CampbellReith
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42 Avenue Road, NW8 6HS

Basement Impact Assessment Audit

For

London Borough of Camden

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1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by the London Borough of Camden (LBC) to carry out an audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 42 Avenue Road, London NW8 6HS - Planning reference 2015/4414/P.

1.2. The Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has reviewed the BIA for potential impacts on land stability and on local groundwater and surface water conditions arising from the proposed basement development.

1.3. CampbellReith has accessed LBC's Planning Portal and reviewed the latest revisions of submitted documentation against an agreed audit check list.

1.4. The BIA includes screening, scoping, site investigation and impact assessment stages as required and defined in the LBC Planning Guidance Document 'Basements and Lightwells (CPG4)', dated July 2015.

1.5. The qualifications of the author of the BIA are in compliance with the requirements of CPG4.

1.6. The number and type of exploratory holes undertaken in the GI should be clarified.

1.7. The volume change potential for the Head Deposits and the London Clay should be confirmed based on the results of laboratory testing.

1.8. It is accepted that provided the basement walls, roof slab etc. are correctly sequenced and stiffly propped during construction there should be no stability concerns regarding the proposed development – see comment below on method statements etc.

1.9. It is accepted that the development will not impact on the wider hydrology of the area and that the risk of surface water flooding is low.

1.10. It is accepted that the development will not impact on the wider hydrogeology of the area and that the risk of subterranean (groundwater) flow issues is low.

1.11. It is accepted that provided the proposed development is constructed in accordance with the recommendations outlined in the arboricultural report, it will not have any significant impact on either of the retained trees on site.

1.12. The method statement in the BIA should be updated to clearly show (in outline at least), the type of construction to be adopted at each location e.g. in the vicinity of the trees, the sequencing of construction and the propping arrangements at all stages. Full method statements should be provided in due course within a BCP.

1.13. It is noted that the BIA refers to the perimeter contiguous piled wall to the basement excavation to be designed (in part at least) as a propped cantilever. Propped cantilever construction will not provide a stiff structure and could lead to unwanted ground movements. This issue should be clarified.

1.14. The nature of the perimeter walling to be adopted facing 44 Avenue Road should be clarified.

1.15. Whether or not the lower basement slab will be designed to resist heave forces should be clarified.

1.16. Geotechnical parameters and indicative calculations for wall design should be submitted with the BIA.

1.17. Detailed monitoring proposals with defined trigger levels for action should be included within the BCP.

1.18. The BIA does not contain a GMA or a prediction of damage category to adjacent properties. This omission should be rectified. The BIA cannot be closed out until this information has been submitted.

1.19. Queries and requests for clarification/further information are summarised in Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by the London Borough of Camden (LBC) on 30/10/2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 42 Avenue Road, NW8 6HS - Planning Reference 2015/4414/P.

2.2. The Audit has been carried out in accordance with the Terms of Reference set by the LBC. The Audit has 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 the LBC in general accordance with policies and technical procedures contained within the following documents:

a) Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

b) Camden Planning Guidance (CPG) 4: Basements and Lightwells.

c) Camden Development Policy (DP) 27: Basements and Lightwells.

d) 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; and,

c) Avoid cumulative impacts upon structural stability or the water environment in the local area.

The BIA should evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and should make recommendations for detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *'Installation of car lift within front forecourt and excavation at sub-basement level to provide two car parking spaces.'*

The audit instruction noted the following:

a) The basement proposals do not involve a listed building nor does the site neighbour any listed buildings.

b) The site is in an area subject to ground stability constraints and in an area subject to surface water flow and flooding constraints but is not in an area subject to subterranean (groundwater) flow constraints.

c) The application does not require determination by the Development Control Committee (DCC).

d) The scope of the submitted BIA extends beyond the screening stage.

2.6. CampbellReith accessed the LBC Planning Portal on 16 November 2015 and has examined the following reports and drawings relevant to the audit:

a) Design and Access Statement.

b) Arboricultural Report.

c) Preliminary Ground Investigation Report.

d) Basement Impact Assessment Report (BIA).

e) Planning Statement.

f) Construction Management Plan.

g) The following planning application drawings:

- Site Location Plan.
- Existing Plans, Elevations and Sections.
- Proposed Plans, Elevations and Sections.

2.7. No comments were received from the public on the planning application.

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?	No	No works programme has been provided. Mitigation measures e.g. propping, should be clarified.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Clarification of the proposed temporary and permanent works is required.
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	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Data source references not always provided. Justification not always given for 'No' answers.
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	
Land Stability Scoping Provided?	Yes	

Item	Yes/No/NA	Comment
Is scoping consistent with screening outcome?		
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	No scoping required.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Single borehole only.
Is monitoring data presented?	No	Groundwater seepage noted during boring of single borehole. No groundwater monitoring undertaken.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	42 Avenue Road has a basement beneath the property and the rear garden. 40 Avenue Road has a basement beneath the front garden.
Is a geotechnical interpretation presented?	No	This should be provided.
Does the geotechnical interpretation include information on retaining wall design?	No	This should be remedied.
Are reports on other investigations required by screening and scoping presented?	NA	
Are baseline conditions described, based on the GSD?	Yes	

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	Yes	See above.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	No	A GMA and damage category assessment should be undertaken for inclusion in the BIA.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	However, clarification is required with respect to pile locations, propping arrangements and construction sequencing.
Has the need for monitoring during construction been considered?	Yes	However, no details have been provided. This should be remedied.
Have the residual (after mitigation) impacts been clearly identified?	No	No mitigation was considered necessary.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	A GMA and damage category assessment should be undertaken for inclusion in the BIA.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Hard surfacing and drainage infrastructure similar to existing.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	A GMA and damage category assessment should be undertaken for inclusion in the BIA.
Does the report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	No assessment of damage category has been undertaken. This should be remedied.

4.0 DISCUSSION

4.1. The BIA includes screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

4.2. The qualifications of the author of the BIA are in compliance with the requirements of CPG4.

4.3. 42 Avenue Road is a large late 20th Century four-storey house located in the St John's Wood area of London on the north-east side of Avenue Road, approximately 500m south of Swiss Cottage and to the west of Primrose Hill.

4.4. 42 Avenue Road is not a listed building and does not lie within the vicinity of any listed buildings. The property is however located within the Elsworthy Conservation Area.

4.5. The BIA confirms that 42 Avenue Road has an existing two-storey basement extending partially under the rear garden and a small extension beneath the front garden. 40 Avenue Road also has a basement beneath the front garden.

4.6. The BIA states that an initial examination of nearby properties did not indicate any evidence of shrink/swell subsidence in the area. However, it was further stated that pre-condition surveys will be undertaken of neighbouring properties to check for cracks or other evidence of movement.

A limited ground investigation (GI) was undertaken at the site by Ground and Water Ltd on 09 July 2015 and appears to have comprised the sinking of a single borehole in the front garden to 15.45m below ground level (bgl). SPTs were undertaken at 1m depth intervals. It may be noted however that a summary report of the strata encountered refers to two window sampler holes, WS1 and WS2. The number and type of exploratory holes should be clarified.

Ground conditions were found to comprise Made Ground to 0.6m bgl, underlain by Head Deposits of firm, silty, gravelly, clay to 2.1m bgl, underlain by firm, becoming stiff, London Clay. Fine roots were noted to 1.8m bgl and root traces at 5.7m bgl.

The summary report notes the Head Deposits to be 'likely' to be of low to medium volume change potential and the London Clay to be 'likely' to be of high volume change potential. The above classifications were noted to be subject to the results of laboratory classification testing. The above categories should be confirmed when the test results become available.

Groundwater seepage was noted at 4.3m bgl. A standpipe was not installed in the borehole and no groundwater monitoring has been undertaken.

Regarding issues of topography and slope/ground instability, the BIA notes that the site and surrounding land do not slope at more than 7^{o} (1 on 8) and that this will not change as a result of the Works.

The BIA confirms that the London Clay is not the shallowest strata at the site and that no trees will be felled as a result of the Works, although the Works will lie within the root protection zone of trees.

The BIA confirms that the site does not lie within 100m of a surface watercourse or potential spring line and is not within an area of previously worked ground. The site does not lie within an aquifer and does not lie within 50m of Hampstead Heath Ponds.

The BIA confirms however that the site does lie within 5m of a pedestrian right of way and a highway and that the proposed basement will significantly increase the differential depth of foundations relative to nearby properties. In the case of the former, it was stated in the BIA that the sequencing of construction, the intended temporary works and the permanent design will mitigate any impact on the pedestrian right of way and the highway. The BIA states in the case of the latter, that basement design and controlled construction methodology will minimise any adverse effects on more shallowly founded neighbouring properties.

The BIA confirms that the site does not lie over or within the exclusion zone of any tunnels.

It is accepted that provided the basement elements i.e. walls (and where necessary, the basement roof slab) are correctly sequenced and stiffly propped during construction there should be no stability concerns regarding the proposed development – see comment below on method statements etc.

Regarding surface water flooding, drainage and discharge to sewer systems, the BIA confirms that the front garden area to the property is currently overlain with asphalt and resin coating. The new Works will not increase the impermeable paved area and existing surface water routes will remain unchanged. On this basis, there will be no change to the quality or the profiles of the inflows of surface water received by adjacent properties or downstream watercourses.

The Environment Agency (EA) flood risk maps show the site to be in Flood Risk Zone 1 i.e. not to be at risk of flooding, however, the BIA records that Avenue Road was flooded in 2002. The BIA states that this occurred due to the surcharging of existing sewers/drains during a storm. However, improvements have now been made by Thames Water and are deemed to have solved the problem. Additionally, 42 Avenue Road is not located at the lowest part of the road and any surcharge flooding would travel down the road from the property. For these reasons, the risk of surface water flooding at the site is accepted as being low.

Regarding subterranean (groundwater) flows, it is accepted that the site is not located above an aquifer but will be founded largely within the relatively impermeable London Clay. The London Clay is not able to support a defined water table and so it is accepted that there is likely to be only limited groundwater inflow into the basement excavation during construction and little change (impediment or diversion) to sub-surface flows arising from the completed construction. Any flows arising from a perched water table within the Made Ground would be able to find a path over (above the tunnel section) and around the basement.

4.7. It is proposed to construct a 6.5m deep two-storey basement beneath the front garden to provide an underground parking/garage area and car lift. The parking/garage area will occupy the lower of the two storeys only. A lift pit will extend from ground level to the lower basement

level. The founding level of the new basement will be set at a higher level than that of the existing and so no further underpinning of the existing property is proposed.

4.8. The arboricultural report assessed the impact of the proposed basement construction on two Category B trees adjacent to the property. One tree is located close to the property, the other is located adjacent to the highway. In order to maintain the integrity of the root zone of the tree in the garden area, it is proposed for the garage part of the basement to be tunnelled at a depth of 2m bgl beneath the root protection zone. A similar approach was used for the construction of a basement at 40 Avenue Road. It is accepted that the impact on the trees can be largely mitigated through suitable design and precautionary measures.

4.9. The excavation sidewalls (apart from the existing basement walls) will be supported by means of a contiguous piled wall. However, there is very little information within the BIA on construction methodology in general and most importantly, on the method of construction to be adopted in the tunnelled section of the lower basement. The method statement in the BIA should be updated to clearly show (in outline at least), the type of construction to be adopted at each location e.g. in the vicinity of the trees, the sequencing of construction and the propping arrangements at all stages. Full method statements should be provided in due course within a Basement Construction Plan (BCP).

4.10. It is noted that the BIA refers to the contiguous piled wall to be designed (in part at least) as a propped cantilever. Propped cantilever construction will not provide a stiff structure and could lead to unwanted ground movements. This issue should be clarified. Also to be clarified, is the nature of the perimeter walling to be adopted facing 44 Avenue Road as the drawings supplied with the BIA do not show this.

4.11. Wall design is to assume groundwater to be at ground level. This is conservative and is accepted as good design practice.

4.12. It is stated that the lower basement slab will be designed to resist hydrostatic uplift pressures but no comment is made on designing for heave forces arising from the excavation. This should be clarified.

4.13. No geotechnical parameters or calculations are provided in the BIA for wall design. Design parameters and indicative calculations at least should be submitted with the BIA. This matter should be remedied.

4.14. The BIA notes that existing properties will be monitored for movement. Little detail is provided. It would be expected that detailed monitoring proposals with defined trigger levels for action would be included within the BCP.

4.15. The BIA does not contain a Ground Movement Assessment (GMA) or a prediction of damage category to adjacent properties. This omission should be rectified. The BIA cannot be closed out until this information has been submitted.

5.0 CONCLUSIONS

5.1. The BIA includes screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

5.2. The qualifications of the author of the BIA are in compliance with the requirements of CPG4.

5.3. The number and type of exploratory holes undertaken in the GI should be clarified.

5.4. The volume change potential for the Head Deposits and the London Clay should be confirmed based on the results of laboratory testing.

5.5. It is accepted that provided the basement walls, roof slab etc. are correctly sequenced and stiffly propped during construction there should be no stability concerns regarding the proposed development – see comment below on method statements etc.

5.6. It is accepted that the development will not impact on the wider hydrology of the area and that the risk of surface water flooding is low.

5.7. It is accepted that the development will not impact on the wider hydrogeology of the area and that the risk of subterranean (groundwater) flow issues is low.

5.8. It is accepted that provided the proposed development is constructed in accordance with the recommendations outlined in the arboricultural report, it will not have any significant impact on either of the retained trees on site.

5.9. The method statement in the BIA should be updated to clearly show (in outline at least), the type of construction to be adopted at each location e.g. in the vicinity of the trees, the sequencing of construction and the propping arrangements at all stages. Full method statements should be provided in due course within a BCP.

5.10. It is noted that the BIA refers to the perimeter contiguous piled wall to the basement excavation to be designed (in part at least) as a propped cantilever. Propped cantilever construction will not provide a stiff structure and could lead to unwanted ground movements. This issue should be clarified.

5.11. The nature of the perimeter walling to be adopted facing 44 Avenue Road should be clarified.

5.12. Whether or not the lower basement slab will be designed to resist heave forces should be clarified.

5.13. Geotechnical parameters and indicative calculations for wall design should be submitted with the BIA.

5.14. Detailed monitoring proposals with defined trigger levels for action should be included within the BCP.

5.15. The BIA does not contain a GMA or a prediction of damage category to adjacent properties. This omission should be rectified. The BIA cannot be closed out until this information has been submitted.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA.	The number and type of exploratory holes undertaken in the GI should be clarified.	Open.	
2	Stability.	The volume change potential for the Head Deposits and the London Clay should be confirmed based on the results of laboratory testing.	Open.	
3	Stability.	The method statement in the BIA should be updated to clearly show (in outline at least), the type of construction to be adopted at each location, the sequencing of construction and the propping arrangements at all stages. Full method statements should be provided in due course within a BCP.	Open.	
4	Stability.	The design of the perimeter contiguous piled wall to the basement excavation as a propped cantilever should be confirmed or otherwise.	Open.	
5	Stability.	The nature of the perimeter walling to be adopted facing 44 Avenue Road should be clarified.	Open.	
6	Stability.	Whether or not the lower basement slab will be designed to resist heave forces should be clarified.	Open.	
7	Stability.	Geotechnical parameters and indicative calculations for wall design should be submitted with the BIA.	Open.	

8	Stability.	Detailed monitoring proposals with defined trigger levels for action should be included within the BCP.	BCP.	NA
9	Stability.	A GMA and prediction of damage category to adjacent properties should be produced and included within the BIA. The BIA cannot be closed out until this information has been submitted.	Open.	

Appendix 3: Supplementary Supporting Documents

None