CampbellReith
consulting engineers

Basement Impact Assessment Audit

21 Baldwin's Gardens, London EC1N 7UY

For
London Borough of Camden

Project No.
14006-24

Date
July 2024

Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com
W: www.campbellreith.com

DOCUMENT HISTORY AND STATUS

Revision	Date	Purpose/ Status	File Ref	Author	Check	Review
D1	08/12/2023	For comment	SSemb14006-24-231218- 21 Baldwins Gardens-D1	SS	NS	EMB
F1	24/07/2024	For comment	SSkb14006-24-240724-21 Baldwins Gardens_F1	SS	KB	KB

Document Details

Last Saved	24/07/2024 15:40
Author	Sam Savery, BSc MSc CGeol FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	14006-24
Project Name	Basement Impact Assessment Audit
Revision	F1
Planning Reference	2020/5897/P
File Ref	SSkb14006-24-240724-21 Baldwins Gardens_F1.docx

CONTENTS

APPENDICES

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 21 Baldwin's Gardens, London EC1N 7UY (planning reference 2020/5897/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 proposal comprises the deepening of an existing basement and its extension beneath a new five-storey rear extension.

1.5 The BIA authors qualifications comply with Camden Planning Guidance for Basements.

1.6 The BIA has been informed by a desk study and site-specific ground investigation, but no in-situ strength testing was undertaken. The revised submission acknowledges the limited strength data and uses conservative geotechnical assumptions. The BIA recommends the ground conditions are verified by in-situ strength testing.

1.7 The BIA has confirmed that the proposed basement will be founded within River Terrace Deposits using an underpinning construction method to support the existing perimeter walls.

1.8 Groundwater was not encountered, and the BIA includes mitigation measures for potential water ingress into the basement excavation.

1.9 The BIA includes outline structural information as required by Scope of Engineering Services. The revised submission states temporary propping and good workmanship are required to maintain lateral support.

1.10 A Ground Movement Assessment (GMA) has been undertaken by Ground and Water; it concludes damage can be limited to Burland Category 1 (very slight) or less, in line with the requirements of CPG Basements.

1.11 The BIA recommends structural movement monitoring strategy is implemented during excavation and construction. Trigger levels for monitoring are provided and should be agreed as part of any party wall agreement.

1.12 It is accepted there is no significant impact to the hydrology of the area.

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

1.14 It is accepted that the development will not impact on the local and wider hydrogeology of the area.

1.15 It can be confirmed that the BIA complies with the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 24th July 2023 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 21 Baldwin's Gardens London EC1N 7UY, planning reference 2020/5897/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

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

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 "Enlargement of existing basement, erection of a single storey mansard roof extension, four storey rear extension, and change of use of existing commercial floor space to create 4 flats and a basement level jewellery workshop."

2.6 The Audit Instruction confirmed 21 Baldwins' Gardens is not listed, and is not a neighbour to listed buildings. It is in an archaeological priority area Tier II.

2.7 CampbellReith accessed LBC's Planning Portal on 28th July 2023 and 21st November 2023 to gain access to the following relevant documents for audit purposes:

- Hydrogeological and hydrological aspects of Basement Impact Assessment (BIA), by H Fraser Consulting Ltd, ref. 307742, rev R1, dated 12th July 2023.
- Land Stability Report for Basement Impact Assessment by RSA Geotechnics Ltd, ref 16336SI, revision unknown, dated November 2023.

- Existing Basement Plan by David Lees Architects, ref 2009, rev P2, dated December 2020.
- Existing Rear Elevation by David Lees Architects, ref 2009, rev P1, dated December 2020.
- Proposed Basement Plan by David Lees Architects, ref 2009, rev P5, dated December 2020.
- Proposed Section AA by David Lees Architects, ref 2009, rev P4, dated December 2020.
- Proposed Section BB by David Lees Architects, ref 2009, rev P3, dated December 2020.
- Thames Water Consultation Response via email, ref 68723, dated 16th February 2021.

2.8 Additional information submitted in response to queries raised during the initial audit was accessed on the LBC's Planning Portal on 7th February 2024. The additional information comprises the following:

- Hydrogeological and hydrological aspects of Basement Impact Assessment (BIA), by H Fraser Consulting Ltd, ref. 307742, rev R1.2, dated 12th January 2024.
- Land Stability Report for Basement Impact Assessment by RSA Geotechnics Ltd, ref 16336SI, version 3, dated May 2024.

2.9 Additional information submitted with the revised BIA submission includes the following:

- Ground Movement Assessment, by Ground and Water, ref. GWPR5984, rev. v1.03, dated April 2024.
- E-mail correspondence, which is included in Appendix 3 of this audit.

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	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	H Fraser and RSA BIA report appendices
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	RSA BIA Section 4.1
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	H Fraser BIA Section 3.1
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	H Fraser BIA Section 3.2
Is a conceptual model presented?	Yes	RSA BIA Section 8.1
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	RSA BIA Section 5

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	H Fraser BIA Section 4
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	H Fraser BIA Section 4
Is factual ground investigation data provided?	Yes	RSA BIA
Is monitoring data presented?	Yes	Single visit 28th September 2023
Is the ground investigation informed by a desk study?	Yes	H Fraser BIA Section 2 and RSA BIA Section 3
Has a site walkover been undertaken?	Yes	RSA BIA Section 6
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	RSA BIA Section 4.1 Q13
Is a geotechnical interpretation presented?	Yes	From limited SI information
Does the geotechnical interpretation include information on retaining wall design?	Yes	RSA BIA Section 7.1
Are reports on other investigations required by screening and scoping presented?	Yes	RSA BIA Appendix 3
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	RSA BIA Section 4.1 Q13

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	RSA BIA Section 7.3
Are estimates of ground movement and structural impact presented?	Yes	RSA BIA Appendix 3.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	RSA BIA Appendix 3
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	RSA BIA Section 7.4
Has the need for monitoring during construction been considered?	Yes	RSA BIA Section 7.4
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	RSA BIA Appendix 3
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	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	RSA BIA Section 7.3 and Appendix 3. Additional correspondence is also included in Appendix 3 of this audit.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	Yes	Executive summaries

4.0 DISCUSSION

4.1 The Basement Impact Assessment (BIA) has been carried out by two engineering consultancies. The Hydrogeology and Hydrology aspects have been undertaken by H Fraser Consulting and the Land Stability aspects have been undertaken by RSA Geotechnics. The revised submission confirms the individuals concerned in the production of the BIA have suitable qualifications.

4.2 The existing structure at 21 Baldwin's Gardens is a four-storey terraced building with a partial basement at the front. The building is of mixed use as a commercial premises on the ground floor and residential in the upper levels. The terrace generally comprises three- to four-storey buildings of similar age and construction. However, the RSA BIA report states there are no records of neighbouring basements. In the absence of hydrogeological impacts (see below) this is accepted as being conservative.

4.3 The proposed development involves extending the first, second and third floors towards the rear (above the existing ground floor), adding a fourth floor (fifth storey) and extending the basement approximately 6.30m towards the rear beneath the new extension. The existing basement will be also deepened to c. 0.40m below current basement slab level to accommodate a thicker floor slab construction. The proposed basement construction method comprises conventional underpinning.

4.4 The revised submission confirms the proposed underpinning of the foundations will increase the differential foundation depth between the neighbouring properties, and states '*The construction may cause ground movements that have the potential to damage existing neighbouring structures and buried services. The risk is considered not to be significant based upon the increase in the proposed foundation depths*'.

4.5 The BIA has been informed by a desk study and a site-specific ground investigation. The ground investigation comprised two window sample boreholes using lightweight handheld equipment due to site access restrictions. The exploratory holes were undertaken from existing basement level (17.30m AOD) to a maximum depth of 1.30m (16.00m AOD). Four foundation exposure pits have been undertaken around the existing perimeter walls. The existing brickwork foundations were encountered at approximately 0.50m below the basement floor at about 16.90m AOD, approximately 2.60m below the external ground level on Leather Lane.

4.6 The ground conditions encountered comprise Made Ground to levels of between 17.10m and 16.50m AOD overlying River Terrace Deposits to the lowest level of investigation (16.00m AOD). No in-situ and/or strength tests have been undertaken.

4.7 The Fraser Consulting Ltd report includes two historical borehole records approximately 115m west and 50m northeast distance from site. These historical BGS logs have been used to infer the ground conditions at depth for the land stability assessment by RSA Geotechnics. The BIA states the London Clay Formation is present at approximately 7m depth below the external ground level (19.50m AOD) corresponding with the historical BGS logs. Groundwater records on the historical logs are unclear.

4.8 A standpipe was installed to the base of WS1A (1.30m depth). Groundwater was not encountered during the investigation or during the single subsequent monitoring visit.

4.9 The screening assessment identifies the River Terrace Deposits mapped at site are classified as a 'Secondary A' aquifer. H Fraser Consulting Ltd state groundwater is likely present within the River Terrace Deposit gravels, but at depths where the basement will not interfere with local groundwater flow. The RSA land stability report confirms groundwater will not be encountered during basement construction and dewatering will not be required. It is accepted there will not be a significant impact on the wider hydrogeological environment. However, considering the available site investigation information and the hydrogeology of the site, ingress of groundwater into the basement excavation cannot be discounted. The revised submission includes a recommendation for groundwater dewatering during construction, mitigation measures against flooding of the property below ground level and recommends a drainage layer to mitigate potential backing up of groundwater.

4.10 The site is classed as being at very low risk of surface water flooding or river flooding. The BIA confirms the hard surface/paved areas will not change as part of the development therefore rainfall and run-off discharge will remain unchanged from the existing. The surface water drainage and foul water will utilise the existing main drainage system. There BIA states there is no significant risk of surface water impacts.

4.11 The proposed basement perimeter walls are to be underpinned to 15.90m AOD. The underpinning sequence for basement construction is included as RP Design drawing number 2198-8, presented in the RSA Geotechnics report. This includes a traditional underpinning technique with 1.00m maximum width. Temporary propping is required for lateral support. The revised submission includes preliminary structural loads and supporting outline calculations for the retaining wall that use suitable soil parameters and an allowable gearing capacity of 150kN/m^2 that is reasonably conservative for the River Terrace Deposits.

4.12 The RSA BIA states there will be an increase in bearing capacity provided by the slightly deeper underpins and that this will provide adequate support for the new four storey extension although this is not supported by any quantitative site investigation data. Section 7.1 of the revised BIA provides geotechnical interpretation and the rationale behind deriving the suitably conservative geotechnical parameters. The revised submission states in-situ strength testing is recommended to confirm the geotechnical parameters and bearing capacities.

4.13 The geotechnical parameters assumed for the Made Ground are not considered a cautious estimate, however, due to its limited extent, this does not alter the conclusions of the impact assessment.

4.14 The revised submission includes a Ground Movement Assessment (GMA) undertaken by Ground and Water that considers five representative stages of construction and considers both vertical and horizontal movement. This GMA uses conservative geotechnical parameters due to the absence of quantitative strength data. A final structural load of 150kPa has been used in the model.

4.15 The GMA uses XDISP to model potential ground movements on neighbouring properties and acknowledges the software limitations. It notes temporary face support should be maintained to prevent collapse and ground loss in any exposed faces. The GMA states that with propping and control of good workmanship damage to neighbouring structures can be limited to Burland Damage Category 1 (very slight). Additional correspondence clarifying and supporting the methods used in the building damage assessment has been provided and is included in Appendix 3 of this audit report.

4.16 The revised BIA includes an assessment of ground movement on the roads and utilities, which states that, given the distance from the highway/ footpath, minimal deflection is expected with no damage anticipated. The revised BIA recommends movement monitoring as good practice.

4.17 The BIA recommends a movement monitoring strategy during excavation and construction is implemented to ensure structural movements remain within acceptable limits. Trigger levels have not provided in section 4.3 of the Ground & Water report and should be agreed as part of the party wall award negotiations.

4.18 The revised submission identifies a combined gravity sewer is present in Leather Lane c.1.5m deeper than the proposed basement foundations. The revised submission states the proposed basement does not pose a risk to the Thames Water combined sewer since the basement is at a shallower depth. The sewer location in relation to the basement is included as drawing number A-3-302 of the BIA. The BIA states liaison with Thames Water is ongoing.

5.0 CONCLUSIONS

5.1 The Basement Impact Assessment (BIA) has been carried out by engineering consultants H Fraser Consulting Ltd and RSA Geotechnics Ltd. The authors' qualifications comply with the requirements of CPG Basements.

5.2 The BIA has been informed by a site-specific ground investigation although the quantitative data is limited to plant access restrictions. The BIA assumes reasonably conservative parameters and recommends in-situ strength testing is undertaken to confirm the ground conditions.

5.3 The BIA has confirmed that the proposed basement will be founded within River Terrace Deposits. The base of the River Terrace Deposits/ upper levels of the London Clay Formation bedrock were not encountered although the ground model used in the subsequent assessments is considered suitably conservative.

5.4 Although groundwater was not encountered or monitored as part of the site investigation, the BIA includes mitigation measures to deal with potential groundwater ingress into the excavation.

5.5 The revised submission includes outline structural information that includes reasonably conservative loads.

5.6 The allowable bearing capacity and geotechnical parameters for retaining wall design are considered suitably conservative. The revised submission states temporary propping is required for lateral support.

5.7 The revised submission includes a GMA by Ground and Water that states damage can be limited the Burland Category 1 (very slight). Additional correspondence to support the building damage assessment methodology is included in Appendix 3 of this audit report. The BIA recommends control of good workmanship and movement monitoring is undertaken.

5.8 It is accepted there will be no significant impact to the hydrology of the area.

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

5.10 It is accepted that the development will not impact on the local and wider hydrogeology of the area.

5.11 The revised submission includes evidence of liaison with Thames Water regarding the potential impact to the nearby asset.

5.12 It can be confirmed that the BIA complies with the requirements of CPG: Basements.

CampbellReith
consulting engineers

Appendix 1

Consultation Responses

None

CampbellReith
consulting engineers

Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	The BIA for land stability should be authored/reviewed by individuals holding qualifications required by the CPG for basements	Closed	February 2024
2	BIA format	Questions 13 and 14 of the land stability screening should be brought forward to scoping	Closed	February 2024
3	Hydrogeology	Proposals to deal with groundwater during construction should be presented in the BIA	Closed	February 2024
4	Land stability	Bearing capacity assumptions and parameters for retaining wall design require justification	Closed	June 2024
5	Land stability	Preliminary structural loads and outline retaining wall calculation to be presented	Closed	June 2024
6	Land stability	Further information on the GMA is required as detailed in Section 4	Closed	July 2024
7	BIA format	Confirmation that liaison with nearby asset owner is ongoing should be presented in the BIA	Closed	February 2024

CampbellReith
consulting engineers

Appendix 3

Supplementary Supporting Documents

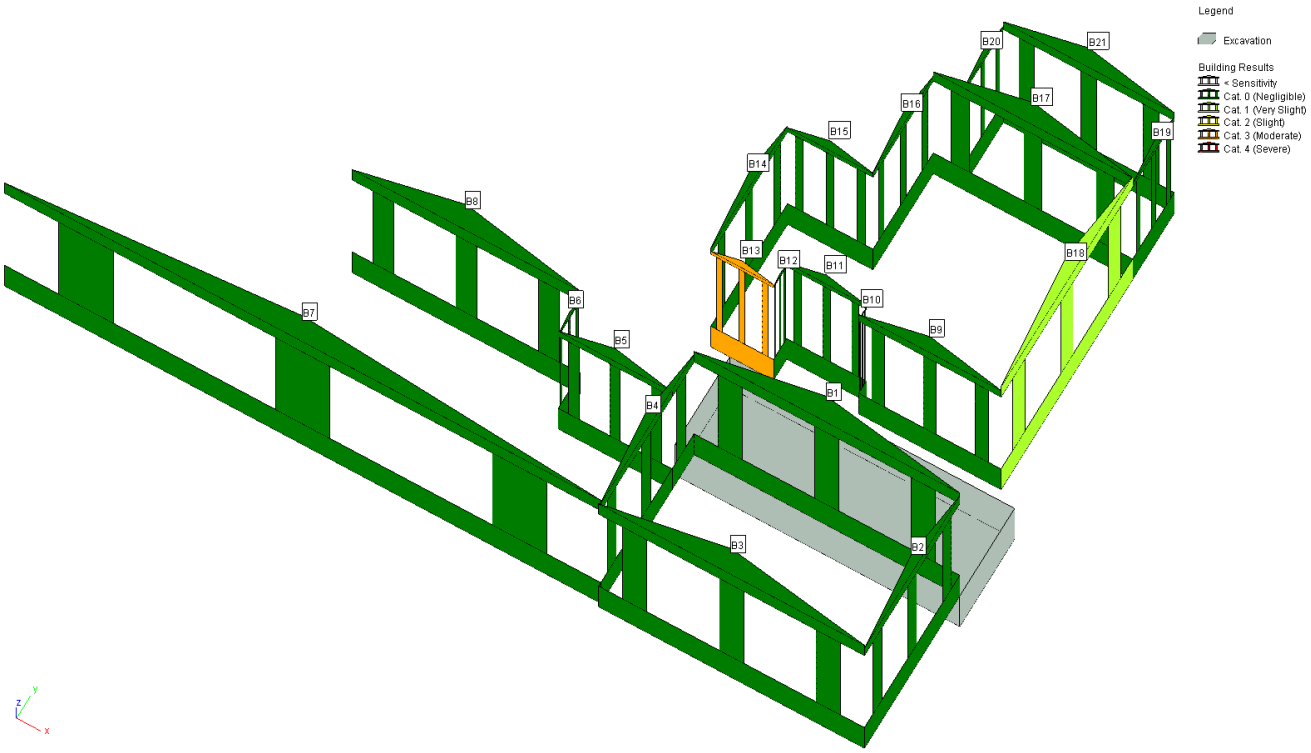
E-mail correspondence

Subject: Re: GWPR5984: 21 Baldwin Gardens & 43 Leather Lane, Holburn, London EC1N 7TJ - Ground Movement Assessment Audit
Sent: 24/07/2024, 12:26:03
From: Robert Terrell<robert.terrell@groundandwater.co.uk>
To: Katharine Barker; Sam Savery
Cc: CamdenAudit; Miltos Mellios

Good Afternoon Kat, Sam,

Thank you for your comments and clarification on what is required regarding the Ground Movement Assessment at 21 Baldwin Gardens & 43 Leather Lane, Holburn, London EC1N 7TJ. Please see below my response.

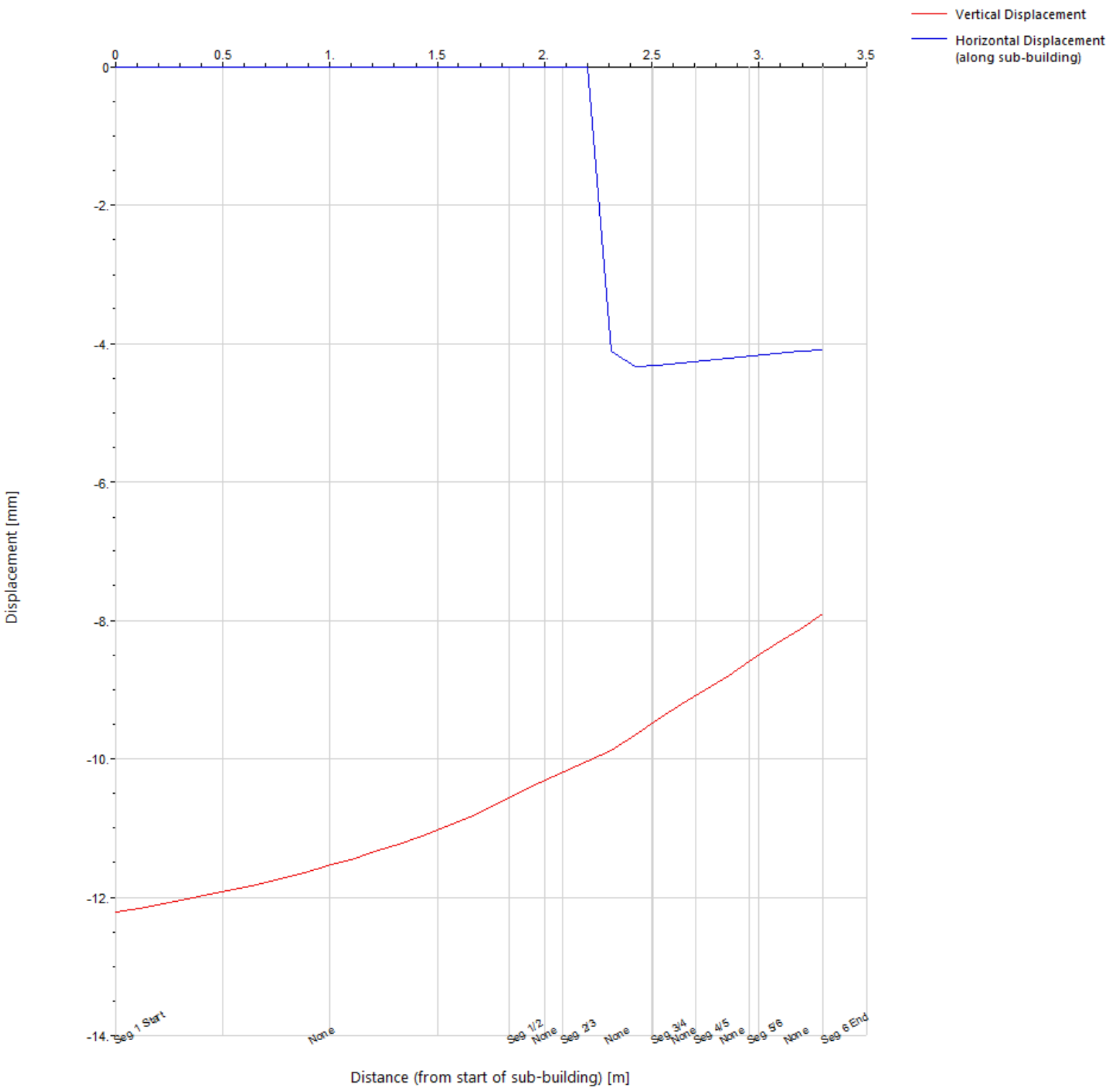
As you can see from the screenshot below, all walls were calculated to be Category 0 or Category 1 damage, before any combining of segments, apart from B13, which was calculated to be Category 3.



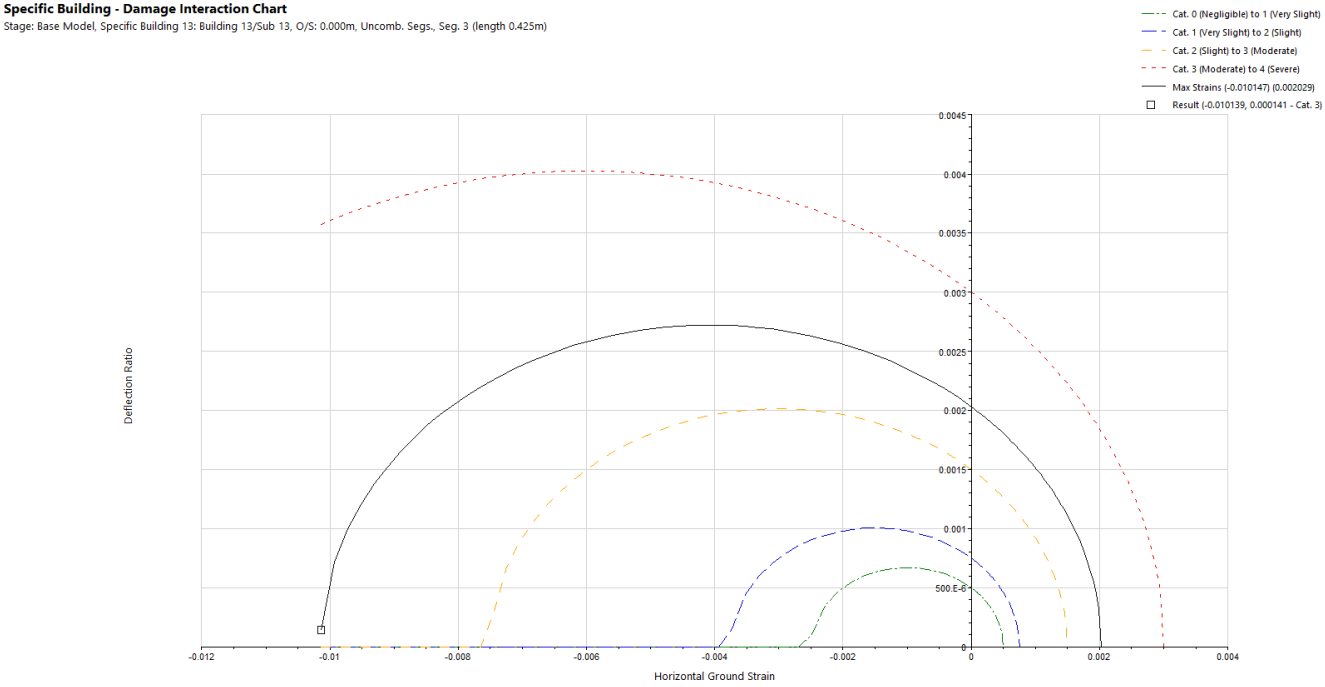
The wall is calculated to have been made up of 6 segments, summarised below:

- Segment 1: 1.834m long, and a damage category 0
- Segment 2: 0.249m long, and a damage category 0
- Segment 3: 0.425m long, and a damage category 3
- Segment 4: 0.195m long, and a damage category 0
- Segment 5: 0.252m long, and a damage category 0
- Segment 6: 0.344m long, and a damage category 0

The soil displacement graph for B13 has been provided below, with each of the six segments also detailed. The graph shows that segment 3 is heavily influenced by an immediate change in the horizontal displacement. When the wall is running directly parallel and immediately adjacent to the proposed basement (i.e Segment 1 and 2), 0.00mm of horizontal displacement is calculated; however, when the wall starts extending beyond perpendicular the proposed basement, horizontal displacement is calculated immediately from 0.00mm to ~4.20mm (Segment 3), before decreasing uniformly (Segment 4 onwards).

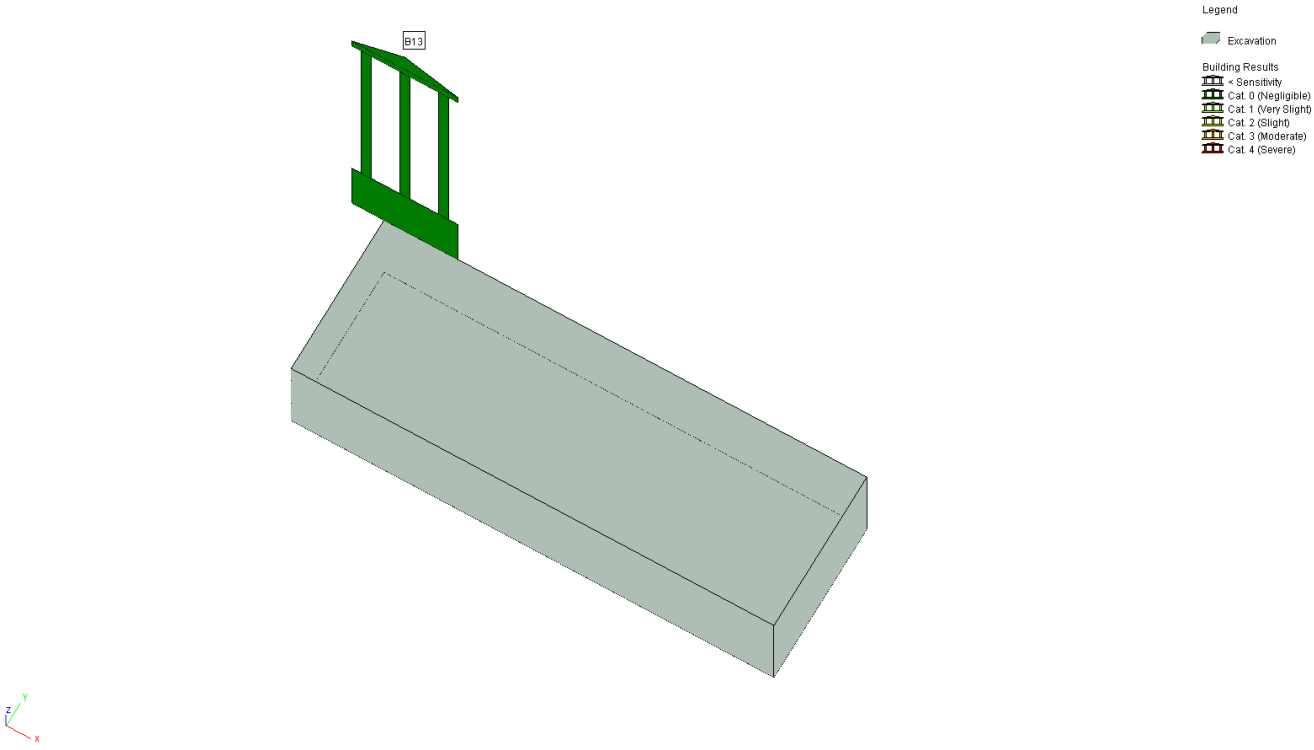


Specifically for Segment 3, there is high amounts of horizontal strain, due to the immediate increase of horizontal soil displacement. The increase is from 0.00mm to ~4.20mm. The horizontal strain is calculated to be approximately -0.01, which is the main driver to place this segment into Category 3.



Given the unique geometry of the wall, with half of the wall running parallel/immediately adjacent to the basement and the second half running perpendicular to the basement, and generally each segment being less than 0.50m in length, the wall was considered more suitable to be assessed as one, and the segments were combined.

Once segments are combined and the wall is assessed structurally as one, the damage category becomes Category 0, as shown by the below screenshot.



Following the combined assessment of B13, all walls were confirmed to be either Damage Category 0 or 1, both of which are acceptable by LBC.

Should you require further information, please let me know.

Kind regards

Robert Terrell MSc
Senior Engineer
Office: 0333 600 1221 Direct Line: 01420 463043
www.groundandwater.co.uk

ground&water

2 The Long Barn, Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

geotechnical and environmental consultants

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Bristol

Unit 5.03,
HERE,
470 Bath Road,
Bristol BS4 3AP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com