CampbellReith
consulting engineers

36 Redington Road, London, NW3 7RT

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-41
Revision: D1

September 2015

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	23/09/2015	Comment	EMBjw12066-41-230915-D1	E M Brown	E M Brown	S D Ash

Document Details

Last saved	23/09/2015 17:06
Path	EMBjw12066-41-230915-D1.doc
Author	E M Brown, BSc MSc CGeol FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12066-41
Project Name	36 Redington Road
Planning Reference	2015/3004/P

Contents

Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 36 Redington Road, London, NW3 7RT (planning reference 2015/3004/P). The basement is considered to fall within Category C as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. It has not been possible to confirm that the BIA and SER have been prepared by individuals who possess suitable qualifications and experience.

1.5. The BIA has confirmed that the proposed basement will be founded within the Claygate Beds a short distance above the London Clay. The structure is to be supported on piled foundations with compressible material beneath the slab to accommodate heave.

1.6. The proposed basement will not undermine the adjacent property, No 38 Redington Road, as it has a two storey basement. It is reported that No 38 is structurally independent of No 36 and founded on piles in which case it will not be affected by the construction of the adjacent basement. However, no evidence of this has been seen by CampbellReith.

1.7. Information is required to confirm that the structure of No 38 is able to accommodate the temporary loads from the RC wall until it cures, or a methodology provided to limit any such loads. Details of the separation between the two properties are required.

1.8. It is likely that the groundwater table will be encountered during basement construction and details of proposed measures to avoid the loss of fine soils into the excavation are required.

1.9. The SER proposes a cantilever retaining wall whilst the ground movement and building damage assessment assumes a stiffly propped wall. The ground movement assessment should be revised to reflect the proposed construction methodology and any impact on the highway considered.

1.10. It is accepted that there will be no significant adverse impact on the hydrogeology. Whilst it has been suggested that a former tributary of the River Westbourne crosses the site, reference to the source data indicates that it ran beneath Redington Gardens.

1.11. It is accepted that in general the surrounding slopes are less than 7^{o} and that there will be no significant adverse impacts from or to the construction of the basement.

1.12. None of the documents seen addresses two potential impacts that were identified by the BIA, namely risk of flooding and the likely increase in surface water flows to the sewer network.

1.13. Proposals for condition surveys and monitoring of potentially affected properties should be provided.

1.14. It is noted that CampbellReith has not seen the Report on Surface and Groundwater referred to in an objection raised by a neighbour.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11/08/2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 36 Redington Road, London, NW3 7RT.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

2.4. The BIA should demonstrate 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; and,

c) avoid cumulative impacts upon structural stability or the water environment in the local area.

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"Erection of 3-storey plus basement 5-bed dwelling including car lift, front and rear lightwell and associated landscaping following demolition of existing dwelling."*

The Audit Instruction confirmed that the property is not listed, nor does it neighbour listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 11/09/2015 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) – Stages 1 & 2
- Basement Impact Assessment Report (BIA) – Stages 3 & 4
- Structural Engineering Report/Method Statement (SER)
- Construction Method Statement (CMS)
- Planning Application Drawings consisting of
- Location Plan
- Existing Plans
- Proposed Plans and Sections
- Planning Consultation Responses

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	Chartered Geologist identified in preparation of BIA, but no evidence of Chartered Engineer. SER prepared by Chartered Structural Engineer – no evidence of experience in engineering geology provided.
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA Stages 3 & 4
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Stages 1 & 2
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Stages 1 & 2
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Stages 1 & 2
Is a conceptual model presented?	Yes	BIA Stages 3 & 4

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to BIA audit section 4.7
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to BIA audit section 4.7
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Assessment required of increased flows off site required and potential surface water flooding.
Is factual ground investigation data provided?	Yes	BIA Stages 3 & 4
Is monitoring data presented?	Yes	BIA Stages 3 & 4
Is the ground investigation informed by a desk study?	Yes	BIA Stages 1 & 2
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	Limited generic interpretation
Are reports on other investigations required by screening and scoping presented?	No	There is the potential need for a Flood Risk assessment and confirmation of the capacity of the sewer network to receive increased flows.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	Ground movement and structural impact estimates assume different construction methodology to SER
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Surface water flows, surface water flooding not addressed.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Building damage assessment based on different methodology to that identified in SER, so it is not possible to confirm likely category of damage.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by a well-known firm of geotechnical consultants, ST Consult. The authors include a Chartered Geologist, however, there is no evidence of a Chartered Engineer having been involved in the preparation of the report.

4.2. The Structural Engineering Report (SER) has been prepared by Zussman Bear. The author is a Chartered Structural Engineer. No proof of expertise in engineering geology has been provided as required by CPG4.

4.3. The LBC Instruction to proceed with the audit identified that neither the property, not any surrounding properties, was a listed building. It is understood that No 36 Redington Road is part of a former semi-detached property and that its neighbour, No 38 Redington Road, was recently redeveloped. It is further understood that No 38 is structurally independent of No 36, that it has a two storey basement, and has piled foundations and basement retaining walls. Whilst it was possible to verify the basement depth by reference to LBC's website, it was not possible to confirm the nature of the foundations and retaining walls. The next closest property is 7 Redington Gardens which is approximately 5m from the site and is understood not to have a basement.

4.4. The proposed basement consists of a single storey construction, approximately 3.50m deep, with three sides formed by a contiguous piled retaining wall. The fourth side, adjacent to No 38, is to comprise a reinforced concrete wall supported on a piled slab. The structural loads from the superstructure will be supported on a piled slab with a compressible medium beneath to accommodate heave. Details should be provided of how the transfer of load from the RC wall on to No 38 Redington Gardens until the concrete has cured will be avoided, or confirmation that the structure of No 38 is capable of accommodating those loads. Additionally of the proposed separator/slip membrane between the two properties should be provided.

4.5. The BIA has identified that the sequence of strata at the site comprises Made Ground to approximately 0.70m depth, underlain by the Claygate Beds to approximately 4.50m depth, in turn underlain by the London Clay. Standing groundwater levels were recorded at approximately 1m below ground level.

4.6. The BIA (Stages 1 & 2) identified five areas that required further investigation, namely:

- The presence of a secondary aquifer beneath the site and the possibility that the proposed and neighbouring basements could have a damming effect.
- The potential for ground movements to affect 38 Redington Road and 7 Redington Gardens.

- The potential for ground movements in relation to the highway.
- The potential for an increase in surface water flows off site.
- The potential for surface water flooding from the neighbouring highway.

4.7. Concerns raised by neighbours have included questions on the screening exercise with respect to slopes in the surrounding area and the course of a tributary of the former River Westbourne and refer to a Report on Surface and Groundwater which has not been seen by CampbellReith. Reference to the figures in the Over Arup Guidance on Subterranean Development and other relevant sources of information support STC's conclusion that whilst two former tributaries of the Westbourne lie close to the site, neither is shown to cross the site. Similarly, although there are small localised areas where slope angles exceed 7^{o}, it is accepted that slopes in the main are less than 7^{o}.

4.8. The presence of the aquifer and shallow groundwater table are considered in Stages 3 and 4 of the BIA and modelling has been carried out to determine the possible damming effect of the basements at 36 and 38 Redington Road. It is accepted that due to the low hydraulic gradient and the low permeability of the Claygate Beds, the change to groundwater levels will be negligible.

4.9. Stages 3 and 4 of the BIA also consider likely ground movements at 7 Redington Gardens arising from the construction of the basement. The approach and conclusions (Burland Category 0 damage) are accepted, however, the assumed construction methodology comprises a stiff retaining wall with stiff high level props. The SER refers to the retaining wall being designed as a cantilever and this will result in greater ground movements. The likely category of damage to No 7 Redington Gardens cannot therefore be confirmed.

4.10. The BIA does not consider No 38 Redington Road, or the adjacent highway. The SER reports that No 38 is structurally independent of No 36 and indicates that it is supported on piled foundations. The SER states that a condition survey will be undertaken. In light of the deep basement to No 38, if it can be confirmed that No 38 does not rely on No 36 for stability and it is on piled foundations, it is accepted that it is unlikely to be adversely affected by the construction of a basement to No 36. No monitoring of either 38 Redington Road or 7 Redington Gardens is proposed and it is recommended that this is undertaken together with a condition survey of the Redington Gardens property.

4.11. The SER states that the works will have no effect on any roadway. However, as cantilever walls can be prone to significant movement, it is recommended that this is demonstrated by means of a ground movement assessment.

4.12. The SER the basement being formed insider a contiguous retaining wall whilst the BIA warns that, due to the high water table, this method carries the risk of the migration of sandy

materials into the excavation. Should this happen, there is the risk of significant settlement outside the excavation. The BIA recommends mitigation measures such as sprayed concrete should a contiguous piled wall be adopted.

4.13. None of the documents seen by CampbellReith address the potential risk of flooding or the likely increase in surface water flows to the sewer network.

4.14. The CMS prepared by Archtype Ltd deals mainly with minimising the impact of construction in terms of nuisance. It is noted that it is prepared for Abbey Properties Ltd whilst the BIA was prepared for Mill Hill Properties Ltd. It is also noted that the CMS incorrectly refers to the site being located on Stuart Avenue. Archtype's drawings, together with the SER, incorrectly give the postcode as N4 2ED.

4.15. As noted above, queries on the BIA and the development have been raised by two neighbours and these are detailed and addressed in Appendix 1.

5.0 CONCLUSIONS

5.1. It has not been possible to confirm that the BIA and SER have been prepared by individuals who possess suitable qualifications and experience.

5.2. The BIA has confirmed that the proposed basement will be founded within the Claygate Beds a short distance above the London Clay. The structure is to be supported on piled foundations with compressible material beneath the slab to accommodate heave.

5.3. The proposed basement will not undermine the adjacent property, No 38 Redington Road, as it has a two storey basement. It is reported that No 38 is structurally independent of No 36 and founded on piles in which case it will not be affected by the construction of the adjacent basement. However, no evidence of this has been seen by CampbellReith.

5.4. Information is required to confirm that the structure of No 38 is able to accommodate the temporary loads from the RC wall until it cures, or a methodology provided to limit any such loads. Details of the separation between the two properties are required.

5.5. It is likely that the groundwater table will be encountered during basement construction and details of proposed measures to avoid the loss of fine soils into the excavation are required.

5.6. The SER proposes a cantilever retaining wall whilst the ground movement and building damage assessment assumes a stiffly propped wall. The ground movement assessment should be revised to reflect the proposed construction methodology and any impact on the highway considered.

5.7. It is accepted that there will be no significant adverse impact on the hydrogeology. Whilst it has been suggested that a former tributary of the River Westbourne crosses the site, reference to the source data indicates that it ran beneath Redington Gardens.

5.8. It is accepted that in general the surrounding slopes are less than 7^{o} and that there will be no significant adverse impacts from or to the construction of the basement.

5.9. None of the documents seen addresses two potential impacts that were identified by the BIA, namely risk of flooding and the likely increase in surface water flows to the sewer network.

5.10. Proposals for condition surveys and monitoring of potentially affected properties should be provided.

5.11. It is noted that CampbellReith has not seen the Report on Surface and Groundwater referred to in an objection raised by a neighbour.

Appendix 1: Resident's Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Heath & Hampstead Society	PO Box 38214, London NW3 1XD	18/07/2015	BIA not complete. Anticipated ground movements could damage neighbouring structure	See sections 4.13 and 4.9
Beckman	7 Redington Gardens, London NW3 7RU	03/08/2015	Slope stability and hydrogeology incorrectly assessed. Risk of flooding not addressed. (Note Report on Surface and Groundwater not seen)	See sections 4.7 and 4.13

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Qualifications	No evidence of involvement of chartered engineer with experience in engineering geology.	Open	
2	Stability	Structural form of No 38 Redington Road, including foundations, to be confirmed.	Open	
3	Stability	Ground movement assessment for 7 Redington Gardens to be revised for proposed construction methodology. Need to GMAs for 38 Redington gardens and highway to be reviewed.	Open	
4	Stability	Construction methodology for RC wall adjacent to No 38 Redington Road required.	Open	
5	Stability	Confirmation of movement monitoring proposals and condition surveys for potentially affected structures required.	Open	
6	Stability	Confirmation of measures to prevent soil and water ingress into excavation.	Open	
7	Surface water	Risk of flooding identified in BIA – not addressed	Open	
8	Surface water	Potential for increased surface water flows off site – not addressed.	Open	

Appendix 3: Supplementary Supporting Documents

None