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Level 2 Strategic Flood Risk Assessment - Site HO/21/00059

Abacus Furniture on Farm 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 HO/21/00059. 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: Abacus Furniture on Farm Road, Garages on Greatness Lane, and Flats on Mill Lane, Greatness, TN14 5BQ
- Site area: 0.22ha
- Existing site use: Brownfield
- Proposed site use: Residential
- Proposed use flood risk vulnerability classification: More vulnerable

The site is located in Greatness and consists of two parcels of land. The north parcel is located on the junction of Farm Road and Greatness Lane. The south parcel is located to the south of Greatness Lane. The site is bounded by a residential area to the north, south and west, and a woodland area to the east. Sevenoaks quarry is located to the northeast, approximately 80m from the site.

Watercress Stream, a statutory Main River and tributary of the River Darent, flows in a northerly direction to the east of the site, approximately 6m from the southeast corner of the southern parcel. A map showing the location of the site can be found below in Figure 1-1.

Figure 1-1: Location of site HP/21/00059

1.2 Topography

Figure 1-2 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LIDAR. The north parcel slopes downwards to the southeast. The maximum elevation (71.0mAOD) occurs on the west border, and the minimum elevation of 70.6mAOD occurs in the southeast corner.

The south parcel slopes downwards to the north. The maximum elevation of 72.5mAOD occurs in the southwest of the site, and the minimum elevation of 70.6mAOD occurs on the north border.

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.

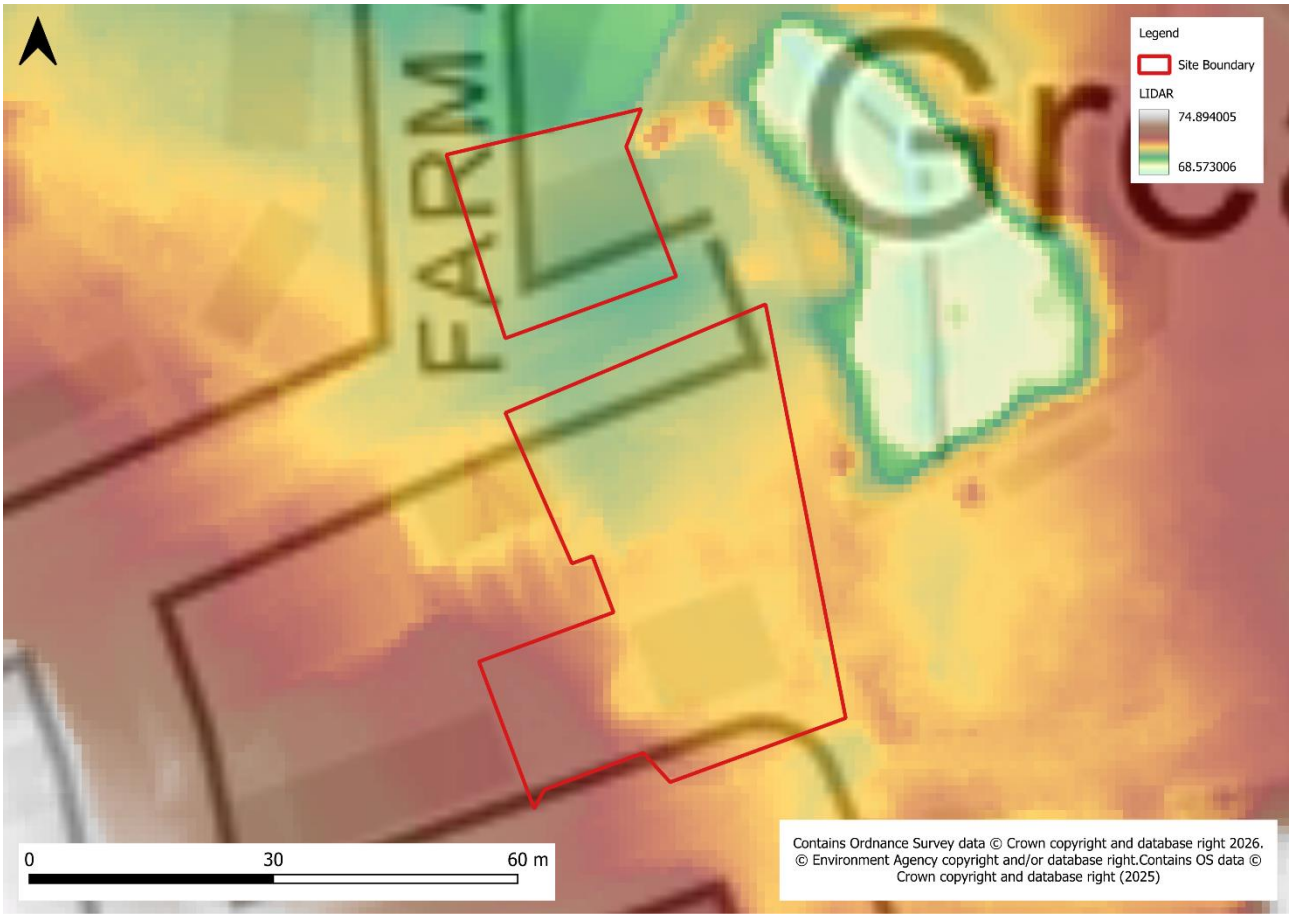

Figure 1-2: Topography of the site.

1.3 Geology and soils

Geology at the site consists of:

- Bedrock - Folkestone Formation, consisting of sandstone
- Superficial - There is no superficial geology information for the site

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 100.4km², and is described as not heavily modified.

2.2 Existing drainage features

Watercress Stream, a Main River and tributary of the River Darent, flows in a northerly direction to the east of the site. The watercourse is curved, passing as close as 6m from the southeast corner of the south parcel and 22m from the east boundary of the north parcel. To the south of the site the watercourse is culverted along Mill Lane.

As there is an existing development on the site, it is expected that the development is served by a surface water drainage system.

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 extents at the site are associated with Watercress Stream located to the east of the site.

As shown in Table 2-1, approximately 7% of the site is located in Flood Zone 3b. The extents of Flood Zone 3b occur in the southeast corner of the southern parcel of land. Approximately 8% of the site is within Flood Zone 3a, which is also concentrated in the southeast corner of the southern parcel.

Flood Zone 2 covers 73% of the site, in the southern parcel, Flood Zone 2 is located in the southeast corner and in the northern half of the parcel. In the northern parcel, Flood Zone 2 encroaches across the west, south, and east borders in the southern half of the parcel.

The EA Flood Map for Planning is shown in Figure 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 (%)
73.01	26.99	8.31	7.35

**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%).*

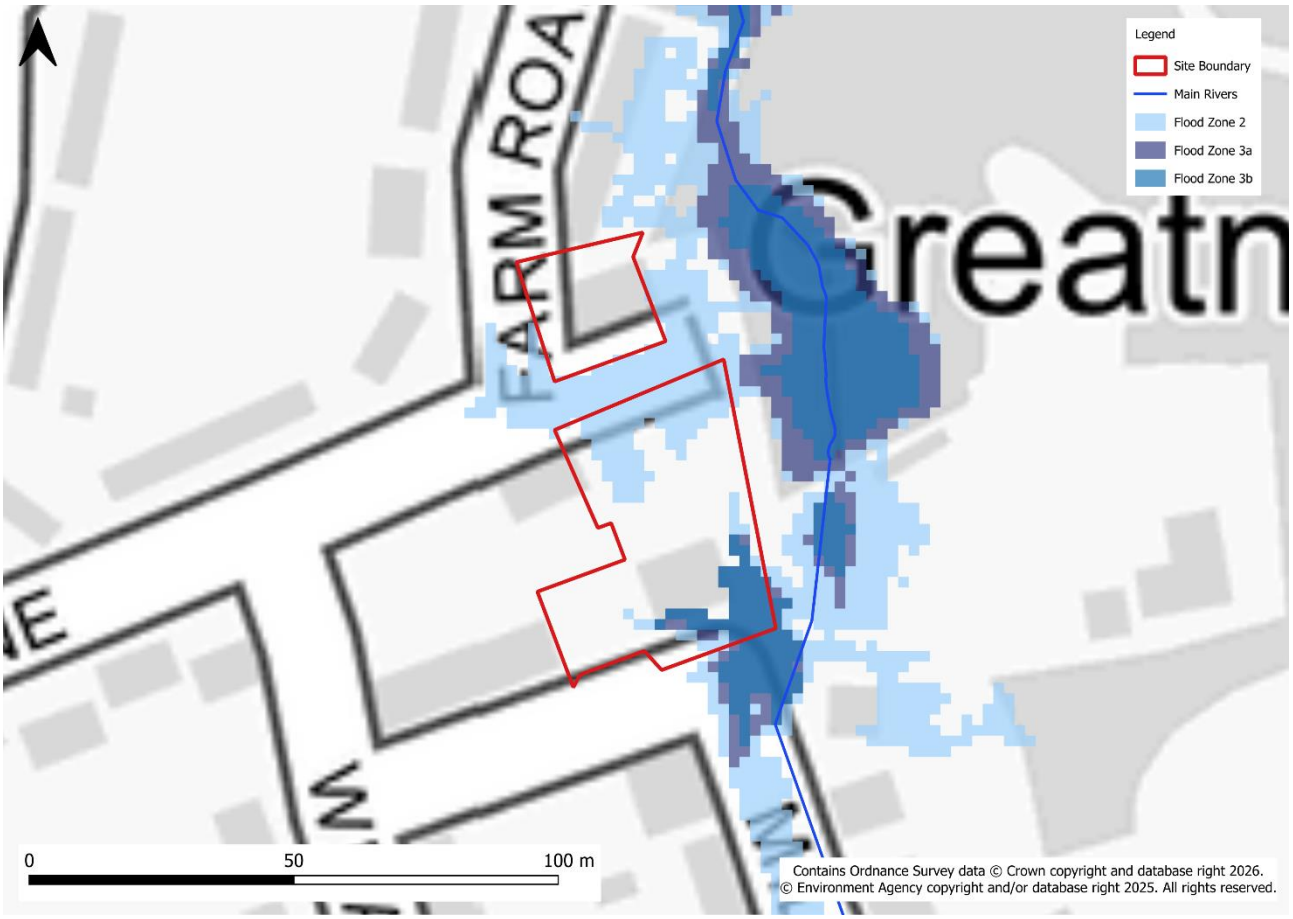

Figure 2-1: EA Flood Map for Planning

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

There is significant ponding on Greatness Lane, between the parcels of land, encroaching across the boundaries of both parcels.

As shown in Table 2-2, the 3.3% AEP (high risk) extent makes up approximately 21% of the site, the 1% AEP (medium risk) makes up approximately 24% of the site, and the 0.1% AEP (low risk) extent makes up approximately 54% of the site. The EA FMfP Surface Water Spatial Planning mapping is shown in Figure 2-2.

In the southern parcel of the site, the 3.3% AEP and 1% AEP extents are similar in area and concentrated in the southeast corner and along the north boundary. In the 3.3% AEP the maximum depth of up to 0.60m occurs along the northern boundary, and the maximum velocity of 0.25m/s and maximum hazard of Moderate (dangerous for some) occurs in the north and southeast of the parcel. In the 1% AEP event the maximum depth remains between 0.30-0.60m along the northern boundary, and the maximum hazard remains Moderate (dangerous for some) in the north and southeast. The maximum velocity increases to 0.50m/s, which occurs in the north and southeast of the parcel. The 0.1% AEP event forms a flow path across the site, in which the maximum velocity increases to 1.00m/s. The maximum depth of up to 0.60m and maximum hazard of Significant (dangerous for most people) occurs on both the north boundary and in the southeast of the site.

In the north parcel, the 3.3% AEP and 1% AEP events inundate the same extents, encroaching across the west, south and east boundaries. In both events the maximum depth of 0.60m encroaches across the southern and east boundaries of the site; as this flooding is associated with ponding on Greatness Lane it has a velocity of 0.00m/s and a maximum hazard classification of Significant (danger for most). In the 0.1% AEP event, extents cover the majority of the parcel and leave only the north border not impacted by flood extents. A maximum depth of 0.90m encroaches across the southern border, and the rest of the site experiences depths of between 0.30m and 0.60m. Maximum velocity remains 0.00m/s, and the maximum hazard classification remains Significant (dangerous for most people) on the south border.

Due to the presence of Watercress Stream to the east of the site, the RoFSW mapping appears to partly represent fluvial risk from the watercourse. It is recommended that 1D-2D detailed hydraulic modelling of the surface water at the site is developed to discern the surface water flood risk without fluvial influence.

Table 2-2: Surface water flood risk based on the FMfP Surface Water Spatial Planning extent mapping and RoFSW mapping

Event	3.3% AEP (high risk)	1% AEP (medium risk)	0.1% AEP (low risk)
Percentage of site at risk* (%)	20.74	23.67	54.47
Maximum depth (m)	0.60	0.60	0.90
Maximum velocity (m/s)	0.25	0.50	1.00
Maximum hazard classification	1.25 - Significant - Dangerous for most people - Danger: Flood zone with deep fast flowing water	1.25 - Significant - Dangerous for most people - Danger: Flood zone with deep fast flowing water	1.25 - Significant - Dangerous for most people - Danger: Flood zone with deep 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).*

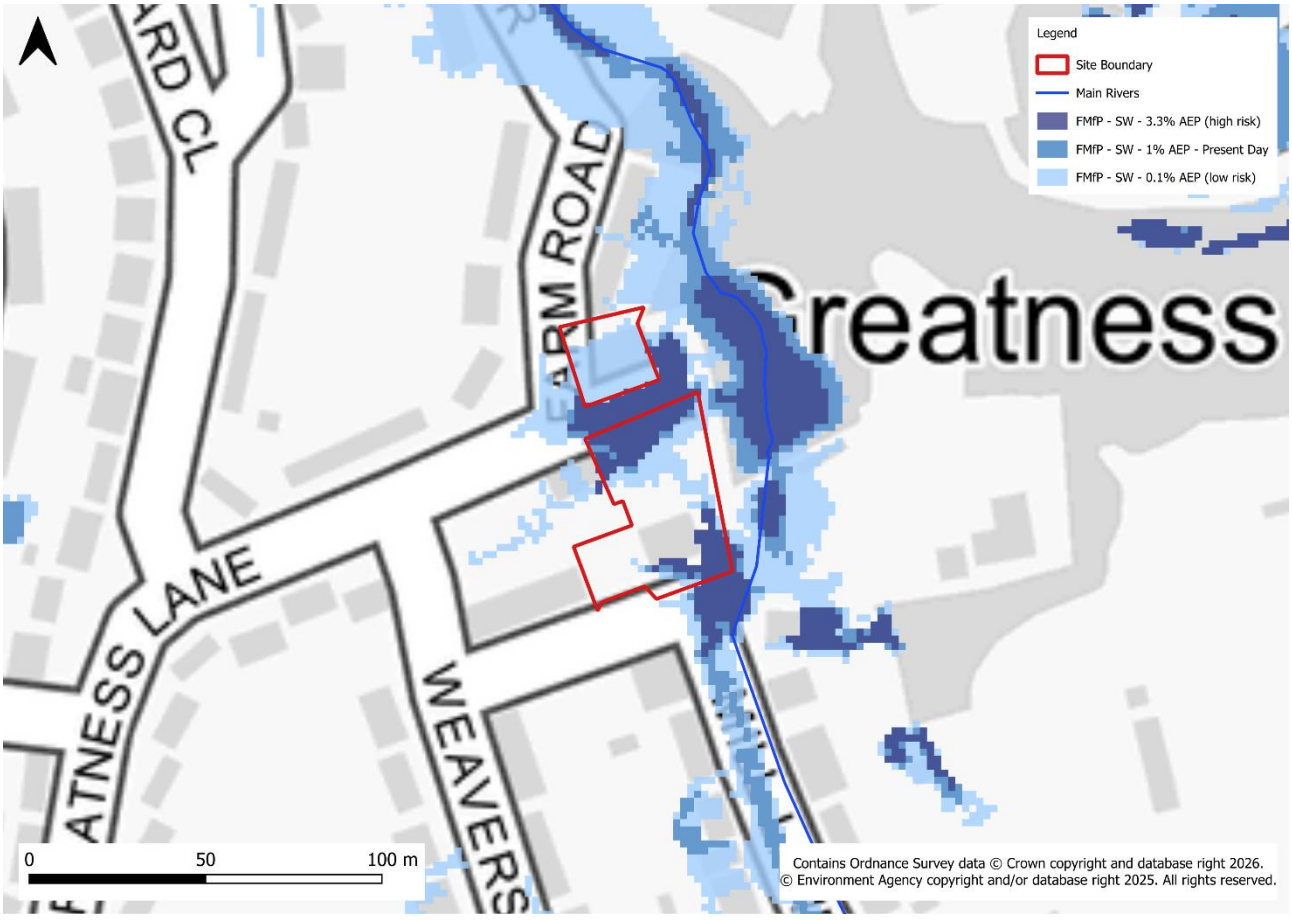

Figure 2-2: EA FMfP Surface Water Spatial Planning mapping

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 2-3) shows that at the site, groundwater levels are predicted to reach shallow depths of less than 0.025m below the ground surface during a 1% AEP groundwater flood event. Based on the topography of the site it is likely that any groundwater that emerges will pool between the parcels, impacting the north end of the south parcel and the south boundary of the north parcel.

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.

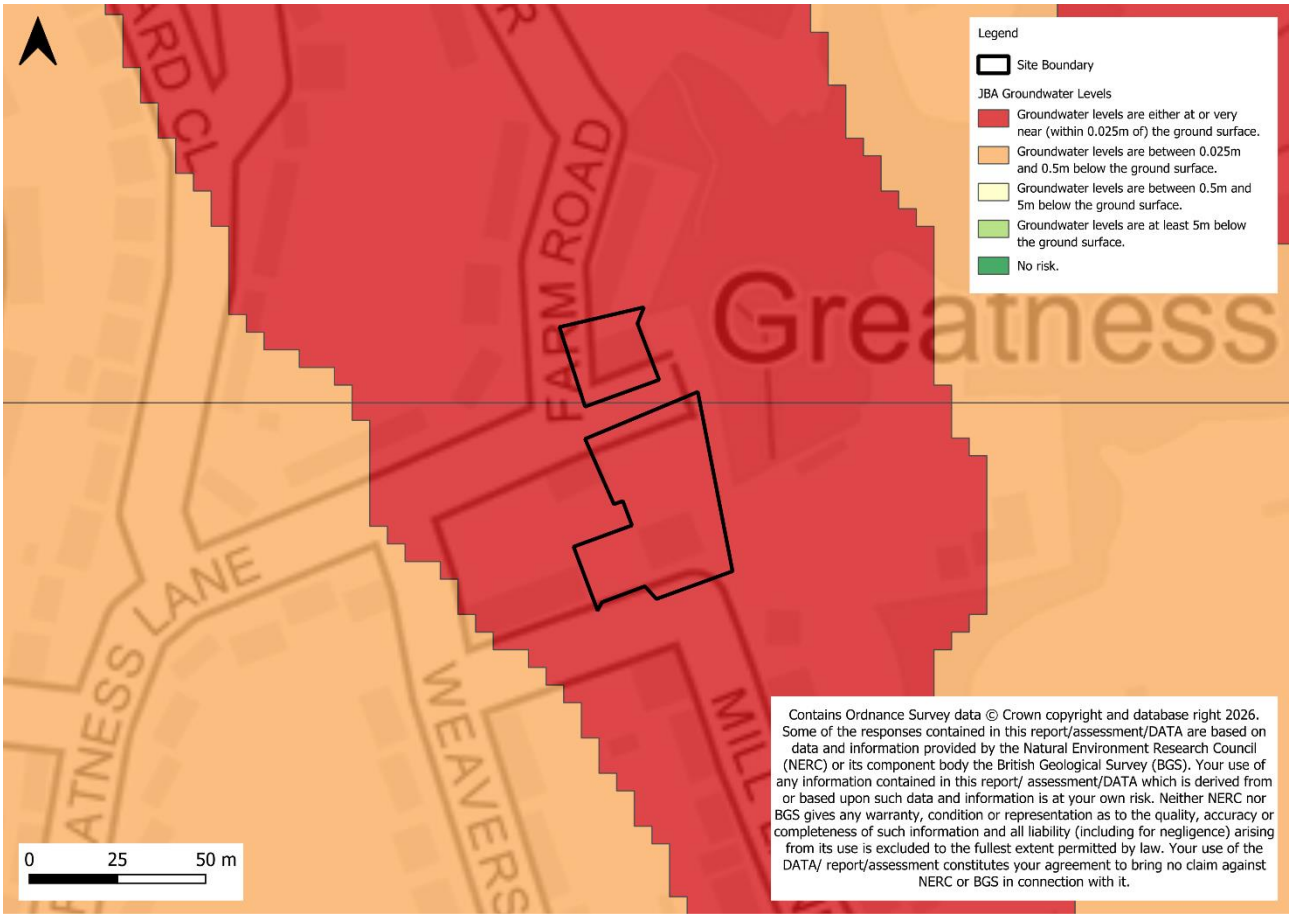

Figure 2-3: JBA Groundwater Emergence Map

2.7 Sewers

The site is located within postcode area TN14 5, where Thames Water sewer flooding incident data indicates that 13 incidents of foul sewer flooding have been recorded in the last 20 years.

2.8 Flood history

Kent County Council LLFA flood incidents records include three flood reports within 50m of the site. These occurred on Mill Lane and Farm Road and were reported to be due to blocked drains.

The south parcel is within the EA Historic Flood Map. The flood event, which occurred in 1968, was associated with Watercress Stream to the east of the site and impacted the southeast of the south parcel.

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 10% ('2080s' epoch Central allowance) climate change extents are currently available, and are based on national modelling.

Watercress Stream, the Main River to the east of the site, has not been modelled in the EA RoFRS dataset. As a result, there is no fluvial climate change data available for the site, and an assessment of the impact of climate change on fluvial flood risk cannot be made at the time of writing. It is recommended that at FRA stage, a 1D-2D detailed hydraulic model is developed for the Main River, to assess the impact of climate change on fluvial flood risk at the site.

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 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

When the upper end climate change allowance (40%) is applied to the 1% AEP event, the extent increases from approximately 24% of the site to approximately 53% of the site, as shown in Table 3-1. The 1% AEP plus climate change extent covers the north and southeast of the southern parcel of the site, and a flow path forms across the centre of the site. In the northern parcel, extents increase to cover most of the area of the parcel except for the northern boundary.

The maximum depth on site increases from 0.60m to 0.90m when climate change allowances are applied.

A comparison of the present day 1% AEP extent and 1% AEP plus 40% climate change event is shown in Figure 3-1.

Table 3-1: 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 (%)	23.67	52.75
Maximum depth (m)	0.60	0.90

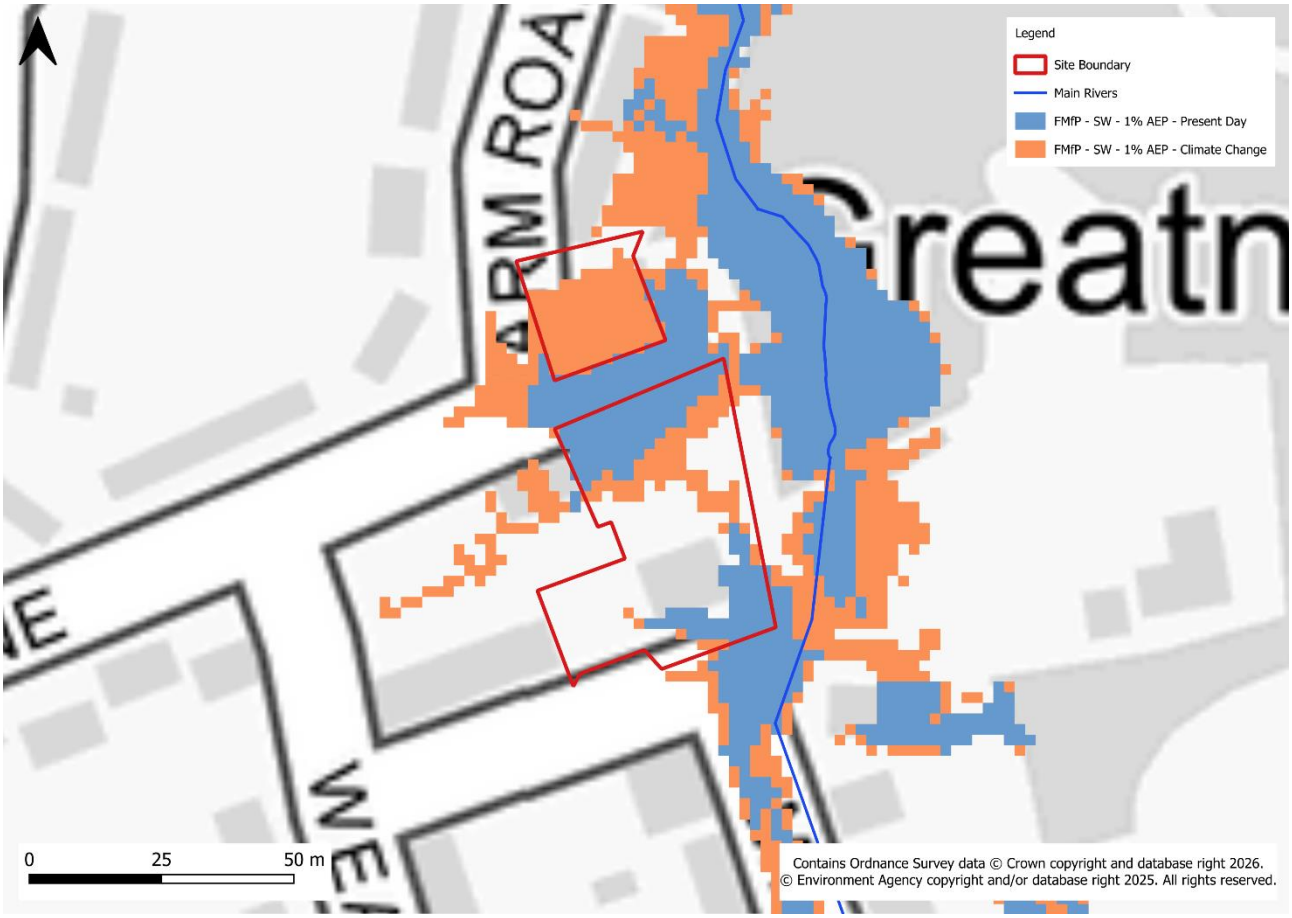

Figure 3-1: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents.

4 Flood risk management infrastructure

4.1 Defences

EA AIMS dataset shows that the site is not protected by any formally engineered flood defences. However, the banks of the Watercress Stream are lined by natural high ground.

4.2 Residual risk

Watercress Stream is culverted beneath Mill Lane to the south of the site. In the event of a blockage of the culvert, flooding could occur upstream of the culvert, and impact the southern parcel. While this is unlikely to impact the site boundary, the risk of flooding from a culvert blockage should be considered within a site specific Flood Risk Assessment.

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 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.

5.3.1 Potential access

The northern parcel of land is currently accessed via Greatness Lane along the south boundary, and could be accessed in future via Farm Road on the west boundary.

The south parcel is currently accessed via Greatness Lane on the north boundary and by Mill Lane on the south boundary.

5.3.2 Fluvial

At the time of writing is not possible to make an assessment of whether safe access and escape can be achieved in the 1% AEP plus climate change fluvial event, as Watercress Stream adjacent to the site is not modelled within the EA RoFRS Climate Change dataset.

A 1D-2D detailed hydraulic model of the watercourse is required at FRA stage to assess the risk of fluvial flooding to the site, plus climate change allowances.

5.3.3 Surface water

For the south parcel, the access north to Greatness Lane and south along Mill Lane are at risk of surface water flooding in the 1% plus climate change scenario up to depts of 0.60m, which would impede safe access and escape. There is flood free access in the southwest corner to Mill Lane, which would allow escape to west to Weavers Lane and north to Greatness Lane.

The majority of the north parcel, except for the north boundary, is within surface water flooding of depths up to 0.60m in the 1% AEP plus climate change event. This means that access and escape from the north parcel to Farm Road is not achievable. Access and escape south on to Greatness Lane is also not achievable; therefore, safe access and escape from the north parcel is severely impeded during the 1% plus climate change event.

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

- BGS data indicates that the underlying geology is sandstone, which is likely to be free draining, however groundwater levels are indicated to be within 0.025m of the ground surface and therefore pose a risk of groundwater flooding during the 1% AEP event. The viability of managing surface water runoff via infiltration should be confirmed through site investigations and infiltration testing, in line with Kent Couty Council LLFA guidance.
- 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. Off-site discharge in accordance with the SuDS hierarchy is likely to be required to discharge surface water runoff from the site.
- Surface water discharge rates should not exceed pre-development discharge rates for the site and should be designed to be as close to greenfield runoff rates as reasonably practical in consultation 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 Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flood risk during the 3.3% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space.
- If it is proposed to discharge runoff to the Watercress Stream, the condition and capacity of the receiving watercourse should be confirmed through surveys and the discharge rate agreed with the EA and LLFA
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the 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.

- The flow path in the east of the southern parcel should be integrated into the site drainage strategy as blue-green infrastructure.
- 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, such as the significant increase in surface water extents in the northern parcel when climate change is applied to the 1% AEP event.
- 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 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. The Upper Darent Water Body has a moderate ecological status.
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.

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 housing development as more vulnerable.

The Exception Test is required for this site because more vulnerable development is proposed within Flood Zone 3a. More vulnerable development is not permitted within Flood Zone 3b.

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, 3a and 3b
- Is within 'Flood Zones plus Climate Change', showing it is at increased risk of flooding from rivers or sea 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, 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 at risk of fluvial and surface water flooding. Residential development is not permitted within Flood Zone 3b.
- Due to the high groundwater flood risk across the site, basements are not permitted.
- Development should be steered outside of Flood Zone 2 and 3a, and areas at high risk of surface water flooding such as the north boundary and southeast of the southern parcel of the site.
- A detailed 1D-2D hydraulic model of Watercress Stream, based on topographic survey of the Main River channel, is required at FRA stage to accurately represent the risk from this watercourse and set the height of any mitigation

measures. This must include fluvial climate change modelling, which is currently not available for the site.
    - Blockage modelling should be conducted to assess the residual risk associated with potential blockage of the culvert beneath Mill Lane.
- 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.
- Watercress Stream, which flows alongside the site to the east, is a Main River. An 8m wide buffer should be maintained between the riverbank and any built structures, to enable the riparian owners and/or the Environment Agency to access and maintain the channel.
- Car parking of lower vulnerability 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.
- 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

Based on the current available flood risk modelling, it is not evident that the site (north parcel) can be made safe for its lifetime.

The developer will need to show, through an FRA, that the development will be safe for its lifetime taking account of the vulnerability of its users. It is for the developer to show that the development meets the objectives of the NPPF's policy on flood risk. For example, how the operation of any mitigation measures can be safeguarded and maintained effectively through the lifetime of the development (paragraph 048 Flood Risk and Coastal Change PPG).

The Exception Test is also required for the site, as more vulnerable development is proposed within Flood Zone 3a.

Fluvial and surface water flood risk is concentrated in the north and southeast of the southern parcel, and on the southern boundaries of the northern parcel of the site. Flood risk is associated with Watercress Stream, a Main River to the east of the site.

Groundwater beneath the site is predicted to be less than 0.025m below ground surface in the 1% AEP groundwater event; this indicates that the site is at high risk of groundwater flooding.

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

- Detailed 1D-2D baseline and post-development modelling of the Watercress Stream, informed by a topographic channel survey and CCTV survey of the culverted reach will be required to demonstrate that the development is not at risk of flooding and does not impact on flood risk elsewhere.
- 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 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 surface water flooding either on or off the site.
- Development should be steered outside of fluvial and surface water flood risk where possible. Where this is not possible, flood resilience and resistance measures should be implemented, where appropriate e.g. raising of floor levels, including property flood resistance and resilience measures. Within areas at risk of surface water flooding, habitable living spaces should not be located on the ground floor. These measures should be assessed to make sure that flooding is not increased 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.

- Due to the high groundwater flood risk across the site, basements are not permitted.
- Developers should utilise SuDS with multiple benefits throughout the site, particularly in areas of predicted surface water ponding.

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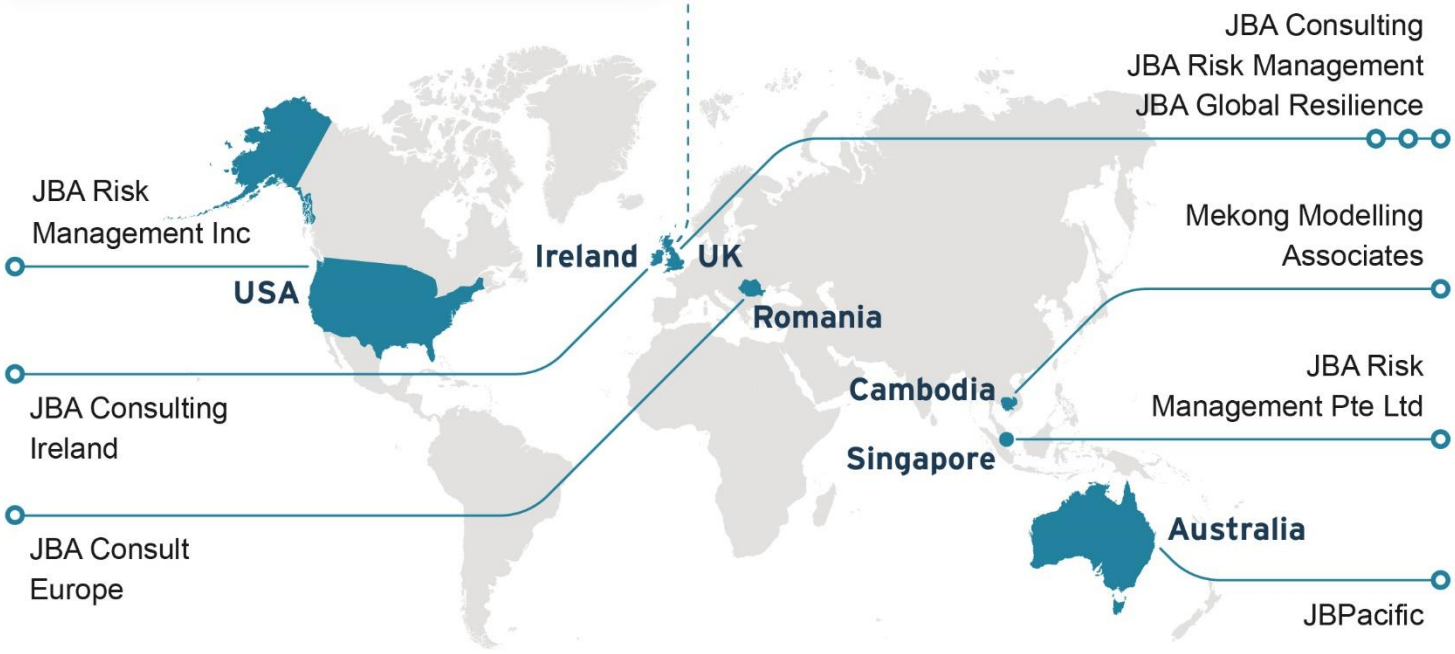

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