

Eastman Dental Hospital Plots 1 & 3,  
256 Gray's Inn Road  
WC1X 8LD

Basement Impact Assessment  
Audit

For  
London Borough of Camden

Project Number: 13398-73  
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## Document Details

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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 Eastman Dental Hospital, 256 Gray's Inn Road, WC1X 8LD (planning reference 2020/5791/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 includes a new two storey basement extending under the majority of the footprint of the Plot 1 development and a part 1 and part 2 storey development in Plot 3.
- 1.5. It should be demonstrated that the authors of the Basement Impact Assessment (BIA) hold qualifications in accordance with LBC guidance.
- 1.6. A comprehensive site investigation has been completed for Plot 1 indicating the development will be founded within the London Clay. A further ground investigation is to be undertaken in Plot 3 and the BIA should be reviewed once the investigation is complete.
- 1.7. Further monitoring is recommended to confirm groundwater levels. However, it is accepted that there will be no impact to the local and wider hydrogeological environment.
- 1.8. SUDS strategies are proposed to mitigate the impact to the hydrological environment.
- 1.9. A construction methodology and programme is presented, including outline sequencing and propping arrangements to the retaining walls.
- 1.10. A ground movement assessment (GMA) is presented which predicts damage to surrounding structures no worse than Burland Category 1 and negligible impact to Gray's Inn Road. However, further information is required to justify the depth of excavation assumed, surrounding ground levels and the derivation of vertical movements. The impact to a boiler room to the north east of Plot 1 within New Calthorpe Estate has not been assessed and the GMA should be updated to include it.
- 1.11. Whilst some utility information is discussed, a full set of asset protection agreements should be sought prior to development.

- 1.12. A non-technical summary has been presented.
- 1.13. A Basement Construction Plan is recommended.
- 1.14. Queries and requests for information are summarised in Appendix 2. Until the requested information is provided, the BIA does not meet the requirements of CPG: Basements.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 21/12/2020 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 'Eastman Dental Hospital Site and Buildings' (planning reference 2020/5791/P. The planning application addresses variations to a consented scheme including significant changes to the depth and extent of the basement.
- 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: Basements. March 2018
  - 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 *"Variation of Condition 2 (Approved Plans) granted under Planning Application reference 2019/2879/P dated 10/03/20 (for: Partial redevelopment of the site to create medical research, outpatient facility and academic floorspace); CHANGES include rear and front extensions to the basement of Plot 1; significant extension of the Plot 3 basement at both level B1 and level B2 to provide two lecture theatres (net additional 852sqm GIA floorspace); additional plant and servicing equipment.."*
- 2.6. The Audit Instruction confirmed the Eastman Dental Clinic on site is a listed (Grade II) building.

2.7. CampbellReith accessed LBC's Planning Portal on 22/01/2021 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report for Plot 1 & 3 (BIA), Rev P04 by Ramboll dated December 2020.
- Geoenvironmental Desk Study P2 and P3, Rev P07 by Ramboll dated December 2020.
- Structural Strategy Statement Rev 06 by Ramboll dated December 2020.
- Planning Application Drawings by Hawkins\Brown consisting of  
Location Plan  
  
Proposed Plans
- Draft Construction Management Plan Addendum by Ramboll dated December 2020.
- Flood Risk Assessment, Rev P08 by Ramboll dated December 2020.
- Drainage Strategy, Rev P07 by Ramboll dated December 2020.
- Design & Access Statement, Rev P02 by Ramboll dated December 2020.
- Planning Consultation Responses.

2.8. Where necessary, the following documents which were provided as part of the previous submission, have also been reviewed:

- Basement Impact Assessment Report for Plot 1 (BIA) by Ramboll dated May 2019.
- Basement Impact Assessment Report for Plot 3 (BIA) by Ramboll dated August 2019
- Arboricultural Report by Thomson Ecology dated May 2019.
- Construction Logistics Plan by Momentum Transport Consultancy dated May 2019.
- Construction Management Plan by Blue Sky Building dated May 2019.
- Ground Investigation Report by Ramboll dated May 2019.

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	See audit paragraph 4.1
Is data required by Cl.233 of the GSD presented?	Yes	Refer to Desk Study and Ground Investigation Report for relevant maps and figures.
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 and supporting documents provided.
Are suitable plan/maps included?	Yes	Refer to Desk Study and Ground Investigation Report for relevant maps and figures. BIA Section 2.
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	BIA Section 4, Table 4.2.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 4, Table 4.1.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 4, Table 4.3
Is a conceptual model presented?	Yes	BIA Section 6, Table 6.1



Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 5, Table 5.1.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 5, Table 5.1
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 5, Table 5.1
Is factual ground investigation data provided?	Yes	Refer to Ground Investigation Report.
Is monitoring data presented?	Yes	Further monitoring recommended. See Audit paragraph 4.10.
Is the ground investigation informed by a desk study?	Yes	Refer to Desk Study, which is referred to within the BIA.
Has a site walkover been undertaken?	Yes	Completed to support original planning application (2019/2879/P).
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See Audit paragraph 4.16.
Is a geotechnical interpretation presented?	Yes	Ground Investigation Report Section 4 See audit paragraph 4.11.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Ground Investigation Report Section 4 See audit paragraph 4.11.
Are reports on other investigations required by screening and scoping presented?	Yes	A number of reports have been compiled and referenced within the BIA. Refer to Section 1 of the current BIA and a full list in the previously submitted BIAs, Section 1 and Section 2.
Are the baseline conditions described, based on the GSD?	Yes	See Audit paragraph 4.11.

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	Yes	See Audit paragraph 4.17.
Is an Impact Assessment provided?	Yes	Impact assessment for all noted issues in screening and scoping assessment, refer to Section 5 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	See Audit paragraph 4.17.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	See Section 5 of BIA.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	See Section 5 and Section 14 of the BIA.
Has the need for monitoring during construction been considered?	Yes	See Audit paragraph 4.22.
Have the residual (after mitigation) impacts been clearly identified?	Yes	See Section 14 of BIA.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Clarification required with respect to GMA and associated contour plots. A boiler building located within the housing estate to the NE has not been assessed. Audit Paragraph 4.19.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	SUDS strategies presented. Refer to Drainage Strategy and Audit paragraph 4.13.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	A Basement Constriction Plan should be provided. Audit paragraph 4.24.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However update to the GMA is required. Refer to Audit paragraph 4.17 - 4.19.
Are non-technical summaries provided?	Yes	

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been prepared by engineering consultants, Ramboll. The qualifications of the authors have not been provided as required by LBC guidance. A list of contributing authors confirming relevant qualifications for all relevant documents is requested.
- 4.2. The LBC Instruction to proceed with the audit identified that the basement proposal involves a building which resides within a Conservation Area and has listed buildings within and around the site.
- 4.3. The existing site is described in Section 2 of the BIA. The site contains three buildings which comprise the former Royal Free Hospital, the grade II listed Eastman Dental Clinic and the Levy Wing. Development Plot 1 covers the former Royal Free Hospital, which is to be part demolished (the façade is to be retained). Development Plot 3 covers the former Levy Wing, which is to be demolished. The other buildings form parts of other phases to the development.
- 4.4. Permission was granted for a basement in March 2020 under planning application reference 2019/2879/P and the BIA for that application has been audited by CampbellReith. The revised scheme includes a rear and front extension to the basement of Plot 1 and a significant extension of the Plot 3 basement at both the B1 and B2 level to extend beneath the centre of the site.
- 4.5. The proposed basements are discussed in Section 2.3 and Section 8 of the BIA. Plot 1 is to have a 2 storey basement (~14m deep) with a 7 storey superstructure. The excavation formation level for the basement is proposed to be to 6.50m AOD with the existing site level at Gray's Inn Road at around 20.30m AOD.
- 4.6. Plot 3 is to have a part 1 storey and part 2 storey basement (up to ~9m deep). Excavation is proposed to be to around 15.50m AOD for the single storey basement and 11.50m AOD for the double, with the existing site level at around 20.60m AOD, except in the NE corner where, due to the natural slope of the site, part of the B1 level basement to the north east of site is almost at existing ground level, at around 18.00m AOD.
- 4.7. A contiguous pile wall solution is proposed to form the basement, with a construction sequence outlined within Section 8 of the BIA. A bottom-up construction sequence is proposed, with temporary props installed as excavations are progressed.
- 4.8. A site wide desk study has been undertaken but a site investigation has only been completed for Plot 1. The Desk Study and Ground Investigation reports are separate documents and are referred to within the BIA. The site investigation comprised a number of boreholes, trial pits

and window samples undertaken within Plot 1. The BIA states that a ground investigation will be undertaken in Plot 3 when demolition permits access. It is accepted that the findings of the ground investigation are sufficient to allow the BIA to be completed for both plots however in light of the possibility of a drift filled hollow in the south east part of Plot 3, this BIA should be reviewed once the ground investigation is complete.

- 4.9. The ground conditions encountered in the ground investigation are Made Ground over isolated pockets of River Terrace Deposits, under which is the London Clay formation. Groundwater was encountered and monitored for approximately one month. It is accepted that the London Clay is non-productive and of low permeability, and the isolated areas of River Terrace Deposits are likely to contain perched water rather than substantial through-flows. The BIA concludes that there will be no significant impact on the shallow aquifer, which is accepted.
- 4.10. Monitoring was conducted during August and September 2018, when seasonal levels may be considered to be low. The ground water table assumed within the BIA has been taken at one of the upper values from the monitoring (9.40m AOD). Future monitoring has been recommended within Section 10 of the BIA as part of mitigation measures, which is considered prudent.
- 4.11. Interpretative geotechnical information is presented within the ground investigation report. The interpretation presented is within the expected normal range for the ground conditions encountered.
- 4.12. Section 3 of the BIA reviews the geological, hydrogeological and flood risk information of the site. Use of Environment Agency and BGS maps have been referenced within the Desk Study and ground investigation report, which are referenced within the BIA.
- 4.13. The screening assessment in Section 4 indicates that this area of Gray's Inn Road has a low risk of flooding. The EA flood maps are provided, a SuDS assessment has been undertaken, and the comments within the justification table are accepted.
- 4.14. It is accepted that the change in impermeable site area has not increased. The drainage strategy and adoption of SUDS to reduce off-site drainage flow rates from current rates should be adopted, with a detailed design to be agreed with LBC and Thames Water.
- 4.15. The screening and scoping discussion with regards to slope stability are accepted. The desk study and ground investigation report have been referenced in discussion of potential volume change of the London Clay formation. The deep foundations proposed and formation level preclude substantial risk from shrink / swell of shallow cohesive soils.
- 4.16. Adjacent structures are discussed in Section 7 of the BIA. There are numerous properties around the site, with their date of construction and structural composition noted. The presence of basements for some structures is confirmed within the BIA in Section 7. It is also noted that

a retaining wall that bounds part of the site is to be demolished as part of the new development. The BIA states that, in the temporary case, this existing wall will be supported by props for stability, and the wall condition assessed with the opportunity to repair and be monitored if required.

- 4.17. The Ground Movement Assessment (GMA) is based on the described construction methodology and sequence and considers the impacts from the proposed works to the neighbouring properties. These are discussed within Section 9 of the BIA. The GMA predicts damage to surrounding structures to be no worse than Burland Category 1. For the purpose of the analysis it has been assumed that the neighbouring structures do not have a basement. The assessment includes installation of retaining walls, excavation and construction of the basement. The means of deriving vertical movements from Frew analyses should be described.
- 4.18. Drawings and sections indicate surrounding ground levels to be between c18 and 20.50m AOD and the BIA notes pile cap levels at between 15.60 and 17.95m AOD. The BIA indicates the GMA is based on excavation from a level of 15.50m AOD and it should be confirmed that the assessment has considered the actual retained heights around the basement. The means of retaining the ground above the pile cap level (where necessary) should be described and impacts from the enabling/temporary and permanent works assessed.
- 4.19. The BIA notes that ground movements have been calculated at surface level where it is likely to be most onerous. However, the contour plots included (Figures 12 and 13) are those for 15.50m AOD, at the 'B1 Level'. It should be confirmed that this adequately assesses ground movements where surrounding structures are at elevations between c18 and 22m AOD. A building, believed to be a boiler room, is present within the New Calthorpe Estate to the north east of Plot 1 which has not been included in the GMA. This should be assessed and the GMA updated.
- 4.20. Ground movements produced as a result of heave within London Clay during demolition of the existing structures and excavation for the basements have not been presented. The BIA states: 'the unloading due to the excavation of the proposed development/construction loading has not been analysed as it is considered that the proposed construction timescales are such that construction will be continuous therefore excavation heave effects will be counteracted relatively promptly by casting the raft and foundation pile caps, and construction of the substructure and superstructure'. It is also accepted that heave from the basement excavation will largely be contained within the embedded retaining wall.
- 4.21. Gray's Inn Road is within 5m of the proposed two storey basement, containing a number of below ground services including Thames Water assets. Although further justification for the GMA is required, it is accepted that ground movements in the vicinity of the road are small. It is noted that Thames Water has been consulted during the planning and assessment processes

and have detailed their specific requirements. The retaining wall that bounds part of the site has not been considered within the GMA as this will be partially demolished.

- 4.22. An outline structural monitoring strategy is referenced within BIA Section 10. Structural monitoring and consequential actions are proposed to be adopted within an updated Construction Management Plan. The contractor should adopt the monitoring strategy to ensure construction is appropriately controlled and impacts to neighbours are maintained within predicted limits.
- 4.23. An outline programme is provided within the draft Construction Management Plan. The programme takes into account all three phases of the project, with an indicative breakdown of predicted duration of substructure works.
- 4.24. In light of the significant extension of the proposed basement structures a basement construction plan should be provided.

## 5.0 CONCLUSIONS

- 5.1. It should be demonstrated that the authors of the Basement Impact Assessment (BIA) hold qualifications in accordance with LBC guidance.
- 5.2. A desk study has been completed in support of the BIA, broadly in accordance with LBC guidance. At present, site investigation has only been completed within Plot 1.
- 5.3. A Ground Investigation is to be undertaken within Plot 3. The BIA should be reviewed once the ground investigation has been completed. Specific attention should be given to a potential drift filled hollow that may be located within the site boundary.
- 5.4. It is accepted that there will be no impact to the wider hydrogeological environment.
- 5.5. The site is at low risk of flooding and a SUDS strategy is proposed to mitigate impacts to the hydrological environment.
- 5.6. A construction methodology is presented, including outline sequencing and temporary propping for bottom-up construction. An outline construction programme has been provided.
- 5.7. A Ground Movement Assessment (GMA) is presented which predicts damage to surrounding structures no worse than Burland Category 1. Queries are raised in relation to the assumptions made and the prediction of ground movements. An additional structure, thought to be a boiler room within the residential housing estate to the north east of site has not been assessed and the GMA should be updated to include it.
- 5.8. It is noted that ground movements around the site perimeter, and the impact to Gray's Inn Road, are small. Asset protection agreements with utility providers should be agreed, as applicable.
- 5.9. An outline movement monitoring strategy is presented and should be adopted to control construction and limit impacts within predicted limits.
- 5.10. A non-technical summary has been presented.
- 5.11. Given the significant extension of the proposed basement structures, the impact of the construction sequence and propping on ground movements, and the need for site investigation in Plot 3, a Basement Construction Plan is recommended.
- 5.12. Queries and requests for information are summarised in Appendix 2. Until the additional information requested is presented, the BIA does not meet the requirements of Camden Planning Guidance: Basements.

## Appendix 1: Residents' Consultation Comments

None



## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Authors Credentials to be confirmed.	Open	
2	Land Stability	Site investigation for Plot 3 should be undertaken and the BIA reviewed once completed. Specific attention should be given to a potential drift filled hollow indicated in the area.	Open	
3	Land Stability	Clarification is required with respect to excavation depths assumed in the Ground Movement Assessment, the level at which ground movement has been predicted and the means of predicting vertical ground movement.	Open	
4	Land Stability	The Ground Movement Assessment should be updated to include the boiler room structure located to the north east of Plot 1 within New Calthorpe Estate.	Open	

## Appendix 3: Supplementary Supporting Documents

None pertinent

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