



Stag Brewery, Mortlake

Structural Impact Assessment

For Reselton Properties

March 2022

Stag Brewery, Mortlake

Structural Impact Assessment

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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
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Comments

0	Dec. 17	Draft Issue
1	Feb. 18	Planning
2	April 20	Revised Planning
3	April 20	Revised following comments
4	May 20	Revised following legal comments
5	July 20	Revised following further legal comments
6	Mar. 22	Revised Hybrid Planning



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1. Introduction

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

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 – Stantec
- Planning Consultant – Gerald Eve

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. Planning Background

Proposals

The redevelopment will provide homes (including affordable homes), 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.

The two planning applications are as follows:

- Application A – hybrid application to include the demolition of existing buildings to allow for comprehensive phased redevelopment of the site:

Planning permission is sought in detail for works to the east side of Ship Lane which comprise:

- a) Demolition of existing buildings (except the Maltings and the façade of the Bottling Plant and former Hotel), walls, associated structures, site clearance and groundworks

- b) Alterations and extensions to existing buildings and erection of buildings varying in height from 3 to 9 storeys plus a basement of one to two storeys below ground
- c) Residential apartments
- d) Flexible use floorspace for:
 - i. Retail, financial and professional services, café/restaurant and drinking establishment uses
 - ii. Offices
 - iii. Non-residential institutions and community use
 - iv. Boathouse
- e) Hotel / public house with accommodation
- f) Cinema
- g) Offices
- h) New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works
- i) Provision of on-site cycle, vehicle and servicing parking at surface and basement level
- j) Provision of public open space, amenity and play space and landscaping
- k) Flood defence and towpath works
- l) Installation of plant and energy equipment

Planning permission is also sought in outline with all matters reserved for works to the west of Ship Lane which comprise:

- a) The erection of a single storey basement and buildings varying in height from 3 to 8 storeys
 - b) Residential development
 - c) Provision of on-site cycle, vehicle and servicing parking
 - d) Provision of public open space, amenity and play space and landscaping
 - e) New pedestrian, vehicle and cycle accesses and internal routes, and associated highways works”
- Application B – detailed planning permission for the erection of a three-storey building to provide a new secondary school with sixth form; sports pitch with floodlighting, external MUGA and play space; and associated external works including landscaping, car and cycle parking, new access routes and other associated works.
 - Together, Applications A and B described above comprise the ‘Proposed Development’.

Background to Submission

The Applications follow earlier planning applications which were refused by the Greater London Authority and the GLA. The refused applications were for:

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

The LBRuT (the Council) originally resolved to grant planning permission for Applications A and B but refuse Application C.

Following the LBRuT’s resolution to approve the applications A and B, the Mayor called-in the Applications and became the determining authority. The Mayor’s reasons for calling in the Applications were set out in his Stage II letter (dated 4 May 2020) but specifically related to concerns regarding what he considered was a low percentage of affordable housing being proposed for the Site and the need to secure a highways solution for the scheme following the LBRuT’s refusal of Application C.

Working with the Mayor’s team, the Applicant sought to meaningfully respond to the Mayor’s concerns on the Applications. A summary of the revisions to the scheme made and submitted to the GLA in July 2020 is as follows:

- i. Increase in residential unit provision from up to 813 units to up to 1,250 units;
- ii. Increase in affordable housing provision from (up to) 17%, to 30%;
- iii. Increase in height for some buildings of up to three storeys;
- iv. Change to the layout of Blocks 18 and 19, conversion of Block 20 from a terrace row of housing to two four storey buildings;
- v. Reduction in the size of the western basement, resulting in an overall car parking spaces reduction of 186 spaces and introduction of an additional basement storey under Block 1;
- vi. Internal layout changes and removal of the nursing home and assisted living in Development Area 2;
- vii. Landscaping amendments, including canopy removal of four trees on the north west corner of the Site; and
- viii. Alternative options to Chalkers Corner in order to mitigate traffic impacts through works to highway land only and allow the withdrawal of Application C.

The application was amended to reflect these changes.

Notwithstanding this, and despite GLA officers recommending approval, the Mayor refused the applications in August 2021.

The Mayor's reasons for refusal in respect of Application A were:

- (i) height, bulk and mass, which would result in an unduly obtrusive and discordant form of development in this 'arcadian' setting which would be harmful to the townscape, character and appearance of the surrounding area;
- (ii) heritage impact. The proposals, by reason of its height, scale, bulk and massing would result in less than substantial harm to the significance of several listed buildings and conservation areas in the vicinity. The Mayor considered that the less than substantial harm was not clearly and convincingly outweighed by the public benefits, including Affordable Housing, that the proposals would deliver;
- (iii) neighbouring amenity issues. The proposal, by reason of the excessive bulk, scale and siting of Building 20 and 21 in close proximity to the rear of neighbouring residential properties in Parliament Mews and the rear gardens of properties on Thames Bank, would result in an unacceptable overbearing and unneighbourly impact, including direct overlooking of private amenity spaces. The measures in the Design Code would not sufficiently mitigate these impacts; and
- (iv) no section 106 agreement in place.

Application B was also refused because it is intrinsically linked with Application A and therefore could not be bought forward in isolation.

The Proposed New Scheme

This 3rd iteration of the scheme seeks to respond directly to the Mayor's reasons for refusal and in doing so also addresses a number of the concerns raised by the LBRuT.

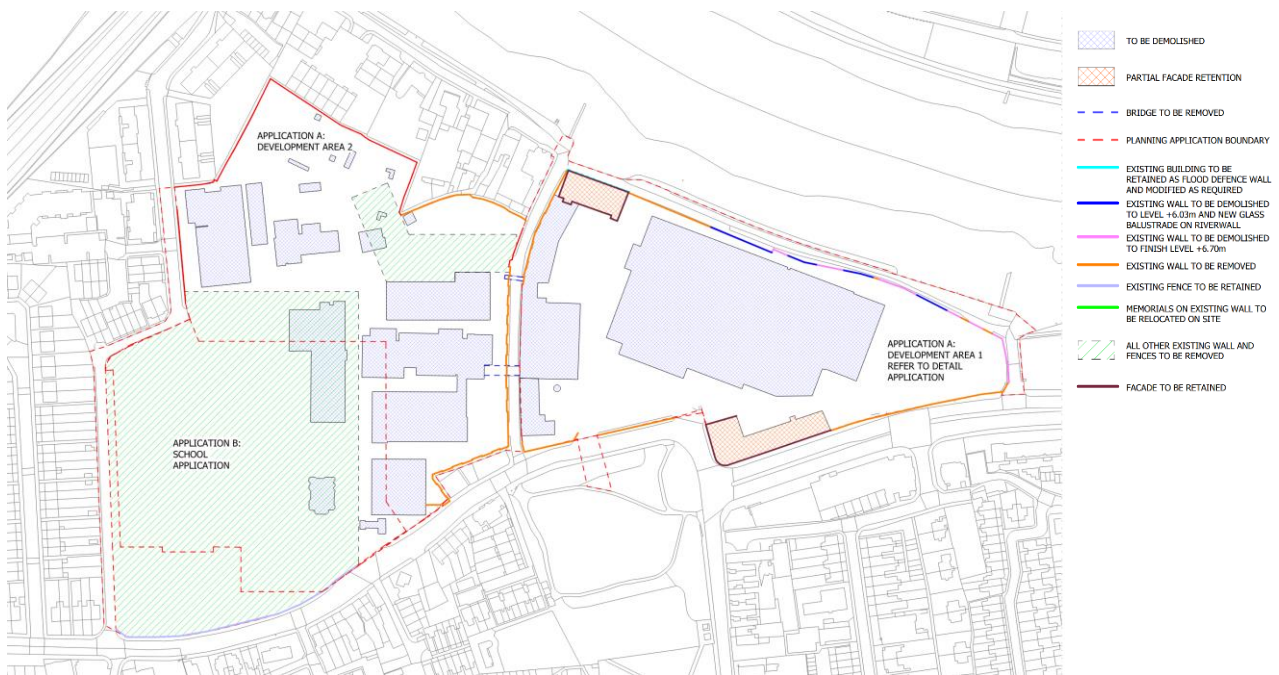
The amendments can be summarised as follows:

- i. A revised energy strategy is proposed in order to address the London Plan (2021) requirements;
- ii. Several residential blocks have been reduced in height to better respond to the listed buildings along the Thames riverfront and to respect the setting of the Maltings building, identified as a Building of Townscape Merit (BTM) by the LBRuT;
- iii. Reconfiguration of layout of Buildings 20 and 21 has been undertaken to provide lower rise buildings to better respond to the listed buildings along the Thames riverfront; and
- iv. Chalkers Corner light highways mitigation works.

The school proposals (submitted under 'Application B') are unchanged. The Applicant acknowledges LBRuT's identified need for a secondary school at the Site and the applications continue to support the delivery of a school. It is expected that the principles to be agreed under

the draft Community Use Agreement (CUA) will be the same as those associated with the refused school application (LBRuT ref: 18/0548/FUL, GLA ref: GLA/4172a/07).

Overall, it is considered that together, the Applications respond successfully to the concerns raised by stakeholders in respect of the previous schemes and during pre-application discussions on the revised Proposed Development. As a result, it is considered that the scheme now represents a balanced development that delivers the principle LBRuT objectives from the Site.



Development/Application Area Plan

3. Site Description

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 west and Bulls Alley (off Mortlake High Street) to the east. 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

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.

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

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: WIE18671-102-R-6-2-2-AIA) produced by Waterman Infrastructure & Environment Limited (WIE).

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 WIE (reference: WIE18671-100-R-9-3-2-BH).

4. Geology

Reference to published maps indicate 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.

5. 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.

6. 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.

Post permission works will consist of the following:

- 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.

7. Contamination

Reference should be made to WIE documents Preliminary Quantitative Environmental Risk Assessment (ref: WIE10667-101-R-4.2.1 RJM) and Preliminary Risk Assessment (ref: WIE18671-100-R-8.2.1-RJM).

8. Proposed Superstructure

There will be a mix of building heights across the site of between three to nine storeys high. 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.

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.

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.

9. Proposed Substructure

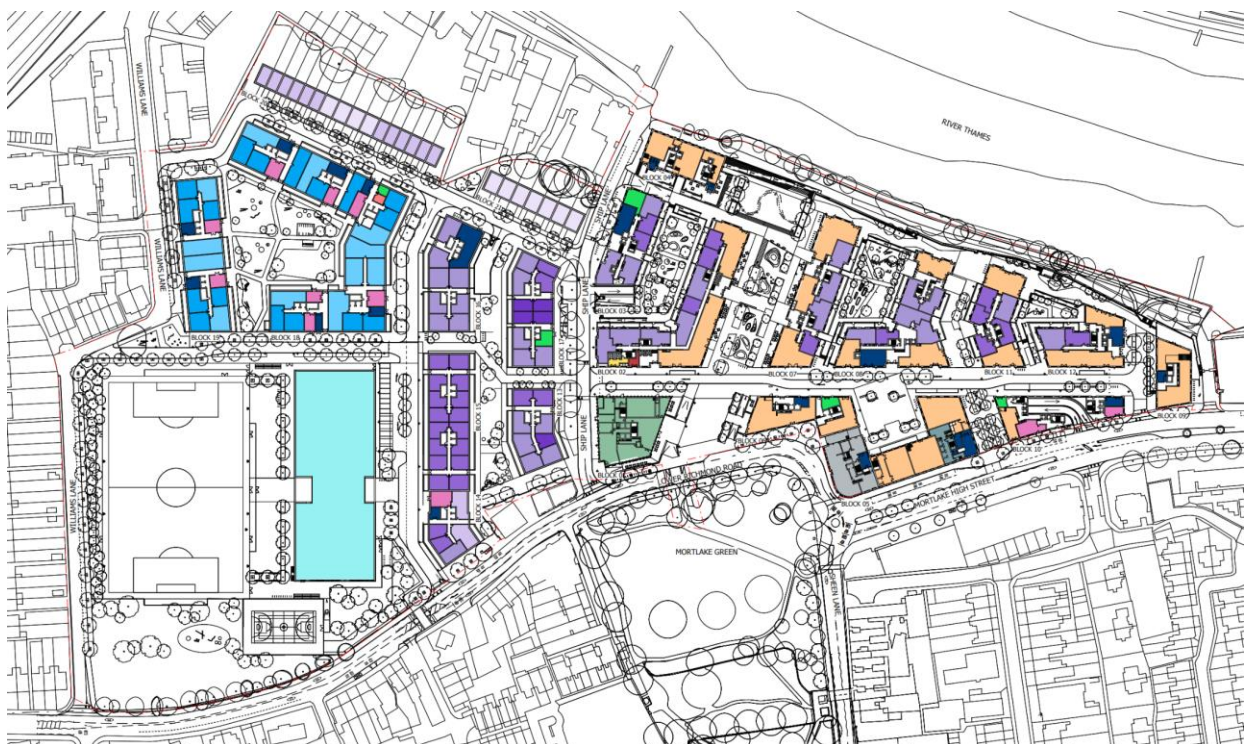
There will be a single storey basement structure under the majority of the site and buildings in the east side of Application Area A. The exception is Block 01/Cinema which has a two level basement to accommodate the Auditoria and plant. The west side of Application Area A has a reduced area of basement 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 where 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. The exception again is Block 01/Cinema which will be a piled foundation due to the larger grid formed by the Auditoria.

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.

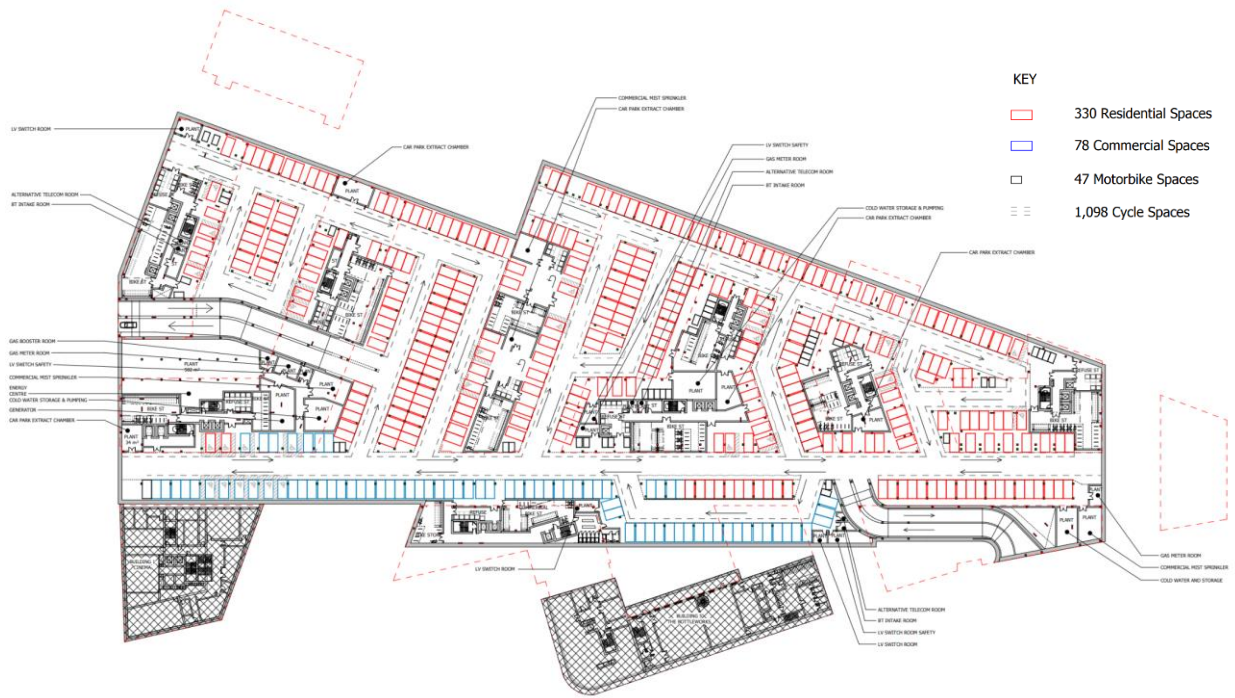
It is possible for the low-rise terrace houses located north west of Application Area A and not over the basement to supported off trench footings which will need be confirmed at detailed design. The initial recommended bearing capacity for the river terrace gravel is 175kPa with a spring stiffness of 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.

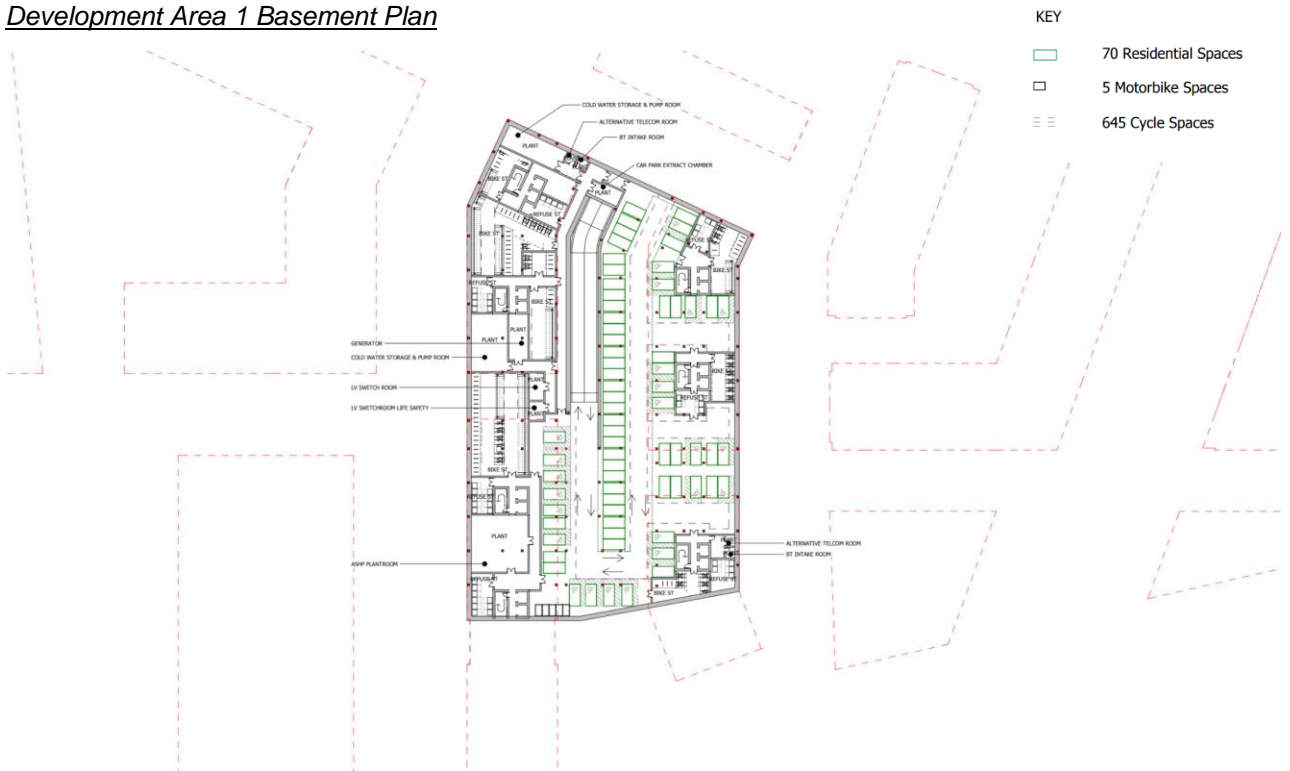


 Studio	 CINEMA
 1B2P	 FLEXIBLE USE
 2B3P	 GAS METER ROOM
 2B4P	 HOTEL
 3B5P	 LV SWITCHROOM
 3B6P	 OFFICE
 4B8P	 REFUSE STORE
 2B3P SR	 SCHOOL
 2B4P SR	 SUBSTATION
 3B5P SR	
 3B6P SR	
 BIKE STORE	
 CAR PARK ENTRANCE	

Masterplan Ground Floor Plan



Development Area 1 Basement Plan



Development Area 2 Basement Plan

10. Existing Buildings/Services Structural Considerations

For locations and views of these buildings refer to Section 2.

Following a Planning Committee meeting on the 29th January 2020 and subsequent Committee Report for the 2018 Planning Applications, there are conditions that were agreed and anticipated to also be placed on any consent for the current Applications. There is a recommendation that a dilapidation report is to be submitted for the Maltings Building, Former Hotel Building and Former Bottling Building. Condition NS38 also relates to these buildings and includes the requirement for details of the works to be submitted for approval. The details required for each building are included in the relevant following sections.

10.1 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.

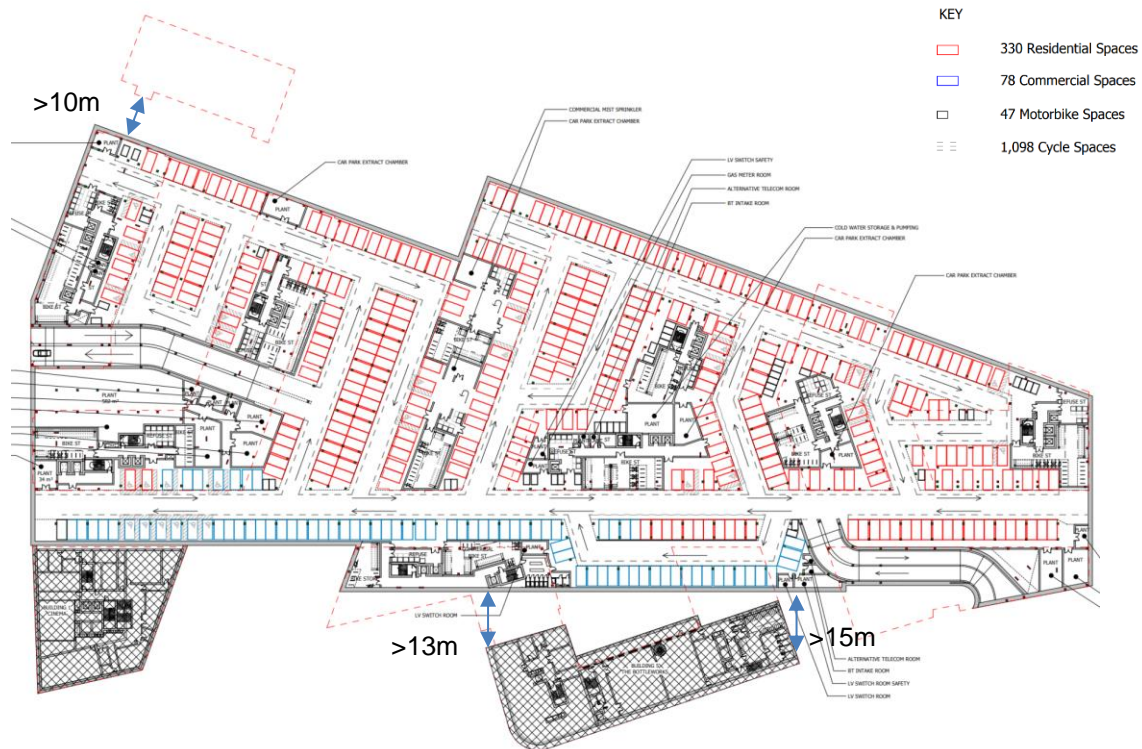
An assessment of the external walls of the Maltings building against the actions applied by the River Thames water levels rising to the flood defence level currently predicted to occur in 2100 has been carried out by WIE.

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.

Condition NS38 requires the following details to be submitted:

- a) *Facing materials and finishes (including new fenestration)*
- b) *Schedule of works for repairs to facade*
- c) *Large scale sections of new and retained/reinstated fenestration*
- d) *Retention / reinstatement of existing fenestration and other fabric/features (including cast iron columns)*
- e) *Sectional elevation showing structure and façade treatment*
- f) *Structural details for the retention of the retained facades during works*
- g) *Structural sectional elevation details showing how new structure is to be keyed in behind the retained facades.*
- h) *New metalwork*
- i) *Commemoration plaques (location and phasing)*
- j) *Glazed curtain wall*



Development Area 1 basement proximity to Retained Existing Buildings

10.2 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.

Condition NS38 requires the following details to be submitted:

- a) Facing materials and finishes (including new fenestration and roof)
- b) Large scale sections of new and retained/reinstated fenestration
- c) Retention / reinstatement of existing fenestration (on front elevation) and other fabric/features (including cast iron columns and vaulting)
- d) Sectional elevation showing structure and façade treatment

- e) Structural details for the retention of the retained facades during works
- f) Structural sectional elevation details showing how new structure is to be keyed in behind the retained facades.
- g) New metalwork
- h) Glazed link (between Building 6)
- i) Treatment of retained chimneys

10.3 Former Bottling Building (Block 05 East)

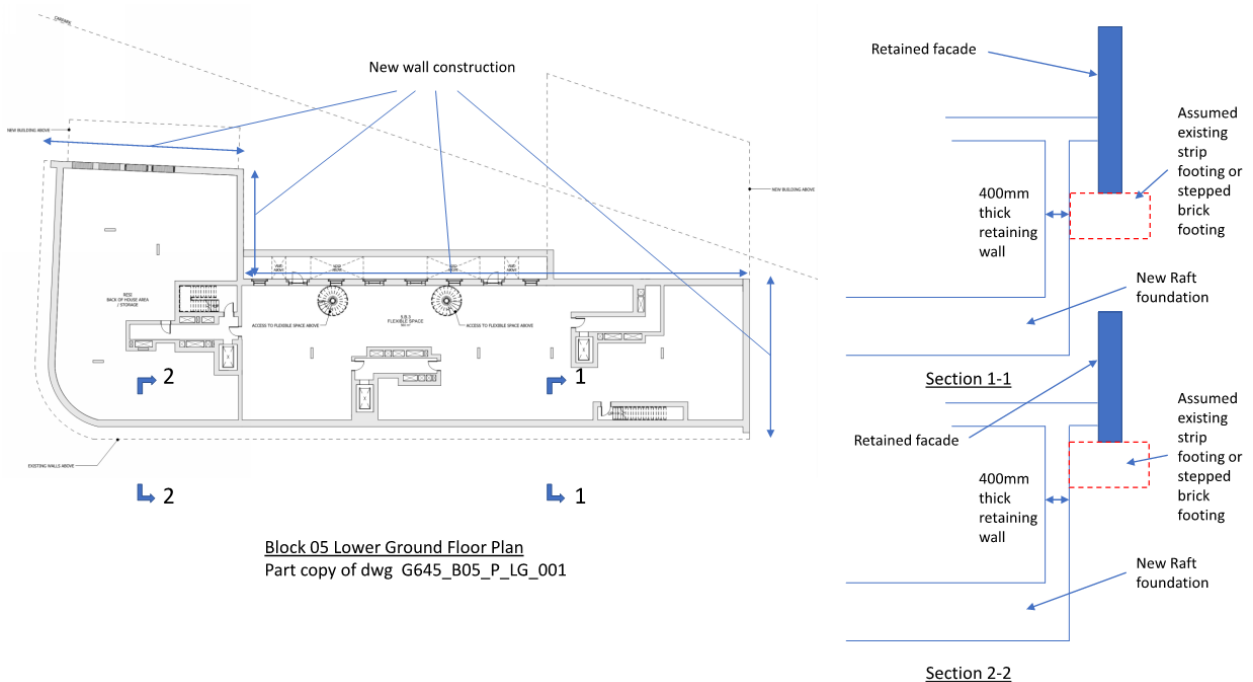
The façade of this building will be retained on the boundary perimeter and temporary works will be installed to maintain the structural integrity of the existing walls.

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 section drawings 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.

The details to be submitted under previously proposed Condition NS38 are the same as those described in Section 9.2.

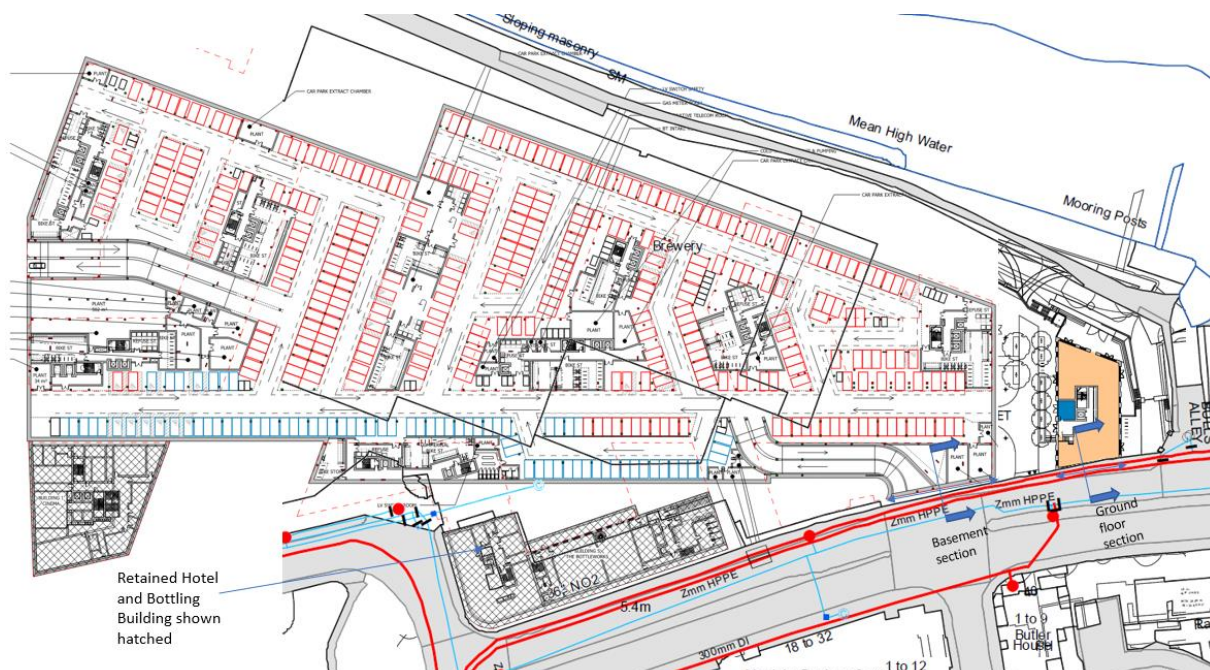


10.4 Thames Water

For the effect on Thames Water reference should be made to the Drainage Strategy document (ref: WIE18671-104-R.1.2.2-DS) produced by WIE 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”.



Plan showing the proximity of existing mains (red lines) along Mortlake High Street to site

Two 36-inch water mains pipes run close to the site along Mortlake High Street and must be protected against damage from the works associated with the development. Concerns are from higher loads due to plant movements and the new foundations proposals causing ground movements/vibrations. Unrestricted access must be maintained at all times for Thames Water maintenance and repair of the asset during the works.

To eliminate this risk: an accurate survey will be carried out to ascertain the exact location of the water mains relative to the buildings/foundations; protection will be installed against plant movements and specific non-impact construction methods have been selected.

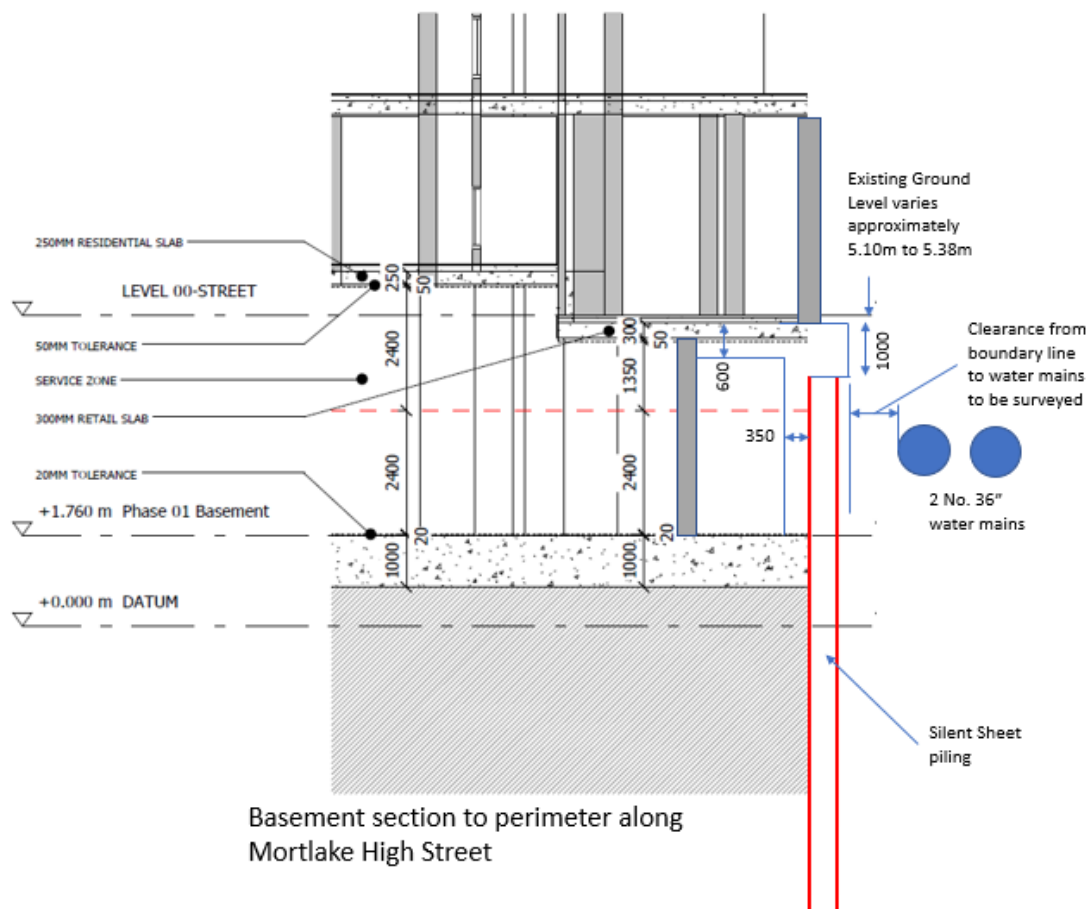
Along Block 10; Silent Sheet piles will be used which are non-impact hydraulically pushed sheet piling method that will prevent disturbance of the soil.

Along Block 09: Continuous Flight Auger (CFA) piles will be used which are non-impact auger screw piling method.

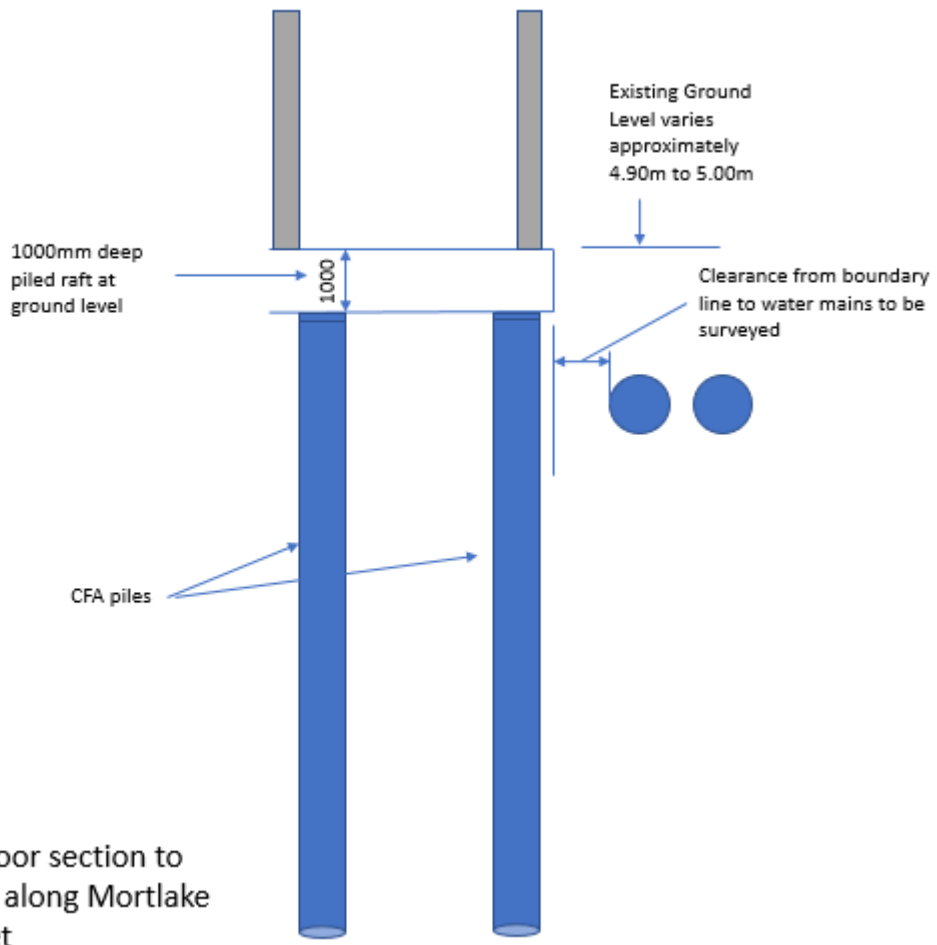
Both these methods are also low-noise construction techniques. These methods; Silent Sheet piles and CFA piles are shown in the figures on the following pages.

The agreed condition with Thames Water is as follows:

“No construction related activities shall take place within 5m of the trunk water main unless otherwise agreed with the local planning authority in consultation with Thames Water. Information detailing how the development will be carried out so as to prevent the potential for damage to subsurface potable water infrastructure, must be submitted to and approved in writing by the local planning authority in consultation with Thames Water. Any construction must be undertaken in accordance with the terms of the approved information. Unrestricted access must be available at all times for the maintenance and repair of the asset during and after the construction works.”



Proximity of Block 10 silent sheet piles to 36-inch mains



Proximity of Block 09 CFA piles to 36-inch mains

11. Conclusions

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

UK and Ireland Office Locations

