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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12336-81
Revision: D1

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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 15 Lymington Road, London, NW6 1HX (planning reference 2016/2597/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) has been prepared by firms of engineering consultants using individuals who possess suitable qualifications.

1.5. The new basement is proposed under the eastern portion of the property, only extending beyond the external walls of the existing building to form lightwells at the front and rear.

1.6. A temporary works design and construction sequence is presented in Appendix 5 of the BIA. Queries relating to the proposal have been raised in Section 4.

1.7. The hollowcore concrete retaining wall design is presented in Appendix D, although this should be revised based on the concerns raised in Section 4.

1.8. An assessment of the likely heave and hydrostatic pressures is required, including any mitigation measures, as this will inform the design of the basement floor slab.

1.9. A Ground Movement Assessment (GMA) with a Structural Impact Assessment is required to assess the effects that the construction of the proposed basement will have on both Lymington Road and adjacent properties.

1.10. Details of monitoring and condition surveys are required to comply with the Party Wall process.

1.11. Although groundwater was not encountered during the site investigation, mitigation measures should be proposed in the event of water being encountered.

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

1.13. It is accepted that there are no potential impacts on the wider hydrogeology and that the development is not in an area subject to flooding.

1.14. Queries and requests for further information are summarised in Section 4 and Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11 July 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 15 Lymington Road, London, NW6 1HX.

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 "Excavation of single storey basement and installation of lightwells to front and rear; demolition of existing rear extension."

The Audit Instruction also confirmed that the basement proposal does not involve a listed building nor does the site neighbour any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 21 July 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated 6 May 2016 by Ecos Maclean Ltd,
- Planning Design and Access Statement dated 18 April 2016 by Gregory Phillips Architects,
- Arboricultural Impact Assessment dated 10 March 2016 by Trevor Heaps Arboricultural Consultancy Ltd, and
- Planning Application Drawings by Gregory Philips Architects (May and August 2015) and Ecos Maclean Ltd (March 2016) consisting of:

  Proposed Site Plan

  Existing Plans and Elevations

  Proposed Plans and Elevations

  Proposed Sequencing Plans and Sections

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	BIA.
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.
Are suitable plan/maps included?	Yes	BIA and drawings.
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 3.2, although the Ground Investigation indicates soil material with a high swelling and shrinkage potential to be present. The resident at 17 Lymington Road suggests the area has experienced subsidence.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 3.1.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 3.3.
Is a conceptual model presented?	Yes	BIA Section 4.6.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	The effect of being within 5m of a road is not addressed. Additionally, the Ground Investigation indicates soil with a high swelling and shrinkage potential to be present.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 4.2.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 4.4.
Is factual ground investigation data provided?	Yes	The Ground Investigation presented is titled 12 Lymington Road, perhaps incorrectly.
Is monitoring data presented?	Yes	Ground Investigation Section 3.3 with monitoring over 5 weeks.
Is the ground investigation informed by a desk study?	Yes	BIA Section 2.
Has a site walkover been undertaken?	Yes	BIA Section 3.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA Section 3.
Is a geotechnical interpretation presented?	Yes	BIA Section 4.6.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Appendix 4.
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Impact Assessment presented.
Are the baseline conditions described, based on the GSD?	Yes	

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	NA	None identified.
Is an Impact Assessment provided?	Yes	Discussed in BIA Sections 2.3 and 5.5.
Are estimates of ground movement and structural impact presented?	No	Discussed in BIA Section 5.3 although no evidence or details are provided.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Effect of ground movement on adjacent properties is not considered in sufficient detail.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Not considered.
Has the need for monitoring during construction been considered?	No	Not considered.
Have the residual (after mitigation) impacts been clearly identified?	No	Not identified.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Not considered in sufficient detail.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Increase in impermeable area is negligible.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	The impact upon structural stability is not considered in sufficient detail.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	BIA Section 5.3, although no details provided.
Are non-technical summaries provided?	Yes	BIA Section 1.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by a team of engineers from Ecos Maclean Ltd and Site Analytical Services Ltd, and the individuals concerned in its production have suitable qualifications.

4.2. The existing building is a three-storey semi-detached house, and includes a small basement consisting of a bedroom and bathroom. The new basement is proposed under the eastern portion of the property, only extending beyond the external walls of the existing building to form lightwells at the front and rear.

4.3. The proposed basement will be approximately 3.5m below the current ground level and constructed approximately 1m deeper than the existing basement. As the road is set approximately 1.5m below the ground floor of the property the proposed basement will be some 2m below Lymington Road.

4.4. The BIA report indicates that the basis of the design is to utilise precast components to form the new walls which will underpin the existing building and act as retaining walls to the sides of the basement. A temporary works design and construction sequence is presented in Appendix 5 of the BIA. Queries relating to this option and the construction methodology are raised as follows:

- Clarification is required as to how the panels will be manhandled into position within a restricted excavation.
- It is to be confirmed whether and how the panels connect to each other and to the floor slab.
- Clarification is required as to how the panels are propped in the temporary case.
- How will backfilling behind the panels be performed?
- It should be confirmed whether the floor slab is suspended or will be designed to accommodate heave.
- What has been assumed in respect of hydrostatic pressures?

4.5. It is noted that one of the reasons behind the proposal to adopt pre-cast panels is that they can be jacked into position to restrict ground movement. However, consideration must be given to the ground and building movements that are likely to occur as a result of the excavation to permit the panels to be placed. This requires further consideration.

4.6. The retaining wall design is presented in Appendix D. Concerns relating to the design are raised as follows:

- The calculations justify a footing size of 2x2m supporting C1. It is not clear where this footing is to be constructed. The construction methodology suggests the footings consist of strip foundation around the perimeter of the basement.

- Groundwater is not considered in the retaining wall design. Minimum accepted practice is to make provision for groundwater at a level of one-third of the basement's depth (or approximately 1m below ground level in this case). This is due to the uncertainty in predicting future groundwater levels.

- Referencing errors are presented at the end of the design. These should be addressed.

4.7. The imposed loads acting on the retaining wall should be checked, particularly those from the 1st floor.

4.8. There is a lack of information on the construction sequence drawings with a number of key elements not labelled.

4.9. No existing basements were identified for adjacent properties, indicating that the proposed basement will increase the differential depth of these foundations. This would be of particular concern for the property at 17 Lymington Road.

4.10. It is stated in the BIA that the design has modelled the impact of underpinning and retaining wall design upon the adjacent buildings, yet there is no detail provided in the report. Additionally, a "Damage Category Assessment" is provided with a Burland Category of 1 determined, but no evidence is provided of how this was obtained. A clear Ground Movement Assessment (GMA) with a Structural Impact Assessment is required to assess the effects that the construction of the proposed basement will have on both Lymington Road and adjacent properties. CPG4 requires mitigation measures to be considered where predicted damage exceeds Burland Category 1 and for the impact to be reassessed.

4.11. Condition surveys of the neighbouring properties should be commissioned and a programme of monitoring the adjoining structures should be established before the work starts. The movement monitoring strategy should be continued during excavation and construction.

4.12. It is noted that the ground investigation completed in April 2016, is titled 12 Lymington Road, although the plan and description appears to relate to 15 Lymington Road. From the investigation, Made Ground was encountered to a depth of 0.6m below ground level, underlain by London Clay. As the proposed founding level is some 3.0 to 3.5m below ground level the basement will be founded in London Clay. The Ground Investigation indicates soil material with a high swelling and shrinkage potential to be present. An assessment of the likely heave pressures is required, including any mitigation measures. This would inform the design of the basement floor slab. It should be confirmed that the ground investigation report relates to 15 Lymington Road.

4.13. The BIA has shown that the surrounding slopes to the development are stable.

4.14. It is accepted that the proposed basement will not result in a significant increase in impermeable area, and no mitigation measures are required to offset the impacts of the development.

4.15. Groundwater was encountered during the site investigation monitoring period at a depth of 4.6m below ground level, or at least 1.0m below the basement final floor level. It is thus accepted that risks due to groundwater are low, although mitigation measures should still be proposed in the unlikely event of water being encountered.

4.16. It is accepted that the permeability in the London Clay is low and so the proposed basement should not impact on groundwater flows.

4.17. An Arboricultural Impact Assessment (AIA) was conducted to appraise the potential impact on trees by the proposed development. Two small shrubs will be removed during construction, with all remaining trees safeguarded by mitigation measures proposed in the AIA. These measures are considered acceptable.

4.18. It is accepted that no railway tunnels are known to pass below or close to the site.

4.19. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.

4.20. It is accepted that the site has no risk of groundwater or fluvial flooding and has no past history of flooding.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by engineering consultants using individuals who possess suitable qualifications.

5.2. The BIA has confirmed that the proposed basement will be founded within London Clay, with underpinning beneath existing walls to support the basement retaining structures. Construction methodology drawings including temporary propping measures are provided in the BIA. Queries relating to the proposal have been raised in Section 4.

5.3. The hollowcore concrete retaining wall design is presented in Appendix D of the BIA, although this should be revised based on the concerns raised in Section 4.

5.4. An assessment of the likely heave and hydrostatic pressures is required, including any mitigation measures. This will inform the design of the basement floor slab. Queries raised in respect of the structural calculations are to be addressed.

5.5. A Ground Movement Assessment (GMA) with a Structural Impact Assessment is required to assess the effects that the construction of the proposed basement will have on both Lymington Road and adjacent properties. Where predicted damage exceeds Burland Category 1, mitigation measures are to be considered and the impact reassessed.

5.6. No proposals are provided for a movement monitoring strategy during excavation and construction. Outline proposals should be presented. The final details of monitoring and condition surveys will be required in due course to comply with Party Wall Process.

5.7. It is accepted that the proposed basement will not result in an increase in impermeable area, and no mitigation measures are required to offset the impacts of the development.

5.8. Although it is unlikely that the ground water table will be encountered during basement foundation excavation, mitigation measures should be proposed in the event of water being encountered.

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

5.10. It is accepted that there are no potential impacts on the wider hydrogeology and that the development is not in an area subject to flooding.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Spreckley, S	Flat 1, 17 Lymington Road, London, NW6 1HX	04/07/2016	1. The extensive digging raises the high risk of subsidence in an area which has already experienced subsidence. 2. The area has also been at risk with flooding in recent years. 3. The heavy traffic of lorries over a 2-year period is also a major concern. 4. The living roof proposed for the extension is not in keeping with the conservation area and will look out of place.	This will be addressed by the condition survey, ground movement and structural impacts assessments, and movement monitoring required. According to the BIA, the property is not located in an area subject to flooding. The proposed construction methodology using precast panels attempts to minimise the impact caused by construction activities. This is an aesthetic consideration for others.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Confirm that the Ground Investigation relates to 15 Lymington Road and not 12 Lymington Road as labelled.	Open	
2	Stability	The construction methodology and sequence drawings require further clarification.	Open	
3	Stability	Structural calculations to be revised and resubmitted.	Open	
4	Stability	Assessment required, and mitigation of, likely heave pressures. This would inform the floor slab design.	Open	
5	Stability	Ground Movement Assessment and Structural Impact Assessment to be justified.	Open	
6	Stability	Outline proposals for monitoring and condition surveys to be provided.	Open	
7	Hydrogeology	Mitigation measures required should groundwater be encountered to be discussed.	Open	

Appendix 3: Supplementary Supporting Documents

None

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