Mr and Mrs Frost

29-31 High Street, Hampton Wick

Flood Risk Assessment and Indicative Surface Water Drainage Strategy

133989-R1(2)-FRA

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RSK GENERAL NOTES

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Title: Flood Risk Assessment and Indicative Surface Water Drainage Strategy

Client: Mr and Mrs Frost

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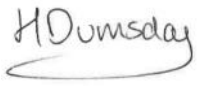
Signature		Signature	
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1 INTRODUCTION

RSK Land and Development Engineering Ltd were commissioned by Mr and Mrs Frost (the client) to provide a Flood Risk Assessment (FRA) and Indicative Surface Water Drainage Strategy to support the planning application for 29-31 High Street, Hampton Wick (the site). Development proposals include the partial demolition of 29 and 29a High Street and associated buildings and the construction of 534sqm of Class E (commercial) floorspace and eight residential dwellings. The proposals also include an extension to the current basement beneath 31 High Street for uses ancillary to the Class E units.

The purpose of the FRA is to establish the risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the flood risk to a more acceptable level. The FRA must demonstrate that the development will be safe for its lifetime (in this case assumed to be 100 years) taking account of the vulnerability of its users, without increasing flood risk elsewhere.

This document has been produced to assess the flood risk from tidal, fluvial, surface water, groundwater, sewer and artificial sources in line with the National Planning Policy Framework (NPPF) and its corresponding Planning Practice Guidance (PPG). It includes a summary of the proposed surface water drainage strategy, demonstrating how Sustainable Drainage Systems (SuDS) have been used to ensure surface water is appropriately managed on-site to ensure there is no increased risk of flooding on-site or elsewhere as a result of the development.

This assessment has been undertaken in consultation with reference to data, documents and guidance published by the Environment Agency (EA), the Lead Local Flood Authority (LLFA) (London Borough of Richmond upon Thames), the Local Planning Authority (LPA) (London Borough of Richmond upon Thames), and the Water Authority (Thames Water).

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 SITE DESCRIPTION & PROPOSALS

2.1 Existing site

2.1.1 Site Description

The site is located at 29-31 High Street, Hampton Wick in the London Borough of Richmond and can be located at National Grid Reference 517522E, 169449N. A site location plan is included as **Figure 2.1**.

The site covers an area of approximately 921m^2 (0.0921ha) and currently comprises two retail units at 29 and 31 High Street which make up the site's frontage. These units are 2 and 3 storeys in height respectively with the upper floors comprising a residential unit. Number 29b is located to the rear and comprises two light industrial workshops. A small basement is located below Number 31. Two dilapidated storage units and car parking spaces are also located to the rear of the site. The site is almost entirely laid to building cover/hardstanding with small areas of soft landscaping around the site periphery. The existing site layout is included in **Appendix B**.

Figure 2.1: Site location plan

2.1.2 Topography

A site-specific topographic survey has been carried out by Survey and Engineering Services Ltd. The survey shows the existing site levels vary from 8.85m above ordnance datum (mAOD) in the southwest to 7.97mAOD at the site entrance in the northeast of the site. The land generally slopes in a southwest to northeast direction.

The topographic survey and existing site sections and elevations are included in **Appendix C**.

2.1.3 Existing Drainage

Surface water runoff is currently thought to discharge via the gulleys shown on the topographic survey into the mains sewers. Thames Water sewer plans have been obtained for the site and are included in **Appendix D**. These plans indicate that a Thames Water surface water sewer originates on the site and appears to flow into a 300mm diameter surface water sewer below High Street (although Thames Water were unable to confirm this connection). They also show a Thames Water foul sewer which originates beneath the site with two Thames Water owned manhole covers located on site. The on-site foul sewer appears to connect into a 175mm diameter foul sewer beneath High Street, although again Thames Water were unable to confirm this connection.

2.2 Development Proposals

The existing retail units fronting the High Street, with commercial and retail space located on the ground floor and residential flats located on the upper floors, will be partly demolished, along with the workshops forming part of 29 High Street, 29b High Street and the delipidated storage units to the rear of the site. In their place the following will be constructed:

- Two Class E units located at the ground floors of 29 and 31 High Street with a finished floor level of 8.1m AOD;
- A Class E unit to the rear of 29 and 31 High Street (finished floor level of 8.1 – 8.39m AOD) and two further Class E units at the rear of the site beyond the car parking area (finished floor level of 8.1 and 8.71m AOD);
- Eight residential units comprising six flats located at the first and second floors of 29 and 31 High Street and two further flats located to the rear of the site above the Class E units at first and second floor level; and
- An extension to the basement beneath 31 High Street, to be used for uses ancillary to the Class E units.

The existing site access between 27 and 29 High Street will be maintained. Within the courtyard, there are two proposed pedestrian entrances into the Class E units/upper floor residential flats. The proposed parking layout will be in a similar location to that of the existing site with 3 spaces allocated for the residential units and 2 allocated for the Class E units. A bin store is proposed to the rear of the Class E unit in the east of the site. The relevant proposed site plans are included as **Appendix E**.

3 ENVIRONMENTAL SETTING

3.1 Hydrology

Reference to Ordnance Survey (OS) mapping and the EA's web-based mapping indicates that the nearest EA Main River is the River Thames, which is located approximately 130m to the east of the site and flows in a south to north direction in the vicinity of the site. The River Thames's tidal influence is limited to those areas downstream of Teddington Lock and as the site is located approximately 2.8km upstream of Teddington Lock the Thames is unlikely to be affected by any tidal influence in this location. There is an EA Main River called the Hogsmill River that discharges into the River Thames located approximately 390m to the southeast of the site.

There is also a series of drainage ditches located approximately 130m to the south of the site. Flow within these drainage ditches appears to be generally in a southwest to northeast direction, following local topography and they appear to discharge into the River Thames. These drainage ditches are classed as Ordinary Watercourses.

Other notable water features include Hampton Wick Pond located approximately 290m to the southwest of the site and a series of ponds (including Leg of Mutton Pond and Heron Pond) located approximately 800m to the northwest of the site.

3.2 Geology

Based on published geological records for the area (British Geological Survey online mapping), the site exhibits the following geology:

- Superficial Geology: Kempton Park Gravel Member
- Bedrock Geology: London Clay Formation

BGS Borehole log reference TQ16NE113 is located approximately 50m to the southeast of the site. It recorded the presence of made ground including sand topsoil and rubble to depths of 0.5m and soft grey silty clay with brick fragments and gravel to depths of 1.4m. Below this, a layer of clay was found to a depth of 3.7m, followed by a layer of flint gravel between 3.7m and 5.8m. After this another layer of clay was found reaching depths of up to 6.4m below ground level. Water was encountered at 1.4m below ground level and standing water was recorded at 1.5m below ground level.

At the time of writing, no site-specific intrusive ground investigations have been undertaken for the site to confirm the underlying geology, potential contamination, permeability or groundwater levels on site. However, a Phase 1 Desk Study has been completed by Albury S.I. Ltd (2020). The report identifies the presence of an engineering works on site during the 1950s and 1960s, and an above ground storage tank was identified on site during the Phase 1 site inspection. These uses were considered to have the potential to have resulted in ground contamination, and further intrusive investigation was recommended.

3.3 Hydrogeology

Hydrogeological information was obtained from the online Magic Maps service. These maps indicate that the site is underlain by a Principal superficial aquifer relating to the Kempton Park Gravel Member.

The site is not located within a groundwater Source Protection Zone.

The site's close proximity to the River Thames and underlying gravel soils may also suggest that shallow groundwater may be present beneath the site. BGS Borehole records 50m to the southeast of the site confirmed that groundwater was found at 1.4m below ground level and standing water was recorded at 1.5m below ground level.

4 SOURCES OF FLOOD RISK

4.1 Criteria

In accordance with the NPPF and advice from the EA, an assessment of the risk associated with various flooding sources is required along with consideration of the effects of climate change over the design life of the development (in this case assumed to be 100 years).

Changes to EA climate change guidance in February 2016 indicate that increased allowances in peak river flow and rainfall intensity should now be incorporated within any assessment. The appropriate allowance for peak river flow is based on the site's location in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533- 'Assessing and managing flood risk in development Code of practice' (October 2011) as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

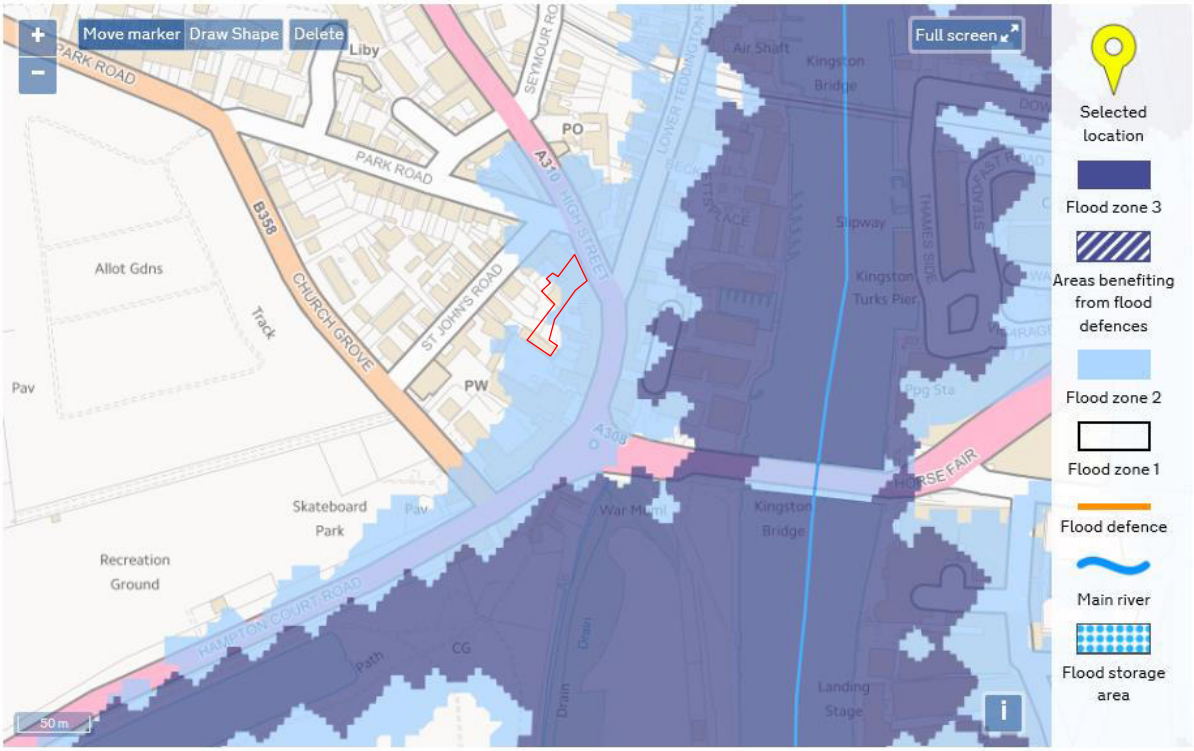
The following section reviews each of these in respect of the subject site.

4.2 Flooding from rivers (fluvial flood risk)

The EA Flood Zone mapping study for England and Wales is available on their website at: https://flood-map-for-planning.service.gov.uk.

The latest EA published flood zone map (**Figure 4.1**) shows that approximately 50% of the site lies within Flood Zone 2, representing between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. The other 50% of the site lies within Flood Zone 1, representing land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding.

Figure 4.1: Environment Agency 'Flood map for planning'



The EA was formally consulted as part of this assessment, with request for flood related information (including flood levels) included in the consultation. Their full response to the flood data request can be found in **Appendix F**.

The Product 4 data request confirms the following points:

- Historical flood mapping indicates that the site has not previously been affected by tidal or fluvial flooding;
- Modelled flood outlines show the site is partially in the 1% plus 35% climate change annual exceedance probability (AEP) flood outline, and fully within the 1% plus 70% climate change AEP flood outline;
- For the 1% plus 35% climate change AEP scenario, the eastern half of the site is shown to be partly at a 'very low' hazard and partly classified as 'danger for some' in the event of a flood; and
- The site is not located within an area benefitting from flood defences. However, the EA are working on the River Thames Scheme from Datchet to Teddington. The scheme is proposed to reduce the risk of flooding to properties by constructing three diversion channels, increasing the capacity to Desborough Cut and improvements to Sunbury and Molesey Weirs and Teddington Lock.

Modelled floodplain levels have been supplied by the EA for a number of nodes on and close to the site, taken from their model Thames (Hurley to Teddington) 2019. The flood levels provided for key flood events are given in Table 4.1. All floodplain points are located on site, with the exception of Floodplain 6 and Floodplain 8 which are located along the High Street, to the south and north of the site respectively.

Table 4.1: Environment Agency modelled floodplain flood levels

	Annual probability of occurrence					
2D grid cell reference	5%	1%	1% (+ 25% increase)	1% (+ 35% increase)	1% (+ 70% increase)	0.1%
Floodplain 1	No data	No data	No data	No data	9.47	No data
Floodplain 2	No data	No data	No data	No data	9.45	No data
Floodplain 3	No data	No data	7.96	8.39	9.48	8.49
Floodplain 4	No data	No data	No data	8.38	9.43	8.47
Floodplain 5	No data	No data	No data	8.37	9.40	8.46
Floodplain 6	No data	No data	No data	8.37	9.40	8.45
Floodplain 7	No data	No data	No data	8.37	9.39	8.45
Floodplain 8	No data	No data	No data	8.37	9.37	8.45
Floodplain 9	No data	No data	No data	8.37	9.38	8.45
Floodplain 10	No data	No data	No data	No data	9.41	No data

The EA guidance 'Flood risk assessments: climate change allowances' (February 2016) indicates that the proposed residential units (classified as a 'more vulnerable' development) should consider a 35% and 70% (higher central and upper) climate change allowance. The commercial units ('less vulnerable' development) should consider a 25% and 35% (central and higher central) climate change allowance.

For a 1 in 100 year plus 25% climate change allowance event, the floodplain flood levels provided by the EA suggest that the very southwestern part of the site would be affected, however, the topographic survey (**Appendix C**) confirms that the site is entirely above the modelled 1 in 100 year plus 25% climate change flood level.

For a 1 in 100 year plus 35% climate change allowance event the predicted water level on site is between 8.37 and 8.39mAOD. Ground levels on the site are in the region of 7.97mAOD to 8.85mAOD. flooding would only occur in the eastern half of the site during the 1 in 100 year plus 35% climate change event. Using the ground levels provided on the topographic survey, the deepest potential flood depth is in the north east corner of the site at the site entrance, where up to 400mm of flooding could occur during the 1 in 100 year plus 35% climate change event. However, this quickly reduced to less than 200mm within a few metres onto the site.

For a 1 in 100 year plus 70% climate change allowance event, modelled flood levels on site range from 9.38 to 9.47m AOD. Reference to the topographic survey (**Appendix C**) indicates that the whole site would be affected by such an event, with flood depths of up to 1.42m close to the site entrance.

The LLFA for this area is the London Borough of Richmond upon Thames. They were contacted in November 2020 to establish the relevant LLFA guidance on constraints related to drainage and flood risk within the site area. The full enquiry and responses can be found in **Appendix G**. The LLFA have not provided any comments on any flooding records but have directed us to the flooding and drainage information held on their website, which is discussed below.

The London Borough of Richmond upon Thames Strategic Flood Risk Assessment (SFRA) explains that The River Thames Scheme is a flood risk management strategy that intends to reduce flood risk to communities along the Thames between Datchet and Teddington. The site is located within this region, which has a history of serious flooding, with major events taking place in 1947, 1968, 2003, and 2014. However, a map titled 'Historic Flooding' contained within the London Borough of Richmond upon Thames SFRA shows that there have not been any fluvial flooding incidents in the close vicinity of the site.

The London Borough of Richmond upon Thames Hampton Wick and Teddington Village Planning Guidance: Supplementary Planning Document (June 2017) contains a map that confirms the site is not located within Flood Zone 3.

The London Borough of Richmond upon Thames Local Development Framework: Core Strategy (2009) states that there are some localised drainage issues, but the main risk in the Borough is from both fluvial and tidal flooding from the River Thames.

The overall risk of fluvial flooding is considered to be **moderate**.

4.3 Flooding from the sea (tidal flood risk)

The lower reaches of the River Thames are affected by tidal influences. However, the London Borough of Richmond upon Thames SFRA states that the non-tidal section of the River Thames is upstream of Teddington Lock. As the site is located upstream of Teddington Lock it can be concluded that the river levels within the River Thames are primarily driven by fluvial influence in this location so for the purposes of this assessment the risk from the Thames is considered to be a fluvial risk.

The overall tidal flood risk is considered to be **low**.

4.4 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff can occur. Excess surface water flows from the pre-development site are believed to drain naturally to the local surface water drains below the site via strip drains located along the centre of the access road and to the rear of the site in the car parking area.

The EA's surface water flood map (**Figure 4.2**) shows that the majority of the site is at very low risk of surface water flooding. A small section of the site at the northwest

boundary and an area on High Street bordering the site appears to be at low risk of surface water flooding.

Figure 4.2: Environment Agency 'Flood risk from surface water' map

The London Borough of Richmond upon Thames SFRA states that surface water flooding varies throughout the borough. It has several large areas of green space which help mitigate against the impact of surface water runoff. However, the borough also has heavily urbanised and densely populated areas, which have a high percentage of impermeable ground, increasing overland flows as less water is able to drain away through infiltration.

The London Borough of Richmond upon Thames Preliminary Flood Risk Assessment (PFRA) states that surface water flooding in July 2007 affected property and roads, including Lower Teddington Road which is located in close proximity to the site. A number of other roads in Hampton were affected. However, Figure 4 in Annex 6 of the PFRA shows that in the 1 in 200 year rainfall event, the surface water depth on and around the site would be less than 0.1m. Figure 6 shows that during the 1 in 100 year rainfall event, the surface water depth on and around the site would also be less than 0.1m. Figure 5 shows that the roads surrounding the site have a surface water hazard rating of 0.75-1.25 or 'moderate' for the 1 in 200 year rainfall event and for the 1 in 100 year rainfall event.

The London Borough of Richmond upon Thames PFRA Addendum (2017) states that there have not been any significant surface water flood events since the publication of the original PFRA report in December 2011 that have added to or changed the London Borough of Richmond upon Thames' understanding of significant flood risk.

The London Borough of Richmond upon Thames Surface Water Management Plan (SWMP) states that Hampton Wick is a Critical Drainage Area. It also states that no

properties within the area are identified as being at risk of flooding to a depth greater than 0.5m.

The topography on site shows the site falls away towards the northeast and therefore any surface water runoff will likely low away in this direction. The proposed development is likely to generate surface water runoff, which needs to be controlled to prevent surface water flooding elsewhere. This is discussed further in Section 7.

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow. Climate change guidance for rainfall intensity was updated by the EA in February 2016. Revised allowances for climate change have been included in the indicative drainage strategy in Section 7.

The overall risk of surface water flooding at the site is considered to be **low**.

4.5 Flooding from groundwater

Groundwater flooding tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Available geological mapping indicates there are superficial deposits of Kempton Park Gravel Member present beneath the site. Additionally, groundwater was encountered at 1.4m below ground level and standing water was recorded at 1.5m below ground level within a nearby borehole.

A map titled 'Areas Benefiting from Defences and Groundwater Flooding Incidents' contained within the London Borough of Richmond upon Thames SFRA shows that there have been three groundwater flooding incidents located approximately 300-400m to the northwest of the site. The London Borough of Richmond upon Thames SWMP (2011) explains that the three past incidences in close proximity to the site occurred in 2000 and 2001. The incidents caused water in a cellar, a basement and a boggy garden.

Another map contained in the SFRA titled 'BGS Susceptibility to Groundwater Flooding' shows the site as being located in an area that has the 'potential for groundwater flooding of property situated below ground level'.

The London Borough of Richmond upon Thames SWMP states that the Critical Drainage Area, Hampton Wick, has not been identified as being at increased risk of groundwater flooding.

There is no ground investigation data available for the site to confirm the geology and groundwater levels on the site. Further information on groundwater levels may be available through any future ground investigation and this would be taken into account in the structural design.

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. If winter rainfall becomes more frequent

and heavier, groundwater levels may increase. Higher winter recharge may however be balanced by lower recharge during the predicted hotter and drier summers. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk as a result of climate change is likely to be low.

The overall groundwater flood risk is considered to be **low to moderate**.

4.6 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes.

Sewer details have been referenced from sewer record plans obtained from Thames Water. The plans indicate the following network of sewers around the site:

- A 175m diameter foul sewer flows beneath Park Road flowing in a northwest to southeast direction. There are multiple connections to this sewer from beneath properties adjacent to the road. The sewer continues to flow beneath High Street;
- A Thames Water foul sewer is located beneath the site and flows in a southwest to northeast direction. It is assumed to connect to a 175mm diameter fowl sewer beneath High Street, although Thames Water were unable to confirm this;
- A combined sewer flows beneath the properties 22 and 24 St John's Road in a northeast to southwest direction. It turns to flow beneath Saddler Mews in a northwest to southeast direction before it joins with a foul sewer beneath St John's Road and flows in a southwest to northeast direction. A further combined sewer beneath 7 St John's Road and a fowl sewer beneath 2 St John's Road join with the foul sewer beneath St John's Road. The foul sewer beneath St John's Road combines with the 175mm diameter foul sewer beneath High Street;
- A 175mm diameter foul sewer flows in a southwest to northeast direction below High Street. It is joined by a foul sewer flowing in an east to west direction beneath Old Bridge Street. The foul sewer beneath High Street then flows in a south to north direction where it is joined by the 175mm diameter foul sewer flowing in a northwest to southeast direction beneath High Street. The two sewers become a 225mm foul sewer that flows in a south to north direction beneath Lower Teddington Road;
- A 300mm diameter surface water sewer flows in a northwest to southeast direction beneath Park Road. It joins with a 375mm diameter surface water sewer flowing beneath High Street in a northwest to southeast direction;
- A 300mm diameter surface water sewer flows in a north to south direction beneath Lower Teddington Road before it combines with the 375mm diameter surface water sewer beneath High Street. It then turns and flows in a west to east direction beneath Old Bridge Street;
- A surface water sewer is located beneath the site and flows in a southwest to northeast direction where it is assumed to combine with the surface water sewer flowing beneath High Street although Thames Water were unable to confirm this; and
- Another surface water sewer flows beneath 37 to 43 St John's Place before joining with the surface water sewer flowing beneath Park Road.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption. One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event would exceed the capacity of the surrounding sewer network as well as any proposed drainage.

When exceeded, the surcharged pipe work could lead to flooding from backed up manholes and gully connections. This could lead to immediate flooding within highways surrounding the site.

Given the local topography, any surcharged surface water on the High Street would most likely follow the road levels and flow away from the site to the southeast along the High Street, remaining within between the roadside kerbs. Any surcharging of the mains sewers on the site is likely to result in overland flow along the access road towards the High Street.

A map titled 'Blocked Gully Incidents' contained within the London Borough of Richmond upon Thames SFRA shows that there have been two incidents of blocked gullies in close proximity to the site. The map is not of high quality, so the precise location of the incidents is unknown, but they are located to the north west, less than 250m from the site.

A map titled 'Sewer Flooding Incidents' contained within the London Borough of Richmond upon Thames SFRA shows the site as being in a zone that has had 1-5 historical sewer flooding incidents based on DG5 data. Figure 3 in Annex 6 of the London Borough of Richmond upon Thames PFRA shows that there have been 11-20 past incidents of sewer flooding recorded in the KT1 4 postcode area.

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure. To ensure that sewer and surface water flooding is not exacerbated, surface water must be considered within the design of the site. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site should be designed to ensure exceedance of the network has been considered.

Climate change is likely to increase the frequency of flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

The resultant sewer flood risk is considered to be **low**.

4.7 Other sources of flooding

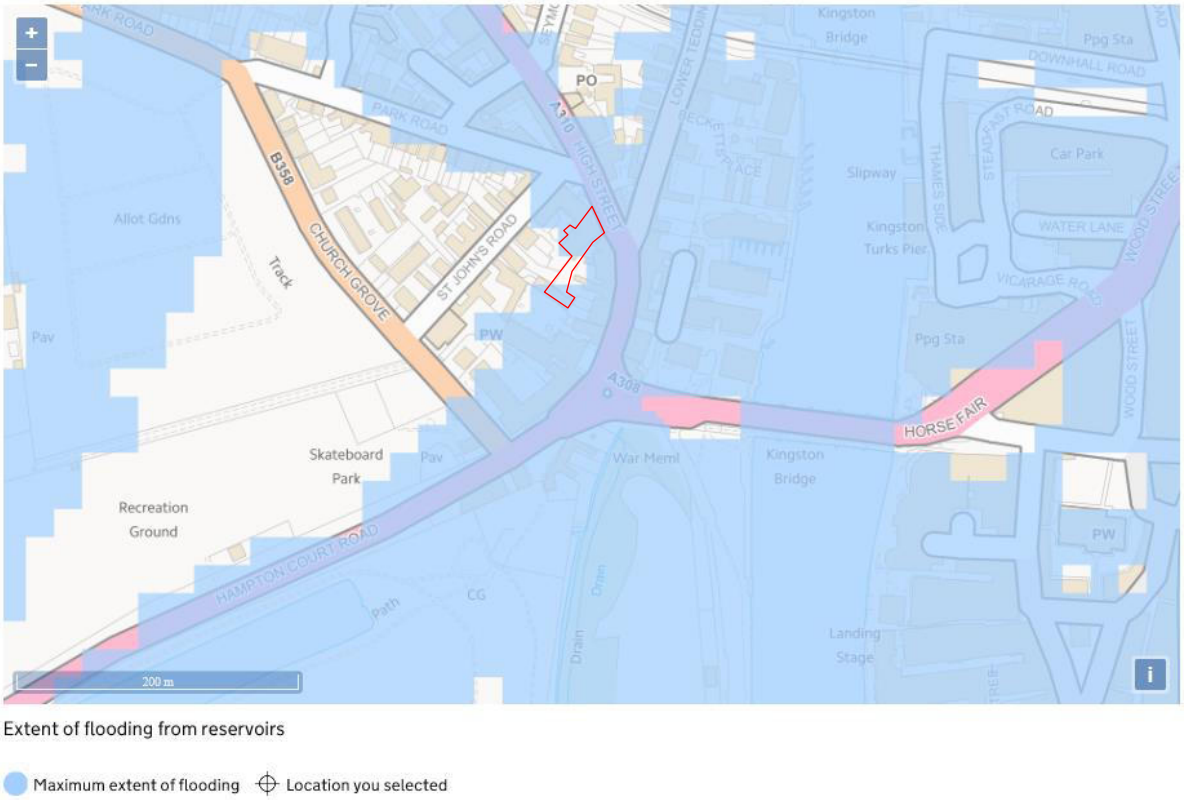
4.7.1 Reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures.

The EA reservoir flood map (reproduced as **Figure 4.3**) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a

prediction of a worst-case scenario, it is unlikely that any actual flood would be this large. According to the EA Reservoir flood maps the site is potentially at risk of flooding from reservoirs.

Figure 4.3: Environment Agency 'Flood risk from reservoirs' map



Reservoir flooding is also extremely unlikely, although the consequence of a breach or overtopping failure in terms of the rate, depth and extent of inundation could be significant. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to ensure reservoirs are maintained. Reservoirs in England and Wales are regulated under the Reservoirs Act 1975, as amended by FWMA 2010, and this is enforced by the EA in England with inundation mapping and robust emergency plans.

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site.

The resultant flood risk is considered to be **low**.

4.7.2 Canals

There are no Canal & River Trust owned canals within the vicinity of the site.

4.7.3 Other artificial features

No other artificial features with the potential to result in a flood risk to the site have been identified.

5 MITIGATION MEASURES AND RESIDUAL RISK

5.1 Overview

This section seeks to identify measures that can be incorporated into the proposal to ensure that the development will be safe over its lifetime. Section 4 has identified a potential flood risk for parts of the site associated with fluvial and groundwater flooding.

5.2 Overland flood flow

No overland flow routes have been identified affecting the site, therefore no overland flow control measures are proposed.

All surface water runoff up to the 1 in 100 year climate change storm will be stored on site and discharged to the surface water sewer network. Surface flows may be generated due to drainage capacity exceedance, which can be conveyed into the SuDS features via surface flows along the access road. Further details of the proposed surface water management system are included in Section 7.

5.3 Finished floor levels

The proposed development comprises Class E uses at ground floor level (with ancillary uses at basement level) and residential uses at first floor level and above.

The EA guidance (**Appendix F**) confirms that the 'central' climate change allowance is the minimum benchmark for flood risk mitigation for commercial (less vulnerable) schemes. For the Thames region, this correlates to the 25% climate change allowance. No part of the site falls within the 1 in 100 year plus 25% climate change flood outline therefore it is not considered necessary to raise floor levels within the ground floor commercial units. Requirements for level access would also mean it would be impractical to do so. However, given the potential for the ground floor commercial units in the eastern part of the site to be affected during the 1 in 100 year plus 35% climate change flood event, the options for improving flood resistance and resilience are considered in Section 5.7.

The most vulnerable (i.e. residential) elements of the scheme have been raised to first floor level and above, significantly reducing the flood risk to these areas. The 'higher central' climate change allowance is the minimum benchmark for flood risk mitigation for residential (more vulnerable) development, which corresponds to a 35% climate change allowance within the Thames region. The residential elements of the scheme will have finished floor levels at least 11m AOD, in comparison to a worse case 1 in 100 year plus 35% climate change flood level of 8.39m AOD.

5.4 Flood compensation

The eastern half of the site is shown to be within the 1 in 100 year plus 35% climate change outline. However, the ground floor built footprint of the proposed buildings within

the affected area is 2m^2 smaller than the existing built footprint within this area. For the site as a whole, the ground floor built footprint will be reduced by 32m^2 compared to the existing scenario. Therefore, floodplain compensatory measures are not deemed necessary.

5.5 Safe access/egress

The site is shown to be partially within the 1 in 100 year plus 35% climate change flood extent with a worse-case flood depth on site of 400mm (although depths for the majority of the affected part of the site are generally around 200mm). The High Street to the east of the site, which forms the site access road, is also within the 1 in 100 year plus 35% climate change flood outline, similarly with anticipated depths of up to 400mm. The EA has provided flood hazard mapping which indicates a maximum flood hazard of 'danger for some' both on site and along the access route. It may not be safe for site occupants to pass through this depth of flooding during a flood event.

Residential occupants would be able to seek refuge within their dwellings should a safe access route be unavailable. However, the commercial units would need to be evacuated prior to floodwaters becoming impassable. The site is located within the EA Flood warning area classified as 'River Thames from Hampton and Thames Ditton to Teddington including Hampton Wick and Kingston-upon-Thames'. The EA charter is to provide a minimum 2 hours advance warning, which would provide sufficient time for site users within the basement/ground floor to be evacuated to an area of safe refuge. A Flood Emergency Plan will be produced prior to occupation of the building giving advice on the actions to be taken prior to and during a flood event to ensure the safety of occupants. It is recommended that future users of the site ensure they are registered with the EA's Flood Warning system (Floodline Warning Direct) to provide adequate forewarning in the event of a predicted flood.

5.6 Basements

The proposed development includes an extension to the existing basement (both in terms of the depth and the floor area) to be used as ancillary space for the proposed ground floor Class E units.

Given the relatively shallow recorded depth to groundwater within the area (approximately 1.5m below ground level), there is the potential for ingress of groundwater into the basement unless appropriate construction techniques are used to ensure the basement is made waterproof. Additionally, the proposed basement is the part of the site that is most vulnerable to other sources of flooding (e.g. fluvial, surface water, sewer and reservoir flooding). However, the absence of any proposed bathrooms within the basement means there is no risk of sewers backing up into the basement.

The London Borough of Richmond upon Thames SFRA states that in Flood Zone 2 basement extensions, conversions or additions may be permitted for existing developments where they are not self-contained or used for bedrooms. If a basement, basement extension or conversion is acceptable in principle in terms of its location, it must have internal access to a higher floor and flood resistant and resilient design techniques must be adopted. These measures should comply with the 1 in 1000 year

return period event for both fluvial and tidal flooding as per Flood Zone 2. These measures should also include climate change considerations.

The London Borough of Richmond upon Thames Planning Advice Note: Good Practice Guide on Basement Developments (2015) states that a small basement is unlikely to have a significant effect on the groundwater regime of a local area, even if it is built below the groundwater table.

In line with the above guidance, the proposed basement is not proposed for residential use and will have internal access to the ground floor Class E units. It is also recommended that structural waterproofing (i.e. a waterproof barrier of at least 1200 gauge) is applied to the walls and floors to prevent groundwater ingress.

On this basis, and given the low vulnerability of the proposed basement uses for Class E ancillary uses only, the basement level is considered appropriate within the flood risk setting.

5.7 Flood resistance and resilience measures

The measures described above are considered to provide appropriate mitigation against flooding scenarios during the design flood event. However, as a precautionary measure, during the detailed design process it would be prudent to consider the use of flood resistant / resilient techniques such as those described below, where possible, within the ground floor and basement Class E areas to provide additional resilience against flooding from any source.

The London Borough of Richmond upon Thames Local Plan states that flood resilient and resistant measures should be incorporated into the design of development proposals in any area susceptible to flooding to minimise and manage the risk of flooding.

The following measures should be considered for the proposed development:

- Flood Resistant measures – methods to prevent floodwater reaching or entering properties, for example:
    - Using waterproof wall render for external walls; and
    - Temporary airbrick covers to be manually installed in advance of flood events where feasible.
- Flood Resilient measures – methods to minimise damage caused by floodwaters, for example:
    - Raised services – it is advisable to install electrical wall sockets and domestic appliances at elevated wall levels, above flood levels;
    - Internal waterproof wall render and internal waterproof coating for any ground level fixings;
    - Plasterboard to be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event; and
    - Waterproof floor covering to be used (e.g. tiles rather than carpets) at ground floor / basement level in order to minimise damage and reduce the turnaround time for returning the property to full operation after a flood event.

In terms of the construction of the development, reference should be made to “Preparing for Floods” a DEFRA publication, CIRIA guidance C624 “Development and flood risk” and the CLG document “Improving the flood performance of new buildings”.

6 PLANNING CONTEXT

6.1 Application of planning policy

Section 14 of the NPPF includes measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

6.2 Land use vulnerability

Planning Practice Guidance (PPG) includes a list of appropriate land uses in each flood zone dependent on vulnerability to flooding. In applying the Sequential Test, reference is made to Table 6.1 below, reproduced from Table 3 of PPG.

Table 6.1: Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Table 2 of the PPG, the proposed development, based on its residential and commercial use, is classed as 'more vulnerable' and 'less vulnerable' respectively. This classification of development is appropriate for areas within Flood Zone 2 and therefore appropriate for the subject site.

6.3 Sequential Test

The Sequential Test requires that proposed development sites are located within areas of lowest flood risk. Only if it can be demonstrated that there are no suitable sites within the wider search area at a lower risk of flooding, then alternative sites (i.e. within areas that may potentially be at risk of flooding) can be considered.

The London Borough of Richmond upon Thames Local Plan and Spatial Strategy identify opportunities for development to come forward by optimising the use of sites, particularly in centres with good public transport accessibility and mixed use redevelopments. The

proposals for the subject site represent a redevelopment of a currently dilapidated site, in a favourable location with excellent transport links and local facilities. It is noted that a significant proportion of the wider borough falls within areas designated as Flood Zone 2 and 3, therefore it is likely that sites within the Flood Zones will need to be considered in order to meet housing targets and ensure the continued growth of local centres. It is noted that the subject site is located at the outer edge of Flood Zone 2, and partially within Flood Zone 1, making it sequentially favourable to sites within Food Zone 3 or fully within Flood Zone 2. A sequential approach has been adopted on the site itself, with the more vulnerable uses (i.e. residential flats) directed to the upper floors of the development, with less vulnerable commercial uses at ground floor level. The scheme also offers opportunities to improve the resistance and resilience of the site against flooding compared to the existing scenario, with improvements both to the built structure and through ensuring an appropriate Flood Emergency Plan is in place. It also offers improvements to flood risk within the wider area by achieving a reduction in surface water runoff from the site.

6.4 Exception Test

The current concept masterplan shows all built development within Flood Zone 1 and Flood Zone 2. In accordance with Table 6.1, there is no requirement to apply the Exception Test for a ‘more vulnerable’ or ‘less vulnerable’ development within Flood Zone 1 or Flood Zone 2. The Exception Test would only need to be applied for the proposed development if the residential elements were proposed within Flood Zone 3a.

7 SURFACE WATER DRAINAGE ASSESSMENT

7.1 Scope

This section discusses the potential quantitative effects of the development on both the risk of surface water flooding on-site and elsewhere within the catchment, as well as the type of potential SuDS features that could be incorporated as part of the masterplan.

The NPPF states that SuDS should be considered wherever practical. In accordance with the London Plan, the surface water drainage strategy should seek to implement a SuDS hierarchy that aspires to achieve reductions in surface water runoff rates to greenfield rates. The Sustainable Design and Construction Supplementary Planning Guidance states that sites should aim to achieve greenfield runoff and where this isn't practicable, should achieve a minimum of a 50% reduction in the existing peak discharge rate and preferably restrict discharge rates to 3x greenfield rate.

The London Borough of Richmond upon Thames Local Plan states that the Council will require the use of SuDS in all development proposals. Applicants will have to demonstrate that their proposal complies with the following:

1. A reduction in surface water discharge to greenfield run-off rates wherever feasible.
2. Where greenfield run-off rates are not feasible, this will need to be demonstrated by the applicant, and in such instances, the minimum requirement is to achieve at least a 50% attenuation of the site's surface water runoff at peak times based on the levels existing prior to the development.

Building Regulations Part H requires that the first choice of surface water disposal should be to discharge to an adequate soakaway or infiltration system, where practicable. If this is not reasonably practicable then discharge should be to a watercourse, the least favourable option being to a sewer (surface water before combined). Infiltration techniques should therefore be applied wherever they are appropriate.

This assessment includes an overview and comparison of the existing brownfield scenario and proposed development scenario. The existing and proposed areas have been included in **Table 7.1** below:

Table 7.1: Existing and proposed site areas

Land use	Existing area (m^2)	Proposed area (m^2)
Impermeable	921m^2 (100%)	921m^2 (100%)
Permeable	0m^2 (0%)	0m^2 (0%)
Total	921m^2	921m^2

7.2 Pre-development situation

The existing site area is 0.0921ha and 100% impermeable.

The ICP SUDS method has been used to estimate the Greenfield surface water runoff for the site. Calculations are contained in **Appendix H**.

Table 7.2: ICP SUDS surface water runoff (greenfield)

Return period	Peak flow (l/s)
QBar	0.1
1 in 1 year	0.1
1 in 30 year	0.3
1 in 100 year	0.4

These values are too small to be practical rates to drain the site at. They would create a risk of blockages and are thus deemed not to be feasible target rates.

As a developed site, the pre-development surface water runoff from the site has also been calculated for a range of return periods using the Modified Rational method. The Modified Rational method uses the following equation to calculate peak runoff rate from an area:

Q = 2.78 Cv Cr i A

Where:

2.78 = Coefficient which accounts for the differences in units used for the inputs and the outputs of the equation.

Cv = Volumetric Runoff Coefficient - a co-efficient that describes the proportion of rainfall appearing in the surface water drainage system, assumed to be 0.95 for impermeable areas

Cr = Routing Coefficient - a routing co-efficient added to the Rational Method to represent runoff characteristics of a particular site or area in a more accurate manner, assumed to be 1.3 for urban areas

i = Rainfall Intensity (mm/hr) based on a 1 hour rainfall event

A = Area (ha)

Table 7.3: Modified Rational Method pre-development surface water runoff

Return period	Rainfall Intensity (mm)	Peak flow (l/s)
QBar	12.4	3.9
1 in 1 year	8.81	2.8
1 in 30 year	33.1	10.5
1 in 100 year	43.64	13.8

Rainfall data has been taken from the Depth Duration Frequency rainfall calculator contained within the FEH 2013 web service, with the associated screenshots included in **Appendix H**.

7.3 Off site discharge options

7.3.1 Infiltration

Infiltration should be considered as the primary option to discharge surface water from the developed site. The effectiveness of infiltration is completely dependent on the physical conditions at the site. Potential obstacles include:

- Local variations in permeability preventing infiltration – It is understood from the local geology that the site is situated on Kempton Park Gravels overlying the London Clay Formation, which has been found at depths of 0.5m. This is very shallow and is not considered suitable for the use of soakaways due to its low permeability;
- Shallow groundwater table - For infiltration drainage devices, Building Regulation approved document H2 states that these “should not be built in ground where the water table reaches the bottom of the device at any time of the year”. The BGS borehole records also indicate a high water table with standing water recorded at 1.5m below ground level which is likely to preclude the use of infiltration devices; and
- Source Protection Zones - the site is not located within a Groundwater Source Protection Zone. However, the Phase 1 land contamination assessment identifies potential sources of contamination on site, which could be mobilised through the use of soakaways.

From the information available above, infiltration is not considered a viable option as part of the drainage strategy.

7.3.2 Discharge to watercourse

Discharging surface water directly to a local watercourse is not considered feasible as there are no surface watercourses in close proximity to the site.

7.3.3 Discharge to surface water sewer

Discharging surface water to the surface water sewer network is considered the most feasible option for the site. Given the existing infrastructure on site, it is considered likely that surface water from the development will be discharged to the public sewer utilising existing connections. The capacity of the receiving sewers to receive runoff from the site

will need to be confirmed with Thames Water at the detailed design stage, along with proposed connections and any required easements associated with the existing on-site Thames Water sewers.

7.4 Post-development situation

The proposed development is approximately 100% impermeable. Although this is not a change from the existing development it will still be necessary to manage surface water on-site in order to limit the discharge of surface water off-site to an agreed rate (as above), to provide sufficient on-site attenuation up to the 1 in 100 year climate change rainfall event and to provide improvements to water quality through appropriate source treatment.

7.4.1 Storage estimates

To determine the approximate volume of attenuation storage that would be required on the site, the WinDes 'Quick Storage' calculation has been used. WinDes 'Quick Storage' calculations provide a range of volumes as an approximation of the storage requirement. These volumes can be later revised at detail design stage by the introduction of specific flow control methods.

It is intended that surface water runoff from the proposed development will be discharged to surface water sewers.

Given that a reduction to greenfield rates would result in an impracticably low discharge rate, calculations have been run using a discharge rate of 2l/s (a 50% reduction of the QBAR discharge rate calculated using the Modified Rational Method) and an impermeable area of 0.092ha. No allowance is included in the calculations for infiltration and therefore the results illustrate a worst-case scenario. Calculations can be found in **Appendix H**.

Table 7.4: Quick storage estimates

Return period	Quick Storage volume (m^3)	
	Minimum	Maximum
1 in 30 year	17	25
1 in 100 year	24	36
1 in 100 year + 40% CC	39	54

The maximum storage required on-site to accommodate the 1 in 100 year plus 40% climate change rainfall event is approximately 54m^3.

7.4.2 Proposed drainage strategy

A range of potential SuDS techniques has been considered, taking account of the site constraints. The proposed SuDS for the site include a combination of permeable paving, a modular storage tank and a green roof. The proposed SuDS features (permeable paving and modular storage tank) are designed to provide approximately 57m^3 of

storage. This is in excess of the 54m^3 required storage volume to retain the 1 in 100 plus 40% climate change event whilst achieving a 50% reduction on the pre-development QBAR runoff rate to 2l/s. The green roof has not been included in the storage calculations but would provide additional attenuation of runoff, further reducing discharge rates. The SuDS measures are outlined in the Indicative Surface Water Strategy as attached in **Appendix I**.

The dimensions, volumes and location of the SuDS features will need to be revised as the masterplan develops and during the detailed planning stage. Detailed design of individual features is not part of the scope of this report. Preliminary design criteria have been based upon guidance given in the CIRIA publication 'The SUDS Manual', The London Borough of Richmond upon Thames Local Plan and The London Borough of Richmond upon Thames Planning Guidance Document; Delivering SuDS in Richmond.

In principle, the strategy contains the following features and criteria:

- It is considered unlikely that **infiltration techniques** will be suitable on site due to the impermeable nature of the underlying bedrock geology, made ground being present on the site (with potential for ground contamination) and a high water table;
- **Permeable paving** can be incorporated within the car parking area to the rear of the site. This will be used to collect and store runoff from the buildings and surrounding hardstanding areas before joining the surface water sewer network. The access road will not be constructed using permeable paving due to ownership and future maintenance issues (it is noted that a refuse truck will require access along the internal road on a regular basis). The permeable paving shown in **Appendix I** is an indication of possible locations for its use;
- **Modular storage tanks** also have potential to be used on the site to provide storm volumes. A tank has been included along the access road on the site. Modular storage has only been indicated as one cell deep (0.4m). It should be noted that in areas of high groundwater levels, these tanks may need to be lined to prevent groundwater ingress. Floatation issues should also be considered at the detailed design stage. Additional cover protection measures required due to shallow depth to the tank and the use of the access road by heavy vehicles such as the refuse truck;
- **Rainwater harvesting** is not proposed as part of this development and therefore has not been included as part of any of the calculations.
- A **green roof** has been included as part of this proposal across the only proposed flat roof (bin store). The other roofs in the proposed development are pitched and therefore will be unsuitable for green roofs. The green roof has not been included as part of any of the calculations.

The SuDS features have been designed to accommodate the 1 in 100 year plus 40% climate change event fully underground within permeable paving and modular storage. A summary of the strategy is provided in the SuDS Pro-forma in **Appendix J**.

The proposals are considered to maximise attenuation benefits on a highly constrained site. The limited size of the site, shallow depth to groundwater, the requirement for an easement along the access road to allow services to be run into the site, and the access requirement for a heavy refuse truck all limit the potential for further use of SuDS. Further green roofs are not feasible as no further flat roofs are proposed. The proposed discharge rate represents a significant improvement to the current situation and is in accordance with local and national policy. Water quality benefits will be provided by the proposed permeable paving and green roof, with the green roof also offering biodiversity benefits.

7.4.3 Adoption and Maintenance

The London Borough of Richmond upon Thames Planning Guidance Document; Delivering SuDS in Richmond states that the satisfactory performance of SuDS depends not only on good design but also adequate maintenance, and provision for adoption and maintenance should be considered at the conceptual design stage. The developer and the Council will agree who will adopt the SuDS scheme and be responsible for the on-going maintenance.

The long term maintenance of the various SuDS features within the site boundary will most likely be undertaken by a management company.

Maintenance of SuDS features should be undertaken in line with maintenance schedules outlined in the SuDS Manual and if adopted, any Thames Water maintenance guidance. Full maintenance schedules should be confirmed at the detailed design stage in consultation with appropriate product suppliers.

7.5 Water quality

The SUDS Manual contains guidance on how to assess water quality, stating *"Determining the hazard posed by the land use activities at a site and the extent to which underlying soil layers and/or proposed treatment components reduce the associated risk can be done using a variety of methods that vary in complexity and data requirements."*

The assessment methodology required is determined by reference to Table 4.3 of the SuDS Manual. Based on this, the quality impacts of the proposed development can be summarised with the following pollution hazard levels and management requirements for discharge to the receiving surface water (there will be no infiltration on site, therefore receiving groundwater is not considered here):

- Residential roofs – **Very Low** Pollution Hazard – Simple Index Approach; and
- Individual property driveways, roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (schools, offices) – **Low** Pollution Hazard – Simple Index Approach.

It is therefore considered appropriate to use the Simple Index Approach (SIA) for the purpose of this assessment. The Simple Index Approach (SIA) to assessing water quality management requirements has been developed by CIRIA to support the implementation of the water quality management design methods set out in the SuDS Manual, with appropriate cross referencing to the relevant 'Design Conditions'. The CIRIA Susdrain website contains a spreadsheet based procedure that can be used for all the UK.

Simple Index Approach

Table 26.1 of the SUDS Manual indicates that for the Simple Index Approach:

- Simple pollution hazard indices should be based on land use (e.g. Table 26.2); and
- Risk reduction for Surface Water should be done using Simple SuDS hazard mitigation indices (e.g. Table 26.3).

Extracts of Tables 26.2 and 26.3 are replicated below, highlighting the relevant features applicable to this site:

Table 7.5: Extract of SuDS Manual Table 26.2: Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery area, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stores, used or manufactured; industrial sites; trunk roads and motorways	High	0.8[2]	0.8[2]	0.9[2]

Table 7.6: Extract of Table 26.3: Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Types of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6

	Mitigation indices[1]		
Types of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

The SuDS Manual States:

Total SuDS mitigation index ≥ pollution hazard index

(for each contaminant type) (for each contaminant type)

Taking each land type use in turn:

- Residential roofs – permeable pavement alone (mitigation 0.6-0.7) is sufficient to mitigate for any of the potential pollutants (indices 0.05-0.2); and
- Residential car parks, low traffic roads, non-residential car parking with infrequent change (schools, offices) – permeable pavement alone (mitigation 0.6-0.7) is sufficient to mitigate for any of the potential pollutants (indices 0.4-0.5).

In addition to these standalone features, the use of a, green roof will provide additional levels of treatment. Therefore, the water quality requirements are considered to be met.

7.6 Foul drainage provision

Foul drainage will be connected into the public foul network as per the existing scenario. Detailed foul drainage work is outside the scope of the assessment.

8 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The proposed development site lies in an area designated by the EA as Flood Zone 1, (outlined to have a chance of flooding of less than 1 in 1,000 (<0.1%) in any year) and Flood Zone 2 (land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1% in any year). When a 35% climate change allowance is applied, the eastern part of the site is shown to be within the 1 in 100 year plus climate change flood outline, with flood depths of up to 400mm.

This FRA has considered multiple sources of flooding and concluded the following:

Table 8.1: Flood risk summary

Source	Level of risk	Mitigation
Fluvial	Moderate	More vulnerable residential uses located at first floor and above. Flood resistance and resilience methods. Flood Emergency Plan to be implemented. No loss of floodplain storage.
Tidal	Low	N/A
Surface water	Low	N/A
Groundwater	Low to moderate	Structural waterproofing for basement level. Internal access provided to upper floor.
Sewers	Low	N/A
Artificial sources	Low	N/A

The proposals will follow best practice regarding site drainage to ensure that any surface water runoff from the development is managed, ensuring flood risk is not increased elsewhere. The proposed development will not change the impermeable area on site. However, the surface water from the proposed development will be managed by attenuation prior to discharge to the nearby sewer. In order to prevent flooding, both on and off the site, a variety of SuDS will be utilised to control surface water flows, including an area of permeable paving, a modular storage tank and a green roof. These features will be designed to store the volume of water associated with a 1 in 100 year rainfall event, plus an additional allowance to account for increased rainfall due to climate change, providing a significant betterment over the existing scenario. A 50% reduction

on the pre-development QBAR runoff rate has been shown to be feasible. SuDS features have been strategically located across the site, taking into consideration the site constraints, and will also provide additional water quality and biodiversity benefits.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.

APPENDIX A
RSK GROUP SERVICE CONSTRAINTS

1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Mr and Mrs Frost (the "client") in accordance with the terms of a contract between RSK and the "client" dated October 2020. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
EXISTING SITE LAYOUT

Key:

Site Boundary

Ownership Boundary

Site Area = 920 m²

N

m 0 10 20 30 40

Existing Schedule of Accomm	
Name	Area m²
Basement	36
Delapidated Building	192
GF GIA	327
1st GIA	168
2nd GIA	34
	757 m²

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www.fletchercrane architects.com

Rev	Description	Drawn	Checked	Date

Client's name: Liz & Allan Frost

Scale: 1:1250 @ A3

Drawn | Checked | Date: 30/10/2020

Job title: Hampton Wick High Street

Drawing title: Existing Block Plan

Job No	Drawing No	Status:	Rev
1911	TP(00)02	PLANNING	

FLETCHER CRANE ARCHITECTS

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
30/10/2020

Job title
Hampton Wick High Street

Drawing title
Existing Site Plan

Job No	Drawing No	Status:	Rev
1911	TP(00)04	PLANNING	

FLETCHER CRANE ARCHITECTS

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

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www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
30/10/2020

Job title
Hampton Wick High Street

Drawing title
Existing Basement Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)00	PLANNING	

FLETCHER CRANE
ARCHITECTS

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Rev	Description	Drawn	Checked	Date

Client's name

Liz & Allan Frost

Scale:

1:100 @ A1 1:200 @ A3

Note: To print at A3, set print scale to 50%

Drawn	Checked	Date
		30/10/2020

Job title

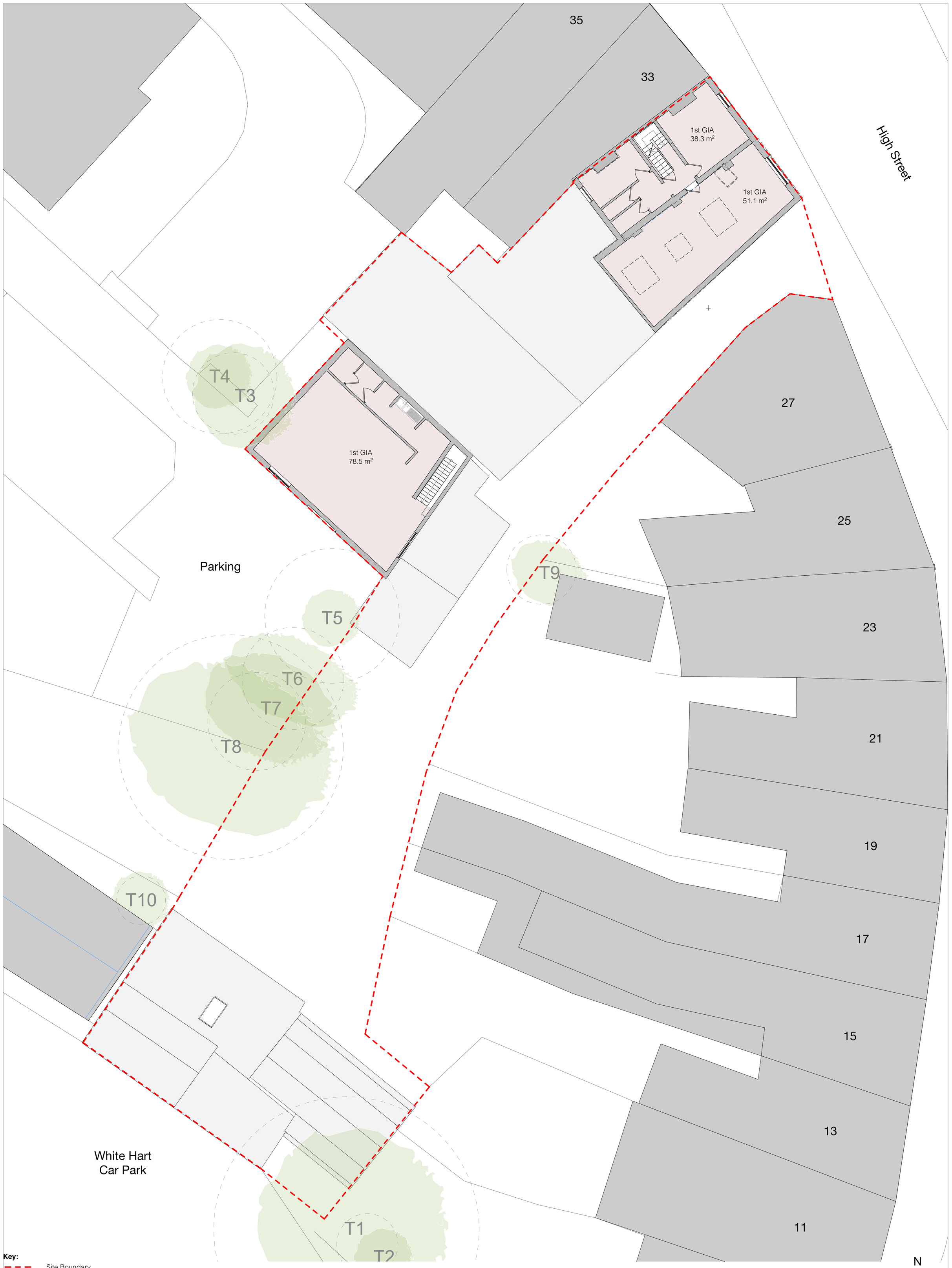
Hampton Wick High Street

Drawing title

Existing Ground Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)01	PLANNING	

FLETCHER CRANE ARCHITECTS



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T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
30/10/2020

Job title
Hampton Wick High Street

Drawing title
Existing First Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)02	PLANNING	

FLETCHER CRANE ARCHITECTS

35
33
2nd GIA
33.6 m²
High Street
T4
T3
Parking
T5
T6
T7
T8
T9
27
25
23
21
19
17
15
13
11
T10
T1
T2
White Hart
Car Park

Key:

- Site Boundary
- T- Trees (Survey ID)
- Root Protection Area

m 0 0.5 1 2 3 4 5

N

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
30/10/2020

Job title
Hampton Wick High Street

Drawing title
Existing Second Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)03	PLANNING	

FLETCHER CRANE ARCHITECTS

Fletcher Crane Architects Ltd

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www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name

Liz & Allan Frost

Scale:

1:100 @ A1 1:200 @ A3

Note: To print at A3, set print scale to 50%

Drawn Checked Date

30/10/2020

Job title

Hampton Wick High Street

Drawing title

Existing Roof Plan

Job No	Drawing No	Status:	Rev
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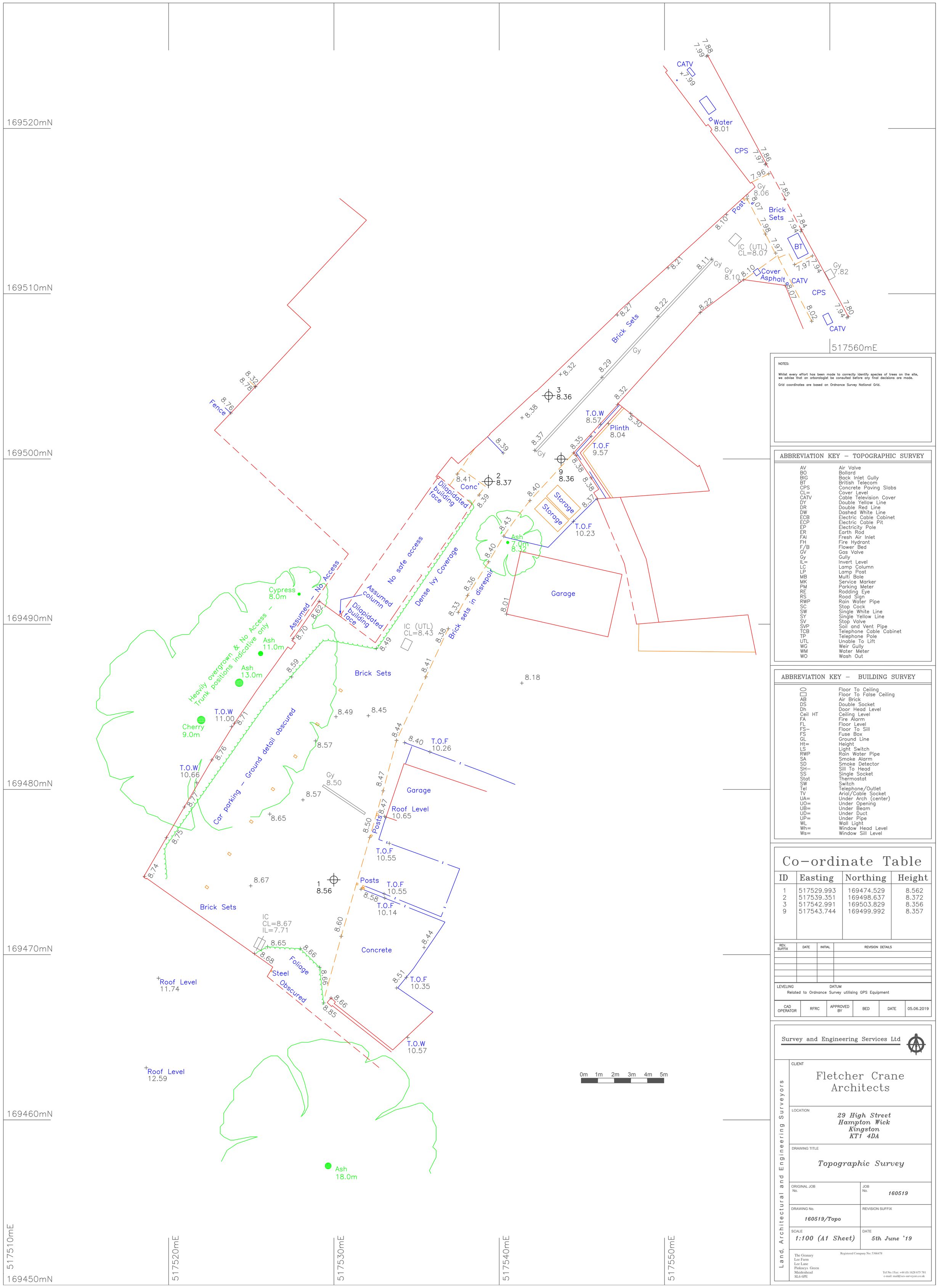
FLETCHER CRANE ARCHITECTS

APPENDIX C
TOPOGRAPHIC SURVEY



NOTES:

Whilst every effort has been made to correctly identify species of trees on the site, we advise that an arborologist be consulted before any final decisions are made.

Grid coordinates are based on Ordnance Survey National Grid.

ABBREVIATION KEY – TOPOGRAPHIC SURVEY

AV	Air Valve
BO	Bollard
BIG	Back Inlet Gully
BT	British Telecom
CPS	Concrete Paving Slabs
CL=	Cover Level
CATV	Cable Television Cover
DY	Double Yellow Line
DR	Double Red Line
DW	Dashed White Line
ECB	Electric Cable Cabinet
ECP	Electric Cable Pit
EP	Electricity Pole
ER	Earth Rod
FAI	Fresh Air Inlet
FH	Fire Hydrant
F/B	Flower Bed
GV	Gas Valve
Gy	Gully
IL=	Invert Level
LC	Lamp Column
LP	Lamp Post
MB	Multi Bole
MK	Service Marker
PM	Parking Meter
RE	Rodding Eye
RS	Road Sign
RWP	Rain Water Pipe
SC	Stop Cock
SW	Single White Line
SY	Single Yellow Line
SV	Stop Valve
SVP	Soil and Vent Pipe
TCB	Telephone Cable Cabinet
TP	Telephone Pole
UTL	Unable To Lift
WG	Weir Gully
WM	Water Meter
WO	Wash Out

ABBREVIATION KEY – BUILDING SURVEY

⬭	Floor To Ceiling
▭	Floor To False Ceiling
AB	Air Brick
DS	Double Socket
Dh	Door Head Level
Ceil HT	Ceiling Level
FA	Fire Alarm
FL	Floor Level
FS–	Floor To Sill
FS	Fuse Box
GL	Ground Line
Ht=	Height
LS	Light Switch
RWP	Rain Water Pipe
SA	Smoke Alarm
SD	Smoke Detector
SH–	Sill To Head
SS	Single Socket
Stat	Thermostat
SW	Switch
Tel	Telephone/Outlet
TV	Arial/Cable Socket
UA=	Under Arch (center)
UO=	Under Opening
UB=	Under Beam
UD=	Under Duct
UP=	Under Pipe
WL	Wall Light
Wh=	Window Head Level
Ws=	Window Sill Level

Co-ordinate Table

ID	Easting	Northing	Height
1	517529.993	169474.529	8.562
2	517539.351	169498.637	8.372
3	517542.991	169503.829	8.356
9	517543.744	169499.992	8.357

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING: Related to Ordnance Survey utilising GPS Equipment

DATUM

CAD OPERATOR	RFRC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT: Fletcher Crane Architects

LOCATION: *29 High Street, Hampton Wick, Kingston, KT1 4DA*

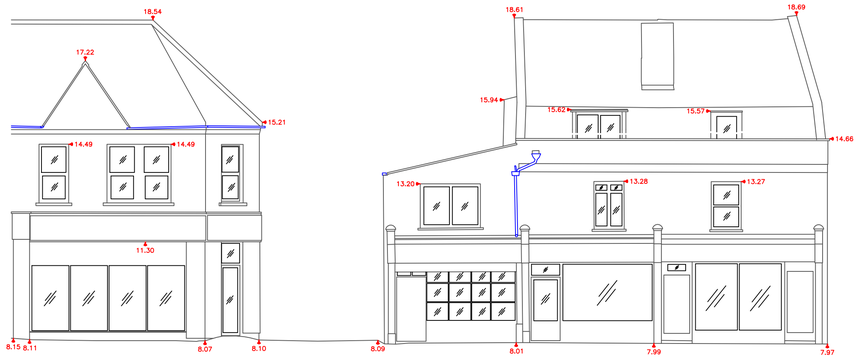
DRAWING TITLE: *Topographic Survey*

ORIGINAL JOB No.	JOB No. 160519
DRAWING No. 160519/Topo	REVISION SUFFIX
SCALE 1:100 (A1 Sheet)	DATE 5th June '19

Registered Company No: 5366478

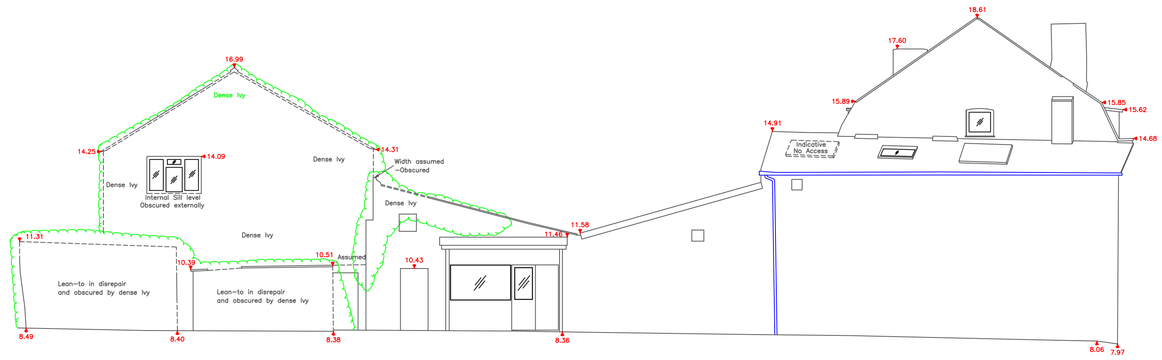
The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE

Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk



Datum 6.00mts

Elevation 1



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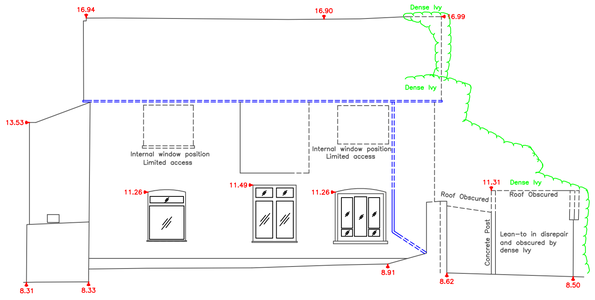
Elevation 2



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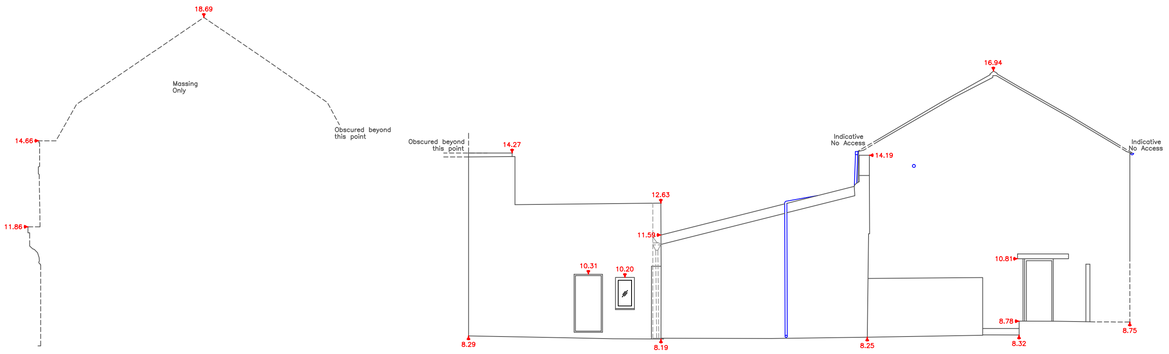


Datum 6.00mts

Elevation 4

NOTES:

Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING: DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT
Alan & Liz Frost

LOCATION
29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

DRAWING TITLE
Elevations 1-4

ORIGINAL JOB No.

JOB No. *160519*

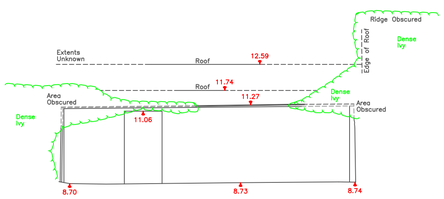
DRAWING No. *160519/Ela1-4*

REVISION SUFFIX

SCALE *1:100 (A1 Sheet)*

DATE *5th June '19*

Registered Company No: 5366478
The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6JE
Tel.No./Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk



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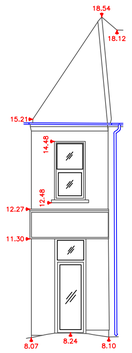
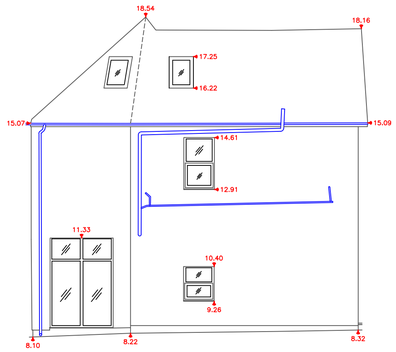
Elevation 5



Datum 6.00mts

Elevation 6



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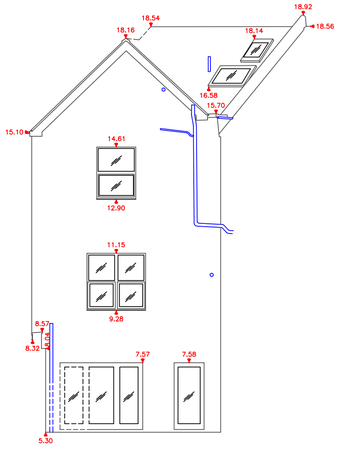
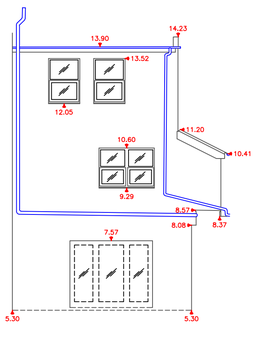
Elevation 7



Datum 4.00mts

Elevation 8



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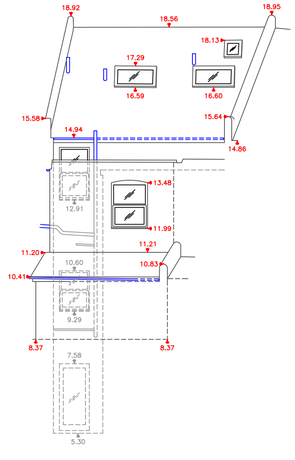
Elevation 9



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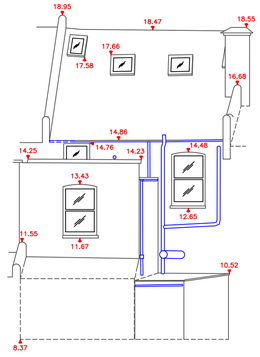
Elevation 10



Datum 4.00mts

Elevation 11

NOTES:

Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT
Alan & Liz Frost

LOCATION
29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

DRAWING TITLE
Elevations 5-11

ORIGINAL JOB No.	JOB No.
	160519

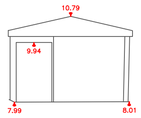
DRAWING No.	REVISION SUFFIX
160519/Els5-11	

SCALE	DATE
1:100 (A1 Sheet)	*5th June '19*

Registered Company No: 5366478

The Granary
Loc Farm
Loc Lane
Pinkneys Green
Maidenhead
SL6 6PE

Tel No / Fax: +44 (0) 1628 671 781
e-mail: mail@ses-surveyors.co.uk

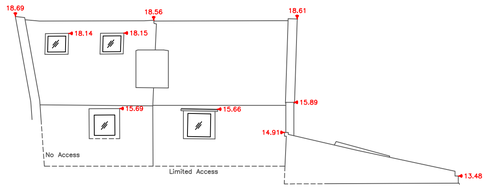


Datum 7.00mts

Elevation 12

Datum 7.00mts

Elevation 13



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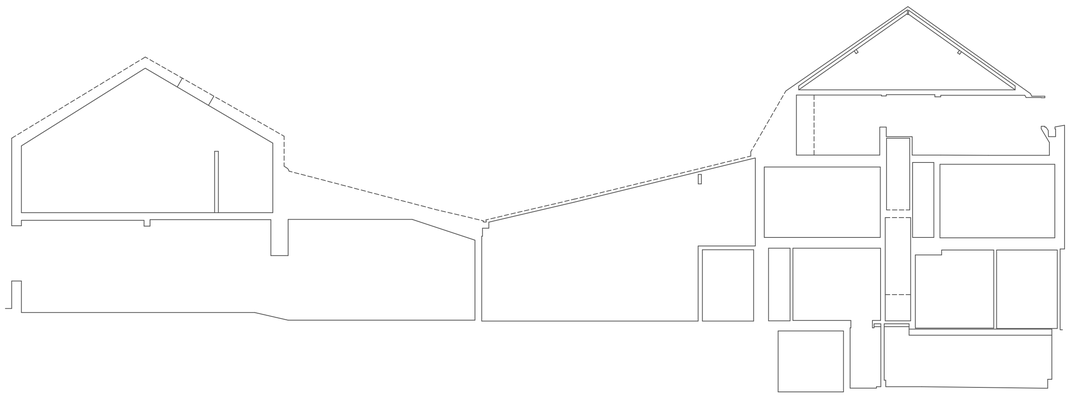

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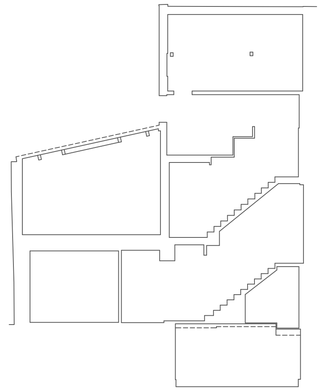
Section A



Datum 5.00mts

Section B

NOTES:

Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING DATUM

Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT

Alan & Liz Frost

LOCATION

29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

DRAWING TITLE

Elevations 12-14 & Sections

ORIGINAL JOB No.	JOB No. 160519
DRAWING No. 160519/Ele12-14	REVISION SUFFIX
SCALE 1:100 (A1 Sheet)	DATE 5th June '19

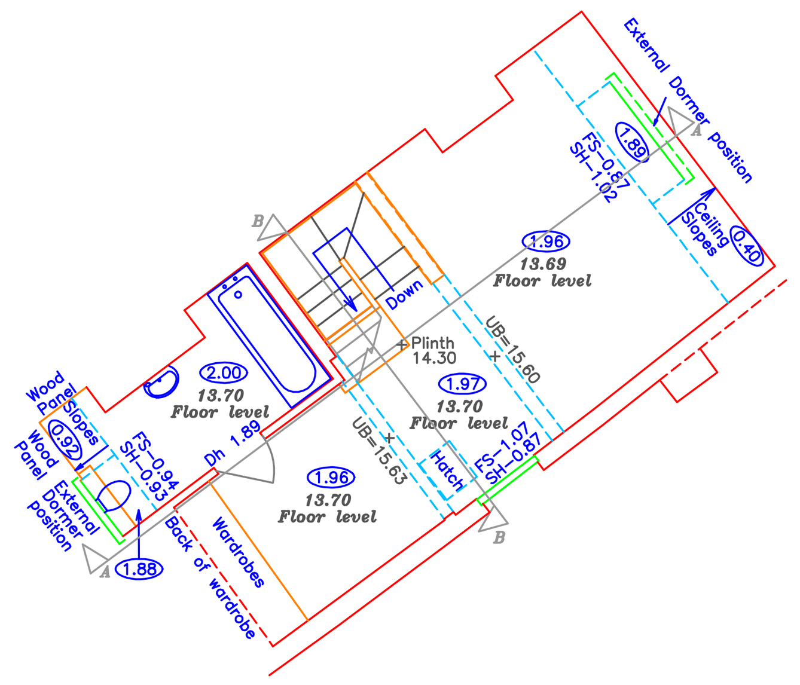
Registered Company No: 5366478

The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE

Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk

Fitmarks Fitmarks

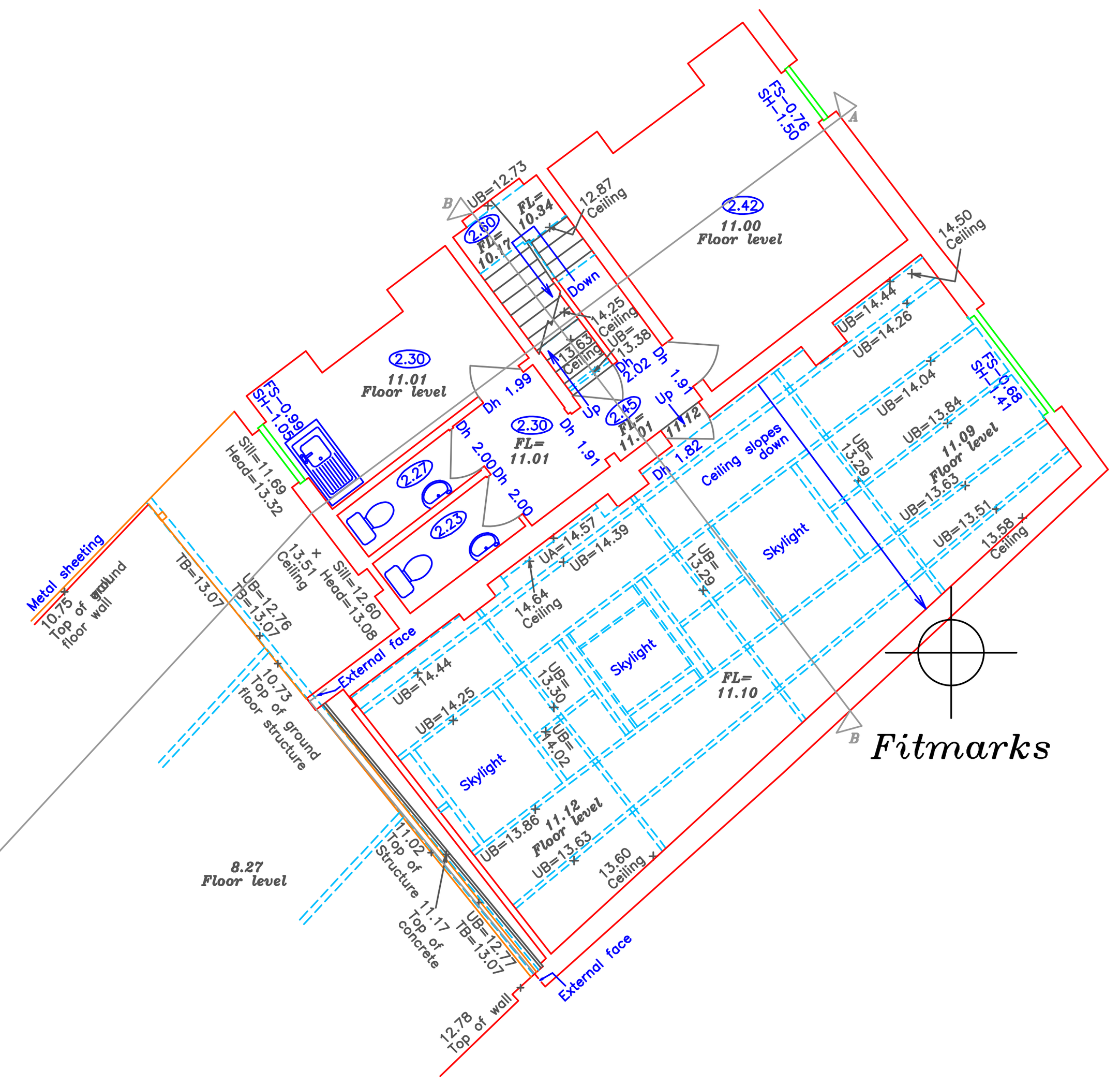
Second Floor

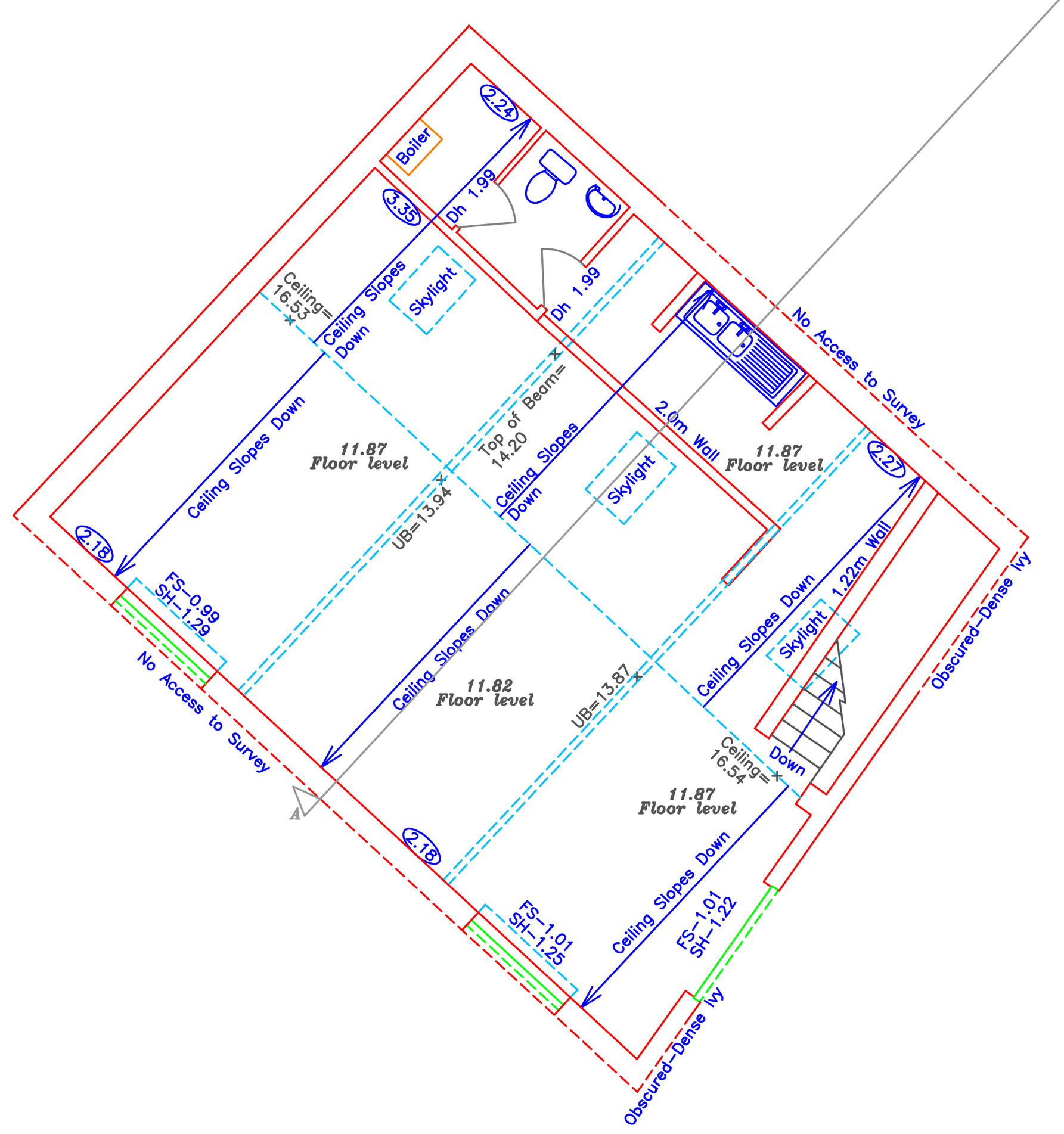


Fitmarks Fitmarks

First Floor – On Grid

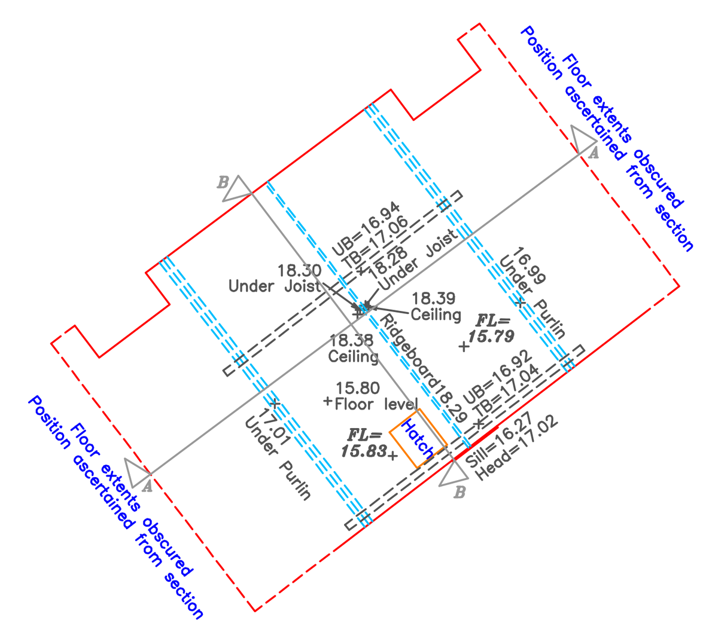
Fitmarks Fitmarks





Fitmarks Fitmarks

Loft



Fitmarks Fitmarks

NOTES:

Co–ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT
Alan & Liz Frost

LOCATION
29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

DRAWING TITLE
First, Second & Loft Plans

ORIGINAL JOB No.

JOB No. *160519*

DRAWING No. *160519/1st*

REVISION SUFFIX

SCALE *1:100 (A1 Sheet)*

DATE *5th June '19*

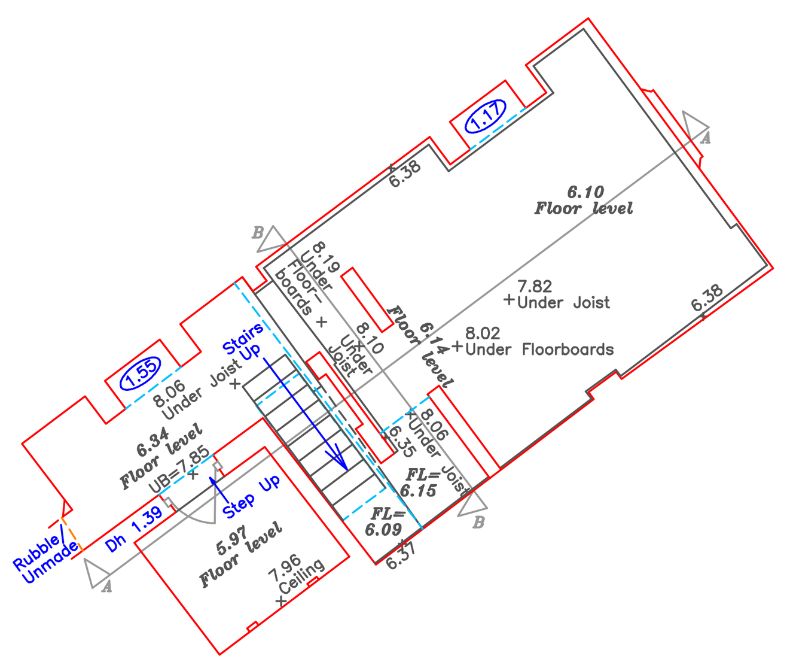
The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE

Registered Company No: 5366478

Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk

Fitmarks Fitmarks

Basement



Fitmarks Fitmarks

Ground Floor – On Grid

Fitmarks Fitmarks

Fitmarks Fitmarks

NOTES:

Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT
Alan & Liz Frost

LOCATION
29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

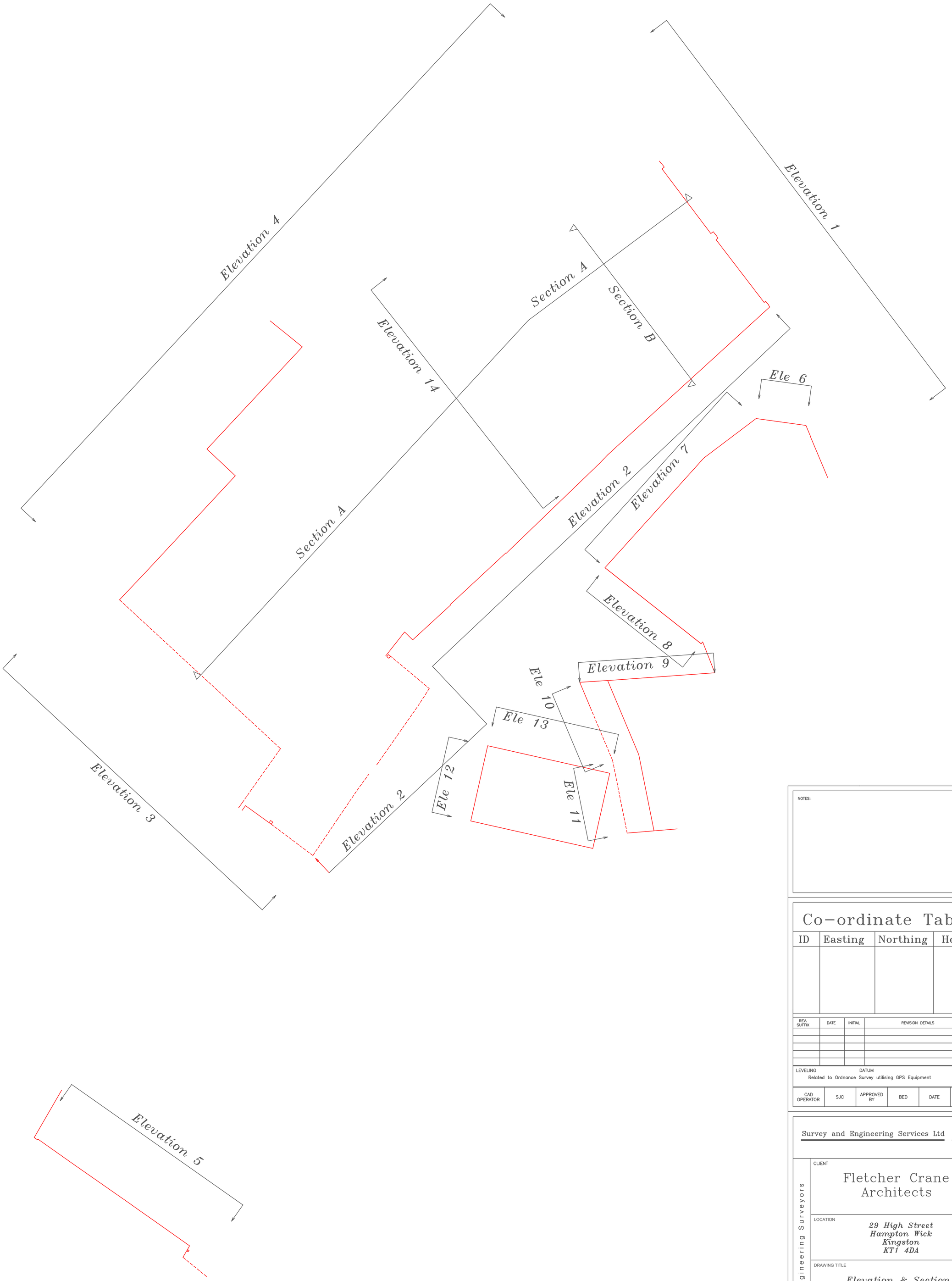
DRAWING TITLE
Ground & Basement Floor Plans

ORIGINAL JOB No.	JOB No. 160519
DRAWING No. 160519/Grd	REVISION SUFFIX
SCALE 1:100 (A1 Sheet)	DATE 5th June '19

The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE

Registered Company No: 5366478

Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk



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Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT

Fletcher Crane Architects

LOCATION

29 High Street
Hampton Wick
Kingston
KT1 4DA

DRAWING TITLE

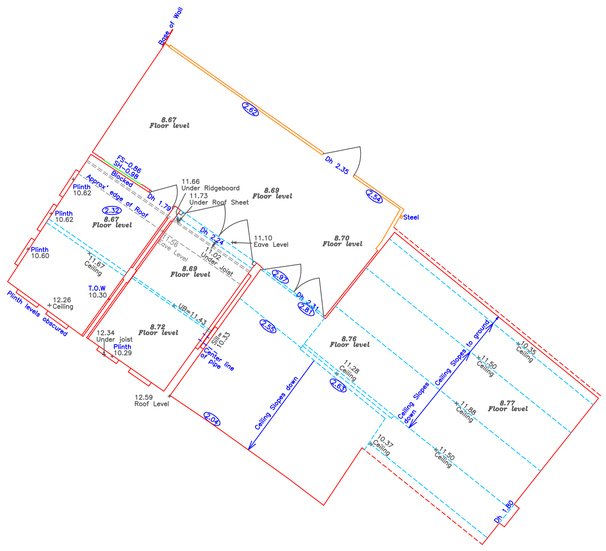
Elevation & Section Location Plan

ORIGINAL JOB No.	JOB No. 160519
DRAWING No. 160519/Loc	REVISION SUFFIX
SCALE 1:100 (A1 Sheet)	DATE 5th June '19

Registered Company No: 5366478

The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE

Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk



NOTES:

Co-ordinate Table

ID	Easting	Northing	Height

REV. SUFFIX	DATE	INITIAL	REVISION DETAILS

LEVELING: DATUM
Related to Ordnance Survey utilising GPS Equipment

CAD OPERATOR	SJC	APPROVED BY	BED	DATE	05.06.2019

Survey and Engineering Services Ltd

Land, Architectural and Engineering Surveyors

CLIENT
Alan & Liz Frost

LOCATION
29A High St
Hampton Wick
Kingston Upon Thames
KT1 4DA

DRAWING TITLE
Outbuilding

ORIGINAL JOB No.	JOB No. 160519
DRAWING No. 160519/Out	REVISION SUFFIX
SCALE 1:100 (A1 Sheet)	DATE 5th June '19

Registered Company No: 5366478
The Granary
Lee Farm
Lee Lane
Pinkneys Green
Maidenhead
SL6 6PE
Tel No / Fax: +44 (0) 1628 675 781
e-mail: mail@ses-surveyors.co.uk

APPENDIX D
THAMES WATER SEWER PLANS

Asset location search

Thames Water Property Searches

RSK Land And Development Engineering Ltd
18Frogmore Road Frogmore Road In
HEMEL HEMPSTEAD
HP3 9RT

Search address supplied 29b
High Street
Hampton Wick
Kingston Upon Thames
KT1 4DA

Your reference 133989

Our reference ALS/ALS Standard/2020_4304231

Search date 18 November 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Asset location search

Property Searches

Search address supplied: 29b, High Street, Hampton Wick, Kingston Upon Thames, KT1 4DA

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

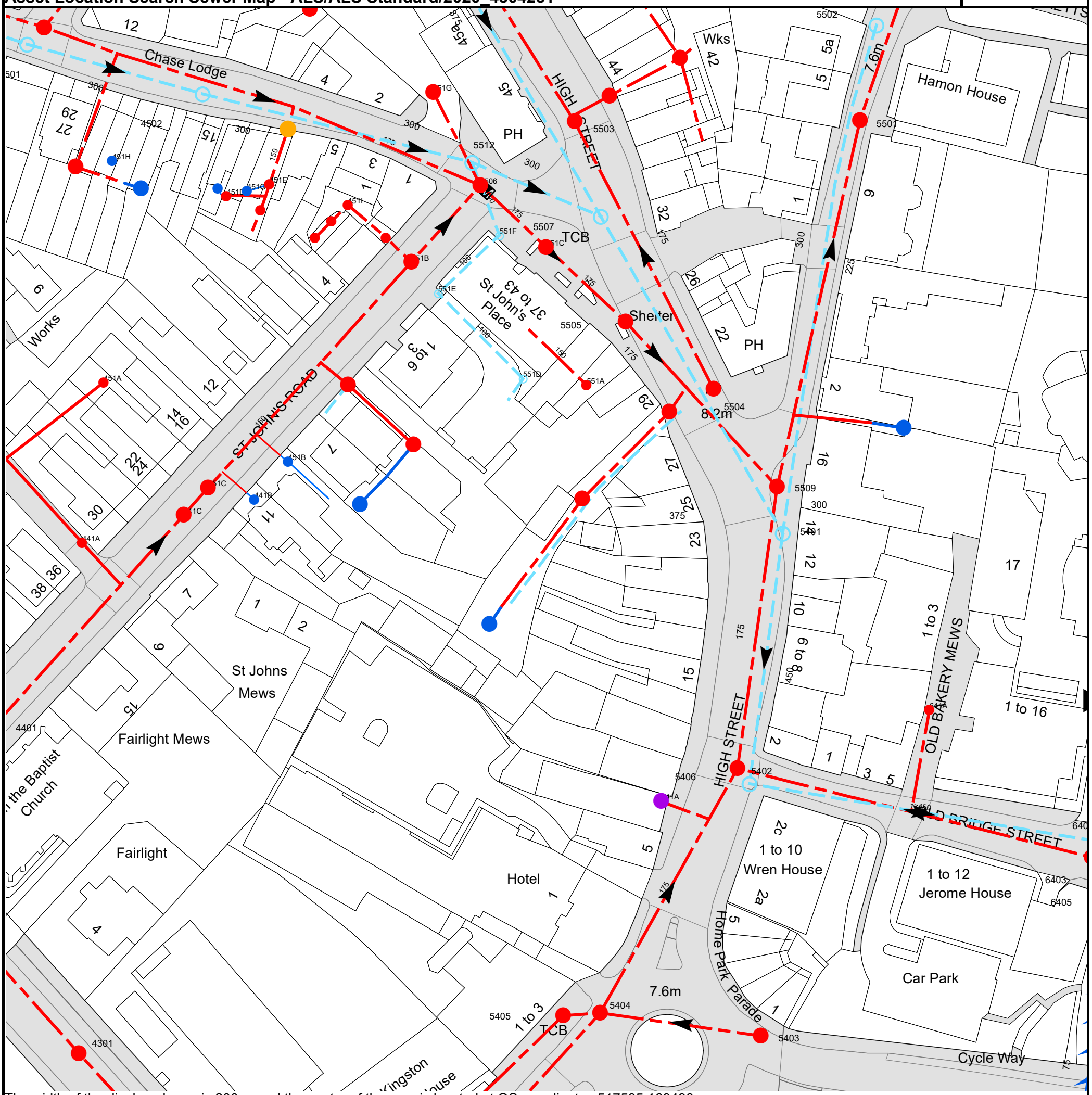
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2020_4304231



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 517535,169490

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
441C	n/a	n/a
551B	n/a	n/a
5505	7.85	4.92
541A	n/a	n/a
5501	7.7	4.14
5502	7.65	5.17
65ZY	n/a	n/a
641A	n/a	n/a
6403	n/a	n/a
4501	n/a	n/a
4503	8.17	5.39
45ZS	n/a	n/a
451H	n/a	n/a
45ZV	n/a	n/a
4502	n/a	n/a
45XW	n/a	n/a
451D	n/a	n/a
451G	n/a	n/a
45XT	n/a	n/a
451E	n/a	n/a
45YT	n/a	n/a
45XZ	n/a	n/a
45XY	n/a	n/a
451I	n/a	n/a
55YP	n/a	n/a
551G	n/a	n/a
5512	7.83	5.07
5506	7.86	5.07
551F	n/a	n/a
551C	n/a	n/a
5503	8.13	5.88
5507	8.04	5.03
55YX	n/a	n/a
55YY	n/a	n/a
4301	n/a	n/a
5403	n/a	n/a
5405	n/a	n/a
5404	n/a	n/a
5402	n/a	n/a
5406	n/a	n/a
54ZT	n/a	n/a
441A	n/a	n/a
5401	n/a	n/a
54ZY	n/a	n/a
441B	n/a	n/a
54ZR	n/a	n/a
451C	n/a	n/a
5509	7.98	4.54
451B	n/a	n/a
55ZX	n/a	n/a
55YT	n/a	n/a
5504	n/a	n/a
551A	n/a	n/a
45ZY	n/a	n/a
451A	n/a	n/a
551D	n/a	n/a
551E	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

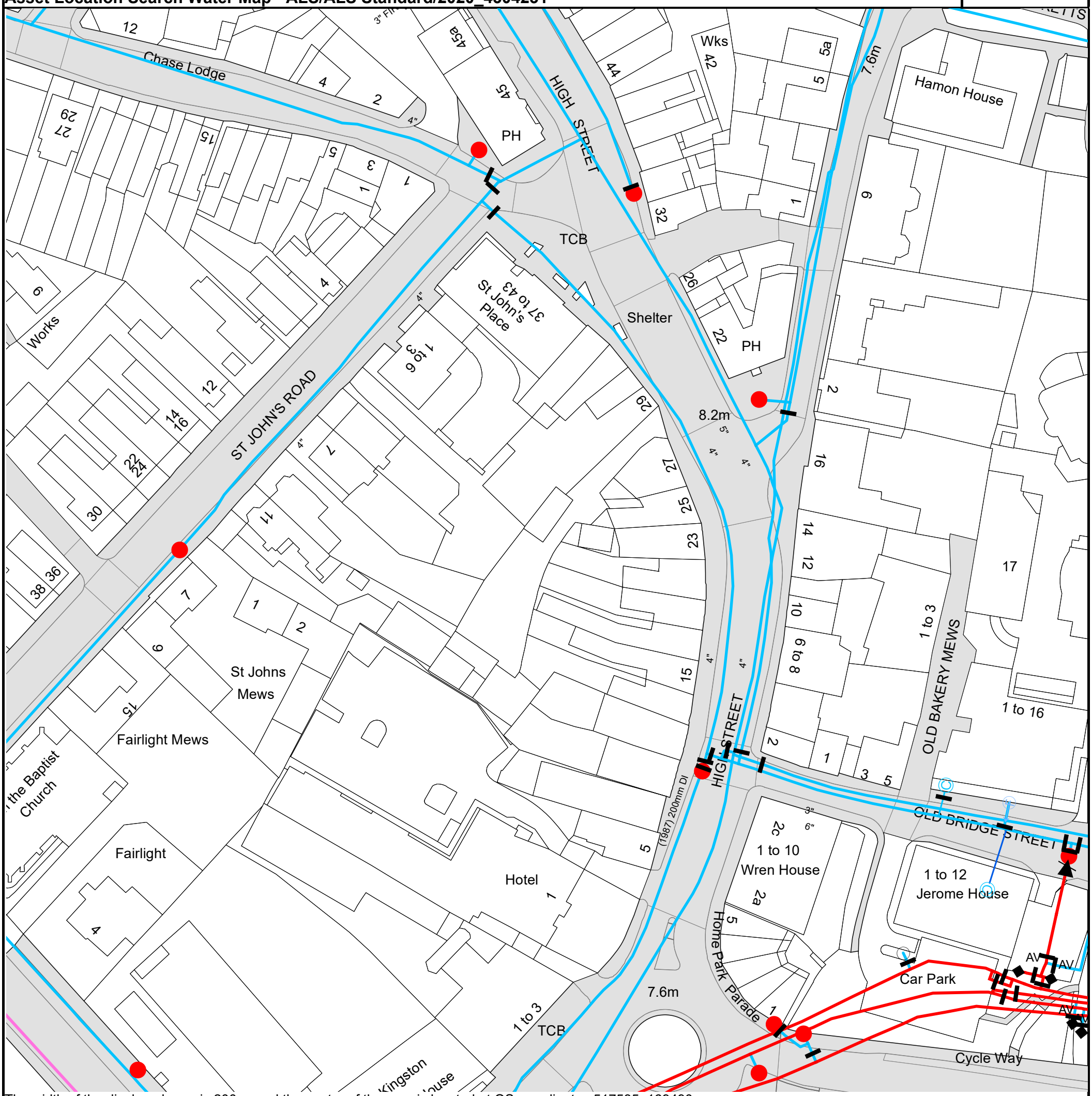
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2020_4304231



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 517535, 169490.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

APPENDIX E
PROPOSED ARCHITECTURAL PLANS

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0 10 20 30 40

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693
www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:1250 @ A3

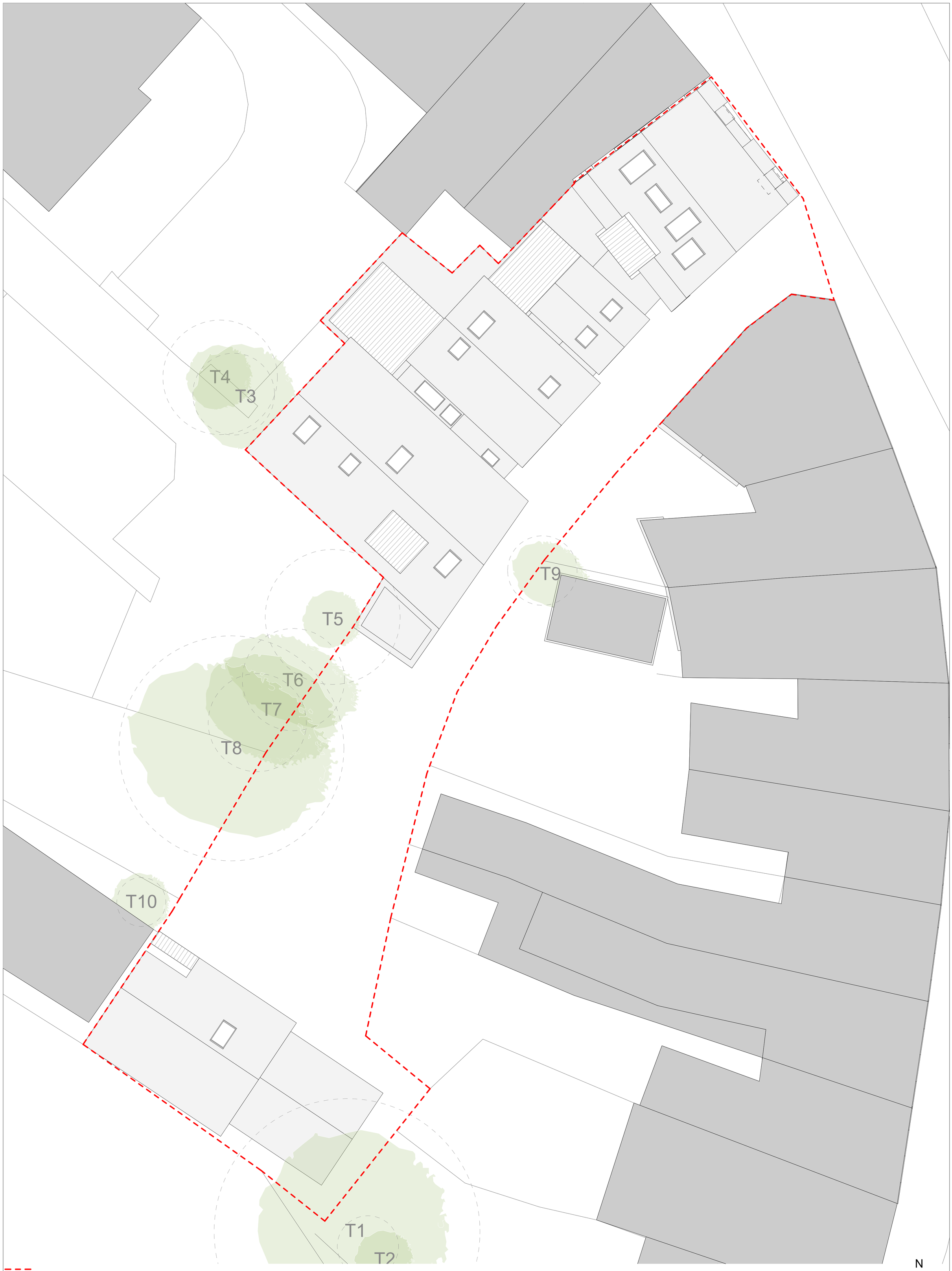
Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

Drawing title
Proposed Block Plan

Job No	Drawing No	Status:	Rev
1911	TP(00)03	PLANNING	

FLETCHER CRANE ARCHITECTS



Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693
www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

Drawing title
Proposed Site Plan

Job No	Drawing No	Status:	Rev
1911	TP(00)05	PLANNING	

FLETCHER CRANE ARCHITECTS

T4
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Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

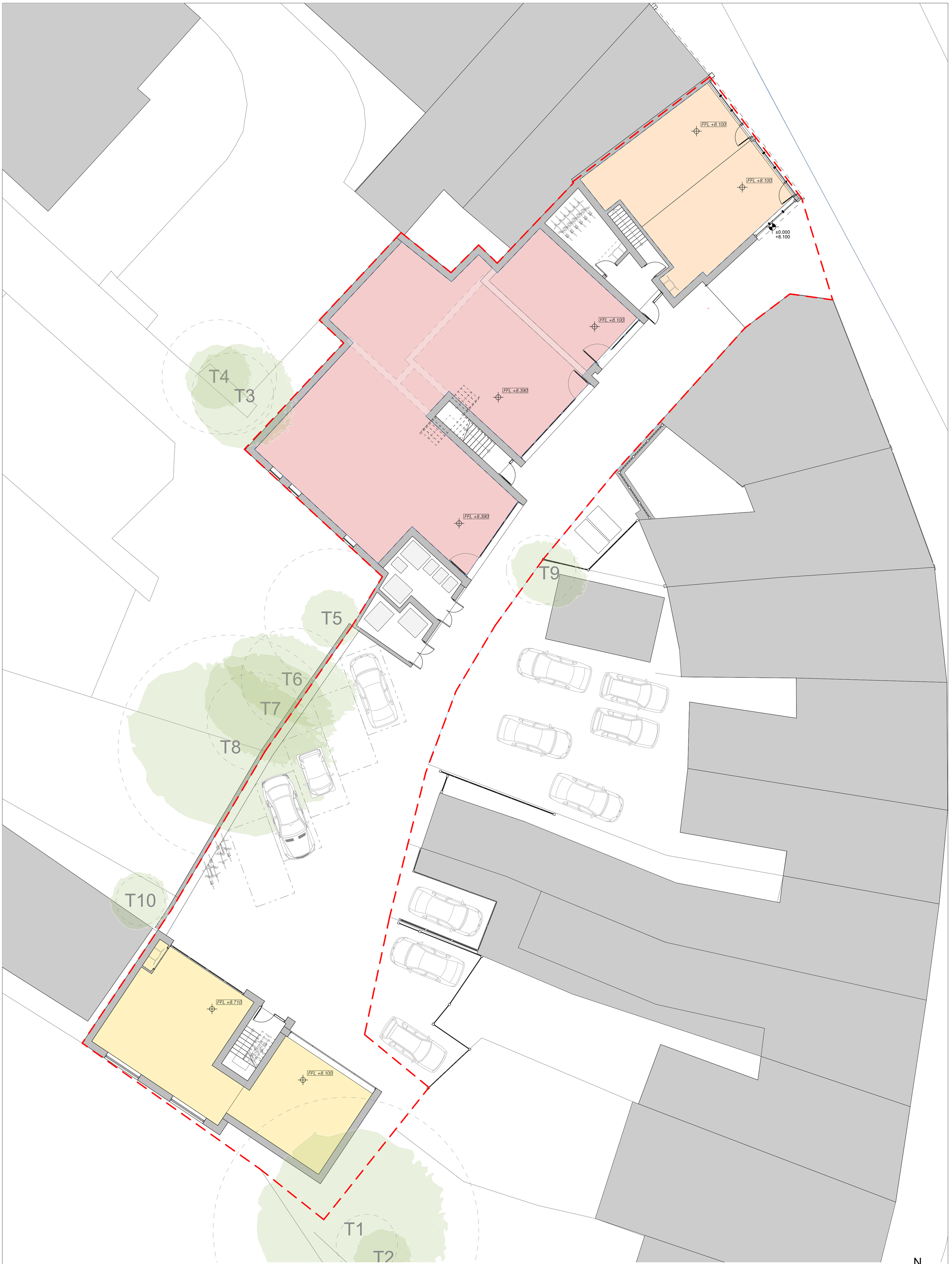
Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

Drawing title
Proposed Basement Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)20	PLANNING	

FLETCHER CRANE ARCHITECTS



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3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693
www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
12/01/2021

Job title
Hampton Wick High Street

Drawing title
Proposed Ground Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)21	PLANNING	

FLETCHER CRANE ARCHITECTS

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

Drawing title
Proposed First Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)22	PLANNING	

FLETCHER CRANE ARCHITECTS

T4
T3
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Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

Drawing title
Proposed Second Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)23	PLANNING	

FLETCHER CRANE ARCHITECTS

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693
www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date

Client's name
Liz & Allan Frost

Scale:
1:100 @ A1 1:200 @ A3
Note: To print at A3, set print scale to 50%

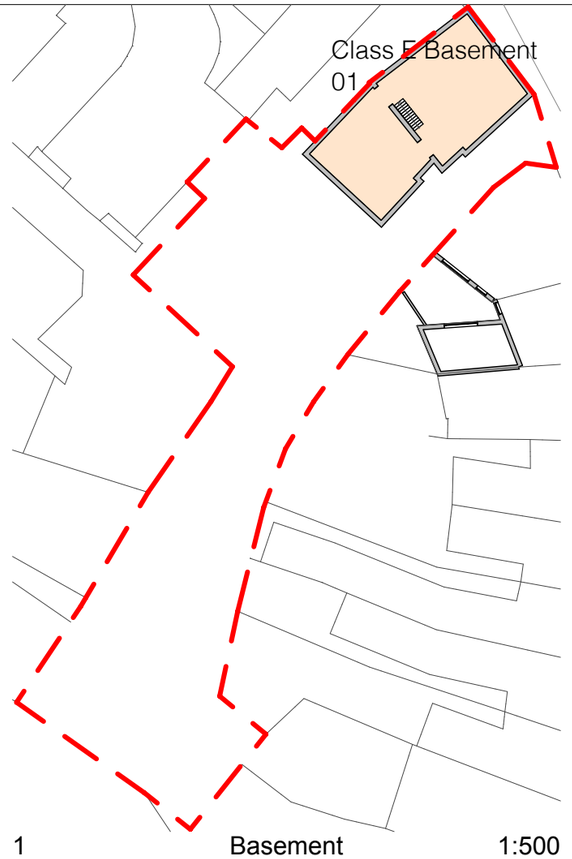
Drawn Checked Date
25/11/2020

Job title
Hampton Wick High Street

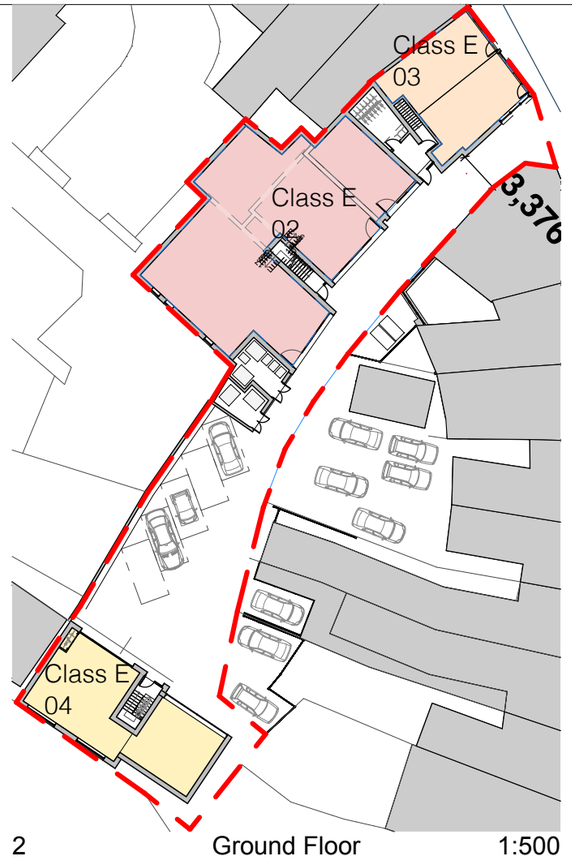
Drawing title
Proposed Roof Floor Plan

Job No	Drawing No	Status:	Rev
1911	TP(10)24	PLANNING	

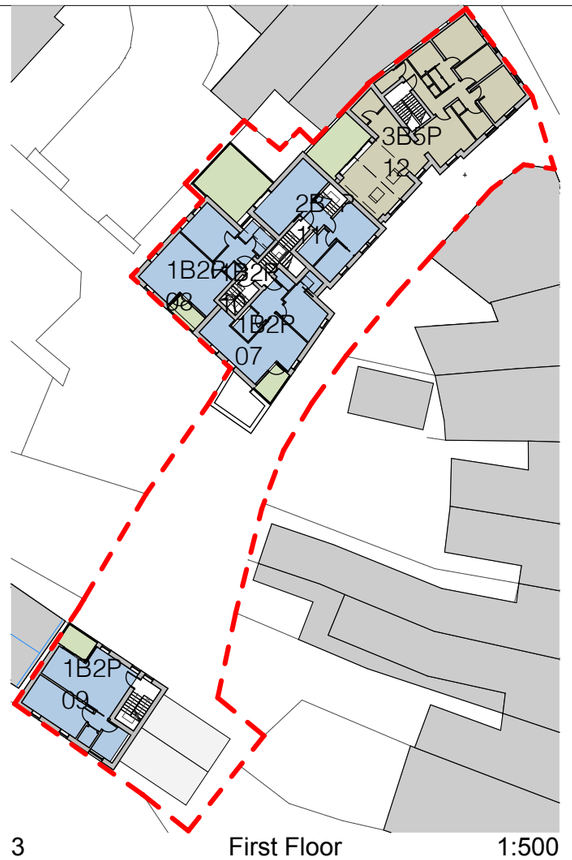
FLETCHER CRANE ARCHITECTS



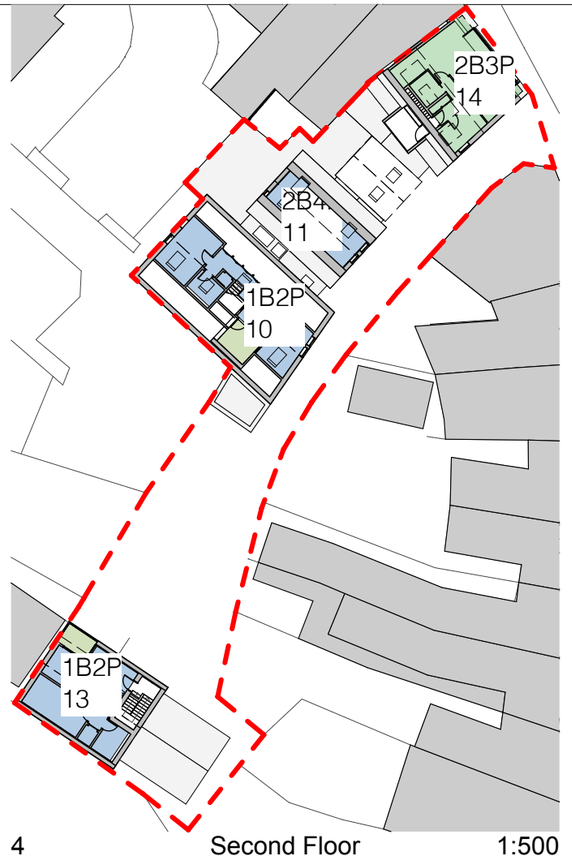
1 Basement 1:500



2 Ground Floor 1:500



3 First Floor 1:500



4 Second Floor 1:500

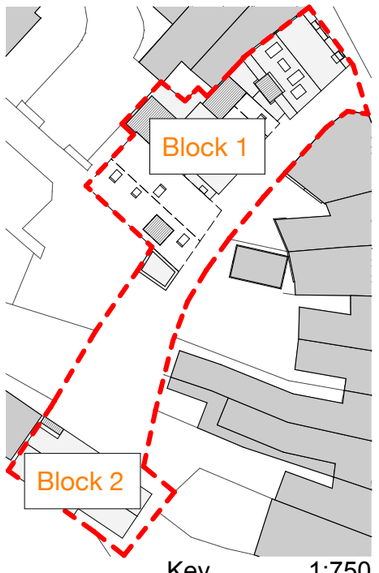
Net GIA		
#	Room Name	Area m2
01	Class E Basement	135
02	Class E	233
03	Class E	76
04	Class E	90
07	1B2P	50
08	1B2P	50
09	1B2P	50
10	1B2P	56
11	2B4P	85
12	3B5P Duplex	110
13	1B2P Duplex	50
14	2B3P	61
		1,046 m²

Gross GIA		
	Level	Area m2
Block 01		
	Basement	135
	Ground Floor	377
	First Floor	304
	Second Floor	65
	Second Floor	44
	Second Floor	59
Block 02		
	Ground Floor	101
	First Floor	60
	Second Floor	60
		1,205 m²

Overall GEA	
Level	Area
Basement	
	156
Ground Floor	
	120
	412
First Floor	
	72
	335
Second Floor	
	53
	72
	72
	76
	1,368 m²

Existing GIA Retained	
Level	Area m²
Basement	36
Ground Floor	46
First Floor	38
Second Floor	34
Total	154 m²

= 1,1051m² New Build



Key 1:750

Fletcher Crane Architects Ltd
3-4 Home Park Parade, Hampton Wick, Kingston upon Thames, Surrey, KT1 4BY

T +44 (0)20 8977 4693

www.fletchercranearchitects.com

Rev	Description	Drawn	Checked	Date
C	Retained GIA added	SD	IC	01.12.2020
B	Basement extended	SD	IC	24.10.2020
A	GEA added	SD	IC	10.11.2020

Client's name: Liz & Allan Frost

Scale: 1:500, 1:750 @ A3

Drawn | Checked | Date: 01/12/2020

Job title: Hampton Wick High Street

Drawing title: Schedule of Accommodation - Proposed

Job No	Drawing No	Status:	Rev
1911	SK 003		C

FLETCHER CRANE ARCHITECTS

APPENDIX F
ENVIRONMENT AGENCY CORRESPONDENCE

Holly Dumsday

From: Holly Dumsday
Sent: 05 November 2020 10:40
To: Holly Dumsday
Subject: FW: 201027/JV15 - Site at Hampton Wick - Pre-planning enquiry
Attachments: South London Pre-application advice 2019.pdf; KSL climate change guidance.doc.Sept.2016.pdf

From: KSLPlanning <KSLPLANNING@environment-agency.gov.uk>
Sent: 28 October 2020 08:57
To: Sophie Thorpe <SThorpe@rsk.co.uk>
Subject: RE: 201027/JV15 - Site at Hampton Wick - Pre-planning enquiry

Dear Sophie Thorpe

SL/2020/120613/01 (our reference),
29-31 High Street
Hampton Wick
Kingston Upon Thames
KT1 4DA

Thank you for consulting us with your proposal. We operate a cost recovery service for providing detailed pre-planning advice to applicants. Therefore, we cannot provide bespoke comments on your enquiry at this stage.

We have attached our pre-application advice note which provides information and guidance about issues within our remit at the planning application stage. Climate change allowance guidance is also attached.

If - following a review of this advice note – you decide that you do wish to obtain more detailed pre-application advice from us, please contact us via the e-mail address shown below and we can provide you with our cost recovery offer.

Kind regards

Sustainable Places team, Kent and South London area
KSLPLANNING@environment-agency.gov.uk

Morgan Haringman
Planning Advisor, Kent and South London Team
Environment Agency | 2 Marsham Street, Westminster, London, SW1P 4DF
kslplanning@environment-agency.gov.uk

From: Sophie Thorpe [mailto:SThorpe@rsk.co.uk]
Sent: 27 October 2020 08:57

To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Cc: Holly Dumsday <HDumsday@rsk.co.uk>
Subject: Site at Hampton Wick - Pre-planning enquiry

Dear External Relations,

Please find attached a pre-planning enquiry for the site named above, along with a site location plan.

We would appreciate any comments you may have on this site, particularly regarding flood risk and drainage and the following questions:

1. Please can you confirm the new climate change allowance (%) which should be included within our assessment of flood risk. Please can you also confirm the acceptable technical methodology for applying this new allowance.
2. Are there any historical reports of flooding that you are aware of in the area surrounding the site? If so what is the source of these events?
3. Are there any particular local requirements relating to the proposed drainage strategy for the area? i.e. in relation to expected discharge rates etc.

(Please note, we have also sent a request for product 4 data in a separate request).

Whilst we have attempted to cover all relevant details in the questions above we are aware that the local knowledge of the Environment Agency is often essential in ensuring that a robust Flood Risk Assessment is achieved. Therefore if there are other issues or information over and above the responses to the questions above that you feel may be of use in this work we would be most grateful if you could let us know.

If you require any additional information, please do not hesitate to contact me or my colleague Holly (cc'd). **Please keep Holly copied in on all responses.**

Many thanks.

Kind regards,

Sophie Thorpe
Hydrologist

RSK
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK

Direct dial: +44 (0)1442 437532
Email: SThorpe@rsk.co.uk

http://www.rsk.co.uk

outside of RSK. DO NOT CLICK links, attachments or respond unless you recognise the sender and are certain that the content is safe]

South London Area

Pre-application Advice Note

Last updated: March 2019

This document sets out the environmental issues we will consider when providing our planning application consultation advice to Local Councils. It can be used by applicants, developers and consultants at the pre-planning stage.

Further pre-application options

We are able to provide detailed and bespoke advice and answer technical questions for a charged fee which equates to £100 per hour plus VAT.

If you are interested in finding out more about this service, please email:

kslplanning@environment-agency.gov.uk

We can explain this service and provide you with a bespoke quote for further pre-application advice that you may require.

Tidal Flood Risk

Development must be safe and should not increase the risk of flooding.

You can view a site's flood zone on the Flood Map for Planning on our website: https://flood-map-for-planning.service.gov.uk/

If your proposed development is located within flood zone 2 or 3 you should consult the Flood Risk and Coastal Change pages of the National Planning Policy Guidance (NPPG) http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/

Here you can determine whether the flood risk vulnerability of your proposed development and the flood zone are compatible. You can also establish if there are flood risk sequential test and exception test requirements for your proposed development.

If your proposed development is located within flood zone 2 or 3 and its vulnerability and flood zone are considered acceptable under the NPPG then a site specific Flood Risk Assessment (FRA) is required to support any subsequent planning application. This is required by paragraph 103 of the National Planning Policy Framework (NPPF) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

Guidance on the content of a site specific FRA can be found on the NPPG and the .gov website: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

Finished Floor Levels

We recommend the finished floor levels of all development are set above the modelled Thames tidal breach level for the year 2100. As a minimum any sleeping accommodation should be located above this breach level.

The Environment Agency can provide any flooding information which we have available – such as predicted flood levels and historical flood data – for use in FRAs. Please note that there may be a charge for this information. Please contact our Customers & Engagement team at kslenquiries@environment-agency.gov.uk for further details.

Thames Estuary 2100 (Tidal Defences)

In line with requirements set out in the Thames Estuary 2100 (TE2100) plan, any application in this location will need to demonstrate how the flood defence could be raised in the future to meet the demands of climate change.

In addition, any application will need to demonstrate how your proposed development adjacent to flood defences does not have a detrimental impact on the integrity of existing flood defences and should aim to be set back from the banks of watercourses and those defences to allow their management, maintenance and upgrading in accordance with both the TE2100 plan and London Plan respectively.

In some cases we hold technical drawings of flood defence structures which may be of use in designing your scheme. To request these you should contact our customers and engagement team at kslenquiries@environment-agency.gov.uk

Fluvial Flood Risk

Development must be safe and should not increase the risk of flooding.

You can view a site's flood zone on the Flood Map for Planning on our website: https://flood-map-for-planning.service.gov.uk/

If your proposed development is located within flood zone 2 or 3 you should consult the Flood Risk and Coastal Change pages of the National Planning Policy Guidance (NPPG) http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/

Here you can determine whether the flood risk vulnerability of your proposed development and the flood zone are compatible. You can also establish if there are flood risk sequential test and exception test requirements for your proposed development.

If your proposed development is located within flood zone 2 or 3 and its vulnerability and flood zone are considered acceptable under the NPPG then a site specific Flood Risk Assessment (FRA) is required to support any subsequent planning application. This is required by paragraph 103 of the National Planning Policy Framework (NPPF) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

Guidance on the content of a site specific FRA can be found on the NPPG and the .gov website: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

Finished Floor Levels

We request that for any new developments within Flood Zones 2 and 3, finished floor levels are set no lower than 300 millimetres above the 1 in 100 chance in any year including an allowance for climate change flood level, to protect people and property from flooding. For extensions to existing buildings, finished floor levels should be no lower than the existing floor levels and that flood resilience/resistance measures are considered, where appropriate, up to the design flood level. Information on preparing property for flooding can be found on the Gov.UK website in the documents *'Improving the Flood performance of new buildings'* and *'Prepare your property for flooding'*.

Increase in built footprint

Your FRA will need to demonstrate that any increase in built footprint within the 1 in 100 chance in any year flood extent including an allowance for climate change can be directly compensated for, on a volume-for-volume and level-for-level basis to prevent a loss of floodplain storage. If it is not possible to provide level for level flood plain compensation then other forms of mitigation may be considered if agreed with the Local Planning Authority (LPA) or there should be no increase in built footprint. It will need to be demonstrated that the proposed development does not impact the flow and conveyance of water.

Please note the use of voids, stilts or undercroft parking as mitigation for a loss in floodplain storage should be avoided, as they may become blocked over time by debris or domestic effects.

We would not recommend these methods to the LPA as an acceptable means of compensation.

Proximity to watercourse

We normally require a buffer zone of 8 metres between any new development and the top of the bank of the river. The permanent retention of a continuous unobstructed area is an essential requirement for emergency access to the river for repairs to the bank and for future maintenance and/or improvement works. A buffer between new development and the river wall is also required to ensure no adverse loading which could impact the stability of the channel wall.

Where development is proposed next to the river we recommend that it includes a green buffer strip alongside the watercourse. Where such a buffer strip does not currently exist, we normally seek that it is established. This is a key way in which we carry out our legal duty to further and promote the ecological and landscape value of rivers and land associated with them. In urban areas, in particular, rivers have often been degraded by past development, and the Environment Agency takes the view that it is reasonable to expect that any new development should go some way to redress the balance.

Flood Risk Activity Permit

Under the Environmental Permitting (England and Wales) Regulations 2016, you must submit plans to the Environment Agency and apply for a Flood Risk Activity Permit if you want to do work:

- In, over or under a main river
- Within 8m of the bank of a main river, or 16m if it is a tidal main river (check the location of main rivers here)
- Within 8m of any flood defence structure or culvert on a main river, or 16m on a tidal main river Flood risk activities can be classified as: Exclusions, Exemptions, Standard Rules or Bespoke. These are associated with the level of risk your proposed works may pose to people, property and the environment.

Further guidance on applying for flood risk activity permits can be found on the following link https://www.gov.uk/guidance/flood-risk-activities-environmental-permits. Flood risk activity permits are required irrespective of any planning permission and are not guaranteed.

Safe Access

During a flood, the journey to safe, dry areas completely outside the 1 in 100 chance in any year plus including an allowance for climate change floodplain would involve crossing areas of potentially fast flowing water. Those evacuating on foot in areas where flooding exceeds 100 millimetres or so would be at risk from a wide range of hazards, including for example unmarked drops, or access chambers where the cover has been swept away.

Safe access and egress routes should be assessed in accordance with the guidance document 'FD2320 (Flood Risk Assessment Guidance for New Developments)'. Where safe access cannot be achieved, an emergency flood plan that deals with matters of evacuation and refuge to demonstrate that people will not be exposed to flood hazards should be submitted to and agreed with the local planning authority.
We recommend that you also discuss safe access and egress routes with the local authority emergency planners as they will be responsible for agreeing to any emergency plan submitted with your application.

The Environment Agency can provide any flooding information which we have available – such as predicted flood levels and historical flood data – for use in FRAs. Please note that there may be a charge for this information. Please contact our Customers & Engagement team at kslenquiries@environment-agency.gov.uk for further details.

Climate Change Allowances

On 19 February 2016, we published new guidance for planners and developers on how to use climate change allowances in a site-specific FRA: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances . Our area guidance is included with this note.

If you have any questions regarding this guidance, please contact our Customers and Engagement team:

kslenquiries@environment-agency.gov.uk

Ecology

If a Main River is located on or within 8 metres of your proposed development site an ecological survey is required to establish whether development is likely to have a detrimental impact on the biodiversity of the watercourse. We would not support development proposals if there was shown to be a likely detrimental impact on the water environment. In accordance with the National Planning Policy Framework (NPPF), any development proposal should avoid significant harm to biodiversity and seek to protect and enhance it. Opportunities to incorporate biodiversity in and around the development will be encouraged.

Your scheme should be designed with a naturalised buffer zone of at least 8 metres from the main river to protect and enhance the conservation value of the watercourse and ensure access for flood defence maintenance.

This buffer zone should be managed for the benefit of biodiversity for example by the planting of locally appropriate, UK native species. The buffer zone should be undisturbed by development with no fencing, footpaths or other structures. This buffer zone will help provide more space for flood waters, provide improved habitat for local biodiversity and allows access for any maintenance requirements.

To identify any Main Rivers in proximity to your proposed development please see our Main Rivers Consultation Map: http://apps.environment-agency.gov.uk/wiyby/151293.aspx

Water Framework Directive (WFD)

With any development alongside watercourses, consideration should be given to the requirements of the Water Framework Directive (WFD) http://ec.europa.eu/environment/water/water-framework/ . This includes preventing overall deterioration in water quality and promoting improvement in the ecological status of any water body. Actions to achieve this are listed in the Thames River Basin Management Plan (RBMP) https://www.gov.uk/search?q=River+Basin+Management+Plans.

Where appropriate, a WFD Assessment (http://planningguidance.communities.gov.uk/blog/guidance/water-supply-wastewater-and-water-quality/water-supply-wastewater-and-water-quality-considerations-for-planning-applications/) should assess any potential impacts on the watercourse and demonstrate that the required enhancements will be delivered. In some cases the requirements of a WFD assessment can be incorporated into an Environmental Impact Assessment (EIA). Any development that has the potential to cause deterioration in classification under WFD or that precludes the recommended actions from being delivered in the future is likely to be considered unacceptable to us.

Groundwater Quality

Development must not cause pollution to the water environment.

Source Protection Zones

These zones indicate that an area is very sensitive to pollution risks due to the proximity of drinking water sources and the way groundwater flows. In these areas we may consider it inappropriate for development to discharge foul or surface water into the ground.

To see if your proposed development is located within a Source Protection Zone, please use our online map: http://apps.environment-agency.gov.uk/wiyby/37833.aspx

Aquifer Designation

These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems. To see if your proposed development is located within which aquifer designation please use our online map: http://apps.environment-agency.gov.uk/wiyby/117020.aspx.

Land affected by contamination

The NPPF takes a precautionary approach to land contamination. Before the principle of development can be determined, land contamination should be investigated to see whether it could preclude certain development due to environmental risk or cost of remediation.

Where contamination is known or suspected, you will need to demonstrate how the proposed development both during construction and after the construction phase will not negatively affect water quality in surface water or groundwater bodies. As part of your planning application, we would except to see as a minimum, a preliminary risk assessment (PRA), such as a site walkover or conceptual model. Where contamination may have a pollution risk to controlled waters, Site Investigation and Remediation Strategy reports may be required. Where this reports are missing or where they don't demonstrate that there will be no adverse impact of the environment, we are likely to raise an objection to the planning application.

Site investigation and remediation strategy reports may be required for submission with a planning application for sensitive land use types or where significant contamination, or uncertainty, is found. When dealing with land affected by contamination, developers should follow the risk management framework provided in the CLR11, Model Procedures for the Management of Land Contamination: https://www.gov.uk/government/publications/managing-land-contamination

Surface water drainage

We recommend the use of Sustainable Drainage Systems (SuDs). The collection and dispersal of clean surface water to ground to recharge aquifer units and prevent localised drainage or surface systems flooding in heavy rainfall is encouraged. However, dispersal into the ground through soakaways or other infiltration systems requires a site-specific investigation and risk assessment. Generally, we would accept roof drainage going to soakaway (or other systems), but other surface drainage may need to go through treatment systems or to foul main, for instance vehicle parking. Infiltrating water has the potential to cause mobilisation of contaminants present in shallow soil/made ground which could ultimately cause pollution of

underlying groundwater resources. Where contamination is known or suspected, remedial or other mitigating measures will likely be required so that it can be demonstrated that there is no resultant unacceptable risk to Controlled Waters.

Generally, we do not support the use of deep borehole soakaways. We are concerned that boreholes, wells and deep soakaways designed for water disposal at depth could bypass any potential attenuation layers and offer a direct conduit for the rapid transport of contaminants to groundwater. Where necessary, we will seek to control the depths of these soakaway systems by recommending maximum penetration depths and a requirement that the water table shall not be intersected. In general, groups of shallow soakaways are preferable to one or two deep boreholes.

Though generally no permit would be required, this is dependent on the perceived risk and the quality of any pollution prevention measures proposed to mitigate the risk.

We advise applicants to follow our guidance – Groundwater Protection. This is a report that highlights the importance of groundwater and encourages industry and other organisations to act responsibly and improve their practices. This can be found at: https://www.gov.uk/government/collections/groundwater-protection

The design of the drainage systems should be in line with G1, G9, G12 and G13 position statements https://www.gov.uk/government/publications/groundwater-protection-position-statements

Surface water drainage should always be carefully considered in discussions with the Lead Local Flood Authority, who are responsible for providing advice on the management of surface water from new larger developments. Please consult them for their comments on your proposal.

Pollution

Please also note that any surface water drainage system must not pose a risk to groundwater quality and must not be constructed in ground affected by contamination.

Further guidance is available at the following links:

Pollution prevention for businesses

Discharge to surface or ground water

Manage business and commercial waste

Store oil and oil storage regulations

We recommend you contact your Local Authority's Environmental Health team who may hold records on known/potential land contamination. Please note our primary concern is with regards to water quality. Your Local Authority's Environmental Health team will advise you on issues related to human health.

Sustainable Drainage Systems (SuDs) should always be carefully considered in discussions with the Lead Local Flood Authority, who are responsible for providing advice on the management of surface water from new larger developments. Please consult them for their comments on your proposal.

Waste

Waste Management

The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/ or land development works are waste or have ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be re-used on-site providing they are treated to a standard such that they fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on-site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

We recommends that developers should refer to:

- the position statement on the Definition of Waste: Development Industry Code of Practice
- The waste management page on GOV.UK

Waste to be taken off-site

Contaminated soil that is (or must be) disposed of is waste. Therefore, its handling, transport, treatment and disposal are subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2016
- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of hazardous waste material produced or taken off-site is 500kg or greater in any 12 month period, the developer will need to register with us as a hazardous waste producer. Refer to the hazardous waste pages on GOV.UK for more information.

Environmental Permitting Regulations

To see if your proposed development requires an Environmental Permit under the Environment Permitting Regulations please refer to our website:

https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit

From 6 April 2016 an Environmental Permit is required for any proposed works or structures, in, under, over or within 8m metres of the top of the bank of designated Main Rivers. Please contact enquiries@environment-agency.gov.uk for more information.

Please note

This document is a response to a pre-application enquiry only and does not represent our final view in relation to any future planning application made in relation to any site.

You should seek your own expert advice in relation to technical matters relevant to any planning application before submission.

If you have any questions please contact the South London Sustainable Places team:

kslplanning@environment-agency.gov.uk

Flood risk assessments: Climate change allowances

Its essential landuse planning decisions are based on the latest evidence and quality site specific Flood Risk Assessments. A key part of this is using the latest climate change allowances and using local evidence and data.

We encourage early pre applications discussions and you should complete this form and email back to kslplanning@environment-agency.gov.uk for sites in high risk flood zones. You should also discuss proposed developments with the local planning authority and refer to their local plan flood risk policies and Strategic Flood Risk Assessment. Guidance on producing a Flood Risk Assessment.

To obtain the latest flood map and data please email our customers and engagement team kslenquiries@environment-agency.gov.uk

1) The climate change allowances

The National Planning Practice Guidance refers planners, developers and advisors to the Environment Agency guidance on considering climate change in Flood Risk Assessments (FRAs). This guidance was updated in February 2016 and is available on Gov.uk and should be read in conjunction with this document. The guidance can be used for planning applications, local plans, neighbourhood plans and other projects. It provides climate change allowances for peak river flow, peak rainfall, sea level rise, wind speed and wave height. The guidance provides a range of allowances to assess fluvial flooding, rather than a single national allowance. It advises on what allowances to use for assessment based on vulnerability classification, flood zone and development lifetime. For proposed development in the tidal Thames flood zone you should continue to use the Thames Estuary 2100 (TE2100) plan and latest flood models.

2) Assessment of climate change impacts on fluvial flooding

Table A below indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location. This should be used as **a guide only**. Ultimately, the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. **For these reasons we recommend that applicants and / or their consultants should contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis**. **Table A** defines three possible approaches to account for flood risk impacts due to climate change, in new development proposals:

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts.
- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow. See Appendix 1.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table A – Indicative guide to assessment approach

vulnerability classification	flood zone	development type		
		minor	small-major	large-major
essential infrastructure	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
highly vulnerable	Zone 2	Intermediate/ Basic	Intermediate/ Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
more vulnerable	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
less vulnerable	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
water compatible	Zone 2	None		
	Zone 3a	Intermediate/ Basic		
	Zone 3b	Detailed		

Notes:

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 sq m.

The assessment approach should be agreed with the Environment Agency as part of pre-planning application discussions to avoid any wasted work.

3) Specific local considerations in Kent and South London

Where the Environment Agency and the applicant and / or their consultant has agreed that a '**basic**´ level of assessment is appropriate the figures in Table B below can be used as a precautionary allowance for potential climate change impacts on peak 'design' (i.e. 1% annual probability) fluvial flood level rather than undertaking detailed modelling.

Table B – Local precautionary allowances for potential climate change impacts

River basin	Central	Higher Central	Upper
Thames	500mm	700mm	1000mm
South East	700mm	850mm	1400mm

For proposed developments in the tidal Thames flood zone you should continue to use the Thames Estuary 2100 (TE2100) plan and latest flood models.

4) Fluvial food risk mitigation

Read the guidance on Gov.uk to find out which allowances to use to **assess** the impact of climate change on flood risk.

For planning consultations where we are a statutory consultee and our Flood risk standing advice **does not** apply we use the following benchmarks to inform flood risk **mitigation** for different vulnerability classifications. **These are a guide only**.

We recommend you contact us at the pre-planning application stage to confirm this on a case by case basis. We can provide you with a free basic opinion and more detailed advice is subject to cost recovery.

For planning consultations where we are not a statutory consultee or our Flood risk Standing advice applies we recommend local planning authorities and developers use these benchmarks but we do not expect to be consulted.

- For development classed as '**Essential Infrastructure**' our benchmark for flood risk mitigation is for it to be designed to the '**upper end**' climate change allowance for the epoch that most closely represents the lifetime of the development, including decommissioning.

- For **highly vulnerable** in flood zone 2, the '**higher central'** climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **upper end** allowance.

- For **more vulnerable developments** in flood zone 2, the '**central**' climate change allowance is our minimum benchmark for flood risk mitigation, and in flood zone 3 the '**higher central**' climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (in flood zone 2) and the **upper end** allowance (in flood zone 3).

- For **water compatible** or **less vulnerable** development (e.g. commercial), the '**central**' climate change allowance for the epoch that most closely represents the lifetime of the development is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (particularly in flood zone 3) to inform built in resilience.

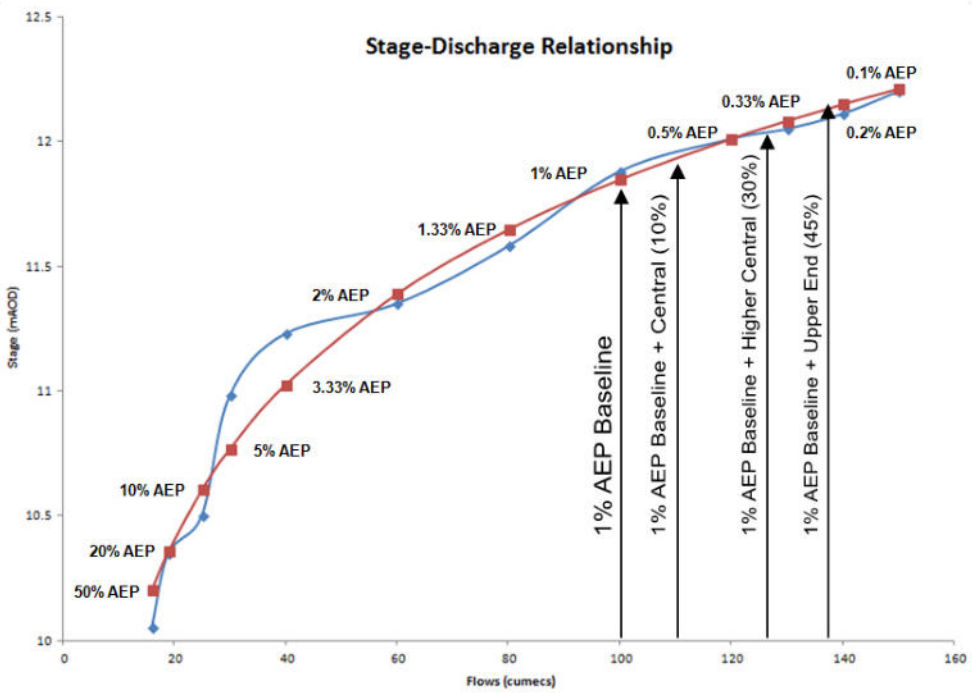
There may be circumstances where local evidence supports the use of other data or allowances. Where you think this is the case we may want to check this data and how you propose to use it.

Appendix 1 – Further information on the Intermediate approach

1) The methodology the chart is based on does not produce an accurate stage-discharge rating and is a simplified methodology for producing flood levels that can be applied in low risk small-scale development situations;

2) The method should not be applied where there is existing detailed modelled climate change outputs that use the new allowances. In such circumstances, the 'with climate change' modelled scenarios should be applied.

An example stage-discharge relationship is shown below:



Product 4 (Detailed Flood Risk) for KT1 4DA
Our Ref: THM197189

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map areas benefiting from defences (where available/relevant);
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
Statutory (Sealed) Main River (where available within map extents);

A table showing:

i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
ii) Flood defence locations unique identifiers and attributes; (supplied seperately)
iii) Historic flood events outlines unique identifiers and attributes; and
iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

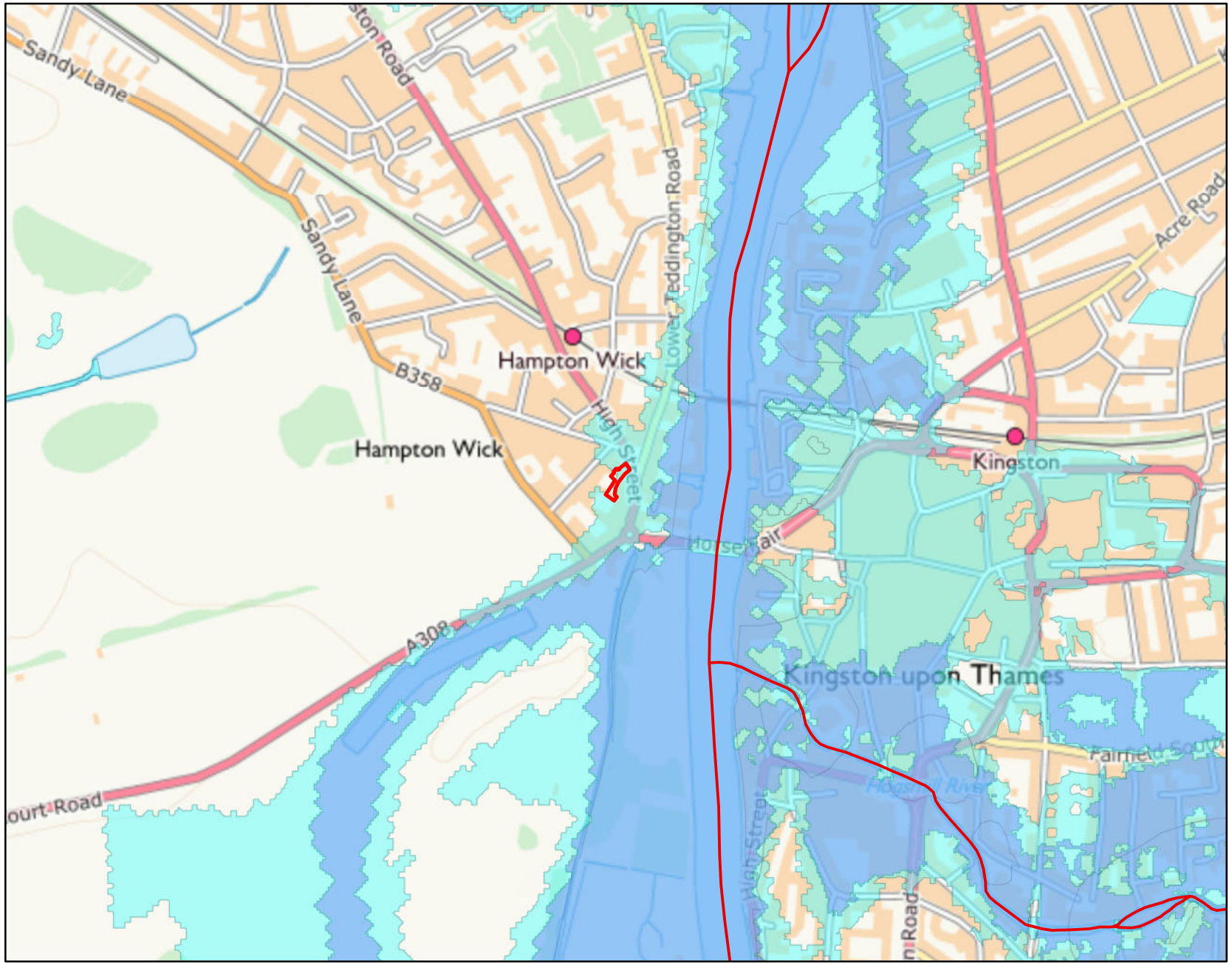
https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Red Kite House, Howbery Park, Wallingford, Oxon OX10 8BD
Customer services line: 08708 506 506
Email: enquiries_THM@environment-agency.gov.uk

Flood Map for Planning centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.25 0.5

Legend

- Site
- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Defence information

THM197189

Defence Location:	River Thames Scheme
Description:	We are currently working on The River Thames Scheme from Datchet to Teddington. The scheme proposes measures to reduce the risk of flooding to the 15,000 properties which are currently at risk from flooding in the area. These measures include the construction of three flood diversion channels, increasing the capacity to Desborough Cut and improvements to Sunbury and Molesey Weirs and Teddington Lock. It also includes community based measures for improving resistance and resilience to flooding for smaller groups of properties and improving mapping information for emergency evacuation plans. For more information please visit our website at: https://www.gov.uk/government/publications/river-thames-flood-risk-management-scheme

Model information

THM197189

Model: Thames (Hurley to Teddington) 2019

Description: The information provided is taken from the Lower River Thames Modelling Study which was completed in December 2019. The model was developed using ISIS-TUFLOW. The flood-frequency behaviour of the Lower Thames is assessed in this project using the multitude of river flow and level records that are available, concentrating mostly on the flow record at the Kingston/Teddington gauge site. Flow records are also available at other gauging sites along the modelled section of the River Thames.

This model fully supersedes the following models: Thames (Lower) Reach 1 & 2 – 2007;
Thames (Lower) Reach 3 – 2009; Thames (Lower) Reach 4 – 2010. And partially supersedes:
Thames (Henley to Hurley) 2002 (lower extent only)

This model includes the Jubilee River (part of the Maidenhead, Windsor and Eton Flood Alleviation Scheme). The design capacity for the Jubilee River is limited to approximately 180m3/s and is designed to remain in-bank irrespective of any increase in flows in the River Thames. Where appropriate this will need to be considered when assessing flood risk.

There are several points along the Lower Thames where there are interactions between the main river and tributaries. At these point's, other local models will need to be additionally assessed to ensure the correct site specific values are being used. These locations include Chertsey Town, and along the extent of the Chalvey Ditches. The Lower Thames model explicitly modelled the tributary focused flood scenerios in particular the Battle Bourne in Old Windsor and Chertsey and its tributaries. These have been marked as - Battle Bourne/ Chertsey Bourne/ The Cut after the model name.

Throughout the majority of the catchment, the model has replicated the flow and level variations observed from gauges during flood events with a high degree of accuracy (± 150mm), however at some sites this was not possible across the whole event. This reflects local variations rather than a fundamental issue with the model (e.g., Bray, Romney and Penton Hook Lock).

Model design runs:
1 in 2 / 50% Annual Exceedance Probability (AEP); 1 in 5 / 20% AEP; 1 in 10; 10% AEP;
1 in 20 / 5% AEP; 1 in 30 / 3.3% AEP; 1 in 40 / 2.5% AEP; 1 in 50 / 2% AEP; 1 in 75% / 1.33% AEP; 1 in 100 / 1% AEP; 1 in 100+15% / 1% AEP plus 15%; 1 in 100+25% / 1% AEP plus 25%; 1 in 100+35% / 1% AEP plus 35%; 1 in 100+70% / 1% AEP plus 70%; 1 in 1000 / 0.1% AEP

Mapped outputs:
1 in 5 / 20% AEP; 1 in 100 /1% AEP; 1 in 100+25% / 1% AEP plus 25%; 1 in 100+35% / 1% AEP plus 35%; 1 in 100+70% / 1% AEP plus 70%

Model accuracy:
Levels ± 150mm

Modelled in-channel flood flows and levels

THM197189

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

				Flood Levels (mAOD)							
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2018_16.069	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517703	169170	5.77	6.19	7.09	0.00	7.98	8.49	9.64	8.57
061_00_2018_16.069D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517703	169191	5.77	6.19	7.09	0.00	7.98	8.49	9.64	8.57
061_00_2018_16.067U	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517714	169366	5.76	6.20	7.10	0.00	7.97	8.48	9.66	8.56
061_00_2018_16.067D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517715	169385	5.74	6.16	7.02	0.00	7.85	8.35	9.52	8.43
061_00_2018_16.065	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517725	169469	5.73	6.14	6.97	0.00	7.77	8.26	9.43	8.34
061_00_2018_16.063	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517735	169564	5.72	6.12	6.95	0.00	7.76	8.26	9.39	8.34
061_00_2018_16.061U	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517731	169630	5.68	6.07	6.91	0.00	7.75	8.29	9.48	8.38
061_00_2018_16.061D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517730	169644	5.66	6.05	6.86	0.00	7.64	8.16	9.32	8.25
061_00_2018_16.06	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517730	169745	5.66	6.05	6.85	0.00	7.62	8.16	9.50	8.24

				Flood Flows (m3/s)							
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2018_16.069	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517703	169170	453.11	581.81	736.94	0.00	860.09	912.27	1040.90	918.43
061_00_2018_16.069D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517703	169191	453.11	581.81	736.94	0.00	860.09	912.27	1040.90	918.43
061_00_2018_16.067U	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517714	169366	453.38	579.18	756.75	0.00	937.93	1043.86	1184.29	1051.44
061_00_2018_16.067D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517715	169385	453.38	579.18	756.75	0.00	937.93	1043.86	1184.29	1051.44
061_00_2018_16.065	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517725	169469	453.60	579.23	776.03	0.00	975.38	1090.80	1362.28	1107.87
061_00_2018_16.063	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517735	169564	453.77	577.88	775.99	0.00	984.12	1114.32	1497.51	1141.56
061_00_2018_16.061U	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517731	169630	453.89	577.12	772.39	0.00	965.38	1095.38	1519.96	1104.40
061_00_2018_16.061D	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517730	169644	453.89	577.12	772.39	0.00	965.38	1095.38	1519.96	1104.40
061_00_2018_16.06	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517730	169745	454.44	576.93	777.12	0.00	988.32	1115.54	1476.09	1128.08

Note:

Due to changes in guidance on the allowances for climate change, the 20% increase in river flows should no longer to be used for development design purposes.
The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Modelled floodplain flood levels

THM197189

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

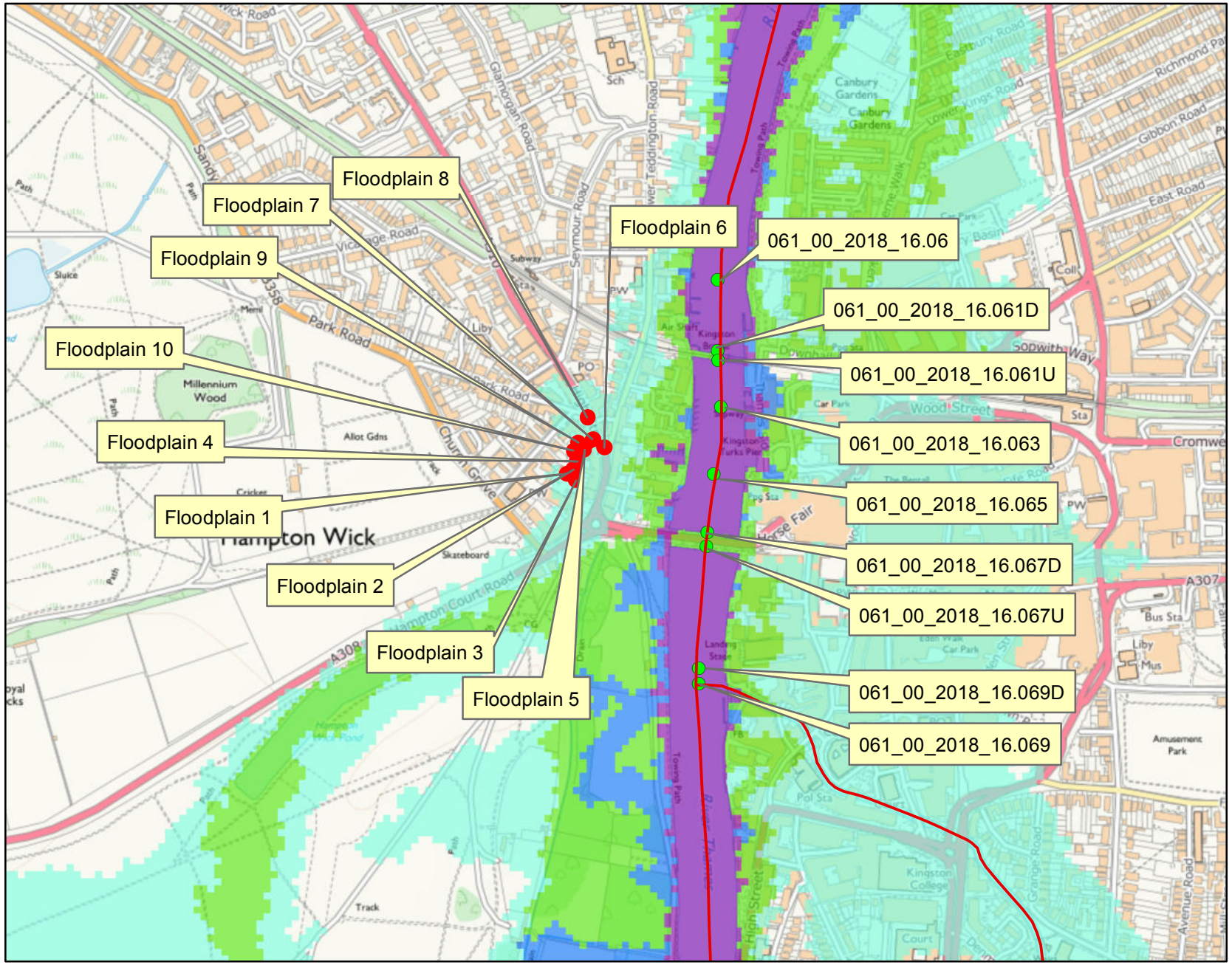
				flood levels (mAOD)							
2D grid cell reference	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Floodplain 1	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517515	169468	No Data	No Data	No Data		No Data	No Data	9.47	No Data
Floodplain 2	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517524	169473	No Data	No Data	No Data		No Data	No Data	9.45	No Data
Floodplain 3	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517528	169458	No Data	No Data	No Data		7.96	8.39	9.48	8.49
Floodplain 4	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517530	169486	No Data	No Data	No Data		No Data	8.38	9.43	8.47
Floodplain 5	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517539	169503	No Data	No Data	No Data		No Data	8.37	9.40	8.46
Floodplain 6	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517568	169505	No Data	No Data	No Data		No Data	8.37	9.40	8.45
Floodplain 7	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517552	169517	No Data	No Data	No Data		No Data	8.37	9.39	8.45
Floodplain 8	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517545	169549	No Data	No Data	No Data		No Data	8.37	9.37	8.45
Floodplain 9	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517532	169512	No Data	No Data	No Data		No Data	8.37	9.38	8.45
Floodplain 10	Thames (Hurley to Teddington) 2019 - Hammersmith Domain	517526	169501	No Data	No Data	No Data		No Data	No Data	9.41	No Data

This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:
Due to changes in guidance on the allowances for climate change, the 20% increase in river flows should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Detailed FRA Map centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.2 0.4

Legend

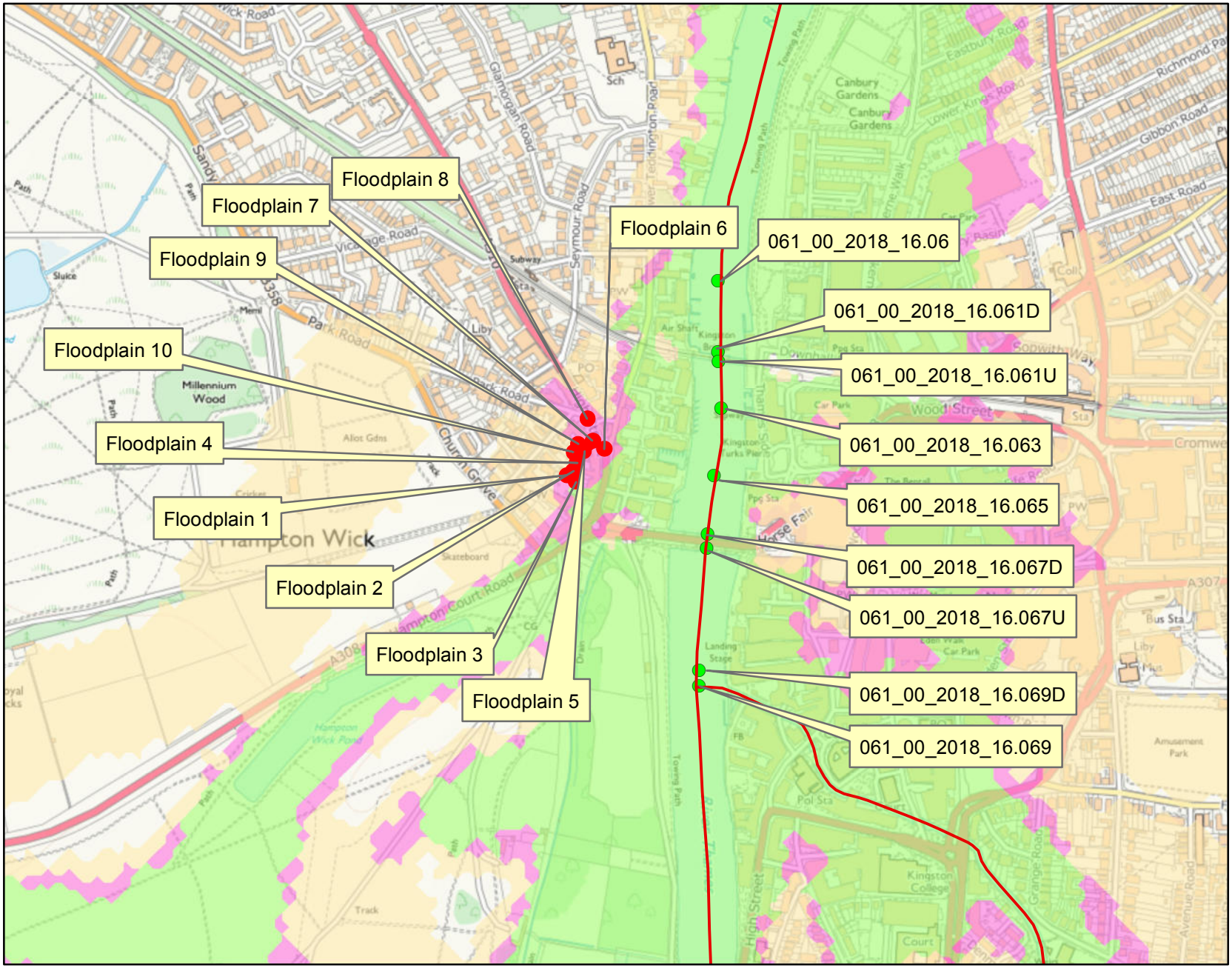
- Site
- Main River
- Node
- 20% AEP Defended Flood Outline
- 5% AEP Defended Flood Outline
- 1% AEP Defended Flood Outline
- 0.1% AEP Defended Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occuring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Detailed FRA Map centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.2 0.4

Legend

- Site
- Main River
- Node
- 1%+25% CC AEP Defended Flood Outline
- 1%+35% CC AEP Defended Flood Outline
- 1%+70% CC AEP Defended Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occuring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Historic flood data

THM197189

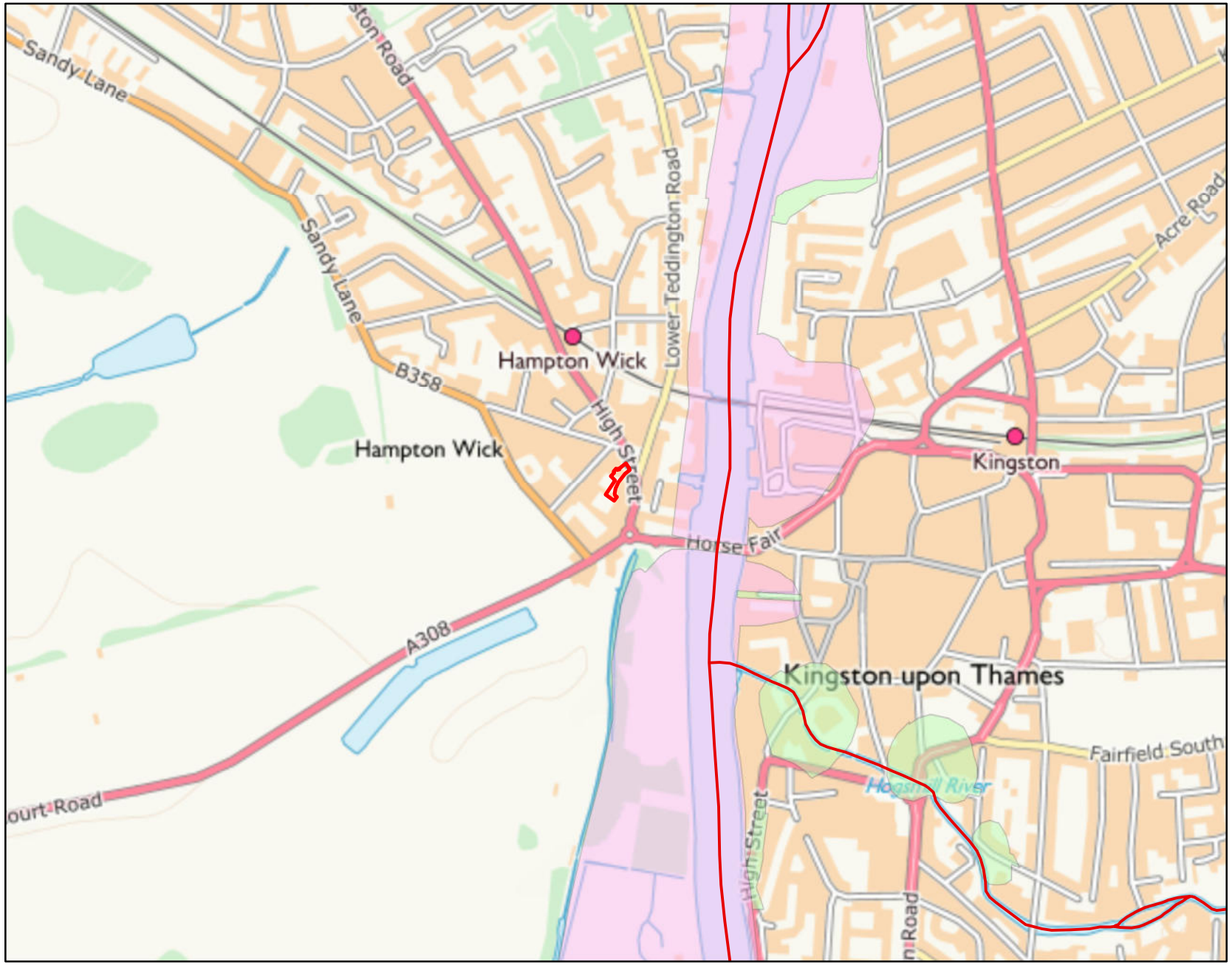
Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
No Historic Information					

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

Historic Map centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.25 0.5

Legend

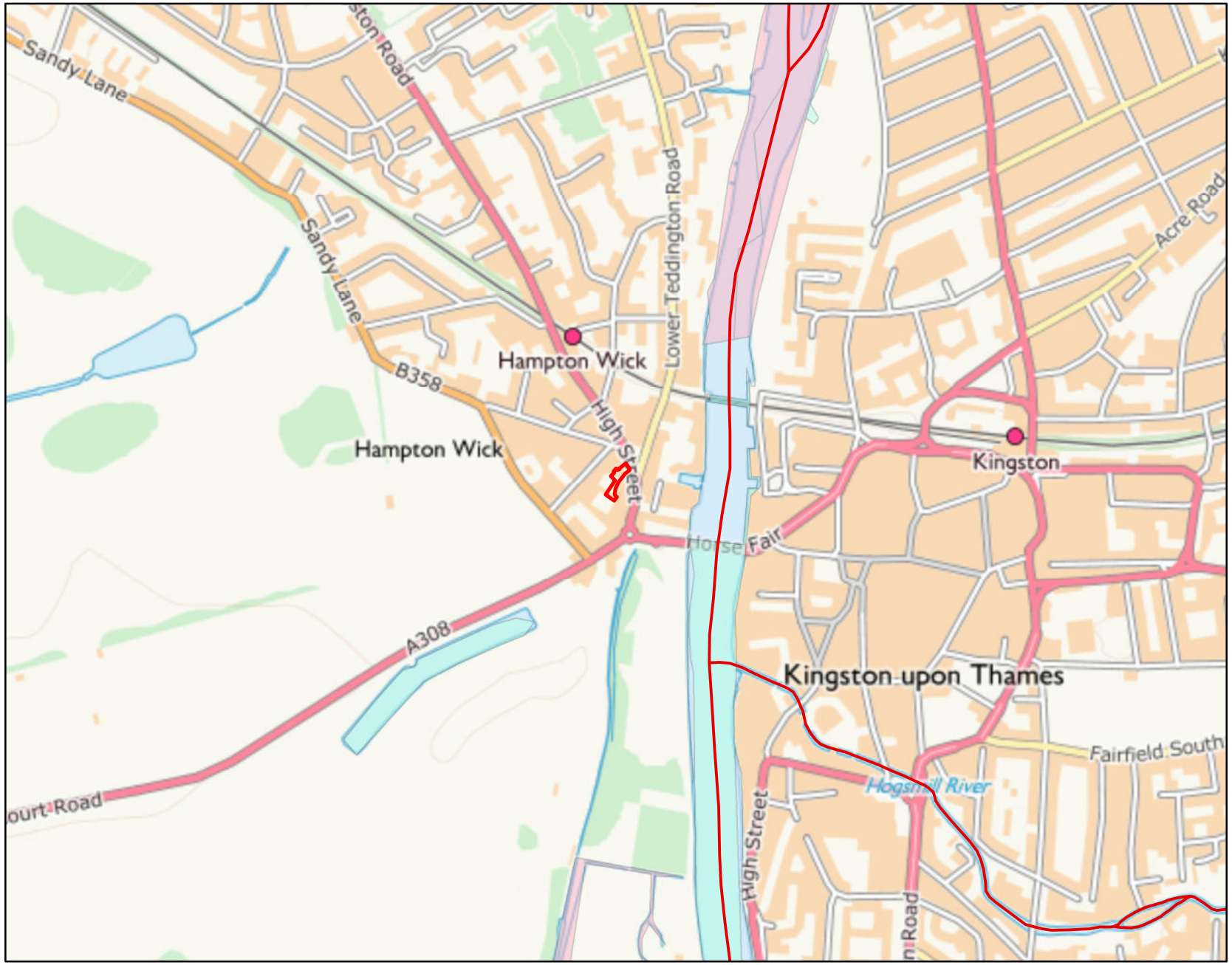
- Site
- Main River
- 1947
- 1968

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Historic Map centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.25 0.5

Legend

- Site
- Main River
- 1988
- 2000
- 2002/3

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Hazard Mapping (for the 1%+35% climate change scenario) THM197189

Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).
The following calculation is used:

HR = d x (v+0.5) + DF

Where HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

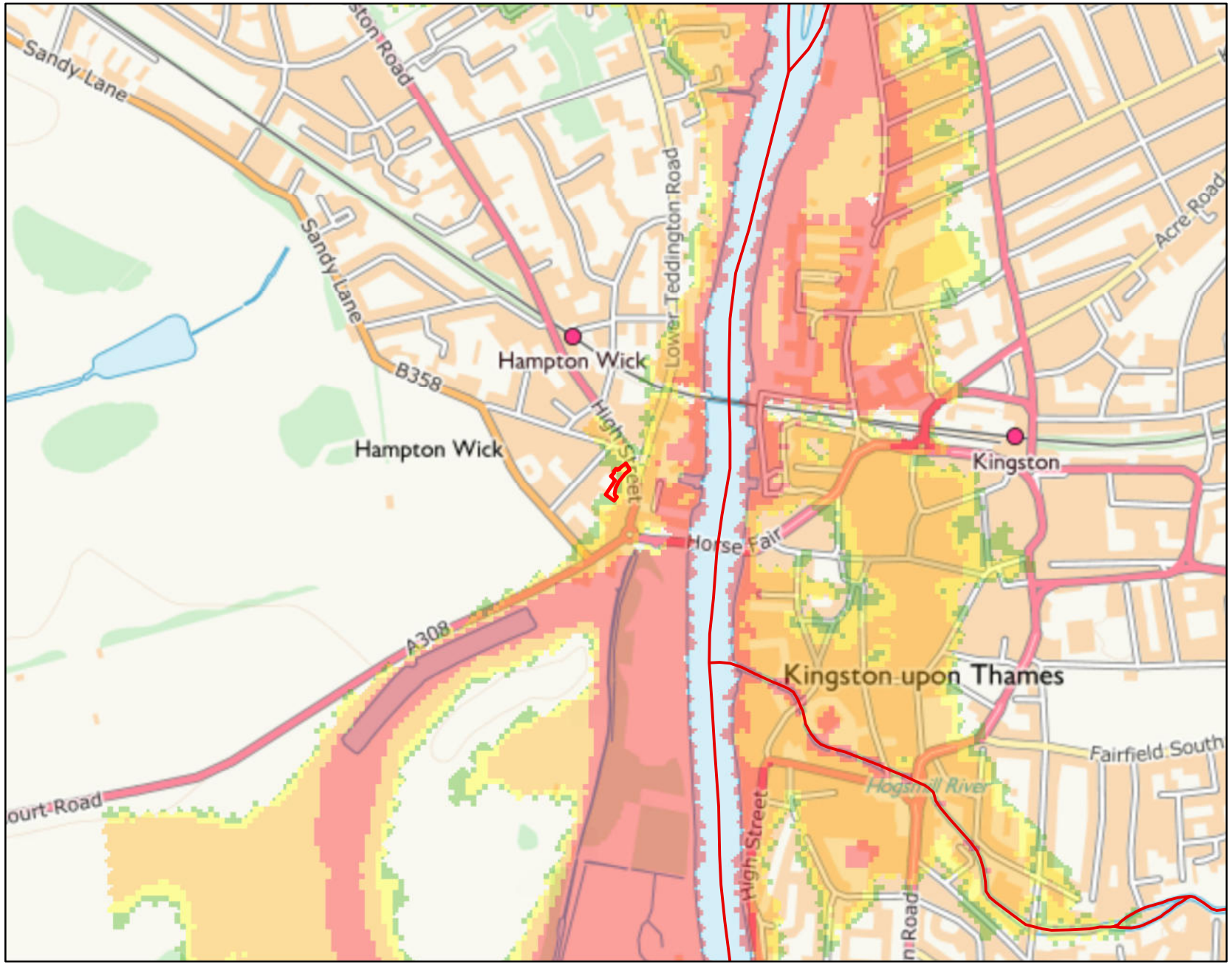
The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification	
Less than 0.75		Very low hazard	- Caution
0.75 to 1.25		Danger for some	- includes children, the elderly and the infirm
1.25 to 2.0		Danger for most	- includes the general public
More than 2.0		Danger for all	- includes the emergency services

REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

Red Kite House, Howbery Park, Wallingford, Oxon OX10 8BD
Customer services line: 08708 506 506
Email: WTenquiries@environment-agency.gov.uk

Hazard Map centred on KT1 4DA
Created on 24/12/2020 REF: THM197189



Environment Agency

Kilometres

0 0.25 0.5

Legend

- Site
- Main River
- Low hazard
- Hazard to all
- Hazard for most
- Hazard to all

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

HR = d x (v+0.5) + DF

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

APPENDIX G
COUNCIL CORRESPONDENCE

Holly Dumsday

From: Humphris, Brian <Brian.Humphris@richmondandwandsworth.gov.uk>
Sent: 27 October 2020 17:40
To: Sophie Thorpe
Cc: Shilstone, Rebecca
Subject: FW: Enquiry re. Local Flooding issues in Hampton Wick

Official

Dear Ms Thorpe

Further to your enquiry below please find below a link to the information that you require. Please contact me if you require any further assistance.

https://www.richmond.gov.uk/services/planning/planning_policy/local_plan/local_development_framework_research/flood_risk_assessment

Yours sincerely

Brian Humphris
Highway Asset Co-ordinator
Serving Richmond and Wandsworth Councils

brian.humphris@richmondandwandsworth.gov.uk
www.richmond.gov.uk / www.wandsworth.gov.uk

Please note that I work only on Tuesday, Wednesday and Thursday.

From: DC Technical Support Hub <DCTechnicalSupportHub@richmondandwandsworth.gov.uk>
Sent: 27 October 2020 17:30
To: Humphris, Brian <Brian.Humphris@richmondandwandsworth.gov.uk>
Subject: FW: Enquiry re. Local Flooding issues in Hampton Wick

Official

Hi Brian

Are you able to help with the query below?

Regards
Rebecca Shilstone
Senior Validations Officer
Development Management
London Borough of Richmond upon Thames

Rebecca.shilstone@richmondandwandsworth.gov.uk
Tel: 020 8891 1411

www.richmond.gov.uk / www.wandsworth.gov.uk

From: planning@richmond.gov.uk <planning@richmond.gov.uk>
Sent: 27 October 2020 10:05
To: SThorpe@rsk.co.uk
Cc: DC Technical Support Hub <DCTechnicalSupportHub@richmondandwandsworth.gov.uk>
Subject: FW: Enquiry re. Local Flooding issues in Hampton Wick

Dear Ms Thorpe

Thank you for your email which I have forwarded to our Technical Support Team who will respond within 7 Working Days

We are conducting a Customer Experience Survey to gather customer feedback to help improve our services. The survey only takes 5 minutes and can be completed by using the link below.

www.richmond.gov.uk/customer_feedback

Kind regards

Michelle Davies

Corporate Customer Services

Serving Richmond and Wandsworth Councils

Tel: 0208 891 1411

www.richmond.gov.uk / *www.wandsworth.gov.uk*

You can also follow us on Twitter for up to date information and news: Twitter @LBRUT_help

---

From: SThorpe@rsk.co.uk
Sent: 27/October/2020 09:12 (GMT)
To: planning@richmond.gov.uk
CC: HDumsday@rsk.co.uk
Subject: Enquiry re. Local Flooding issues in Hampton Wick

FAO: Drainage and Flooding team

Good Afternoon,

We are Engineering Consultants acting for a Client who is considering development of a site within the Hampton Wick High Street area. We are in the process of producing a Flood Risk Assessment for the site and would be grateful for your input on the following points.

For reference, I have included a site plan.

The site is approximately 0.045ha in size and the proposals include the re-provision of employment space on the site at more efficient levels to generate more employment opportunities and numbers. The scheme will also provide a net gain of 8 residential units.

Flooding records/maps

Are the council aware of any local flooding issues within thearea? As part of our Flood Risk Assessment we will be documenting any recorded incidents of flooding so any records/anecdotal evidence that the council may have, would be of great help. In particular we would be interested to hear of any reported incidents of surface water, highway or groundwater flooding.

Are there any surface water flood maps available and if so please can we obtain a copy?

We have recently submitted a request for data from the Environment Agency and are currently awaiting their response. We anticipate that they will be able to provide us with any relevant modelled fluvial flood levels for the site.

Flood Mitigation Measures

Can you provide information on any required flood mitigation measures you may suggest for development in this area, if deemed necessary.

Surface Water Drainage Strategy

We understand that the London Borough of Richmond Upon Thames, acting as the Lead Local Flood Authority (LLFA), are now a statutory consultee on all major planning applications and will be providing comments on the surface water drainage for new sites.

At this stage, a formal drainage strategy has not yet been produced. Therefore we would be grateful if you could please provide your pre-planning advice on the surface water drainage strategy for this site? Are there any particular local requirements that the council wish to raise, relating to the proposed drainage strategy for the area, such as:

- Discharge restrictions

- Use of SuDS features – what types and level of adoption
- Level of drainage detail required at the planning stage
- Any interim guidance for proposed drainage on new developments in this area?

Following the recent publication of the new climate change allowances from the Environment Agency, please can you confirm what the London Borough of Richmond Upon Thames consider to be an appropriate climate change allowance for developments in this area.

If you have any formal pre-planning procedure i.e. forms, fees etc, please can you provide details.

If you require any additional information, please do not hesitate to contact me or my colleague Holly (cc'd). **Please keep Holly copied in on all responses.**

Many thanks for your time.

I look forward to your reply.

Kind regards,

Sophie Thorpe
Hydrologist

RSK
18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT, UK

Direct dial: +44 (0)1442 437532
Email: SThorpe@rsk.co.uk

http://www.rsk.co.uk

APPENDIX H
DRAINAGE CALCULATIONS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	0.092	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	0.1
QBAR Urban	0.1
Q1 year	0.1
Q1 year	0.1
Q30 years	0.3
Q100 years	0.4

Point Data

QBAR Rainfall Event

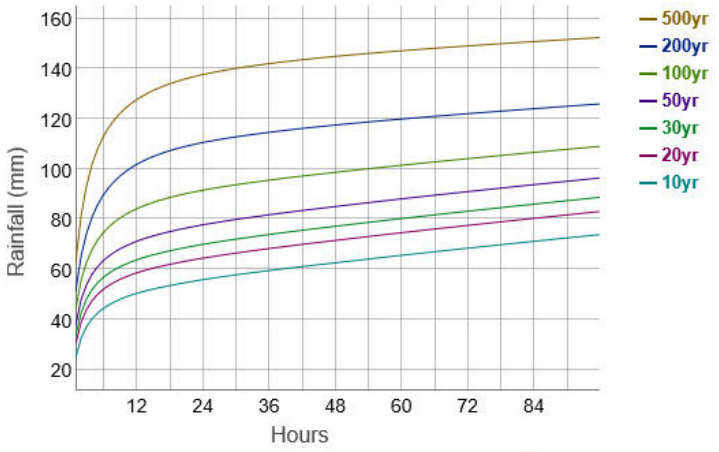
FEH 2013

Point rainfall at 517537, 169492

◉ Design Rainfall ○ Event Rarity

Duration	1	Hours
Return period	2.3	Years
Depth	12.4	mm

Calculate



Save graph as image | Export design rainfall (CSV)

A design rainfall of 12.4 mm was calculated.

This design rainfall has been calculated for a return period on the annual maximum scale.

Return period options

◉ Annual maximum
○ Peaks over threshold

Duration options

○ Fixed
◉ Sliding

1 in 1 year rainfall depth

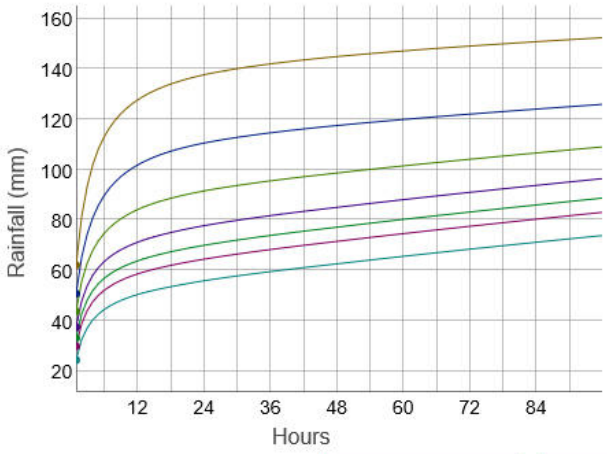
FEH 2013

Point rainfall at 517537, 169492

(•) Design Rainfall ( ) Event Rarity

Duration	1	Hours
Return period	1	Years
Depth	8.81	mm

Calculate



1.0h (0.0days):
500yr: 62.07mm
200yr: 50.69mm
100yr: 43.64mm
50yr: 37.38mm
30yr: 33.10mm
20yr: 29.85mm
10yr: 24.37mm

Save graph as image | Export design rainfall (CSV)

A design rainfall of 8.81 mm was calculated.

This design rainfall has been calculated for a return period on the POT scale (see FEH volume 2, Section 2.4).

A return period of 1 year has been expressed as 12 months on the peaks-over-threshold (POT) scale.

Return period options
- ( ) Annual maximum
- (•) Peaks over threshold

Duration options
- ( ) Fixed
- (•) Sliding

1 in 30 rainfall depth

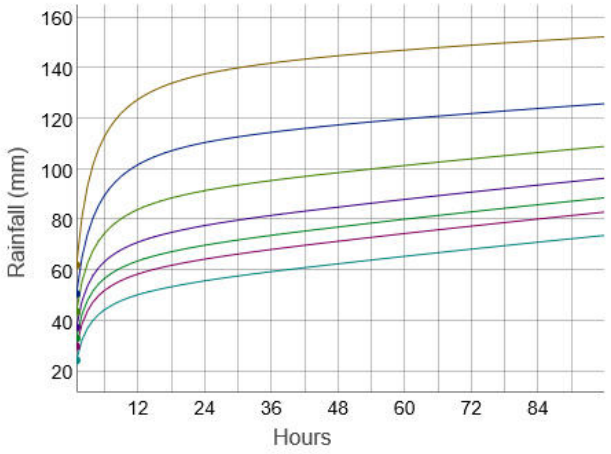
FEH 2013

Point rainfall at 517537, 169492

(●) Design Rainfall ( ) Event Rarity

Duration	1	Hours
Return period	30	Years
Depth	33.1	mm

Calculate



1.0h (0.0days):
500yr: 62.07mm
200yr: 50.69mm
100yr: 43.64mm
50yr: 37.38mm
30yr: 33.10mm
20yr: 29.85mm
10yr: 24.37mm

Save graph as image | Export design rainfall (CSV)

A design rainfall of 33.1 mm was calculated.

This design rainfall has been calculated for a return period on the annual maximum scale.

Return period options
- (●) Annual maximum
- ( ) Peaks over threshold

Duration options
- ( ) Fixed
- (●) Sliding

1 in 100 rainfall depth

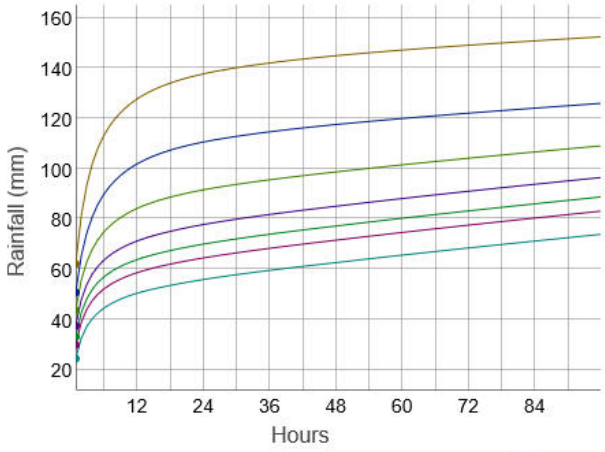
FEH 2013

Point rainfall at 517537, 169492

◉ Design Rainfall ○ Event Rarity

Duration	1	Hours
Return period	100	Years
Depth	43.64	mm

Calculate



1.0h (0.0days):
500yr: 62.07mm
200yr: 50.69mm
100yr: 43.64mm
50yr: 37.38mm
30yr: 33.10mm
20yr: 29.85mm
10yr: 24.37mm

Save graph as image | Export design rainfall (CSV)

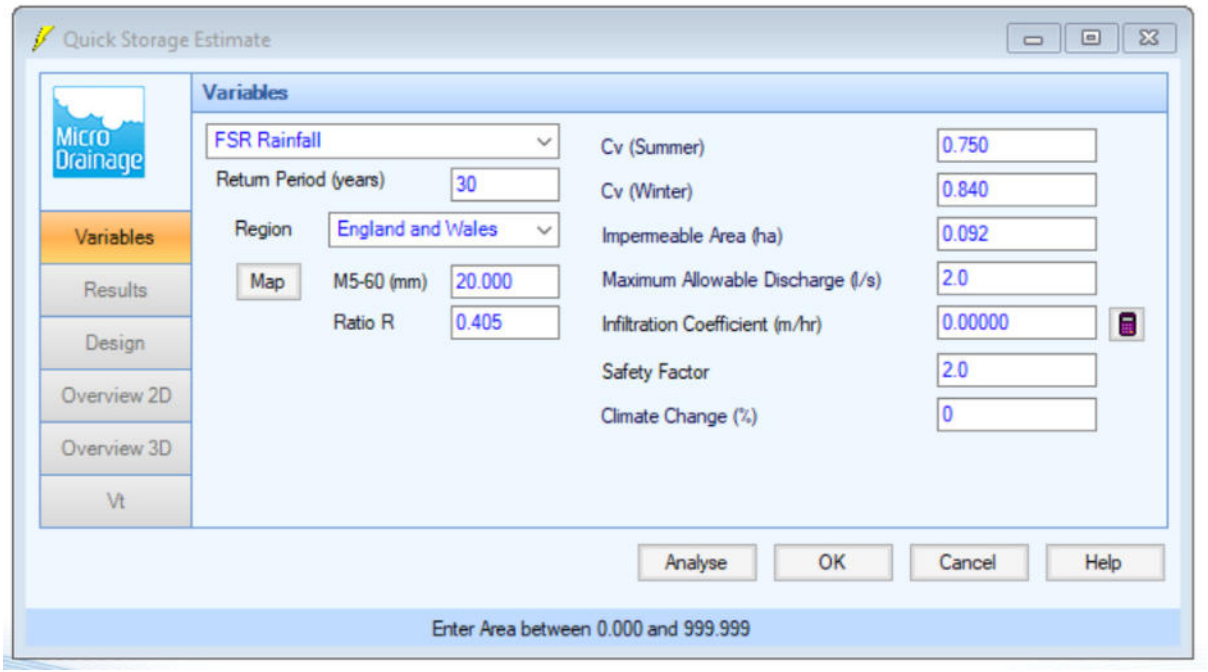
A design rainfall of 43.64 mm was calculated.

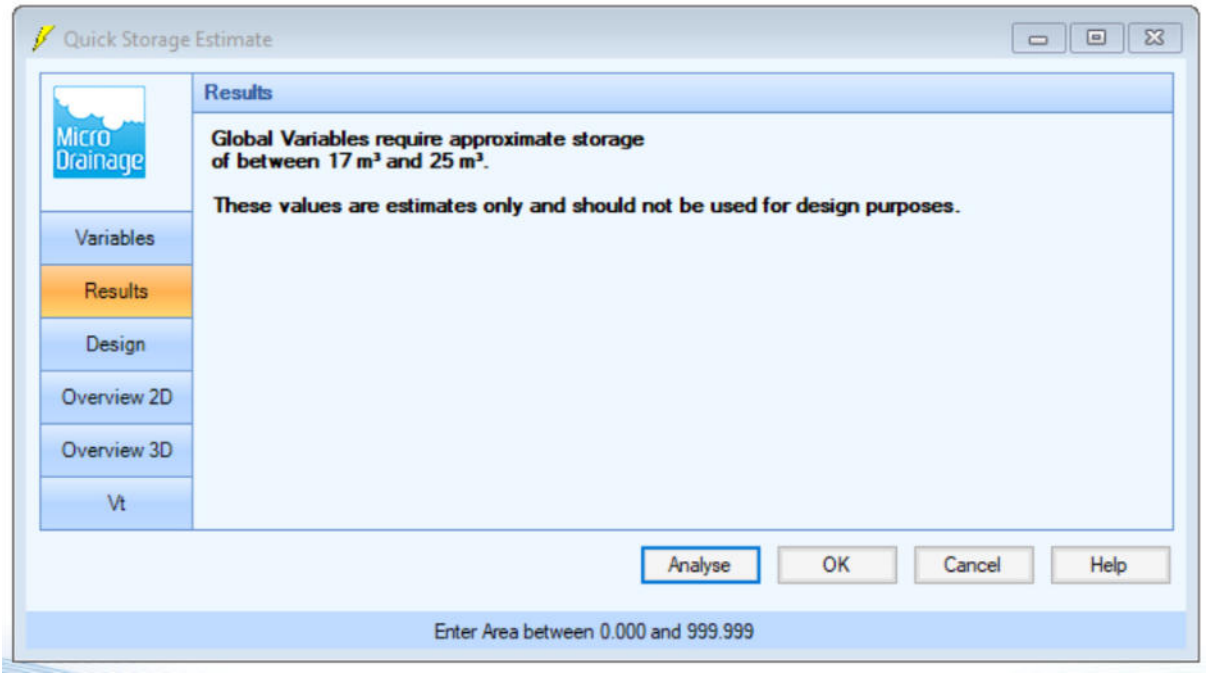
This design rainfall has been calculated for a return period on the annual maximum scale.

Return period options
◉ Annual maximum
○ Peaks over threshold

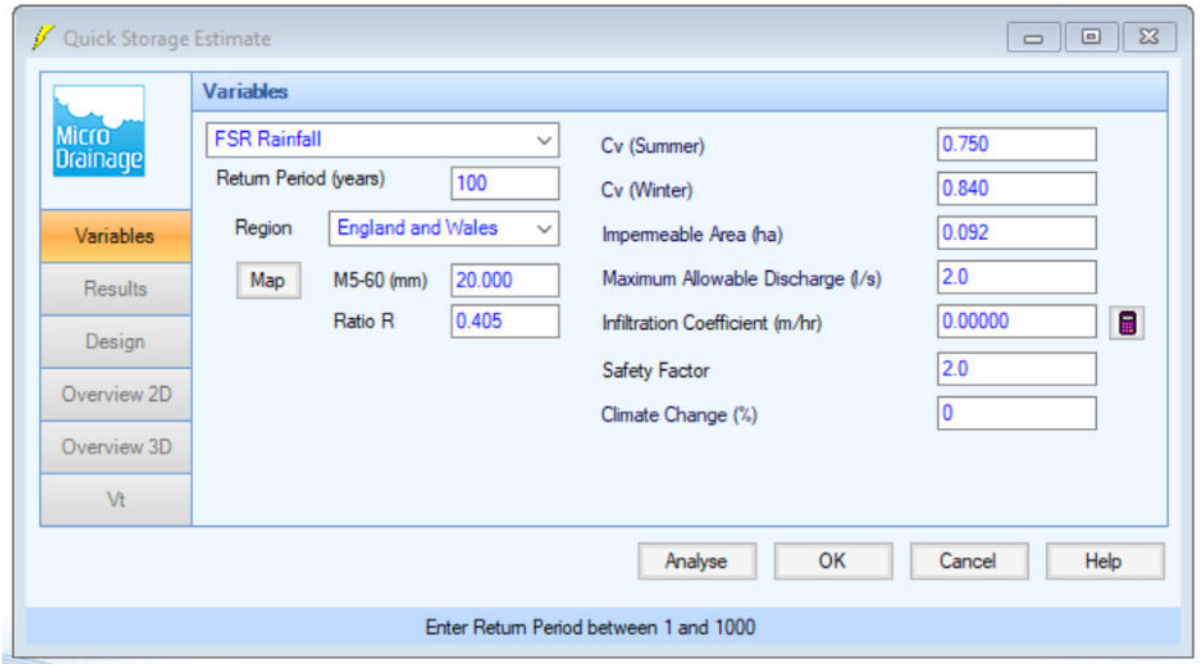
Duration options
○ Fixed
◉ Sliding

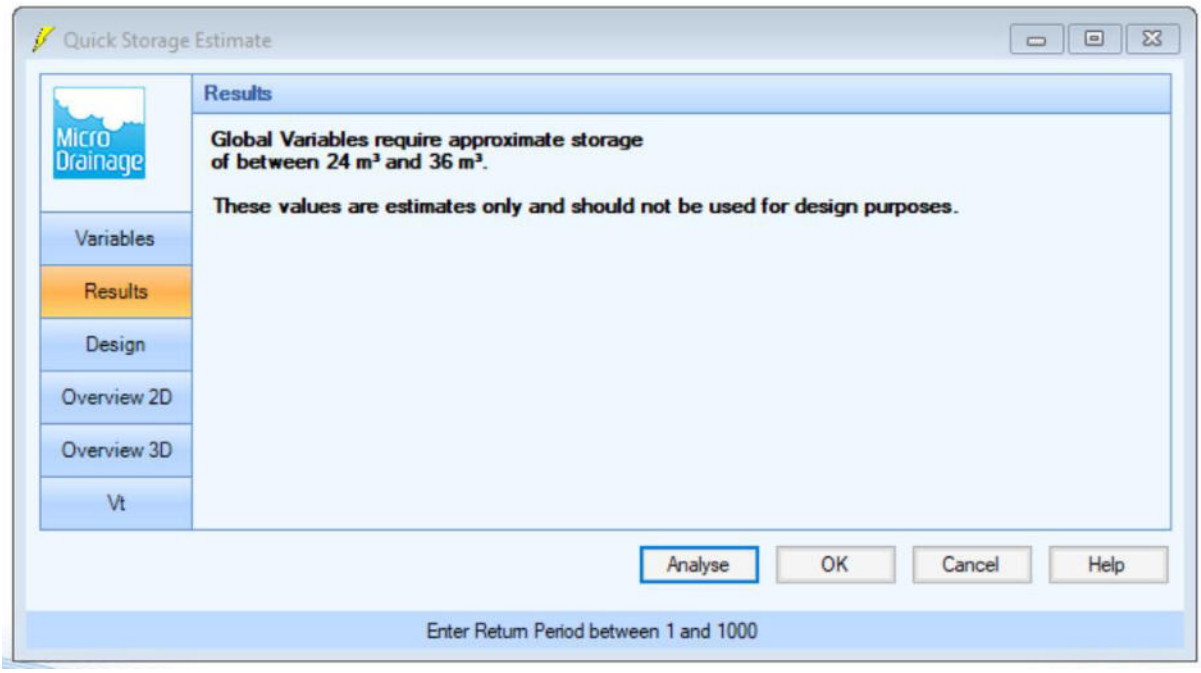
1 in 30 year rainfall event



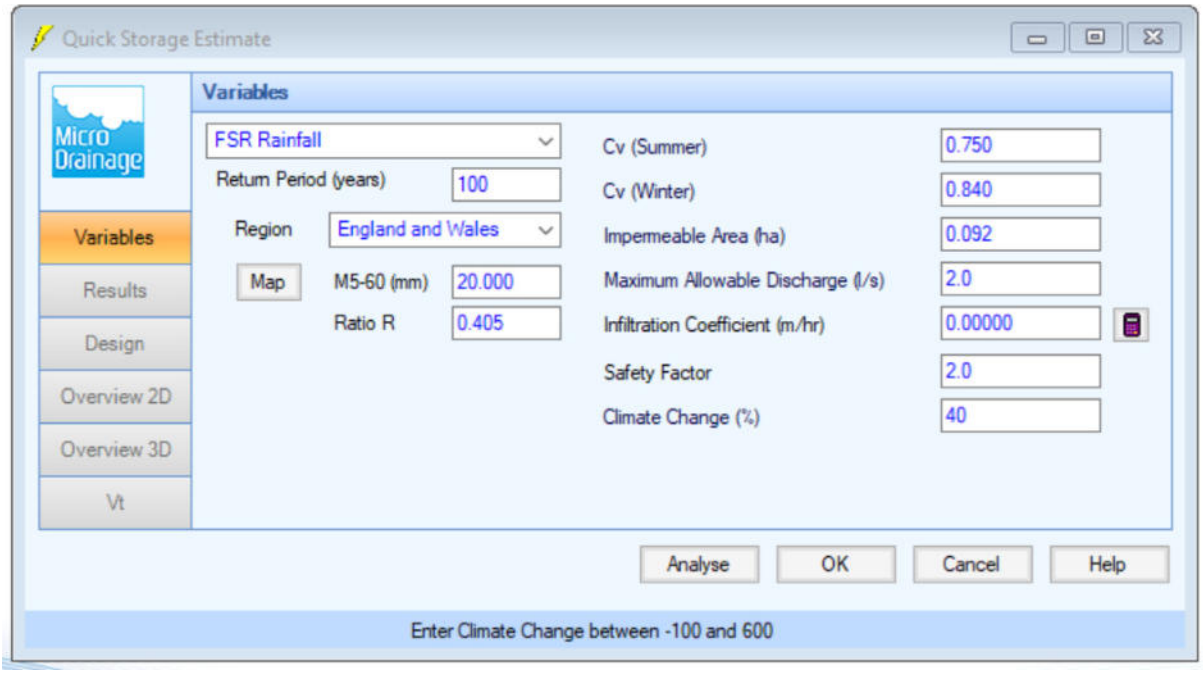


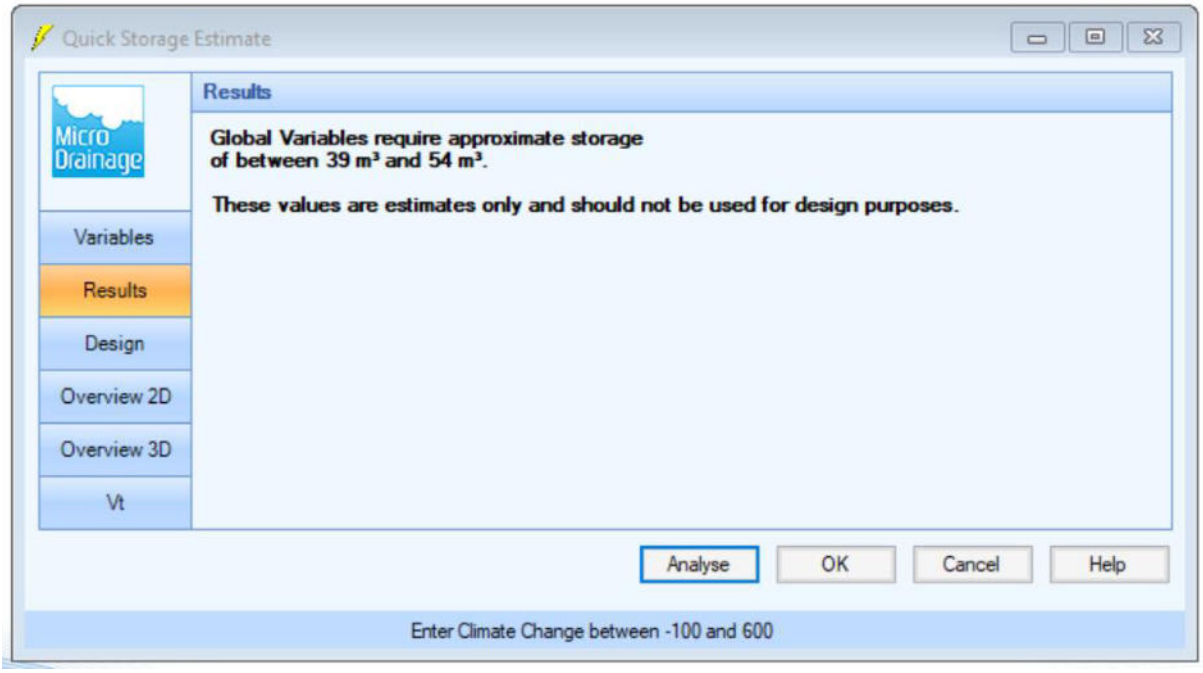
1 in 100 year rainfall event



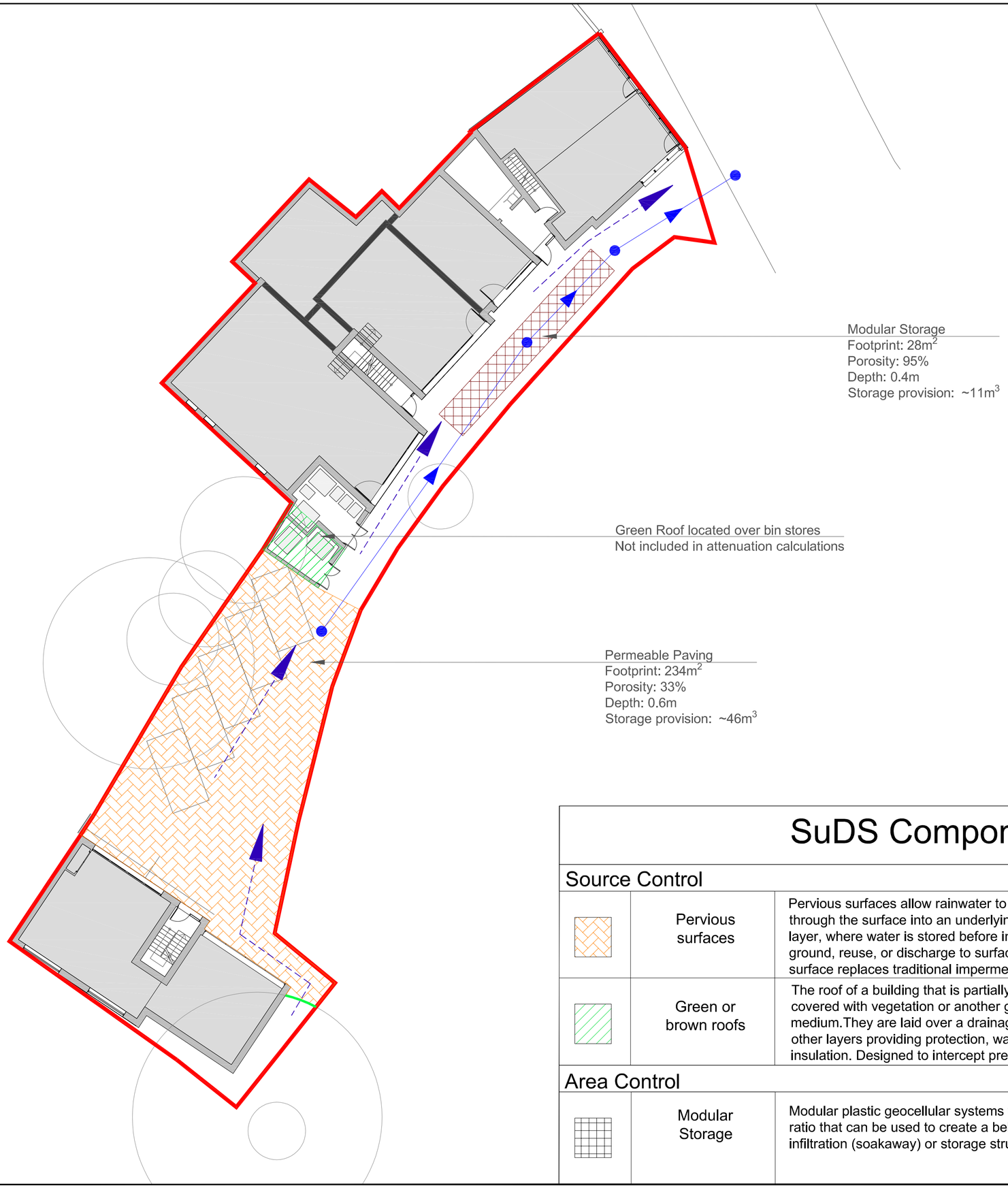


1 in 100 year rainfall event plus a 40% allowance for climate change





APPENDIX I
SURFACE WATER DRAINAGE STRATEGY



Notes

1. Proposed layout taken from Fletcher Crane Architects (drawing number TP(10)21 Proposed Ground Floor Plan)
2. The locations of all SuDS features is indicative only and should be finalised at the detailed design phase. Not for construction.
3. Connections into the Thames Water Sewer network should be confirmed with the LLFA.

Legend

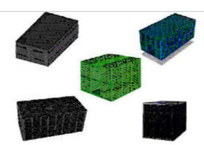
- Site Boundary
- Tree Root Protection Area
- Proposed Surface Water Manhole and Sewer Run
- Exceedance Routes

SuDS Components

Source Control

Pervious surfaces	Pervious surfaces allow rainwater to infiltrate through the surface into an underlying storage layer, where water is stored before infiltration to the ground, reuse, or discharge to surface water. Porous surface replaces traditional impermeable surfaces.	
Green or brown roofs	The roof of a building that is partially or completely covered with vegetation or another growing medium.They are laid over a drainage layer, with other layers providing protection, waterproofing and insulation. Designed to intercept precipitation.	

Area Control

Modular Storage	Modular plastic geocellular systems with a high void ratio that can be used to create a below ground infiltration (soakaway) or storage structure.	

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
P1	14.12.2020	Draft	HD	AC	AC

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Client
MR AND MRS FROST

Project Title
29-31 HIGH STREET
HAMPTON WICK

Status
DRAFT

Drawing Title
INDICATIVE SURFACE WATER DRAINAGE STRATEGY

Drawn	Date	Checked	Date	Approved	Date
HD	10.12.20		10.12.20		

Scale	Orig Size	Dimensions
1:200	A2	m

Project No.	Drawing File
133989	133989 - ISWDS P1 draft d.dwg

Drawing No.	Rev.
133989 - 01	P1

Scale 1:200
0 2 4 6 8 10m

File Location: K:\133000-133999\133989 - 29-31 HIGH STREET, HAMPTON WICK\GRAPHIC\FLOOD RISK\133989 - ISWDS P1 DRAFT D.DWG

APPENDIX J
SUDS PRO-FORMA

LONDON BOROUGH OF RICHMOND UPON THAMES

LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	133998 - 29-31 High Street, Hampton Wick
Address & post code	29-31 High Street, Hampton Wick, Kingston upon Thames, KT1 4DA
OS Grid ref. (Easting, Northing)	E 517522 N 169449
LPA reference (if applicable)	N/A
Brief description of proposed work	Partial demolition of existing buidlings and the construction of two retail units, a business unit, two workshops and nine residential units.
Total site Area	921 m^2
Total existing impervious area	921 m^2
Total proposed impervious area	921 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	The site is not in a Critical Drainage Area and is at low risk of surface water flooding.
Existing drainage connection type and location	Connection to mains surface water sewer below High Street.
Designer Name	Holly Dumsday
Designer Position	Graduate Hydrologist

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	Kempton Park Gravel Member
Bedrock geology classification	London Clay Formation
Site infiltration rate	2 m/s
Depth to groundwater level	1.5 m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use		
2 use infiltration techniques, such as porous surfaces in non-clay areas		
3 attenuate rainwater in ponds or open water features for gradual release		
4 attenuate rainwater by storing in tanks or sealed water features for gradual release		
5 discharge rainwater direct to a watercourse		
6 discharge rainwater to a surface water sewer/drain	Feasible (Y/N	oposed (Y/
7 discharge rainwater to the combined sewer.		

2c. Proposed Discharge Details

Proposed discharge location	Surface water sewer network
Has the owner/regulator of the discharge location been	To be contacted at detailed design stage.

	Designer Company	RSK LDE Ltd		consulted?	

LONDON BOROUGH OF RICHMOND UPON THAMES

LoDEG

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.1			
1 in 1	0.1	2.8	86	0.3
1 in 30	0.3	10.5	67	0.9
1 in 100	0.4	13.8	62	1.2
1 in 100 + CC			54	2
Climate change allowance used		40%		

3b. Principal Method of Flow Control	Flow limiter to be decided.

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	13.5846	13.5846	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	376.8957	234.4956	46
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	920.7587		11
Total	**1311.239**	**248.0802**	**57**

4. Supporting Documentation

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	FRA Section 7
Drainage hierarchy (2b)	FRA Section 7
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	FRA Section 7 Approval to be sought at detailed design stage
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	FRA Section 7
Proposed SuDS measures & specifications (3b)	FRA Section 7
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	TBC at detailed design stage.
Detailed drainage design drawings, including exceedance flow routes	Appendix I of FRA. TBC at detailed design stage.
Detailed landscaping plans	TBC at detailed design stage.
Maintenance strategy	TBC at detailed design stage.
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	FRA Section 7
b) biodiversity?	FRA Section 7
c) amenity?	FRA Section 7