Stag Brewery, Mortlake

Structural Impact Assessment

For Reselton Properties

February 2018

Stag Brewery, Mortlake

Structural Impact Assessment

Client Name: Reselton Ltd
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Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008 and BS EN ISO 14001: 2004)

Issue	Date	Prepared by	Checked by	Approved by
0	Dec. 17	D. Hung	R. Whitehead	R. Whitehead
1	Feb. 18	D. Hung	R. Whitehead	R. Whitehead

Comments		
0	Dec. 17	Draft Issue
1	Feb. 18	Planning

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Content

1. Introduction

This report is to be read in conjunction with the reports from all of the other disciplines that form part of the project team. These include as follows;

Architect – Squire and Partners

Landscape Architect - Gillespies

MEP Consultant – Hoare Lea

Environmental Consultant – Waterman (WIE)

Highways Consultant – Peter Brett

Planning Consultant – Gerald Eve

This Structural Impact Assessment has been prepared by Waterman Structures on behalf of Reselton Properties Limited in support of three linked planning applications for the comprehensive redevelopment of the former Stag Brewery Site in Mortlake within the London Borough of Richmond Upon Thames.

This report does not provide the specific details relating to site location, proposed development, on-site services constraints or contamination / remediation strategy as these elements are covered by others.

The report aims to look at the specific structural engineering issues that are associated with buildings on this site.

2. Site Description

2.1 The former Stag Brewery Site is bounded by Lower Richmond Road to the south, the river Thames and the Thames Bank to the north, Williams Lane to the east and Bulls Alley (off Mortlake High Street) to the west. The Site is bisected by Ship Lane. The Site currently comprises a mixture of large scale industrial brewing structures, large areas of hardstanding and playing fields.

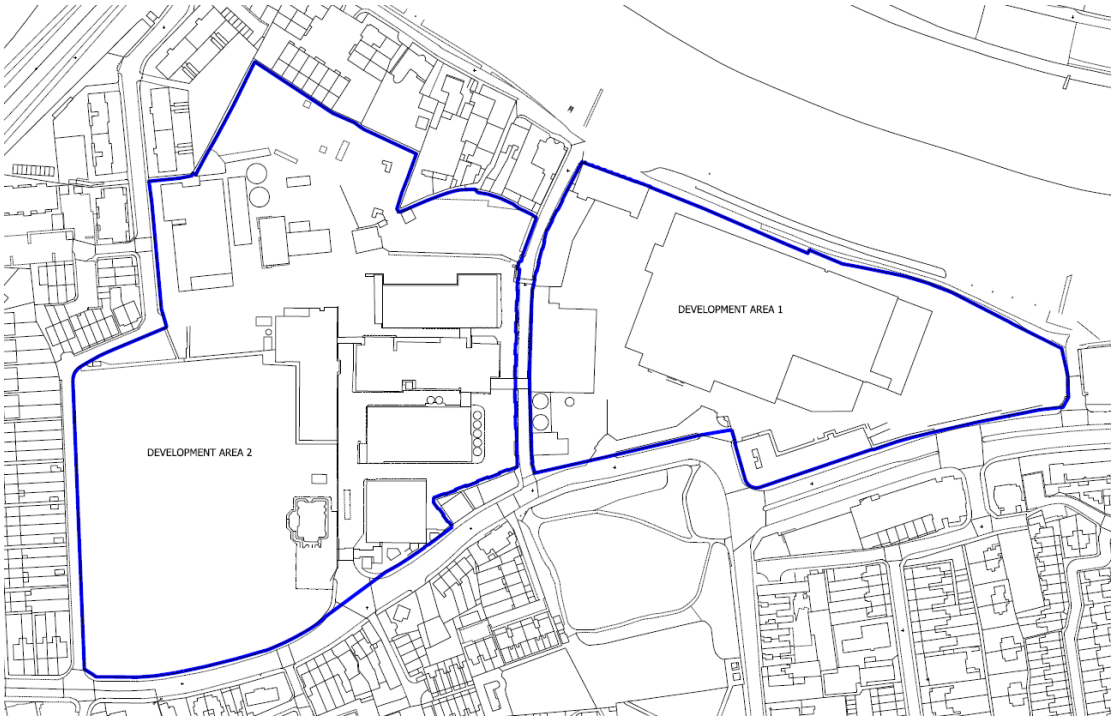
Site Location Plan

2.2 The redevelopment will provide homes (including affordable homes), accommodation for an older population, complementary commercial uses, community facilities, a new secondary school alongside new open and green spaces throughout. Associated highway improvements are also proposed, which include works at Chalkers Corner junction.

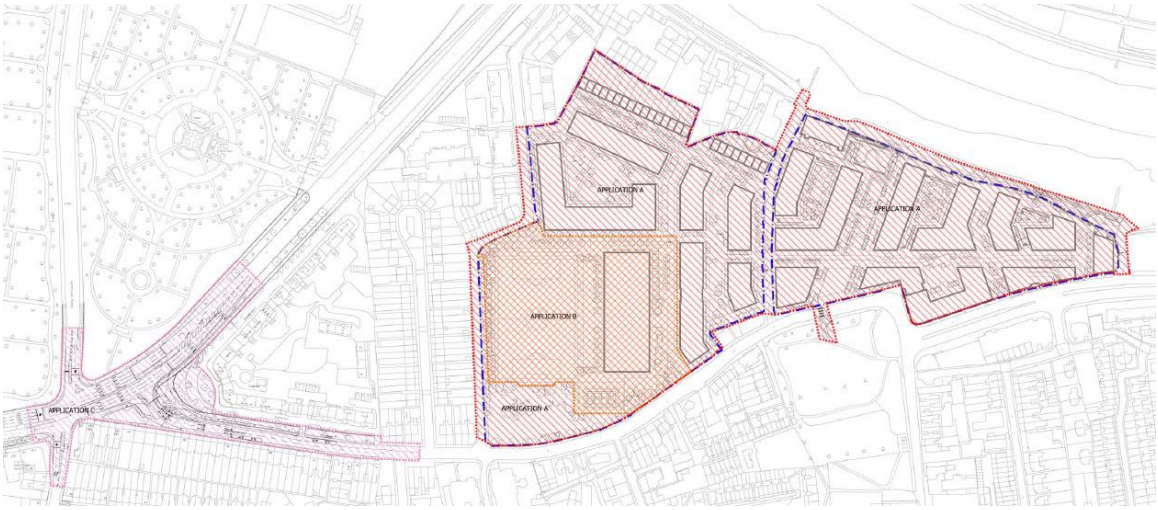
2.3 The three planning applications are as follows:

- Application A – hybrid planning application for comprehensive mixed-use redevelopment of the former Stag Brewery site consisting of:
  - Land to the east of Ship Lane applied for in detail (referred to as 'Development Area 1' throughout); and
  - Land to the west of Ship Lane (excluding the school) applied for in outline detail (referred to as 'Development Area 2' throughout).
- Application B – detailed planning application for the school (on land to the west of Ship Lane).
- Application C – detailed planning application for highways and landscape works at Chalkers Corner.

2.4 Full details and scope of all three planning applications are described in the submitted Planning Statement, prepared by Gerald Eve LLP.



Development Area Plan



Application Area Plan

2.5 The site is a triangular shaped plot of land which covers an area of approximately nine hectares (22 acres). The existing site level is approximately 5 to 6m OD with the highest level to the west falling to the east. The proposed site levels will be similar to the existing.

2.6 South-west of the site is currently a recreational area called Watney's Sports Ground. The rest of the site comprises a mix of two to nine storey existing buildings. There are three

buildings on site with historical interest and have been proposed for retention/refurbishment. The eight/nine-storey masonry-framed building (The Maltings Building) north of the site, located at the corner where Thames Bank joins Ship Lane. The three-storey masonry-framed building (former Hotel Building) located at the junction of Mortlake High Street, Lower Richmond Road and Sheen Lane. The two-storey masonry-framed building (former Bottling Building) adjoining the former Hotel Building along the Mortlake High Street.

Location of The Maltings, Former Hotel Building and Former Bottling Building

The Maltings Building

Former Hotel Building

Former Bottling Building

2.7 There are a number of trees around the site, most of which are located adjacent to Watney's Sports Ground and along the river edge (outside the site boundary). The tallest is approximately 22m high located north of the site. Reference should be made to the Arboricultural Survey Report and Impact Assessment document (reference: WIE10667-100_R_3_2_3_TSR&IA) produced by Waterman Infrastructure & Environment Limited (WIEL).

2.8 The northern site boundary is retained by an existing riverside wall. It is likely that the riverside wall has ties and anchor blocks. The presence of these ties/ anchors and their extent should be determined as part of the ground investigations. For information on boundary walls refer to Built Heritage Statement report produced by WIEL (reference: WIE10667_101_4_1_1HR).

3. Geology

Reference to published maps indicates that the site is underlain by Kempton Park Gravel Formation, overlying the London Clay Formation, shown to extend to at least 45m depth in nearby historical boreholes. Alluvium, associated with The River Thames, is shown along the southern bank of the Thames, immediately to the north of the site. Historical BGS borehole from the 19th and early 20th centuries at the brewery site indicate that the London Clay Formation is about 60m thick and the chalk is present (below the Lambeth Group and Thanet Beds) at about 81m to 83m depth below ground level.

The various ground investigations at the site confirmed the anticipated upper sequence.

4. Hydrology

Groundwater inflows were noted within the Kempton Park Gravel at 4.3m and at 3.20m. In the deeper dynamic sampler boreholes water was recorded at between about 2.9m and 4.5m depth, whilst several of the boreholes remained dry throughout.

The historical BGS boreholes recorded groundwater depths at about 4.5m and 6.1m bgl. The Ground Explorations 1980 investigation reported water at between about 2.6m and 4.0m, and the SCL boreholes of 2004 recorded groundwater within the superficial deposits at between 5.1m and 5.6m depth. More recently, groundwater monitoring by AECOM indicated water depths ranging between 3.57m and 5.14m bgl. A small tidal influence (of 60mm) was measured over a short period of 2.5 days – although it is not stated whether this reflects a Spring tide condition where the water range differences between low and high tide are at their highest.

5. Further Investigations

The current preliminary exploratory work (ref: Soil Consultants Limited Preliminary Ground Investigation SCL Report 10022/OT/JRCB) was restricted to the eastern side of Application Area A and within this area there are significant distances of up to 100m between exploratory positions.

Further investigations should comprise a series of deep boreholes across the site to confirm the finding of the above report.

A detailed ground movement analysis will be required to assess the performance of the proposed raft, piles and pile/raft interface.

6. Contamination

Reference should be made to WIEL documents Preliminary Quantitative Environmental Risk Assessment (ref: WIE10667-101-R-4.1.7 RJM) and Preliminary Environmental Risk Assessment (ref: WIE10667-101-R-3-2-1_RB).

7. Proposed Superstructure

7.1 There will be a mix of building heights across the site of between three-eight storeys. All the buildings are likely to be concrete framed utilising flat slab construction on in situ reinforced concrete columns. Columns are to be spaced at a maximum grid of 7.5m x 7.5m. For cost efficiency, and to maximise headroom height, transfer structures are to be avoided.

7.2 Reinforced concrete core walls shall be provided for lateral stability to the multi-storey buildings. Where possible, vertical service risers shall be restricted within/adjacent to the core walls. On a suspended flat slab, evenly spaced service penetrations of 150mm diameter are generally acceptable. Larger penetrations are to be located more than 3x effective depth from the face of any column, and where required, are to be trimmed with beams.

7.3 Flood risk at the entrance to the basement car park from Mortlake High Street would require mitigation measures and these could be either passive or active protection. Passive measures would be in the form of local build up in levels around the entrance. Active protection would be via self-activating flood barrier. The flood risk expert and landscape architect are to advise on the solution.

8. Proposed Substructure

There will be a single storey basement structure under the majority of the site and buildings in the east side of Application Area A. The west side of Application Area A has a reduced area of basement under the buildings. The primary purpose of the basements is to provide car parking and plant space. The retaining walls are to be formed utilising steel sheet piles and a reinforced concrete wall were vertical loads are to be resisted above ground floor level. The latter will require a piled raft along its edge to mitigate differential settlement. No surcharge, from any of the proposed buildings, are to be exerted on the proposed basement walls. If applicable, adjacent new buildings will be supported off new piled foundations, to mitigate surcharge. If steel sheet piles are to be used, the clutches/joints are to be welded to form a water-tight seal and painted from the inside to resist corrosion. The steel sheet piling wall is to be constructed as a permanent wall. Currently, the Environment Agency requires any new structure to be 4m clear from the flood defence wall for maintenance purposes and all new proposed construction complies with this requirement. The construction sequencing, which should be formed as part of the appointed Contractor's method statement, will require consideration in the detailed design of the sub and superstructure.

A ground bearing raft is the likely foundation option under the basement structures, where this can be formed at/below the river terrace gravel. This stratum starts at approximately 2.8mOD. Where the substructure cannot be founded on suitable bearing stratum, or will exert a surcharge load onto the basement wall, a piled foundation shall be adopted. It is possible for the low-rise terrace houses located north west of Application Area A and not over the basement to supported off trench footings which will need be confirmed at detailed design. The initial recommended bearing capacity for the river terrace gravel is 175kPa with a spring stiffness of 5-6MN/m2/m. Reference should be made to the Preliminary Ground Investigation Report by Soil Consultants Limited (ref: 10022/OT/JRCB) for further details. Further analysis at the detailed design stage can refine the capacity through soil structure interaction and floatation calculations.

The basement will be designed to achieve a minimum of Grade 1 environment using the grade classification in Table 2 in BS 8102:2009, Clause 6.2.3, except that no water penetration will be permitted.

9. Existing Buildings/Services Structural Considerations

For locations and views of these buildings refer to Section 2.6.

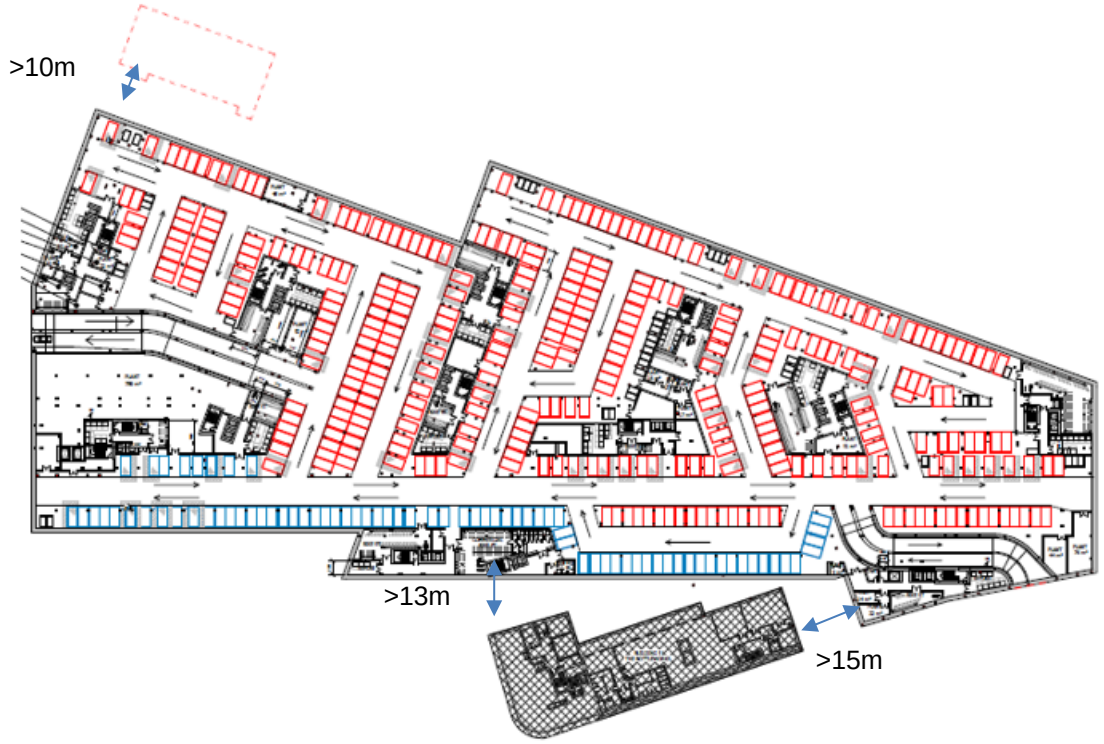
9.1 The Maltings Building (Block 04)

The façade of this building will be retained. Temporary works will be installed to maintain the integrity of the existing walls.

An assessment of the external walls of the Maltings building against the actions applied by the River Thames water levels rising to the flood defence level currently predicted to occur in 2100 has been carried by WIEL.

The new basement is over 10m from the footprint of the building and will not affect the foundations.

The internal alterations will respect the load paths and load intensities of the original building and the building stability will be maintained during construction and in the final condition.



Development Area 1 basement proximity to Retained Existing Buildings

9.2 Former Hotel Building (Block 05 West)

The façade of this building will be retained on the boundary perimeter and temporary works will be installed to maintain the structural integrity of the existing walls.

The new basement is over 13m from the footprint of the building and will not affect the foundations.

A new lower ground is proposed and to maintain the foundations against the site boundary a 400mm thick retaining wall is proposed. Temporary works will be proposed to retain both the roadway and the footings to the existing wall (see below).

The internal alterations will respect the load paths and load intensities of the original building and the building stability will be maintained during construction and in the final condition.

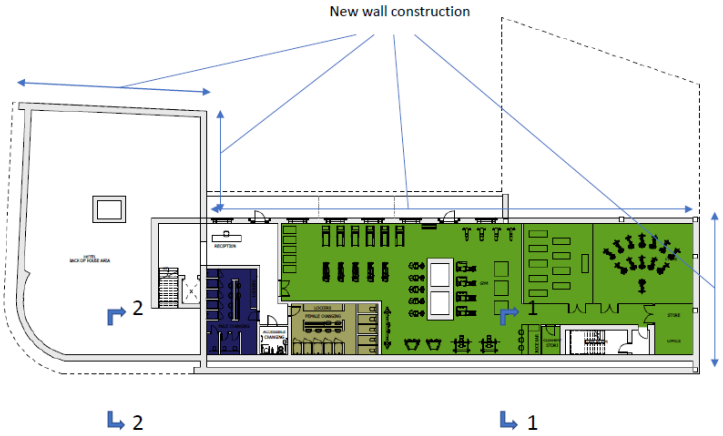
9.3 Former Bottling Building (Block 05 East)

The façade of this building will be retained on the boundary perimeter and temporary works will be installed to maintain the structural integrity of the existing walls.

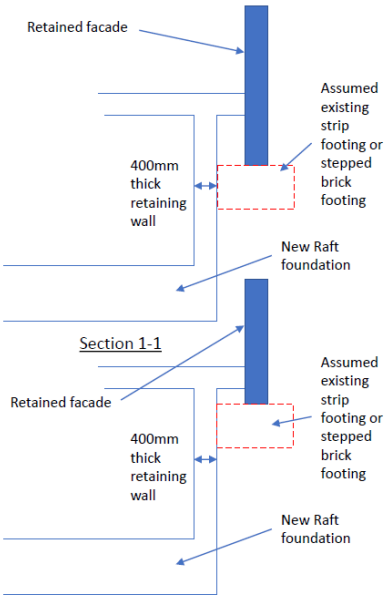
The new basement is over 15m from the footprint of the building and will not affect the foundations.

A new lower ground is proposed and to maintain the foundations against the site boundary a 400mm thick retaining wall is proposed. Temporary works will be proposed to retain both the roadway and the footings to the existing wall (see sketch in Section 9.2).

The internal alterations will respect the load paths and load intensities of the original building and the building stability will be maintained during construction and in the final condition.



Block 05 Lower Ground Floor Plan
Part copy of dwg G200_B05_P_LG_002



Section 2-2

9.4 Thames Water

For the effect on Thames Water reference should be made to the Drainage Strategy document produced by WIEL and an abstract of which is quoted below:

“Easements to existing drainage infrastructure crossing the Stag Brewery component of the Site need to be allowed for to ensure it is not impacted upon. The Development complies with all necessary easements, and where these are not possible, appropriate diversions are proposed”.

“The 225mm diameter Thames Water foul sewer crossing the Stag Brewery component of the Site is proposed to be diverted. The two rising mains only service the existing uses within the Stag Brewery component of the Site (now redundant and disused), and are proposed to be abandoned as part of the Development. An easement of 4.0m is allowed for to the combined sewer along the north-eastern boundary of the Site to ensure it is not impacted upon as it conveys off-Site flows”.

10. Conclusions

Structurally both temporary works and permanent designs will not affect the locally listed buildings.

UK and Ireland Office Locations