

27A Parkway

London

NW1 7PN

Basement Impact Assessment  
Audit

For

London Borough of Camden

Project Number: 12336-27  
Revision: D1

Date: March 2016

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](mailto:london@campbellreith.com)  
W: [www.campbellreith.com](http://www.campbellreith.com)

**Document History and Status**

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	29/03/2016	Comment	RMam-12336-27-290316-35 27A Parkway - D1.doc	R Morley	A Marlow	A Marlow

This document has been prepared in accordance with the scope of Campbell Reith Hill LLP’s (CampbellReith) appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of CampbellReith’s client. CampbellReith accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of Campbell Reith Hill LLP. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Campbell Reith Hill LLP 2015

**Document Details**

Last saved	29/03/2016 11:17
Path	RMam-12336-27-290316-35 27A Parkway -D1.doc
Author	Robert Morley MEng
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12336-27
Project Name	27A Parkway, London NW1 7PN
Planning Reference	2015/2976/P

**Contents**

1.0 Non-technical summary ..... 1  
2.0 Introduction ..... 3  
3.0 Basement Impact Assessment Audit Check List ..... 5  
4.0 Discussion ..... 8  
5.0 Conclusions ..... 12

**Appendix**

- Appendix 1: Residents’ Consultation Comments
- Appendix 2: Audit Query Tracker
- Appendix 3: Supplementary Supporting Documents

## 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 27A Parkway, London NW1 7PN (planning reference 2015/2976/P). The basement is considered to fall within 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 reviewed it against an agreed audit check list.
- 1.4. A structural engineering report and subterranean construction method statement has been produced by a well-known firm of consulting engineers, along with a Basement Impact Assessment (BIA) having been produced by a different well known firm of engineers. However the accreditation of those responsible for the production of these reports has not been provided. These have been requested.
- 1.5. The BIA has confirmed that the proposed basement will be founded within The London Clay.
- 1.6. It has been concluded that ground water is not likely to be encountered and the wider hydrogeology of the area is not likely to be significantly affected.
- 1.7. The proposal uses industry standard techniques to form the basement level using a combination of underpinning, reinforced concrete retaining walls, and piling. An appropriate construction method statement has been provided.
- 1.8. A discrepancy is present in the documentation regarding the type of underpinning, and how this underpinning is to be designed. Clarification of this is required.
- 1.9. A ground movement assessment has been produced which predicts a low potential for damage to the surrounding buildings. However some of the values used in the ground movement calculations are considered inappropriate and it is requested that this be amended and resubmitted along with a damage assessment for the immediately adjacent highway (Arlington Road).
- 1.10. A movement monitoring strategy has been produced. This is accepted however further development will be required.
- 1.11. It is accepted that the surrounding slopes to the development site are stable.

- 1.12. It is accepted that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.
- 1.13. A number of requests for further information have been included in Appendix 2. These can likely be addressed by the submission of further information via email, rather than the resubmission of the BIA document.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11/02/2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 27A Parkway, London NW1 7PN, planning reference 2015/2976/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 *"Installation of two storey glazed enclosure around existing Routemaster bus, plus formation of additional office floor space within new basement excavation, and associated plant room at basement level."*

The Audit Instruction also confirmed 27A Parkway is within the vicinity of listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 23/03/2016 and gained access to the following relevant documents for audit purposes:

- BIA Screening Report, Elliott Wood, March 2015
- Basement Impact Assessment (BIA), Site Analytical Services, January 2016
- Structural Engineering Report and Construction Method Statement, Elliott Wood, January 2016
- Planning Application Drawings by EMRYS dated May 2015 consisting of,
  - Existing Plans
  - Proposed Plans
  - Proposed Sections
  - Proposed Elevations
  - OS Map
- Planning Comments and Response

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Unclear	The authors of neither the BIA nor structural report have been provided.
Is data required by Cl.233 of the GSD presented?	No	No program has been provided.
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, structural method statement, and proposed structural drawings.
Are suitable plan/maps included?	Yes	Architectural and Engineering Plans, maps embedded in BIA.
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	Data sources have generally been referenced. An appropriate statement has been provided for each no answers.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Data sources have generally been referenced. An appropriate statement has been provided for each no answers.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Data sources have generally been referenced. An appropriate statement has been provided for each no answers.
Is a conceptual model presented?	Yes	BIA Section 5.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	A scoping statement has been provided for each item identified by screening.



Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	A scoping statement has been provided for the single item identified by screening.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No hydrology items were identified by the screening exercise.
Is factual ground investigation data provided?	Yes	'Factual Report on Ground Investigations' appended to the BIA.
Is monitoring data presented?	Yes	Section 3.3 in Factual Report on Ground Investigations.
Is the ground investigation informed by a desk study?	Yes	BIA.
Has a site walkover been undertaken?	Unclear	No explicit reference of a walkover is provided. However from the content of the BIA is it clear that the author has a good understanding of the site.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Two adjacent basements are confirmed.
Is a geotechnical interpretation presented?	Yes	Section 6 in the BIA
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	While not flagged as required by the screening and scoping, a ground movement assessment has been produced.
Are the 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	Section 7 in the BIA.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Ground movement assessment report appended to BIA. However the method of calculation has been questioned and the ground movement assessment is to be resubmitted.
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	Movement monitoring during the works and continued ground water level monitoring have been proposed.
Has the need for monitoring during construction been considered?	Yes	Section 8 of the structural method statement report
Have the residual (after mitigation) impacts been clearly identified?	No	No
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Ground movement assessment and structural method statement. However the ground movement assessment is to be resubmitted.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Discharge into the sewer system is not changing.
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	The ground movement assessment indicates that damage will be no worse than Burland Category 2. However the method of calculation has been questioned and the ground movement assessment is to be resubmitted.
Are non-technical summaries provided?	Yes	Non-technical summaries are provided for each chapter of the BIA.

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by a well-known firm of site investigation and geotechnical engineering consultants, Site Analytical Services Ltd. The accreditation of those responsible for the production of the report has not been provided to indicate that suitable accreditation are held as described in CPG4. This should be provided.
- 4.2. The Structural Engineering Report and Subterranean Construction Method Statement has been carried out by a well-known firm of engineering consultants, Elliott Wood LLP. The accreditation of those responsible for the production of the report has not been provided to indicate that suitable accreditation are held as described in CPG4. This should be provided.
- 4.3. A report titled 'Basement Impact Assessment Stage 1 : Screening Report' prepared by Elliott Wood in March 2015 provides an initial screening exercise that appears to have been used as an initial advisory report. A formal screening exercise has been carried out in accordance with the CPG4 document, however some of the screening outcomes differ from that in the main BIA document produced by Site Analytical Services. It has therefore been considered that the information provided in this report has been superseded by the BIA document.
- 4.4. The LBC Instruction to proceed with the audit identified that the basement proposal is located within the vicinity of, but is not itself and is not adjoining, listed buildings.
- 4.5. The existing site is largely undeveloped, with the exclusion of a small lightweight single storey steel framed entrance lobby, and single storey masonry toilet and kitchenette. The remainder of the site contains a double decker London bus on hardstanding.
- 4.6. The proposal involves the demolition of the single storey structure, and the formation of a single storey basement level, with two storey steel framed glazed enclosure from ground level upwards. The glazed enclosure is to house the existing double decker bus.
- 4.7. The immediately neighbouring properties, 165 Arlington Road and 27 Parkway, have been confirmed as containing basement levels. The buildings to the rear of the site are reported to be single storey conservatory/masonry structures that are not believed to contain basement levels.
- 4.8. Site investigations have been carried out and have involved one trial pit to identify the foundations to No 165 Arlington Road, and one borehole located adjacent to this. The trial pit did not reach the underside of the foundation along this boundary, however it confirmed it to be in excess of 1.5m below ground level. No trial pit or investigations of the foundations to No 27 Parkway have been presented, or to the single storey structures along the rear boundary. However reasonable assumptions have been made regarding the foundations to the remaining

properties, based on the properties to the rear not containing basements, and No 27 Parkway containing a basement.

- 4.9. The site is underlain by 0.6m of made ground, overlaying London Clay to a considerable depth. Water level monitoring was carried out over a 2 week period and was found to remain dry. The proposed basement will be founded within the London Clay, and it has been assumed that the surrounding properties are also founded within the London Clay.
- 4.10. The proposal to form the basement level consists of underpinning the existing foundations to number 27 Parkway, 165 Arlington Road, and the single storey structures to the rear with concrete prior to forming a reinforced concrete liner wall inside of this. The liner wall is to connect into a ground bearing slab forming the floor to the basement level, which also is to be designed as a raft foundation. The raft foundation will contain local thickenings to support internal columns supporting the bus and ground floor structure.
- 4.11. The basement wall that is along the boundary of Arlington Road is to be formed by the construction of a sheet piled or bored piled wall, with the construction of a reinforced liner wall inboard of this.
- 4.12. The underpinning to the surrounding walls is identified as being of mass concrete in the structural engineering report, but is then referred to as 400 thick reinforced concrete underpinning on the structural drawings therefore causing a discrepancy. Given that the construction method statement indicates that the ground level is to be reduced prior to the formation of the liner wall, this would suggest that the underpinning may be relied upon to resist lateral forces in the temporary case by spanning vertically between propping.
- 4.13. Underpinning has been proposed in a traditional hit and miss sequence in bays of measuring no more than 1m in width. This is accepted as the industry standard technique and is an effective way of minimising movements to the underpinned walls should good workmanship be applied.
- 4.14. The RC liner wall is to act as a vertical cantilever, with no permanent prop provided at its head. This is acceptable provided the detailed design calculations for the wall reflect this scenario, and the ground movement assessment reflects the low stiffness characteristics of an unpropped cantilever wall in the permanent case.
- 4.15. A construction method statement has been produced by Elliott Wood. This method sets out a logical sequence of works by constructing the underpinning first, followed by the reduction in ground level with subsequent propping to the underpinning, the formation of the basement ground slab, and finally the formation of the liner wall to resist lateral forces in the permanent case.

- 4.16. Ground water has been deemed to not be present at the site, due to the basement being formed within the London Clay. This conclusion is supported by the site investigation data that found no ground water present in a monitored standpipe. However it has been advised that the contractor maintains a method of how to deal with ground water should inflows occur once construction has commenced. It is accepted that ground water is not likely to be present, and it is agreed that a contractor's method statement is prepared should ground water flows be encountered during construction.
- 4.17. While a ground movement assessment was not deemed necessary by the screening and scoping stages, one has been produced by Applied Geotechnical Engineering who are established geotechnical engineers. It is considered appropriate that a ground movement has been produced due to the increase in the differential foundation level with the surrounding properties.
- 4.18. The ground movement assessment has predicted vertical and horizontal movements based on wall deflections, wall installations, and movements due to the unloading of the existing ground (heave). For the calculation of ground movements due to wall deflection, values for a high stiffness scenario have been used. The CIRIA C580 document indicates that high support stiffness can be assumed for high propped walls, or top down construction, and that low stiffness should be assumed for cantilever walls. The proposal is to construct a cantilever liner wall inboard of the underpinning, it is therefore considered that the proposal more accurately represents the low stiffness scenario as described by CIRIA C580 and the ground movement assessment should be resubmitted to reflect this. Should the revised damage assessment conclude that the potential damage is of Burland category 2 then mitigation measures to reduce this damage potential will be required.
- 4.19. A damage assessment of the highway (Arlington Road) that is adjacent to the basement has not been produced. Due to the proximity it is required that this is carried out and included in the revised damage assessment.
- 4.20. An outline movement monitoring strategy has been produced by Elliott Wood that details actions and movement trigger values. The trigger values given are 5mm and 10mm for amber and red vertical movements, and 4mm and 8mm for amber and red horizontal movements. These values are in excess of those predicted by the current ground movement assessment. It is appreciated this is an outline movement monitoring strategy that is to be developed further by the contractor; this is accepted and it is recommended that the final movement monitoring strategy adopt trigger values related to the final ground movement assessment.
- 4.21. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding.

- 4.22. Given the above, a number of requests for additional information have been included in the query tracker found in Appendix 2. These queries can likely be fulfilled by submission of the requested information via email, and a resubmitted BIA is not likely to be required.

## 5.0 CONCLUSIONS

- 5.1. The BIA and Structural Report have been carried out by well-known firms of engineering consultants. The qualifications of those responsible for the production of the reports have not been provided, these have been requested.
- 5.2. The basement is to be formed using concrete underpinning to the surrounding properties with an inboard reinforced concrete liner wall bearing onto a ground bearing raft foundation.
- 5.3. The boundary that is adjacent to Arlington Road is proposed as being either sheet piled or bored piled, with a reinforced concrete liner wall constructed inboard of this.
- 5.4. The method proposed describes the construction being carried out using established construction techniques and a logical sequence of works is proposed.
- 5.5. There is a discrepancy in whether the underpinning is to be of mass concrete or reinforced concrete. This is potentially critical due to the underpinning potentially resisting lateral forces in the temporary case. This should be clarified.
- 5.6. The basement walls are to be designed as unpropped cantilever walls. While no structural calculation have been produced to substantiate the feasibility of this proposal it is accepted that the retained height of a shallow single storey is feasible given the preliminary wall sizes proposed.
- 5.7. The BIA confirms that the basement will be founded within the London Clay which has been confirmed via site investigations, no ground water flows are anticipated as being interrupted. This conclusion is accepted.
- 5.8. The ground movement assessment has used a method for calculating movements based on a high support stiffness in the permanent case. This is not considered acceptable given that lateral forces are to be resisted by an unpropped cantilever wall in the permanent case. The ground movement assessment should be resubmitted based on low support stiffness, along with a damage assessment for the immediately adjacent highway.
- 5.9. An outline movement monitoring strategy has been provided. This is accepted and is recommended to be further developed in order to link the trigger values to the movements predicted by the final ground movement assessment.
- 5.10. It is accepted that the surrounding slopes to the development site are stable.
- 5.11. It is accepted that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.

## **Appendix 1: Residents' Consultation Comments**



Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Haigh (on behalf of the Diocese of Westminster)	165 Arlington Road NW1 7EX	9/06/2015	No method statement detailing excavation for basement level.	An appropriate construction method statement has been provided in the report titled 'Structural Engineering Report and Subterranean Construction Method Statement'.

## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Qualifications	Confirmation that those responsible for the production of the BIA and Structural report has the accreditation as required by CPG4.		
2	Stability	The ground movement assessment has used values for high stiffness walls for the calculation of vertical and horizontal ground movements due to wall deflection. However this is not considered appropriate given that the proposal consists of an unpropped cantilever wall which CIRIA 580 describes as a low stiffness scenario. This should include a damage assessment of the highway (Arlington Road) also.		
3	Stability	The underpinning to the north, south, and eastern perimeters is described as being of mass concrete in paragraph 3.2 of the Structural Engineering Report. However in structural drawing SK-01 the underpinning is indicated as being 400mm thick R.C underpinning. This discrepancy in the specification of the underpinning should be clarified, along with whether or not the underpinning is to resist lateral loads in the temporary case due to the lowering of the ground level prior to the formation of the liner wall.		

### **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

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082  
A list of Members is available at our Registered Office at: Friars Bridge Court, 41- 45 Blackfriars Road, London SE1 8NZ  
VAT No 974 8892 43