

Land South of 3 Malden Road
London, NW5 3HS

Basement Impact Assessment
Audit

For
London Borough of Camden

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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 Land South of 3 Malden Road (planning reference 2015/7207/P). On the basis of the BIA, the basement was considered to fall within Category A as defined by the Terms of Reference, however, the screening has not been fully carried out to be able to confirm that there are no potential impacts.
- 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 Momentum Structural Engineers and the individuals concerned have suitable qualifications.
- 1.5. The site does not comprise buildings and is currently used as a carpark. The proposed building comprises five storeys to be supported on piles, over a basement which is to be formed by a contiguous piled wall.
- 1.6. An indicative structural design is not presented. Construction sequence sketches indicating each stage of the basement excavation and construction and temporary works proposal have not been provided and these are requested.
- 1.7. The screening process has not been fully undertaken. The baseline conditions are considered incomplete as a site specific ground investigation has not been undertaken to confirm the sequence and depth of strata and the presence or absence of basements beneath the neighbouring properties has not been confirmed.
- 1.8. Supporting analysis has not been provided to justify the statements in the BIA that adverse effects on the neighbouring property foundations are not anticipated.
- 1.9. With regards to the neighbouring property foundation depths, these should be investigated or the maximum differential depth assumed for design.
- 1.10. It is recommended the BIA be re-submitted with a site specific ground investigation undertaken, a full description of the baseline conditions, the full screening undertaken and details of the temporary works included together with construction sequence sketches. A ground movement assessment giving anticipated vertical and horizontal movements as a result of pile installation

and excavation together with predicted damage categories for the neighbouring properties are also requested. This will inform the need for further assessment and/mitigation or support the statements in the BIA that no adverse effects are anticipated.

- 1.11. It is accepted there are no slope stability concerns regarding the proposed development.
- 1.12. Outline proposals for movement monitoring with trigger levels are presented although these may need revising following the ground movement assessment undertaken as described above. The trigger levels may be agreed as part of a detailed proposal for the Party Wall awards.
- 1.13. A works duration is included as part of the indicative construction management plan (CMP). A more detailed programme may be presented by the appointed Contractor with details of the CMP to be agreed with the Council.
- 1.14. Queries and requests for further information 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 27 May 2016 to carry out a Category A Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Land South of 3 Malden Road, NW5 3HS (Camden Planning reference 2015/7207/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;
 - 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 *"Redevelopment of the site to provide 20 single person dwelling self-contained studios (use class C3) and associated landscaping."*
- 2.6. The Audit Instruction stated the site is not a neighbour to listed buildings, however, it is stated in the BIA that Fiddler's Elbow, located to the south is Grade II listed.

2.7. CampbellReith accessed LBC's Planning Portal on 16 June 2016 and gained access to the following relevant documents for audit purposes:

- Structural Engineering Planning Report: Momentum Structural Engineers, dated December 2015
- Phase 1 Preliminary Risk Assessment: RPS, dated December 2015
- Design and Access Statement: JPA, dated December 2015
- Outline Construction Management Plan: COTTEE Highways and Transportation Consultants, dated October 2015
- John Pardey Associates Planning Application Drawings consisting of
 - Existing Plans
 - Proposed Plan
 - Proposed Sections
 - Existing elevations
 - Proposed elevations

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See Audit paragraph 4.1
Is data required by Cl.233 of the GSD presented?	Yes	Structural Engineering Planning (SEP) Report although the depth of the basement is not stated in the report
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	SEP Report although the depth of the basement is not stated
Are suitable plan/maps included?	No	Although a site location is included, Arup GSD map extracts with the site location indicated not included
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Suitable maps not included
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Justification not given for 'No' responses and Arup GSD maps not included to support statements. Response to Q5 is incorrect (see Audit paragraphs 4.4, 4.7 and 4.9)
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Justification not given for all the 'No' responses and Arup GSD maps not included to support statements. Response to Q1b should be 'unknown' (see Audit paragraphs 4.5, 4.7 and 4.9)
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Screening not undertaken (see Audit paragraph 4.8)
Is a conceptual model presented?	No	Site specific ground investigation not undertaken. Anticipated sequence of strata from a BGS borehole located at some distance away referenced, however, this could vary significantly on site (see Audit paragraph 4.10)
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Although one issue from the screening should have been carried forward (see Audit paragraph 4.6)

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Although one issue should have been carried forward from the screening (see Audit paragraph 4.6)
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	Screening not undertaken
Is factual ground investigation data provided?	No	Site specific ground Investigation not undertaken
Is monitoring data presented?	No	Site specific ground Investigation not undertaken
Is the ground investigation informed by a desk study?	N/A	Desk study by RPS undertaken as part of Phase 1 Preliminary Risk Assessment but no ground investigation undertaken.
Has a site walkover been undertaken?	Yes	As part of desk study. RPS report Section 2.1.
Is the presence/absence of adjacent or nearby basements confirmed?	No	No description of the neighbouring property basements although the proposed basement is not indicated to cover the whole site (see Audit paragraph 4. 12).
Is a geotechnical interpretation presented?	N/A	Ground investigation not undertaken
Does the geotechnical interpretation include information on retaining wall design?	N/A	Ground investigation not undertaken (see Audit paragraph 4.11)
Are reports on other investigations required by screening and scoping presented?	No	Ground investigation recommended but not undertaken
Are the baseline conditions described, based on the GSD?	No	No mention of ground conditions or description of neighbouring property foundations.
Do the base line conditions consider adjacent or nearby basements?	No	Description of the neighbouring properties provided but considered incomplete.
Is an Impact Assessment provided?	Yes	Provided but not all of the issues identified has been carried forward and screening incomplete (see Audit paragraphs 4.6 and 4.7)

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	No	Not provided. Impact assessment states no adverse effects anticipated (see Audit paragraphs 4.12 and 4.13)
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	However Hydrology screening not undertaken and one issue each from the Hydrogeology and Land Stability screening not carried forward (see Audit paragraphs 4.6 and 4.7)
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Considered, however, as all the potential impacts of the proposed basement have not been identified, this is considered inadequate.
Has the need for monitoring during construction been considered?	Yes	Outline proposal with trigger levels presented although as ground movement assessment with supporting analysis is not presented, it is unclear how these were determined (see Audit paragraph 4.16)
Have the residual (after mitigation) impacts been clearly identified?	N/A	Not possible to determine if these are needed as all the potential impacts have not been considered.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Supporting analysis not provided to justify conclusions (see Audit paragraph 4.13)
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Not demonstrated. Surface flow and flooding screening not undertaken.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Not demonstrated
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	Anticipated damage categories not given
Are non-technical summaries provided?	No	Not provided

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried by Momentum Structural Engineers and the individuals involved have CEng IStructE and CGeol qualifications.
- 4.2. The site is indicated to previously comprise housing which was demolished in the early 1970s and more recently has been used as a carpark. It is proposed to construct a five storey building over a basement. The basement walls are to be formed by a contiguous bored pile wall with the building loads supported on piled foundations to be constructed from ground level. The proposed basement depth is not indicated in the BIA report although one of the Architect's sections indicates c. 3.40m. An indicative structural design has not been provided. A proposed construction sequence is provided within the BIA, however, no sketches are presented to better illustrate this.
- 4.3. It is stated the piled retaining wall will be propped during construction, however, temporary works sketches have not been provided and this is requested.
- 4.4. A 'No' response is given to Question 5 of the Land Stability screening which relates to whether or not the London Clay is the shallowest strata on site. This is incorrect as the Made Ground which is stated to overlie the London Clay is not a stratum in the context of the screening. A definitive 'Yes' or 'No' response is not given to Question 12 which relates to whether or not the differential depth in relation of the neighbouring property foundations will increase although the drawing referenced indicates shallow foundations have been assumed for the nearby properties and this issue was carried forward to scoping.
- 4.5. A 'No' response is given to Question 1b of the Hydrogeology screening and part of the justification given is *'water was encountered in the historic boreholes in the vicinity of the site. As the site is not over an aquifer, this is likely to be limited perched water in the Superficial Deposits above the London Clay Formation, and is not considered to pose a significant issue'*. Clarification is requested as it is stated elsewhere that the site is underlain by London Clay with no Superficial Deposits indicated. Although the London Clay is an unproductive stratum, it should be noted that perched water may be encountered and measures such as sump pumping may be required during construction.
- 4.6. It is stated in the screening that the site is within 60m of a *'hidden water course'*. Although the Camden SFRA states that these have been culverted and incorporated into the sewer network, this issue should have been carried forward to scoping and appropriately addressed.
- 4.7. Although it is evident that a thorough screening process for the Land Stability and Hydrogeology has been largely undertaken, justification is not given for all the 'No' responses.

- 4.8. The screening process has not been fully undertaken. The surface flow and flooding screening questions have not been answered although the desk study section makes reference to the various sources and concludes the site is in an area with a low risk of flooding.
- 4.9. Cl. 234 of the Arup GSD states that it is the applicant's responsibility to provide sufficient information proportionate to the potential impacts of the proposed basement. At the very least, a thorough screening process with the requirements of CPG4 accurately followed by referencing and the inclusion of all the relevant map extracts from the Arup GSD, Environment Agency and the LBC Flood Risk Management Strategy identifying the site location on each map needs to be completed to demonstrate there are no potential impacts from the proposal. These extracts would help to support statements made in the screening process.
- 4.10. No intrusive investigation has been undertaken although it is stated in the BIA that a ground investigation is required to confirm the site conditions. The desk study section makes reference to '*nearby borehole records*' which it states indicates the top of the London Clay to be between 0.60 and 1.80m bgl. It should be noted that whilst these give an indication of the likely sequence of strata, the depths could vary significantly on site. A suitable ground investigation establishing the sequence and depth of strata with a programme of groundwater monitoring needs to have been completed as part of the design stage.
- 4.11. Retaining wall parameters should be provided as part of the interpretation of the ground investigation data.
- 4.12. It is stated in the ground stability screening that '*the form and level of the adjacent properties foundations are to be confirmed. The proposed single-storey basement is ~3.5m from the building to the north, ~7.5m from the highway to the east, ~3.5m away from the building to the south, and ~8m away from the building to the west*'. It is stated in the Impact Assessment that the neighbouring properties to the south and west are at a sufficient distance away from the basement dig to be of concern. Clarification is requested.
- 4.13. It is stated in the Impact Assessment that '*the neighbouring property to the north is ~3.5m from the proposed basement dig. The form and level of the foundations, and the presence of a basement, are unknown. Further investigation is required to establish the level and form of the existing foundations. This will assist in assessing any potential impacts however at present, as the proposed basement is 3.5m away at its closest, and only single storey, significant adverse impacts on the foundations of the building to the north are not anticipated*'. No supporting analysis has been provided to justify these statements. CIRIA Report C580 suggests that any buildings and infrastructure within a distance of 4 x excavation depth could experience ground movements. Anticipated vertical and horizontal movements as a result of the excavation and pile installation together with a predicted damage category for the neighbouring properties are

requested to justify the above statements. It is noted that the property to the south, Founder's Elbow, is listed.

- 4.14. It is stated in the BIA that the magnitude of anticipated heave is expected to be small although a value is not given. It is further stated that piles forming the basement will restrict heave movements within the basement footprint with the piles outside the footprint further acting to restrain any potential heave movements. This is considered reasonable given the basement does not cover the full footprint of the site.
- 4.15. A drainage strategy is presented within the BIA. The preferred system is to utilise attenuation tanks beneath the building with water indicated to drain into the combined sewer beneath Malden Road. A gravity fed foul system into the sewer is also indicated.
- 4.16. Outline proposals for movement monitoring with trigger levels are presented although it is unclear how these were determined given a ground movement assessment with supporting analysis is not presented.
- 4.17. Although a works programme has not been provided, a work duration for the groundworks and construction is indicated in the outline construction management plan (CMP). Details of the CMP should be agreed with the Council.
- 4.18. Without undertaking the full screening process, a site specific ground investigation and a ground movement assessment with supporting analysis, it is not possible to determine whether the BIA has identified and appropriately addressed all the potential issues.

5.0 CONCLUSIONS

- 5.1. The BIA was undertaken by Momentum Structural Engineers and the individuals concerned have the appropriate qualifications.
- 5.2. The site does not comprise buildings and is currently used as a carpark. The proposed building comprises five storeys to be supported on piles, over a basement which is to be formed by a contiguous piled wall.
- 5.3. An indicative structural design is not presented. Construction sequence sketches indicating each stage of the basement excavation and construction and temporary works proposal have not been provided and these are requested.
- 5.4. The screening process has not been fully undertaken. The baseline conditions are considered incomplete as a ground investigation has not been undertaken to confirm the sequence and depth of strata and the presence or absence of basements beneath the neighbouring properties has not been confirmed.
- 5.5. Supporting analysis has not been provided to justify the statements in the BIA that adverse effects on the neighbouring property foundations are not anticipated.
- 5.6. With regards to the neighbouring property foundations, these should be investigated or the maximum differential depth assumed for design.
- 5.7. It is recommended the BIA be re-submitted with a ground investigation undertaken, a full description of the baseline conditions, the full screening undertaken and details of the temporary works included together with construction sequence sketches. A ground movement assessment giving anticipated vertical and horizontal movements as a result of pile installation and excavation together with predicted damage categories for the neighbouring properties is also requested. This will inform the need for further assessment and/mitigation or support the statements in the BIA that adverse effects are anticipated.
- 5.8. It is accepted that there are no slope stability concerns regarding the proposed development.
- 5.9. Outline proposals for movement monitoring with trigger levels are presented although these may need revising following the ground movement assessment as described above. These may be agreed as part of a detailed proposal for the Party Wall awards.
- 5.10. A works durations is included as part of the indicative construction management plan. A more detailed programme may be presented by the appointed Contractor with details of the CMP to be agreed with the Council.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format/ Surface flow and flooding	Screening not fully undertaken in accordance with CPG4 requirements	Open – Full screening to be undertaken as discussed on audit paragraph 4.9	
2	BIA format/ stability	No site specific ground investigation to confirm sequence of strata	Open – site specific ground investigation to be undertaken with retaining wall parameters provided as part of the interpretation.	
3	Hydrogeology	Groundwater level not established	Open – to be established as part of the recommended ground investigation.	
4	Stability	Presence or absence of basements beneath the neighbouring properties not confirmed.	Open – to be confirmed	
5	Stability	Neighbouring property foundations not determined	Open – to be investigated or maximum differential depth assumed.	
6	Stability	No temporary works or construction sequence sketches	Open - to be provided	
7	Stability	No supporting analysis to justify statements regarding ground movements. No anticipated movements from construction activities and damage categories for neighbouring properties	Open – to be provided	
8	Stability	Movement monitoring proposal	Open – Outline proposal with trigger values provided although these may need to be reconsidered following ground movement assessment. Details and trigger levels to be agreed as part of the Party Wall award.	

Appendix 3: Supplementary Supporting Documents

None

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