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Tottenham House and Estate

The Old Stables (Building 2 on the approved Master Plan):

Addendum to structural engineering notes on first floor proposals of 27 September 2021

1.0 Introduction

This note has been prepared by Alan Baxter Ltd. (ABA) on behalf of the client, to support the proposed planning submission for recent design amendments to the proposed first floor structure of The Old Stables on the Tottenham House Estate. This note should be read in conjunction with the structural engineering note dated 27 September 2021, submitted in support of the initial Listed Building Consent application. The design proposals are being led by ADAM Architecture.

2.0 Summary of design amendments since initial LBC application

In the initial Listed Building Consent application, it was proposed to replace the deteriorated and largely collapsed timber first-floor structure with a new reinforced concrete floor, supported on new steel beams that will be installed at the locations of the historic timber primary beams.

The principles of this approach are unchanged in the revised proposals, but there several proposed amendments to the previously submitted information. These are a result of site discoveries, evolving brief and general design development.

A summary of the proposed amendments is as follows:

- Steel beam depths – Shallower sections have now been specified to increase the depth of the clear service zone beneath the first-floor slab soffit. This is across the entire plan but the change in specification is shown on the schedule drawing THB002-ABA-XX-XX-DR-S-0999_H.
- First-floor trimmer beams – These have been added to the scheme to locally support the higher first-floor partition and fixture loads that are proposed. This is across all first-floor plans.
- Elbow ties – The scope of elbow ties has developed in response to site discoveries that have arisen through improved access to the structure over the past two years. It has been discovered that the cross walls are not tied into the external elevations at present. These works are required in Zones 1-3.
- East elevation gap infill – It was discovered that wall movement in the east range has created gaps between the intermediate cross walls and external elevations. Further to installing elbow ties, these gaps will be filled with a lime-based grout to improve robustness. This is shown on the Zone 1 and 2 plans.
- Toothing and bonding existing nib in the west range – It was discovered on site that an existing brick nib was in poor condition and not bonded to the external elevation. This nib is to be rebuilt to improve robustness. This nib is in Zone 3.
- New reinforced padstones – In 5No. locations where primary beams bear directly above window openings, reinforced concrete lintels had previously been specified. Due to the more onerous load requirements, it is proposed to upgrade these padstones to concrete-encased steel beams. This is shown on Detail 02 and is present in Zones 1 and 4.

- Additional steel angle supports – During the design development, locations in the corner bays were identified where additional short lengths of steel angle are required to support the first-floor slab. This is in Zones 3 and 4.
- New reinforced beams to replace deteriorated lintels – During the site works it was discovered that the lintels over the windows in the north-east and north-west corners of the North elevation (Zones 1 & 3), and the south-east corner of the South elevation (Zone 2), are severely deteriorated. It is proposed to replace these with new reinforced concrete beams as shown on Site Memo SM04.

3.0 Changes to loading since initial LBC application

A number of the amendments listed above relate to changes in the client requirements and increases in the design loads in certain areas. Primarily, these loads relate to an increase in partition thickness around bathrooms and increased allowance for lighting loads. This results in a 18% increase in bearing pressures at foundation level, exceeding the 10% previously advised. Despite this, we have been able to justify the increased loading through a better understanding of the bearing strata and the footing details of the Stables following the works to date. We have also received advice from the Geotechnical Consulting Group (GCG) on the Tottenham House project as a whole.

A summary of the justification is as follows:

- Despite general issues with the condition of the structure, we have not noted any issues with historic settlement.
- Trial pit investigations have confirmed that the structure is footed between 1m and 2m below ground level, and typically at 1.5m depth. The foundations have been seen to have corbels that are wider than our original assessments conservatively allowed for. This has shown that the historic average bearing pressure under the walls at formation level was approximately 130 kN/m^2.
- The bearing strata of the existing foundations consists of firm clay overlying chalk. The works on site have shown this clay to be of a consistent good quality. Geotechnical investigations undertaken on site (but not local to the Stables) show the clay formation has an allowable bearing capacity of 140 kN/m^2. This is lower than would be expected from site observations and appraisals of the existing structures and therefore seems conservative. It can be noted that bearing pressures in excess of this value were calculated beneath the clock tower and also the Main House without signs of historic settlement of these structures.
- Due to the large ground-floor storey height and reasonably deep foundations, the first-floor loads on the external walls are quite evenly distributed at formation level, even on the east range where there are large openings in the external walls. The new loads increase the average bearing pressure under the walls to 154 kN/m^2. Whilst this does exceed the site investigation guidance, it is lower than bearing pressures observed elsewhere on the site.
- Based on advice from GCG for the over-consolidated Lambeth group clay, we can expect up to 6mm of settlement of the foundations. This movement would be quite uniform, and the information presented above gives us a good level of confidence that this will be well within acceptable limits for a structure of this nature and importance.