CampbellReith
consulting engineers

20A Ferncroft Avenue
London
NW3 7PH

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-02
Revision: F1

May 2020

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
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F1	May 2020	For planning	EMBemb-13398-02-210520-20A Ferncroft Avenue-F1.doc	EMB	GK	GK

Document Details

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Author	E M Brown
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	13398-02
Project Name	20A Ferncroft Avenue
Planning Reference	2019/6220/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 20A Ferncroft Avenue (planning reference 2019/6220/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 authors of the BIA and supporting documents possess suitable qualifications.

1.5. The proposed basement is to be formed using underpinning techniques. Clarification was required with respect to the depth of excavation and the nature of the basement retaining walls, which has now been provided.

1.6. The site is at low risk of flooding and is not in a Critical Drainage area.

1.7. The hydrogeological assessment notes that the basement will have only a local impact. It has been confirmed that infiltration drainage will be designed to ensure no changes to surface water flows to the ground.

1.8. The BIA notes that dewatering may be required and states that any such system will be designed by a specialist contractor.

1.9. The site investigation identified that the Claygate Member has a medium volume change potential. The impact of tree removal on nearby shallow foundations has been assessed as negligible.

1.10. A ground movement impact assessment has been provided. Estimations of building damage indicate that it can be limited to Burland Category 1.

1.11. An outline monitoring scheme is described. Monitoring should be implemented during the works.

1.12. It is accepted that the surrounding slopes to the development site are stable.

1.13. It is confirmed that the BIA complies with the requirements of the Camden Planning Guidance for basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 17 January 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 20A Ferncroft Avenue, London, NW3 7PH, Camden Planning Reference 2019/6220/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 Basements. March 2018.
- 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: "*Demolition of existing rear extension and erection of new rear extension; excavation of new basement floor with front lightwell; and associated removal of 1 x Cherry Tree in rear garden.*"

The Audit Instruction confirmed that the property is not listed.

2.6. CampbellReith accessed LBC's Planning Portal on 31 January 2020 and gained access to the following relevant documents for audit purposes:

- Existing and proposed plans and sections, Trace Architects, dated December 2019
- Basement Impact Assessment, reference P18-461 - 20a Ferncroft Av – BIA, Rev 0, dated 12 December 2019 and prepared by Simpson TWS, containing
- Construction sequencing drawings and calculations
- Site Investigation report by Risk management Ltd, dated September 2019
- Ground movement assessment (GMA) by Geotechnical Consulting Group LLP (GCG), dated December 2019
- Hydrogeological impact assessment by GCG, dated December 2019
- Design & Access Statement, Trace Architects, dated November 2019
- Arboricultural Impact Assessment, Ashley Tree Surveys, dated November 2019
- Tree Protection Plan, Ashley Tree Surveys, Dated November 2019.

2.7. Following the issue of the initial audit report, in March 2020 CampbellReith received an addendum to the BIA (rev 0), prepared by TWS and dated March 2020. The addendum contained revisions to the ground movement and hydrogeological assessment prepared by GCG.

2.8. Whilst some queries were closed out, some remained and a second addendum was issued by TWS in April 2020. Queries on the ground movement assessment and use of infiltration drainage remained and were finally closed out in an exchange of emails. The BIA addendums have been uploaded to Camden's Planning Portal. The emails and attachments are presented in Appendix 3 of this report.

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?	Yes	BIA appendices
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA appendices
Are suitable plan/maps included?	Yes	BIA appendices
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	BIA appendices
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Recent sub-surface water mapping exercise for RedFrog and Hampstead area not referenced, but screening outcomes generally correct.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	No	However, relationship between ground and groundwater conditions, topography and proposed scheme clearly described.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Clarification provided (see Appendix 3).
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Clarification provided (see Appendix 3).
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	No desk study provided, however, ground investigation is adequate for impact assessment.
Has a site walkover been undertaken?	Yes	The BIA notes that the engineer visited site on a number of occasions. A site description and numerous photographs are presented.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Partially. BIA assumes there is a basement beneath No 22 Ferncroft Avenue but not No 20.
Is a geotechnical interpretation presented?	Yes	Limited interpretation contained within Risk Management Ltd's GI report.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Contained within Risk Management Ltd's GI report.
Are reports on other investigations required by screening and scoping presented?	Yes	Ground movement, hydrogeological and arboricultural assessments, proposed construction method statement and indicative structural calculations provided.
Are the baseline conditions described, based on the GSD?	Yes	Although assumptions made with respect to surrounding basements.

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	Revised GMA has been received.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Revised GMA has been received.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Revised GMA and assessment has been received.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Revised GMA and assessment has been received.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been prepared by engineering consultants Simpson TWS. The structural appraisal, construction sequencing and outline structural calculations have been prepared by Simpson TWS and some of the impact assessments undertaken by GCG and Ashley Tree Surveys. The individuals concerned in the production of the BIA and supporting documents have suitable qualifications.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building. The Design & Access Statement identified that the property lies within the Redington Frognal Conservation Area.

4.3. The proposed basement consists of a single storey construction formed by excavating below and beyond the existing property. To the front is a small lightwell, while to the rear, the basement lies below an extension to the host property. It is intended to form the basement walls using underpinning techniques. The working area to each underpin is to be backfilled and the ground floor slab is to be cast before bulk excavation.

4.4. Drawings indicate excavations depths between approximately 3.00m and 3.70m below ground level (bgl). The BIA has been updated to address the previous queries raised in regards to the proposed methodology and dimensions.

4.5. The BIA has identified that the site is underlain by the Claygate Member of the London Clay Formation. The site investigation comprised two exploratory holes although the BIA also references historic site investigation data from 20 Ferncroft Avenue and further afield. Limited geotechnical interpretation is presented. However, the assumptions made are reasonably conservative and have been adopted in the structural appraisal and subsequent assessments.

4.6. The site investigation has identified that the Claygate Member has a medium volume change potential. The BIA notes that a tree is to be removed to facilitate the basement construction. The impact of tree removal on foundations to the host structure and No 20 Ferncroft Avenue has been assessed as being negligible due to the poor condition of the tree.

4.7. The Claygate Member is classified as an aquifer. The BIA states that the basement will extend below the water table. However, the hydrogeological assessment identifies two separate water bodies; a deeper water table in the aquifer at around 5.00m bgl and shallow perched water at circa 2.00 to 3.00m bgl. The assessment concludes that the shallow perched water is impersistent and that, whilst there may be a small, localised rise in water levels at the rear of the basement, there is unlikely to be any adverse impact on local or wider subterranean flows. This interpretation is accepted. The hydrogeological assessment did not consider the impact of

the proposed surface water infiltration tank, however, it has subsequently been confirmed that the drainage will be designed to ensure that surface water flows into the ground match existing.

4.8. The hydrogeological assessment notes that some local dewatering may be required to remove perched water from excavations and the BIA notes the intention to install two dewatering wells in the rear garden, with the dewatering scheme designed by a specialist contractor. The hydrogeological assessment notes that retaining walls are to be designed for water pressure higher than that recorded in the ground investigation. Revised calculations adopt a higher groundwater level.

4.9. The BIA has identified that Ferncroft Avenue flooded in 1975 but that otherwise the site is at low risk of flooding and does not lie within a Critical Drainage Area. The impermeable area is decreasing nominally, a partial brown roof is being provided and surface water is to be drained via an infiltration tank in the rear garden. It is accepted that surface water flows off site to the network will not be increased and that an infiltration tank will be designed to maintain surface water flows into the ground at their current volume.

4.10. A ground movement impact assessment has been undertaken using proprietary software and empirical data. The GMA assumes an excavation depth of 3.00m to 3.50m bgl, which is broadly consistent with the depths indicated in the BIA text and drawings. For clarity, as 4.4, the depth of excavations should be confirmed. With respect to No 22 Ferncroft Avenue, the GMA notes that the main structure is approximately 3.00m from the proposed excavation, and itself has a basement. The GMA assumes that the garage to No 22 and the property at No 20 have shallow foundations.

4.11. Clarification was sought with respect to a number of statements in the GMA, mainly in respect of the settlement and horizontal movement that had been assumed in the damage assessment and whether the most critical walls had been considered. The GMA author provided further explanations and graphs in an addendum and a series of emails. It is accepted that the BIA has demonstrated that damage to neighbouring properties may be limited to Burland Category 1 assuming they are in good condition and there is careful control of workmanship.

4.12. The BIA recommends that the observation method is adopted with monitoring employed to control ground movement and building damage. An outline monitoring strategy is described in the BIA. Trigger levels for monitoring are recommended in the GMA and BIA.

4.13. It is accepted that there are no slope stability concerns regarding the proposed development.

5.0 CONCLUSIONS

5.1. The BIA and supporting documents have been prepared by individuals who possess suitable qualifications.

5.2. The BIA has confirmed that the proposed basement will be founded within the Claygate Member.

5.3. The basement will be formed using underpinning techniques. Clarification is required with respect to the depth of excavation and the nature of the basement retaining walls. The calculations assume a groundwater level that broadly complies with the recommendations of the hydrogeological assessment.

5.4. The impermeable area is staying broadly unchanged and the scheme introduces a brown roof and surface water infiltration tank. Clarifications have confirmed the attenuation tank will be designed to maintain surface water inflows to the ground as existing.

5.5. The BIA notes that dewatering may be required and states that any such system will be designed by a specialist contractor.

5.6. The site investigation identified that the Claygate Member has a medium volume change potential and that a tree is to be removed. The impact of tree removal on nearby shallow foundations has been assessed as being negligible.

5.7. A ground movement impact assessment has been provided. The means of deriving estimations of building damage have been confirmed and it is accepted that the BIA demonstrates damage to neighbouring properties can be limited to Burland Category 1.

5.8. An outline monitoring scheme is described. Monitoring should be implemented during the works.

5.9. It is accepted that the surrounding slopes to the development site are stable.

5.10. It is confirmed that the BIA complies with the requirements of the Camden Planning Guidance for basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

CampbellReith
consulting engineers

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Clarification required with respect to excavation depth and nature of basement retaining walls.	Closed	21/04/2020
2	Stability	Retaining wall calculations to be revised to reflect recommendations in hydrogeological assessment.	Closed	21/04/2020
3	Stability	Building damage assessment to be reviewed to ensure consistent with anticipated ground movements.	Closed	14/05/2020
4	Stability	Consideration to be given to impact of tree removal.	Closed	21/04/2020
5	Hydrogeology / Hydrology	Impact of infiltration tank to be considered.	Closed	21/05/2020

Appendix 3: Supplementary Supporting Documents

Correspondence between GCG and CampbellReith

Addenda to GMA

Clarification of Impermeable Site Area

Query No	Subject	Query	Status	Date closed out
1	Stability	Clarification required with respect to excavation depth and nature of basement retaining walls.	Structural calculations and sketches, and GMA, refer to RC walls. Assumed reference to mass concrete in original BIA is error. To be confirmed. Depth of basement described as 3.00 to 3.50m in BIA addendum and GMA. Structural calculations give retained wall heights of max 2.375m but allow for surcharge from retained soil above.	24/03/20
2	Stability	Retaining wall calculations to be revised to reflect recommendations in hydrogeological assessment.	Open - BIA addendum states walls to be designed for water at 1m bgl but structural calculations unchanged with exception of shear resistance.	
3	Stability	Building damage assessment to be reviewed to ensure consistent with anticipated ground movements.	Open - Clarification required as described below	
4	Stability	Consideration to be given to impact of tree removal.	Open – it is stated in GMA that current water demand of tree to be removed is low due to poor condition, therefore impact of removal will be small. To be confirmed by arboriculturalist.	
5	Hydrogeology / Hydrology	Impact of infiltration tank to be considered.	Open - Reference made in addendum to attenuation tank. Clarification required.	

Clarification of GMA
What settlement assumed?
Section 6.1 indicates 5mm due to underpinning (but section 5.2.1 suggests up to 10mm?)
Section 5.2.1 suggests 1-2mm due to load transfer
Section 5.2.2 suggests 2-3mm due to excavation (max at 1.5-2m behind wall due to ground sagging)
Is this cumulative? How distortion calculated? Do these different causes of settlement cause any sagging/hogging in walls?
What is impact of horizontal movement described in 5.2.2?
Are there any internal walls to consider in No 20 Ferncroft Ave?

RE: 20A Ferncroft Avenue
Graham Boston to: LizBrown@campbellreith.com 19/05/2020 15:14
Cc: "camdenaudit@campbellreith.com", "Hazelton, Laura ,", "Apollonia Gasparre"

1 Attachment

P19-461_SK11 rev A.PDF

Dear Liz,

Further to our phone conversation today we confirm there is an additional area of hard standing for the new development, this increase in area is equal to the rear paved terrace and the brown roof area, the design is for these areas to drain into the infiltration tank so that the surface water drainage to landscape areas is the same as the existing site condition

I attached our update drawing confirming the rear terrace area and brown roof area will drain to the garden Infiltration tank.

Hope the above confirms as we discussed

Regards

GRAHAM BOSTON
Technical Associate
simpson tws
Taylor Whalley Spyra Ltd
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3 Dufferin Avenue, London, EC1Y 8PQ
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From: LizBrown@campbellreith.com [mailto:LizBrown@campbellreith.com]
Sent: 14 May 2020 09:52
To: Apollonia Gasparre
Cc: camdenaudit@campbellreith.com; Hazelton, Laura ,; Graham Boston
Subject: RE: 20A Ferncroft Avenue

Dear Apollonia

Thanks for this clarification. I expect that L/H is not 1 in all cases, but agree that the predicted damage is no worse than Burland Category 1.

Camden place a higher burden on an applicant than showing that structural stability is not at risk. Their guidance requires the BIA to demonstrate that any damage to neighbouring properties, including internal walls, caused by basement construction can be limited to Burland Category 1 hence the request for further information.

We shall now close out this query although we are still waiting for a statement with respect to changes in impermeable area, proposed mitigation measures and any impacts of those measures on surface water and groundwater.

Regards,

Liz Brown
Partner

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From: "Apollonia Gasparre" <a.gasparre@gcg.co.uk>
To: "LizBrown@campbellreith.com" <LizBrown@campbellreith.com>
Cc: "camdenaudit@campbellreith.com" <camdenaudit@campbellreith.com>
Date: 13/05/2020 23:06
Subject: RE: 20A Ferncroft Avenue

Dear Liz

Please find attached the full output of the calculations for the site. I have also included the calculations for a 4m long wall. You will appreciate that the actual figures of distortions and horizontal strains are even lower than what we quoted in the report. This is due to the fact that the values for 20 FA are fairly close to the boundary between Category 0 and 1 and we conservatively quoted Category 1, which also accounts for any further cracks due to underpinning.

I am not sure I really understand the issue of a shorter wall. It is unconventional for an assessment of this type to consider internal walls of unknown length and position, because the deflection ratio would vary depending on the length of the wall and its position in the house. In any case this is a check that should perhaps be done in a situation when the structural stability of a building is at risk, but it does not seem to be worth the effort in a situation where the excavation is shallower than 4m and the estimated movements are lower than 5mm.

I hope this closes the issue.

Kind regards
Apollonia

From: LizBrown@campbellreith.com [mailto:LizBrown@campbellreith.com]
Sent: 13 May 2020 12:32
To: Apollonia Gasparre <a.gasparre@gcg.co.uk>
Cc: camdenaudit@campbellreith.com
Subject: RE: 20A Ferncroft Avenue

Dear Apollonia

Thank you for your response.

With respect to the category of damage/strain calculation, your chart shows that a 4m length of wall is more onerous. $\Delta/L = 0.8/4000 = 0.02\%$. $\Delta/L = 1.5/12000 = 0.0125\%$.

Just so that I understand, can you confirm the horizontal strain and deflection ratio that you calculated for 20 Ferncroft Ave?

Regards, Liz

Elizabeth Brown
Partner

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SE1 3UN

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From: "Apollonia Gasparre" <a.gasparre@gcg.co.uk>
To: "LizBrown@campbellreith.com" <LizBrown@campbellreith.com>
Cc: "camdenaudit@campbellreith.com" <camdenaudit@campbellreith.com>, "Hazelton, Laura ," <Laura.Hazelton@camden.gov.uk>, "Graham Boston" < Graham.Boston@TWS.UK.COM>
Date: 06/05/2020 20:53
Subject: RE: 20A Ferncroft Avenue

Dear Liz
Please find my response below.
Kind regards

Apollonia

From: LizBrown@campbellreith.com [mailto:LizBrown@campbellreith.com]
Sent: 06 May 2020 17:04
To: Apollonia Gasparre
Cc: camdenaudit@campbellreith.com; Hazelton, Laura ,; Graham Boston
Subject: RE: 20A Ferncroft Avenue

Dear Apollonia

Thank you for your time just now. As discussed, it would be helpful if you could confirm/clarify the following:

At the boundary between 20 and 20A Ferncroft Avenue, there are 4 components of movement
- vertical movement due to changes in load
- vertical movement due to excavation
- horizontal movement due to excavation
- vertical movement due to workmanship.

With the exception of the last one, these ground movements extend beyond the building line. Building strains and damage have been calculated on the basis of the first three components as shown in the contour plots in figures 6, 9 and 10.

It is acknowledged that cracking can occur at the junction of an underpinned wall and non-underpinned wall. GCG would normally advance the predicted damage category by one class to account for this. How has this been considered in the estimation of the building damage category for No 20 Ferncroft Ave?

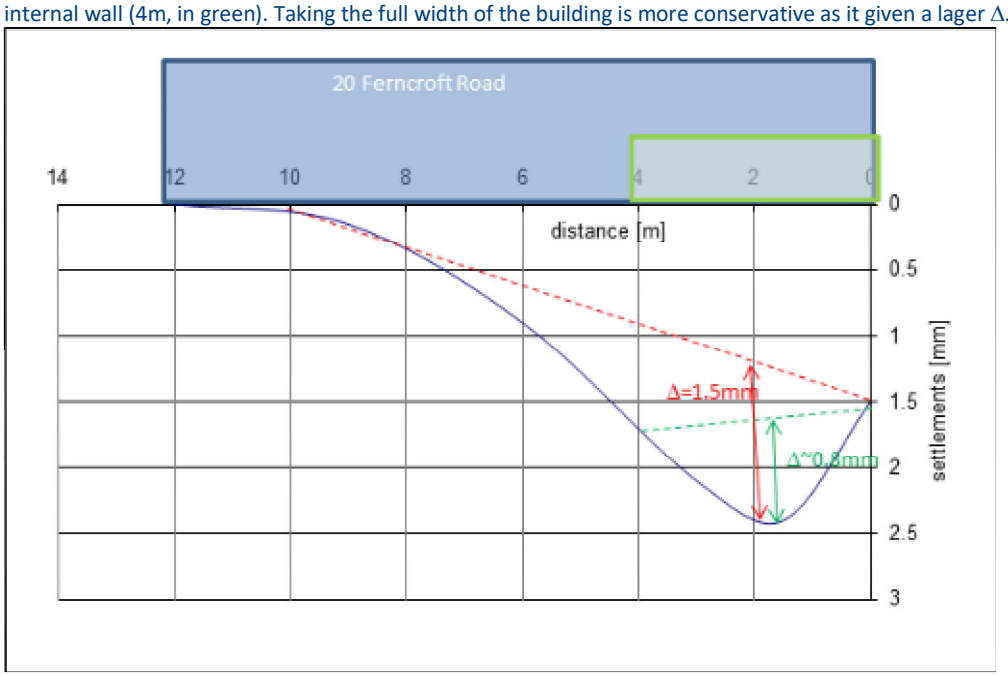
When the underpinning is relatively shallow and the loads changes on the new foundations are low the settlements of the underpinned walls due to workmanship are limited to less than 5mm. Such movements would cause cracks at the wall junctions but their magnitude is such that these cracks are unlikely to be other than fine cracks, hence they would still fall into a category 1. This is the case for 20 Ferncroft Road. If the overall damage of a structure was predicted to be $)C
!.negligible
!/, we would generally increase it to 1 to account for underpinning movements.

Predicted long term settlement beneath the party wall has not been considered. There are two reasons for this:
- the settlement will be reversing some heave that took place
- the calculated figures overestimate settlement because the underpin foundations are tied into the raft slab which will distribute the load over a wider area and which will be trying to heave.

Correct.

GCG note that it is conservative to calculate strain over the full building width rather than consider an internal wall with a smaller dimension. As the strains depends on the distance over which the movement occurs, the profile of the deflection curve and the breadth of the affected building, a sketch of the ground movement profile and resultant Δ plotted against a section of the neighbouring building would be helpful.

Please see below the diagram that refers to the full width of a building, in accordance with CIRIA C760 and the length of a shorter internal wall (4m, in green). Taking the full width of the building is more conservative as it given a lager Δ.



I hope that reflects our conversation. If you have any questions, please give me a ring.

Thanks,

Liz Brown
Partner

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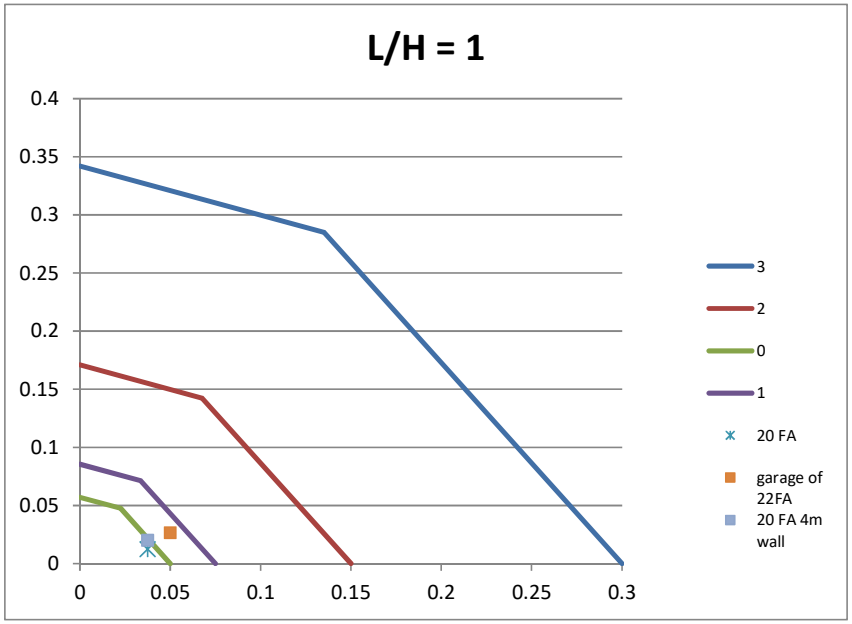
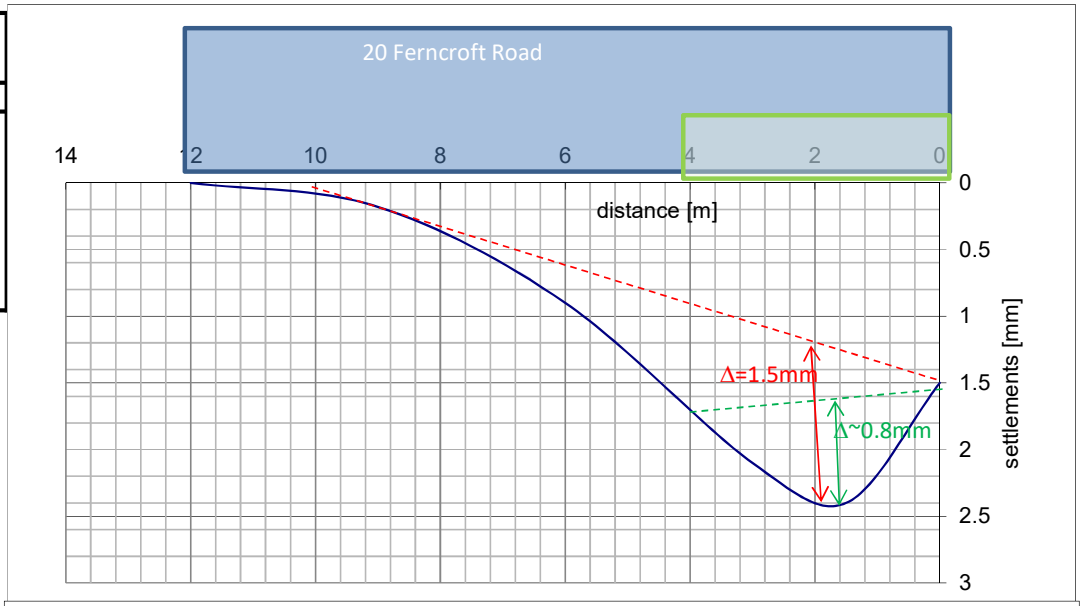
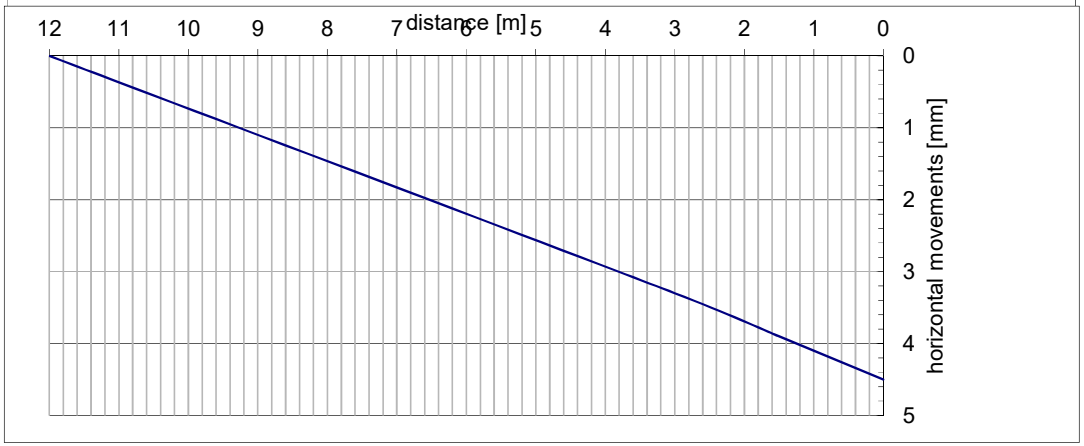
By responding to this email or by emailing GCG, your name and contact information may be collected, retained, and processed by GCG for its internal business purposes. For information about how we process data please see our privacy statement. [attachment "20a FA CIRIA calcs.pdf" deleted by Liz Brown/CRH]

	excavation depth	length	horizontal movements (differential)	Δ	εh	Δ/L
	[m]	[mm]	[mm]			
garage of 22FA	3.5	3000	1.5	0.8	0.050	0.0267
20 FA	3	12000	4.5	1.5	0.038	0.0125
20 FA 4m wall	3	4000	1.5	0.8	0.038	0.0200



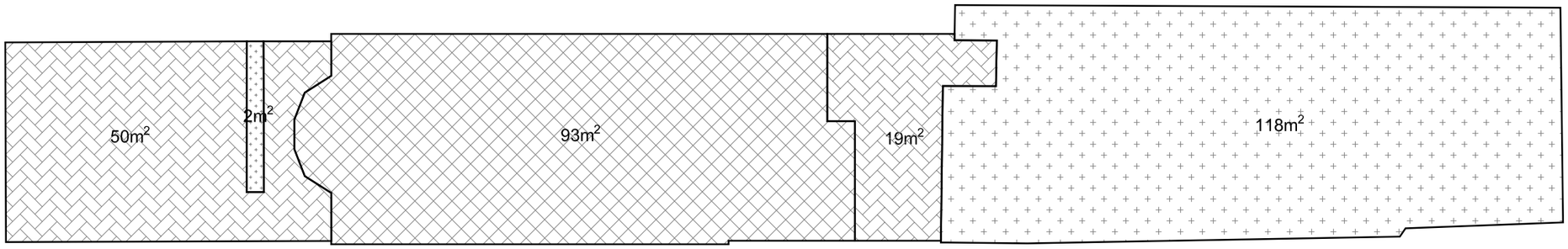




DO NOT SCALE

KEY Total Site Area (282m²)

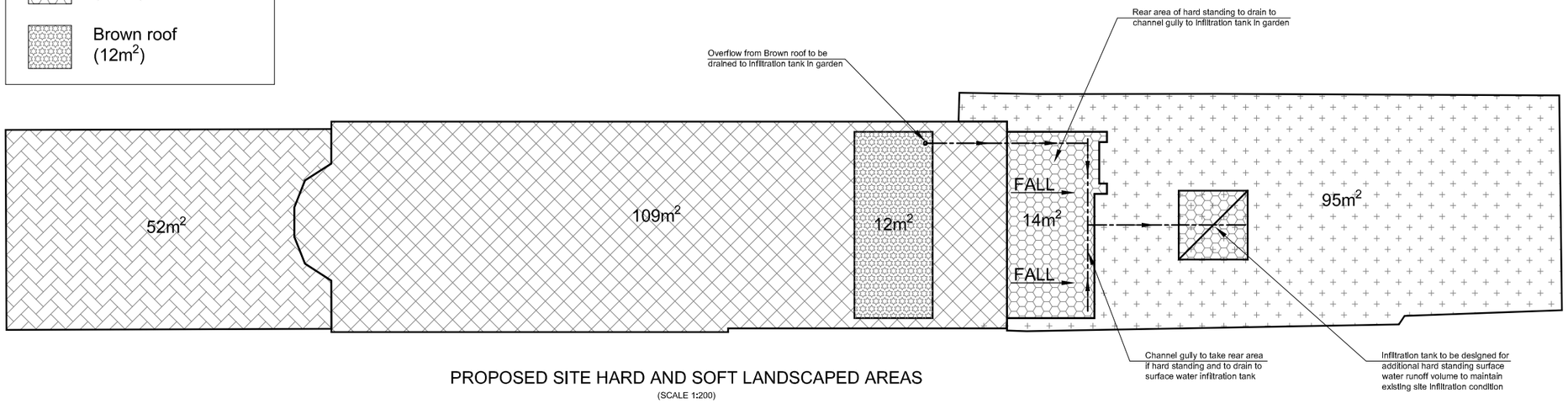
- Landscaped Area (120m²)
- Paved Area (69m²)
- Building (93m²)



EXISTING SITE HARD AND SOFT LANDSCAPED AREAS
(SCALE 1:200)

KEY Total Site Area (282m²)

- Landscaped Area (95m²)
- Paved Area (52m²)
- Building (109m²)
- Permeable paving (14m²)
- Brown roof (12m²)



PROPOSED SITE HARD AND SOFT LANDSCAPED AREAS
(SCALE 1:200)

MK	REVISION	BY	DATE
A	Confirmation of increased external hard standing to drain to infiltration tank to maintain existing surface water infiltration condition	GB	19.05.20

DRAWING STATUS

PLANNING

DRAWING TITLE

COMPARISON OF EXISTING AND PROPOSED HARD & SOFT LANDSCAPING AREAS

PROJECT Project Number - P19-461

20A FERNCROFT AVENUE,
LONDON,
NW3 7PH,

simpson | tws
3 Dufferin Avenue
Barbican
London, EC1Y 8PQ
T: 020 7253 2626
E: mail@slmpsoneng.com
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London, Henley-on Thames, Gloucester and Exeter

Drawn	Ch'kd	Scales	Date
GB	Ch'kd	NTS	29.10.19

Purpose of Issue
BASEMENT IMPACT ASSESSMENT

Drawing Number	Revision
P19-461_SK11	A

A3

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