

**35 Greville Road  
London NW6 5JB**

**Basement Impact Assessment  
Audit**

For  
London Borough of Camden

Project Number: 12066-62  
Revision: D1

October 2015

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### Document Details

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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 35 Greville Road (planning reference 2015/5013/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 BIA was carried out by Croft Structural Engineers with two separate reports considering groundwater and land stability undertaken by H Fraser Consulting Ltd and Ground and Project Consultants Ltd respectively. The Croft report was reviewed by individuals with suitable qualifications and the groundwater and land stability reports were prepared by specialists with suitable qualifications.
- 1.5. The proposed basement will be excavated and constructed using a contiguous piled wall and underpinning, however, it is unclear if the underpins are cantilevered or propped.
- 1.6. Croft's construction sequence is unclear and confusing. Clarity is needed on the construction sequence and it is requested that plans are included to better indicate the sequence. An indicative temporary works proposal showing propping arrangements is requested and this should cater for the critical point loads from the superstructure.
- 1.7. The BIA has confirmed that the proposed basement will be founded within the London Clay and that the surrounding slopes are stable.
- 1.8. It is noted that the neighbouring property (37 Greville Road) is Grade II listed.
- 1.9. It is noted that trial pits were not undertaken to investigate the foundations of the property or the neighbouring building.
- 1.10. The BIA has not demonstrated that the development will not affect the hydrogeology of the surrounding area or that it would not cause detrimental effect on surface water discharges into the network drainage system.
- 1.11. Contradictory information on the risk of surface water flooding is given in Croft's BIA report. Clarification is requested.

- 1.12. The Croft BIA, land stability, groundwater and ground investigation reports which were reported under separate covers contain inconsistent information with regards to baseline conditions and soil parameters for design. It is requested these are made consistent.
- 1.13. The ground movement and building damage assessment is considered incorrect and is to be resubmitted.
- 1.14. The BIA does not explicitly consider the impact on the adjacent road and pavements. Additional information is required to demonstrate the roadways and the utilities running beneath them are not adversely affected by the development.
- 1.15. The suggested method statement in Croft's report is confusing as it contains a construction management plan and a construction sequence. It is requested that a better laid out construction management plan is submitted. Condition surveys are recommended.
- 1.16. A works programme has not been provided and this is requested.
- 1.17. Monitoring during construction is proposed. Such a mitigation measure should be adopted.
- 1.18. Queries and requests for further information are summarised in Appendix 2.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 7 October 2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 35 Greville Road, Camden Reference 2015/5013/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 "*Basement excavation under the footprint and extending into the garden of an existing building.*"
- 2.6. CampbellReith accessed LBC's Planning Portal on 21 October 2015 and gained access to the following relevant documents for audit purposes:
- Basement Impact Assessment Report – Croft Structural Engineers (first issue), dated August 2015

- Basement Impact Assessment Report: Land Stability – Ground and Project Consultants Ltd, dated July 2015.
- Basement Impact Assessment Report: Groundwater – H Fraser Consulting, dated August 2015.
- Ground Investigation Report – Ground and Water, dated August 2015.
- Design and Access Statement
- FK Project Management Ltd’s Drawings (with the same drawing no 71-1)

Existing elevations

Existing plans

Existing sections

Proposed plans

Proposed sections

Proposed elevations

- 2 No Residents’ consultation responses.

2.7. It is noted that a more up to date version of the Croft BIA report (second issue) was sent to CampbellReith by the Planning Officer. This document was not available on the LBC Planning Portal, however, as it appeared to be the more up to date version this document was audited.

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The reviewers of the Croft BIA Report and authors of the Ground and Project land stability report and H Fraser groundwater report have suitable credentials.
Is data required by Cl.233 of the GSD presented?	No	The construction method given in Croft's BIA is inadequate and confusing (see Audit paragraph 4.4) and a programme of works has not been 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	Croft's construction method is inadequate and confusing.
Are suitable plan/maps included?	No	Inadequate. FK Project management drawings show the proposed layout, however, these are not detailed enough as required by Cl. 233 of the Arup GSD. Plans for each stage of the basement excavation and construction are not included (see Audit paragraph 4.4).
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	See Audit paragraph 4.4
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Ground and Project Land Stability report Section 3 although this contains conflicting information to Croft's BIA report (See Audit paragraph 4.10)
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	No reference to relevant Arup GSD maps and no justification for 'No' answers.



Item	Yes/No/NA	Comment
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Croft BIA report Section 1
Is a conceptual model presented?	Yes	H Fraser Groundwater report Section 4.1, Ground and Project Land Stability report Section 6 and Ground and Water Limited ground investigation report (GIR) Section 4. The conceptual model presented in Section 2 of Croft's report is not in accordance with Cl.253 of the Arup GSD.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	The Ground and Project Land Stability report does not appear to include a formal scoping.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Section 4 of the H Fraser Groundwater report appears to include scoping however this is not consistent with the screening (see Audit paragraph 4.7)
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Croft BIA report Section 2 although this is a bit confusing (see Audit paragraph 4.8).
Is factual ground investigation data provided?	Yes	Ground and Water GIR, however, it is noted a contamination assessment was not undertaken.
Is monitoring data presented?	Yes	Ground and Water GIR Section 4.4
Is the ground investigation informed by a desk study?	Yes	Croft BIA Section 3, however it is noted that a trial pit to investigate the existing foundations was recommended but this was not undertaken.
Has a site walkover been undertaken?	Yes	Croft BIA Section 3

Item	Yes/No/NA	Comment
Is the presence/absence of adjacent or nearby basements confirmed?	No	Not confirmed although Section 3 of the Croft BIA notes that a visual inspection of the internal façade of the neighbouring properties was undertaken (see Audit paragraph 4.6).
Is a geotechnical interpretation presented?	Yes	Ground and Water GIR Section 6
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 6.4 of the Ground and Water GIR although it is noted that these parameters differ from those used in Section 5 of the Croft report and the conceptual model in Ground and Project's Land Stability report.
Are reports on other investigations required by screening and scoping presented?	No	The Croft BIA notes the need for a Flood Risk Assessment
Are baseline conditions described, based on the GSD?	Yes	It is noted that it is not stated in the Croft BIA report what the depth of the basement is although the other reports give the depth as 4.30m bgl.
Do the base line conditions consider adjacent or nearby basements?	No	The presence of a basement beneath the neighbouring properties especially No. 37 Greville Road was not confirmed (see Audit paragraph 4.6).
Is an Impact Assessment provided?	Inadequate	Ground and Project Land Stability report - Impact assessment provided H Fraser Consulting Groundwater report - Provided but incomplete (see Audit paragraph 4.7) Croft BIA report – Confusing and not in accordance with Arup GSD (see Audit Section 4).
Are estimates of ground movement and structural impact presented?	Yes	Croft BIA report contains a ground movement assessment, however, this is considered incorrect (see Audit paragraphs 4.13 and 4.14)

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Ground and Project Land Stability report – appropriate to matters identified in screening H Fraser Consulting Groundwater report – incomplete as all of the issues identified in screening are not addressed (see Audit paragraph 4.7) Croft BIA report – a summary of the screening is provided not an impact assessment
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Inadequate	Some mitigation measures are suggested but further details of these measures are not provided.
Has the need for monitoring during construction been considered?	Yes	Croft's BIA report provided recommended monitoring with trigger levels although it is not clear what these levels are based on.
Have the residual (after mitigation) impacts been clearly identified?	No	Croft's BIA construction methodology is unclear and confusing
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	The ground movement assessment is considered incorrect.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Not demonstrated
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Not demonstrated
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Croft's BIA report state the anticipated damage category is 'negligible to slight Category 0 -1'. This is confusing as negligible is Category 0 (hairline crack – up to 0.1mm) and slight is Category 2 (up to 5mm). The assessment is considered incorrect.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	No	Not provided in Ground and Project's Land Stability report or H Fraser's groundwater report.  A non-technical/executive summary is provided in Croft's BIA report, however, this is deemed inadequate and inconsistent with the other reports.

## 4.0 DISCUSSION

- 4.1. The BIA has been carried out by Croft Structural Engineers, who have employed Ground and Project Consultants Ltd and H Fraser Consulting to undertake the land stability and groundwater assessment respectively. These are reported under separate covers. The reviewers of the Croft report and the authors of the land stability and groundwater reports all have suitable qualifications.
- 4.2. It is noted that a revised version of Croft's BIA report (second issue) was sent to CampbellReith by the Planning Officer. It was brought to the Planning Officer's notice that this version was different from the document on LBC's Planning Portal which was marked as a first issue and as this appeared to be the more up to date version, this document was audited.
- 4.3. It is noted that Section A of Camden's Audit instruction states that the site does not neighbour a listed building, however, Section 3 of Croft's report states the neighbouring property (37 Greville Road) is listed. A search of the LBC of Camden's listed buildings confirms the neighbouring property is Grade II listed.
- 4.4. The basement is to be constructed by a combination of a contiguous pile wall and cantilevered underpins. It is noted that that the description of the proposed development and construction method given in Croft's report is confusing and not detailed enough. The description on the executive summary indicates the retaining walls will be propped back to the central soil 'dumpling' in the temporary condition whilst other sections of the report seem to suggest the underpins are cantilevered without the need for elaborate temporary propping. Additional information and plans to indicate the construction sequence is required to demonstrate the structural stability of the neighbouring properties and infrastructure is maintained. An indicative temporary works proposal showing propping arrangements is requested. This should cater for the critical point loads from the superstructure identified in Croft's BIA report but not developed.
- 4.5. The BIA has confirmed that the proposed basement will be located within the London Clay and that the surrounding slopes are stable.
- 4.6. It is noted that groundwater was observed at <1m bgl in the ground investigation undertaken by Ground and Water. The H Fraser Groundwater report assumes the presence of a basement beneath the neighbouring property, 37 Greville Road extending to 3.15m bgl, however, this was not confirmed despite Section 3 of Croft's BIA report stating a visual inspection of the internal facades of the neighbouring properties had been undertaken. Although, the basement is to be founded in the London Clay it is noted that the construction of the basement could alter the groundwater flow and that there is a risk of groundwater ingress. Although the groundwater report recommends provision of groundwater drainage pathways around the proposed structure

and ongoing monitoring of groundwater levels, the BIA has not demonstrated the development will not affect the hydrogeology of the surrounding area.

- 4.7. The H Fraser report does not address the implications of more surface water being discharged to the ground despite noting at screening stage that this is unknown and will be carried forward to scoping stage. The BIA has not demonstrated the development will have little detrimental effect on the surface water discharges to the network drainage system.
- 4.8. Croft's BIA screening indicated the site is in a low risk area with respect to surface water flooding, however, the scoping notes the site is in an area with risk of flooding from surface water and infrastructure failure. Clarification is required.
- 4.9. The Croft report notes the presence of a trunk sewer running along Greville Road and states the risk of potential flooding from infrastructure failure. A dual pumping mechanism in the basement is proposed as a mitigation measure and whilst this is accepted, it is not clear if this is for foul or surface water.
- 4.10. The Ground and Project Land Stability screening states the structural survey of the property did not reveal any apparent sign of distress, however, this information contradicts the Croft report which noted fine to moderate cracking on the property with a photograph presented as Figure 9 showing cracking on the garage walls.
- 4.11. Croft's BIA recommendations for site investigation included a trial pit to the front side to confirm the existing foundations and consider the effects of the works on the neighbouring properties. This is confusing as it is not clear if this meant a pit on the neighbouring property or on the site itself. It is noted that trial pits to investigate the foundations of 35 Greville Road or 37 Greville Road were not undertaken in the ground investigation. Croft's report also recommended a borehole with Standard Penetration Tests (SPTs) to be undertaken, however, a windowless sampler hole was undertaken with dynamic probing next to it.
- 4.12. It is noted that the strength values of the London Clay given in the Ground and Water ground investigation report differ from those given in Section 6 of the Ground and Project report. The retaining wall parameters given in Section 6.4 of Ground and Water's report are contradictory to the parameters given in Section 6 of Ground and Project's report and the trench sheet and temporary prop design in Croft's report. Croft's method statement states that the bearing pressures have been limited to  $130 - 150\text{kN/m}^2$ , however, is not clear what depth or foundation geometry this is based on. Section 6.2 of the Ground and Water GIR gives suggested bearing capacities, however, these are based on specific foundation geometries at a depth of 4.30m bgl which is the depth of the basement.

- 4.13. The ground movement assessment provided in Croft's report indicates that anticipated damage may be categorised as Category 0 to 1. It is unclear which building this relates to and what foundation depth has been assumed for the neighbouring buildings especially 37 Greville Road. Whilst it is not stated in the Croft report, the calculations for potential movements appear to be for the underpinning and movements due to the contiguous pile wall have not been considered. The property is detached and it is unclear what distance has been assumed between the neighbouring buildings and the underpins or contiguous pile wall. A depth of 3.60m is used in the calculations and it is unclear how this was determined. The depth of the basement is not stated in Croft's report although it is noted this information is given in H Fraser's Groundwater report and the proposed drawings as 4.30m bgl.
- 4.14. The ground movement assessment is deemed to be incorrect and is to be resubmitted. The calculations appear to have assumed a high support stiffness which would be appropriate for a propped wall, however, a low support stiffness should be assumed for a cantilevered wall. The length (L) and height (H) used in the damage category assessment should be for the affected building not the property being developed.
- 4.15. There is no evidence that Croft have considered heave resulting from the excavation or settlement of the underpins due to the applied load.
- 4.16. Croft's report states that it is not expected that any cracking will occur during the works, however, it is noted that the property already shows signs of distress. Whilst the cause of the distress is unclear, it is noted that there are trees present in the garden along the site boundary as indicated on the tree survey plan.
- 4.17. Section 3 of the Croft report only notes the presence of a tree, shrubs and general vegetation in the neighbouring garden, however, the tree survey (existing plan with trees) shows the presence of trees in the garden of the property itself. The proposed plan with trees also shows a tree to be replaced or removed although the Croft report states no tree will be removed. Whilst this information is contradictory, Ground and Project's Land Stability report note the basement will be founded beyond the depth of any seasonal shrink/swell zone which is accepted.
- 4.18. The basement design and construction impacts discussion in Croft's report gives loadings allowed for highways but does not explicitly consider the impact of the development on the pavements even though it states the development is within 5m of the footpath. Section 3 of Croft's BIA report includes a question on whether any UK power network assets will be affected by the basement works but this question was not answered. Additional information is required to demonstrate the roadways and any utilities running beneath them will not be adversely affected by the development.

- 4.19. A suggested method statement is included in Croft's report. This is confusing as it contains both a construction management plan and a construction sequence. It is difficult to understand and some of the information is contradictory. It is noted that details on construction vehicle movements are not included in the construction management plan. LBC is to confirm if this is required.
- 4.20. A works programme as required by cl. 233 of the Arup GSD has not been provided and this is requested.
- 4.21. Proposals are provided for a movement monitoring strategy and some contingency measures during excavation and construction and such measures should be adopted.



## 5.0 CONCLUSIONS

- 5.1. The reviewers of the BIA and the authors of the land stability and groundwater reports all have suitable qualifications.
- 5.2. The construction sequence in Croft's report is confusing and inadequate. Clarity is needed on the construction sequence and it is requested that plans are included to better indicate this sequence. This should include an indicative temporary works proposal showing propping arrangements which should cater for the critical point loads from the superstructure.
- 5.3. The BIA has not demonstrated that the development will not affect the hydrogeology of the surrounding area or that it would not cause detrimental effect on surface water discharges into the network drainage system.
- 5.4. Contradictory information on the risk of surface water flooding is given in Croft's BIA report. Clarification is requested.
- 5.5. A dual pumping mechanism is proposed as a mitigation measure in the event of flooding from infrastructure failure. This is accepted, however, clarity is needed on whether this is for foul or surface water.
- 5.6. The property is noted as showing signs of distress with cracking shown on a figure included in the Croft's BIA report although the land stability report states there were no signs of distress.
- 5.7. It is noted that trial pits were not undertaken to investigate the property or the neighbouring building. Confirmation is required as to whether these are intended to be undertaken.
- 5.8. It is noted that the BIA report, land stability and groundwater reports contain conflicting information with respect to the presence of trees, building distress etc. It is requested that these reports are made consistent. Condition surveys are recommended.
- 5.9. It is noted the soil parameters in Croft's report, the GIR and the land stability report are inconsistent. Clarification is required as to which parameters are to be used in design.
- 5.10. The ground movement and building damage assessment is considered incorrect and is to be resubmitted.
- 5.11. The BIA does not explicitly consider the impact on the adjacent roads and pavements and any possible utilities running beneath them. Additional information is required to demonstrate the roadways and the utilities running beneath them are not adversely affected by the development.

- 5.12. The suggested method statement in Croft's report is confusing as it contains a management plan and a construction sequence. It is requested that a better laid out construction management plan is submitted.
- 5.13. A works programme as required by cl. 233 of the Arup GSD has not been provided and this is requested.
- 5.14. Proposals are provided for a movement monitoring strategy and some contingency measures during excavation and construction and such measures should be adopted.

## **Appendix 1: Resident's Consultation Comments**

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Denndy	12 Broadoak House Mortimer Crescent Kilburn NW6 5PA	21-09-15	Inconsiderate builders Effect on trees and drainage Presence of a river	N/A  See Audit paragraphs 4.7 and 4.17  The BIA notes there are no surface water features in the vicinity of the site.
Not provided	Greville Road (full address not provided)	19-09-15	Concerns about building damage and notes subsidence further along row of buildings  Noise and loss of amenity	The BIA makes no note of subsidence on neighbouring properties (see Audit paragraphs 4.10, 4.14, and 4.16)  N/A

## **Appendix 2: Audit Query Tracker**

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format and stability	Inadequate and unclear construction method and sequence	To be provided in updated document with detailed plans and cross sections	
2	BIA format	Non technical summaries not provided	To be provided in updated documents	
3	BIA format	Inconsistent baseline conditions in different reports	To be made consistent and provided in updated documents	
4	BIA format	A works programme has not been submitted	To be provided in updated document	
5	Hydrogeology	Mitigation measure in the groundwater report is unclear and inconsistent with the measures in Croft's report	Clarification required in updated document	
6	Surface water flooding	BIA screening and scoping are inconsistent	Clarification is required in updated document	
7	Stability	Ground movement and building damage assessment is incorrect	To be resubmitted	
8	Stability	No explicit impact assessment on the roadways	To be provided in updated document	
9	Stability	BIA offers monitoring of existing building	Condition surveys, monitoring regime and trigger levels to be agreed with Party Wall Surveyor	N/A
10	Construction management plan	Confusing and unclear	To be resubmitted	

## **Appendix 3: Supplementary Supporting Documents**

None