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Flood risk, water and environment

## Flood Risk Assessment AEG02771\_DA1\_Dartford\_01

Site Address: 9 High Street

Dartford

DA1 1DT

UK Experts in Flood Modelling, Flood Risk  
Assessments, and Surface Water Drainage Strategies

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# Document Issue Record

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Prepared for: Holkham Properties

Reference: AEG02771\_DA1\_Dartford\_01

Site Location: 9 High Street, Dartford, DA1 1DT

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# Summary

Development Description	Existing	Proposed
<b>Development Type</b>	Commercial premises	Conversion of the first and second floor from commercial use to create a number of residential dwellings. The ground floor will remain unchanged as part of the application.
<b>EA Vulnerability Classification</b>	Less Vulnerable	More Vulnerable
<b>Ground Floor Level</b>	The LiDAR data shows the ground elevation of the site varies between approximately 4.9m AOD and 5.5m AOD.	No change due to dwellings being located on the first and second floor.
<b>Level of Sleeping Accommodation</b>	N/A <sup>2</sup>	First and second floor
<b>Impermeable Surface Area</b>	Entire development area considered impermeable due to existing hardstanding.	No change – development is change of use of existing building.
<b>Surface Water Drainage</b>	N/A <sup>1</sup>	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
<b>Site Size</b>	Approximately 123m <sup>2</sup>	No change
<b>Risk to Development</b>	<b>Summary</b>	<b>Comment</b>
<b>EA Flood Zone</b>	Flood Zones 2 and 3	Majority of site is in Flood Zone 2 with a negligible extent at the north of the site in Flood Zone 3
<b>Flood Source</b>	Fluvial	River Darent
<b>SFRA Available</b>	Dartford Borough Council SFRA (2021)	
<b>Management Measures</b>	<b>Summary</b>	<b>Comment</b>

<b>Ground floor level above extreme flood levels</b>	No	Development at the first and second floor only.
<b>Safe Access/Egress Route</b>	Yes	Site and surrounding road network unaffected in modelled 1 in 100 year +25%CC event, and also the 1:200 year (2115) Thames Downriver modelled breach event, and thus safe access/ egress considered possible in these design events.
<b>Flood Resilient Design</b>	No	Development at first and second floor only modelled flood levels for all assessed return periods.
<b>Site Drainage Plan</b>	No	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
<b>Flood Warning and Evacuation Plan</b>	Yes	Recommended to sign up to the Areas at risk of tidal flooding from Dartford to Allhallows, including Crayford, Greenhithe, Northfleet, Gravesend and the North Kent Marshes Environment Agency (EA) flood alert and warning service.
<b>Offsite Impacts</b>	<b>Summary</b>	<b>Comment</b>
<b>Displacement of floodwater</b>	No	Development is a change of use with no increase in built footprint.
<b>Increase in surface run-off generation</b>	No	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
<b>Impact on hydraulic performance of channels</b>	No	Distance from watercourse is approximately 225m

<sup>1</sup> not required for this assessment

<sup>2</sup> data not available.

# 1. Introduction

- 1.1. Aegaea were commissioned by Holkham Properties to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

## Site Overview

- 1.3. The site of the proposed development is 9 High Street, Dartford, DA1 1DT (Figure 1). The site is currently in commercial use.

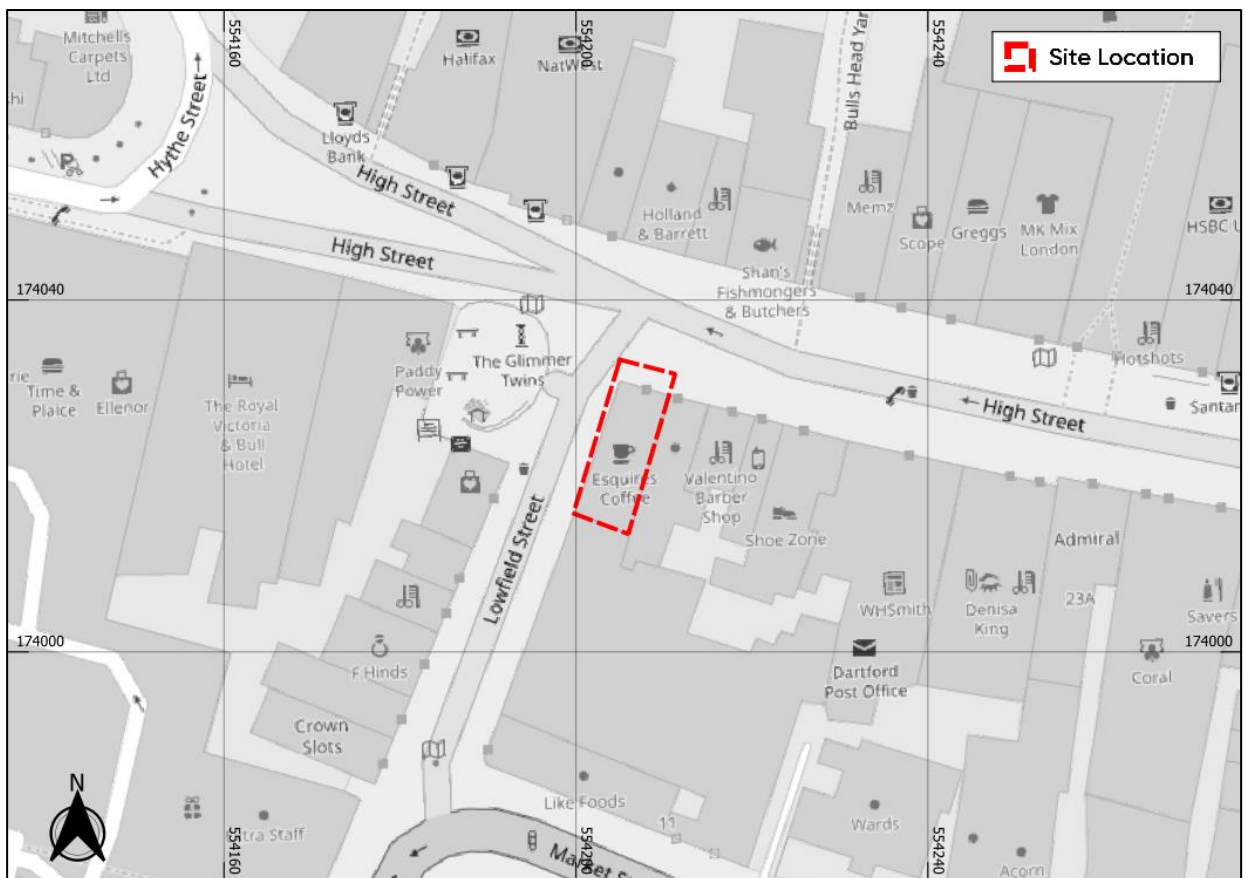


Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors)

- 1.4. It is understood that the proposed development is for the conversion of the first and second floors from commercial to residential via Class G Permitted Development.
- 1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site. The LiDAR data shows the ground elevation of the site varies between approximately 4.9m AOD (Above Ordnance Datum) and 5.5m AOD (Figure 2). Analysis of topographic levels indicates that the site generally slopes with a fall to the west.

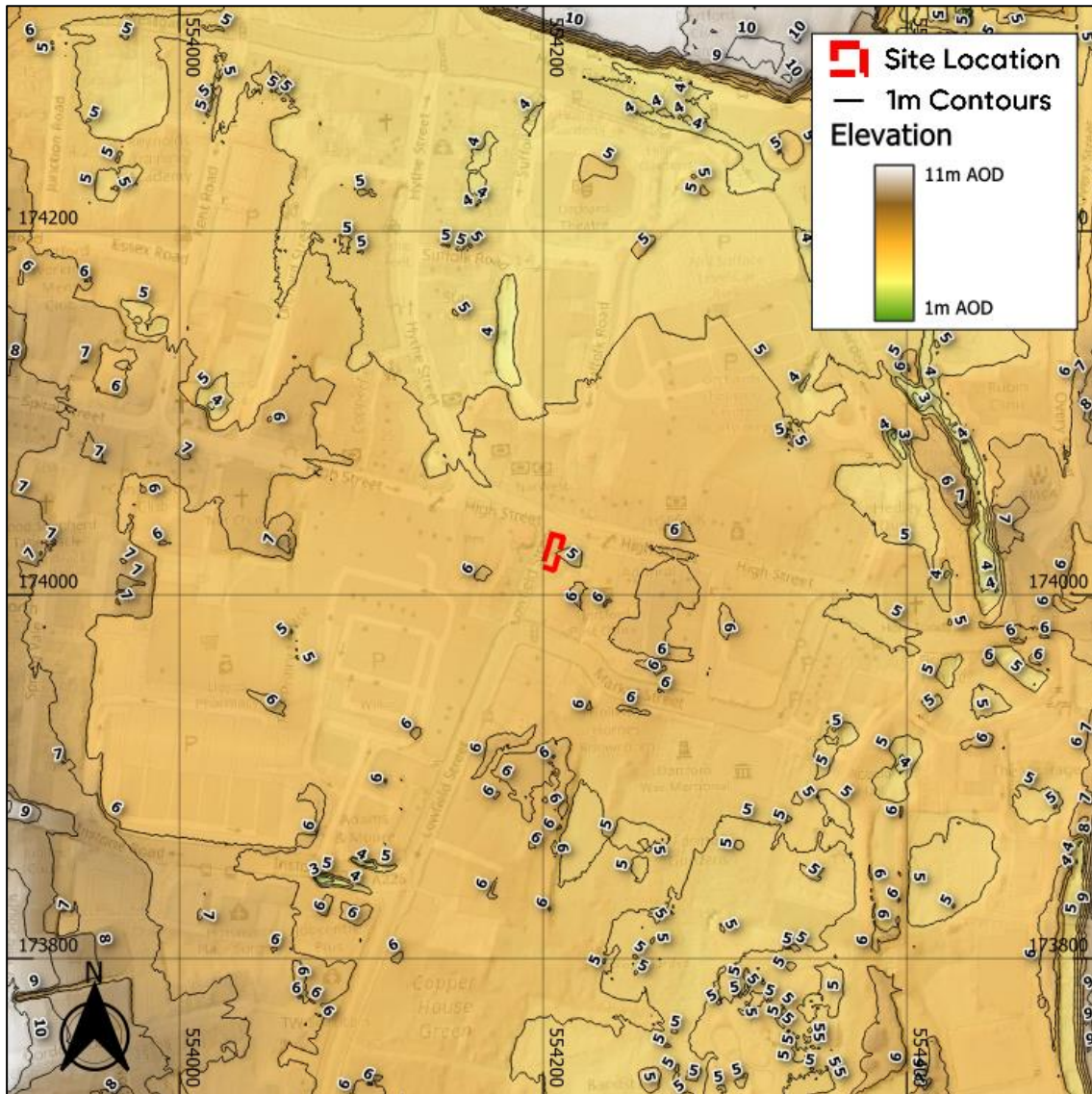


Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)



1.6. Dartford Borough Council is the Local Planning Authority (LPA) for the site, and Kent County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Kent South London and East Sussex region.

## Planning Policy and Guidance

1.7. UK government planning guidance states<sup>1</sup> that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

1.8. The site is in Flood Zones 2 and 3 therefore the NPPF states that an FRA is required.

1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial/ tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

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<sup>1</sup><https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

## 2. Planning Policy

2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

### National Planning Policy Framework (NPPF)

2.2. The National Planning Policy Framework<sup>2</sup> (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

*159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*

*167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

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<sup>2</sup><https://www.gov.uk/guidance/national-planning-policy-framework>, last updated Sept 2023

- d) *any residual risk can be safely managed; and*
- e) *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

*168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.*

2.3. Footnote 55 of the NPPF states:

*A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.*

2.4. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	<p>This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:</p> <p>land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or</p> <p>land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).</p> <p>Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)</p>

- 2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.
- 2.6. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

## Local Plan

- 2.7. The Local Plan prepared by the Local Planning Authority, Dartford Borough Council, sets out the policies for development in the local area.
- 2.8. Policy CS24 of the Dartford Core Strategy states:

*Policy CS 24: Flood Risk*

*1. To manage and mitigate flood risk the Council will:*

*a) Ensure that sites in Flood Zone 2 and 3a, shown to be acceptable for development following application of the Sequential Test and parts A and B of the Exception Test, demonstrate that part C of the Exception Test can be passed and that residual risk is managed through a Flood Risk Assessment (FRA) and an appropriate Flood Plan. Windfall sites will be subject to the same tests to assess whether they are appropriate for the development proposed.*

*b) Engage with the Environment Agency and Defra in the further stages of the Thames Estuary 2100 Project (TE 2100), and seek not to foreclose any medium or long-term options through proposals in this Plan. In particular, the Council will protect the Dartford Marshes from development, in the event that the area is required to implement flood protection proposals or compensation freshwater habitats.*

*c) Require the SUDS 'management train' to be applied, as appropriate, in all new development. In Water Source Protection Zones, SUDS will need to demonstrate that any surface water run-off infiltrating the ground will not lead to deterioration of groundwater quality.*

*d) Identify and implement a green infrastructure network through the safeguarding of existing areas of open space and a requirement for generous provision of green space and water bodies in new development (see Policy CS 14).*

## Sequential and Exception Tests

- 2.9. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.
- 2.10. Under the NPPF all new planning applications should undergo a Sequential Test accordance with paragraph 168 and footnotes 55 and 56. This test should be implemented by local planning authorities with a view to location particularly vulnerable new developments outside of the floodplain.
- 2.11. Paragraph 168 of the NPPF states:

*“168. Applications for some minor development and **changes of use** should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.”*

- 2.12. As such, a site-specific Sequential Test and Exception Test for the proposed developments is not considered necessary in line with the NPPF given that the proposal is for a change of use.

## Summary

- 2.13. This flood risk assessment has been prepared with due consideration to the above local and national policy.

## 3. Consultation and Review

### Consultation

3.1. The EA have provided Aegaea with outputs for the Darent and Cray Model (2019) and this is discussed further in Section 4 of this report.

### Documents and Online Mapping

3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.3. The following sources of information have been reviewed for this assessment:

- Flood Map for Planning on the Environment Agency website <https://flood-map-for-planning.service.gov.uk/>
- Long Term Flood Risk Information on the Environment Agency website <https://www.gov.uk/check-long-term-flood-risk>
- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- Geoindex Onshore (British Geological Survey, 2023)
- Dartford Core Strategy<sup>3</sup> (Dartford Borough Council, 2011)
- Dartford Development Policies Plan<sup>4</sup> (Dartford Borough Council, 2017)

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<sup>3</sup> <https://windmz.dartford.gov.uk/media/Inspector%20Approved%20Core%20Strategy.pdf>

<sup>4</sup> [https://windmz.dartford.gov.uk/media/DP\\_Plan\\_Final\\_Version\\_for\\_Adoption\\_for\\_web.pdf](https://windmz.dartford.gov.uk/media/DP_Plan_Final_Version_for_Adoption_for_web.pdf)

- Dartford Borough Level 1 and 2 Strategic Flood Risk Assessment<sup>5</sup> 2021

## **Strategic Flood Risk Assessment (SFRA)**

- 3.4. The SFRA provides the evidence base for the Local Planning Authority Dartford Borough Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.
- 3.5. The SFRA mapping provided by Dartford Borough Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

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<sup>5</sup> <https://www.dartford.gov.uk/downloads/file/1392/dartford-borough-level-1-and-2-strategic-flood-risk-assessment-report-february-2021>



## 4. Sources of Flood Risk

### Fluvial

- 4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.
- 4.2. The site is located mostly within Flood Zone 2 (Figure 3). Flood Zone 2 denotes a risk of flooding from fluvial sources between a 1 in 100 (1%) and 1 in 1,000 (0.1%). The northern boundary of the site is partially affected by Flood Zone 3 also however this extent is considered to be negligible. Flood Zone 3 denotes a risk of flooding from fluvial sources greater than 1 in 100 (1%).

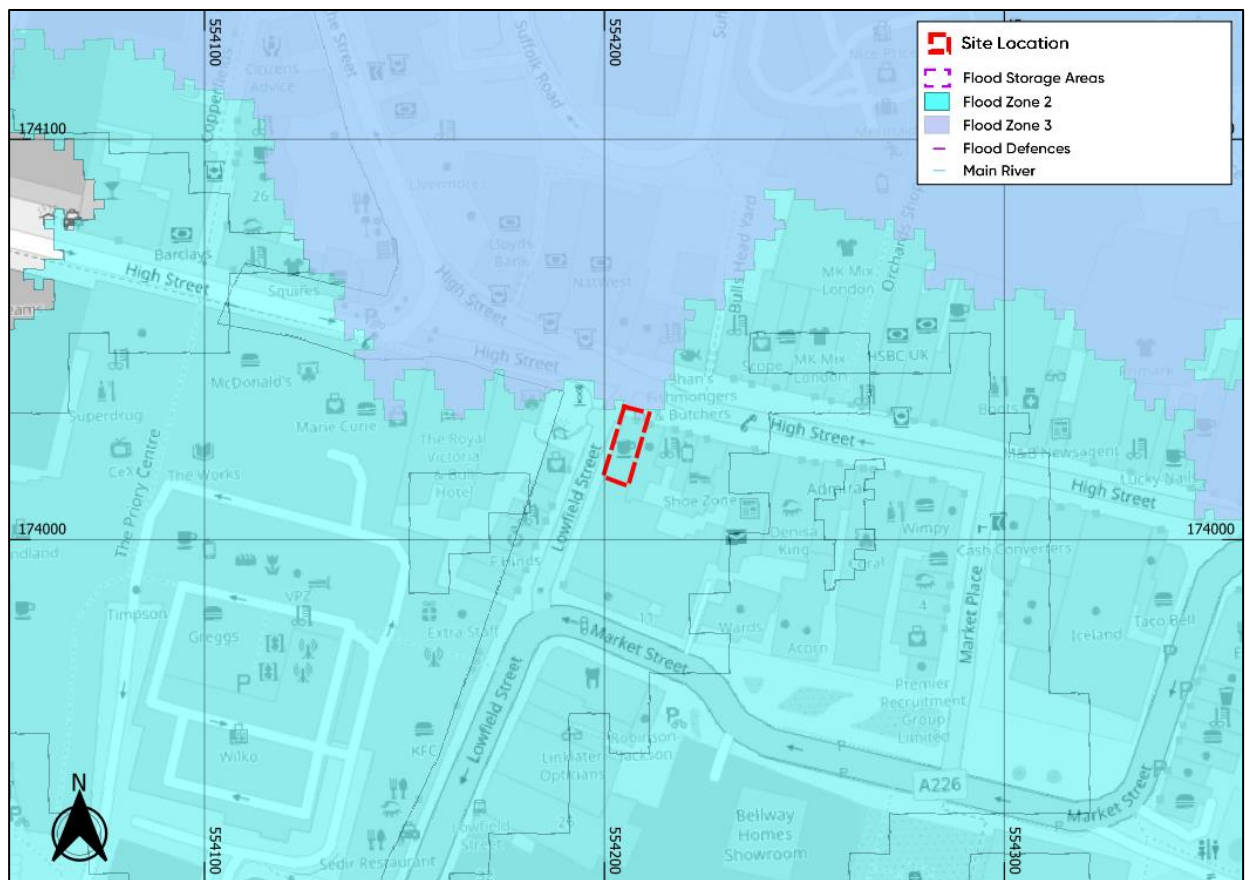


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

### Main Rivers

- 4.3. The nearest main river is the River Darent which is approximately 225m east of the site.

## Ordinary Watercourses

- 4.4. No ordinary watercourses could be found within 500m of the site based on OSM mapping.

## Historical Fluvial Flooding

- 4.5. The EA Recorded and Historical Flood Outlines dataset (Figure 4) shows main river fluvial flooding on-site in 1968 caused by channel capacity exceeded (no raised defences).

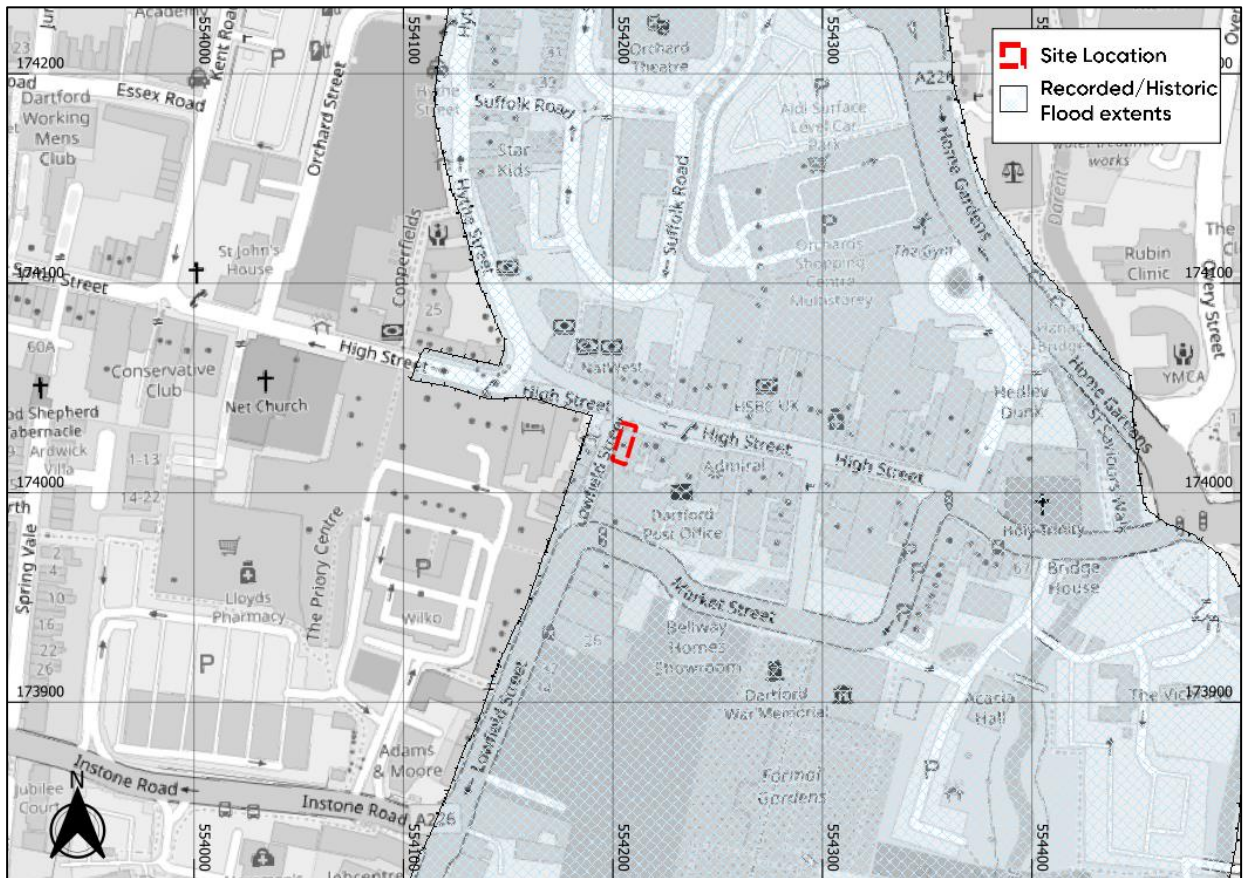


Figure 4: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

## Climate Change

- 4.6. Under the EA climate change guidance (2021) a more vulnerable development within the Darent and Cray management catchment should consider a 10% allowance for climate change.

## EA Flood Data

- 4.7. The EA have provided Aegaea with outputs from the Darent and Cray Model (2019).
- 4.8. It is noted that the Darent and Cray Model (2019) does not include a 1 in 100 year +10%CC event but does include a 1 in 100 year +25%CC event which is to be used as a conservative estimate for the former.
- 4.9. Analysis of the model outputs indicate that the site would remain unaffected for all modelled events up to and including the 1 in 100 +25%CC allowance for climate change, however, could be affected in the 1 in 1000 year event (Figure 5 and 6).
- 4.10. As can be seen from Figure 5 much of the surrounding road network would also be unaffected in the modelled 1 in 100 +25%CC event therefore safe access/egress should also be possible in this event.

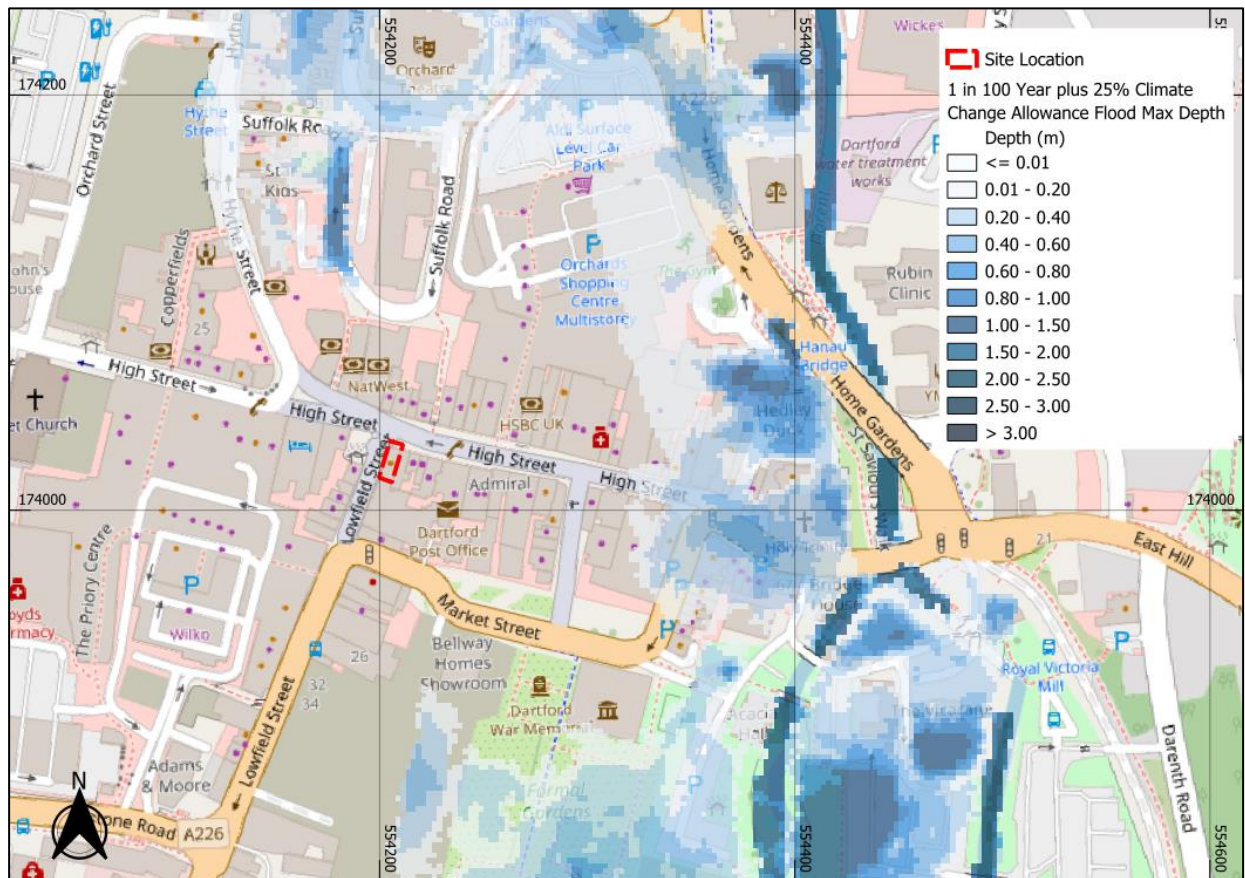


Figure 5. EA Modelled 1 in 100 plus climate change (25%) flood depths (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.11. Interrogation of the flood level grid provided by the EA indicate a modelled flood level of 6.04m AOD in the 1 in 1000 year event. The LiDAR data shows the ground elevation of the site varies between approximately 4.9m AOD and 5.5m AOD. Based on this, the site could experience a maximum flood depth of 1.14m in this modelled event.

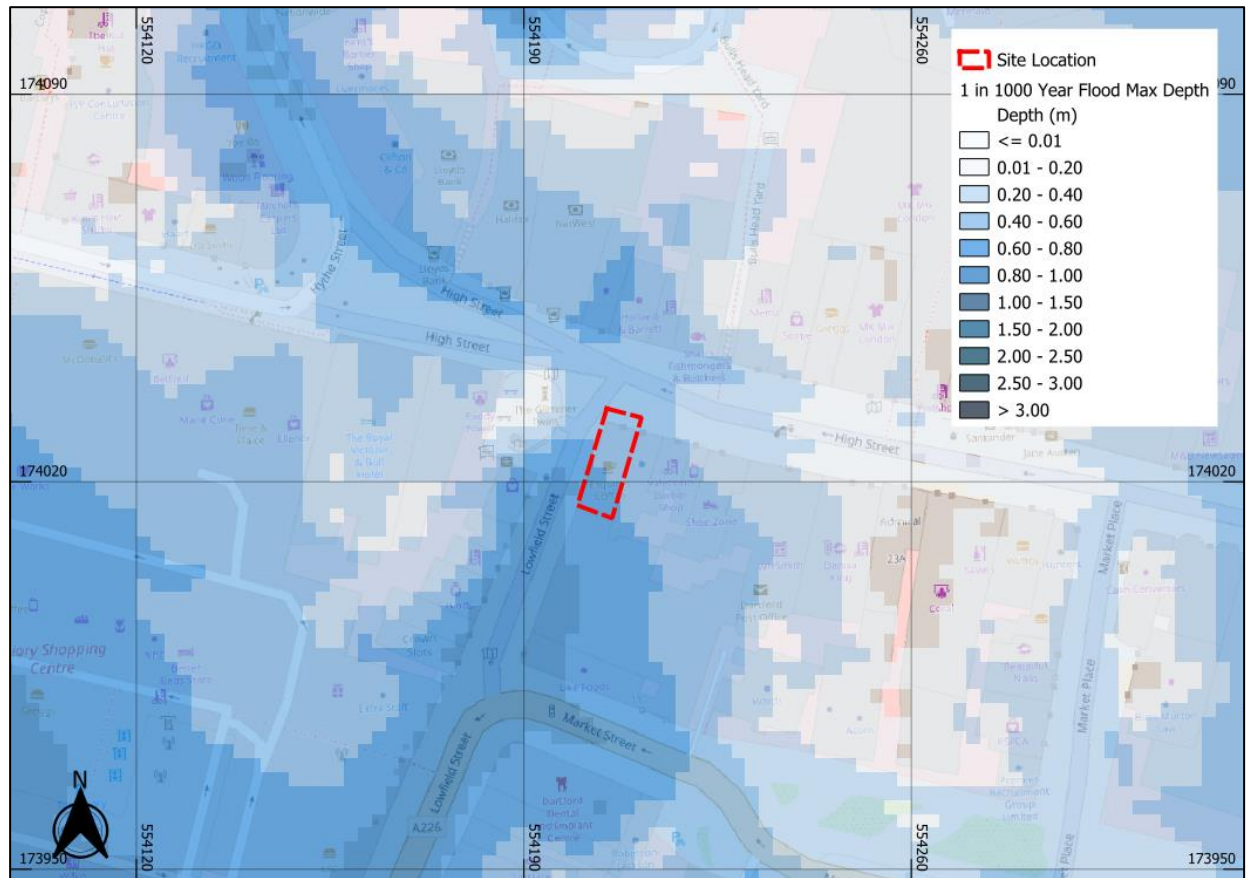


Figure 6. EA Modelled 1 in 1000 flood depths (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government

## Summary

4.12. Based on the data reviewed above the risk of fluvial flooding to the site is considered to be low to moderate however with the proposed flats being at the first and second floor the risk to the proposed development is considered to be low.

## Tidal

4.13. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through

them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high.

- 4.14. Interrogation of the EA Flood Zone datasets indicates that the Flood Zone 2 extent in the area is derived from fluvial models whereas the Flood Zone 3 is derived from tidal models.
- 4.15. The tidal Flood Zone 3 extent in this area is an area benefitting from the presence of the Thames Tidal Defences (TTD). The TTD are designed to provide a 1 in 1000 year standard of protection until at least 2100. As such, the risk of flooding from tidal sources when considering the impact of nearby flood defences is considered low.
- 4.16. Review of the EA's Thames Downriver Breach Model (2018) indicates that the modelled 1:200 year (2115) breach extent could reach the High Street to the north of the site but the site, and all access roads to the west and south would remain unaffected in this modelled event and thus the risk is considered low.

## Canals

- 4.17. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.
- 4.18. No canals were detected within 1km of the site.
- 4.19. The risk of flooding to this site from canals is considered to be low.

## Pluvial

- 4.20. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 4.21. Annual surface water flood risk is labelled by the EA as:
  - 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
  - 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
  - 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
  - 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.22. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the site is at risk of flooding in 'Low' surface water flood events. The adjacent Lowfield Street is at risk in the 'Medium' and 'High' risk events; based on the pixelation of the dataset the western boundary of the site may be affected in these events, but this may remain within the roadway rather than affecting the site.

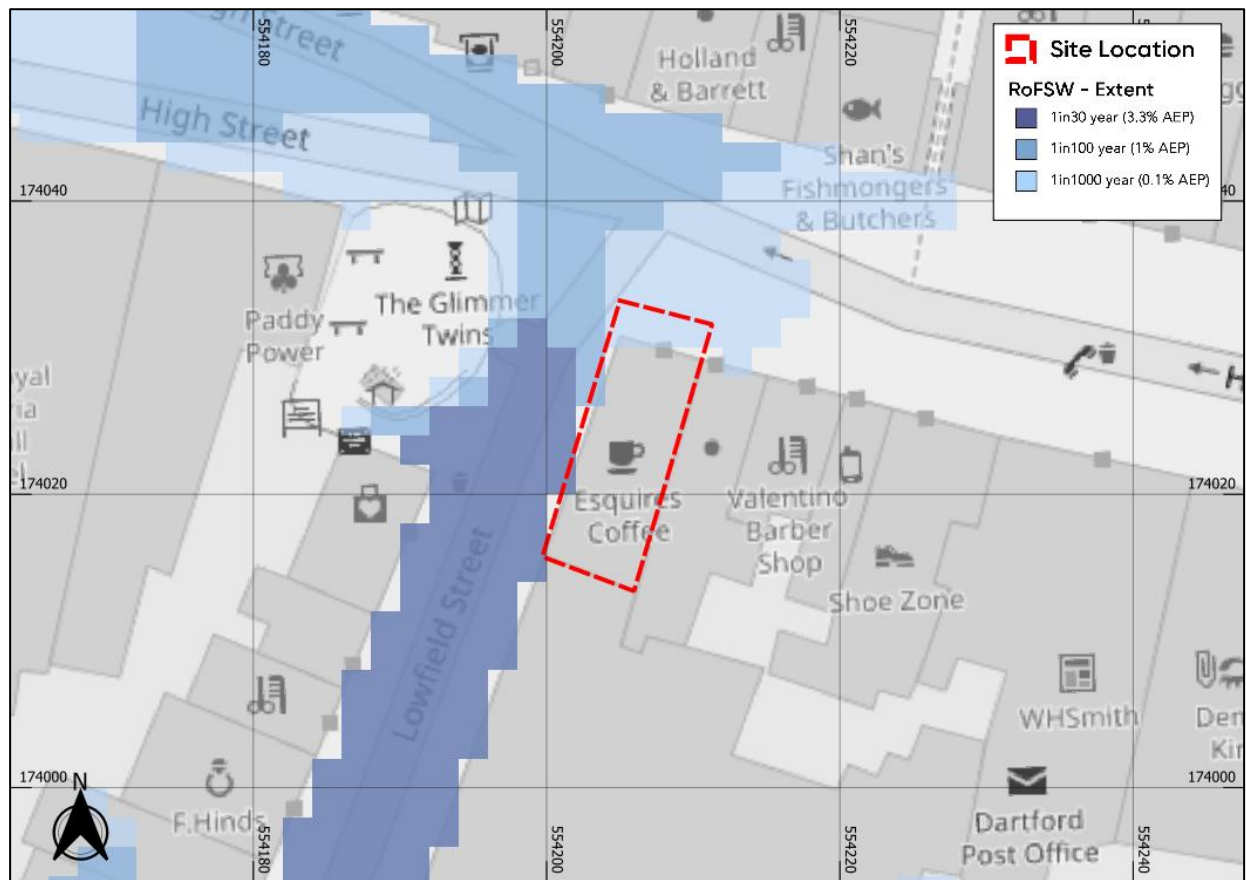


Figure 7: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.23. As can be seen in Figure 8, during the modelled 1 in 30 year probability event, surface water flooding depths could reach 300 – 600mm to the west of the site. Depths of 150 – 300mm can be shown on the site however this could be due to the pixelation of the model and the surface water may actually be contained to the roadway.

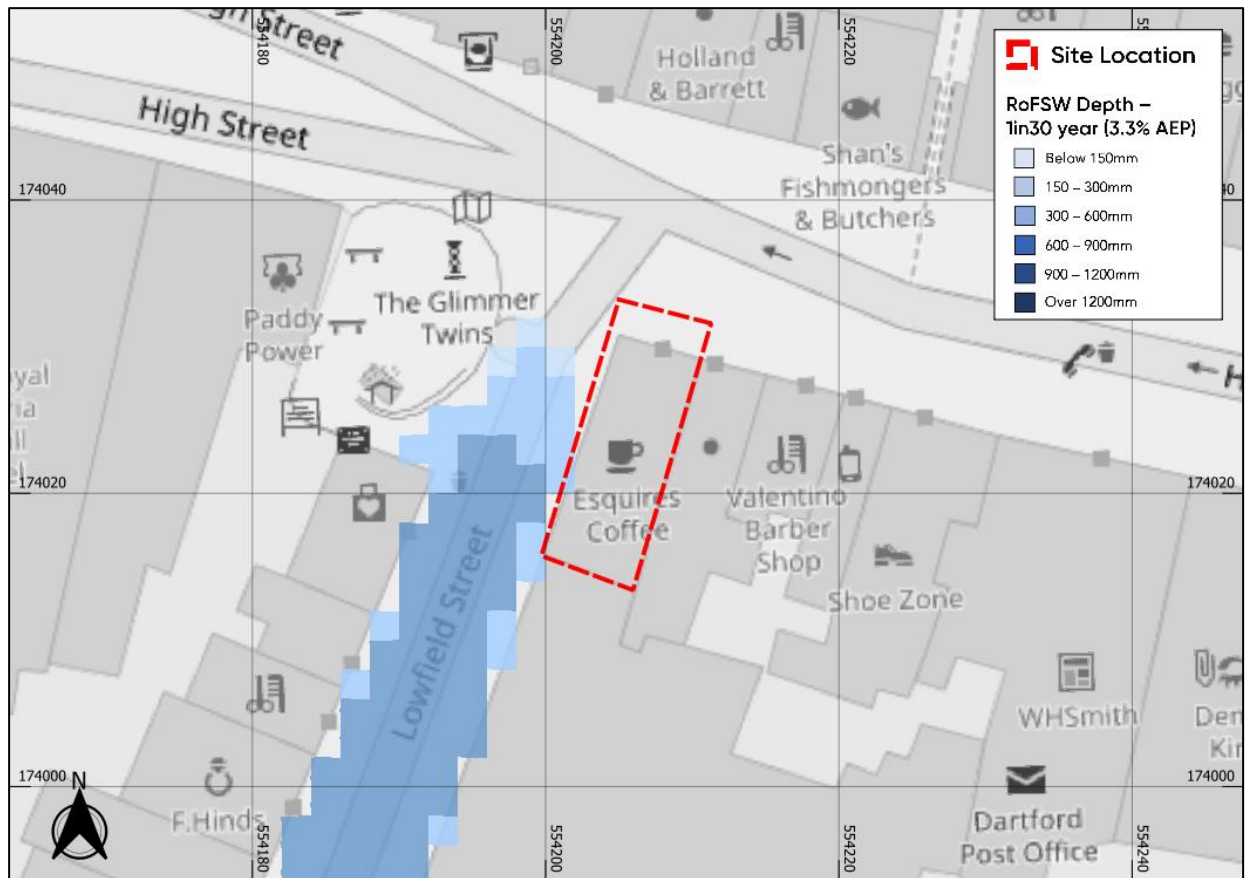


Figure 8. EA Surface Water Flood Risk Mapping 1 in 30 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.24. As can be seen in Figure 9, during the modelled 1 in 100 year probability event, surface water flooding depths could reach 300 – 600mm to the west and north of the site. Depths of 300 – 600mm can be shown on the site however this could be due to the pixelation of the model and the surface water may actually be contained to the roadway.

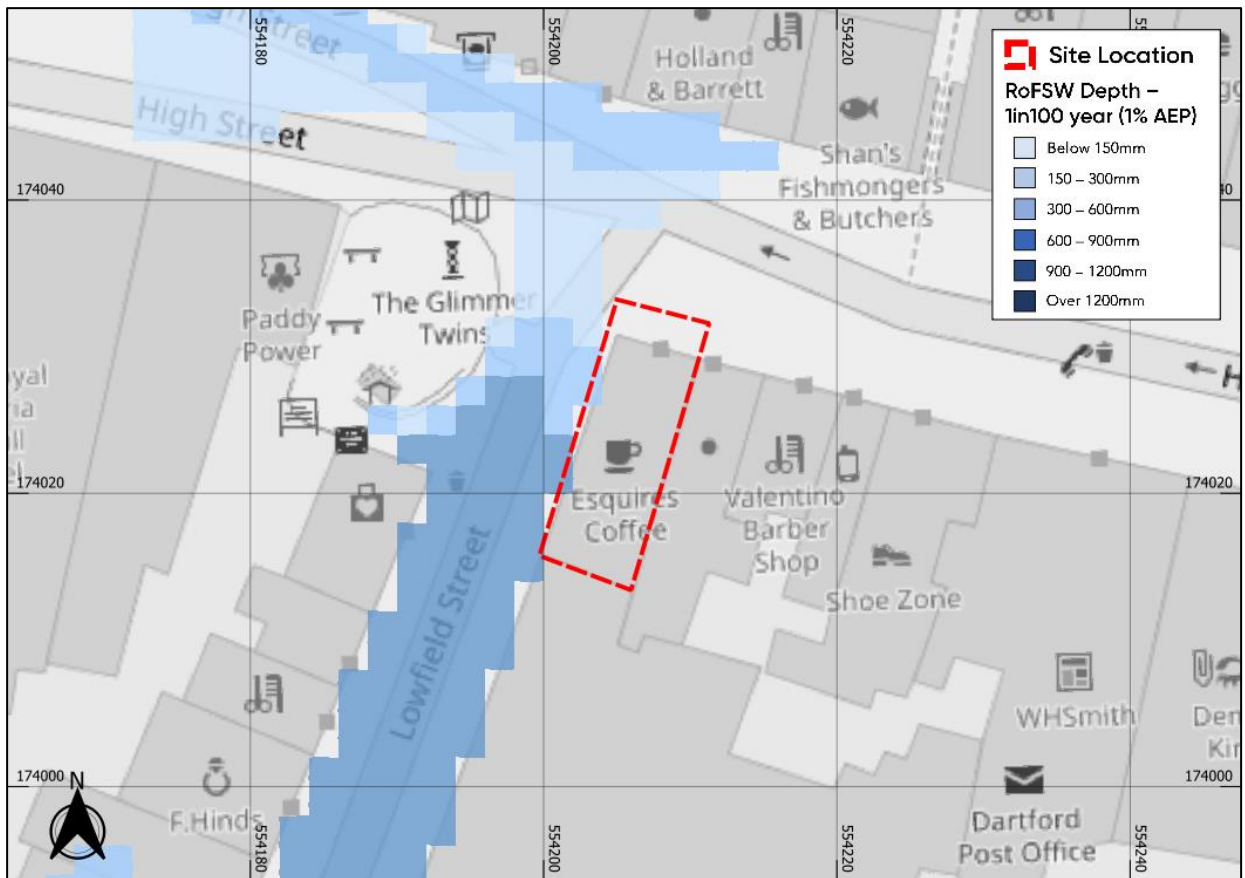


Figure 9. EA Surface Water Flood Risk Mapping 1 in 100 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.25. As can be seen in Figure 10, during the modelled 1 in 1000 year probability event, surface water flooding depths could reach 600 – 900mm to the west and north of the site. Depths of 300 – 600mm can be shown on the site however this could be due to the pixelation of the model and the surface water may actually be contained to the roadway.



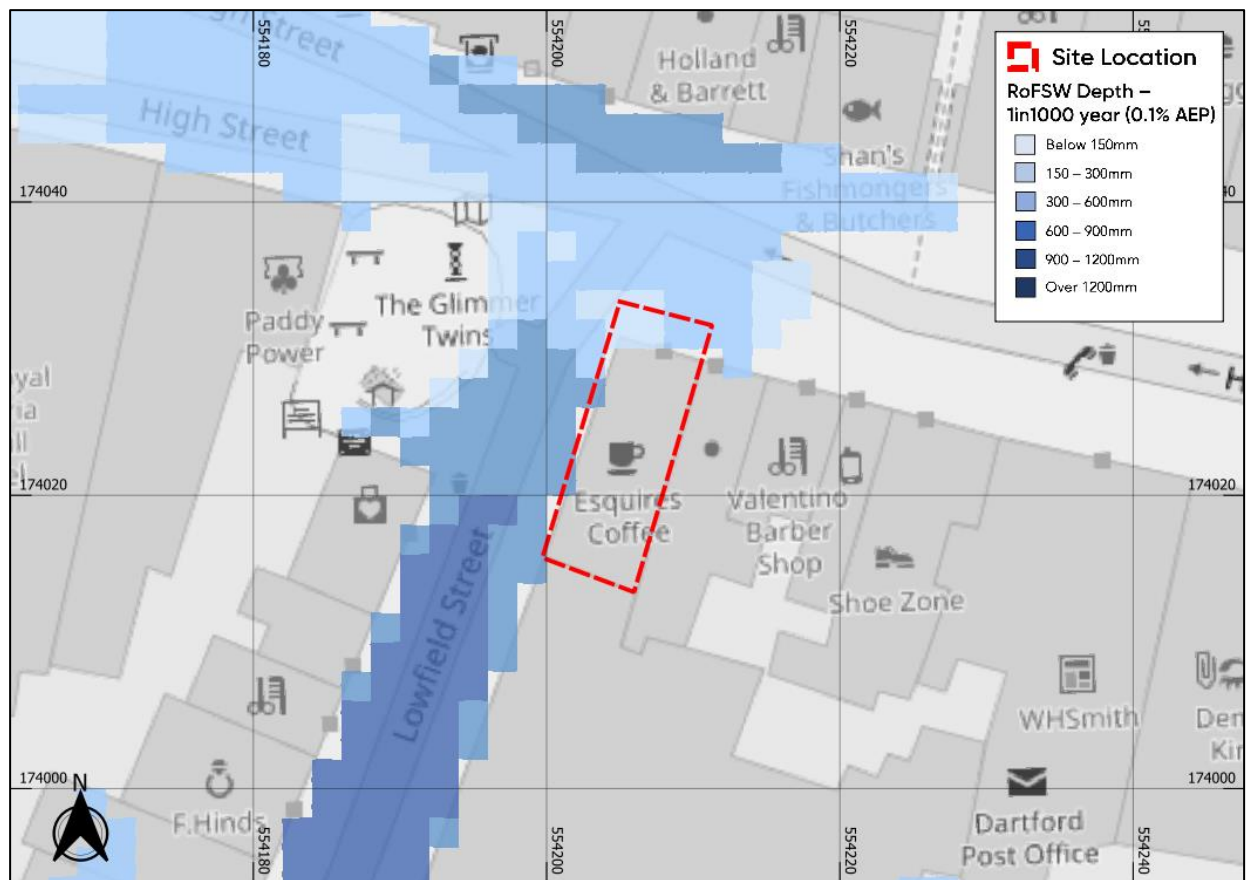


Figure 10. EA Surface Water Flood Risk Mapping 1 in 1000 year depth (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.26. The risk to the site can be considered as low due to the surface water flooding likely remaining on the roadway rather than affecting the site. However, access/ egress may not be possible due to potential flood depths on Lowfield Street and thus safe refuge may need to be sought at the first and second floors within the dwellings.
- 4.27. The SFRA provides mapping of historical surface water flood incident records kept by the local authority. No historical surface water incidents have been recorded in the vicinity of the site.

## Reservoirs

- 4.28. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

4.29. According to the EA's Flood Risk from Reservoirs mapping (Figure 11) the site is at risk of flooding in the event of a breach at the Coombe Bank Lake reservoir. The reservoir failure model is a 'wet day' scenario meaning that it would have to happen at the same time as other flooding for there to be enough water to reach the site.

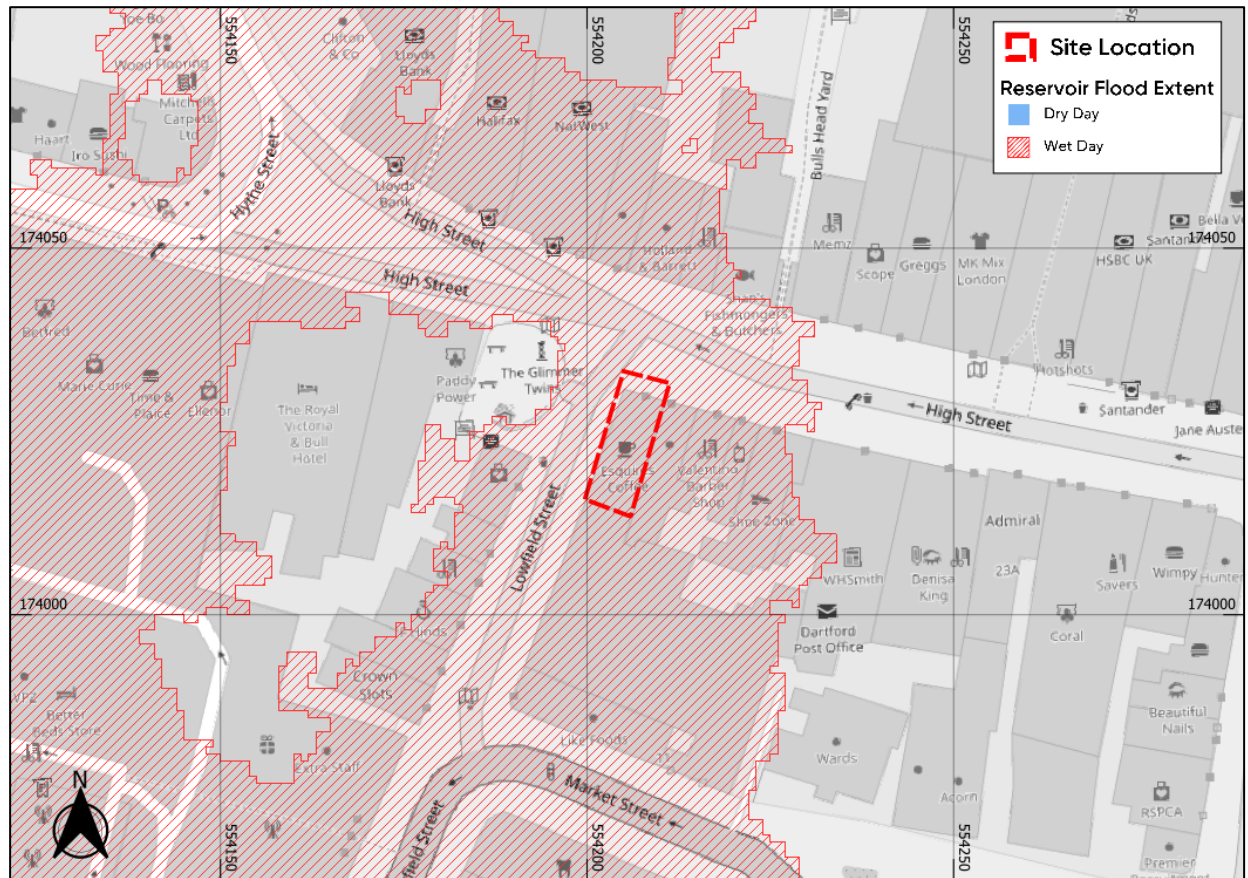


Figure 11: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©<https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.30. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst-case scenario.

4.31. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered as a relatively low risk.

## Groundwater

- 4.32. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.
- 4.33. The British Geological Survey's (BGS) mapping shows superficial deposits of Alluvium comprised of clay, silt, sand, and gravel underlying the site. The bedrock underlying the site is Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation comprising chalk.
- 4.34. Historical BGS boreholes within the vicinity of the site confirm that the site is underlain by dense sandy fine medium and coarse gravel. The closest borehole TQ57SW301 was around 75m from the site and was bored to a depth of 6m and no groundwater was encountered.
- 4.35. Groundwater mapping within the SFRA could not be accessed at the time of writing. However, text within the SFRA states that susceptibility to groundwater flooding is generally greatest along the routes of the River Darent and is linked to the geology in the borough, generally being highest in areas of alluvial deposits, which the site is.
- 4.36. Even though the BGS showed alluvial deposits, and the site is located near to the River Darent, with the evidence of no groundwater encountered in the nearby borehole and the proposed development being located at the first and second floor, the development is considered at low risk of groundwater flooding.

## Sewers

- 4.37. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.
- 4.38. The SFRA provides mapping of historical sewer flood incident records kept by the local authority. Table 7-3 of the SFRA shows that, in the site's postcode, there have been 12 recorded sewer flooding incidents. While sewer flooding has been recorded within the postcode area of the site, it should be noted that this does not necessarily mean that the site itself has flooded previously.
- 4.39. Local policy documentation does not identify the site as being in a Critical Drainage Area.

4.40. As the proposed development is located at the first and second floor level, the proposed development is considered to be at low risk of flooding from sewers.

## 5. Flood Risk Mitigation

### Fluvial

- 5.1. Based on the analysis within Section 4, the risk of fluvial flooding to the site is considered to be low to moderate however with the proposed flats being at the first and second floors the risk to the proposed development is considered to be low.
- 5.2. Therefore, no specific flood mitigation measures are recommended for fluvial flooding, other than the site owners and occupants signing up to the EA Flood Warning Service.

### Pluvial

- 5.3. The risk of pluvial flooding to the proposed development (first and second floor flats) is considered to be low. Therefore, no specific flood mitigation measures are recommended for fluvial flooding, other than the site owners and occupants monitoring local weather reports.

### Reservoirs, Groundwater and Sewers

- 5.4. Flood risk to the proposed development from other sources is considered to be low, therefore mitigation is not required.

### Increase to Flood Risk Elsewhere

- 5.5. It is understood that the proposed development is for the conversion of the first and second floors from commercial to residential via Class G Permitted Development.
- 5.6. As the proposal will not increase footprint on site, it should not increase flood risk elsewhere through displacement of flood water.

### Flood Warnings

- 5.7. The site is in an area benefiting from the Environment Agency (EA) flood warning service - Areas at risk of tidal flooding from Dartford to Allhallows, including Crayford, Greenhithe, Northfleet, Gravesend and the North Kent Marshes. This service allows site owners to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the site owner will be sent an alert directly to their chosen method of contact. As a further precaution and risk reduction, the owner of the site should sign up.

5.8. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site-specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site-specific flood defences.

## 6. Conclusions

- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 9 High Street, Dartford, DA1 1DT. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

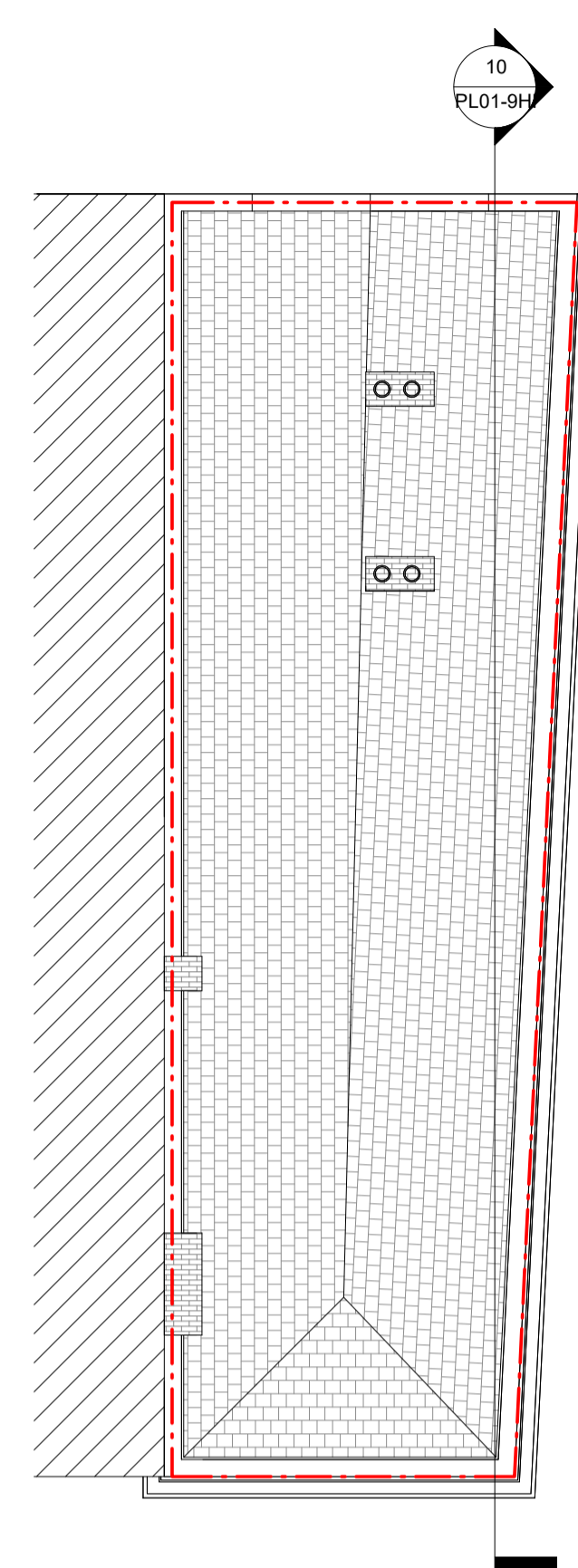
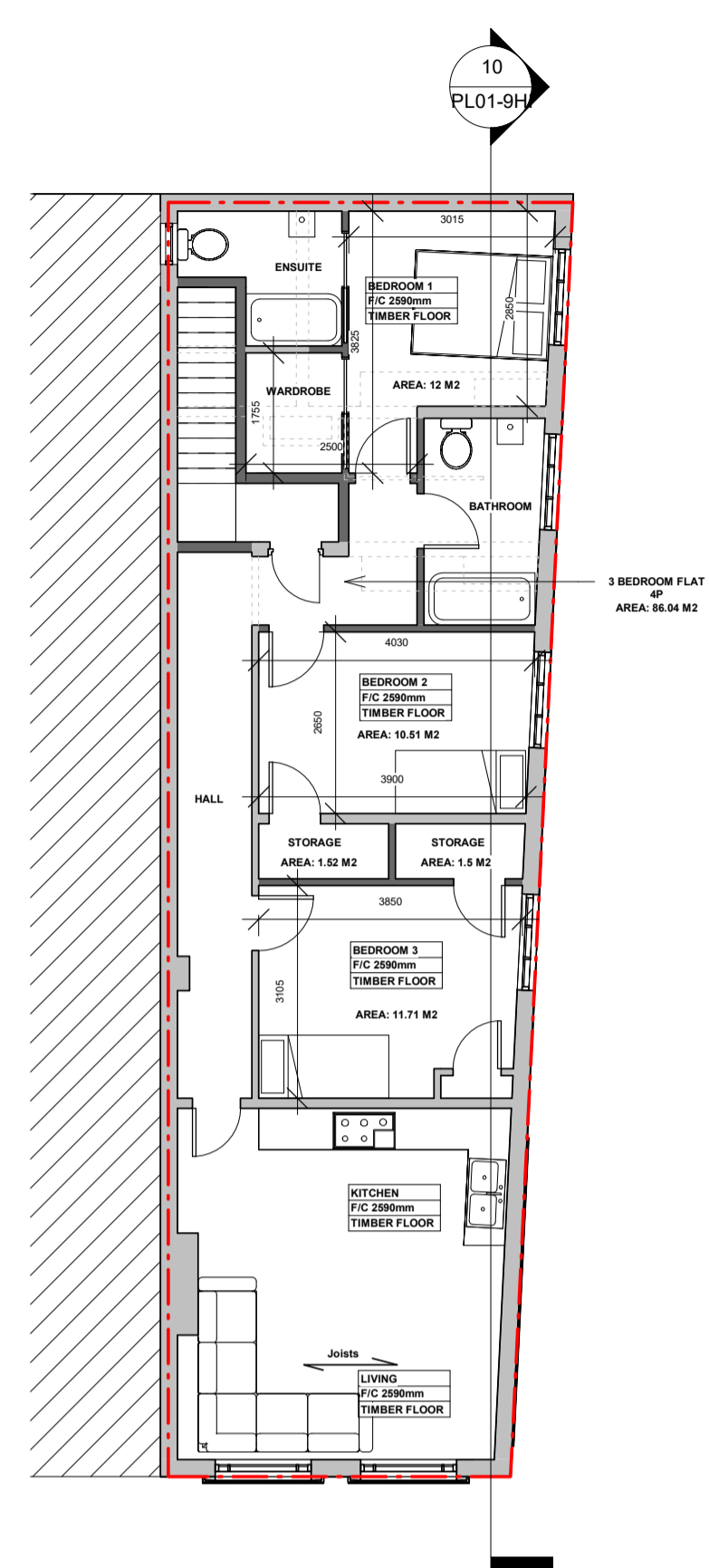
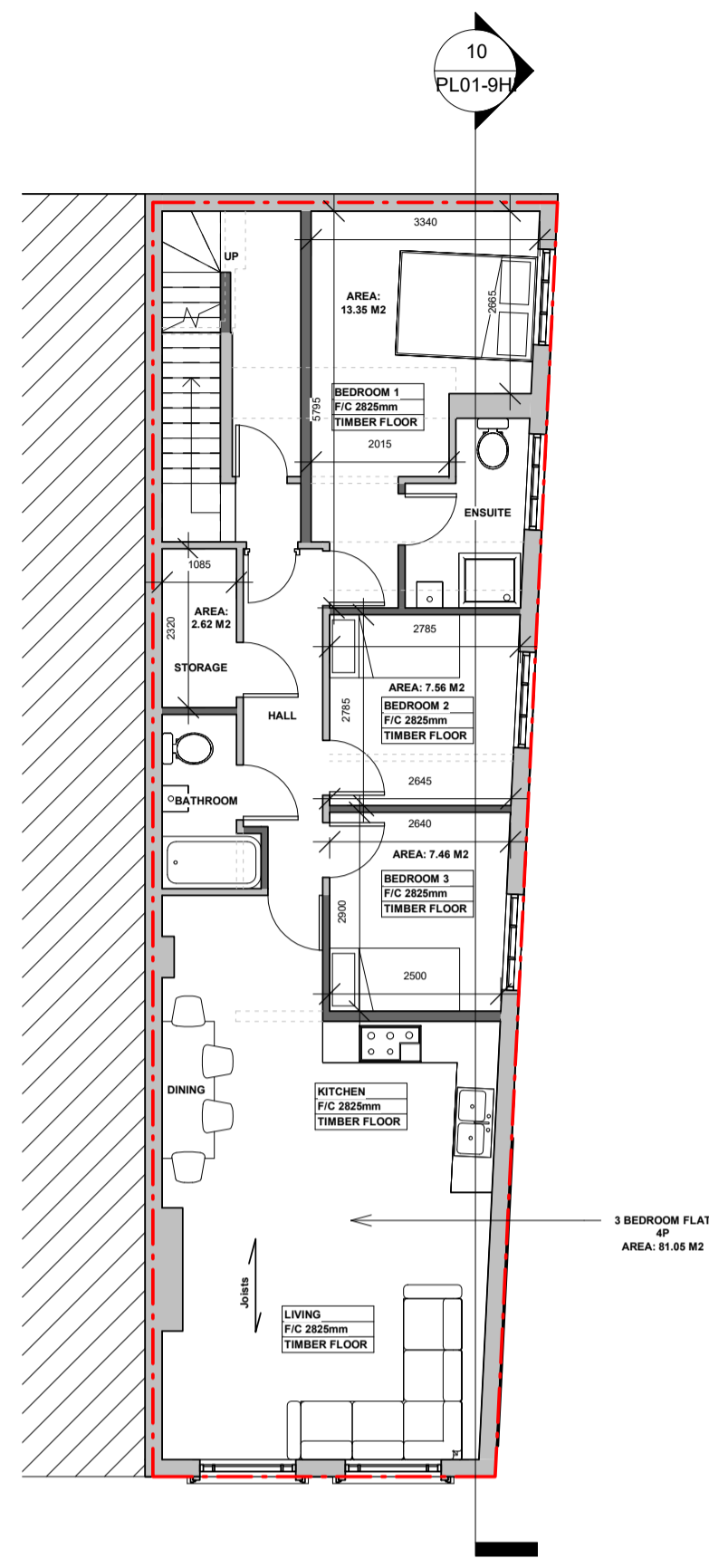
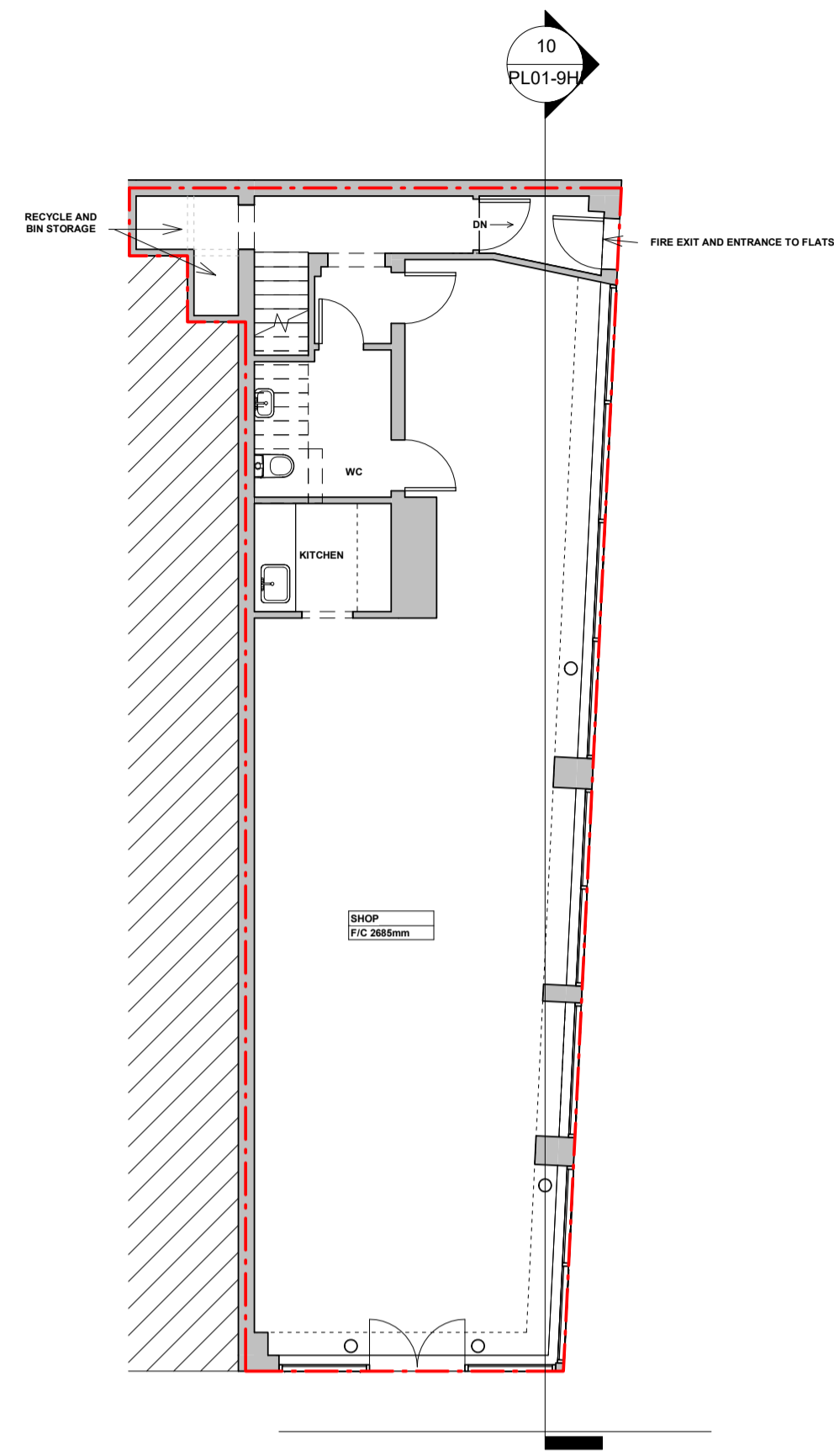
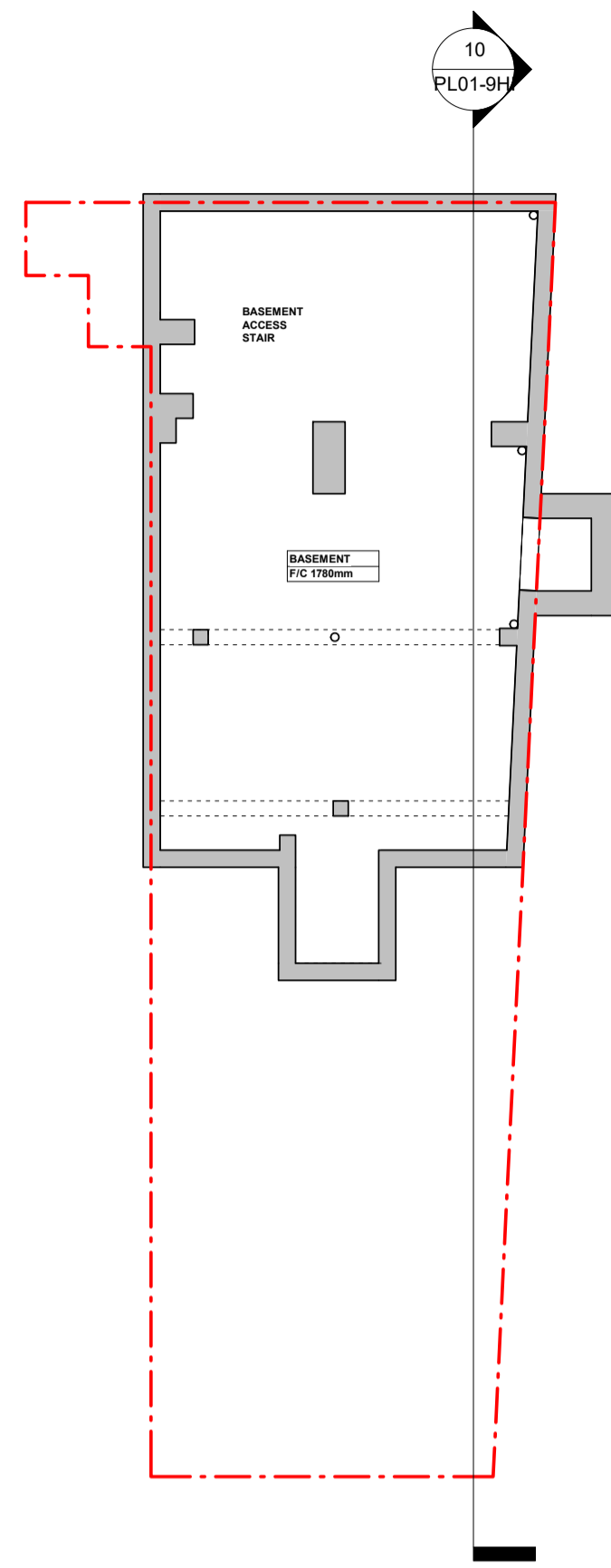
Source of Flooding	Flood Risk Summary
Fluvial	<p>Based on the analysis within Section 4, the risk of fluvial flooding to the site is considered to be low to moderate however with the proposed flats being at the first and second floor the risk to the proposed development is considered to be low.</p> <p>Safe access/ egress should be possible in the modelled 1 in 100 year +CC25% event based on EA data.</p> <p>Therefore no specific flood mitigation measures are recommended for fluvial flooding, other than the site owners and occupants signing up to the EA Flood Warning Service</p>
Pluvial	<p>The risk of pluvial flooding to the proposed development (first and second floor flats) is considered to be low. Therefore no specific flood mitigation measures are recommended for fluvial flooding, other than the site owners and occupants monitoring local weather reports.</p>
Tidal Reservoirs Groundwater Sewers Canals	<p>The proposed development is considered to be at low risk from these sources.</p>

- 6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

- 6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.



# Appendix A - Development Proposals



1 Proposed Basement  
1 : 100

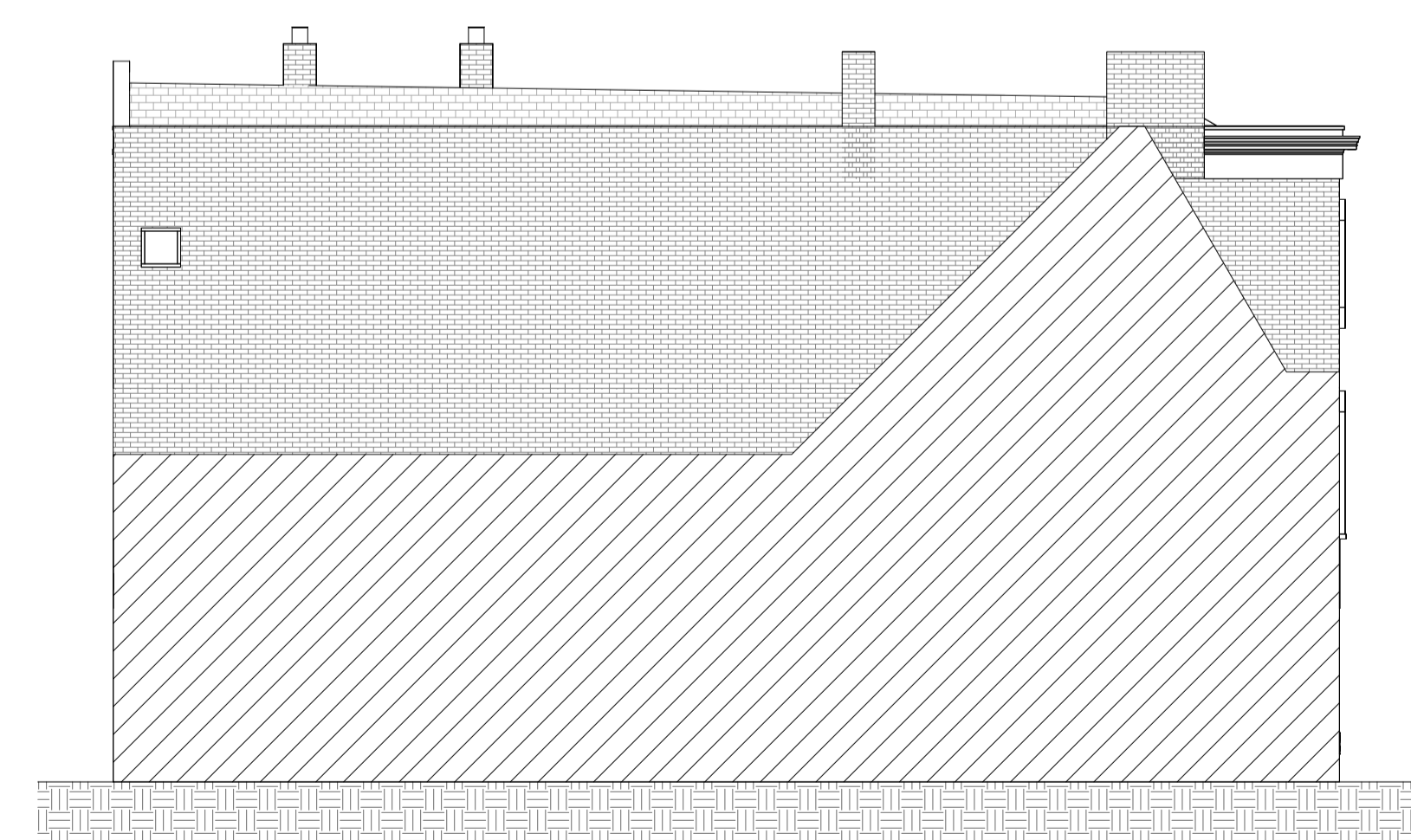
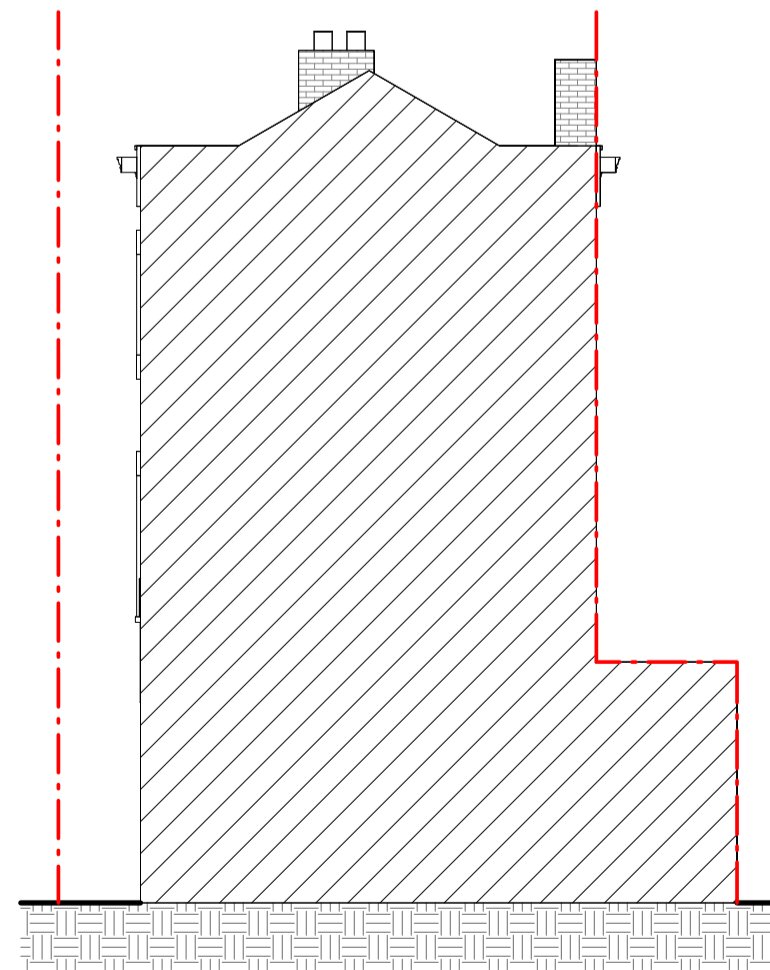
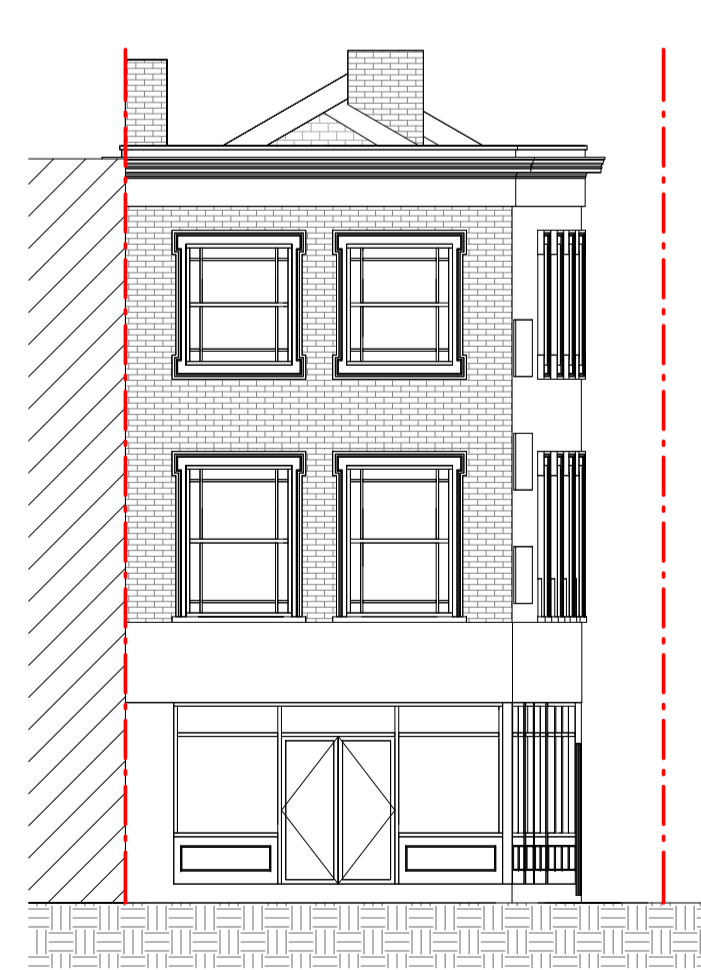
2 Proposed Ground Floor  
1 : 100

3 Proposed First Floor  
1 : 100

4 Proposed Second Floor  
1 : 100

5 Proposed Roof  
1 : 100

10 Proposed Section AA'  
1 : 100



6 Proposed Front Elevation  
1 : 100

7 Proposed Rear Elevation  
1 : 100

8 Proposed Left Side Elevation  
1 : 100

9 Proposed Right Side Elevation  
1 : 100

	EXISTING WALL		PROPOSED WALL
	BOUNDARY LINE		
	F/C		
	FLOOR TO CEILING HEIGHT		

PROJECT Flat Conversion, Internal Reconfiguration and All Associated Works	
ADDRESS 9 High St, Dartford DA1 1DT	
CLIENT NAME David Guest	
PROJECT STATUS Planning	
SHEET N. PL01-9H1	DRAWING TITLE Proposed Floor & Elevation Plans
DESIGNED BY GOPLANS	DRAWN BY SD
DATE 16/10/2023	CHECKED BY GOPLANS
	SCALE As Indicated @ A1

All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.

