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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-14

Revision: F1

March 2018

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	January 2018	Comment	GKrm12727-14-120118-2-6 St Pancras Way-D1.docx	GK	HS	RM
F1	March 2018	Planning	GKrm12727-14-260318-2-6 St Pancras Way-F1.docx	GK	HS	RM

Document Details

Last saved	26/03/2018 18:00
Path	GKrm12727-14-260318-2-6 St Pancras Way-F1.docx
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Project Number	12727-14
Project Name	2-6 St Pancras Way
Planning Reference	2017/5497/P

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Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 2 - 6 St Pancras Way, London, NW1 0TB (planning reference 2017/5497/P). The basement is considered to fall within Category C 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 proposed development will involve the demolition of the existing building (the 'Ugly Brown Building') and construction of 6 new buildings ranging in height from 2 to 12 storeys above ground with 1 to 2 basement levels.

1.5. The BIA has been prepared by GD Partnership Ltd with supporting documents prepared by RSK Environment Ltd, Waterman Infrastructure & Environment Ltd and Bennetts Associates Architects. The authors' qualifications for stability and hydrological assessments have been demonstrated, in accordance with LBC guidance. Whilst the preliminary hydrogeological assessment is accepted, a Chartered Geologist should review the final assessment within the required Basement Construction Plan (BCP).

1.6. The BIA includes the majority of the information required from a desk study in line with LBC guidance. A preliminary ground model is provided. This should be updated using site specific data once a site investigation has been undertaken and included within the BCP.

1.7. The Screening and Scoping assessments are generally accepted.

1.8. No ground investigation work has been completed at the site in relation to the proposed redevelopment. However, historical data indicates the previous building occupying the site was founded on a raft within the London Clay.

1.9. It is understood that a site investigation is being undertaken and this should be presented in the BCP. The site investigation should be in accordance with LBC guidance and appropriate to the scale of the proposed development to confirm ground and groundwater conditions.

1.10. The London Clay is designated unproductive strata. Subject to confirmation by site investigation, no impacts to the wider hydrogeological environment is likely. This should be confirmed in the BCP.

1.11. Thames Water assets including the culverted River Fleet are known to be below the site. The BCP should include appropriate survey to confirm the location of these assets and any other utility / underground infrastructure within the zone of influence.

1.12. It is accepted that the site is not in a Flood Risk Zone and is at low risk of flooding from all sources.

1.13. The site is within a Critical Drainage Area (Group 3-003). A SUDS assessment is presented. Off-site drainage flows will be attenuated in accordance with LBC guidance, which will provide a benefit to the wider hydrological environment.

1.14. In the updated BIA, embedded contiguous piled retaining walls with stiff popping is confirmed as the proposed construction method. Following completion of the site investigation and finalisation of assessments, the design should be confirmed within the BCP.

1.15. Indicative structural drawings are provided, including indicative temporary propping arrangements. As 1.14, construction methodology should be confirmed and sufficient temporary works information provided to demonstrate stability of neighbouring structures / assets will be maintained, within the BCP. In the revised BIA, preliminary geotechnical parameters for retaining wall design have been provided.

1.16. An outline construction programme has been provided.

1.17. A preliminary GMA is presented by RSK which defines the likely zone of influence of the works, estimates ground movements and predicts damage impacts to neighbouring structures. Following completion of the site investigation and finalisation of assessments, this should be reviewed and confirmed within the BCP.

1.18. Notwithstanding 1.17, whilst it is accepted that a final GMA will be required as part of a BCP, subsequent to site investigation, the preliminary GMA concludes that damage to neighbours should be feasibly maintained within Category 1 (Very Slight), in accordance with the Burland Scale. Movements impacting other assets (e.g. utilities, Thames Water culvert, highways) should be discussed with asset owners and asset protection agreements entered into, where required.

1.19. An outline structural monitoring strategy is proposed in the updated BIA. This should be reviewed and confirmed within the BCP, sufficient to demonstrate that construction will be controlled and damage to neighbours will be a maximum of Category 1.

1.20. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. The requirements of CPG4 have been met, subject to submission of a BCP to confirm assessments and design prior to construction.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 21 November 2017 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 2 - 6 St Pancras Way, London, NW1 0TB, Camden Reference 2017/5497/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) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- 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 Audit Instruction described the planning proposal as: "Demolition of the existing building (class B8 and B1) and erection of 6 new buildings ranging in height from 2 storeys to 12 storeys in height above ground and 2 basement levels comprising a mixed use business floorspace (B1),

residential (C3), hotel (C1), gym (D2), flexible retail (A1 - A4) and storage space (B8) development with associated landscaping work."

The proposal is located within the Regent's Canal Conservation Area however the proposal does not involve a listed building nor is it a neighbour of a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 29th November 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated 27 October 2017 by GD Partnership Ltd.
- Flood Risk Assessment and SUDS strategy (ref W/17017, Rev B) dated August 2017 by GD Partnership Ltd.
- Historic Environment Desk Based Assessment (ref WIE1170) dated September 2017 by Waterman Infrastructure & Environment Ltd.
- Outline Construction Management Plan (ref WIE1170) dated August 2017 by Waterman Infrastructure & Environment Ltd.
- Preliminary Risk Assessment (Contamination) (ref E12897/1) dated June 2017 by DTS Raeburn.
- Arboricultural Impact Assessment (ref 9298_AIA.001 Rev D) dated September 2017 by Aspect Arboriculture.
- Transport for London response (ref 17/4792) dated 10th November 2017.
- Design and Access Statement (ref 1603_RP_002) dated September 2017 by Bennetts Associates Architects.
- Planning Statement dated September 2017 by DP9 Limited.
- Application Drawings - Proposed plans of elevations, floor plans and sections dated September 2013 by Bennetts Associates Architects.

2.7. CampbellReith accessed LBC's Planning Portal during March 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated 5 February 2018 by GD Partnership Ltd.
- Flood Risk Assessment and SUDS strategy (ref W/17017, Rev C) dated 2 March 2018 by GD Partnership Ltd.

- Application Drawings - Proposed plans of elevations, floor plans and sections dated February 2018 by Bennetts Associates Architects.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	The authors' qualifications for stability. Whilst the preliminary hydrogeological assessment is accepted, a Chartered Geologist should review the final assessment within the required Basement Construction Plan (BCP).
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	Revised in updated BIA.
Are suitable plans/maps included?	Yes	
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 Report, Section 3, Table 3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Section 3, Table 2.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Section 3, Table 1.
Is a conceptual model presented?	Yes	Preliminary ground model (BIA Report, Appendix 9, Section 4). Once a site investigation has been completed this should be updated within a BCP.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Section 4. It is understood that a site investigation is being undertaken – this should be provided within a BCP.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Section 4. To be confirmed within a BCP subsequent to site investigation.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Section 4. Flood Risk Assessment / SUDS assessment provided.
Is factual ground investigation data provided?	Yes	No proposal specific ground investigation work has been completed currently. However, reference to published IStructE papers from construction of current development.
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	N/A	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	Assumed foundation depths have been provided for the adjacent properties (BIA Report, Appendix 9, Table 8). It is understood that the Beaumont Court Building has a semi-basement level but no further information on basement levels for the remaining adjacent buildings have been provided.
Is a geotechnical interpretation presented?	Yes	Updated in revised submissions.
Does the geotechnical interpretation include information on retaining wall design?	Yes	

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment including SUDS Strategy and Arboricultural Impact Assessment provided.
Are baseline conditions described, based on the GSD?	Yes	No ground investigation work has been completed at the site in relation to the proposed redevelopment. However, reference to published IStructE papers provides sufficient information on the baseline conditions at this stage.
Do the baseline conditions consider adjacent or nearby basements?	No	Adjacent foundations / basement depths should be confirmed.
Is an Impact Assessment provided?	Yes	BIA Report, Section 6.
Are estimates of ground movement and structural impact presented?	Yes	BIA Report, Appendix 9 (Ground Movement Assessment by RSK Environment Ltd). Retaining wall type / wall stiffness to be confirmed as consistent with structural scheme.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	To be updated within BCP following SI, as required.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Updated in revised submissions.
Has the need for monitoring during construction been considered?	Yes	To be updated within BCP following SI, as required.
Have the residual (after mitigation) impacts been clearly identified?	Yes	To be updated within BCP following SI, as required.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated in revised submissions.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	SUDS assessment

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	To be updated within BCP following SI, as required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	BIA Report, Appendix 9 (Ground Movement Assessment by RSK Environment Ltd). GMA to be updated within BCP following SI, as required.
Are non-technical summaries provided?	Yes	BIA Report.

4.0 DISCUSSION

4.1. The BIA has been prepared by GD Partnership Ltd with supporting documents prepared by RSK Environment Ltd, Waterman Infrastructure & Environment Ltd and Bennetts Associates Architects. The authors' qualifications for stability and hydrological assessments have been demonstrated, in accordance with LBC guidance. Whilst the preliminary hydrogeological assessment is accepted, a Chartered Geologist should review the final assessment within the required Basement Construction Plan (BCP).

4.2. The site is currently occupied by a 4 to 5 storey concrete structure known as the 'Ugly Brown Building'. The proposed development will involve the demolition of the existing building and erection of 6 new buildings ranging in height from 2 to 12 storeys above ground and 1 to 2 basement levels, comprising a mixed use of business, residential, hotel, gym, flexible retail and storage space development with landscaping work to include a plaza. The proposed basement level at the site varies from 13.40m to 19.10m AOD while the canal bed is approximately 21.15m AOD (water level approximately 2m higher).

4.3. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. A preliminary ground model is provided, based on historical site data and nearby locations, which should be updated using site specific data from the planned site investigation. The model should indicate the new foundation / retaining wall levels, the ground and groundwater conditions and the depth of foundations / basements of any structures within the proposed development's zone of influence. It should highlight any risks or potential impacts.

4.4. The Screening and Scoping assessments are generally accepted.

4.5. Whilst no site investigation work has been completed in relation to the proposed redevelopment, reference to published IStructE papers indicates that the former Granary building that occupied the site was founded upon a concrete raft foundation that was placed directly upon London Clay, approximately 6m below the canal water level.

4.6. It is understood that a site investigation is being undertaken and it is recommended that this is presented in a Basement Construction Plan (BCP). The site investigation should be in accordance with the GSD Appendix G2 and appropriate to the scale of the proposed development to confirm ground and groundwater conditions. The thickness of any worked ground and the presence of any perched groundwater should be assessed in terms of stability and hydrogeological impacts. Geotechnical data should be presented in an interpretative report in accordance with GSD Appendix G3.

4.7. On the basis of the current conceptual model, the proposed basement will be founded within the London Clay, which is designated unproductive strata. Subject to confirmation by further

site investigation, no impacts to the wider hydrogeological environment is likely. This should be confirmed in the BCP.

4.8. Thames Water assets are known to run below the site. The exact position of the assets (middle level sewer no. 2, culverted River Fleet) under the northern part of the site should be established and presented within the BCP. Similarly, the BCP should include appropriate survey to confirm the location of all other utilities / underground infrastructure within the zone of influence, assess potential impacts to those assets and confirm that asset protection agreements have been entered into, where required.

4.9. The site investigation should provide sufficient insitu strength / density data to confirm bearing capacity for foundation design and stiffness parameters for ground movement assessments. Groundwater conditions should be considered in regards to both temporary and permanent works designs. Groundwater monitoring should be undertaken as required to inform temporary works contingency planning and control of construction, and waterproofing design.

4.10. Notwithstanding 4.9, preliminary geotechnical parameters for retaining wall and foundation design has been provided in the updated BIA.

4.11. The site is within a Critical Drainage Area (Group 3-003) and on the boundary of Kings Cross Flood Risk Zone. The Flood Risk Assessment confirms the site is predominantly at a low risk of flooding from all sources. The current medium risk areas along the canal are due to the existing walkway along that side of the building, currently set 2 m below the top of the canal bank. This walkway will no longer exist in the proposed development. Standard flood risk mitigation measures should be implemented within the final design.

4.12. The development will not increase the impermeable area across the site. A SUDS assessment is presented. Off-site drainage flows will be attenuated in accordance with LBC guidance, which will provide a benefit to the wider hydrological environment. However, current proposals include some drainage discharge to the Regent Canal, subject to the consent of the Canal & River Trust. Its noted that the Trust has raised concerns regarding specific discharge arrangements, including ensuring water quality. Final drainage design should be agreed with the Thames Water, LBC and the Canal & River Trust.

4.13. Proposed basement retaining walls were described inconsistently throughout the original BIA and the indicative structural drawings, as either contiguous or secant, bored piled walls. In the updated BIA, embedded contiguous piled retaining walls with stiff popping is confirmed as the proposed construction method. For the preliminary assessment, the retaining wall pile toe depths are assessed as being 1.5 times that of the height of the soil to be retained. Following completion of the site investigation and finalisation of assessments, the design should be confirmed within the BCP.

4.14. Indicative structural drawings are provided, including indicative temporary propping arrangements. As 41.3, construction methodology should be confirmed and sufficient temporary works information provided to demonstrate stability of neighbouring structures / assets will be maintained.

4.15. The preliminary GMA presented by GDP is incomplete. A preliminary GMA is presented by RSK which defines the likely zone of influence of the works, estimates ground movements and predicts damage impacts to neighbouring structures. Whilst the approach of the GMA appears to be generally appropriate, following completion of the site investigation and finalisation of assessments, this should be reviewed and confirmed within the BCP.

4.16. Whilst it is accepted that a final GMA will be required as part of a BCP, subsequent to site investigation, the preliminary GMA concludes that damage to neighbours should be feasibly maintained within Category 1 (Very Slight), in accordance with the Burland Scale. Movements impacting other assets (e.g. utilities, Thames Water culvert, highways) should be discussed with asset owners and asset protection agreements entered into, where required (as 4.8, and presented within BCP).

4.17. An outline structural monitoring strategy is proposed in the updated BIA. This should be reviewed and confirmed within the BCP, sufficient to demonstrate that construction will be controlled and damage to neighbours will be a maximum of Category 1.

4.18. An outline construction programme is provided within section 2.3 of the BIA Report in addition to the Outline Construction Management Plan prepared by Waterman Infrastructure & Environment Ltd.

4.19. Non-technical summaries should be provided within any revisions to the BIA submitted.

5.0 CONCLUSIONS

5.1. The author's qualifications and experience have been accepted for the preliminary assessment. Within the BCP, a Chartered Geologist should be demonstrated as the hydrogeological assessment author / reviewer.

5.2. The BIA includes the majority of the information required from a desk study in line with LBC guidance.

5.3. The Screening and Scoping assessments are generally accepted.

5.4. It is understood that a site investigation is being undertaken and it is recommended that this is presented in a Basement Construction Plan (BCP).

5.5. A preliminary conceptual model is provided. This should be updated subsequent to the site investigation, dependent assessments reviewed and confirmed, and presented within the BCP.

5.6. The BCP should include appropriate survey to confirm the location of utility / underground infrastructure assets within the zone of influence.

5.7. Subject to confirmation by site investigation, no impacts to the wider hydrogeological environment is likely. This should be confirmed in the BCP.

5.8. It is accepted that the site is not in a Flood Risk Zone and is at low risk of flooding from all sources.

5.9. The site is within a Critical Drainage Area (Group 3-003). A SUDS assessment is presented. Off-site drainage flows will be attenuated in accordance with LBC guidance, which will provide a benefit to the wider hydrological environment.

5.10. In the updated BIA, embedded contiguous piled retaining walls with stiff popping is confirmed as the proposed construction method. Following completion of the site investigation and finalisation of assessments, the design should be confirmed within the BCP.

5.11. A preliminary GMA is presented by RSK that concludes that damage to neighbours should be feasibly maintained within Category 1 (Very Slight), in accordance with the Burland Scale. The GMA should be updated within the BCP.

5.12. An outline structural monitoring strategy is proposed in the updated BIA. This should be reviewed and confirmed within the BCP.

5.13. Queries and matters requiring further information or clarification are summarised in Appendix 2. The requirements of CPG4 have been met, subject to submission of a BCP to confirm assessments and design prior to construction.

Appendix 1: Consultation Comments

Consultation Comments

Surname	Address	Date	Issue raised	Response
Canal & River Trust	Fradley Junction, Alrewas, Burton-Upon-Trent, Staffordshire, DE13 7DN	29th November 2017	The proposed works will need to comply with the Code of Practice for Works Affecting the Canal & River Trust, and we have requested an informative regarding this. A survey of the canal wall will be required to inform potential mitigation measures to carry out demolition and piling work safely, and we have therefore suggested a condition regarding this be attached. The contractor should develop a works sequence to ensure demolition of the existing structure does not destabilise the canal, which we will need to review before works. New piling works are proposed close to the canal so a displacement and vibration monitoring regime will need to be in place for the work. We consider that the applicant should commit to a design and maintenance regime for the biodiverse roofs that will ensure only low nutrient runoff will be discharged to the canal (e.g. low organic content in substrate and minimal fertiliser application). We have therefore suggested that this should be part of the landscaping condition. There are no existing surface water outfalls to the canal to consider during the construction phase and it is stated in the Construction Management Plan that any contaminated groundwater encountered will be treated and sent to the foul sewer. If there was any request to discharge extracted groundwater from the construction phase to the canal, we would require water quality data to ensure this was acceptable.	Section 4

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	Author's qualifications	The authors' qualifications should be demonstrated in accordance with CPG4 guidelines.	Demonstrated for stability and hydrology. Preliminary hydrogeological assessment accepted – CGeol review to be demonstrated within BCP.	March 2018, closed stability / hydrology. Hydrgeological review by CGeol to be demonstrated in BCP.
2	Site Investigation	Site specific SI to be undertaken and presented within BCP. Updated Conceptual Site Model to be provided.	Open	N/A - BCP
3	Hydrogeology	Current assessments to be confirmed pending site investigation / conceptual site model update.	Open	N/A - BCP
4	Land stability	Underground assets to be identified / located and asset protection agreements entered into, where required.	Open	N/A - BCP
5	Land Stability	Construction methodology to be confirmed, including sufficient temporary works information to demonstrate stability assessments feasible	Closed	March 2018 Details to be provided within BCP.
6	Land Stability	Preliminary interpretative geotechnical information to be provided, including retaining wall design parameters	Closed	March 2018
7	Land Stability	Ground movement assessment should confirm construction methodology / stiffness assumptions are consistent with proposed scheme.	Closed	March 2018 Details to be provided in BCP following SI.
8	Land Stability	Structural monitoring strategy to be proposed to ensure damage to neighbours of maximum Category 1.	Closed	March 2018 Details to be provided within BCP.

Appendix 3: Supplementary Supporting Documents

None – All Available on LBC Planning Portal

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