

Appendix F - Cumulative Impact Assessment

1 Background

1.1 Introduction

The cumulative impact of development should be considered at both the Local Plan making stage and the planning application and development design stages.

Paragraph 160 of the National Planning Policy Framework (NPPF, 2021) states:

'Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.'

Appropriate mitigation measures should be undertaken to prevent exacerbation of flood risk, and where possible the development should be used to reduce existing flood risk issues, both onsite and downstream of the development.

To understand the impact of future development on flood risk in Wokingham Borough, catchments were identified where development may have the greatest potential effect on flood risk, and where further assessment would be required within a Level 2 Strategic Flood Risk Assessment (SFRA) or site-specific Flood Risk Assessment (FRA). To identify the catchments at greatest risk, various factors were considered, including the potential change in developed area within each catchment and communities sensitive to increased risk of surface water and fluvial flooding, alongside evidence of historic flooding incidents. Where catchments have been identified as sensitive to the cumulative impact of development, the assessment sets out planning policy recommendations to help manage the risk.

1.2 Strategic flood risk solutions

1.2.1 Local solutions

Wokingham Borough Council (WBC) is reviewing and updating its planning policies through a process known as the Local Plan Update (LPU). This will set an updated planning policy framework for the future management of flood risk and drainage in the area. This includes flood risk management, alongside wider environmental and water quality enhancements. Strategic solutions that the LPU may directly or indirectly help to shape include upstream flood storage, integrated major infrastructure/ Flood Risk

Management schemes, new defences, and watercourse improvements as part of regeneration and enhancing green infrastructure, with opportunities for natural flood management and retrofitting Sustainable Drainage Systems (SuDS).

Existing specific actions for the authority area are set out in the WBC Local Flood Risk Management Strategy, which can be [downloaded from the Council website here](#), and the Thames River Basin District Flood Risk Management Plan, which is [available on the Government website here](#).

Section 2 of the main report sets out the strategic plans that exist for the authority area. The list below summarises the key outcomes these are seeking to achieve. This vision needs to be delivered by new development alongside retrofitting and enhancing green infrastructure and flood defence schemes in the existing developed area.

The strategic policy vision from the Catchment Flood Management Plans and the River Basin Management Plans focuses on community engagement and seeking opportunities to fund and deliver flood alleviation schemes in areas deemed high-risk; re-naturalising watercourses, safeguarding the floodplains and encouraging collaboration and creating new partnerships to reduce the risk of flooding and to enhance the natural environment.

Strategic policies relevant to Wokingham Borough, encourage development to:

- Reduce risk to people, economic damage, and community disruption,
- Use sustainable flood storage and mitigation schemes to store water and manage surface water runoff in locations that provide overall flood risk reduction as well as environmental benefits,
- Engage with a variety of stakeholders across the region to develop plans and seize opportunities for collaborative partnership working,
- Provide a greater role for communities in managing flood risk,
- Improve knowledge and understanding of flood risk and management responsibilities, and of watercourse networks and drainage infrastructure,
- Be completed in a sustainable and appropriate way,
- Deliver flood risk management measures that have social, economic, and environmental benefits, and
- Promote and consider SuDS at the earliest stage of site development.

1.2.2 National solutions

In some locations nationally, the Environment Agency (EA) have committed to assist Local Planning Authorities (LPAs) in identifying areas which may be most affected by increased flood risk due to development and/or climate change. However, this work is stated to likely fall short of extensive hydraulic modelling and detailed mapping of theoretical flood extents. The headline message is therefore:

Flood risk is increasing, perhaps substantially, so Planners, Emergency Planners, Asset Managers, and others will need to mitigate this through a mix of collaborative working, planning policies, use of ‘worst case’ scenarios, development of contingency plans and some detailed analysis.

1.2.3 Opportunities and projects in and/or affecting the Wokingham Borough

Wokingham Borough is already a partner of the Berkshire Local Nature Partnership (BLNP). The partnership aims to work together to create a sustainable, healthy, and vibrant area by promoting the conservation and enhancement of nature and the benefits we receive from a healthy environment. More information is [available on the BLNP website here](#).

Wokingham Borough Council also work closely with the Thames Valley Environmental Records Centre (TVERC) for the provision of ecological data for the Borough. More information is [available on the TVERC website here](#).

The following sections address other stakeholders and project delivery schemes affecting the Borough.

1.2.3.1 South East Rivers Trust

The South East Rivers Trust are the associated Catchment Based Approach partner for the ‘River Loddon’ catchment.

Their key principles are:

- To inspire lifelong stewardship for rivers by getting people of all ages to experience, enjoy and understand rivers.
- Restore, re-naturalise, and reconnect rivers, removing barriers to fish migration and enhancing habitats.
- Improve water quality through wetland creation and construct natural flood management measures to protect communities and surrounding land.
- Work in partnership with a wide range of stakeholders including local government, non-governmental organisations, landowners, and businesses.
- Work with farmers to promote sustainable land and water management ensuring healthy soils, tackling water scarcity, and boosting biodiversity.
- Develop, design, and deliver physical improvements on rivers as well as their catchments, working with nature to bring rivers back to life.
- Work with local people to improve rivers in the south-east through our river clean-up events and restoration days.
- Inspire communities with opportunities to learn about their local river, its history and wildlife at our guided walks and river talks.
- Monitor the health of our rivers by training and supporting volunteers and citizen scientists.

More information is available from the [South East Rivers Trust website](#) here.

1.2.3.2 Berkshire, Buckinghamshire, and Oxfordshire Wildlife Trust (BBOWT)

BBOWT manage two Nature Reserves within Wokingham Borough. These are:

- Loddon
- Shepperlands Farm

These sites are home to various important and protected habitats and species, including:

- Old Berkshire Grassland
- Westlands
- Woodland
- Lowland Heath
- Lowland Meadow and Pasture
- Cuckooflower
- Heather
- Adder
- Slow Worm
- Common Lizard
- Buzzard
- Adder's-tongue fern
- Pepper Saxifrage
- Bluebell
- Devil's-bit scabious
- Dyer's greenweed
- Marbled white butterfly
- Grizzled skipper butterfly
- Skylark
- Green woodpecker
- Blackcap
- Lesser whitethroat
- Tufted Duck
- Pochard Gadwell

Natural Flood Management techniques could be encouraged at some of the reserves to aid flood storage and improve natural habitats.

Further information on their reserves and the work they do is available on the [Wildlife Trust website](#) here.

1.3 Assessment of Cross-Boundary Issues

Wokingham Borough is bordered by the following Local Authority areas, shown in Figure 1-1:

- Basingstoke and Deane Borough
- Bracknell Forest
- Buckinghamshire
- Hart District
- Reading Borough
- South Oxfordshire District
- West Berkshire
- Royal Borough of Windsor and Maidenhead

The topographic characteristics of Wokingham Borough are dictated by the Thames Basin Heaths, a Special Protection Area atop chalk hills in the south, the southern end of the Chilterns in the northern tip of the Borough, and lowland Thames Valley through the middle reach. The high ground in the south of the borough creates the watershed for a number of tributaries to the River Loddon, which flows northward into the River Thames. The Twyford Brook, Emm Brook, Barkham Brook and the River Blackwater drain the majority of Wokingham Borough from the east into the Loddon, which drains the western portion. Some cross-boundary tributaries also drain small sections in the far west, including the Burghfield Brook and Foudry Brook, and parts of the River Thames catchment. Section 1.5 of the main report provides further details on the study area.

Future development, both within and outside of Wokingham Borough, as well as climate change, have the potential to affect flood risk to existing development and the surrounding areas, depending on the effectiveness of SuDS and drainage implementation.

Development control should ensure that the impact on receiving watercourses from development in the Borough has been sufficiently considered during the planning stage. The National Planning Policy Framework (NPPF) sets out how developments should demonstrate they will not increase flood risk elsewhere. Therefore, providing developments near watercourses in neighbouring authorities comply with the latest planning policy, guidance and legislation relating to flood risk and sustainable drainage, they should result in no increase in flood risk within the Borough. The neighbouring authorities were contacted for information on their site allocations, to determine where development in neighbouring authorities may have an impact on Wokingham Borough. The Wokingham Borough LPU, which will look up to at least 2039/40, is currently being prepared.

The following Local Plans have been adopted by neighbouring local authorities and include policies relevant to flood risk and drainage, with hyperlinks to the documents provided:

- [Basingstoke and Deane Local Plan 2011 – 2029](#)

- Bracknell Forest Local Plan (Currently at Examination stage, due to cover up to 2037)
- Buckinghamshire Local Plan (Currently under review, not yet adopted)
- Hart Local Plan 2020 – 2032
- Reading Local Plan 2019 - 2036
- South Oxfordshire Local Plan 2020 – 2035
- West Berkshire Local Plan 2022-2039 (Currently under review, submitted to Secretary of State for Examination)
- Windsor and Maidenhead Local Plan (2013 – 2033)

For the CIA, Wokingham Borough was assessed at catchment level, with these catchments shown in Figure 1-2.

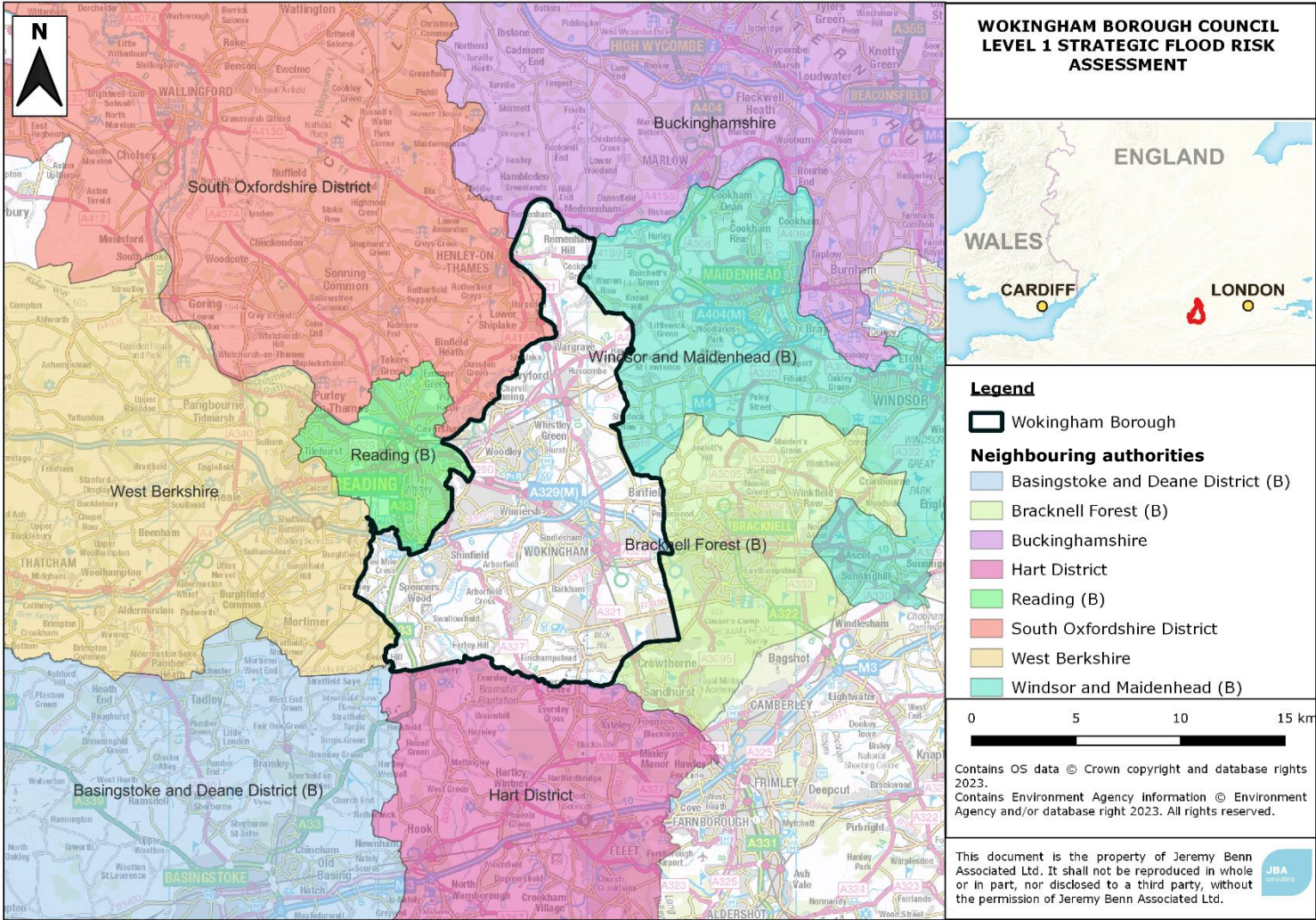


Figure 1-1: Neighbouring authorities to Wokingham Borough.

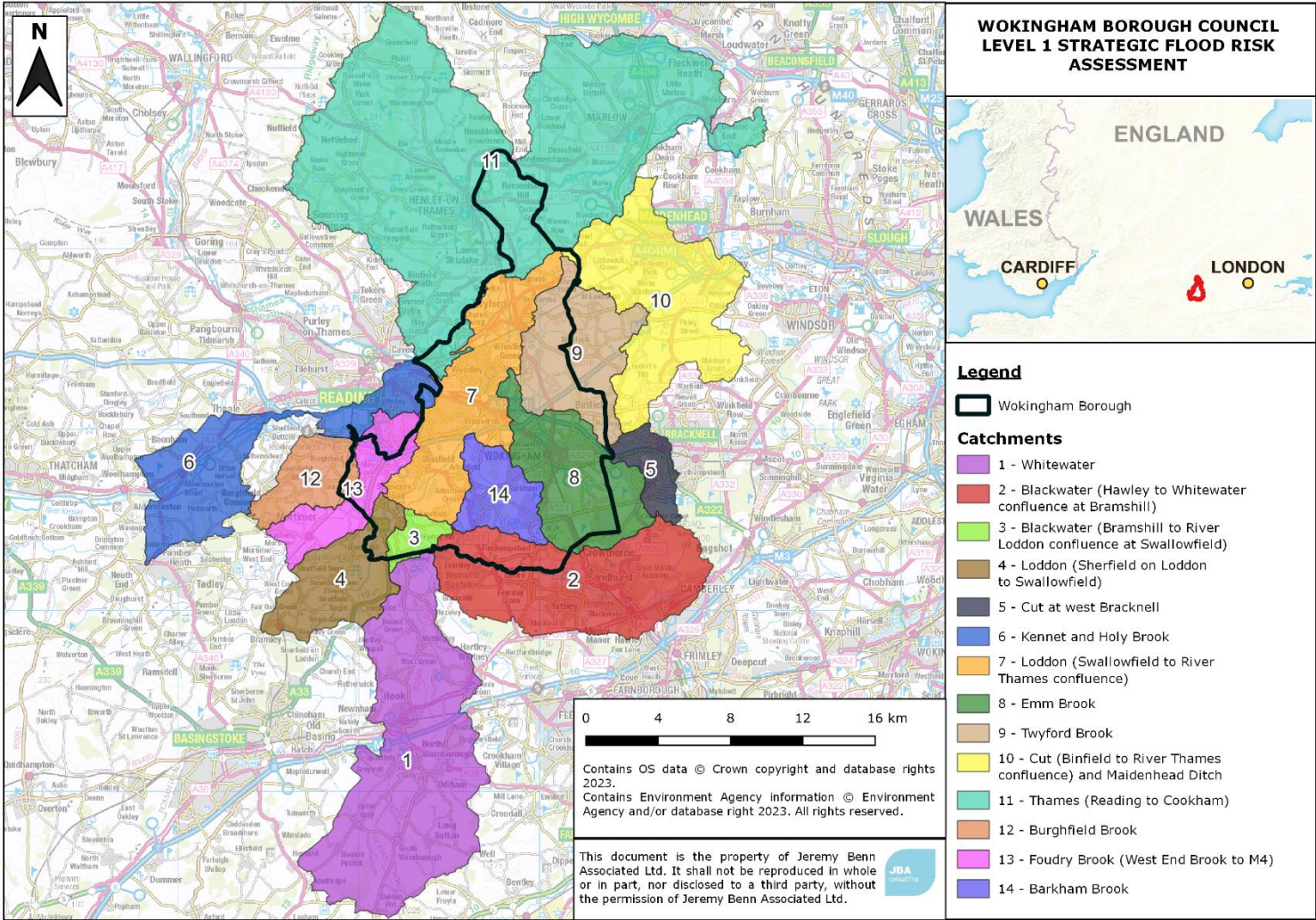


Figure 1-2: Catchments within the Wokingham Borough.

1.4 Cumulative Impact Assessment Methodology

This broadscale assessment determines where the potential cumulative impact of developments may have the greatest effect on flood risk across the study area. Catchments at the highest risk are taken forward to a catchment-level analysis. Potential change in developed areas within each catchment from neighbouring authorities was also considered. Records of historic flooding were available for Wokingham Borough but not for the neighbouring authorities. It should be noted that not all flooding is reported, for several reasons, so the number of recorded historic flooding incidences is indicative. Analysis of this data facilitated the identification of catchments at the greatest risk of cumulative impacts of an increase in impermeable area within the catchment.

There are four stages to the Level 1 Cumulative Impact Assessment (CIA):

1. Assess sensitivity to surface water and fluvial flood risk.
 - This will be assessed by calculating the change in the number of properties at risk from the 1% AEP to the 0.1% AEP events for surface water and fluvial flooding respectively, given as a percentage of the total properties in the catchment.
2. Identify historic flooding incidents.
 - Identify the total number of historic flooding incidents within each catchment.
3. Assess the catchments with the highest degree of proposed new development.
 - This will be assessed by calculating the percentage area of each catchment covered by proposed development.
4. Identify the catchments at greatest risk.
 - Rank catchments in each category.
 - Discussion of catchments which are at high risk in all categories/individual categories.
 - Policy recommendations for developments in higher risk catchments.
 - Identify catchments needing further consideration within a Level 2 SFRA (if required).

The next stage after this process would be to assess the impacts of individual sites/preferred development areas in Wokingham Borough. However, this is beyond the scope of a Level 1 SFRA and would be assessed within a Level 2 SFRA (if required) and site-specific FRA.

Table 1-1 summarises the datasets used within the Wokingham Borough CIA.

Future development sites within the study area were provided by WBC and neighbouring authorities. Catchments within the study area were ranked on four metrics: sensitivity to increased fluvial flood risk, sensitivity to increased risk of surface

water flooding, sensitivity to increased risk of fluvial flooding, prevalence of recorded historic flood incidents (limited by the data available), and area of new development proposed within the catchment.

The final results of this assessment gave a rating of low, medium, or high risk for each metric, for each catchment within the study area, the boundaries of which were derived from the Water Framework Directive (WFD). The rating of each catchment in each of these assessments was combined to give an overall ranking.

Table 1-1: Summary of datasets used within the Broadscale CIA.

Dataset	Coverage	Sources of Data	Use of Data
Catchment boundaries	Wokingham Borough and neighbouring authorities	Water Framework Directive Catchments	Assessment of susceptibility to cumulative impacts of development by catchment
National Receptor Dataset (2021)	Wokingham Borough and neighbouring authorities (does not extend across all cross-boundary catchments)	EA	Properties for the assessment of flood risk
Risk of Flooding from Surface Water	Wokingham Borough and neighbouring authorities	EA	Assessing the number of properties at risk of surface water flooding within each catchment
Fluvial Flood Zones 2 and 3a	Wokingham Borough and neighbouring authorities	EA Flood Map for Planning, EA detailed hydraulic models and updated hydraulic models for the River Loddon and Arborfield	Assessing the number of properties at risk of fluvial flooding within each catchment
Future development areas (recently built out sites/sites under construction/sites with planning permission/previously	Wokingham Borough and neighbouring authorities (excluding Buckinghamshire)	WBC Basingstoke and Deane Borough Council Bracknell Forest Council	Assessing the impact of proposed future development on risk of flooding

Dataset	Coverage	Sources of Data	Use of Data
allocated sites/currently allocated sites)		Hart District Council Reading Borough Council South Oxfordshire Council West Berkshire Council Royal Windsor and Maidenhead Borough Council	
Historic flooding incidents	Wokingham Borough	WBC Thames Water	Assessing incidences of historic flooding within the study area

1.4.1 Sensitivity to increases in fluvial flooding

This is the measure of the increase in the number of properties at risk of fluvial flooding from the 1% AEP event to the 0.1% AEP event. It is an indicator of where local topography makes an area more sensitive to increases in flood risk that may be due to any number of reasons, including climate change, new development etc. It is not an absolute figure or prediction of the impact that new development will have on flood risk.

The National Receptor Database (NRD) dataset 2021 was used to identify all properties within the catchments. The NRD provided by WBC covered the full extent of Wokingham Borough with a considerable buffer but did not cover the entire area of all the cross-boundary catchments as this data is not held by WBC. The main catchments affected are:

- Thames (Reading to Cookham)
- Kennet and Holy Brook
- Cut (Binfield to River Thames confluence) and Maidenhead Ditch)
- Whitewater

As shown in Figure 1-2 these catchments lie predominantly outside of Wokingham Borough so the impact of this missing data coverage will be minimal.

The NRD was intersected with the 1% and 0.1% AEP fluvial flood extents separately to determine the number of properties in each catchment, in each fluvial flood extent. The difference between the two values was then taken as a percentage of the total

number of properties within the catchment to allow comparison between catchments of different sizes.

1.4.2 Sensitivity to increases in surface water flooding

This is the measure of the increase in the number of properties at risk of surface water flooding in a 1% AEP event to a 0.1% AEP event and follows the same process as for fluvial flood risk, see Section 1.4.1 above.

1.4.3 Growth in the area

Development within Wokingham Borough has the potential to affect flood risk in neighbouring authorities, especially if there are existing flood risk issues. The River Loddon drains out of the Borough into the Thames, which forms part of the district boundaries for Buckinghamshire, Royal Borough of Windsor and Maidenhead, and South Oxfordshire.

Areas for future proposed development were received from WBC and neighbouring authorities and were assessed as part of this CIA. The area of new development within each catchment was expressed as a percentage of the total catchment area to determine the potential for increases in flood risk as a result of new development. At this stage the whole area of each development was considered, with no land use assumptions for the development areas.

1.4.4 Historic flood risk

Recorded flooding event data for fluvial, surface water and sewer flooding within Wokingham Borough were made available for this assessment. No historic flooding data was made available for the neighbouring authorities as this data is not held by WBC. Therefore, historic events in catchments that cross local authorities' boundaries are unknown.

Details of historic flood events can be found in Section 5.1 of the main report. The historic data was represented as point data, where each point represents a location where it is known there has been at least one flood event (however, the nature and scale of these flood events varies significantly).

A count of each historical flood incident was conducted for each catchment to determine the historic flood risk within the catchments. Where a considerable proportion of the catchment lies outside Wokingham Borough, where historic flooding data was not available, the historic assessment result was not included in calculating the overall ranking for the catchment. As a result, historic flood risk was only considered in the final flood risk rankings for the following catchments:

- Blackwater (Bramshill to River Loddon confluence at Swallowfield)
- Loddon (Swallowfield to River Thames confluence)

- Emm Brook
- Barkham Brook

1.4.5 Ranking the results

The results for each assessment were ranked into high, medium, and low risk as shown in Table 1-2. Ranking delineations were given at natural breaks in the results.

The ranking results were combined from all four assessments to give an overall high, medium, and low ranking for all catchments within the Borough. Each catchment was assigned a score for each assessment based on its ranking (high = 3, medium = 2, low = 1) and these were then averaged to produce a final score and ranking. Any catchment producing an overall score higher than 2 was considered high risk.

There is currently no national guidance available for assessing the cumulative impacts of development. These rankings provide a relative assessment of the catchments within Wokingham Borough and are not comparable across other boroughs/districts. The thresholds used have been based on natural breaks in the data and professional judgement.

Table 1-2: Ranking assessment criteria

Flood risk ranking	Percentage of properties at increased risk of fluvial flooding	Percentage of properties at increased risk of surface water flooding	Total number of historic flooding incidents	Percentage area of catchment covered by new development
Low risk	<1	<4	<20	<3
Medium risk	1 to 5	4 to 5	20-50	3 to 10
High risk	>5	>5	>50	>10

1.4.6 Assumptions

The assumptions made when conducting the CIA are shown in Table 1-3.

Policy recommendations with regards to managing the cumulative impact of development have been made in Section 2 below. This will help to ensure there is no incremental increase in flood risk both within and downstream of Wokingham Borough.

Table 1-3: Assumptions of the CIA.

Assessment aspect	Assumption made	Details of limitation in method	Justification of method used
Surface water flood risk; Flood Zone 2 and 3a	Total number of properties	Assumption that all properties have been included in the 2021 NRD dataset. It may not include all new build properties. It also does not include all properties across some of the larger cross-boundary catchments.	This was the most up to date and accurate data available. The cross-boundary catchments most affected by the missing NRD data lie mostly outside Wokingham Borough so the impact will be minimal.
Fluvial flood risk	Climate change proxy	Used the Flood Map for Planning Flood Zone 2 as an indicative estimate of the impacts of climate change across the Borough.	Although detailed climate change modelling was available for some watercourses, the broader Flood Map for Planning covers the entire area of the catchments both within and outside the Borough and therefore provided a consistent approach for this high level assessment.
Historic Flooding incidents	Total number of historic events and severity of flooding	Only flooding incidents recorded that could be georeferenced with XY coordinates to produce GIS files were used. Each point represents a location where it is known there has been at least one flood incident. The severity of the historic flooding event relating to the point has not been considered, just the total number of points within each catchment where there has been a flood incident.	GIS data sourced provided the most accurate results possible for the location of historic flooding incidents in Wokingham Borough.

Assessment aspect	Assumption made	Details of limitation in method	Justification of method used
Development	Area of development	<p>Have assumed all promoted sites provided by Wokingham Borough and the neighbouring authorities are taken forward to development. For Wokingham Borough, sites included all promoted sites provided by the Council as of the 24 March 2023.</p> <p>Have not considered whether sites are greenfield or brownfield sites (with brownfield regeneration having the potential to reduce flood risk) or the proposed allocation type and land use of the site.</p>	<p>This is a reasonable worst-case scenario as we do not have further information to inform which sites are most likely to go forward to development.</p> <p>Information on greenfield and brownfield sites was not readily available so this will be considered further in the Level 2 assessment.</p>

1.5 Cumulative Impact Assessment

1.5.1 Sensitivity to fluvial flooding

The number of properties located within Flood Zone 2, but not presently within Flood Zone 3a was calculated, as a percentage of the total properties across the whole catchment. These properties are considered sensitive to increased flood risk as a result of climate change. Flood Zone 2 can be used as an indicative climate change extent given the upper end climate change estimates are often similar to the 0.1% AEP/ Flood Zone 2 extents.

Catchments with greater than 5% of properties at increased risk were considered high risk and are listed in Table 1-4 below.

Table 1-4: Catchments considered highly sensitive to increased fluvial flood risk in the future.

Catchment	Percentage of properties sensitive to increased fluvial flood risk	Rank
Thames (Reading to Cookham)	7.5	1
Kennet and Holy Brook	5.2	2

1.5.2 Sensitivity to surface water flooding

The number of properties located within the 0.1% AEP surface water extent not presently within the 1% AEP extent was calculated, as a percentage of the total properties across the whole catchment. These properties are considered sensitive to increased flood risk as a result of climate change.

Catchments with greater than 5% properties at increased risk were considered high risk and are listed in Table 1-5.

Table 1-5: Catchments considered highly sensitive to increased surface water flood risk in the future.

Catchment	Percentage of properties sensitive to increased surface water flood risk	Rank
Foudry Brook (West End Brook to M4)	7.4	1
Loddon (Sherfield on Loddon to Swallowfield)	5.5	2
Whitewater	5.5	3
Cut (Binfield to River Thames confluence) and Maidenhead Ditch	5.3	4
Kennet and Holy Brook	5.3	5
Barkham Brook	5.3	6

1.5.3 Prevalence of historic flooding incidents

Historic flood incidents data for fluvial or surface water flooding were available from WBC and sewer flooding incidents from Thames Water. While this will not provide a detailed scope of historic flooding incidents across the region from neighbouring authorities, using the data available the number of flood incidents in each catchment were identified to provide a broadscale understanding of flood risk. Where a large proportion of the catchment falls outside Wokingham Borough, and historic data was not available, the historic data was therefore not included within the final ranking calculations.

Catchments with more than 50 recorded flooding incidents were considered high risk.

For a more detailed assessment of historic flood risk, acquiring historic flooding incidents records from all neighbouring authorities is recommended.

Table 1-6: Catchments with the highest number of recorded historic flood incidents.

Catchment	Number of recorded incidents	Rank
Loddon (Swallowfield to River Thames confluence)	83	1
Emm Brook	67	2

1.5.4 Area of proposed development

WBC and neighbouring authorities provided shapefiles of promoted development sites and the total area of new development in each catchment was measured, as a percentage of catchment area. Due to the scale of proposed developments in comparison to the catchment areas, catchments with more than 10% of their area earmarked for development were considered high risk.

Development sites were not provided for Buckinghamshire which covers part of the Thames (Reading to Cookham) catchment and therefore development in Buckinghamshire could not be taken into account during this assessment. The Buckinghamshire area was removed from the total catchment area so that it did not skew the results. As the Buckinghamshire area is downstream of Wokingham Borough, the exclusion of the development in Buckinghamshire should not affect flood risk upstream across Wokingham Borough.

Two of the catchments extend further than the neighbouring authorities: Whitewater extends slightly into East Hampshire District and Blackwater (Hawley to Whitewater confluence at Bramshill). Proposed development data was not available for these authority areas. However, these cover only small areas of the catchments and removing them from the calculations was shown to have no impact on the catchment rankings.

Table 1-7: Catchments with the highest percentage cover of proposed development.

Catchment	Area of proposed development (ha)	Area of proposed development as percentage of catchment area	Rank
Barkham Brook	496	27	1
Emm Brook	859	20	2
Foudry Brook (West End Brook to M4)	408	17	3

Catchment	Area of proposed development (ha)	Area of proposed development as percentage of catchment area	Rank
Loddon (Swallowfield to River Thames confluence)	899	17	4
Twyford Brook	631	15	5

1.6 Overall rankings

For each assessment, catchments were given a score of 3 (high), 2 (medium), or 1 (low) risk, excluding the historic data assessment where sufficient information was not available. These scores were then averaged across the assessment to give a combined score. Table 1-8 provides a summary of the rankings for each catchment for the individual assessments and the combined scores.

Table 1-8: Catchment rankings and combined scores.

Waterbody name	Development	Historic flooding	Fluvial flooding	Surface water flooding	Average score
Whitewater	1	n/a	1	3	1.67
Blackwater (Hawley to Whitewater confluence at Bramshill)	1	n/a	2	2	1.67
Blackwater (Bramshill to River Loddon confluence at Swallowfield)	2	2	2	2	2.00
Loddon (Sherfield on Loddon to Swallowfield)	2	n/a	1	3	2.00
Cut at west Bracknell	1	n/a	1	1	1.00
Kennet and Holy Brook	1	n/a	3	3	2.33
Loddon (Swallowfield to River Thames confluence)	3	3	2	1	2.25
Emm Brook	3	3	2	2	2.50
Twyford Brook	3	n/a	2	1	2.00

Waterbody name	Development	Historic flooding	Fluvial flooding	Surface water flooding	Average score
Cut (Binfield to River Thames confluence) and Maidenhead Ditch	2	n/a	1	3	2.00
Thames (Reading to Cookham)	1	n/a	3	2	2.00
Burghfield Brook	2	n/a	2	1	1.67
Foudry Brook (West End Brook to M4)	3	n/a	2	3	2.67
Barkham Brook	3	2	1	3	2.25

A Red-Amber-Green (RAG) rating was then applied to the catchments, with red being high risk, amber being medium risk and green being low risk. The RAG ratings are shown in Figure 1-3. The catchments with an average score of greater than 2 were deemed high risk and are shown in Table 1-9.

Table 1-9: High risk catchments as shown in Figure 1-3.

Waterbody name	Average score
Foudry Brook (West End Brook to M4)	2.67
Emm Brook	2.50
Barkham Brook	2.25
Loddon (Swallowfield to River Thames confluence)	2.25
Twyford Brook	2.00

Despite scoring a combined score of 2, the Twyford Brook catchment was increased from medium to high risk on the account of ranking high for development increase, medium for surface water risk and had 15 recorded historic flood incidents although these were not included in the overall rankings due to half the catchment lying outside Wokingham Borough. All other high risk catchments named in Table 1-9 above ranked high for at least two parameters.

Despite scoring a combined score of 2.33, the Kennet and Holy Brook catchment has been decreased to medium risk. This catchment lies predominantly upstream of Wokingham Borough. The Kennet and Holy Brook catchment ranked high risk for fluvial and surface water risk but ranked low risk for development increase. As this catchment lies predominantly upstream of the Borough, it is the responsibility of neighbouring authorities to put measures in place so flood risk within Wokingham Borough is not increased because of development in this area.

The catchments classified as medium and low risk are shown in Table 1-10 and Table 1-11 respectively.

Table 1-10: Medium risk catchments.

Waterbody name	Average score
Kennet and Holy Brook	2.33
Blackwater (Bramshill to River Loddon confluence at Swallowfield)	2.00
Loddon (Sherfield on Loddon to Swallowfield)	2.00
Cut (Binfield to River Thames confluence) and Maidenhead Ditch	2.00
Thames (Reading to Cookham)	2.00

Table 1-11: Low risk catchments.

Waterbody name	Average score
Whitewater	1.67
Blackwater (Hawley to Whitewater confluence at Bramshill)	1.67
Burghfield Brook	1.67
Cut at west Bracknell	1.00

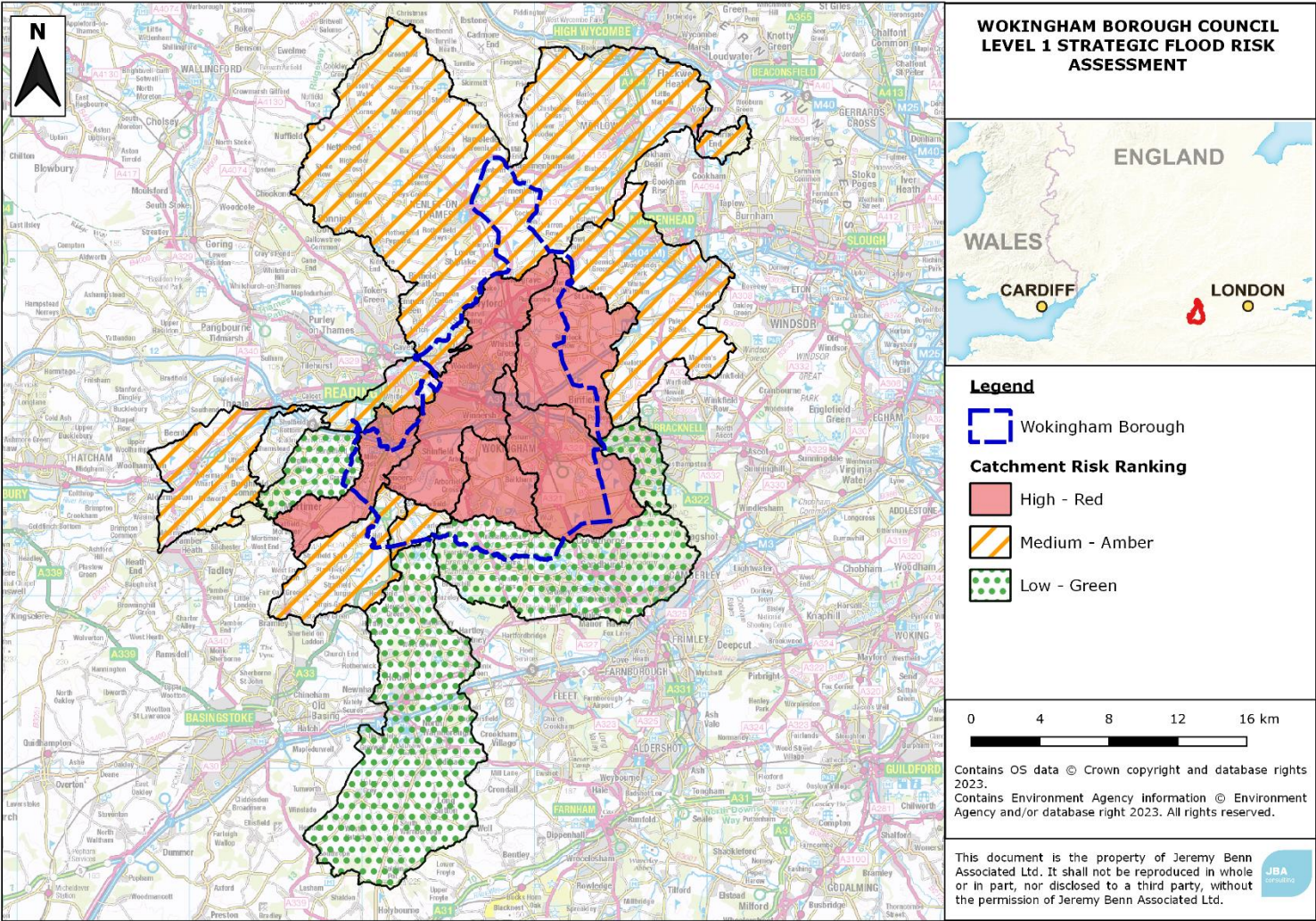


Figure 1-3: Results of the ranking assessment showing high (red), medium (amber) and low (green) risk catchments across Wokingham Borough.

2 Level 1 SFRA Policy recommendations

2.1 Broadscale recommendations

All developments are required to comply with the NPPF and demonstrate they will not increase flood risk elsewhere. Therefore, providing developments comply with the latest guidance and legislation relating to flood risk and sustainable drainage, and appropriate consideration is given to surface water flow paths and storage proposals should normally not increase flood risk downstream.

The high-level CIA for Wokingham Borough has highlighted areas where there is the potential for development to have a cumulative impact on flood risk. Catchments have been identified as high, medium, or low risk, relative to the other catchments within the borough.

Flood risk can be affected by several different factors, which have been assessed as part of the CIA. As a result, incremental action and betterment in flood risk terms across all of the Borough should be supported where possible.

The following policy recommendations therefore apply to all catchments within the study area:

- WBC should work closely with neighbouring local authorities to develop complementary Local Planning Policies for catchments that drain into and out of the area to other local authorities in order to minimise any cross boundary issues of cumulative impacts of development.
- Developers should incorporate SuDS and provide details of adoption, ongoing maintenance, and management on all development sites. Proposals will be required to provide reasoned justification for not using SuDS techniques, where ground conditions and other key factors show them to be technically feasible. Preference will be given to systems that contribute to the conservation and enhancement of biodiversity and green infrastructure where practicable. Developers should refer to the relevant Lead Local Flood Authority (LLFA) guidance for the requirements for SuDS in Wokingham Borough. Further guidance on SuDS can be found in Section 9 of the main report.
- WBC as LLFA will review Surface Water Drainage Strategies in accordance with their local requirements for major and non-major developments. These should consider all sources of flooding to ensure that future development is resilient to flood risk and does not increase flood risk elsewhere.
- Where appropriate, the opportunity for NFM in rural areas, SuDS retrofit in urban areas and river restoration should be maximised. Culverting should not be supported, and day-lighting existing culverts should be promoted through new developments.

- Runoff rates from all development sites must be limited to greenfield rates (including brownfield sites) unless it can be demonstrated that this is not practicable. If it is demonstrated that greenfield rates are not practicable then the runoff rates should be restricted to the closest rate that is practicable. Developers should refer to the relevant LLFA guidance for the requirements for SuDS in the Wokingham Borough.
- All development proposals should undertake a site-specific FRA. Site-specific FRAs should explore opportunities to provide wider community flood risk benefits through new developments. Measures that can be put in place to contribute to a reduction in flood risk downstream should be considered. This may be either by the provision of additional storage on site e.g. through oversized SuDS, NFM techniques, green infrastructure and green-blue corridors, and/ or by providing a Partnership Funding contribution towards any flood alleviation schemes.
- WBC should consider requiring developers to contribute to community flood defences outside of their red line boundary to provide wider benefits and help offset the cumulative impact of development.

Section 8 of the main report details the local requirements for mitigation measures. Catchment-specific recommendations are made for high-risk catchments below.

2.2 Recommendations for high risk catchments

High risk catchments are detailed in Table 1-9. From analysing the results produced above, high-level recommendations for flood storage and betterment have been proposed for sites in each of the high risk catchments. These recommendations should be considered by developers as part of a site-specific assessment, but more detailed modelling must be undertaken by the developer to ascertain the true storage needs and potential at each site at the planning application stage. The FRA should consider the potential cumulative effects of all proposed development and how this affects sensitive receptors.

The following recommendations are made for high risk catchments:

- Developers should include a construction surface water management plan to support the Construction Drainage Phasing Plan. This should provide information to the EA, the LLFA and the LPA regarding the proposed approach to surface water management in storm events during the construction phase.
- For developments in high risk catchments, the LLFA and LPA should consult with Local Not-For-Profit organisations such as wildlife trusts, rivers trusts and catchment partnerships. This will help to understand ongoing and upcoming projects where NFM, flood storage and attenuation, and environmental betterment may be possible alongside developments and aid in reducing flood risk.
- LPAs should work closely with the EA and the LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and NFM

features. Investigations should seek to determine where developments have the potential to contribute towards works to reduce flood risk and enable regeneration in catchments as well as contributing to the wider provision of green infrastructure.

2.3 Development within medium risk catchments

Catchments that have scored an overall ranking of medium, but where development is proposed should also consider the following recommendations:

- LPAs should work closely with the EA and the LLFA to identify any areas of land that should be safeguarded for any future flood alleviation schemes and NFM features.
- There is the potential for development in these catchments to contribute towards works to reduce flood risk and enable regeneration as well as contributing to the wider provision of green infrastructure.

Medium risk catchments can be found in Table 1-10.