

Appendix 7 – Flood Risk and Water Resources

7.1 Areas within Three Rivers are at risk of flooding from rivers, surface water, groundwater, sewers and reservoirs and the effects of climate change are predicted to increase the risk of flooding in the District. Three Rivers is located in one of the driest parts of the UK, with Hertfordshire's average rainfall returning only two-thirds of the national average. Due to the potential impacts of climate change and the increasing pressure for development across the District, it is vital that developments are safe and resilient to the risk of flooding, that water quality is enhanced and that development makes efficient use of water resources.

Flood Risk & Water Resources

Flood Risk

- 1) In locations identified as being at risk of flooding from any source, planning permission will only be granted where sequential and exception tests¹ have been undertaken and passed as necessary and where the requirements set out in national policy have been demonstrated through a site-specific flood risk assessment.
- 2) Development will only be permitted where it would not be subject to unacceptable risk of flooding and would not exacerbate the risk of flooding within the site or elsewhere. Wherever practicable and feasible, development should reduce existing flood risks to and from the site.
- 3) New development will not be permitted in Flood Zone 3b, as defined by the Environment Agency. Redevelopment of existing built development in Flood Zone 3b will only be permitted where a less vulnerable use class as per the Environment Agency is proposed and ensuring no loss of floodplain or an increase in flood risk elsewhere.
- 4) A Flood Risk Assessment (FRA) will be required for development proposals of 1ha or greater in area within Flood Zone 1, for any proposals for development within Flood Zones 2 and 3; for proposals within Flood Zone 1, where proposed development or a change of use to a more vulnerable class may be

¹ The Sequential and Exception Tests are not required for applications for some minor development (householder development, non-residential extensions of less than 250sqm) and changes of use (unless the change of use would introduce a more vulnerable use to flood risk). However, if applicable, these applications should be supported by site-specific FRAs. For allocated housing sites, the Sequential Test is not required but the Exception Test may need to be reapplied.

subject to other sources of flooding, as identified in the SFRA or by the Lead Local Flood Authority.

- 5) Development should be designed using a sequential approach; the most vulnerable uses of proposed development should be located in the areas of lowest flood risk within a site, unless there are overriding reasons to prefer a different location. The site and building design will need to ensure that development is safe and resilient to flood risk and to any residual risk in flood defended areas.
- 6) Development at risk of flooding should be flood resilient and resistant through appropriate mitigation measures. Safe access and egress routes are required for development at risk of flooding and for changes of use to a more vulnerable use; it should be demonstrated that residual risks can be safely managed.
- 7) Finished Floor Levels (FFLs) of development in Flood Zones 2 and 3 should be situated at a freeboard of at least 300mm above the modelled 1% (1 in 100 year) plus climate change predicted maximum water levels. FFLs should also be 300mm above the modelled 1 in 100-year (1%) AEP surface water level with allowance for climate change. If no surface water model is available, FFLs should be 300mm above ground level.
- 8) Major development in all areas will require Sustainable Drainage Systems to reduce surface water runoff to greenfield rates or less. Minor developments which incorporate Sustainable Drainage Systems into their designs will be encouraged.
- 9) Where appropriate, developers will be required to show that any necessary flood protection and mitigation measures will not have unacceptable impacts on nature conservation, landscape character, recreation or other important matters.
- 10) Development should maintain a minimum distance of 8m from a main river (as defined by the Environment Agency) and a minimum distance of 5m from any ordinary watercourse, in order to maintain the riparian habitat and provide access for maintenance.

Water Resources

- (11) The Council will support development where:
- a) the quantity and quality of surface and groundwater resources are protected from pollution and where possible enhanced.
 - b) it will not be at risk or adversely affected by unacceptable levels of aquatic pollution.
 - c) Efficient use is made of water resources and account taken of climate change. This means incorporating all or some of the following measures as part of development:
 - I. Rainwater harvesting techniques (for example providing waterbutts fitted to drainpipes and rainwater storage tanks as part of new development)
 - II. Harvesting and recycling greywater (wastewater from baths, showers, washbasins, kitchen sinks)
 - III. Using water efficient appliances (for showers, taps, washing machines, toilets etc.)
 - IV. Using water efficient landscaping and irrigation measures (for example by using drought tolerant plants)
 - V. New development adjacent to watercourses should seek to restore rivers to their natural state, including through de-culverting piped watercourses. Further culverting and building or within 8m of existing culverts will not be permitted.
 - d) Any development adjacent to, over or in a watercourse needs to take into account consideration of the Water Framework Directive requirements and opportunities outlined in the Thames River Basin Management Plan. All developments should seek to improve the biodiversity of the site and contribute towards the riparian corridor's ability to be used by migrating species.
 - e) All new residential development must achieve as a minimum the optional requirement set through Building Regulations for water efficiency that requires an estimated water use of no more than 110 litres per person per day. Non-residential development achieving the 'BREEAM Excellent' rating for water efficiency will be supported.
 - f) Where appropriate, planning permission for developments resulting in the need for off-site upgrades to wastewater infrastructure will be subject to conditions to ensure the occupation does not outpace the delivery of necessary infrastructure upgrades.

Reasoned Justification

Flood Risk

7.2 National Policy aims to ensure that flood risk is taken into account at all stages of the planning process and to avoid inappropriate development in areas at risk from flooding by directing development away from areas at highest risk. Where development cannot be allocated or granted permission in areas of low risk, it must be made safe without increasing flood risk elsewhere.

7.3 The District is mapped according to the level of flood risk; Flood Zones in Three Rivers are defined in the Council's Strategic Flood Risk Assessment.

Flood Zone	Definition
Zone 1 – Low Probability	Land having a less than 1 in 1,000 annual probability of flooding from rivers or sea.
Zone 2 – Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of flooding from rivers or sea.
Zone 3a – High Probability	Land having a 1 in 100 or greater annual probability of flooding from rivers or sea.
Zone 3b – The Functional Floodplain	Land providing flood storage or where water has to flow in times of flood.

7.4 Through applying a risk-based, sequential approach, the overall aim is to steer new development to Flood Zone 1 (low risk) in the first instance. Development in Zone 2 and Zone 3a may be considered if no other preferable, reasonably available sites in areas of lower flood risk exist and both parts of an 'Exception Test' are satisfied. Development in Flood Zone 3b will not be permitted; Flood Zone 3b will be protected as the functional floodplain and its capacity to attenuate periodic flood events will not be compromised. When applying the Sequential Test to individual planning applications, a pragmatic approach on the availability of alternative sites should be taken.

7.5 Although Flood Zone 1 represents areas of low flood risk, it does not account for the risk of flooding from other sources (e.g. surface water, groundwater). Under the NPPF, all sources of flood risk and the impacts of climate change, must be taken into account.

Site-specific Flood Risk Assessments (FRAs)

7.6 Site-specific FRAs should demonstrate how flood risk will be managed, taking into account climate change and having regard to the vulnerability of different land uses to flood risk. FRAs should make optimum use of already available information, for example from the

SFRA, the Environment Agency and the Lead Local Flood Authority (LLFA). The detail contained in FRAs should be proportionate to the degree of flood risk and appropriate to the scale, nature and location of development².

7.7 National planning guidance³ provides a 'checklist' of information to be included in a site-specific FRAs. In addition, for sites located in catchments identified in the SFRA as highly sensitive to the cumulative impact of development, site-specific FRAs should also require consideration of the cumulative effects of the proposed development and should demonstrate that flood risk downstream will not be made worse as a result of cumulative development. Where developments are located in areas benefitting from defences or adjacent to a canal, FRAs should include an assessment of the residual risk, considering the impact of breach, including the effect on safe access and egress, as well as potential for flood risk to increase in the future due to overtopping.

Strategic Flood Risk Assessment (SFRA)

7.8 As a means of assessing levels of risk, the Council in conjunction with adjoining authorities in South West Hertfordshire commissioned a Strategic Flood Risk Assessment.

The SFRA defines the flood risk within the District, taking into account all sources of flooding and future climate change impacts. The document details the following flood risk objectives:

- Achieve a reduction in flood risk through spatial planning and site design;
- Consider the cross-boundary and cumulative impacts of flood risk;
- Inform flood risk and drainage assessments and promote SuDS; and
- Identify strategic flood risk solutions, including river and floodplain restoration and enhancement.

7.9 The SFRA considered the risk of flooding to individual sites as well as the cumulative impacts which successive developments may have on flood risk within a river catchment. The Colne (Ver to Gade) and Gade (Bulbourne to Chess) catchments were identified as highly sensitive to the cumulative impact of development. In order to manage the cumulative impact of development on flood risk, all new development (other than minor extensions) in the Colne (Ver to Gade) and Gade (Bulbourne to Chess) catchments should provide wider betterment by demonstrating site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream. This may either be by provision of additional storage on site (e.g. SuDS with long-term storage, natural flood management techniques, green-blue corridors) and/or by providing a contribution towards any wider schemes.

Sustainable Urban Drainage Systems (SuDS)

7.10 The use of Sustainable Drainage Systems (SuDS) to manage surface water flows is an important tool in managing flood risk, designed to control surface water run off close to where it falls and to mimic natural drainage as closely as possible. SuDS increases permeable

² NPPG Flood Risk and Coastal Change, Paragraph: 021

³ NPPG Flood Risk and Coastal Change, Paragraph: 080

surfaces in development, allowing water to seep into the ground rather than running off directly into rivers and drainage systems. SuDS also help to reduce the burden on traditional water management systems such as sewers and reduce the impact of pollution on receiving water bodies. Proposals incorporating SuDS should seek to deliver multifunctional benefits for green space and amenity, recreation and wildlife.

7.11 SuDS should be integrated into the design of all development sites, although as the effectiveness of SuDS within a site is dependent on the site characteristics (such as topography, geology, soil permeability and existing flow paths across the site), the techniques used should be appropriate to local conditions. Surface Water Drainage Strategies will be required for major development and where appropriate, for minor developments. Where SuDS are implemented, the systems used should take account of advice from the LLFA, have appropriate proposed minimum operational standards and have maintenance arrangements to ensure operation for the development's lifetime. Where implemented on major and minor developments, SuDS schemes should reduce runoff to greenfield rates or less, unless achieving this standard is shown to be unreasonable.

Buffer Zones

7.12 In order to maintain the riparian habitat and provide access for maintenance, a minimum 8m buffer zone from development to a main river (as defined by the Environment Agency) will be required. The 8m distance is required from the top of the river bank and the buffer zone should be used to exclude any development, including hardstanding, paths and lighting. Buffer zones should be used as green spaces, with native planting encouraged. Buffer zones should not be used for the storage of materials. Between an ordinary watercourse and development, a minimum distance of 5m will be required.

Further Guidance

7.13 Applicants are advised to consult the Level 1 and 2 SFRA for information on areas at risk from flooding. Where required by applicants, Hertfordshire County Council (as the LLFA), the Environment Agency and Thames Water can be contacted for more detailed flood risk information.

7.14 In some cases, developers will be required to contribute to the delivery of flood risk management schemes and facilities, as identified in the South West Herts Level 1 SFRA, the Three Rivers Level 2 SFRA and other relevant plans such as the Local Flood Risk Management Strategy for Hertfordshire. If identified as appropriate in a site-specific FRA, developers will be required to work with the emergency services and emergency planners to prepare an acceptable Flood Warning and Evacuation Plan, in order to safely manage residual flood risk.

7.15 Further guidance on ways flood risk and ways to deliver SuDS are contained in the following documents (and subsequent updates):

- SuDS Design Guidance for Hertfordshire⁴;
- Lead Local Flood Authority SuDS Policy Statement: Meeting SuDS Standards in Hertfordshire⁵;
- Roads in Hertfordshire – Highways Design Guide⁶; and
- Three Rivers Surface Water Management Plan (in draft).

Water Resources

7.16 The Three Rivers District is entirely underlain by a chalk aquifer, which is the main drinking water resource for the area and a regionally important source of groundwater. It is important to protect this resource from pollution and to safeguard it, taking into account future climate change. The Three Rivers area has a large number of surface water resources including the Rivers Colne, Gade and Chess, the Grand Union Canal, as well as several lakes and ponds, particularly within the floodplain of the River Colne.

7.17 It is essential for development to protect and, where possible, enhance water quality. This means controlling pollution, protecting and enhancing the quality and quantity of groundwater, and protecting and enhancing surface water resources, such as through the use of SuDS to manage surface water. Development should ensure, where possible, that it carries out measures found in the Thames River Basin Management Plan and should ensure that there is no deterioration in the status of designated water bodies. Changes to the design of developments and the implementation of mitigation measures should ensure potential harm to water bodies is prevented, however, where it is likely that a proposal would have a significant adverse impact on water quality, a more detailed assessment will be required⁷. If adequate mitigation cannot be provided against any significant adverse impact on water quality, the application should be refused.

7.18 Three Rivers is an area of serious water stress (as classified by the Environment Agency)⁸, so reducing water consumption levels is important. Measures that will reduce water consumption will be expected, recognising that the incorporation of water efficiency measures into developments is essential to prepare and be able to adapt to climate change and increased water demand in future. The efficient use of water resources, including water reuse and recycling, should be sought through sustainable construction methods (such as rainwater harvesting) that conserve and make prudent use of water and other natural

⁴ Hertfordshire County Council (2015) SuDS Design Guidance for Hertfordshire. <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/surface-water-drainage/guidance-for-suds-in-hertfordshire.pdf>

⁵ Hertfordshire County council (2016) Lead Local Flood Authority SuDS Policy Statement <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/water/surface-water-drainage/suds-policies-rev1-v2-webpage.pdf>

⁶ Hertfordshire County Council (2011) Roads in Hertfordshire - Highway Design Guide <https://www.hertfordshire.gov.uk/services/highways-roads-and-pavements/business-and-developer-information/development-management/highways-development-management.aspx#highwaydesignguide>

⁷ The requirements of a detailed water quality assessment are set out in NPPG (Water supply, wastewater and water quality; Paragraph: 016).

⁸ The Environment Agency (2021) Water stressed areas – final classification <https://www.gov.uk/government/publications/water-stressed-areas-2021-classification>. ‘Serious’ water stress is identified as an area where the current or future demand for household water is, or is likely to be, a high proportion of the effective rainfall which is available to meet that demand.

resources. Water-efficient appliances (for showers, taps, washing machines, toilets, etc.) and water-efficient landscaping and irrigating measures in new developments will also help to support sustainable supplies of water for the future.

7.19 Given the District's location in an area of serious water stress and the estimated future shortfall in water supply, all new developments will be expected to meet the water efficiency standard of 110 litres per person per day (or less). Older buildings are often the least efficient in resource use and therefore, where opportunities arise through the refurbishment or change of use of existing buildings, retrofitting to improve the water efficiency of buildings will be supported⁹. The Environment Agency's Thames River Basin Management Plan and Affinity Water support the adoption of this standard, given the need to ensure long-term water efficiency and supply. The Colne Abstraction Licensing Strategy (2019)¹⁰ shows that the Environment Agency were unable to grant new licences for abstraction from surface waters and most groundwater areas, further evidencing the stress on water availability in Three Rivers and the subsequent need to incorporate water efficiency measures into development.

Waste Water & Sewage

7.20 Three Rivers will seek to ensure that there is adequate wastewater infrastructure to serve all new developments. Developers are encouraged to contact Thames Water as early as possible to discuss their development proposals and intended delivery programme to assist with identifying any potential water and wastewater network reinforcement requirements. Where there is a capacity constraint, where appropriate, phasing conditions will be applied in order to ensure that any necessary infrastructure upgrades are delivered ahead of the occupation of the relevant phase of development.

7.21 It is noted that many existing water mains and sewerage systems are increasingly becoming overloaded by successive development. It is therefore crucial to ensure that adequate infrastructure is in place prior to development, in order to avoid impacts such as sewage flooding of existing residential dwellings and commercial premises. New development must be served by an adequate means of water supply and sufficient foul and surface water drainage and adequate provision must be made for water supply and sewerage infrastructure.

7.22 The Water Cycle Study Scoping Report (2010) for South West Hertfordshire highlighted the restrictions in the capacity of Maple Lodge and Blackbirds Wastewater Treatment Works in accommodating growth. Upgrading of the sewerage infrastructure across South West Hertfordshire was identified as a requirement. These conclusions were reinforced in the Draft Hertfordshire Water Study (2017) which concluded that in the longer term (2031-2051), strategic investment will be required to increase the capacity of major sewage

⁹ The BREEAM Refurbishment and Fit-Out Technical Standard provides guidance to support retrofitting. BREEAM UK (2014) Refurbishment and Fit-out Technical Standard <https://breeam.com/standards/refurbishment>

¹⁰ The Environment Agency (2019) Colne abstraction licensing strategy. <https://www.gov.uk/government/publications/colne-catchment-abstraction-licensing-strategy>

treatment works in Hertfordshire, including Maple Lodge STW. This infrastructure requirement is detailed further in the Infrastructure Delivery Plan (IDP).

7.23 Further guidance on ways to conserve water are contained in the following documents (and subsequent updates):

- Building Futures: A Hertfordshire guide to promoting sustainability in development¹¹;
- Affinity Water: Water Resource Management Plan¹²; and
- Thames River Basin Management Plan¹³.
- BREEAM New Construction Technical Standards
- BREEAM Refurbishment and Fit-Out Technical Standard

¹¹ Building Futures (2008) Building Futures: A Hertfordshire Guide to Promoting Sustainable Development
<https://www.hertfordshire.gov.uk/microsites/building-futures/about-us.aspx>

¹² Affinity Water (2019) *Draft* Final Water Resources Management Plan
<https://www.affinitywater.co.uk/corporate/plans/water-resources-plan>

¹³ DEFRA and The Environment Agency (2015) Thames River Basin Management Plan
<https://www.gov.uk/government/collections/river-basin-management-plans-2015>