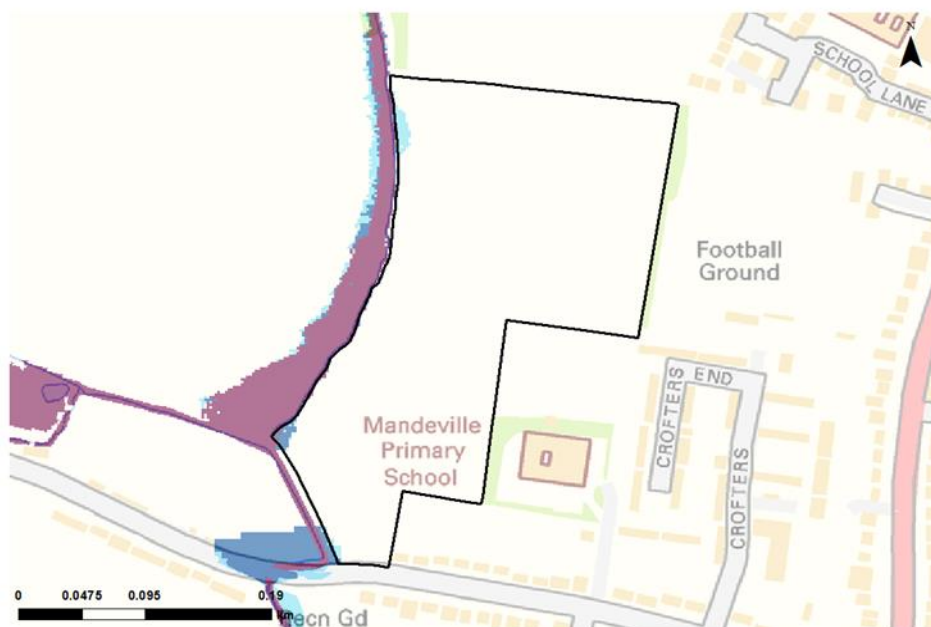


EH2 - SAWB2, Sawbridgeworth West: North West Road				
OSNGR:	547887,215500	Area: 5.91ha		Greenfield
Flood Zone Coverage:		FZ3b	FZ3a	FZ2
<small>*based on 2D Jflow modelling</small>		0.44%*	0.79%*	1.59%*
Proposed Development Details:				
125 homes, expansion of existing primary school and green space				
Exception Test Required?				
Unlikely, as the majority of the site is located within Flood Zone 1. Less than 1% of the site is located in the Flood Zones.				
The Exception Test is required if:				
"More Vulnerable" and "Essential Infrastructure" development is located in FZ3a and for "Highly Vulnerable" development located in FZ2.				
"Essential Infrastructure" development in FZ3b will also require the Exception Test.				
"Highly Vulnerable" development should not be permitted within FZ3a and FZ3b.				
"More Vulnerable" and "Less Vulnerable" development should not be permitted within FZ3b				
NPPF Guidance:				
<ul style="list-style-type: none"> • 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 very small area of the site is at risk of fluvial flooding from two unnamed watercourses located just outside of the southern and western site boundaries. The vast majority of the site is on higher ground located in Flood Zone 1 and therefore is at little risk of fluvial flooding. Factoring in climate change allowances does not significantly affect the area at risk of fluvial flooding. The site is at limited risk of surface water flooding adjacent to the unnamed watercourse along the western site boundary.				

Flood Zone Map



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The Flood Zones in this map are derived from two different sources of data. The drain along the site's western boundary is represented by 2D generalised modelling using Jflow software, to obtain indicative flood extents where a drain was shown on OS mapping. The extent for the unnamed watercourse along the site's southern boundary is derived from existing model results from the Stort Tributaries modelling (Sawbridgeworth Brook). They use the 20-year extent as FZ3b, the 100-year extent as FZ3a, and the 1,000-year extent as FZ2.

The Jflow extent has been trimmed to where it meets the Sawbridgeworth Brook so that detailed modelling takes precedence, though the flood extent at the confluence may therefore be conservative.

Developers may need to consider undertaking more detailed hydraulic modelling of the western boundary drain as part of a site-specific FRA.



Climate Change Map

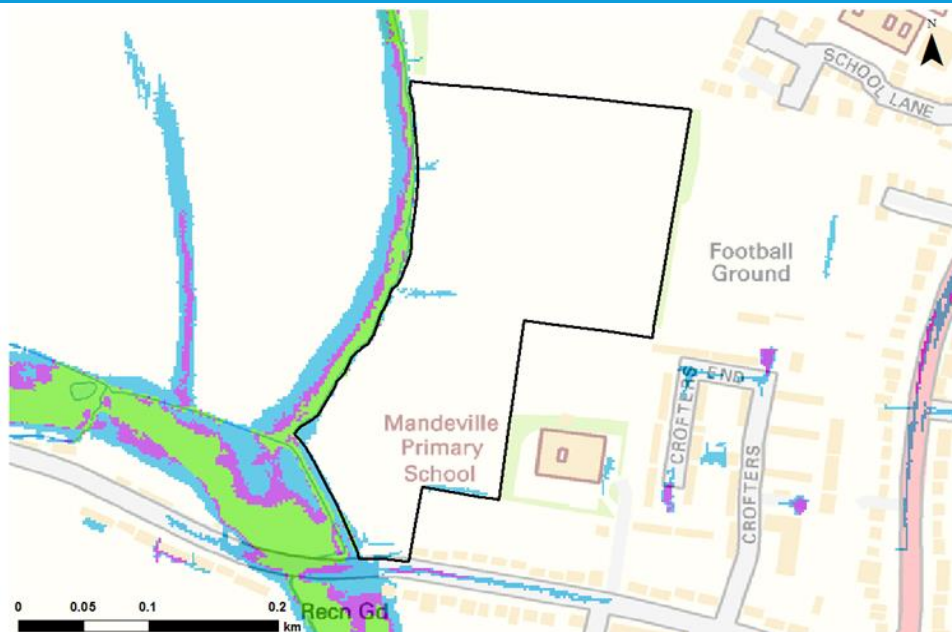


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This climate change map is a combined output from Jflow 2D generalised modelling for the western drain, and existing Stort Tributaries modelling (Sawbridgeworth Brook) for the southern drain. Climate change was modelled for the 2080s epoch, applying 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

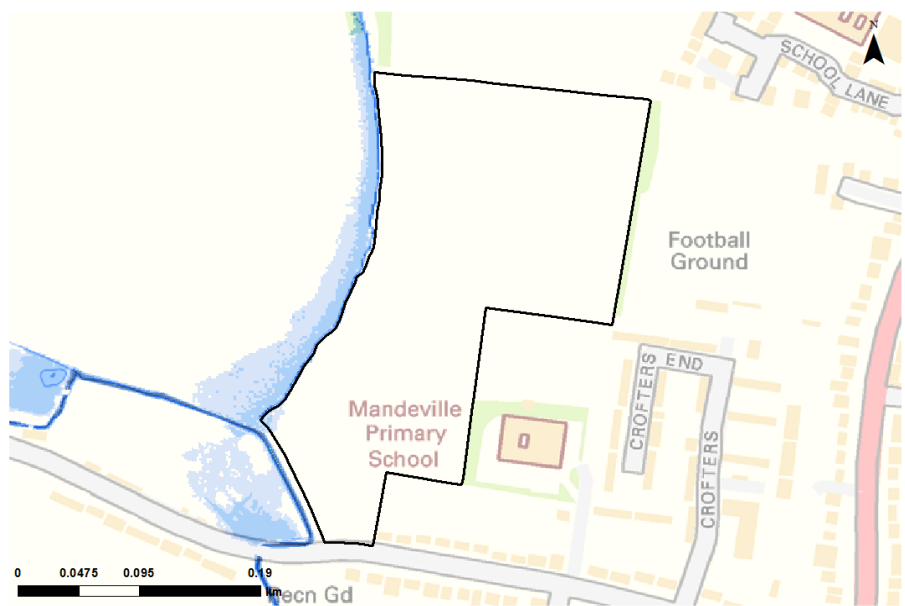
Surface Water Map



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

Depth Map

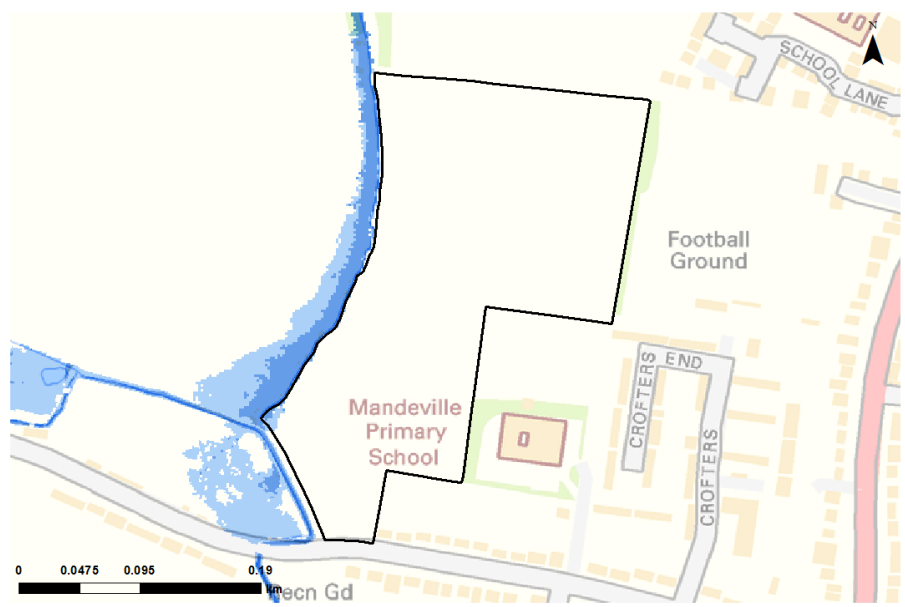


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This depth map is a combined output from Jflow 2D generalised modelling for the western drain, and existing Stort Tributaries modelling (Sawbridgeworth Brook) for the southern drain, and represents the 100-year event

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

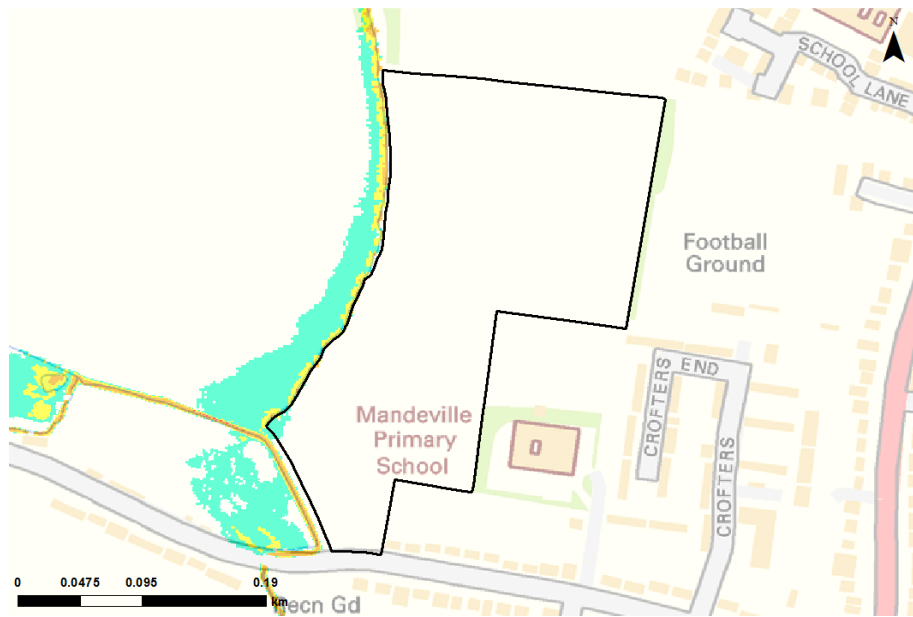


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This velocity map is a combined output from Jflow 2D generalised modelling for the western drain, and existing Stort Tributaries modelling (Sawbridgeworth Brook) for the southern drain, and represents the 100-year event

Potential Site Allocations	Velocity (m/s)	0.2 - 0.5	1.0 - 2.0
Council boundary	0 - 0.2	0.5 - 1.0	> 2.0

Hazard Map



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This hazard map is a combined output from Jflow 2D generalised modelling for the western drain, and existing Stort Tributaries modelling (Sawbridgeworth Brook) for the southern drain, and represents the 100-year event

Potential Site Allocations	Hazard Rating	Danger for some	Danger for all
Council boundary	Very low hazard - caution	Danger for most	

SuDS & the development site:		
SuDS Type	Suitability	Comments
Source Control		Most forms of source control are likely to be suitable.
Infiltration		Mapping suggests medium permeability at the site consequently infiltration is likely to be suitable. A site investigations 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.
Detention		Mapping suggests that the site slopes are suitable for all forms of detention. A liner maybe required to prevent the egress of groundwater.
Filtration		All filtration techniques are likely to be suitable. A liner maybe required to prevent the egress of groundwater.
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. A liner maybe required to prevent the egress of groundwater.
<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>		

Flood Defences:

There are no flood defences at this site.

Flood Warning:

This site is partly covered by 'The River Lee at Hertford and Ware including Stanstead Abbots' Flood warning Area, and partly covered by 'The River Lee at Hertford including Lemsford, Hatfield, Ware and Stanstead Abbots' Flood Alert Area (062WAF46MidLee).

Access & Egress:

Access to and egress from the site is possible via West Road. The possibility for access and egress may be limited in the event of fluvial flooding with much of the road affected by surface water flooding and sections are located within Flood Zone 3a. Consideration is needed to how safe access and egress can be achieved in times of flood.

Climate Change:

Climate change mapping indicates the following impacts for the future:

- Increased storm intensities.
- The increase in Flood Zone 3a outline with differing climate change allowances is minimal at the site boundary.
- Climate change may also increase the extent, depth and frequency of surface water flooding.

Implications for Development:

- Use of the Sequential approach to development means, given the size of the site, development can be placed away from the Flood Zones, with the area affected by the Flood Zones left undeveloped.
- Access and egress routes are at risk from both 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
- The site is partially covered by the Environment Agency's Flood Warning Service. However, if development is placed outside of the Flood Zones, then access to the Flood Warning Service would not be required.
- The site is not known to benefit from any flood defences. Given the size and location of the site, it is unlikely the site could be used to implement strategic solutions to alleviate flood risk elsewhere in the catchment. This could be investigated further at site-specific level.

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.
- The peak flows of the unnamed watercourse should be considered when considering drainage.
- Resilience measures will be required if buildings are situated in the flood risk area.
- Safe access and egress will need to be demonstrated; currently some access and egress routes are affected by surface water flooding and fluvial flooding from a 100-year event.
- 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 any unnamed watercourses to ensure flows are not exacerbated downstream within the catchment.
- Developers may need to undertake more detailed hydraulic modelling of the unnamed watercourse along the western boundary to confirm flood risk at the site. The Jflow outputs present an indication of flood risk in the absence of Environment Agency Flood Zones; however, this does not incorporate channel/ structure topographic survey and assumes a channel capacity of QMED.