CampbellReith
consulting engineers

36 Flask Walk
London NW3 1HE

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-42
Rev: 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	Sept 2015	Comment	AJMjw12066-42-100915-D1.doc	A Marlow	A Marlow	E Brown

Document Details

Last saved	18/09/2015 11:42
Path	AJMjw12066-42-100915-D1.doc
Author	A J Marlow, BSc CEng MIStructE FConsE
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12066-42
Project Name	36 Flask Walk, London NW3 1HE
Planning Reference	2015/3753/P

Contents

Appendices

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 Flask Walk (planning reference 2015/3753/P). The basement is considered to fall with Category B 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 review it against an agreed audit check list.

1.4. The BIA has been prepared by personnel who have suitable qualifications.

1.5. The proposed single storey basement is to be constructed using traditional underpinning techniques, other than at the front of the property, where reinforced concrete training walls will form a lightwell and cloakroom.

1.6. It is accepted that the site is not in an area known to be at risk from flooding. It is also accepted that the development will not affect the hydrogeology of the surrounding area and that there is un likely to be a net increase in surface water discharge to the mains drainage system.

1.7. The BIA is in contradiction with construction proposals contained in the CMS. The CMS should be reassessed and additional/revised information provided for the following issues:

- Confirmation of an adequate bearing stratum at foundations level.
- Construction methodology to produce watertight construction.
- Management of potential water ingress during construction works.
- Improved ground movement monitoring proposals.
- Improved information regarding the introduction of temporary permanent support of the existing front wall.

1.8. The BIA makes reference to possible historic slope instability and this should be clarified.

1.9. Provision of requested information should allow the concerns within the Flask Walk Neighbourhood Association's Report to be addressed provided the CMS also produces additional

information to verify that the stability of the front wall to No. 36 and its party wall with No. 38 will be maintained.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11 August 2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 36 Flask Walk, Camden Reference 2015/3753/P.

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 the *"Creation of a new basement and alterations to the ground floor rear elevation fenestrations."*

and confirmed that the basement proposal did not involve a listed building, although the BIA states that the property lies within the Hampstead Conservation Area.

2.6. CampbellReith accessed LBC's Planning Portal on 24 August 2015 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA)

- Subterranean Construction Method Statement, and Structural Report (CMS)
- Construction Management Plan (CMP)
- Geo-environmental Interpretative Report (GIR)
- Architects Drawings EX-01 rev 02, EX-02 rev 03, EX-03 rev 03, EX-04 rev 03, EX-05 rev 03, LP-01 rev 02, PA-01 rev 03, PA-02 rev 03, PO-03 rev 03, PA-04 rev 04, PA-05 rev 04.

2.7. LBC's Planning Department forwarded on 02 September a "Geotechnical and Structural Assessment" produced by Eldred Geotechnics on behalf of the Flask Walk Neighbourhood Association dated 27 August 2015 and requested that its findings be considered within this audit.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	BIA and introduction and CMS Section 13.
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	Sections 2 and 3.
Are suitable plan/maps included?	Yes	Sections 2 to 6.
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 Section 7.3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 7.2.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 7.4.
Is a conceptual model presented?	Yes	BIA Section 10.1.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 8.3.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 8.2.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 8.4.
Is factual ground investigation data provided?	Yes	BIA Section 9.
Is monitoring data presented?	Yes	Standpipes monitored twice, see BIA Section 9.7.
Is the ground investigation informed by a desk study?	Yes	BIA Introduction and Appendices B, E, F & G.
Has a site walkover been undertaken?	Yes	BIA Introduction and Appendix A.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA Section 2 and Architects drawings.
Is a geotechnical interpretation presented?	Yes	BIA Section 10.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Section 10.4 and CMS Appendix G.
Are reports on other investigations required by screening and scoping presented?	N/A	
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	BIA Section 10.
Are estimates of ground movement and structural impact presented?	Yes	BMA Sections 10.5 and 10.6.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	BIA Section 10.9.
Has the need for monitoring during construction been considered?	Yes	BIA Section 10.7
Have the residual (after mitigation) impacts been clearly identified?	Yes	BIA Section 10.9.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties maintained?	Yes	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The BIA and CMS have been carried out by established firms of consultants and the lead authors and reviewers have suitable qualifications.

4.2. The proposed single storey basement is to be constructed below the footprint of the existing ground floor and extended forwards to the back of the existing footpath by removing existing planters on either side of the access steps and creating a lightwell and cloackroom in their place.

4.3. The property is part of a terrace of adjoined houses and the BIA has established that No. 38 has no basement but on the party wall with No. 34, there is a ramp from ground level down to a basement car park which wraps around the rear of No. 36.

4.4. The CMS identified that two trial pits have been excavated to establish the form of foundations to the party walls surrounding No. 36. These identified traditional corbelled brick foundations at a level of between 101.16 to 101.40, set approximately 0.8 metres below the floor of the communal parking area.

4.5. The existing ground floor to No. 36 has a void below the floor of approximately 0.8 metres depth resulting in an excavation of approximately 2.3 metres to form the basement. The sections contained within the CMS and the Architects drawings show only a nominal depth of underpinning being required, although the depth is not stated, other than for the construction of the front lightwell and cloakroom, where the depth of construction will be in excess of 3.0 metres.

4.6. The BIA indicates that the basement will be founded within Re-worked Ground, which has soil characteristics similar to the Claygate Member. The BIA contained a comment that "the initial underpin excavation beneath each of the walls should be inspected by suitably experienced and competent ground engineering professional…" and it is agreed that this would be a sensible precaution during construction works. Although the BIA states that "the adequacy of the available bearing capacity in the Re-worked Ground must be checked when the first underpins are inspected", the CMS states "a safe bearing pressure of 160kN/m^2 was reported to be applicable at the underside of the new foundations".

4.7. The BIA and CMS both state that the basement will be formed using traditional "hit and miss" underpinning techniques together with temporary works support during excavation and construction of the basement underpins.

4.8. There is an apparent contradiction between the BIA and CMS in that the BIA states the underpins will be mass concrete, together with reinforced concrete inner lining walls, whilst the CMS states that underpins will be reinforced concrete, does not mention an inner reinforced

concrete lining wall, yet states "all reinforced concrete works will be specified as water tight concrete construction but in addition there will be a drained cavity to achieve a grade 3 level of protection against water ingress". It is difficult to accept that the construction methodology in the CMS will result in watertight construction and the CMS proposals should be reassessed.

4.9. The BIA indicates that "it is likely that groundwater control will be required during the basement construction works…manageable" by sump pumping, although the use of well pointing techniques might be required. The CMS states. "We expect the excavation to remain dry during construction". The CMS proposals should be reassessed.

4.10. The BIA contains an assessment of heave/settlement and horizontal movements anticipated to affect the adjoining properties and the adjacent highway. As noted in paragraph 4.6, it is not usual to place foundations in 'Reworked Ground' due to its uncertain settlement characteristics. As the extent of the underpinning is relatively limited and foundation loads will already be imparted to the reworked ground by the existing foundations, it is considered that provided the risk of slope instability is ruled out, the soils may have adequate bearing and settlement characteristics. However, this should be confirmed by inspection and further investigations prior to construction. It is accepted that ground movements due to underpinning and excavation will be small and that, provided the bearing capacity is adequate and surrounding structures are in a sound condition, building damage should not exceed Burland Category 2.

4.11. The BIA contains a detailed procedure for the monitoring of ground movements during construction which will enable comparison of actual and predicted movements in order to minimise potential damage. The CMS reduced this procedure to "reflective targets fixed to the front elevations of No. 34 and No. 38" which is unacceptable. The CMS proposals should be reassessed.

4.12. The BIA states that the surrounding slopes to the development are stable however, further clarification of the statement made in BIA paragraph is required as noted above.

4.13. It is accepted that the development site is not in an area known to be at risk from surface water flooding, although precautionary measures around the lighwell, mentioned in the BIA, should be incorporated in the final design.

4.14. Measures identified in the BIA to prevent roof water and foul water entering the basement at times of peak rainfall should be incorporated into the final design.

4.15. It is accepted that the BIA has shown that the hydrogeology of the surrounding area will not be affected by the basement development.

4.16. It is accepted that the basement development will not result in any increase in surface water discharge to the mains drainage system provided the area of the existing front planter matches its replacement front lightwell.

4.17. The CMS provides, in its Appendix A, an Indicative Construction Sequence which identifies a methodology to install temporary works piles and pilecaps to transfer the load of the front wall to No. 36 onto these piles, thus allowing the foundations to the front wall to be subsequently removed. After underpinning has been completed, a steel box frame is to be installed as permanent works to support the front façade and the temporary works piles and pilecaps will be removed. Although calculations are provided for the box frame members, the box frame is not shown on any engineering or architectural drawings nor is there any drawn information to show the special relationship between the temporary piled and pilecaps and the permanent box frame members. The CMS proposals should be reassessed and additional information provided.

4.18. The Flask Walk Neighbourhood Association has commissioned a report to determine whether the application provided sufficient information to satisfy the engineering aspects of LBC's DP27. This report, produced by Eldred Geotechnics, has concluded that the application fails in all respects to comply with DP27. It can be seen from our audit above that several aspects of the CMS proposal should be reassessed and additional information provided. If this is carried out, it is likely that Eldred Geotechnics concerns with the application will be reduced or removed. Apart from the basement developed proposals, Eldred also comment upon the potential lack of overall stability to the superstructure of No. 36 generated by the introduction of a reconfigured staircase opening at ground and first floors. In reality, the reconfiguration appears to increase the length of unrestrained flank party wall with No. 38 from approximately 3.0 metres to approximately 4.0 metres.

4.19. Whilst carrying out the other amendments to their CMS proposals, it is suggested that Trigram investigate the existing structural arrangement at ground and first floors and develop proposals to maintain horizontal stability to the party wall over the increased length of stair opening and ensure that each floor is capable of acting as a diaphragm to transfer horizontal wind loadings.

5.0 CONCLUSIONS

5.1. The BIA had been prepared by personnel who have suitable qualifications.

5.2. The proposed single storey basement is to be constructed using traditional underpinning techniques, other than at the front of the property, where reinforced concrete retaining walls will form a lightwell and cloakroom.

5.3. It is accepted that the site is not in an area known to be at risk from flooding. It is also accepted that the development will not affect the hydrogeology of the surrounding area and that there is unlikely to be a net increase in surface water discharge to the mains drainage system.

5.4. The BIA is in contradiction with the construction proposals contained in the CMS. The CMS should be reassessed and additional/revised information provided for the following issues:

- Acceptable settlement characteristics of the soils at foundation level.
- Construction methodology to produce watertight construction.
- Management of potential water ingress during construction works.
- Improved ground movement monitoring proposals.
- Improved information regarding the introduction of temporary permanent support of the existing front wall.

5.5. The Geo-environmental Interpretative Report and BIA indicate the presence of 'Reworked Ground' to below the depth of the proposed underpinning. It is suggested that it could have been placed in response to a slope failure. This requires clarification and confirmation that there is not a relic slip surface beneath the property which could be reactivated.

5.6. It is accepted that ground movement associated with the underpinning and excavation are likely to be small. Provided that the risk of slope instability is ruled out and the bearing soils are confirmed to have adequate settlement characteristics, it is agreed that any damage to surrounding properties in sound condition should not exceed Burland Category 2.

5.7. Provision of the requested information should allow the concerns within the Flask Walk Neighbourhood Association's Report to be remedied provided that CMS also produces additional information to verify that the stability of the front wall to No. 36 and its party wall with No. 38 will be maintained.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Eldred Geotechnics Report	Flask Walk Neighbourhood Association	27.08.15	Compliance with LBC's DP27	See 4.5 to 4.18

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Identify acceptable bearing and settlement characteristics	Open	
2	Stability	Contradiction with BIA with respect to ground movement monitoring	Open	
3	Stability	Temporary and Permanent Support Proposals to existing front wall require additional information	Open	
4	Stability	Additional investigation and further information to inform lateral stability	Open	
5	Stability	Clarification with respect to potential historic slope movement	Open	
6	Subterranean Flows	Contradiction with BIA with respect to water tight construction and water ingress	Open	

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

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

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com