WELLAN

Proj No. 19-172 **Nov 2019 (Rev A)**

The Old Malthouse, St John's Road, Banbury

Structural Statement Regarding Proposed Alterations

Introduction and Proposals

The Old Malthouse was built in the first half of the 18th century. It was originally constructed as a single-storey building with a pitched slate roof supported on rafters, purlins and very substantial timber trusses spanning the full 11 metre width of the building. The walls and trusses were built in a fashion typical of its period and are very substantial.

The building has been subject to various alterations over the course of its life, the most significant of which is the introduction of a mezzanine floor during the 1980s. This comprises of concrete floor units supported on a steel frame. The joints of the trusses were strengthened as part of the 1980's work using steel plates and epoxy resin. Props were also installed to provide additional support from the mezzanine floor to the trusses. The first floor and a small timber mezzanine area above it appear to have last been used as an office with most of the lower floor being used for car parking. It is now proposed to make further modifications which will include structural work to install an additional area of mezzanine above the first floor and formation of an opening through an internal brick load-bearing crosswall.

Details and Checks

A check has been carried out on the strength of the trusses to establish whether the load from a mezzanine floor can safely be applied over a short length the bottom chords to either side of the centre of the trusses. This will also form a cap over cellular offices to be constructed on the first floor. The calculation has been carried out without any contribution being taken into account from the central prop. Calculations demonstrate that the additional weight is not significant and is comfortably within the capacity of the structure. The mezzanine floor is intended to provide access to ductwork and extract ventilation that will serve the office space. The mezzanine will therefore be relatively lightly loaded. It is proposed that the mezzanine floor will be formed with softwood timber joists and a chipboard floor. The joists will also provide a support to a suspended ceiling. The joists can sit on top of the bottom chord and the only necessary connection to the existing structure will be via small diameter screws into the upper surface of the truss bottom chord.

There are steel drop rods connecting the principal rafter of the trusses to the bottom chord (shown on SK/02). These are structurally redundant. The reason for their inclusion in the trusses is not clear. It is possible, but unlikely, that they were used as part of the assembly process of the trusses. However it is more likely that they were part of an earlier repair to stiffen the restraint to the joints prior to the more effective epoxy resin fixing of the plates applied during the 1980s. There is therefore for no reason why these rods should not now be removed. There are also two lines of longitudinal steel rods through the bottom chords of the trusses (also shown on SK/02). As the bottom chord of the truss will be in tension in all loading arrangements there is no requirement for restraint to the bottom flange. They are, therefore, also structurally redundant and can be removed. In any event, the mezzanine floor will provide equivalent, or better, restraint to the bottom flange. These longitudinal bars again have no purpose in the structure can also be removed.

The first floor internal brick cross-wall is 225mm thick and supports the roof purlins in lieu of a truss. There are currently three door openings through this wall, one of which is adjacent to the north wall. It is proposed to slightly enlarge this opening to give better access to the base of the stairs. The load above this opening is relatively modest due to the relatively short span of the purlins and lightweight nature of the slate. The opening can easily be enlarged simply by the inclusion of a pair of steel beams.

Conclusion

The overall structural condition of these elements of the building is good and these operations can be implemented without any detriment to its long-term structural stability.