CampbellReith
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Flat 1, 11 Glenilla Road, London NW3 4AJ

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-24

Revision: D1

November 2016

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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 Flat 1, 11 Glenilla Road, London, NW3 4AJ (planning reference 2016/5528/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 BIA was undertaken by Gledsdale Associates Structural Engineers and the checker has a CEng MIStructE qualification. Evidence is required to demonstrate the author has some expertise in engineering geology with respect to the land stability assessment. In accordance with the requirements CPG4, it is requested that individuals with C.Geol and CWEM or CEng MICE qualifications with respect to hydrogeology and hydrology respectively, undertake the revised assessment.

1.5. The existing building is a three storey terraced house with a partial shallow basement and rear ground floor extension. It is proposed to construct a deeper basement over the full ground floor footprint, including rear extension, and form front and rear lightwells.

1.6. The BIA has not taken into account the proximity of the 'lost river' Tyburn and the potential for superficial deposits or softening of the London Clay to cause stability or hydrogeological impacts.

1.7. The site is within a Critical Drainage Zone and the proposed development indicates there will be an increase in impermeable site area, which is in contradiction to the report text. Further consideration of drainage and potential to attenuate run-off flows in line with guidance should be presented.

1.8. The BIA has confirmed that the proposed basement will be founded within London Clay and proposes underpinning existing walls. The following information is requested:

- Geotechnical design information for retaining wall design
- Long term groundwater monitoring
- Retaining wall calculations to form lightwells
- Results of trial pits to verify existing foundation depths
- Underpinning bay layout

- Indicative temporary works proposal
- Construction sequence drawings
- Ground movement analysis together with mitigation measures, if appropriate
- Details to constrain heave pressures
- Movement monitoring proposal, if appropriate
- Details of adjacent basements, if appropriate

1.9. It is evident that the Screening process has been undertaken using the relevant Arup GSD and Camden Strategic Flood Risk Management Assessment maps. In regards to the slope stability screening, questions 5, 8, 12 and 13 require further consideration, with assessments carried forward to scoping. In regards to the surface flow and flooding screening, questions 2, 3, 4 and 6 require further consideration, with assessments carried forward to scoping. In regards to the subterranean (groundwater) flow screening, questions 1b, 2, 4 and 5 require further consideration, with assessments carried forward scoping.

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

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 28 October 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Flat 1, 11 Glenilla Road, London, NW3 4AJ.

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;

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 to enlarge existing basement including installation of front and rear lightwells and extension to existing part width ground floor rear projection with revised fenestration."*

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 16 November 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated August 2016 by Gledsdale Associates Consulting Structural Engineers,
- Design, Access and Heritage Statement dated September 2016 by Strange Associates,
- Geotechnical Survey Report dated June 2016 by Fasttrack,
- Arboricultural Report dated July 2016 by Tim Moya Associates, and
- Planning Application Drawings dated August 2016 by Gledsdale consisting of:
- Existing Plans, Elevations and Sections
- Proposed Plans, Elevations and Sections

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	See item 4.1.
Is data required by Cl.233 of the GSD presented?	Yes	BIA, Sections 2 to 5.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Additional information required for temporary works, ground movement assessment, critical drainage zone, drainage details, and impermeable areas ratio.
Are suitable plan/maps included?	Yes	BIA, Section 5.
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 6 although answers to Questions 5, 8, 12 and 13 are considered to be incorrect or require more detail.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA, Section 6 although answers to Questions 1b, 2, 4 and 5 are considered to be incorrect.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA, Section 6 although answers to Questions 2, 3, 4 and 6 are considered to be incorrect.
Is a conceptual model presented?	No	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA, Section 7 although scoping of incorrectly answered screening questions is required.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA, Section 7 although scoping of incorrectly answered screening questions is required.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA, Section 7 although scoping of incorrectly answered screening questions is required.
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	No	Groundwater not encountered during investigation, although no evidence of monitoring is presented.
Is the ground investigation informed by a desk study?	No	
Has a site walkover been undertaken?	No	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	No	
Does the geotechnical interpretation include information on retaining wall design?	No	
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Report.
Are the baseline conditions described, based on the GSD?	Yes	Although more detail is requested.
Do the base line conditions consider adjacent or nearby basements?	No	
Is an Impact Assessment provided?	Yes	BIA, Section 10 but inadequate.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	But not substantiated.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Assessments incomplete.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	BIA, Section 7 to be reassessed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	BIA, Section 10 but not substantiated.
Are non-technical summaries provided?	Yes	BIA, Section 11.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Gledsdale Associates Consulting Structural Engineers and the checker has a CEng MIStructE qualification, however, no proof of expertise in engineering geology is provided with respect to the land stability assessment. The production of a BIA also requires input from a Hydrogeologist with a CGeol. Qualification with respect to the appraisal of groundwater flow and a Chartered Hydrologist or Chartered Civil Engineer specialising in flood risk management and surface water drainage.

4.2. The existing building comprises a three storey terraced house with a partial basement and a single storey rear extension. The proposal seeks to deepen the existing 1.9m deep basement to, approximately, 2.7m and extend the basement beneath the entire ground floor footprint, including the extension, and form front and rear lightwells.

4.3. The BIA has not taken into account the proximity of the 'lost river' Tyburn, which has been mapped to within 20m to 30m of the site, and the potential for superficial deposits or softening of the London Clay to cause stability or hydrogeological impacts, which should be considered and, if required, mitigated against.

4.4. The site is within a LBC defined Critical Drainage Zone and the proposal plans indicate there will be an increase in impermeable site area, which is in contradiction to the report text. Further consideration of drainage and potential to attenuate run-off flows in line with the guidance should be presented.

4.5. The BIA refers to a Geotechnical Survey Report carried out by Fastrack in June 2016. A single borehole was installed in the front garden to 5.0m depth and identified 0.45m of Made Ground above London Clay with no significant standing water. Although the BIA identifies that a bearing pressure of 100kN/m^2 will be utilised to form the new basement, no design parameters have been provided to allow retaining walls to be designed to form the front and rear lightwells. All this information is requested and long term groundwater monitoring is recommended.

4.6. Although the BIA states that "external and party walls are of solid masonry which extends down to a corbelled brick footings" (sic), it goes on to state that "existing corbelled foundations are expected at a depth between 500-1000mm below existing ground floor level in general except along the part basement where it could be less". It also states that "prior to commencement of construction, adequate trial pits will be carried out…to confirm the depth and extent of existing foundations". It is requested that these are carried out to inform the viability of construction proposals and its effect on the stability of No.11 and its neighbouring properties.

4.7. The BIA states that the basement construction will be formed by underpinning and discusses general requirements for propping and bay arrangement. It is requested that an underpinning

bay layout is provided together with an indicative temporary works proposal showing propping arrangements, together with construction sequence drawings.

4.8. The BIA discusses ground movements that are likely to occur and states that a Burland Damage Category of 2 – Slight, is achievable but provides no justification. A Ground Movement Analysis conforming to the requirements of CIRIA C580 is requested and mitigation measures should be provided if the resulting Damage Category is found to exceed 1 - Very Slight.

4.9. The BIA correctly identifies that heave of the underlying clay material is likely to occur due to basement excavation but does not evaluate the likely effect on basement slab construction. This should be incorporated into the additional information requested.

4.10. If found necessary following the additional information requested, a movement monitoring proposal should also be provided.

4.11. No mention is made within the BIA whether any basements have been constructed in any of the other houses within the terrace. This information would assist an assessment of whether there is a cumulative impact on the water environment in the local area.

4.12. It is evident that the Screening process has been undertaken using the relevant Arup GSD and Camden Strategic Flood Risk Management Assessment maps. In regards to the slope stability screening, questions 5, 8, 12 and 13 require further consideration, with assessments carried forward to scoping:

- the London Clay is the shallowest natural strata, and therefore requires consideration in relation to shrink / swell movements;
- the site is within 20m to 30m of the mapped position of the 'lost river' Tyburn, which should be considered in relation to potential softening of the London Clay or presence superficial deposits;
- the site is within 5m of the highway, and consideration of movements to the highway and suitable propping should be discussed;
- there will be a deepening of foundations relative to adjacent properties, the impacts and mitigation of which should be presented.

4.13. In regards to the surface flow and flooding screening, questions 2, 3, 4 and 6 require further consideration, with assessments carried forward to scoping:

- (Q's 2, 3 and 4) the proposal drawings indicate an increase in impermeable area compared to the current condition (which is in contradiction to the descriptions presented within the text), and this change should be assessed;

- the site itself is indicated as having a low risk of surface water flooding, but is immediately adjacent to properties indicated as having a medium and high risk of surface water flooding, therefore assessment of potential risk to a basement should be considered, with due consideration of waterproofing and drainage mitigation measures.

4.14. Observing that the site is within a LBC defined Critical Drainage Zone, further consideration of drainage and potential to attenuate run-off flows in line with the guidance should be presented.

4.15. In regards to the subterranean (groundwater) flow screening, questions 1b, 2, 4 and 5 require further consideration, with assessments carried forward to scoping:

- consideration of perched water within the Made Ground to impact the stability of the site during construction should be assessed, and management of perched water (waterproofing / drainage) in the permanent case should be presented, noting that long term monitoring on site has not yet been presented;

- the site is within 20m to 30m of the mapped position of the 'lost river' Tyburn, which should be assessed (potential for superficial deposits and groundwater flow);

- the proposal drawings indicate an increase in impermeable area compared to the current condition (which is in contradiction to the descriptions presented within the text), and this change should be assessed.

4.16. It is accepted that there are no slope stability concerns caused by the proposed development.

5.0 CONCLUSIONS

5.1. The BIA was undertaken by Gledsdale Associates Structural Engineers and the checker has a CEng MIStructE qualification. Evidence is required to demonstrate the author has some expertise in engineering geology with respect to the land stability assessment. In accordance with the requirements CPG4, it is requested that individuals with C.Geol and C.WEM or C.Eng MICE qualifications with respect to hydrogeology and hydrology respectively, undertake the revised assessment.

5.2. The existing building is a three storey terraced house with a partial shallow basement and rear ground floor extension. It is proposed to construct a deeper basement over the full ground floor footprint, including rear extension, and form front and rear lightwells.

5.3. The BIA has not taken into account the proximity of the 'lost river' Tyburn and the potential for superficial deposits or softening of the London Clay to cause stability or hydrogeological impacts.

5.4. The site is within a Critical Drainage Zone and the proposed development indicates there will be an increase in impermeable site area, which is in contradiction to the report text. Further consideration of drainage and potential to attenuate run-off flows in line with guidance should be presented.

5.5. The BIA has confirmed that the proposed basement will be founded within London Clay and proposes underpinning existing walls. The following information is requested:

- Geotechnical design information for retaining wall design
- Long term groundwater monitoring
- Retaining wall calculations to form lightwells
- Results of trial pits to verify existing foundation depths
- Underpinning bay layout
- Indicative temporary works proposal
- Construction sequence drawings
- Ground movement analysis together with mitigation measures, if appropriate
- Details to constrain heave pressures
- Movement monitoring proposal, if appropriate
- Details of adjacent basements, if appropriate

5.6. It is evident that the Screening process has been undertaken using the relevant Arup GSD and Camden Strategic Flood Risk Management Assessment maps. In regards to the slope stability screening, questions 5, 8, 12 and 13 require further consideration, with assessments carried forward to scoping. In regards to the surface flow and flooding screening, questions 2, 3, 4 and

6 require further consideration, with assessments carried forward to scoping. In regards to the subterranean (groundwater) flow screening, questions 1b, 2, 4 and 5 require further consideration, with assessments carried forward scoping.

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

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Geotechnical design information for retaining wall design and long term groundwater monitoring.	Open	
2	Stability	Retaining wall calculations to form lightwells.	Open	
3	Stability	Results of trial pits.	Open	
4	Stability	Underpinning bay layout.	Open	
5	Stability	Indicative temporary works proposal.	Open	
6	Stability	Construction sequence drawings.	Open	
7	Stability	Ground movement analysis plus mitigation.	Open	
8	Stability	Details to constrain heave pressures.	Open	
9	Stability	Movement monitoring proposals.	Open	
10	Stability	Details of adjacent basements.	Open	
11	Format	Evidence to demonstrate adequate experience and further revision to include commentary from authors meeting CPG4 requirements.	Open	
12	Slope Stability	Enhanced responses to Screening Q5, Q8, Q12 and Q13.	Open	
13	Surface Flow and Flooding	Enhanced response to Screening Q2, Q3, Q4 and Q6.	Open	
14	Subterranean (Groundwater Flow)	Enhanced responses to Screening Q1b, Q2, Q4 and Q5.	Open	

Appendix 3: Supplementary Supporting Documents

None

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