



Bristol Local Plan

Flood Risk topic paper (April 2024)



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Introduction

1.1 The NPPF September 2023, under which the Bristol Local Plan is to be examined, requires local plans to take account of flood risk (paragraphs 159-169) by directing development away from areas at highest risk but, where development is necessary, making it safe without increasing flood risk elsewhere. Central to this is the idea that a sequential test be used to steer new development to areas with the lowest probability of flooding.

1.2 The emerging local plan proposes development in the following locations:

- 11 areas of growth and regeneration (Policies DS1A-9 and DS13-14).
- 62 new development allocations including:
 - 3 undeveloped sites in the Green Belt (Policies DS10-12);
 - 4 new areas for industrial development in Avonmouth (Policy E4); and
 - 55 development allocations elsewhere in the city (Policy DA1).
- 39 development allocations retained from the current local plan (Policy DA1).

1.3 In accordance with the NPPF, the emerging local plan seeks to minimise exposure to more vulnerable types of development by allocating land for development, to the greatest extent possible, within low-risk areas. In doing so it also has regard to proposals for defending central Bristol against flooding.

Sequential test methodology

2.1 The sequential test is required if any of the potential development allocations or areas of growth and regeneration are within Flood Zones 2 or 3. Before allocating sites in higher risk flood zones it must be demonstrated that there are no reasonably available sites with a lower probability of flooding that would be appropriate for the type of development of land use proposed. The methodology below has been used to apply the sequential test.

Stage A: Identify the need for development

To assess whether land is needed for development and whether any land is needed beyond Flood Zone 1, it is necessary to look at what is needed to achieve the housing and economic development requirements and the regeneration objectives of the emerging local plan.

Stage B: Identification of the flood risk of potential development sites

This stage identifies all the areas of growth and regeneration and development allocations in the emerging local plan that are subject to fluvial and/or tidal flood risk. This is based on undefended flood risk, as the improvements that are expected to be achieved through the construction of tidal flood defences are more properly assessed as part of the exception test after the sequential test has been passed.

Stage C: Application of the sequential test

This stage considers the capacity of sites and areas of growth and regeneration to meet the housing and economic development requirements and regeneration objectives of the emerging local plan. It considers whether there is any potential to locate more vulnerable uses on lower flood risk sites, and therefore whether the proposed sites and areas of growth and regeneration pass the sequential test. Search areas are defined for the sequential test where they are smaller than the whole local authority area.

Stage D: Assess risk of flooding from other sources

Information about sources of flooding other than fluvial and tidal flooding is acknowledged and its significance assessed.

Stage A: Identify the need for development

Housing requirement

3.1 As set out in the emerging local plan and the accompanying LHNA (City of Bristol Local Housing Needs Assessment: Report of Findings – ORS 2023), the Government's standard method forms the starting point for determining housing need in Bristol. The 2023 standard method figure for Bristol comprises two elements:

- A locally derived need of 2,503 homes per annum; and
- An additional 35% cities and urban centres uplift, resulting in a total figure of 3,380 homes per annum.

3.2 As set out in the Housing Need and Supply topic paper, Bristol is not able to meet its full housing need within its boundary. Policy H1 of the emerging local plan identifies a capacity-based housing requirement of **1,925 homes per annum**, amounting to a total of **34,650 homes** over the 18-year plan period.

3.3 The housing requirement is supported by a Strategic Housing Land Availability Assessment (SHLAA) which shows a total capacity slightly over the housing requirement, allowing an additional buffer of approx. 15% against non-delivery, and summarises Bristol’s capacity for new homes as follows:

Source	Capacity
<i>Specific development sites</i>	
Areas of growth and regeneration	20,386
Planning permissions	9,087
Existing development allocations	1,381
Proposed development allocations	1,125
Green Belt locations	1,400
<i>Citywide assumptions</i>	
Small sites windfall	3,600
Urban potential	2,219
Student accommodation	600
TOTAL	39,798

Employment requirements

3.4 In addition to the housing requirement, the emerging local plan identifies the following employment requirements:

- 164,000m² of net additional office floorspace; and
- 164,000m² of net additional industry and distribution floorspace.

Stage B: Identification of the flood risk of potential development sites

4.1 As shown in the table above, the capacity identified by the SHLAA is divided between multiple sources, including a mix of specific development sites and citywide assumptions.

4.2 Some of the sources of capacity are outside the scope of this sequential test for the following reasons:

Source	Reason for exclusion
<i>Specific development sites</i>	
Planning permissions	The sequential test has already been carried out and the principle of development determined.
Existing development allocations	The sequential test has already been carried out and the principle of development determined.
<i>Citywide assumptions</i>	
Small sites windfall	It is not possible to sequentially test a citywide assumption. A sequential test will be required at the planning application stage.
Urban potential	It is not possible to sequentially test a citywide assumption. A sequential test will be required at the planning application stage. The capacity identified by the urban potential assessment assumed no development on sites at high risk of flooding.
Student accommodation	It is not possible to sequentially test a citywide assumption. A sequential test will be required at the planning application stage.

4.3 The level of flood risk has been assessed as it affects each of the following as set out in the emerging local plan:

- 11 areas of growth and regeneration (Policies DS1A-9 and DS13-14).
- 62 new development allocations including:
 - 55 development allocations elsewhere in the city (Policy DA1);
 - 3 undeveloped sites in the Green Belt (Policies DS10-12); and
 - 4 new areas for industrial development in Avonmouth (Policy E4).

4.4 All sites affected by Flood Zone 2 and 3 are included in Appendix 1. Flood zones are not mutually exclusive because they overlap. Therefore any area within Flood Zone 3 will also be in Flood Zone 2.

4.5 The sequential test seeks the following order of preference for the allocation of sites:

1. Site in Flood Zone 1; then
2. Site in Flood Zone 2; then
3. Sites in Flood Zone 3.

Stage C: Application of the sequential test

5.1 As set out above, Bristol's capacity to meet its housing requirement depends on a combination of specific development allocations and wider areas of growth and regeneration, the latter of which make up approximately half of Bristol's capacity for new homes.

5.2 While the specific development allocations largely avoid areas at risk of flooding, as set out later in this section, this is only possible due to the significant contribution to Bristol's capacity made by the areas of growth and regeneration. The two sources in combination meet the local plan housing requirement but, as set out above, are still not sufficient to meet the city's housing need in full.

Areas of growth and regeneration

5.3 As set out in Appendix 1, three of Bristol's areas of growth and regeneration are significantly affected by tidal flood risk:

- DS2 Bristol Temple Quarter
- DS3 St. Philip's Marsh
- DS4 Western Harbour

5.4 A further three areas of growth and regeneration are affected by flood risk of a more fluvially-dominated nature:

- DS1A Broadmead, Castle Park and the Old City
- DS5 Frome Gateway
- DS8 Central Bedminster

5.5 The remaining areas of growth and regeneration are not significantly affected by flood risk.

5.6 The areas of growth and regeneration all promote regeneration on previously developed land, as an alternative to meeting Bristol's housing requirement on greenfield land within and beyond the city. They make an essential contribution to meeting Bristol's housing requirement and, in turn, its best effort to meet its housing need in accordance with the NPPF. The equivalent capacity cannot be found in other locations that are not at risk of flooding and, on that level, the areas of growth and regeneration are deemed to accord with the sequential approach. However, there are variations in the level of flood risk within each area of growth and regeneration, and there will remain a need for a sequential test to be carried out at the planning application stage.

5.7 The sequential test is usually applied over a whole local authority area. However, in the areas of growth and regeneration, a more focused approach is required in order to ensure they make the necessary contribution to meeting Bristol's housing requirement and deliver the regeneration objectives of the local plan. In such cases it is appropriate to restrict the search area for the sequential test to the regeneration area in question. This approach has been established by the Bristol City Council Flood Risk Sequential Test Practice

Note (August 2013)¹, which was prepared in consultation with the Environment Agency, and is reflected in the emerging development strategy policies for the areas of growth and regeneration.

Strategic Flood Defences

5.8 The three areas of growth and regeneration most affected by tidal flooding are within the scope of the Bristol Avon Flood Strategy², which is the long-term plan to better protect homes, businesses, and infrastructure from flooding from the River Avon. Policies DM2-4 make specific reference to this strategy, with the further support of policy FR2, making clear that development in these locations will require comprehensive mitigation that will not increase flood risks elsewhere. While not relevant to the sequential test, the future delivery of strategic flood defences will be key to the application of the exception test to development in these locations.

Development allocations

5.9 The majority of the development allocations in the emerging local plan are in Flood Zone 1 and therefore automatically pass the sequential test.

5.10 Appendix 1 shows the development allocations that are wholly or partly affected by Flood Zones 2 or 3.

Development allocations (policy DA1)

5.11 Ten of the new development allocations set out in policy DA1 are wholly or partly affected by flood risk.

5.12 In some cases, the proportion of the site affected by flood risk is not significant, or the site has planning permission as such the sequential test has already been determined.

5.13 The following sites are wholly or partly within Flood Zones 2 or 3 and contribute a specified number of homes to Bristol's overall capacity:

- BDA1201 16-20 Fishponds Road, Eastville (20 homes, 100% FZ2, 51% FZ3)
- BDA1401 Previously developed land at Hartcliffe Way, Bedminster (55 homes, 99% FZ2, 0% FZ3)
- BDA2902 Works at Felstead Road, Southmead (20 homes, 70% FZ2, 41% FZ3)

5.14 The council has considered all reasonably available sources of housing land in determining Bristol's capacity, and as such the development of homes on these sites is considered to pass the sequential test. All three sites are mixed-use allocations on previously developed land that offer the opportunity to apply the sequential approach within the site boundary and locate more vulnerable uses on upper floors or on parts of the site that are less at risk of flooding. Where required, the exception test will be applied at the planning application stage.

¹ <https://www.bristol.gov.uk/files/documents/419-flood-risk-sequential-test-practice-note-august-2013>

² <https://www.bristol.gov.uk/council-and-mayor/policies-plans-and-strategies/energy-and-environment/flood-risk-strategy>

5.15 There are a further three sites which are wholly or partly within Flood Zones 2 or 3 but have no specific number of homes assigned to them:

- BDA0801 The Grove Car Park, The Grove and Prince Street, Harbourside (100% FZ2, 100% FZ3)
- BDA0802 Land at Redcliffe Way (67% FZ2, 41% FZ3)
- BDA2102 Maritime Heritage Centre Public Car Park, Gas Ferry Road (74% FZ2, 18% FZ3)

5.16 All three sites are mixed-use allocations that offer the opportunity to apply the sequential approach within the site boundary and locate more vulnerable uses on upper floors or (where possible) on parts of the site that are less at risk of flooding. They will make an important contribution to the ongoing regeneration of Bristol City Centre as set out in policy DS1 of the emerging local plan. Where required, the exception test will be applied at the planning application stage.

Green Belt sites (policies DS10-12)

5.17 One site falls within Flood Zone 2 and partly within Flood Zone 3. The site has planning permission and as such the sequential test has already been determined.

Avonmouth site allocations (policy E4)

5.18 All of the Avonmouth sites fall wholly or largely within Flood Zones 2 and 3. The sites are allocated for industry and distribution uses, which are 'less vulnerable' uses as defined by NPPF Annex 3. The area has recently benefited from the construction of tidal flood defences as part of the ASEA Ecology Mitigation and Flood Defence Project³.

5.19 The allocation of these sites passes the sequential test as the reasonably available alternative sites within Flood Zone 1 are required for 'more vulnerable' uses, including the new homes required to meet Bristol's housing requirement.

5.20 Since industry and distribution are 'less vulnerable' uses, the development of these sites will not require the application of the exception test.

Stage D: Assess risk of flooding from other sources

6.1 Bristol's Strategic Flood Risk Assessment (SFRA) also assesses risk from other sources of flooding including surface water. The SFRA mapping indicates a scattering of surface water flood risk throughout the city, with some more significant pockets that typically coincide with areas at risk of fluvial and tidal flooding (notably in certain areas of growth and regeneration as shown in the SHLAA). In these cases, the impact of surface water flood risk will be assessed by flood risk assessments submitted at the planning application stage and in consideration of the exception test.

6.2 Flood risk from other sources such as sewer and groundwater flooding are also reported in the SFRA. They are generally assessed as being a low risk to the city.

³ <https://www.asea-flood-ecology.co.uk/>

Conclusion

7.1 In order to deliver the housing requirement and regeneration objectives of the emerging local plan, it is necessary to allow for some more vulnerable uses on sites which have a higher probability of flooding. This is consistent with approach set out in the NPPF and the national planning practice guidance.

7.2 The few specific development allocations that are affected by Flood Zones 2 and 3 and where the sequential test has not already been determined can generally be developed so that more vulnerable uses, where proposed, avoid the part of the site that is most affected by flood risk.

7.3 Areas of growth and regeneration that are affected by Flood Zones 2 and 3 will continue to require a sequential test that will be carried out within the boundary of that regeneration area, and this is reflected in the emerging local plan policies.

7.4 All sites that are subject to flood risk or are greater than 1 hectare in size will be required to submit a site-specific flood risk assessment demonstrating that development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall.

Appendix 1: Sites affected by flood risk

Development Allocations (affected by flood risk)

Site	Area (Ha)	Allocation	Capacity	% Flood Zone 2	% Flood Zone 3
BDA0302 Land to the west of Ashton Gate Stadium, Marsh Road / Winterstoke Road, Ashton Gate	2.2	Mixed-use, which could include: offices, hotel, sports, leisure and housing.	None assigned	100%	2.3%
	The sequential test has already been determined as part of planning permission 21/03165/F.				
BDA0702 Land at Marmalade Lane (south), Brislington	0.6	Housing	40	5.1%	0%
	The allocation specifies that development should be sited appropriately within low-risk areas and as such there will be no development in Flood Zones 2 or 3.				
BDA0801 The Grove Car Park, The Grove and Prince Street, Harbourside	0.5	Site would be considered appropriate for a number of city centre uses, including housing to create a more efficient use of land.	None assigned	100%	100%
	No specific capacity is assigned to this complex city centre site, which therefore makes no specific contribution to meeting Bristol's housing requirement until such a time as it obtains planning permission.				

Site	Area (Ha)	Allocation	Capacity	% Flood Zone 2	% Flood Zone 3
BDA0802 Land at Redcliffe Way	3.1	On appropriate sites the area would be suitable for residential led growth, supported by a mix of uses including offices, community infrastructure, leisure uses and culture / tourism uses, which may include hotel uses. An element of retail will be acceptable on appropriate sites subject to consideration of its impact on other designated shopping areas.	None assigned	67%	41%
	No specific capacity is assigned to this complex city centre site, which therefore makes no specific contribution to meeting Bristol's housing requirement until such a time as it obtains planning permission.				
BDA1201 16-20 Fishponds Road, Eastville	0.2	Housing-led mixed uses with flexible workspace, if no longer required in its current use.	20	100%	51%
	Through mixed-use development more vulnerable uses can be directed to upper floors and/or areas of the site that are not in Flood Zone 3.				
BDA1401 Previously developed land at Hartcliffe Way, Bedminster	0.9	Housing-led mixed uses with flexible workspace, if no longer required in its current use.	55	99%	0%
	The allocation will not result in development in Flood Zone 3.				

Site	Area (Ha)	Allocation	Capacity	% Flood Zone 2	% Flood Zone 3
BDA2102 Maritime Heritage Centre Public Car Park, Gas Ferry Road	0.8	Residential-led mixed use, if no longer required in its current use.	None assigned	74%	18%
	No specific capacity is assigned to this complex city centre site, which therefore makes no specific contribution to meeting Bristol's housing requirement until such a time as it obtains planning permission.				
BDA2401 Bridge Farm, Land at South Hayes, Eastville	1.7	Self-build, custom housebuilding or community-led housing, with open space.	15	2.0%	0.3%
	The proportion of the site at risk of flooding is not significant.				
BDA2801 Land to the south of Blackswarth Road, St George	0.6	Housing-led mixed uses with flexible workspace.	75	2.4%	2.4%
	The proportion of the site at risk of flooding is not significant.				
BDA2902 Works at Felstead Road, Southmead	0.3	Housing-led mixed uses with flexible workspace, if no longer required in its current use.	20	70%	41%
	Through mixed-use development more vulnerable uses can be directed to upper floors and/or areas of the site that are not in Flood Zone 3.				

Green Belt Sites (all)

Site	Area (Ha)	Allocation	Capacity	% Flood Zone 2	% Flood Zone 3
DS11-1 Land at Ashton Gate	8.2	Housing	500	100%	9%
	The sequential test has already been determined as part of planning permission 21/03166/P.				
DS11-2 Land at Elsbert Drive, Bishopsworth	3.5	Housing	150	0%	0%
	The site is in Flood Zone 1.				
DS12 Bath Road, Brislington	30	Residential led mixed-use development.	750	2.0%	2.0%
	The proportion of the site at risk of flooding is not significant.				

Avonmouth Site Allocations (all)

Site	Area (Ha)	Capacity	% Flood Zone 2	% Flood Zone 3
ASA001 Land at Kings Weston Lane (south)	27	N/A	88%	81%
ASA002 Land at Kings Weston Lane (north)	5.7	N/A	100%	99%
ASA003 Land east of Packgate Road	4.8	N/A	100%	99%
ASA004 Land east of Chittening Road	18	N/A	100%	100%
ASA005 Land south of Seabank Power Station	2.5	N/A	100%	100%

Areas of Growth and Regeneration (all)

Site	Area (Ha)	Capacity (SHLAA)	% Flood Zone 2	% Flood Zone 3
DS1A Broadmead, Castle Park and the Old City	54	2,800	43%	0.8%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. The proportion of the policy area in Flood Zone 3 is not significant.			
DS2 Bristol Temple Quarter	68	3,674	50%	41%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. Policy DS2 requires a sequential test to be carried out within the policy area.			
DS3 St. Philip's Marsh	69	4,627	63%	54%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. Policy DS3 requires a sequential test to be carried out within the policy area.			
DS4 Western Harbour	36	320	66%	62%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. Policy DS4 requires a sequential test to be carried out within the policy area.			
DS5 Frome Gateway	15	1,200	71%	37%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. Policy DS5 requires a sequential test to be carried out within the policy area.			

Site	Area (Ha)	Capacity (SHLAA)	% Flood Zone 2	% Flood Zone 3
DS6 Lawrence Hill	56	514	0%	0%
	The area is in Flood Zone 1.			
DS7 Central Fishponds	34	1,277	0%	0%
	The area is in Flood Zone 1.			
DS8 Central Bedminster	53	4,067	49%	9.1%
	The sequential approach will apply at the planning application stage, directing more vulnerable development towards areas less at risk of flooding. Policy DS8 requires a sequential test to be carried out within the policy area.			
DS9 Brislington	28	552	5.0%	2.8%
	The proportion of the area at risk of flooding is not significant.			
DS13 Lockleaze	107	1,055	3.2%	2.4%
	The proportion of the area at risk of flooding is not significant.			
DS14 Central Southmead	9.5	300	0%	0%
	The area is in Flood Zone 1.			