

EH11 - BISH4: Bishops Stortford: Causeway/Old River Lane

OSNGR: 548873,221529	Area: 1.373316		Brownfield	
Flood Zone Coverage:	FZ3b 0%	FZ3a 13.25%	FZ2 83.24%	FZ1 3.51%

Proposed Development Details:

Mixed use including 100 homes.

Exception Test Required?

Likely. Buildings used for "dwelling houses" are considered "More Vulnerable" development according to new guidance and over 13% of the site is located in Flood Zone 3a.

The Exception Test is required if:

"More Vulnerable" and "Essential Infrastructure" development is located in FZ3a and for "Highly Vulnerable" development located in FZ2. "Highly Vulnerable" development should not be permitted within FZ3a.

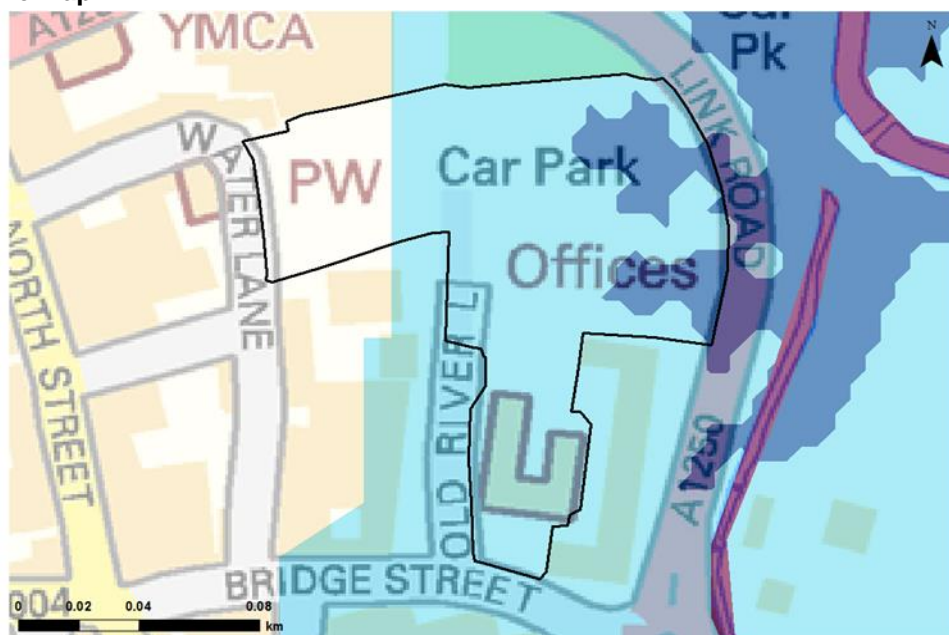
NPPF Guidance:

- For development proposals on sites comprising one hectare or above in Flood Zone 1 the vulnerability of flooding from other sources as well as from river flooding should be incorporated into a FRA.
- The potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off should be considered.
- Developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development and through appropriate sustainable drainage techniques.

Sources of Flood Risk:

A large proportion of the site (over 80%) is situated in Flood Zone 2 and at risk of flooding from the 0.1% AEP event from the River Stort. Surface water flooding affects a similar proportion of the site in the 1,000 year event with the north-eastern corner affected by lower return period events.

Flood Zone Map

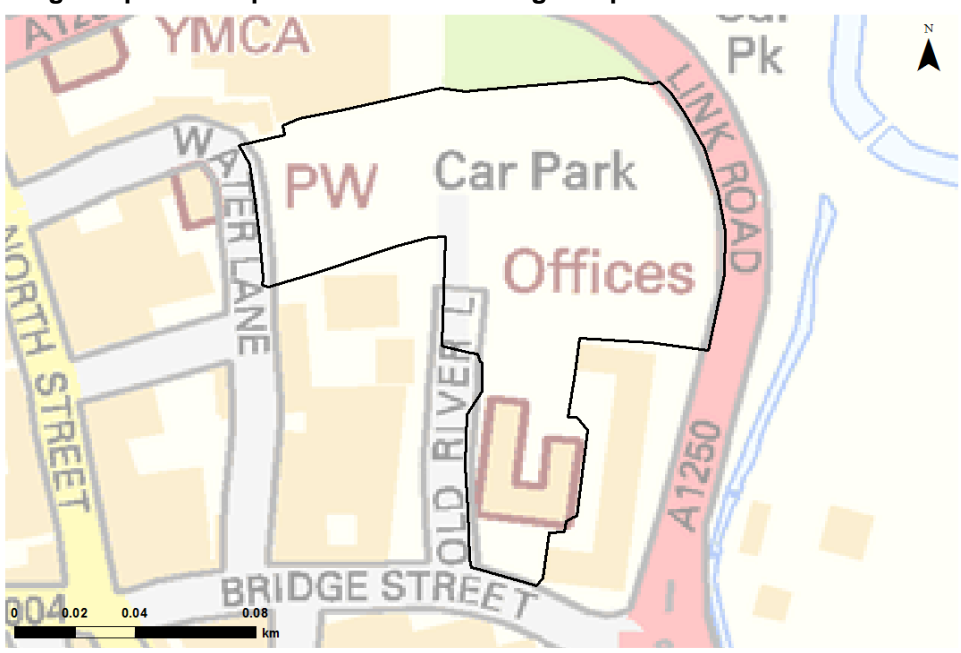


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The Flood Zones in this map are derived from existing model results from the Upper & Middle Stort Modelling (Middle Stort reach) provided by Environment Agency. They use the 20-year extent as FZ3b, the 100-year extent as FZ3a, and the 1,000-year extent as FZ2.



Climate Change Map - to be updated when modelling completed

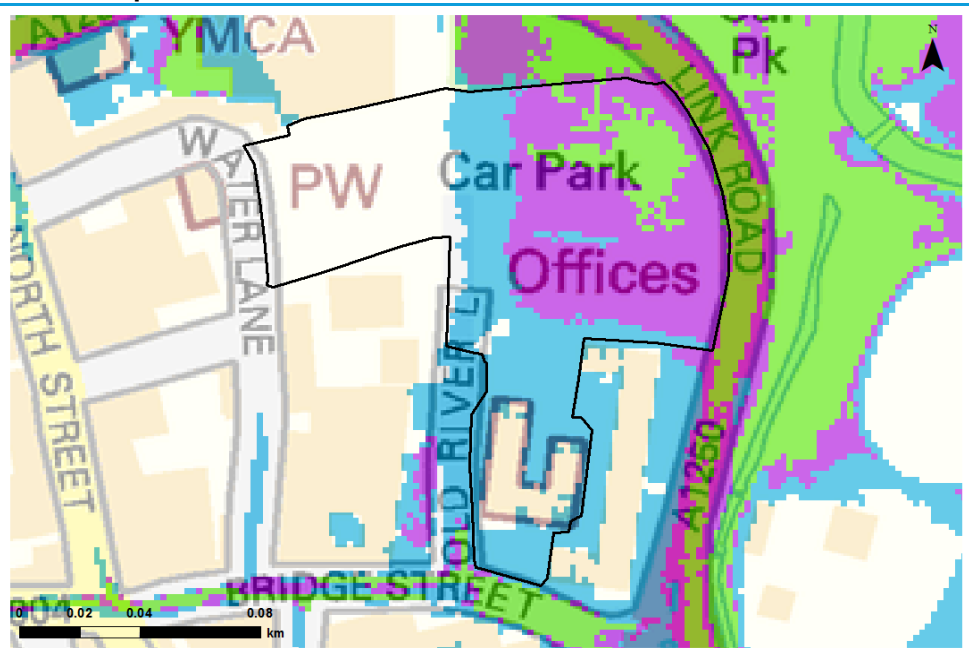


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Climate change was modelled for the 2080s epoch, applying the following climate change factors to the 100-year flow: 25%, 35% and 70%.
The map above shows the 100-year + 70% climate change scenario, therefore representing a 'worst case'.

- Potential Site Allocations
- Flood Zone 3 with Climate Change
- Council boundary

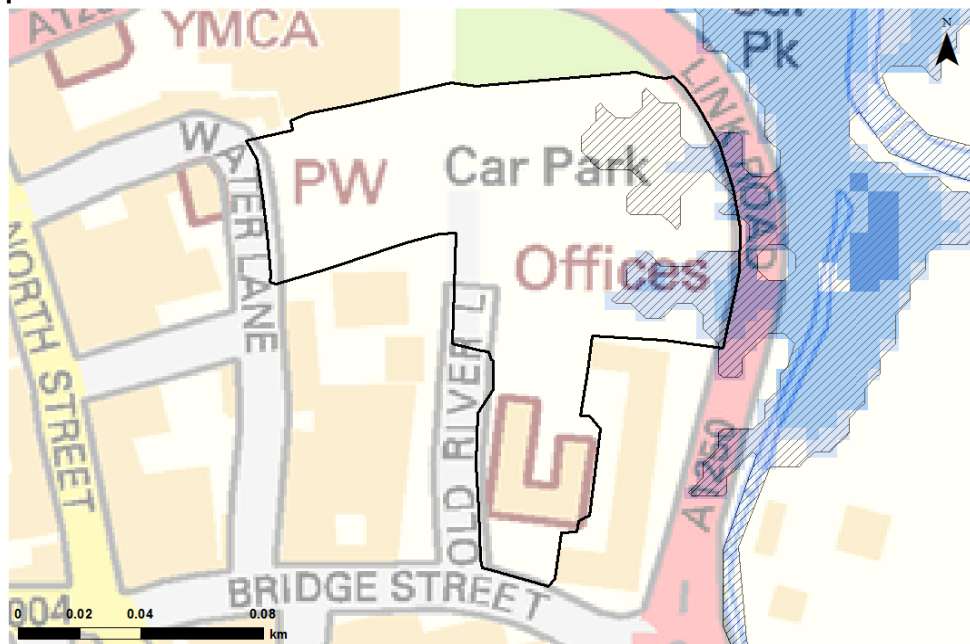
Surface Water Map



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- Potential Site Allocations
- uFMfSW* 30-year Extent
- uFMfSW* 1,000-year Extent
- Council boundary
- uFMfSW* 100-year Extent

Depth Map



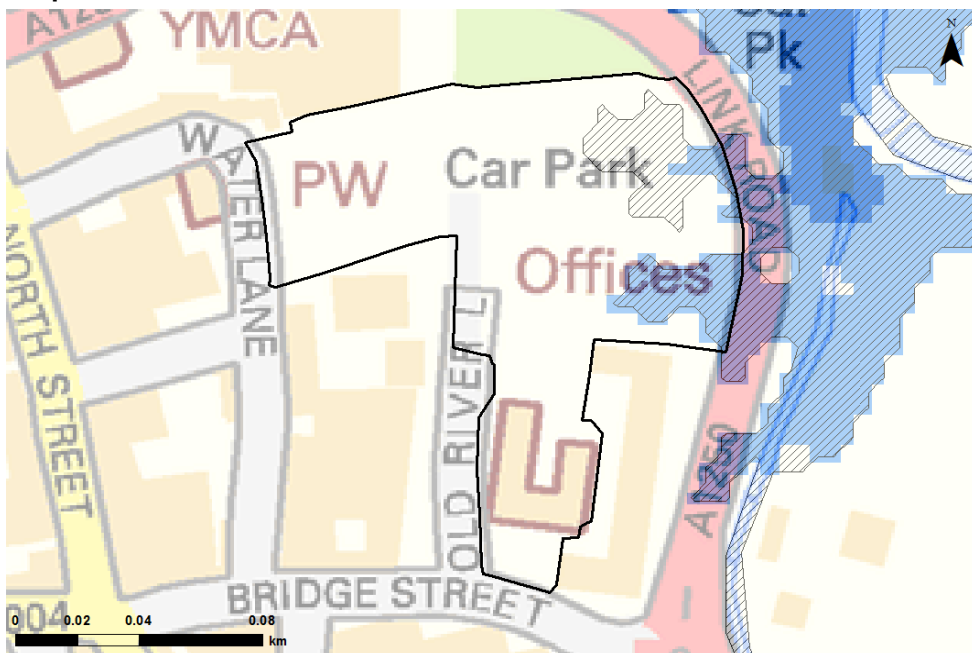
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This depth map is derived from the existing Environment Agency Upper & Middle Stort Modelling (Middle Stort reach) and represents the 100-year undefended event.

To note: the flood zone covers the full hatched extent; depths in some areas are currently not available and should be confirmed as part of a site-specific assessment.

Potential Site Allocations	Depth (m)	0.50 - 1.00	2.00 - 2.50	3.50 - 4.00
Council boundary	0 - 0.10	1.00 - 1.50	2.50 - 3.00	>4.00
	0.10 - 0.50	1.50 - 2.00	3.00 - 3.50	

Velocity Map



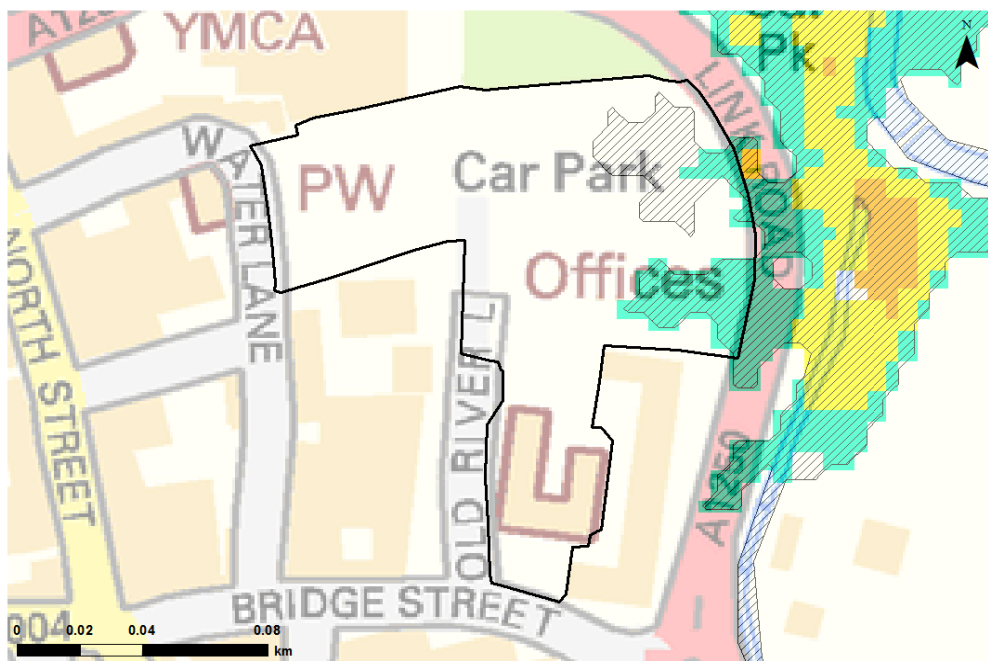
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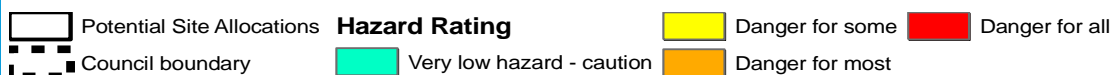
Hazard Map



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SuDS & the development site:		
SuDS Type	Suitability	Comments
Source Control		Most source control techniques are likely to be suitable.
Infiltration		Infiltration may be suitable. Mapping suggests a medium risk of groundwater flooding and underlying soils may be permeable. Further site investigation should be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m. Additionally, proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints given that the site is located with a Source Protection Zone.
Detention		This option may be feasible provided site slopes are < 5% at the location of the detention feature. If the site has groundwater issues or contamination issues in areas of brownfields, a liner will be required.
Filtration		This feature is probably suitable provided site slopes are <5% and the depth to the water table is >1m. If the site has contamination or groundwater issues, a liner will be required.
Conveyance		All forms of conveyance are likely to be suitable. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. If the site has contamination or groundwater issues; a liner will be required.
<p>The site is not designated by the Environment Agency as previously being a landfill site.</p> <p>The site is located with a Source Protection Zone. As such infiltration techniques should only be used where there are suitable levels of treatment 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 constraints.</p> <p>Drainage strategies should demonstrate that an appropriate number of treatment stages have been delivered. This depends on the factors such as the type of development, primary source of runoff and likelihood of contamination. Guidance should be sought from LLFA and other guidance documents such as the CIRIA SuDS Manual (C753).</p>		
<p>Flood Defences:</p> <p>To the east of the site, along right hand bank of the River Stort (site-side), there are two privately-owned embankments. The 100m long north-eastern defence has a 5% AEP standard of protection and the 340m south-eastern embankment has a 0.1% AEP standard of protection. The condition of these defences range from poor to fair respectively.</p>		
<p>Flood Warning:</p> <p>This site is partly covered by 'The River Stort at Bishops Stortford including Spellbrook' Flood warning Area, and partly covered by 'The River Stort, Stansted Brook and their tributaries from Clavering to Hoddesdon including Stanstead Mountfitchet, Bishops Stortford, Sawbridgeworth and Harlow ' Flood Alert Area (062WAF51Stort).</p>		

Access & Egress:

Access and egress from the site can be achieved via a number of roads around the site including the Link Road A1250, Water Lane, Bridge Street and Old River Lane. All of these roads are shown to be affected by surface water and fluvial flooding during the 1,000 year events. Bridge Street and the Link Road are susceptible to surface water flooding in the 30 year event, whereas Link Road is affected by fluvial flooding from the Stort in the 100 year event. Water Lane offers some access/ egress outside of the flood zones/ surface water flood extents.

Climate Change:

Climate change mapping indicates the following impacts for the future:

- Increased storm intensities.
- Increased water extent, depth, velocity and hazard in the watercourse.
- Climate change may also increase the extent, depth and frequency of surface water flooding.

Implications for Development:

- Use of the Sequential Approach is limited due to the majority of the site being covered by the Flood Zones; therefore development placed within the Flood Zone will be required to pass the Exception Test. The site is afforded some protection from flood embankments. These defences have a 5% -0.1% AEP standard of protection; however, there is still a residual risk of flooding should the defence fail (breach). There is also the potential for the defence to overtop in the future due to climate change. Therefore, it is important that the defences in this area continue to be maintained in line with catchment policy and that any development accounts for the potential residual risk.
- Access and egress routes are at risk from fluvial and surface water flooding; in order to pass the Exception Test, development will need to ensure that safe access and egress can be provided for the lifetime of the development. Development should also ensure that there is no increase in flood risk that may exacerbate flooding to access/ egress routes.
- Broad-scale assessment of suitable SuDS has indicated a number of different types may be possible; given the size of the site and the proportion of the site at risk from flooding, the type of SuDS system used may be influenced by amount of land available; depending on the system used there may be an impact on the amount of land available for development and the cost of development.
- The site is covered by the Environment Agency's Flood Warning Service. Given the potential access and egress issues, development may need to consider provision of safe refuge in the event of occupiers being unable to evacuate. Given the size and location of the site in the flood zones, it is unlikely the site could be used to implement strategic solutions to alleviate flood risk elsewhere in the catchment. This could be investigated at site-specific assessment stage.

Guidance for Developers:

- At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3 or greater than 1ha in size. Other sources of flooding should also be considered.
- Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage, to determine requirements for a FRA and to establish an approach to consider climate change in line with latest guidance.
- Safe access and egress will need to be demonstrated; currently all access and egress routes are affected by fluvial and surface water flooding in the 1,000 year event. Bridge Street and Link Road are affected during lower return periods.
- The peak flows of the River Stort should be considered when considering drainage.
- Resilience measures will be required if buildings are situated in the flood risk area.
- Assessment for runoff should include allowance for climate change effects.
- New or re-development should adopt exemplar source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff.
- New development must seek opportunities to reduce overall level of flood risk at the site, for example by:
 - o Reducing volume and rate of runoff
 - o Relocating development to zones with lower flood risk
 - o Creating space for flooding.
 - o Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.
- Onsite attenuation schemes would need to be tested against the hydrographs for the River Stort to ensure flows are not exacerbated downstream within the catchment.