Independent Assessment of Basement Impact Assessment for planning application 2013/8234/P (UPDATED)

> at 19 Bisham Gardens London N6 6DJ

for London Borough of Camden

> LBH 4220 May 2015



| Site: 19 Bisham Gardens, London, N6 6DJ | LBH4220         |
|---|-----------------|
| Client: London Borough of Camden        | Page 2<br>of 16 |

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Report approved by:

S R Lefroy-Brooks BSc MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC

Principal Engineer

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

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| Site: 19 Bisham Gardens, London, N6 6DJ | LBH4220         |
|---|-----------------|
| Client: London Borough of Camden        | Page 3<br>of 16 |

## Contents

| Co | Contents 3                                     |   |    |  |  |
|----|--|---|----|--|--|
| Fo | Foreword-Guidance Notes 5                      |   |    |  |  |
| 1. | Introduction                                   |   |    |  |  |
|    | 1.1  | Brief                                     | 6  |  |  |
|    | 1.2  | Report Structure                          | 6  |  |  |
|    | 1.3  | Information Provided                      | 6  |  |  |
| 2. | 2. Policy DP27 – Basements and Lightwells      |   |    |  |  |
| 3. | Assessment of Adequacy of Information Provided |   |    |  |  |
|    | 3.1  | Basement Impact Assessment Stages         | 9  |  |  |
|    | 3.1.1  | Stage 1: Screening                        | 9  |  |  |
|    | 3.1.1.1  | Subterranean (Groundwater) Flow           | 9  |  |  |
|    | 3.1.1.2  | Stability                                 | 9  |  |  |
|    | 3.1.1.3  | Surface Flow and Flooding                 | 9  |  |  |
|    | 3.1.2  | Stage 2: Scoping                          | 10 |  |  |
|    | 3.1.3  | Stage 3: Site Investigation and Study     | 11 |  |  |
|    | 3.1.4  | Stage 4: Impact Assessment                | 11 |  |  |
|    | 3.2  | The Audit Process                         | 12 |  |  |
|    | 3.2.1  | Qualifications / Credentials of authors   | 12 |  |  |
|    | 3.2.2  | BIA Scope                                 | 13 |  |  |
|    | 3.2.3  | Description of Works                      | 13 |  |  |
|    | 3.2.4  | Investigation of Issues                   | 13 |  |  |
|    | 3.2.5  | Mapping Detail                            | 13 |  |  |
|    | 3.2.6  | Assessment Methodology                    | 13 |  |  |
|    | 3.2.7  | Mitigation                                | 13 |  |  |
|    | 3.2.8  | Monitoring                                | 14 |  |  |
|    | 3.2.9  | Residual Impacts after Mitigation         | 14 |  |  |
| 4. | Assess   | ment of Acceptability of Residual Impacts | 15 |  |  |
|    | 4.1  | Proposed Construction Methodology         | 15 |  |  |
|    | 4.2  | Soundness of Evidence Presented           | 15 |  |  |
|    | 4.3  | Reasonableness of Assessments             | 15 |  |  |

| Site: 19 Bisham Gardens, London, N6 6DJ                        | LBH4220 |  |
|--|---------|--|
| Client: London Borough of Camden                               |         |  |
| 4.4 Robustness of Conclusions and Proposed Mitigation Measures | 15      |  |
| 5. Conclusions   | 16      |  |

Page 5 of 16

## **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.

Client: London Borough of Camden

LBH4220

Page 6 of 16

### 1. Introduction

It is proposed to deepen the existing cellar at this property and to extend it to match the footprint of the whole house, including an area of new extension and to provide a front lightwell and a rear basement area.

### 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
- 5. Specific details of any further information that is required to enable an assessment to be satisfactorily concluded.

### 1.3 Information Provided

The information studied comprises the following:

- Basement Impact Assessment by Green Structural Engineering, dated 22<sup>nd</sup> April 2015, Ref: 11994 Rev 2
- Groundwater BIA Assessment by H Fraser Consulting, dated 23<sup>rd</sup> October 2015, Ref: 30057R1 (incorporated as Appendix G in Document 1)
- 3. Surface Flow and Flooding BIA Assessment by Evans Rivers and Coastal, dated 10<sup>th</sup> December 2014, Ref: 1377/RE/01. (incorporated as Appendix H in Document 1)
- 4. Land Stability BIA Assessment by Ground and Project Consultants, dated February 2015, unreferenced. (incorporated as Appendix I in Document 1)

LBH4220

Page 7 of 16

## 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

Client: London Borough of Camden

Page 8 of 16

• 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.

### LBH4220

Page 9 of 16

## 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 2).

This has identified the following issues of potential concern:

- The site is located directly above an aquifer.
- The proposed basement development will result in a change in the proportion of hard surface/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 Stability

A screening checklist for the impact of the proposed basement on land stability is included in the BIA (Document 3).

This has identified the following issues of potential concern:

- The site is located directly above an aquifer.
- 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 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 4).

Page 10 of 16

The screening has not identified any issues of potential 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).

There is no scoping stage described in the Land Stability BIA (Document 4), but a scoping stage is correctly described in the Groundwater BIA (Document 2).

The, issues that can be reasonably identified from the submission 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 if the basement extends into the underlying aquifer it could potentially alter the groundwater flow regime.

• The proposed development will result in a change in the area of hard-surfaced/paved areas.

The guidance advises that 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. 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.

• 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 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 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.

Page 11 of 16

### 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 investigation information submitted includes the records of 2m deep hand auger borehole constructed in October 2013 and a subsequent 10m deep borehole constructed, also apparently by hand-augering, in August 2014. Additionally, the record of a hand-dug trial pit constructed in October 2013 to expose existing foundations has been provided.

### 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 submission does include a discussion of potential impacts and the following statements are made:

### • The site is located directly above an aquifer

"Groundwater levels were measured to be approximately 10m below the existing ground levels, below the extent of the proposed basement which will therefore not have significant effect on the groundwater elevations.

The possibility of perched water tables occurring on top of clay bands within the ground may give rise to some seepage. Any water ingress which does occur due to variation in the ground strata will be relatively minor and will be controlled by forming local sumps and pumping without adversely affecting adjacent properties or the stability of excavations."

• The proposed development will result in a change in the area of hard-surfaced/paved areas.

"There will be no significant change in hardstanding areas as the proposed basement occupies an area of existing hardstanding."

• 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).

"Changes to surfacing and drainage that might affect recharge to groundwater should be appropriately designed so that groundwater levels are not adversely affected. Design of drainage systems should consider the requirements of sustainable urban drainage."

"The construction of the front lightwell will has the potential to reduce rainfall recharge to groundwater. It is understood that the rear lightwell will extend below an area that is currently surfaced with impermeable materials, hence the development will not make a difference in this area. In the front garden, the affected area may be up to 9m2, or 6% of the total plot area. This is unlikely to have a significant effect on groundwater levels, however drainage design in this area should comply with the requirements of sustainable urban drainage."

"All existing drainage and sewage connections will be maintained throughout the construction works so there will be no impact on these existing systems."

Client: London Borough of Camden

Page 12 of 16

- The site is within 5m of a highway or pedestrian right of way. "The method of constructing the front retaining wall, along with the presence of the front garden area means that any services in the street should not be affected by these works."
- The proposed basement will significantly increase the differential depth of foundations relative to neighbouring properties.

"The basement is proposed to be constructed involving an excavation to 3.7m below the existing ground floor and 2.6m below street level. Basement construction is understood to have taken place next door at no.21 with, it is understood, no adverse effects on it or adjacent properties, including no.19. It is presumed that no.17 has only a small basement similar to that existing at 19 and therefore the depth of the proposed basement has some significance."

"An assessment of the damage category has been carried out for the party wall with No17 and is within category 0. Likewise an assessment of the impact on existing spine all has been undertaken and this is also category 0. The potential impact of the proposed basement will therefore be minimal provided a suitably experience (sic) constrictor (sic) is appointed and a designed temporary works methodology is developed and followed on site."

### 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

### **Qualifications required for assessments**

| Surface flow<br>and flooding          | <ul> <li>A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either:</li> <li>The "CEng" (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers ("MICE); or</li> <li>The "C.WEM" (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.</li> </ul>  |  |
|---------------------------------------|---|--|
| Subterranean<br>(groundwater)<br>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<br>A Member of the Institution of Civil Engineers ("MICE") and a Geotechnical<br>Specialist as defined by the Site Investigation Steering Group.<br>With demonstrable evidence that the assessments have been made by them in<br>conjunction with an Engineering Geologist with the "CGeol" (Chartered Geologist)<br>qualification from the Geological Society of London. |  |

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Check qualifications / credentials of author(s):

Surface flow and flooding: The report meets the author requirements.

Client: London Borough of Camden

### LBH4220

Page 13 of 16

Subterranean (groundwater) flow: The report meets the author requirements.

Land stability: The report meets the author requirements.

### 3.2.2 BIA Scope

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

The scope of issues of concern has been checked against the flowcharts and it is considered that they have been identified in section 3.1.2 above.

### 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.

### 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.

Client: London Borough of Camden

LBH4220

Page 14 of 16

### 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?

No residual impacts on ground or surface water are envisaged.

With regards to stability the following statement is made:

"From the analysis of the damage assessment due to the proposed basement being category 0 the impact of any settlement on the existing properties will be minimal and is likely to be accommodated within the elasticity of the superstructure. The extent of movement which will occur under this category is some slight distortion and hairline cracking, which can be dealt with by local redecoration."

Client: London Borough of Camden

### LBH4220

Page 15 of 16

### 4. Assessment of Acceptability of Residual Impacts

### 4.1 Proposed Construction Methodology

The proposed construction methodology appears acceptable.

### 4.2 Soundness of Evidence Presented

The evidence presented 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 robust.

Client: London Borough of Camden

Page 16 of 16

## 5. Conclusions

The originally submitted BIA did not wholly reflect the processes and procedures set out in DP27 and CPG4 and it was considered that in order to meet the requirements of DP27 further information was required as follows:

- Confirmation of the actual ground and groundwater conditions within the proposed depth of excavation.
- Further assessment of the possible effects of the works upon neighbouring structures, including the adjacent road and pavement and any services buried beneath.
- An assessment of potential cumulative effects.

The revised BIA now submitted has included additional investigation and assessments of all the identified issues of potential concern, signed off by persons with the required credentials.

It is therefore considered that the revised submission does now accord 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

As with any scheme, there may be some concern that the proposals contained within the BIA submission will be implemented in due course by the basement contractor, and consideration may therefore be given to requiring the appointment of a suitably qualified engineer to take responsibility for the design of the temporary works either as a condition of planning approval or by means of a Basement Construction Plan (BCP) secured by a Section 106 agreement.