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

August 2016

LBH WEMBLEY

Geotechnical & Environmental

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Contents

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 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, 116_S1300, 116_S1400, 116_S1200, 116_S1201 Rev 00 dated 30th June 2016
4. Proposed Drawings by Nico Warr Architects, Ref: 115_A1200 Rev01, dated 11th March 2013, 115_A1401 Rev 00, dated 31st March 2013, 115_A1300, 115_A1400A, , Rev01, dated 7th July 2013, 115_P4_A1200, Rev01, dated 11th November 2015, 115_P4_A1201, Rev01, dated 11th November 2015, 116_A1200 Rev 03 dated 16th June 2016, 116_A1300 Rev 00 dated 26th June 2016, 116_P5_A1400, 116_P5_A1401, 116_P5_A1401A Rev 00 dated 30th June 2016
5. Basement Impact Assessment by Techniker, Ref: 16056-01, dated 7th July 2016.
6. Envirocheck Search by Landmark, Ref: 90239476_1_1, dated 5th July 2016 (included as appendix B to document 5)

7. Ground Investigation by Ground Engineering, Ref: SJF/Cl3870L, dated 1st June 2016. (included as appendix C to document 5)
8. Structural Statement, Drawings and Calculations by TSConsulting, Ref: 1615, dated July 2016 (included as appendices E & F to document 5)

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).

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 and, in June 2016, a further 15m deep exploratory borehole was undertaken by Ground Engineering (Document 7)..

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 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 revised proposals for the development incorporate a shallower basement to avoid/minimise encroaching below the water table and disturbing the groundwater flow. The water table is believed to be at 3.6m below ground level and the basement formation level is expected to be maximum 4.0m below ground. This may necessitate dewatering during construction. The basement raft and bases to the wall panels will be designed to resist any hydrostatic pressure arising from interaction with groundwater. The aquifer layer (Lynch Hill Gravel) which is overlain by approximately 3.3m of Made Ground is 2.6m thick, leaving 1.9m of permeable soil beneath the basement."

"Groundwater has been recorded at basement formation level. From knowledge of the adjacent site, at number 25 Kings Mews, it is likely that this can be controlled by localised pumping."

"The temporary works solution adopted would not adversely affect the groundwater flow as it does not employ piles. As such, the impact of the proposed basement on the groundwater flow is expected to be negligible."

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

"The underside of the proposed basement will be founded in the very dense Lynch Hill Gravel, where the SI recommends a safe bearing capacity of 200 kN/m² for pad foundations, reducing to 140 kN/m² for a raft solution."

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

"A method statement for the construction of the basement is outlined on drawing 1615-03. A traditional "hit and miss" underpinning technique is employed, with walls being constructed in two lifts. Staged installation and removal of a stiff lateral support system ensures stability of the surrounding ground and buildings until such time as the box is complete."

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

"The SI identifies the potential for Clay heave, following the removal of 4 metres of overburden, but concludes that this will dissipate through the Lynch Hill Gravel strata. Consequently, no anti-heave precautions are required.
Providing that the design of temporary lateral support to the basement excavation follows best practice it is not anticipated that bulk ground movements would exceed 12 mm in either the horizontal or vertical

directions. The nature of the immediately adjacent structures is such that the anticipated level of damage, if any, would be categorised as "negligible" (category 0) to "very slight" (Category 1) on the Burland Classification."

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

From the desk study searches (Document 5) this does not appear to be the case.

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?

Yes. A rigid reinforced concrete box is to be formed of walls and a raft foundation constructed in a 'hit and miss' underpin sequence.

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?

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)

Yes. A structural monitoring scheme and plan is included in Document. The frequency of monitoring should be increased to daily (and ideally twice daily) during the underpinning works and basement excavation.

3.2.9 Residual Impacts after Mitigation

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

Yes, the submission anticipates a level of damage to the adjacent structures of "very slight" (Category 1) on the Burland Classification. The impact on groundwater flow is expected to be negligible.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The proposed methodology appears acceptable and has apparently been recently adopted for the nearby No. 25 Kings Mews.

4.2 Soundness of Evidence Presented

The evidence appears sound.

4.3 Reasonableness of Assessments

The assessments 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 initial submission comprised only the screening and scoping stages and did not demonstrate sufficient detail and certainty to ensure accordance with DP27 and CPG4(2015).

The revised submission does describe a specific construction sequence and methodology and proceeds to consideration and assessment of the stability and groundwater impacts associated with the proposed construction methodology and includes a detailed monitoring and contingency plan.

It is concluded that the revised submission does meet the requirements of 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