

20 February 2014

Mr. Gavin Sexton
Principal Planner
Regeneration and Planning, Culture and Environment
London Borough of Camden, Town Hall Extension
Argyle Street, London
WC1H 8EQ

Your ref: 2013/7195/P

Our ref: CG/08704

Please reply to: Richard Ball/Ian
Marychurch

Dear Mr. Sexton,

99a Frognal, Independent Review of Basement Impact Assessment

We set out below our independent assessment of the risks associated with the construction of a new basement at 99a Frognal.

1. *The submission contains a Basement Impact Assessment, which has been prepared in accordance with the processes and procedures set out in Camden Planning Guidance 4.*

CPG 4 requires Basement Impact Assessments (BIA) to be issued in four stages; CGL has assessed the documents provided against the requirements for each stage in CPG4.

A Basement Impact Assessment was originally prepared by Geotechnical and Environmental Associates (GEA) in May 2013. The BIA has been undertaken by personnel holding the appropriate qualifications. A further BIA was prepared by GEA in February 2014. This section of CGL's review refers only to the earlier BIA, with the more recent work reviewed subsequently.

Screening: A screening and scoping assessment is provided, addressing the relevant flowcharts as set out in CPG4, the conclusions of this assessment are summarised below:

Section	Items carried forward to scoping and BIA (e.g. 'yes' answer)
Subterranean groundwater flow	<p>a) The site is located on a Secondary 'A' aquifer</p> <p><i>It is noted that groundwater was recorded on site at between 9.3m below ground level (mbgl) and 10.5mbgl. With the basement extending to 10mbgl it is possible that groundwater will be intercepted. If the basement is constructed within a piled box, then groundwater will be obstructed.</i></p>

Section	Items carried forward to scoping and BIA (e.g. 'yes' answer)
Slope Stability	b) Site contains a number of retaining walls and average slope steeper than 7° and reprofiling may possibly change local boundary slopes to greater than this. c) The site is underlain by an aquifer. d) The property is detached, but the proposed development will increase foundation depths to a maximum of some 10mbgl.
Surface Flow and Flooding	e) No issues identified

The screening assessment accords with the methodology set out in CPG4 and in terms of subterranean groundwater flow and slope stability assessment provides a reasonable indication of the potential impacts of the proposed basement.

With regard to surface flow and flooding as it is evident from the proposed development plans that the proportion of hard/soft landscaping on site will change as part of the final development, with the ground floor level extending beyond the existing building footprint. The potential impact of this should be considered, as the exposed Bagshot Formation material may currently act to attenuate surface water flow to a slightly greater degree than would occur with the new building constructed.

Scoping and Site Investigation: The scoping and site investigation phases of the BIA have been combined. The scope of the ground investigation included three cable percussion boreholes to depths of between 15mbgl and 20mbgl and four window sampler boreholes with dynamic probing to up to 10mbgl. Four groundwater monitoring standpipes were installed and four monitoring visits have been undertaken to date. It is understood that additional monitoring will be undertaken. Two hand-dug trial pits were excavated beneath existing foundations in addition to the boreholes.

It is considered that the scope of the investigation is appropriate to the scale of the development.

The ground investigation recorded a variable thickness of Made Ground, overlying Bagshot Formation Sands to variable depths, with Claygate Member clays beneath this. Groundwater was recorded at depths of between 9mbgl to 10mbgl, a typical level of approximately 110mOD.

Impact Assessment: An impact assessment is provided to review the issues identified in the screening phase (these comments refer to the 2013 impact assessment).

a. The site is located on a Secondary 'A' aquifer and the basement may extend beneath the water table:

GEA conclude that the basement formation will be above the water table based on monitoring records, and that therefore will not obstruct groundwater.

b. Slope stability:

No detail is provided in the 2013 BIA, GEA conclude that slope stability is not a factor and that suitable retaining wall systems are required. CGL agree in principle with these and have reviewed the 2014 BIA for further detail as below.

The 2014 BIA goes into considerable detail regarding the analysis of ground movements and retaining walls at the site. The parameters and methodologies adopted are appropriate to the scale of the development, and the resulting ground movements and building damage categories are considered to be reasonably conservative. It is noted that the piled walls are terminated at 110mOD (toe of pile) which is at or above ground water level such that groundwater flow is unlikely to be significantly obstructed. We note further that a secant piled wall is proposed as a precaution adjacent to the western perimeter of the basement and would suggest that the female piles are terminated close to below basement formation level (say 1m) such that they cannot extend into a nominal groundwater table and create an obstruction.

It is notable that a Damage Category of 2 is recorded for the swimming pool to No. 5 Oak Hill Park, this is unlikely to be acceptable for this structure (crack widths up to 5mm) and may cause leakage. A damage category of 2 is also predicted for no. 4 Oak Hill Park and this is considered acceptable under the terms of CPG4.

The effect of the increased hard-standing has been considered by Chord Environmental limited (incorporated within the second BIA) concluding that the basement is unlikely to have a significant effect on surface water flows.

2. *The methodologies have been appropriate to the scale of the proposals and the nature of the site*

Agreed

3. *The conclusions have been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of conservative engineering values/estimates*

Agreed

4. *The conclusions are sufficiently robust and accurate and are accompanied by sufficiently detailed amelioration/mitigation measures to ensure that the grant of planning permission would accord with DP27, in respect of*

- a) *maintaining the structural stability of the building and any neighbouring properties*

Generally agreed – construction sequence and analysis should be revised to control impact on swimming pool at No. 5 Oak Hill Park.

- b) *avoiding adversely affecting drainage and run-off or causing other damage to the water environment and*

Agreed

- c) *avoiding cumulative impacts on structural stability or the water environment in the local area*

This is not explicitly considered within the BIA and the applicant should provide an assessment.

We are looking for a third party independent assessment because of the underlying ground conditions therefore we are required to:

5. *Raise any reasonable concerns about the technical content or considerations of the submission which should be addressed by the applicant by way of further submission, prior to planning permission being granted. In this case it would need to be apparent that the submission is so deficient in some respect that the three conclusions (points 4a-c above) cannot be guaranteed without the provision of further information at this stage. Please clearly denote the precise information (if any) that would be required to satisfy 4a-c.*

The information provided generally defines the risks of the proposed development adequately in accordance with CPG4.

Comment is required from the applicant regarding cumulative impacts prior to granting planning.

6. *Raise any relevant and reasonable considerations in respect of the structural integrity of neighbouring structures which may be unknown or unaccounted for by the submission or which would benefit from particular construction measures or methodologies in respect of the development following a grant of permission for the development. Please clearly denote what such conditions should entail.*

The analysis provided is generally adequate and defines anticipated risks well. Because the property is detached and groundwater is below construction level, risks to neighbouring properties are generally low subject to good construction control.

It is considered that 'Category 2' damage to the neighbouring swimming pool will be unacceptable (despite CPG4 permitting up to this level of damage), and the construction sequence/analysis should be reviewed in this area to determine an appropriate construction strategy prior to site works commencing.

We would suggest that conditions relating to the construction phase are applied such that the assumed construction sequences and details are adhered to, such that the predicted ground movements will not be exceeded. Suggested conditions are provided below:

1. A detailed design and construction methodology for the project should be provided, produced by the main contractor engaged to construct the project in concert with the project structural engineer and produced on the basis of the design assumptions included to date. This should include:
 - a. Proposed construction sequence and timing of the works
 - b. Details of temporary propping, including levels and layout, type of props to be used.
 - c. Construction methodology, including excavation (access routes, plant to be used, removal of spoil etc.)
 - d. Proposed construction method for deep underpinning
 - e. Detailed methodology and design of under-drainage for basement.
 - f. A monitoring plan including 'trigger limits' and actions to be taken at each trigger limit, locations and type of monitoring (assume 3D position monitoring), monitoring frequency.
2. The main contractor should provide:
 - a. Details of procedures for auditing and controlling site works during construction
 - b. Details of temporary works checking regime
 - c. Detailed contingency plans to reinstate and control ground movements should they occur

- d. Evidence of recent and successful experience in the construction of basements of this scale in London (track record)
 - e. Details of accreditation or membership of accredited bodies (such as ASUC).
 - f. Details of warranty/insurance cover
 - g. Details of all subcontractors involved in the basement excavation, including track records, construction method statements, insurances.
3. The structural engineer should provide:
- a. Detailed structural design calculations and methodology – or acceptance (independent review and approval) of contractor proposed design and methodology.
 - b. Programme of site inspections to confirm that construction is being undertaken in accordance with the approved design.

The commentary provided above represents our professional, independent opinion of the data provided. We trust this assists and are available to contact should you have any further questions or comments.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Ian Marychurch', with a long horizontal flourish extending to the right.

Ian Marychurch, Director
Card Geotechnics Limited

A handwritten signature in black ink, appearing to read 'Richard Ball', with a circular scribble above the main signature.

Richard Ball, Principal Engineer
Card Geotechnics Limited