Flood risk analysis.

**Flood risk** can be described as the combination of the statistical probability of a flood occurring and the scale of its potential consequences, whether inland or on the coast, and includes consideration of development located outside of the river and tidal flood risk areas. It is possible to define flood risk as: = (probability of a flood) x (scale of the consequences)

**The probability of flooding** can be expressed as a return period in years (the average time between years with at least one larger flood), or as an annual exceedance probability (%) (the probability that a certain magnitude of flood will be exceeded in any one year). Increasing the probability or chance of a flood being experienced increases the flood risk. In situations where the probability of a flood being experienced increases gradually over time, for example due to the effects of climate change, then the magnitude of the flood risk will increase. The severity of the consequences can increase the flood risk:

Flood hazard magnitude:

* If the direct hazard posed by the depth of flooding, velocity of flow, the speed of onset, rate of rise in flood water or duration of inundation is increased (for example due to the effects of climate change), then the consequences of flooding, and therefore risk, is increased. **New development can potentially increase the hazard if it causes an increase in surface runoff flows.**
* Receptor presence: The consequences of a flood will be increased if there are more receptors affected. **Additionally, if there is new development that increases the probability of flooding or increased density of infrastructure then consequences will also be increased.**
* Receptor vulnerability: If the vulnerability of the people, property or infrastructure is increased then the consequences are increased. For example, old people or children are more vulnerable if they are caught up in a flood event.

New development should, whenever possible, be placed in Flood Zone 1. The Flood Zones are indicative of the potential undefended floodplain. Allocating sites in Flood Zone 1 means that future development is not reliant on fluvial or coastal flood defences. This negates the requirement of committing future generations to costly long-term expenditure, which becomes unsustainable in light of the effects of climate change.

**However, developers should be aware that the runoff from development on Flood Zone 1 land can potentially cause an increase in the probability of flooding.**

Climate change

**The Environment Agency Flood Map layers do not include a layer for climate change impact.**

* The 1 in 100 year plus 20% climate change modelled flood extent should be used wherever hydraulic models are available.
* **Elsewhere, take a precautionary approach and assume that the Flood Zone 2 outline represents Flood Zone 3 with climate change.**

Historic Flood Map

The Environment Agency maintains and updates a Historic Flood Map (HFM), which shows the combined extents of known flooding from rivers, the sea, and groundwater. Events are only included where there is sufficient information to accurately map them. No information about the date of the event, or the mechanism of flooding is recorded in the layer.

Sewer flood risk mapping

The sewer flooding register provided by Thames Water is a register held by water companies on the location of properties at risk of foul and/or surface water sewer related flooding problems showing the number of properties flooded by 'overloaded sewers' within the districts over the past ten years by postcode area. 'Overloaded sewers' is the Ofwat definition of flooding due to excessive flows in sewers.

Thames Water do not make publicly available figures for other causes of flooding including blockages, collapses and equipment failure, because such problems should be rectified in a relatively short time and unlikely to recur. The incidents recorded relate to incidents of flooding due to a wide range of storm return periods and may include repeated incidents at a single property.

Where improvements have been made by Thames Water to rectify a known flooding problem, the affected properties are taken off the register. **Given that only ten years of incidents are provided, it is reasonable to assume that there are more properties at risk of sewer flooding which haven’t experienced the rainfall or other conditions to cause flooding during this period.**

Risk of flooding from reservoirs

The risk of inundation as a result of reservoir breach or failure can be viewed on the Environment Agency website under Risk of Flooding from Reservoirs. Bearwood Lake is a reservoir with a category A dam. This means a severe threat to life and property is posed should it burst or overflow. It is situated just above Mole Road, B3030, which runs along the Southeastern boundary of the proposed Hall Farm/Loddon Valley SDL.

Flooding in the news

Planning professionals have called for a “more thoughtful and joined up approach” to where thousands of new homes are planned because of the “growing problem of potential flooding” across the county.

Their warning comes after several earmarked housing sites were left partially underwater by flooding at the start of the year.

“There is certainly a growing problem of potential flooding in various parts of Oxfordshire,” said David Young, a spokesman for POETS (Planning Oxfordshire’s Environment and Transport Sustainably), a group of planning professionals and academics.

“It is a direct result of climate change and has been made worse over the last few years, by the government promoted dash for growth, against a background of chronic under-investment by its severely underfunded Environment Agency.

“This is just one of the reasons why we have called for a much more thoughtful and joined up approach to strategic planning in the county.”