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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12336-42
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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 (BIA) submitted as part of the Planning Submission documentation for 8a Belmont Street, London NW1 8HH (planning reference 2016/0896/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 proposed development is the demolition of the existing structure and its redevelopment to provide two residential structures of two storeys plus a single level basement. In the original BIA submission the nature of the proposed development was unclear; this has been clarified in the revised submission.

1.5. The original BIA submission comprised four documents that inconsistently referenced each other. The revised BIA submission comprises a main BIA document prepared by Croft Structural Engineers with supporting documentation. However, inconsistencies still exist between the documents submitted.

1.6. The qualifications of the authors were not demonstrated in the original BIA submission. However, the qualifications of the authors of the revised BIA meet LBC's requirements.

1.7. The revised BIA submission now includes screening and scoping assessments for Surface Flow and Flooding and a desk study broadly in accordance with the GSD Appendix G1, which were both absent from the original BIA submission.

1.8. The BIA documents are inconsistent with respect to basement depth and current site level. Site and foundation levels should be checked and presented as elevations AOD for clarity and be consistent with the structural drawings.

1.9. The ground investigation is extremely limited and subsequent geotechnical interpretation is inconsistent between the Ground Investigation Report and the Land Stability Report, and consequently the assumptions used in the Ground Movement Assessment (GMA) are inconsistent. Further ground investigation will be required for detailed design.

1.10. An outline structural methodology statement for planning purposes is presented, including construction sequence, temporary works requirements and recommendations for contractors. The BIA states that the advice of a dewatering contractor should be sought prior to excavation to plan for mitigation measures in case groundwater is encountered.

1.11. The proposed basement excavation may encounter groundwater seepages. Groundwater monitoring has only been carried out on one occasion and the level should be confirmed by either longer term monitoring and/or by the contractor in advance of excavation.

1.12. The BIA states there will be Very Slight (Category 1) to Slight (Category 2) impact to 8a Belmont Street and surrounding structures. The assumptions are inconsistent with the geotechnical interpretation. The ground movement assessment has not been provided for review.

1.13. In line with CPG4, where Category 1 or a higher damage category is assessed, the BIA should provide mitigation measures to address ground movement, and the ground movement assessment should be re-evaluated and new net consequences determined. Mitigation measures are discussed in the revised BIA submission and should be referenced in the GMA.

1.14. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the missing information is provided, it is not possible to conclude that the criteria contained in CPG4 and DP27 have been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 30th March 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 8a Belmont Street, London NW1 8HH, Camden Reference 2016/0896/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 "*Partial demolition of the existing building … and its redevelopment with a 3-storey building including a basement excavation to provide 2 x 2-bed self-contained units on the lower ground floor, ground and first floor levels*".

2.6. CampbellReith accessed LBC's Planning Portal on 20 April 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment: Land Stability, February 2016 by Ground and Project Consultants Ltd.
- Basement Impact Assessment: Groundwater, Draft 14 March 2016 (ref 30110R1D1) by H Fraser Consulting Ltd.
- Ground Investigation Report, March 2016 by Ground and Water Limited.
- Structural Scheme for Planning, 3 March 2016 by Croft Structural Engineers.
- Design and Access Statement, February 2016 by Martin Evans Architects.
- Demolition Plans, Existing and Proposed Plans, Elevations and Sections, 18 June 2015 by Martin Evans Architects.

2.7. Further to the issue of the initial report, CampbellReith accessed LBC's Planning Portal to access revised BIA submission documents on 23 June 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment, Reference 160215, First Issue, 26 May 2016, by Croft Structural Engineers.
- Desk Study Report, Reference GWPR1534/GIR/May 2016, Final V1.01, May 2016 by Ground and Water Limited.
- Basement Impact Assessment: Land Stability Report, Reference 20094, Revision 1, February 2016 by Ground and Project Consultants Ltd.
- Basement Impact Assessment: Groundwater, Final, 25 May 2016 (ref 30110R1) by H Fraser Consulting Ltd.
- Ground Investigation Report, Reference GWPR1534/GIR/May 2016, Final V2.01, May 2016 by Ground and Water Limited.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	In the revised submission the author's qualifications are in accordance with CPG4 guidelines.
Is data required by Cl.233 of the GSD presented?	Yes	In the revised submissions a desk study broadly in line with the requirements of GSD Appendix G1 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	In the revised submission, hydrological aspects have now been considered in line with CPG4.
Are suitable plan/maps included?	Yes	Provided in the revised submission.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Provided in the revised submission.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Some inconsistencies, for instance the Land Stability report / Ground Investigation report and revised BIA contradict each other on the location of a 'nearby' Northern Line tunnel, reported as: 95 - 100m to the south west and 'more than 30m away' respectively. The location of underground infrastructure should be confirmed with the relevant asset owners e.g. TFL / Network Rail.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Provided in revised submission. Previous submission contained contradictory information on the distance to a tributary of the River Fleet.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Provided in the revised submission.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Conceptual models are provided but are inconsistent e.g. soil strength profile.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Provided in revised submission. Previous submission contained contradictory information on the distance to a tributary of the River Fleet.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Provided in the revised submission.
Is factual ground investigation data provided?	Yes	Ground and Water Ltd report. The site investigation data is extremely limited and does not comply with minimum Eurocode or LBC guidance (GSD Section 7.2.2).
Is monitoring data presented?	Yes	Only 1 round of groundwater monitoring is presented.
Is the ground investigation informed by a desk study?	Yes	Provided in the revised submission.
Has a site walkover been undertaken?	Yes	Provided in the revised submission.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Single level basements are indicated to be present in adjacent properties.
Is a geotechnical interpretation presented?	Yes	Geotechnical interpretations are presented in the Land Stability and Ground Investigation reports, although they are not consistent.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Within the Structural Scheme for Planning. Detailed calculations for the internal liner walls are provided but information on the proposed contiguous pile walls has been omitted.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	No	A desk study is provided in the revised submission. However, ground movement assessment calculations have not been provided.
Are baseline conditions described, based on the GSD?	Yes	Provided in the revised submission.
Do the base line conditions consider adjacent or nearby basements?	Yes	Single level basements indicated in adjacent properties.
Is an Impact Assessment provided?	Yes	Provided in the revised submission.
Are estimates of ground movement and structural impact presented?	Yes	No methodology or calculations have been provided. Assumptions (e.g. soil strength, depth of excavations) are inconsistently referenced.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Provided in the revised submission.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Updated in the revised submission. However, until GMA updated not all appropriate mitigation may have been considered.
Has the need for monitoring during construction been considered?	Yes	Movement monitoring is discussed in the Land Stability report and Structural Scheme for Planning. Additional detail provided in the revised submission.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Provided in the revised submission.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Ground movement assessment calculations should be provided. A zone of influence should be identified. Nearby basements and assets (tunnels / utilities etc) should be identified.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Provided in the revised submission.

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Subject to provision of ground movement assessment.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Ground movement assessment calculations should be provided. A zone of influence should be identified. Nearby basements and assets (tunnels / utilities etc) should be identified.
Are non-technical summaries provided?	Yes	Provided in the revised submission.

4.0 DISCUSSION

4.1. The original BIA submission was prepared by a number of sources and did not address all the requirements of CPG4 in a single, coherent document. The revised BIA submission has addressed this issue to some extent, with a main BIA document authored by Croft Structural Engineers which summarises all the presented information in supporting documents provided by a number of sources: Ground and Project Consultants Ltd, Ground and Water Ltd and H Fraser Consulting Ltd. However, the revised BIA submission does not address all the comments from the previous audit and consequently there are still inconsistencies and not all the required information has been provided. The revised BIA submission is not in line with the requirements of CPG4.

4.2. There were several omissions and inconsistencies in the original BIA submission that have been suitably addressed in the revised BIA submission: the screening and scoping process to address surface flow and flooding is provided; the BIA has been informed by a desk study broadly in accordance with GSD Appendix G1; and, the credentials of the authors in line with CPG4 have been established. The previous submission also referred to the presence of a local tributary to the River Fleet which has now been revised.

4.3. The extent of the ground investigation does not follow the guidance provided by LBC's Guidance for Subterranean Development (Section 7.2.2) or Eurocode 7 and further investigation will be required for detailed design. The ground investigation and subsequent geotechnical interpretation presents a range of undrained shear strength values for the London Clay that should be confirmed by the Contractor in advance of construction. It is noted that the London Clay undrained shear strength is inconsistently interpreted in the original BIA submission and this has not been addressed in the revised BIA submission.

4.4. The BIA inconsistently reports existing site levels, the proposed foundation levels and geotechnical interpretation.

4.5. The proposed basement excavation may encounter groundwater seepages in the Made Ground or within sandy partings of the London Clay Formation. The monitoring data suggests that perched groundwater is present approximately 2.1m below ground level. However, only one round of monitoring has been undertaken. Ideally longer term groundwater monitoring should be carried out to establish a baseline and / or proven in advance of construction by the contractor.

4.6. The proposed development is the demolition of the existing structure and its redevelopment to provide two residential structures of two storeys plus a single level basement. In the original BIA submission the nature of the proposed development was unclear; this has been clarified in the revised submission.

4.7. The BIA documents are inconsistent and state that the proposed basement will be founded in the London Clay Formation at between approximately 2.80m and 3.50m below the current site ground level. The current site level is reported inconsistently, at between 30m AOD and 35m AOD. Site and foundation levels should be checked and presented as elevations AOD for clarity and be consistent with the structural drawings.

4.8. The BIA indicates basement retaining walls to be formed by contiguous bored piles with a ground bearing basement slab and strip foundations for internal supporting walls. An outline structural methodology statement for planning purposes is presented, including construction sequence, temporary works requirements and recommendations for contractors. No details of the proposed contiguous bore piles are provided (e.g. toe depth, spacing, diameter). The BIA states that the advice of a dewatering contractor should be sought prior to excavation to plan for mitigation measures in case groundwater is encountered.

4.9. The BIA states there will be Very Slight (Category 1) to Slight (Category 2) impact to 8a Belmont Street and surrounding structures. The ground movement assessment assumes that 'stiff' clay is present, which is inconsistent with the geotechnical interpretations presented between the Ground Investigation Report and the Land Stability Report. These inconsistencies should be revised and the ground movement assessment calculations should be presented for review, including an indicative zone of influence and the presence or absence of nearby basements, underground structures or listed buildings.

4.10. In line with CPG4, where Category 1 or a higher damage category is assessed, the BIA should provide mitigation measures to address ground movement, and the ground movement assessment should be re-evaluated and new net consequences determined. The revised BIA submission does include recommended mitigation measures for the reduction of ground movements, and these should be considered within the GMA.

5.0 CONCLUSIONS

5.1. The BIA has been prepared by a number of sources. Although the revised BIA submission does present a main BIA document with supporting evidence, the documents are inconsistent with each other for some key issues e.g. depth of proposed excavations, geotechnical interpretation.

5.2. In the revised BIA submission, the qualifications of the authors have been demonstrated to meet LBC's requirements.

5.3. In the revised BIA submission, the screening and scoping requirements for Surface Flow and Flooding have been carried out.

5.4. In the revised BIA submission, a desk study broadly in accordance with the GSD Appendix G1 has been provided for the proposed development.

5.5. The BIA documents are inconsistent with respect to basement depth and current site level. Site and foundation levels should be checked and presented as elevations AOD for clarity and be consistent with the structural drawings.

5.6. The ground investigation is extremely limited and subsequent geotechnical interpretation is inconsistent between the Ground Investigation Report and the Land Stability Report, and consequently the assumptions used in the Ground Movement Assessment (GMA) are inconsistent. Further ground investigation will be required for detailed design.

5.7. An outline structural methodology statement for planning purposes is presented, including construction sequence, temporary works requirements and recommendations for contractors. The BIA states that the advice of a dewatering contractor should be sought prior to excavation to plan for mitigation measures in case groundwater is encountered.

5.8. The proposed basement excavation may encounter groundwater seepages. Groundwater monitoring has only been carried out on one occasion and the level should be confirmed by either longer term monitoring and/or by the contractor in advance of excavation.

5.9. The BIA states there will be Very Slight (Category 1) to Slight (Category 2) impact to 8a Belmont Street and surrounding structures. The assumptions are inconsistent with the geotechnical interpretation. The ground movement assessment has not been provided for review.

5.10. In line with CPG4, where Category 1 or a higher damage category is assessed, the BIA should provide mitigation measures to address ground movement, and the ground movement assessment should be re-evaluated and new net consequences determined. Mitigation measures are discussed in the revised BIA submission and should be referenced in the GMA.

5.11. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the missing information is provided, it is not possible to conclude that the criteria contained in CPG4 and DP27 have been met.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	The authors' credentials in line with CPG4 have not been substantiated.	Addressed in revised BIA	June 2016
2	BIA	The BIA should be presented as a single report with supporting documents appended or with a clear non-technical summary.	Open – the revised submission provides some clarity, but inconsistencies between supporting documents still present.	
3	BIA	A desk study in accordance with the GSD Appendix G1 has not been provided for the proposed development e.g. historical land use review, infrastructure / utility asset review etc.	Addressed in revised BIA	June 2016
4	BIA	Non-technical summaries should be provided in line with CPG4.	Addressed in revised BIA	June 2016
5	Surface Flow and Flooding	Screening and scoping assessments should be undertaken.	Addressed in revised BIA	June 2016
6	Hydrogeology	Only 1 round of groundwater monitoring has been undertaken.	Open - The baseline should be confirmed by longer term monitoring and / or by the contractor in advance of the works.	N/A
7	Hydrogeology / Land stability	Site level, foundation formation levels and groundwater levels should be presented consistently (elevations AOD would aid clarity). The presence or absence of local tributaries should be established and discussed if relevant.	Open – the River Fleet tributary issues has been clarified (June 2016). Other issues still outstanding.	
8	Hydrogeology / Land stability	The BIA should propose appropriate additional ground investigation prior to construction in line with LBC's GSD (Section 7.2.2) sufficient to confirm ground and groundwater conditions.	Open	

9	Land Stability	Geotechnical interpretation to be updated.	Open – still inconsistent between documents in the revised submission.	
10	Land Stability	Ground movement calculations should be provided for review. Nearby basements should be identified. A zone of influence should be identified. The presence or absence of nearby Listed structures should be identified. The BIA should provide mitigation measures to address ground movement, and the ground movement assessment should be re-evaluated and new net consequences determined.	Open – although references to basements and listed structures are made in the text, indicative / sketch figures related to the GMA should be presented indicating plan and sections of the zone of influence including affected structures.	

Appendix 3: Supplementary Supporting Documents

None

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