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Level 2 Strategic Flood Risk Assessment - Site SsM06

Whiteoak Garage off London Road

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 SsM-06. 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: Whiteoak Garage off London Road, Swanley
- Site area: 0.17ha
- Existing site use: Brownfield - existing buildings onsite
- Proposed site use: Residential
- Proposed use flood risk vulnerability classification: More Vulnerable

The site is located in the residential area of Swanley and is on the junction of London Road and Oliver Road. A map showing the location of the site can be found below in Figure 1-1.

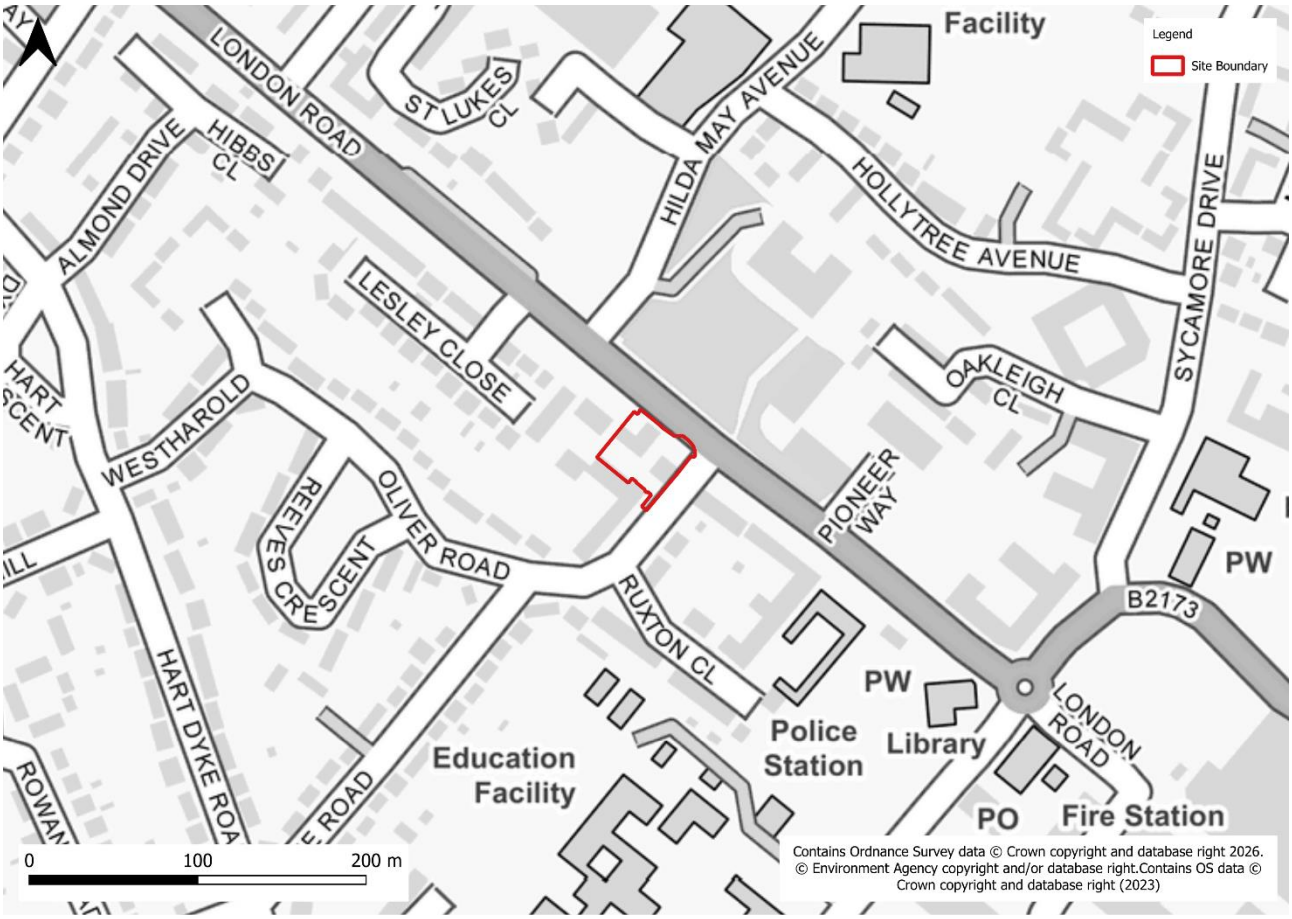

Figure 1-1: Location of Site SsM06

1.2 Topography

Figure 1-2 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LiDAR. The highest topography of 71.5mAOD is found on the west of the site. The topography slightly slopes towards the east. The lowest topography is found in the north of the site at 69.22mAOD, indicating a slight decline in topography northwards.

The site is situated within a developed urban area, and LIDAR data is unlikely to be representative of the actual site topography. As such, this may have an impact on some of the flood risk datasets used within this assessment.

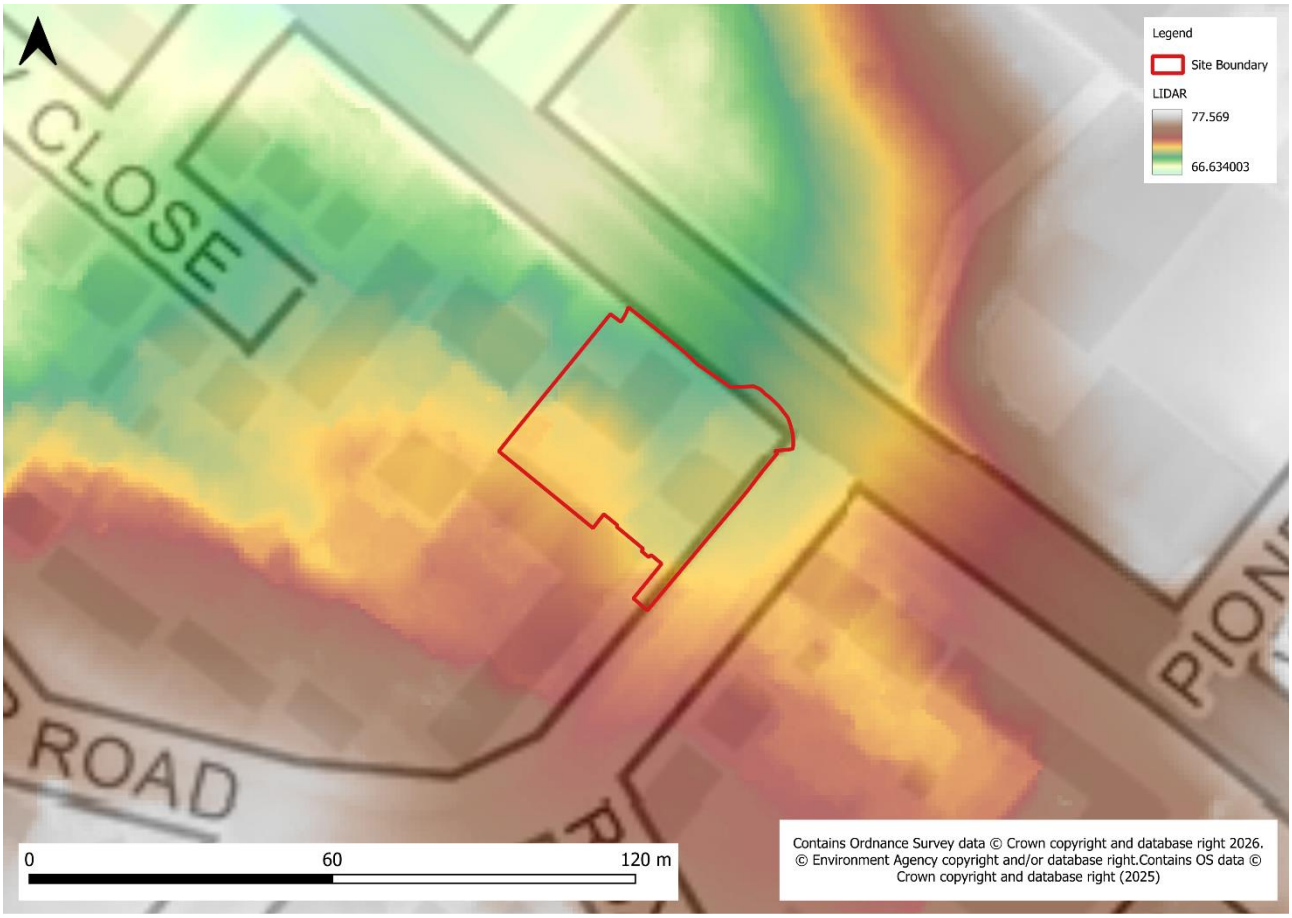

Figure 1-2: Topography of the site

1.3 Geology and soils

Geology at the site consists of:

- Bedrock - Thanet Formation consisting of Sand (fine-grained sand)
- Superficial - No information is 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 Middle and Lower Darent Water Body which is part of the Darent Operational Catchment and the Darent and Clay Management Catchment. The Middle and Lower Darent Water Body has a catchment area of 153.50km^2 and is not described as heavily modified.

2.2 Existing drainage features

There are no identifiable drainage features within or surrounding the site. However, as there is an existing development on the site, it is expected that the development is served by a surface water drainage system, which discharges into the local sewer systems.

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

The site is located within Flood Zone 1 and is therefore predicted to be at very low risk of fluvial flooding, as shown in Table 2-1.

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

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

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 2-1 presents the surface water flood risk across the site and shows that during the 3.3% AEP (high risk) event, the site is not at risk.

During the 1% AEP (medium risk) event, surface water flooding encroaches along the southeast boundary with Oliver Road. Flooding is shown to back-up against the existing building and flow into the southern corner of the site, covering over 5%, to depths of up to 0.30m. Velocity is predicted to be 0.25m/s and the hazard rating is Low (caution).

Compared to the 1% AEP event, there is an increase in extent of over 20% during the 0.1% AEP (low risk) event. The flood extent covers the southern and eastern section of the site, and appears to be part of a flow route, which forms offsite to the southeast, flows across the site and onto London Road. Depths are anticipated to be up to 0.30m with a velocity of 1.00m/s. The hazard rating remains Low (caution).

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

Event	3.3% AEP (high risk)	1% AEP (medium risk)	0.1% AEP (low risk)
Percentage of site at risk* (%)	0	5.51	27.81
Maximum depth (m)	N/A	0.30	0.30
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 - Low - Caution: Flood zone with shallow flowing water or deep standing 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).*

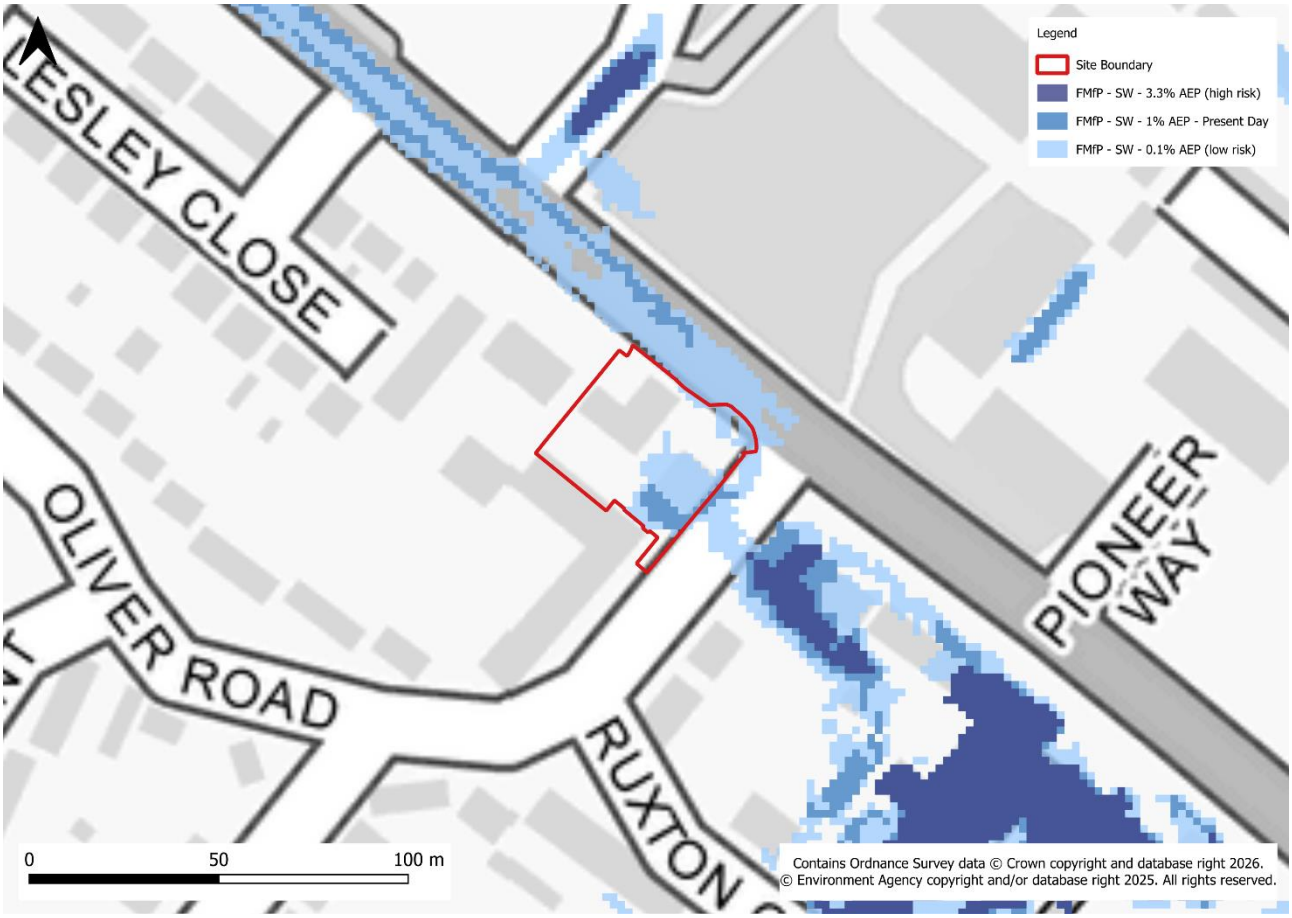

Figure 2-1: Flood Map for Planning - Surface Water Spatial Planning extents

2.5 Reservoir

The site is not shown to be at risk of reservoir flooding during the Dry Day or Wet Day scenarios in the EA Reservoir Flood Maps.

2.6 Groundwater

The JBA Groundwater Emergence Map (Figure 2-2) shows that groundwater levels are anticipated to be between 0.025m and 0.5m below the ground surface. There is a risk of groundwater flooding to both surface and subsurface assets and the possibility of groundwater emerging at the surface locally. Based on the RoFSW and topography of the site it is likely that any groundwater that emerges will pool in the southeastern and northeastern areas of the site.

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

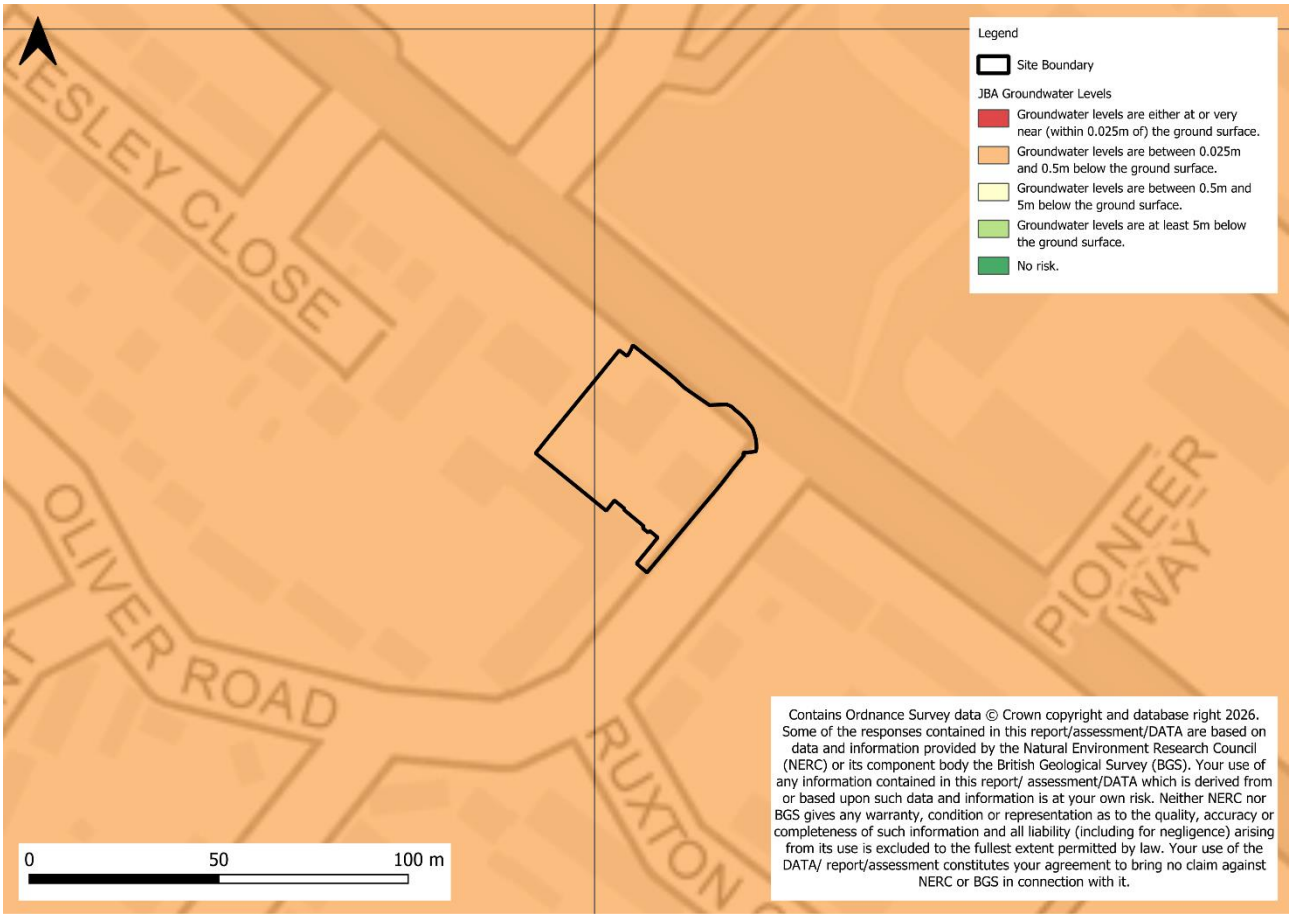

Figure 2-2: JBA Groundwater Emergence Mapping

2.7 Sewers

The site is located within the postcode area BR8 7, where Thames Water sewer flooding incident data indicates that there have been 2 incidents of internal flooding to properties and 4 incidents of external flooding, making a total of 6 incidents recorded between October 2019 and January 2023.

2.8 Flood history

Kent County Council LLFA flood incidents records include two incidents of flooding within 100m of the site, between 2011 and 2016.

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 4.6 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 3-1, the site is not predicted to be impacted by fluvial flooding during the 1% AEP plus 35% climate change allowance event.

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 (%)	0	0

3.2 Surface water

3.2.1 Available data

The EA's Flood Map for Planning - Surface Water Spatial Planning Extents (Climate Change) dataset has been used to assess the potential impact of climate change on surface water flood risk at the site in the 1% AEP plus 40% extents. 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

As shown in Table 3-2 and Figure 3-1 the extent of flooding in the climate change scenario increases from 5% (present day 1% AEP event) to nearly 24%. The area and extent of the

surface water flooding is comparable to the 0.1% AEP present day event, encroaching the site along the boundary with Oliver Road and covering the south east corner of the site.

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 (%)	5.51	23.64
Maximum depth (m)	0.30	0.30

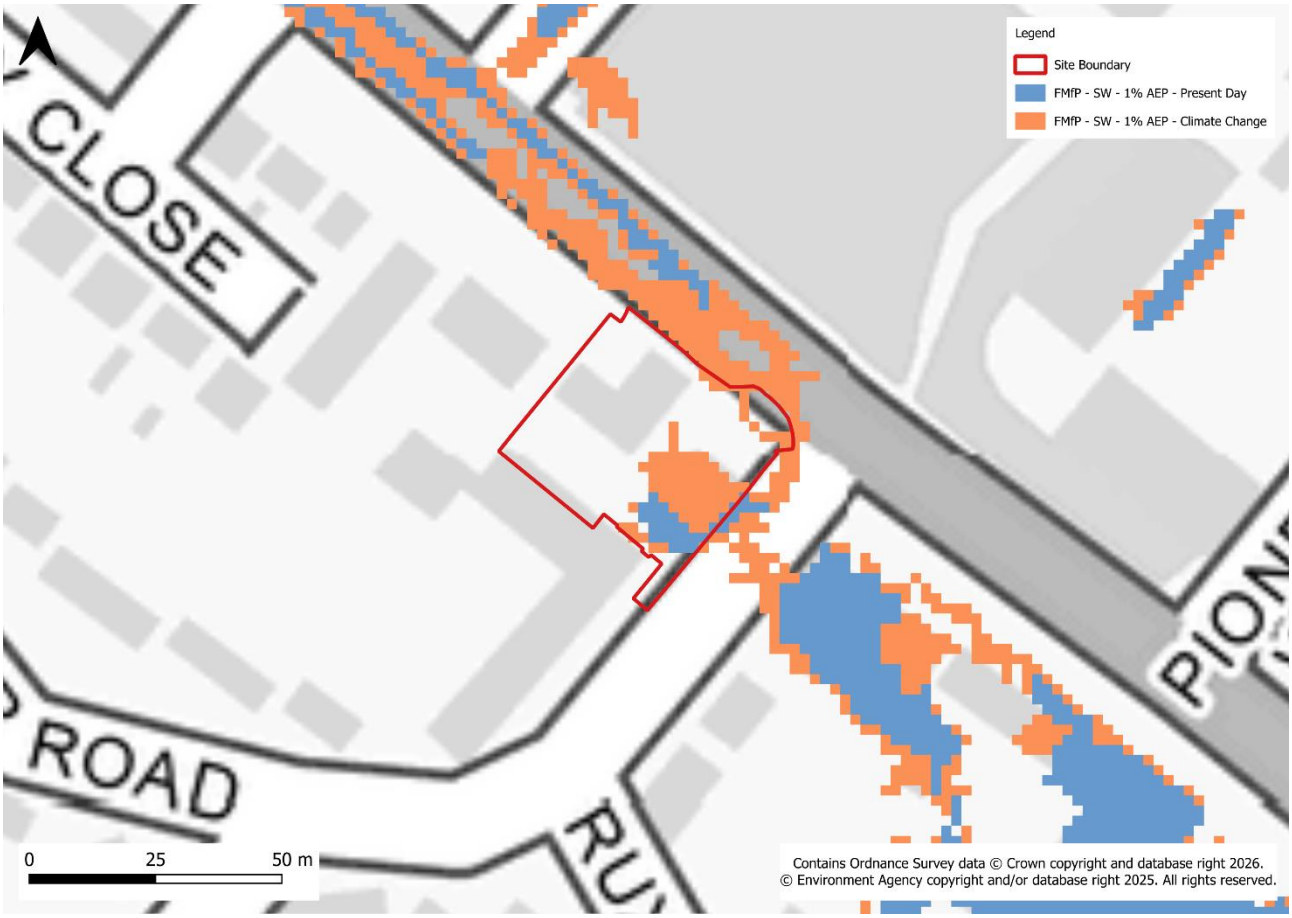

Figure 3-1: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents.

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

There is no residual risk to the site from flood risk management structures.

5 Emergency planning

5.1 Flood warnings and alerts

The site is not located in an EA Flood Warning or Flood Alert Area.

5.2 Existing emergency plans and procedures

Kent County Council's Kent Resilience Forum (KRF) is one of a number of Local Resilience Forums (LRFs) that have bene set up across England. The overall aim of an LRF is to ensure that the various agencies and organisations plan and subsequently work together so that responses to emergencies are coordinated appropriately. The KRF is made up of a number of different agencies and organisations that work together across a range of areas including planning for emergencies.

The Kent County Council Flood Response Plan (October 2023) sets out the principles that govern the Kent County Council's response to a significant flooding event within their local authority administrative area. The Plan is built upon the existence and maintenance by Category 1 and 2 Responders of their own plans for response to flooding. The response plan provides information on Kent County Council's actions, roles, and responsibility in response to a flood emergency in their administrative area.

5.3 Access and escape

Safe access and escape will need to be demonstrated in the 0.1% AEP and the 1% AEP plus climate change 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.

5.3.1 Potential access

Current access to the site is available via London Road to the northeast of the site. The site is located on the junction of London Road and Oliver Road; therefore, access could also be achieved via Oliver Road.

5.3.2 Fluvial

Safe access and escape from the site can be achieved during fluvial flood events.

5.3.3 Surface water

London Road is shown to be at risk from surface water flooding in the 1% AEP plus climate change scenario, therefore safe escape travelling northwest along London Road will be impeded. Safe access and escape is likely to be achievable southeast along London Road.

Directly south of the site Oliver Road is also shown to be at risk of surface water flooding, however, depths are anticipated to be 0.15m and therefore, safe access and escape is likely to be achievable for vehicles.

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

5.4 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

- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.
- BGS data indicates that the underlying geology is sand, which is likely to be free draining, however groundwater levels are indicated to be between 0.025 and 5m below ground level. The viability of managing surface water runoff via infiltration should be confirmed through site investigations and infiltration testing, in line with Kent County Council LLFA guidance. Off-site discharge in accordance with the SuDS hierarchy is likely to be required to discharge surface water runoff from the site.
    - The site is also located within a Groundwater Source Protection Zone. If infiltration techniques are found to be viable, an environmental permit from the Environment Agency may be required for Zones 3, 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.
- 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.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- 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 Surface Water Spatial Planning extent mapping indicates the presence of surface water flooding during the 1% and 0.1% AEP events. Existing flow paths should be retained and integrated with blue-green infrastructure.

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 the housing development as More Vulnerable

The Exception Test is not required for this site because the site is within Flood Zone 1.

While the Exception Test is not explicitly required for sites at risk from other sources of flooding, the LPA should follow a similar principle, as the proposed site is at risk from other sources of surface water flooding. This includes ensuring that site users can be kept safe through the lifetime of the development and ensuring that residual risk can be safely managed.

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:

- within Flood Zone 1 and the flood map for planning shows it is at risk of flooding from surface water, now or in future

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

Consultation with the Local Authority, Lead Local Flood Authority, Water Company, 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 at risk of surface water flooding. Development should be steered outside of the southwestern and northwestern site boundaries.
- 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 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.
- 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.
- Lower vulnerability development, such as car parking, should be prioritised as ground floor development, as opposed to more vulnerable residential development. Habitable areas and sleeping accommodation should be located on the first floor or above.
- 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.
- Due to the high groundwater flood risk, basements are not permitted.
- Finished Floor Levels should be raised above the expected height of flooding in line with the EA's guidance and any raising of ground levels should ensure that flood risk is not increased elsewhere.
- Flood resilience and resistance measures should be implemented where appropriate, e.g. raising of floor levels. These measures should be assessed to make sure that flooding is not increased elsewhere. If the floor levels cannot be raised to meet the minimum requirements, developers will need to:
    - raise them as much as possible.
    - consider moving vulnerable uses to upper floors.
    - include extra flood resistance and resilience measures.
- Other examples of flood resistance and resilience measures include:
    - using flood resistant materials that have low permeability to at least 600mm above the estimated flood level.
    - making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level.
    - by raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level.

8 Conclusions

The site is with Flood Zone 1, and therefore at very low risk of flooding from fluvial sources, however, the site is at risk of surface water flooding in the 1% and 0.1% AEP events. Surface water flooding enters the site along Oliver Road and inundates the southeast corner. During the climate change 1% AEP event, the extent of surface water flooding is comparable to the present day 0.1% AEP event.

Groundwater levels are also anticipated to be between 0.025m and 0.5m of the ground surface, indicating that the site is at risk of groundwater emergence.

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

- A site-specific Flood Risk Assessment is required which demonstrates that site users will be safe during events up to and including the 0.1% and 1% AEP rainfall event, 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 surface water flooding either on or off the site.
- The site layout should adopt a sequential approach by steering the most vulnerable aspects of the development outside of areas at risk of surface water flooding.
- Lower vulnerability development, such as car parking, should be prioritised as ground floor development, as opposed to more vulnerable residential development. Habitable areas and sleeping accommodation should be located on the first floor or above.
- Arrangements for safe access and escape will need to be provided for the 1% AEP 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. 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.

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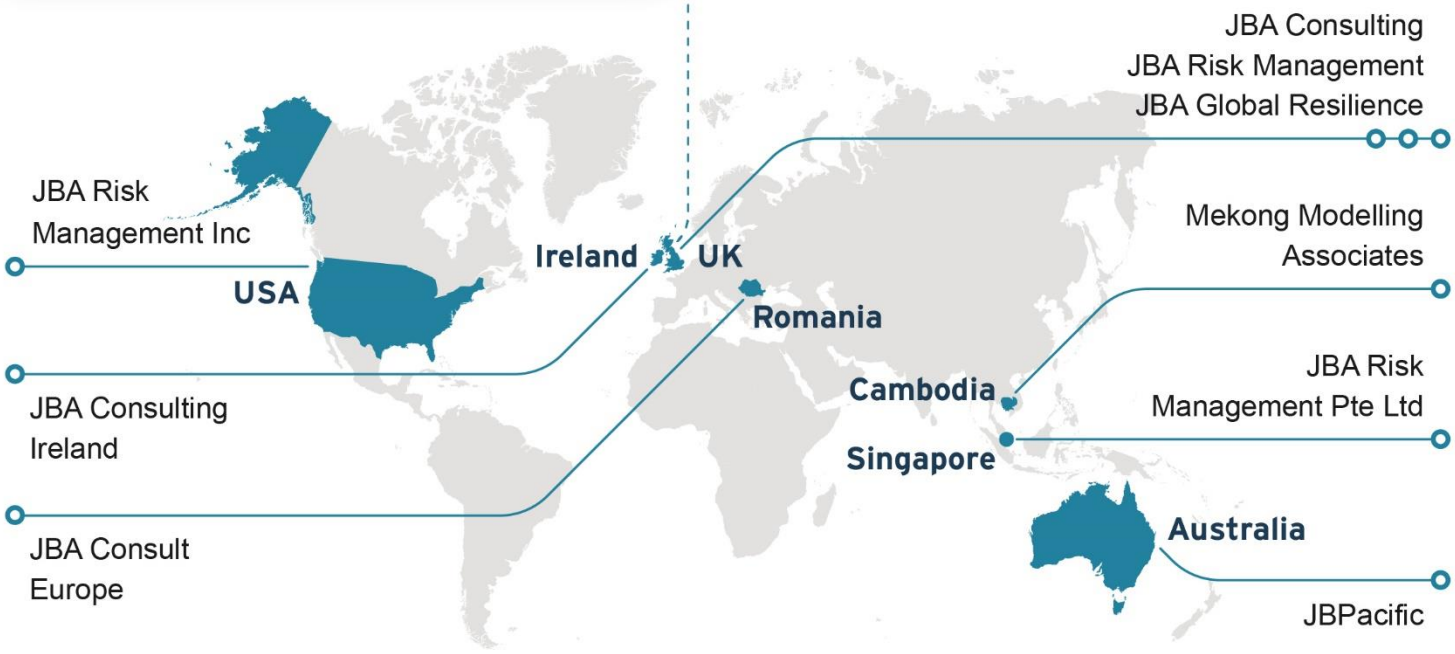

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