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Level 2 Strategic Flood Risk Assessment - Site HO/24/00014

Land west of Brittain's Lane, Sevenoaks

FINAL

Prepared for

Sevenoaks District Council

Date

July 2026

Contents

1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for site HO/24/00014. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the Sevenoaks Level 1 SFRA and read the Level 2 SFRA Main Report and is therefore familiar with the terminology used in this report.

1.1 Site details

- Location: Land west of Brittain's Lane, Sevenoaks, TN13 2JU
- Site area: 5.32ha
- Existing site use: Greenfield
- Proposed site use: Residential
- Proposed use flood risk vulnerability classification: More Vulnerable

The site is bordered by residential properties to the north and south, greenfield land to the west, and Brittains Lane to the east. An unnamed ordinary watercourse enters the site at the south-western corner and flows along the western and northern site boundaries before exiting the site to the north. A map showing the location of the site can be found below in Figure 1-1

Figure 1-1: Location of site HO/24/00014

1.2 Topography

Figure 1-2 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LiDAR.

The site topography generally slopes westwards and northwards from the southern part of the site towards the watercourse. The highest ground level, at approximately 109.61mAOD, is located along the southern site boundary, while the lowest ground level, at approximately 90.88mAOD, is situated to the north of the site along the watercourse channel. Lower-lying areas are also present in the eastern part of the site, where the land falls in a northerly direction. Along Brittains Lane, the lowest topography is approximately 88.04mAOD. LiDAR mapping of the surrounding area indicates that the watercourse that flows through the site, forms a valley.

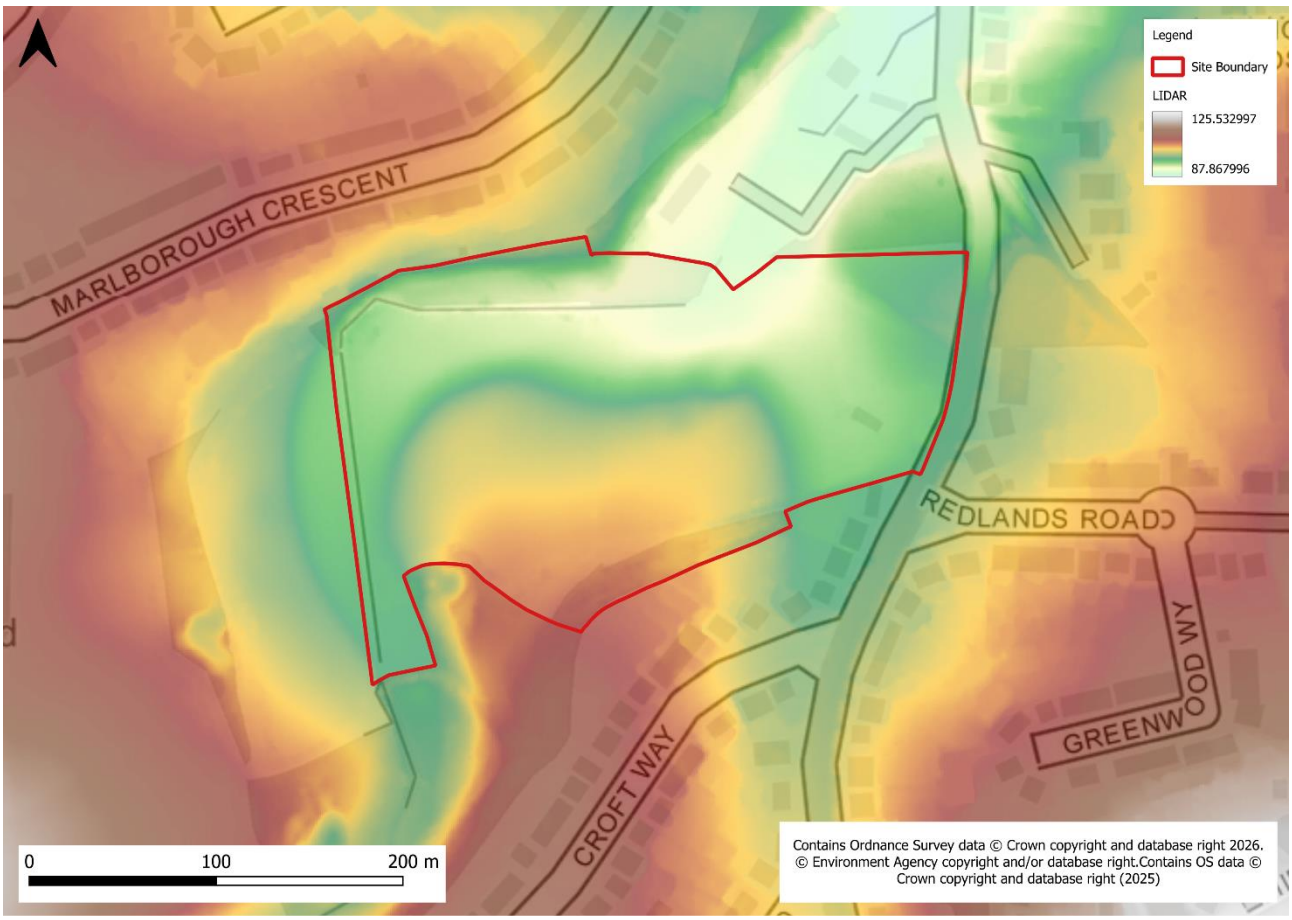

Figure 1-2: Topography of the site

1.3 Geology and soils

Geology at the site consists of:

- Bedrock - Hythe Formation consisting of interbedded sandstone and limestone
- Superficial - There is no information available for this location

Soils at the site consist of:

- Freely draining slightly acid loamy soils

2 Sources of flood risk

2.1 Location of site within the catchment

The site is located within the catchment for the Upper Darent Water Body which is part of the Darent Operational Catchment. The Upper Darent Water Body has a catchment area of 100.38km2 and is not designated artificial or heavily modified.

2.2 Existing drainage features

An unnamed ordinary watercourse, a tributary of the River Darent, enters the site at the south-western corner and flows along the western and northern site boundaries before exiting the site to the north.

2.3 Fluvial

2.3.1 Available data

The EA's Flood Map for Planning (FMfP) has been used within this assessment to determine Flood Zones 3a and 2. The 3.3% AEP defended extent from the EA's Risk of Flooding from Rivers and Sea (RoFRS) mapping has been used to determine Flood Zone 3b.

2.3.2 Description of risk to the site

Fluvial flood risk is associated with the unnamed watercourse which flows along the western and northern site boundaries. Table 2-1 indicates that 12.13% of the site is affected by the Flood Zone 3b extent, which is generally confined to the channel of watercourse, with some out of bank flooding in the north-western corner of the site (Figure 2-1). Flood Zone 3a affects 13.21% of the site and Flood Zone 2 covers 15.17% of the site. A large proportion of the site (84.83%) is located within Flood Zone 1.

Table 2-1: Existing fluvial flood risk based on EA FMfP*

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
84.83	15.17	13.21	12.13

**The percentage flood zones quoted show the percentage of the site at flood risk from that particular flood zone or event, including the percentage of the site at flood risk at a higher risk zone, e.g., Flood Zone 2 includes the Flood Zone 3 percentage. Flood Zone 1 is the remaining area outside Flood Zone 2 (Flood Zone 2 + Flood Zone 1 = 100%).*

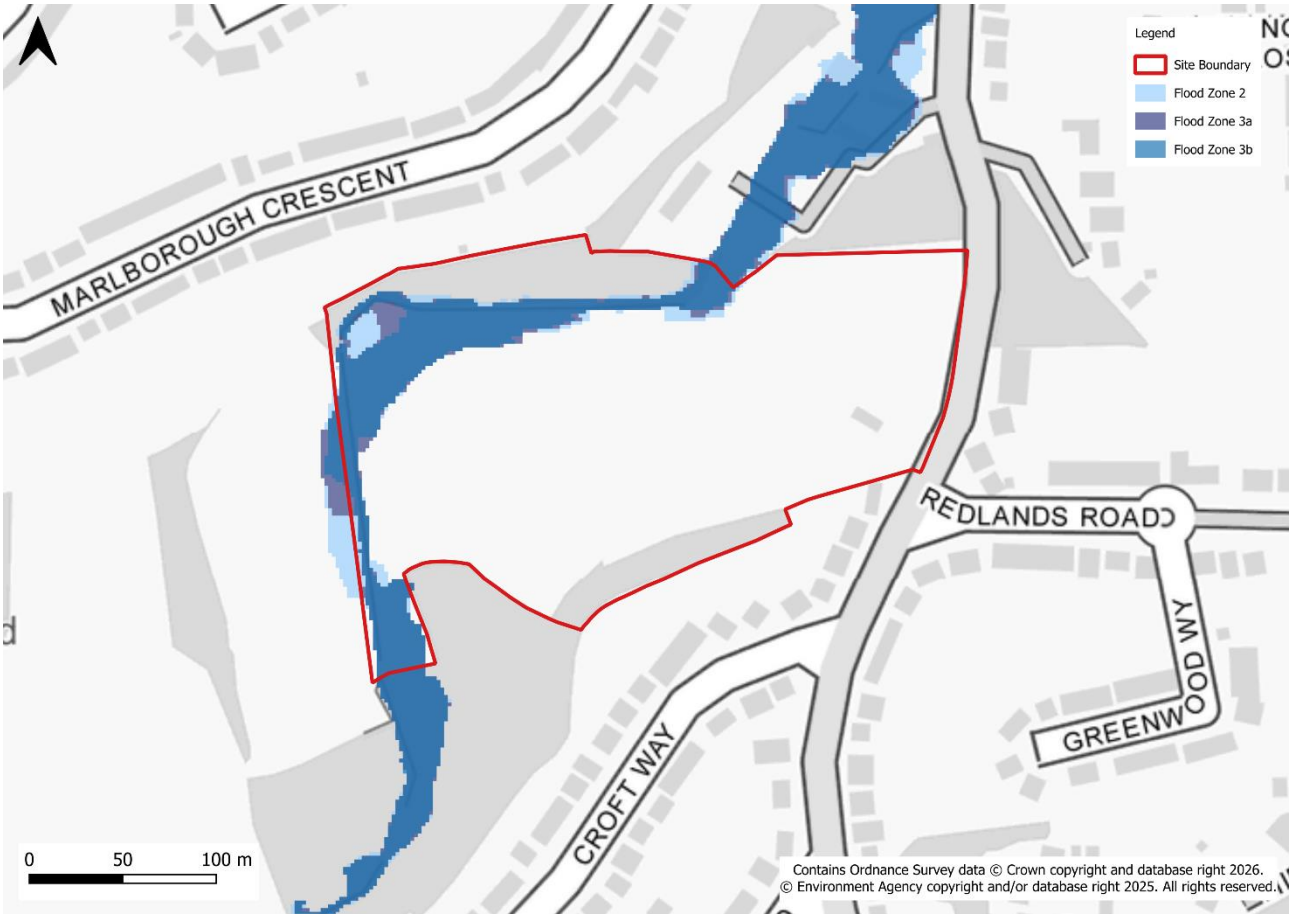

Figure 2-1: Flood Map for Planning - Fluvial Flood Zones

2.4 Surface water

2.4.1 Available data

The EA's FMfP Surface Water Spatial Planning mapping has been used to assess the extent and depth of surface water flooding. The EA's Risk of Flooding from Surface Water (RoFSW) mapping has been used to assess the velocity and hazard of surface water flooding.

2.4.2 Description of risk to the site

Table 2-2 and Figure 2-2 present the surface water flood risk across the site based on the Surface Water Spatial Planning extent mapping.

During the 3.3% AEP (high risk) surface water event, flooding within the site is not predicted. During the 1% AEP (medium risk) event, 0.10% of the site is affected. Two areas of ponding are identified around the perimeter of the site: one along the northern boundary and one along the southern boundary. Surface water flooding along the northern boundary is shown to extend up to approximately 9m into the site, whereas flooding extends up to approximately 1m along the southern boundary. Predicted flood depths are shallow, less than 0.20m, with a maximum hazard rating of Low (Caution).

During the 0.1% AEP (low risk) event, a flow path is predicted to enter the south-eastern part of the site via the southern boundary. This flow path follows the topography of the site, travels northwards across the eastern part of the site and flows into the watercourse. During this event, 3.63% of the site is affected. Flood depths remain relatively shallow and are not predicted to exceed 0.20m, although velocities of up to 1.00m/s are indicated in some areas. Overall, a maximum hazard rating of Moderate (dangerous for Some) is predicted.

Table 2-2: Existing surface water flood risk based on the FMfP and RoFSW maps

Event	3.3% AEP (high risk)	1% AEP (medium risk)	0.1% AEP (low risk)
Percentage of site at risk* (%)	0.00	0.10	3.63
Maximum depth (m)	N/A	<0.20	0.20
Maximum velocity (m/s)	N/A	0.25	1.00
Maximum hazard classification	N/A	0.50 - Low - Caution: Flood zone with shallow flowing water or deep standing water.	0.75 - Moderate - Dangerous for Some - Danger: Flood zone with deep or fast flowing water.

** The percentage surface water extents quoted show the percentage of the site at surface water risk from that particular event, including the percentage of the site at flood risk at a higher risk zone (e.g., 1% AEP includes the 3.3% AEP percentage).*

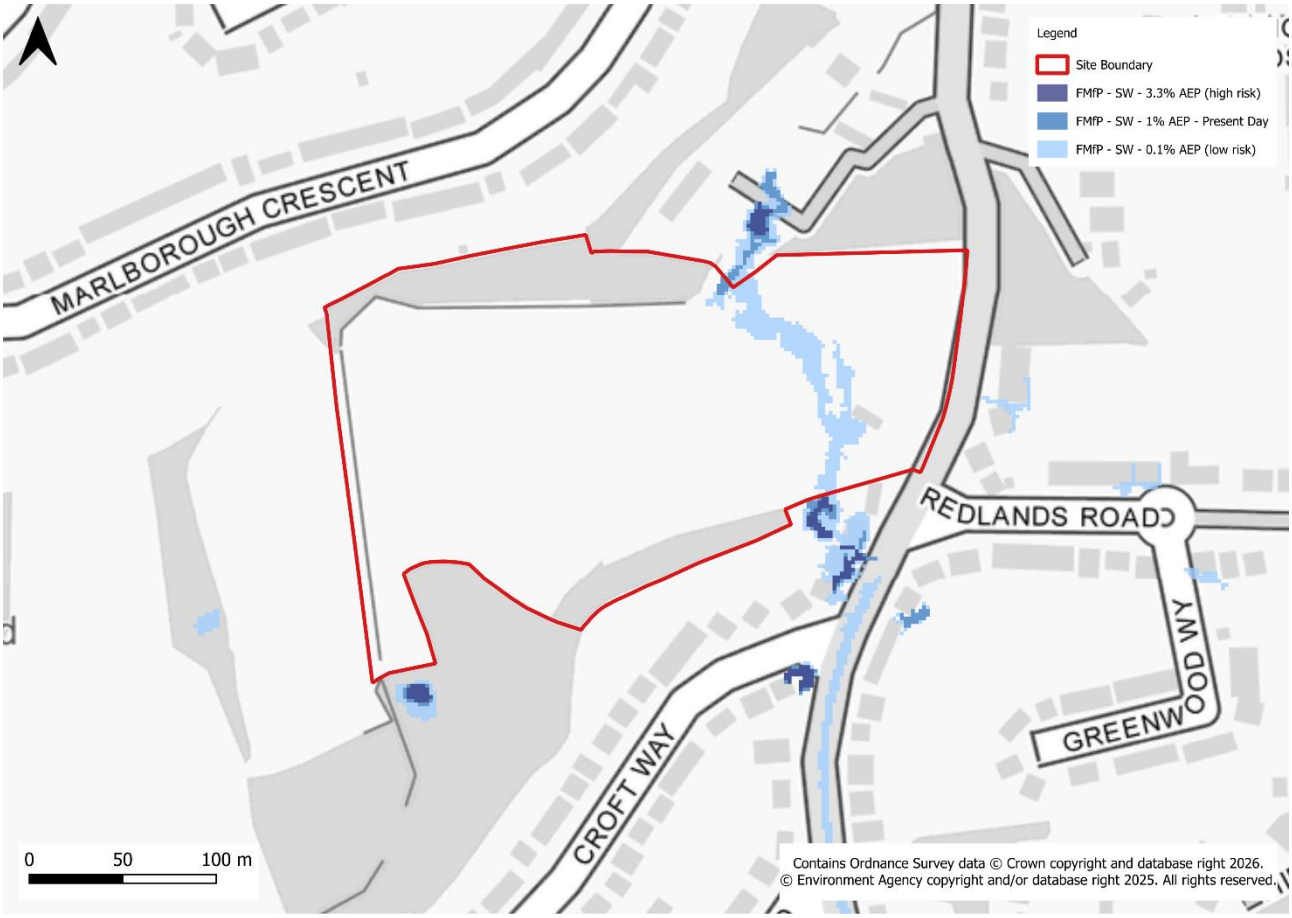

Figure 2-2: Flood Map for Planning - Surface Water Spatial Planning extents

2.5 Reservoir

The EA's Reservoir Flood Mapping shows that the site is not at risk of reservoir flooding during the Dry Day or Wet Day scenarios.

2.6 Groundwater

The JBA Groundwater Emergence Map (Figure 2-3) shows that the site is not at risk of groundwater emergence during a 1% AEP groundwater flood event.

This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.

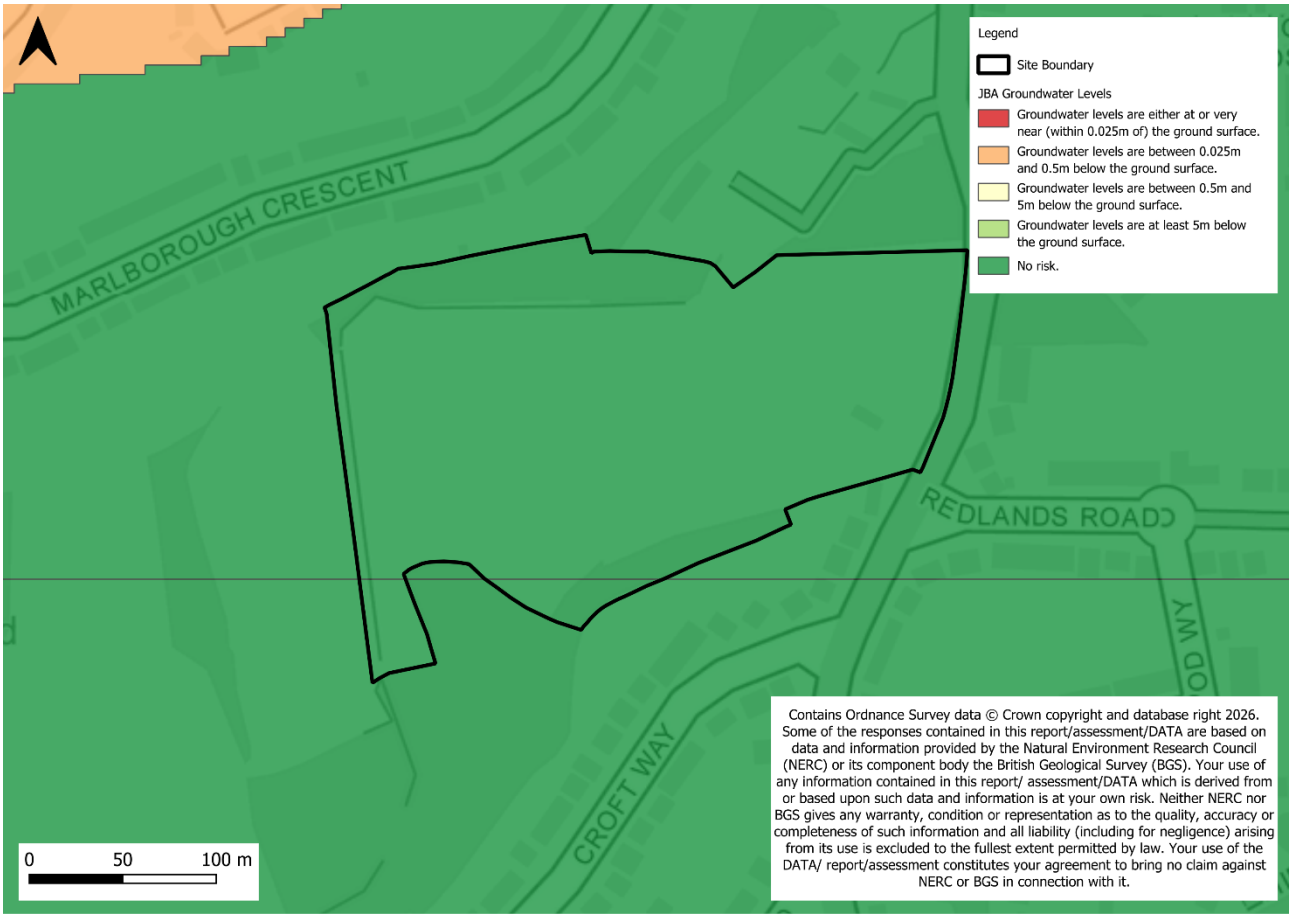

Figure 2-3: JBA Groundwater Emergence Map

2.7 Sewers

The site is located within postcode area TN13 2, where Thames Water sewer flooding incident data indicates 11 incidents of internal and external sewer flooding.

2.8 Flood history

The EA's Historic Flood Map does not indicate any recorded flooding within the site. However, records held by the LLFA at Kent County Council identify at least three instances of blocked drains/gullies along Brittains Lane, to the south-east of the site, between 2024 and 2025.

3 Climate change

Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard, and frequency of both fluvial and surface water flooding. Please see Section 4.7 of the Sevenoaks District Level 2 SFRA for information on climate change allowances.

Development proposals at the site must address the potential changes associated with climate change and be designed to be safe for the intended lifetime. The provisions for safe access and escape must also address the potential increase in severity and frequency of flooding.

3.1 Fluvial

3.1.1 Available data

The EA RoFRS maps have been used to assess the impact of climate change on flood risk to the site. The 1% AEP plus 35% ('2080s' epoch Central allowance) climate change extents are currently available, and are based on national modelling. These are shown in shown in Table 3-1. No local detailed flood modelling is available.

3.1.2 Description of risk to the site

As shown below in Table 3-1Table 3-1: Comparison of fluvial flood risk to the site between the 1% AEP and 1% AEP plus 35% climate change extents and Figure 3-1, there is a slight increase in flood extent between the present-day 1% AEP event and the 1% AEP plus climate change allowance event. Flooding is shown to extend along the western and north-western site boundaries, associated with the unnamed watercourse in this area.

Table 3-1: Comparison of fluvial flood risk to the site between the 1% AEP and 1% AEP plus 35% climate change extents

Event	1% AEP	1% AEP plus 35% CC
Percentage of site at risk (%)	13.21	13.95

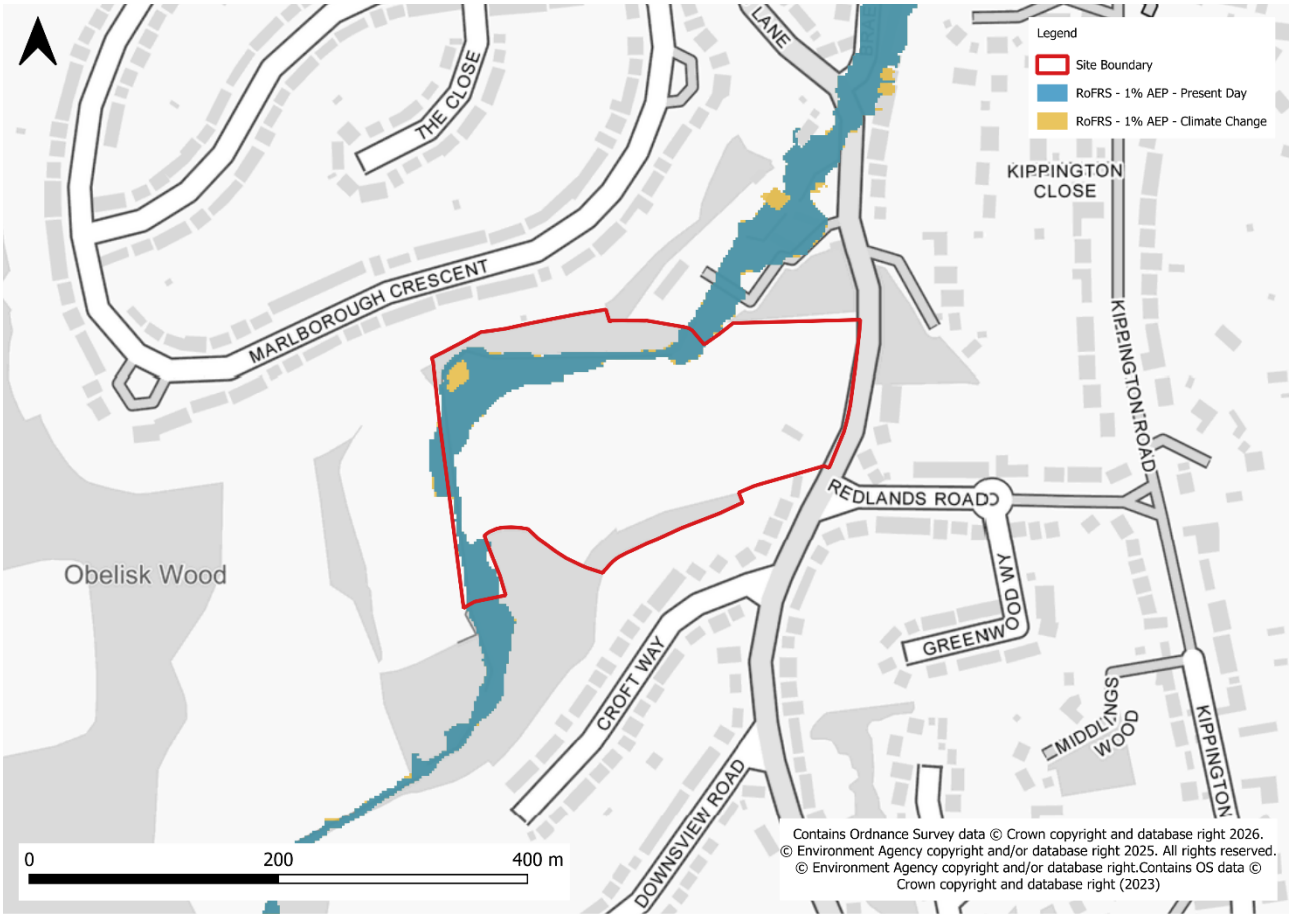

Figure 3-1: Comparison of fluvial flood risk to the site between the 1% AEP and 1% AEP plus 35% climate change extents

3.2 Surface water

3.2.1 Available data

The EA's FMfP Surface Water Spatial Planning mapping has been used to assess the extent and depth of surface water flooding impact of climate change on flood risk to the site in the 1% AEP plus 40% climate change allowance event. The impact of climate change on surface water flood risk should be assessed as part of a site-specific Flood Risk Assessment, in line with the latest available climate change allowances and guidance.

3.2.2 Description of risk to the site

Surface water flooding in the 1% AEP plus 40% climate change allowance event is predicted to increase slightly compared to the present day 1% AEP event, as summarised in Table 3-2 and illustrated in Figure 3-2. The mapping indicates that the pattern of flooding under the climate change scenario is broadly comparable to that observed during the present-day 0.1% AEP event. This includes a defined flow path entering the south-eastern section of the site via the southern boundary, before travelling northwards across the eastern portion of the site and exiting at the northern boundary, consistent with the site's topographic gradient.

Flood depths are predicted to increase under the climate change scenario, with maximum depths reaching up to 0.30m. However, depths across the majority of the site typically remain below 0.15m.

Table 3-2: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents

Event	1% AEP	1% AEP plus 40% CC
Percentage of site at risk (%)	0.10	2.97
Maximum depth (m)	<0.20	0.30

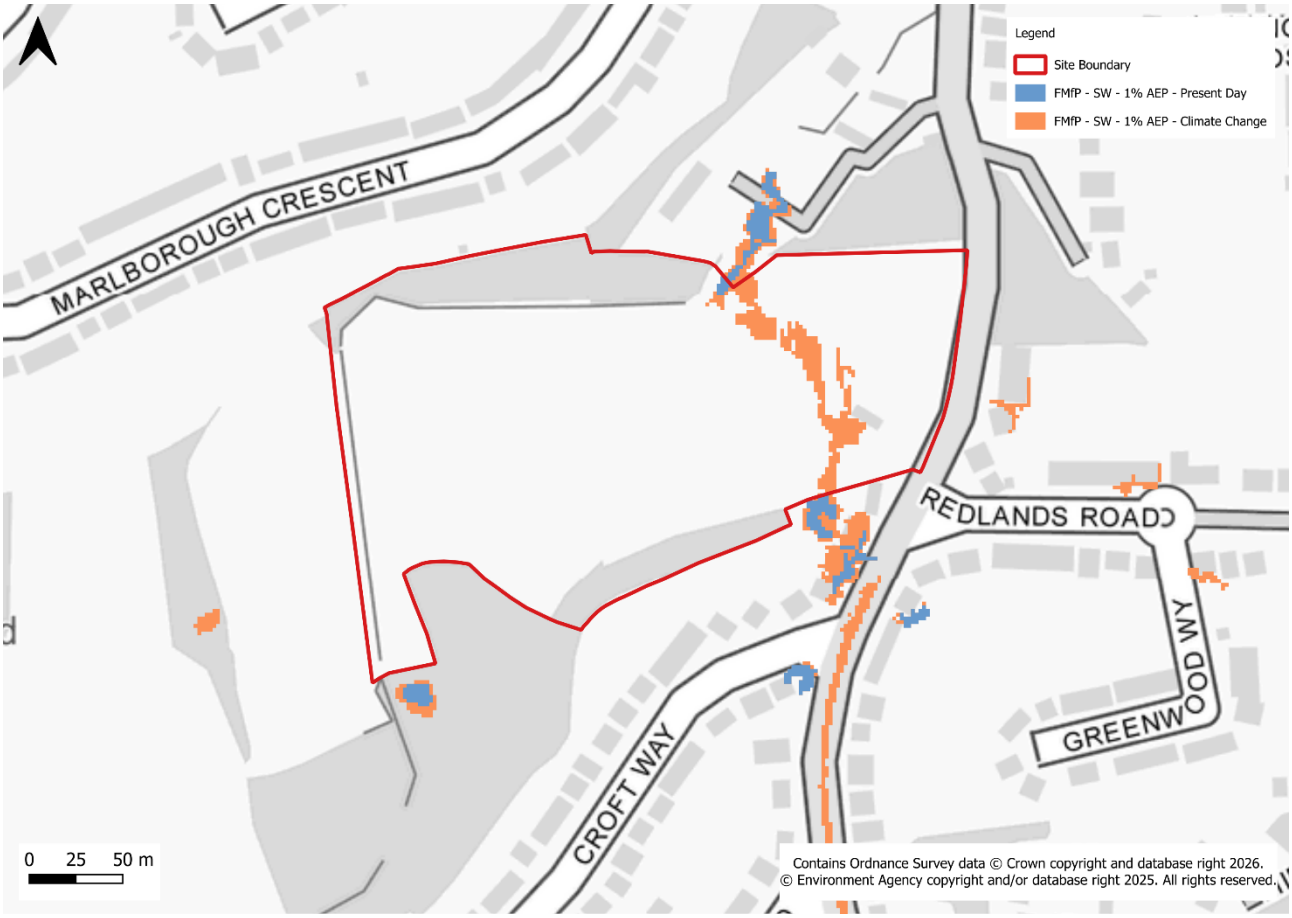

Figure 3-2: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents

4 Flood risk management infrastructure

4.1 Defences

The EA AIMS dataset shows that the site is not protected by any formal flood defences.

4.2 Residual risk

The unnamed watercourse is likely culverted beneath Little Brittains Lane, approximately 45m north of the site. This presents a potential flood risk in the event that the culvert becomes obstructed or collapses, which could cause water to back up and result in flooding of the site.

5 Emergency planning

5.1 Flood warnings and alerts

The site is located in the River Darent from Westerham to Dartford EA Flood Alert Area; however, the site is not located in an EA Flood Warning Area.

5.2 Access and escape

Safe access and escape will need to be demonstrated in the 1% AEP plus climate change fluvial and surface water events. Site drainage proposals should address the requirements for access routes, avoid impeding surface water flows and preserve the storage of surface water to avoid exacerbation of flood risk elsewhere on the site and in the wider catchment.

5.2.1 Potential access

Existing access to the site is achieved via Brittains Lane, situated along the eastern boundary.

5.2.2 Fluvial

Safe access and escape from the site can be achieved by heading south along Brittains Lane during fluvial flood events. Fluvial flooding is predicted to affect Brittains Lane approximately 150m north-east of the site during both present-day and climate change scenarios.

5.2.3 Surface water

During the 1% AEP plus 40% climate change allowance event, surface water flooding is predicted along Brittains Lane to the south of the site, with depths reaching up to 0.30m in some locations. Brittains Lane remains largely free from flooding to the north of the site, with a single area of ponding identified near its junction with London Road, where depths may also reach up to 0.30m. As flood depths are not predicted to exceed 0.30m, it is considered likely that safe access and escape can be maintained via Brittains Lane

A site Specific Flood-Risk Assessment (FRA) must show that the development can be designed to be safe and that there is adequate planning provision.

5.3 Dry islands

The site is not located on a dry island.

6 Requirements for drainage control and impact mitigation

6.1 Broadscale assessment of possible SuDS

- BGS data indicates that the underlying geology is sandstone and limestone which is likely to have highly variable permeability. In addition, the site is not considered to be susceptible to groundwater flooding due to the nature of the local geological conditions. As such, the feasibility of managing surface water runoff through infiltration should be verified by site investigations and infiltration testing, in accordance with Kent County Council LLFA guidance. It is therefore likely that off-site discharge, in line with the SuDS hierarchy, will be required to manage surface water runoff from the site.
- The site is located within a Groundwater Source Protection Zone. Infiltration techniques may not be suitable and should only be used following the granting of any required environmental permits from the Environment Agency for Zones 2, 3 and 4 although it is possible that infiltration may not be permitted. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible opportunities and constraints.
- The site is not located within a historic landfill site.

6.2 Opportunities for wider sustainability benefits and integrated flood risk management

- Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.
- Proposals to use SuDS techniques should be discussed with relevant stakeholders (Local Planning Authority, Lead Local Flood Authority, and the EA) at an early stage to understand possible constraints.
- Surface water discharge rates should not exceed the existing greenfield runoff rates for the site. Opportunities to further reduce discharge rates should be considered and agreed with the LLFA. It may be possible to reduce site runoff by maximising the permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques.
- The unnamed ordinary watercourse that flows along the western and northern site boundaries should be integrated into the site drainage strategy as blue-green infrastructure.
- The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 0.1% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space.

- Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development. The eastern part of the site is indicated to be sensitive to the impacts of climate change.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The site lies within the Upper Darent Water Body, which has Moderate ecological status. The use of multistage SuDS treatment will improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies.
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.
- The potential to utilise conveyance features such as swales to intercept and convey surface water runoff should be considered. Conveyance features should be located on common land or public open space to facilitate ease of access. Where slopes are >5%, features should follow contours or utilise check dams to slow flows.
- If it is proposed to discharge runoff to a watercourse, the condition and capacity of the receiving watercourse should be confirmed through surveys and the discharge rate agreed with the asset owner.

7 NPPF and planning implications

7.1 Exception Test requirements

The Local Planning Authority will need to confirm that the Sequential Test has been carried out in line with national guidelines. The Sequential Test will need to be passed before the Exception Test is applied.

The NPPF classifies residential development as More Vulnerable.

The Exception Test is required for this site because the proposals consist of More Vulnerable development, located within Flood Zone 3a.

7.2 Requirements and guidance for site-specific Flood Risk Assessment

At the planning application stage, a site-specific FRA will be required as the proposed development site:

- is within Flood Zones 2 and 3a and 3b
- is within 'Flood Zones plus Climate Change', showing it is at increased risk of flooding from river or sea in the future
- is at risk of surface water flooding
- is changing vulnerability class from less vulnerable to more vulnerable, as the proposed use is for housing.
- is over 1 hectare in size

All sources of flooding should be considered as part of a site-specific FRA.

Consultation with the Local Authority, Lead Local Flood Authority, Thames Water, and the EA should be undertaken at an early stage.

Any FRA should be carried out in line with latest guidance including the National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice Guidance (PPG), and Sevenoaks District Council Local Plan Policies.

The development should be designed with mitigation measures in place where required.

7.3 Guidance for site design and making development safe

- The site layout should adopt a sequential approach by steering the most vulnerable aspects of the development outside of areas within Flood Zones 2 and 3, as well as the surface water flow route. Residential development is not permitted within Flood Zone 3b.
- Developers should consider utilising the unnamed watercourse located along the western and northern site boundaries as a green corridor or as a location for SuDS.
- A detailed 1D-2D hydraulic model of the ordinary watercourse, based on detailed topographic survey of the watercourse channel, may be required at FRA stage to

accurately represent the risk from this watercourse and set the height of any mitigation measures.

    - Blockage modelling should be conducted to assess the residual risk associated with potential blockage of the culvert structure beneath Little Brittains.

- The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, so runoff magnitudes from the development are not increased by development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates are as close as possible to pre-development greenfield rates, with areas of surface water ponding used as open space and SuDS or water compatible/essential infrastructure uses only.
- Arrangements for safe access and escape will need to be provided for the 1% AEP fluvial and surface events with an appropriate allowance for climate change, considering depth, velocity, and hazard. Design and access arrangements will need to incorporate measures, so development and occupants are safe.
- Provisions for safe access and escape should not impact on surface water flow routes or contribute to loss of floodplain storage. Consideration should be given to the siting of access points with respect to areas of surface water flood risk.
- The site is located within a catchment identified as highly sensitive to the cumulative impacts of development on flood risk. The site-specific FRA and surface water drainage strategy should consider the recommendations outlined for catchments of high sensitivity in the Sevenoaks District Level 1 SFRA Cumulative Impacts Assessment.
- The unnamed watercourse, which flows forms a boundary of the site, is an ordinary watercourse. A sufficient width of buffer, to be agreed in consultation with Kent County Council, should be maintained between the riverbank and any built structures, to enable riparian owners to access and maintain the channel.
- Any proposed river crossings on the site must ensure they are clear span in design and allow sufficient clearance of flood flows, to ensure that flood risk will not be increased elsewhere, and that future users of the bridge will be safe for the lifetime of the development.
- The watercourse on the site should remain as an open channel. The EA and Kent County Council have a presumption against the culverting of watercourses. In addition, any other structures encountered on the site which may restrict flow of water should be removed, to allow better management of flood risk, provide amenity space and improve habitats.

8 Conclusions

The Exception Test if required for the site as More Vulnerable development is proposed and the site is located within Flood Zone 3a.

The site is at risk of fluvial flooding during present day scenarios. Flood Zones 2 and 3 extents along the course of the unnamed watercourse, affecting land along the western and northern boundaries. The Flood Zone 3b extent is generally confined to the channel of watercourse, with some out of bank flooding in the north-western corner of the site. During the 1% AEP plus central climate change allowance event, 13.95% of the site is affected by fluvial flooding.

The EA's Surface Water Spatial Planning extent mapping indicates minimal flooding during the present day 3.3% and 1% AEP events. A flow path is predicted to cross the eastern part of the site during the 0.1% AEP event; however, this is only shown to affect 3.63% of the site. During the 1% AEP plus 40% climate change allowance event, the extent of flooding within the site is similar to the low risk present day event.

The following points should be considered in development of this site:

- The site layout should follow a sequential approach, directing development away from Flood Zones 2 and 3, as well as areas at risk of surface water flooding.
- A site specific Flood Risk Assessment is required which demonstrates that site users will be safe during events up to and including the 1% AEP fluvial and surface water events, with an appropriate allowance for climate change. This will need to show that the site is not at an increased risk of flooding in the future and that development of the site does not increase the risk of fluvial or surface water flooding either on or off the site.
- Arrangements for safe access and escape will need to be provided for the 1% AEP fluvial and surface water events with an appropriate allowance for climate change, considering depth, velocity, and hazard. Design and access arrangements will need to incorporate measures, so development and occupants are safe.
- A detailed 1D-2D hydraulic model of the ordinary watercourse within the site is likely to be required at FRA stage to accurately represent the risk from this watercourse and set the height of any mitigation measures.
    - Blockage modelling should be conducted to assess the residual risk associated with potential blockage of the culvert structure beneath Little Brittains.

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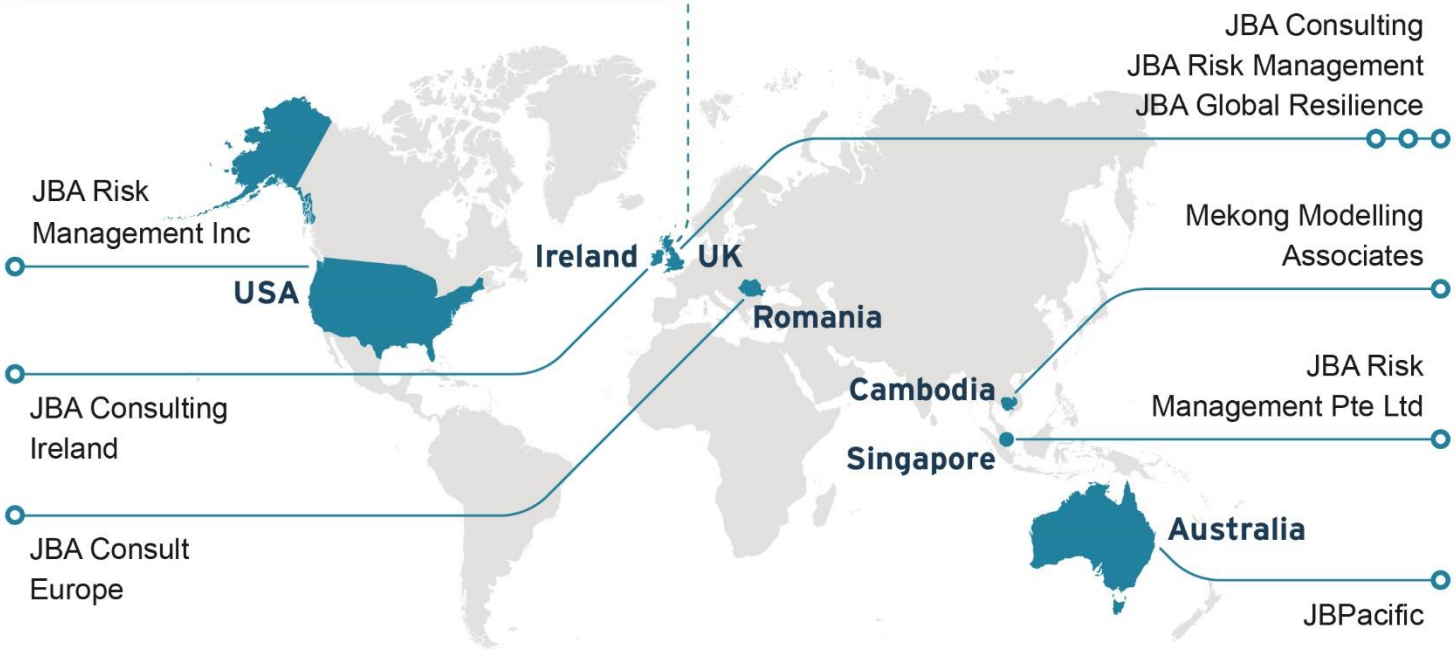

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