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143 Gloucester Avenue, NW1 8LA

Basement Impact Assessment Audit

For

London Borough of Camden

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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 143 Gloucester Avenue, NW1 8LA (planning reference 2016/0667/P). The basement is considered to fall within Category A 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 proposal is for extension of the existing vaults beneath the front garden both in plan and depth. The basement will be constructed by underpinning in a hit-and-miss approach, with temporary supports provided at all time during the construction work.

1.5. The Basement Impact Assessment (BIA) and its constituents have generally been carried out by engineering consultants using individuals who possess suitable qualifications. The author of the BIA which contains the land stability impact assessments is not identified in the document.

1.6. A limited ground investigation indicates that the site is underlain by Made Ground and London Clay, although the nature of the soil to be retained above lightwell level has not been determined. It was initially assumed that the proposed basement will not extend below the groundwater table, however groundwater has been recorded above this level.

1.7. Blue Engineering refers to presence of a sewer that runs underneath the proposed development. Any constraints to development should be confirmed prior to commencement of any construction work on site. The engineer should review his calculations in light of the ground conditions revealed and the potential for heave.

1.8. Further justification for the predicted damage to the neighbouring properties has been presented. However, queries are raised with respect to the assumptions made and the need to consider of possible settlement.

1.9. An outline monitoring proposal has been provided. Details and trigger levels may be agreed as part of the Party Wall award.

1.10. It is accepted that there are no concerns with regard to surface water considerations regarding the proposed development.

1.11. The appraisal of the subterranean flow impact assessment requires further consideration as the description of the basement proposals is not as shown on the drawings and the groundwater is not as assumed. Justification for the conclusion regarding the impact on neighbouring basements is required.

1.12. Queries and requests for clarification are described in Section 4 and summarised in Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 19 July 2016 to carry out a Category A Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 143 Gloucester Avenue, London NW1 8LA, Camden Reference 2016/0667/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 *"Excavation at lower ground floor level to form ancillary accommodation and including a rooflight to the front paved external area."*

The Audit Instruction confirmed that the basement proposals did not involve any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 3/8/2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA)- Surface Water and Flooding;
- Screening and Scoping Study: Groundwater;
- BIA Stage 1 and 2 Land Stability;
- Planning Application Drawings consisting of:

  Location Plan

  Existing Plans

  Proposed Plans

- Design & Access Statement (DAS).

2.7. Subsequent to the issue of the initial audit report, the supplementary information listed below was submitted by the applicant. This revised audit report considers that supplementary information which is provided in Appendix 3. The information provided is as follows:

- 160119 - 143a Gloucester Avenue - CMS Supplementary Calculations - Blue Engineering 29/09/2016;
- 160922 - 143a Gloucester Avenue - Construction method statement - REV C - Blue Engineering 29/09/2016;
- 160216 - 143a Gloucester Avenue - CMS - Issue 2-2 - Blue Engineering 29/09/2016;
- GWPR1799 143 Gloucester Avenue Ground Investigation Report and Basement Impact Assessment FULL FINAL v103 – Ground & Water Ltd – dated October 2016 (NB identified as V1.02 on front cover).

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	Limited site investigation and groundwater monitoring data, a damage assessment and an outline ground movement monitoring scheme have been provided subsequent to the initial audit 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	
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	However, the provided site plan does not include sufficient detail about the adjoining properties.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Limited ground and groundwater information provided.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	However, it should be informed by a site investigation.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Assessment requires to be revisited in light of GI data.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Limited ground investigation information has been presented.
Is monitoring data presented?	No	Results of a single groundwater monitoring visit are reported.
Is the ground investigation informed by a desk study?	NA	
Has a site walkover been undertaken?	-	Unknown. But it is likely that one has been undertaken. See the Design and Access Statement report.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	Some limited information provided.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Although no ground investigation has been undertaken.
Are reports on other investigations required by screening and scoping presented?	Yes	The BIA: Stage 1 and 2 Land Stability stated that a ground and groundwater investigation was required to allow the impact of the basement to be fully assessed. Partial information has subsequently been provided.
Are the baseline conditions described, based on the GSD?	Yes	Baseline conditions described on basis of desk study only, supplemented by limited GI data.
Do the base line conditions consider adjacent or nearby basements?	Yes	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	It was stated in the BIA documents that it required further development. Whilst some further assessment has been provided, the hydrogeological assessment requires to be revisited and queries are raised with respect to the GMA and structural calculations.
Are estimates of ground movement and structural impact presented?	Yes	A damage category is concluded in the body of the CMS. Further justification has been provided, however, queries are raised on the assumptions made/information provided.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	The hydrogeological assessment requires to be revisited and queries are raised with respect to the GMA and structural calculations.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	NA	More information is required.
Has the need for monitoring during construction been considered?	Yes	Outline scheme has been provided.
Have the residual (after mitigation) impacts been clearly identified?	NA	More information is required.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Further justification is required.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Further justification is required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	However, further justification is required.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) and its constituents have generally been carried out by engineering consultants using individuals who possess suitable qualifications. The author of the DAS which contains the land stability impact assessments is not identified in the document.

4.2. The existing building is a 4 storey mid-terraced property, including a basement beneath the entire footprint of the structure that extends to a small lightwell and storage area below the front garden. The access to the existing basement is via the lightwell which includes an external staircase down the ground level.

4.3. The proposed plan is to reduce the base of the existing lightwell by 0.4m, and extend it to a full depth basement beneath the entire footprint of the front garden which stands 1.2m lower than the main basement level (stepping up to the main basement).

4.4. The proposed construction methodology as described by Blue Engineering consists of mass concrete underpinning of the lightwell and T-shaped RC underpinning of the basement extension in a hit-and-miss approach. The excavation will be undertaken in a narrow strip along the perimeter, in stages, with battering and stepping back the sides. The free holding faces will be restrained by temporary supports, Acrow Props and sacrificial plywood sheets, during the excavation. The toe then the stem of the main underpinning works will be cast in a two stage sequence. A 48hr period is allowed before removing the middle bulk of soil, and adjoining the remaining of the basement slab.

4.5. The hydrological elements of the BIA have been prepared by Ground and Water Limited. The BIA screening correctly identifies that the site has previously been affected by the 1975 flooding event, and is located in the local flood risk zone of Primrose Hill. The Environment Agency (EA) designates the site to be at a low risk from surface flooding whilst PPS25 indicates a significant flood hazard to be present on site. The property is outside the catchment of Hampstead Heath Pond chain, well away from surface water courses/lost rivers of London. The proposed development will not result in considerable change in the hardstanding/paved area of the site. It is accepted that there will be no impact on the wider hydrology of the area, and mitigation measures are described to address the potential risk to the basement from flooding.

4.6. Blue Engineering refers to presence of a sewer that runs underneath the proposed development. Any constraints to development should be confirmed prior to commencement of any construction work on site.

4.7. The subterranean flow impact assessment has been prepared by H Fraser Consulting. Since the assessment was carried out, a limited ground investigation has been completed. Whilst the exploratory holes confirmed the geology to comprise London Clay, it is overlain by a significant

thickness of Made Ground and a single monitoring visit recorded groundwater above the base of the proposed excavation. The assessment should be revisited to confirm whether it remains valid. The site is not found to be within 100m of a watercourse/well/ or spring lines, or within the catchment of the ponds in Hampstead Heath.

4.8. The assessment erroneously describes the new basement as being separated from the existing basement and that it is unlikely that groundwater backing up around the structure would cause nuisance to neighbouring properties. It was requested that their statement with respect to the basement should be corrected and justification provided for the conclusion. This remains outstanding. We concur with the BIA recommendation that precaution measures should be undertaken in the design and construction of the basement, such as: the excavation should be kept dry, and the basement walls should be designed to be waterproof.

4.9. The screening and scoping stages of the land stability section of the BIA have been prepared by Ground and Project Consultants Ltd. A damage assessment and construction sequence/ methodology are provided by Blue Engineering within the CMS. The October 2016 GI/BIA Report by Ground and Water Ltd includes a ground movement and building damage assessment. The assessment, which predicts Category 0 or 1 damage, assumes that the retaining walls support stiff clay. However, the ground investigation identified a significant thickness of soft organic Made Ground at one location and has not confirmed the nature of the strata to be retained above the current level of the lightwell. The assessment has also not considered the settlement of the underpins beneath load bearing walls, which the documents suggest could be up to 25mm.

4.10. The ground is gently rising towards the west and Primrose Hill but the topography local to the property is generally flat. Gloucester Avenue and its pedestrian right of way are immediately to the front of the property. An overground line is around 60m to the east of the site.

4.11. The Groundsure report appended in the Design and Access Statement and the consulted BGS nearby boreholes suggest that London Clay is the shallowest stratum (Made Ground may be present on site), and the groundwater table on site is likely to be deeper than the bottom of excavation. The BIA correctly identifies the volume change potential of London Clay and possible heave in front of the site due to removal of the front garden shrubs. However, the excavation of the basement will remove any desiccated soils. It recommends that the basement structures should be designed to account for swelling pressures due to excavation.

4.12. The Blue Engineering DAS concludes that Category of 0 to 1 damage according to Burland Scale is anticipated for the neighbouring structures however no justification is provided. This is now superseded by the information presented by Ground & Water Ltd.

4.13. A revised Method Statement and construction sequence drawings have been provided which include an outline monitoring proposal as requested.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) and its constituents have generally been carried out by engineering consultants using individuals who possess suitable qualifications. The author of the DAS which contains the land stability impact assessments is not identified in the document.

5.2. The proposal is for extension of the existing vaults beneath the front garden both in plan and depth. The basement will be constructed by underpinning in a hit-and-miss approach, with temporary supports provided at all time during the construction work.

5.3. The desk study suggests that the site is underlain by Made Ground and London Clay and this has been confirmed by subsequent ground investigation. It was also assumed that the proposed basement would not extend below the groundwater table, however, a single monitoring visit is reported to have recorded water level at shallow depth. The subterranean flow assessment should be revisited to address the issues raised in the audit and confirm whether it remains valid in light of the GI data. The CMS considers the need for dewatering.

5.4. Although a site specific ground investigation has been undertaken and soil parameters recommended for design, it has not provided information to allow the design of the retaining walls above the current lightwell level.

5.5. The site is far from any watercourse and there will not be a significant increase in the hardstanding/paved area as a result of the proposed development. Additionally the size of the proposed extension to the existing basement is relatively small. On this basis, whilst PPS25 indicates that the site is located within the local flood risk zone of Primrose Hill, and was previously affected by the 1975 London flooding incident, it is accepted that the proposed construction will not have an impact on the wider hydrology of the area.

5.6. Blue Engineering refer to presence of a main sewer that runs underneath the proposed development. Any constraints to development should be confirmed prior to commencement of any construction work on site.

5.7. Justification for the predicted damage to the neighbouring properties was requested and a further assessment has been provided on the basis that the retaining walls will support stiff clay. The GI has revealed a significant thickness of soft organic Made Ground and has not identified the nature of the soils to be retained at higher level. Additionally the assessment does not consider the settlement of underpins beneath load bearing walls. The potential impact to the roadway and any utilities running beneath are addressed in the CMS.

5.8. An outline monitoring proposal has subsequently been provided and this is requested. Details and trigger levels may be agreed as part of the Party Wall award. Now that GI data are

available, consideration should be given to whether the basement slab is to be designed for heave as noted in para 4.11.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Detail should be provided for the author of BIA - in relation to the land stability damage assessment conclusion.	Open (note audit report D1 erroneously referred to DAS).	
2	BIA	Ground and Project has requested a site specific ground and groundwater investigation to allow the impact assessment to be completed.	Open - partial information provided. No information presented for design of retaining walls above current lightwell level. Hydrogeological assessment has not been revised as requested and requires confirmation further to receipt of GI data. Structural calculations to include consideration of heave if required.	
3	Stability	Ground movement assessment (GMA) insufficient. See the comments raised in section 4.	Open - queries raised on GMA presented by Ground and Water Ltd.	
4	Stability	Movement monitoring proposal not provided.	Closed.	29/09/2016
5	Stability	Details and constraints associated with sewer and other utilities to be confirmed prior to commencement of any construction work on site and further impact assessment to be undertaken if need be.	Open - not addressed.	

Appendix 3: Supplementary Supporting Documents

(Disc)