CampbellReith
consulting engineers

35 Greville Road
London NW6 5JB

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-62
Revision: D2

May 2016

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Project Number	12066-62
Project Name	35 Greville Road, London NW6 5JB
Planning Reference	2015/5013/P

Contents

Appendix

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 construction method and sequence have been revised subsequent to the initial audit which requested clarity and plans to better indicate the sequence and indicative temporary works proposal which have also been provided. Further details of prop spacing and sizes are required to demonstrate the feasibility of undertaking construction around the propping.

1.6. Clarification was requested on the issue of more surface water entering the ground which was identified in the Hydrogeology screening but not addressed any further. It is now stated this will have minimal effect due to the low permeability of the London Clay.

1.7. Contradictory information on the risk of surface water flooding was given in Croft's BIA report and clarification was requested. The revised BIA states there will be no notable impacts on surface water flow within or around the site.

1.8. A dual pumping mechanism is proposed as a mitigation measure in the event of flooding from infrastructure failure.

1.9. The property (No 35) 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. Croft have stated in their email response that in the long term, due to the new development, the property will be on a more stable foundation which they conclude reduces the

risk of further cracking. It is accepted that with good workmanship, further damage to the existing building should be limited.

1.10. It is noted that trial pits were not undertaken to investigate the property or the neighbouring building. Unless this information is forthcoming, the greatest differential depth should be assumed.

1.11. It was noted that the BIA, Land Stability and Hydrogeology reports contain conflicting information with respect to the presence and potential removal of tree of trees and it was requested that these reports are made consistent.

1.12. Croft's response states a tree in the rear of the property is to be relocated not felled, however, it should be noted felling or relocation of a tree has the same effect with respect to shrink and swell. The Land Stability report states the basement will be founded beyond the zone of seasonal shrink or swell.

1.13. It was noted the soil parameters in Croft's report, the GIR and the Land Stability report were inconsistent and clarification was requested as to which parameters are to be used in design. Soil parameters are now only given in the Land Stability report with additional information on an email (see Appendix 3) from Croft.

1.14. The ground movement and building damage assessment was considered incorrect following the initial audit and it was requested it be resubmitted. The revised ground movement predicts Category 2 (Slight) damage which requires mitigation measures and the impacts to be re-evaluated. Additional props to increase wall stiffness have been proposed by Croft. It is also stated in the Land Stability report that the CIRIA C580 approach which was used to predict damage is considered conservative and represents an upper bound.

1.15. Increasing the amount of propping exacerbates the problem of limited room for construction due to the temporary propping proposal as described above. It is suggested that the ground movement assessment be re-evaluated as this may indicate less than Category 2 damage which means additional mitigation measures would not be required.

1.16. The Land Stability report indicates a maximum excavation depth of 4.80m which was used in the ground movement analysis, however, up to 6m is indicated in the monitoring proposal. Clarification is requested.

1.17. The BIA did not explicitly consider the impact on the adjacent roads and pavements and any possible utilities running beneath them. Additional information was requested to demonstrate the roadways and the utilities running beneath them are not adversely affected by the development. Croft's email response states the with the exception of part of the garage, the new substructure

will be more than 5m away from the highway, although the impact on the road is still not addressed.

1.18. The suggested method statement in Croft's report was considered confusing as it contains a management plan and a construction sequence. It should be noted that a better laid out construction management plan should detail noise and dust control as well as traffic management and the construction sequence should be separate from this document.

1.19. An outline works programme as required by cl. 233 of the Arup GSD has now been provided as requested and it is accepted a more detailed programme may be submitted by the appointed Contractor.

1.20. Proposals are provided for a movement monitoring strategy and some contingency measures during excavation and construction and such measures should be adopted. Condition surveys are recommended. Details and trigger levels may be agreed as part of the Party Wall awards.

1.21. Queries and requests for further information is discussed in Section 4 and 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 more recent version, this document was audited.

2.8. Supplementary information was received on 26 February 2016 in response to queries raised in the initial audit and these are as follows:

- Basement Impact Assessment Report – Croft Structural Engineers (Revision 2), dated February 2016
- Basement Impact Assessment Report: Land Stability (revised) – Ground and Project Consultants Ltd, dated July 2015
- Basement Impact Assessment Report: Groundwater – H Fraser Consulting, dated February 2016
- Ground Investigation Report – Ground and Water (Final), dated August 2015

- 1 No Residents' consultation response

2.9. Further queries were raised on the supplementary information by email to Croft on 15 March 2016 and a response to those queries was received on 13 April 2016 (see Croft email in Appendix 3). The following documents were updated with the relevant sections referenced in Croft's email response:

- Basement Impact Assessment Report – Croft Structural Engineers (Revision 3), dated April 2016
- Basement Impact Assessment Report: Groundwater – H Fraser Consulting, dated April 2016

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?	Yes	Croft BIA. Outline programme of works provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Croft BIA Section 1.
Are suitable plan/maps included?	No	Croft BIA report provides suitable maps, the other reports do not include the relevant Arup GSD map extracts.
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	Ground and Project Land Stability report Section 3 although this contains conflicting information to Croft's BIA report with respect to tree removal (see Audit paragraph 4.17).
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.
Hydrology Screening:	Yes	Croft BIA report Section 1.

Item	Yes/No/NA	Comment
Have appropriate data sources been consulted? Is justification provided for 'No' answers?		
Is a conceptual model presented?	Yes	H Fraser Groundwater report Section 4.1, Ground and Project (G&P) Land stability report Section 6 and Ground and Water Limited ground investigation report (GIR) Section 4.
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 4.8).
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Croft BIA report Section 2.
Is factual ground investigation data provided?	Yes	Ground and Water GIR, however it is noted that trial pits to investigate the existing foundations was recommended but this was not undertaken (see Audit paragraph 4.7).
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.
Has a site walkover been undertaken?	Yes	Croft BIA Section 3.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Section 3 of the Croft report states a planning application was granted for the construction of a basement but it is unknown if this was constructed (see Audit paragraph 4.7).

Item	Yes/No/NA	Comment
Is a geotechnical interpretation presented?	No	Initially provided in the Ground and Water GIR Section 6 but subsequently removed in the revised report.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 6 of the G&P's Land Stability report although this did not include stiffness parameters for the Made Ground and London Clay. Outstanding information provided in Croft email included in Appendix 3.
Are reports on other investigations required by screening and scoping presented?	N/A	No such reports identified.
Are baseline conditions described, based on the GSD?	Yes	Croft BIA and G&P Land Stability report.
Do the base line conditions consider adjacent or nearby basements?	Yes	Considered for No 37 the immediate neighbouring property, but no confirmation of presence or absence (see Audit paragraph 4.7).
Is an Impact Assessment provided?	Yes	G&P Land Stability report, H Fraser Consulting Groundwater report and Croft BIA.
Are estimates of ground movement and structural impact presented?	Yes	Land Stability report Section 8.
Is the Impact Assessment appropriate to the matters identified by screen and scoping	Yes	G&P Land Stability report, H Fraser report and Croft BIA.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Provided in Croft and Land Stability reports with additional mitigation measures on Croft email.
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.

Item	Yes/No/NA	Comment
Have the residual (after mitigation) impacts been clearly identified?	Yes	Croft's BIA.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Further details of prop spacing and sizes is required to demonstrate the feasibility of carrying out the out construction around the propping (see Audit paragraphs 4.5, 4.6 and 4.12 to 4.14.).
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Croft BIA and email response.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Temporary propping details require reconsideration.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	G&P Ground Movement Assessment predicts 'Slight' damage (Category 2). Further mitigation measures required.
Are non-technical summaries provided?	No	Not provided in G&P's Land Stability report or H Fraser's groundwater report although the reports are easily understandable. A non-technical/executive summary is provided in Croft's BIA report.

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 Hydrogeology assessments respectively. These are reported under separate covers. The reviewers of the Croft report and the authors of the Land Stability and Hydrogeology reports all have suitable qualifications.

4.2. The existing property is described in the Croft BIA as a detached house with three storeys and a loft space area. The existing lower ground floor is indicated to be c.1.60m below ground level (m bgl). It is proposed to construct a new basement below the existing building extending partly beneath the garden with a maximum excavation depth to 4.80m bgl although it is noted that Section 3 of the monitoring proposals indicates excavation up to 6m bgl to the rear of the property. Clarification is requested.

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 BIA has confirmed that the proposed basement will be located within the London Clay and that the surrounding slopes are stable.

4.5. The construction methodology has been revised following the initial audit which requested clarification. It is now proposed to construct the basement using a contiguous pile wall. Subsequent to the initial audit, the indicative temporary works proposal appeared to suggest excavation will be undertaken to formation level prior to propping installed and it was requested the propping arrangements be reconsidered. The proposal has been altered to include tunnelling under the existing lower ground floor with intermediate propping prior to the raking props being installed.

4.6. As indicated on Croft's temporary works sequence (SD-12), and Croft's email response (see Appendix 3), it is proposed to retain the existing lower ground floor and form the basement using tunnelling. This means vertical propping needs to be provided for the lower ground floor slab as the basement is excavated. The piled wall will be cross propped until permanent propping is installed. This proposal clearly leads to a basement very congested with props during construction.

4.7. The H Fraser Groundwater report assumes the presence of a basement beneath the neighbouring property, 37 Greville Road extending to 3.15m bgl. It is stated on Section 3 of the revised Croft BIA that planning permission was granted for a basement beneath No 37 Greville Road, however,

it is unknown if this was constructed or not. It is noted that trial pits to investigate the foundations of the property itself (35 Greville Road) or the neighbouring property 37 Greville Road were not undertaken in the ground investigation. It is stated in Section 5 of the land stability report that this was due to lack of access. Unless this information is forthcoming, the greatest differential depth should be assumed.

4.8. It is noted that groundwater was observed at <1m bgl in the ground investigation undertaken by Ground and Water. 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. The H Fraser report recommends provision of groundwater drainage pathways around the proposed structure and ongoing monitoring of groundwater levels. The issue of increase in the proportion of surface water entering the ground identified in the screening is not addressed in the scoping, however, it is now stated in the impact assessment this will have minimal impact due to the low permeability of the London Clay.

4.9. Croft's BIA screening and scoping notes the risk of flooding from infrastructure failure and a dual pumping mechanism with a non-return valve in the basement is proposed as a mitigation measure. Upstands above ground level are proposed to reduce the likelihood of flooding into the lightwells.

4.10. The Ground and Project Land Stability screening states the structural survey of the property (No. 35) 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 10 showing cracking on the garage walls, however, it is stated these cracks are believed to be non-structural. Clarification was requested and Croft have stated in their email response that in the long term, due to the new development, the property will be on a more stable foundation which they conclude reduces the risk of further cracking. As the depths of the existing foundations are not being altered, assuming good workmanship, the long term impact on the stability of the building is low.

4.11. Contradictory strength values for the London Clay and retaining wall parameters were given in the ground investigation report and Section 6 of the Land Stability report and it was requested that these are made consistent following the initial audit. Strength values for the London Clay and retaining wall parameters are now only given in the Land Stability report with stiffness parameters for the London Clay on an email from Croft (Appendix 3).

4.12. The ground movement assessment provided in Croft's report was considered incorrect and it was requested this be resubmitted following the initial audit. A revised ground movement assessment is now included in the Land Stability report and predicts a Category 2 (Slight) damage to No 37. It is stated the suggested values from CIRIA C580 is considered conservative and represents an upper bound. CPG4 requires mitigation measures where damage exceeds Category 1 and the

impacts to be re-evaluated. Croft's email suggests mitigation measures in the form of increasing the number of props to increase wall stiffness.

4.13. As described above, Croft's temporary works proposal would lead to a very congested working area during construction and this is exacerbated by the proposed mitigation measure due to the predicted Category 2 damage which is to increase the amount of cross propping of the basement walls.

4.14. Whilst the proposal described theoretically provides enough mitigation to maintain stability of the property itself and the neighbouring properties, it is not considered feasible to undertake construction within the basement due to the lack of room with all the propping. Further details of prop spacing and sizes are required to demonstrate the feasibility of undertaking construction around the propping.

4.15. Section 8 of the Land Stability report predicts short term heave movements of 7mm using elastic and consolidation theories and further states this is the maximum figure at the centre of the basement and will reduce towards the edges of the basement.

4.16. Croft's report stated that it is not expected that any cracking will occur during the works, however, it is noted that the property (35 Greville Road) already shows signs of distress. Although Section 3 of Croft's report states the cracks are believed to be non-structural, it is noted that there are trees present in the garden along the site boundary as indicated on the tree survey plan.

4.17. The Croft report only noted 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. A 'No' response is given to Question 6 of the Land Stability screening which relates to whether or not any trees are to be felled as part of the development. 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. Croft has responded to a clarification request by stating that '*the tree will be relocated and therefore not be felled in the conventional use of the term*'. It should be noted that a tree being felled or relocated would have the same effect as this relates to the potential for the ground to swell as a result of the excess moisture being retained in the ground.

4.18. The basement design and construction impacts discussion in Croft's report gave loadings allowed for highways but did not explicitly consider the impact of the development on the pavements even though it was stated the development is within 5m of the footpath. Additional information was requested to demonstrate the roadways and any utilities running beneath them will not be adversely affected by the development. It is stated in Croft's response that with the exception of

the part of the basement beneath the garage, the new substructure will be more than 5m away from the highway, however, the impact on the highway has still not been addressed.

4.19. A suggested method statement is included in Croft's report. This was considered confusing as it contains both a construction management plan and a construction sequence. It is noted that details on construction vehicle movements are not included in the construction management plan. Croft have indicated a more detailed construction management plan may be provided by the appointed Contractor and details should be agreed with the Council.

4.20. An outline works programme as required by cl. 233 of the Arup GSD has now been provided as requested and it is accepted a more detailed programme may be provided by the appointed Contractor.

4.21. Proposals are provided for a movement monitoring strategy together with some contingency measures during excavation and construction and such measures should be adopted with details and trigger levels to be agreed as part of the Party Wall awards.

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 method and sequence have now been revised subsequent to the initial audit which requested clarity and plans to better indicate the sequence and indicative temporary works proposal which have also been provided.

5.3. The revised temporary works proposal is considered to be unfeasible due to the amount of propping proposed which would hinder construction. Further details of prop spacing and sizes are required to demonstrate the feasibility of undertaking construction around the propping.

5.4. Clarification was requested on the issue of more surface water entering the ground which was identified in the Hydrogeology screening but not addressed any further. It is now stated this will have minimal effect due to the low permeability of the London Clay.

5.5. Contradictory information on the risk of surface water flooding was given in Croft's BIA report and clarification was requested. The revised BIA states there will be no notable impacts on surface water flow within or around the site.

5.6. A dual pumping mechanism is proposed as a mitigation measure in the event of flooding from infrastructure failure.

5.7. 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. Croft have stated in their email response that in the long term, due to the new development, the property will be on a more stable foundation which they conclude reduces the risk of further cracking. It is accepted that with good workmanship, further damage to the existing building should be limited.

5.8. It is noted that trial pits were not undertaken to investigate the property or the neighbouring building. Unless this information is forthcoming, the greatest differential depth should be assumed.

5.9. It was noted that the BIA, Land Stability and Hydrogeology reports contain conflicting information with respect to the presence and potential removal of tree of trees and it was requested that these reports are made consistent.

5.10. Croft's response states a tree in the rear of the property is to be relocated not felled, however, it should be noted felling or relocation of a tree has the same effect with respect to shrink and swell. The Land Stability report states the basement will be founded beyond the zone of seasonal shrink or swell.

5.11. It is noted the soil parameters in Croft's report, the GIR and the Land Stability report were inconsistent and clarification was requested as to which parameters are to be used in design. Soil parameters are now only given in the Land Stability report with additional information on an email (see Appendix 3) from Croft.

5.12. The ground movement and building damage assessment was considered incorrect and it was requested it be resubmitted. The revised ground movement predicts Category 2 (Slight) damage which requires mitigation measures and the impacts to be re-evaluated. Additional props to increase wall stiffness have been proposed by Croft. It is also stated in the Land Stability report that the CIRIA C580 approach which was used to predict damage is considered conservative and represents an upper bound.

5.13. Increasing the amount of propping exacerbates the problem of limited room for construction due to the temporary propping proposal as described above. It is suggested that the ground movement assessment be re-evaluated as this may indicate less than Category 2 damage which means additional mitigation measures would not be required.

5.14. The Land Stability report indicates a maximum excavation depth of 4.80m which was used in the analysis, however, up to 6m is indicated in the monitoring proposal.

5.15. The BIA did not explicitly consider the impact on the adjacent roads and pavements and any possible utilities running beneath them. Additional information was requested to demonstrate the roadways and the utilities running beneath them are not adversely affected by the development. Croft's email response states the with the exception of part of the garage, the new substructure will be more than 5m away from the highway, although the impact on the road is still not addressed.

5.16. The suggested method statement in Croft's report was considered confusing as it contains a management plan and a construction sequence. It should be noted that a better laid out construction management plan should detail noise and dust control as well as traffic management and the b construction sequence should be separate from this document.

5.17. An outline works programme as required by cl. 233 of the Arup GSD has now been provided as requested and it is accepted a more detailed programme may be submitted by the appointed Contractor.

5.18. Proposals are provided for a movement monitoring strategy and some contingency measures during excavation and construction and such measures should be adopted. Condition surveys are recommended. Details and trigger levels may be agreed as part of the Party Wall awards.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Denndy	12 Broadoak House Mortimer Crescent Kilburn NW6 5PA	21-09-15	Effect on trees and drainage Presence of a river	See Audit paragraphs 4.12 to 4.14 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	See Audit paragraphs 4.12 to 4.14

Appendix 2: Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format and stability	Inadequate and unclear construction method and sequence	Closed – Construction method reconsidered. Plans and detailed cross sections provided	13/05/16
2	BIA format	Non technical summaries not provided	Closed - Agreed that existing documents clearly describe outcomes	13/05/16
3	BIA format	Inconsistent baseline conditions in different reports	Closed – Clarification in Croft email	13/05/16
4	BIA format	A works programme has not been submitted	Closed – Outline programme provided with detailed programme to be provided by appointed Contractor.	13/05/16
5	Hydrogeology	Mitigation measure in the groundwater report is unclear and inconsistent with the measures in Croft's report	Closed - Clarification in Croft email	13/05/16
6	Surface water flooding	BIA screening and scoping are inconsistent	Closed - Clarification in Croft email and document revised.	13/05/16
7	Stability	Contradictory maximum excavation depths given in various documents	Open – to be clarified	
8	Stability	Temporary works proposal in supplementary documents considered inadequate.	Open – Proposal revised, however, this is considered unfeasible and further details are requested	
9	Stability	Ground movement and building damage assessment considered incorrect after initial audit. Resubmitted but damage category (Category 2) required further mitigation	Open - Mitigation provided not considered feasible. Further details requested (see Audit paragraphs 4.12 to 4.14)	
10	Stability	No explicit impact assessment on the roadways. Stated in Croft email that only a small section will be within 5m of the roadway but impact still not addressed	Open – Impact on roadway to be addressed	

11	Stability	BIA offers monitoring of existing building	Condition surveys, monitoring regime and trigger levels to be agreed with Party Wall Surveyor	N/A
12	Construction management plan	Confusing and unclear	Agreed that appointed Contractor may provide more detailed plan. Details to be agreed with Council.	N/A

Appendix 3: Supplementary Supporting Documents

Croft email response dated 13/04/15

Geoff Watson

From: Jon Smithson <jon.smithson@ground-projects.co.uk>
Sent: 12 April 2016 10:12
To: 'Geoff Watson'
Subject: RE: 35 Greville Road - heave
Attachments: params.xlsx

Hi Geoff

Parameters spreadsheet attached. Happy to talk to them direct if this helps.

Regards

Jon

Jon Smithson
Director

Ground and Project CONSULTANTS LTD

Ground and Project Consultants Ltd, Shrewsbury, UK
Tel: 01743 383155
Mobile: 07825 819799

jon.smithson@ground-projects.co.uk
www.ground-projects.co.uk
Follow me at @jonsmithson0305

From: Geoff Watson [mailto:gwatson@croftse.co.uk]
Sent: 11 April 2016 16:18
To: 'Jon Smithson' <jon.smithson@ground-projects.co.uk>
Subject: RE: 35 Greville Road - heave

Hi Jon,

Could you include the parameters that you used for the heave please? The auditors expect to see a mention of the soil stiffness for the clay (and for the made ground if applicable). Please could you mention this within the report, or in reply to this e-mail.

Kind regards

Geoff Watson
Structural Engineer

London Clay **Eu** Undrained Youngs Modulus = 360 x Cu (CIRIA Special Publication 27)

From GI Cu assumed = 50kN/m2 increasing to 100 at 10m

Therefore Eu = 18000 + 36 Kn/m2 where z1 is depth below formation

Mv for long term heave

0.08m2/MN at shallow depth

0.05m2/MN deeper Lower strains and stiffer soil at depth

Bulk Unit Weight

Made Ground	17 kN/m3
London Clay	20kN/m3

RE: 35 Greville Road, Camden Reference 2015/5013/P
Geoff Watson
to:
FatimaDrammeh
13/04/2016 12:37
Cc:
"'Yeung, Raymond'", "'Raymond'", " <Raymond.Yeung@camden.gov.uk/O=, camdenaudit,/,@campbellreith.com"
Hide Details
From: "Geoff Watson" <gwatson@croftse.co.uk>
To: <FatimaDrammeh@campbellreith.com>
Cc: "'Yeung, Raymond'" <Raymond.Yeung@camden.gov.uk>, "'Raymond'"@croftse.co.uk, <" <Raymond.Yeung@camden.gov.uk/O=, camdenaudit,/,@campbellreith.com"@cluster-d.mailcontrol.com>, "Irina Bogdanova" <irina@fkprojectmanagement.com>, <nmanzini@croftse.co.uk>
History: This message has been forwarded.

4 Attachments

image001.jpg image002.jpg 35 Greville Rd heave parameters.pdf

35 Greville Road BIA - Groundwater [30092R1v2].pdf 35 Greville Road BIA - Land Stability [rev 2].pdf

35 Greville Road BIA - Main - Rev3.pdf

Dear Fatima,

Thanks for your comments on our BIA. Please find our responses to your queries inserted within your message below (in blue).

We have attached revised BIA documents for this application. Please note that the changes are minor and we have given pointers to the relevant sections within our responses.

Kind regards

Geoff Watson
Structural Engineer

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-----Original Message-----
From: FatimaDrammeh@campbellreith.com [mailto:FatimaDrammeh@campbellreith.com]
Sent: 15 March 2016 17:33
To: Geoff Watson; nmanzini@croftse.co.uk
Cc: Yeung, Raymond; Raymond; " <Raymond.Yeung@camden.gov.uk/O=, camdenaudit,/,@campbellreith.com"@rly06d.srv.mailcontrol.com
Subject: 35 Greville Road, Camden Reference 2015/5013/P

Noma/Geoff

We have reviewed the supplementary documents sent across for 35 Greville Road and we have a few queries. We would be grateful if you can provide clarification on the following rather than issuing another report with queries and outstanding information identified.

Croft main BIA

Construction sequence - The proposed sequence on Page 4 and the temporary works drawing (SD-12) appears to suggest excavation will be undertaken to formation level and then propping installed. This will leave the excavation unsupported for a significant amount of time which would have an effect on ground movements and the stability of the neighbouring property. We suggest the propping arrangements to be reconsidered.

> On page 4 of the main BIA, Step 4 has been altered to clarify that we propose tunnelling under the existing Lower Ground Floor.
> The temporary works drawing (SD-12 at the end of the main BIA) has been altered to show that we propose propping for the initial excavations/tunnelling, before the raking props are installed.

It is stated on the executive summary (Page 6) the predicted damage to the neighbouring property is 'very slight' to 'slight' however this is contradictory to other sections of the report and the GMA within the land stability report which indicate 'slight' damage. Please make this consistent.

> The summary describes how the damage may change during the course of the works: ie as excavation commences, the predicted damage category will be 'Very Slight' and may increase to 'Slight'. For clarity, we changed the wording to 'maximum anticipated damage category'.

It is stated on page 16 that the basement is further than 5m away from the highway, however, a 'Yes' response is given to Q12 of the land stability screening and it is further stated in the impact assessment of the land stability report that the basement is within 5m of the pavement and highway on Mortimer Crescent. Please clarify. If the basement is within 5m of the road, information is required to demonstrate the road and any utilities running beneath it are not adversely affected by the development. This was requested in the but it has not been addressed.

With the exception of the part of the basement below the garage, the new substructure will be more than 5m away from the highway. This is now clarified on page 16.

The BIA correctly identifies the need for mitigation measures as required by CPG4 where damage exceeds Category 1, and the impact re-evaluated however it is noted the measures proposed are not appropriate to limiting ground movements and they are not consistent with the measures proposed in the land stability report. One of the mitigation measures proposed in the land stability report is 'installation of adequate propping' however, it is noted the assessment used to predict Category 2 damage already assumes high support stiffness. Further mitigation with regards to limiting damage to the neighbouring property which is Grade II listed is

requested.

We propose mitigation measures in the form of increasing the number of props in the excavations to increase the wall stiffness. We inserted a requirement (Item 1.1.1) in the method statement in Appendix B for this.

A better laid out construction management plan was requested following the initial audit as the information included both a construction management plan and a construction sequence which makes it confusing. It should be noted that the method statement should detail the sequence of construction whilst traffic management, noise and dust control should be included in the construction management plan.

We inserted a caveat (Item 1.1.2) in the method statement for this, which requires more details at detailed design stage.

Land Stability report

A 'No' response to given to Q6 of the screening which relates to whether or not any trees are to be felled. This is contradictory to drawing No 71-1 which indicated a tree in the rear of the property is to be relocated. This issue was however carried forward and it is stated on the impact assessment that should any trees be removed there is a potential for the soils to swell and this should be accounted for in design. We would request the information is made consistent in the various reports and the impact of the tree removal considered.

The tree will be relocated and therefore not be 'felled' in the conventional use of the term.

Mitigation measures to limit ground movements to be reconsidered as described above, In response to Q6 which relates to seasonal shrink/swell subsistence, it is stated 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. Clarification was requested following the initial audit however this has not been addressed. It is further noted that one of the neighbours comments relate to subsidence along the row of buildings and this was noted on Appendix 1 of the initial audit.

As discussed above, further mitigation measures are proposed to limit ground movement. In the long term, due to the new development, the property will be on a more stable foundation. The likelihood of further cracking will be reduced.

On a separate note, the parameters used for the heave calculations are attached.

Hydrogeology report

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 . A revised report dated February 2016 has been provided although it appears the issue of surface water discharge has still not been addressed. Clarification is requested.

The implications of surface water being discharged to the ground was described in Table 5.1 of this report. It discussed recharge ie surface water into the ground. This is now altered for clarity. In the latest report, please refer to the final paragraph in the 'Predicted Change' column of Table 5.1 on page 10. This ends in '..Impacts of changes in the amount of surface water entering groundwater are likely to be minimal.'

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