Managing flood risk in Camden

Camden's Flood Risk Management Strategy

Consultation draft

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Camden

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Glossary and terms

Acronyms	
CPG	Camden Planning Guidance
DEFRA	Department for Environment, Food and Rural Affairs
DWMP	Drainage and Wastewater Management Plan (Thames Water)
EA	Environment Agency
FRMP	Flood Risk Management Plan
FRMS	Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LRFZ	Local Flood Risk Zone
MAFP	Multi Agency Flood Plan
PFRA	Preliminary Flood Risk Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Programme (Thames Water)

Glossary	
Annual Exceedance Probability (AEP)	The probability, expressed as a %, of a flood event occurring in any year. A large flood which may be calculated to have a 1% chance of occurring in any one year is described as 1% AEP.
Asset Record	A database of local flood risk assets, including a map of assets across Camden, available for public use.
Asset Record Asset Register	A database of assets, including further information on each asset and ownership, for use by Risk Management Authorities.
Combined Sewer System	A combined sewer system carries both rainwater and foul water in the same pipework.
Climate Change Allowance	Climate change allowances are predictions of anticipated change for peak rainfall intensity and sea level rise. These allowances are included in flood modelling and flood risk assessment
Designating (of flood or coastal erosion assets)	If an asset becomes ‘designated’ its owner cannot alter or remove it without first consulting the designating risk management authority.
Drain London	A GLA sponsored London project which helped Lead Local Flood Authorities in London to meet their requirements around understanding flood risk
Flood Hazard Map	Maps which show the flood extent, water depths or levels and where appropriate the flow velocity, or the relevant water flow for a particular rainfall event.

Flood Investigation Report (s19)	As set out in the Flood and Water Management Act 2010 in section 19, on becoming aware of a flood in its area a Lead Local Flood Authority must investigate and publish the results of its investigation.
Flood Resilience	Providing people and places with the means to plan for, better protect, respond to, and to recover from flooding.
Flood Risk Map	Map which shows the potential adverse implications of a particular rainfall event including the number of people affected as well as infrastructure and businesses
Flood Risk Management Plan	A requirement of Flood Risk Regulations producing a plan for each of the 10 indicative flood risk areas every six years beginning in 2015
Groundwater	All water which is below the surface of the ground and in direct contact with the ground or subsoil
Initial Assessment	A high level study to determine what locations might be suitable for flood alleviation schemes. If the Initial Assessment is successful then a Project Appraisal Report for each location will be commissioned
Local Flood Risk Zone (LFRZ)	Local Flood Risk Zones are defined as areas at risk of flooding which do not meet the national definition of a 'Flood Risk Area' but where flooding could still affect houses, businesses or infrastructure
Lead Local Flood Authority (LLFA)	As defined by the Flood and Water Management Act, in relation to an area in England, this means the unitary authority or where there is no unitary authority, the county council for the area, in this case LBC
Partnership Funding	DEFRA Government funding mechanism for flood alleviation schemes which calculates a set amount of funding for any scheme based on cost-benefit ratio. Any further funding required to deliver the scheme must be found locally
Project Appraisal Report	A feasibility study which considers potential capital schemes to alleviate flood risk. If a suitable option is found it is used as the business case for partnership funding
Resilience	Ability to adapt and respond to changing conditions while maintaining functionality.
Risk Management Authority (RMA)	District and Borough Councils, Lead Local Flood Authorities, the Environment Agency, Water Companies, Highways Authorities and Internal Drainage Boards.
Siphon	A tube in an inverted U shape which causes a liquid to flow uphill, above the surface of the reservoir, without pumps.
Sewer Surcharge	When the combined sewer system is overloaded beyond its design capacity, with overflow at manholes or backing up into properties.
Surface Water	Rainwater (including snow and other precipitation - which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer

Foreword

The flash flooding that hit Camden and places across London in July 2021 was yet another reminder of the reality of the Climate Emergency. In Camden, it impacted on more than 100 properties, turning people's lives upside-down and disrupting local infrastructure and services.

We continue to do all we can to limit climate change in Camden through the delivery of our Climate Action Plan, but scientific evidence highlights the irreversible impacts that are already being experienced. We expect to see increases in the frequency of extreme weather and intensity of rainfall. While we cannot prevent flooding from happening entirely, we will do everything we can to reduce the risk of flooding occurring and have made significant strides in reducing risk in Camden.

Since the publication of Camden's first Local Flood Risk Management Strategy in 2013, the council has delivered sustainable drainage projects in Camley Street and Fleet Valley. Major restoration works have been undertaken by the City of London on Hampstead Heath ponds to reduce the annual probability of the ponds overtopping to a 1 in 10,000 year rainfall event. We have also increased water storage in Russell Square and Camden Square.

Across Camden we will continue to do what we can to green up our streets and introduce Sustainable Drainage Systems (SuDS) to help mitigate periods of heavy rainfall. We will lobby Thames Water and the Government, working alongside other London Boroughs with this shared challenge, to provide more funding for urban areas to de-pave our public realm, turning the grey to green.

Responsibility for managing flooding sits with a number of organisations, meaning we need close cooperation between public agencies, businesses, households and communities. Camden Council is the designated Lead Local Flood Authority for the borough. This does not mean we can achieve everything alone: we need to work with partners to identify new opportunities and funding streams, as well as encouraging all relevant organisations to take action to reduce the risk of flooding.

In addition to reducing the risk of flooding occurring, it is also important to help our communities prepare for more extreme weather and support our residents and businesses when they are affected. Increasing the borough's resilience to extremes of the weather and keeping Camden residents safe is a top priority as we learn to adapt to the changes in climate as well as seeking to slow them.

Councillor Adam Harrison (Cabinet Member for a Sustainable Camden)

1. Introduction

The Camden Flood Risk Management Strategy sets out how Camden Council, in its role as Lead Local Flood Authority for Camden, and partner authorities will work together to manage flood risk. No single organisation can effectively manage flood risk and co-operation is therefore needed across the Council, public agencies, the private sector and the community to manage flood risk and respond to flooding when it occurs.

Human-induced climate change is seeing extreme weather events affect many parts of the world. Camden is not immune, and the likelihood of flood events occurring is increasing. Flooding will sometimes occur despite all efforts to prevent it. This Flood Risk Management Strategy therefore focuses not just on action to manage flood risk, but also on measures designed to build resilience to its impact.

The aim of the Flood Risk Management Strategy ("the Strategy") is to provide a transparent approach for managing and reducing flood risk in a way that benefits people, property and the environment. It is the focal point for integrating flood risk related actions across Camden.
The Strategy aims to contribute to the creation of a climate resilient Camden, able to adapt to the changing climate and increased severe rainfall events. The Strategy also seeks to build community flood resilience by supporting residents and organisations to reduce risk and increase preparedness.

The Strategy supports the Council's We Make Camden[1] vision for a Camden community working collaboratively to address our shared challenges. The Strategy specifically supports the aims to create a Camden which actively tackles injustice and inequality; ensures everyone in Camden should have a safe place they call home; and creating a green, clean, vibrant, accessible, and sustainable place.

The Strategy has been written in consultation with key stakeholders, including Thames Water, the Greater London Authority, neighbouring local authorities and the Environment Agency to provide a shared vision for how flood risk will be managed.

The Flood Risk Management Strategy has the following key objectives:

1. To improve our understanding of flood risk in Camden;
2. To identify, secure funding and deliver projects that help to manage flood risk;
3. To build community resilience to flood risk; and
4. To support the review of, and recovery from, a flood event, embedding practical recommendations

[1] We Make Camden - https://www.wemakecamden.org.uk/

2. Background

2.1 Why are we publishing a Flood Risk Management Strategy?

After the national floods of 2007, which affected over 55,000 homes and organisations across the UK, the Flood and Water Management Act was introduced in 2010 to provide legislation for the management of risks associated with flooding and coastal erosion.

The Flood and Water Management Act made the London Borough of Camden ('the Council') the Lead Local Flood Authority (LLFA) for the borough and introduced a requirement for the LLFA to produce a Flood Risk Management Strategy. In 2013 the Council, in its role as LLFA, published Camden's Flood Risk Management Strategy which identified the likelihood of flooding across the borough and the responsibilities stakeholders have to manage it. It also set out the actions the Council and other key stakeholders would take to help manage flood risk in Camden. We committed to monitor and review the Strategy and to undertake a full review in 2021 to align with the publication of the Thames Regional Flood Risk Management Plan.

The London floods of July 2021 impacted Camden significantly, with over 100 properties affected. Publication of the new Strategy was delayed until the LLFA had completed its statutory Flood Investigation Report into the July 2021 flooding so that the findings of the investigation could be incorporated into the new Strategy. The Flood Investigation Report was published in July 2022.

This new Flood Risk Management Strategy sets out the approach to flood risk management in Camden until 2027.

A summary of the actions, progress and outcomes of Camden's first Flood Risk Management Strategy (2013) has been included in **Appendix D**.

2.2 How does the Flood Risk Management Strategy relate to Camden's other environmental plans?

The Camden Flood Risk Management Strategy complements Camden's Climate Action Plan (2020-2025)2 by helping to ensure that Camden's people, places, buildings and places are resilient to the impacts of a changing climate.

The Strategy also aligns with Camden's Transport Strategy3, by ensuring that public spaces that encourage and enable healthy and sustainable travel choices, also increase green infrastructure such as trees and planting which promote biodiversity.

Camden's Tree Planting Strategy (2020-2025)[4] and Biodiversity Strategy – "Creating Space for Nature in Camden"[5] highlights how green infrastructure can provide opportunities for supporting biodiversity enhancements alongside sustainable drainage (SuDS) solutions.

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[2] Camden's Climate Action Plan (2020-2025)
[3] Camden's Transport Strategy
[4] Camden's Tree Planting Strategy (2020-2025)
[5] Biodiversity Strategy – "Creating Space for Nature in Camden"

The Council is also required to produce a Strategic Flood Risk Assessment to support Camden's Local Plan[6] (the core Council planning policy document governing new development). Camden's 2014 Strategic Flood Risk Assessment[7] provides extensive further detail on the level of flood risk in Camden and has been used to inform this Flood Risk Management Strategy.

2.3 Who is responsible for managing flood risk?

Authority	Responsibility
Thames Water (TW)	• Designs and maintains the primary drainage network for London - transporting rainwater and sewage away from properties
The Council (LBC)	• Owns and maintains the majority of roads in Camden. • Responsible for gully clearance and maintenance that allow rainwater to drain into the TW network. • Controls the approval of new developments and associated development changes in Camden
Private landowners'	• Own buildings that are affected by flood risk
City of London Corporation and Transport for London	• Own and maintain infrastructure which affects flood risk in Camden

To implement strategic solutions to flood risk management, input from all flood risk stakeholders is therefore required. Responsibilities of the key stakeholders are outlined in the diagram below. Further information on the roles and responsibilities of stakeholders, including partners such as the Greater London Authority and Canal and River Trust is set out in **Appendix C**.

2.4 National, regional and local context for flood risk management in Camden

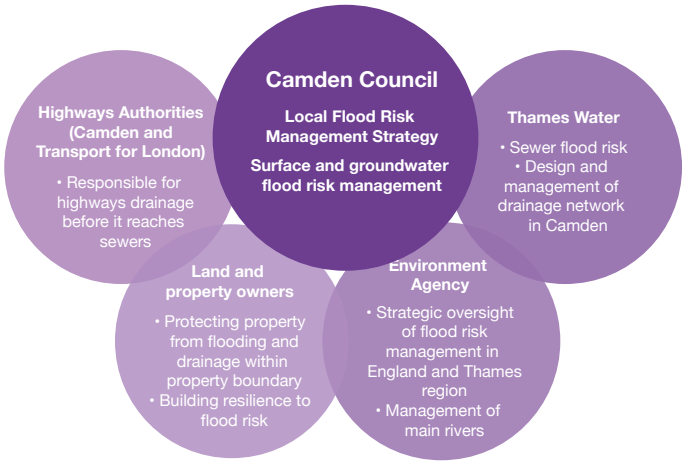


Figure 2:4

[6] Camden Council – Local Plan
[7] Camden's 2014 Strategic Flood Risk Assessment

Flood risk management is a holistic process and decisions of flood risk mitigation across rainfall catchment areas may impact flooding up or down-stream. It is therefore important that local strategies are informed by a strategic approach across the region.

The Flood and Water Management Act made the London Borough of Camden ('the Council') the Lead Local Flood Authority (LLFA) for the borough and introduced a requirement for the LLFA to produce a Flood Risk Management Strategy. In addition to this there are a number of national policies which influence the requirements for flood risk management duties, these are outlined in **Appendix A**.

The different national, regional and local documents that have informed and contributed to this strategy are summarised below, a detailed description is included in **Appendix B**.

2.4.1 National

- **National Flood and Coastal Erosion Risk Management Strategy for England (2020)** – describes what needs to be done by all risk management authorities involved in flood and coastal erosion.
- **UK Climate Change Risk Assessment (2022)** – outlines the UK Government's progress on managing and preparing for the key climate risks
- **A Green Future: 25 Year Environment Plan (2018)** – sets out what government will do to improve the environment, including risks of harm from environmental hazards.
- **National Planning Policy Framework (NPPF) (2021)** – sets out the Government's planning policies for England and how these are expected to be applied by Local Planning Authorities.

2.4.2 Regional

- **Flood Risk Management Plan for the Thames River Basin District (2022)** – sets out how risk management authorities will work with communities to manage flood and coastal risk across the 16,200 km^2 catchment.
- **Thames Estuary 2100 (TE2100)** – sets out recommendations for flood risk management for London and the Thames estuary through to the end of the century.
- **Thames Water Drainage and Wastewater Management Plan (2023)** – long-term strategic plan that sets out how wastewater systems and drainage networks are to be improved and maintained. To be published in 2023.
- **London Sustainable Drainage Action Plan (2016)** – promote the awareness of sustainable drainage systems across London and highlights routes for potential delivery.
- **London Plan 2021** – planning document setting out the Spatial Development Strategy for Greater London, including policies on flood risk and drainage.
- **London Surface Water Management Plan (2023)** – a commitment has been made by risk management authorities to establish a Strategic Group for surface water flood risk management in London and produce a subsequent strategy.
- **London Flood Review 2022**

2.4.3 Local

- **Strategic Flood Risk Assessment (2014)** – a review of available flood risk information to inform strategic land use planning and the Council's Local Plan – the main planning policy for Camden.
- **Preliminary Flood Risk Assessment (2011, addendum 2017)** – a document produced for the EA and DEFRA providing an assessment of flood risk in Camden.

- **Surface Water Management Plan (2011)** – an analysis of surface water flood risk in Camden and proposed actions for the preferred surface water management strategy.
- **Camden Multi-Agency Flood Plan (2022)** – a plan owned by statutory "First Responders" including the Council, London Fire Brigade and Thames Water to provide a co-ordinated multi-agency response to a major flooding event, minimising impact to the public and key infrastructure.
- **Flood Investigation Report**

The following table summarises some of the actions which will be delivered under the Strategy relating to strategic policy documents.

Table 2:1 Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 relating to policy documents

Stakeholder	Measure	Deadline
Thames Water	Publish and deliver the Drainage and Wastewater Management Plan and seek to increase drainage capacity in the areas of Camden at the greatest risk of sewer surcharge flooding	From 2023
Environment Agency	Publish Flood Hazard and Flood Risk Maps	By 2025
Environment Agency	Publish and deliver, in collaboration with partners, the Thames Region Flood Risk Management Plan	2022

2.5 Funding for flood risk alleviation projects

Funding for flood risk management projects comes primarily from Government through the Flood and Coastal Erosion Risk Management (FCERM) Grant in Aid (GiA) regime, which is also supported by regional funding secured by the Thames Regional Flood and Coastal Committee through levies on local authorities. Additional funding is also provided by Thames Water.

It is important to note that Camden can only secure capital funding from Government to deliver flood alleviation projects where significant flood risk to properties is identified through detailed assessment. To date, the level of flood risk in Camden has not been considered severe enough to secure sufficient Government funding to finance flood alleviation schemes in Camden in their entirety, with match funding required from partners to secure implementation.

The following sections provide further detail on the main funding mechanisms for flood mitigation in Camden.

2.5.1 Environment Agency and Government

The Flood and Coastal Erosion Risk Management (FCERM) Investment Programme is a DEFRA capital investment plan to better protect homes and non-residential properties. The UK Government has committed to deliver a six-year £5.2 billion investment to upgrade and expand national flood defences and infrastructure.

There are two main sources of funding for flood defence projects from Government:

- FCERM Grant in Aid from central Government – administered by the Environment Agency, the Grant in Aid available to each capital scheme is calculated by the Outcome Measures delivered by the project. Outcome Measures reflect financial, environmental, health and FCERM benefits.
- Local levy contributions – the Thames Regional Flood and Coastal Committee (TRFCC) can choose to support projects that are either not eligible for Grant in Aid, or to support projects where there is a shortfall in Grant in Aid.

Under the previous FCERM investment programme, funding was allocated to projects within the Thames region through an established DEFRA system called Partnership Funding, whereby the costs and benefits of the proposed flood alleviation scheme are assessed against other proposed projects across the UK.

Under the previous FCERM capital investment programme and across the duration of implementation of the Camden Flood Risk Management Strategy (2013), the surface water flood risk schemes needed for Camden tended not to score highly on the partnership funding calculator and required additional funding to secure viability.

The Government worked with the Environment Agency in 2021 to review how funding is allocated to projects through the FCERM. The changes include a new risk category designed to better support surface water flooding schemes which could prove helpful to Camden. The Council in its role as LLFA intends to revisit previous submissions for Government funding over the duration of this Strategy.

2.5.2 Thames Water funding

Thames Water Utilities Ltd (TWUL), through their Surface Water Management Programme (SWMP), is aiming to reduce the amount of runoff entering their sewer network as part of their Asset Management Plan – AMP7 (2020-2025).

The SWMP funding seeks to fund projects which: manage the quantity or rate of runoff of surface water; improve the quality of surface water run-off; improve the amenity of public spaces; and improve biodiversity.

Projects submitted for funding need to demonstrate compliance with the following three principles of the Thames Water programme:

- **Need for capacity** – focusing on areas where existing sewer systems have lower capacity,
- **Collaboration** – partnering with organisations who are already improving the streets and public realm, so that benefits can be maximised.
- **Generate public value** – going beyond regulatory compliance to demonstrate long-term stewardship of the environment and deliver social value.

Project submissions for AMP7 are now closed, with Camden securing funding for two projects. SWMP funding will reopen for AMP8 (2025 – 2030) to support the delivery of the Thames Water Drainage and Wastewater Management Plan.

2.5.3 Other funding mechanisms

The LLFA will also seek opportunities to secure other funding for the delivery of flood risk management, including funding from the Greater London Authority, S106 funding through the planning system (developer contributions to improve local infrastructure), partnership/beneficiary funding from local landowners and by mainstreaming flood risk alleviation infrastructure into established Council led public realm investment programmes such as the Camden Transport Strategy.

3. Flood Risk in Camden

3.1 Types of flood risk in Camden

Flooding can occur from sources including rivers and seas, rainfall induced surface or sewer flooding, and failure of water storage, such as reservoir breach. The risk of each of these sources is outlined in this section.

The risk outlined below has been identified through detailed flood risk modelling described in Flood Hazard and Flood Risk Maps for the borough produced in partnership with the Environment Agency and Camden's Strategic Flood Risk Assessment[8]. The maps reflect the latest available modelling of flood risk but are not accurate to individual property level. The latest maps are available at **gov.uk/check-long-term-flood-risk**

3.1.1 Surface Runoff and Sewer Surcharge Flooding

The majority of London's sewers carry both sewage and rainwater and are referred to as "combined sewers". The main risk of flooding in Camden is from surface water runoff and surcharge flooding from combined sewers which have exceeded their capacity due to heavy rainfall. These two types of flooding often happen at the same time.

Sewer surcharge occurs when the combined sewer is overloaded beyond its design capacity during very heavy rainfall, and sewage is forced back to ground level through manholes or by backing up into properties from the main sewer.

Surface water flooding occurs when heavy rainfall overwhelms the drainage system so that water cannot be accepted by sewers, and instead flows overland towards properties.

All new sewers are designed by Thames Water to cope with rainfall events with 3.33% Annual Exceedance Probability (AEP), plus an allowance for anticipated change in peak rain, plus an allowance for anticipated change in peak rain intensity resulting from climate change. Some of the older main sewer network in London, operated by Thames Water, falls below the 3.33% AEP design standard, with implications for those areas. Intense storms in urban areas that exceed the Thames Water design standard are likely to result in localised flooding, however given that rainfall intensity and its location are impossible to precisely forecast, it is extremely difficult to predict how and when flooding will occur.

As noted above, Camden's Strategic Flood Risk Assessment provides further detail of the areas of Camden considered to be most at risk of surface water flooding.

3.1.2 Groundwater flooding

Groundwater flooding usually occurs in low lying areas underlain by permeable rock (such as chalk or gravel) and aquifers that allow groundwater to rise to the surface through the permeable subsoil following long periods of wet weather. Low lying areas may be more susceptible to groundwater flooding because the water table is usually at a shallower depth and groundwater paths tend to travel from high to low ground. Groundwater responds slowly to rainfall, but sustained rainfall can lead to saturation and a rising of the water table.

[8] Camden's 2014 Strategic Flood Risk Assessment

The Lead Local Flood Authority is notified of a small number of groundwater flooding incidents in basements and cellars every year, with a tendency for these to be located in Kilburn, West Hampstead and north Kentish Town, however many incidents may not be reported.

Camden's Strategic Flood Risk Assessment contains more detailed information about the causes and likely locations of groundwater flooding, which are not considered to have substantially changed since 2014. The main mechanism impacting groundwater levels is the disruption of groundwater flows through basement development. The creation of a barrier in the sub-surface may cause an obstruction to groundwater flow, which can lead to a change in the water table upstream or downstream.

Basement and flooding planning policies implemented in 2017 seek to address the issue of increased groundwater flood risk from new basement development in flood-prone areas. This is discussed further in **Section 4.4**.

3.1.3 Flooding from rivers or sea

Camden is considered to be at very low risk of flooding from the sea or rivers. The Environment Agency defines "very low risk" as "a chance of flooding of less than 0.1%" in every year.

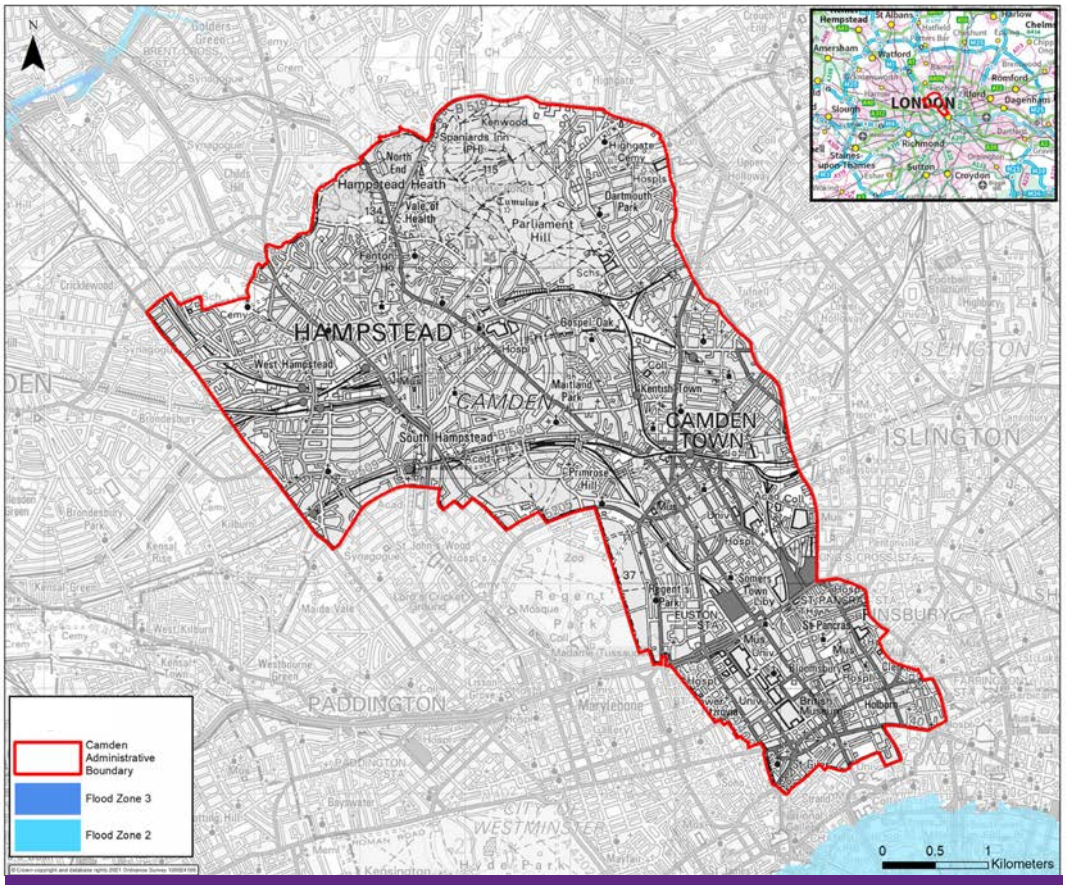


Figure 3:1 Likelihood of flooding by rivers and sea in Camden

3.1.4 Risk from bodies of water

The Regent's Canal is owned by the Canal and River Trust (see **Appendix C**). This has been identified as a low flood risk water body in Camden's Multi-Agency Flood Plan.

The Maiden Lane Reservoir in Islington is a covered service water reservoir owned by Thames Water which poses a flood risk to Camden. The reservoir has undergone recent reinforcement, as outlined in the case study below.

Case Study: Maiden Lane Reservoir - Restoration works

A £2.5 million construction project to renew and reinforce an 1850s covered reservoir on Dartmouth Park Hill was completed in the summer 2022. The brick-built Maiden Lane Reservoir, which can hold 67 million litres of water or the equivalent of 27 Olympic-size swimming pools, supplies 200,000 north Londoners with water.

The structural work on the reservoir was triggered by signs of slippage, evident in large cracks on the path leading through the park surrounding the reservoir. Any failure of the reservoir would put communities downstream at risk of flooding.

To shore up the structure, two rows of concrete piles have been installed below ground level, 135 in total, at a depth of up to 11 metres. They are positioned every two metres to stop the soil shifting and inclinometers are in place to measure any residual movement.

This will protect the reservoir structure and reduces the risk of reservoir flooding. The project has also helped to regenerate Dartmouth Park green space.

Figure 3:2 Construction works at Maiden Lane Reservoir - Credit: Thames Water

The Hampstead Heath ponds consist of two chains of earth banked reservoirs and ponds situated on Hampstead Heath. Works were completed in 2016/17 to significantly reduce flood risk from the reservoirs and ponds. The project is described in more detail in the case study in Section 4.1.2.

The Environment Agency's Risk of Flooding from Reservoirs Mapping identifies areas that could be flooded if a large reservoir were to fail. **check-long-term-flood-risk.service.gov.uk/map**

3.1.5 Water mains

Flooding may also occur if a Thames Water mains water pipe bursts, as happened on Kilburn High Road in July 2012, in West Hampstead in 2014 and on Priory Terrace in July 2021. These are not caused by rainfall events although they occasionally coincide with surface water floods such as in the Priory Terrace example. Rectification is the responsibility of Thames Water who maintains the water supply and sewerage network in Camden.

3.1.6 Flooding from "lost rivers"

Camden was home to a number of historic rivers including the Fleet and the Tyburn. These rivers were culverted in the 19th century and now form part of the Thames Water drainage network. The River Fleet was incorporated into the sewer network as the Fleet Trunk Sewer, with the Fleet Storm Relief Sewer built in the 1870s to increase the ability of the sewer network to cope during extreme rainfall events. The Fleet Storm Relief Sewer runs through Kentish Town before running roughly parallel to the Fleet Trunk Sewer past Camden Town and St Pancras railway stations, southwards along Gray's Inn Road, Hatton Garden, Farringdon Road and subsequently outfalls into the River Thames by Blackfriars Bridge. The River Kilburn has been incorporated into the Thames Water sewer network as the Ranelagh Sewer and the River Tyburn as the King's Scholar's Trunk Sewer.

While the courses of the culverted rivers often correspond with levels of heightened flood risk, this is due to topography (rivers sit in low lying areas) rather than from the river itself. More information about the location of Camden's lost rivers can be found at **camden.gov.uk/lost-rivers-project**

3.2 History of flooding in Camden

There have been three major flooding incidents recorded in Camden, taking place in 1975, 2002 and 2021.

3.2.1 1975 Flooding

The 1975 flood was caused by a severe storm on 14 August 1975. It led to extensive flooding in West and South Hampstead as well as Gospel Oak, Kentish Town, Belsize Park and Camden Town. The drainage capacity of the sewer network was unable to cope with the volume of rainfall with resulting surface and sewer flooding. At the time, it was the heaviest and most concentrated rainfall event recorded for Camden, with 150mm falling in two and a half hours.

3.2.2 2002 Flooding

The 2002 flood was less severe but still saw 60mm of rainfall in under an hour on 7 August 2002. This rainfall event was considered to have a 1% chance of happening in any year (a 1 in

100 year return period). The flooding (surface water and sewer) occurred primarily in West and South Hampstead, although there was also flooding in parts of Kentish Town and isolated areas elsewhere. These floods caused at least £1 million worth of damage, excluding costs to residents[9].

3.2.3 2021 Flooding

The 2021 floods were caused by two storm events occurring on the 12 and 25 July 2021. Under the requirements of Camden's previous Flood Risk Management Strategy, the Council in its role as LLFA, was required to produce a formal Flood Investigation Report into the scale and impacts of the flood event. Due to the scale of flooding across London, Thames Water also commissioned an independent analysis of the flood events called the London Flood Review. These respective reports are discussed below.

Camden's Flood Investigation Report

The Flood and Water Management Act (2010) placed a new duty on Lead Local Flood Authorities to produce a Section 19 The Flood Investigation Report[10] when flooding meets defined criteria. The Flood Investigation Report examines the mechanisms and impacts of the July 2021 flooding and analyses the response of front-line services. The report was published in July 2022.

The Flood Investigation report concluded that the July 2021 flooding was preceded by a period of sustained rainfall, which was defined as the fifth wettest three-month cumulative rainfall total (ending in July) in southeast England since records began in 1891[11]. The sustained rainfall saturated many green spaces in Camden, including Hampstead Heath, which limited the capacity for attenuation at the point of peak rainfall.

Radar rainfall data for the dates in July when flooding occurred determined that there was high spatial variability in rainfall over Camden. The most severe rainfall reported exceeded a 1% AEP, and significantly impacted South End Green, south-west of Hampstead Heath, and South Hampstead. The south east and north west areas of Camden were observed as experiencing the lowest rainfall in the borough with the event having a 10% chance of occurring in any given year.

The Thames Water combined sewer network was unable to accommodate the rainfall, resulting in surface water and sewer surcharge flooding.

Recorded incidents suggest that over 100 homes and organisations were impacted by flooding across Camden. The areas which reported the highest number of flood incidents in July are identified in the flooding hotspot map below. There were other isolated incidents of flooding experienced in properties outside these areas.

[9] Report of the Flood Scrutiny Panel, London Borough of Camden, June 2003
[10] July 2021 Flood Investigation Report - https://www.camden.gov.uk/flooding#pxho
[11] EA Water Situation report, England July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1010038/Water_situation_report_for_England_July_2021.pdf

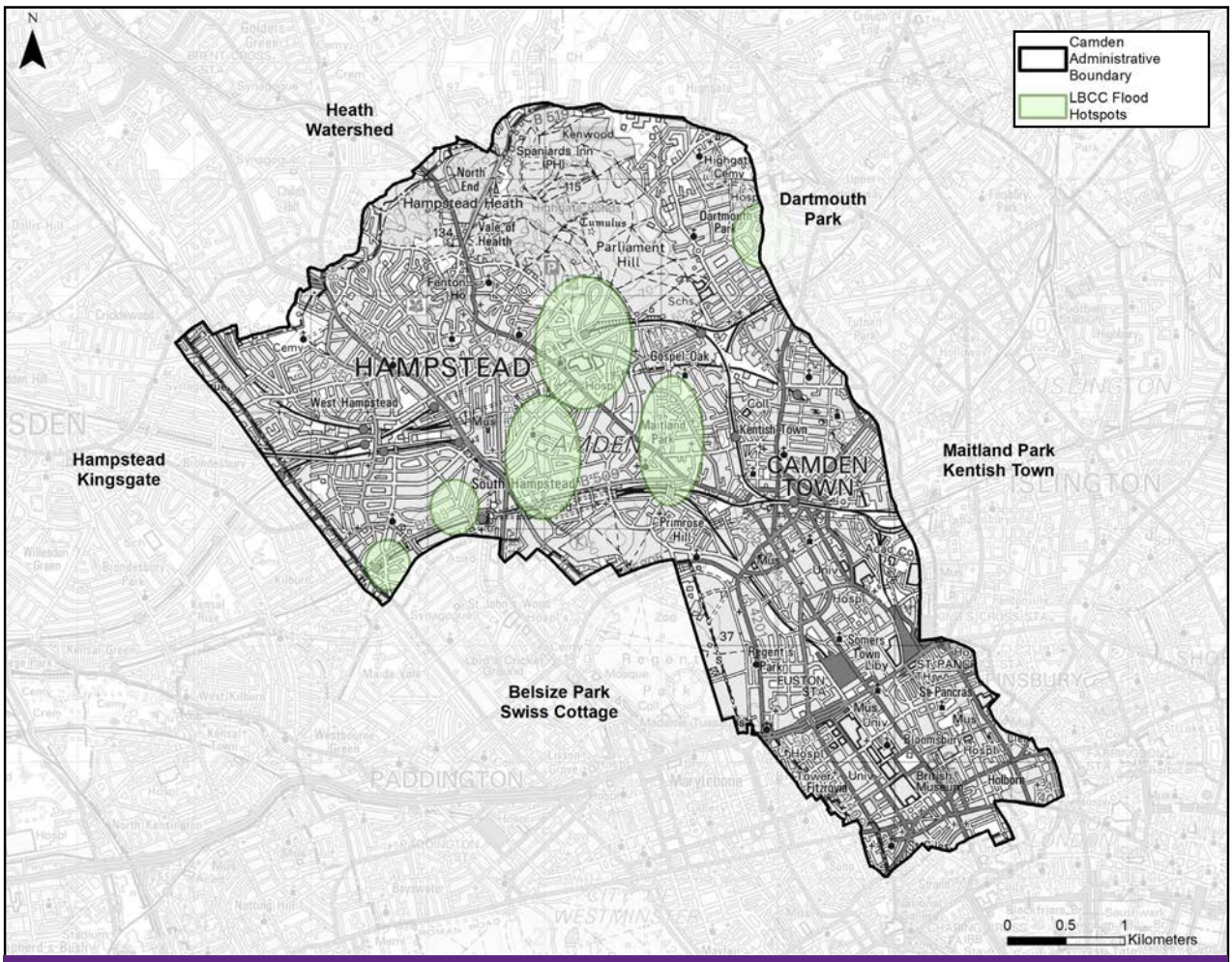


Figure 3:3 - Flood hotspot map – AECOM S19 Flood Investigation Report

Flooding in hotspot areas was driven by local topography, which directed surface water to lower lying areas. The Heath Watershed area received surface water run-off from Hampstead Heath. Debris from streets and the Heath was transported by overground flows, blocking gullies, which exacerbated the flooding, particularly in South End Green.

South Hampstead experienced significant sewer surcharge flooding due to the rainfall exceeding the sewer network design capacity. Belsize Park, Maitland Park and Dartmouth Park had fewer flooding incidents which were generally exacerbated by topography and local road layouts. Disruption to infrastructure resulted from flooded roads and stations, including the mainline to Euston which halted rail services.

The report concluded that all agencies and authorities were proactive in their response to the incident. However, the limited warnings available in advance of flooding; the rapid onset of the flood event; and pace of information exchange between agencies, were limiting factors to the response.

To support our evidence-based approach to flood risk management measures, the Flood Investigation report included several recommendations for action to improve flood risk management in Camden. The recommendations within the report have been discussed with other flood risk stakeholders in Camden and where appropriate, have been incorporated into the proposed measures within this Strategy.

London Flood Review

Thames Water commissioned the London Flood Review[12], to examine the extent and causes of the July 2021 flooding across Greater London. The Review was commissioned as an independent review and led by the Mott McDonald consultancy. The Review was issued in four stages: stage 1 – assessment of available data, stage 2 – flood mechanisms, stage 3 – Thames Water asset performance and stage 4 – recommendations for mitigating future flooding events.

The report analysed data across London to shape strategic flood risk management but does not provide the level of detail of Camden's Flood Investigation Report. The London Flood Review makes recommendations for flood risk management stakeholders across London and these have been reviewed and incorporated in this Camden Flood Risk Management Strategy where appropriate.

3.3 Developing our understanding of flood risk in Camden

The Council as LLFA has undertaken significant flood risk modelling since the adoption of the Camden's original Flood Risk Management Strategy to help build our understanding of flood risk and identify opportunities for flood alleviation schemes.

This enhanced modelling built on the Preliminary Flood Risk Assessment[13] and Surface Water Management Plans[14] for Camden which were produced on behalf of all London Councils by the Greater London Authority in 2010-12.

To help frame our approach to the enhanced modelling, Camden was divided into three zones: North, South and West, with each zone representing a topographically informed catchment. Camden North covers the areas surrounding Hampstead Heath (i.e. Hampstead village, South End Green, Gospel Oak, Dartmouth Park and Highgate). Camden South covers a large area starting in Belsize Park and Camden Town and going through St. Pancras to Holborn and St. Giles' Circus. Camden West covers West and South Hampstead as well as Kilburn.

"Initial assessments" of each zone were carried out to identify "hotspot" locations for detailed flood risk modelling. Funding was then secured to deliver the enhanced "hotspot" modelling in a format that was compliant with requirements for national funding through the FCERM Grant in Aid regime.

The following sections describe the conclusions of the work. Further detail on flood risk in Camden is set out in Camden's Strategic Flood Risk Assessment[15].

[12] London Flood Review - https://londonfloodreview.co.uk/
[13] Camden Preliminary Flood Risk Assessment
[14] Camden Surface Water Management Plan
[15] Camden's 2014 Strategic Flood Risk Assessment

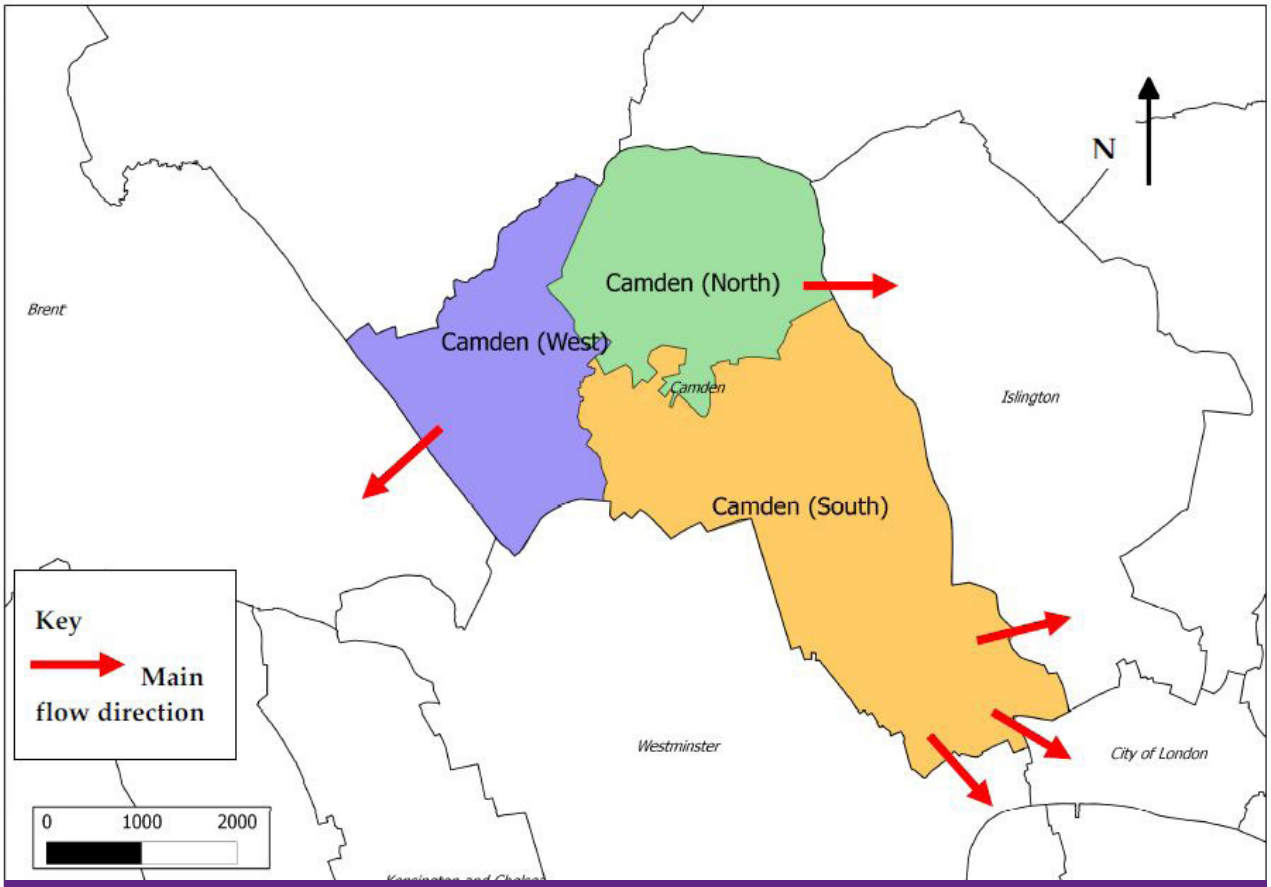


Figure 3:4 - Map of Camden flood areas and flows into neighbouring boroughs

3.4 Camden North

The Camden North area is particularly susceptible to surface water flooding because of the area's steep topography. Three higher risk flood risk hotspots were identified for enhanced modelling further to the initial assessment.

The Council commissioned enhanced surface water modelling of the Gospel Oak area in 2013 with a view to this informing a national funding bid for a flood alleviation scheme. The modelling showed that flood risk to the area had significantly reduced due to the North London Flood Relief sewer constructed in 1987. While the modelling showed that there was still some residual flood risk in the area, it was limited to one property during a 0.5% AEP rainfall event, and the risk level was too low to support a funding bid to the FCERM Grant in Aid regime. Circumstantially, it is notable that there were no reports of flooding in Gospel Oak during the two major flood events of 2002 and 2021 after the construction of the North London Flood Relief Sewer.

Detailed modelling was also conducted in the Hampstead area covering a range of different locations to the west and south of Hampstead Heath including Willow Road, South End Green and Heath Street. The area is particularly susceptible to surface water flood risk. The modelling concluded that 47 residential properties and 12 commercial properties may be at risk during a 5% AEP rainfall event. During the floods of July 2021, areas such as South End Green encountered significant levels of disruption due to surface water flooding.

Detailed modelling of flood risk in the York Rise and St Albans Road area was completed in 2015 with representatives from the community, which incorporated updated information from Thames Water relating to sewer capacity and investigated community concerns regarding a narrow siphon spanning the railway bridge south of York Rise which was considered to be restricting drainage from the area.

The investigation and modelling concluded that surface water flood risk was lower than that presented under the Preliminary Flood Risk Assessment and Surface Water Management Plan and that the siphon was, in fact, a gas main that was not affecting drainage. The feasibility work still showed some residual property risk from surface water flooding and consideration was given to a funding bid the Government's FCERM Grant in Aid for property level protection measures, that would have required partnership funding from residents. Concerns were raised about the capacity for private investment and the project was not taken forward.

3.5 Camden South

An initial assessment of flood risk was commissioned to look at potential flood risk in Camden South. This work showed a lower level of flood risk to Camden North and it is notable that Camden South was not significantly affected by the July 2021 flood event, although this could be attributable to the rainfall being highly localised to the north and west of the borough. Camden South was less than a 5% AEP rainfall event, compared Camden North and West which experienced a 1% AEP rainfall event.

Only the Primrose Hill area was identified as having any significant risk and the Royal Parks, which own and manage the park, continue to improve drainage to help limit flood risk. The other risk identified in the assessment was the inverted Thames Water drainage siphon under Grand Union canal along Gloucester Avenue. The siphon is logged on Camden's flood risk Asset Register (outlined in Section 5.1.1) and the Council seeks regular updates from Thames Water on its condition to determine if the risk profile has changed.

The Kings Cross and Somers Town area was also considered as part of the Initial Assessment. The area was also assessed as being at a low risk of flooding; however, some very localised areas, notably at the junction of Goods Way and Camley Street were deemed to be higher risk. To help alleviate flood risk in the location, the Camley Street Raingardens were installed in 2021.

Case study: Camley Street Raingardens

The Camley Street Raingardens project was delivered by the Council as part of the London Strategic SuDS Pilot and was jointly funded by Thames Water, Camden Council and contributions from local developments obtained through the Planning process.

The 135 metre-long sustainable drainage system (SuDS) was completed in March 2021 and disconnects an area of 1,537 m2 from the sewer by providing 142 m2 of raingardens to a depth of 1 m to hold water before it enters the sewer. There are also 11 tree pits and beds containing over 30 diverse herbaceous planting and bulbs, contributing to local biodiversity improvements.

Camden's Surface Water Management Plan identified the area as being susceptible to surface water flooding in a 3.33% AEP rainfall event. The scheme was designed to remove rainfall from the surrounding streetscape from entering the sewer for up to a 3.33% AEP rainfall event, helping to reduce the risk of surface water and sewer surcharge flooding in the area.

The raingardens and surrounding highways improvements also provide amenity to the local area with places for people to sit, biodiversity from the planting, and an 'urban cooling' effect.

The project was an example of how flood risk management stakeholders can work together to provide solutions which help to manage surface water and sewer flood risk simultaneously.

Figure 3:5 - Camley Street raingardens

3.6 Camden West

The history of flooding in this area is significant with a number of areas in South and West Hampstead affected in 1975, 2002 and 2021. After the 2002 floods, Thames Water invested in significant new flood risk infrastructure as part of the West Hampstead Flood Relief Scheme. The project involved larger diameter sewers and a holding tank, both of which have reduced flood risk in the area as outlined in the case study below.

South Hampstead experienced surface water and sewer surcharge flooding in 1975, 2002 and 2021. In July 2021 there were several reported incidents of sewer flooding and evidence of surcharging manholes; the key areas affected included Fairhazel Gardens, Goldhurst Terrace, Belsize Road, Priory Terrace and the southern section of Priory Road.

West Hampstead also experienced surface water and sewer surcharge flooding in 1975, 2002 and in 2021. During the July 2021 events, the impact of surface water flooding was relatively low compared to other areas of Camden; however, isolated incidents of flooding were reported near to West End Lane and the West Hampstead Fire Station. Although the rainfall return period was lower than for other areas (less than a 2% AEP rainfall event), the risk of surface water flooding in West Hampstead is still considered to have reduced as a result of the West Hampstead Flood Relief Scheme.

Case study: West Hampstead Flood Relief Scheme

Sumatra Road and the surrounding areas in West Hampstead have historically been susceptible to flooding and many of the streets, including Sumatra Road flooded in the major flood events in Camden in 1975 and 2002. In the 2002 flooding, residents observed manhole covers being ‘blown-off’ and water from sewers coming into properties through sinks, baths and toilets, all of which are key indicators of sewer surcharge flooding.

In order to reduce the risk of flooding within the area, Thames Water designed a scheme to increase sewer capacity and water storage. The West Hampstead Flood Relief Scheme is designed to intercept and divert water flows towards a storage shaft providing approximately 1,322 m3 of storage during extreme rainfall events. The storage is located below the Maygrove Peace Park and is connected to the surrounding sewer network. The project was designed to provide a direct reduction in sewer surcharge flood risk to 197 properties with indirect flood risk reduction in the West Hampstead area and further downstream in the catchment.

This project demonstrates the positive impact that increased water storage and sewer capacity can have flood risk in a local area.

In 2013-14, modelling was commissioned to look at potential flood risk locations in Camden West to determine where mitigation should be focused. In West Hampstead, an application for funding was completed in late 2013 and Government agreed to part fund a flood alleviation scheme on Cannon Hill Road, subject to the balance of funding being provided by a third-party landowner (the freeholder of mansion apartment blocks on Cannon Hill Road). After negotiation, the third-party landowner decided not to financially contribute to the project and the project was unable to proceed.

A similar funding application was considered for Fairhazel Gardens in 2013 but the proposed permeable paving linked to underground water attenuation tanks was not considered to be as likely to secure funding as the Cannon Hill Road project and it was not prioritised. The scheme was subsequently submitted for funding to the Thames Water SWMP funding in 2022 but was again unsuccessful but has been shortlisted for if further funding becomes available.

Addressing flood risk in the West Camden zone is a key priority for this Flood Risk Management Strategy and a number of actions are proposed in the following section.

4. Delivering flood risk alleviation projects

While there is no statutory obligation on any organisation in Camden to deliver flood defence or alleviation schemes in locations that are at risk of flooding, the Council in its role as LLFA, will seek opportunities to deliver flood risk alleviation projects across Camden to help build a more climate resilient borough.

We will prioritise projects in areas where there is modelled flood risk and evidence of historic flooding. However, this will not preclude the development of projects in other areas of Camden where one-off funding or other opportunities arise, for example through the planning system or through planned public realm improvements.

The primary priority areas for flood alleviation projects include South Hampstead, South End Green and parts of West Hampstead and Kilburn. These are areas where the evidence of flood risk is accompanied by reasonable opportunities for external funding. Secondary priority areas include Dartmouth Park, Gospel Oak and Camden Town and Kings Cross. These areas are characterised by lower levels of modelled flood risk and are less likely to attract external funding; however, there is scope for flood alleviation investment linked to regeneration and planned public realm improvement work.

The following approaches will be used to maximise investment in flood alleviation across Camden over the duration of The Strategy:

- Delivery of flood alleviation schemes in primary and secondary priority areas by:
  - Continuing to seek to secure funding from the national FCERM Grant in Aid regime and Thames Water for projects in locations that meet the required cost-benefit ratios
  - Working with Thames Water and the City of London Corporation to leverage investment in flood alleviation projects in Camden
- Mainstream sustainable drainage systems and green infrastructure into public realm improvement projects led by the Council
- Help communities across Camden to build resilience to flooding through preparation and protection
- Continue to use the planning system to require developments in Camden to reduce their impact on flood risk and wherever possible alleviate flood risk through green infrastructure

4.1 Delivery of flood alleviation schemes in priority areas

The following sections describe the action that will be taken over the term of this Flood Risk Management Strategy. Geographically defined actions are provided for the primary priority areas of South and West Hampstead and Kilburn, the area around South End Green to the west of Hampstead Heath, and the secondary priority areas of Dartmouth Park, Gospel Oak, Kings Cross and Camden Town.

4.1.1 Action in South and West Hampstead and Kilburn

Given the findings of the Flood Investigation Report into the July 2021 flooding, we will commission an assessment of Thames Water drainage capacity for the area to inform whether or not new gullies could be safely installed, or any other drainage interventions could be implemented, to help to manage flood risk.

We will also seek to secure funding from Thames Water to develop Sustainable Drainage (SuDS)

projects for the area. This would provide some local flood alleviation benefit but would not be sufficient to fully address flood risk in the area. We will also revisit earlier feasibility work for SuDS in the area with a view to a potential re-submission for FCERM Grant in Aid funding. Focus areas include the junction of Fairhazel Gardens and Goldhurst Terrace, and around Belsize Road, Priory Terrace and Priory Gardens.

We will also work with Thames Water to identify and survey as many properties as reasonably practicable which experienced sewer surcharge flooding in July 2021 to identify risk and install control devices (such as one-way valves) to help protect properties from sewer surcharge flooding. Any installation work would be completed by Thames Water.

The Council has also received funding from the GLA's Green and Resilient Space Fund[16] to develop a vision and masterplan for Kilburn Grange Park to shape its future development. The project will identify opportunities for increasing water attenuation within the park and reduce the risk of surface water flooding. Once the masterplan has been completed, the Council will seek funding opportunities to deliver the works. The Council has also submitted funding bids to Central Government for pocket parks in Kilburn to reduce surface water run-off in the area.
We will also work with Thames Water and the local residents to pilot a community flood resilience project for South Hampstead – as outlined in Section 4.3.

The following table summarises the key activity for West and South Hampstead.

Table 4:1: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – South Hampstead

Stakeholder	Measure	Deadline
Camden Council and Thames Water	Complete study of drainage capacity in South Hampstead and work with partners to deliver the recommendations in the local area, subject to funding	2022-2023
Camden Council	Deliver a sustainable drainage project in South Hampstead on the intersection of Priory Road and Belsize Road	2022-2023
Camden Council	Review previous sustainable drainage feasibility reports with a view to resubmitting for available funding and deliver if successful	By 2024
Thames Water	Engage with the community to identify as many properties as reasonably practicable who experienced flooding in July 2021, survey all properties to identify risk and install devices (such as one-way valves) to help protect those properties	Summer 2023
Camden Council	Deliver the Kilburn Grange Park masterplan under the Green and Resilient Spaces fund and identify funding opportunities to deliver the redevelopment of the park	2022-2024

[16] Green and Resilient Spaces Fund - https://www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/green-and-resilient-spaces-fund

4.1.2 Action in Hampstead Heath / South End Green

Building on the recommendations of the Flood Investigation Report into the July 2021 flooding, which highlighted how surface water run-off from the Heath contributed to the overwhelming of the local sewer network, the LLFA will work with the City of London Corporation to explore how run-off can be better managed on the Heath, either through storage or soakaways at key locations. The priority focus will be to address run-off towards Parliament Hill, South Hill Park and South End Road.

The LLFA will also complete an assessment of drainage capacity in South End Green to identify potential interventions to manage flood risk and work with partners to deliver recommendations, subject to funding. One potential solution could include testing the viability of increased gullies in and around South End Green, potentially with hydro-brakes to limit downstream pressure.

Significant storage improvements have already been installed at Hampstead Heath as part of the reservoir restoration project, which demonstrates how the LLFA and the City of London Corporation can successfully work together to limit flood risk.

The following table summarises the key activity for Hampstead Heath and South End Green.

Table 4:2: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Hampstead Heath and South End Green

Stakeholder	Measure	Deadline
Camden Council and Thames Water	Complete study of drainage capacity in South End Green area to identify potential interventions to manage flood risk and work with partners to deliver recommendations, subject to funding	2022-23
City of London Corporation and Camden Council	To undertake a review to increase storage capacity and reduce surface water flow rates from Hampstead Heath and implement measures, subject to funding being secured	2023-24

Case study: Hampstead Heath Reservoir Dam Restoration Project

The Hampstead Heath ponds consist of two chains of earth banked reservoirs and ponds situated on Hampstead Heath. All are managed and owned by the City of London Corporation, except the top two ponds in the Highgate Chain which are managed by English Heritage as part of Kenwood.

Previous hydrological studies of the ponds commissioned by the City of London Corporation concluded that a number of earth-banked dams along the chains overtopped under relatively frequent rainfall events (the worst case being the Stock Pond which was estimated to overtop in a 20% AEP rainfall event). This modelling highlighted the potential risk of dam failure and potential significant impacts to the downstream population. To mitigate the risk of uncontrolled overtopping, a dam restoration project was developed by the Corporation of London in consultation with the Council.

The works were designed to virtually eliminate the risk of dam breach due to uncontrolled overtopping, for all flood events up to and including the Probable Maximum Flood (PMF) which is the highest possible category (above 0.01% AEP event). In addition to the flood risk management benefits, the project also provided biodiversity benefits with the tree planting and the installation of bird and bat boxes on existing mature trees.

The Hampstead & Highgate Ponds (reservoirs) restoration project was completed by Corporation of London in October 2016.

Watch a timelapse video of the project **here**.

Figure 4:1 - Hampstead Heath ponds restoration project
Credit: City of London Corporation

4.1.3 Action in secondary priority areas

Camden Town and Kings Cross

Flood risk in Camden Town and Kings Cross is lower than many parts of North and West Camden. However, the areas have less green space and are typically characterised by larger impermeable surfaces, which do little to slow the passage of rainwater to the sewer network, causing capacity issues downstream. To help mitigate, the Council, in its role as LLFA, will continue to seek funding to deliver schemes that increase water storage and slow surface water flows.

In 2021/22 the Council secured £1.4m from the Greater London Authority's Future Neighbourhoods programme to bring environmental improvements to the Somers Town area, which suffers from pockets of surface water flood risk. The programme includes a wide range of environmental projects including improvements to the public realm and Council-owned housing estates which incorporate surface water storage and biodiversity benefits.

Such projects would build on recently successful funding bids to Thames Water for projects such as the Camley Street Raingarden and the Fleet Valley Pocket Park in Farringdon – case study below.

The following table summarises the key activity for Kings Cross and Camden Town.

Table 4:3: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Camden Town and Kings Cross

Stakeholder	Measure	Deadline
Camden Council	Delivering greening projects in the public realm in Somers Town, through the Future Neighbourhoods project	2022-2024

Case Study: Fleet Valley Pocket Park

Building on the success of the Camley Street raingarden, a construction of the new Fleet Valley pocket has been finalised at Mount Pleasant close to Farringdon Road, to help alleviate pressure on the Fleet sewer.

Mount Pleasant lies in one of Camden's Critical Drainage Areas and is between the North Swinton Street and Farringdon Local Flood Risk Zones (LFRZ). This new pocket park comprises SuDS features (rain garden, tree pits and tree root cells) that have a storage volume of over 48m3.

These new features are designed to capture surface water flow in an area that was previously completely paved over. The pocket park has replaced the previous impermeable pavement with permeable paving and surrounding vegetation and surface water is now redirected from the sewer network into the rain garden.

As well as providing water storage, the scheme has been designed to serve as a valuable public amenity in an area of London with limited green space. The pocket park will also provide new habitats in the area.

The works are being supported by funding awarded from the Thames Water Surface Water Management Programme and the Council.

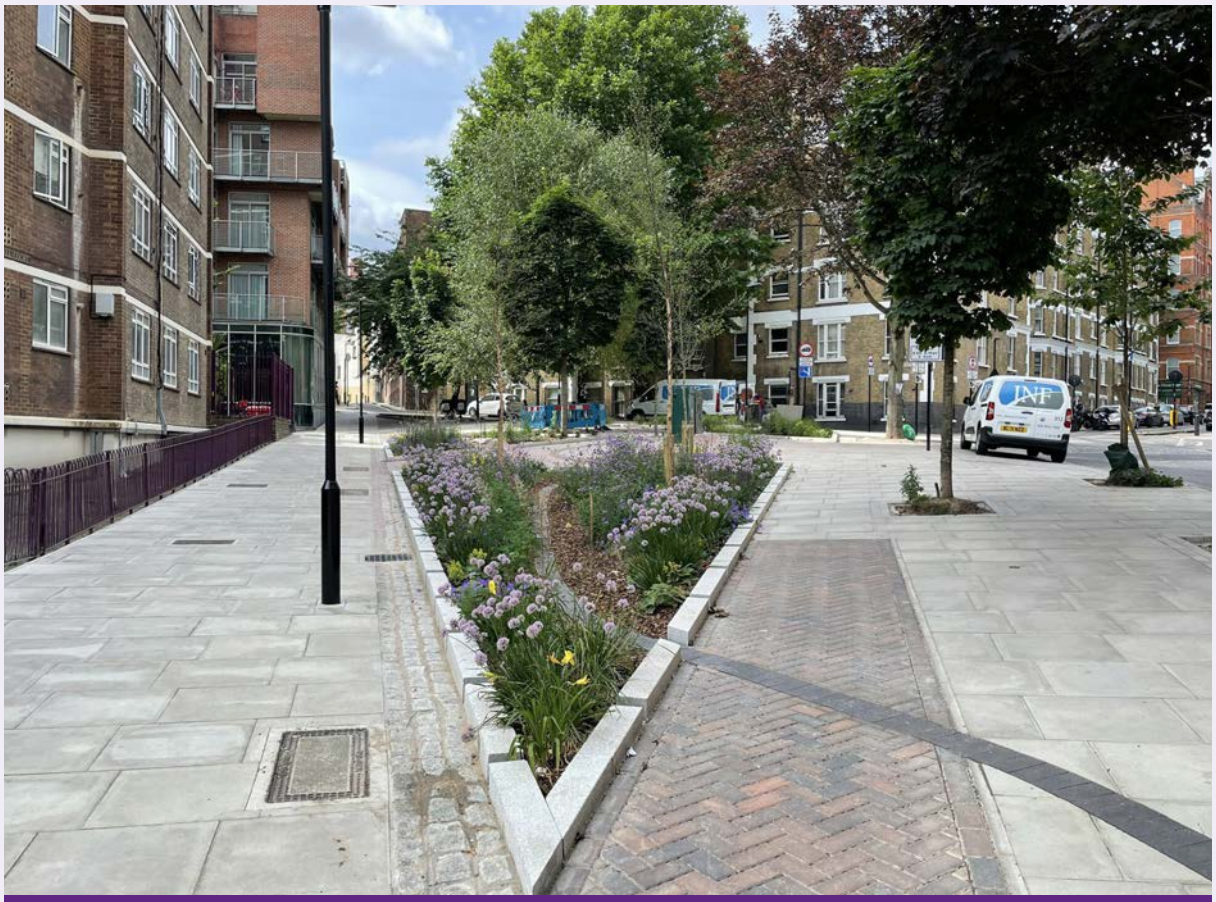


Figure 4:2: - Fleet Valley Pocket Park delivered through Surface Water Management Plan funding

Gospel Oak and Dartmouth Park

Surface water flows from Hampstead Heath are split into two directions due to the varying topography of the area, with flows directed to South End Green to the west and Gospel Oak to the east. Further to the actions above, the LLFA will work with the City of London Corporation to explore how run-off can be better managed on the Heath, but in addition to the focus on improvements in South End Green, the study will have a secondary focus on Gospel Oak and Dartmouth Park.

The following table summarises the key activity for this area of work.

Table 4:4: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Gospel Oak and Dartmouth Park

Stakeholder	Measure	Deadline
City of London Corporation and Camden Council	To undertake a review of increase storage capacity and surface water flow rates on Hampstead Heath that may offer opportunities to manage flood risk in South End Green and Gospel Oak, subject to funding	2023-24

4.2 Mainstreaming sustainable drainage into public realm improvements

In addition to the above geographically defined projects, the LLFA will work with teams across the Council to mainstream sustainable drainage and flood alleviation into other major Council investment programmes.

As part of Camden's Safe & Healthy Streets programme we will seek to identify opportunities to introduce trees, urban greening and sustainable drainage systems as part of every road improvement scheme. Interventions would range from small scale sustainable drainage with tree pits alongside cycle hangars and electric vehicle charging points whenever new infrastructure is introduced, through to large scale interventions, such as extensive green infrastructure along the length of new segregated cycle schemes or at planned major public realm improvement schemes such as those at Holborn or around the Bloomsbury university campus.

SuDS incorporated into Camden's Safe & Healthy Streets programme include projects on Savernake Road in Gospel Oak and on Ferdinand Street in Chalk Farm. The Savernake Road scheme incorporated raingardens into the modal filter project, which directs rainwater from the highway into raingardens, slowing the infiltration of water into gullies and sewers below. Improvements in the Chalk Farm and Camden Town area include new raingardens on Harmood Street and near the junction of Prince of Wales Road and Ferdinand Street.

Flood risk modelling will inform future Safe & Healthy Streets interventions as part of the Council's next 3-year programme of public realm improvement works from 2022-2025. Flood modelling will complement other transport indicators – walking and cycling potential of specific areas, road traffic collisions, air pollution and car ownership – to identify opportunities to deliver both sustainable transport and sustainable drainage benefits.

The LLFA will also continue to work with the Council to bring flood risk benefits to green spaces in Camden. In 2020, works were completed in Russell Square to store 129.6m3 of rainwater, Brunswick Square (8.1m3) and Camden Square (38.4m3). The projects have reduced flood risk in the parks and pressure on the sewer network at times of peak rainfall. Drainage works have also recently been completed at Waterlow Park to reduce the risk of overflow from the lower pond.

In addition to the above projects, Camden and Islington have been awarded funding from the Future Parks Accelerator programme[17] to produce a strategy for identifying and delivering green infrastructure opportunities, with a focus on the conversion of 'grey to green' on highway land. The project will look to build on the success of recently completed "pavement to park" projects such as Alfred Place Gardens in the West End. These projects reduce impermeable surfaces and help to slow the movement of water into sewers and reduce flood risk.

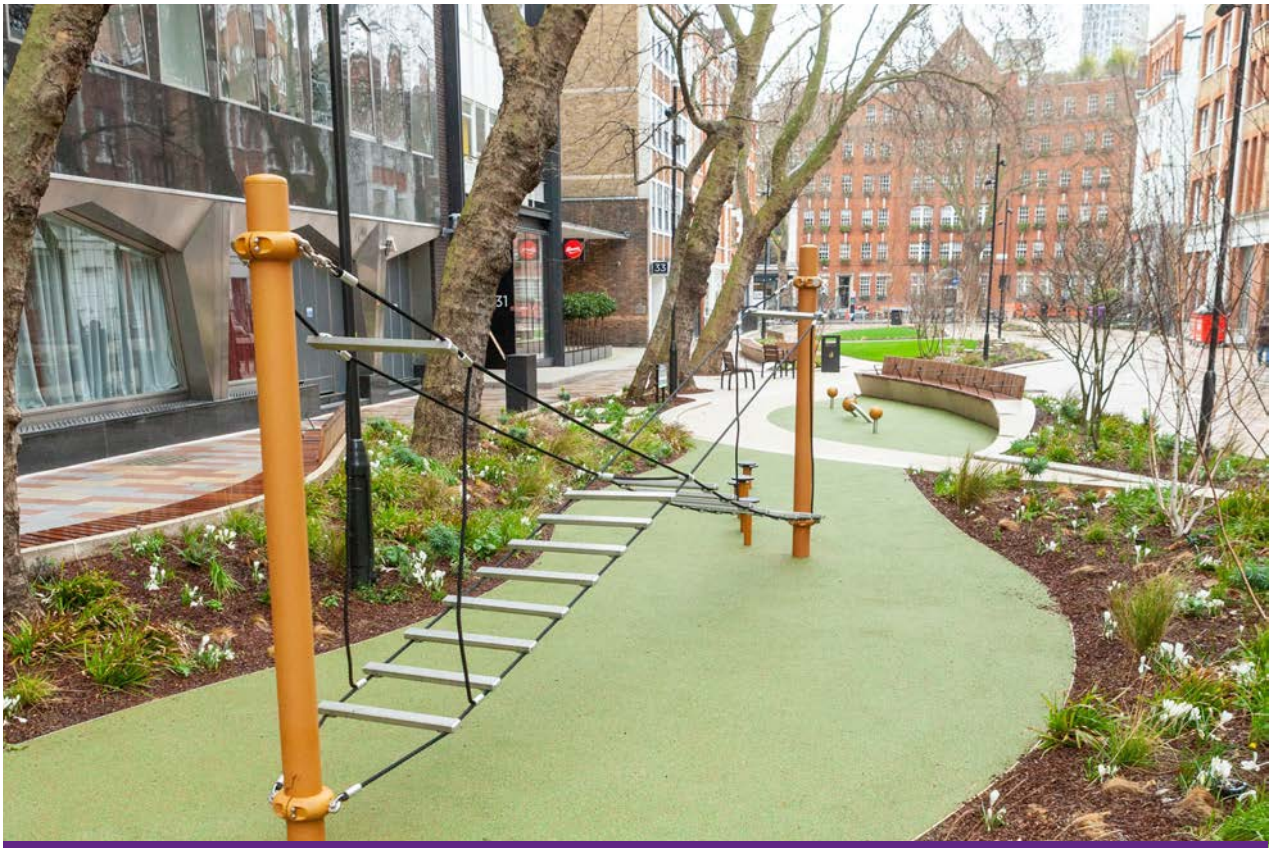


Figure 4:3 - Alfred Place Gardens – from pavement to park

[17] Future Parks Accelerator - https://www.futureparks.org.uk/

Further opportunities to reduce flood risk will be incorporated into Camden's Green Space Investment programme.

The following table summarises the key activity for this area of work.

Table 4:5: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Mainstreaming sustainable drainage into public realm improvements

Stakeholder	Measure	Deadline
Camden Council	As part of Camden's Safe & Healthy Streets programme, identify opportunities to introduce trees, urban greening and sustainable drainage where feasible as part of every road improvement scheme	From 2022 onwards
Camden Council	Continue to identify opportunities for implementing drainage and water storage solutions within Camden green spaces to reduce flood risk	From 2022 onwards

4.3 Building community resilience to flooding

The flood events in July 2021 naturally increased public awareness of flood risk in Camden and the community played a key role in providing evidence for the Flood Investigation Report described in **Section 3.2.3**. A key recommendation from the flood Investigation Report is that communities should be supported to play a more active role in building resilience to flood risk within their local area.

Building a community's resilience to flood risk will involve improving their understanding of when flooding is likely to occur, for example by being aware of Met Office weather alert systems, developing an understanding of the protective measures a building owner can take to reduce flood risk, for example through property protection; and ensuring that neighbours, particularly those who may be vulnerable to flood risk, are supported to protect themselves.

This is a new area of work in Camden and the LLFA would like to pilot the production of a Community Flood Plan for an area at risk. Working together as a community or group to complete a plan could help an area respond more effectively when flooding occurs. It could also help the community to decide which practical actions to take before, during and after a flood.

To trial this approach, the LLFA will work with Thames Water, the National Flood Forum and the South Hampstead Flood Action Group to implement a pilot Community Flood Plan. If successful, the LLFA will seek to support communities across Camden to adopt this approach.

The LLFA will also work with the GLA to identify schools that are at the greatest climate risk and deliver projects to reduce surface water flood risk and educate students about climate resilience and its importance.

Insurance is an important part of building community resilience, so that residents and organisations can recover when flood damage does occur. The Council is aware that the national FloodRe insurance scheme, which was implemented by Government to ensure that

previously flooded properties could access insurance, includes exclusions for privately-owned flats in buildings with more than three dwellings. Given that much of London is characterised by apartment blocks containing more than three dwellings, the LLFA will work to identify alternative options for insurance and communicate this information where appropriate. The following table summarises the key activity for this area of work.

Table 4:6: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Building community resilience to flooding

Stakeholder	Measure	Deadline
Thames Water and Camden Council	Pilot a Community Flood Plan, working with a community group to identify practical actions to take before and during a flood, helping reduce the damage flooding can cause	2022-2024
GLA	Deliver the Climate Resilient Schools Programme, seeking to install measures in schools to manage surface water flood risk and educate students about the importance of building climate resilience	2022-23
Camden Council, GLA, London Councils, Thames Water	Continue to highlight the issue of flood insurance in Camden, and identify other routes of obtaining insurance and communicate to residents and businesses	Ongoing

4.4 Improving flood risk management through development

Local planning policy

The Council will continue to ensure that new developments are safe from flood risk and wherever possible reduce the risk of flooding elsewhere.

In April 2015, the Government made Lead Local Flood Authorities (LLFA) statutory consultees on planning applications for all major developments. The LLFA advise the Local Planning Authority on the flood and sustainable drainage aspects of planning applications. Thames Water continue to advise on major developments and the Environment Agency also advise on large sites.

Policy CC3 of Camden's Local Plan 2017 states that the Council will require all development in areas at risk of flooding to protect the property and surrounding area from increased flood risk. The Local Plan defines areas which are at risk of flooding as any previously flooded street and areas within Local Flood Risk Zones (identified in the Surface Water Management Plan[18] and Strategic Flood Risk Assessment[19]).

[18] Camden Surface Water Management Plan
[19] Camden's 2014 Strategic Flood Risk Assessment

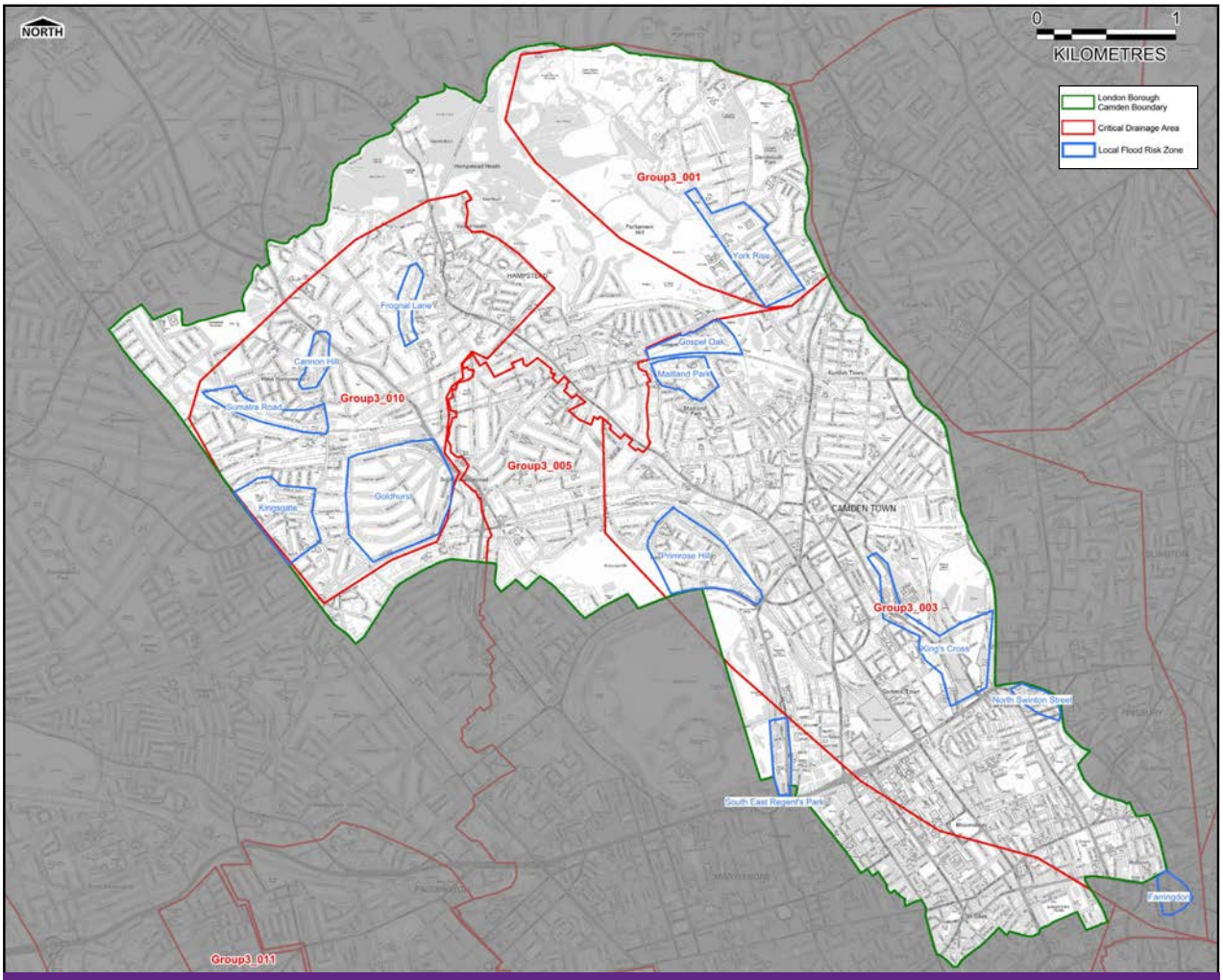


Figure 4:4 - Map showing Local Flood Risk Zones and Critical Drainage Areas in Camden

Developments in defined local Flood Risk Zones, which have been identified as being at risk of surface water flooding must be designed to cope with storm events with a 1% chance of happening in any one year/ 1 in 100-year return period (including an appropriate allowance for climate change).

The LLFA assess compliance by requiring and reviewing Flood Risk Assessments (FRA) for developments in local Flood Risk Zones. The FRA must consider whether the development will increase flood risk and propose mitigating measures to reduce the impact of flooding at the site and surrounding area.

The July 2021 floods affected some areas that were not within designated local Flood Risk Zones and the LLFA will review and extend the zones so that future developments in the areas benefit from FRA.

Basements

The Council shall also continue to require all new basement developments whether domestic or non-domestic to conduct Basement Impact Assessments (Local Plan Policy A5 Basements[20] contains further detail) which consider both groundwater and surface water flooding.

[20] Local Plan Policy A5 Basements

Paving Front Gardens

Camden Development Policy DP19 states that, as well as damaging the character and biodiversity of a neighbourhood, paving can also increase surface water run-off, which adds pressure to the drainage network and increases the risk of surface water flooding.

Camden Planning Guidance CPG1[21] states that permission will not be granted for hard standings greater than 5m2 that do not incorporate Sustainable Drainage Systems or just SuDS as it has been previously mentioned throughout the document and no more than 50% of the frontage area should become hard landscape.

Camden's Local Plan Policy T2[22] also limits the availability of parking in the borough and requires all new developments to be car-free, reducing the amount of hardstanding required for new development sites.

The following table summarises the key activity for the planning and development control areas.

Table 4:7: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Improving flood risk management through development

Stakeholder	Measure	Deadline
Camden Council	Review Strategic Flood Risk Assessment in advance of new Local Plan and identify whether other areas in Camden should be designated as Local Flood Risk Zones, including those flooded in July 2021	By 2025
Camden Council	Review the drainage implications of all major planning applications	Ongoing
Camden Council	Review the flood risk of basement developments in streets identified to be at high risk of flooding or areas with elevated risk of groundwater flooding	Ongoing

[21] Camden Planning Guidance (CPG) https://www.camden.gov.uk/planning-policy-documents
[22] Camden's Local Plan Policy T2

4.5 Additional flood alleviation measures

The Council in its role as LLFA will seek other innovative routes to alleviating flood risk, including working with utility companies other than Thames Water to coordinate streetworks with cost-effective SuDS. We will also use SuDS opportunity mapping produced through the London Strategic SuDS pilot (a project to evaluate the benefits of small retrofit sustainable drainage systems (SuDS) features dispersed across a catchment) to identify areas for small SuDS interventions.

The Council will also complete a review of Council-owned homes to identify the risk profile of our tenants, reduce risk and increase flood preparedness where possible. This will be supported by the Environment Agency with access to delivery frameworks for flood risk management schemes.

The following table summarises the key activity for this area.

Table 4:8: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Additional measures to alleviate flood risk

Stakeholder	Measure	Deadline
Camden Council and GLA	Work with utility providers to identify collaboration opportunities to simultaneously install sustainable drainage. Seek to complete pilot project, subject to opportunity and funding	2023-2024
Camden Council	Complete a review of Camden-owned homes that are at risk of flooding and identify opportunities to reduce risk and increase flood preparedness	By 2024
Camden Council	Identify potential drainage interventions in areas of greatest risk of flooding, in addition to named studies, and apply for funding to support delivery of surface water flood management schemes	Ongoing
Environment Agency	Support Risk Management Authorities with access to key EA delivery frameworks to support any future surface water flood risk projects	From 2022
Camden Council	Expand SuDS opportunity mapping to identify and implement small scale interventions to manage surface water flood risk	From 2022

5. Flood preparedness, response, and asset management

This section explains how flood risk management will be approach through the following on-going activities:

- Recording and maintaining assets
- Responding to flood incidents
- Investigating incidents of flooding
- Communicating about flood risk

5.1 Recording and Maintaining Assets

Flood risk assets refer to all structures or physical features that have an effect on flood risk in an area. These include everything from the Hampstead Heath Ponds to highways gullies. DEFRA has provided full guidance on what constitutes a flood risk asset.

Well maintained assets cannot prevent flooding, but they can lessen its impact and probability. For example, new Thames Water sewers are designed to cope with events which have a 3.3% chance of happening in any one year. When a rainfall event happens which is less probable than this, such as the 2002 and 2021 floods, they are likely to overflow causing flooding.

5.1.1 Asset Register and Record

As the LLFA, the Council is obliged to establish and maintain a register of structures or features which are likely to have a significant effect on flood risk in its area. This must be available for inspection at all reasonable times. The Council must also produce a record detailing the ownership and state of repair of each asset, which is not publicly accessible.

The LLFA must determine the criteria for deeming an asset as having a significant effect. In Camden an asset is deemed to be significant if it is:

of such significant size that its failure could cause drainage problems on its own; or
located within an area considered to be at a relatively high probability of flood risk; or
identified as having an impact on an area considered to be at a relatively high probability of flood risk.

The Council will integrate the current flood asset register within its existing highways and infrastructure Asset Management Plan and extend the Asset Register to areas affected by the July 2021 flooding that are not part of its current geographic scope.

The asset register is available for inspection[23].

The following table summarises the key activity for this area of work.

[23] Further information on Camden's Flood Asset Register: https://www.camden.gov.uk/flooding#qslg

Table 5:1: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Asset register and record

Stakeholder	Measure	Deadline
Camden Council	Update and maintain the Flood Asset Register in consultation with other flood asset owners	Ongoing
Camden Council	Seek to combine the Flood Asset Register with the Council's highways asset management systems to improve condition information	2022-2023
Camden Council, Thames Water and other asset owners	Review the flood asset register and update the areas of coverage if further assets are deemed to have a significant effect on flood risk in Camden	By 2027

5.1.2 Maintaining Assets

All asset owners are responsible for maintaining their own assets. Information on asset ownership can be found in **Appendix C**.

The Council is responsible for maintaining over 9,500 gullies covering all the roads in Camden except 'Red Routes', which are maintained by Transport for London. Gully cleansing is carried out by the Engineering team on a cyclical basis with all gullies cleaned at least once a year and gullies in higher flood risk areas cleaned four times a year. The frequency with which gullies are cleansed is based on best practice guidance and historic data.

Residents are encouraged to report blocked gullies when identified[24]. When a report of a blocked gully is made, the team will respond within 24 hours to investigate the problem.
The following table summarises the key activity for this area.

Table 5:2: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Maintaining assets

Stakeholder	Measure	Deadline
Camden Council	Regularly review gully clearance regime to ensure that maintenance and clearance is sufficient in known flood risk areas such as South End Green and South Hampstead	Ongoing

[24] More information on how to report a blocked gulley: https://www.camden.gov.uk/report-street-issue#rgky

5.1.3 Designation of Assets

The Council and the Environment Agency are the 'designating' authorities of flood risk assets. That is, we may 'designate' features or structures. If an asset becomes designated, its owner cannot alter or remove it without first consulting the designating authority. The aim of designating flood risk assets is to safeguard against unchecked works which could increase flood risk. It is not possible to designate assets owned by a risk management authority so no Thames Water or City of London Corporation assets (including the Hampstead Heath Ponds) can be designated although this does not diminish their responsibility for maintaining them as asset owners.

5.2 Responding to Flood Incidents

Flooding comes in a variety of forms with varying levels of seriousness. For the sake of clarity, flood incidents will be divided into the following types:

- Ponding- This is a common occurrence after heavy rain and is characterised by puddles of water on roads and sometimes footpaths which have neither drained away nor evaporated. The water is neither causing serious disruption nor threatening buildings or critical infrastructure.
- Disruptive flooding- This is flooding which is making it harder for people to carry on as normal by blocking roads and pathways or forcing the cordoning off of parks and other open spaces. It is not threatening buildings, people or critical infrastructure.
- Damaging or dangerous flooding- This is flooding that enters buildings or critical infrastructure causing damage or is flowing at such rates as to cause serious danger to people.
- Preparation for responding to "damaging or dangerous flooding" is part of 'emergency planning' and is governed by Camden's Multi-Agency Flood Plan.

5.2.1 Multi Agency Flood Plan

The requirement to lead emergency planning and recovery after a flood event is coordinated through the Multi Agency Flood Plan for Camden. The plan was first produced following the surface water flooding events throughout the UK in 2007.

Camden's Multi-Agency Flood Plan (MAFP) defines how all risk management authorities will respond in a flood event to reduce the impact on the public and key infrastructure. The plan defines the nature of flood risk in Camden and the trigger points for plan activation.

Camden Council's Emergency Management service along with local Borough Resilience Forum, made up of emergency service partners in Camden, produce the MAFP. Maintenance, review, and exercise cycle of the MAFP are led by the Council. The MAFP is reviewed and updated on a 3 yearly cycle but may be amended within these timeframes should a flood event prove that amendments are required. The MAFP has been updated with learning from the July 2021 flood event and is under consultation with the Borough Resilience Forum, concluding in September 2022.

The plan is made available for review and comment to London Resilience Group (LRG) and the Department for Environment Food & Rural Affairs (DEFRA).

There are clear and robust roles and responsibilities in the MAFP which align with the Joint Emergency Services Interoperability Programme (JESIP) principles to ensure a coordinated response.

In a flooding event, overall responsibility for activating the MAFP lies with the Police and the Council's Emergency Management team. Upon activation of the plan, all relevant organisations would be notified and they would decide on the level of response required.

In a major rainfall event, the ability of local emergency services to be able to help everybody is limited and will focus on preservation of life. In major flood events, the Council will look to help those who are vulnerable and cannot help themselves through family and friends by organising short term temporary shelter in Emergency Respite Centres.

The Flood Investigation Report into the July 2021 flooding (**Section 3.2.3**) concluded that all agencies and authorities were proactive in their response to the incident. However, the limited warnings available in advance of flooding; the rapid onset of the flood event; and pace of information exchange between agencies, were limiting factors to the response in Camden.

The following table summarises the key activity for maintaining and improving the Multi-Agency Flood Plan.

Table 5:3: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Multi-agency flood plan

Stakeholder	Measure	Deadline
Camden Council and Borough Resilience Forum partners	Regularly review the Multi-agency Flood Plan working with other first responders in Camden	Ongoing

5.2.2 Flood Warnings

The Met Office's national severe weather warning service provides warnings of hazardous weather to the public.

There are two categories:

- Alerts which indicate the risk of severe weather over the next 2 to 5 days.
- Warnings which indicate the risk of severe weather during the next 24 hours.

When the Emergency Management team receives alerts, they inform relevant services and partners and ask that they undertake appropriate risk mitigation. Processes are being improved further to the findings of the 2021 Flood Investigation report - for example, the Engineering service will now check how recently the critical gullies have been cleared and if necessary, send out the gulley crew.

Any reported flood incidents will be immediately reported to the Borough Emergency Control Centre. To ensure that the Council has as much information available as possible on the likelihood of surface water and sewer flooding occurring, we will undertake a review of the available flood warnings systems to identify if any improvements can be made to increase our preparedness for these events.

The following table summarises the key activity for reviewing and improving our flood warnings in Camden.

Table 5:4: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Flood warnings

Stakeholder	Measure	Deadline
Camden Council	Complete a review of the Council's flood warnings and identify any opportunities for improvement, to help increase preparedness for flash flooding	2023

5.2.3 Recovery after a flood incident

Recovery from an incident will begin as soon as possible. As the floodwater recedes, the emergency response may still be on-going while the recovery phase begins. If it is a minor flood, recovery activities such as cleaning of streets will usually form part of normal operations without special arrangements. If it is a severe flood affecting many people and properties, it will require a co-ordinated response through a specifically established Recovery Coordinating Group which will determine local strategies in recovery, prioritising needs and allocating resources appropriately so that the community returns to normality as soon as possible. The Council will take the lead in chairing and managing the recovery process.

The following table summarises the key activity for recovering from flooding.

Table 5:5: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Flood recovery

Stakeholder	Measure	Deadline
Camden Council, MAFP partners	When significant flooding occurs, convene a Recovery Coordinating Group to determine local strategies and implement them as appropriate	As required

5.3 Flood Investigation Reports

As the LLFA, the Council has a responsibility to produce a Flood Investigation Report for any significant flood events.

The criteria for triggering a formal Flood Investigation Report are determined by the Lead Local Flood Authority. Current policy is that the following two criteria should be met:

- The incident resulted in internal flooding of at least three properties; and
- There is ambiguity about the source or responsibility of the flood (e.g. it is not clearly the result of a burst water pipe)

Investigations will involve consultation with the relevant stakeholders, residents, landowners and private organisations. In the event that a flood event has affected more than one area, a single Flood Investigation Report will be produced.

Flood Investigation Reports aim to provide an enhanced understanding of the mechanisms of the flooding and potential long-term solutions, with a primary focus on the actions and duties of the risk management authorities. Further recommendations will also be made to highlight potential future flood risk mitigation.

Reports seek to provide a clear and thorough understanding of the flooding situation, but our duty to investigate does not extend to implementing measures to prevent future flooding. Decisions to take action must be taken by the responsible parties and we cannot force other authorities into action. However, the investigations can act as a catalyst for change.

Flood Investigation Reports will normally be published on our website within six months of an incident being reported to us. However, there may be cases where this timeframe will be extended (e.g. widespread flooding across the borough such as in 2021).

Until July 2021 there had not been any reported flood events that met the criteria for a Flood Investigation Report. The Flood Investigation Report into the July 2021 is summarised in Section 3.2.3.

Table 5:6: Actions for delivery under the Camden Flood Risk Management Strategy 2022-

Stakeholder	Measure	Deadline
Camden Council	Undertake Flood Investigation for any significant flood event in Camden, as defined by the Flood Risk Management Strategy	As required

5.4 Communicating with the public on flood risk

Flood risk is an understandably emotive issue and needs to be explained sensitively to residents and organisations.

The key messages are:

- Flooding is rare in Camden but when it does occur the impact can be severe and it is important that everybody is as prepared as reasonably possible for it;
- It is the responsibility of building owners to protect their building from flooding. There is advice available to help understand flood risk and prepare for flooding.
- It is important that we increase our knowledge of flood risk so that we can reduce that risk. Without knowledge we cannot take action;
- We can never be sure, to individual property level, where will be affected by flooding and we shall not publish maps to suggest that we can; and
- The Council as LLFA has a programme of work to reduce flood risk where practical affordable solutions can be found.

It is the responsibility of all flood risk management stakeholders to communicate these messages to residents and organisations in Camden. The Greater London Authority, working closely with the Council, produced a leaflet which was delivered to all basement properties across London over the summer of 2022 communicating some of the key flood risk messages.

The Council will update our advice to residents and work with the Camden Climate Change Alliance to provide information on flood resilience to organisations in Camden.

Table 5:7: Actions for delivery under the Camden Flood Risk Management Strategy 2022-

Stakeholder	Measure	Deadline
Camden Council, GLA, London Councils, Thames Water	Provide properties at the greatest risk of flooding with access to information about flood risk to their property; how to prepare for flooding; and how to respond when flooding occurs	2022-23
Camden Council	Update online flood risk advice for residents and work with the Camden Climate Change Alliance in Camden to improve flood resilience and preparedness of Camden organisations	2022-23

6. Monitoring and Review

A bi-annual update will be published to share progress on the measures outlined in this Flood Risk Management Strategy. The update will include new actions developed in response to completed feasibility work or information about completed flood risk alleviation projects.

Bi-annual progress updates will be supplemented by updates throughout the period to communicate project progress and raise awareness of flood risk in the borough.

A fuller review of the Strategy will take place following measures being proposed for the new regional Flood Risk Management Plan from 2028. In the event of either a major flooding incident or a significant change in the legislation, the actions or the timing of this may be reviewed.

Table 6:1: Actions for delivery under the Camden Flood Risk Management Strategy 2022-2027 – Monitoring and review

Stakeholder	Measure	Deadline
Camden Council	Provide a biannual update on the progress of delivery of the Flood Risk Management Strategy	Bi-annually
Camden Council	Produce a new Flood Risk Management Strategy for Camden	2028

Appendix A: Legislative Framework

1. The Flood Risk Regulations (2009)

The Flood Risk Regulations came into force in December 2009 and transposed the EU Floods Directive into law for England and Wales. The Flood Risk Regulations require three main pieces of work:

- *Preliminary Flood Risk Assessment (PFRA)* – This involves collecting information on past and future floods from surface water, groundwater and small watercourses, assembling the information into a PFRA report (the report for the London Borough of Camden can be found **here**) and identifying Indicative Flood Risk Areas. There is an Indicative Flood Risk Area which covers the whole of Greater London.
- *Flood Hazard and Flood Risk Maps* – Following the identification of Flood Risk Areas, the Environment Agency and Lead Local Flood Authorities are required to produce hazard and risk maps for Indicative Flood Risk Areas by 22nd December 2013.
- *Flood Risk Management Plans* – The final stage is for the Council to produce a Flood Risk Management Plan for the Indicative Flood Risk Areas by 22nd December 2015. This will be based on the Local Strategy and the Surface Water Management Plan

All of these actions will then be repeated on a six yearly cycle with a new PFRA expected in 2017, new Flood Hazard and Flood Risk Maps in 2019 and a new Flood Risk Management Plan in 2021.

2. Flood and Water Management Act (FWMA) 2010

The Flood and Water Management Act aims to improve both flood risk management and the way water resources are managed. It creates clearer roles and responsibilities through defining flood 'risk management authorities' and instils a risk-based approach to flood and water management. There is a lead role for local authorities in managing local flood risks and a strategic overview role of all flood risk for the Environment Agency. Section 13 of the FWMA places a duty to cooperate on the flood risk management authorities in the exercise of their functions. The way in which we deliver this is through working in partnership.

3. Town & Country Planning (Development Management Procedure) (England) Order 2015

In April 2015 planning legislation was amended to make LLFA's statutory consultees for all major development proposals with surface water implications during the planning process. This applies to development within any flood zone.

The Environment Agency is a statutory consultee for major development proposals within Flood Zone 2 and Flood Zone 3, and for developments in Flood Zone 1 within an area defined by the Agency as having critical drainage problems. The entirety of Camden is a Flood Zone 1.

4. The Land Drainage Act (1991)

This act outlines the duties and powers to manage land drainage for a number of bodies including the Environment Agency, Internal Drainage Boards, local authorities, navigation authorities and riparian owners. However as there are no ordinary watercourses[25] or open rivers in Camden this act has less impact then it does in other parts of the country. The Regent's Canal is fully owned by the Canal & River Trust and is not affected by this act.

5. The Highways Act 1980

The Highways Act covers a large range of activities and responsibilities that Highways Authorities have. In Camden, the two highways authorities are Transport for London for the 'red routes' and Camden Council for all other roads.

The Highways Act states that the highway authority may construct drains and take actions to diver surface water into them for the purpose of draining the highways. Highways have a responsibility for ensuring that the highways drain fully and can take actions to clean out drains and watercourses which prevent this happening.

6. The Climate Change Act (2008)

This act requires a UK-wide Climate Change Risk Assessment every five years, the first of which was published in 2012 (see Appendix A). This is to be accompanied by a National Adaptation Programme to tackle the risks identified in the climate change risk assessment. Once it is published it will also be reviewed every five years. The Act has given the Government powers to require public bodies and statutory organisations such as water companies to report on how they are adapting to climate change.

7. Water Framework Directive (2000/60/EC) (WFD)

This is a European Directive which aims to protect and improve the water environment. It is implemented through River Basin Management Plans (RBMPs), and establishes a legal framework for the protection, improvement and sustainable use of water bodies across Europe.
WFD applies to all water bodies, including rivers, streams, brooks, lakes, estuaries and canals, coastal waters out to one mile from low water, and groundwater bodies.

[25] Ordinary watercourses are defined as any ditch, drain or stream through which water flows which is not part of a main river or sewer system.

8. Reservoirs Act (1975)

This act focuses on the management of reservoirs and provides the following definitions:
(a) a reservoir is a "raised reservoir" if it is designed to hold, or capable of holding, water above the natural level of any part of the land adjoining the reservoir; and
(b) a raised reservoir is a "large raised reservoir" if it is designed to hold, or capable of holding, more than 25,000 cubic metres of water above that level.
The undertaker of a reservoir is the person who controls the use of the reservoir. They are obliged to produce onsite reservoir flood plans. The Environment Agency is responsible for regulating this. The Flood and Water Management Act changed the legislation so that all reservoirs over 10,000m3 must have flood plans.

9. The Water Industry Act 1991

This act outlines the roles of Water Supply and Water and Sewerage Companies. The relevant section for Flood Risk Management is Part IV which deals with sewerage services. It also looks at the general powers and duties of water companies including concerning water supply and their ability to charge for services.

The act was principally amended by The Water Industry Act 1999 and the Water Act 2003.

10. The Strategic Environmental Assessment (SEA) Directive (2001)

This legislation aims to increase the consideration of environmental issues during decision making related to strategic documents such as plans, programmes or strategies. The SEA identifies the significant environmental effects that are likely to result due to the implementation of a plan, programme or strategy.

Guidance on the production of Local Flood Risk Management Strategies refers to the need for them to be subject to SEA, stating that "the Local FRM Strategy is likely to require statutory SEA, but this requirement is something the LLFA must consider".

The London Borough of Camden considers that our FRMS does require SEA. It is also noted that the guidance recognises that "LLFAs should take a proportionate approach to applying SEA to local strategies particularly when environmental effects are not evident in the early stages of plan development. As the detail of plans develops, SEA should be reviewed".

None of the measures in the FRMS are considered likely to have significant negative effects on any of the SEA objectives. This is because of the nature of the FRMS, which has an underlying aim of environmental protection through flood risk management, meaning that the effects of the strategy are largely positive.

A SEA was undertaken for Camden's first FRMS (2013) and this concluded that the action proposed would have largely positive impacts and as such have decided not to produce a SEA for the revised FRMS.

Appendix B: Guide to relevant documents

National

National Flood and Coastal Erosion Risk Management Strategy for England (FCERM) (2020)

The Flood and Water Management Act gives the Environment Agency a national strategic overview role for flood risk management and places on them a requirement to develop the National Strategy for FCERM in England. This strategy provides a framework for the work of all Lead Local Flood Authorities.

The National Strategy sets out the Government's national approach to flood risk and coastal erosion through its long-term vision and ambitions for managing this risk, and the measures to deliver it. It sets the context for and informs on the production of local flood risk management strategies by Lead Local Flood Authorities. Local strategies provide the framework for the delivery of local improvements needed to help communities to manage local flood risk. They also aim to encourage more effective flood risk management by enabling people, communities, business and the public sector to work together.

The vision and ambitions of the National Strategy are set out below. This strategy recognises the need to integrate flood and water management within a wide range of direct and indirect agendas to enable our businesses, communities and infrastructure to become better adapted to flood risk whilst at the same time helping to tackle climate change and biodiversity challenges.

Vision: A nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.

Ambitions:

- Climate resilient places: working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change
- Today's growth and infrastructure resilient in tomorrow's climate: Making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as resilient infrastructure.
- A nation ready to respond and adapt to flooding and coastal change: Ensuring local people understand their risk to flooding and coastal change, and know their responsibilities and how to take action

Our Flood Risk Management Strategy supports the local delivery of the high level ambitions set out in the Environment Agency's National FCERM Strategy by ensuring our vision and themes are locally appropriate whilst remaining in alignment with those of the national strategy.

UK Climate Change Risk Assessment 2022

As required by the Climate Change Act 2008, the UK government has undertaken the third five-year assessment of the risks of climate change on the UK. This is based on the Independent Assessment of UK Climate Risk, the statutory advice provided by the Climate Change Committee (CCC), commissioned by the UK government and devolved administrations.
The risk assessment considers sixty-one UK-wide climate risks and opportunities cutting across multiple sectors of the economy and prioritises the following eight risk areas for action in the next two years:

- risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards
- risks to soil health from increased flooding and drought
- risks to natural carbon stores and sequestration from multiple hazards
- risks to crops, livestock and commercial trees from multiple climate hazards
- risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks
- risks to people and the economy from climate-related failure of the power system
- risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings
- multiple risks to the UK from climate change impacts overseas

A Green Future: 25 Year Environment Plan

The 25 Year Environment Plan (YEP), published in 2018, sets out what government will do to improve the environment, within a generation, focusing on improving the UK's air and water quality and protecting threatened plants, trees and wildlife species. It details how those in government will work with communities and businesses to do this over the next 25 years.
There are 10 goals of the Environment Plan and the one most applicable to flood and water management is 'reducing the risks of harm from environmental hazards' which will be achieved through:

- making sure everyone is able to access the information they need to assess any risks to their lives and livelihoods, health and prosperity posed by flooding and coastal erosion.
- bringing the public, private and third sectors together to work with communities and individuals to reduce the risk of harm
- making sure that decisions on land use, including development, reflect the level of current and future flood risk.
- boosting the long-term resilience of our homes, businesses and infrastructure.

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied by Local Planning Authorities (LPA) and decision-makers, both in drawing up plans and making decisions about planning applications. Section 14 of the NPPF sets out how the challenges of climate change, flooding and coastal change will be approached through planning and development.

The interpretation of the NPPF is supported by the Planning Practice Guidance (PPG). This is a web-based resource which sets out how the government's planning policies are expected to be applied in England. The flood risk and coastal change section of the PPG advises how to take account of and address the risks associated with flooding and coastal change in the planning process.

In broad terms, this national framework requires plans and developments to:

- Take into account climate change over the longer term to avoid increased vulnerability to the range of impacts arising from climate change.
- Develop policies to manage flood risk from all sources, taking account of advice from the flood risk management authorities (RMAs).

- Ensure new development does not increase flood risk elsewhere.
- Avoid inappropriate development in areas at risk of flooding by directing development away from areas at highest risk.
- Where development is necessary, make it safe without increasing flood risk elsewhere and direct the most vulnerable development to areas of lowest flood risk.
- Be supported by an appropriate site-specific Flood Risk Assessment, where one is required.
- Ensure development is appropriately flood resilient and resistant.
- Major development should incorporate sustainable drainage systems (SuDS) which should meet the Technical Standards for SuDS.

Regional

Flood Risk Management Plan for the Thames River Basin District

The Thames River Basin District (RBD) covers over 16,200 square kilometres. It spans from northern Oxfordshire and Gloucester, southwards to the north of Hampshire, across to the Thames Estuary and northern Kent in the east. It also covers all of Greater London. Over 15 million people live in the Thames RBD.

Flood risk management plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work with communities to manage flood and coastal risk over the next 6 years. Risk management authorities include the Environment Agency, local councils, internal drainage boards, Highways England and lead local flood authorities (LLFAs).

The current cycle is from 2015 to 2021. The draft second cycle Flood Risk Management Plans (FRMP) 2021-2027 has been consulted on, closing in January 2022 and due to be published later in the year.

The draft second cycle Flood Risk Management Plans (FRMP) is a plan to manage significant flood risk in the Flood Risk Areas (FRAs) identified within the Thames River Basin District (RBD). Producing the plan for these areas is a requirement of the Flood Risk Regulations (2009). However, it is recognised that there are areas at risk of flooding outside of these FRAs. Therefore, the Environment Agency and other Risk Management Authorities (RMAs) will continue to plan for and manage the risk of flooding to all communities. This is regardless of whether they are in a FRA or not. For example, RMAs carry out flood risk management interventions such as warning and informing and capital investment and maintenance programmes.

This draft plan has been expanded to show what is happening across the RBD and in locally important areas, referred to as ‘Strategic Areas’. In the Thames RBD, Strategic Areas were put forward by the Environment Agency providing these were not already designated FRAs. The Environment Agency and other RMAs, in particular Lead Local Flood Authorities (LLFAs), worked together to develop the first cycle FRMP. This created a plan to manage the risk from all sources of flooding. The second cycle FRMP will build on this approach. The ambition is that the FRMP is a strategic, place-based plan that shows what is happening in flood risk management across the Thames RBD. It is closely aligned with the:

- The government's 25 Year Environment Plan
- National Flood and Coastal Erosion Risk Management Strategy for England (FCERM strategy)

The second cycle FRMP will encourage closer ways of working between RMAs that will help to achieve its revised objectives and measures. More information on the background to FRMPs, the Flood Risk Regulations, and how FRAs were identified, is in 'Part A: National Overview of Flood Risk Management in England for Second Cycle FRMPs'. The draft FRMP is also aligned with the draft River Basin Management Plan for the Thames RBD. Together, these plans set the strategic goals and approaches to managing water and flood risk within the RBD

Thames Estuary 2100 (TE2100)

The Thames Estuary 2100 Plan sets out how the Environment Agency and partners can work together to manage tidal flood risk in the Thames Estuary.

Climate change, ageing flood defences and population growth mean tidal flood risk will increase over time, unless this risk is carefully managed. The Thames Estuary 2100 Plan aims to protect 1.4 million people, £320 billion worth of property and critical infrastructure from increasing tidal flood risk.

The Plan aims to:
- manage the risk of flooding to people, property and the environment
- adapt to the challenges of climate change
- ensure sustainable and resilient development in the floodplain
- protect the social, cultural and commercial value of the tidal Thames, tributaries and floodplain
- enhance and restore ecosystems and maximise benefits of natural floods

Thames Water Drainage and Wastewater Management Plan

A Drainage and Wastewater Management Plan (DWMP) is 'a long-term strategic plan that sets out how wastewater systems, and the drainage networks that impact them, are to be extended, improved and maintained to ensure they are robust and resilient to future pressures'.

The planning period is 25 years, from 2025 to 2050. DWMP is iterated every five years with the first one known as 'cycle 1' to be published as a final plan in March 2023. The DWMP process identifies the impact of climate change and growth on catchments in the Thames Water area and develops a strategic-level investment plan for those most affected. It provides a long-term (25-year) view of investment to ensure a resilient wastewater service to inform medium-term planning. The DWMP provides an unconstrained, strategic view of risk and possible interventions. The subsequent medium-term plan produced for price reviews is more granular and constrained as it balances the long-term needs against other competing requirements to keep bills affordable.

The DWMP vision is working in partnership to co-create a 25-year plan for drainage and wastewater that sustainably benefits communities and the natural environment in Thames Water's region. The DWMP aim is to identify future catchment risks to our drainage and wastewater treatment systems and develop sustainable solutions to address them.

The DWMP aims to

- Protect the environment
- Look after the health of rivers
- Limit the risks of flooding
- Generate wider benefits for the community

London Sustainable Drainage Action Plan

The London Sustainable Drainage Action Plan addresses a specific need to promote the awareness, and the retrofitting, of sustainable drainage systems right across London. It contains a series of actions to make drainage system work in a more natural way which will bring a wide range of benefits including:

- steadily reducing flood risks by easing the burden on our drains and sewers
- reducing pollution of our tributary rivers and streams
- creating more pleasant landscapes, streets and settings for London's buildings
- providing opportunities to save water
- providing opportunities for school activities and studies related to the water cycle.

The main focus of the action plan is on the retrofitting of sustainable drainage to existing buildings, land and infrastructure. A key aim is to identify when and where other planned maintenance, repair or improvement works are scheduled and then to identify opportunities to retrofit sustainable drainage as part of those works. The action plan aims to set the direction for the next 20 years, but included 40 actions specifically for five years to 2021.

London Surface Water Management Plan (LSWMP)

The flooding in London in July 2021 led to significant political and partnership interest, and a number of reports on surface water management in London. In response, a group of partners convened to scope out the work needed to ensure that London has a cohesive vision, strategy and plan to manage surface water.

A commitment has been made from lead partners, including the Environment Agency, Greater London Authority, London Councils, Thames Water, and Transport for London to establish a Strategic Group for surface water flood risk management to provide leadership, agree a vision, and develop a strategy and plan to achieve the vision.

The aim of the LSWMP stakeholder group is to initially identify governance and resource for Surface Water Flooding Strategic Group and consider the scope of strategic plan and initial evidence gathering, with a view to launch a Strategic Group December 2022. The draft Strategy will be published in 2023.

London Plan 2021

The London Plan 2021 is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for Good Growth.

The Plan is part of the statutory development plan for London, meaning that the policies in the Plan should inform decisions on planning applications across the capital. Borough's Local Plans must be in 'general conformity' with the London Plan, ensuring that the planning system for London operates in a joined-up way and reflects the overall strategy for how London can develop sustainably, which the London Plan sets out.

The London Plan includes policies on Flood Risk Management (SI 12) and Sustainable Drainage (SI 13) which sets out a preference for managing surface water run off as close to the source as possible and using green/blue roofs or raingardens to store water before releasing slowly into the sewers.

Local

Strategic Flood Risk Assessment (SFRA)

The National Planning Policy Framework (NPPF) and associated Planning Practice Guidance for Flood Risk and Coastal Change emphasise the active role Local Planning Authorities (LPAs) such as the London Borough of Camden, should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process.
The NPPF outlines that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and LPAs should use the findings to inform strategic land use planning. The purpose of the SFRA is to collate and present the most up to date flood risk information for use by Camden to inform the preparation of robust planning documents as part of the Camden Local Plan and prudent decision-making by Development Management officers on a day-to-day basis.

Surface Water Management Plan (SWMP)

Surface Water Management Plans are non-statutory documents, which outline the preferred surface water management strategy for a particular area. Lead Local Flood Authorities can choose to produce them in order to better understand their surface water flood risk and inform the local flood risk management strategies.

The Camden SWMP was completed in July 2011 as part of the Drain London project. The SWMP had the following objectives:

- Develop a robust understanding of surface water flood risk in and around the London Borough of Camden, taking into account the challenges of climate change, population and demographic change and increasing urbanisation in London;
- Identify, define and prioritise Critical Drainage Areas, including further definition of existing local flood risk zones and mapping new areas of potential flood risk (see definitions in Section 3.8);
- Make holistic and multifunctional recommendations for surface water management which improve emergency and land use planning, and enable better flood risk and drainage infrastructure investments;

- Establish and consolidate partnerships between key drainage stakeholders to facilitate a collaborative culture of data, skills, resource and knowledge sharing, and closer coordination to utilise cross boundary working opportunities;
- Undertake engagement with stakeholders to raise awareness of surface water flooding, identify flood risks and assets, and agree mitigation measures and actions;
- Identify outputs to enable a real change on the ground rather than just reports and models, whereby partners and stakeholders take ownership of their flood risk and commit to delivery and maintenance of the recommended measures and actions;
- The SWMP suggested actions which were incorporated into Camden first FRMS (2013) and have informed our approach to this strategy. These actions included:
- Communications/Partnerships Actions to communicate risk internally or externally to LLFA or create/improve flood risk related partnerships
- Financial/Resourcing/Capacity Building Actions to secure funding internally/externally to support works or additional resources to deliver actions.
- Policy Action Spatial planning or development control actions.

Preliminary Flood Risk Assessment (PFRA)

A Preliminary Flood Risk Assessment (PFRA), and the identification of 'flood risk areas', is required to be produced by Lead Local Flood Authorities (LLFAs) under Section 10 of the Flood Risk Regulations (FRRs) 2009. The first PFRAs were produced in 2011 and Section 17 of the FRRs required LLFAs to review their PFRA and 'flood risk areas' in 2018. Subsequent reviews must be carried out at intervals of no more than 6 years.

A PFRA is an assessment of floods that have taken place in the past and floods that could take place in the future. It considers flooding from surface water runoff, groundwater and ordinary watercourses. PFRAs are used to identify areas that are at risk of significant flooding. These areas are called 'flood risk areas.' Existing 'flood risk areas' have been identified using guidance produced Defra and represent 'clusters' of areas where flood risk is an issue and where 30,000 people or more live.

PFRAs include:
- a summary of information on significant historic floods;
- a summary of information on future flood risks based primarily on the Environment Agency's national datasets;
- a spreadsheet containing information for reporting to the European Commission.

The PFRA was delivered to the Environment Agency for approval in June 2011 and published in December 2011 on their website. An addendum to the PFRA was produced in December 2017 and provided to the EA and published on the Camden website.

The Addendum to the PFRA highlights the progress in developing our understanding of flood risk in Camden between 2011-2017, and in particular our updated surface water flood risk modelling outlined in this FRMS.

Camden Multi-Agency Flood Plan

The aim of the multi-agency flood plan (MAFP) is to provide a co-ordinated multi-agency response to a major flooding event minimising impact to the public and key infrastructure. It is prepared, maintained and updated by the London Borough of Camden's Emergency planning team. This plan will be updated every two years or if new information or events require it. The following organisations were consulted in the development of the plan and are key partners in its delivery:

London Borough of Camden	London Ambulance Service	NHS North Central London
London Fire Brigade	Camden Police	British Red Cross
Environment Agency	Thames Water	Transport for London
Royal Free Hospital	University College London Hospital	

The Multi-Agency Flood Plan has the following objectives:

- Provide a framework for response activities.
- Manage the wider impact of borough flooding events to reduce disruption to the communities, utilities and environment.
- Manage precautionary actions to preserve life for the highest impact flood risks.
- To prioritise the identification and required responses to protect the vulnerable within the community.
- To support the Environment Agency in the provision of warnings to communities at flood risk although that has no direct application within the geography of Camden.
- Provide accurate and timely information to public and local business on flood response.
- Prepare key parts of the community susceptible to flooding through the provision of advice and information.
- Provide a framework for recovery activity to support the recovery of communities and business.

Appendix C: Stakeholder responsibilities

Risk Management Authorities

The flood and water management act recognises the following organisations to be risk management authorities:

- Lead Local Flood Authorities
- The Environment Agency
- Water Companies
- Highways Authorities
- Internal Drainage Boards (not applicable in Camden)
- District and Borough Councils (not applicable in Camden).

In Camden, the four organisations who are risk management authorities are the London Borough of Camden, Thames Water, the Environment Agency and Transport for London. All risk management authorities have the following duties and powers:

1. Duty to be subject to scrutiny from lead local flood authorities' democratic processes. They can be called to account for their actions by the Culture and Environment Scrutiny Committee.
2. Duty to co-operate with other risk management authorities in the exercise of their flood and coastal erosion risk management functions, including sharing flood risk management data.
3. Power to take on flood risk functions from another risk management authority when agreed by both sides

1. London Borough of Camden

The Flood and Water Management Act 2010 identified Camden as the Lead Local Flood Authority for its administrative area. This gives Camden a strategic role in overseeing the management of surface water runoff and groundwater flood risk as well as the following new powers:

- Power to do works to manage flood risk from surface runoff or groundwater;
- Power to designate structures and features that affect flooding;
- Powers to request information from any person in connection with the authority's flood and coastal erosion risk management functions;

It also gives the Lead Local Flood Authority new responsibilities which can be divided into the following areas:

- Strategic Leadership- bringing together stakeholders and leading on developing a strategy to manage flood risk in the borough.
- Meeting the Flood Risk Regulations
- Producing Flood Investigation Reports
- Maintaining Register and Record of Assets
- Designating Assets
- Recording Flood Incidents
- Implementing the SuDS Approval Body

As well as these new roles, some of Camden's longstanding responsibilities have important roles to play in flood risk management. These include:

- Responsibilities as a planning authority
- Responsibilities as a highways authority
- Responsibilities for emergency planning
- Responsibilities for parks and open spaces
- Responsibilities for social housing

2. Thames Water

Thames Water is responsible for both the supply and drainage of water in the borough. It has the following responsibilities around flood risk management:

- Provide, maintain and operate systems of public sewers and works for the purpose of effectively draining an area, including maintenance of all drains which serve more than one property or which extend beyond the property boundary.
- Respond to flooding incidents involving their assets.
- Undertake capacity improvements to alleviate sewer flooding problems with priority being given to more frequent internal flooding problems
- Adopt all new lateral drains and sewers that are to connect to a public sewer from 1 April 2013.
- Statutory consultee to the SuDS (Sustainable Drainage System) Approval Body when the drainage system is proposed to communicate with the public sewer.
- Maintains its reservoirs according to the standards of the reservoir act.
- N.B. Thames Water does not have:
- responsibility for highway drainage or land drainage until it reaches the sewer network;
- responsibility for drainage within the property boundary and serving one property

3. Environment Agency

The Environment Agency has an important strategic role in flood risk management across England including the following tasks:

- Publishing the National Strategy which provides a clear national framework for all forms of flood risk management
- Managing the Regional Flood and Coastal Committees (RFCCs) and support their decisions in allocating funding for flood defence and flood resilience schemes.
- Reviewing and supporting Lead Local Flood Authority activities
- Providing the data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities.
- Reporting and monitoring flood and coastal erosion risk management.

The Environment Agency also has a large operational role which mainly focuses on flooding from main rivers and the sea, which do not affect Camden . However the following two operational roles do affect Camden:

- Statutory consultee for all planning applications (other than minor development) in areas where there is a risk of flooding and for any site greater than 1 hectare in size. The Agency

will provide advice on Flood Risk and help the local planning authority to technically interpret developer's flood risk assessments that have been submitted as part of the evidence base in support of a planning application.
- Enforcement authority for reservoirs that are greater than 10,000m3 ensuring they have flood plans although reservoir owners are responsible for carrying out work to manage reservoir safety. The Environment Agency is also responsible for establishing and maintaining a register of reservoirs, and making this information available to the public.

4. Transport for London

Transport for London (TfL) is the local government body responsible for most aspects of the transport system in Greater London. It is responsible for the London Underground and its gullies and culverts and for ensuring that these assets do not cause flood risk. TfL are undertaking a climate risk assessment of its assets and operations and develop a prioritised action plans for key climate risks. As a highways authority it is identified by the Flood and Water Management Act as a risk management authority with all the responsibilities that role entails.

5. Residents and businesses

It is the responsibility of residents and businesses to look after their homes and properties, including protecting them from flooding. While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities.

For this reason there are some easy steps that all those with ground floor and basement homes or in premises in areas susceptible to surface water flooding should consider doing:

- Ensure they have flood insurance
- Put important documents out of flood risk and protect in polythene
- Identify what you would need to take with you if you had to leave your home
- Identify who can help you/ who you can help
- Make a flood plan and prepare a flood kit

A flood plan is a short plan providing important contact details and a checklist of actions you should take when at risk of flooding. The Environment Agency has designed one which can be found on the Environment Agency website www.environment-agency.gov.uk.
Some residents will be at greater risk of flooding in a major rainfall event than others. It is important that you understand your level of risk. Those who are based in areas of greater flood risk may also wish to consider protection measures for their home to stop flood water coming in or resilience measures to stop it causing lasting damage. More information can be found in the Preparing for flood events section.

The council will seek to deliver capital schemes to alleviate flood risk in areas identified as most at risk. The council will ensure that the affected communities are engaged early with the issues and are able to discuss it and share their concerns, interests and priorities and will rely on residents taking an active interest in order to make this process a success.

Other key stakeholders

6. The Greater London Authority

The Greater London Authority (GLA) is the strategic regional authority with powers over transport, policing, economic development and fire and emergency planning. Transport for London is a delivery agency of the GLA.
The GLA is not a lead local flood authority and has no statutory role in flood risk management. However it developed the Drain London project to improve knowledge of flood risk in London. It helped Camden produce a Surface Water Management Plan and Preliminary Flood Risk Assessment as required by the Flood Risk Regulations.

The Drain London project divided up boroughs into groups, loosely based on catchments. Camden is in a group with Hammersmith & Fulham, Islington, Westminster, Kensington & Chelsea and the City of London. This group continues to meet to discuss joint work.

7. City of London Corporation

The City of London Corporation is the local government for the City or 'Square mile' and as such is a Lead Local Flood Authority with responsibilities for flood risk management in its area. It is also the manager of Hampstead Heath and is responsible for management of the Hampstead and Highgate ponds which are impacted by the Reservoirs Act. Under the new legislation all of these ponds are considered reservoirs and hence require flood plans. If the ponds are in a chain then, should any one of the ponds be a reservoir, a plan is needed for the entire chain. More information about their potential risk can be found in the flood risk section.

8. Canal & River Trust

The Canal & River Trust, formerly British Waterways, are the owners of Regent's Canal which goes through Camden from the top of Regent's Park to York Way via Camden. The canal has a number of locks (Camden, Hawley, Kentish Town Road, and St Pancras) within Camden which are maintained by the Canal & River Trust. It is the responsibility of the Canal & River Trust to ensure that no flooding occurs from the canals network.

9. Network Rail

Network Rail is responsible for three mainline stations in Camden: Euston, St Pancras and King's Cross. All other stations are managed by either Transport for London or the mainline railway company. However Network Rail does manage the entire track from national rail services and the London Overground including cuttings, culverts and tunnels which can be crucial for flood risk. They are not risk management authorities but are responsible for ensuring that their assets are maintained and do not increase flood risk.

10. Neighbouring London boroughs

All London boroughs are Lead Local Flood Authorities for their area, with the same responsibilities as Camden. However water, of course, flows across organisational boundaries and so it is crucial to work closely with neighbouring boroughs to recognise where issues in Camden are caused by the situation in other boroughs and vice versa.

As well as the boroughs directly surrounding Camden (Islington, Westminster, Haringey, Brent and the City of London), Camden will also be working with Hammersmith & Fulham and Kensington & Chelsea because although they are not neighbours, they are part of the same catchment. This means water can potentially run from Camden through Westminster into both of these boroughs and so it is possible we may be able to contribute to solutions to their problems.

Appendix D: Delivered actions from 2013 Flood Risk Management Strategy

The tables below summarise the outcome of the actions set in the original 2013 strategy as well as further actions set out in the internal review of the strategy in 2016.

This is not an exhaustive list of actions completed to manage flood risk in Camden by risk management authorities. Further information of action taken is outlined in the Section 3 and throughout.

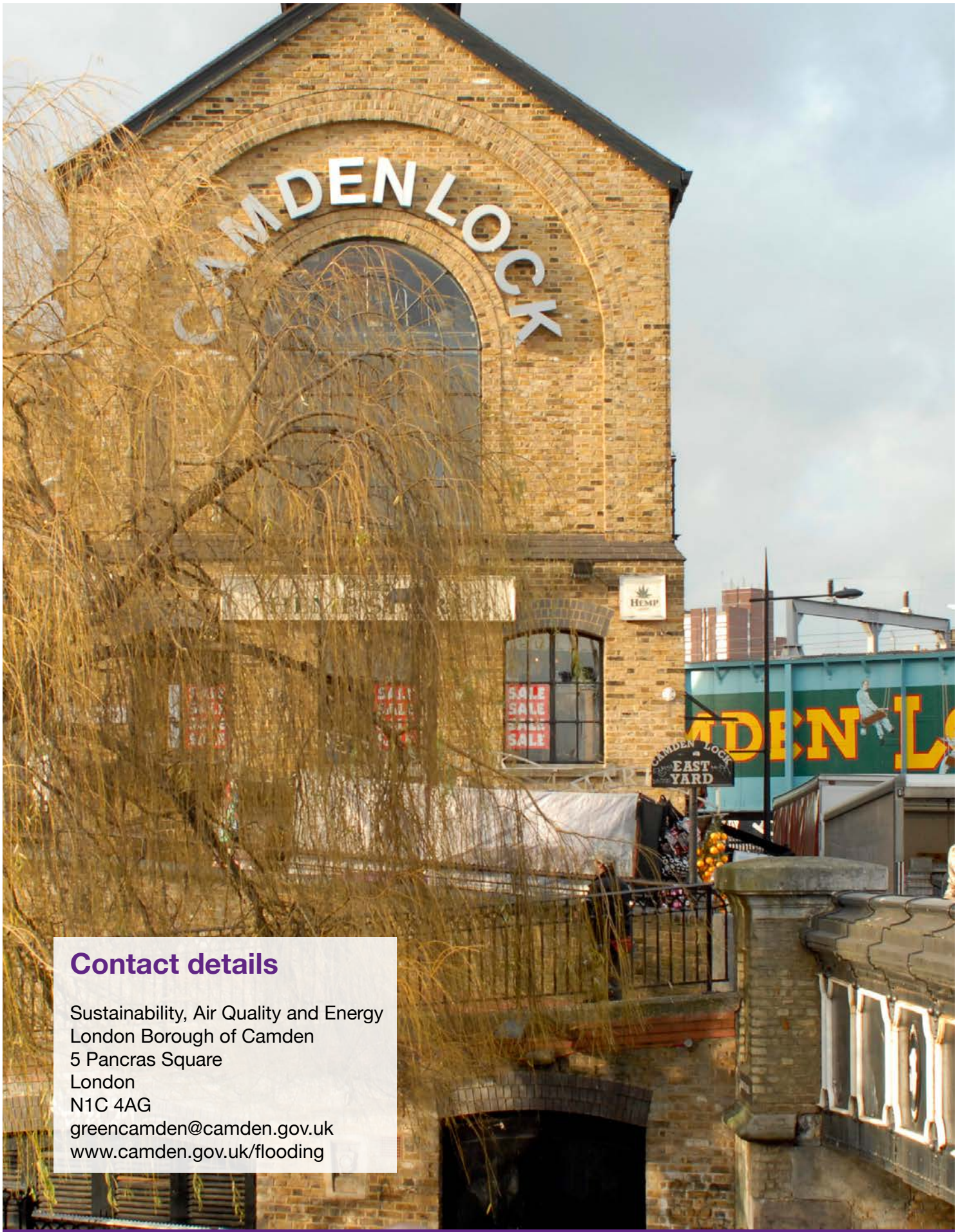
Key Action from the Camden Flood Risk Management Strategy (2013)

Stakeholder	Measure	Deadline	Outcome	Notes
DEFRA	Announce implementation timetable for SuDS approval body	June 2013	Action removed by Government	Replaced by LLFA planning duties within NPPF
Camden Council	Publication of advice to residents on Camden Council website	June 2013	Completed & ongoing	Updated as required
Camden Council	Submit appropriate local data to be incorporated into the flood risk and flood hazard maps	June 2013	Completed	Published in SFRA 2014 & on Environment Agency website
GLA	Begin investigation of Royal Free Hospital flood risk	June 2013	Completed	DRAIN London worked with 11 major hospitals to assess surface water risk
Thames Water	Complete modelling of Thames Water sewer system in Highgate and South Camden	July 2013	Completed - The model was updated in the Thames Water Asset Management Plan AMP4 (2010-2015).	The 'Beckton' model has continued to be maintained and updated through successive AMPs
Camden Council	Complete project appraisal report for West Camden	September 2013	Appraisal completed for Cannon Hill and Fairhazel Gardens	Further information on outputs of report are outlined in Section 3.6
City of London Corporation	Complete consultation on preferred option for Hampstead Ponds	September 2013	Completed	

Camden Council	Determine whether a new Strategic Flood Risk Assessment for Camden is required	September 2013	Completed & ongoing	SFRA published July 2014.
Environment Agency	Publish Flood Hazard and Flood Risk Maps	December 2013	Completed & ongoing	1st published Dec 2013. Updated Dec 2019.
City of London Corporation	Submission of detailed planning application for Hampstead Heath Ponds by City of London	February 2014	Completed	Submitted July 2014. Approved January 2015
GLA	Finish Assessment of Royal Free Flood Risk	March 2014	Completed DRAIN London worked with 11 major hospitals to assess surface water risk	Produced guidance for health sector and identified opportunities for funding
GLA	Publish London SuDS Guidance	March 2014	Completed & ongoing	London Sustainable Drainage Action Plan published Dec 2016

Additional actions from internal review of FRMS (2016)

Stakeholder	Measure	Deadline	Outcome	Notes
City of London Corporation	Complete dam restoration project on Hampstead Heath	2017-18	Completed	Construction completed 2016
Camden Council	Delivery of Project initial assessment for Somers Town area	April 2016	Completed	Somers Town Greening Strategy Implementation Plan completed, Mar 2016
Camden Council	Update Asset Register	Annually	Ongoing	
Camden Council	Review the drainage implications of all major planning applications	Ongoing	Complete and Ongoing	
City of London Corporation	Deliver the Hampstead Heath dam restoration project	2017-18	Completed	Construction completed 2016
Camden Council	Complete initial assessment of flood risk at Dartmouth Park with local residents	2015	Completed December 2015	More information provided in Section 3.4
Camden Council	Complete Project Appraisal Report for West Camden	2013	Completed September 2013	More information provided in Section 3.6
Camden Council	Continue targeted gully cleansing and maintenance across Camden	Ongoing	Complete and ongoing	Enhanced gully cleaning 4 times per year for priority areas



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we make Camden

Camden