

9D The Grove, Highgate

Structural Engineering Notes on a review of the Basement Impact Assessment and supporting information submitted for planning for 9D The Grove

1.0 Introduction and Brief

Alan Baxter Ltd (ABA) are appointed by the Fitzroy Park Residents Association (FPRA) to review the Basement Impact Assessment (BIA) submitted for 9D The Grove. The BIA forms part of the full planning application for the demolition of the existing two storey house and construction of a replacement two storey property over a basement. (Note: The site investigation report includes early Architects drawings showing an attic storey, but we understand that this has been omitted and the proposals now show a flat roof).

The site is located on fairly flat ground at the top of Highgate, just to the west of the south west corner of the junction of The Grove and Fitzroy Park. On the corner, to the east, is 9C The Grove, a Grade II listed single storey property. Originally constructed as a stable block, but now in residential use, it was used by 9B The Grove, the Grade II listed 'Park House' to the south. This is a more substantial property, with a lower ground floor, plus three storeys and an attic. Immediately to the west of the site, along Fitzroy Park, there are three single storey garages and then further to the west, 2 Fitzroy Park. To the north there are four large mature Lime trees just beyond the brick boundary wall to Fitzroy Park. On the east side of The Grove there is a large covered Victorian reservoir. The main access to the site is from Fitzroy Park, adjacent to an existing garage which forms part of the property. There is a second, pedestrian, access to the east from The Grove through a pedimented timber gate in the elevation of the old stable block.

2.0 Information Provided

A package of drawings and supporting information was submitted with the planning application and has been uploaded to the London borough of Camden (LBC) website. These notes focus on the Basement Impact Assessment (BIA), produced by ByrneLooby (BL). This generally follows the current procedures set out by LBC for applications that incorporate basements and lightwells. The text includes summary sections on desk studies, screening, scoping, site investigations, construction methodology (including ground movement and damage assessments) and a Basement Impact Assessment.

Further supporting information in the Appendices includes:

- A site investigation report by Paddock Geo Engineering(PGe)
- A contamination report also by PGe
- Architects (Charlton Brown Architecture & Interiors) existing and proposed drawings
- Engineers hand drawn plans and a section
- An Arboricultural Report by Tretec

3.0 The Proposals

As noted above, the proposals are to demolish the existing two storey loadbearing masonry house on the site and replace this with a one storey deep reinforced concrete basement structure, with a two-storey structure over, built of loadbearing masonry with steel frames and precast concrete floors. The footprint of the new house will be slightly larger than the existing and the proposed basement is shown extending out further to the west below a paved section of garden.

The proposals are to construct the new reinforced concrete basement box within a contiguous piled wall which extends around the perimeter of the basement. The contiguous piled walls are to be propped at high and also low level as the ground within the contiguous piled walls is excavated and the reinforced concrete slab and walls are cast to form the basement box. The building envelope above extends beyond the basement box to the north where the external wall and slabs are built off a reinforced concrete ground beam which is supported on a number of individual piles. A projecting bay window, shed and entrance porch are all supported on cantilevering sections of the reinforced concrete ground floor slab. The contiguous piled wall is built between 3.5m and 7m from 9C The Grove to the east and only 1.2m from the lower ground floor to 9B The Grove to the south.

4.0 Ground conditions

The geological maps of the area show the site is underlain by the Bagshot Sands (or Bagshot Formation) over the Claygate Member, the uppermost strata of London Clay, and then London Clay. As the ground falls to the south and west towards Hampstead Heath the Bagshot Sands get thinner and peter out and the Claygate beds are exposed before they too get thinner and peter out just to the east of the Heath.

This area to the north and east of the Heath is an important catchment area for the Highgate Ponds, with rainfall on the top of Highgate Hill percolating down through the Bagshot Sands and making its way south-westwards down the hill. Initially the ground water percolates through the Bagshot Sands, then through the more permeable sand lenses in the Claygate beds and then finally through the made ground at the surface over the impermeable London Clay. There are a number of natural springs present at the interfaces between the Bagshot Sands and the Claygate Beds and the Claygate Beds and the London Clay.

5.0 Discussion on Key Points

5.1 Information Provided

The documents have been prepared by appropriately qualified personnel. Whilst in general the level of information provided appears to be broadly in line with the requirements of LBC, there are some areas where further more detailed information is needed in order to properly assess the proposals as follows:

The site investigation has confirmed the presence of 1 to 1.8m of made ground over the Bagshot Sands. However, the physical investigations comprised only two window sample boreholes to depths of 8m and three trial pits (two completed) to expose the foundations to the existing building to be demolished. The preliminary design of the contiguous piled wall (the detailed design is to be carried out by a specialist contractor) assumes a depth of 7m. The depths of the loadbearing piles which are to support the north wall of the house are not indicated, but are likely to be greater than 8m deep. No groundwater was encountered in the window samples undertaken or recorded in the subsequent monitoring. It is normal practice to extend boreholes several metres below the deepest piles anticipated. Deeper borehole investigations should therefore be carried out to determine the ground conditions at greater depths and the ground water levels in the Bagshot Sands, which should then be monitored. We would expect the boreholes to extend at least down into the top of the Claygate Member to establish design parameters for the loadbearing piles and to confirm that there is no change in ground conditions just below the level at which the piles are founded. This would also provide better information in order to draw a geological section across the site, which has not been provided to date. No trial pits have been carried out yet to determine the depths of the foundations to the two adjacent houses. These should be arranged, if possible, to better inform the Damage Assessments of these two listed properties.

To date the Construction Methodology and Outline Temporary and Permanent Works Proposals are very broad and unclear in places. The Construction Methodology consists of one page of written text outlining one possible sequence with reference to two levels of temporary propping to the basement excavation shown indicatively on BL's drawings. No details of the proposed propping arrangement are shown. The permanent works drawings show the proposed general arrangements, but there are very few sizes or dimensions given on the drawings(see comments on piles above). There is no information at all on the proposals for surface water or foul drainage on the site and BL indicate that this is to be designed later by a specialist. There is some mention of possible SuDS on the site, over the section of basement which extends out to the west beyond the ground floor footprint, and a green roof, but no drawings or details are provided.

Given the lack of information on these aspects of the proposals in the BIA we looked briefly at the Construction Management Plan(CMP) also submitted as part of the planning application. This contained even less useful information than the BIA, with almost every section noting that details are 'TBC upon appointment of a contractor'. This means that in addition to the gaps identified in the BIA, there is little or no information available on the impact of the proposals on local traffic and pedestrians, or the environment. These are significant omissions.

5.2 Hydrology/Ground water

Given that this area of Highgate forms part of the catchment area for the Highgate Ponds it is important that there is a good understanding of the ground water below the site. The desk studies and site investigations to date indicate that flooding is very unlikely to be an issue and ground water levels are unlikely to be affected by the permanent works proposals. However, further investigations, as noted above, are needed to confirm this. In order to avoid the risk of contamination details of proposals for managing any surface water on the site that may be trapped above the cohesive sandy clay in excavations should also be provided. If SuDS are proposed then details should be made available in order that the impact on ground water can be assessed.

5.3 Slope Stability

The BIA indicates that slope stability is not an issue on the site. This appears reasonable given the location and the topography in the area. The proposals to form the basement within a contiguous piled perimeter wall with propping at the top and bottom also appear reasonable in principle but more detail is needed of the contiguous piled wall design and the temporary works in order to assess this fully.

5.4 Ground Movements and Damage Impact Assessments

The ground movement and damage assessments carried out assume that the sandy clay present in the top 5m of the Bagshot Sands below the site is stiff and that there are high stiffness pile walls. There is insufficient information currently available in order to demonstrate these assumptions. The assessments are also based on a combination of CIRIA 580 (which is generally for piles embedded in London Clay, not the Bagshot Sands) and CIRIA 760, which has largely superseded CIRIA 580 and is applicable in a number of different ground conditions. The movement predictions of a maximum of 5mm vertical movement and 9mm of horizontal movement to the north elevation of Park House may therefore be optimistic, along with the 'negligible' Damage Impact Assessment, indicated in the BL calculations. Given the close proximity of the basement construction to Park House a more rigorous analysis should be carried out, using CIRIA 760. The BIA recommends monitoring movements during the works, which is essential, but no details of proposed trigger levels are provided, as BL indicate these will be agreed in conjunction with the contractor and party wall surveyors when they are appointed. They should provide some preliminary proposals now for consideration by these parties.

5.4 Impact on Trees

An arboricultural report incorporating a method statement for carrying out the works is included in an appendix to the report. This includes a drawing showing the root zone for the Lime trees on the south side of Fitzroy Park, with the northern part of the basement and the piles to support the north wall within the root zone. The arboriculturalist and BL are suggesting that this is acceptable because the proposed works are largely contained within the footprint of the existing building and hard finishes, the isolated piles are to be carefully located and a tree protection fence is to be erected to control the movement of site plant. However, it is clear from the drawing that these major works are proposed very close to the Lime trees and that they will inevitably be affected. We recommend that an arboriculturalist is asked to provide independent advice on whether the proposals are acceptable and whether the impact can be further mitigated.

6.0 Conclusions

Whilst the BIA broadly covers much of the information required by LBC, there are areas where further more detailed information is needed to assess the proposals. Further deeper boreholes are needed, along with trial pits to expose the foundations to adjacent properties. The construction sequence/methodology and temporary works proposals need developing to inform any review of the damage impact assessments. Clarification and details are needed of the drainage, green roof and SuDS proposals.

The CMP also needs developing in a great deal more detail. No information at all appears to be available on transport proposals and how these will affect local traffic and pedestrians, or on the environmental impact of the proposals.

More information is needed on existing ground water levels and any SuDS proposals to assess the impact on the hydrology.

More information is needed on the contiguous piled wall design and temporary works proposals to prop the walls during the basement construction in order to properly assess the proposals.

Further information is also needed to justify some of the assumptions made in the damage assessments carried out to date. These appear rather optimistic given the close proximity of the proposed basement to Park House and a more rigorous analysis using CIRIA 760 should be carried out. Proposed preliminary trigger levels for monitoring the movements should also be provided.

It appears inevitable that the works will impact the Lime trees in Fitzroy Park, given the close proximity of the basement and piling operations to some of these trees. Further independent advice should be sought from an arboriculturist on the impact of the proposals and possible further mitigation works.