

5 Gloucester Crescent
London, NW1 7DS

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12466-10
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February 2017

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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 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 original BIA was undertaken by Ecos Maclean Ltd. The author's qualifications are in accordance with CPG4 requirements. The supplementary information has been provided by Studio Gray Architects, Site Analytical Services, Geotechnical and Environmental Associates Ltd and Knapp Hicks Consulting Engineers.
- 1.5. The proposal includes a single storey basement extending beyond the external wall of the existing listed property. The development was originally proposed to utilise precast concrete planks as a retaining wall. However, in the revised submission underpinning of the existing property's rear wall is proposed, with new retaining walls formed in reinforced concrete, constructed in a 'hit and miss' sequence.
- 1.6. It was requested that the Arup GSD figures referenced in BIA Section 3 be included to support screening responses. These have now been provided.
- 1.7. It was requested that the BIA be updated to include a commentary on the walkover to support screening answers. This has now been provided.
- 1.8. It was requested that the ground investigation report included in BIA Appendix 2 be updated to include better quality borehole logs. These have now been provided.
- 1.9. In the revised submissions, it has been confirmed that the proposed development will result in an increase in permeable area and attenuation SUDS is proposed. As such, it is accepted there will be no impacts to the wider hydrological environment.
- 1.10. It was noted that no foundation inspection pits were included within the BIA. This information has now been provided and the foundation levels considered in the assessments.

- 1.11. The original BIA did not include a ground movement assessment, which has now been provided. This predicts damage impacts of Category 0 to 1 (Negligible to Very Slight).
- 1.12. The original BIA did not discuss monitoring or mitigation measures to reduce damage impacts. In the revised BIA monitoring is discussed. However, a detailed monitoring strategy will be required which should be agreed under the Party Wall Act. The trigger values, mitigation measures and contingency plans adopted should be linked to the GMA and implemented to ensure that damage impacts are no greater than Category 1.
- 1.13. A consultation response (Perry, March 2016) states that a number of trees have been felled. In the revised BIA it has been confirmed that three apple trees and a pear tree were removed in 2014, which have been assessed as having no impact on the prevailing soil conditions in the context of the proposed development.
- 1.14. It is accepted that there are no slope stability concerns regarding the proposed development.
- 1.15. 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.
- 1.16. 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

2.7. CampbellReith were provided the following documents for audit purposes in January 2017:

- BIA Audit Response Letter dated 20 January 2017 by Studio Gray Architects.
- Borehole and Trial Pit Logs by Site Analytical Services Ltd.
- Temporary Work Sequencing Drawing ref 34474/S/001 dated 12 January 2017 by Knapp Hicks Consulting Engineers.
- Screening Reference Maps from Arup's GSD.
- Ground Movement Assessment Report ref J16293 dated January 2017 by Geotechnical and Environmental Associates Ltd.
- Proposed Sections Drawing ref 051_PL-05 dated January 2016 by Studio Gray Architects.

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?	Yes	Updated in the revised submissions.
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?	Yes	Updated in the revised submissions.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Updated in the revised submissions.
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	Described in the GMA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated in the revised submissions.

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?	Yes	Updated in the revised submissions.
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?	Yes	Updated in the revised submissions.
Has a site walkover been undertaken?	Yes	See Audit paragraph 4.8.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Updated in the revised submissions. Foundation depths considered in GMA.
Is a geotechnical interpretation presented?	Yes	Updated in the revised submissions.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Updated in the revised submissions.
Are reports on other investigations required by screening and scoping presented?	Yes	GMA.
Are the baseline conditions described, based on the GSD?	Yes	Updated in the revised submissions.
Do the base line conditions consider adjacent or nearby basements?	Yes	Presented in the GMA.
Is an Impact Assessment provided?	Yes	Updated in the revised submissions.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Updated in the revised submissions.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Updated in the revised submissions.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Structural monitoring with contingency actions, attenuation SUDS.
Has the need for monitoring during construction been considered?	Yes	Updated in the revised submissions.
Have the residual (after mitigation) impacts been clearly identified?	N/A	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated in the revised submissions.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Updated in the revised submissions.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Updated in the revised submissions.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Updated in the revised submissions.
Are non-technical summaries provided?	No	The BIA does not include any non-technical summaries.

4.0 DISCUSSION

- 4.1. The original BIA was undertaken by Ecos Maclean Ltd. The author's qualifications are in accordance with CPG4 requirements. The supplementary information has been provided by Studio Gray Architects, Site Analytical Services, Geotechnical and Environmental Associates Ltd and Knapp Hicks Consulting Engineers.
- 4.2. The proposal comprises 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 slab will be approximately 4m below existing garden level. The construction methodology has been revised, and incorporates underpinning of existing foundations and new retaining walls formed in a 'hit and miss' sequence.
- 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 identifies 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. In the revised submission, clear borehole logs have been provided.
- 4.6. 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 were not included in the original BIA.
- 4.7. In the revised submission appropriate map extracts have been provided.
- 4.8. 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 the structural design and construction activities, and appropriate waterproofing should be specified at detailed design stage.

- 4.9. The justification for answers to questions 6, 8 and 9 of the land stability screening refers to the walkover. There was no discussion regarding the walkover included within the original BIA. This has been updated in the revised submissions and is accepted.
- 4.10. 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 appeared to be no justification for this statement, and it was noted that no foundation inspection pits had been undertaken for the scheme. This should have been carried through to scoping.
- 4.11. In the revised submissions, the GMA references foundation inspection pits and makes conservative assumptions with regards to un-inspected foundation depths in order to assess damage impacts. This approach is accepted.
- 4.12. The BIA discusses the stratigraphy encountered in Section 4.6 along with providing the Site Investigation report by SAS in Appendix 2. There was however, no discussion as to suggested geotechnical parameters to be used in design and assessments as required by CPG4.
- 4.13. In the GMA included within the revised submissions, conservative geotechnical parameters are proposed, which are accepted. The site investigation indicates the insitu shear strength of the London Clay to be stiff, which should provide adequate bearing capacity for the proposed foundations.
- 4.14. 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.
- 4.15. The original BIA stated damage impact to adjoining structures would be no more than Burland Category 1 (Very Slight). In the revised submission a GMA is presented which confirms that damage impacts will be between Category 0 and 1, depending on the methodology of assessment. The GMA indicates that with the correct workmanship, damage impacts should be limited to Category 0 for all structures. It is accepted that the movements and damage impacts predicted are in line with expectations, assuming proper controls on construction.
- 4.16. The original BIA did not discuss monitoring or mitigation measures to reduce damage impacts. In the revised BIA monitoring is discussed. However, a detailed monitoring strategy will be required which should be agreed under the Party Wall Act. The trigger values, mitigation

measures and contingency plans adopted should be linked to the GMA and implemented to ensure that damage impacts are no greater than Category 1.

- 4.17. The original BIA proposed forming the basement with pre-cast concrete planks. The revised submissions propose an underpinning methodology beneath the rear wall of the existing house and a new basement to be formed beneath the rear garden, with an RC retaining wall to be formed in a 'hit and miss' sequence. Suitable outline sequencing and propping arrangements have been presented.
- 4.18. 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.
- 4.19. In the revised submissions, it has been confirmed that the proposed development will result in an increase in permeable area, due to the planned planters above basement roof level, providing an indicated 1m of topsoil. In addition, it is proposed to attenuate rainfall using onsite storage tanks / crates. The details of the proposed attenuation scheme should be agreed in consultation with Thames Water and LBC. As such, it is accepted there will be no impacts to the wider hydrological environment.

5.0 CONCLUSIONS

- 5.1. The BIA was undertaken by Ecos Maclean Ltd. The author's qualifications are in accordance with CPG4 requirements. The supplementary information has been provided by Studio Gray Architects, Site Analytical Services, Geotechnical and Environmental Associates Ltd and Knapp Hicks Consulting Engineers.
- 5.2. The proposal includes a single storey basement extending beyond the external wall of the existing listed property. Underpinning of the existing property's rear wall is proposed, with new retaining walls formed in reinforced concrete, constructed in a 'hit and miss' sequence.
- 5.3. In response to the comments made in the D1 Audit Report, the required additional information and assessments have been provided, and are accepted.
- 5.4. The original BIA did not include a ground movement assessment, which has now been provided. This predicts damage impacts of Category 0 to 1 (Negligible to Very Slight).
- 5.5. The original BIA did not discuss monitoring or mitigation measures to reduce damage impacts. In the revised BIA monitoring is discussed. However, a detailed monitoring strategy will be required which should be agreed under the Party Wall Act. The trigger values, mitigation measures and contingency plans adopted should be linked to the GMA and implemented to ensure that damage impacts are no greater than Category 1.
- 5.6. In the revised submissions, it has been confirmed that the proposed development will result in an increase in permeable area and attenuation SUDS is proposed. As such, it is accepted there will be no impacts to the wider hydrological environment.
- 5.7. It is accepted that there are no slope stability regarding the proposed development.
- 5.8. 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.	Closed – February 2017
2	BIA	Borehole logs in Appendix 2 not legible	Open – Logs to be readable upon resubmission of BIA	Closed – February 2017
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.	Closed – February 2017
4	Stability	Foundation inspection pits not included in BIA	Open – Foundation inspection pits are required to confirm existing foundations and discussed within BIA.	Closed – February 2017
5	Stability	Ground movement assessment not included	Open – GMA to be included in resubmission of BIA	Closed – February 2017
6	Stability	Mitigation and monitoring requirements not discussed	Open – The need for mitigation and/or monitoring requirements to be discussed in BIA	Closed – February 2017
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	Closed – February 2017
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.	Closed – February 2017
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.	Closed – February 2017

Appendix 3: Supplementary Supporting Documents

BIA Audit Response Letter dated 20 January 2017 by Studio Gray Architects

Borehole and Trial Pit Logs by Site Analytical Services Ltd.

Temporary Work Sequencing Drawing ref 34474/S/001 dated 12 January 2017 by Knapp Hicks Consulting
Engineers

Screening Reference Maps from Arup's GSD

Ground Movement Assessment Report ref J16293 dated January 2017 by Geotechnical and Environmental
Associates Ltd.

Proposed Sections Drawing ref 051_PL-05 dated January 2016 by Studio Gray Architects

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