

Local Flood Risk Management Strategy

February 2017

Introduction from the Executive Member for Environment and Transport

I am pleased to introduce this Strategy setting out how the Council will deliver our statutory duty to develop, maintain, monitor and manage local flood risk. This is all in accordance with the Flood Risk Regulations 2009 and the Flood and Water Management Act 2010.

Islington has a low risk of flooding from surface water runoff, groundwater and sewer surcharging. Our biggest risk of flooding has been from fractured water mains that are owned by Thames Water, and although these are not covered by this legislation, the Council will continue to pursue these matters with them.

The Strategy is a living document that will be updated as required by the Corporate Director of Environment and Regeneration.

This document includes an action plan setting out how our strategy will be delivered over the next six years, and a range of individual, community and Council-led actions to improve awareness. This will help manage both the likelihood and impact of flooding and consequently lead to social, economic and environmental benefits to Islington's communities.



Councillor Claudia Webbe
Executive Member for Environment and Transport
March 2017

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List of Acronyms

AEP	Annual Exceedance Probability
BAP	Biodiversity Action Plan
BGS	British Geological Survey
CFMP	Catchment Flood Management Plan
CIL	Community Infrastructure Levy
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
FCRM	Flood and Coastal Erosion Risk Management
GiA	Grant in Aid
FIR	Flood Investigation Report
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
HRA	Habitat Regulations Assessment
LBI	Islington
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LRF	Local Resilience Forum
MoU	Memorandum of Understanding
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
PSA	Public Service Agreement
RBMP	River Basin Management Plan
RFCC	Regional Flood and Coastal Committees
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SPG	Supplementary Planning Guidance
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TWUL	Thames Water Utilities Limited
WFD	Water Framework Directive
WFDa	Water Framework Directive Assessment

Glossary of terms

Glossary	Definition
Annual exceedance probability (AEP)	Chance of occurrence in any one year, expressed as a percentage. For example, a 1% annual probability event has a 1 in 100 chance of occurring in any given year.
Aquifer	A source of groundwater comprising water bearing rock, sand or gravel capable of yielding significant quantities of water.
Catchment Flood Management Plan (CFMP)	A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
Civil Contingencies Act	This Act delivers a single framework for civil protection in the UK. As part of the Act, Local Resilience Forums must put into place emergency plans for a range of circumstances, including flooding.
Climate Change	Long term variations in global temperature and weather patterns caused by natural and human actions. Climate change allowances are based upon information within the NPPF and Planning Practice Guidance (PPG) and supporting guidance published by the Environment Agency.
Culvert	A channel or pipe that carries water below the level of the ground.
Exception Test	A method set out in the NPPF to help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. The two parts to the Test require proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.
Flood and Water Management Act (FWMA)	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 Floods; the aim of which is to clarify the legislative framework for managing local flood risk (flooding from surface water, groundwater and ordinary watercourses) in England.
Flood Defence	Infrastructure used to protect an area against flooding such as floodwalls and embankments.
Flood Resilience measures	Measures designed to reduce the impact of water that enters property and businesses and to promote fast drying and easy cleaning; for example raising electrical appliances, installing tiled flooring.
Flood Resistance measures	Measures to prevent flood water entering a building or damaging its fabric, for example the use of flood guards. This has the same meaning as flood proofing.
Flood Risk	The level of flood risk is the product of the frequency or likelihood of the flood events and their consequences (such as loss, damage, harm, distress and disruption).
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.
Flood Zone	Areas defined by the probability of river and sea flooding, ignoring the presence of defences. Flood Zones are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's web site.
Fluvial	Relating to the actions, processes and behaviour of a watercourse (river or stream).
Groundwater	Water that is in the ground, usually referring to water in the saturated zone below the water table.
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. RB of Greenwich is the LLFA for their administrative

Glossary	Definition
	area.
Local Planning Authority (LPA)	Body that is responsible for controlling planning and development through the planning system.
Main river	Watercourse defined on a 'main river map' designated by Defra.
Mitigation measure	An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.
National Planning Policy Framework (NPPF)	The National Planning Policy Framework was published on 27 March 2012. It is a framework which sets out the Government's planning policies for England and how these are expected to be applied.
Planning Practice Guidance	Supporting guidance to the National Planning Policy Framework, available at http://planningguidance.communities.gov.uk/
Ordinary watercourse	A watercourse that does not form part of a main river. This includes "all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows" according to the Land Drainage Act 1991.
Residual Flood Risk	The remaining flood risk after risk reduction measures have been taken into account.
Return Period	The average time period between rainfall or flood events with the same intensity and effect.
Risk	Risk is a factor of the probability or likelihood of an event occurring multiplied by consequence: Risk = Probability x Consequence. It is also referred to in this report in a more general sense.
Sequential Test	An approach to future site planning whereby new development is directed towards areas with the lowest probability of flooding before consideration of higher risk areas. The Sequential Test helps ensure that development can be safely and sustainably delivered and developers do not waste their time promoting proposals which are inappropriate on flood risk grounds.
Sewer Flooding	Flooding caused by a blockage or overflowing of a sewer or urban drainage system.
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.
Surface Water Management Plan (SWMP)	A plan which outlines the preferred surface water management strategy in a given location. In this context surface water flooding describes flooding from sewers, drains, groundwater and runoff from land, small watercourses and ditches that occurs as a result of heavy rainfall.
Sustainable drainage systems (SuDS)	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Topographic survey	A survey of ground levels.

Executive Summary

The Flood Risk Regulations 2009 and the Flood and Water Management Act 2010 (the “Act”), enacted by Government in response to the recommendations of The Pitt Review, gave unitary and county councils, as Lead Local Flood Authorities, new responsibilities for leading and co-ordinating the management of local flood risk; namely the flood risk arising from surface water, groundwater and smaller watercourses and ditches, known as ordinary watercourses. This includes a statutory duty to develop, maintain, apply and monitor a strategy for the management of local flood risk.

This Local Flood Risk Management Strategy (the “Strategy”) outlines Islington’s priorities, as the Lead Local Flood Authority for Islington, for local flood risk management and provides a delivery plan to manage the risk over the next six years. The Strategy aims to deliver the greatest benefit to the people, property and environment of Islington. This Strategy is for all members of the public, residents, workers, commuters, business owners and landowners within Islington.

Within Islington, there are risks of flooding from a number of different sources, including surface water runoff and ponding, groundwater and sewer surcharging. It is predicted that this risk will increase in the future; influenced by climate change and increasing pressures on development and housing need. Whilst the interaction of different flood sources is considered, the Strategy only sets out measures to address local sources of flooding namely surface water, groundwater and ordinary watercourses as laid out in Section 9 of the Act. Management of flooding from artificial waterbodies or Thames Water assets such as burst water mains is not included as this sits outside the requirements of the Act.

The Environment Agency has undertaken national modelling of the risk of flooding from surface water and identified that within Islington, 780 residential properties and 118 non-residential properties could be at risk of surface water flooding during a rainfall event with a >3.3% Annual Exceedance Probability (AEP).

Using the latest flood risk information available, and taking account of the local communities’ needs and concerns, Islington has applied the guiding principles, from the Environment Agency’s National Flood and Coastal Erosion Risk Management Strategy for England, when setting the following objectives for the management of local flood risk in Islington:

The Strategy is accompanied by an Action Plan setting out how the objectives of the Strategy will be delivered over the next six years and a Strategic Environmental Assessment (SEA) assessing the impacts of the Strategy on the environment. A range of individual, community, council-led and Risk Management Authority actions and improved awareness will help manage both the likelihood and impact of flooding and consequently lead to social, economic and environmental benefits to Islington’s communities.

Islington Local Flood Risk Management Objectives

- 1) Improve flood risk understanding for properties, communities and infrastructure at risk of flooding from surface water, groundwater or ordinary watercourses.
- 2) Support sustainable growth and development by understanding the needs of all parties and ensuring the best evidence feeds into decision-making.
- 3) Maximise use of resources through targeted flood management and partnership working.
- 4) Improve local community preparedness for flooding events, and co-ordinate stakeholders involved in community flood risk management to ensure efficient warning and recovery.

1. Introduction

1.1 Background

Within Islington, there are risks of flooding from a number of sources, including surface water runoff and ponding, groundwater, and sewer surcharging. In some cases more than one of these sources of flooding can combine to cause a flood event and exacerbate localised flooding. Parts of Islington have a susceptibility to surface water and sewer flooding due to the urbanised nature of the area and the complexity of the sewer system leading to a high potential for constrictions, blockages and failure.

Whilst Islington has not experienced the level of severe flooding in recent years as some other London boroughs, localised flooding has been recorded within the borough in recent years and climate change and continued urbanisation are likely to increase flood risks in the future unless action is taken to mitigate or adapt to that risk.

1.2 Flood Risk Management in Islington

The Flood Risk Regulations 2009 ('the Regulations')¹ and the Flood and Water Management Act 2010 ('the Act')², gave unitary and county councils, as Lead Local Flood Authorities (LLFAs), responsibilities for leading and co-ordinating the management of local flood risk.

Local Flood Risk Definition:

“The risk of flooding from local sources including surface water, groundwater and Ordinary Watercourses (small ditches and watercourses)”

As the LLFA, Islington has a statutory requirement to produce a strategy outlining how local flood risk will be managed and ensure that the actions identified within it are monitored and achieved. The Local Flood Risk Management Strategy ('the Strategy') compliments and contributes towards Islington's existing approach to flood risk management, as outlined in the following documents:

- Islington Surface Water Management Plan (SWMP)³;
- Islington Preliminary Flood Risk Assessment⁴; and
- North London Level 1 Strategic Flood Risk Assessment⁵.

¹ HSMO (2009) The Flood Risk Regulations <http://www.legislation.gov.uk/uksi/2009/3042/contents/made>

² HMSO (2010) The Flood and Water Management Act 2010 <http://www.legislation.gov.uk/ukpga/2010/29/contents>

³ Halcrow (2011) Islington Surface Water Management Plan

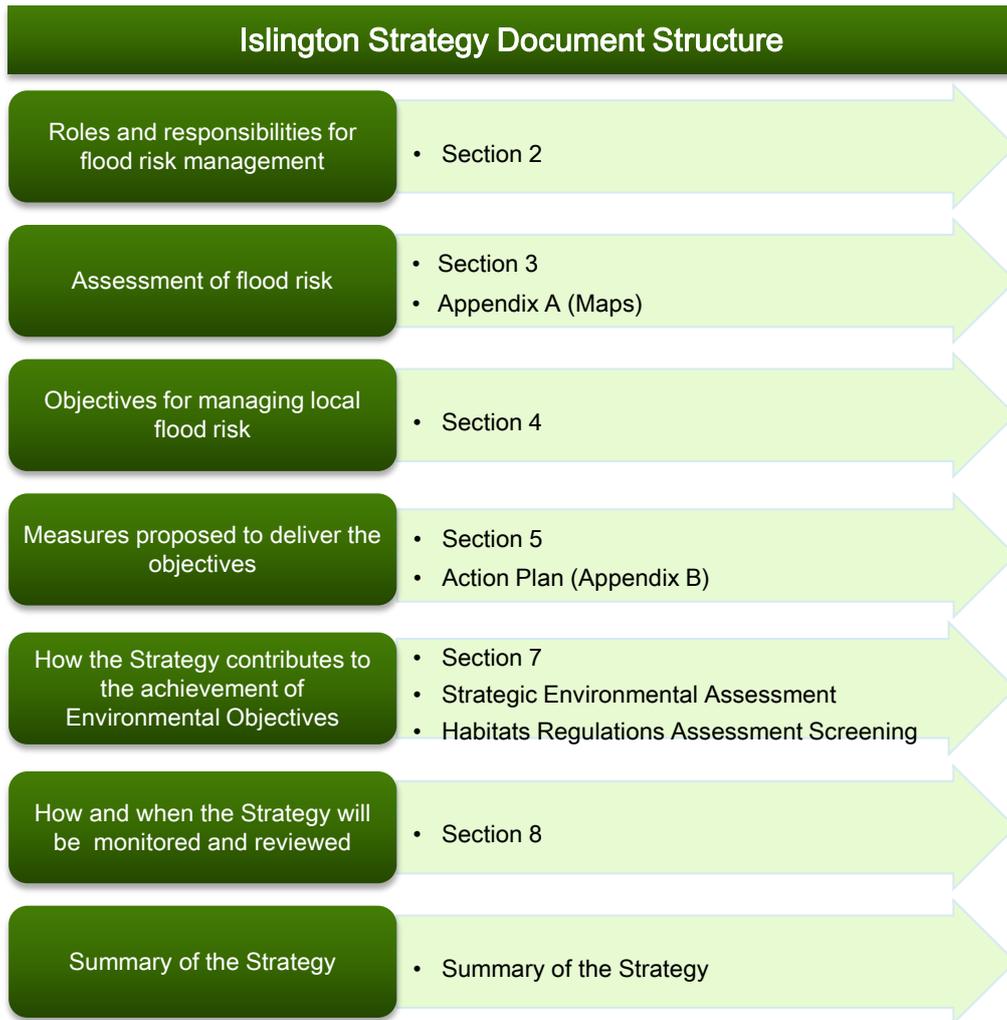
⁴ Halcrow (2011), Preliminary Flood Risk Assessment

⁵ Mouchel (2008), North London Level 1 Strategic Flood Risk Assessment.

1.3 The Islington Strategy

The purpose of this Strategy is to set out Islington’s approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help to manage the risk in a way that delivers the greatest benefit to the residents, businesses and environment of Islington. It also outlines how Islington will work with others to manage all sources of flooding within the borough and neighbouring catchments.

Figure 1-1: Structure of the Strategy



This Strategy complements and supports the National Strategy⁶, published by the Environment Agency, which outlines a National framework for flood and coastal risk management, balancing the needs of communities, the economy and the environment.

This Strategy has been developed in partnership with Risk Management Authorities (RMAs)⁷ including the Environment Agency and Thames Water Utilities Limited (TWUL), as well as neighbouring boroughs.

⁶ Defra, Environment Agency (2011) The National Flood and Coastal Erosion Risk Management Strategy for England <http://www.environment-agency.gov.uk/research/policy/130073.aspx>

⁷ A RMA is defined in Section 6 of the Act as the Environment Agency, a lead local flood authority, a district council for an area where there is no unitary authority, an internal drainage board, a water company and a highway authority

Delivering flood risk management also provides the opportunity to deliver wider environmental objectives and requirements, as set out in European legislation including the Water Framework Directive⁸. The approach for this, including the preparation of a Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment (HRA), is outlined in Section 8.

1.4 Legislative context

This section provides a summary of the relevant pieces of national legislation and local policies that outline Islington's requirements for flood risk and environmental management across the borough.

1.4.1 Flood and Water Management Act 2010

The Act aims to provide better, more comprehensive management of flood risk for people, homes and businesses. It does this by defining RMAs and formalises the flood risk management roles and responsibilities for each.

Further details regarding RMA responsibilities and functions in relation to flood risk management responsibilities in Islington are provided in Section 2.

1.4.2 Flood Risk Regulations 2009

Islington lies within the Greater London Flood Risk Area, and as such Islington, as the LLFA, has obligations under the EU Floods Directive⁹, which was transposed into UK Law through the Flood Risk Regulations 2009¹⁰ ('the Regulations'). as outlined below.

1.4.2.1 Preliminary Flood Risk Assessment

Islington is required to prepare a Preliminary Flood Risk Assessment (PFRA) report every six years. Islington's PFRA¹¹ was prepared in 2011. The PFRA seeks to provide a high-level overview of flood risk from local flood sources and includes flooding from surface water (i.e. rainfall resulting in overland runoff), groundwater, ordinary watercourses (smaller watercourses and ditches). The PFRA is currently due to be updated in 2017.

1.4.2.2 Flood Risk Management Plan

Islington is required to prepare a Flood Risk Management Plan (FRMP) outlining significant flood risk, receptors and consequences across their administrative area. FRMPs describe the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. They set out how Risk Management Authorities (RMAs) will work together, with communities, to manage flood risk and are important for delivering the aims of the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy for England.

An FRMP was prepared and published by the Environment Agency for the Thames River Basin District in 2015, in partnership with Islington and other LLFAs.

The Strategy has been produced with the aim of aligning and integrating the objectives of the Strategy with the wider river basin objectives.

⁸ European Union (2000) Water Framework Directive <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0060:EN:NOT>

⁹ European Union (2007) EU Floods Directive 2007/60/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0060:EN:NOT>

¹⁰ HSMO (2009) The Flood Risk Regulations <http://www.legislation.gov.uk/ukxi/2009/3042/contents/made>

¹¹ Halcrow (2011) Preliminary Flood Risk Assessment for Islington <https://www.islington.gov.uk/~media/sharepoint-lists/public-records/planningandbuildingcontrol/information/adviceandinformation/20122013/20120809preliminaryfloodriskassessment>

1.4.3 Land Drainage Act 1991

The Land Drainage Act¹² sets the statutory roles and responsibilities of key organisations such as Internal Drainage Boards, local authorities, the Environment Agency and riparian owners with jurisdiction over watercourses and land drainage infrastructure. Parts of the Act have been amended by the Flood and Water Management Act 2010.

1.4.4 Climate Change Act 2008

Under the Climate Change Act¹³, the Government, public bodies and statutory organisations are required to report on how they are adapting to climate change. This Strategy assesses the impact of climate change and its effect on flood risk throughout the borough, and reports on plans to manage and mitigate the effects.

1.4.5 Highways Act 1980

Under Section 100 of the Highways Act¹⁴, Islington as the Highway Authority has powers to construct, maintain or cleanse drainage systems in the highway or on adjoining/nearby land, for the purpose of drainage or prevention of surface water on the highway. Much of the surface water risk in urban environments is associated with highways which are usually the primary flow paths and connect flood waters to the sewer system.

European Directives

1.4.6 Strategic Environmental Assessment (SEA) Directive 2001

The SEA Directive¹⁵ was adopted by the European Union and transposed into English law as the Environmental Assessment of Plans and Programmes Regulations¹⁶ (Statutory Instrument No.1633) in 2004.

The Directive requires a Strategic Environment Assessment to be carried out for all plans and programmes which are 'subject to preparation and/or adoption by an authority at national, regional or local level'. The SEA informs the preferred long-term strategy through its identification of the likely significant effects of the implementation of this Strategy on relevant environmental receptors.

1.4.7 Habitats Regulations Directive

The Habitats Directive was adopted by the European Union in 1992¹⁷ and transposed into English law as the Conservation (Natural Habitats, & c.) Regulations 1994¹⁸

The Directive requires a Habitats Regulations Assessment (HRA) to accompany a plan or project which may have a significant effect on a European site (Special Areas of Conservation, Special Protection Areas and Ramsar sites)

1.4.8 Water Framework Directive (WFD) 2000

The Water Framework Directive (WFD)¹⁹ is a European Directive which introduced a strategic planning process to manage, protect and improve the water environment. The Environment Agency is responsible for preparing management plans for river basin districts in England. These plans must be prepared in line with the requirements of the WFD. The

¹² HSMO (1991) Land Drainage Act <http://www.legislation.gov.uk/ukpga/1991/59/contents>

¹³ HMSO (2008) Climate Change Act http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf

¹⁴ HSMO (1980) Highways Act <http://www.legislation.gov.uk/ukpga/1980/66/contents>

¹⁵ European Union (2001) Strategic Environmental Assessment Directive 2001/42/EC. <http://ec.europa.eu/environment/eia/sea-legalcontext.htm>

¹⁶ HMSO (2004) Environmental Assessment of Plans and Programmes Regulations. <http://www.legislation.gov.uk/uksi/2004/1633/contents/made>

¹⁷ European Union (1994), The Habitats Directive, http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

¹⁸ HMSO (1994), The Conservation (Natural Habitats & c) Regulations 1994, <http://www.legislation.gov.uk/uksi/1994/2716/contents/made>

¹⁹ European Union (2000) Water Framework Directive 2000/60/EC. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0060:EN:NOT>

plans outline the characteristics of the river basin district, identify the pressures that the local water environment faces and actions to improve or manage these. Islington is covered by the Thames River Basin Management Plan (RBMP)²⁰.

This Strategy has been assessed for WFD compliance to ensure that local measures reduce flood risk, comply with the objectives of the WFD, and identify, where possible, measures to contribute to achieving WFD objectives, in line with the Thames RBMP.

Planning Policy

1.4.9 National Planning Policy Framework

As the Local Planning Authority, the National Planning Policy Framework²¹ (NPPF) and supporting guidance²² requires Islington to undertake a Strategic Flood Risk Assessment (SFRA) and to use the findings, and those of other studies, to inform strategic land use planning including the application of the Sequential Test which seeks to steer development towards areas of lowest flood risk prior to consideration of areas of greater risk. Islington's Level 1 SFRA was produced in 2008, as part of the joint North London Level 1 SFRA⁵. At the time of writing the Islington SFRA is undergoing an update and is due for publication in 2017.

1.4.9.1 Ministerial Statement HCWS161: Sustainable Drainage

The government published a ministerial statement (HCWS161)²³ on sustainable drainage systems (SuDS) on 18th December 2014 whereby decisions on planning applications relating to major development²⁴ must ensure that SuDS for the management of runoff are put in place, unless demonstrated to be inappropriate. Planning applicants must demonstrate that the proposed minimum standards of operation are appropriate and that there are clear arrangements in place for ongoing maintenance. The ministerial statement should be read in conjunction with the policies in the NPPF.

Islington has produced local guidance on SuDS design which can be found on our website [here](#).

1.4.10 The London Plan (March 2016)

The London Plan (March 2016)²⁵ sets out an integrated economic, environmental, transport and social framework for the development of London over a 20-25 year period. This document, published in March 2015, is consolidated with all the alterations to the London Plan since 2011. The Plan includes a number of key policies aimed to assist protection of the water environment during redevelopment and construction. The following policies are of relevance to flood risk and drainage:

- Policy 5.11 Green Roofs and Development Site Environs
- Policy 5.12 Flood Risk Management
- Policy 5.13 Sustainable Drainage

²⁰ Thames River Basin Management Plan (2015) <https://www.gov.uk/government/publications/thames-river-basin-district-river-basin-management-plan>

²¹ Communities and Local Government (2012) National Planning Policy Framework <http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950>

²² Communities and Local Government (2014) Planning Practice Guidance: Flood Risk and Coastal Change:

<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

²³ <http://www.parliament.uk/documents/commons-vote-office/December%202014/18%20December/6.%20DCLG-sustainable-drainage-systems.pdf>

²⁴ Developments of 10 dwellings or more; or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010)

²⁵ Greater London Authority, March 2016, The London Plan The spatial development strategy for London consolidated with alterations since 2011.

1.4.10.1 Sustainable Design and Construction SPD

The Sustainable Design and Construction SPG²⁶ provides guidance on the implementation of London Plan policy 5.3 - Sustainable Design and Construction, as well as a range of policies relating to environmental sustainability. It is a key supporting document for the management of flood risk in London and the implementation of SuDS.

To support the flood related policies in the London Plan, the SPG includes guidance on:

- Surface water flooding and sustainable drainage, including Surface Water Management Plans (SWMP), greenfield runoff rates, the multifunctional benefits of SuDS, management of SuDS and contributions;
- Flood resilience and resistance of buildings in flood risk areas;
- Flood risk management, including the design life of development, safety, and basements;
- Flood defences; and,
- Other sources of flooding, including groundwater flooding, reservoir flooding and surface water flooding.

With regards to greenfield runoff rates, the SPG states the following preferred standards:

“ all developments on greenfield sites must maintain greenfield runoff rates. On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate. The only exceptions to this, where greater discharge rates may be acceptable, are where a pumped discharge would be required to meet the standards or where surface water drainage is to tidal waters and therefore would be able to discharge at unrestricted rates provided unacceptable scour would not result”.

However, if it is not practical to achieve greenfield runoff rates, the essential standards for runoff requires a minimum of 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. Developers are required to demonstrate and justify why the greenfield runoff rate cannot be achieved, and identify which methods/opportunities have been used to minimise final site runoff, as close to greenfield rate as practical. This should be done using calculations and drawings appropriate to the scale of the application.

1.4.11 Islington Local Plan

The most up to date Local Plan policies can be viewed online at

<https://www.islington.gov.uk/planning/planningpol>

Details of Islington policy supporting flood and water management at the time of producing this strategy are included below;

Core Strategy Strategic Policies;

- **CS10: Sustainable Design**

E. Requiring all development to demonstrate that it is designed to be adapted to climate change, particularly through design which minimises overheating and incorporates sustainable drainage systems (SUDS), with more specific targets to be set out in the Development Management Policies. Developments may also be required to contribute to wider local adaptation schemes which mitigate the impacts of climate change.

²⁶ Mayor of London, 2014, Sustainable Design and Construction SPG, London Plan 2011 Implementation Framework.

- **CS15: Open Space and green infrastructure**

G. Maximising the contribution of new and existing open spaces to broader sustainability objectives including SUDS, climate change adaptation and biodiversity. These opportunities will be set out in the aforementioned Open Space and Green Infrastructure Strategy.

Development Management Policies

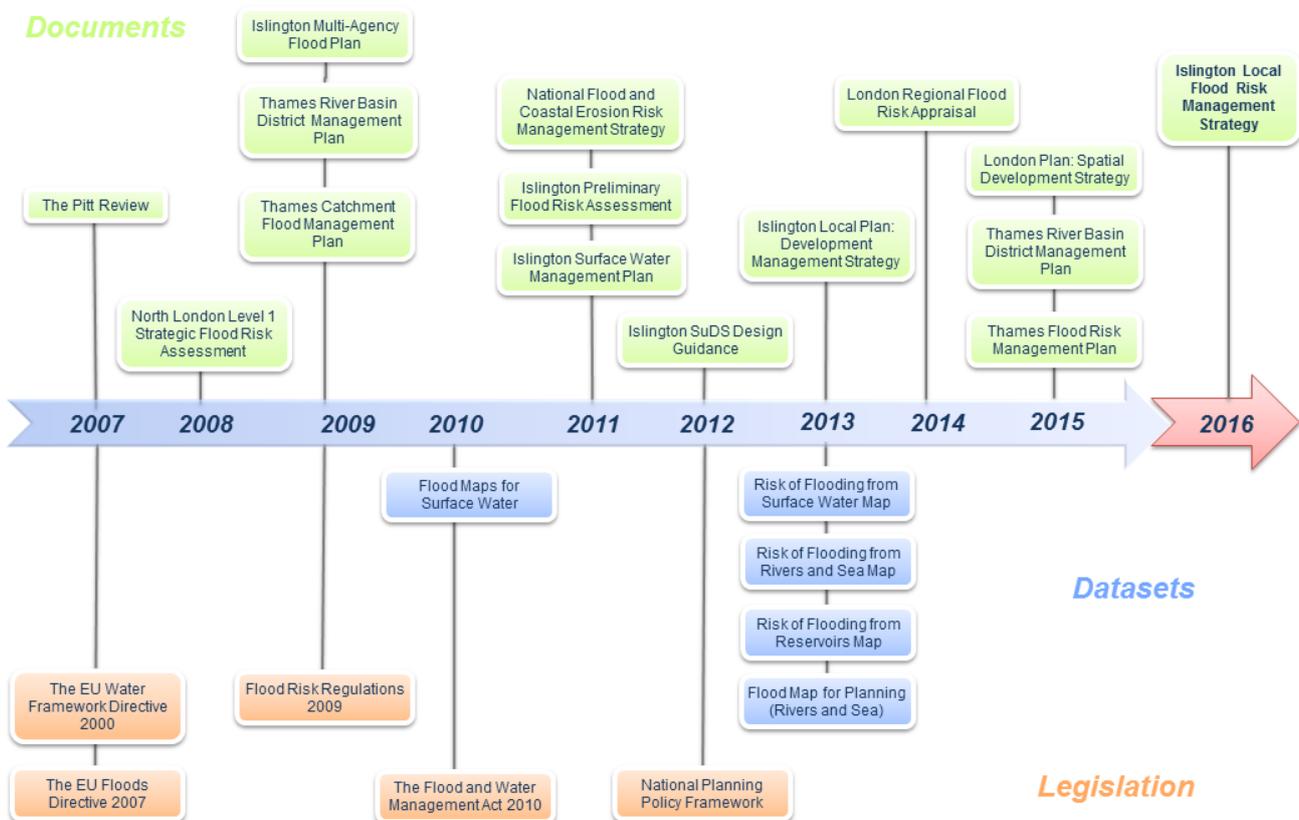
Policy DM6.6: Flood Prevention

- A. Applications for major developments creating new floorspace and major Changes of Use that are likely to result in an intensification of water use are required to include details to demonstrate that Sustainable Urban Drainage Systems (SUDS) have been incorporated and meet the following design standards:
- i) Quantity: schemes must be designed to reduce flows to a 'greenfield rate' of run-off (8 litres/second/hectare for Islington), where feasible. The volume of run-off that must be stored on site should be calculated based on the nationally agreed return period value of a 1 in 100 years flood plus a 30% allowance for climate change for the worst storm duration. Where it is demonstrated that a greenfield run-off rate is not feasible, runoff rates should be minimised as far as possible. The maximum permitted runoff rate will be 50 litres/second/hectare.
 - ii) Quality: the design must follow the SUDS 'management train', maximise source control, provide the relevant number of 'treatment stages' and identify how the 'first flush' will be dealt with.
 - iii) Amenity and biodiversity: the design must maximise amenity and biodiversity benefits, while ensuring flow and volumes of run-off entering open space are predictable and water at the surface is clean and safe. Schemes should maximise areas of landscaping and/or other permeable surfaces to support this.
- B. Sites located in Local Flood Risk Zones (LFRZs) will be required to submit a Flood Risk Assessment (FRA) to assess the risk of flooding, particularly surface water flooding, taking climate change projections into account. Where the FRA indicates that an additional volume of run-off must be stored above and beyond the amount calculated based on the method above, this must be provided on site.
- C. All minor new build developments of one unit or more are required to reduce existing run-off levels as far as possible, and as a minimum maintain existing run-off levels, including through the incorporation of SUDS.
- D. Developments may be required to make contributions to addressing surface water flood risk, particularly where they are located in areas considered at high risk of surface water flooding and in exceptional cases where the SUDS quantity standards cannot be achieved on site.

1.5 Supporting plans and documents

Over recent years, a number of documents have been prepared detailing the assessment and management of flood risk within Islington and across administrative boundaries with neighbouring boroughs. Figure 1-2 illustrates the sequence of flood risk studies, plans, legislation and data in relation to the Strategy. Each of these have built on emerging evidence, assessments and modelling techniques to improve the knowledge of flood risk across the borough.

Figure 1-2: Timeline of supporting documents, datasets and legislation for the Strategy



1.5.1 Surface Water Management Plan (SWMP)

A Surface Water Management Plan (SWMP) was prepared for Islington in October 2011²⁷ as part of the wider Drain London Project²⁸ for all 33 Boroughs within Greater London. A SWMP is a plan which outlines the preferred surface water management strategy in a given location. In this context surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall.

²⁷ Halcrow (2011). Islington Surface Water Management Plan

²⁸ <https://www.london.gov.uk/mayor-assembly/gla/governing-organisation/executive-team/directors-decisions/DD1250>

The objectives of the SWMP are to:

- Develop a robust understanding of surface water flood risk in and around Islington, taking into account the challenges of climate change, population and demographic change and increasing urbanisation in London;
- Identify, define and prioritise Critical Drainage Areas (CDA), including further definition of existing local flood risk zones and mapping new areas of potential flood risk;
- 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 learning sharing and exchange, 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;
- Deliver 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;
- Meet Islington's specific objectives as recorded during the development of the SWMP (further details have been specified in the SWMP);
- Facilitate discussions and report implications relating to wider issues falling outside the remit of the work specified in the SWMP, but deemed important by partners and stakeholders for effectively fulfilling their responsibilities and delivering future aspects of flood risk management.

Where appropriate, the findings of the SWMP have been referred to within this LFRMS.

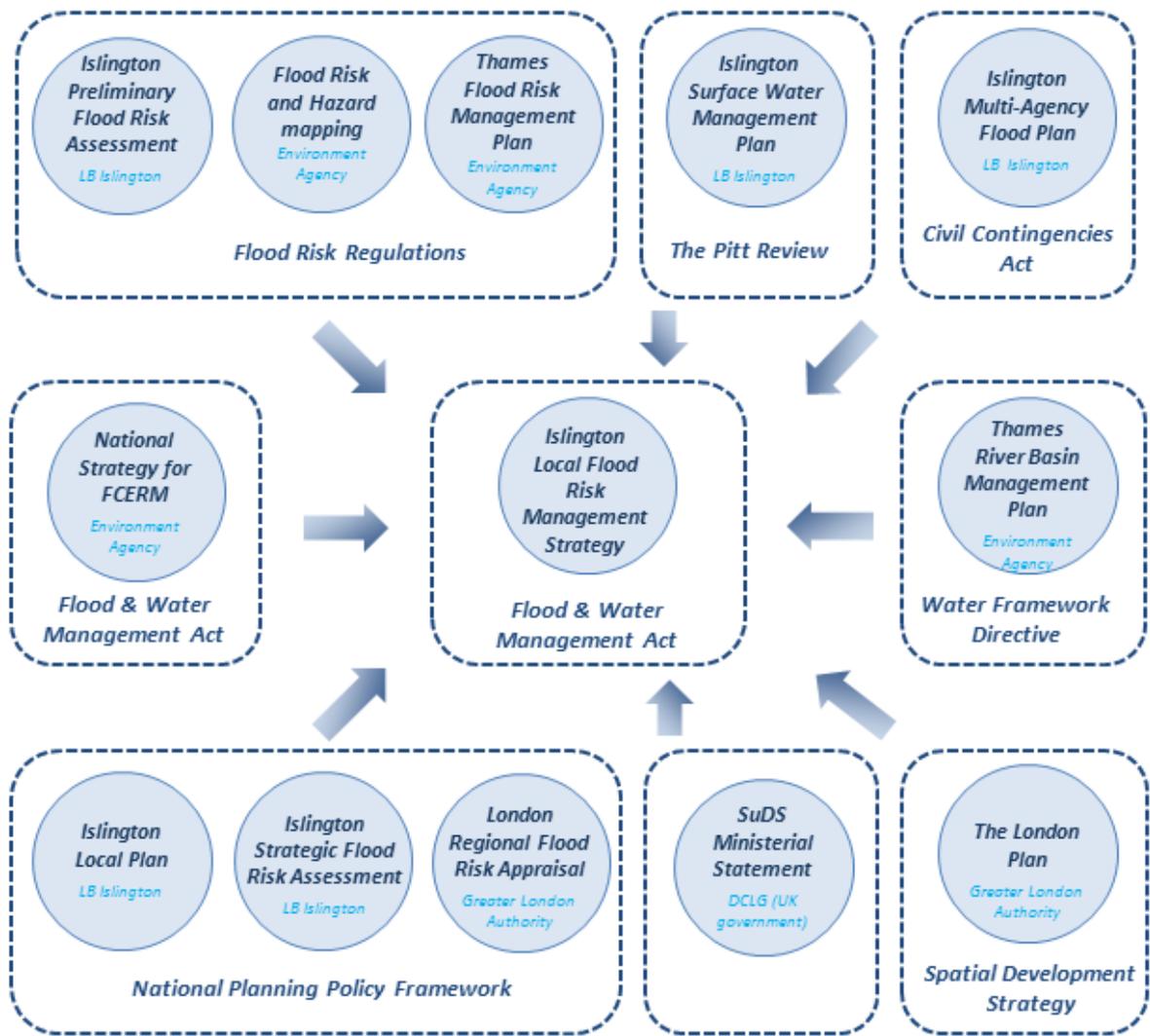
1.5.2 Bringing together existing evidence

This Strategy draws together existing flood risk studies and plans, including technical information and historic records of flooding presented in the SWMP, SFRA and the PFRA, into a single document that outlines how Islington will manage local flood risk going forwards, as illustrated in.

The Strategy also draws from wider environmental plans covering the Thames River Basin District including the Thames RBMP and the Thames Catchment Flood Management Plan (CFMP)²⁹ as updated by the Thames FRMP (see section 1.4.2) to ensure a coordinated approach to flood risk management at a catchment level.

²⁹ Environment Agency (2009) Thames Catchment Flood Management Plan
<https://www.gov.uk/government/publications/thames-catchment-flood-management-plan>

Figure 1-3 : Legislative Drivers and Supporting Documents for the Strategy



2 Roles and Responsibilities for flood risk management

2.1 Who are the 'Risk Management Authorities' in Islington?

Flood events are often a complex interaction of flood source(s), pathway(s) and receptor(s), the responsibility for managing which can lie with a number of different organisations or individuals. As a result, a clear definition of responsibilities and effective communication across these organisations and individuals is vital if the risk to people, property and the environment across Islington is to be managed effectively.

The following organisations are designated Risk Management Authorities (RMAs) under the Regulations and the Act, and have a number of legal responsibilities for managing flood risk in Islington:

- Islington as the Lead Local Flood Authority (LLFA) and Highways Authority;
- Environment Agency;
- Thames Water as the water and sewerage undertaker; and
- Transport for London as the Highways Authority for the Red Routes.

All RMAs have a duty to cooperate with the LLFA and other RMAs when exercising their flood risk management functions.

In addition, other legislation such as the Highways Act 1980³⁰, Water Industry Act 1991³¹, Water Resources Act 1991³² and Civil Contingencies Act 2004³³ place duties and powers upon specific organisations and individuals of relevance to local flood risk management.

2.2 Islington – Roles and responsibilities

Islington has a number of roles and responsibilities for flood risk management under the Act, the Regulations and other national legislation, as outlined below.

2.2.1 Role as LLFA

As the LLFA, Islington has a number of duties and discretionary powers under the Act, the Regulations and Land Drainage Act 1991. Figure 2-1 presents the LLFA duties and discretionary powers.

2.2.1.1 SuDS Statutory Consultee

The recent government SuDS policy update (see section 1.4.9.1) has assigned LLFAs as statutory consultees to the planning process for surface water drainage in relation to planning applications for major development. From 6th April 2015, SuDS proposals must be submitted for all planning applications for major developments. As the LLFA, Islington is consulted on the drainage elements of planning applications to ensure they conform to necessary national and local SuDS standards.

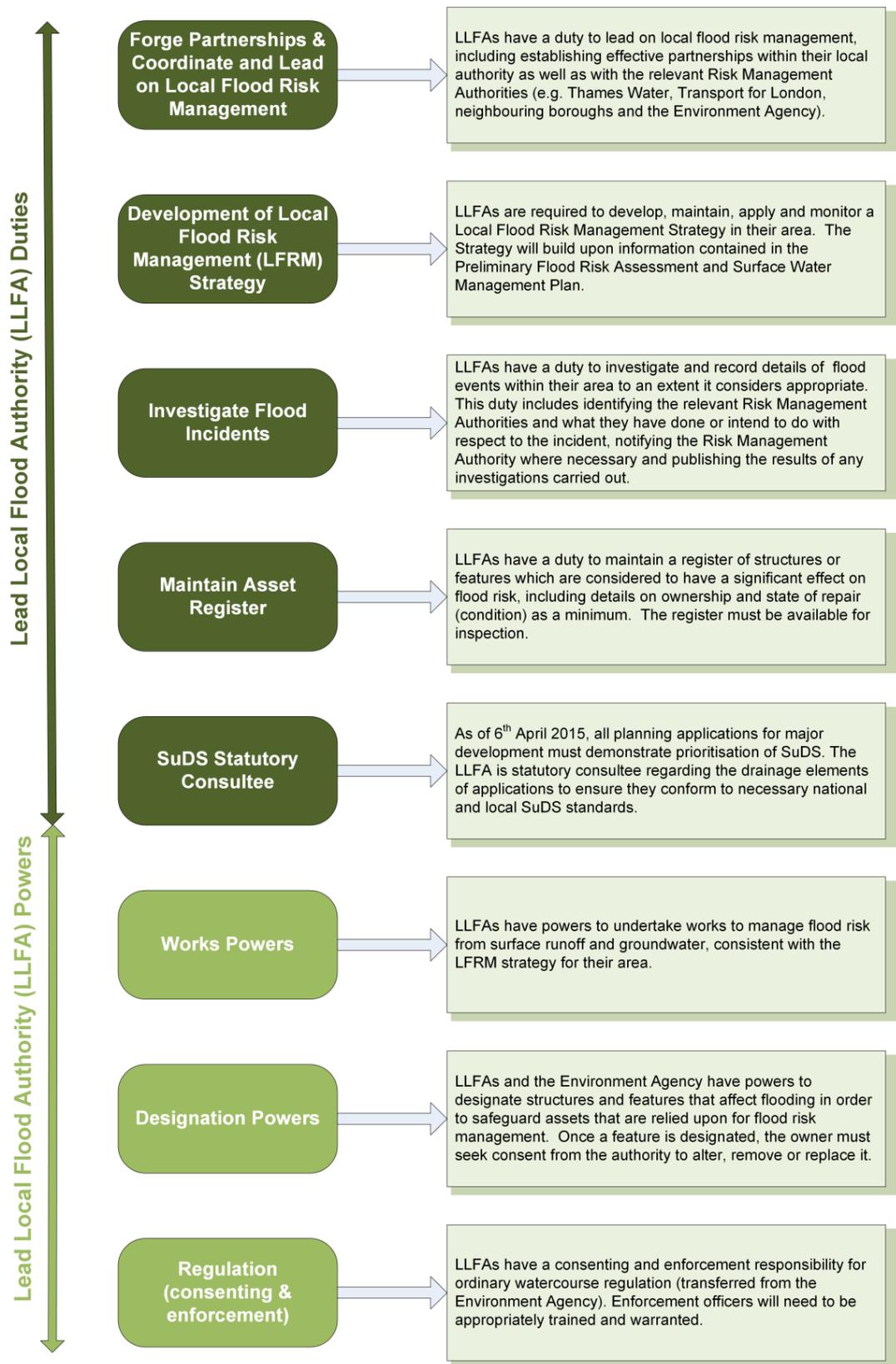
³⁰ HMSO (1980) Highways Act <http://www.legislation.gov.uk/ukpga/1980/66>

³¹ HMSO (1991) Water Industry Act <http://www.legislation.gov.uk/ukpga/1991/56/contents>

³² HMSO (1991) Water Resources Act <http://www.legislation.gov.uk/ukpga/1991/57/contents>

³³ HMSO (2004) Civil Contingencies Act <http://www.legislation.gov.uk/ukpga/2004/36/contents>

Figure 2-1: Islington Duties and Discretionary Powers as LLFA



2.2.2 Role as Highway Authority

The highway drainage system is integral in the management and behaviour of surface water during heavy rainfall events. As a Highway Authority, Islington is required by the Highways Act 1980 to ensure that all local highways are drained of surface water and where necessary maintain highway drainage systems (excluding red routes managed by TfL).

2.2.3 Role as Emergency responder

Islington is a Category 1 Responder under the Civil Contingencies Act 2004 and therefore has a responsibility, along with other organisations, for developing emergency plans, contingency plans and business continuity plans to help reduce, control or ease the effects of an emergency in Islington.

2.2.4 Role as Local Planning Authority

As a Local Planning Authority (LPA) Islington has a responsibility to consider flood risk in their strategic land use planning and the development of their Local Plan, as set out under the NPPF and supporting guidance. Islington is the 'decision maker' on flood risk for planning applications for development, taking into consideration technical advice from other risk management authorities as consultees (statutory). When considering applications for development, the Council requires site-specific flood risk assessments to be undertaken in line with the NPPF

2.2.5 As the Regulator of Ordinary Watercourses

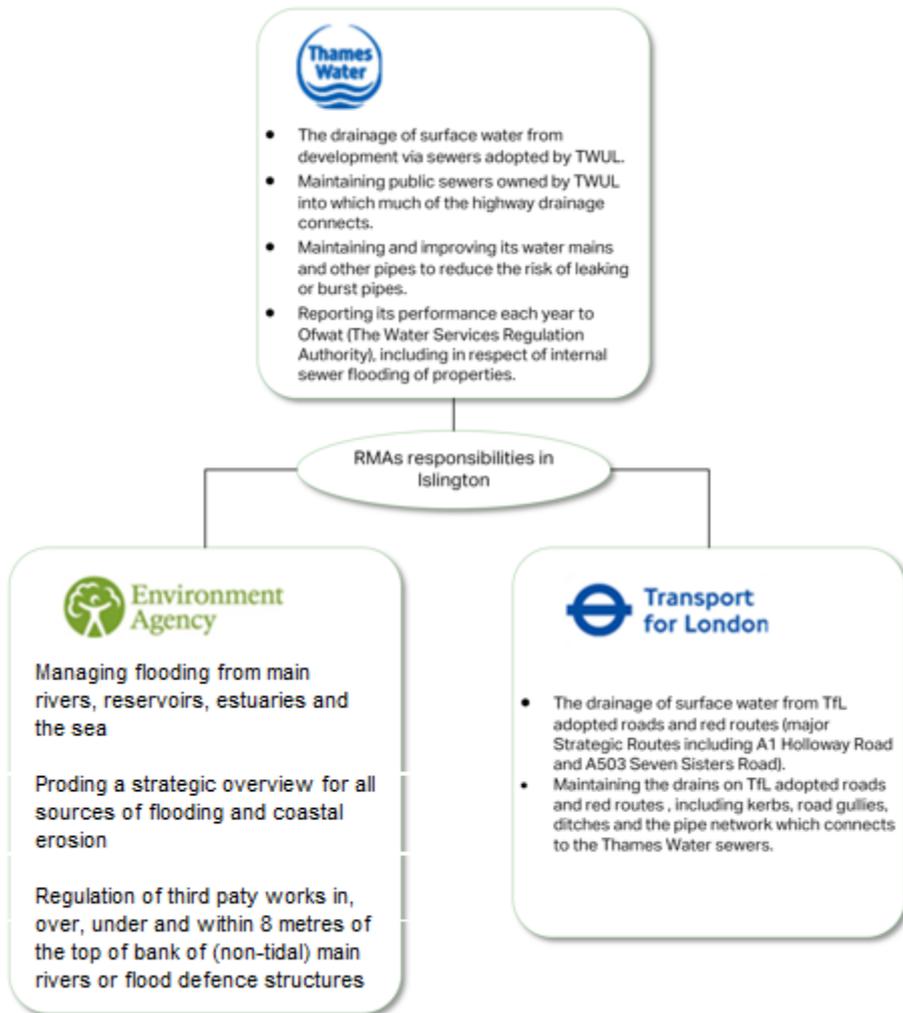
Under the Land Drainage Act 1991 as amended by the 'the Act', one of the Council's roles is the regulation of ordinary watercourse consent. Any works (either temporary or permanent), that may alter or impact the flow or storage of water within an ordinary watercourse will require consent from the Council prior to any work being carried out.

2.2.6 Role as a land owner and asset owner

Islington is responsible for the maintenance of Council owned assets which have a role in flood risk management. These include community open spaces.

2.3 Other RMAs in Islington

Figure 2-1 Responsibilities of other RMAs in Islington



2.4 Responsibilities of Other Organisations / Individuals

Islington recognises the vital role individuals, communities and businesses have in managing flood risk and the requirement for more information to be available to support these initiatives. This Strategy aims to promote and encourage personal responsibility by raising awareness of flood risk and how this can be reduced and by supporting community-based actions.

2.4.1 Property Owners and Residents

It is the responsibility of householders and businesses to look after their property, including protecting it from flooding. It is important that householders, whose homes are at risk of flooding, take steps to ensure that their home is protected.

Practical guidance can be found in the publication 'Prepare your property for

Home and Business owners are responsible for:

- Protecting their property (through property level resilience and resistance measures).
- Maintaining a proper flow of water in any watercourse running through their land.

Individuals can:

- Reduce flood risk by taking action such as disposing of leaf litter rather than letting it block drains
- Co-operating with neighbours and other RMAs,
- Getting involved in local flood risk management activities.

flooding' available on the Environment Agency website³⁴.

2.4.2 Riparian Owners

Riparian owners have the responsibility to manage their own flood risk. If you own land which is adjacent to a watercourse or land which has a watercourse running through it, you are a riparian owner and you have certain legal responsibilities to maintain the watercourse unobstructed. Where a watercourse marks the boundary between adjoining properties, it is normally presumed the riparian owner owns the land up to the centre line of the watercourse.

In general, riparian owners also have the responsibility of piped watercourses and culverts, from where they enter to the point they leave that person's land. The duties, responsibilities and rights exist for piped watercourses and culverts as for

2.4.3 Insurance Companies

Insurers do not have any statutory duties or responsibilities under the Act. However, the Flood Reinsurance Scheme under the Water Act 2014³⁵, known as 'Flood Re', is a not-for-profit scheme proposed by the Association of British Insurers to safeguard the availability and affordability of flood insurance for properties at high risk. The scheme will cap the flood aspect of buildings insurance according to council tax band, and will be funded by an annual levy on all household premiums. Properties in Tax band H and properties built since 2009 are not covered by the scheme.

2.4.4 Other local stakeholders

There are a number of other local stakeholders with an interest in flood risk management in Islington, with whom Islington already working with to manage flood risk where necessary. These are:

- Network Rail;
- London Underground;
- Canal and Rivers Trust;
- Neighbouring Councils, including City of London and the London Boroughs of Haringey, Hackney, and Camden.

These organisations will be involved as required to support flood studies and schemes, or to provide information, support and input on a project-by-project basis. We will continue to work with neighbouring authorities through the Central London North Flood Risk Partnership group, in order to address any issues and learn from any incidents.

³⁴ Environment Agency website - 'Prepare your property for flooding' <https://www.gov.uk/prepare-for-a-flood>

³⁵ HMSO (2014) The Water Act 2014 <http://www.legislation.gov.uk/ukpga/2014/21/contents/enacted>

3. Overview of Flood Risk in Islington

3.1 Flood Risk

Flood risk is not just the likelihood of flooding occurring, but also the potential damage a flood could cause. Assessing risk in quantifiable, financial terms can help prioritise where available funding should be directed, as well as support applications for additional external funding.

However, it should also be borne in mind that the consequences of flooding can be far reaching and not always easy to value, particularly the social impacts of displacement from property, loss of possessions and fear of repeat events.

What is Flood Risk?

Flood Risk is the likelihood of a particular flood happening (probability) e.g. 'there is a 1 in 100 chance of flood in any given year in this location', multiplied by the impact or consequence that will result if the flood occurs.



The evaluation of risk takes into account the severity of impacts from a flood event, which can be highly variable in terms of social, economic and environmental consequences. Consequences are often measured by number of properties flooded and level of economic damage. It will also be influenced by vulnerability (i.e. a basement flat or a key emergency service station is more vulnerable than a commercial warehouse).

There will only be a risk if there is a means (pathway) of connecting the source of the flood with the people, property and land that may be affected (receptors). Source, pathway and receptor must all be present for there to be a risk.



3.2 Local Sources

Flood Risk across Islington is associated with a number of sources including surface water runoff; sewer and highway networks; groundwater; artificial sources (Regent's Canal) and a combination of any of these sources.

Sewers and artificial sources are not considered to be 'local' sources of flooding. Consequently, they do not fall under the responsibility of Islington and the scope of this Strategy. However, these sources may be considered to be significant within Islington and

can combine with local sources to create a flood event. Therefore a brief summary of all flood sources is provided below along with the identification of the responsible RMA for each flooding source. Maps illustrating the flood risk from all sources are provided in 9.3Appendix A.

3.3 Surface Water from Rainfall (Pluvial)

Surface water flooding usually occurs during very intense rainfall which causes water to flow over the surface of the ground and create deep pools or puddles of water in low lying areas. This type of flooding is most common in urban areas where water is unable to enter the ground because of tarmac or other impermeable surfaces. It can be exacerbated when the ground is saturated and/or when watercourses or road drainage systems have insufficient capacity to cope with the additional surface water runoff or due to a lack of maintenance.

Islington's planning policies and decisions on planning applications in relation to major developments (those of 10 dwellings or more; or equivalent non-residential or mixed development) ensure that sustainable drainage systems for the management of run-off are put in place. https://www.islington.gov.uk/planning/planningpol/other-planning-guidance/sustainable/sus_building/suds_buildings

Islington has produced a good practice guide for sustainable urban drainage and which will be actively promoted.

https://www.islington.gov.uk/~/_media/sharepoint-lists/public-records/environmentalprotection/information/guidance/20112012/20120303sudsgoodpracticeguide.pdf

Islington will work closely with Thames Water to reduce the risk of run off from surface water surcharging the combined sewers. Where the risk of excessive run off has been identified Thames Water will be included in any design and implementation of mitigation measures.

3.3.1 Historic records

There are very few historic records of surface water flooding held by Islington. Surface water flooding incidents attributed to heavy rainfall were documented in neighbouring boroughs in 2002, August 2008 and December 2009, which may also have affected Islington, although this is unconfirmed. Islington now investigates and records any flooding events covered by this strategy.

During a stakeholder workshop held in 2016, small localised flooding issues were noted. However, these are largely attributed to Thames Water assets (discussed further under sewer flooding **Error! Reference source not found.**). It was noted that St John's Way in Upper Holloway tends to accumulate standing water during heavy rainfall.

3.3.2 Future flood risk

During the production of the SWMP, areas at greatest risk from surface water flooding were identified as Critical Drainage Areas (CDAs) or Local Flood Risk Zones (LFRZs) which are mapped in Figure A4 in 9.3Appendix A and discussed further in section 0. More recently, The Environment Agency has undertaken national modelling of the risk of flooding from

surface water and published the mapping outcomes on their website in December 2013. The Risk of Flooding from Surface Water Map³⁶ identifies the risk of surface water flooding at a strategic scale, utilising up to date datasets and refined modelling techniques to provide a useful means whereby surface water flood risk extents can be identified.

3.3.3 Surface Water flood risk is banded based on the following:

- **High Risk:** at risk of flooding for a rainfall event with a 3.3% AEP (1 in 30 year chance of flooding in any one year);
- **Medium Risk:** at risk of flooding for a rainfall event with a 1% AEP (1 in 100 year chance of flooding in any one year); and,
- **Low Risk:** at risk of flooding for a rainfall event with a 0.1% AEP (1 in 1000 year chance of flooding in any one year).

3.3.4 A high level assessment of the risk to properties, critical infrastructure, transport, heritage and the environment has been undertaken for this Strategy using the Environment Agency’s National Receptor Database and the Risk of Flooding from Surface Water mapping to provide an indication of the level of risk facing Islington. This is presented in

Table 2-1 and mapped in Figure A5.

Table 2-1: Number of properties at Risk of Flooding in Islington (based on Environment Agency Risk of Flooding from Surface Water mapping (RoFSW))

Type of Property		Risk		
		High	Medium	Low
Residential		780	2840	10493
Non-residential	Commercial & Industrial	86	307	1174
	Public Services (Education, Health Centre, Residential Home, Community Centre, Library, Fire/Ambulance, Police Station, Hospital, Museum, Church)	23	56	270
	Electricity Sub Station or Building	9	40	111
	Other ³⁷	206	583	2221
	Total (excl. other)	118	403	1555
Residential and Non-Residential Total		898	3243	12048

3.3.5 Figure A2 in Appendix A shows the modelled surface water flood risk across Islington. The PFRA and SWMP identify parts of Islington to be susceptible to surface water flooding, including:

- Caledonian Road (bottom of canal museum),
- Clerkenwell Road,
- Jackson Road,

³⁶ Flood Risk from Surface Water maps, previously known as the updated Flood Map for Surface Water (uFMFSW) dataset, is owned by Islington (for their respective administrative area). Available to view here: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?map=Reservoirs>

³⁷ Majority of ‘Other’ contains unclassified buildings where the building type has not been verified, due to it being recently built. ‘Other’ also includes sport/leisure centres, hotels, hostels, library, museums, cinemas and public toilets.

- Finsbury Park Station – Severn Sisters Road (entrance near the bridge), and,
- Upper Holloway area.

Although the modelling evidence base has been updated since the production of the SWMP, the RoFSW dataset confirms these locations to still be at risk, Other localised areas may be more susceptible to risk of flooding to roads, ground floors or basements.

Responsible RMA: Islington, as the LLFA, is responsible for managing the risk of surface water flooding.

3.4 Groundwater

Groundwater flooding occurs as a result of a rising water table from the underlying aquifer or from water flowing from springs. This tends to occur after long periods of sustained heavy rainfall and can be unpredictable in both location and time of flooding, often lasting longer than a river or surface water flood. High groundwater levels may not always lead to widespread groundwater flooding; but has the potential to exacerbate the risk of;

- surface water flooding by saturating the soil and reducing the amount of rainfall the ground can accept,
- river flooding by increasing the base flow in rivers, and
- sewer flooding through the interaction between groundwater and underground sewer networks.

3.4.1 Historic records

Islington do not hold any historic records of groundwater flooding. The Islington SWMP mapped several records of groundwater flooding across the borough based on records provided by the Environment Agency.

Islington is underlain by gravel deposits (Boyn Hill formation and Hackney Gravel formation) to the south and east, which overlay an impermeable clay layer beneath. This may contribute to localised flooding events after periods of prolonged rain due to water being released from the gravels, because of the impermeable layer of clay preventing the rainfall percolating through.

During the preparation of the strategy, anecdotal evidence was provided relating to basement flooding in the north of the borough in Ashley Road and that properties in Heathville Road have also reported water running through their gardens³⁸. This is in close proximity to a recorded groundwater flood incident from the Environment Agency data.

3.4.2 Future flood risk

Groundwater flooding can be particularly difficult to predict due to the 'hidden' nature of the source of flooding and relatively longer period as the water table rises and emerges, often several days or weeks after heavy rainfall has fallen and river levels have dropped. Basements and other below-ground level installations are particularly vulnerable to groundwater flooding, although property and land above ground level can be at risk.

Existing efforts to predict groundwater flooding events are based on monitoring water levels in boreholes in areas known to be at risk. These systems can give days or weeks warning

³⁸ based on discussions with Council Officers, Environment Agency and Thames Water during Islington Strategy Stakeholder Meeting on 02/03/16

notice before flooding might occur. Groundwater models can also be used to provide early warning systems to alert authorities to possible groundwater flooding in advance allowing authorities to plan their response and possibly even to implement mitigating measures. However, the monitoring of boreholes and development of groundwater flood models can be costly, and are only normally undertaken in those areas of greatest risk.

For the Islington SWMP, an 'Increased Potential for Elevated Groundwater' (IPEG) dataset was derived from British Geological Survey, Environment Agency and Defra groundwater flooding datasets. The dataset identifies areas where ground conditions may be prone to rising groundwater levels, and which may rise to within 2 m of ground surface following periods of higher than average rainfall and is intended as a high-level risk assessment. The IPEG map (see Figure A3) indicates that the area with greatest potential for elevated groundwater is around the eastern boundary with Hackney from Leconfield Road to the junction of City Road and Tabernacle Street in the south with some other small pockets of risk in the southern half of the Borough.

Recorded historic flood incidents do not appear to closely correspond with areas in the IPEG being quite widely dispersed across the borough as discussed above, and therefore groundwater flooding incidents may potentially occur outside these areas.

3.4.3 Responsible RMA: Islington, as the LLFA, is responsible for managing the risk of groundwater flooding. The Council also works with other organisations, including the Environment Agency, to manage this risk.

3.5 Ordinary Watercourse

Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows, above ground or culverted, which is not designated as a main river.

As stated in the SFRA and SWMP, and supported by figure A1 in Appendix A; there are no identified ordinary watercourses within Islington. The mapped above ground watercourses are the New River (a Thames Water, water supply asset) and the Regents Canal (an artificial waterbody managed by the Canals and Rivers Trust). These are considered under 'other sources of flooding. It is therefore considered that there is no risk of flooding from ordinary watercourses within the Borough.

3.5.1 Responsible RMA: Islington, as the LLFA, is responsible for managing the risk of ordinary watercourse flooding

3.6 Other Sources of flooding

3.6.1 During heavy rainfall flooding from the sewer system may occur if the amount of rainfall exceeds the capacity of the sewer system / drainage system; the system becomes blocked by debris or sediment; and/or high water levels in receiving watercourses cause water to back up in the sewer system and overflow. Sewer flooding generally results in localised short term flooding.

Sewers are designed to cope with the vast majority of storms but occasionally rainfall can be so heavy that it overwhelms the system. When this happens, sewage can overflow from manholes and gullies and flood homes and gardens. It is difficult to disassociate sewer flooding from surface water runoff (for which Islington is responsible for as LLFA).

Islington is served by a combined sewer network, with a deep series of east-west interceptor sewers transporting flows to Becton Sewage Treatment Works.

3.6.2 Historic records

TWUL records sewer flooding incidents reported to them.

3.6.3 Future Flood Risk

Climate change is anticipated to increase the potential risk from sewer flooding as summer storms become more intense and winter storms more prolonged. This combination is likely to increase the pressure on the existing efficiency of sewer systems, thereby reducing their design standard and leading to more frequent localised flooding incidents. Sewer flooding could be exacerbated by the increase in surface water runoff caused by heavy rainfall.

TWUL prioritise flooding on a risk basis and assess, implement and manage the risk on a cost benefit basis.

3.6.4 Responsible RMA: Thames Water Utilities Limited, as the sewerage undertaker in Islington

3.7 Water Mains

Flood risks from the water supply network are predominantly from burst mains and in general smaller in nature compared to other sources of flood risk. They are also virtually impossible to predict. Flooding from burst water mains is not covered under the Act. Further information on management and response to this type of flooding should be requested from TWUL.

3.7.1 Historic records

The SFRA notes incidents of flooding from burst water mains, which were attended by Islington officers in Wallace Road in November 2003 and Upper Street in February 2006, although details of these incidents are not included. A more recent incident in December 2016 has once again flooded Upper Street as a result of a burst water main affecting numerous homes and businesses, particularly basements. Final numbers of properties affected are unconfirmed at the time of writing although around 50 properties have been reportedly evacuated by emergency services.

3.7.2 Future Flood Risk

Whilst it is extremely difficult to predict where a burst water main may occur, the increasing age of assets may make these types of incidents more likely. The risk can be managed where TWUL continue to improve understanding of the condition of their network and schedule proactive maintenance work.

3.8 Artificial Sources

Artificial sources include any water bodies not covered under other categories and typically include canals, lakes and reservoirs. Within Islington these include;

- The Regents Canal
- The Claremont Square Reservoir
- The New River

3.9 Reservoirs

In the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning. The Environment Agency's Risk of Flooding from Reservoirs map³⁹ shows the area and depths of flooding and flow velocities that could occur if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large.

The Claremont Square Reservoir is a covered water supply reservoir managed by Thames Water in the south of the borough and is not included in the risk of flooding from reservoirs mapping. Whilst there are no open reservoirs within Islington, some northern parts of the borough are mapped in the risk of flooding from reservoirs map in the event of failure of reservoirs outside of the borough.

3.9.1 Historic records

There are no records held of reservoir flooding in the borough.

3.10 The New River

Whilst not classified as a reservoir, the New River may also be considered in the same context as reservoir flooding as an artificially constructed water body. Sections of the New River are elevated above ground level and a failure of the embankment at these locations would result in a significant discharge of flow in a similar way to reservoir breach. The purpose of the New River is water supply and therefore Thames Water does not permit any new connections for drainage purposes.

3.10.1 Historic records

Anecdotal evidence provided to support the Strategy⁴⁰ has stated that properties near Willow Bridge Road have been flooded as a result of overflows from the New River at least once in the last ten years.

3.11 The Regents Canal

Generally canals have a very low risk of flooding compared to more naturally occurring rivers. As artificial waterbodies, the levels can be easily controlled to prevent overtopping. The Regents Canal (managed by the Canal and Rivers Trust) is therefore considered to pose a minimal likelihood of flooding. There are no records held of flood incidents.

3.11.1 Future flood risk

Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers on a yearly basis. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency are responsible for ensuring that reservoirs are inspected regularly and essential safety work is carried out.

The New River as an artificial water supply route should not pose a future flood risk. However, some issues have been noted regarding overtopping of the New River in

³⁹ Environment Agency website: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?map=SurfaceWater>

⁴⁰ Based on discussions with council officers during stakeholder meeting on 02/03/16

Islington. Thames Water as the asset owner should ensure the causes are fully investigated and where possible rectified.

3.11.2 Responsible RMA: Thames Water as owner and operator of the Claremont Square reservoir and New River are responsible for ensuring they do not pose a flood risk. The Canal and Rivers Trust are not an RMA under FWMA. Therefore, in the unlikely event of a flood incident associated with the Regents Canal, Islington would be the Lead RMA and work with the Canal and Rivers Trust.

3.12 Future Flooding in Islington

Islington is faced by a number of pressures which could influence flood risk in the future, both adversely and beneficially, these include:

- Climate change leading to more intense periods of rainfall, increasing the frequency of large-scale flooding and the chances of flooding occurring where it has not been experienced before;
- Heightened sewer levels preventing surface water from draining;
- Population increase leading to increased demand for development and key services;
- Pressure for new development in areas at risk of flooding or changes in land use which increase risk elsewhere;
- Deterioration of structures or features that currently protect us from flooding and thus require maintenance or replacement;
- Lack of maintenance or replacement of said structure or features of the existing strategic drainage network;
- Public sector cuts leading to reduced maintenance activities and reduced central government funding for flood alleviation schemes; and
- More stringent building regulations and new developments which can contribute to reducing flood risk.

4. Impact of climate change

Current predictions of future rainfall indicate that increasing numbers of severe and extreme weather events are expected in the future. Intense storms are the main cause of surface water flooding, which would also increase in frequency. It is predicted that the frequency of heavy rainfall events could double by the 2080s according to the UK Climate Projections 2009⁴¹. By the 2080s, it is predicted that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day) and that the amount of rain in extreme storms (with a 20% AEP or rarer) could increase locally by 40%. Consequently, the number of properties, business and critical infrastructure at risk will also increase.

⁴¹ United Kingdom Climate Projections 2009 <http://ukclimateprojections.defra.gov.uk/>

The effects of climate change by 2050 for London are presented in **Table 2-2 Effects of climate change under different UKCP09 emission scenarios**

Effects of climate change	Low emissions	Medium emissions	High emissions
% change in annual mean precipitation	0%	0%	0%
% change in winter mean precipitation	12%	14%	16%
% change in summer mean precipitation	-14%	-19%	-19%

4.1 Implications for flood risk

Climate change can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability. Wetter winters and more of this rain falling in wet spells may increase river flooding in both rural and heavily urbanised catchments.

In Islington, more intense rainfall is likely to result in an increase in localised surface water flooding. In turn, this may increase pressure on drains, sewers and water quality of connected waterbodies. Storm intensity in summer could increase even in drier summers. Rising river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

Where appropriate, local assessments are needed to understand climate impacts in detail, including effects from other factors like land use.

4.2 Adapting to Change

Past emissions means some climate change is inevitable. It is essential to respond by planning ahead. Islington will prepare by understanding the current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

Although the broad climate change picture is clear, the Council will have to make local decisions against deeper uncertainty. Islington will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that the vulnerability of communities and businesses to flooding does not increase.

A number of regional and local policies are in place to reduce the impact of and adapt to climate change, including Policy 5.13 Sustainable Drainage (London Plan) and Policy CS10 Sustainable design (Islington Core Strategy).

4.3 Including allowances for Climate Change in Flood Risk Management

The NPPF and supporting guidance set out the allowances required for climate change to be used in Flood Risk Assessments. The Environment Agency has produced guidance on Climate Change Allowances for Planners⁴² to support the NPPF to outline requirements for preparing FRAs for Local Plans and planning applications. This includes recommended

⁴² <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

national precautionary sensitivity ranges for peak rainfall intensity and peak river flow suitable for use in the planning system (Table 2-3).

Table 2-3 Recommended national precautionary sensitivity ranges for peak rainfall intensity and peak river flow

Parameter	Category allowance	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Peak rainfall intensity	Upper end	10%	20%	40%
	Central	5%	10%	20%
Peak river flow	Upper End	25%	35%	70%
	Higher central	15%	25%	35%
	Central	10%	15%	25%

All new development should be planned and designed to avoid or mitigate the impacts of climate change, with the sensitivity ranges for peak rainfall intensity and river flow (Table 2-3) accounted for during drainage design.

4.4 Critical Drainage Areas in Islington

The Islington SWMP outlines the preferred surface water management strategy across Islington. The SWMP has defined Critical Drainage Areas (CDAs) as “A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure.”

Identified CDAs in Islington are listed in Figure 2-2 and shown in Figure A4 in Appendix A.

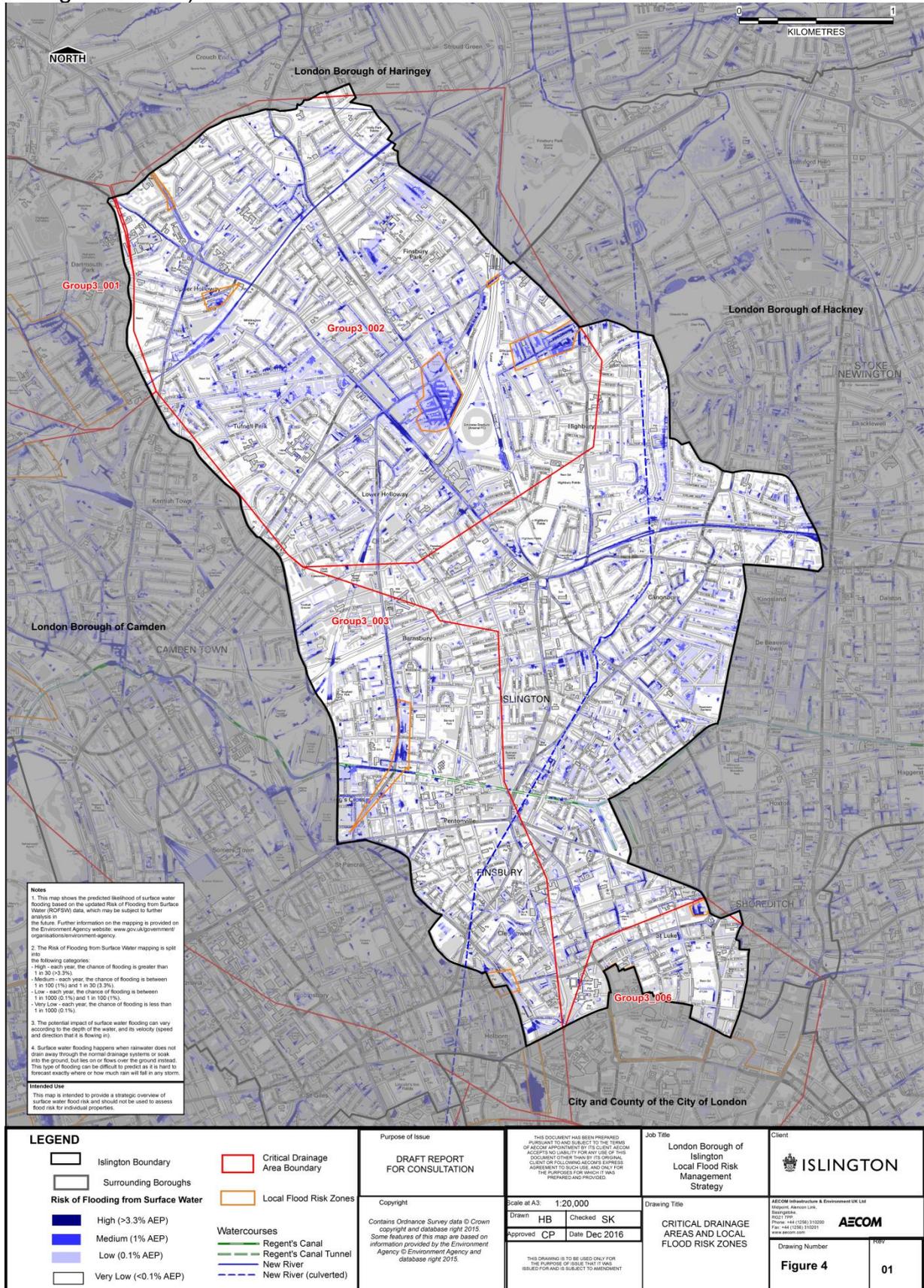
Table 2-4: Critical Drainage Areas (CDAs) in Islington (from the SWMP)

CDA ID	LFRZ ID	LFRZ Name
Group3_002	3006	Gillespie Road
	3008	Jackson Road – Emirates Football Stadium
	3009	Finsbury Park Station – Severn Sisters Road
	3010	Archway Road, adjacent to College
	3011	St John’s Grove
Group3_003	3004	Caledonian Road
	3005	Clerkenwell Road
	3013	Gospel Oak (LB Camden)
	3020	Farringdon Street/City Thameslink (City of London)
	3024	Primrose Hill (LB Camden)
Group3_006	3007	St Lukes
	3019	Barbican (City of London)
	3022	Liverpool Street Station (City of London)

Note: Grey cells relate to Local Flood Risk Zones (LFRZs)⁴³ outside of Islington that fall within the CDA

⁴³ Discrete areas of flooding that do not exceed the national criteria for a ‘Flood Risk Area’ but still affect houses, businesses or infrastructure. A LFRZ is defined as the actual spatial extent of predicted flooding in a single location

Figure 2-2 Critical Drainage Areas and Local Flood Risk Zones in Islington (as derived from the Islington SWMP)



5. Objectives for managing flood risk

5.1 Islington Local Flood Risk objectives

The following objectives for managing local flood risk in Islington have been developed and agreed with the RMAs:

Islington Local Objectives

- 1) Improve flood risk understanding for properties, communities and infrastructure at risk of flooding from surface water, groundwater or ordinary watercourses.
- 2) Support sustainable growth and development by understanding the needs of all parties and ensuring the best evidence feeds into decision-making.
- 3) Maximise use of resources through targeted flood management and partnership working.
- 4) Improve local community preparedness for flooding events, and co-ordinate stakeholders involved in community flood risk management to ensure efficient warning and recovery.

5.2 National Flood Risk Management objectives

Islington has developed the objectives of this Strategy in line with the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy for England⁴⁴. This sets out the following national objectives for flood risk management;

- **Understand the risks** – understanding the risks of flooding and coastal erosion, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
- **Prevent inappropriate development** – avoiding inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks;
- **Manage the likelihood of flooding** – building, maintaining and improving flood and coastal erosion management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society;
- **Help people to manage their own risk** – increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient; and,
- **Improve flood prediction, warning and post-flood recovery** – improving the detection, forecasting and issue of warnings of flooding, planning for and co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

5.3 Guiding Principles for Local Flood Risk Management

The National Strategy aims and objectives are supported by six high-level principles listed in Table 2-5, to guide decisions on risk management activities, and the process by which

⁴⁴ Environment Agency (2011) National flood and coastal erosion risk management strategic for England
<http://www.environment-agency.gov.uk/research/policy/130073.aspx>

they are taken, at both a national and local level. Islington has used these to guide the development of objectives and identification of measures to deliver local flood risk management within Islington.

Table 2-5 Guiding Principles for Local Flood Risk Management in Islington	
Proportionate and risk based approach	Flood risk management activities should be proportionate to the risk that is faced. It is not possible to prevent flooding altogether. To try and do so would be technically unfeasible, environmentally damaging and uneconomical. A risk based approach to managing flooding targets investment to areas where the risk is greatest by examining both the likelihood and consequences of a flood occurring.
A catchment based approach	To manage flood risk effectively, it is important to understand the interactions with the wider area over the entire catchment. This means ensuring that activities are coordinated and working closely with neighbouring authorities to ensure that activities do not adversely affect other areas.
Community focus and partnership working	Working closely with communities provides a clearer understanding of the issues and appreciation of the community perspective of flooding. Giving communities a greater say in what activities take place and helping them to manage their own risk will result in better decisions being made and allows greater flexibility in the activities that take place. It is also vital to work in partnership with other authorities to ensure that risk is managed in a coordinated way beyond the boundaries and responsibilities of individual authorities and organisations.
Beneficiaries encouraged to invest	If funding for flood risk management activities relies on central and local government alone, then those activities will be significantly limited by the funds available. They will also be constrained by national controls and reduce the scope for local influence. Those that benefit should therefore be encouraged to invest in order to maximise flood risk management activity and allow innovative solutions to take place.
Sustainability	More sustainable approaches to flood risk management should be sought to consider wider sustainability issues such as the environment, whole-life costs, and the impact of climate change. Wherever possible, solutions to flooding problems should work with natural processes and aim to enhance the environment.
Multiple benefits	Flood risk management solutions can often provide additional social, economic and environmental benefits. For example the use of sustainable drainage systems (SuDS) can reduce the pollution of watercourses by minimising urban storm water runoff. The potential to achieve multiple benefits should be considered in all flood risk management activities.

6 Measures to achieve delivery of flood management objectives

This section sets out how the local flood risk management objectives will be delivered over the next six years. A number of measures and actions have been identified to achieve this, and these are set out in more detail in the Action Plan that accompanies the Strategy, as provided in Appendix B. These will help to improve the understanding of flood risk across the Borough and inform the way flood risk is reduced and planned for, and to increase resilience against the impacts of climate change.

In delivering flood risk management, there is the opportunity to help deliver environmental objectives and requirements, as set out in European Legislation including the Water Framework Directive. A Strategic Environmental Assessment and a Habitats Regulations Assessment Screening exercise has been undertaken to inform the Strategy development; further details are provided in Section 8.

6.1 Delivery of Flood Risk Management

As the LLFA, Islington has been undertaking a number of activities to deliver duties under the Act and take a proactive approach to delivering local flood risk management in Islington. Some of the key activities undertaken to date are outlined in Box 5.1.

Box 5.1: Flood Risk Management Activities Delivered in Islington

- Production of a Surface Water Management Plan,
- Production of a Preliminary Flood Risk Assessment,
- Attending meetings with Drain London Strategic flood group comprising representatives from Camden, City of London, City of Westminster, Kensington and Chelsea and Hammersmith and Fulham,
- Production of SuDS Guidance,
- Implementation of SuDS schemes in the public realm; Ashby Grove & Spa Fields,
- Development of a basement policy, and,
- Securing funding from the Environment Agency to undertake investigations into flooding risk, mechanisms and potential mitigation schemes in the identified CDAs (3002, 3003, & 3006),

6.2 Measures to achieve flood management objectives

Table 6-1: Measures to achieve flood management objectives		
Objective	Measures proposed	Guiding principles
Improve flood risk understanding for properties, communities and infrastructure at risk of flooding from surface water, groundwater or ordinary watercourses.	<ul style="list-style-type: none"> • Improve understanding and identify areas at particular risk from surface water flooding and groundwater flooding. • Model flooding within areas identified at risk, identify actions to mitigate flood risk to human life, property and infrastructure. • Improve in house records of assets which influence water management by sharing information with partner authorities (e.g. Thames Water, TfL, Network Rail, London Underground). 	<ul style="list-style-type: none"> • Community focus and partnership working. • Beneficiaries encouraged to invest
Support sustainable growth and development by understanding the needs of all parties and ensuring the best evidence feeds into decision-making	<ul style="list-style-type: none"> • Provide planning guidance in relation to the potential risks associated with basement development including risk from flooding. • Inform planning decisions using the most up-to date flood risk information. • Ensure all new developments are prioritising the use of SuDS and water sensitive urban design, and that tools are available to support this. 	<ul style="list-style-type: none"> • Community focus and partnership working. • Sustainability
Maximise use of resources through targeted flood management and partnership working	<ul style="list-style-type: none"> • Ensure the most recent flood evidence base is feeding into flood management funding decisions. • Build on opportunities to work in partnership with other local stakeholders for multiple benefits. 	<ul style="list-style-type: none"> • Community focus and partnership working. • Beneficiaries encouraged to invest
Improve local community preparedness for flooding events, and co-ordinate stakeholders involved in community flood risk management to ensure efficient warning and recovery	<ul style="list-style-type: none"> • Support the public in providing and signposting information that increases resilience to flooding. • Encourage local residents to get involved in managing their own risk through small local schemes. • Improve communication between partner authorities and build on lessons learnt. 	<ul style="list-style-type: none"> • Community focus and partnership working. • Beneficiaries encouraged to invest • Proportionate and risk-based approach

6.3 Islington LFRMS Action Plan

Objective	Measure	Sub-actions	Delivery Lead	Start by	Complete by	Funding source	Priority/notes	
1	Improve flood risk understanding for properties, communities and infrastructure at risk of flooding from surface water, groundwater or ordinary watercourses.	Improve understanding and identify areas at particular risk from surface water flooding and groundwater flooding	Improve methods of data capture to build on in house flooding information.	LBI Highways	2017/18	2018/19	Defra Grant funding	Medium
			Develop online tools where the public or stakeholders can input or upload information.	LBI Highways	2017/18	2019/20	Internal TBC	Low
			Clarify how flood related contact gets recorded with 'contact Islington' and identify any improvements.	LBI Highways	2017/18	2018/19	Internal TBC	Medium
		Model flooding within areas identified at risk, identify actions to mitigate flood risk to human life, property and infrastructure.	Undertake refined modelling based on the North Islington Critical Drainage Area.	LBI Highways	2016/17	2017/18	FCRM GiA	High – funding already approved and work ongoing
			Undertake refined modelling based on the Central Islington Critical Drainage Area.	LBI Highways	2016/17	2017/18	FCRM GiA	
			Undertake refined modelling based on the South Islington Critical Drainage Area.	LBI Highways	2016/17	2017/18	FCRM GiA	
		Improve in house records of assets which influence water management by sharing information with partner authorities (eg. Thames Water, TfL, Network Rail, London Underground).	Share and agree asset information with local stakeholders.	LBI Highways, TfL, TWUL	2016/17	2020/21	Internal TBC	Medium
			Ensure asset information from different council teams is collated together.	LBI Highways, Emergency Planning, Parks	2017/18	2020/21	Internal TBC	Medium
			Develop and publish an asset register.	LBI Highways, TfL, TWUL	2016/17	2017/18	Defra Grant funding	High – legal requirement
			Develop an action plan to target deteriorating assets.	LBI Highways, TfL, TWUL	2017/18	2018/19	Defra Grant funding	Medium
2	Support sustainable growth and development by understanding the needs of all parties and ensuring the best evidence feeds into decision-making	Provide planning guidance in relation to the potential risks associated with basement development including risk from flooding.	Review basement guidance annually.	LBI Planning, Highways	2017/18	Ongoing	Internal TBC	Low
			Improve information to public about cumulative impacts of basements.	LBI Planning, Highways	2017/18	2018/19	Internal TBC	Medium
		Inform planning decisions using the most up-to date flood risk information.	Update the Strategic Flood Risk Assessment.	LBI Planning	2016/17	2017/18	Internal TBC	High
			Review how existing flood data currently feeds into planning decisions.	LBI Planning, Highways	2017/18	2018/19	Internal TBC	Medium
		Ensure all new developments are prioritising the use of SuDS and water sensitive urban design, and that the tools are available to support this.	Review Islington SuDS guidance.	LBI Highways, Planning	2018/19	2019/20	Internal TBC	Low
			Promote retrofitting and small scheme SuDS.	LBI Highways	2017/18	2019/20	Defra Grant funding	Medium
3	Maximise use of resources through targeted flood management	Ensure the most recent flood evidence base is feeding into flood management funding decisions.	Following completion of local studies, target management to identified areas of risk through developing an action plan.	LBI Highways	2017/18	2019/20	Internal TBC	Low
			Collate local knowledge and public reports to define local hotspots.	LBI Highways	2017/18	2018/19	Internal TBC	Medium

	and partnership working	Build on opportunities to work in partnership with other local stakeholders for multiple benefits.	Prepare a communication plan and public awareness plan including stakeholder mapping.	LBI Highways	2017/18	2020/21	Internal TBC	Low
			Identify opportunities to work in partnership with neighbouring boroughs on cross-boundary issues.	LBI Highways	2017/18	Ongoing	Internal / FCRM GiA	Medium
			Identify opportunities for joint project funding with other RMAs and local stakeholders.	LBI Highways, TWUL, EA	2017/18	2020/21	Internal TBC	Medium
4	Improve local community preparedness for flooding events, and co-ordinate stakeholders involved in community flood risk management to ensure efficient warning and recovery.	Support the public in providing and signposting information that increases resilience to flooding.	Develop a 'who to contact' pamphlet.	LBI Highways, emergency planning	2017/18	2019/20	Defra Grant funding	Medium
Identify communities most vulnerable to flood risk in Islington.			LBI Highways	2016/17	Ongoing	Defra Grant funding	High	
Engage with community groups about available information.			LBI Highways	2017/18	2019/20	Internal TBC	Low	
Review website and update with links to emerging advice.			LBI Highways	2017/18	2017/18	Defra Grant funding	Medium	
Encourage sign up to free warning alerts in identified risk areas.			LBI Highways, Emergency Planning, EA	2017/18	Ongoing	Internal TBC	Low	
Encourage local residents to get involved in managing their own risk through small local schemes.		Develop links with communities in higher risk areas.	LBI Highways, Emergency Planning, EA	2017/18	2019/20	Internal TBC	Medium	
		Support property or street levels schemes such as de-paving or pocket parks.	LBI Highways	2017/18	2020/21	Defra Grant funding	Medium	
		Support formation of community groups.	LBI Highways	2017/18	Ongoing	Internal TBC	Low	
Improve communication between partner authorities and build on lessons learnt.		Raise awareness of the multi-agency flood plan with RMA teams and emergency responders.	LBI Emergency Planning	2016/17	Ongoing	Internal TBC	Medium	
		Meet regularly with partner responders to share information and maintain communication channels.	LBI Emergency Planning, Highways	2016/17	Ongoing	Internal TBC	High	

7. Prioritising actions and funding flood risk management

7.1 Flood risk measures

It is not possible to prevent all flooding, and with limited resources and funding, flood risk management work will need to be prioritised. Each measure in this Strategy has been split into a number of actions (as outlined in the Action Plan in Appendix B) and these have been prioritised as High, Medium or Low based on current understanding of local flood risk, resources and funding available to address.

As understanding of flood risk improves, Islington will develop specific mitigation schemes and activities to address flood risk in those areas at greatest risk, where required and appropriate. This will require a clear protocol in terms of identifying which actions or schemes should be taken forward given the limited local and national funding streams. In these cases the following will be important considerations:

- **Risk** - the risk of doing nothing in terms of economic, social and environmental impacts,
- **Consequence** - how many people or properties the measure or scheme could impact, e.g. an individual property, parish or Islington as a whole, and
- **Deliverability** - including costs and technical deliverability, e.g. providing information on flood resilience measures via the council website would be cheaper and technically easier to implement than designing and implementing a large flood alleviation scheme.

Moving forward, to ensure funding and resources are targeted to those areas and actions of highest importance, the Council will prioritise local flood risk management activities based on the following, where:

- There is a historic and ongoing flood risk from local flooding sources (surface water and groundwater),
- Funding is available,
- There is an identified benefit to properties, communities, businesses and / or infrastructure,
- Funding is made available by partners, where perhaps traditional funding sources are not available or cannot fully fund the cost of the measure,
- The measure delivers benefit and mitigation to areas identified as being at risk through Islington's Strategy, SFRA, SWMP or PFRA, and,
- Schemes deliver multiple benefits, including wider environmental benefits.

The prioritisation of schemes and actions will be reviewed annually based on available funding, resources and local priorities.

7.2 Funding flood risk management projects

In the main, flood risk management projects are funded by a combination of the following funding streams:

- **National funding** – Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA);
- **Regional funding** – Local Levy; and,

– **Local / other funding contributions.**

The mechanism for attracting the national (FCRM GiA) and regional (Local Levy) funding gives priority to the protection of residential properties.

7.2.1 Flood and Coastal Erosion Management Grant in Aid

Flood and Coastal Risk Management Grant in Aid (FCRM GiA) is the capital budget set aside by central government for flood defence projects across England. Following consultation during 2011, the Department for the Environment, Food and Rural Affairs (Defra) introduced a new approach to the funding of flood risk management capital projects. This approach was termed the ‘Flood and Coastal Resilience Partnership Funding’ approach. The Partnership Funding Approach is governed by the Environment Agency and represents a key source of funding for flood alleviation measures proposed by LLFAs.

The key benefits of the new approach are:

- Communities, through their Regional Flood and Coastal Committees (RFCCs), can take decisions on which projects should progress, based on local willingness to contribute towards the benefits that would be delivered,
- The programme of capital works will be prioritised based on the damages being prevented by the project, and,
- A higher proportion of capital projects can be eligible for some government funding, subject to resources being available.

7.2.2 Other funding sources

In order to maximise the benefits of the new approach to funding of flood risk management capital projects, Islington will work closely with partnering organisations and other bodies to seek alternative sources of funding. It is important to note that the likelihood of securing FCRM GiA can significantly increase when other sources of funding are secured.

In taking forward flood risk management activities, the Council will need to consider securing funding from alternative sources, including Central Government, other RMAs and stakeholders and private beneficiaries. Looking at schemes with multiple benefits could open up more avenues of internal revenue than purely flood risk management, particularly where measures address existing core activities for the Council.

Whilst the process of attracting funding from private sources is still developing, Table 6-1 highlights possible sources of funding that could contribute to the delivery of flood risk management projects or schemes.

Table 6-1: Potential Sources of Funding

Potential Sources of Funding	Description	Administered By:
Local Levy	A levy on local authorities within the boundary of each Regional Flood and Coastal Committee (RFCC). The Local Levy is used to support, with the approval of the committee, flood risk management projects that are not considered to be national priorities and hence do not attract full national funding through the FCRM GiA.	Environment Agency through Thames RFCC
Private Contributions	Voluntary, but funding from beneficiaries of projects could make contributions from national funding viable. Contributions could be financial or "in kind" e.g. land, volunteer labour.	Islington
Water Company Investment	Investment is heavily regulated by Ofwat but opportunities for contributions to area-wide projects which benefit their customers, for example by addressing sewer under-capacity problems and locating and removing surface water draining to the foul sewer to reduce combined sewer outfall spills.	Thames Water Utilities Limited
Community Infrastructure Levy (CIL)	The Community Infrastructure Levy (CIL) allows Local Authorities to raise funds from developers undertaking new building projects within their area of governance. Such funds can be used to mitigate the effects of the development, including flood defences.	Islington
Section 106 Agreements	Section 106 agreements (Town and Country Planning Act 1990) are a mechanism designed to make a development proposal acceptable in planning terms, through the site specific mitigation of impacts from a development.	Islington
Local Residents / Businesses	Community engagement can be a very effective means of raising awareness of flood risks and management activities in local areas, and promoting a sense of 'helping communities to help themselves' can result in contributions from private sources, such as local residents and businesses.	Islington
Funding for Local Flood Risk Management Responsibilities	The Government has committed funding annually to support LLFAs in their flood management roles up to 2016/17. The funding is provided through 'Area Based Grants', which have been allocated Defra based on the individual flood risk each local authority faces. Beyond this period funding commitments are unclear.	Islington
Local Flood Risk Management Partners	Local Flood Risk Management Partners, or Risk Management Authorities, could also be engaged. For example Thames Water manage much of the drainage system and therefore could be a potential source of funding if a scheme offers mutual benefits.	Islington
Council Tax	A "ring-fenced" provision within the annual council tax for the specific purpose of addressing flood risk management.	Islington
Business Rates Supplements	Agreement from local businesses to raise rates for specified purposes.	Islington
Council Capital Funding	The Council's infrastructure programme, prioritising capital improvement projects. The Council programme may include funding for drainage capacity improvements for highway drainage systems, for example, but could include a flood scheme, if benefits can be identified.	Islington

Potential Sources of Funding	Description	Administered By:
Council Revenue Funding	The Council has a number of revenue streams to support technical and administrative processes and to maintain council infrastructure. Existing revenue budgets include Highway Drainage and Gully Maintenance, and Ordinary Watercourse Maintenance, discharging the Lead Local Flood Authority duty for the Council.	Islington
Thames Water schemes	Thames Water may often support schemes where there is a demonstrable reduction in risk from sewer flooding due to removal of surface water from the combined sewer system. IN 2015, they launched the 'twenty 4 twenty' scheme which aims to invest £20 million to reduce at least 20 hectares of impermeable areas currently draining to sewer by creating new SuDS schemes.	Thames Water

7.2.3 Maintenance Costs

In the current financial climate, there are significant pressures on the Council budget and funding for maintenance activities. Using the Strategy Action Plan, historic flood evidence and communication with residents, Islington will look to prioritise maintenance for those assets which have the greatest effect on local flood risk and in those areas most at risk to maximise effectiveness of limited funding. At the same time, the Council will seek to maximise income from external sources, including asset owners and riparian owners, for flood risk management.

8 Delivery of wider environmental objectives

8.1 Overview

This section outlines how this Strategy will contribute to the achievement of wider environmental objectives. A Strategic Environmental Assessment⁴⁵ (SEA) and Habitats Regulations Assessment (HRA) screening assessment of the Strategy has been undertaken alongside the development of the Strategy to inform sustainable decision making throughout.

8.1.1 Strategic Environmental Assessment Background

SEA is an iterative, systematic, publicly accountable framework with an overarching aim of integrating environmental considerations within policy development at the earliest opportunity whilst providing an 'audit trail' of option development and environmental mitigation.

Article 1 of the SEA Directive states that the preparation of an SEA will “provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development”. More simply an SEA is undertaken to identify the significant impacts that plans, programmes and strategies may have on the existing and future environment, and therefore heightens the consideration of environmental issues in decision making processes and planning.

SEA involves the identification and evaluation of potential environmental impacts resulting from the implementation of high-level decision-making (e.g. a plan, programme or strategy). By addressing strategic level issues, the SEA aids the selection of the preferred options, directs individual schemes towards the most environmentally appropriate solutions and locations and helps to ensure that resulting schemes comply with legislation and other environmental requirements. Impacts should not just be considered on a direct basis but should encompass temporary, permanent, positive, negative, secondary, cumulative and synergistic impacts over a range of timescales and probabilities.

The application of the SEA process to flood management plans and programmes is not legally required in every case, however adopting the SEA approach is strongly encouraged by Defra to enable a strategic approach to managing flood risk.

The SEA process ensures that environmental considerations inform the development of objectives and measures of the Strategy, whilst mitigating against adverse environmental impacts and highlighting areas of environmental and socioeconomic opportunity. Additionally, the SEA process identifies how the Strategy can contribute to the achievement of wider environmental objectives, including WFD objectives.

⁴⁵ AECOM (2016) Islington Strategic Environmental Assessment to support the Local Flood Risk Management Strategy

8.1.2 Strategic Environmental Assessment Approach

The Communities and Local Government's Guidance on the development of an SEA⁴⁶ identifies five key stages which are intended to be valid for all plans and programmes to which the Directive implies, irrespective of their geographical scope.

- Stage A *Scoping and Baseline* was conducted during the Strategy SEA Scoping stage
- Stage B *Developing and Refining Alternatives and Assessing Effects* is covered in the *Preparation of an SEA Environmental Report* (Stage C).
- Stage D relates to *Consultation* of both the Draft Strategy and Environmental Report.
- Stage E *Implementation and Monitoring* will occur over the lifetime of the Strategy in order to ensure continual improvement and the delivery of effective flood risk management alongside wider environmental objectives.

8.1.3 SEA Outcomes

The SEA found that the Strategy is likely to have a number of beneficial environmental impacts both in the short term and the long term (beyond the life of the Strategy). This is predominantly due to the proactive and holistic approach of the Strategy. The Strategy outcomes are predicted to fulfil the environmental objectives identified in the SEA framework and to have a beneficial outcome.

The majority of the objectives in the Strategy are expected to have a beneficial effect on the environment as they aim to enhance individual understanding and awareness of flood risk along with high-level flood risk management measures rather than individuals actions which would potentially have a larger effect 'on the ground'

The 'do nothing' alternative assessment demonstrates the advantages of implementing the strategy. The impact on the environment if the strategy was not implemented would have unfavorable consequences both in the short term as well as the long term as the risk of flooding would increase as a result of climate change.

Overall, the Strategy will have a favorable effect on the environment.

8.1.4 Habitats Regulations Assessment (HRA)

A Habitats Regulations Assessment (HRA) screening assessment is being undertaken as part of the Strategy development. This screening exercise assesses the impacts of implementing the Strategy objectives and measures on European Designated Sites (Special Areas of Conservation, Special Protection Areas and Ramsar sites) within 10km of Islington.

8.1.5 Water Framework Directive (WFD)

The Environment Agency is responsible for preparing management plans for river basin districts in England and Wales. The plans outline the characteristics of the river basin district, identify the pressures that the local water environment faces, and specify the actions that will be taken to address any problems before 2027. Islington does not contain any WFD designated waterbodies, although it is considered as part of the 'Land area part of London Management Catchment draining to the Tidal Thames'⁴⁷.

⁴⁶ CGL Guidance on SEA https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf

⁴⁷ <http://environment.data.gov.uk/catchment-planning/OperationalCatchment/3245>

For the Thames River Basin District, the density of the population together with relatively low rainfall means that the water environment is assessed to be stressed, with less water per person than many Mediterranean regions. This leads to over-extraction, and the high risk of pollution. Many of the rivers within the Thames river basin have been heavily modified as a consequence of development, flood risk management and for navigation. As a result only 23% of the assessed water bodies covered by the Thames RBMP are regarded having an ecological status of at least “good”. There are no water bodies in the Thames river basin that were considered to exhibit “high” ecological status.

Flood risk management activities are expected to have a significant impact on the ability of the UK to comply with the requirements of the WFD, as flood protection can involve substantial alteration to the natural properties of a river. The Thames RBMP encourages the use of sustainable drainage systems as a means of reducing the physical impact of flood risk management works on the ecological status or potential of water bodies.

In assessing this Strategy for WFD compliance, the measures proposed are unlikely to have environmental effects and will not cause deterioration to water bodies. However, as projects and schemes are developed these may require site specific environmental assessment to identify any potential environmental effects (positive and negative).

9 Implementation, monitoring and review of the Strategy

9.1 How will the Strategy be implemented?

The Strategy is based on the latest information available at the time of its preparation. It will be updated, in consultation with other organisations and individuals in managing flood risk, and should be considered a 'live' document which will evolve over time as new information becomes available and flood events occur.

Islington works in partnership with stakeholders, including local communities and businesses, to deliver the objectives of this Strategy. Through continuing to work with partners to build relationships and deliver the actions identified, the Council will ensure that measures promoted achieve social, economic and environmental benefits for the community, and seek to meet future climate conditions.

The Strategy provides the framework for the Council's delivery of its flood risk management responsibilities and coordinate its duties with neighbouring authorities through the Central London North Flood Risk Partnership group

9.2 How will the Strategy be monitored?

Progress against the Strategy Action Plan will be monitored annually or following a significant flooding incident. This will involve assessing which actions have been delivered, and determining whether there has been any change to the prioritisation of actions, in line with current flood risk management priorities and funding availability.

9.3 How will the Strategy be reviewed?

The Strategy has been developed to deliver a short to medium (6-year) improvement plan to establish a sound evidence and knowledge base upon which to develop a longer-term investment plan for local flood risk management activities in Islington.

It is proposed that a full update of the Strategy should be scheduled for 2022, and thereafter every six years (as a minimum).

However, the Strategy and the supporting Action Plan will remain live documents over the Strategy period, and may require review more regularly to recognise potential events or specific changes, such as:

- Occurrence of a significant and widespread surface water flood event;
- Significant changes to datasets or information which may alter the understanding of risk within Islington (such as the locations of critical infrastructure);
- Significant amendments to the legal responsibilities and/or roles and functions of Risk Management Authorities and/or other organisations;
- Annual Monitoring identifies that the Strategy is not achieving its objectives;
- Changes to relevant national and European legislation; or,
- Change in funding availability which has a significant effect on the Strategy Action Plan.

Appendix A. Figures

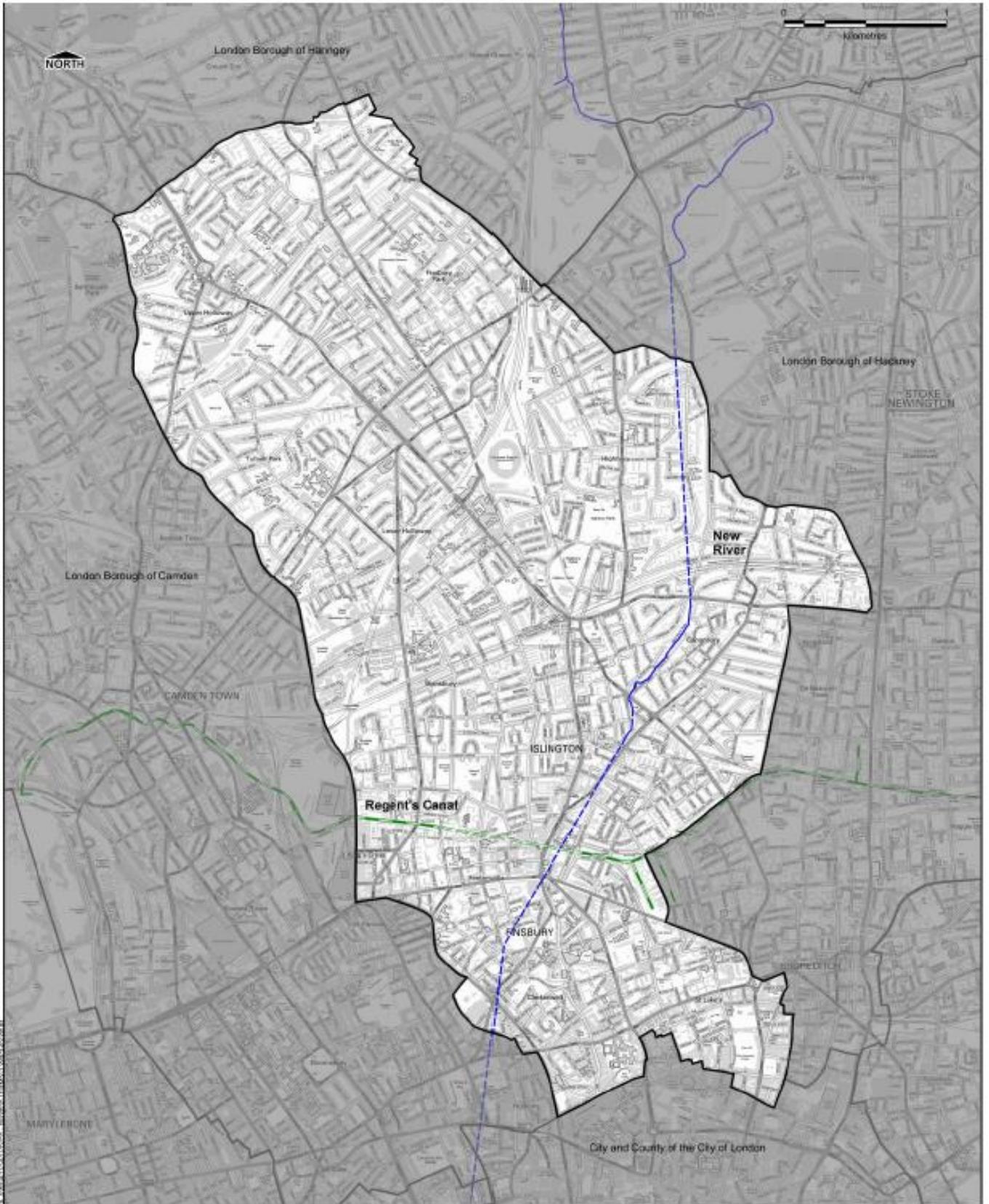
A.1 Waterbodies and Watercourses

A.2 Risk of Flooding from Surface Water

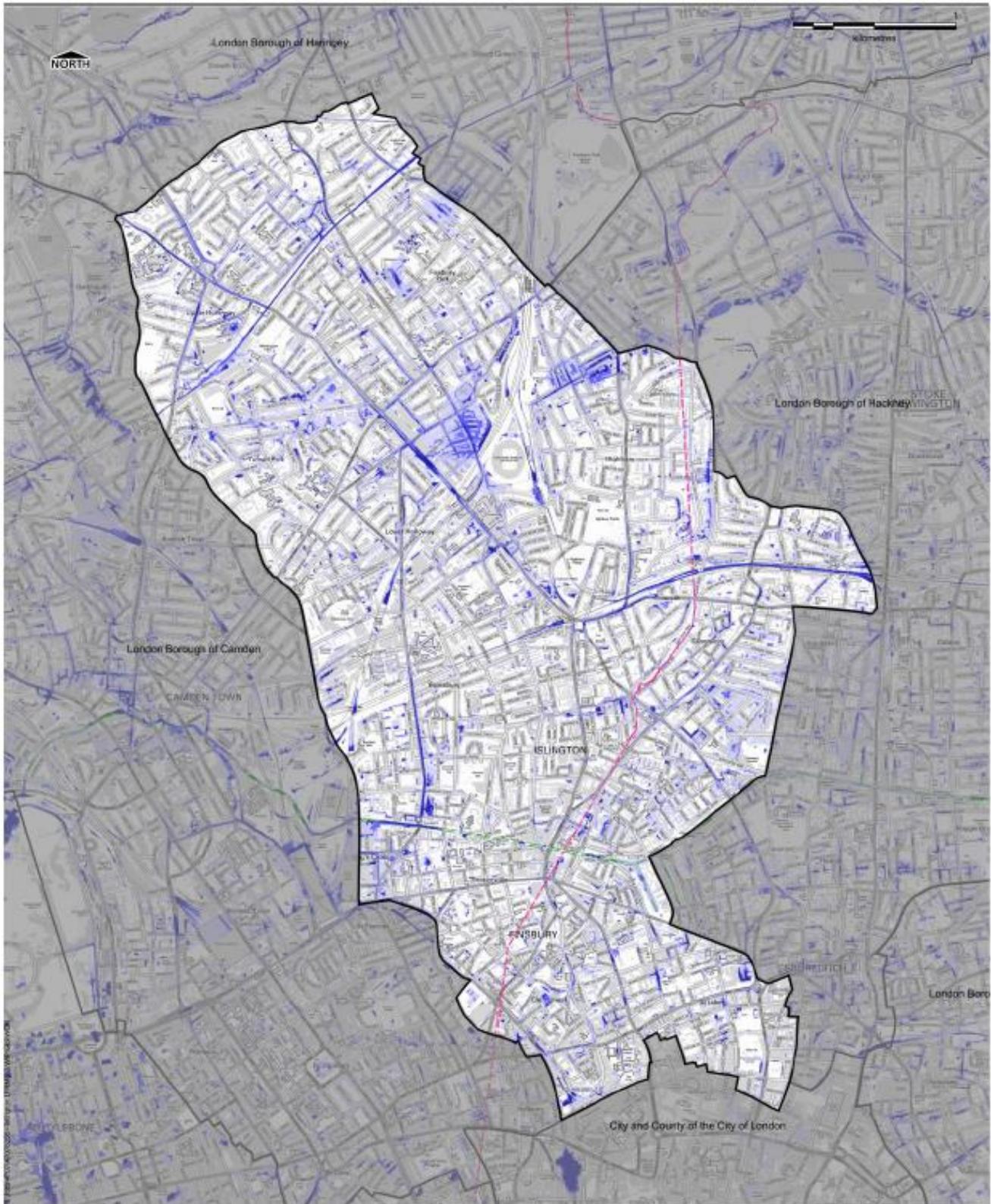
A.3 Increased Potential for Elevated Groundwater

A.4 Critical Drainage Areas and Local Flood Risk Management Zones

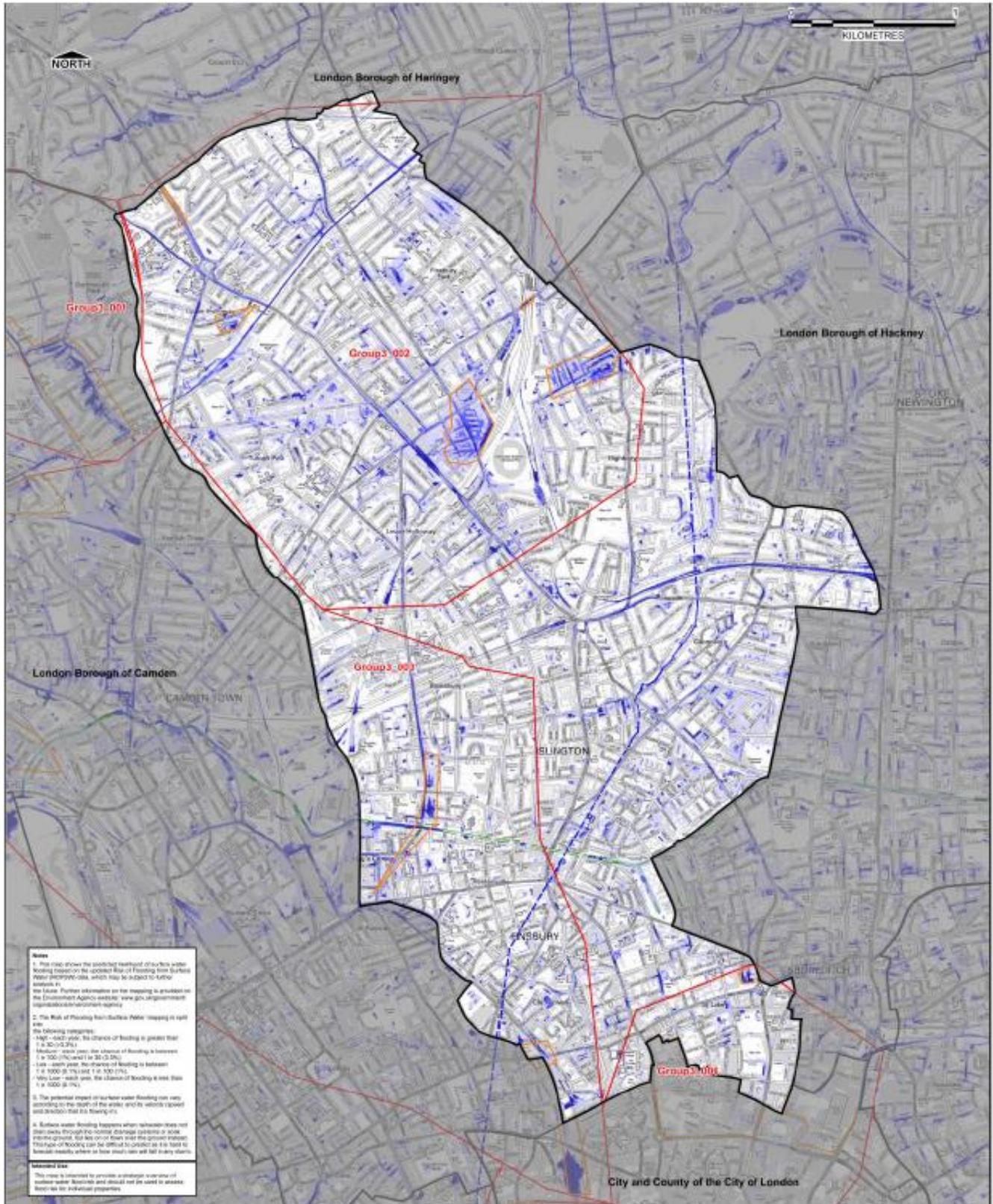
A.5 Critical Infrastructure and Surface Water



LEGEND Islington Boundary Surrounding Boroughs Watercourses Canal Canal Tunnel Culvert Secondary River	Purpose of Issue DRAFT REPORT FOR CONSULTATION Copyright Contains Ordnance Survey data © Crown copyright and database right 2015. Some features of this map are based on information provided by the Environment Agency © Environment Agency and database right 2015.	This document has been prepared exclusively for the purposes of the project described herein and is not to be used for any other purpose without the prior written consent of the project team.	Job Title London Borough of Islington Local Flood Risk Management Strategy Drawing Title WATERCOURSES IN THE LONDON BOROUGH OF ISLINGTON	Client ISLINGTON AECOM Drawing Number Figure 1 Page 01
	Scale of A3: 1:20,000 Drawn: HB Checked: SK Approved: CP Date: Dec 2016 This document is to be used only for the purposes of the project described herein.	AECOM Infrastructure & Environment UK Ltd 150 Tottenham Court Road London W1P 0LP Tel: +44 (0)20 7061 4000 Fax: +44 (0)20 7061 4001 www.aecom.com		



<p>LEGEND</p> <p>Islington Boundary</p> <p>Surrounding Boroughs</p> <p>Watercourses</p> <ul style="list-style-type: none"> Regent's Canal Regent's Canal Tunnel New River New River (subverted) <p>Risk of Flooding from Surface Water</p> <ul style="list-style-type: none"> High (>33% AEP) Medium (1% AEP) Low (0.1% AEP) Very Low (<0.1% AEP) 	<p>Purpose of Issue</p> <p>DRAFT REPORT FOR CONSULTATION</p> <p>Copyright</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2016. Some features of this map are based on information provided by the Environment Agency © Environment Agency and database right 2016.</p>	<p>Scale of A2: 1:20,000</p> <table border="1"> <tr> <td>Checked</td> <td>HB</td> <td>Checked</td> <td>SK</td> </tr> <tr> <td>Approved</td> <td>GP</td> <td>Date</td> <td>Dec 2016</td> </tr> </table> <p>Not intended to be used for the purposes of liability. Not to be used for navigation.</p>	Checked	HB	Checked	SK	Approved	GP	Date	Dec 2016	<p>File Title</p> <p>London Borough of Islington Local Flood Risk Management Strategy</p> <p>Drawing Title</p> <p>RISK OF FLOODING FROM SURFACE WATER</p>	<p>Client</p> <p>ISLINGTON</p> <p>Address: Metropolitan & Environmental Ltd 25 Abchurch Lane London EC4A 3DF Phone: +44 (0)20 7460 1000 Fax: +44 (0)20 7460 1001 Email: info@met-environmental.com</p> <p>AECOM</p> <table border="1"> <tr> <td>Drawing Number</td> <td>Date</td> </tr> <tr> <td>Figure 2</td> <td>01</td> </tr> </table>	Drawing Number	Date	Figure 2	01
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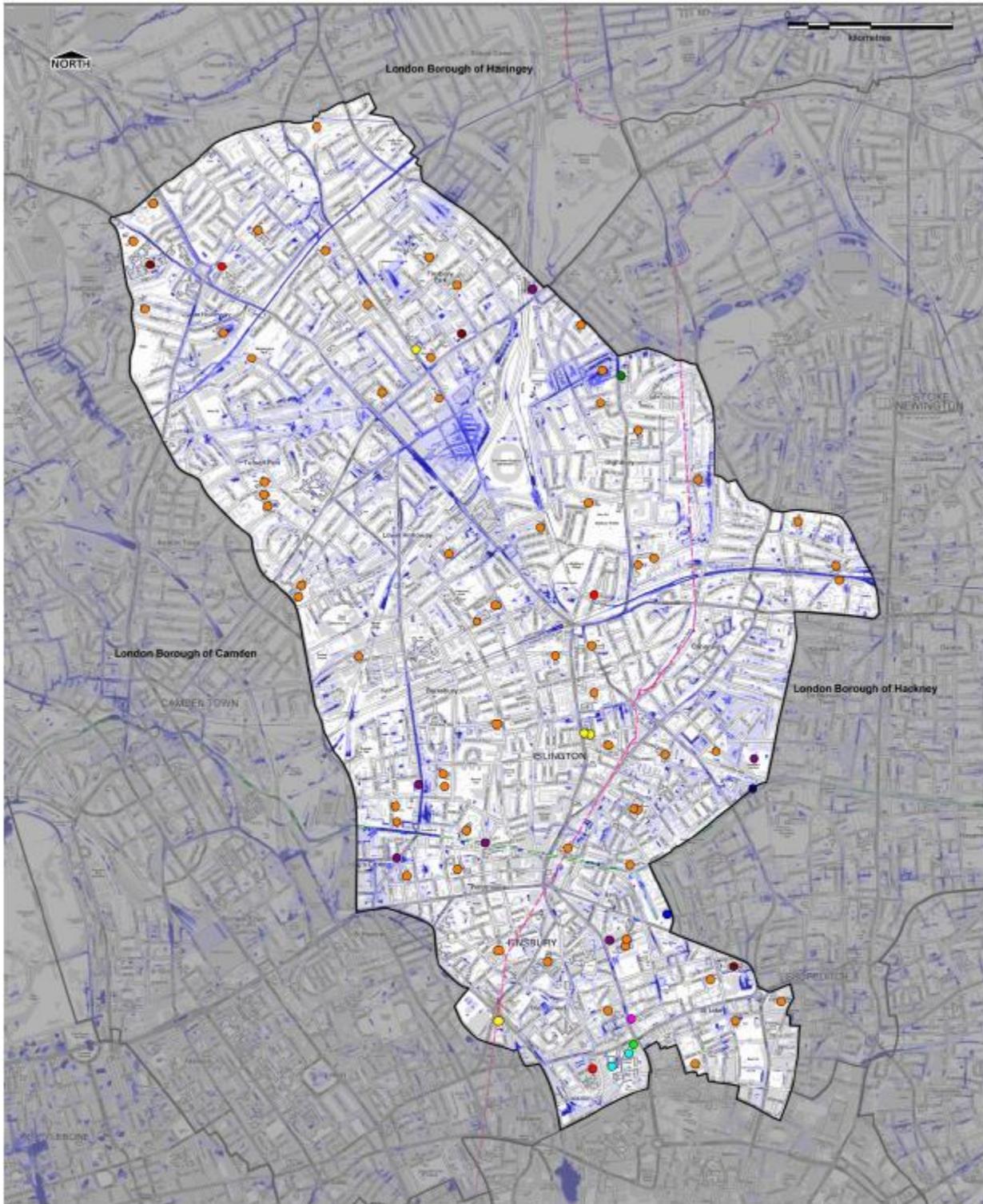
Notes

- This map shows the predicted likelihood of surface water flooding based on the current flow of flooding from the River North (Regent's Canal), which may be subject to future changes.
- Further information on the mapping is available on the Environment Agency website: www.gov.uk/government/uploads/system/uploads/attachment_data/file/302236
- The Risk of Flooding from Surface Water (mapping is split into the following categories):
 - High - each year, the chance of flooding is greater than 1 in 100 (1% AEP)
 - Medium - each year, the chance of flooding is between 1 in 100 (1% AEP) and 1 in 1000 (0.1% AEP)
 - Low - each year, the chance of flooding is between 1 in 1000 (0.1% AEP) and 1 in 100 (1% AEP)
 - Very Low - each year, the chance of flooding is less than 1 in 1000 (0.1% AEP)
- The potential impact of surface water flooding can vary according to the depth of the water and the volume (speed and direction) that it flows in.
- Surface water flooding happens when rainwater does not drain away through the normal drainage system or soak into the ground, but has to sit on top of the ground surface. This type of flooding can be difficult to predict as it is hard to forecast exactly where or how much rain will fall every year.

Disclaimer

This map is intended to provide a general overview of surface water flooding and should not be used to assess flooding on individual properties.

LEGEND Islington Boundary Surrounding Boroughs Risk of Flooding from Surface Water High (>3.3% AEP) Medium (1% AEP) Low (0.1% AEP) Very Low (<0.1% AEP) Critical Drainage Area Boundary Critical Drainage Area Boundary Local Flood Risk Zones Local Flood Risk Zones Watercourses Regent's Canal Regent's Canal Tunnel New River New River (culverted)	Purpose of Issue DRAFT REPORT FOR CONSULTATION	Date at A3: 1:20,000 Drawn: HB Checked: SK Approved: CP Date: Dec 2016	Job Title London Borough of Islington Local Flood Risk Management Strategy	Client ISLINGTON
	Copyright Contains Ordnance Survey data © Crown Copyright and database right 2015. Some features of this map are based on information provided by the Environment Agency © Environment Agency and database right 2015.	Drawing Title CRITICAL DRAINAGE AREAS AND LOCAL FLOOD RISK ZONES	AECOM Infrastructure & Environment UK Ltd 1500000 1500000 1500000 AECOM	Drawing Number Figure 4



<p>LEGEND</p> <p>Islington Boundary</p> <p>Surrounding Boroughs</p> <p>Risk of Flooding from Surface Water</p> <p>High (>3.3% AEP)</p> <p>Medium (1% AEP)</p> <p>Low (0.1% AEP)</p> <p>Very Low (<0.1% AEP)</p>	<p>Critical Infrastructure</p> <p>Ambulance Station</p> <p>Education</p> <p>Electricity Production Facility</p> <p>Emergency / Rescue Service</p> <p>Fire Station</p> <p>Hospital</p> <p>Police / Transport Police / Station</p> <p>Pump House / Pumping Station / Water Tower</p> <p>Utility</p>	<p>Purpose of Issue</p> <p>DRAFT REPORT FOR CONSULTATION</p> <p>Copyright</p> <p>© Crown Copyright and database right 2018. Some features of this map are based on information provided by the Environment Agency © Environment Agency and database right 2018.</p>	<p>Scale of A2: 1:20,000</p> <p>Drawn: HB</p> <p>Checked: SK</p> <p>Approved: CP</p> <p>Date: Dec 2018</p> <p>THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSES OF THIS PROJECT AND SHOULD NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.</p>	<p>Job Title</p> <p>London Borough of Islington Local Flood Risk Management Strategy</p> <p>Drawing Title</p> <p>FLOOD RISK FROM SURFACE WATER AND CRITICAL INFRASTRUCTURE</p>	<p>Client</p> <p>ISLINGTON</p> <p>AECOM Infrastructure & Environment Ltd</p> <p>100 Brook Hill Drive</p> <p>PO BOX 1000</p> <p>PO BOX 1000</p> <p>PO BOX 1000</p> <p>PO BOX 1000</p> <p>AECOM</p> <p>Drawing Number</p> <p>Figure 5</p> <p>Page</p> <p>01</p>
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