CampbellReith
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The Hall School
23 Crossfield Street
London NW3

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12466-38
Revision: D1

January 2017

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	January 2017	Comment	MLml-12466-38-250117-The Hall School-D1.doc	ML	GK	GK

Document Details

Last saved	30/01/2017 12:59
Path	MLml-12466-38-250117-The Hall School-D1.doc
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Project Number	12466-38
Project Name	The Hall School, 23 Crossfield Street London
Planning Reference	2016/6319/P

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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 The Hall School, 23 Crossfield Street NW3 4NT (planning reference 2016/6319/P). The basement is considered to fall within Category C 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 BIA has been prepared by Geotechnical and Environmental Associates (GEA), with supporting documents by Elliott Wood Partnership, using individuals who possess suitable qualifications.

1.5. The site is currently occupied by The Hall School, a partly four storey and partly three storey building, including a lower ground level, with a single storey section extending across the south eastern corner of the site. It is proposed that part of the school will be demolished and a two storey basement will be constructed within the footprint of the existing buildings, utilising contiguous bored pile walls and localised underpinning.

1.6. The BIA identified the site is underlain by Made Ground over London Clay. The site specific ground investigation proved that Made Ground extends to depths between 1.00m and 3.80m below ground level. The ground water table was encountered during the site investigation in the Made Ground.

1.7. Clarifications are requested about the preliminary construction sequence with sketches to identify methodologies to be utilised and indicative temporary works required to stabilise the excavation during the basement works.

1.8. A Ground Movement Analysis has been undertaken which is generally acceptable although additional information has been requested.

1.9. A monitoring strategy has been proposed but appropriate mitigation measures are requested for those walls that are indicated to suffer Very Slight damage (Category 1) and above.

1.10. It is accepted that the development site will not impact upon slope stability.

1.11. It is accepted that the development will not impact on the wider hydrogeology or hydrology of the area and is at low risk of flooding. It is noted that a Drainage and SUDS Assessment has been completed that concluded SUDS strategies are not practicable to install due to site constraints. It is proposed to maintain existing rates of surface water discharge.

1.12. Until the additional information requested has been provided, it is not possible to assess whether the criteria of CPG4 have been met.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 15 December 2016 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for The Hall School, 23 Crossfield Street, NW3 4NT Camden Reference 2016/6319/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 *"Demolition of the 'Centenary' and 'Wathan Hall' buildings and erection of new four storey building with glazed link to original school building, two storey rear extension with external terrace and enlarged basement, replacing the existing Wathan Hall, and enlargement of rear roof storey and insertion of three dormer windows to old school building, all in association with providing additional accommodation for the existing school use (Class D1)."*

2.6. CampbellReith accessed LBC's Planning Portal on 12 January 2017 and gained access to the following relevant documents for audit purposes:

- Desk Study and Basement Impact Assessment (ref J15302, issue 1, Final) dated 15 August 2016 by Geotechnical and Environmental Associates (GEA).
- Planning Application Drawings consisting of Location Plan, Demolition Plans, Proposed Plans and Structural Drawings by Elliott Wood Partnership and Norr Consultants.
- Structural and Civil Engineering Report and Basement Impact Assessment (ref 2150206, rev P4) dated November 2016 by Elliott Wood Partnership.
- Drainage and SUDS Statement (ref 2150206, rev P4) dated November 2016 by Elliott Wood Partnership.
- Flood Risk Assessment (ref 2150206, rev P3) dated November 2016 by Elliott Wood Partnership.
- Design & Access Statement dated November 2016.
- Planning Comments and Responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See BIA Section 1.3.2.
Is data required by Cl.233 of the GSD presented?	Yes	However, works programme to be provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	See Audit Paragraph 4.3.
Are suitable plan/maps included?	Yes	See BIA Section 2.
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	See BIA Section 3.1.2.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 3.1.1 and 3.1.3.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 3.1.1 and 3.1.3.
Is a conceptual model presented?	Yes	See BIA Section 5 and 7
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 3

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 4
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	See BIA Appendix
Is monitoring data presented?	Yes	See BIA Section 5.3
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	See BIA Section 1.3
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	See BIA Section 5
Does the geotechnical interpretation include information on retaining wall design?	Yes	See Audit Paragraph 4.3.
Are reports on other investigations required by screening and scoping presented?	Yes	FRA / Drainage Assessment
Are the baseline conditions described, based on the GSD?	Yes	Included within BIA
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	See BIA Part 3

Item	Yes/No/NA	Comment
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	Ground monitoring and temporary propping is proposed
Has the need for monitoring during construction been considered?	Yes	See BIA Section 12.4. Further detail required.
Have the residual (after mitigation) impacts been clearly identified?	Yes	See BIA Section 13
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	See BIA Section 12. Further GMA and structural information required.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	FRA / Drainage Assessment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Further GMA and structural information required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	See BIA Section 12.1
Are non-technical summaries provided?	No	However a conclusion is provided, see BIA section 13.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been produced by a well-known firm of consultants, Geotechnical and Environmental Associates (GEA) and the authors' possess relevant qualifications. The GEA documents are supported by assessments from the Elliott Wood Partnership.

4.2. The proposal includes the demolition of part of the existing school building and the increase in depth of the single storey basement to a two storey basement, approximately 8 metres deep, within the proposed building footprint. The BIA states that the basement retaining wall will be formed through a combination of underpinning of the existing basement wall and a contiguous bored pile wall below the remaining footprint of the new section of the building that does not currently include a basement.

4.3. The BIA states that a contiguous pile wall will be adopted but does not provide outline design information of the retaining wall (i.e. pile length, diameter and spacing, liner wall etc). Moreover, the proposal identifies the need for a temporary propping system but no outline information is provided. Retaining wall design and structural information, including temporary propping and sequencing information, should be provided.

4.4. The relevant maps extracts from the Arup GSD, Camden SFRA and Environment Agency (EA) referenced in the screening process are not included. It would be beneficial if these extracts are included, with the site location marked, as they help to support statements made in the BIA.

4.5. A ground investigation has been carried out by GEA through the installation of 4 no. boreholes and the investigation of surrounding party wall foundations by 5 no. trial pits. These have revealed the site stratigraphy to consist of 1.0m to 3.8m of Made Ground underlain by London Clay to depths exceeding 15m. Although groundwater was monitored at shallow depth, the water encountered is considered to be perched water within the permeable sections of the Made Ground.

4.6. Although Section 8.1 of the BIA anticipates that the impacts of groundwater will be extremely low to negligible, an allowance for dewatering will be made for perched water in the excavation and construction of the basement through the use of strategically placed sumps with intermittent pumping.

4.7. A Ground Movement Assessment has been carried out by GEA to determine the effect of the underpinning and excavation on the adjoining / adjacent properties. Generally the assumptions and the output of the assessment are in agreement with industry practice. Notwithstanding, the following observations are made:

- The BIA notes that the proposed basement walls will be constructed by a combination of traditional underpinning and bored piles. It is noted that the effect of the underpinning has been considered referencing CIRIA 580. Although this methodology is designed for embedded retaining walls, it is also accepted as suitable for this preliminary assessment to include the underpinned construction.

- The effect of the bored pile wall installation is evaluated based on CIRIA 580 assuming a length of the piled wall. The assumed piled wall length should be clearly stated.

- The predicted movements due to the basement excavation have been evaluated using X-Disp adopting the ground movement curves for 'excavations in front of a stiff wall in stiff clay'. An adequate propping system should be proposed to confirm the assumptions made in the GMA as it has a significant impact on ground movement. Xdisp inputs should be provided.

- A damage assessment for The Hall School building itself, 23 Crossfield Street, has been omitted and should be provided.

4.8. The BIA had identified the potential for heave of the underlying clay soils to occur and suitable mitigation is proposed. PDisp inputs should be provided.

4.9. The duration of the works is not indicated in the BIA. An outline programme should be submitted.

4.10. Although Section 12.4 mentions movement monitoring should be undertaken, details and trigger levels are not described. These should be provided.

4.11. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by a well-known firm of consultants who possess relevant qualifications and experience.

5.2. The proposed two storey basement utilises a mixture of contiguous bored piled retaining walls installed from existing ground level and underpinning of the existing single storey basement wall.

5.3. The BIA has confirmed that the proposed basement will be founded within London Clay.

5.4. Although they are referenced, it would be beneficial to include the relevant maps extracted from the Arup GSD, Camden SFRA and Environment Agency (EA) identifying the site location to support statements made in the BIA screening process.

5.5. The following information is required, in accordance with CPG4:

- Outline retaining wall design and an indicative temporary works scheme including sequencing and propping, illustrated by structural sketches.
- A damage assessment of The Hall School building, 23 Crossfield Road.
- Xdisp and Pdisp inputs.

5.6. It is accepted that there are no slope stability concerns with respect to the development proposals.

5.7. It is accepted that the development will not impact on the wider hydrogeology or hydrology of the area and is at low risk of flooding.

5.8. It is noted that a Drainage and SUDS Assessment has been completed that concluded SUDS strategies are not practicable to install due to site constraints. It is proposed to maintain existing rates of surface water discharge.

5.9. Until the additional information requested has been provided, it is not possible to assess whether the criteria of CPG4 have been met.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments **[Request 'relevant comments' from the Case Officer]**

Surname	Address	Date	Issue raised	Response
Wade	12 Crossfield Road	05/01/17	Basement excavation and effect on existing foundations of nearby buildings.	See audit paragraphs 1.8, 1.9, 4.7 and 5.5
Balint-Kurti	40 Eton Court, Eton Avenue	04/01/17	Risk of structural damage to existing garages	See audit paragraphs 1.8, 1.9, 4.7 and 5.5
Mayne	12 Crossfield Road	11/01/17	Basement excavation and effect on existing foundations of nearby buildings	See audit paragraphs 1.8, 1.9, 4.7 and 5.5
The and Loh	Flat 1, 26 Adamson Road	11/01/17	Construction of the basement excavation and effect on existing foundations of nearby buildings	See audit paragraphs 1.8, 1.9, 4.7 and 5.5
Hall School Opposition Group	Not given	Not given	Basement Construction Implications	See audit paragraphs 1.8, 1.9, 4.7 and 5.5

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Proposed construction methodology and sequence not sufficiently detailed. Structural Engineer to provide indicative temporary works scheme.	Open – Construction sequence and indicative propping scheme (as 4.3 and 4.7).	
2	Stability	Retaining wall	Open - Outline retaining wall design required (as 4.2 and 4.3).	
3	Stability	Damage assessment	Open – Damage Assessment of The Hall School building to be provided (as 4.7)	
4	Stability	Damage assessment	Open – Xdisp and Pdisp input to be provided (as 4.7).	
5	Stability	Monitoring	Open – Proposals for monitoring. Further detail on trigger levels and pre-condition surveys of affected assets required prior to commencement of the construction works (as 4.12).	
6	BIA	Works Programme	Open – an outline works programme should be provided.	

Appendix 3: Supplementary Supporting Documents

None

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