Independent Review
of
Basement Impact Assessment for planning application 2014/1977/P (UPDATED)
at

29 Prince of Wales Road
London
NW5 3LH

for
London Borough of Camden

LBH4259

December 2014

LBH WEMBLEY

Geotechnical & Environmental

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Foreword-Guidance Notes

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 single level of basement below the building at 29 Prince of Wales Road and into extending into the rear garden. It is noted that the excavation of that part of the basement beneath the existing building footprint was granted a certificate of lawfulness as permitted development on 20th January 2014 and has been commenced.

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. Desk Study and Basement Impact Assessment by Geotechnical & Environmental Associates (GEA), dated 14th January 2014, revised 9th July 2014, Ref: J13359
2. Planning, Design & Access Statement by Clive Sall Architecture Ltd (CSA), dated 2nd September 2013, Ref: 191_3000_DOC_DA_Design and Access Statement P1

3. Existing Drawings by CSA, Refs: 191_1300 (Front Elevation Existing, Revision P1), 191_1301 (Rear Elevation Existing, Revision P1) dated 22nd October 2013, 191_1002 (Existing 1F Plan, Revision P1), 191_1003 (Existing 2f Plan, Revision P1), 191_1101 (Ground Floor Plan As Existing, Revision 1101) dated 12th November 2013, 191_1115 (Roof Plan Existing, Revision P1) dated 3rd December 2013
4. Proposed Drawings by CSA, Refs: 191_3113 (Proposed 2f Plan, Revision P1) dated 7th January 2014, 191_3112 (Proposed 1F Plan, Revision P1), 191_3111 (Ground Floor Plan Proposed, Revision P1-3), 191_3311 (Basement Proposal Rear Elevation, Revision P1), 191_3115 (Roof Plan Proposed, Revision P1), 191_3201 (Proposed Section AA, Revision P1-3), 191_3312 (Basement Proposal Side Elevation, Revision P1), 191_3110 (Proposed Bf Plan, Revision P1-3) last dated 12th June 2014
5. Construction Method Statement by Fluid Structures, dated 22nd January 2014, updated 24th November 2014, Ref: 23704 Rev P1
6. Ground Movement Assessment by GEA, dated 17th September 2014, Ref: J13359A
7. Letter from GEA to CSA dated 23rd October 2014, Ref J13359/SB/01
8. Party Wall Movement Monitoring Notes by Fluid Structures, dated August 2014, Ref:23704
9. Proposal for Monitoring Survey by Chanton, dated 3rd September 2014, Ref Q013214
10. Storm Water Runoff Assessment by Synergy, dated 25th November 2014, unreferenced

2. Policy DP27 – Basements and Lightwells

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

The DP27 Policy reads as follows:

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

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

and we will consider whether schemes:

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

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

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

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

Core Strategies:

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

Development Policies:

- DP23 Water
- DP24 Securing high quality design
- DP25 Conserving Camden's heritage
- DP26 Managing the impact of development on occupiers and neighbours

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

3. Assessment of Adequacy of Information Provided

3.1 Basement Impact Assessment Stages

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

3.1.1 Stage 1: Screening

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

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

3.1.1.1 Subterranean (Groundwater) Flow

A screening checklist for the impact of the proposed basement on groundwater is included in the BIA (Document 1) and identifies that:

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

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) and identifies that:

- **London Clay is the shallowest strata at the site.**
- **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 is included in the BIA (Document 1) and does not identify any potential issues.

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).

A scoping stage is provided in the BIA (Document 1) and the issues identified and are as follows:

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

  The guidance advises that construction of the basement may cause and alteration of the surface runoff and shallow groundwater regimes such that flow volumes or water quality in the watercourse is affected

- **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).

- **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.

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 three window sampler boreholes taken to a depth of 6m with standpipe installations, and nine trial pits hand dug to examine the existing foundations.

3.1.4 Stage 4: Impact Assessment

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

The submitted BIA (Document 1) includes an Impact Assessment and the following issues have been addressed:

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

It is clarified in the BIA that two wells constructed to extract groundwater from the deep Chalk Aquifer were located approximately 70m northeast of the site and will not be impacted by the basement.

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

The BIA reports that the investigation found no evidence of desiccation and that the site is not densely vegetated with mature deciduous trees and concludes that "*despite that the London Clay is the shallowest geology, there is not considered to be a risk to the proposed development or the neighbouring properties"*

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

The BIA states *"The proposed basement structure will require a number of the existing foundations across the rear of the existing property to be underpinned down to the proposed depth of the basement. However, these foundations are also party walls and therefore the neighbouring foundations will also be underpinned in the process. This will prevent the creation of differential foundation depths between the existing property and the neighbouring properties and provided that good workmanship is applied and the work carried out by a suitably qualified contractor, there is no need for the stability of the adjacent properties to be compromised. Furthermore, the existing foundations have been found to be bearing on made ground and underpinning the foundations down to the London Clay will only aid the stability of the existing structures."*

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.
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.

Stability: The report meets the requirements.

3.2.2 BIA Scope

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

The BIA states that there will be no surface expression of the basement and that surface water flows (e.g. volume of rainfall and peak run-off) will not be materially changed from the existing route.

> *The guidance advises that basement development may increase the load on the sewer and drainage systems if it leads to increased occupancy of dwellings. In turn this may increase the risk of flooding should the sewer and drainage systems become overwhelmed. Constructing a basement, either beneath or adjacent to an existing building will typically remove the permeable shallow ground that previously occupied the site footprint. This reduces the capacity of the ground to allow rainfall to be stored in the ground (which in essence acts as a natural SUDS, or sustainable urban drainage system). This runoff must then be managed by other means (eg through construction of SUDS), to ensure that it doesn't impact on adjoining properties or downstream watercourses.*
>
> *The guidance also advises that a change in the 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 BIA states that *"all paved surfaces above the basement will be constructed using permeable paving or similar which will allow infiltration of surface water into the sub-soil. Other surfaces above the basement will remain vegetated."* .

Document 10 clarifies that there will be an increased peak run-off of 4.1 l/sec and that collector sumps will be sized to provide the required attenuation prior to discharge to the sewer.

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. Document 5 describes a detailed construction methodology, including a description of those works that have already been completed under permitted development rights. It is noted that the latter included underpinning of the party walls, and that some movement occurred that has been attributed to poor workmanship.

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. Document 6 provides a ground movement assessment.

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. However, it would appear from Document 5 that those works that have already been completed under permitted development rights did not follow the specified methodology.

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, Document 8 described monitoring proposals. However, it would appear that effective monitoring was not undertaken for those works that were undertaken under permitted development rights.

3.2.9 Residual Impacts after Mitigation

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

Yes. However, it would appear that those works that have already been completed under permitted development rights did not follow the specified methodology and that some movement occurred that has been attributed to poor workmanship.

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The methodology described in the additional submission is considered acceptable.

4.2 Soundness of Evidence Presented

The BIA identifies that tributaries of the Fleet River flowed *"approximately 120 m to the east and 200 m west of the site"*. It might be shown that the tributary to the East ran significantly closer to the site, perhaps nearer 50m than 120m. However, the natural soils reported by the investigation are not indicative of any alluvial tract within the immediate vicinity of the site and in the apparent absence of groundwater the issue is arguably not of concern.

4.3 Reasonableness of Assessments

The assessments appear reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The conclusions and proposed mitigation measures are considered acceptable. It seems evident that those works that were commenced under permitted development rights did not follow the specified methodology, resulting in some structural movement.

5. Aborted Basement Excavation

It is noted that in the interim period between the original BIA review and the present review underpinning works were commenced under permitted development rights and that these apparently did not follow the specified methodology, with some unsupervised and unapproved overdig being executed, apparently resulting in some structural movement.

The concerns of the neighbouring owner of No. 27 Prince of Wales Road regarding the movement that appears to have occurred in September of this year seem entirely valid. It would appear from Document 5 that this work was subsequently aborted and that excavations were backfilled.

However, it would appear that the most sensitive sections of underpinning were completed during this period.

Provided that the condition of the completed underpinning, as identified by the structural engineer on 21st November 2014, is acceptable, then it can be stated that the risks associated with the remaining works currently proposed are considered to be significantly less than the risks associated with completing the whole of the works.

Nevertheless, it must be stressed that the BIA assessment of a satisfactory situation was made "*provided that good workmanship is applied and the work carried out by a suitably qualified contractor*".

A high standard of workmanship, monitoring and supervision is required and it is obviously essential that only suitably competent persons are employed.

6. Conclusions

The initial BIA submission did not demonstrate sufficient detail and certainty to ensure accordance with DP27.

It was considered that in order to meet the requirements of DP27 further information was required as follows:

- A detailed assessment of the extent of the possible ground movements and damage to be expected during and after the works.
- A specific construction sequence and methodology, prepared by a qualified Structural Engineer, indicating in detail how the host building and neighbouring structures are to be protected.
- A detailed monitoring and contingency plan.
- A detailed assessment of the existing and proposed surface water drainage measures.

This additional information has been provided and it is now concluded the submission meets 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