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4 Wedderburn Road
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Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12066-01

May 2015

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Planning Reference	2014/7292/P

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Appendices

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 No. 4 Wedderburn Road (planning reference 2014/7292/P). The basement is considered to fall with 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 review it against an agreed audit check list.

1.4. Additional information has been provided to enable confirmation that the BIA has been prepared by the author and reviewer and that they have suitable qualifications.

1.5. It has not been possible to conclude whether the proposed basement will impact on local groundwater movement because

- more information is required regarding the presence and size of basements in the vicinity, and particularly upstream, of the proposed development.
- there has been no conclusive determination of the direction and volume of groundwater flow.

1.6. There has been insufficient monitoring of groundwater standpipes to conclusively determine the likely groundwater flow rate and whether this is likely to effect the strength of below ground soils during the underpinning process. The BIA states that additional groundwater monitoring is to be reported in an addendum letter report.

1.7. The BIA offers an alternative construction sequence which proposes to construct the rear garden portion of the basement, which is formed using piled retaining walls, prior to underpinning the basement portion below the existing house. This should reduce or omit the need for ground water control measures and help to restrict potential damage to adjoining properties and should, therefore, be adopted unless further testing confirms that groundwater flow rates are minimal.

1.8. The BIA states that a ground movement analysis is in hand and will be reported as an addendum. This document is required to complete this audit and to overcome concerns with current settlement predictions. Until its receipt, it is not possible to accept the BIA statement that potential damage to adjoining properties will be Damage Category 1 – Very Slight.

1.9. The BIA states that attenuation will be required to cater for increased surface water run-off.

1.10. The BIA offers that a set of monitoring targets may be installed onto the external walls with No. 6 Wedderburn Road. These should be installed to act as an early warning system against the occurrence of unexpected movement.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 7 May 2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for No. 4 Wedderburn Road, Camden Reference 2014/7292/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; and,

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 "*Excavation at basement floor level below footprint of house and part rear garden with associated front and rear lightwells, erection of single storey rear extension, enlarge side dormers to main roof and associated elevational alterations.*"

and confirmed that the basement proposals did not involve a listed building nor did the site neighbour any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 13 May 2015 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment – Revised
- BIA Revised – Appendix C, Proposed Structure Full Rev B
- BIA Revised – Appendix F, Retaining Wall Calc
- BIA Revised – Appendix G, Existing Site Plan
- BIA Revised – Appendix H, CTMP
- BIA Revised – Appendix I, Trial Pit Info Full
- BIA Revised – Appendix D, GEA Geotechnical Report
- BIA Revised – Appendix E, Thames Water Asset
- Plans, elevations and sections – Proposed drawings

2.7. CampbellReith accessed LBC's Planning Portal on 22 May 2015 and identified a number of residents' consultation comments as being pertinent to the audit of the BIA. The comments reviewed are summarised in Appendix A.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No/Yes	No details of author credentials provided, see 4.1 and 4.2, but subsequently provided, see Appendix.
Is data required by Cl.233 of the GSD presented?	Yes	BIA Appendix E.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA Section 6 & Appendix D.
Are suitable plan/maps included?	Yes	BIA Section 2 & Appendix D.
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	BIA & Appendix D.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Direction of groundwater flow not determined, see 4.3.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA & Appendix D
Is a conceptual model presented?	Yes	BIA & Appendix D
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?	Yes	
Is factual ground investigation data provided?	Yes	BIA & Appendix D
Is monitoring data presented?	Yes	Standpipes monitored twice, see 4.5.
Is the ground investigation informed by a desk study?	Yes	BIA Appendix D, Cl. 1.3.
Has a site walkover been undertaken?	Yes	BIA Appendix D, Cl. 1.3.
Is the presence/absence of adjacent or nearby basements confirmed?	No	BIA Cl. 2.1 states "... the majority of which appear to have basements", see 4.4.
Is a geotechnical interpretation presented?	Yes	BIA & Appendix D, see 4.5.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Appendix F, see 4.6.
Are reports on other investigations required by screening and scoping presented?	na	
Are baseline conditions described, based on the GSD?	Yes	BIA Cl. 4.2 states "The results of subsequent (groundwater) monitoring will be reported as an addendum letter".
Do the base line conditions consider adjacent or nearby basements?	No	
Is an Impact Assessment provided?	Yes	BIA
Are estimates of ground movement and structural impact presented?	No	Additional ground movement analysis referred to within BIA Appendix D, see 4.7.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Groundwater volume and flow direction to be confirmed, see 4.3 – 4.5. Inadequate ground movement analysis, see 4.6 and 4.7.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes/No	Alternative construction sequence identified but not incorporated, see 4.5 and 4.8.
Has the need for monitoring during construction been considered?	Yes	A set of movement monitoring targets may be installed, see 4.9.
Have the residual (after mitigation) impacts been clearly identified?	No	Impact on groundwater flow to be confirmed, see 4.3 and 4.4.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties maintained?	Yes	Alternative construction sequence would be preferable, see 4.5.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	The direction and volume of groundwater flow have not been determined, see 4.3 – 4.5.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	The direction and volume of groundwater flow have not been determined, see 4.3 – 4.5.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	But the GMA is required to support this statement, see 4.7.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. Although the BIA has been carried out by a well known firm of structural consulting engineers, Heyne Tillett Steel (HTS), there is no indication that it has been completed by a Chartered Engineer, as there is no indication of author or reviewer.

Contact was made with HTS to gather this information for audit purposes, who provided confirmation of author and reviewer, who have suitable qualifications.

4.2. The current revised BIA, and its supporting documentation, appear thorough and include a Site Investigation carried out by Geotechnical & Environmental Associates (GEA). GEA's document does provide information on author and reviewer, who have suitable qualifications.

4.3. Although GEA's Geotechnical Report, BIA Appendix D, has a section 2.5 describing the Hydrology and Hydrogeology, they have not conclusively determined the direction of groundwater flow. Additionally, it is reported by the Heath and Hampstead Society (consultation response dated 18 December 2014) that groundwater flows through the existing basement via an open conduit. Without knowing the volume and direction of the groundwater flow in the Claygate Beds, it is not possible to conclude whether the proposed basement will impact on local groundwater movement.

4.4. The BIA states at section 2.1 that "… *the majority of which* (adjacent properties) *appear to have basements.*" No further investigation has been carried out and no material to support this statement has been provided. The existing basement is shallower than that proposed and measures only approximately 10 metres by 6 metres on plan. Without knowing whether the majority of other local basements are similar in size to No. 4 or whether they have been previously developed in a similar manner to this proposal, it is not possible to conclude whether the proposed basement will impact on local groundwater movement.

4.5. Within its section 10, "Outstanding Risks and Issues", the Geotechnical Report identifies that *"groundwater inflows are likely to be encountered during the basement excavation although groundwater monitoring should be continued to further assess groundwater levels …."* To date, only two sets of groundwater monitoring have been carried out.

The BIA acknowledges that the underpins will be excavated within the Claygate Member of the underlying soils. GEA state that this material is likely to soften and lose strength during construction. Each pin location is likely to be open for some time to allow for excavation, placing of reinforcement and formwork, and concreting. GEA indicate that additional testing should be carried out prior to construction commencement to adequately identify the degree of water movement within the Claygate Member.

HTS acknowledge that *"should adequate water control to allow initial underpinning not be possible it is proposed that the following sequence* (of construction operations) *be adopted".*

What follows is basically the secant piled rear garden basement would be constructed prior to the underpinned basement below the existing house. In this way, together with possible temporary pumping, potential damage to adjoining properties should be restricted. HTS acknowledge that *"the benefit of the rear garden basement being installed first will be the reduction in any level of ground water* ….. (which) *will reduce or omit the need for any ground water control measures when underpinning."*

4.6. HTS have provided calculations for stability and reinforcement details of underpins below loadbearing walls to the existing property to form the front part of the new basement. They have assumed a nominal vertical settlement of 3mm to the underpinning with no justification and then made the statement within the BIA that the pins have been designed to limit any damage to Damage Category 1 – Very Slight, even though their unsubstantiated value of 3mm accounts for approximately 50% of total anticipated vertical movement.

4.7. GEA have stated within their "Outstanding Risks and Issues" that *"A ground movement analysis is in hand and will be reported as an addendum"* although it does not appear to have been issued to date. A ground movement analysis should provide estimates of horizontal movement and its impact on adjoining properties, which has not been carried out to date, as well as an improved assessment of vertical settlement. This should then allow agreement to be reached on the potential category of damage to adjoining properties.

4.8. The BIA identifies a nominal increase in impermeable area with resulting increases in surface water flows being dealt with by means of attenuation although no details are provided.

4.9. Within the BIA section 8 "Impacts of Subterranean Development on Existing & Neighbouring Structures", HTS acknowledges *"as a precautionary measure a set of monitoring targets may be installed onto the external walls with No 6 Wedderburn Road".* These should definitely be included within the building process to *"act as an early warning system to identify any unexpected movement allowing time for remedial action to be taken"* as identified in section 8.1.

4.10. Apart from the previous comments, HTS have provided a comprehensive overview of construction methodology although they have stated that final temporary works design, installation and maintenance to ensure the strength and stability of the building throughout the construction process will be the responsibility of the contractor, who has yet to be identified.

5.0 CONCLUSIONS

5.1. Additional information has been provided to enable confirmation that the BIA has been prepared by the author and reviewer and that they have suitable qualifications.

5.2. It has not been possible to conclude whether the proposed basement will impact on local groundwater movement because

- more information is required regarding the presence and size of basements in the vicinity, and particularly upstream, of the proposed development.
- there has been no conclusive determination of the direction of groundwater flow.

5.3. There has been insufficient monitoring of groundwater standpipes to conclusively determine the likely groundwater flow rate and whether this is likely to effect the strength of below ground soils during the underpinning process. The BIA states that additional groundwater monitoring is to be reported in an addendum letter. Additionally it is reported that an open conduit carried groundwater through the existing basement. The depth, volume and direction of flow of the groundwater should be confirmed.

5.4. The BIA offers an alternative construction sequence which proposes to construct the rear garden portion of the basement, which is formed using piled retaining walls, prior to underpinning the basement portion below the existing house. This should reduce or omit the need for ground water control measures and help to restrict potential damage to adjoining properties and should, therefore, be adopted unless further testing confirms that groundwater flow rates are minimal.

5.5. The BIA states that a ground movement analysis is in hand and will be reported as an addendum. This document is required to complete this audit and to overcome concerns with current settlement predictions. Until its receipt, it is not possible to accept the BIA statement that potential damage to adjoining properties will be Damage Category 1 – Very Slight.

5.6. The BIA states that an attenuation system will be required to cater for increased surface water run-off flows.

5.7. The BIA offers that a set of monitoring targets may be installed onto the external walls with No. 6 Wedderburn Road. These should be installed to act as an early warning system against the occurrence of unexpected movement.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Ungar	6 Wedderburn Road, London NW3 5QE	16.12.14	Shallow groundwater flow	See 5.2 and 5.3
The Heath and Hampstead Society	PO Box 38214, London NW3 1XD	17.12.14	Risk of structural damage due to ground and groundwater conditions	See 5.3
Heath and Hampstead Society		18.12.14	Shallow groundwater flow	See 5.2 and 5.3
Ungar	6 Wedderburn Road, London NW3 5QE	16.12.14	Shallow groundwater flow	See 5.2 and 5.3
Andrew Court Ltd	2 & 2a Wedderburn Road, London NW3 5QE	19.12.14	Risk of structural damage and shallow groundwater flow	See 5.2 to 5.5
Kurzke	4 Elim Mansions, 15 Lyndhurst Gdns, NW3 5NT	04.01.15	Shallow groundwater flow	See 5.3
Banks	3 Andrew Court, 2 Wedderburn Rd, NW3 5QE	14.01.15	Risk of structural damage	See 5.4 and 5.5
Banks	3 Andrew Court, 2 Wedderburn Rd, NW3 5QE	Uploaded 02.04.15	Shallow groundwater flow	See 5.2 and 5.3
Finch	8 Wedderburn Road, London NW3 5QG	02.04.15	Shallow groundwater flow	See 5.2 and 5.3
Kurzke	4 Elim Mansions, 15 Lyndhurst Gdns, NW3 5NT	07.04.15	Shallow groundwater flow	See 5.2 and 5.3

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA Author Qualifications	BIA author and qualifications not presented in BIA	Information provided by email – see Appendix C	19.05.15
2	BIA format	Non technical summaries not provided	To be provided in updated document	
3	Subterranean Flows	Direction of groundwater flow	To be confirmed by further monitoring and impact assessed	
4	Subterranean Flows	It is reported by the Heath and Hampstead Society that groundwater flows through the existing basement via a culvert	To be confirmed and impact assessed	
5	Stability	No supporting evidence for Burland damage category assessment	Ground movement assessment to be provided	
6	Stability	Impact of groundwater flow on construction method	Construction method to be confirmed once groundwater regime clarified	
7	Stability	BIA offers monitoring of No 6 Wedderburn Road	Monitoring regime and trigger levels to be agreed with Party Wall Surveyor	N/A

Appendix 3: Supplementary Supporting Documents

1220 - Wedderburn Road - BIA Report
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andrewmarlow@campbellreith.com
19/05/2015 11:35
Cc:
Andy Heyne, Chris Eaton
Hide Details
From: Ben Woodwiss <BWoodwiss@hts.uk.com>
To: "andrewmarlow@campbellreith.com" <andrewmarlow@campbellreith.com>
Cc: Andy Heyne <AHeyne@hts.uk.com>, Chris Eaton <c.eaton@stiffandtrevillion.com>
History: This message has been forwarded.

Andrew,

Thanks for taking my call earlier, as discussed I have included below the requested credentials for the author and checkers of the report both from within HTS and the previously included GEA credentials, these are inline with the Camden CPG4 document.

	HTS/GEA Qualifications
Surface Flow and Flooding	Rupert Evans MSc CEnv CWEM MCIWEM AIEMA, Martin Cooper BSc CEng MICE
Subterranean (groundwater flow)	John Evans MSc FGS CGeol, Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc
Land Stability	Martin Cooper BSc CEng MICE Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc Ben Woodwiss BEng MSc CEng MIStructE Andy Heyne BEng (Hons) DIS CEng MIStructE

Also discussed was the ground movement report which was noted as "...currently in hand and will be reported as an addendum", this is being chased by HTS and we will report back on when this can be expected hopefully by the end of today.

In terms of the other points which may be included in the initial audit report we will be happy to deal with these once we have received this.

Regards

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