as a result of changes in groundwater level.

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**
  The guidance advises the 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.

- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**
  The guidance advises that a change in the in proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding. The sealing off of the ground surface by pavements and buildings to rainfall will result in

decreased recharge to the underlying ground. In areas underlain by an aquifer, this may impact upon the groundwater flow or levels. In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability.

- **More surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS).**
  The guidance advises that in areas underlain by an aquifer, this may impact upon the groundwater flow or levels – this would then have similar impacts to those listed in 1b) and 2). In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability.

- **The proposed re-profiling of landscaping at the site changes slopes at the property boundary to more than 7 degrees.**
  The guidance advises that this may cause local slope instability within and adjoining the site

- **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).

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
  The guidance advises that the soil moisture deficit associated with felled tree 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.

- **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 site is in an area known to be at risk from surface water flooding**
  The guidance advises that the developer should undertake a Flood Risk Assessment (FRA).

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).

The site investigation submitted comprised a single 5m window sample borehole with the installation of a standpipe and one subsequent water monitoring visit. No water was encountered.

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 the following statements.

- **The proposed basement will extend beneath the water table surface.**

"*Monitoring of the site investigation borehole did not record any groundwater. However, some water may percolate through the upper Made Ground and the design needs to account for this possibility*."

"The basement might be at risk of water ingress from any shallow or perched groundwater and there is potential for localised impacts on the water table if a groundwater table is present."

"*As the basement will be constructed using temporary sheet piles, any seepage from the Made Ground will be minimal though dewatering of the excavation itself may be required during the construction works. As only limited dewatering within the excavation may be required, any dewatering is unlikely to affect any shallow/perched groundwater levels in the Made Ground outside of the sheet piled excavation.*"

"*No significant impact on groundwater levels are anticipated based on the findings of the site investigation*"

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**

"*The canal is lined and is kept separate from groundwater flows; so should not be affected by the proposed small basement.*"

- **The proposed development will result in a change in the area of hard-surfaced/paved areas.**
- **More surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS).**

"The impermeable area of the site will be decreased by 15m^2 through the introduction of a sunken landscaped garden."

"*Although the sunken garden will be grassed, the London Clay is of low permeability, such that no significant increase in infiltration is anticipated given that the majority of rainfall will be lost through evapotranspiration. Furthermore, it is likely that the sunken garden will in effect be constructed similar to a "green roof" and will require some drainage to ensure that the grass does not become waterlogged.*"

"*Include sufficient sub-surface drainage for the grassed area/sunken garden as part of the detailed drainage design. This may include the incorporation of granular fill layer beneath the soil and/or a rainwater harvesting tank, with an overflow to the surface water drainage system; pumped to the public sewer network.*"

- **The proposed re-profiling of landscaping at the site changes slopes at the property boundary to more than 7 degrees.**

"*A structural retaining wall will need to be included in the proposals."*
"Without adequate temporary and permanent propping this would lead to slope stability issues."

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

"Differential movement may occur in the structure and adjacent buildings if not taken into account in the design of temporary works and permanent design of the substructure."

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained.**

"One tree in the south-west corner of the site is to be removed for the proposed building."

"The removal of the on-site tree & vegetation is not considered to have a significant impact. This is due to the basement extending below the potential influence zone of this and nearby trees."

- **There is a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site.**

"*Potential for shrink-swell to occur will be considered in the detailed design of the temporary works and permanent design of the substructure*"

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

"*Propping will be required as part of the detailed design of the temporary works and permanent design of the substructure*"

- **The site in an area known to be at risk from surface water flooding**

"EA Surface water maps indicate flooding in the vicinity and according to Camden Surface Water mgt Plan it lies within the Critical Drainage Area CDA (3003) and Local Flood Risk Zone LFRZ (3024)."

"The proposed basement may be at risk of flooding from surface water; which may result in safety/damage to property."

"*The entrance threshold to the property should ideally be 32.5mAOD, to reduce the risk of surface water flooding to the property."*

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 following additional potential issue of concern is not directly identified in the submission.

- **The proposed basement significantly will increase the differential depth of foundations relative to 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."

It would appear that there is a 1930s single storey rear extension to the adjacent pub that may have high level foundations that could be affected by the proposed basement.

However, the issue has been addressed as follows *"The temporary works design criteria will be set to limit potential movement of the soil behind the sheets, to limit the risk of undue movement and hence damage to adjacent properties."*

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. The description of works is that a reinforced concrete basement will be constructed within a braced temporary sheet piled cofferdam.

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. However, little information is given with regards to the adjacent foundations of the pub and it is stated that "…*trial pits to be dug along the walls to the pub building; to identify the projection and depth of their foundations*".

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?

Yes.

3.2.6 Assessment Methodology

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

Yes.

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)

Yes.

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)

It has been stated within the Construction Management Plan (Document 2) that "*Site management will conduct routine daily and weekly checks to ensure the safety and security of pedestrians around the Site are maintained.*"

Document 1 states "*Undertake a structural condition survey of neighbouring properties, as part of party wall award process prior to commencement of works.*"

3.2.9 Residual Impacts after Mitigation

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

Yes.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

It is unclear if the proposed construction methodology is considered appropriate due to there being no information included with regards to the foundations of the neighbouring pub.

4.2 Soundness of Evidence Presented

The evidence appears sound.

4.3 Reasonableness of Assessments

The assessments made appear reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The conclusions and proposed mitigation measures appear to be sufficiently robust.

5. Conclusions

The submitted BIA does reflect the processes and procedures set out in DP27 and CPG4.

There are some elements of detail that have not been fully addressed. However, given the particular circumstances of this site it is not considered that the present submission is so technically deficient as to not meet the requirements of 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