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11 Fitzjohn's Avenue, NW3 5JY

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-27
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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 11 Fitzjohn's Avenue (planning reference 2016/5782/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. The Basement Impact Assessment (BIA), Construction Management Statement (CMS), Ground Movement Assessment (GMA) and the Flood Risk Assessment (FRA) have all been prepared by well-known firms of engineering consultants using individuals who possess suitable qualifications.

1.5. The BIA has confirmed that the proposed basement will be founded within London Clay and that the London Clay is overlain by approximately 0.4-1.1m of Made Ground.

1.6. It is unlikely that ground water will be encountered during basement foundation excavation. However, the design of the basement underpin walls has conservatively allowed for ground water presure.

1.7. The neighbouring properties are shown on the various sections and details provided in the CMS. There is a basement under construction at No 13. There is no basement at No 9.

1.8. Analysis has been undertaken of the ground movements and this has been assessed for excavation and construction (unloading and loading) in both the short and long term conditions. This has resulted in the proposed works obtaining a Burland Category 1.

1.9. In the original BIA, no proposals were provided for a movement monitoring strategy during excavation and construction. This has subsequently been provided and should be agreed under the Party Wall Act.

1.10. It is accepted that the surrounding slopes to the development site are stable, that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.

1.11. Queries and requests for clarification are discussed in Section 4 and summarised in Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2nd November 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 11 Fitzjohns Avenue, 2016/5782/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;

c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;

d) 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 "*Construction of Basement floor level beneath building to provide additional floor space to consented residential units (Use Class C3) dated 08/09/2016 (ref: 2016/4057/P)"*

The Audit Instruction also confirmed the development at 11 Fitzjohns Avenue does not involve, or neighbour, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 11th November 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA), LBH Wembley, Sep 2016
- Construction Method Statement (CMS), Blue Engineering, 11 Oct 2016
- Flood Risk Assessment (FRA), LBH Wembley, Sep 2016
- Geotechnical and Ground Movement Assessment (GMA), LBH Wembley, Oct 2016
- Existing Plans, Bchitecture, July 2016
- Existing Consented Plans, Bchitecture, July 2016
- Proposed Plans, Bchitecture, July 2016
- Planning permission application form, Sterling Consultants, 7 Oct 2016
- Application Letter, Sterling Consultants, 7 Oct 2016
- Residents comments

2.7. CampbellReith were provided with the following document via email on 23 January 2017:

- Monitoring Strategy

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Page 2 of BIA.
Is data required by Cl.233 of the GSD presented?	Yes	Where required for this development.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Section 2.2 of BIA and CMS.
Are suitable plan/maps included?	Yes	Detailed plans/maps provided in FRA.
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	Section 3.3 of BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.2 of BIA. Q3 is missing but covered by section 3.4 of BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.4 of BIA. Q6 is missing but confirmed in section 2.6 and in the FRA.
Is a conceptual model presented?	Yes	Section 2.5 of BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of BIA.
Is factual ground investigation data provided?	Yes	Section 3.1 of GMA.
Is monitoring data presented?	N/A	No ground water on site. Section 2.4 of GMA.
Is the ground investigation informed by a desk study?	Yes	Section 2 of BIA.
Has a site walkover been undertaken?	Yes	Section 3.3 Q7 of BIA and Section 1.4 of CMS.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Basement under construction at No 9. No basement at No 13.
Is a geotechnical interpretation presented?	Yes	Section 3 of GMA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 4.1 of GMA.
Are reports on other investigations required by screening and scoping presented?	Yes	FRA, Boreholes and Ground Water Monitoring.
Are the baseline conditions described, based on the GSD?	Yes	Section 4 of GMA.
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 4 of GMA.
Is an Impact Assessment provided?	Yes	Section 4 of GMA.
Are estimates of ground movement and structural impact presented?	Yes	Section 4 of GMA.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Section 5 of GMA.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	However, also see point below on monitoring and sections in the discussion.
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	Yes	Section 5 of CMS.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be 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	However, as per section 3.30 on page 20 of the CPG4 2015, further mitigation measures are required if the Burland Category is 1 or higher.
Are non-technical summaries provided?	No	However, the information is clearly laid out and easy to follow.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by a well-known firm of engineering consultants, LBH Wembley and the individuals concerned in its production have suitable qualifications.

4.2. The Construction Method Statement (CMS) has similarly been carried out by a well-known firm of engineering consultants, Blue Engineering. The reviewer is a chartered structural engineer, however, 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 the basement proposal is not part of, or neighbours, a listed building.

4.4. The proposed basement consists of a single storey construction formed below the original structure and part of the garden area. A new light well will also be constructed to the front and one side (adjacent to No 9). At the rear of the property the basement will extend under an area that is currently landscaped. The existing site also includes a one storey rear extension. The proposed basement does not extend under this area. Clear plans and sections are provided by both the Architect and Structural Engineer.

4.5. The BIA and CMS have identified that the reinforced concrete ground slab will be founded within the London Clay. The pressure from heave is identified and preliminary calculations are provided to justify the design. Where the weight of the proposed structure does not overcome the resulting heave, tension piles have been designed to resist uplift of the structure.

4.6. All documents, BIA, GMA, CMS, Drawings and Applications have all been produced within a six month time frame. There does not appear to be any significant design changes/assumptions between the documents.

4.7. The CMS gives a clear identifiable structural solution that encompasses the various situations and sections of the design. Cross sections are provided at all the main design scenarios and tension piles have been included where the self-weight of the structure is insufficient to resist the heave forces that could be applied to the new structure. Suitable design and loading assumptions have been made by the Structural Engineer, where not confirmed by the BIA and Ground Investigation. The assumptions of propping positions in the design of the underpin walls is in agreement with the construction sequence proposed. A conservative assumption on ground water level has been made for the design of the underpin walls.

4.8. Neither the original BIA nor the CMS made recommendation for movement monitoring during the construction works. This has subsequently been provided and should be agreed under the Party Wall Act. Maximum damage impacts of Category 1 (Very Slight) are predicted.

4.9. The Ground Investigation, included within the GMA, shows approximately 0.4m to 1.1m of made ground over London Clay to depth of borehole. The ground investigation carried out would appear suitable for the construction proposed.

4.10. No ground water was encountered during the Ground Investigation. Groundwater standpipes were installed to enable future monitoring. The design of the basement construction has made conservative assumptions on the level of ground water.

4.11. The ground movement assessment has carried out a detailed analysis of the expected ground movements which are clearly stated. This has resulted in the construction type and method being identified as Burland Category 1. As per CPG4 (Basements and Lightwells) 2015, this recommends further mitigation measures to reduce or monitor movement of the existing and neighbouring properties. Originally, no proposals were provided for a movement monitoring strategy during excavation and construction. This has subsequently been provided and should be agreed under the Party Wall Act.

4.12. It is accepted that there will be a slight increase to the amount of hardstanding. This is carried forward to the GMA as part of the impact assessment.

4.13. The BIA has shown that the proposed development is within 100m of a nearby culverted River Tyburn. However, the lack of ground water has closed this item from the scoping stage.

4.14. It is accepted that there are no slope stability concerns regarding the proposed development and that it is not in an area prone to flooding from rivers or sea water. A flood risk assessment has been completed to assess the risk of surface water flooding.

5.0 CONCLUSIONS

5.1. The BIA, GMA, CMS and FRA have all been carried out by well-known firms of engineering consultants using individuals who possess suitable qualifications.

5.2. The BIA has confirmed that the proposed basement will be founded within London Clay and its foundations have been designed to accommodate suitable loadings for this construction.

5.3. Ground water was not found during investigation works and it is not expected to be discovered during the construction and excavation works.

5.4. The BIA, CMS, GMA and FRA provide a detailed assessment of the various impacts of the proposed basement construction.

5.5. The proposed construction has been identified as Burland Category 1. In accordance with CPG4, a Movement Monitoring Strategy (covering excavation and construction) is proposed to reduce the risk of damage to neighbouring properties.

5.6. It is accepted that the surrounding slopes to the development site are stable.

5.7. 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
Polescuk (Belsize Residents Association)	8a Belsize Court, Garages	5/11/16	Without reference to context - Design and Access Statement illustrating the exisitng adjacent buildings, it is not possible to judge the impact of the proposed lightwells on the front of the property and on the boundary to no 9 on the character of the Conservation Area. In addition, The submitted Basemnt Impact Assesment is based on two boreholes only - one in front of the building, the other between the applicant and adjacent property at no 13. No borehole was performed adjacent to property at no 9, despite the proposal involving excavation right up to the boundary line, no more than a meter or so away from no 9. The Forward Notes of the BIA states: 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. This proposal is not adequately justified and should be refused permission until it	The borehole logs are provided in the GMA and show similar findings. The results are typical of the area and we would not expect an additional borehole closer to No 9 would be required.

			had done so.	
The Heath and Hampstead Society	PO Box 38214, London, NW3 1XD	2/11/16	We object to this application on these grounds: 1. There is no Design and Access Statement, as required by your standing rules for applications. 2. The Basement Impact Assessment is incomplete, in that no assessment is made the possible damage to existing property, especially adjacent buildings, from the proposed excavations. So far as we are concerned, the protection of neighbouring buildings from such damage is the principal purpose of a BIA; neglect of this renders the assessment useless. Please refuse.	Monitoring of neighbouring buildings added to Audit Query Tracker

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Land Stability	There are currently no proposals for movement monitoring of the existing structure or neighbouring properties during the construction work. Based on the findings of the GMA, we would recommend a movement monitoring strategy is provided showing trigger levels for each direction of movement.	Closed – an outline monitoring strategy has been submitted. This should be agreed under the Party Wall Act, with trigger values observed to ensure damage impacts remain within a maximum of Category 1.	January 2017

Appendix 3: Supplementary Supporting Documents

Monitoring Strategy

11 Fitzjohns Avenue Monitoring to Prevent Damage to Existing Structure and Adjoining Neighbours

Vibration

Trial holes on site have established there are no existing reinforced concrete structures requiring removal and therefore vibration is anticipated to be minimal.

It is imperative that vibrations greater than 2mm/s PPV are avoided to prevent disturbance to adjoining owns. It is on note that masonry structures can accommodate vibrations up to 15mm/s however this would be intolerable for adjoining owners. During key activities, such as excavation and installing of any temporary trench sheeting that vibration is monitored at the start of each of these high-risk activities at a location >10m from the adjoining owners to assess likely vibration. This will be done using a mobile vibration monitor by the contractors engineering surveyor trained in the use of the vibration monitor.

If during monitoring, vibration levels of greater than 2mm/s are encountered, the activity will be stopped immediately and the methodology will be reviewed. An alternative method will be explored to see if this will reduce vibration levels. Only when the methodology is found to be less than 2mm/s PPV will the activity be allowed to proceed closer than 10m to the adjoining owners.

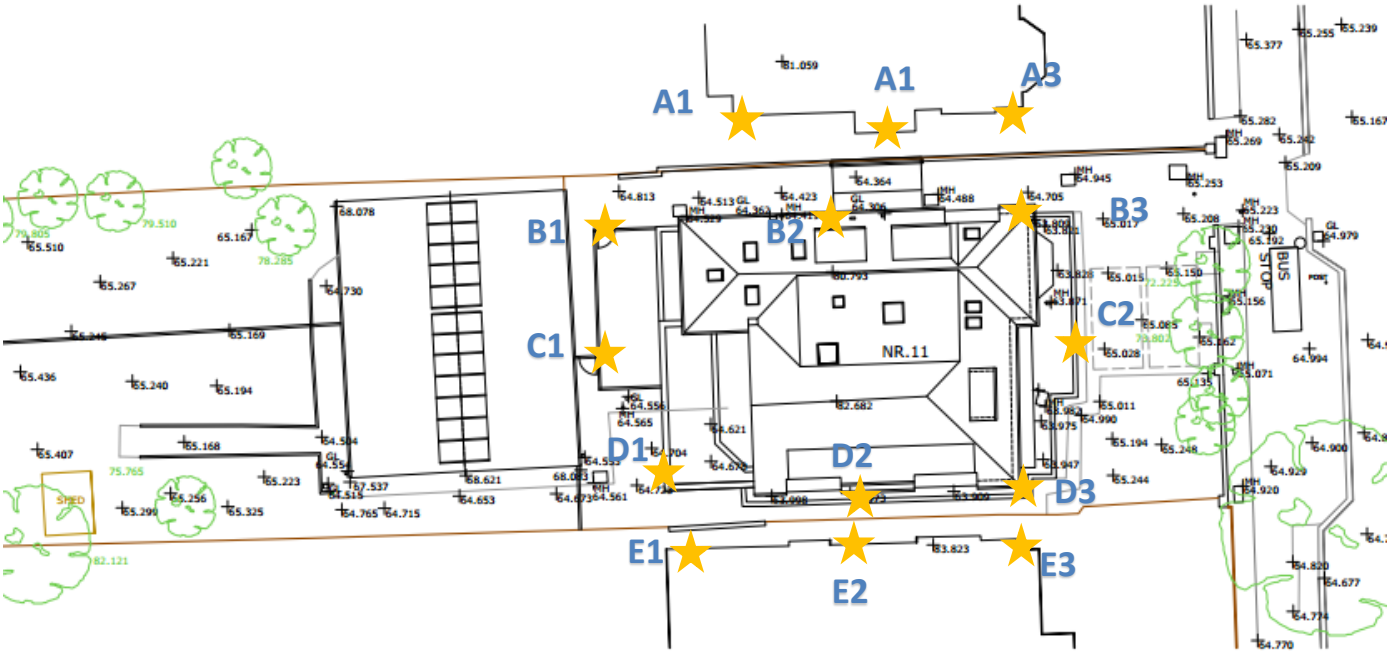
From experience vibration is not likely to exceed 2mm/s PPV and we therefore consider vibration exceedance 2mm/s to be extremely unlikely. Whilst excavating within 5m of the adjoining owners, a digital vibration monitor will be utilised to monitor throughout excavation. The following trigger levels will be utilised to establish controls:

Action Colour	Maximum Vibration PPV	Action
Green	0-1mm/s	Continue works with monitoring in place
Amber	1 - 2mm/s	Continue works with caution
Red	>2mm/s	Cease works and look at alternative measures

Movement & Settlement

During the excavation stage both start of shift and end of shift measurements will be necessary in order for movements to be checked to prevent the excessive movement to either the neighbouring properties.

3D targets will be positioned on the partywall elevations as shown on the below site plan. Readings will be undertaken weekly using a Leica theodolite (+/-1mm accuracy).



This will act as a check on vertical and horizontal movement in 3 dimensions.

Any cumulative settlement greater than 3mm in the X, Y or Z planes will be referred to Blue Structural Engineers for comment / advice.

A maximum of 5mm differential in the X, Y or Z planes will be set as the threshold which if reached, adjoining surveyors will be approached for advice.

Baseline readings will be taken of the targets prior to any excavation commencing. These will be the readings from which any movement will be measured against.

The baseline readings and final readings will be recorded in this document as below:

Point	Baseline Coordinate Readings Prior to Excavation	Final Readings on Completion of Ground Floor Slab
9 Fitzjohns Avenue :		
A1X		
A1Y		
A1Z		
A2X		
A2Y		
A2Z		
A3X		
A3Y		
A3Z		
11 Fitzjohns Avenue		
B1X		
B1Y		
B1Z		
B2X		
B2Y		
B2Z		
B3X		
B3Y		
B3Z		
C1X		
C1Y		
C1Z		
C2X		
C2Y		
C2Z		
D1X		
D1Y		
D1Z		
D2X		
D2Y		
D2Z		
D3X		
D3Y		
D3Z		

13 Fitzjohns Avenue		
E1X		
E1Y		
E1Z		
E2X		
E2Y		
E2Z		
E3X		
E3Y		
E3Z		

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