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Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12466-10
Revision: D1

October 2016

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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 5 Gloucester Crescent, London, NW1 7DS (planning references 2016/1099/P and 2016/1187/L). 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 Ecos Maclean Ltd. The author's qualifications are in accordance with CPG4 requirements.

1.5. The proposal includes a single storey basement extending beyond the external wall of the of the existing listed property. The developments proposes the utilisation of precast concrete planks as a retaining wall, further clarification on the use of these is required and discussed in paragraphs 4.14 to 4.24.

1.6. It is requested that the Arup GSD figures reference in BIA Section 3 are included to support screening responses.

1.7. It is requested that the BIA is updated to include a commentary on the walkover to support screening answers.

1.8. It is requested that the ground investigation report included in BIA Appendix 2 is updated to include better quality borehole logs.

1.9. It is noted that the response to question 4 of the Hydrogeology screening states that there is no change to hard surfaced/paved areas, however it also states that mitigation is required due to the basement extending into the garden. It is advised that this question is reviewed and should it be deemed that mitigation is required, this should be carried through and discussed within the BIA.

1.10. It is noted that no foundation inspection pits have been included within the BIA. If these have been undertaken they need to be included within the BIA. If none have been undertaken, these are required to determine suitability and impact of the proposed development.

1.11. The BIA should present a conceptual model which includes, stratigraphy, geotechnical parameters as per Arup GSD Appendix G3 and groundwater assumptions, and this is requested. A review of the shrinkage and swelling potential is requested as discussed in 4.11.

1.12. The BIA does not include a ground movement assessment which is required. Consideration should be given to the presence of pea shingle and insulation shown to be present on the outside of the basement wall excavation.

1.13. The BIA does not discuss monitoring or mitigation measures and this requirement for these should be discussed within the BIA.

1.14. A consultation response (Perry, March 2016) states that a number of trees have been felled, yet the response to question 6 of land stability states no trees are to be felled. Clarification is requested.

1.15. It is accepted that there are no slope stability concerns or any other surface water considerations regarding the proposed development.

1.16. 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.

1.17. 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 29 September 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 5 Gloucester Crescent, London, NW1 7DS and Planning References 2016/1099/P and 2016/1187/L.

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 "Creation of basement below approved single storey rear extension"

The Audit Instruction also confirmed 5 Gloucester Crescent involved, or was a neighbour to, Grade II listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 5 October 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) (dated 24 August 2016, by Ecos Macleand Ltd)
- Planning and Heritage Report (dated February 2016, by Studiogray)
- Draft Construction Management Plan (by Ecos Maclean Ltd)
- Ground Investigation Report (GIR) (dated January 2016, by Site Analytical Services Ltd)
- Planning Application Drawings consisting of (by StudioGray)

  Location Plan

  Existing Plans (Dwg 051_SP_01 Rev P1, Dwg 051_EX_01 to 05 Rev P1)

  Proposed Plans (Dwg 051_PL_01 Rev P2)

  Proposed Sections (Dwg 051_PL_05 Rev P2)

- Planning Comments and Response

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See BIA Section 1.
Is data required by Cl.233 of the GSD presented?	No	See comments in audit Paragraph 4.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See BIA Section 2.3.
Are suitable plan/maps included?	No	See Audit paragraph 4.5.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	NA	See Audit paragraph 4.5.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 3.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 3.
Is a conceptual model presented?	No	See Audit paragraph 4.10
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	See Audit Paragraph 4.9.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 4.2.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No issue identified.
Is factual ground investigation data provided?	Yes	See paragraph 4.4.
Is monitoring data presented?	Yes	See SAS Ground Investigation Report in BIA Appendix 2.
Is the ground investigation informed by a desk study?	No	Brief desk study information included in BIA Section 2 however does not meet the requirements of Arup GSD Appendix G1.
Has a site walkover been undertaken?	Yes	See Audit paragraph 4.8.
Is the presence/absence of adjacent or nearby basements confirmed?	No	No discussion within BIA.
Is a geotechnical interpretation presented?	No	See Audit paragraph 4.10.
Does the geotechnical interpretation include information on retaining wall design?	No	See Audit paragraph 4.10.
Are reports on other investigations required by screening and scoping presented?	NA	None identified.
Are the baseline conditions described, based on the GSD?	No	See Audit paragraph 4.9.
Do the base line conditions consider adjacent or nearby basements?	No	No reference to nearby basements.
Is an Impact Assessment provided?	Yes	See Audit paragraphs 4.12 to 4.24.
Are estimates of ground movement and structural impact presented?	No	See Audit paragraphs 4.12 and 4.13.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	See Audit paragraphs 4.12 and 4.13.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	No discussion on mitigation within BIA.
Has the need for monitoring during construction been considered?	No	No discussion on monitoring within BIA.
Have the residual (after mitigation) impacts been clearly identified?	No	Mitigation not discussed within BIA.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	See Audit paragraphs 4.12 to 4.24.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See BIA Section 5.4.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	See Audit paragraphs 4.12 to 4.24.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	BIA states Burland Category 1, but presents no evidence to support this, see Audit paragraphs 4.12 and 4.13.
Are non-technical summaries provided?	No	The BIA does not include any non-technical summaries.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Ecos Maclean Ltd with assistance from Site Analytical Services (SAS). The individuals concerned in its production have suitable qualifications.

4.2. The proposal consists the construction of a single storey basement below an approved rear extension, extending beyond the external wall of the existing listed property to the garden walls. The basement will be approximately 4m below existing garden level and is to be formed using precast concrete units to form the retaining wall along with mass concrete underpinning to the party wall corners of the rear external wall.

4.3. The LBC Instruction to proceed with the audit identified that the basement proposal either involved a listed building or was adjacent to listed buildings but gave no details. The Planning and Heritage Report identified that 5 Gloucester Crescent is a Grade II listed building located in the Primrose Hill Conservation Area.

4.4. The BIA reports the ground conditions to comprise Made Ground over London Clay, based on a single borehole undertaken to the rear of the house. Whilst groundwater was not encountered during drilling, it is reported that six to seven weeks after the investigation works, water was recorded at 1.17m below ground level (bgl). A report on the ground investigation by SAS is included within Appendix 2 of the BIA. However, the report includes a poor quality scan of the borehole log, resulting details being unreadable.

4.5. The relevant maps extracts from the Arup GSD, Camden SFRA and the Environment Agency (EA) identifying the site location on each map are referenced but have not been included. It would be beneficial if these extracts are included as they help to support statements made in the BIA screening process.

4.6. The answer to Hydrogeology screening question 1b which relates to whether the proposals extend beneath the groundwater table is given as 'No'. It is also noted that groundwater has not been considered in the retaining wall design. SAS' ground investigation report included in Appendix 2, reports that perched groundwater was observed on monitoring visit at 1.17m below ground level. Whilst the groundwater table may not be affected, groundwater will still need to be considered in design and construction activities.

4.7. The justification for a 'No' answer to question 4 in the Hyrogeology screening states that mitigation measures need to be identified as the basement extends into the garden. However, it is stated that the garden is currently partially paved and that the basement lays within this area so no change to hard surfaced/paved areas, so it is unclear why mitigation is required. This is not discussed further in the BIA.

4.8. The justification for answers to questions 6, 8 and 9 of the land stability screening refers to the walkover. There is no discussion regarding the walkover included within the BIA.

4.9. An answer of 'Yes' is given to question 13 of the land stability screening which relates to whether there is an increase of the differential depth of foundations relative to neighbouring properties. The BIA states that the new foundations will be approximately 2.5 to 3.0m below neighbouring foundations. There appears to be no justification for this statement, and it is noted that no foundation inspection pits have been undertaken for the scheme. This should have been carried through to scoping.

4.10. The BIA discusses the stratigraphy encountered in Section 4.6 along with providing the Site Investigation report by SAS in Appendix 2. There is however, no discussion as to suggested geotechnical parameters to be used in design and assessments as required by CPG4.

4.11. BIA Section 4.3 discusses the susceptibility of the soil to shrinkage and swelling. It is noted the BIA states the London Clay has a low to medium susceptibility based on plasticity index of 37% and 39%. These values are towards the upper limit of medium susceptibility and given that there are only two results it would be prudent to suggest the London Clay has a medium to high susceptibility.

4.12. The BIA states that the risk of cracking to adjoining party walls along with the garden walls have been assessed and is no more than Damage Category 1. The BIA does not include a ground movement assessment (GMA) nor does it give any other justification for this statement. A GMA should be included with the BIA to justify the stated Damage Category.

4.13. It is noted that the sections in Appendix 3 show 50mm pea shingle and insulation outside of the basement wall excavation. Commentary as to how this will be installed and if any concerns when acting under loading due to earth pressures should be included. Consideration as to these effects should also be given in the GMA.

4.14. The BIA proposes to utilise precast planks as a retaining wall for which further clarification and details are required.

4.15. It is noted that the bases and retaining wall planks are to be installed sequentially rather than in a traditional 'hit and miss' under-pin technique. It should be clarified how soil will be retained local to the excavations during installation

4.16. Commentary is provided in Appendix 5 regarding the construction sequencing, however, it is requested that a series of plans showing the proposed sequencing and temporary propping are provided to enable confirmation that stability of the existing buildings and the basement surroundings are maintained at all times.

4.17. The detail between the wall and the base of the planks is noted as being a series of steel angles which are assumed to be bolted to the concrete foundations. It is noted that these are 200mm long and 6mm thick, the BIA should demonstrate that this thickness of angle is sufficient to accommodate the bending stresses induced as a result of the pressure at the rear of the wall.

4.18. It is assumed that the pre-cast planks to be used are a standard thickness, with the calculations noting 150mm or 200mm thick 'hollowcore' planks. Given the existing footings are likely to be significantly wider than this, it should be confirmed whether there are any concerns with regards to crushing of the existing foundation at the junction with the new planks, particularly as these contain hollow voids which will further reduce the contact area. The same query is raised with regards to the base detail where it is understood that the plank will sit on a 200mm long steel angle.

4.19. It is noted that the planks to form the retaining wall will be brought to site in 600mm widths and assumed fixed lengths, then manoeuvred into position. Clarification is requested on how these are to interact with existing foundations which will inevitably vary slightly. It is assumed that despite their reduced width the planks will still be of a significant weight and further detail should be included with regards to the means by which the planks shall be installed whilst ensuring good workmanship and compliance with Health and Safety Regulations.

4.20. The basement slab is shown on the section drawings but not referred to in the calculations. Section 5.5 of the SAS report recommends that the slab is fully suspended. Confirmation of whether slab has been designed to resist long term heave pressures or is fully suspended should be included. Details with regards to fixing the slab into the hollow core plank are also required.

4.21. It is noted that calculations are provided which show the moments induced in the plank, are within the specified bending capacity. Justification/commentary should be included on their use as a load bearing element, particularly their ability to deal with any eccentricity in the application of vertical load applied, given that they are 'simply supported' at the base and head.

4.22. The plan view of structural details shows the rear façade underpinned, possibly with steproc blocks, however Section G-G and D-D do not show this wall underpinned. Clarification is required as the proposed pad footing spreaders appear to undermine the ground below this wall if underpinning is not adopted as suggested by the sections.

4.23. It is noted that the garden party/boundary wall is not shown on Section EE. There is potential for the proposed basement retaining wall installation to compromise these footings and/or wall stability. Further clarification is requested.

4.24. Commentary should be provided to ensure that the specification of the proposed steel posts and spreaders which will sit in the ground behind the basement retaining wall and support the structure over, will be suitably durable such that it is adequate to provide long term support to the structure above.

4.25. The BIA does not discuss monitoring or mitigation measures and this requirement for these should be discussed within the BIA.

4.26. It is accepted that there are no further slope stability concerns regarding the proposed development and in the absence of any significant groundwater flows, it is accepted there are no potential impacts to the wider hydrogeology.

4.27. It is accepted that there are no hydrology concerns with the proposed development.

5.0 CONCLUSIONS

5.1. The BIA was undertaken by Ecos Maclean Ltd. The author's qualifications are in accordance with CPG4 requirements.

5.2. The proposal includes a single storey basement extending beyond the external wall of the of the existing listed property. The developments proposes the utilisation of precast concrete planks as a retaining wall, further clarification on the use of these is required and discussed in paragraphs 4.14 to 4.24.

5.3. It is requested that the Arup GSD figures reference in BIA Section 3 are included to support screening responses.

5.4. It is requested that the BIA is updated to include a commentary on the walkover to support screening answers.

5.5. It is requested that the ground investigation report included in BIA Appendix 2 is updated to include better quality borehole logs.

5.6. It is noted that the response to question 4 of the Hydrogeology screening states that there is no change to hard surfaced/paved areas, however it also states that mitigation is required due to the basement extending into the garden. It is advised that this question is reviewed and should it be deemed that mitigation is required, this should be carried through and discussed within the BIA.

5.7. It is noted that no foundation inspection pits have been included within the BIA. If these have been undertaken they need to be included within the BIA. If none have been undertaken, these are required to determine suitability and impact of the proposed development.

5.8. The BIA should present a conceptual model which includes, stratigraphy, geotechnical parameters as per Arup GSD Appendix G3 and groundwater assumptions, and this is requested. A review of the shrinkage and swelling potential is requested as discussed in 4.11.

5.9. The BIA does not include a ground movement assessment which is required. Consideration should be given to the presence of pea shingle and insulation shown to be present on the outside of the basement wall excavation.

5.10. The BIA does not discuss monitoring or mitigation measures and this requirement for these should be discussed within the BIA.

5.11. A consultation response (Perry, March 2016) states that a number of trees have been felled, yet the response to question 6 of land stability states no trees are to be felled. Clarification is requested.

5.12. It is accepted that there are no slope stability concerns or any other surface water considerations regarding the proposed development.

5.13. 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
Moffat	Flat 5, 3 Gloucester Crescent, London	31/03/2016	The effect on groundwater flow around and under perimeter of basement. Concerns that shrinkage and swelling has not been considered for wider area.	See BIA Sections 4.3 and 5.2 and Audit paragraph 4.11.
Perry	Not given	29/03/2016	Effect on of loads on neighbouring properties. Concern over shrinkage and swelling potential of London Clay stated in BIA Depth of foundations in relation to the number of trees felled. Questions on the validity of Basement Impact Assessment	GMA required, See Audit paragraph 4.12 Review of shrinkage and swelling potential requested, see audit paragraph 4.11. To be Clarified, see Audit paragraph 4.9 To be addressed by comments in Audit Section 4

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Additional information to be included in BIA	Open – BIA to be resubmitted to include commentary on walkover and extracts of Arup GSD maps as references in screening process.	
2	BIA	Borehole logs in Appendix 2 not legible	Open – Logs to be readable upon resubmission of BIA	
3	BIA	Conceptual model not included in BIA	Open – BIA to be resubmitted to include conceptual model as discussed in paragraph 4.10. Geotechnical discussion to be as per Arup GSD Appendix G3.	
4	Stability	Foundation inspection pits not included in BIA	Open – Foundation inspection pits are required to confirm existing foundations and discussed within BIA.	
5	Stability	Ground movement assessment not included	Open – GMA to be included in resubmission of BIA	
6	Stability	Mitigation and monitoring requirements not discussed	Open – The need for mitigation and/or monitoring requirements to be discussed in BIA	
7	Stability	Resident response reports that trees have been felled for schem	Open – Clarification of whether trees have been felled at the site location is requested and the BIA to be updated accordingly	
8	Stability	Further clarification requested with regards to the use of precast concrete planks for the retaining wall	Open – Please provide clarification on the items discussed in Audit paragraphs 4.14 to 4.24.	
9	Hydrogeology	In consistency in response to screening question 4	Open – It is requested that Q4 of the hydrogeology screening is reviewed as discussed in Audit paragraph 4.7.	

Appendix 3: Supplementary Supporting Documents

None

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