

# FloodSmart Plus



## Flood Risk Assessment

### Site Address

200 Castelnau Barnes  
London  
SW13 9DW

### Date

2021-09-10

### Report Status

FINAL

### Grid Reference

522818, 177807

### Site Area

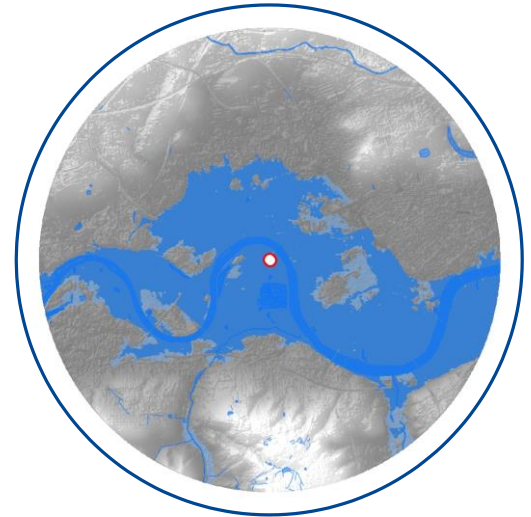
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### Report Prepared for

Dr Alexander Jabour  
Castelnau Dentists,  
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SW13 9DW

### Report Reference

75282R1



## RISK – Low to Very Low

The Site is located within a tidal Flood Zone 3 (high probability), but benefits from the presence of flood defences. Taking into consideration the presence of defences, the risk of flooding from rivers and sea is classed as Very Low. The Site is at a Very Low risk of pluvial and Low risk of groundwater flooding.

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# 1. Executive summary



A review has been undertaken of national environmental data sets to assess the flood risk to the Site from all sources of flooding in accordance with the National Planning Policy Framework (NPPF) (2021) and National Planning Practice Guidance (NPPG) (2014). A site-specific flood risk assessment, to assess the flood risk to and from the development Site, is provided within this concise interpretative report written by an experienced GeoSmart consultant. Baseline flood risk and residual risks that remain after the flood risk management and mitigation measures are implemented are summarised in the table below.

## Site analysis

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Very Low	Very Low
Sea (coastal/tidal) flooding	Very Low	Very Low
Surface water (pluvial) flooding	Very Low	N/A
Groundwater flooding	Low	Negligible
Other flood risk factors present	Yes	N/A
Is any other further work recommended?	Yes	Yes (see Below)

N/A = mitigation not required

## Summary of existing and proposed development

The Site is currently used within a mixed-use capacity. At present there is a single building with a lower ground floor flat and a dentist surgery across both the lower ground and ground floor. Development proposals comprise the single story rear extension to the lower ground floor (the existing and proposed lower ground floor has direct access to the rear garden due to the Site's topography) and the change of use of the existing flat to provide an extended dental surgery.

## Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

- According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located within a fluvial and tidal Flood Zone 3 (High probability).
- The Site benefits from the presence of flood defences, 200 m away in good condition, designed to provide a 1 in 1000 year event standard of protection.
- The Site is located 200 m from a watercourse.
- According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map, which considers the type, condition and crest height of flood defences, the Site has a Very Low risk of flooding from Rivers and the Sea.
- The Site could potentially be at risk from flooding due to blockage or failure of a bridge located on the water course 200 m from the Site although this is considered unlikely based on the distance from site and nature of the bridge.
- Modelled flood data obtained from the EA has been analysed in line with the most up to date guidance on climate change (EA, 2016), to confirm a maximum "design" flood level at the Site.

The Site is not at risk of overtopping of flood defences in the present day or future flood scenarios, flood defences will be raised in accordance with the TE2100 project plans.

There is a residual risk of a breach occurring in the River Thames flood defences, albeit the condition and likelihood of this occurring is very low. During a 1 in 200 year, 2100 scenario tidal flood event, where a breach in the tidal flood defences occurred, the flood level at the Site would be 5.38 mAOD.

During this event, flood depths in the area proposed for development could be between 0.10 to 3.22 m, with the greatest depths associated with the topographic low in the garden. Flood mitigation measures are included in the next section.

Emergency evacuation routes are available to the south. In the event of a flood, safe refuge can be taken on the 1<sup>st</sup> floor levels and above.

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a Very Low risk of pluvial flooding.
- Groundwater Flood Risk screening data indicates there is a Negligible risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100 year event. However, the risk is increased to Low due to the proposed lower ground floor extension and local hydrogeological conditions.
- The risk of flooding from artificial (man-made) sources such as reservoirs, sewers and canals has been assessed:
  - The EA's Risk of Flooding from Reservoir map confirms the Site is at risk of reservoir flooding.
  - Ordnance Survey (OS) data confirms there are no canals near to the Site.

A risk has been identified from reservoirs, although the level of risk could not be determined.

- The risk to the development has been assessed over its expected 60 year lifetime, including appropriate allowances for the impacts of climate change. More extreme weather events could increase the risk to the Site from sea level rise/and or increases in river flooding / and or increased potential for surface water / river flooding. Site specific assessment indicates risk to the Site will not increase significantly and appropriate mitigation measures are proposed.

In accordance with paragraphs 161, 168 and footnote 56 of the NPPF (2021), as the development proposals are comprised of a minor extension to an existing building within Flood Zone 3 the Sequential Test is not required.

## Recommendations / Next steps

Recommendations for mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.

- There is a risk of flooding from fluvial sources during a breach event, where flood depths could be up to 3.22 m in depth. As the development proposals are comprised of a lower ground floor extension and change of use to an existing dwelling, the raising of Finished Floor Levels (FFL) is unlikely to be a feasible method of flood mitigation. Flood resilience measures should be considered in lieu of raising FFL, as detailed in Section 7.
- Mitigation measures for groundwater flooding that could be considered include: waterproof tanking; interceptor drains; sump and pump; and non-return valves on sewer lines.
- Occupants of the Site should be signed up to receive EA Flood Alerts.
- A Flood Warning and Evacuation Plan (FWEP) is recommended to ensure persons using the Site can evacuate safely on receipt of a Flood Warning.
- A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

## 2. Introduction



### Background and purpose

A site-specific flood risk assessment has been undertaken, to assess the flood risk to and from the development Site. This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2021) and the source(s) of any flood risk present. Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development was undertaken.

This report has been prepared with reference to the NPPF (2021) and NPPG (2014).

*"The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied" (NPPF, 2021).*

The NPPF (2021) and NPPG (2014) promote a sequential, risk based approach to the location of development. This also applies to locating a development within a Site which has a variable risk of flooding.

*"This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible" (NPPG, 2014).*

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

### Report scope

In accordance with the requirements set out within NPPG 2014 (Paragraph: 030 Reference ID: 7-030-20140306), a thorough review of a commercially available flood risk report and EA supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the EA and a review of the London Borough of Richmond upon Thames Strategic Flood Risk Assessment (SFRA) is/are used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the NPPF (2021).

The existing and future flood risks to and from the Site from all flood sources is assessed in line with current best practice using the best available data. The risk to the development has been assessed over its expected lifetime, including appropriate allowances for the impacts of climate change. Residual risks that remain after the flood risk management and mitigation

measures are implemented, are considered with an explanation of how these risks can be managed to keep the users of the development safe over its lifetime.

An indication of whether the Site will potentially increase flood risk elsewhere is provided, including where the proposed development increases the building footprint at the Site. A drainage strategy to control runoff can be commissioned separately if identified as a requirement within this report.

## Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

The basemap used is the OS Street View 1:10,000 scale, however the Site boundary has been drawn using BlueSky aerial imagery to ensure the correct extent and proportion of the Site is analysed.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

## Datasets

The following table shows the sources of information that have been consulted as part of this report:

**Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk**

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	OS Data
Historical	X	X	X	
River (fluvial) / Sea (tidal/coastal)	X	X	X	
Surface water (pluvial)	X	X	X	

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	OS Data
Groundwater	X	X		
Sewer		X		
Culvert/bridges		X		X
Reservoir		X	X	

\*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.



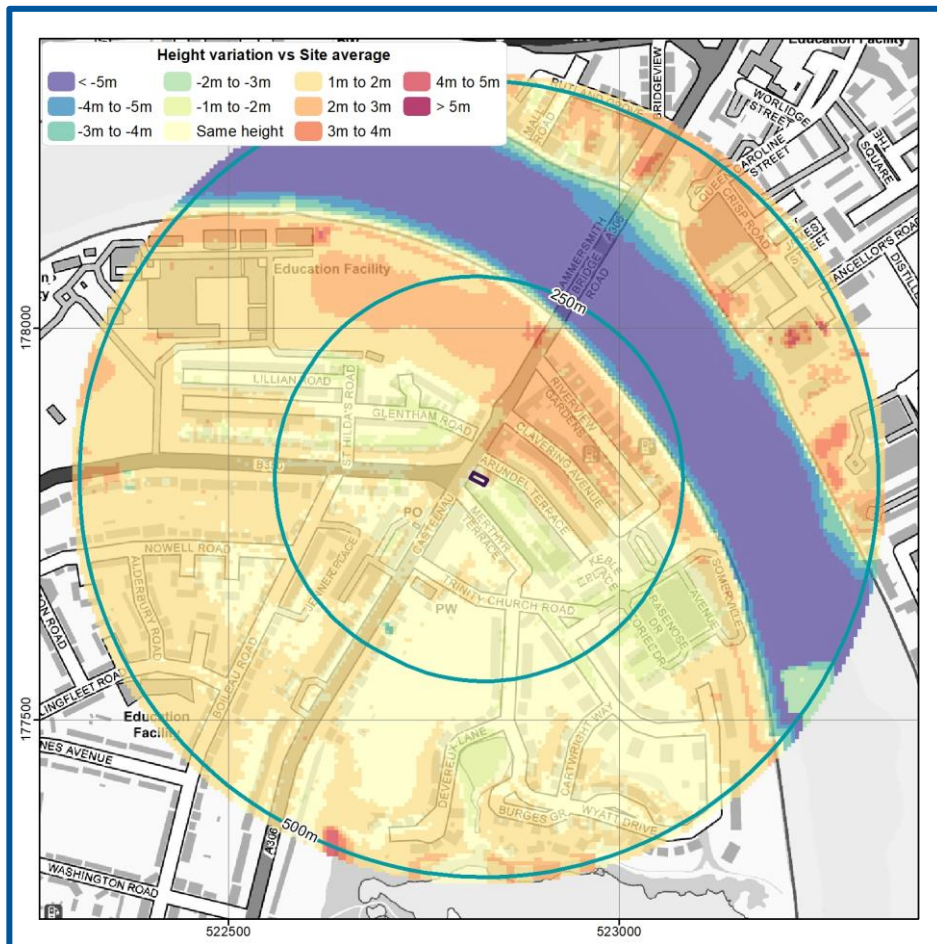


## Site information

The Site is located in the London Borough of Richmond upon Thames in a setting of commercial and residential land use at National Grid Reference TQ 22814 77802. Site plans and drawings are provided in Appendix A.

The general ground levels on the Site are between 5.3 and 2.7 mAOD with the Site falling in an easterly direction. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of  $\pm 0.15$  m (Appendix D).

Figure 1. Site Location and Relative Elevations (GeoSmart, 2021).



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## Development

The Site is currently used within a mixed-use capacity. At present there is a single building with a lower ground floor flat and a dentist surgery across both the lower ground and ground floor. Development proposals comprise the single story rear extension to the lower ground floor (the existing and proposed lower ground floor has direct access to the rear garden due



to the Site's topography) and the change of use of the existing flat to provide an extended dental surgery.

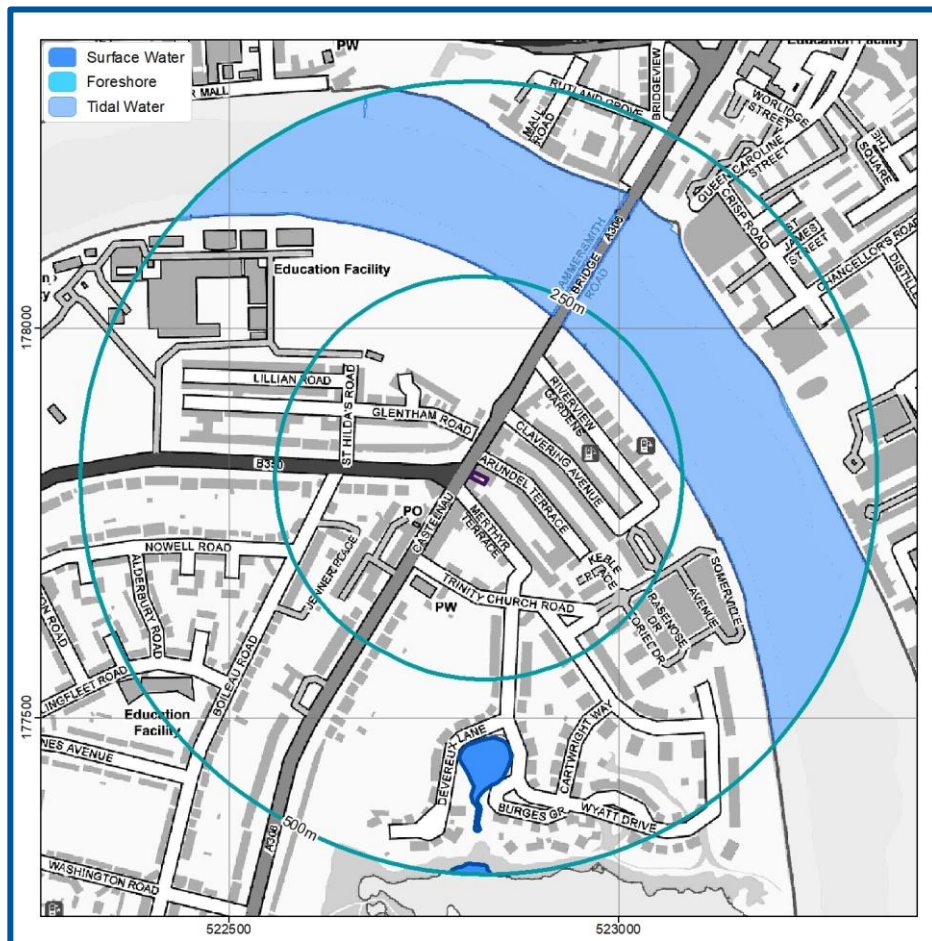
Site plans are included within Appendix A.

The effect of the overall development will result in an increase in number of occupants and/or users of the building but will not result in the change of use, nature or times of occupation. According to Table 2 of the NPPG (2014), the vulnerability classification of the existing development is More Vulnerable and proposed development is Less Vulnerable. The estimated lifespan of the development is 60 years.

## Hydrological features

According to Ordnance Survey (OS) mapping included in the following figure, there are numerous surface water features within 500 m of the Site.

Figure 2. Surface water features (EA, 2021)



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The River Thames is approximately 220 m north at a lower elevation than the Site.

The London Wetland Centre approximately 350 m south of the Site at a similar elevation to the Site.

## Proximity to relevant infrastructure

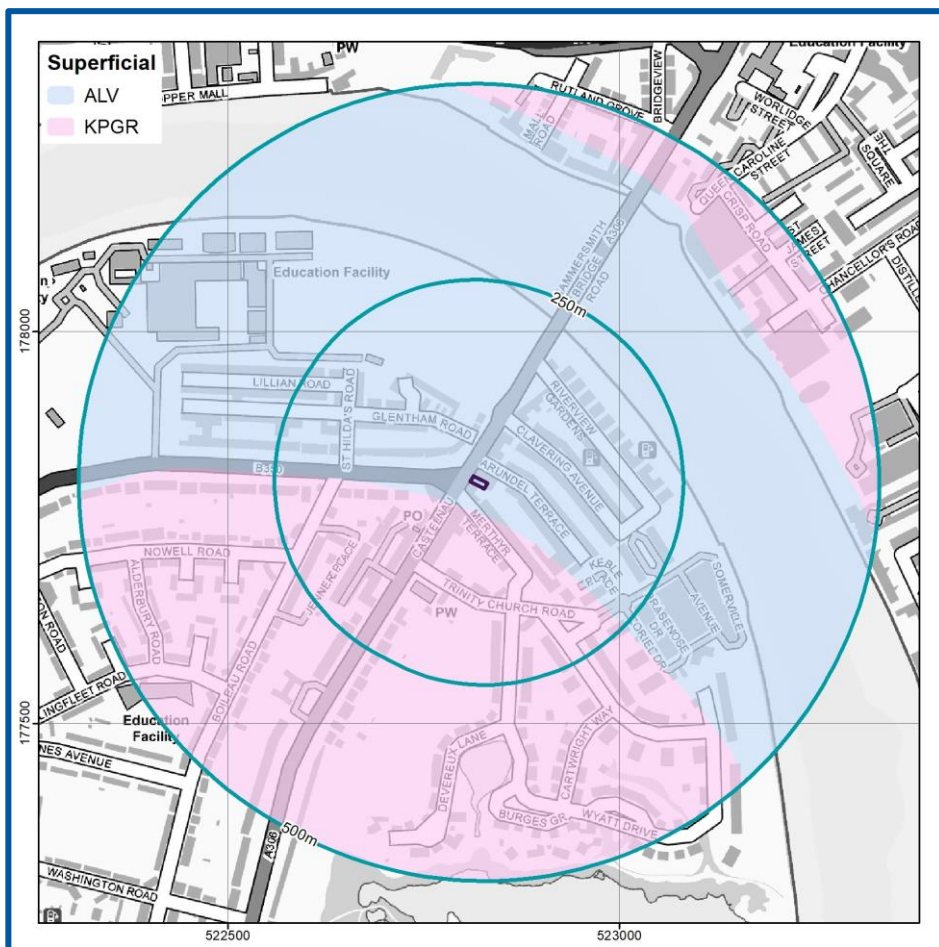
The nearest flood defences are located approximately 200 m north of the Site.

Hammersmith Bridge is approximately 200 m to the north of the Site.

## Hydrogeological features

British Geological Survey (BGS) mapping indicates the underlying superficial geology (Figure 3) consists of Alluvium (ALV) (BGS, 2021) and is classified as a Secondary Undifferentiated Aquifer(EA, 2021).

**Figure 3. Superficial Geology (BGS, 2021)**



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BGS mapping indicates the underlying bedrock geology (Figure 4) consists of the London Clay Formation (LC) (BGS, 2021) and is classified as a Unproductive Strata (EA, 2021).

Figure 4. Bedrock Geology (BGS, 2021)



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The Site does not lie within a groundwater Source Protection Zone (SPZ) (EA, 2021).

the nearest and most relevant borehole (ref:TQ27NW467) is approximately 45 m to the north of the Site boundary at an elevation of 5.1 mAOD. The borehole records confirm the underlying geology is comprised of made ground to a depth of 2.55m below ground level (BGL) underlain by sand and gravel to a depth of 6.05m BGL, and clay to a depth of 7m BGL where the borehole ends.

Groundwater levels are recorded at 3.6 m below ground level, subject to seasonal variations.

The hydrogeological characteristics suggest there is potential for a shallow groundwater table beneath the Site.

Groundwater levels may rise in the superficial aquifer in response to high river events subject to hydraulic continuity between the driving water level, the groundwater system and the Site.

Permeable material has been identified overlying low permeability material which could give rise to a shallow perched water table.



## 4. Flood risk to the development



### Historical flood events

According to the EA's historical flood map (Figure 5) no historical flood events have been recorded at the Site (EA, 2021).

The SFRA, does not include any data on whether there have been historic flooding at the Site.

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 5. EA historic flood map



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## Rivers (fluvial) / Sea (coastal/tidal) flooding

The predominant flooding risk at the Site is from flooding from rivers, termed as fluvial flooding due to the closure of the Thames Barrier to reduce the tidal effects from the Thames Estuary. Although in this instance the flooding risks are considered to be from both fluvial and tidal sources.

River (fluvial) flooding occurs during times of heavy rainfall or snow melt when watercourses' capacity can be exceeded, over topping the banks and flood defences.

Estuarine (Tidal) flooding is caused by extreme tidal conditions which can occur because of the following mechanisms, either individually or in combination. These are:

- High tide levels – variations in tidal levels due to gravitational effects of the sun and moon can result in higher sea levels – there is an approximate twice daily variation between high and low tide, onto which is superimposed a spring-neap tide cycle when extra high and low tides occur.
- Surge – an increase in sea level above tidal level caused by low atmospheric pressure which may be exacerbated by the wind acting on the sea.

According to the EA's Flood Map for Planning Purposes (Figure 6), the Site is located within fluvial and tidal Flood Zone 3 and is therefore classified as having a High probability of fluvial and tidal (coastal) flooding from the River Thames / Sea. The Site lies approximately 1.7 km to the north of the nearest land outside Flood Zones 2 and 3.



# Flood defences

## Guidance

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250 m) may require a more detailed FRA subject to local topography.

- The Site is in an area which benefits from flood defences.<sup>1</sup>

Information from the EA relating to the flood defences is outlined below.

- According to the EA (2021) the flood defences in place for this area are designed to defend up to a 1 in 1000 year flood event.
- The nearest and most applicable formal flood defences are raised, man-made and privately owned with a minimum crest level of 6.03 - 6.09 mAOD.
- The EA inspects the defences twice a year and classifies their current condition as "Good (Condition Grade: 2)".

## Thames Estuary 2100 (TE2100)

The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels - for which the Barrier would normally shut for the 2008 epoch - will have to be allowed through to ensure the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be heightened to match.

There are two node points within close proximity to the proposed site:

- The current extreme water level at Node point 2.19 is 5.03 mAOD and flood defences are 5.54 mAOD therefore will prevent overtopping occurring in this scenario.
- The current extreme water level at Node point 2.2 is 5.01 mAOD and flood defences are 5.54 mAOD therefore will prevent overtopping occurring in this scenario.

The proposed flood defence levels to allow for future 2100 predictions are 6.40 mAOD with the predicted water levels rising to 5.92 mAOD. This will prevent flooding in both present day and future scenarios.

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<sup>1</sup> The EA maps Areas which Benefit from the presence of Defences (ABD) in a 1 in 100 (1%) chance of flooding each year from rivers; or 1 in 200 (0.5 %) chance of flooding each year from the sea. If the defences were not there, these areas would flood in a 1 in 100 (1%)/ 1 in 200 (0.5 %) or larger flooding incident. The EA do not show all areas that benefit from all flood defences, some defences are designed to protect against a smaller flood with a higher chance of occurring in any year, for example a flood defence which protects against a 1 in 30 chance of flooding in any year. Such a defence may be overtopped in a flood with a 1 in 100 (1%)/ 1 in 200 (0.5%) chance of occurring in any year, but the defence may still reduce the affected area or delay (rather than prevent) a flood, giving people more time to act and therefore reduce the consequences of flooding.



## Model data

As the Site is located within the EA’s fluvial / tidal floodplain, modelled flood elevation data was obtained from the EA. This data is more up to date than that which is included in the London Borough of Richmond SFRA (Metis, 2020) and has been used to assess flood risk and to provide recommendations for mitigation for the proposed development. The data is provided in Table 2 below and included with Appendix B.

### Thames Tidal Defences Study (Halcrow, 2006) and Thames Estuary 2100 Study (HR Wallingford, 2008)

In-channel flood level data has been taken from the nearest and most relevant node point (2.20) approximately 300 m to the north in the River Thames. When compared with the existing (2008) and proposed (2100) defence raising, the data confirms even if the water level in the River Thames rises due to climate change, the defences are going to be raised too and therefore the Site will always be defended (EA, 2021).

### Residual Tidal Flood Risk

The tidal flood assessment in the “Rivers (fluvial) / Sea (Coastal) flooding” section represents the likelihood of flooding from overtopping at the Site, where flood defences are in good condition and are fully maintained. The Site is not at risk of overtopping, however there is a residual risk related to a breach in the Thames flood defences.

### Thames Tidal Upriver Breach Inundation Modelling – 2017

Modelled breach flood level data has been taken from the Thames Tidal Upriver Breach Inundation Modelling Study (Atkins, 2017) to assess flood risk and provide recommendations for mitigation measures.

The mapped data indicates the Site would flood in the 2005 and 2100 breach flood scenarios.

**Table 2. Modelled Breach Flood Levels**

Flooding scenario	1 in 200 year (2005) scenario breach Event	1 in 200 year (2100) scenario breach Event
Flood Level (mAOD)	4.88	5.40

Ground levels at the Site are between 5.3 and 2.7 mAOD, therefore the flood depth at the Site during the 2005 breach event would be between 0 and 2.18 m with the greatest depths associated with the topographic low in the garden. Flood depth at the Site during the 2100 breach event would be between 0.10 and 3.22 m with the greatest depths associated with the topographic low in the garden.

The ground levels in the area proposed for the extension are between 3.5 and 3.3 mAOD therefore during the 2005 breach event flood depths would be between 1.38 and 1.58 m, and during the 2100 breach event flood depths would be between 1.9 and 2.1 m.

## Climate change factors

The EA's *Flood risk assessments: climate change allowances* guidance (Published 19 February 2016 and updated 27 July 2021) has been used to inform a suitable increase in river flows, sea level and to allow for surge and wave action for the proposed development.

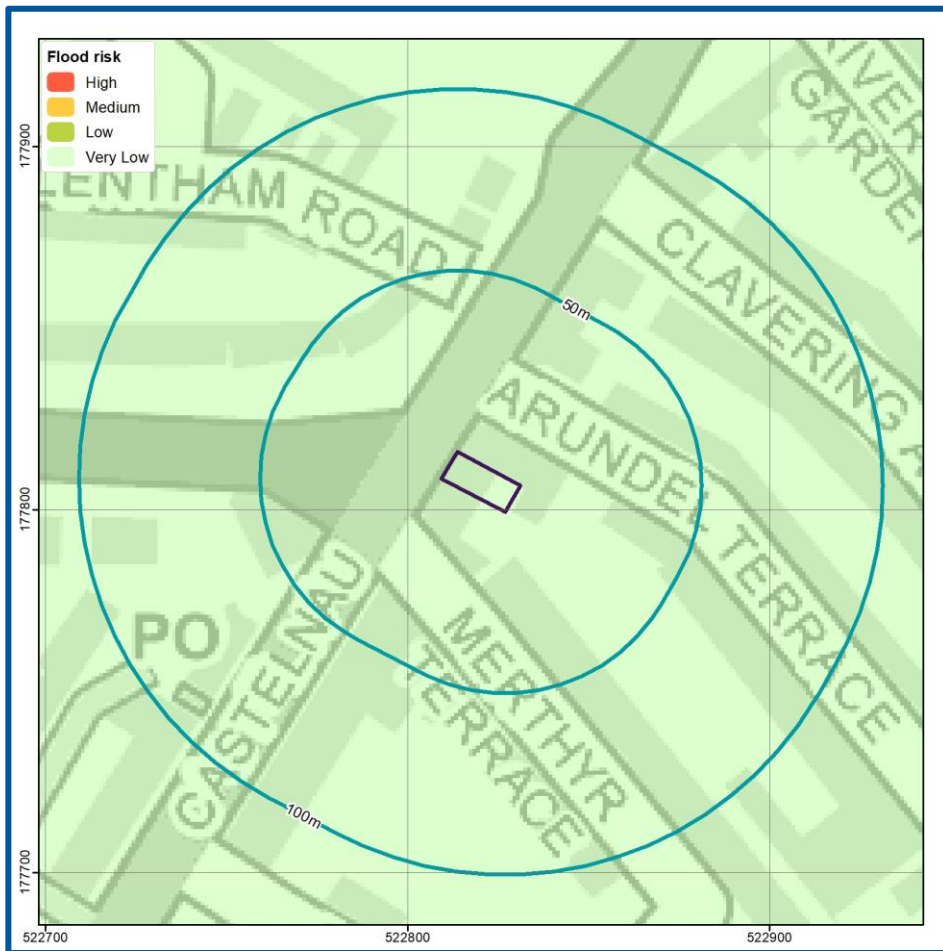
The updated guidance confirms 'Less Vulnerable' developments are required to undertake a Basic assessment approach. In this instance the EA model already incorporates the most up to date allowance for climate change on tidal flood risk, the maximum flood level in this instance is 5.40 mAOD as indicated by Table 2.

## Flood risk including the benefit of defences

The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) mapping (Figure 7), which considers the crest height, standard of protection and condition of defences, the flood risk from Rivers and the Sea is Very Low.

Figure 7. Risk of Flooding from Rivers and Sea map (EA, 2021)



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## Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a Very Low risk of pluvial flooding.

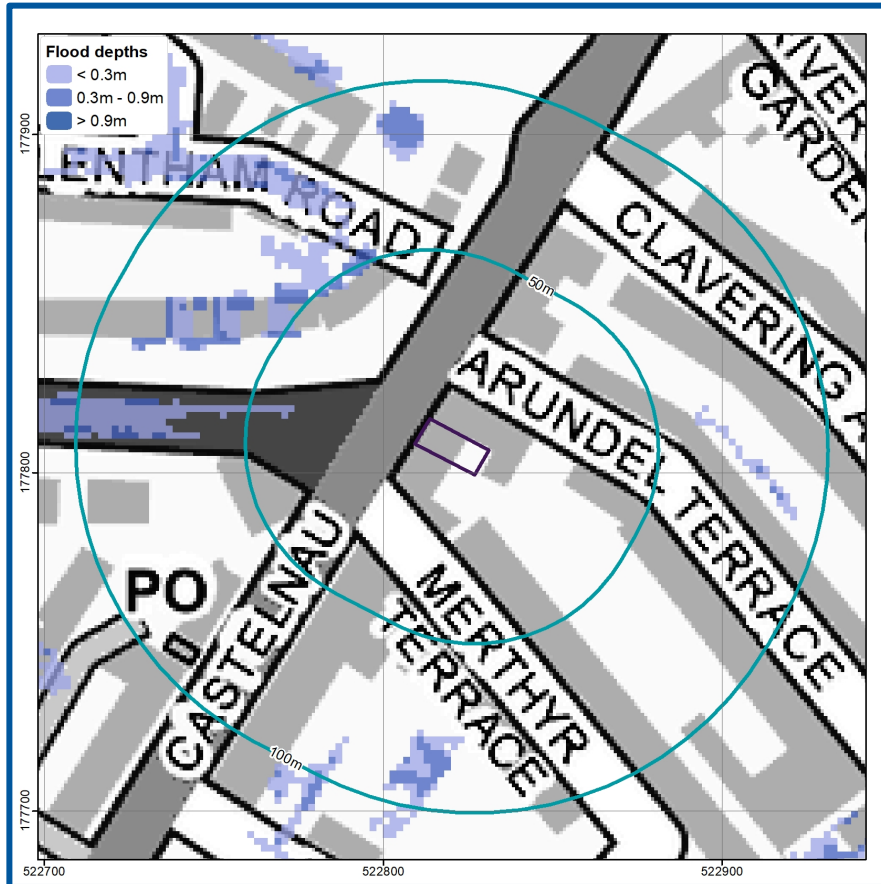
### Guidance

According to EA's surface water flood risk map the Site is at:

- Very Low risk - chance of flooding of less than 1 in 1000 (0.1%).

The Site lies immediately adjacent to areas at Medium and High risk where flood depths could be up to 0.9 m OR could be between 0.3 to 0.9m, however flooding is likely to be contained within the highway of Lonsdale Road so is unlikely to affect the Site.

Figure 8. EA Medium surface water flood risk map (EA, 2021)



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Analysis of OS mapping, ground elevation data and the EA’s pluvial flow route mapping in the 1 in 1000 year event confirms the Site is not located on a potential overland flow route during a Low risk scenario.

The London borough of Richmond’s interactive mapping service illustrates that the Site is not at risk of surface water flooding from a 1 in 30, 100, and 1000 year event (Richmond.gov.uk, 2021)(Appendix C). The SFRA confirms the Site is not located within a Critical Drainage Area (CDA)<sup>2</sup> (Metis, 2020).

<sup>2</sup> A Critical Drainage Area (CDA) is an area that has critical drainage problems and which has been notified to the local planning authority as such by the Environment Agency in line with the National Planning Policy Framework (NPPF, 2021). CDA’s are specific to Flood Zone 1, defined as areas where runoff can and may have historically contributed to flooding downstream, although they are not necessarily areas where flooding problems may occur. Where a Site is located in Flood Zone 1 and within a CDA, a Flood Risk Assessment (FRA) is required and the Council may also request Sustainable Drainage Scheme (SuDS) features to be included within the proposed development.

Climate change may lead to an increase in rainfall intensity which affects river levels, land and urban drainage systems. Rainfall intensity for small and urban catchments may increase from 5 to 20% (central estimate) or 10% to 40% (Upper estimate) over the period to 2115 (EA, 2021). The increase in surface water flood risk is best represented by the 1 in 1000 year pluvial flood extent but according to the mapping this is unlikely to impact the Site.

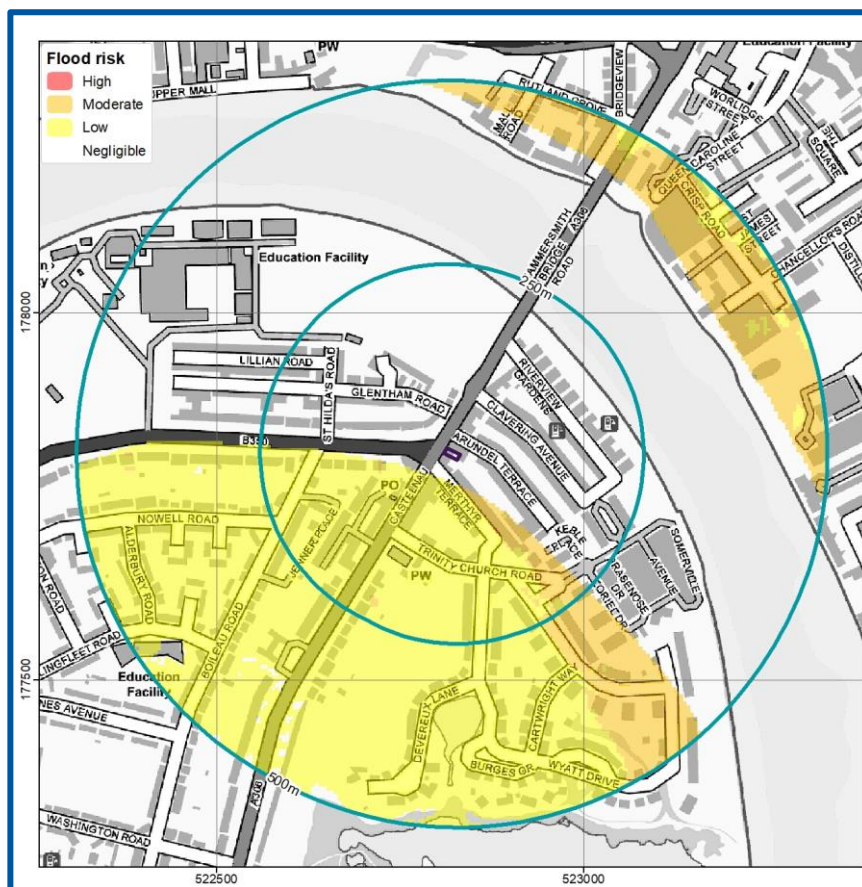
On-Site surface water drainage systems should be designed appropriately to manage the run-off.

## Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure 9) indicates there is a Negligible risk of groundwater flooding at surface in the vicinity from permeable superficial during a 1 in 100 year event.

Figure 9. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2021)



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Mapped classes combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

The London Borough of Richmond's interactive mapping service indicates the Site is not at risk of groundwater flooding but is located in area that is susceptible to groundwater flooding, with >75% of the area at risk (Richmond.gov.uk, 2021).

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data, and the EA's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

Based on a review of (limited) site specific data groundwater levels may rise in the superficial aquifer in response to high tidal events.

It is noted that groundwater flooding may occur in response to prolonged high river levels even if overtopping of flood defences does not occur.

Spring lines could give rise to groundwater seepage and overland flow through the Site, a spring line has not been identified in the vicinity of the Site.

A shallow water table has been identified potentially within 5 m of the ground surface.

Site specific assessment suggests that groundwater levels are unlikely to reach the surface at the Site.

The risks are higher for basements, buried infrastructure and soak-away systems which may be affected by high groundwater levels. Given that a lower ground floor extension is proposed (although this is accessible at ground level to the rear of the property) and based on the hydrogeological conditions, the groundwater risk to the development is revised from Negligible to Low.

## Guidance

Low Risk - There will be a possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in



peak river level for the local catchment. Sea level rises of between 0.4m and 1m are predicted by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted risk in both peak river levels and sea levels and also the variation in rainfall recharge which is uncertain.

Based on the available evidence the resulting increase to groundwater flood risk is not considered significant.

## Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.)

### Sewer flooding

The London Borough of Richmond's interactive mapping service indicates the Site is in an area where 7 outdoor and 10 indoor incidents have been recorded. However, it is recognised the data covers an area approximately 1.8 km<sup>2</sup>, and the records do not indicate any incidents specific to the Site.

#### Guidance

Properties classified as "at risk" are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

### Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

### Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.



If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier Thames Water.

## Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Culverts and bridges have been identified within 500 m of the Site.

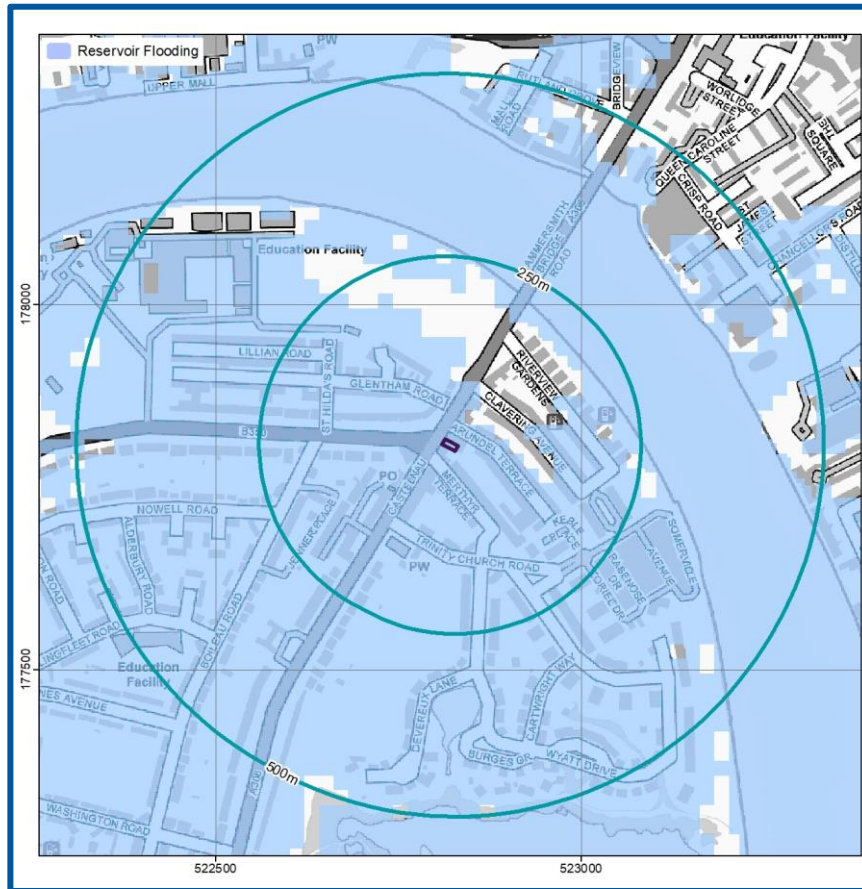
However, these structures are a significant distance upstream from the Site and are unlikely to represent a flood risk to the Site in the event of a blockage.

## Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is at risk of flooding from reservoirs (Figure 10) (EA, 2021).

The Site is considered to be at risk of flooding from several Reservoirs: Queen Elizabeth II, Queen Mary, Queen Mother, and Wrasbury located c. 20 km west of the Site, where flood depths are between 0.3 and 2 m and speed of flooding between 0.5 and 2 m/s could impact the Site.

Figure 10. EA Risk of Reservoir Flooding (EA, 2021)



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Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m<sup>3</sup> of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2021).

## 5. Flood risk from the development



### Floodplain storage

The development is located within a tidal Flood Zone and involves an increase in the proposed building footprint.

As the development is proposed in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

According to the SFRA flood plain compensation is only required where developments are located on a fluvial flood plain (Metis, 2020). As the Site is not located on a fluvial flood plain compensation is unlikely required.

### Drainage and run-off

The proposed development involves an increase of impermeable surfaces at the Site. An estimation of run-off is therefore required to permit effective Site water management and prevent any increase in flood risk to off-Site receptors from the Site.

The potential surface water run-off generated from the Site during a 1 in 100 year return period should be calculated, using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016).

The NPPF (2021) recommends the effects of climate change are incorporated into FRA's and the recently updated climate change guidance (published in 2016 and updated in 2021) confirms the requirements for inclusion within FRA's.

As the proposed development is being changed to commercial, the lifespan of the development and requirements for climate change should allow up to the 2115 scenario.

**Table 3. Climate change rainfall allowances**

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

## Sustainable Drainage System (SuDS)

It is recommended that attenuation of run-off is undertaken on-Site to compensate for proposed increases in impermeable surface areas. GeoSmart have prepared a separate SuDSmart report (ref: 75282.01).

## 6. Suitability of the proposed development



The information below outlines the suitability of proposed development in relation to national and local planning policy.

### National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

#### Guidance

**Sequential test:** The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2021). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

**Exception test:** In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within Table 4 overleaf (Table 3 of the NPPG (2014)).

As the Site is located within Flood Zone 3a and the proposed development is defined as Less Vulnerable; the proposals would be acceptable, but may be subject to the Sequential Test.

The proposed development is a 08 m<sup>2</sup> extension to the existing property which would extend out of the existing living room (the extension would not result in any additional bedrooms) and is therefore defined as minor development.

Paragraph 168 of the NPPF states: *"Applications for some minor development should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments."* (NPPF, 2021).

The NPPG (2014) defines a 'minor development' as *"householder development and small non-residential extensions (with a footprint of less than 250 m<sup>2</sup>)."*

As a result, as the proposals are defined as “minor development – householder development” they are not subject to the Sequential Test or an Exception Test.

**Table 4. Flood risk vulnerability and flood zone ‘compatibility (taken from NPPG, 2014)**

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a - high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

\*As the development proposals are for Choose an item, the Sequential and Exception Tests are not required.

## EA Flood Risk Standing Advice for vulnerable developments located in Flood Zones 2 or 3

The proposed development is considered to be a minor extension, this is defined as a household or non-domestic extension with a floor space of no more than 250 m<sup>2</sup>.

In line with the ‘Minor extensions standing advice’

- A plan is required showing the finished floor levels and the estimated flood levels.
- Floor levels are either no lower than existing floor levels or 0.3 m above the estimated flood level. If your floor levels aren’t going to be 0.3 m above existing flood levels, you need to check with your local planning authority if you also need to take flood resistance and resilience measures.

## Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below:

### *London Borough of Richmond Strategic Flood Risk Assessment (Metis, 2020):*

- Flood compensation requirements are for major developments and minor developments only. If permissible development decreases the volume of a fluvial floodplain, flood storage compensation needs to be provided. The compensatory storage provided must be equal to or exceed the storage lost to ensure there will be no net loss of flood storage. Compensation should be provided on a level-for-level and volume-for-volume basis. The EA's 2016 climate change allowances (including subsequent updates) must also be incorporated to assess and calculate floodplain storage compensation. In most cases, the 'higher central' allowance should be used to calculate floodplain storage compensation. However, the 'upper end' allowance should be used if: the catchment is particularly sensitive to small changes in volume or the affected area contains essential infrastructure or vulnerable uses.
- Application Exceptions Paragraph 164 of the 2019 NPPF highlights planning application exceptions to Sequential and Exception Tests. Minor developments and change of use development proposals that fall under one of the following criteria should not be subject to the Sequential and Exception Tests:
  - Householder developments within the curtilage of the existing dwelling.
  - Small non-residential extensions (with a footprint of less than 250m<sup>2</sup>).

### *London Borough of Richmond Basement assessment user guide (Metis, 2021):*

- Planning applications which feature basements will need to provide supporting information regarding the potential level of impact the proposed development will have. The applicant will need to show that the proposal will not adversely impact the site, neighbouring properties, and the wider natural environment. This includes impacts to groundwater and water transferred via throughflow.
- Through the London Borough of Richmond upon Thames' SFRA map if the proposed property falls within one of the two following borough designations:
  - an area with  $\geq 25\%$  susceptibility to groundwater flooding
  - one of the four throughflow catchment areas

If the proposed development falls within one (or both) of these two designations, and contains a basement, then the applicant needs to complete a Screening Assessment.



Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2021).

## Environment Agency pre-application response:

The EA (2021) was contacted as part of this FloodSmart report in order to obtain site-specific feedback on the proposed development. However, a response was not received within the timeframe of this report.

## 7. Resilience and mitigation



Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

### Rivers (fluvial) and Sea (Coastal/tidal) flood mitigation measures

The Site is located within an area which is affected by flooding from rivers and sea, during a breach scenario the following table confirms the flood depths associated with the area proposed for development.

**Table 5. Flood levels compared to ground levels in the area proposed for development**

Flooding scenario	1 in 200 year (2005) scenario breach Event	1 in 200 year (2100) scenario breach Event
Flood Level (mAOD)	4.88	5.40
Flood depths (m)	0 – 2.18	0.10 - 3.22

#### Raising minimum floor levels

As the development proposals are comprised of a lower ground floor extension and change of use to an existing dwelling, the raising of Finished Floor Levels (FFL) is unlikely to be a feasible method of flood mitigation. In lieu of raising FFL, it may be appropriate to adopt a water exclusion strategy for flood depths up to 0.3 m in line with the EA's Standing Advice. A water exclusion strategy, using avoidance and resistance measures, is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Passive flood door systems;
- Temporary flood barriers;
- Air brick covers (manual or automatic closing);
- Non-return flap valves on sewer outfalls.

Avoidance and resistance measures are unlikely to completely prevent floodwater entering a property, particularly during longer duration flood events. Therefore, it is recommended that the following flood resilience measures are also considered.

- Flood resilient materials and designs:
  - Use of low permeability building materials up to 0.3 m such as engineering bricks (Classes A and B) or facing bricks;
  - Hard flooring and flood resilient metal staircases;
  - The use of internal lime plaster/render or where plasterboards are used these should be fitted horizontally instead of vertically and/or using moisture resistant plasterboard at lower levels;
  - Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
  - Communications wiring: wiring for telephone, TV, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

## Surface water (pluvial) flood mitigation measures

As the Site is not identified as being at risk of pluvial flooding, mitigation measures are not required.

The regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk.

A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff from the proposed development.

## Groundwater flood mitigation measures

A Low risk of groundwater flooding, specifically to the lower ground floor, has been identified at the Site. In order to ensure the development includes sufficient flood mitigation measures to reduce the risk of groundwater flooding over its lifetime, the following additional mitigation measures should be considered:

- Waterproof tanking of the basement;
- Interceptor drains;
- Automatic sump and pump to extract flood water; and
- Non-return flap valves on the proposed foul and surface water sewer lines.

Due to the proposed extension to the lower ground floor there may be a requirement to undertake a formal Basement Impact Assessment (BIA).

## Reservoir flood mitigation measures

According to EA information, the nearest reservoir is situated approximately 20 km to the west of the Site and the maximum predicted flood depths for the Site in the case of a breach of the nearest reservoir would be between 0.3 - 2 m.

There would be a relatively high rate and onset of flooding associated with a reservoir breach, it is therefore unlikely that safe access could be achieved unless a long warning period was provided. Therefore, occupants should get to the highest level of the building as possible and contact the emergency services.

## Other flood risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

## Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

## Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: [http://www.planningportal.gov.uk/uploads/br/flood\\_performance.pdf](http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf)

[www.knowyourfloodrisk.co.uk](http://www.knowyourfloodrisk.co.uk)

## Emergency evacuation - safe access / egress and safe refuge

Emergency evacuation to land outside of the floodplain should be provided if feasible. Where this is not possible, 'more vulnerable' developments and, where possible, development in general (including basements), should have internal stair access to an area of safe refuge within the building to a level higher than the maximum likely water level. An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

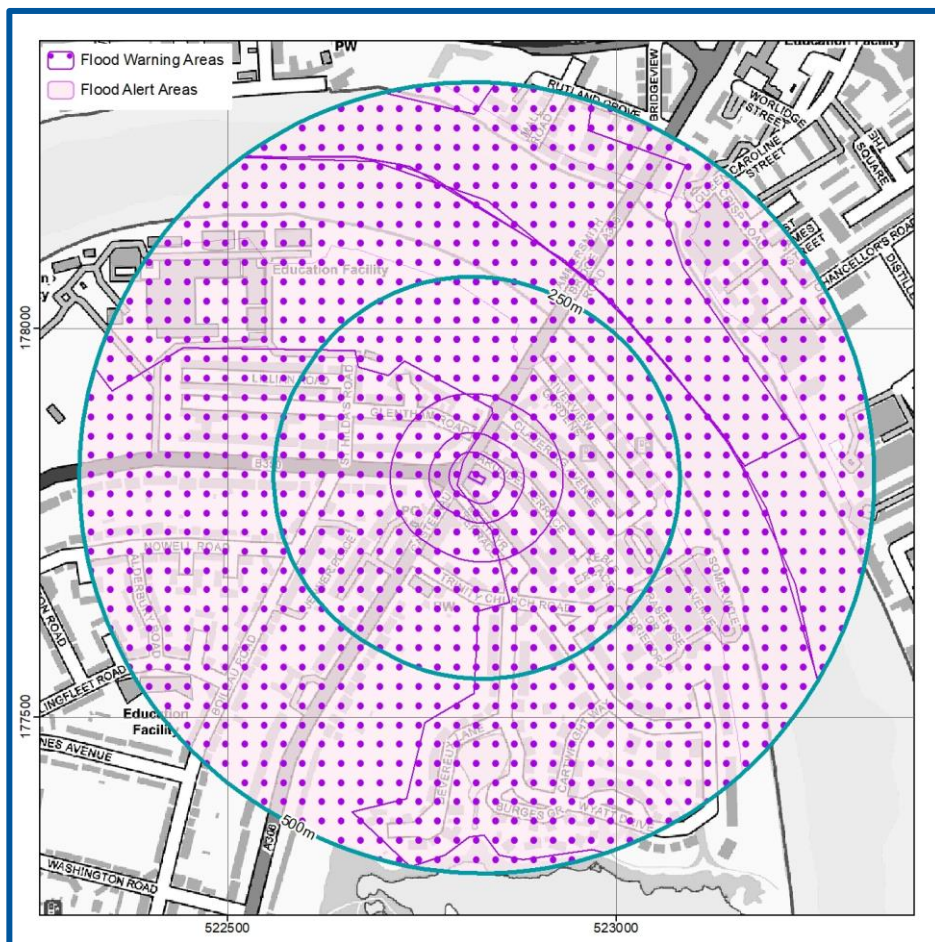
Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

## Flood warnings

The EA operates a flood warning service in all areas at risk of flooding; this is available on their website: <https://www.gov.uk/check-flood-risk>. The Site is located within an EA Flood Alerts/Warning coverage area (ref: 063FWT23) so is able to receive alerts and/or warnings (Figure 11). All warnings are also available through the EA's 24 hour Floodline Service 0345 988 1188.

The EA aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

Figure 11. EA Flood Warning Coverage for the local area (EA, 2021).



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## Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the EA's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is along Rocks Lane (c.1.7 km south – direct measurement). It is advised that evacuation from the premises would be the preferred option in a flood event if safe to do so. It is recommended that residents prepare to evacuate as soon as an EA Flood Warning is issued in order to completely avoid flood waters.

### On-Site refuge

Evacuation should be the primary action in preference, however safe refuge could be sought at first floor level in a worst-case scenario.

### Other relevant information

A business continuity plan is recommended to reduce risks to people, property and profit.

A Flood Warning and Evacuation Plan (FWEP) is recommended, and occupants should be signed up to receive EAs Flood Alerts and Warnings.

Registration to the Environment Agency's flood warning scheme can be done by following this link: <https://www.gov.uk/sign-up-for-flood-warnings>.

It is recommended that main communication lines required for contacting the emergency services, electricity sockets/meters, water supply and first aid stations and supplies are not compromised by flood waters. Where possible these should all be raised above the extreme flood level.

## 8. Conclusions and recommendations



**Table 6. Risk ratings following implementation and subsequent maintenance of mitigation measures**

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Very Low	Very Low
Sea (coastal/tidal) flooding	Very Low	Very Low
Surface water (pluvial) flooding	Very Low	N/A
Groundwater flooding	Low	Negligible
Other flood risk factors present	Yes	N/A

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.

**Table 7. Summary of responses to key questions in the report**

Key sources of flood risks identified	Fluvial/tidal, reservoir and groundwater (see Section 4).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes (see Section 7).
Is any further work recommended?	Yes
<p>Recommendations for mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.</p> <ul style="list-style-type: none"> <li>There is a risk of flooding from fluvial sources during a breach event, where flood depths could be up to 3.22 m in depth. As the development proposals are comprised of a lower ground floor extension and change of use to an existing dwelling, the raising</li> </ul>	



of Finished Floor Levels (FFL) is unlikely to be a feasible method of flood mitigation. Flood resilience measures should be considered in lieu of raising FFL, as detailed in Section 7.

- Mitigation measures for groundwater flooding that could be considered include: waterproof tanking; interceptor drains; sump and pump; and non-return valves on sewer lines.
- Occupants of the Site should be signed up to receive EA Flood Alerts.
- A Flood Warning and Evacuation Plan (FWEP) is recommended to ensure persons using the Site can evacuate safely on receipt of a Flood Warning.
- A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

## 9. Further information



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
✓	Additional assessment: <b>SuDSmart Report</b>		<p>The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening and work up to more complex SuDS Assessments detailing alternative options and designs.</p> <p>Please contact <a href="mailto:info@geosmartinfo.co.uk">info@geosmartinfo.co.uk</a> for further information.</p>
✓	Additional assessment: <b>EnviroSmart Report</b>		<p>Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective.</p> <p>Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements.</p> <p>Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions.</p> <p>Please contact <a href="mailto:info@geosmartinfo.co.uk">info@geosmartinfo.co.uk</a> for further information.</p>



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# Glossary

## General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.
Dry-Island	An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)
Flood resilience	Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is $\pm 0.25\text{m}$ for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council

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SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs).
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## Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
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Secondary A aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
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Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
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Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.
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Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.
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## NPPF (2021) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
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Sequential test	Aims to steer new development to areas with the lowest probability of flooding.
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Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.
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Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

## Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2021 BlueSky copyright and database rights 2021
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2021 Ordnance Survey data © Crown copyright and database right 2021
Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)	Environment Agency copyright and database rights 2021 Ordnance Survey data © Crown copyright and database right 2021
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2021) Contains British Geological Survey materials © NERC 2021 Ordnance Survey data © Crown copyright and database right 2021
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2021
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2021 Environment Agency copyright and database rights 2021

## 11. Appendices

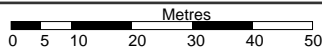


# Appendix A



## Site plans





Scale: 1:1250



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 Serial number: 56126

200 CASTELNAU  
 LONDON  
 SW13 9DW

Plot centre co-ordinates: 522818,177807  
 Download file:  
 Project name: MZA\_200Castelnau



## Environment Agency data

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**From:** KSL PSO SW London and Mole <PSO.SWLondonandMole@environment-agency.gov.uk>  
**Sent:** 10 September 2021 13:50  
**To:** Jasmine Spender  
**Subject:** KSL 232200 CM - 75282: Castelnau Dentists, 200 Castelnau, London SW13 9DW

**Re: KSL 232200 CM**

Thank you for your enquiry which was received on 6 September 2021.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please note that we have changed our process for responding to modelled data requests, please read the information within this email for further details.

You have requested a Product 4/8. Please see below table detailing each product:

Product 4	Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event outlines and more detailed information from hydraulic models (including model extents and 2D flood level data for specific points)
Product 5	Reports, including flood modelling reports, model user logs and guides, hydrology reports, etc
Product 6	Model Output Data, including product 5. <ul style="list-style-type: none"><li>• flood outlines usually provided in shapefile format</li><li>• 2D grids (level (h), depth (d) velocity (v) and hazard ZKU0) usually provided in ASCII format</li><li>• 1D flow and level data</li></ul> Requires GIS software such as ArcGIS, MapInfo, QGIS or similar.
Product 7	Calibrated and Verified Model Input Data (CaVMID), including product 5. Enables customer to re-run and/or make changes to a hydraulic model. Requires specific hydraulic modelling software such as Flood Modeller, TUFLOW, or ICM InfoWorks.
Product 8	Breach Hazard Map Provides a hazard map of breaches in PDF format including, maximum flood depth, maximum flood velocity and maximum flood hazard.

Please note product 8 is not available for fluvial models.

Your request for a Product 4 and 8 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR) which states that

*'.....6.—(1) Where an applicant requests that the information be made available in a particular form or format, a public authority shall make it so available, unless—  
(a) it is reasonable for it to make the information available in another form or format; or  
(b) the information is already publicly available and easily accessible to the applicant in another form or format.....'*

On this occasion we are not providing the information in the Product 4 and 8 format for the following reasons:

- Complying with the preference would incur a significant cost, which the public authority [The Environment Agency] cannot pass on to the requester;
- Using a Product 5/6/7 allows us to make the information available at a lower cost; and
- The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less.

Please find below the link containing the Product 5 and 6:

**Thames Tidal Upriver Breach Inundation Modelling 2017** <https://defra.sharefile.com/d-s278738904084ccb9>

The ShareFile link also contains Thames Estuary 2100 information.

We are licensing the supplied data to you under the [Environment Agency Conditional Licence](#), details of which are included in the ShareFile link. You must first check this supporting information, to determine if the conditions of use are suitable for your purposes. If the conditions for use are not suitable for your purposes, this information is not provided with a licence for use, and the data is provided for the right to read only.

Product 4 data is derived from the product 6 supplied above and the following open data sources;

Flood Zone 3 <https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-3>

Flood Zone 2 <https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-2>

Historic Flood Map <https://data.gov.uk/dataset/historic-flood-map1>

Product 8 data can be derived using the depth (d) velocity (v) and hazard (ZKU0) 2D grids which are provided in the Product 6 dataset

Please note, that the Flood Map for Planning is available to view and export maps for your site at: <https://flood-map-for-planning.service.gov.uk/>

Please note that our historic flood event maps may not be comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at your location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system)
- overflowing or backing up of sewer or drainage systems which have been overwhelmed
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea.

### **Defence Information**

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they are designed to defend London up to a 1 in 1000 year **tidal** flood event. The defences are all raised, man-made and privately owned. It is the riparian owners' responsibility to ensure that they are maintained to a crest level of 5.54m AODN (the Statutory Flood Defence Level in this reach of the Thames).

We inspect them twice a year to ensure that they remain fit for purpose. The current condition grade for defences in the area is 3 on a scale of 1 (very good) to 5 (very poor). For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at: <https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

### **Areas Benefiting from Flood Defences**

Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in

the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

-  
**Flood Risk Assessment Checklist**

If you are planning on using this data within a Flood Risk Assessment, we recommend that you take the time to fill in the attached FRA checklist, and to read the attachments which contain information relevant to the area that interests you.

We would like to stress the importance of filling in the Flood Risk Assessment check list, and providing up-to-date and correct data. The data will be checked against our records when we review the Flood Risk Assessment in our role as statutory consultee.

It is important that you provide a map in section 2 of the FRA checklist (See Appendix A), including the highest and most representative flood levels for your site. We recommend using a number of nodes that provide a fair representation of the modelled data across your site. For example, if it is a small extension (< 250 square metres) then approximately 5-10 nodes would be sufficient. For larger sites, approximately 10 to 20 nodes would be appropriate.

Please contact our Sustainable Places team at [KSLPLANNING@environment-agency.gov.uk](mailto:KSLPLANNING@environment-agency.gov.uk) if you have any further enquiries regarding the planning process and Flood Risk Assessments.

**If you have any further queries regarding how to use the above data please contact the Partnership and Strategic Overview (PSO) team directly by reply email.**

If you have a new enquiry or would like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months by email at [KSLF@environment-agency.gov.uk](mailto:KSLF@environment-agency.gov.uk)

Kind Regards,

Matthew Samwells  
Flood & Coastal Risk Management Officer  
Partnership & Strategic Overview - South West London and Mole  
Kent, South London and East Sussex Area  
Environment Agency

**From:** Lily Jordan [<mailto:LilyJordan@geosmartinfo.co.uk>]

**Sent:** 09 August 2021 10:13

**To:** KSL Enquiries <[KSLF@environment-agency.gov.uk](mailto:KSLF@environment-agency.gov.uk)>

**Subject:** RE: 75282: Product 4 Data request for Castelnau Dentists, 200 Castelnau, London SW13 9DWR 210806/NW24

Dear Charlotte,

In Jasmine's absence, does the attached suffice?

Kind regards,

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**From:** KSL Enquiries <[KSLE@environment-agency.gov.uk](mailto:KSLE@environment-agency.gov.uk)>

**Sent:** Friday, August 6, 2021 4:34:46 PM

**To:** Jasmine Spender <[JasmineSpender@geosmartinfo.co.uk](mailto:JasmineSpender@geosmartinfo.co.uk)>

**Subject:** RE: 75282: Product 4 Data request for Castelnau Dentists, 200 Castelnau, London SW13 9DWR 210806/NW24

Dear Jasmine,

Thank you for your email. In order to process your enquiry, we will require a site map clearly showing the boundaries of the site, such as in the attached.

Kind regards,

**Charlotte Goss**

**Executive Correspondence and Complaints Specialist**

**Kent, South London & East Sussex**

**Environment Agency**

02084 746 848 – If you are unable to reach us, please contact our National Customer Contact Centre on 03708 506 506

Orchard House | Endeavour Park | London Road | West Malling | Kent | ME19 5SH



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**From:** Enquiries, Unit

**Sent:** 06 August 2021 15:36

**To:** 'Jasmine Spender' <[JasmineSpender@geosmartinfo.co.uk](mailto:JasmineSpender@geosmartinfo.co.uk)>

**Subject:** RE: 75282: Product 4 Data request for Castelnau Dentists, 200 Castelnau, London SW13 9DWR 210806/NW24

|Good afternoon Jasmine

I have passed your e-mail to the local customer team who will deal with your request.

The Freedom of Information Act and Environmental Information Regulations state that a public authority must respond to requests for information within 20 working days.

You can find more information about our service commitment by clicking on the link below:

<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment>

You can contact our customer team directly on the contact details below, or call the National Customer Contact Centre on 03708 506506 who will transfer you to the area team.

Please quote your enquiry reference 210806/NW24 in any correspondence with us regarding this matter.

Customers & engagement team

Environment Agency - Kent, South London & East Sussex Area - [KSLE@environment-agency.gov.uk](mailto:KSLE@environment-agency.gov.uk)

Best regards

Nick Ward

Customer Service Advisor, Email Management Unit, NCCC

Contact Centre Services - Part of Operations, Regulation & Customer

☎ Tel: 03708 506 506

Web Site: [www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

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**From:** Jasmine Spender [<mailto:JasmineSpender@geosmartinfo.co.uk>]

**Sent:** 03 August 2021 16:22

**To:** Enquiries, Unit <[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)>

**Cc:** Data <[data@geosmartinfo.co.uk](mailto:data@geosmartinfo.co.uk)>

**Subject:** 75282: Product 4 Data request for Castelnau Dentists, 200 Castelnau, London SW13 9DWR 210806/NW24

To whom it may concern,

We are currently undertaking a Flood Risk Assessment for a proposed development at Castelnau Dentists, 200 Castelnau, London SW13 9DW (X: 522818 , Y: 177810, NGR: TQ 22818 77810). Please find a copy of the Site Location Plan attached (RED LINE).

As part of the FRA we would like to obtain the most up to date flood risk data for the Site, please could you provide us with the following data/Product 4:

- Flood Map for Planning Purposes, 1:10,000 if available;
- Risk of Flooding from Rivers and the Sea (Including the NaFRA rating for the Site);
- Pluvial flood risk and flood depth map;
- Reservoir failure flood risk map (including information on flood depth and velocity);
- Historical flood maps and information regarding flooding at the Site and surrounding area;
- Modelled flood levels, depths and velocities for the Site, including the levels for the 1 in 100 year (fluvial) / 1 in 200 year (tidal) events with and without allowance for climate change.
- Availability of flood modelling reports for the site;
- Information on any current and proposed flood defences within the vicinity of the Site;
- Where the Site benefits from flood defences, please also supply details of the defences and the modelled flood levels for the worst case breach scenario;
- Flood level, depth, velocity and hazard data for the Site and potential evacuation routes; and
- guidance with a table of nominal allowances which are specific to the region, like we have received from other EA areas

Please don't hesitate to contact me should you require any further information or have any questions regarding our request.

Kind regards,

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GeoSmart is registered with the Property Codes Compliance Board as a subscriber to the Search Code.

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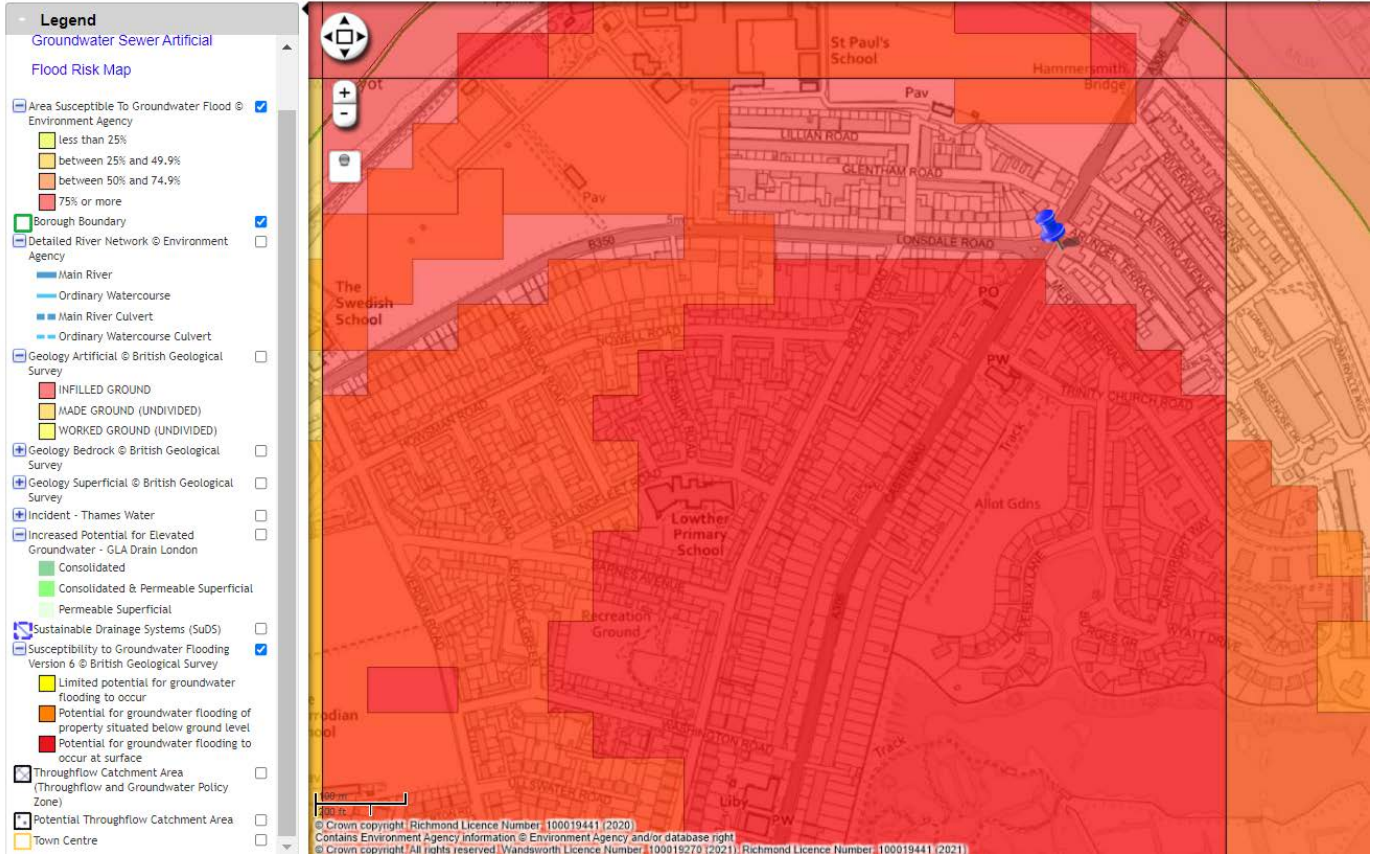
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## Interactive mapping



Location:





# Environment Agency LiDAR ground elevation data



## Disclaimer

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Tel: 01743 298 100

Email: [info@geosmartinfo.co.uk](mailto:info@geosmartinfo.co.uk)

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

### The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

### The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

## Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

*Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.*

### TPOs contact details:

The Property Ombudsman scheme  
Milford House  
43-55 Milford Street  
Salisbury  
Wiltshire SP1 2BP  
Tel: 01722 333306  
Fax: 01722 332296  
Email: [admin@tpos.co.uk](mailto:admin@tpos.co.uk)

You can get more information about the PCCB from [www.propertycodes.org.uk](http://www.propertycodes.org.uk).

Please ask your search provider if you would like a copy of the search code

## Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: [admin@tpos.co.uk](mailto:admin@tpos.co.uk).

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Alan White

Operations Manager

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

[alanwhite@geosmartinfo.co.uk](mailto:alanwhite@geosmartinfo.co.uk)



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<http://geosmartinfo.co.uk/data-limitations/>