Independent Review
of
Basement Impact Assessment for planning application 2013/8171/P (UPDATED)
at

15a Parliament Hill
London
NW3 2SY

for
London Borough of Camden

LBH 4336

June 2015

LBH WEMBLEY

Geotechnical & Environmental

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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: 2015.06.01 09:36:07 +01'00'

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

Contents

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 demolish an existing two storey residential building and construct a new three storey building with a single storey basement.

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 Review by Gyoury Self Partnership, dated 24th March 2015, Ref: 10366NA Final
2. Ground Investigation Report and Basement Impact Assessment by EPS, dated 25th March 2015, Ref: UK14.1639 FINAL (Rev B)
3. Flood Risk Assessment by Gyoury Self Partnership, dated 24th March 2015, Ref: 10366NA Final
4. Design & Access Statement by Woollacott Gilmartin Architects, undated, unreferenced
5. Arboricultural Development Report by Arbtech Consulting Limited, dated 12th December 2014, unreferenced
6. Tree Survey by Arbtech Consulting Limited, dated 24th October 2014, unreferenced
7. Structural Design Statement by Gyoury Self Partnership, dated 10th December 2014, Ref: 10366NA
8. Drawings of Existing by Woollacott Gilmartin Architects, dated 14th November 2014, Refs: X/1:50-000, X/1:50-101 to -104, X/1:200-000 and X/1:12500-000

9. Drawings of Proposed by Woollacott Gilmartin Architects, dated 14th November 2014, Refs: P/1:50-0 0-1, P/1:50-101 to -105, P/L1:50-201, to -202 -204, P/1:50-301, to -304, P/1:100-101, P/1:200-000 and P/1:500-000
10. Ground Movement Assessment by Gyoury Self Partnership, dated March 2015, Ref: 10366NA
11. Email from Gyoury Self Partnership to Woollacott Gilmartin Architects dated 6th May 2015 14:52:21, Ref:10366NA.

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 2.

This identifies the following potential issues of concern:

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**
- **The lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) is close to or lower than the mean water level in any local pond.**

3.1.1.2 Stability

A screening checklist for the impact of the proposed basement on land stability is included in Document 2.

This identifies the following potential issues of concern:

- **The existing site includes slopes, natural or manmade, greater than 7 degrees.**
- **The development neighbours land, including railway cuttings and the like, with a slope greater than 7 degrees.**
- **The site is within a wider hillside setting in which the general slope is greater than 7 degrees.**
- **London Clay is the shallowest strata at the site.**
- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
- **The site is within 100m of a watercourse of a potential spring line.**
- **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 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 Document 2.

This does not identify any potential issues of concern based upon The London Borough of Camden Flood Risk Management Strategy and CPG4 (2013)

However, a second checklist for the impact of the proposed basement on surface water flow and flooding is included in Document 1, and that identifies the following potential issue of concern based upon CPG4 (2011):

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**

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 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 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.

- **The lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) is close to or lower than the mean water level in any local pond.**
  The guidance advises that groundwater may drain from the pond or spring and flow into the basement/excavation space.

- **The existing site includes slopes, natural or manmade, greater than 7 degrees.**
  The guidance advises that there may be local slope instability within the site.

- **The development neighbours land, including railway cuttings and the like, with a slope greater than 7 degrees.**
  The guidance advises that there may be instability within the neighbouring site(s)

- **The site is within a wider hillside setting in which the general slope is greater than 7 degrees.**
  The guidance advises that there may be potential for a larger slope failure system including re-activation of a pre-existing slide.
  .
- **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).

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
  The guidance advises that the soil moisture deficit associated with felled tree will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect the slope stability. Additionally the binding effect of tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of 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 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.

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**
  The guidance advises that the developer should undertake a Flood Risk Assessment (FRA).

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 two window sample boreholes to 6m depth and two trial pits to expose the existing foundations. A groundwater monitoring visit was also undertaken

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 Document 2 includes an Impact Assessment stage and potential impacts are also discussed in Document 1. The following statements are made

- **The site is within 100m of a watercourse, well (used/disused) or potential spring line.**
  "*The course of the former Fleet River is indicated by mapping to run to the west of the site. However, the borehole formed closest to the western boundary has shown undisturbed London Clay to at least 6m. Additionally, ground levels fall to the south west from approximately 76m AOD at the site to a low point of roughly 69m AOD, 150m to the west, which is where it is considered the line of the former river would have most likely been. Therefore, this former feature is not considered likely to affect the proposed development.*"

- **The lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) is close to or lower than the mean water level in any local pond.**
  "*Groundwater has been recorded at depth in the soils beneath the site. This is likely to represent perched water.*"

  "*…this is only a relatively small structure and will be constructed with drainage around the perimeter of the structure to deal with the presence of perched water.2*

  "*Whilst some small silty partings have been recorded in the London Clay, these are not continuous and will not be in hydraulic continuity with Pond 1. Therefore the Pond is unlikely to be affected by the proposed development.*"

- **The existing site includes slopes, natural or manmade, greater than 7 degrees.**
- **The development neighbours land, including railway cuttings and the like, with a slope greater than 7 degrees.**
- **The site is within a wider hillside setting in which the general slope is greater than 7 degrees**
  "*The site is effectively split into two sections, namely the front area, occupied by the existing dwelling, and the rear garden to the rear of No 15. The proposed basement and dwelling will occupy the front section, which is predominantly flat. The proposed development does not extend to the sloping rear gardens and typically the proposals will not alter the site topography. No further investigation or slope stability calculations are proposed given that the current topography will remain unaltered by the proposals."*

- **London Clay is the shallowest strata at the site.**
  "*London Clay is a well known material and ground movement associated with heave over both the short term and long term is expected to be less that 25mm in total. .*"

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**
  "*The new basement will not suffer from seasonal shrink-swell subsidence, as its proposed depth will be below the level of any tree root activity.*"

"*…excavation for the basement is within the tree protection zone for the two trees to the front of the existing property/proposed basement. However, subsequent trenching on the line of the proposed light well has revealed limited root activity. This indicates that the basement excavation will have a low impact on the trees.*"

- **The site is within 5m of a highway or pedestrian right of way.**
  "*The contiguous bored pile wall shall be designed to support highway surcharge loading where located within the influence of the public highway.*"

- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**
  "*The depth of adjoining basements will need to be confirmed. However the trial pits indicate that the adjoining properties will surcharge the rear of the proposed basement wall. The piled wall works shall be designed for the surcharge for both temporary construction stage and permanent loading.*"

  "*Limiting long-term lateral deflections to 10mm will limit the risk to adjoining properties to within a 'Slight' or better category of damage (Burland Category), which is considered acceptable.*"

- **The site is over (or within the exclusion zone of) tunnels, e.g. railway lines.**
  "*A 2450mm storm relief tunnel is indicated on the Thames Sewer Asset Records. The manhole data provided in Nassington Road indicates the tunnel is approximately 36m below ground level. The indicative line of the tunnel could suggest that it passes through the rear garden section behind No.15 and away from the immediate area of the proposed basement. The proposed contiguous bored piles will stop significantly short of the tunnel and consequently will not adversely affect the tunnel.*"

- **The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.**
  "A Flood Risk Assessment has been undertaken by the Gyoury Self Partnership. This demonstrates that the site is not at risk from surface water flooding and will not affect the adjoining area."

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 submission meets the requirements.

Subterranean (groundwater) flow: The submission meets the requirements.

Land stability: The submission meets the requirements.

3.2.2 BIA Scope

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

The scoping is considered satisfactory.

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?

An outline method statement was originally provided in Document 7, but did not include detail of the temporary works required.

Document 11 now includes the following description:

- "*Demolish existing 2 storey structure.*
- *Install contiguous bored pile wall around perimeter of proposed basement.*

- *Install temporary propping or permanent works at or about ground level to provide 'High support stiffness' in accordance with Ciria C580.*
- *Once and only once high level propping is in place commence excavation to formation level.*
- *Install basement slab.*
- *Install permanent propping and structure.*
- *Once concrete design strengths have been achieved remove temporary works.*
- *Complete structure above ground."*

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. Document 11 now states

"It is proposed that adjacent structures within the influence of the work will be monitored prior to and throughout the works. Whilst the works and monitoring etc will be subject to final agreement of Party Wall Awards it is proposed that Total Station monitoring (with targets placed on the adjoining buildings) will be put in place.

Readings should be taken prior to any works commencing on site, prior to piling, once every day during piling, on completion of piling, twice daily during excavation works and installation of permanent works for the basement structure, including ground floor slab and twice daily during removal of any temporary works.

The temporary works and permanent work design engineer will be responsible for reviewing the monitoring data in 'real time'. Where any movements over and above those predicted are recorded works shall stop immediately and additional propping, temporary works or backfill shall be instructed by the design engineer as necessary, to stabilise the situation and allow a full review and remedial proposal to be put in place."

3.2.9 Residual Impacts after Mitigation

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

Yes. A ground movement analysis and damage category assessment was not included in the original submission. Document 11 now refers to a ground movement assessment (Document 10) stating "*A maximum 10mm deflection in the piles has been taken to achieve a 'Slight' category of damage (Burland Category).*"

4. Assessment of Acceptability of Residual Impacts

4.1 Proposed Construction Methodology

The proposed construction methodology has not been developed sufficiently to bear assessment of acceptability.

4.2 Soundness of Evidence Presented

The evidence presented appears to be sound.

4.3 Reasonableness of Assessments

The assessments appear to be reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

The conclusions and proposed mitigation measures appear to be sufficient to meet the requirements of DP27.

5. Conclusions

The original BIA submission did not wholly reflect the processes and procedures set out in DP27 and CPG4.

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

- A specific ground movement and damage category assessment.
- A detailed monitoring and contingency plan.
- A definitive temporary works design and sequence.

A ground movement and damage category assessment has now been submitted (see 3.2.9 above).

A statement regarding monitoring and contingency has now been submitted (see 3.2.8 above).

A statement regarding the temporary works design and sequence has now been submitted (see 3.2.3 above).

It is considered that the submission now accords sufficiently 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