

Local Flood Risk Management Strategy Summary

1 Introduction and Overview

The purpose of the Local Flood Risk Management Strategy (LFRMS) is to set out Brighton and Hove City Council's (BHCC) strategy for managing local flood risk, in our role as Lead Local Flood Authority (LLFA) as required by the Flood and Water Management Act 2010. The Strategy highlights existing flood risk issues, outlines proposed mitigation work and provides a long-term flood risk management plan.

There has been one previous version of the Strategy, produced in 2014 and approved by ETS Committee in January 2016. This updated version of the Strategy addresses the gaps in the previous version bearing in mind an updated understanding of climate change, and recent and upcoming legislation. The Strategy aims to set out and prioritise objectives in managing flood risk and working with partners; the Environment Agency and Southern Water and other Risk Management Authorities (RMAs) as well as neighbouring LLFAs, local communities and other stakeholders.

The Vision for Flood Risk Management has the following overall objectives:

- Reduce flood risk to properties in Brighton and Hove
- Address today's flood risk issues whilst looking to manage future flood risk
- Lead in managing and reducing risk from local sources of flooding in our area
- Better understand how flooding happens and how different types of flooding interact
- Work with our partners and communities to make Brighton and Hove more resilient to flooding
- Promote sustainable flood risk management multiple benefits

Other relevant policies, plans and strategies applicable to this Strategy include the Environment Agency's National FCERM (Flood and Coastal Erosion Risk Management Strategy), Brighton and Hove Plan 2020-2023, the Brighton and Hove City Plan (Parts One, 2016 and Two, 2022), the Brighton and Hove Supplementary Planning Document on Sustainable Drainage SPD16, the Greater Brighton Water Plan, the Adur and Ouse Flood Risk Management Plan Cycle 2: 2021-2027, and Southern Water's Drainage and Wastewater Management Plans.

2 Understanding Flood Risks in Brighton & Hove

Flood risk can be defined as a combination of the risk of a flood happening and the consequences of it occurring i.e. the likely effects on a receptor (people, property, or land for example). Examples of flood sources include rivers, reservoirs, the sea (tidal), ordinary watercourses (streams, brooks, irrigation channels etc.), surface water (typically rainwater) and groundwater (from within the chalk aquifer underlying the city).

Flooding is considered in the context of its source-pathway-receptor. Flooding impacts can be social, economic and environmental, and are considered based on the vulnerability of a receptor, and its level of exposure to flooding.

Surface water is the most common cause of flooding in the city. It occurs when the amount of rain falling is greater than that which can be absorbed into the ground (infiltrated) or drained into sewers. As much of the city has paved hardstanding surfaces, water can pool and form flow routes, especially on the steep slopes which are prevalent throughout the city. Several main roads (including Lewes Road, Falmer Road and London/Preston Road) run along the bottom of valleys, where surface water tends to accumulate.

According to analysis produced for the Adur and Ouse Flood Risk Management Plan (Cycle 2) areas at risk of surface water flooding in the city contain:

- 46,293 people living in the Flood Risk Area
- 2,571 non-residential properties
- 9.2km of A roads including strategically important roads such as the A23 and A27
- 8km of railway
- 36ha of agricultural land
- 107 listed buildings

Groundwater is another of the principal sources of flooding for the city. The chalk which underlies the city is capable of absorbing large amounts of water in cracks, gaps, and pores known as the aquifer. However, excessive rainfall can cause this water's level to rise towards ground level, where it can seep into basements and affect sewer pipes and other below ground assets and development. If the groundwater level exceeds the ground level, then flooding occurs at the surface. Aside from excessive rainfall, in coastal areas, groundwater flooding can also be exacerbated by high sea levels, as seawater fills up the aquifer. Groundwater can also exacerbate surface water flooding, by seeping into and damaging or reducing the capacity of drains and pipes, either from the ground or overland, and also oversaturate the ground, reducing its capacity for infiltration.

According to modelling, the areas of Brighton at greatest risk of groundwater flooding are Aldrington, Falmer and Patcham. In Patcham, groundwater flooding is a semi-regular occurrence, with a particularly serious example occurring in the winter of 2000/2001. Groundwater flooding also occurred during the winter of 2013/2014 in Patcham again and in Portslade, Bevendean, Coldean, and around Preston Park. The Environment Agency monitors groundwater levels, and rainfall data, issuing groundwater flood warnings for the most vulnerable parts of Patcham.

In Brighton & Hove, there are no rivers or ordinary watercourses on the surface, nor are there any large reservoirs, (defined by the 1975 Reservoir Act as a reservoir having a volume of greater than 25,000 cubic metres), so these sources of flooding are not considered in this Strategy.

The Environment Agency's flood mapping shows that tidal flooding only poses a risk to small areas of the city, in Brighton Marina and Shoreham Port. Brighton Marina has sufficient protection for up to a 1 in 200-year storm currently, this doesn't take into consideration future climate change scenario. During the winter of 2013/2014, tidal flooding occurred at points along the coast at Shoreham Port, Western Esplanade in Hove, and the lower promenade in Brighton.

Sewer flooding is also known to occur in the city, and has historically been most prevalent in a few clusters, around the Preston Park area, Market Street, Hollingbury and Hangleton, according to the Southern Water's data. It occurs when there are issues with sewers; typically, intense rainfall exceeding capacity, but also when sewer blockages occur, or when pipes or other equipment fails. Although sewers are designed for a 1 in 30 rainfall event, this has only been a legal requirement since 1980 (or more recently for smaller private developments), and many of the city's sewers are likely to have been designed with less capacity. Additionally, further development upstream of sewers can increase the volume of water flowing through above capacity.

The current projections shows that climate change will cause winters to become warmer and wetter, and summers will be hotter and generally drier, but the rainfall which does occur in summer is expected to be more intense. This means that the ground is more likely to become saturated, and drainage is more likely to be overwhelmed, leading to surface water, groundwater (at least in winter) and sewer flooding becoming more likely. Warmer drier summers may, however, have less groundwater flood risk as reduced precipitation reduces groundwater levels. Flood events with particular return periods are predicted to increase in magnitude by between 20% and 45% by 2070. Rising sea levels, combined with increasing storm frequency, will also reduce the effectiveness of coastal defences; meaning that they will need to be upgraded if they are to continue offering protection from a 200-year storm.

In Brighton & Hove, we have several contextual challenges. For example, our first line of defence against coastal flooding is the beach, which is currently eroding. Storms of great intensity are expected to increase the rate of erosion and increase the flood risk to coastal areas. In the city centre, many sewers are combined sewers, which accept both surface water and wastewater from properties. Therefore, an excess of surface water entering the sewers can either cause the wastewater to flood into properties or be discharged directly into the sea without treatment. This is less the case in the outskirts of the city, where separate sewers are more common. Although groundwater is a leading cause of flooding, it is also the source for the city's drinking water. Therefore, it's quality and quantity both need to be maintained. The city's location, hemmed in by the sea and South Downs National Park, mean that population growth (an increase of 23,300 projected by 2030), will lead to an increase in population density, and if not managed, an increase in hardstanding area, reduction in green space, and consequent increase in flood risk.

3 Flood Risk Management Responsibilities

At Central Government level, DEFRA decides and sets policy direction. The Environment Agency oversees all flood and coastal erosion risks in England and Wales. The Flood and Water Management Act 2010 identifies Risk Management Authorities (RMAs), who work together and are responsible for flood risk management.

BHCC as Lead Local Flood Authority (LLFA) have the following responsibilities:

- Investigating and reporting flooding incidents
- Managing flood risk from surface water, groundwater and ordinary watercourses
- Producing a Local Flood Risk Management Strategy
- Maintaining a register of flood risk management and drainage assets
- Acting as statutory consultee on major developments

Aside from this, BHCC acts in the following capacities:

- Local Planning Authority
- Local Highway Authority- responsible for drainage on all highways (apart from the A27 itself, for which National Highways is responsible)
- Coastal Protection Authority

The Environment Agency is directly responsible for flooding from rivers and reservoirs (neither of which apply to Brighton and Hove), and work with the LLFA and other RMAs to manage flood risk. Their responsibilities include:

- Providing and operating flood warning systems for river and tidal flooding, and some areas at high risk of groundwater flooding
- Carry out works to manage flood risk from the sea and main rivers (permissive powers)
- Issuing permits for works on or near main rivers and works protected by byelaws
- Advise planning authorities on the implications of development proposals on flood risk
- Designating structures and features of the environment that affect flood or coastal erosion risk

Southern Water, as the main sewer and water company for the city, has responsibilities to:

- ensure their systems have the appropriate level of resilience to flooding
- maintain essential services during emergencies
- maintain their water supply and sewerage systems to manage the impact and reduce the risk of flooding and pollution to the environment
- provide advice to Lead Local Flood Authorities on how water and sewerage company assets impact on local flood risk

- work with developers, landowners and LLFAs to manage risks to and from the public sewer system
- work with the Environment Agency, LLFAs and district councils to coordinate the management of water and sewerage systems with other flood risk management work
- address frequent and severe sewer flooding through their capital investment plans

Three further organisations act as RMAs for parts of the city:

- The Brighton Marina Company are responsible for funding the marina, including the maintenance of all structures including drainage and flood defences.
- Shoreham Port Authority own the section of beach between Southwick and Portslade, and work with BHCC in beach management; returning material from Hove beach westwards, to ensure that this section of beach is not eroded.
- The Western Esplanade Beach Management Company (WemCo) manages the private section of beach adjacent to Western Esplanade.

4 Review of the Previous LFRMS (2014)

The previous LFRMS mainly focused on developing the Council's role as LLFA. Within it, an action plan was set out, to be monitored annually, with the entire Strategy reviewed every six years. Since that Strategy was published, BHCC has:

- Completed a new Strategic Flood Risk Assessment (SFRA)
- Installed Property Flood Resilience (PFR) measures – in Patcham, central Hove, Portslade, and the Carden Avenue area
- Implemented a highway SuDS (sustainable drainage) pilot scheme in Carden Avenue

Other changes related to flood risk and BHCC's management of it have included:

- The declaration of a climate and biodiversity emergency by Brighton and Hove City Council – in December 2018, including the pledge to become a carbon neutral city by 2030, involving a programme of work including SuDS (a need to implement a Sustainable Urban Drainage Supplementary Planning Document), a coastal defence strategy and coastal protection schemes
- The production of Brighton and Hove Supplementary Planning Document (SPD) for Sustainable Drainage, as suggested by the above point
- National Planning Policy Framework and Planning Practice Guidance updates, and updated climate change allowances for flood risk assessment – an update to planning policy at national level in July 2021, including an increased emphasis on considering flood risk, and implementing SuDS and other green infrastructure in planning applications

- New responsibilities within the planning system - Since 2015, the LLFA comments on major planning applications, advising on surface water drainage
- Changes in the resourcing of the Lead Local Flood Authority – with new officer roles to support delivery of actions from plans and strategies, and to support other BHCC teams

However, several of the actions from the first Strategy are still ongoing or expected to take multiple six-year strategy periods to complete. As per the new FCERM, flood management policy on a national level is moving more towards resilience. Therefore, the Council will now be prioritising actions focusing on this, together with our objectives. These priorities include:

- Investigating and recording internal property flooding
- Setting out when a formal investigation would be required under S19 of the Flood and Water Management Act.
- Undertaking a study into groundwater flooding in Brighton and improve monitoring levels throughout the city.
- Investigating and defining local surface water flood risk areas with drainage infrastructure constraints
- Raising public awareness and resilience to flooding
- Implementing sustainable measures to reduce flood risk

Brighton and Hove City Council has updated its citywide Surface Water Management Plan (SWMP); a study to understand the flood risks from surface water, groundwater, and ordinary watercourses. Within that document, areas of the city were identified for specific priority actions, to mitigate future flood risk.

5 Objectives of Revised LFRMS (2025)

Seven key objectives have been set out for this new version of the LFRMS, these are:

- 1 Work collaboratively with Partners, Stakeholders and Local Community to understand and manage flood risk.
- 2 Continue to improve knowledge and evidence base for local flood risk.
- 3 Work with Partners and Funders to implement sustainable measures to reduce flood risk and promote water quality, biodiversity and amenity.
- 4 Manage the impact of development on flood risk.
- 5 Raise public awareness and resilience to flooding.
- 6 Strengthen the ability of the LLFA to manage flooding.
- 7 Reduce flood risk through asset maintenance and good land management practices.

An Action Plan has been prepared to support these objectives and is appended to the Strategy.

6 Strategic Themes for Flood Risk Management in Brighton and Hove

There are six main strategic themes for flood risk management. The first of strategic theme is resilience. This refers to the ability of people and places to prepare for, respond to, and recover from a flooding event. In other words, to reduce its impact of flooding on receptors. As the climate changes, the characteristics of flood risk in the city will change, with flooding becoming more frequent, intense, and affecting a more widespread area. This will make resilience more important in the future. To this end, the Council will be investing in Property Flood Resilience (PFR) and aims to work with experts to ensure that the entire community is aware of flood risk, and resilience measures, and has the funding and ability to implement these measures.

The second strategic theme is climate change responsiveness. As future climate change increases storm frequency and intensity, and rising sea levels threaten coastal areas, the city's flood risk is expected to increase. However, there is uncertainty as to what extent. Therefore, the Council will be using adaptive pathways to consider and plan for a range of future environmental, social and economic scenarios.

The third strategic theme is nature-based solutions, SuDS in the city and natural flood management (NFM) in the Downland Estate (comprising less built-up areas around the edge of the city, where runoff from the downs poses a flood risk) are to be used for flood risk management. The most feasible NFM practises for the Downland Estate include woodland planting, the creation of new ponds and streams for attenuation (storing water to ease rates at which it has to be drained, through infiltration or into sewers) and changing land and soil use practices. The other main measure is to identify opportunities for implementing new NFM and SuDS features to reduce flood risk.

The fourth strategic theme is sustainable development. From the LLFA's perspective, this involves ensuring that new developments are at a minimal risk of flooding, and do not increase flood risk elsewhere throughout the lifetime of the development. The Council in its role as the LLFA, requires that new developments on brownfield sites demonstrate an improvement in flood risk and drainage over site's previous development, and all developments must demonstrate adequate drainage and flood protection measures. The Council also aims to promote good practice in SUDS design throughout the planning process.

The fifth strategic theme is partnership and collaboration. Brighton & Hove City Council is continuing to work with partners, such as the Environment Agency, Southern Water, Southdown National Park (SDNP), The Aquifer Project (TAP) and National Highways, to achieve goals related to flood risk management. The Council also aims to work with the public, to ensure that they can report flooding, and can build resilience within their communities. To this end, we will be organising community Flood Action Groups, which can provide an interface between the community and the LLFA.

The final strategic theme is flood defences and asset. Flood defences are defined as anything that can provide protection from flooding. It includes both artificial

constructions and natural terrain features, i.e. high ground. The Council as the LLFA maintains an asset register in which the locations and other information about these assets is recorded. Our surface water management assets mainly comprise earthworks (embankments, or earth dams and ditches) around the edge of the city, one dew pond at Millcroft, off Mill Road. Coastal defences include sea walls and revetments, and frequent groynes along the length of the seafront managed by both the Council, Shoreham Port Authority and Brighton Marina Company. Southern Water, meanwhile, own the stormwater storage tunnel, which is located along the seafront between the bottom of Hove Street Black Rock. During storm events, this is capable of holding up to 132,000 litres of water prior to treatment.

7 Funding for Flood Risk Management

Under the Flood and Water Management Act 2010, the Environment Agency can provide Flood Defence Grants in Aid to RMAs who may apply on behalf of community or private organisations. The Environment Agency can also offer further grants for flood management schemes from local levies raised from LLFAs.

Another approach to obtaining funds is through partnership funding, in which government funds may be provided for any project where benefits outweigh costs, through capital grants, which other organisations may match. Stakeholders who are likely to benefit from projects, or who have requested that projects be carried out are expected to contribute, with those being the sole beneficiaries being expected to fully contribute.

Other potential sources of funding for flood management, including:

- Section 106 agreements (s106), local tariffs, and the community infrastructure levy (CIL)
- Carbon neutral funded activities (BHCC internal funding)
- Local business rates
- Public Loans Work Board
- Making funding applications in partnership with organisations such as The Aquifer Project (TAP), Sussex Nature Partnerships (SxNP) and Greater Brighton Economic Board.

8 Implementation, Monitoring and Action Plan Review

The Council will use this strategy to support local flood management across the city and aim to deliver all actions suggested in the action plan within this 6-year strategy period. However, external factors are likely to affect this and will need to be responded to as they arise. Flood management opportunities will be considered based on both merits and availability of funding over their projected lifetime. It is planned that this strategy will be fully reviewed and updated in 2031/2032, although periodic reviews will occur during the strategy period, with the action plan reviewed annually.