INDEPENDENT ASSESSMENT

OF

BASEMENT IMPACT ASSESSMENT

FOR PLANNING APPLICATION 2014/1495/P

FOR

9-11 MANSFIELD ROAD

LONDON

NW3 2JD

Project No. P2955
November 2014

Document Reference IH/P2955/Issue 2.0
UPDATED TO REFLECT REVISED SUBMISSION

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Contents

1.00 INTRODUCTION

1.01 It is proposed to demolish the existing properties at 9-11 Mansfield and construct a new 3 storey building over a single level of basement.

1.02 A planning application has been made for the works (reference 2014/1495/P) and the submission included a Basement Impact Assessment prepared by Ramboll.

1.03 Michael Alexander have been commissioned to provide an Independent Assessment of information submitted as set out in London Borough of Camden's letter dated 2 September 2014.

Specifically Michael Alexander has been asked to confirm whether: -

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 (CPG4).
2) The methodologies have been appropriate to the scale of the proposals and the nature of the site
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
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
   b) avoiding adversely affecting drainage and run-off or causing other damage to the water environment and
   c) avoiding cumulative impacts on structural stability or the water environment in the local area

1.04 This Report is for the sole use of the London Borough of Camden and their advisors.

1.05 Δ This assessment was prepared by Isaac Hudson MEng MA(Cantab.) CEng MIStructE, a chartered structural engineer. The assessment has been made in conjunction with GEA Ltd, geotechnical engineers, and this report should be read in conjunction with their letters of 19 September 2014 & 21 October 2014, included in Appendix A

1.06 Michael Alexander can confirm that they have: -

- No prior involvement with the scheme
- No previous working relationship with the application, Mr & Mrs Hauser, nor with Abbotswood Properties
- No professional conflict of interest with Ramboll, the authors of the submitted BIA

1.07 Δ The results of our initial review were summarised in Issue 1 of this report, dated 19 September 2014. This report has subsequently been updated to reflect the revised BIA received forward to us by London Borough of Camden on 30 October 2014. Amended clause in this report are marked thus:- 'Δ'

1.08 The following information was reviewed in the course of this assessment: -
Δ

i) Basement Impact Assessment by Rambolls, Ref: 61032977, rev 1, dated 24 February 2014
ii) 'Proposed Construction Method Statement and Sequence of Works' by Martin Redstone Associates Ref 13.111 dated 24 May 2013
iii) Proposed Structural Drawings by Martin Redstone Associates: -

13.111 Sheet 1	Proposed Ground Floor Plan
13.111 Sheet 2	Suggested Underpinning Sequence
13.111 Sheet 3	Proposed Section Details

iv) Proposed underpinning temporary works sketches 13.111/T1- T12
v) Basement Impact Assessment by Rambolls, Ref: 61032977, rev 2, dated 22 October 2014 (which incorporates documents ii), iii) & iv) above). This is referred to as '*the revised BIA*' in this report.

2.00 APPLICABLE POLICIES

2.01 The applicable guidance document for basement developments which sets out the requirement for Basement Impact Assessments is CPG4 'Planning Guidance on Basements and Lightwells'

2.02 CPG4 refers to Camden's planning policy DP27 'Basements and Lightwells'. As set out in DP27

> *In determining proposals for basement and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, where appropriate. The Council will only permit basement and other underground development that does not cause harm to the built and natural environment and local amenity and does not result in flooding or ground instability. We will require developers to demonstrate by methodologies appropriate to the site 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 we will consider whether schemes:*
>
> *d) harm the amenity of neighbours;*
>
> *e) lead to the loss of open space or trees of townscape or amenity value;*
>
> *f) provide satisfactory landscaping, including adequate soil depth;*

g) harm the appearance or setting of the property or the established character of the surrounding area; and

h) protect important archaeological remains.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding. In determining applications for lightwells, the Council will consider whether:

i) the architectural character of the building is protected;

j) the character and appearance of the surrounding area is harmed; and

k) the development results in the loss of more than 50% of the front garden or amenity area.

2.03 This Assessment therefore: -

- Verifies the submissions against the procedures set out in CPG4
- Checks for compliance of the application with DP27

In carrying out this assessment, reference has been made to the Camden Geological, Hydrogeological and Hydrological Study, Guidance for Subterranean Development (CGHHS), as prepared by Arup.

3.00 ASSESSMENT OF ADEQUACY OF SUBMISSION

3.0.01 The first part of the assessment is a review of the adequacy of the submission, in terms of its following of the procedures set out in CPG4.

3.0.02 The areas of assessment are set out in section 8.1 of the CGHHS, clause 318, and these are set out in the clauses below.

3.1 Qualifications/Credentials of Authors

3.1.01 The required qualifications for carrying out the Impact Assessments are given in clauses 2.37, 2.38 & 2.45 of CPG4 and set out below: -

Surface flow and flooding: -
A Hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either:
• The “CEng” (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers (“MICE); or
• The “C.WEM” (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management.

Subterranean (groundwater) flow: -
A Hydrogeologist with the “CGeol” (Chartered Geologist) qualification from the Geological Society of London and a Fellow of the Geological Society of London.

Land stability: -
A Civil Engineer with the "CEng" (Chartered Engineer) qualification from the Engineering Council and specialising in ground engineering;

• A Member of the Institution of Civil Engineers ("MICE") and a Geotechnical Specialist as defined by the Site Investigation Steering Group; or
• A Chartered Member of the Institute of Structural Engineers with some proof of expertise in engineering geology.

With demonstrable evidence that the assessments have been made by them in conjunction with an Engineering Geologist with the "cGeol" (Chartered Geologist) qualification from the Geological Society of London.

3.1.02 In respect of Surface Flow and Flooding an author of the report is a hydrologist with CEng MCIWEM qualifications and so meets the criteria.

3.1.03 In respect of Subterranean (groundwater) flow an author of the report is a chartered geologist and Fellow of the Geological Society of London and so meets the criteria.

3.1.04 Δ In respect of Land Stability**,** the revised report confirms that the Land Stability assessment has been prepared by a chartered civil engineer CEng MICE and so meets the criteria.

There is also evidence that the assessment has been carried out in conjunction with a chartered geologist.

3.2 Scope of BIA

3.2.01 The scope of the BIA required is determined by the answers to the questions given in the Screening Process. This approach is summarised in the flow charts (figures 1, 2 & 3) in CPG4. We have assessed here whether the flow charts have been correctly followed in terms of carrying forward of issues to the Scoping stage.

3.2.02 In Screening for Subterranean (groundwater) flow a 'Yes' response was given to the following questions: -
1b) Will the proposed basement extend below the water table surface
6) Is the lowest point of the proposed excavation … close to, or lower than the mean water level in any local pond

These items have been carried forward to the Scoping Stage in accordance with flow chart.

3.2.03 In Screening for Land Stability a 'Yes' response was given to the following questions: -
5) Is the London Clay the shallowest strata at the site
12) Is the site within 5m of the highway or pedestrian right of way
An 'Unknown' response was given to the following question –
13) Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties.

These items have been carried forward to the Scoping Stage in accordance with flow chart.

3.2.04 Δ In Screening for Surface Flow and Flooding a 'Yes' response was given to the following question: -

6) *Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature*?

The flow chart states that if the answer to question 6 is 'Yes' then the developer is normally to undertake a Flood Risk Assessment in accordance with PPS25. Whilst detailed consideration has been given to the issues of Flooding, a formal Flood Risk Assessment in the format set out in PPS25, has not been provided. However in clause 8.1.4 of the revised BIA reference is made to part of 27.6 of DP27, which set outs the circumstances for which a formal Flood Risk Assessment is not required, where there '*is no, or minimal, impact on drainage conditions'.* On this basis we believe the submission to be compliant.

3.3 Description of Project

3.3.01 The CGHHS states that the Description of Project should include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology.

3.3.02 A brief description of the project is provided in section 3 of the BIA, which confirms the proposed depth of the excavation. Appendix 1 includes architectural layout drawings for the works and a topographic survey. Structural engineering drawings, method statement and temporary works proposals by Martin Redstone Associates have also been provided.

3.3.03 The description of the project is therefore considered to meet the requirements.

3.4 Investigation of Issues

3.4.01 The CGHHS states that assessment of impacts with respect to DP27 including land stability, hydrology & hydrogeology are required.

3.4.02 Δ In respect of ground stability an impact assessment has been made which includes reference to issues raised at screening stage. CPG4 also notes in clause 2.30 that '*the engineering interpretation will require calculations of predicted ground movements and structural impact to be provided'.* Calculations have been provided in Appendix 4 of the revised BIA. The damage prediction is '*very slight to slight*' which is within the normally acceptable limits with further mitigation.

3.4.03 In respect of hydrology, there an impact assessment for surface flow and flooding has been provided in section 8 of the Ramboll report, drawing reference to investigations set out in section 7 of their report.

3.4.04 Δ The impact assessment provided by Ramboll includes a statement of the impact on the local hydrogeology. There is also a requirement in DP27 for consideration to be made to the potential cumulative impacts of other local basement developments.

In section 7.6 of the revised BIA it is noted that there have been five approved basement schemes within 500m of the site, but that there is considerable distance between the site and these other basements. The report therefore concludes that '*the potential cumulative hydrogeological impacts to the other local basements will negligible*'.

3.5 Scale of Mapping

3.5.01 The CGHHS notes that maps should show the whole of the relevant area of study and show sufficient detail.

3.5.02 A number of maps are included within the BIA. These have been extracted from the CGHHS and are of an appropriate scale and detail.

3.6 Investigation Methodology

3.6.01 The investigations are required by CPG4 to be *'thorough, up to date and (using) professional methodologies'*

3.6.02 A site investigation report by Site Analytical Services Ltd has been provided. The investigation works included a deep borehole to 10m. Additional boreholes were aborted due to the presence of buried concrete in the area of the investigation. Sampling and in-situ testing was carried out the borehole, and groundwater monitoring was carried out. An interpretive report was prepared by Site Analytical Services Ltd.

3.6.03 CGHSS notes in clause 290 that '*A minimum of three boreholes or trial pits is usually required in order to determine the groundwater flow direction*'. However it also notes '*that if no measurements are available it can often be assumed … that the flow direction corresponds to the slope of the ground surface*.'

3.6.04 Δ In section 7 of the revised BIA, reference is made to CGHSS and the acceptance therein that the scope of works will need to take account of '*the size of the site and what can practicably be achieved prior to construction*'. It seems a reasonable assertion that the presence of the buried concrete has limited the practicable scope of investigation works posible prior to building demolition. As noted in GEA's letter of 21 October 2014, the need for further investigations going forward has been identified in the BIA, specifically to establish the depth of the existing foundations.

3.7 Mitigation

3.7.01 The CGHSS requires an assessment of whether mitigation measures are required and confirmation that these are incorporated in the scheme.

3.7.02 A mitigation measure has been identified to reduce the risk of basement flooding by incorporation of a raised threshold around lightwells. Consideration has also been given to creating a flow path around the basement box for any groundwater.

3.8 Monitoring

3.8.01 The CGHSS states that the 'need for monitoring should be addressed' and the proposed monitoring should be evaluated to ensure it is 'sufficient and adequate'. This requirement relates specifically to section 7.2.3 of the CGHSS which relates to the monitoring of ground water.

3.8.02 Within the scoping section of the Basement Impact Assessment it is noted that '*Groundwater flow is to be monitored more closely prior to construction*'.

3.9 Residual Impacts after Mitigation

3.9.01 The CGHSS looks for any residual impacts after Mitigation to be identified.

3.9.02 The BIA highlights that construction activities will have 'the potential to cause short term disruption to an area' and notes that the Client will commit to measures proposed by the Council to minimise this impact.

4.00 ASSESSMENT AGAINST REQUIREMENTS OF DP27

4.1 Proposed Construction Methodology

4.1.01 The proposed construction methodology has been set out on the Martin Redstone drawings. These have been reviewed only in respect of their meeting the principles of DP27. We have not considered whether they can or will be accepted by adjoining properties in respect of the Party Wall act.

4.1.02 An appropriate methodology appears to have been selected, provided the assumption is valid that the rate of ground water ingress will be low and can be pumped from the excavation.

4.1.03 Δ Given the relatively limited data available for the site on ground water levels and flows, consideration should also be given for condition where water inflows to the investigation are more significant. The revised BIA notes in section 6 (Scoping) that trial excavations will be carried out prior to construction to enable such an assessment to be made.

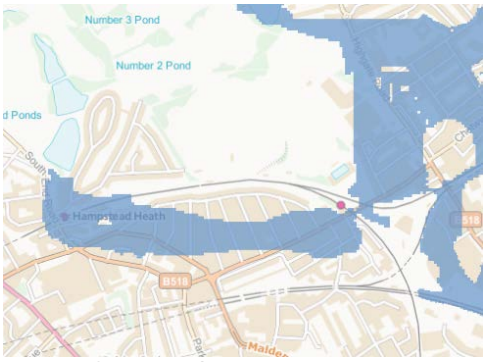
4.1.04 Δ Within section 6 (Scoping) of the report, a possible mitigation measure is given as 'dewatering'. It is assumed that the requirement for mitigation will be evaluated following the trial excavations. If dewatering is the proposed solution then the potential impact on ground stability within the adjoining properties would also need to be assessed at that time.

4.2 Soundness of Evidence Presented

4.2.01 Δ The Evidence presented in the screening exercise (within the revised BIA) appears to be sound.

4.2.02 Δ In respect of surface flow and flooding, the issue of surface water flooding was discussed. With reference to the Environment Agency map, the potential for flooding of the site from the Hampstead Heath ponds requires consideration.

This is addressed in detail in section 7.3.5 of the revised BIA.



Extract from Environment Agency maps for 'Flooding from Reservoirs'

4.2.03 Δ As noted in GEA's letter of 19 September 2014 (included in Appendix A) the upper strata of the soil was incorrectly classified as Brickearth in Issue 1 of the BIA. The revised BIA has corrected Table 5 to read '*Superficial Deposit (possibly Head Deposits).*

4.3 Reasonableness of Assessments

4.3.01 Assessments have been made in respect of Groundwater flows, Land Stability and Surface Flow/Flooding.

4.3.02 Notwithstanding the requirements for additional information noted elsewhere in the report, the assessments made appear reasonable.

4.4 Robustness of Conclusions and Proposed Mitigation Measures

4.4.01 The BIA concludes that the proposed scheme be allowed to proceed providing it complies with the applicable recommendations of CPG4 which were highlighted in the report. Recommendations are also given for mitigation measures.

5.00 CONCLUSIONS

5.01 An independent review has been carried of the BIA and other supporting documentation for the proposed development at 9-11 Mansfield Road, in accordance with the brief set by the London Borough of Camden and the approach set out in the Camden Geological, Hydrogeological and Hydrological Study

5.02 Δ The review of revision 1 of the BIA highlighted a number of areas where further information was required. However, the revised BIA submission appears to comply fully with the requirements of DP27, as described in CPG4.

5.03 Δ Following our review of the Adequacy of the Submission, the revised BIA has addressed the following issues: -

i) Evidence has now been supplied that the Land Stability assessment has been prepared by a chartered civil engineer

ii) There is justification, with reference to DP27, as to why Flood Risk Assessment compliant with PPS25 has not been provided.
iii) Calculations of Ground Movement have been made, and the predicted damage to adjoining properties have been categorised.
iv) Consideration has been given as to the cumulative impact of the proposed development together with other approved basement developments in the vicinity.
v) Justification has been provided as to why a single borehole is sufficient rather than normal practice of providing three boreholes. The BIA includes details of further investigations which are proposed to be carried out in due course.

5.04 Δ Following our review of the application in respect of compliance with DP27, the following additional information has been provided in the revised BIA

i) Trial excavations have been proposed, so it can be assessed whether groundwater inflows will be significant during construction
ii) Consideration has been given to the risk of flooding from the Hampstead Ponds.
iii) The classification of the upper strata of the soil has been updated.

5.05 Δ The revised BIA appears to have followed the processes and procedures set out in CPG4 and DP27 and is now considered to demonstrate accordance with DP27, in respect of

- Maintaining the structural stability of the building and any neighbouring properties
- Avoiding adverse impact on drainage and run-off or causing other damage to the water environment
- Avoiding cumulative impacts on structural stability or the water environment.

APPENDIX A

LETTER FROM GEA DATED 19 SEPTEMBER 2014
LETTER FROM GEA DATED 21 OCTOBER 2014

Geotechnical & Environmental Associates

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19 September 2014

Our ref: J14279/JF/1

Isaac Hudson
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Dear Isaac

Re: ASSESSMENT OF BIA AT 9-11 MANSFIELD ROAD, LONDON

Further to your instruction on behalf of the Client we have reviewed your assessment of the BIA at the above site, ref: IH/P2955/Draft 0.1, Independent Assessment of BIA for planning application 2014/1495/P.

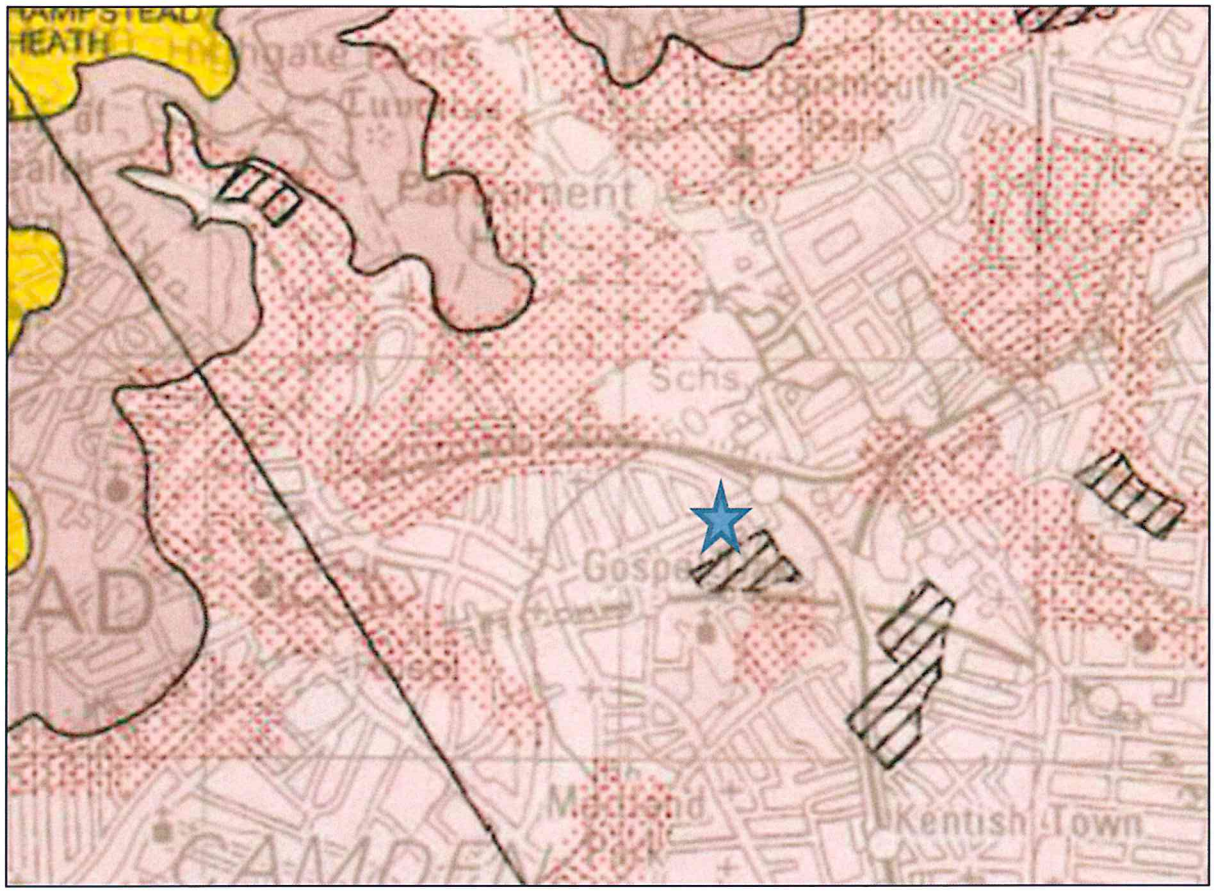
This review has been carried out by appropriately qualified personnel in accordance CPG4. The land stability assessment has been reviewed by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng) and member of the Institution of Civil Engineers (MICE), who has over 20 years specialist experience in ground engineering. The review has been made in conjunction with Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a chartered geologist (CGeol) and Fellow of the Geological Society (FGS) with 25 years' experience in geotechnical engineering, engineering geology and hydrogeology.

In general we agree with your assessment and the recommendations for further consideration that have been identified. In addition we note the following points relating to local geology and scope of the investigation.

The ground investigation has indicated a covering of superficial soil, extending to a depth of 2.6 m, which is underlain by London Clay. The Ramboll report and the SAS report describe these shallow soils as Brickearth, which we do not consider to be correct, mainly in view of their geological and geomorphological setting. The most recent version of the British Geological Survey map of North London (sheet 256) indicates areas close to the site where there is a propensity for Head Deposits over the London Clay, as shown on the map extract below. We therefore consider that these shallow soils are probably Head Deposits.

Ramboll describe the "Brickearth" as permeable, which we do not consider to be accurate. Based on the soil description and the accompanying laboratory data, this upper layer of soil includes varying amounts of gravel and has a variable moisture content; it will have a higher permeability than the London Clay, but is not considered to be "permeable" and will let water through relatively slowly due to the high proportion of clay. The higher permeability should however be considered in the design of the basement; this is not a significant issue, but the contractor should have an expectation that there may be inflows into the excavation at a rate that is higher than through the London Clay.

We are aware that two boreholes were initially proposed on the site but the second was terminated prematurely due to the presence of concrete. Our view is that if it was initially considered that two



boreholes were required the report should have included some explanation of why a single borehole was subsequently deemed to be sufficient. As the only borehole drilled on the site encountered ground conditions that were not entirely expected from published sources, and as this borehole is not within the footprint of the proposed new building, we suggest that at least one additional borehole is completed once access becomes available; this could however presumably be dealt with by way of a planning condition.

The additional investigation could include a proper assessment into groundwater inflows from the shallow Head Deposits although continued groundwater monitoring would also be beneficial and can be carried out at any time.

We trust that our comments are of assistance.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

Steve Branch

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21 October 2014

Our ref: J14279/JF/2

Isaac Hudson
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Dear Isaac

Re: ASSESSMENT OF BIA AT 9-11 MANSFIELD ROAD, LONDON

Further to our original letter dated 19 September 2014, we have received a copy of the updated BIA for the above site in respect of planning application 2014/1495/P.

We confirm that calculations for ground movement have now been included and an assessment of the likely damage to nearby structures has been made. Consideration has also now been given to the cumulative impact of the proposed development on basements nearby.

The report includes an explanation for the limited scope of investigation to date and further work, in the form of trial pits, has been recommended. At present, the single borehole record is assumed to represent the ground conditions across the site and the recommendations in the report have been based on these findings being the 'worst case'. It is still our view that a question remains over the ground conditions at the front of the site but provided that the trial pits are included in this area and they extend to the proposed basement depth, it should be possible to determine the presence of the Head Deposits in the northwest of the site and the anticipated rate of groundwater inflow. As noted previously, continued groundwater monitoring would also be beneficial and can be carried out at any time.

We trust that our comments are of assistance.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

Steve Branch