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Level 2 Strategic Flood Risk Assessment

Site CA006

Prepared for: Southend-on-Sea City Council

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for CA006. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the Southend-on-Sea City Council Level 1 SFRA and read the Southend-on-Sea City Council Level 2 SFRA Main Report and is therefore familiar with the terminology used in this report.

1.1 Site details

- Location: Southend Central, Cluster Area 6: Victoria Avenue West
- Site area: 5.12ha
- Existing site use: Brownfield, combination of residential and commercial buildings
- Proposed site use: Mixed-use, residential and commercial

1.2 Topography

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

Topography at the site is mostly flat. There is a difference of approximately 3m between the highest (29.51mAOD) and lowest (26.57mAOD) ground level.

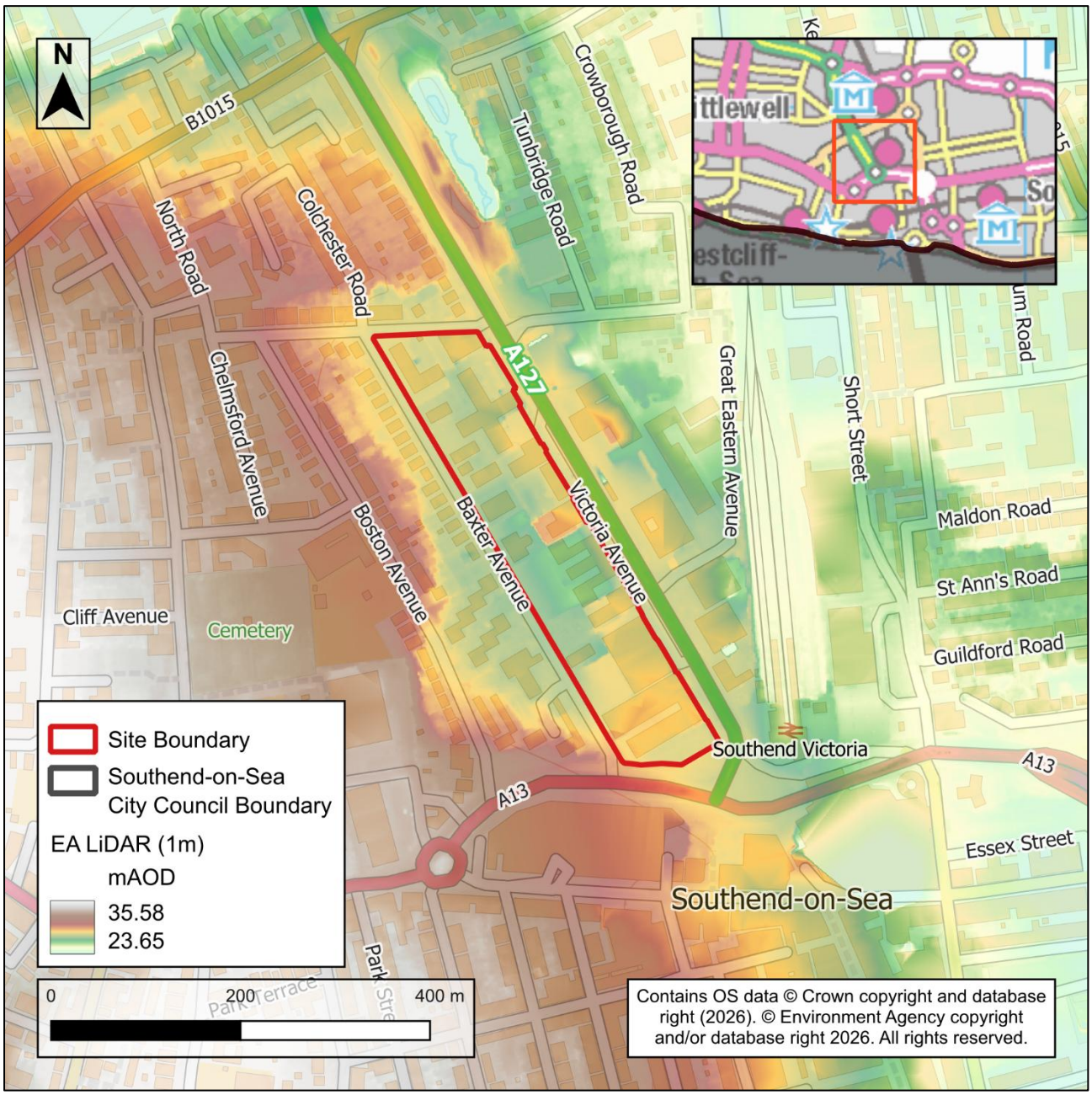


Figure 1-1: Topography of the site.

1.3 Geology and soils

Geology at the site consists of:

- Bedrock - London Clay Formation comprised of clay, silt and sand.
- Superficial - River Terrace Deposits comprised of clay and silt.

Soils at the site consist of freely draining slightly acid loamy soils.

The likely impact of the geology and soils on drainage within the site is discussed within Section 5.

2 Sources of flood risk

2.1 Location of site within the catchment

The site is located in the catchment of Prittle Brook, a tributary of the tidal River Roach, within the lower reaches of the Crouch and Roach Operational Catchment. Prittle Brook flows in a northeasterly direction approximately 700m northwest of the site. This watercourse originates approximately 7km northwest of the site in West Wood in the north of Hadleigh, situated within Castle Point Borough. Upstream of the site, the catchment is predominantly urban, with the exception of allotment spaces, Belfairs Nature Reserve and Golf Course, as well as West Wood.

2.2 Existing drainage features

Based on online mapping, there are no existing drainage features within the site. However, as the existing land use is brownfield, there is likely to be existing drainage infrastructure present within the site.

2.3 Fluvial and tidal

The site is not shown to be at risk of fluvial or tidal flooding in present day or climate change scenarios based on available national and local modelling.

2.4 Surface water

2.4.1 Available data

The EA's FMfP Surface Water Spatial Planning Dataset, released in May 2026, has been used within this assessment to inform the extent and depth of the present day and future surface water risk. Climate change outputs are available for the 3.3%, 1%, and 0.1% AEP events with the Upper End climate change allowance for the 2070s epoch.

The Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment to inform the velocity and hazard of the present day surface water risk. There is currently no available velocity or hazard information to use to assess future surface water risk.

Descriptions refer to the maximum depth, velocity, and hazard values experienced in each area of the site within a given event.

2.4.2 Present day

As shown in Table 2-1, and mapped in Figure 2-1, surface water risk to the site is extensive.

The predominant area of ponding is in the centre of the site, with multiple smaller areas of ponding present in the northern half of the site. These areas of ponding increase in size from the 3.3% AEP event to the 1% AEP event. In the 0.1% AEP event, the areas of

ponding merge to form one large area of surface water flood risk across much of the western half of the site. This ponded area extends eastwards in places, covering the full width of the site.

Figure 2-2 shows the depth, velocity, and hazard across the site in each event. The largest flood depths in each AEP event are situated within the main area of ponding in the centre of the site. Although the maximum velocities are as shown in Table 2-1, the velocities for most of the flood risk in all AEP events are shown to remain below 0.5m/s. The highest classification is shown to be 'Danger for All' during all AEP events in the centre of the site. However, this is only applicable to a small amount of flood risk in the 1% and 0.1% AEP events. Most of the flood risk during these AEP events is shown to be a 'Danger to Some' or a 'Very Low Hazard'.

Table 2-1: Present day surface water flood risk based on the EA's FMfP Surface Water Spatial Planning dataset (extent, depth) and RoFSW dataset (velocity, hazard).

Event	3.3% AEP	1% AEP	0.1% AEP
Percentage of site at risk* (%)	16	27	52
Maximum depth (m)	0.60 - 0.90	0.90 - 1.20	1.20 - 2.30
Maximum velocity (m/s)	0.50 - 1.00	0.50 - 1.00	1.00 - 2.00
Maximum hazard classification	Danger for Most	Danger for Most	Danger for Most

** 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. the 1% AEP includes the 3.3% AEP percentage).*

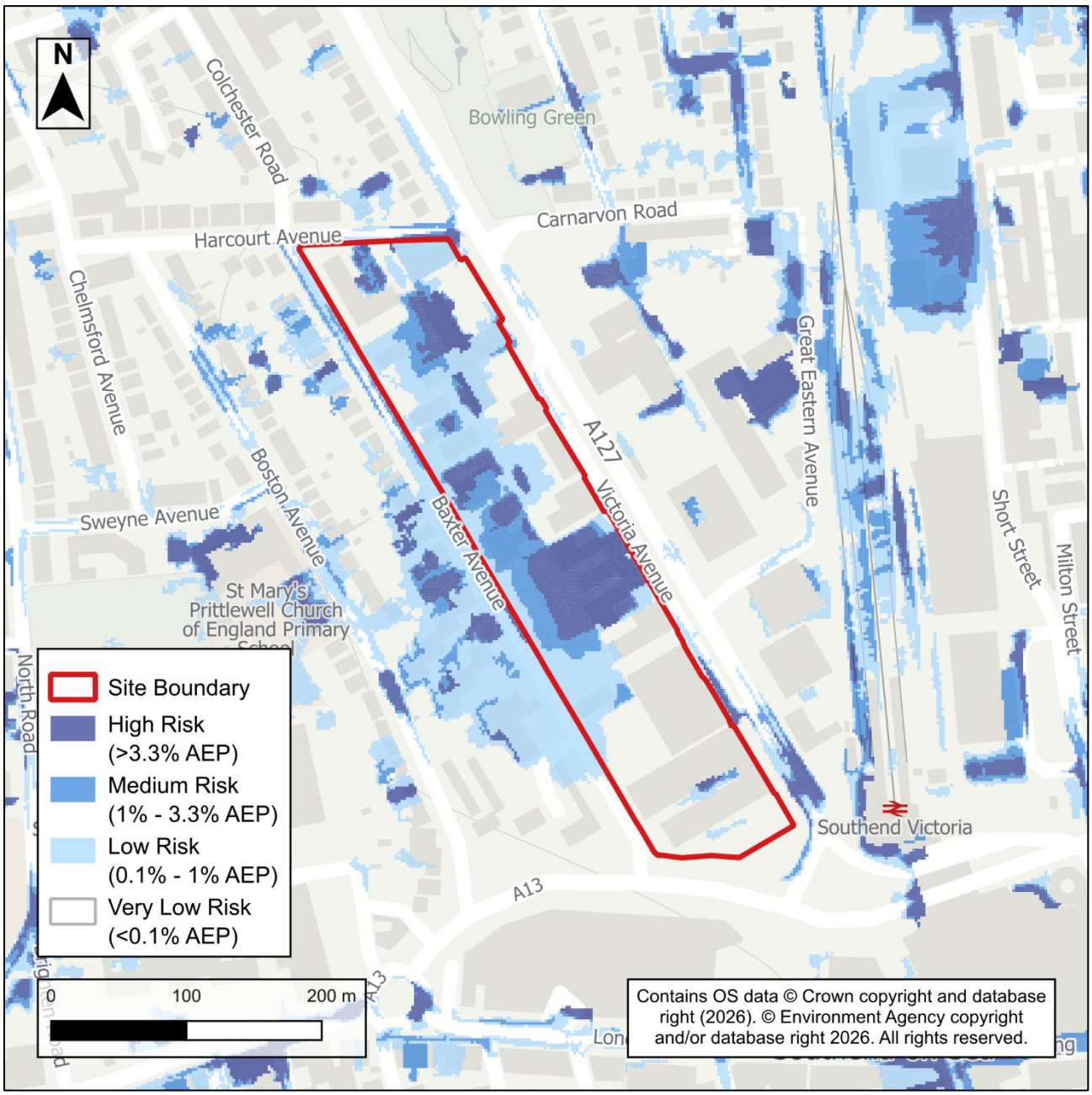


Figure 2-1: Present day surface water risk, based on the EA FMfP Surface Water Spatial Planning dataset.

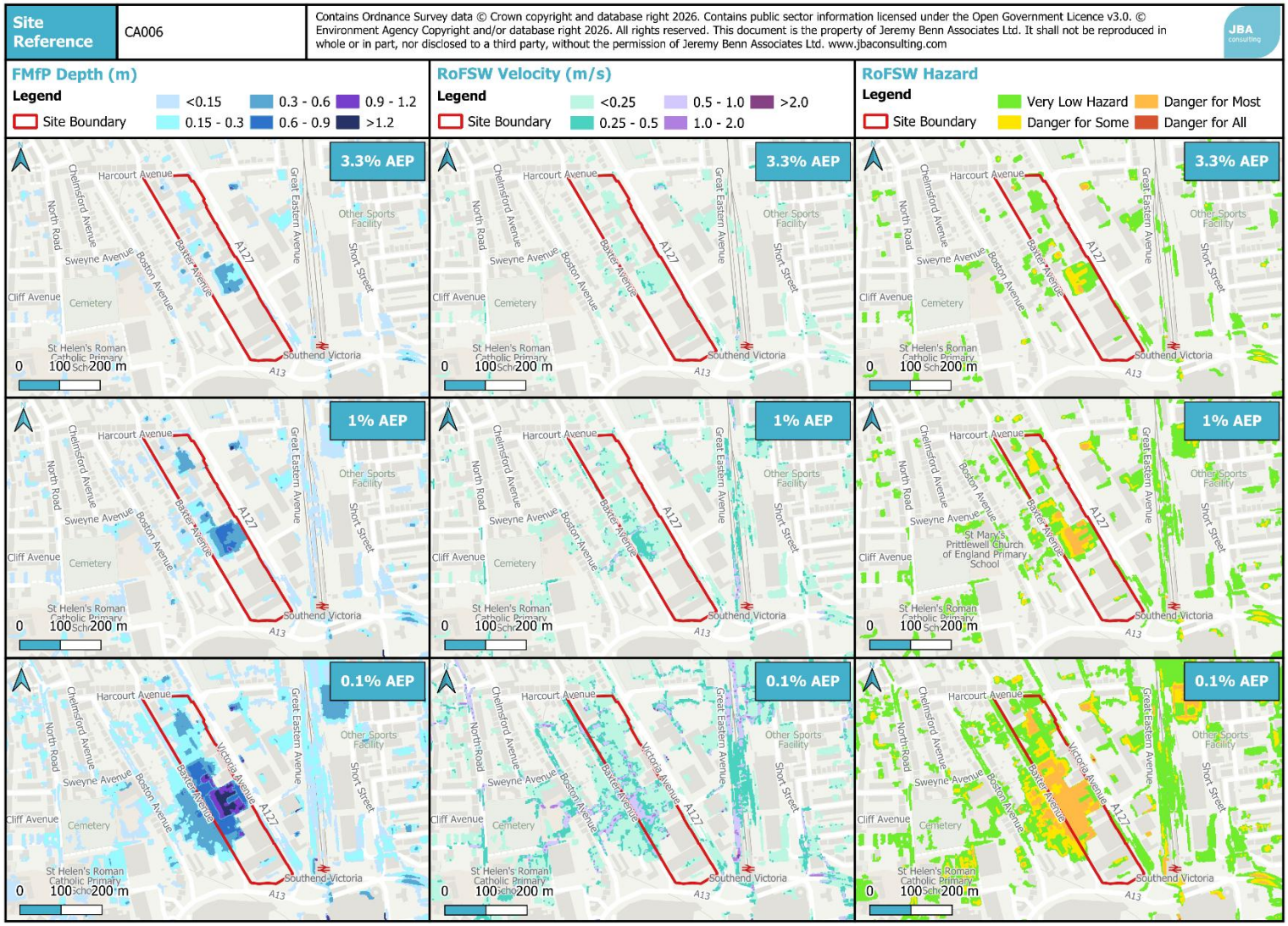


Figure 2-2: Present day surface water depth, velocity, and hazard for the 3.3%, 1%, and 0.1% AEP events.

2.4.3 Climate change - 2070s Upper End

The site is shown to be very susceptible to climate change, particularly in the centre and north of the site. Between the present day and climate change events maximum depths increase to exceed 0.90m in the 3.3% AEP event and 1.20m in the 1% AEP event. The area exceeding 1.20m in depth during the 0.1% AEP event has also increased in size. All the increases in depth are shown in the centre of the site.

Table 2-2: Comparison of surface water flood risk between the present day and climate change scenarios based on the EA's FMfP Surface Water Spatial Planning.

Event	1% AEP	1% AEP plus 2070s Upper End Climate Change
Percentage of sites at risk* (%)	27	49
Maximum depth (m)	0.90 - 1.20	1.20 - 2.30

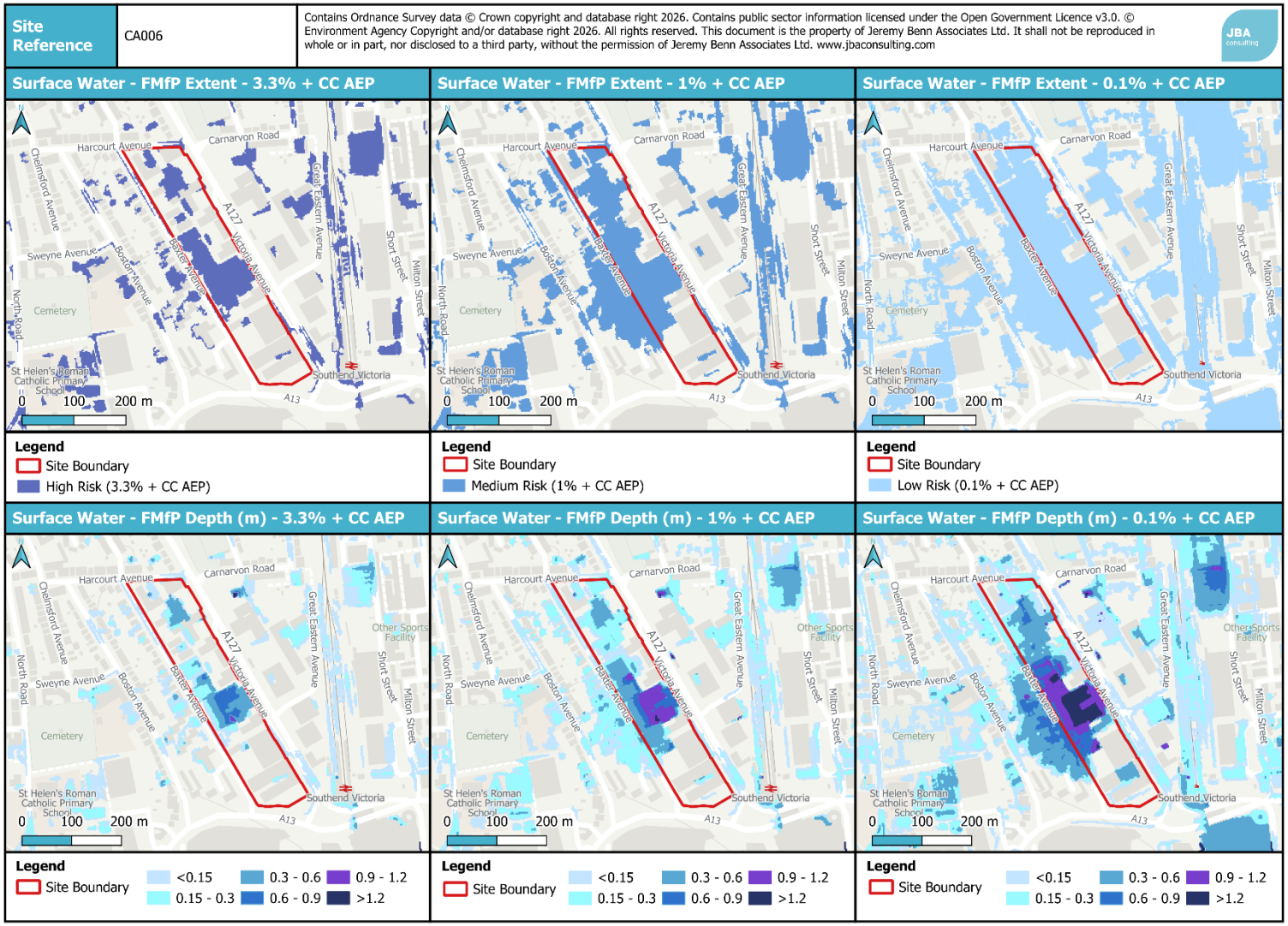


Figure 2-3: Surface water extents and depths for the 3.3%, 1%, and 0.1% AEP climate change events.

2.5 Groundwater

The JBA Groundwater Emergence Map shows that the site has a negligible risk of groundwater emergence due to the nature of the local geological deposits.

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.

2.6 Sewers

Anglian Water provided a redacted GDPR compliant version of their DG5 dataset for the study area, which identifies internal and external historic sewer flooding records between 2022 and 2026.

There is one recorded incident within the site. The incident occurred in 2023 and caused internal flooding.

The available data should always be supplemented by direct consultation with Anglian Water to ascertain if there is any site-specific risk from a public sewer. This is because sewer flood risk information is not publicly available and would need to be considered on a site-specific basis.

2.7 Flood history

The EA's Historic Flood Map shows no records of flooding at the site.

Data provided by Essex County Fire and Rescue Service shows no records of flooding at the site.

3 Flood risk management infrastructure

3.1 Defences

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

3.2 Residual risk

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

4 Emergency planning

4.1 Flood warnings and alerts

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

4.2 Access and escape

Safe access and escape will need to be demonstrated in the 1% AEP plus climate change surface water and fluvial event and the 0.5% AEP plus climate change tidal event. 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.

4.2.1 Potential access

The site can be accessed via Victoria Avenue to the east, Queensway (A13) to the south, Baxter Avenue to the west, and Harcourt Avenue to the north.

4.2.2 Fluvial and tidal

The site and surrounding roads are not shown to be at fluvial or tidal risk. Therefore, access and escape remain unimpeded.

4.2.3 Surface water

Access and escape are likely possible in all modelled surface water events, including in the 1% plus climate change event. However, there is surface water flood risk on the roads that require consideration, particularly on Baxter Avenue.

On Baxter Avenue, there is significant flood risk on large parts of the road. Flood depths reach between 0.3m and 0.6m in the 1% AEP plus climate change event, rising to between 0.6m to 0.9m in the 0.1% AEP event. However, there are some shallower flood depths (less than 0.15m) to the northwest of the site, and access and escape via Baxter Road from Queensway in the southwest remain clear.

There is surface water flood ponding on Victoria Avenue and Harcourt Avenue in all modelled events, but depths remain below 0.3m. The stretch of Queensway directly south of the site is clear from flood risk.

4.3 Dry islands

The site is not located on a dry island.

5 Requirements for drainage control and impact mitigation

5.1 Broadscale assessment of possible SuDS

Surface water at the site should be discharged in accordance with the drainage hierarchy as set out in the National standards for SuDS (gov.uk). SuDS that provide opportunities to deliver multiple benefits including volume control, water quality, amenity, and biodiversity should be prioritised. SuDS proposals should be discussed with relevant stakeholders (Local Planning Authority (LPA), Lead Local Flood Authority (LLFA), and the EA) at an early stage to understand possible constraints.

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.

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 following factors should be considered when assessing whether infiltration is suitable at the site:

- The site is not considered to be susceptible to groundwater flooding, due to the nature of the local geological conditions. This should be confirmed through additional site investigation work.
- BGS data indicates that the underlying geology is clay, silt and sand which is likely to have highly variable permeability. This should be confirmed through infiltration testing. Off-site discharge in accordance with the SuDS hierarchy may be required to discharge surface water runoff from the site.
- The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
- The site is not located within a historic landfill site.

If it is proposed to discharge runoff to a sewer system, the condition and capacity or the receiving asset should be confirmed through surveys and the discharge rate agreed with the asset owner.

5.2 Opportunities for wider sustainability benefits and integrated flood risk management

The following are opportunities for wider sustainability benefits and integrated flood risk management at the site:

- 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.
- 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 and can also contribute towards requirements for Biodiversity Net Gain. Prittle Brook is considered to be of moderate ecological status.

6 NPPF and planning implications

6.1 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 mixed use development as 'More Vulnerable'.

The Exception Test is not required for this site because the entire site is not shown to be at fluvial risk within the EA's FMfP.

6.2 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 with a site area of 1 hectare or more
- 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 LPA, LLFA, Anglian 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 Southend-on-Sea City Council Local Plan Policies.

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

6.3 Guidance for site design and making development safe

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 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 event 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.

7 Conclusions

Summary of the key areas of flood risk across the site:

- **Surface water:** Surface water risk to the site is predominantly from an area of ponding in the centre of the site, with multiple other small areas of ponding present in the northern half of the site. The site is shown to be very susceptible to climate change, particularly in the centre and north of the site.
- **Sewer:** There is one recorded incident of sewer flooding within the site. The incident occurred in 2023 and caused internal flooding.

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

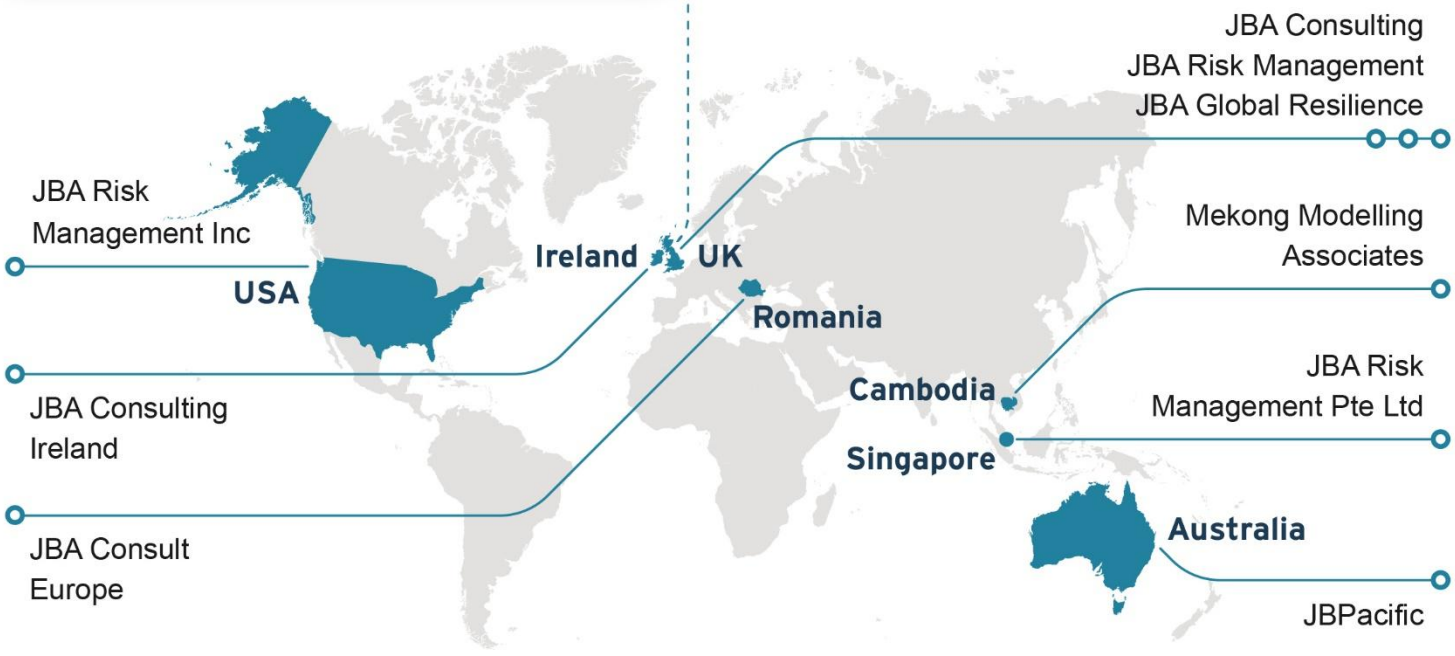
- The Exception Test is not required for this site because the entire site is not shown to be at fluvial risk within the EA's FMfP.
- A site-specific FRA should be undertaken, which assesses all sources of flood risk. This may require detailed surface water modelling.
- Safe access and escape routes should be demonstrated in the 1% AEP plus climate change surface water event. This initial assessment has shown that access and escape are likely to be possible.
- A carefully considered and integrated flood resilient and sustainable drainage design should be put forward, including a site-specific Surface Water Drainage Strategy, and SuDS maintenance and management plan and supported by detailed modelling.
- Anglian Water should be consulted at an early stage on drainage proposals for the site to identify any potential constraints or existing sewer flooding issues that may not have been identified through this high level assessment.

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