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16 Hollycroft Avenue
London, NW3 7NR

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-28

Revision: D1

December 2016

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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 16 Hollycroft Avenue London NW3 7NR (planning reference 20156/5365/P). 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 proposed development comprises the lowering of the existing lower ground floor by approximately 1.2m, the construction of a rear extension and lightwell, and an extension of the lower ground floor at the front of the building with associated lightwell. The property shares a Party Wall with 18 Hollycroft Road.

1.5. The BIA and structural report have been prepared by organisations with acceptable qualifications.

1.6. The BIA has confirmed that the proposed lower ground floor will be founded within the Claygate Member.

1.7. The BIA indicates there will be no change in impermeable site area, but this appears inconsistent with the development plans. Changes in impermeable site area should be clearly stated and an outline drainage assessment presented, noting the requirements of CPG4 section 3.51.

1.8. The BIA notes that the groundwater monitoring had been undertaken at a time of likely annual low groundwater levels and that the groundwater level is likely to rise during the winter months. Groundwater flow within the Claygate Member would be expected. Long term groundwater monitoring is recommended with temporary works proposals presented, reflecting suitable contingency measures to deal with potential for encountering groundwater.

1.9. The impact assessment states that "groundwater will flow around the building". However, the presence of nearby basements has not been identified nor potential for cumulative impacts assessed. If groundwater flow is assessed to be potentially restricted by the proposed development in conjunction with other basement structures then additional SI in line with GSD

Appendix G1 should be undertaken, to allow groundwater flow to be ascertained and impacts evaluated.

1.10. The geotechnical interpretation includes the presentation of parameters for the retaining wall, foundations and pile design. The parameters are generally considered to be acceptable. The insitu testing undertaken at 4m indicates soft conditions whereas the bearing capacities presented rely on firm-stiff conditions. Insitu shear strengths should be confirmed on site during initial opening up works at formation level, with designs / assessments updated if soft conditions are present.

1.11. A ground movement assessment has been undertaken and there are some queries on the assumptions and methodology that require further information to be submitted.

1.12. Structural drawings and calculations have been submitted. Further detail is required on the ground floor construction to review the lateral restraint provided to the deeper underpins.

1.13. It is stated that the lower ground floor will have a pumped drainage system which will provide protection against sewer surcharging, although no drainage layouts have been provided.

1.14. It is accepted that the proposals will not impact the wider land stability subject to clarifications to 1.10, 1.11 and 1.12, above.

1.15. Further discussion and queries requiring responses from the applicant are discussed in Section 4 and summarised in Appendix 2. Until the additional information requested is presented, the criteria of CPG4 and DP27 have not been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 2nd November 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 16 Hollycroft Avenue London NW3 7QL planning reference 2016/5365/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 "*The erection of a two storey rear extension at ground floor level, excavation of existing basement for an ancillary accommodation with front and rear lightwells, installation of an inset balcony to the rear with sliding door for a terrace at first floor level, replacement of the rear dormer windows with door and installation of balustrade for new balcony at roof level, new windows to the flank at ground floor level, installation of new rooflights and solar panels to the rear elevation all associated with the use as a dwelling house.*."

The Audit Instruction also confirmed 16 Hollycroft Avenue did not involve nor was a neighbour to, any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 25th November 2016 and gained access to the following relevant documents for audit purposes:

- Ground Investigation and Basement Impact Assessment report by Ground and Water, GWPR 1810/GIR/November 2016, Final. (BIA)
- Proposed lowering of FFL to existing Lower Ground Floor ground with addition of new Lower Ground Floor to front of property including front lightwell, by Vincent and Rymill, Issue 1, October 2016. (SR)
- Tree Survey, Aboricultural Impact Assessment and Tree Protection Plan by Marton Dobson Associates, MDA reference FO8, September 2016.
- 5D Architects Ltd Drawings

06.951	02	A	Existing and proposed site plan
	04		Existing 1st, 2nd and attic space floor
	05		Existing front and rear elevations
	06		Existing side wall elevations
	07	A	Existing sections A-A and B-B
	08	A	Proposed lower ground floor
	09	A	Proposed ground floor
	11	A	Proposed front elevations and flank wall elevation
	12	A	Proposed rear elevations
	14	A	Existing and proposed showing adjoining property
	15	A	Proposed sections A-A and B-B
	16		Proposed view as seen from No 18 Hollycroft Avenue
	17		Proposed details of front light well and roof light
	18		Existing and proposed showing extent of basement in pink.

- Construction Management Plan B&G Construction, October 2016.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The combination of authors covering the various elements is accepted as satisfactory.
Is data required by Cl.233 of the GSD presented?	Yes	
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	The CGHHS maps have been included in the BIA and SR with the site location noted.
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?	Yes	Refer to Section 3.1.2 of BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 3.1.1 of BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 3.1.2 of BIA. Change of impermeable site area has not been considered.
Is a conceptual model presented?	Yes	Section 2 of the BIA reviewed Desk Study Information and a ground investigation was subsequently undertaken.
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	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Change of impermeable site area requires clarification and / or assessment.
Is factual ground investigation data provided?	Yes	A ground investigation was undertaken comprising 2 boreholes and 2 foundation trial pits. Not consistent with GSD Appendix G1 that recommends 3no monitoring wells to be installed to assess ground water flow.
Is monitoring data presented?	Yes	One round of groundwater monitoring has been carried out in BH1. The BIA states that groundwater is likely to be higher over winter months.
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?	No	Required to confirm both structural stability assessment and potential cumulative hydrogeological impacts.
Is a geotechnical interpretation presented?	Yes	Section 7 of the BIA considers the implications of the site soils for foundation and retaining wall design.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Parameters are not based on testing, rather an interpretation of typical values for the soil type. No Eu value provided.
Are reports on other investigations required by screening and scoping presented?	Yes	Tree report has been provided due to the cohesive nature of the soils.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	No	No information has been presented on the presence or absence of nearby basements.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	The Impact Assessment has been detailed in Section 7.5 of the BIA, and actions noted in the SR.
Are estimates of ground movement and structural impact presented?	Yes	A ground movement analysis has been carried out, refer to Section 7.7 of the BIA. Calculations required.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	However, potential cumulative impacts not considered (if nearby basements are present) nor the potential for springlines / groundwater flow due to close proximity of the Bagshot / Claygate boundary.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Temporary propping scheme is included in the SR. Hydrogeological impacts need further assessment with mitigation proposed, if required.
Has the need for monitoring during construction been considered?	Yes	Noted in the GMA as a recommendation – this should be linked to the GMA at detailed design stage.
Have the residual (after mitigation) impacts been clearly identified?	No	Pending review of nearby basements and potential cumulative impacts.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Further information and clarification required on the GMA and structural support.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Changes in site impermeable area to be addressed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Subject to resolution of the stability / hydrogeological issues noted above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Predicted movements are in either Category 0 or 1. These should be substantiated with calculations.
Are non-technical summaries provided?	Yes	In SR.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Ground and Water with a structural statement being prepared by Vincent and Rymill, a firm of consulting structural engineers. The qualifications of the authors for the various elements are considered acceptable.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal neither involved a listed building nor was adjacent to listed buildings. The Design & Access Statement identified that 16 Hollycroft Avenue is located in the Redington and Frognal Conservation Area.

4.3. The proposed development comprises the lowering of the existing lower ground floor by approximately 1.2m, the construction of a rear extension and lightwell, and an extension of the lower ground floor at the front of the building with associated lightwell. The topography of the site is such that the lower ground floor level at the front of the site is around 3m below ground level whilst at the rear it is approximately 1.0 m below ground level. The property is semi-detached with No 18.

4.4. A ground investigation was undertaken in September 2016 comprising 1 borehole to 10.45m below ground level (bgl), 1 window sample borehole to 5m bgl, and 2 foundation inspection pits to investigate the existing foundations. The boreholes revealed the following soil sequence at the site.

- Made Ground
- Claygate Member
- London Clay

4.5. No foundation inspection pits for the adjacent properties were undertaken although TP/FE 2 was excavated along the party wall with No 18. It would be reasonable to assume that No 18 has a similar lower ground floor as No 16.

4.6. One round of groundwater monitoring was carried out after 4 weeks in BH1. Groundwater was encountered at 44.630m AOD in BH1 and at 42.87m AOD in BH2 during the site works, and at 45.310m AOD in BH1 on the monitoring visit. All the groundwater strikes are within the Claygate Member.

4.7. The BIA undertook screening and scoping assessments for each of the elements noted in the Camden guidance, namely surface water flow, groundwater flow and land stability.

4.8. Generally the queries posed in the Camden flowchart have been adequately responded to. The impact assessment has been undertaken within the Vincent and Rymill structural report

on the proposed lower ground floor/basement works. Where relevant, these are discussed in the following paragraphs.

4.9. The BIA indicates there will be no change in impermeable site area, but this appears inconsistent with the development plans. Changes in impermeable site area should be clearly stated and an outline drainage assessment presented, noting the requirements of CPG4 section 3.51

4.10. The BIA notes that the groundwater monitoring had been undertaken at a time of likely annual low groundwater levels and that the groundwater level is likely to rise during the winter months. There is an inconsistency between the BIA and SR, with the BIA indicating that encountering groundwater during construction is likely, and the SR indicating it will be unlikely. Groundwater flow within the Claygate Member would be expected. Long term groundwater monitoring is recommended with temporary works proposals presented, reflecting suitable contingency measures to deal with potential for encountering groundwater. The provision of sump pumps is referred to.

4.11. The impact assessment states that "groundwater will flow around the building". Should nearby basement structures be identified then potential for cumulative impacts exist, if groundwater flow is restricted. In that case, additional SI in line with GSD Appendix G1 should be undertaken, with 3no monitoring wells installed to allow groundwater flow to be ascertained and impacts evaluated.

4.12. Cavity drainage to the basement structure is referred to with drainage to be pumped to sewers as existing. No further details are provided.

4.13. A tree report has been prepared and notes that 2 trees require removal, due to safety and development reasons and that there is a minor encroachment into the Root Protection Zone for other retained trees. Other than reviewing the impact of the trees on the proposed foundations, the tree report does not identify any significant issues.

4.14. The geotechnical interpretation includes the presentation of parameters for the retaining wall, foundations and pile design. The parameters are generally considered to be acceptable. The Claygate Member is noted as ranging from soft-stiff whilst the London Clay is noted as stiff. The insitu testing undertaken at 4m indicates soft conditions whereas the bearing capacities presented rely on firm-stiff conditions. Insitu shear strengths should be confirmed on site during initial opening up works at formation level, with designs / assessments updated if soft conditions are present.

4.15. A Ground Movement Assessment (GMA) has been undertaken based on CIRIA C580. The GMA notes that in carrying out the GMA:

- A high wall stiffness has been assumed;
- The Claygate Member is of at least firm to stiff consistency;
- Propping at high level is assumed in all cases.

4.16. It is considered that the propping is achieved in the temporary case provided the V&R temporary works support scheme illustrated in their SR is implemented.

4.17. Permanent high level propping to the lower ground floor underpins is provided by the lower ground floor slab. Further detail is required on the ground floor construction to review the restraint provided to the deeper underpins. The structural design drawings indicate the form of the retaining walls and lower ground floor slab construction but do not provide any details on the support for the existing building walls at ground floor level where the new basement has removed the existing supporting walls or foundations.

4.18. The GMA has assumed firm–stiff conditions whereas soft–stiff conditions were encountered and the GMA should be reviewed for the impact of this soil classification.

4.19. Estimates of ground movements and strains are presented in Section 7.7 of the BIA, and are based on CIRIA C580. There appears to be some inconsistencies in the calculated deflections e.g. vertical deflection for 14 Hollycroft Avenue, and the size of the wall panels is not clear. Further information is required on which walls have been considered, what the deflections are, and what strains have been calculated. The GMA calculations should be provided.

4.20. It is noted that the damage categories are either Burland Category 1 or 0. This should be reviewed in light of the comments in 4.17, 4.18 and 4.19.

5.0 CONCLUSIONS

5.1. The BIA has been undertaken by Ground and Water Ltd, and Vincent and Rymill. The authors/reviewers have acceptable qualifications.

5.2. The BIA has confirmed that the proposed basement will be founded within the Claygate Member.

5.3. The BIA indicates there will be no change in impermeable site area. Changes in impermeable site area should be clearly stated and an outline drainage assessment presented, noting the requirements of CPG4 section 3.51

5.4. The BIA notes that the groundwater monitoring had been undertaken at a time of likely annual low groundwater levels. Long term groundwater monitoring is recommended with temporary works proposals presented, reflecting suitable contingency measures to deal with potential for encountering groundwater.

5.5. The presence of nearby basements has not been identified nor potential for cumulative impacts assessed. If groundwater flow is assessed to be potentially restricted then additional SI in line with GSD Appendix G1 should be undertaken, to allow groundwater flow to be ascertained and impacts evaluated.

5.6. The geotechnical interpretation is generally considered to be acceptable. Insitu shear strengths should be confirmed on site during initial opening up works at formation level, with designs / assessments updated if soft conditions are present.

5.7. Structural drawings and calculations have been submitted. Further detail is required on the ground floor construction to review the lateral restraint provided to the deeper underpins.

5.8. A ground movement assessment has been undertaken and there are some queries on the assumptions and methodology that require further information to be submitted.

5.9. The GMA currently suggests that Burland Category 0 and 1 damage will occur. This requires review following the comments above.

5.10. It is stated that the lower ground floor will have a pumped drainage system which will provide protection against sewer surcharging, although no drainage layouts have been provided.

5.11. Until the additional information requested is presented, the criteria of CPG4 and DP27 have not been met.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability / Hydrogeology	Presence / absence of nearby basements to be identified, with particular reference to potential to restrict groundwater flow.	Open	
2	Hydrogeology	Further to 1 (if required), if basements identified with the potential to cause 'cumulative' groundwater flow impacts, SI should be undertaken in accordance with the GSD G1 to assess groundwater flow. Impact Assessment to be updated.	Open	
3	Hydrogeology / Stability	Further monitoring required. Temporary works contingency plans to be provided.	Open	
4	Hydrology	Changes in impermeable site area should be clearly stated and an outline drainage assessment presented, noting the requirements of CPG4 section 3.51	Open	
5	Land Stability	The Claygate Member is noted as ranging from soft-stiff whilst the London Clay is noted as stiff. The insitu testing undertaken at 4m indicates soft conditions whereas the bearing capacities presented rely on firm-stiff conditions.	Insitu shear strengths should be confirmed on site during initial opening up works at formation level, with designs / assessments updated if soft conditions are present.	N/A
6	Land Stability	Clarification on GMA assumptions of soil stiffness. Assessment should be reasonably conservative.	Open	
7	Land Stability	Clarification on damage category calculations / methodology. Calculations should be presented.	Open	

8	Land Stability	Details of support to existing building walls required.	Open	
9	Land Stability	Details of permanent high level propping to the deeper underpinning required.	Open	

Appendix 3: Supplementary Supporting Documents

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