

Flat 1, 44 Goldhurst Terrace
NW6 3HT

Basement Impact Assessment
Audit

For

London Borough of Camden

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Revision: D1

July 2018

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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 Flat 1, 44 Goldhurst Terrace, Swiss Cottage NW6 3HT (planning reference 2017/6906/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 has been prepared by Solid Geometry Structural Engineers with input from Soiltechnics, Cooper Associate and Chord Environmental Limited. The authors' qualifications are in accordance with LBC requirements.
- 1.5. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 1.6. The proposed basement will be founded within the London Clay formation. A borehole drilled at the site encountered Made Ground underlain by London Clay. No groundwater was found either during drilling or a subsequent monitoring visit.
- 1.7. The proposed basement will utilise traditional underpinning of the perimeter walls. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. Geotechnical parameters for retaining wall design are provided.
- 1.8. A Ground Movement Assessment has been undertaken. The assessment methodology is not accepted, as described in Chapter 4, and should be reviewed.
- 1.9. No trees are to be removed as part of the proposal. An assessment of seasonal shrink/swell movements concludes that the proposed foundations are to be constructed at the appropriate depths in accordance with relevant guidance.
- 1.10. The BIA states that the tree protection measures proposed in the accompanying arboricultural report will be carried out during construction.

- 1.11. Neither the BIA nor Flood Risk Assessment (FRA) identify that the site is within a Local Flood Risk Zone or Critical Drainage Area. Notwithstanding this, the FRA proposes appropriate flood risk mitigation which should be adopted.
- 1.12. The proposed development will result in an increase in impermeable site area. The increase should be quantified and appropriate drainage proposed, considering the site location and requirements of LBC and Thames Water.
- 1.13. It is accepted that there are no slope stability impacts as a result of the proposed development.
- 1.14. It is accepted that the development will not impact on the wider hydrogeology of the area.
- 1.15. An outline construction programme should be provided.
- 1.16. Non-technical summaries should be provided in any updates to the BIA.
- 1.17. Until the queries described in Section 4, and summarised in Appendix 2, are addressed, the BIA does not meet the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 14th May 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Flat 1, 44 Goldhurst Terrace, Swiss Cottage NW6 3HT reference 2017/6906/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): Basements.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan Policy A5 Basements.

2.4. The BIA should demonstrate that schemes:

- a) maintain the structural stability of the building and neighbouring properties;
- b) avoid adversely affecting drainage and run off or causing other damage to the water environment;
- c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;

evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as "*Construction of basement extension including lightwells to front and rear and single storey extension at rear lower ground floor level.*"

2.6. The Audit Instruction also confirmed that 44 Goldhurst Terrace is not involved in, or was a neighbour to, listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 29 May 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) issue 02 Part 1 by Solid Geometry Structural Engineers, dated 31 May 2018.
- Basement Impact Assessment Report (BIA) issue 02 Part 2 by Soiltechnics Environmental and Geotechnical Consultants, dated May 2018.
- BIA Appendix A to F and G1 to G6 by Soiltechnics dated April and November 2017.
- BIA Appendix H, Arboricultural Survey and Planning Integration Statement, reference AR/3684/rg, by Quaife Woodlands, dated 29 May 2017.
- Planning Application Drawings consisting of
 - Location Plan - Proposed Site Plan reference AP00 00 by Kokorelia Architects dated November 2017
 - Existing Plans AP100 R01 and AP120, by Kokorelia Architects dated March 2018.
 - Existing Drawings AP100 00, AP110 00, AP111 00, AP112 00, AP113 00, AP120 by Kokorelia Architects dated November 2017.
 - Proposed Drawings AP200 00, AP201 00, AP202 00, AP210 00, AP211 00, AP212 00, AP213 00, AP220 00 by Kokorelia Architects dated November 2017.
 - Proposed Plans AP200 R01, AP210 R01, AP202 R01, AP210 R01, AP211 R01, AP220 R01 by Kokorelia Architects dated March 2018.
- Design & Access Statement by Kokorelia Architects dated November 2017.
- Flood Risk Assessment reference CA4735.02, by Cooper Associates, dated April 2018.
- Planning Advice Letter reference 2015/1118/PRE by Camden Council dated 08 April 2015.
- Planning Comments and Responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	No	Outline construction programme to be provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Change in impermeable area to be quantified
Are suitable plan/maps included?	Yes	
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?	No	Q13 The proposal will significantly increase the differential depth of foundations.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Q3 Change in impermeable area to be quantified. Q4 Should be confirmed by drainage proposals. Q6 has not been addressed: neither BIA nor FRA have identified that the site is within a Local Flood Risk Zone or Critical Drainage Area.
Is a conceptual model presented?	Yes	Described within the text

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	GMA provided which considers differential depth of foundations (assessment methodology not accepted).
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Change in impermeable area to be quantified. Drainage proposals to be provided, considering LFRZ and CDA and requirements of LBC and TW.
Is factual ground investigation data provided?	Yes	No laboratory testing results are included.
Is monitoring data presented?	Yes	One groundwater monitoring visit was undertaken and results provided.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	However, bearing pressure and settlement calculations not provided for consideration within GMA.
Are reports on other investigations required by screening and scoping presented?	Yes	
Are the baseline conditions described, based on the GSD?	No	Hydrological impacts to be confirmed considering drainage proposals.

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	However, methodology not agreed.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	GMA to be reviewed; hydrological impacts to be reviewed.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Temporary works proposed appear robust; however, should be reviewed considering final GMA. Flood mitigation proposed. Drainage to satisfy LBC and TW requirements to be proposed.
Has the need for monitoring during construction been considered?	Yes	Although not specified.
Have the residual (after mitigation) impacts been clearly identified?	No	Predicted to neighbours is Burland Category 1. However, GMA to be reviewed.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA to be reviewed.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Drainage to satisfy LBC and TW requirements to be proposed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	GMA to be reviewed. Drainage to satisfy LBC and TW requirements to be proposed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	GMA to be reviewed
Are non-technical summaries provided?	No	

4.0 DISCUSSION

- 4.1. The BIA has been prepared by Solid Geometry Structural Engineers with input from Soiltechnics, Cooper Associate and Chord Environmental Limited. The authors' qualifications are in accordance with LBC requirements.
- 4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building or is adjacent to listed buildings. The site is located within the South Hampstead Conservation Area.
- 4.3. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 4.4. The BIA has identified that the existing brick foundations bear on the London Clay formation. Intrusive ground investigation indicates the underlying soils to comprise Made Ground to 1.1m below ground level (bgl), underlain by London Clay to 5.75m bgl, which was the full depth of exploration. No groundwater strikes were noted during the investigation and one subsequent monitoring visit recorded the standpipe to be dry. The laboratory testing results have not been presented for review.
- 4.5. The Desk Study within the BIA shows the site to lie in close proximity to a branch of the historic Westbourne, although no watercourses are shown on historic mapping. The BIA concludes that river is likely to have been culverted. The BIA highlights the site as being continuously residential from 1896, prior to which it comprised open fields.
- 4.6. The proposed basement will utilise traditional underpinning of the perimeter walls. The lightwell retaining walls will be formed in an underpinned style sequence. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. The works will be stiffly propped in the temporary condition. In the permanent condition, the retaining walls will cantilever.
- 4.7. Geotechnical parameters for retaining wall design and a bearing capacity for foundations is presented. Structural calculations are not presented; proposed bearing pressures and resultant settlements are not stated.
- 4.8. Due to the age and style of the terraced housing, and the inspection pits undertaken, the BIA concludes that foundations at the adjacent properties will be similar or identical to those found at 44 Goldhurst Terrace. Nearby basements are identified although none are within the immediate vicinity of the site.

- 4.9. The BIA uses CIRIA C760 to predict ground movements resulting from underpinning and construction of the basement. Whilst the CIRIA approach is intended for embedded retaining walls, we accept that by using this methodology predicted ground movements are within the range typically anticipated for underpinning techniques carried out with good workmanship. However, the assessment is not accepted because:
- movements due to installation of the underpins have not been considered.
 - the retaining walls cantilever in the permanent case and should not be considered 'stiffly propped' in accordance with the methodology described in C760.
 - the damage calculations presented are not in accordance with the methodology described within C760.
 - Damage calculations for the Party Walls, including for the neighbours in the flats located above the proposed development, have not been considered.
- 4.10. Additionally, although a bearing capacity for the London Clay at founding level is assessed, the bearing pressures and resultant settlement of the walls have not been provided, which should also be considered in relation to the damage assessment.
- 4.11. The damage assessment considers the impact to the highway. This should be reconsidered, following a review of the GMA, noting also the requirement to protect utility assets where applicable. Thames Water waste and mains water assets are identified within close proximity of the site.
- 4.12. A movement monitoring strategy during excavation and construction is provided in the BIA, which details when to review the use of active propping. However, the strategy should be reviewed once the GMA has been concluded in accordance with the comments of 4.9 to 4.11.
- 4.13. The underlying, impermeable London Clay is classified as unproductive strata. The proposed basement will have no adverse effect on the local hydrogeology.
- 4.14. The BIA refers to the GSD Figure 15 and highlights that the site lies on a street known to have flooded in 2002, although states that it is not located within an area considered to be at risk from surface water flooding. The BIA section 3.4.4 also refers to known incidents of ruptured Thames Water pipes in the vicinity of the site leading to localised surface water flooding. The accompanying Flood Risk Assessment (FRA) identifies that the site lies in Environment Agency Flood Zone 1, which has a low probability of flooding. Contrary to the BIA, the FRA also identifies that Goldhurst Terrace experienced flooding in 1975 and 2002, according to the LBC surface water flooding records, and therefore is at risk from future surface water flooding.
- 4.15. Neither the BIA nor Flood Risk Assessment (FRA) identify that the site is within a Local Flood Risk Zone (LFRZ) or Critical Drainage Area (CDA). Notwithstanding this, the FRA proposes

appropriate flood risk mitigation which should be adopted, such as fitting non-return valves to the existing foul and rainwater drainage system and waterproofing throughout.

- 4.16. The proposed development will result in an increase in impermeable site area. The increase should be quantified and appropriate drainage proposed, considering the site location within a LFRZ and CDA, and the requirements of CPG Basements 4.54 and Thames Water.
- 4.17. The scoping stage of the BIA outlines that no evidence of tree-related subsidence has been noted on the property itself or at adjacent properties. Consultation Responses received indicate that some local ground movements may have occurred. No trees are to be removed as part of the proposal. Reference to NHBC Chapter 4.2 is made in the BIA, and an assessment made of recommended foundations depths according to the governing trees in the proximity at both the front and back of the property. It is concluded that the depth of the proposed development is in excess of the foundation depths recommended in the guidance, and as such any new foundations will be beyond the zone of influence of the tree roots.
- 4.18. The BIA states that tree protection measures identified in the accompanying arboricultural report will be carried out during construction.
- 4.19. It is accepted that there are no slope stability impacts as a result of the proposed development.
- 4.20. An outline construction programme should be provided.
- 4.21. Non-technical summaries should be provided in any updates to the BIA.

5.0 CONCLUSIONS

- 5.1. The BIA has been prepared by authors who possess suitable qualifications.
- 5.2. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 5.3. The proposed basement will be founded within the London Clay formation.
- 5.4. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. Geotechnical parameters for retaining wall design are provided.
- 5.5. A Ground Movement Assessment has been undertaken. The assessment methodology is not accepted, as described in Chapter 4, and should be reviewed.
- 5.6. No trees are to be removed as part of the proposal. The proposed foundations are to be constructed at the appropriate depths to mitigate against shrink / swell movements.
- 5.7. The BIA states that the tree protection measures proposed in the accompanying arboricultural report will be carried out during construction.
- 5.8. Neither the BIA nor Flood Risk Assessment (FRA) identify that the site is within a Local Flood Risk Zone or Critical Drainage Area. Notwithstanding this, the FRA proposes appropriate flood risk mitigation which should be adopted.
- 5.9. The proposed development will result in an increase in impermeable site area. The increase should be quantified and appropriate drainage proposed, considering the site location and requirements of LBC and Thames Water.
- 5.10. It is accepted that there are no slope stability impacts as a result of the proposed development.
- 5.11. It is accepted that the development will not impact on the wider hydrogeology of the area.
- 5.12. An outline construction programme should be provided.
- 5.13. Non-technical summaries should be provided in any updates to the BIA.
- 5.14. Until the queries described in Section 4, and summarised in Appendix 2, are addressed, the BIA does not meet the requirements of CPG Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Fladmark	Flat 3, 44 Goldhurst Terrace NW6 3NT	06 April 2018	Concerned that signs of existing subsidence haven't been considered in BIA.	Discussed in Section 4
Willans	Flat 3, 44 Goldhurst Terrace NW6 3HT	26 March 2018	Concerned about the proposed excavation methodology, impact on existing subsidence, flooding reported within the last 5 years, effects on existing arboriculture and services (gas) in common areas.	Discussed in Section 4
Gaskin	46 Goldhurst Terrace NW6 3HT	13 March 2018	Concerned that the development will affect the structural integrity of the building and surrounding properties, with particular reference to subsidence. Concerned that the area for water runoff and soakaway will be reduced. Concerned for loss of amenity, that the garden above the proposed basement will no longer be able to support trees and other vegetation. Concerned that the proposals do not consider protected trees within the Conservation Area.	Discussed in Section 4
Campbell	unknown	05 March 2018	Concerned about Party Wall issues with no. 46.	Discussed in Section 4

Fletcher	Leaseholder in building	09 April 2018	Concerned about slope stability; describes the property as being on a slight hill. Concerned about proximity to London Underground infrastructure – states that since conversions at No.s 58 and 66, can hear the trains. Concerned about the depth of the proposal, states that Flat 1 is already below ground level.	Discussed in Section 4
Quinn	42c Goldhurst Terrace	13 March 2018	Concerned about structural implications for adjoining properties and lack of notification to occupiers, owners and Freeholders. Concerned at lack of a Method Statement. Concerned that area is already known to be unstable and property situated on sloping ground. Concerned about implications of excavating a sub-basement beneath an existing semi-basement. Concerned about party walls.	Discussed in Section 4
Prooth	15 Fairfax Place, NW6 4EJ	20 February 2018	Concerned about subsidence and longer-term 'sinking' of neighbouring properties.	Discussed in Section 4
Hirsch	50 Goldhurst Terrace, NW6 3HT	21 February 2018	Concerned that exploratory works in advance of planning permission being granted may form large excavations.	Discussed in Section 4
Macleod	52 Goldhurst Terrace	10 March 2018	Concerned that the proposal excavation will be excessively deep due to Flat 1 already being below ground, and lightwell ineffectual.	Discussed in Section 4
Gabriel	50 Goldhurst Terrace	13 March 2018	Agrees with all points made by other residents.	Discussed in Section 4

Fuller	Flat 2, 44 Goldhurst Terrace NW6 3HT	13 March 2018	Concerned about subsidence of the building as a result of the proposal affecting the structural integrity of his flat, which lies above Flat 1. Concerned about land stability and mentions a historic flooding problem from the front garden into Flat 1 hallway. Concerned that proposed lightwell is not situated on land fully owned by the applicant.	Discussed in Section 4
Quinn & Israel	42c Goldhurst Terrace	13 March 2018	Highlights that adjacent property (No. 42) suffered subsidence previously, and concerned that proposal will cause the same again. States that site is built on sloping historic landfill with known instability. States that buildings in this area show signs of distress. Lime trees removed. States that foundations at alternate party walls are inadequate. Existing lower floor flat floor levels 1.2 – 1.6m below street level. Concerned about movement to already unstable buildings. Concerned about the size of the proposed lightwell.	Discussed in Section 4
Ryan	42a Goldhurst Terrace	10 March 2018	Concerned that development will impact on the adjacent garden fence and garden space.	Not within scope of BIA Audit
Campbell, J	46a Goldhurst Terrace	13 March 2018	Mentions a historic water leak at Flat 1, 44 Goldhurst Terrace.	Discussed in Section 4

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Outline Construction Programme to be provided	Open	
2	Hydrology	Drainage proposals to be provided considering site location (LFRZ / CDA) and TW and LBC requirements	Open	
3	Stability	Non-technical summaries to be provided, in accordance with LBC requirements	Open	
4	BIA	Confirm drainage proposal	Open	

Appendix 3: Supplementary Supporting Documents

None

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