

**Independent Review
of
Basement Impact Assessment for
planning application 2014/2553/P
(UPDATED)**

at

**21-23 Cressy Road
London
NW3 2NB**

for

London Borough of Camden

LBH4264

January 2015

LBH
WEMBLEY



**Geotechnical &
Environmental**

Project No: LBH4264

Report Ref: **LBH 4264 Ver 2.0**

Date: 5th January 2015

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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 construct a new single level basement, approximately 3.5m depth, beneath the existing properties at Nos. 21-23 Cressy Road. The proposed basement will occupy approximately the same area as the above properties but ends 2m short of the shared party wall with No. 19 Cressy Road.

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 by Glencross & Hudson dated 3rd Nov. 2013, (**superseded**)
2. Flood Risk Assessment by Scott White and Hookins dated February 2014, Ref: B00652 Ver.1.0
3. Planning, Design & Access Statement by Phillips Planning Services dated April 2014, unreferenced
4. Existing Plans by Rosser Morris dated 13th March 2014, Ref: RM13/139 31
5. Proposed Plans by Rosser Morris dated 5th June 2014, Ref: RM13/139 33A, RM13/139 34A and RM13/139 32
6. Basement Impact Assessment by CGL dated November 2014, Ref: CG/18104

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 Document 6 and identifies the following potential issues of concern.

- **The site lies within 100m of a watercourse, well or potential spring line**

3.1.1.2 Stability

A screening checklist for the impact of the proposed basement on stability is included in Document 6 and identifies the following potential issues of concern:

- **London Clay is the shallowest strata at the site.**
- **The site lies within 100m of a watercourse, well or potential spring line.**
- **The site is within 5m of a highway or pedestrian right of way.**
- **The proposed basement may significantly increase the differential depth of foundations relative to 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 Document 6 and identifies no 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 and there is a scoping stage described in Document 6.

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

A ground investigation was undertaken by CGL on Thursday 9th October 2014 and comprised two window sampling boreholes to a maximum depth of 7m and two pits to expose the existing foundations. A groundwater monitoring well was installed in one borehole and was subsequently monitored on one occasion (21st October 2014).

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 6) contains an Impact Assessment stage and includes the following comments:

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

“Based on the proposed basement formation depth of 3.0mbgl, groundwater is unlikely to be encountered during basement excavation, excluding perched water within the Made Ground, and the proposed basement is not likely to obstruct groundwater flow or levels in the region.”

“The excavation is not expected to alter the local groundwater regime over the long term due to presence of impermeable London Clay and based on the groundwater observation during the current site investigation.”

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

“Short term heave movements within the excavation will occur instantaneously upon unloading and will be removed during the excavation process. They should therefore be discounted from any anticipated heave movements beneath the sub-basement slab at formation level, where only long term heave movements to a maximum of 5mm at centre decreasing to 1mm at excavation perimeter will occur.”

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

“It is anticipated that total settlement movements affecting Cressy Road carriageway will not exceed 2mm. It is expected that this will have a negligible effect on both the roadway and underlying services.”

“An overall heave regime does not extend over the adjacent pavement into Cressy Road carriageway. It is considered the proposed works will have negligible impact upon the carriageway and underlying infrastructure.”

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

“For Critical Sections A-A and B-B the maximum damage category predicted based on combined lateral and vertical ground movement profiles is Category 1 ‘very slight’ damage.”

“Based on the results of the ground movement assessment, it is considered that the neighbouring terrace properties on Cressy Road positioned greater than 6m from the excavation are located outside the zone of influence from ground movements and will be subjected to negligible damage (i.e. Category 0) from the proposed basement development”.

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 | <p>A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either:</p> <ul style="list-style-type: none"> • 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 BIA scope is considered appropriate.

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 structural method statement is provided that indicates that the proposed basement's perimeter retaining walls are to be formed by extending the existing foundations under the front, rear and right hand flank wall of the existing building down to the new basement level via reinforced concrete underpins.

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, albeit as the existing properties at 21 and 23 Cressy Road appear to be founded at a high level on the London Clay, there is some possibility that these buildings are experiencing a degree of seasonal movement due to swelling and shrinkage of the upper levels of the clay.

While the ground movement assessment has addressed the movements associated with the basement excavation per se, the BIA would benefit from further discussion of potential seasonal ground movements as identified in Section 3.3.3 (paragraph Nos. 165. and 166) of the CGHSS guidance.

The establishment of new deep foundations to part of the structure of No. 21 may render this section of the buildings essentially stable, creating a potential for seasonal differential movements to occur between the new deep foundations and the remaining high level foundations to No. 21. However, it would appear that the new basement is to be terminated 2m away from the party wall with No. 19 Cressy Road. As a result of this, it may perhaps be expected that the scope for any on-going long term seasonal differential movements between old and new foundations would occur essentially within the structure of No.19 itself rather than affecting neighbouring properties.

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, albeit topographic details do not appear to have been provided indicating the relationship between the ground levels at the site and those of neighbouring properties and the course of the River Fleet.

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)

It is not clear that the new basement is to be designed as a watertight structure capable of withstanding any hydrostatic head of water. The submission describes drainage being collected beneath the new basement slab and running via gravity to the front boundary to a pumped collector sump.

It may be important, given the expected presence of perched water with the made ground and the high level nature of the existing foundations, to demonstrate that the proposed drainage measures will not lead to any potential removal of this perched water from beneath adjacent properties.

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.

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

The proposed construction methodology is considered appropriate in principle given an absence of groundwater.

4.2 Soundness of Evidence Presented

The evidence presented appears sound, albeit that the course of the River Fleet is stated to be approximately 100m to the south and west of the site. The Fleet Culvert (on Fleet Road) is estimated to be at a minimum distance of nearer 200m, and some 4m lower than the site.

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 robust.

5. Conclusions

The originally submitted BIA did not wholly reflect the processes and procedures set out in DP27 and CPG4. As a consequence it was considered that the submission did not demonstrate sufficient detail and certainty to ensure accordance with 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

Further information has now been obtained as follows:

- Additional groundwater investigation/monitoring
- Information regarding the location and form of the foundations to the host building and neighbouring properties.

A new BIA has been submitted that includes

- An assessment of potential groundwater impacts.
- A detailed assessment of the extent of the possible damage to host building and neighbouring structures to be expected during and after the works.

However, while it is evident that the new BIA has addressed most of the weaknesses within the original report, it is considered that for completeness some further discussion of three aspects of the development would be beneficial:

- The issue of potential seasonal ground movements that is referred to in Section 3.2.4 above.
- The issue of potential drainage of perched water that is referred to in Section 3.2.7 above.
- Confirmation that there are no potential cumulative effects envisaged.

It is envisaged that the BIA (Document 6) can be revised to address these three aspects and re-submitted.