Local Flood Risk Management Strategy 2015

A strategy to define the approach within the London Borough of Hillingdon to the management of flood risk from local sources, with proposals for measures and actions to help manage that risk.

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HILLINGDON
LONDON

Executive Summary

The production of this Strategy and its public consultation and specific elements of its contents are a legal requirement of the Flood and Water Management Act 2010.

Hillingdon is required to develop, maintain, apply and monitor a local strategy for local flood risk management in its area.

Local flood risk is defined as flooding caused by the following sources; surface water, groundwater, and ordinary watercourses.

This Local Flood Risk Management Strategy provides an overview of the assessment of flood risks already undertaken in other documents, and sets out a framework for the management of local flood risk in the London Borough of Hillingdon, by the Council and other relevant bodies.

This strategy is supported by the already published Flood Risk Management Portfolio of documentation which contains other critical legal documents such as the Preliminary Flood Risk Assessment, Strategic Flood Risk Assessment and Surface Water Management Plan Parts1 and 2. These provide the evidence base for this strategy with more detailed information on the flood risks in Hillingdon and actions.

These documents are recognised as complex and have been undertaken in compliance with the legislative requirements and are borough wide rather than on a site specific basis useful to residents.

The Council website, has therefore been updated with key information for residents, on the action to prepare for a flood event, and during a flood event and who to contact for different types of flooding.

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1. Introduction

1.1. What is a Local Flood Risk Management Strategy (FRMS)?

The Flood and Water **Management** Act (FWMA) 2010 requires a Lead Local Flood Authority (LLFA), to develop, maintain, apply and monitor a strategy for local flood risk management in its area. Local flood risk is defined by the Flood and Water Management Act as flooding from surface water, groundwater and ordinary watercourses.

The LLFA is responsible for ensuring a strategy is put in place. Hillingdon, as a London Borough and unitary authority, is a Lead Local Flood Authority and thus responsible for publishing a Local Flood Risk Management Strategy (LFRMS).

The Local Flood Risk Management Strategy, once approved by Cabinet, will be a statutory document, which will impact on the activities of all flood risk management authorities active in the Borough. These bodies will all have a 'duty to act consistently with the local strategy' when undertaking their flood and coastal erosion risk management functions and have a 'duty to have regard for the strategy' when discharging other duties that may affect flood and coastal risk (for example spatial planning and development).

This document will explain the need for a Local Flood Risk Management Strategy for Hillingdon, the evidence available to inform it, and the responsibilities each of the different parties has in managing flood risk. It will complement and support the national strategy.

It aims to be a coordinated plan which balances the needs of the communities, the economy and the environment, to support the aim of reducing flood risk, to the best of its abilities. The strategy will identify objectives, based on the available evidence, and set out ways to achieve them, within the limited resources available.

The strategy is supported by other documents all of which form the Flood Risk Portfolio of documentation for Hillingdon. These provide the flooding evidence and further information as to how Hillingdon is complying with other specific duties of the 'FWMA'.

1.2. What is local flood risk?

Local flooding is defined as flooding from surface water, groundwater and ordinary watercourses.

Flooding is a natural phenomenon, the adverse effects of which can be made worse by poor management of the landscape and environment and failure to address known risks.

These local sources of flooding are caused by storms which are hard to forecast, blockages or poor maintenance. There are also complex interactions between these sources and other sources such as sewer and river flooding. The consequential flooding is therefore unpredictable in location and severity.

There are a number of actions that can be taken to reduce the likelihood of local floods, including green infrastructure, Sustainable Drainage (SuDs) such as permeable surfacing, management of existing flood risk assets such as gullies, and adapting buildings.

Local flood risk management must promote adaptation and preparation in advance of an event rather than mobilisation during flood events, with the toleration of a residual level of risk, accepting that some disruption may be caused temporarily.

Flooding from these sources is generally more localised than flooding from rivers, but cooperation and integrated planning is required from all the risk management authorities involved in order to understand where the risks are and how to manage them effectively.

1.3. Why is a Local Flood Risk Management Strategy needed?

The last decade has witnessed some devastating floods across the country. The floods in summer 2007 were particularly severe, affecting a large number of communities. As a result the Government commissioned Sir Michael Pitt to review the flood risk in this country. Published in June 2008, the Pitt Review[1] identified six themes for improving the situation for those at risk of flooding:

- Knowing when and where it will flood,
- Improved planning and reducing the risk of flooding and its impact;
- Being rescued and cared for in an emergency;
- Maintaining power and water supplies and protecting essential services;
- Better advice and helping people to protect their families and homes; and
- Staying healthy and speeding up recovery.

The 92 recommendations made to Government, local authorities, Local Resilience Forums, providers of essential services, insurers and others, including the general public, were transposed into a new piece of legislation, namely the Flood and Water Management Act (FWMA) 2010.

The FWMA 2010, amongst many other duties, requires every LLFA to create a Flood Risk Management Strategy.

1.4. What should a Local Flood Risk Management Strategy contain?

This strategy has been prepared using the information which is currently available. This is liable to change with any new flood event, which may change at any time.

The Local Flood Risk Management Strategy must be consistent with the National Flood Risk Management Strategy[2] produced by the Environment Agency. The following six Guiding Principles have been included in the formation of this document:

- Community focus and partnership working
- A catchment and coastal cell based approach
- Sustainability
- Proportionate and risk based approaches
- Multiple benefits
- Beneficiaries should be allowed and encourage to invest in local flood risk management

Section 9 of the Flood and Water Management Act sets out the statutory requirements for Local Flood Risk Management Strategies. Table 1 sets out the requirements of the Local Flood Risk Management Strategy and details what the Strategy must specify in summary.

[1] http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html

[2] https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england

FWMA requirements	Section within LFRMS	Page
The Flood Risk Management Authorities in the London Borough of Hillingdon	Roles, responsibility and functions	21
The flood risk functions that may be exercised by those authorities	Roles, responsibility and functions	21
The objectives for managing local flood risk	Appendix 3	
The measures proposed to achieve the objectives	Appendix 3	
How and when the measure are expected to be implemented	Appendix 3	
The costs and benefits of those measures and how they are to be paid for	Funding	30
The assessment of local flood risk for the purpose of the strategy	Hillingdon	16
How and when the strategy is to be reviewed	Monitoring and review	35
How the strategy contributes to the wider environmental objectives	Sustainability	34

Table 1: *Requirements of the Local Flood Risk Management Strategy*

The Council has sought community involvement in the development of the document by consulting residents who have experienced flooding within the Borough in the three years prior to October 2015. The consultation asked property owners about their knowledge of flood risk and understanding of the current documentation, so as to determine if the priorities already established in the Surface Water Management Plan (SWMP) in the Flood Risk Portfolio are aligned with those of the public. This feedback has been taken into account within the document.

This document will be a living document, to be updated as roles and responsibilities change and as the various provisions of the Flood and Water Management Act are commenced.

This document is issued for public consultation as required by the 'FWMA'. The 'LFRMS' is available on the Council's website. It has also been sent to key partners of the Council. All feedback will be collected and will be used in reviews of the LFRMS.

2. Policy and legislative context

The management of flood risk in the London Borough of Hillingdon is informed by the requirements and evidence within a growing number of relevant European, national legislation, policies and non-statutory plans, relating to flood risk management. The most significant of which are outlined in Figure 1: "Flood Risk Management Overview" and detailed in Appendix 1.

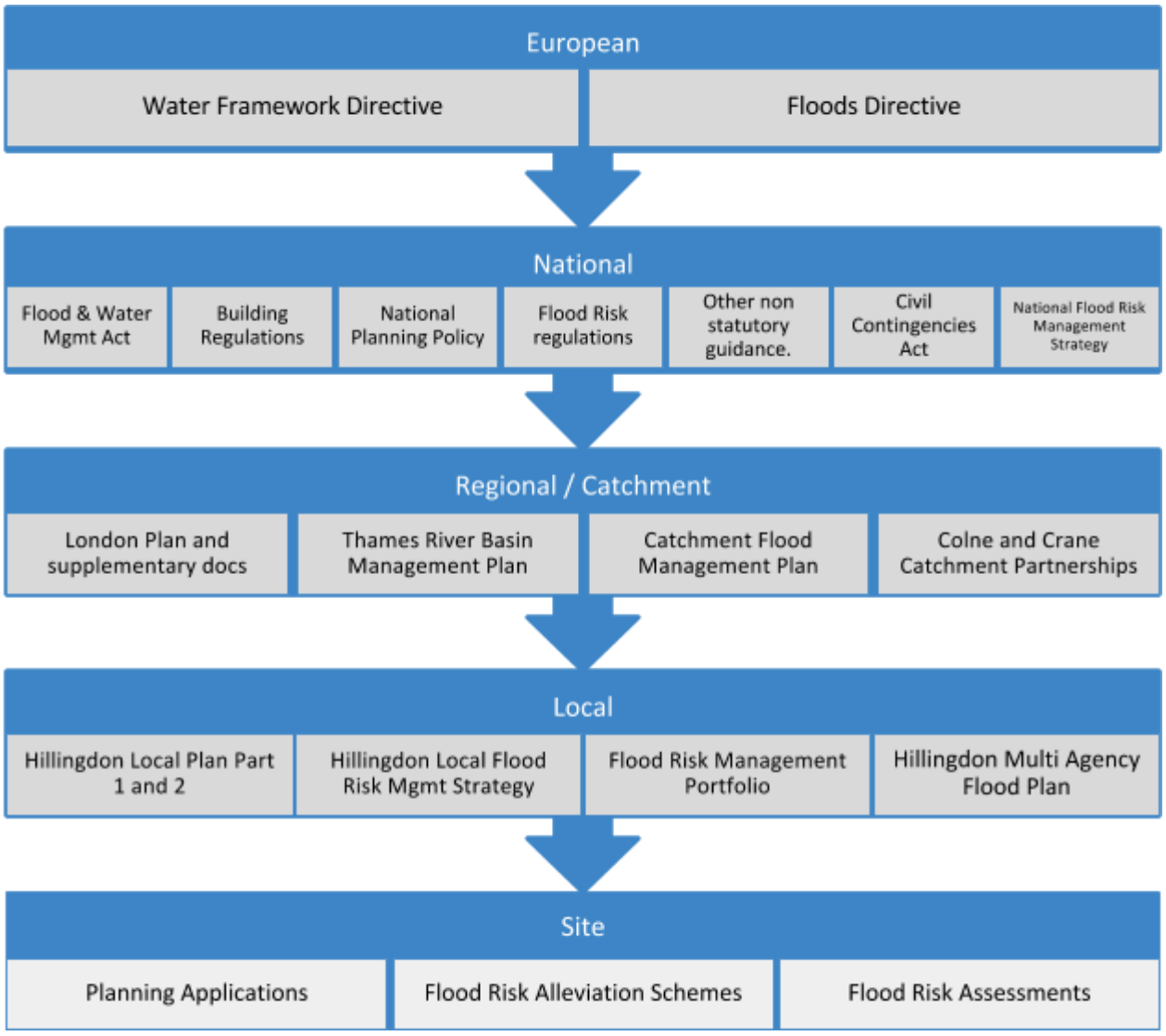

Figure 1: *Flood Risk Management Overview*

Locally specific policies and requirements which must be applied to developments are listed below:

2.1. Regional

The London Plan[3] produced by the Mayor of London contains various policies, supporting documentation and plans relating to flood risk as follows:

Policy 5.11 Green Roofs and development site environs.

This policy promotes the use of green roofs and walls where feasible, to deliver objectives including sustainable urban drainage amongst other wider environmental and sustainability benefits

Policy 5.12 Flood Risk Management.

This policy states that the Mayor will work with all relevant agencies, including the Environment Agency, to address current and future flood issues and minimise risks in a sustainable and cost effective way.

Development proposals must comply with the flood risk assessment and management requirements set out in National Planning Practice Framework (NPPF) over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 and Catchment Flood Management Plans.

Policy 5.13 Sustainable Drainage.

Development should utilise urban drainage systems (SUDS), unless there are practical reasons for not doing so, and should aim to achieve Greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible, in line with the following drainage hierarchy:

- *Store rainwater for later use*
- *Use infiltration techniques, such as porous surfaces in non clay areas*
- *Attenuate rainwater in ponds or pen water features for gradual release.*
- *Attenuate rainwater by storing in tanks or sealed water features for gradual release*
- *Discharge rainwater direct to a watercourse*
- *Discharge rainwater to a surface water sewer/drain and*
- *Discharge rainwater to the combined sewer*

Drainage should be designed and implemented in ways that deliver other policy objectives of the Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

Further requirements ensure that redevelopment in London aims to reduce surface water run-off to greenfield run-off rates. Sustainable Design and Construction[4] Supplementary

[3] https://www.london.gov.uk/priorities/planning/london-plan

[4] https://www.london.gov.uk/priorities/planning/consultations/draft-sustainable-design-and-construction

Planning Guidance sets out a minimum target of a 50% reduction. The London Sustainable Drainage Action Plan[5] also identifies further actions.

The Regional Flood Risk Appraisal[6] includes an overview of the different types of flood risk in London and provides a spatial analysis of tidal, fluvial and surface water flood risk against major development locations, key infrastructure assets and services.

The All London Green Grid[7] SPG 2012 is also key in identifying opportunities within the Borough for the provision of Green infrastructure. This Borough falls in Green Grid Area 10, 'River Colne and Crane'. There are a number of mutual benefits to managing flooding through developing strategic green infrastructure and providing space for water and waterside habitat naturalisation as well as meeting other targets for access to open space. The areas where green grid infrastructure opportunities exist and flood risk reduction should be improved should be identified to help deliver mutual benefits and apply for wider funding streams.

Securing London's Water Future, the Mayor's Water Strategy[8] also supports the need to address the water cycle by identifying source techniques which help reduce water use and increase resilience in time of drought, as well as contributing to reducing flood risk and promoting green roofs.

Thames River Basin Management Plan 2015[9](RBMP), covers the whole of the River Thames catchment. It explains the current ecological health of the water environment in this river basin district, and what needs to be done to improve them. Annex B highlights key actions for waterbodies in Hillingdon, such as improving floodplain connectivity. All of this, even if on a small scale, can cumulatively contribute to the management of flood risk. As it is produced in 6 yearly cycles, this has just replaced the 2009 version.

Thames Catchment Flood Management Plan 2009[10] (CFMP), Again covers the whole of the Thames Catchment. CFMP's give an overview of the flood risk across each river catchment. It recommends ways of managing those risks now and over the next 50-100 years. This is soon to be replaced, with a draft now available 2015.

*The River Pinn catchment falls in **Policy Option 6***
Areas of low to moderate flood risk where all will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits
*The Colne, Crane and Yeading Brooks fall in **Policy Option 4***
Areas of low, moderate or high flood risk where flood risk is already managed effectively. Action needs to be taken to keep pace with climate change, through adaptation of the urban environment.

5 https://www.london.gov.uk/what-we-do/environment/climate-change-weather-and-water/sustainable-drainage-action-plan

6 https://www.london.gov.uk/priorities/planning/publications/draft-further-alterations-to-the-london-plan-january-2014

7 https://www.london.gov.uk/priorities/environment/greening-london/improving-londons-parks-green-spaces/all-london-green-grid

8 https://www.london.gov.uk/priorities/environment/publications/securing-london-s-water-future-the-mayor-s-water-strategy

9 https://www.gov.uk/government/publications/thames-river-basin-management-plan

10 http://www.environment-agency.gov.uk/research/planning/127387.aspx

Thames Flood Risk Management Plan[11](FRMP) covers the whole of the River Thames catchment. Under the Flood Risk Regulations 2009 (the Regulations) some Lead Local Flood Authorities (LLFAs), Natural Resources Wales and the Environment Agency are required to produce Flood Risk Management Plans[12] by December 2015 in England and Wales. The London Borough of Hillingdon were required to undertake a FRMP as it lies in the London Flood Risk Area.

Rather than prepare separate FRMP, Hillingdon has provided information to the Environment Agency so that it forms part of the Thames FRMP.

> *"consolidated FRMPs in partnership with others so that they cover flooding from main rivers, the sea and reservoirs, as well as from surface water flooding .....all in one place".*

This work was undertaken and consulted upon at the same time as consultation for the draft river basin management plans in order to achieve opportunities for synergies across the wider catchment for concerted action such as with land management measures.

All development in this area should also have regard to the Crane Valley Partnership's catchment plan Objective 4 – Reduced Risk of Flooding in Built-Up Areas, "We need increased innovative solutions to improve the catchment's capacity to store and slowly release stormwater".

2.2. Local

2.2.1 London Borough of Hillingdon's Local Policy

The London Borough of Hillingdon's, Local Plan Part 1[13] Strategic Policies (previously known as the Core Strategy), adopted Nov 2012, forms the first part of the Local Development Framework (LDF) for Hillingdon. It sets out the long-term vision and objectives for the Borough, what is going to happen, where, and how it will be achieved. The Local Plan Part 1 includes broad policies for steering and shaping development.

It includes policies such as EM6 Flood Risk and the EM3 Blue Ribbon Network. Guidelines for decisions about planning applications will be included in Supplementary Planning Documents.

The Local Plan refers to strategies which the London Borough of Hillingdon are drawing up to enable it to deliver the vision set, in regard to the management of flood risk. This includes a Green Spaces Strategy, Tree Management Strategy and Biodiversity Action Plan.

The Local Plan Part 2[14] comprises a Development Management Policies, Site Allocations and Designations and Policies Map. It delivers the detail of the strategic policies set out in the Local Plan Part 1: Strategic Policies (2012). There is further information on both policies EM6 and EM3 relevant to managing flood risk and the water environment. and introduces other including one on new basements to minimise groundwater flood risk issues.

11 https://consult.environment-agency.gov.uk/portal/ho/flood/draft_frmp/consult?dm_i=1QGB,3R34C,KI58VF,DICTE,1

12 https://www.gov.uk/guidance/flood-risk-management-plans-what-they-are-and-whos-responsible-for-them

13 http://www.hillingdon.gov.uk/article/11414/Local-Plan

14 http://www.hillingdon.gov.uk/lpp2

Together they will form a comprehensive development strategy for the Borough up to 2026.

2.2.2 Flood Risk Management Documents

The London Borough of Hillingdon has created a Flood Risk Management Portfolio[15] of flooding documents, which will provide greater information on flood risk in the Borough, to meet the Council's responsibilities as a Lead Local Flood Authority. This is comprised of the following:

- The **Strategic Flood Risk Assessment (SFRA)** 2008, and updated in 2015, collated all known evidence of flood risk and forms part of the evidence base for the vision and objectives of the Local Plan.

  It provides an understanding of all flood risks at that point in time. There may be additional information on flood risk collected subsequently.
- The **Preliminary Flood Risk Assessment (PFRA)** 2011 for Hillingdon aimed at providing a high level overview of flood risk from all sources within the Borough, including consideration of surface water, groundwater, ordinary watercourses and canals.

  This does not provide detailed site specific information to inform residents of specific risks. PFRA were a requirement of the Flood Risk Regulations, where areas of significant risk are identified. Hillingdon falls within the Greater London Flood Risk Area. The PFRA for Hillingdon was therefore produced as part of a co-ordinated programme of work across Greater London, facilitated by the Drain London Forum and the GLA.

  The PFRA includes a: summary of information on significant historic floods; summary of information on future flood risks based primarily on the Environment Agency's national datasets; as well as a spreadsheet containing information for reporting to the European Commission.

  The work will continue on a 6 year cycle and the first review of the PFRA is due by 22nd December 2017.
- A **Surface Water Management Plan (SWMP)** for Hillingdon has also been completed. This was divided into 2 sections. Part 1, the Evidence Base 2013, and Part 2 the Options and Actions Plan 2014.

  These documents outline the evidence and the surface water management strategy for Hillingdon. They include consideration of flooding from sewers, drains, groundwater and run-off from land, small watercourses and ditches that could occur as a result of heavy rainfall.

  Both have been published and are available on the Council's website. They identify a number of 'Critical Drainage Areas' (CDA) within Hillingdon which require further investigation.
- **Flood Risk Investigation Reports** for Hillingdon. The Flood and Water Management Act 2010 requires the LLFA to investigate significant flood events. These provide a useful summary of key events that may have happened in between the production and updates of the PFRA, SFRA, SWMP etc.

  Recommendations from these will be used to inform future revisions of other plans.

[15] http://www.hillingdon.gov.uk/24117

- **Hillingdon Multi Agency Flood Plan** . The Civil Contingencies Act (2004) requires Category One Responders to have plans in place to respond to all emergencies. This was produced by Hillingdon in 2014 utilising the best available information at the time. As flooding poses a significant risk and is well recognised within many Community Risk Registers, Local Resilience Forums are encouraged to develop a specific flood plan to both complement other plans and to provide more detail to generic Major Incident Plans or Strategic Emergency Response Plans. (Not publically available).
- **Other Local Flood Risk Management Strategies.** The London Borough of Hillingdon lies on the western most boundary of Greater London. A number of watercourses flow from outside London into Hillingdon, and onto other RMA and so all those 'Risk Management Authorities' (RMA) strategies are of interest to the London Borough of Hillingdon.

  Within two tier authorities, the LLFA responsibilities sit in County Councils. The adjacent districts of South Bucks and Chiltern lie within Buckinghamshire County Council and Three Rivers District lies within Hertfordshire County Council, both of which have produced their Local Flood Risk Management Strategies. Slough (A Unitary authority and therefore LLFA) and Spelthorne (District authority within Surrey County Council which is the LLFA), are located on the Colne River.

The Hillingdon Strategy will therefore be of relevance to them. Table 2 on the next page provides links to all the relevant strategies.

LLFA	Strategy
London Borough of Harrow	http://www.harrow.gov.uk/info/100006/environment/1690/local_flood_risk_management_strategy
London Borough of Ealing	https://www.ealing.gov.uk/downloads/download/3484/local_flood_risk_management_strategy
London Borough of Hounslow	http://www.hounslow.gov.uk/index/council_and_democracy/consultations/consultations_archive/flood_risk_management_consultation.htm
Hertfordshire County Council	http://www.hertsdirect.org/services/envplan/water/floods/floodrisk/lfrmsherts/
Buckinghamshire County Council	http://www.buckscc.gov.uk/environment/flooding/strategic-flood-management/flood-management-strategy/
Slough	http://www.slough.gov.uk/council/strategies-plans-and-policies/flooding-and-flood-risk.aspx
Surrey County Council	http://www.surreycc.gov.uk/people-and-community/emergency-planning-and-community-safety/flooding-advice/more-about-flooding/surrey-local-flood-risk-management-strategy

Table 2 *Adjacent Lead Local Flood Authorities*

Figure 2 Map of Adjoining Risk Management Authorities and watercourses**',** illustrates the Risk Management Authorities, adjacent to Hillingdon.

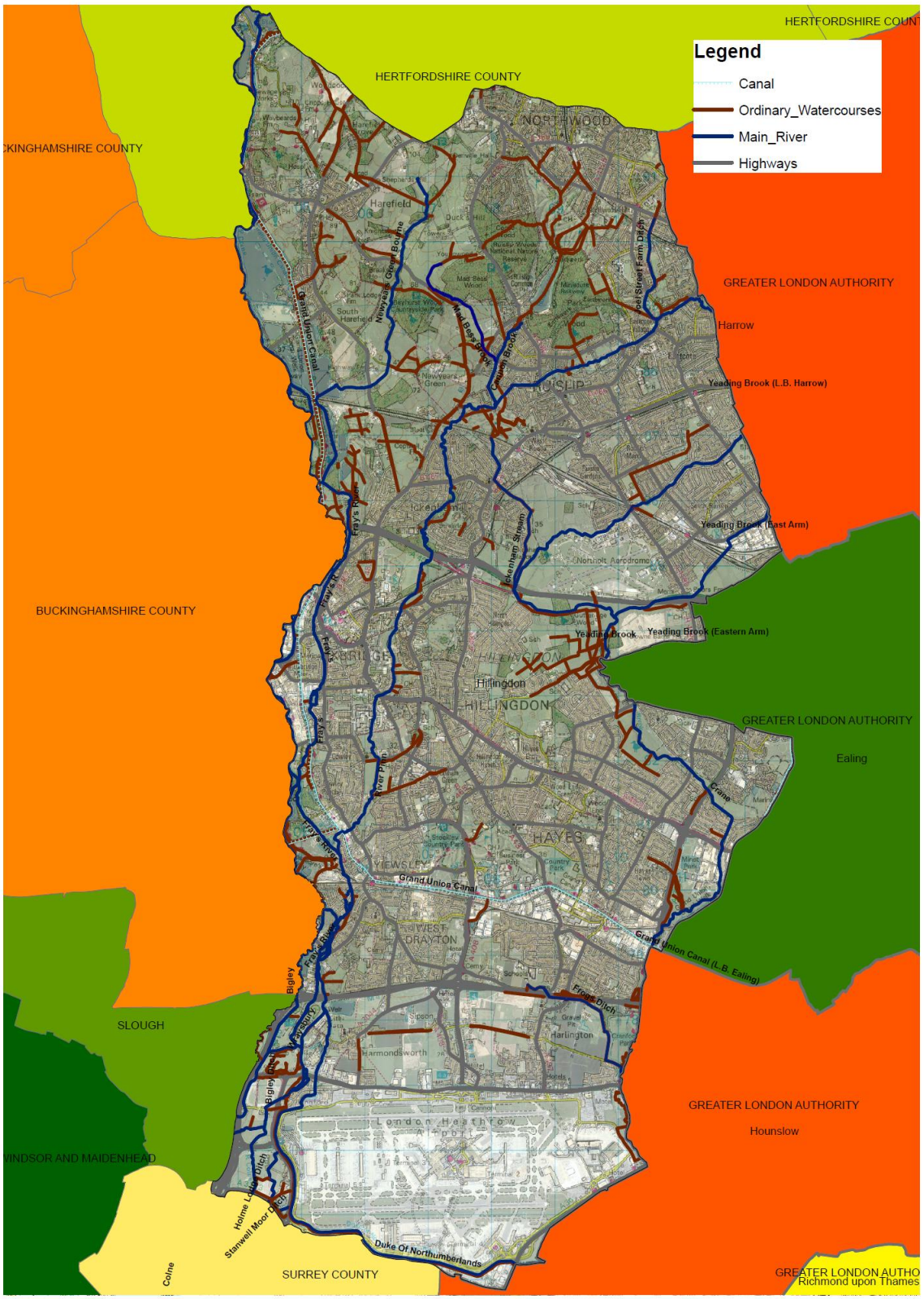

Figure 2: *Map of Adjoining Lead Local Flood Authorities and watercourses*

3. Hillingdon

3.1. Available Evidence / Assessments of Flood Risk

The Council has collected evidence and made assessments on flood risk which inform this strategy. The documents where this information can be found are all available on the Council's website within the Flood Risk Management Portfolio and are detailed in this document in Section 2.2. Local plans and policies page.

In addition there are documents written by other Risk Management Authorities and partners that include relevant evidence. Thus a catchment based approach can be taken in the formulation of any strategy.

3.2. Characteristics of the area

3.2.1 Profile

Hillingdon is London's second largest borough by area, covering 42 sq. mile, (109 sq. kilometres), with a population of 274,000 from the 2011 Census. The borough has a distinctive character with its combination of suburban streets and shopping centres, industrial land, major office developments and large areas of open land, historic woodland and inland waterways including 4,960 hectares of Green Belt. It also contains Heathrow Airport which covers the majority of the South of the Borough.

3.2.2 Geology

The dominant solid geology within Hillingdon is the London Clay Formation. To the north of the Borough, within the vicinity of Ruislip and Northwood, outcrops of the Lambeth group occur within river valleys. Along the western boundary of the district some areas of chalk are located within the vicinity of the River Colne. To the south there are drift deposits overlying the solid geology, consisting of pockets of Langley Silt (sandy clay and silt 'brick earth').

3.2.3 Watercourses

There are two key river catchment areas in which London Borough of Hillingdon falls, the River Colne (contains the River Pinn) and River Crane (also known as the Yeading Brook). Both rivers start in other authorities to the north of Hillingdon before flowing in a generally southerly direction through and out of the borough.

In addition, the Grand Union Canal flows through the Borough, as do a network of smaller rivers called 'ordinary watercourses' which interact with the main rivers. This is important to recognise in the management of flood risk.

Watercourses are shown in Figure 2 on the previous page: 'Map of Watercourses'. They are also shown in more detail on Rivers, Ditches and Canals[16] page on the Hillingdon Website.

3.2.4 Environment Assets

Further baseline data on environmental assets that are within Hillingdon and maybe impacted that any future flood risk schemes should have regard to and aim to support the enhancement of is found is the Strategic Environment Assessment Screening document sections 4.9 Material Assets, 4.10 Cultural Assets and 4.11 Landscape.

[16] http://www.hillingdon.gov.uk/article/28579/Rivers-ditches-and-canals

3.3. Flooding Characteristics

Although this strategy is focused on the management of local flood risk sources such as surface water, groundwater and ordinary watercourses, it is important to understand the other sources of flooding as they are often interlinked and so a description of these are included as well.

3.3.1 Local Flood Risks

3.3.1.1 Surface Water flooding

Surface water occurs when heavy rainfall exceeds the capacity of the ground and local drainage network to absorb it. It can lead to water flowing over the ground and ponding in low lying areas, and is typically caused by short intense rainfall.

It is estimated from the SWMP that approximately 38,300 properties are potentially at risk from surface water flooding, making this the key risk affecting residents in Hillingdon.

These areas likely to be at risk of surface water flooding are identified on the Environment Agency website in their Flood maps.[17] This information supersedes the information established in the Hillingdon Surface Water Management Plan as the extents of flooding.

The SWMP identifies a number of Critical Drainage Areas that should be focused on in developing a strategy to manage flood risk. However prioritisation for action is also based on actual flooding history. Victoria Retail Park identified as a Critical Drainage Area suffered from flooding in August 2015.

Often surface water issues are combined with multiple other sources of flooding which are prevalent in Hillingdon, particularly sewer flooding as when sewers are full it prevents surface water from flowing away and presents as roads flooding.

Climate change and growth pressure could both result in greater frequency and severity of flooding, and so every opportunity through redevelopment should be taken to reduce surface water run off to greenfield run off rates.

Private individuals awareness of responsibilities will be key to managing those risks as Council records show there are increasing reports of private service roads or alley access roads flooding as there are no formal drainage systems or they are not being maintained as ownership is unclear or there are multiple shared owners.

Surface water can also pollute a river, as water flows along roads and into sewers it can pick up large levels of contaminants and take them into our rivers. This is called diffuse pollution and a major issue in the catchments in Hillingdon. More information can be found on the Water Pollution page on the Council website.

Large privately owned sites and their management of surface water networks also contribute to the flood risks across Hillingdon. For example Heathrow Airport forms a manmade catchment occupying approximately 10% of the borough. Surface water from this area is managed through a private network within the Airport and controlled mainly through a series of balancing ponds outside the Borough, in London Borough of Hounslow. This network has been overwhelmed in the past resulting in flooding into the nearby rivers.

3.3.1.2 Ordinary Watercourses flooding

These smaller watercourses which are not designated as main rivers, are also shown on ***Figure 2:*** *Map of Adjoining Lead Local Flood Authorities and watercourses*. As an outer

[17] http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

London borough, with a more rural feel in parts, there are a large number of ordinary watercourses, with a combined length of approximately 125km.

Generally considered low risk systems, they can and do cause flooding on a local scale in Hillingdon. Often ordinary watercourse flooding is affected by water levels in main rivers. When river levels are high, this can in turn have an impact on sewers as outfalls cannot discharge, often causing flooding on roads.

Ordinary watercourses are so extensive that there is very little data about them. Flood risk is only mapped by the Environment Agency where it is part of a large enough catchment. The Environment Agency and Ordnance survey maps do not contain all ordinary watercourses.

Utilising local knowledge ordinary watercourses in Hillingdon have been mapped and can be seen on the Council's website on the Rivers, Ditches and Canals[18] page. This information represents the best available information, though site specific investigation should be undertaken to determine exact locations and extents.

Collecting information about their condition on a regular basis is very resource intensive.

Residents are encouraged to provide further information on the locations of ordinary watercourses, where they believe this is missing, to help ensure there is a full picture of flood risk for the Borough.

3.3.1.3 Groundwater flooding

Groundwater flooding occurs as a result of water rising up from the underlying aquifer, or from water flowing from springs. Flooding from these sources tends to occur after long periods of rainfall.

Groundwater is very complex. It is poorly understood and it is very difficult to assess the location and likelihood of groundwater flooding. The areas identified from some basic groundwater susceptibility mapping within the SWMP, generally fall along the gravel river corridors.

At a time when a number of areas in the Country such as Croydon were suffering from serious groundwater issues in 2014, there were a number of areas within Hillingdon which experienced limited groundwater flooding, particularly Kings College Playing Fields, Ruislip, where water ponded mainly in open spaces.

Due to the limited likely impact and areas affected as well as the complexities and uncertainties, it is not proposed that further expensive intrusive investigations or mapping is undertaken by the Council.

A better picture of groundwater flooding is being built through the continued recording of reports of groundwater flooding and any site investigations undertaken and the promotion of resistance and resilience measures.

3.3.2 Other flood risks

3.3.2.1 Sewer flooding

This is where the sewer network exceeds its capacity, causing flooding above ground. This can be the result of a number of factors, including an excess volume of surface water entering the both the surface and foul sewers. Blockages within the network created by silt

[18] http://www.hillingdon.gov.uk/article/28579/Rivers-ditches-and-canals

building up in the sewer, reducing its capacity, or often tree roots breaking through pipes. In addition the surface water sewers flow into rivers and if the river level is high this often prevents water on the road from draining away.

Public sewers are the responsibility of the local Water Utility Companies.

As sewers are underground, it is very difficult to tell whether flooding is a capacity issue or a local blockage unless further investigation is carried out by the Water Utility Company.

For residents, sewer flooding often manifests itself in water not flowing down the gullies in the road leading to the confusion about who is responsible.

'Missconnections' from a foul pipe into a surface water sewer can result in flooding and pollution incidents which can have potential health and environmental impacts.

Further information on who to contact and when, together with the contact details for the Water Utilities can be found on the Hillingdon Council Website on the page Road Drainage and Gullies[19].

3.3.2.2 Main river flooding

There are over 6000 properties (6%) at risk of fluvial flooding within Hillingdon.

These areas are identified on the Environment Agency website in their Flood maps for Planning (Rivers and Sea)[20] and are used to assess the risk to future development.

The National Flood Risk Assessment (Nafra) produced by the Environment Agency is used for insurance purposes. This shows that 51% of these are in areas where the likelihood of flooding is low due to protection from defences. These areas are also identified on the Environment Agency in their Flood maps for Rivers and the Sea [21] Hillingdon fluvial flooding is characterised by:

- Extensive, heavily developed floodplain with residential and industrial development built right up to the edge of river channels;
- Some rivers, such as the Yeading Brook and River Pinn, have a rapid response to rainfall. In these areas, those within flood risk zones have less than 2 hours flood warning time. Some small communities have been identified as having no appropriate warnings;
- There are a number of flood risk alleviation schemes in Hillingdon, ranging from formal defences such as embankments to features such as the formation of additional channels for holding water. These are often owned by, and should be maintained by, private landowners. The Environment Agency has permissive powers to manage flood risk from 'main rivers', the sea and reservoirs. They can also use enforcement powers to require landowners to take action to minimise flood risk to others."
- The Lower Colne river system is a complex, heavily managed river system, comprising a network of interconnecting rivers and flood control structures;

[19] http://www.hillingdon.gov.uk/article/26542/Road-drainage-and-gullies

[20] http://maps.environment-agency.gov.uk/wiyby/wiybyController?lang=_e&topic=floodmap&layer=default&ep=map&layerGroups=default&scale=2&x=357683&y=355134

[21] http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap&scale=2&ep=map&layerGroups=default&lang=_e&y=355134&x=357683#x=357683&y=355134&scale=2

- The levels in the Grand Union Canal are managed through a series of overflows comprising control structures managed by the Canals and River Trust. Water flows from the Canal via ordinary watercourses to the River Colne. In a number of historic cases, water has flowed over the towpath and into the River;
- The River Pinn and River Crane, (in its upper reaches the Crane is referred to as the Yeading Brook, East and West Arms) are less engineered than the River Colne, though the channels have been straightened and managed in the past;
- Across the Borough, the in-channel flood control structures, such as weirs, are aging.
- Blockages are a key issue with a heavily built up flood plain and a network of roads crossing river corridors, resulting in localised issues developing quickly.
- There is an ever increasing problem of non native invasive species within the Borough, on the River Pinn, Giant Hogweed[22] has been found along large stretches, and so can conflict with the aims to improve access to areas without careful management, Floating Pennywort[23] on the River Frays and Grand Union Canal can also contribute to flooding issues where it fragments and can block debris screens. The Environment Agency has a yearly programme of clearance.

3.3.2.3 Reservoir flooding

There are a number of reservoirs within the London Borough of Hillingdon and externally which can affect Hillingdon. The areas that could be affected are identified on the Environment Agency Flood Maps for Risk of flooding from Reservoirs[24] .

3.4 Historic Flooding Events

Fluvial (main river) flooding has occurred in the London Borough of Hillingdon a number of times over the last few years. key events have included August 1977 and May 1988 in the borough, more recently in the last 15 years, events were recorded in 2000, 2001, 2003, 2007, 2009, 2013 and 2014. These events were mainly located in discrete locations across the Borough. Following these events, a number of flood defences have been put in place to manage fluvial flood risk across the Borough.

Heavy rainfall in a short period of time has caused substantial disruption to residents and businesses in the Borough. In July 2014 the A40 was closed, triggering a Flood Investigation. Again in August 2015, heavy rain over two hours caused issues for residents in the Ruislip area. Further details of the these events can be found on the Council's Website on the Flood Risk Investigations[25] page.

3.5. Future Flood Risk

Flood risk in the London Borough of Hillingdon will change as a result of the changing environment and all flood risk management measures will need to make allowance for future changes to ensure they deliver long term protection.

Climate change will be a potential cause of changes to flood risk. There are predictions of more intense storms, with the 1 in 30 year rainfall event likely to double in frequency, according to the 'Mayor's Water Strategy'.

22 https://www.rhs.org.uk/advice/profile?PID=458

23 http://www.cabi.org/projects/project/33139

24 http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=reservoir#x=357683&y=355134&scale=2

25 http://www.hillingdon.gov.uk/article/29022/Flood-risk-investigation

Other changes which will take place include new developments and the increasing density of settlements, as well as other strategic infrastructure projects proposed in the area, which will influence the environment.

4. Roles, responsibility, functions and contact details

4.1. The London Borough of Hillingdon, as a Lead Local Flood Authority

The FWMA gives Unitary Authorities a new leadership role in local flood risk management. This LLFA role, and the responsibilities of the other Risk Management Authorities, are outlined in Figure 3 and further explained in Appendix 2.

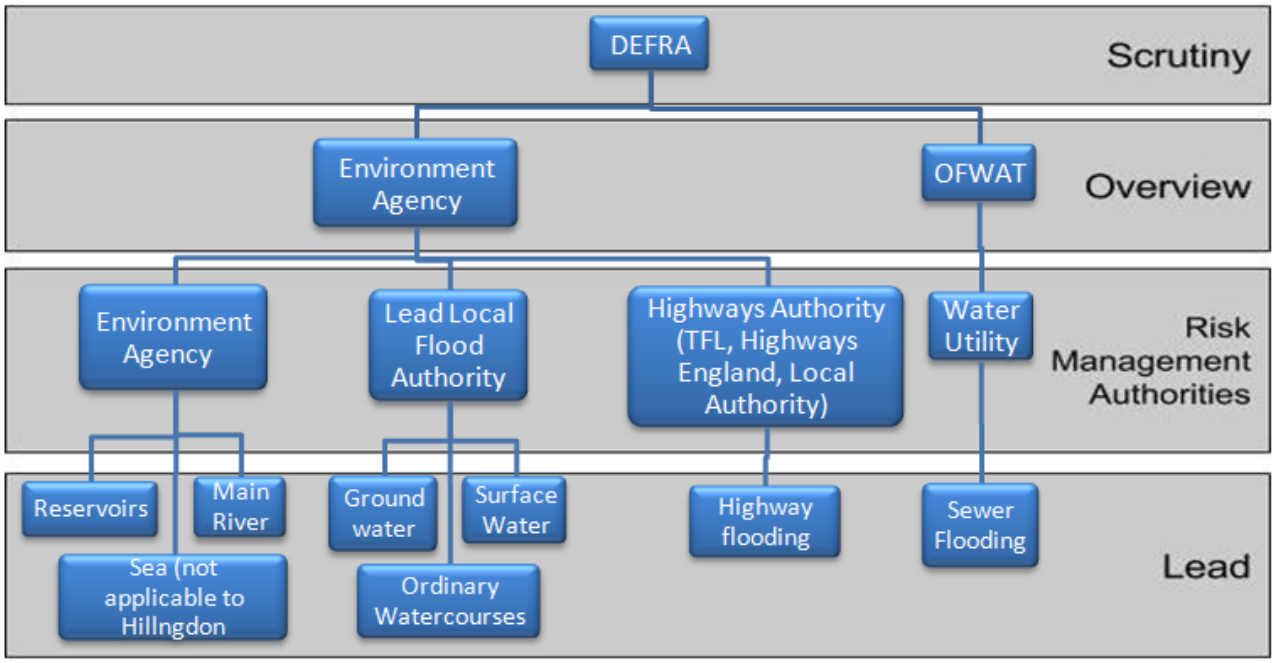

Figure 3: *Risk Management Authorities*

Local flood risk is defined as a risk of flooding arising from surface run-off, groundwater, or an ordinary watercourse. Establishing effective partnerships with stakeholders will be key to managing flood risk.

There are additional responsibilities for LLFAs in the Flood Risk Regulations, which require Flood Risk Management plans for those areas at significant risk of flooding in 2015, which includes London and therefore Hillingdon.

> Please report flooding to the Council via the report it function. It is important the Council are aware of all flooding events, however please be aware that not all issues of flooding may be the Councils responsibility to deal with. They may have to be investigated and referred to other bodies to deal with.
>
> If you need to contact the Council please use the Customer Contact Centre during office hours **01895 556000,** or in an emergency out of hours **01895250111**.

All these responsibilities must be co-ordinated with the Council's other responsibilities outlined below:

4.1.1 Category 1 Responder (Emergency Planning).

As a Category 1 responder the Council is required to:

- assess the risk of emergencies occurring and use this to inform contingency planning

- put in place emergency plans
- put in place business continuity management arrangements
- put in place arrangements to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency
- share information with other local responders to enhance co-ordination
- co-operate with other local responders to enhance coordination and efficiency
- provide advice and assistance to businesses and voluntary organisations about business continuity management (local authorities only).

Hillingdon as part of the Hillingdon Resilience Forum have written a Multi Agency flood plan and updated it on a number of occasions to inform and allow coordination between other local responders when dealing with flood risk.

4.1.2 Local Highway Authority.

The Local Highway Authority is responsible for all public highways in Hillingdon, apart from those managed by Highways England or TFL. Highways Authorities are risk management authorities in their own right according to the Flood and Water Management Act and must adhere to all the responsibilities of risk management authorities.

Under the Highways Act, the Highway Authority has a duty to maintain the highway, i.e. ensuring that highway drainage systems are clear and that blockages are removed, where reasonably practicable.

The Highway Authority can deliver works that they consider necessary to protect the highway from flooding. These can be on the highway or on land which has been acquired by the highway authority

The London Borough of Hillingdon Highway Service in having regard for the requirements of the flood risk management strategy undertake annual maintenance of gullies within the Borough. This is not currently provided publically as the timing and location of gully cleansing varies year on year. In a large surface water event the Council Highways service does not have the ability to respond to all reports of flooding, and will prioritise reports based on the consequence, some may have to be investigated before responding or be directed to other authorities to respond.

4.1.3 Local Planning Authority

A Local Planning Authority is responsible for the determination of planning applications. The planning functions affect flood risk management in four key ways:

- considering flooding concerns in developing local plans
- consulting the LLFA to ensure drainage has been considered appropriately in the application
- considering flood risk assessments submitted in support of applications on which the Environment Agency does not require to be consulted, ensuring that the requirements of their standing advice are applied.
- developing proactive strategies to mitigate and adapt to climate change which take full account of flood risk.

The Local Plan Part 1 Policies adopted already consider flooding issues within the Strategic Policies, further information is provided in the Local Plan Part 2 and consultation with other Risk Management Authorities was undertaken as part of the Site Allocations.

The Local Planning Authority in having regard for the requirements of the Flood and Water Management Act now consult the LLFA on all major planning applications.

As there are also a large number of minor developments these can cumulatively add to the burden on existing drainage infrastructure. Therefore in addition, the LLFA is consulted on minor development in 'Critical Drainage Areas' to ensure smaller applications in problem areas control surface water on site. This will significantly reduce flood risk from surface water where redevelopment takes place.

In recognition of the cumulative impact of small changes there has also been a change in the permitted development rights for front gardens, to ensure that front gardens remain permeable. The government have produced Guidance on the permeable surfacing of front gardens to explain the requirements. However it is not a well known requirement and requires promotion and enforcement to ensure that new driveways comply. The Hillingdon Planning Enforcement team have taken action over the non compliance of permeable front gardens.

4.1.4 Landowner and Riparian owner

As a landowner and riparian owner the Council has rights and responsibilities similar to all other 'Riparian owners'.

4.2. Other Flood Risk Management Authorities

Other bodies such as the Environment Agency, Water Companies and Highways Authorities have also been given new responsibilities to co-operate as risk management authorities. More information on these can be found in the LGA Framework for Local Flood Risk Management 2nd Edition Nov 2011[26]

4.2.1 **The Environment Agency**

The Environment Agency take the lead for managing flood risk from main rivers, reservoirs and the sea, and also have a strategic overview role for all flood and coastal erosion risk management.

They also have a key role in providing flood warnings to the public, protecting and improving the environment and promoting sustainable development.

As the lead on Main Rivers, there is normal misconception that the Environment Agency has to combat is that, as they own the watercourses. Land owners are ultimately responsible, however the Environment Agency has the power to do work to them. The Environment Agency has a river and coastal maintenance programme[27] which is available online, where you can enter a postcode to find out the work that they do nearby.

> Contact for Flood warning information and advice please call the national Floodline:
>
> Tel: **0345 988 1188** or Tel: 0845 988 1188 (24 hrs).
>
> To report incidents and issues of trees causing flooding in main rivers contact Incident Hotline Telephone: 0800 80 70 60. Please be aware the EA will assess each report on an individual basis and may not action every report.
>
> More information on this and other types of incidents the Environment Agency wish you to report to them are found on Report an Environmental Incident[28]

[26] http://www.local.gov.uk/c/document_library/get_file?uuid=ac7cd7c8-3388-4707-b4c2-10a7ab0f0940&groupId=10180

[27] https://www.gov.uk/government/publications/river-and-coastal-maintenance-programme

[28] https://www.gov.uk/report-an-environmental-incident

4.2.2 Highways England

Highways England is responsible for the drainage assets on the M4 and M4 spur into Heathrow, together with a short section of the M40, as it enters Hillingdon and crosses the Colne valley before Swakeleys Roundabout.

Further information on their responsibilities can be found on http://www.highways.gov.uk/our-road-network/environment/environmental-topics/drainage-and-water/ or for urgent issues please call **0300 123 5000**.

4.2.3 Water Utilities

Thames Water, is responsible for the provision of all foul and surface water sewerage, and some supply in Hillingdon. Further information on their future plans is provided in section 5.4.4. Water Company planning.

For information on their responsibilities and when to contact them please visit their website: http://www.thameswater.co.uk/help-and-advice/16739.htm

To report sewer issues, please call **0845 9200 800** or report it via the website: http://www.thameswater.co.uk/16266.htm

Although **Affinity Water** is not a risk management authority as it only supplies water to the majority of the north-west of the Borough it is easier to include their details as well. There have also been flooding from burst water supply pipes which have caused substantial flooding issues in the Borough such as Ruislip Woods.

For information on Affinity Water responsibilities and advice please visit their website: https://www.affinitywater.co.uk/flooding-information.aspx To report a leak please call Affinity Water **0800 376 5325** or report it via their website: https://www.affinitywater.co.uk/report-a-leak.aspx

A water company is a private company accountable to OFWAT.

4.2.4 **Transport for London (TfL)**

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 the Strategic Highway network such as the A40, A312, and its drainage assets, such as gullies and culverts, and are also responsible where rivers cross that land, ensuring that these assets do not cause flood risk. A number of key features identified are:

Overflow channel which starts adjacent to Yeading Infants School, Carlyon Road Hayes UB4 0NR and takes high flows from the Yeading Brook, reducing the risk to the A312, and returns the flows into the Yeading Brook in Minet Country Park.

The Joel Street Ditch flows into culvert underneath the London Underground line at the rear of Hazelwood Drive, Pinner Middlesex HA5 3TT

London Underground Contact Tel: **0343 222 1234***

http://www.tfl.gov.uk/contact/4417.aspx#page-link-london-overground

4.3. Other Stakeholders

4.3.1 Heathrow

A large part of the Borough is covered by Heathrow airport, the drainage assets and arrangements of which are private and managed by Heathrow Airport Limited (formerly BAA). HAL have undertaken a SFRA and are in the process of undertaking a SWMP to inform future flood risk management within their site.

4.3.2 Ministry of Defence (MOD) - RAF Northolt

Another large part of the borough forms RAF Northolt, the drainage assets and arrangements of which are also the responsibility of the MOD.

4.3.3 Other large Landowners

Such as Brunel University and Hospital all have a responsibility to manage their own private drainage networks and comply with current standards to control surface water through sustainable methods.

4.3.4 Developers

Those developing within Hillingdon have a vital role in delivering sustainable drainage as promoted by the Flood and Water Management Act, as well as the wider planning proposals in relation to flood risk outlined in this strategy. It is crucial that future development takes proper account of all sources of flooding illustrated in the evidence base and delivers reductions in flood risks both on and off site.

4.3.5 Public

A key partner in managing flood risk, in addition to these professional bodies, is the public themselves. They have a responsibility to be aware of their own responsibilities and contribute to reducing flood risk.These are outlined in Table 3:

Actions	Council Webpage	Contents
Be aware of flooding risks	Flooding	Are you at risk of flooding?
	River Ditches and Canals	What and where are the rivers ditches and canals.
Plan the action to take to protect from flooding in an emergency	Flooding	Action you can take Evacuation
	Property drainage	Property owner responsibilities Water Utility responsibilities
Be aware of the action to take to immediately after flooding	Flooding	Recovery Insurance
Be aware who to contact for different types of flooding	Flooding	Environment Agency contact
	Road Drainage and gullies	What is a gully? Who is responsible Flooding on roads

After the event provide local information on flood events to the Council to help inform flood risk management decisions.	Flood Risk Management Email: flooding@hillingdon.gov.uk	Report flooding through the report it function, Council Contact Contact Centre, Council web pages and flooding survey or send information to or report through email address.
Take action to reduce flood risk: creating permeable driveways, checking for missconnections and reusing water. Awareness of wider environmental benefits these actions can have.	Sustainable Drainage requirements	What are Suds? SuDs information required for major applications Water sensitive design Minor development Permeable front gardens
	Water Pollution and commercial drainage National Campaign Connect Right	Surface water sewers Where does the pollution come from? Foul sewage What you can do to help
Fulfill responsibilities as 'Riparian' landowners.	River Ditches and Canals These contain links to useful government information such as 'Living on the Edge'. River Maintenance and Drainage charges.	Your responsibilities as a riparian owner. Apply for flood defence consent where appropriate when undertaking works along watercourses
Provide feedback so that action and priorities for managing flood risk reflect the priorities of the local community.	Report it Email: contactcentre1@hillingdon.gov.uk	Report others that do not comply with the above requirements to the Council through the website or email the Contact Centre
	Flood Risk Management	Provide feedback to consultations on flood risk documents.

Table 3: *Flooding information on the Hillingdon website*

It is important in providing feedback on the priorities that residents recognise the finite nature of funding and the importance of prioritising resources to ensure funding is spent on the areas where it will provide most benefit.

4.3.6 **Canal and River Trust (CRT)**

The CRT manages the Grand Union Canal, which flows through Hillingdon from north to south, and also connects with the Slough Arm. The Canal contributes to the complex nature of Hillingdon waterways and flood risks. In a number of cases it is perched above the surrounding area and the maintenance of its assets, such as embankments, is critical for managing flood risk in the Borough. Also important is how the CRT operates sluices to manage water levels which overflow from the Canal into the River Colne.

> For non-critical events you can call weekdays between 8am and 6pm, Monday to Friday on **0303 040 4040** or email. In an emergency if lives or property are at risk or there is danger of serious environmental contamination please use 24 hour emergency contact number **0800 47 999 47**. This includes serious injury or a fatality, a fire or explosion on a boat, a dangerously damaged lock, bridge or tunnel, a boat trapped in a dangerous situation e.g. on a weir or in a lock, serious flooding or a breech which risks lives or property or serious pollution.

4.3.7 **Network Rail**

Network Rail is responsible for managing Hillingdon's strategic railways. The Chiltern Line crosses Hillingdon, in some places high on an embankment and in others in a cutting, disrupting the normal drainage catchment areas. Thus can have a considerable implications for local flood risk, and an understanding of these assets will help determine how to solve these problems.

> To report non-urgent issues with fencing, structures flooding or drainage or railway equipment (eg track alarms) please their online form.
>
> In an emergency: **08457 11 41 41**

4.3.8 Neighbouring London Boroughs

In order to promote more effective cooperation across London Boroughs, the 'GLA' set up the 'Drain London'[29], project. This then set up smaller working parties across London of groups of adjacent Boroughs to meet and share best practice and create an ongoing working partnership for managing local flood risk in the area. The London Borough of Hillingdon is part of 'Group 1'. Drain London Group 1 includes the London Boroughs of: Hounslow, Hillingdon and Ealing. Group 1 has now merged with Group 2, comprising Brent, Barnet and Harrow to form the **North West London Flood Risk Management Strategic Partnership.** This group is represented on the Thames Regional Flood and Coastal Committee (RFCC) by Councillor Dean Cohen from the London Borough of Barnet. Thames Water, the Environment Agency, and other key partners referred to above, are invited to these meetings to discuss the management of flood risk strategically. The strategic partnership works together to share resources to develop and provide this information.

4.3.9 Other District and County Authorities

It is also important that there are good relationships with the neighbouring districts of South Bucks and Chiltern, which lie within Buckinghamshire County Council, and Three Rivers district council which is within Hertfordshire County Council. There is also a need for co-operation with Slough (A unitary authority and therefore LLFA) and Spelthorne

[29] The GLA developed the Drain London Project (Greater London Authority, 2007) that helps to predict and manage surface water flood risk in London. The project is a direct response to the Mayor's Regional Flood Risk Appraisal, which identified surface water flood risk as the most likely cause of flooding in London, rather than river, tidal or groundwater sources.

(district authority within Surrey County Council which is the LLFA). There is no formal mechanism for these relationships on a flood risk management basis, however there has been consultation by all parties on their Local Flood Risk Management Strategies. This should be formalised and clear contacts shared for future engagement.

4.3.10 Other local stakeholders

Local stakeholders include the key environmental groups such as the Colne Valley Partnership[30], the Colne Valley Park are instrumental within this group as well as the Colne Catchment Action Network. This is led by a steering group. The vision is that the Colne Catchment is a place where people are working together to protect and improve the water environment for everyone.

Crane Valley Partnership[31] is a collaboration between charities, community groups, borough councils, private businesses & government agencies in the five boroughs that border the River Crane (London Boroughs of Harrow, Hillingdon, Ealing, Hounslow and Richmond-upon-Thames). The Partnership aims to restore one of London's most natural rivers, conserve its surrounding habitats and improve public access so that its nearby communities can enjoy contact with the natural world.

The Hillingdon Canals Partnership is made up of a number of local groups which use the Canal. This includes representatives from Canal and River Trust, Thames 21 are also involved in a number of projects in the London Borough of Hillingdon.

[30] http://www.colnecan.org.uk/
[31] http://cranevalley.org.uk/

5. Managing local flood risk

5.1. Community Involvement

The majority of significant flooding incidents reported to the Council have been collated over the last three years. This information, and a review of the issues reported, has been important in the development of the SWMP and its Action Plan. It provided a number of additional sites to focus on that are important within the community in addition to significant areas identified by modelling and mapping work.

To engage the community further in the development of this strategy, a survey was developed to canvas the opinions of those who had been affected by flooding in the last three years. Residents were asked about their understanding as to which areas were at risk of flooding and their views on the Council's priorities.

Over 100 responses were given to the survey, and a summary of these can be found in Appendix 4. This survey will remain online on the flood risk management [32] page, in order to encourage further feedback from stakeholders on the value of the Council's flood risk information and how it could be best presented.

The consultation has shown that residents find it hard to discover the relevant information. The Flood Risk Portfolio of documents is comprised of information the Council is legally required to put together. It is complex for the community to understand and difficult for them to know how to use it to obtain the most relevant information for their area.

Providing local information on interactive maps could help this understanding. Thus, when a review of the current flood risk documentation is undertaken, maps of local flood risk, and details of flood risk assets and new projects should be provided on a community basis. This will also help all 'RMA' responding to flood events, in managing a flood event, and help residents inform where issues and events can occur.

Residents want flood risk defined at a community level. and say that there is too little information generally about the role and responsibility of bodies other than the Council in managing flood risk.

There are a number of commitments in the national strategy. It is clear from feedback from residents that they feel that the level of information provided on the maintenance regimes of some 'Risk Management Authorities' is insufficient.

5.2. Objectives developed for the local flood risk strategy

The requirements of the Flood and Water Management Act have secured significant improvements in the way that flood risk has been managed.

The Council has been implementing the utilisation of 'SuDs' in new planning developments and has been securing flood risk mitigation across all major development. This will help provide some resilience to future climate change.

The objectives outlined in Appendix 3, have been developed in line with the National Flood and Coastal Erosion Risk Management Strategy and will further address the needs of local flood risk in Hillingdon.

[32] http://www.hillingdon.gov.uk/article/24117/Flood-risk-management

5.3. Issues to overcome

5.3.1 National v Local prioritisation

There is an increasing emphasis on local prioritisation. However there are national organisations which drive much of the flood risk management delivery and their priorities may not align with the priorities of groups working on a catchment basis or those working on an even more local level.

It is clear that Hillingdon will have to work hard to promote its issues and secure funding for flood risk schemes, compared with other locations such as major town centres.

There appears to be a conflict in the responsibilities that the Environment Agency have with their strategic overview function of overseeing all flood risk management, whilst still having responsibility for leading on managing risk for main rivers.

This is particularly true where maintenance is currently prioritised with a focus on fluvial flood risk, while the emerging risks for many areas show much more complex interactions between different sources and a need for the Environment Agency to recognise this and engage with the local community to determine priorities. This has started with a recent engagement programme proposed by the Environment Agency.

A separate and independent organisation would help continue progress and coordination with flood risk bodies.

5.3.2 Information Sharing

The FWMA has promoted the sharing of information across Risk Management Authorities and given powers to ensure this occurs.

However in practice from feedback by residents other Risk Management Authorities have are not as transparent with the information they hold, to help the community understand flood risk.

When the Council has undertaken investigations into significant flood events, little support or help in determining the source of complex issues has been provided by other RMA. Further, cooperation by other 'RMA', such as Thames Water and TFL, and the more transparent sharing of information on their flood risk assets and actions proposed, or not proposed, would help community understanding of issues.

5.3.3 Separate bodies, legislation and funding streams

It must be acknowledged that each Risk Management Authority is separately funded and works within different legislative requirements. This militates against co-ordination.

In heavy rain storms there is still no single body which manages all flood risk. Local flood risk is particularly complex and, for residents, it can be difficult to know to whom they should report issues. Reports often have to be investigated before it can be determined who is responsible, and this can take time.

5.3.4 Reducing risk not preventing flooding

It is not technically or feasibly possible to prevent all flooding. Also there may be some solutions which, although achievable, may be too expensive.

The expectations of residents should be managed so that it is clear that not all reports of flooding from local sources will receive an immediate response from Risk Management Authorities. In a heavy rainstorm, there are too many reports of issues across a wide area

for quick responses to be given. The most effective management of risk is for residents to take action themselves.

The Government has set some standards of design to which Risk Management Authorities have to adhere, such as the non statutory standards for sustainable drainage[33]. However, there will always be events that will be greater than these standards were designed to protect, and the management of flows where these standards are exceeded will be very important in managing the impacts of climate change.

5.3.5 Management of large privately owned or historic sites

The London Borough of Hillingdon has a number of large privately owned large sites, where development takes place on a piecemeal basis, and thus does not deliver any long term reduction in flood risk. In these cases, a holistic approach to the management of flood risk should be undertaken, by looking at a water cycle approach for the whole site to inform future development. There is specific useful guidance on on how to take actions to protect properties, including conservation of historic fabric from Historic England 'Flooding and Historic Buildings[34]'.

5.3.6 Costs of flooding

It is difficult to quantify the full costs of flood management. These can include the whole life costs of maintaining flood defences.

However the costs of flooding can include both direct and indirect impacts, such as the closure of infrastructure, and the required responses by emergency services dealing with flooding incidents.

5.4. Funding approach

5.4.1 DEFRA Grant

The Council is funded for flood risk management through a grant system from DEFRA for Lead Local Flood Authorities detailed in Table 4.

DEFRA grant	**Allocated**			**Proposed**	
	2013/14	2014/15	2015/16	2016/17	2017/18
Settlement Funding Assessment	£127,000	£125,000	£124,000	£126,574	£128,938
SuDs Added Burden				£14,069	£13,611

***Table 4** DEFRA funding grants*

The Settlement Funding Assessment has reduced over time and further funding cuts were expected until recent flooding events of Winter 2015/2016 occurred.

[33] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

[34] https://historicengland.org.uk/images-books/publications/flooding-and-historic-buildings-2ednrev/

The funding the Council receives is currently spent on officer resource, in order to equip the Council for meeting its legislative requirements, and developing flood risk reduction projects for potential external funding.

A risk based approach will have to be taken to target resources on areas where they will have the greatest effect.

5.4.2 Flood defence grant in aid

Flood defences and coastal erosion risk management schemes are funded from a government grant called Flood Defence Grant in Aid (grant in aid) which is administered by the Environment Agency on behalf of Defra.

The funding approach determines what proportion of the cost of a scheme can be funded by grant in aid. Some schemes will be fully funded, others only partly funded, according to how much public benefit they will give, for example by reducing flood risk to homes and vital infrastructure, (e.g. power stations and water treatment works). Any shortfall in the amount of grant in aid required to construct the scheme will need to be found from elsewhere. This could be from funding from the local levy, from local businesses or other parties who will benefit from the scheme.

5.4.3 The local levy

Administered by the Thames Regional Flood and Coastal Committee (RFCC)[35], The London Borough of Hillingdon currently makes a contribution of £**209,382** annually to the Thames region local levy.

The local levy can be distributed to flood defence schemes at the discretion of the TRFCC. It is often used to fund locally important schemes which would otherwise not receive funding or to provide partnership contributions for grant in aid funding.

5.4.4 Water company planning

Water company investment in their infrastructure has to be agreed by the water company regulator, Ofwat. This is done on a five-year cycle called an Asset Management Plan (AMP). AMP6 began on 1st April 2015 and will run until the 31st March 2020.

The London Borough of Hillingdon does not have a responsibility to oversee the management of water company assets or the performance of sewerage undertakers.

Similarly sewerage undertakers only have a duty to manage their assets and ensure they perform to the appropriate criteria. They do not have a duty to manage or prevent other flooding.

However, there are clearly common areas of concern for many risk management authorities and sewerage undertakers where a joint approach may be mutually beneficial.

5.5. Flood Risk Management Projects

5.5.1 Non Structural or Hillingdon wide measures

The majority of the Council's objectives are strategic and non structural and involve the improvement of land use management practices, informed by improved data collection. Improved records' management can be undertaken, supported by changes in computer infrastructure, with minimal costs to the Council as long as funding continues to be utilised

[35] https://www.gov.uk/government/groups/thames-regional-flood-and-coastal-committee

for officer resources. For example, reported significant flood risk events will be added to the SWMP Action Plan and work will be prioritised, based on that evidence.

Funding for the additional burdens on Local Authorities as Lead Local Flood Authorities, has been used to employ a Flood and Water Management Officer (FWMO). In order to undertake the additional work required to ensure that surface water flooding is a material consideration in planning decisions, the Council has also recruited a temporary Drainage officer.

To help provide the community with useful information on flood risk in a more accessible form, the London Borough of Hillingdon has continued to update its website with key information. This is summarised in Table 3 on page 25. Further updates are planned and are a key part of the objectives for this strategy to help allow communities to make decisions on residual risk.

5.5.2 Site Specific Projects

The Council currently has identified a number of schemes from 'SWMP Actions' to investigate opportunities for reducing flood risk. The Council has applied to the Regional Flood and Coastal Committee for funding. The full Programme of flood and coastal erosion risk management schemes[36] can be found the government website. A list of the projects within Hillingdon on the 6 year programme, and are set out in Table 5. These are projects are led by either the Environment Agency or the London Borough of Hillingdon in close cooperation.

Project	Status
Ladygate Lane Trash Screen	Delivered
Kendal Close	Initial Investigation
The Common	Initial Investigation
Cranford Park	To start 2021
River Pinn	Modelling work undertaken
Cannons Brook	Modelling work undertaken
Longford Flood Alleviation Scheme	No funding allocated yet
Huntsmoor Weir Site Access track	No funding allocated yet
Yeading Brook West Flood Storage Area Decommissioning	No funding allocated yet

Table 5 *Projects within Hillingdon on the RFCC programme*

Officer resources have been committed by the Council to develop these projects.

As more significant flooding issues are recorded and potential schemes identified, funding for pre-feasibility studies will be required. Funding from the Environment Agency has been

[36] https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes

curtailed from the full to partial funding of flood risk projects. Community involvement and match funding from the Council, other flood risk authorities or the public will be crucial to the long term development and delivery of any schemes arising from any initial investigation and study.

The Council will also continue to explore these and other further funding streams, both national and local, as outlined in Table 6.

National	Regional / Local
• European • Highways England • Heritage Lottery Fund • Tesco Community Projects • DEFRA grants	• RFCC: Local Levy and Grant in Aid • Greater London Authority • Drain London • Thames Water • Heathrow Communities • LB Hillingdon Chrysalis • S106 and CIL • Property owners

Table 6: *Funding streams*

5.7. Review of document against National Strategy objectives

The National Strategy has an objective to encourage more effective risk management by enabling people, communities, businesses, infrastructure operators and the public sector to work together. The specific requirements are outlined in Table 7.

National Flood Risk Management Strategy Aims	Delivery
Provide a clear understanding of the risks of flooding and erosion, nationally and locally, so that investment in risk management can be prioritised more effectively	Objective 1 and 5 for flood investigations and provision of more information publically
Set out clear plans for flood risk management, so communities and business can make informed decisions about management of residual risk.	Objective 1
Encourage innovative management of flood and coastal erosion risks, taking into account the needs of communities, businesses and the environment	Objective 1
Form the links between the Local Flood Risk Management Strategy and local spatial planning.	Objective 3
Help communities to recover more quickly and effectively after incidents.	Objective 1 and 4
Ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond properly to flood warnings.	Objective 1

Table 7: *National Flood Risk Management Strategy aims*

6. Sustainability

6.1. Strategic Environmental Assessment (SEA)

To ensure that the strategy contributes to the achievement of wider environmental objectives, it is important that it meets the requirement of the Strategic Environmental Assessment (SEA) directive and the Water Framework Directive.

The objective of the SEA is 'to provide for a high level of protection of the environment and to contribute to the integration of environmental consideration into the preparation and adoption of plans and programmes with a view to promoting sustainable development.

It was transposed into English legislation by the Environmental Assessment of Plans and Programmes Regulations 2004 (the 'SEA Regulation').

The scoping report and initial testing of the objectives for the Strategy against the SEA objectives has found that no SEA is required.

Although there is no requirement for a SEA, there is a requirement to undertake flood risk works in a manner consistent with the National Flood Risk Management Strategy, and the six guiding principles – Community focus, catchment approach, sustainability, proportionate risk based approaches, multiple benefits and varieties of beneficiaries. Therefore a decision was taken to undertake a review of the LFRMS as part of the screening for SEA to assess the Strategy against these and other environmental considerations.

6.2. Habitats Regulations Assessment (HRA)

The EU Habitats Directive was adopted in 1992 and aims to protect habitats and species of European Significance. It was transposed into UK law in The Conservation of Habitats and Species Regulations 2010:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives".*

A Habitats regulation scoping has been undertaken which has determined there is no requirement for a Habitats Regulation Assessment.

6.3. Environmental impact conclusions

There is no significantly adverse effect identified which requires further assessments at this current stage, as the key objectives of the LFRMS are high level. However it is expected that the Flood Risk Management Strategy and documents within the London Borough of Hillingdon's Flood Risk Management Portfolio, will be updated and specific flood risk management schemes developed.

Site specific flood risk projects may require an Environmental Impact Assessment (EIA). All future flood risk schemes should have regard to the environmental issues facing Hillingdon, as identified in the SEA screening. There are opportunities for flood risk schemes to contribute to the wider environmental and sustainable aims and objectives identified as priorities for the London Borough of Hillingdon, as well as for other schemes to help reduce flooding.

7. Monitoring and review

7.1. Monitoring

It is in the interests of the Council and residents that the LFRMS remains up-to-date. It will be monitored and, where appropriate, updated.

There may be circumstances which may trigger a review and/or an update of the evidence base in the interim, such as:

- Additional data or modelling becoming available, which may alter the understanding of risk within the Borough;
- Additional (major) development or other changes in the catchment which may affect the flood risk.
- Updates within key supporting documents within the Flood Risk Management Portfolio

The evidence base, with actions and priorities, will be continually reassessed as more information on flooding is collected and as actions are progressed and investigated. The Surface Water Management Action Plan is a living document and will be updated regularly for internal use. Periodically the version published on the Council website will be updated.

7.2. Updating the FRMS

The Local Flood Risk Management Strategy is likely to follow a six year cycle following the proposed six yearly review of the National Flood Risk Management Strategy and Flood Risk Regulations requirement for Flood Risk Management Plans.

In recognition that the FRMS will be updated in the future, each document should be given version number and date so it is clear which is the most recent. Any amendment should trigger the reissue to departments within the Council and to other stakeholders, as well as to the website.

8. Glossary

AMP	Water Utilities Asset Management Plans
AQMA	Air Quality Management Area
The Council	London Borough of Hillingdon
CCA	Civil Contingencies Act 2004 gives a duty to plan for emergencies to Category 1 responders, which the London Borough of Hillingdon is defined as.
CDA	Critical Drainage Areas identified in the SWMP as areas that contribute to and have critical drainage problems.
CFMP	Catchment Flood Management Plan considers all types of inland flooding, from rivers, groundwater, surface water and tidal flooding.
CRT	Canal and River Trust is responsible for the assets on the grand union canal which runs through Hillingdon. For non-critical events Tel **0303 040 4040**. Weekdays 8am to 6pm. In an emergency Tel **0800 47 999 47**.
EA	The Environment Agency is a national executive non-departmental public body, sponsored by DEFRA to protect and improve the environment. Responsible for: ● regulating major industry and waste ● treatment of contaminated land ● water quality and resources ● fisheries ● inland river, estuary and harbour navigations ● conservation and ecology ● managing the risk of flooding from main rivers, reservoirs, estuaries and the sea. They provide the following services: Flood maps for rivers and surface water flooding. **Flood Warning Service Tel 0345 988 1188** (24 hour service) The Environment Agency offer a free service that provides flood warnings by phone, text or email, Floodline Warnings Direct. **Environment Agency Incident Hotline Tel 0800 80 70 60** (Freephone, 24 hour service). More information on the type of environmental issues the Environment Agency deal with can be found on their website. Water levels at monitoring stations. Type your postcode in local flood information.
EIA	Environmental Impact Assessment assess the significant environmental impact of a project which requires planning permission
Floating Pennywort	An invasive aquatic plant further information on this can be found on the CABI website including details of its management
Flood Map	Produced by the Environment Agency, shows flooding from rivers, areas likely to be at risk from surface water flooding, and other key environmental information.
FRMP	Flood Risk Management Plan what they are and who is responsible for them can be found on the government website.
FRM Portfolio	Flood Risk Management Portfolio, group of flood risk management documents produced by the London Borough of Hillingdon, includes the Hillingdon PFRA, SFRA, SWMP Evidence Base and Options and Action Plan and Flood Investigations.
FRR	Flood Risk Regulations
FWMA	Flood and Water Management Act 2010
FWMO	Flood and Water Management Officer

Giant Hogweed	A non native invasive species which is harmful (the sap can cause severe skin burns) more information can be found on the RHS website
GLA	Greater London Authority, prepares the London Plan
Grant in Aid	A grant provided to the EA for flood alleviation schemes
Gullies	Roadside grills to allow water to drain off the road. responsibility of the Highways Authority.
HRA	Habitats Regulations Assessment
LFRMS	Local Flood Risk Management Strategy. The Flood and Water Management Act requires a strategy to be produced by Lead Local Flood Authorities on the management of local flood risk.
LLFA	Lead Local Flood Authority, defined by the Flood and Water Management Act which gives unitary or County councils responsibilities in managing local flood risk, asset registers, and investigating significant flood events.
Local flood risk	Surface water, groundwater and ordinary watercourses
Local Levy	Funding provided to the RFCC from LLFA
LRF	Local Resilience Forum, made up of Category 1 responders
London Plan	Produced by the Mayor, the strategic plan for London, setting out a plan for economic, environmental, transport and social framework for London includes supplementary planning guidance such as the Sustainable Design and Construction SPG, All London Green Grid, Mayor's Water Strategy
MAFP	Multi Agency Flood Plan. The Civil Contingencies Act (2004) requires Category One Responders to have plans in place to respond to all emergencies. So the Hillingdon Local Resilience Forum has determined the complex and diverse nature of flooding and the consequences that arise, requiring a comprehensive and often sustained response from a wide range of organisations required a specific Hillingdon MAFP.
Misconnections	Wrongly connected pipe work from kitchens into the surface water sewer
NFEF	National Flood Emergency Framework to provide a forward looking policy framework for flood emergency planning and response.
NFRMS	National Flood Risk Management Strategy A requirement of the FWMA to be produced by the Environment Agency
NAFRA	National Flood Risk Assessment
OFWAT	The Water Regulator for England and Wales
Pitt review	Government Commissioned report to learn the lessons from the 2007 floods
PFRA	Preliminary Flood Risk Assessment
RBMP	River Basin Management Plans
RMA	Risk Management Authorities, defined by the Flood and Water Management Act and includes the Environment Agency, Lead Local Flood Authorities, Highway Authorities, Water and Sewerage Companies
Sewer	Usually a underground pipe conveying foul sewage or surface water. In some instances this is combined. The responsibility of the Water Utility.
SEA	Strategic Environmental Assessment
SFA	Settlement Funding Assessment grant from DEFRA
SFRA	Strategic Flood Risk Assessment, collates all available flood risk information to inform planning decisions within the Local Plan
Spatial Planning	The management of space and development in order to create better places.
SuDs	Sustainable Drainage and the non statutory national standards.

SWMP	A Surface Water Management Plan outlines the preferred strategy for managing surface water flooding, which describes flooding from sewers, drains, groundwater, and runoff from land, small (ordinary) water courses and ditches that occurs as a result of heavy rainfall
TFL	Transport for London
TRFCC	Thames Regional Flood and Coastal Committee
Water Utility	**Thames Water** If you are aware it is the surface water sewer that is blocked: Report sewer issue to Thames Water » Or call Thames Water on 0800 0093964 - please select option 2 **Affinity** supply water to the north of the borough
WFD	Water Framework Directive introduced by the Eu to provide an integrated and comprehensive way of managing the water environment