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23rd May 2025

Daren Zuk
Principal Planner
London Borough of Camden
5 Pancras Square
London N1C 4AG

Our ref: CGL/10104A
Planning ref: 2024/3497/P
Please reply to: josephb@cgl-uk.com

VIA EMAIL

Dear Daren,

RE: Camden Planning Ref. 2024/3497/P at 335 Euston Road (335ER), London, NW1 3AD

Letter to supplement CGL's Basement Impact Assessment Ref. CGL10104_335 Euston Road_Rev1_Jan25

1. Background

The 335 Euston Road team received an email from Daren Zuk (principal planner at the London Borough of Camden), on Tue 20/05/2025 via email, which is presented below. This illustrated CGL comments (black) and Campbell Reith's (CR) responses (blue). This is presented below for background, and to introduce the premise of this letter.

1. ***"CGL believe the BIA is conservative and overestimates lateral movements (and thus horizontal strain) as the underpin installs would reduce excavation movements calculated via C760."***
   CR: It should be noted that the CIRIA C760 movement curves are based on piled embedded retaining walls and are not always reflective of underpinning. It is widely accepted within the industry that horizontal ground movements resulting from a single lift of underpinning cannot reliably be kept below 5mm. We would therefore appreciate clarification on why CGL considers the assessment to overestimate lateral movements.

2. ***"The foundation inspection pits could be completed post-vacancy, or post-demolition of the existing structure."***
   CR: The Building Damage Assessment estimates a maximum damage of Burland Category 1 (very slight) based on the neighbouring wall being located 0.50m from the proposed underpins. No evidence has been provided to confirm the neighbouring wall is at that distance. Clarification on the predicted damage category if the wall is less than 0.50m away are requested (i.e. a sensitivity check would be appropriate in this context).

3. ***"Residual risks would be controlled by implementation of a stringent movement monitoring and contingency plan during basement construction."***
   CR: While more robust or stiffer temporary propping and stringent movement monitoring plan may reduce lateral ground movements during construction, it should be noted that the purpose of the BIA is to demonstrate that the residual risks do not exceed those permitted under Camden's Basement Policy.

4. ***"More robust/stiffer temporary propping could be incorporated into the design to further limit lateral movements, thus the predicted movements in this BIA could be seen as conservative." "CGL has also run a sense check on this stiffer propping arrangement, and movements at this 333ER critical section reduce the damage category closer to the CAT0–CAT1 boundary."***
   CR: The sensitivity check is requested for review, however, assuming <5mm horizontal movement is not considered to be reasonably conservative.

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2. Letter contents

This letter therefore contains the following aspects.:

1. **A sensitivity check**, for
    a. **Case 1)** the existing condition presented (where the neighbour is 0.5m distance away) in the CGL BIA revision1;
    b. **Case 2)** a condition as per Cambell Reiths request whereby the neighbouring property (the 'worst case' 333ER critical section #1) is 0m from 335ER;
    c. **Case 3)** what 'limiting horizontal movement' needs to be maintained during the detailed temporary works, construction sequencing/methodology, and structural design for the *0m distance to neighbour* analysis case, in order to keep the adjacent property within damage category CAT1; and,
    d. **Case 4)** an additional sensitivity check, whereby CGL model a theoretical condition where the net horizontal deflection exceeds 5mm (using an elevated horizontal deflection value of 6mm), for comparison.

    Note the above 'design case 1, 2, 3, and 4' terminology is carried forwards into the plots/figures below.

2. **CGL's in-house movement monitoring data 'archive'** - CGL are also presenting an industry first case study compilation of movement monitoring data (spanning 17years from 2008) for circa 12nr underpin projects, CGL have successfully completed, which includes live movement monitoring data, which backs up CGL's assumptions and calculations – note this is sensitive data and should not be shared outside this forum with regards to 335ER.

We trust the above numbered content list, presented in the subsequent sections below, answers CR's comments, for namely.:

- "Clarification on the predicted damage category if the wall is less than 0.50m away are requested (i.e. a sensitivity check would be appropriate in this context)." (via CGL's sensitivity check presented within this letter).
- "It is widely accepted within the industry that horizontal ground movements resulting from a single lift of underpinning cannot reliably be kept below 5mm. We would therefore appreciate clarification on why CGL considers the assessment to overestimate lateral movements" (via CGL's transparency of releasing the summary of movement monitoring data/records for real project case studies we have been involved in and compiled over the years for similar basement methodology and ground conditions).

3. Sensitivity Check on Distance to Critical Neighbouring Property (assessed at the worst case 333 Euston Road critical section for clarity)

For the purpose of our existing BIA report[1] for 335 Euston Road, it was assumed that the commencement of the 'building' structure/slabs of the critical neighbouring property (333 Euston Road) was circa 500mm away from the proposed underpin centre line, with horizontal and vertical movements resulting from underpin installation being in the order of 5mm at ground level, decaying parabolically to 0mm over a distance equal to the depth of excavation. The resulting anticipated net horizontal movements in the case (Case 1) are shown in Plate 1, below. The resulting damage category in accordance with CIRIA C760 was CAT1 (very slight), nearing the boundary to CAT2 (slight). It is noted that irrespective of the horizontal ground movement variation based on the various cases considered, the deflection ratio from the vertical movements remain relatively consistent at approximately 1.8mm. As such, the horizontal strain is considered to be the primary driving factor as to whether the 333ER critical section can be considered CAT1 or CAT2.

[1] CGL (January 2025). 335 Euston Road, London, NW1 3AD. *Phase I Desk Study and Phase II Geotechnical and Geoenvironmental Factual & Interpretative Report with Preliminary Basement Impact Assessment. Rev. 1.*

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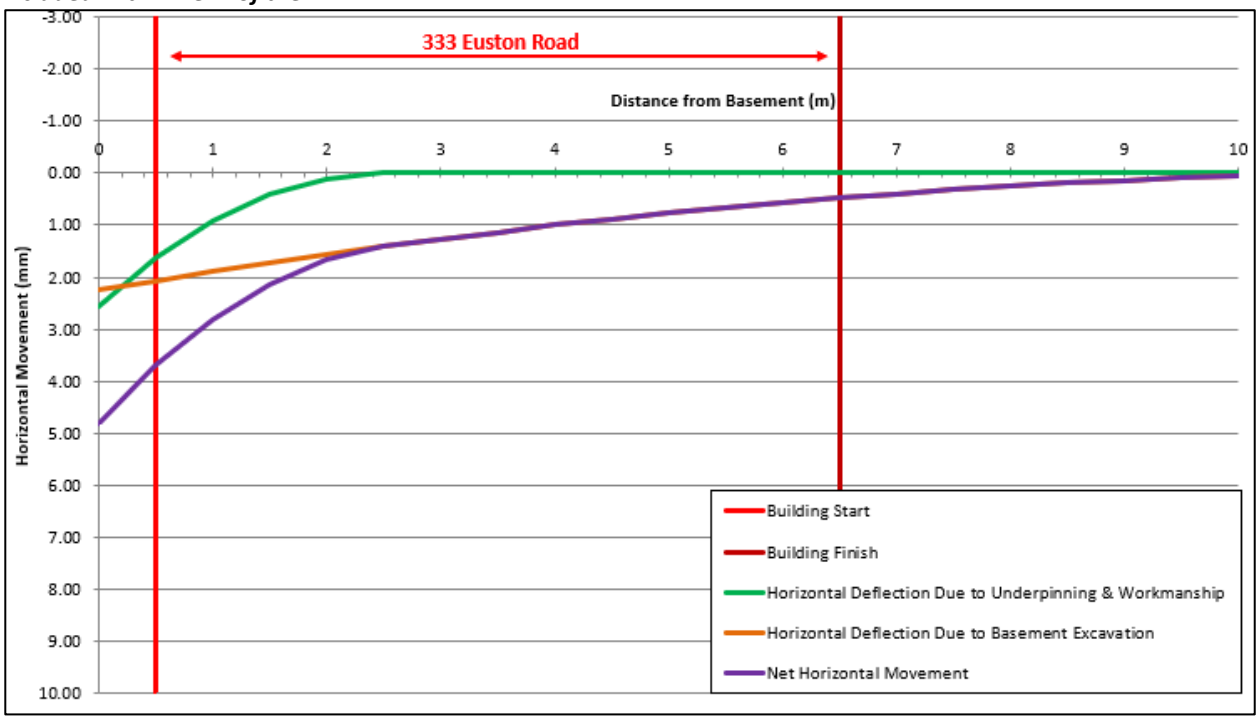
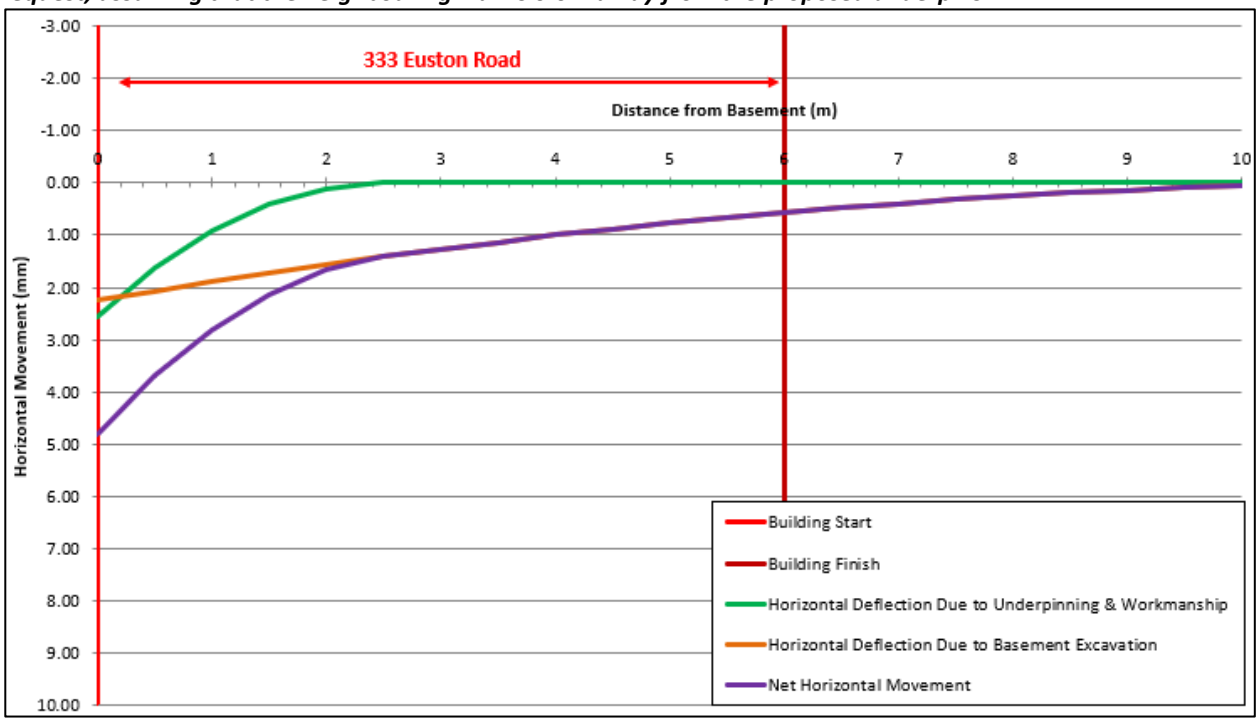
Plate 1. Case 1 – Phase Horizontal Deflection with Lateral Distance from 335 Euston Road. This is CGL's calculation, included within Rev1 of the BIA.



A sensitivity check has been done in line with CR's request, assuming that the neighbouring wall is 0.0m away from the proposed underpins ('Case 2'). The resulting anticipated horizontal movements give **4.8mm** horizontal deflection **at the neighbouring wall**, and a net horizontal strain of 0.071%, pushing the section slightly into potentially CAT2 damage.

Plate 2. Case 2 – Phase Horizontal Deflection with Lateral Distance from 335 Euston Road. A sensitivity in line with CR's request, assuming that the neighbouring wall is 0.0m away from the proposed underpins.



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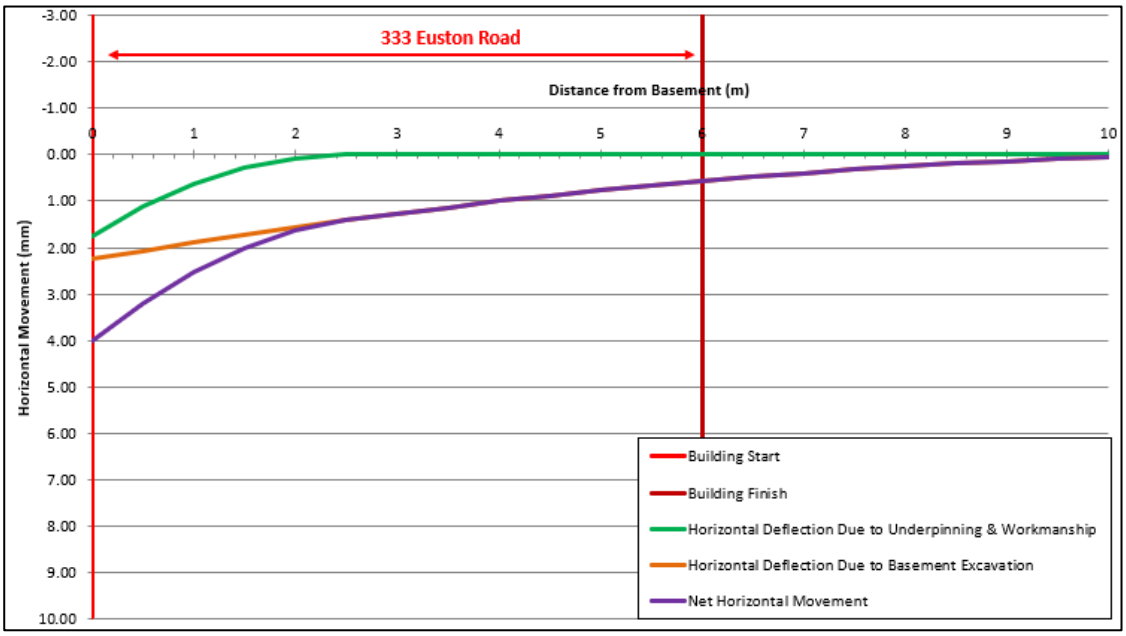
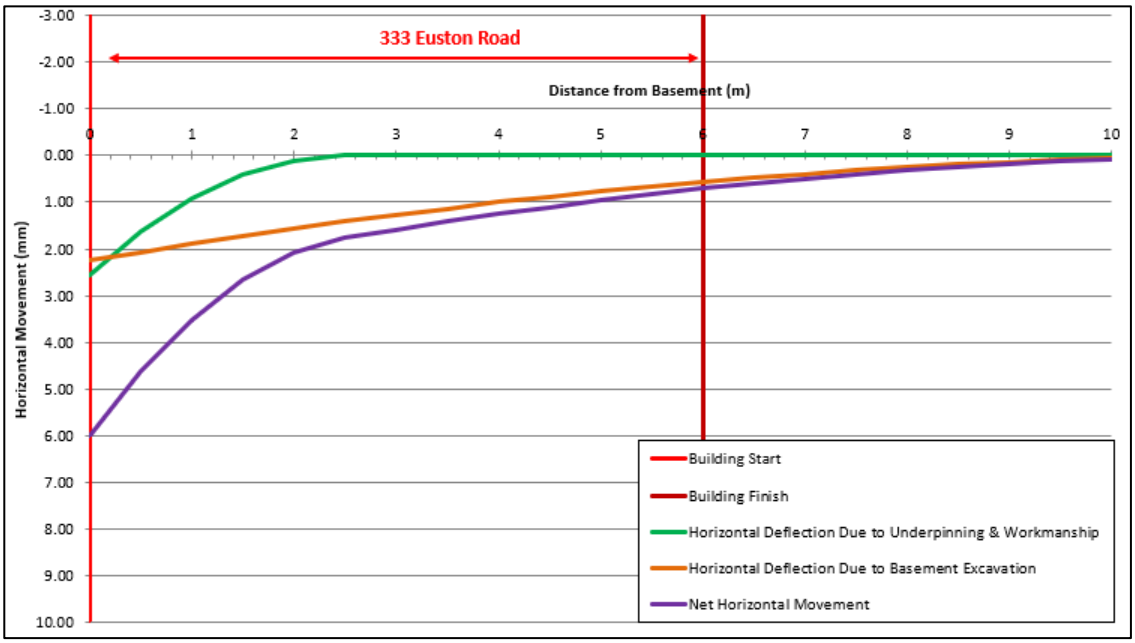
In order to **limit** the horizontal strain and keep the damage category within **CAT1**, a further sensitivity check indicates that the horizontal movement at the nearest neighbouring wall must be restricted to a maximum of **4.0mm**. (Only 0.8mm less than design 'case 2' as presented above). This scenario (Case 3) is shown graphically in Plate 3, below.

Plate 3. Case 3 – Phase Horizontal Deflection with Lateral Distance from 335 Euston Road. Whereby horizontal deflection is limited to 4mm at the 333ER boundary wall.



A final sensitivity scenario ('Case 4') has been assessed, to demonstrate the impact in the event that net horizontal movements exceed 5mm (in this case, artificially elevating horizontal movements to 6mm at the 333ER-335ER boundary). It is noted that this should be seen as conservative sensitivity assessment. It is noted that the building damage is still within CAT2 (midpoint between the lower end of CAT2 and the upper end of CAT2). CGL refer to the later building damage sections.

Plate 4. Case 4 – Phase Horizontal Deflection with Lateral Distance from 335 Euston Road. A sensitivity check, artificially elevating horizontal movements to 6mm at the 333ER-335ER boundary.



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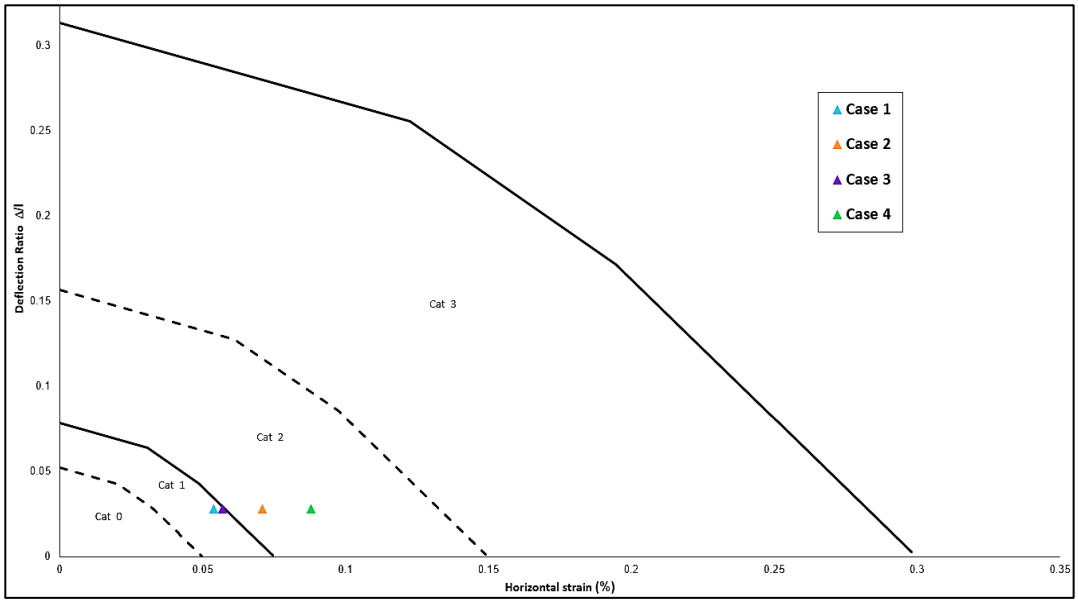
The associated Building Damage Assessment points for Case 1 to Case 4 are shown below.

a. **Case 1)** The existing condition presented (where the neighbour is 0.5m distance away) in the CGL BIA rev1;
b. **Case 2)** A condition as per Cambell Reiths request whereby the neighbouring property (the 'worst case' 333ER critical section #1) is 0m from 335ER;
c. **Case 3)** What 'limiting horizontal movement' needs to be maintained during the detailed temporary works, construction sequencing/methodology, and structural design for the *0m distance to neighbour* analysis case, in order to keep the adjacent property within damage category CAT1.
d. **Case 4)** an additional sensitivity check, whereby CGL model a theoretical condition where the net horizontal deflection exceeds 5mm (using an artificially elevated horizontal deflection value of 6mm), for comparison.

Plate 5. Building Damage Categorisation for the design 'cases' 1 to 4, as discussed above.



4. Underpin Installation Movement Monitoring Data Presentation

There is currently a lack of movement monitoring data published within the industry with regards to underpin installation movement deflection (vertical and lateral). As part of justifying why CGL are of the opinion that a lateral movement of 5mm can and is achievable, we have decided to provide a summary of our inhouse archive of monitored underpinning works for various basement construction projects we have been involved in over the past number of years. For each case study summarized, construction programmes and drawings were consulted to obtain the installation periods and locations of the underpins. This information was used in conjunction with movement monitoring data to record vertical and lateral movements for the specified targets during the installation, loading and construction period.

Other data categories (headings within the table below), where available, are noted such as;

- The movement monitoring site location;
- Geology, ground conditions, and groundwater;
- The material of wall being underpinned;
- The geometry of wall being underpinned, (wall height, and thickness) linked to the relative loads and surcharges;
- The underpin heights/widths/depths;
- Whether the underpin is reinforced;
- And a 'quality of workmanship' grade, which is ranked 1 to 5 (1=poor; 5=excellent).

Installation movement data has been presented for the following 12nr case studies, all of which CGL has had close involvement in:

- 7-14 Baker Street, London;
- Pont Street, London;
- 62/63 Pall Mall, London;
- 7 St James's Square, London;
- 48/50 Pall Mall, London;
- Seymour Street, London;
- Corpus Christi, Oxford;
- Park Road, Cambridge;
- St Olaves, Canada Water, London;
- 42 Elsworthy Road, London;
- 65 Crutched Friars; and,
- Big Yellow Storage, Wapping

For each of these 14nr case studies, CGL present the maximum and minimum vertical and horizontal movements/deflections recorded via onsite movement monitoring regimes. It should also be noted that the movements recorded from these case studies did not lead to any notable impact or concern to the neighboring properties/party walls where present.

To note, similar projects to 335 Euston Road (in terms of ground conditions, underpin depth, underpin 'hit') would be Pont Street, 62 Pall Mall, Seymore Street, Park Street and Crutched Friars. Where temporary works were installed, the geology is roughly made ground, over gravels, over clay, and the underpins installed in 1nr 'hit' vertically. It is noted the horizontal movements on these comparable sites/projects are 1mm to 4mm, and on average ~**3.5mm**.

Therefore based on the assessment and information provided, it is our opinion that with a detailed robust temporary works propping arrangement in place, high level of workmanship by a competent/experience contractor, the use of live observational risk control monitoring, movement monitoring and contingency plan, and combined with the option of **prop-pre loading** of temporary work to counteract/compensate lateral movements of walls/underpins, the impact and damage to the neighboring properties can be kept within the required limit ~4mm, and this within CAT1 damage category, complying with Camden's policies as described in CPG Basements guidance.

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CGL's Project Case Study Underpin Installation Movement Monitoring Data

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Project Background		Ground Conditions		Underpin Details						Party wall details			Date	Movement Vertical (mm)		Movement Lateral (mm)	
Project Name	Location	Soil type(s)	Groundwater (mOD)	(H) Underpin depth (mbgl)	No. of stages / lifts (#)	Type (Straight /Boot)	Reinforced? (Y/N)	Temporary Works (lateral support) (Y/N)	Workmanship Grade (1-5) 1=Poor 5=Excellent	Party wall type (Masonry / Concrete)	Wall Height (m)	Wall thickness (m)	Underpin Completion	Min (mm)	Max (mm)	Min (mm)	Max (mm)
7-14 Baker Steet	London	Gravels over Clay Bearing strata LC	Dry	3.20	2 lifts	ST with boot	No	Yes	4	Masonry	12.5	0.40-0.60	Sep-08	-	5mm	-	4mm
Pont Street	London	7.5mOD Mand Ground 5.5-6mOD Gravels 0.1mOD Clay	2.25	3.00	1 lift	Straight	No	Yes	4	Masonry	3.2	0.25	2009	-	5mm	-	3mm
62/63 Pall Mall	London	5.24mOD Made Ground, 5.24-3.74mOD Langley Silt, 1.74-2.24mOD Kempton Park -3.26 to -3.66mOD London Clay			1 lift	Straight		Yes	3	Masonry			2010	2.7mm	4.4mm	2.7mm	4.4mm
7 St James's Square	London	6.9-15.2mOD Made Ground, 6.1-8.6mOD Langley Silt, 3.4-8.1mOD River Terrace -1.7-6.3mOD London Clay			1 lift	Straight		Yes	4	Masonry			Aug-12	1mm	4.5mm	1mm	5mm
48/50 Pall Mall	London	Made Ground over Taplow Gravel Member			1 lift	Straight		Yes	4	Masonry			Sep-14	1mm	6mm	2mm	5mm
Seymour Street	London	21.37-21.38mOD Made Ground, 18.38mOD Lynch Hill Gravel, 17.58-16.17mOD London Clay			1 lift	Straight		Yes	3	Masonry			Sep-16	1mm	4mm	1mm	4mm
Corpus Christi	Oxford	61mOD Made Ground 58.2mOD Gravels 57.6mOD Oxford Clay	58.3	2.88	2 lifts	Straight	No	Yes	4	Oxford City Wall (Old Masonry)	5.3	0.60	Sep-22	1mm	4.5mm	2mm	4mm
Park Road, Cambridge	Cambridge	Made Ground and natural dry Medium Dense Gravels	Dry	1.87	1 lift	Straight	No	Yes	5	Masonry	8.0	0.40	May-22	1mm	2mm	1.5mm	2mm
St Olaves, Canada Water	London	2.5mOD Made Ground, 1.3mOD Alluvium, 0.5mOD River Terrace -5.5mOD Llambeth Group		3.00	1 lift	Straight	No	Yes	4	Masonry		0.25	Jul-23	1mm	4mm	1mm	5mm
42 Elsworthy Road	London	46.92-47.12mOD Made Ground 45.52-45.92mOD W-Lon Clay 35.12-37.92mOD London Clay	Dry	5.70	2 lifts	Straight	Yes	Yes	3	Masonry		0.40	Feb-24	1mm	5mm	1mm	4mm
65 Crutched Friars	London	13.7mOD Made Ground 8.5mOD Taplow Gravels 5.5mOD London Clay	Wet at base, but overall dry dig	4.00	1 lift	Straight	No	Yes	5	Concrete	6.7	0.75	Jun-24	1mm	3mm	1mm	2.5mm
Big Yellow, Wapping	London	10mOD Made Ground 5mOD London Clay	6	1.80	1 lift	Straight	No	Yes	4	Masonry	4.0	0.25	Mar-25	1mm	3mm	1mm	3mm

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We trust that this supplementary letter, presenting a sensitivity check and over 12nr CGL project case studies via a movement monitoring data presentation approach, now **adequately demonstrates that the BIA complies with Camden's policies as described in CPG Basements.** Should you have any further queries, please do not hesitate to contact us.

Yours sincerely,

Joseph Birnie, Associate
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