CampbellReith consulting engineers

58 Hillway, London N6 6EP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-98

Revision: F1

October 2021

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Document History and Status

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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 58 Hillway, London N6 6EP (planning reference 2020/5695/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 (BIA) 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 Soils Limited with supporting documents by The Basement Design Studio. The authors' qualifications are in accordance with the requirements of CPG guidelines.
- 1.5. The site is occupied by a three-storey detached property. The proposed development involves the construction of a full basement to an estimated 3.50m below ground level (bgl) under the footprint of the existing building plus lightwells extending beyond the existing external walls.
- 1.6. The BIA includes the majority of the information required from a desk study in line with LBC guidance. In the revised submission, conceptual model sketches, utility and underground infrastructure information is provided.
- 1.7. In the revised submission, Screening responses have been clarified, as requested.
- 1.8. A site investigation was undertaken by Soils Limited in November 2020. The ground conditions comprise shallow Made Ground over the Claygate Member.
- 1.9. Groundwater was monitored at a depth of 2.17m bgl within the Claygate Member, based on only one groundwater monitoring visit presented in the original BIA. In the revised submission, an additional round of monitoring has been undertaken which broadly confirms the same groundwater level. It would be prudent to continue monitoring prior to construction to inform temporary works strategies.
- 1.10. The proposed basement development will be below the standing groundwater level. In the revised submission, it has been confirmed that immediately surrounding properties do not have basements. Groundwater control will be required during construction. There will be no adverse impacts or cumulative impacts to the hydrogeological environment.



- 1.11. Interpretative geotechnical information is presented. The revised submission confirms formation level of the basement. Settlement based on proposed structural loads is presented.
- 1.12. In the revised submission, outline permanent and temporary structural proposals are presented, including confirmation of formation levels, construction methods, sequencing and propping.
- 1.13. A Ground Movement Assessment (GMA) is presented which predicts a maximum of Category 1 (Very Slight) damage in accordance with the Burland Scale to the neighbouring property. The revised submission includes assessment based on the structural proposals and a sensitivity analysis.
- 1.14. Hillway is within a Critical Drainage Area (Group 3-001). The BIA indicates that the impermeable site area will not increase as a result of the proposed development. The final drainage design should be approved by LBC and Thames Water.
- 1.15. The site is not located within a Local Flood Risk Zone. The site is at 'very low' risk of flooding from surface water run-off. Standard flood risk mitigation measures should be adopted, such as non-return valves and raised above the external levels (lightwells).
- 1.16. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Considering the revised submissions, the BIA meets the requirements of CPG Basements.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 19th May 2021 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 58 Hillway, London N6 6EP, Camden Reference 2020/5695/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. January 2021.
 - Camden Development Policy (DP) 27: Basements and Lightwells.
 - Camden Development Policy (DP) 23: Water.
 - The Local Plan (2017): 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; 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 planning portal describes the proposal as: "*Excavation of basement extension below* footprint of building with front, rear and side lightwells, and associated alterations including external side access stair and new side entrance doors at basement level." The planning portal also confirmed the site lies within the Holly Lodge Estate Conservation Area but that the building is not listed.

- 2.6. CampbellReith accessed LBC's Planning Portal on 10th June 2021 and gained access to the following relevant documents for audit purposes:
 - Basement Impact Assessment and Ground Investigation (Ref 18781/BIA_R38) dated November 2020 by Soils Limited.
 - Existing and proposed elevations, plans and sections dated October 202 by The Basement Design Studio.
 - Design & Access Statement dated December 2020 by The Basement Design Studio.
 - Construction Management Plan dated 7 December 2020 by Alex Painting and Amol Pisal.
 - Comments and objections to the proposed development from local residents and the Holly Lodge Estate Conservation Area Advisory Committee.
- 2.7. CampbellReith were provided with the following relevant documents for audit purposes in August 2021:
 - Basement Impact Assessment and Ground Investigation (Ref 18781/BIA_R1.02) dated November 2020 (issued 31 August 2021) by Soils Limited.
 - Structural Engineer's Statement (included within Appendix D of BIA) dated 23 August 2021 by Axiom Structures Ltd.
 - Email 31/08/2021 from Soils Limited (Appendix 3)
- 2.8. CampbellReith were provided with the following relevant document for audit purposes in October 2021:
 - Basement Impact Assessment and Ground Investigation (Ref 18781/BIA_R1.03) dated November 2020 (issued 6th October 2021) by Soils Limited.
 - Email 05/10/2021 from Soils Limited (Appendix 3)



3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by CI.233 of the GSD presented?	Yes	Updated as requested from D1 Audit in revised submission.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Updated as requested from D1 Audit in revised submission.
Are suitable plans/maps included?	Yes	Updated as requested from D1 Audit in revised submission.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Updated as requested from D1 Audit in revised submission.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Updated as requested from D1 Audit in revised submission.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.3, Table 3.2 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.2, Table 3.1 of the BIA.
Is a conceptual model presented?	Yes	Updated as requested from D1 Audit in revised submission.

58 Hillway, London N6 6EP BIA – Audit



Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated as requested from D1 Audit in revised submission.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.2, Table 4.1 of the BIA. Updated in revised submission.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.2, Table 4.1 of the BIA.
Is factual ground investigation data provided?	Yes	Section 5 of the BIA.
Is monitoring data presented?	Yes	Groundwater monitoring data is presented in Section 5.5 of the BIA. Updated in revised submission.
Is the ground investigation informed by a desk study?	Yes	No historical information provided as part of a desk study.
Has a site walkover been undertaken?	Yes	In conjunction with the site investigation.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Updated as requested from D1 Audit in revised submission – no basements present.
Is a geotechnical interpretation presented?	Yes	Section 5.6, 6 and 7 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Parameters provided for design. Updated in revised submission.
Are reports on other investigations required by screening and scoping presented?	Yes	Updated as requested from D1 Audit in revised submission – no trees to be felled.
Are baseline conditions described, based on the GSD?	Yes	Updated as requested from D1 Audit in revised submission.

58 Hillway, London N6 6EP BIA – Audit



Item	Yes/No/NA	Comment
Do the baseline conditions consider adjacent or nearby basements?	Yes	Updated as requested from D1 Audit in revised submission.
Is an Impact Assessment provided?	Yes	Section 8 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Sections 9 and 10 of the BIA. Queries in Section 4.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Updated as requested from D1 Audit in revised submission.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Updated as requested from D1 Audit in revised submission.
Has the need for monitoring during construction been considered?	Yes	Monitoring is referred to in Section 8.2 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Updated as requested from D1 Audit in revised submission.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated as requested from D1 Audit in revised submission.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Updated as requested from D1 Audit in revised submission.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Updated as requested from D1 Audit in revised submission.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Updated as requested from D1 Audit in revised submission.
Are non-technical summaries provided?	Yes	Section 11.2 of the BIA.

4.0 DISCUSSION

- 4.1. The BIA has been prepared by Soils Limited with supporting documents by The Basement Design Studio. The authors' qualifications are in accordance with the requirements of CPG guidelines.
- 4.2. The site is occupied by a three-storey detached property. The proposed development involves the construction of a full basement under the footprint of the existing building plus lightwells extending beyond the existing external walls to the south and east of the property. It is estimated that the proposed basement formation level depth will be no greater than 3.50m below ground level (bgl).
- 4.3. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. The revised submissions include provision of relevant utilities information.
- 4.4. In the revised submission, a conceptual site model has been presented, annotated to indicate ground and groundwater conditions, and existing and proposed development levels.
- 4.5. The revised submission provided clarifications to the D1 audit queries raised in relation to the Screening assessment:
 - It has been confirmed that 'wider hillside setting' of the site has been considered within stability assessment and the retaining wall design for the proposed basement.
 - It has been confirmed that no trees will be felled during the proposed development.
 - The 'shrink swell' potential of the underlying London Clay has been considered within the assessment.
 - Relevant mapping (utilities, transport) has been provided in regard to the presence of nearby underground infrastructure.
 - It has been confirmed that the adjacent houses do not have basements.
- 4.6. A site investigation was undertaken by Soils Limited in November 2020, comprising two window sampler boreholes to a depth of 6.00m bgl, two dynamic probes (DPSH) to a maximum depth of 10.00m bgl and three trial pits for foundation inspection purposes. The ground conditions comprise shallow Made Ground (from ground level to depths ranging from between 0.65m and 1.30m bgl) over the Claygate Member to depth.
- 4.7. The BGS mapping data for the area indicates that the Claygate Member is designated a Secondary 'A' Aquifer. The monitoring data suggests that groundwater is present at a depth of 2.17m bgl within the Claygate Member. However, originally only one groundwater monitoring visit was undertaken (20 November 2020) when groundwater levels should be rising from their annual minimum (typically September). A second monitoring visit was undertaken in August 2021 which indicates a similar groundwater level. The proposed basement development will be at an

estimated depth of 3.50m bgl and therefore below the standing groundwater level. The BIA recommends further groundwater monitoring and concludes that 'excavations beneath the groundwater table are likely to be unstable and dewatering of foundation trenches may be necessary'.

- 4.8. The BIA indicates that the impacts to the hydrogeological environment will be negligible, based on the generally low permeability of the underlying soils and the discontinuous nature of granular lenses / beds within the Claygate Member. Additionally, as the basement is isolated from other basement structures, any damming effect created by the basement is likely to create small changes in the upslope groundwater level, with flow continuing around the structure. The short term effects of construction dewatering are indicated to be negligible.
- 4.9. Interpretative geotechnical information is presented. The revised submissions confirm the proposed formation level of the basement. Whilst the outline bearing capacity assessment allows for 25mm of settlement, its noted that the settlements predicted from the proposed bearing pressures are considerably lower, as presented in the Ground Movement Assessment (GMA), discussed in 4.11.
- 4.10. Outline permanent and temporary structural proposals are presented in the revised submission, including confirmation of formation levels, construction methods, sequencing and propping. Structural loads are confirmed and outline retaining wall calculations presented. Sump pumping is proposed to deal with groundwater inflows into excavations, and mitigation measures are described to limit the ingress of fines and potential for local instability.
- 4.11. A GMA is presented which predicts a maximum of Category 1 (Very Slight) damage in accordance with the Burland Scale to the neighbouring property. The GMA is based upon the proposals described in the revised submission and includes a sequenced model using industry standard software to predict vertical and lateral movements, and a sensitivity analysis based upon the methodologies described in CIRIA C760. No adverse impacts are predicted to highways or utilities, which should be confirmed in discussion with the asset owners.
- 4.12. An outline methodology and guidance for monitoring structural movements during construction is provided in the revised submission. Monitoring should be implemented during construction to ensure impacts are minimised in line with predictions.
- 4.13. Hillway is within a Critical Drainage Area (Group 3-001). The BIA indicates that the impermeable site area will not increase as a result of the proposed development. Attenuation SUDS is proposed. The final drainage design should be approved by LBC and Thames Water.
- 4.14. The site is not located within a Local Flood Risk Zone. The site is at 'very low' risk of flooding from surface water run-off with the road Hillway classified as 'low risk'. The site is not at risk



from flooding from reservoirs. The site did not flood in 1975 or 2002. Standard flood risk mitigation measures should be adopted, such as non-return valves and raised above the external levels -(lightwells).



5.0 CONCLUSIONS

- 5.1. The authors' qualifications are in accordance with the requirements of CPG guidelines.
- 5.2. The additional information requested in the D1 audit has been provided.
- 5.3. Screening responses have been updated in the revised submission and are accepted.
- 5.4. A site investigation indicates the ground conditions to comprise Made Ground over the Claygate Member.
- 5.5. An additional round of groundwater monitoring has been undertaken. There are no significant impacts predicted to the hydrogeological environment.
- 5.6. Interpretative geotechnical information is presented.
- 5.7. Outline permanent and temporary structural proposals have been provided in the revised submission.
- 5.8. A Ground Movement Assessment (GMA) is presented, confirming impacts to neighbouring structures will be within Category 1 (Very Slight).
- 5.9. The site is not located within a Local Flood Risk Zone. The site is at 'very low' risk of flooding from surface water run-off. Standard flood risk mitigation measures should be adopted.
- 5.10. Hillway is within a Critical Drainage Area (Group 3-001). The proposed development will not increase the impermeable area of the site. Attenuation SUDS is proposed. The final drainage design should be approved by LBC and Thames Water.
- 5.11. Queries and matters requiring further information or clarification are summarised in Appendix 2.Considering the clarifications provided in the revised submission, the BIA meets the requirements of CPG Basements.



Appendix 1: Residents' Consultation Comments



Consultation Comments

Surname	Address	Date	Issue raised	Response
Chaumeton	63 Hillway	24/01/21	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Hendy	Not provided.	28/01/21	Concerns regarding hydrogeological impacts.	Queries raised in Section 4
Rogers	Not provided.	30/01/21	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Sanders	54 Hillway	01/02/21	Reported subsidence of 54 Hillway. Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Crowley	Not provided.	5/02/21	Reported subsidence risk. Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Straker	Not provided.	06/02/21	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Rattan	56 Hillway	08/02/21	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
Smith	Not provided.	11/02/21	Concerns regarding land stability.	Queries raised in Section 4
Elliot	Not provided.	13/02/21	Concerns regarding land stability.	Queries raised in Section 4
Rothenberg	Not provided.	14/02/21	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
M Narraway	Chair of Holly Lodge Estate Conservation Area Advisory Committee	Not provided.	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4



Fox 15 Makepeace Not provided. Avenue	Concerns regarding land stability and hydrogeological impacts.	Queries raised in Section 4
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Appendix 2: Audit Query Tracker

58 Hillway, London N6 6EP BIA – Audit



Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	Desk Study	Underground utility and infrastructure information should be provided.	Closed	September 2021
2	BIA Format	A conceptual model of the development should be presented. Strata, groundwater, existing and proposed development levels, relative levels of structures within the zone of influence should all be indicated in plan and section with relevant annotation.	Closed	September 2021
3	Land Stability	Screening responses should be clarified, as Section 4.	Closed	September 2021
4	Hydrogeology	The BIA recommends additional groundwater monitoring, which should be undertaken. Further assessment should be presented.	Closed – ongoing monitoring to inform temporary works strategies would be prudent.	September 2021
5	Land Stability	Interpretative geotechnical information is presented. However, the final formation level should be confirmed to ensure a suitable foundation solution is proposed, noting the change in geotechnical parameters with depth in the Claygate Member.	Closed	September 2021
6	Land Stability	Permanent and temporary works information, including structural load, retaining wall construction methodology, temporary works sequencing and propping, planning for groundwater control etc.	Closed	September 2021
7	Land Stability	GMA to be reviewed and updated	Closed	October 2021
8	Land Stability	An outline methodology and guidance for monitoring structural movements during construction should be provided. Outline discussion is already presented, but this may require further review once the GMA has been confirmed, sufficient to demonstrate works will be controlled to mitigate impacts in line with predictions.	Closed	September 2021



Appendix 3: Supplementary Supporting Documents

Email from Soils Limited dated 31 August 2021

Revised GMA Plot from Soils Limited dated 5 October 2021



J18781, 58 HillwayDante Valerio Tedesco to GrahamKite@campbellreith.com 31/08/2021 13:16 History:This message has been replied to.

Good morning Graham,

I hope you are well.

I revised the BIA at 58 Hillway to deal with the points you raised in the Audit Form and according to what we discussed during our phone conversation.

Please find below the link to the revised BIA for your comments.

18781 BIA Rev1.02_ISSUE.pdf

No tree felling was part of the proposed development. This was confirmed by the Client and by information in the Structural Engineers Statement in Appendix D of the BIA. No arboricultural assessment or shrink/swell assessments were therefore needed.

Existing foundation depth was already part of the BIA. Depths and foundation exposure details were presented in the dedicated paragraph and also in Appendix A. Details to the presence of basements in the vicinity of the proposed development were instead clarified by the Client and by a search done using LB Camden's planning portal. No basements were present under the neighbouring property and the proposed development can be considered as isolated.

The above information was the used also to re-discuss eventual structural and hydrological cumulative effects. The absence of basements confirmed the comments about structural cumulative impacts already in the report.

In addition, the isolated basement allowed to further minimise the impact of the proposed development on the existing groundwater regime. Groundwater flow can easily develop both around and beneath an isolated basements without significant effects (as per the ARUP report) on groundwater rise to the upslope and deviation from the existing route to the downslope. Furthermore, the intrusive investigation showed the soils of Claygate Member at the site to be predominantly cohesive and characterised by very low permeability. Groundwater flow, in that case, can be expected to be minimal and eventually confined within isolated granular beds, which however would be discontinuous.

The ARUP report also clarified that all the rivers in Camden were culverted and that the risk of fluvial flooding in Camden is negligible. This can be referred to the Highgate branch of the River Fleet, anticipated at >200m SE of the site. The influence of the proposed development on ground subsidence is therefore minimal, as the proposed development must be designed in agreement with the volume change potential observed from laboratory testing and negligible changes to the existing groundwater regime can be caused in agreement with documents provided by the Council. The known subsidence issues at neighbouring properties were caused by foundations falling within the area of influence of tree roots (as demonstrated by documents from the planning portal). If the proposed development has negligible as well.

A TW utility search pack was part of the documents provided by the Client as part of the Structural Engineers Statement presented in Appendix D. The plans showing sewers and distribution mains around the house were further reported in Figure 20 and 21 of the BIA. In addition, a sketch of the site model (already described in the text) was added and presented in Figure 25.

The SE Statement also included a Construction Method Statement and structural information regarding temporary and permanent works and also information, retaining wall design and drainage strategy.

Land stability was re-assessed considering the presence of slope gradients >12.5% to the immediate upslope. A sensitivity check was done considering the expected factor of safety of the slope before and after the proposed construction. In addition, recommendations were made for a safe development of site works.

One more groundwater monitoring visit was done in August after our phone conversation. The measured groundwater substantially confirmed the groundwater depth measured in November 2020. However, the BIA and GMA were developed conservatively considering groundwater at ground level.

The GMA was redeveloped considering the construction sequence in the CMS provided by the Structural Engineer. The calculated ground movements allowed to confirm an expected Burland's damage category of 1 (very slight damage) for the building at 56 Hillway, the closest one to the proposed development. A sensitivity check was done using a simplified empirical approach presented in CIRIA C760 to confirm the validity of the ground movements calculated using PDisp and Wallap. The simplified approach estimated a Burland's damage category of 0 (negligible) for the building at 56 Hillway.

The BIA report included recommendations on ground and structure monitoring and a traffic light alert system in the case limit ground movements are achieved.

The SE Statement presented in Appendix D presented a drainage strategy to be adopted at the site. The drainage strategy also dealt with surface water runoff and other issues to avoid adverse effects on downslope properties. The drainage strategy has to be approved by the relevant Authority. Should changes be required to the strategy, Soils Limited must be informed and the BIA updated accordingly if needed.

A paragraph was dedicated to comments received from neighbours and the main issues discussed. This was particularly referred to subsidence issues, drainage strategy and ground movements.

Subsidence and drainage strategy were already discussed and additional information was provided showing that the proposed development will not adversely affect the neighbouring properties and the sewers, provided that the drainage strategy presented in the SE Statement will be approved by the relevant Authority. A simplified evaluation of the expected damage category for the property at 54 Hillway was also carried out and a damage category of 0 (negligible) was obtained.

Finally, a number of comments were received with regard to the proposed development to represent an exception to the characteristics of the wider area and to constitute a precedent for the construction of further basements. It is unclear if similar comments, willingly or unwillingly, tried to conceal that LB Camden already approved the construction of basements within the area. However, Figure 25 of the Camden

Geological, Hydrogeological and Hydrological Study (presented in this BIA report as Figure 24) clarified that a number of basement applications were already approved until 2010. It is therefore clear that basement developments within the area have been and can be permitted, provided that suitable design and clarifications are provided.

I look forward to receiving your comments. Please do not hesitate to contact me.

Best regards,



Click here to report this email as spam.



RE: 13398-98: 58 Hillway BIA <2020/5695/P>Dante Valerio Tedesco to GrahamKite@campbellreith.com 05/10/2021 11:11

 $Cc\ "camden audit@campbellreith.com",\ "NicolaSimonini@campbellreith.com"$

History: This message has been replied to.

Good morning Graham and Nicola,

Thank you for coming back to me about that.

Yesterday I was away from my desk, but sorted things out this morning. I can anticipate that I used the worst case scenario with regards to ground movements induced by wall installation (i.e. the curve related to secant pile walls) and the resulting damage category was at the boundary between Category 0 and Category 1.

I am happy to revise the relevant text and add the plots to the BIA, but in the meantime please receive the plots referring to wall installation, excavation in front of the wall and overall ground movements.

1. Installation Stage



Vertical movements



2. Excavation Stage Horizontal movements



Vertical movements



3. Overall Movements

Horizontal movements



Vertical movements



The maximum vertical deflection was evaluated as circa 0.55mm, while the maximum horizontal movement in correspondence of the section characterised by the maximum vertical deflection was 2.813mm.



I would be glad if you could preliminarily inform me if you need anything else to be adapted.

Best regards,



From: GrahamKite@campbellreith.com <GrahamKite@campbellreith.com> Sent: 04 October 2021 11:48

To: Dante Valerio Tedesco <dt@soilslimited.co.uk>

Cc: camdenaudit@campbellreith.com; NicolaSimonini@campbellreith.com

Subject: RE: 13398-98: 58 Hillway BIA <2020/5695/P>

Hi Dante

Your graph on page 90 indicates vertical movement at the wall of <2mm (1.88mm), and I can see how you have obtained this from figure 6.15b, as you illustrate. However, we would expect this to be summed with movements from installation taken from figure 6.8b. This would give you total vertical movement at the wall of <4mm (3.76mm) and maximum movements of approx 5mm at 2m from the wall.

Typically we consider underpinning to generate a minimum of 5mm vertical / horizontal movement at the wall. In this case, you are using the CIRIA curves to generate a sensitivity analysis to your other assessment, where you have considered heave / settlement by way of PDisp and horizontal movements by way of CIRIA, which does indicate higher movements at the wall and at the neighbouring wall . Although we would not generally accept analysis that offsets short term settlements by the heave, looking at your assessment and comparing the Delta V for the the various settlement / heave curves you present, we would accept that you have taken your assessment on the worst case curve / Delta V.

If you follow the sensitivity analysis through (combining 6.15b and 6.8b), and considering the closest neighbouring wall is 2.8m from the excavation, I do not believe a more onerous damage category will result. If you can check through my comments, and if you agree update your graph / any relevant text, then we should be able to close this out.

I have copied in Nico for his information, as he'll do the final review of the audit before it is issued.

Regards

Graham Kite

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 From:
 "Dante Valerio Tedesco" <<u>dt@soilslimited.co.uk></u>

 To:
 "<u>GrahamKite@campbellreith.com</u>" <<u>GrahamKite@campbellreith.com</u>

 Date:
 01/10/2021 14:31

 Subject:
 RE: 13398-98: 58 Hillway BIA <2020/5695/P>

Hi Graham,

Here are the reference plots I told you about on the phone.

The below is Figure 6.15 b) from CIRIA C760, the one I used in my calculations to produce the plot in Figure 32 of the BIA (page 90 of the pdf). The plot to use is the one for high stiffness structures because the wall is propped at the top in both temporary and permanent conditions. Ground movements at the top of the wall, are therefore restrained and tend to zero.



This is better explained in Figure 6.17 and Figure 6.20.



I think the problem was that the description in paragraph 9.5 of the BIA did not report what happened between the outer face of the excavation (where the settlement was evaluated as 1.88mm) and the building at 56 Hillway (where the movement was 2.69mm). For this reason, the text did not report that ground movement would increase to circa 3mm at a distance of 0.5 times the excavated depth from the outer face of the excavation (1.875m from the excavation).

For the above reason, I would confirm the values presented in paragraph 9.5. I will explain this in a further email as soon as back home and prepare a short pdf in which this is presented for being added to the assessment.

Best regards,



 Sent: 01 October 2021 13:32

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 NicolaSimonini@campbellreith.com

 Subject: 13398-98: 58 Hillway BIA <2020/5695/P>

Hi Dante

Just to confirm our discussion, your email of 31 August and revised BIA (rev1.02) largely closes out the queries with the BIA.

In regards to the GMA, the sensitivity analysis in Section 9.5 (ie combining C760 installation values of 0.05% wall depth, 0.1% excavation depth) is acceptable and I believe your conclusions are correct - however, could you check the figure 32 on page 90 as I think this contradicts your text and methodology and is probably in error?

We are preparing the audit report for issue, if you could clarify the above please.

Regards

Graham Kite

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