Independent Review
of
Basement Impact Assessment for planning application 2015/6893/P
at

27 King's Mews
Camden
London
WC1N 2JB

for
London Borough of Camden

LBH4399

March 2016

LBH WEMBLEY

Geotechnical & Environmental

Project No: LBH4399

Report Ref: **LBH4399 Ver 1.0**

Date: 16th March 2016

Report approved by:

Digitally signed by Seamus Lefroy-Brooks
DN: cn=Seamus Lefroy-Brooks, o, ou=LBH WEMBLEY, email=seamus@LBHGEO.co.uk, c=GB
Date: 2016.03.16 17:25:18 Z

Seamus R Lefroy-Brooks
BSc(hons) MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC RoGEP UK Registered Ground Engineering Adviser

LBH WEMBLEY Geotechnical & Environmental
Unit 12 Little Balmer
Buckingham Industrial Park
Buckingham
MK18 1TF

Tel: 01280 812310

email: enquiry@lbhgeo.co.uk

website: www.lbhgeo.co.uk

Contents

Foreword-Guidance Notes

GENERAL

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.

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 demolish the existing building at No. 27 King's Mews and construct a new three storey building with one storey of basement, to be used as three separate apartments.

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 2015.

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. Screening and Scoping BIA Report for Nos. 26-28 King's Mews Report by Campbell Reith, Ref 11066, dated 1st June 2012, revision D1
2. Design and Access Statement, unreferenced, dated 27th November 2015, Revision 01.
3. Existing Drawings, by Nico Warr Architects, Ref: 115_S1200 Rev00 dated 31st January 2013, 115_S1201 Rev00 dated 31st January 2013, 115_S1300 Rev00 dated 31st January 2013, 115_S1400 Rev00 dated 31st January 2013.
4. Proposed Drawings by Nico Warr Architects, Ref: 115_A1200 Rev01, dated 11th March 2013, 115_P4_A1200, Rev01, dated 11th November 2015, 115_P4_A1201, Rev01, dated 11th November 2015.

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 site is located directly above an aquifer.**
- **The proposed basement will extend beneath the water table surface.**

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)

This identifies the following potential issues of concern:

- **The site is within an area of previously worked ground.**
- **The site is possibly within an aquifer.**
- **The proposed basement will possibly extend beneath the water table such that dewatering may be required during construction.**
- **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.**
- **The site is possibly over (or within the exclusion zone of) tunnels, e.g. railway lines.**

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 does not identify any potential issues of concern.

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 a 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 site is located directly above an aquifer.**
  The guidance advises that the basement may extend into the underlying aquifer and thus affect the groundwater flow regime.

- **The proposed basement will extend beneath the water table surface.**
  The guidance advises that 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 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 site is within an area of previously worked ground.**
  The guidance advises that previously worked ground may be less homogenous than natural strata, and may include relatively uncontrolled backfill zones.

- **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.

- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**
  The guidance advises that excavation for a basement may result in damage to the tunnel.

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).

No site investigation information has been submitted but reference is made to a March 2007 Site Investigation of Nos. 43 and 45 Gray's Inn Road and Nos. 22 to 30 King's Mews by Ground Engineering.

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 covers the Screening and Scoping BIA stages only and does not proceed to the Impact Assessment or Decision Making BIA stages.

Nevertheless, the following statements are made in respect of the various potential issues that have been identified:

- **The site is located directly above an aquifer.**
- **The proposed basement will extend beneath the water table surface.**

"The construction of the basement may affect the groundwater flow regime …
…The potential for this situation to occur will depend on the nature of the basement construction adopted (i.e. will it result in cut off of the water under the structure) the extent and depth of other basements in the area and the direction of groundwater flow…
…The presence of groundwater will need to be considered in the design of the basement which will need to consider the associated hydrostatic up-lift pressures on the basement slab and the associated lateral pressures on the wall…
…The basement design will also need to incorporate suitable water protection measures.."

"In relation to the above it is noted that groundwater flow is anticipated to be towards the north east, east or possibly south east or south. Whilst current data suggests a paucity of existing basements on Kings Mews, there are already extensive existing basements along Gray's Inn Road to the east, (including the immediately adjacent properties), to the north (along Nothington Street) and south (along Theobald's Road)."

"If River Terrace Deposits are to be used as a founding stratum for the proposed building and/or underpinning, then some form of dewatering or groundwater control may be required during construction… In relation to this, the depth of the London Clay may make it difficult to cut off groundwater using trench sheeting."

"Dewatering could result in ground movements that could affect nearby buildings and assets….For this risk to be better understood additional ground modelling will be required…"

"Alternatively consideration could be given to cutting off the groundwater by the use of a piled wall followed by pumping…

Another alternative would be to grout the permeable strata prior to excavation but this would also have associated impacts that would need to be considered."

- **The site is within an area of previously worked ground.**

"Such ground has a relatively poor load bearing and settlement characteristics, which lead to a risk of structural failure or adverse differential movement. This matter is of substantial significance…."

"This potential impact can be addressed by utilising the underlying River Terrace Deposits as a founding stratum or piled foundations…

Such materials are likely to require temporary support during excavation."

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

"Basement construction could result in ground movements detrimental to the highway and any infrastructure contained therein. Statutory undertakers should be consulted so as establish if any buried utilities are present and the owners of these assets, along with the owner of highway, so as to determine any constraints to design, for example, easements, surcharge loadings on the basement wall casements and limiting values on ground movement. This matter is considered to be of substantial significance.

Such matters will need to be modelled in the design of the basement. They are likely to result in a need for support to the excavation, through either bored piling or temporary sheet piling and may require the excavation to be propped."

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

"The basement excavation will act to undermine the adjacent foundations leading to a risk of movement and damage. This matter is considered to be of substantial significance. Underpinning of these foundations is therefore recommended. The extent and nature of the underpinning would need to consider the potential for differential movement between the new, stiffer, foundations and the parts of the buildings on original foundations."

"Conventional underpinning would need to be undertaken in an appropriate and controlled 'hit and miss' sequence to minimise the risk of movement… the presence of groundwater above the bearing stratum, [may] *result in the conventional underpinning not being the preferred solution, possibly necessitating a piled underpinning solution.*

Alternatively if a piled basement wall is taken forward, consideration could be given to ground modelling to determine if the adjacent foundations could be left as they are, but the with wall designed to accommodate the associated surcharge and to minimise ground movements."

"In relation to the above matters… it is recommended that ….supplementary trial pits are undertaken in the northern part of the site so as to inspect uninvestigated party wall foundations."

- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**

"The site is in the general vicinity of a sewer and possibly also a government communications tunnel. The proposed development could result in ground movements, such as ground heave associated with stress relief arising from the basement excavation or settlements arising from the new foundations. Similarly the new foundations could result in load being shed on to the tunnels."

"It is recommended that the utilities search … is extended to include operators of underground tunnels. The asset owners should be consulted with regard to confirming the location, depth and nature of their tunnels and to establish any associated constraints to the proposed development. Typically such constraints comprise foundations exclusion zones and limitations on the magnitude of the load shed on to the asset and on the ground movements experienced by the asset…"

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).

All issues noted in the screening are carried forward to the scoping section.

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?

No. The construction methodology does not yet appear to have been decided.

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.

No. The issues that have been carried forward to scoping will each need to be investigated.

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?

No. Only architectural drawings have been submitted, without any engineering detail.

3.2.6 Assessment Methodology

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

No. The issues that have been carried forward to scoping will each need to be investigated using appropriate methodology.

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, but a mitigation solution has not been identified.

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)

Yes, but no detailed monitoring scheme has been proposed.

3.2.9 Residual Impacts after Mitigation

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

In the absence of any definite scheme of mitigation the residual impacts cannot be assessed at this stage.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

No specific construction methodology has been submitted.

4.2 Soundness of Evidence Presented

The BIA comprises screening and scoping stages only and does not include site investigation evidence.

4.3 Reasonableness of Assessments

The BIA comprises screening and scoping stages only and does proceed to an assessment stage.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The BIA comprises the screening and scoping stages only and does proceed to the impact assessment or decision making BIA stages where specific mitigation is proposed and the acceptability of any residual impacts are assessed.

5. Conclusions

The submitted BIA does reflect the processes and procedures set out in DP27 and CPG4 but comprises only the screening and scoping stages and does proceed to consideration and assessment of the impacts associated with any specific scheme or construction methodology.

It is appreciated that this particular BIA document was submitted in connection with a previous planning application 2013/1002/P that was granted on condition that a suitably qualified chartered engineer was appointed to inspect, approve and monitor the critical elements of the basement construction in order to safeguard the structural stability of neighbouring buildings.

However, Camden basement policy has developed in the interim period and as a consequence it is considered that the present submission does not demonstrate sufficient detail and certainty to ensure accordance with DP27 and CPG4(2015), 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 concerns about the submission that have been raised in sections 3 and 4 of this document can be addressed by the applicant by way of further submission.

5.1 Further Information Required

It is considered that in order to meet the requirements of DP27, appropriate investigation and assessment of all the potential issues that have been identified in the present document is undertaken.

With the benefit of this further information, the BIA should then be revised accordingly to include an updated assessment of any groundwater impact and a specific construction sequence and methodology indicating in detail how neighbouring structures are to be protected. The revised BIA should provide a detailed assessment of the extent of the possible movements and damage to be expected during and after the works. A detailed monitoring and contingency plan should also be presented that reflects the outcome of this further assessment.