THE ROYAL BOROUGH OF KINGSTON UPON THAMES

Royal Borough of Kingston upon Thames
Local Flood Risk Management Strategy

Final for Adoption

December 2015

CAPITA | URS

Rev	Date	Details	Prepared by	Checked by	Approved by
01	April 2014	Draft for Comment	RE	LT	SK / PH
02	July 2014	Final draft	RE	LT	MA
03	April 2015	Final for consultation (following legislative changes)	MM		DC
04	August 2015	Final for approval and adoption	EP	WW / MM	DC
05	10th December 2015	Final for publication	EP	WW / MM	Residents Committee

Limitations

URS Infrastructure & Environment UK Limited ("URS") and Capita Property and Infrastructure have prepared this Report for the sole use of **Kingston Council** ("Client") in accordance with the Agreement under which our services were performed **(3113187, April 2013)**. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken between [November 2013] and [May 2014] and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

Costs may vary outside the ranges quoted. Whilst cost estimates are provided for individual issues in this Report these are based upon information at the time which can be incomplete. Cost estimates for such issues may therefore vary from those provided. Where costs are supplied, these estimates should be considered in aggregate only. No reliance should be made in relation to any division of aggregate costs, including in relation to any issue, site or other subdivision.

Project Number

47069163

Contact Details

URS Infrastructure and Environment UK Ltd
6-8 Greencoat Place
London
SW1P 1PL
United Kingdom

Telephone: +44(0)20 7798 5000
Fax: +44(0)20 7798 5001

FOREWORD

In response to the flood events during 2007, the Government commissioned Sir Michael Pitt to undertake a review. The outcome of this, *Learning Lessons from the 2007 Floods* outlined the need for changes in the way England is adapting to the increased risk of flooding and the role different organisations have to deliver this function.

The Flood and Water Management Act 2010, enacted by Government in response to the recommendations of The Pitt Review, designated unitary and county councils as Lead Local Flood Authorities with 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.

Kingston Council is the Lead Local Flood Authority for the Royal Borough of Kingston upon Thames. This Local Flood Risk Management Strategy offers the first opportunity for us to formalise our longer term vision and flood risk management priorities to shape a Strategy that delivers the greatest benefit to the people, property and environment of Kingston Borough.

Although Kingston Borough is at relatively low risk from surface flooding water flooding, complex interactions exist between the pluvial, fluvial and sewer systems which pose a risk.

Since April 2011 we have been working closely with communities, businesses, and other risk management authorities, including our neighbouring boroughs, the Environment Agency and Thames Water, to improve our understanding of flood risk in Kingston Borough and deliver measures that improve community resilience alongside nationally funded strategic schemes that deliver flood and environmental benefits to communities, businesses and infrastructure.

In developing this Strategy, we have consulted with communities, businesses, neighbouring boroughs and risk management authorities to develop a coordinated Strategy for local flood risk management across Kingston Borough. The Strategy outlines the priorities for local flood risk management and provides a delivery plan to manage the risk over the next five years. We have given consideration to the roles and responsibilities of other risk management authorities in Kingston Borough, including the Environment Agency and Thames Water, who have responsibility for managing the risk arising from Main Rivers and sewer flooding respectively, which interact and influence surface water and groundwater flood risk.

Our Local Flood Risk Management Strategy complements and supports the *National Strategy* published by the Environment Agency which outlines a National framework for flood and coastal risk management. In addition, the Local Strategy is aligned with the corporate priorities of Kingston Council's strategic plans. We have taken the guiding principles from these strategies into account when setting the following objectives for the management of local flood risk:

Royal Borough of Kingston upon Thames Strategy Objectives

- Educate, encourage and empower local stakeholders to take action on reducing flood risk
- Apply an intelligence-led risk based approach to the management of flood risk in the Royal Borough of Kingston upon Thames
- Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency
- Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change.

The Strategy is accompanied by an Action Plan setting out how we will deliver the objectives of the Strategy over the next five years and a Strategic Environmental Assessment (SEA) assessing the impacts of the Strategy on the environment. The Action Plan outlines the measures identified through this Strategy and the

outcomes of each action are linked to the objectives of the Strategy so that we can monitor how we are delivering our local flood risk management measures.

Over the next five years we will continue to work with communities and businesses to help them understand the risks they face and what can be done to manage them. A range of individual, community and council-led actions and improved awareness will help manage both the likelihood and impact of flooding and consequently lead to social, economic and environmental benefits to Kingston Borough communities.

Longer term strategic development across Kingston Borough will integrate consideration of flood risk and sustainable drainage into planning and development control systems. Inappropriate development which could increase flood risk will be avoided, as will inappropriate development in areas of significant flood risk.

The Local Flood Risk Management Strategy will be updated periodically to ensure that its content and emphasis remains relevant. This final version of the Strategy was given approval for adoption by the Royal Borough of Kingston upon Thames on 10th December 2015.

TABLE OF CONTENTS

1. INTRODUCTION 3

1.1 Flood Risk in South West London 3
1.2 Flood Risk Management in South West London 5
1.3 The Royal Borough of Kingston Upon Thames Strategy 5
1.4 Community Engagement and Consultation 6
1.5 Supporting Plans and Documents 6

2. ASSESSMENT OF LOCAL FLOOD RISK 9

2.1 What is Flood Risk? 9
2.2 Local Sources of Flood Risk 9
2.3 Other Sources of Flooding 13
2.4 Flood Warning Areas 17
2.5 Impact of Climate Change 19
2.6 Summary 19

3. RESPONSIBILITIES FOR FLOOD RISK MANAGEMENT 20

3.1 Overview 20
3.2 Responsibilities of Risk Management Authorities 20
3.3 Responsibilities of Other Organisations / Individuals 23

4. OBJECTIVES FOR MANAGING LOCAL FLOOD RISK .. 25

4.1 Royal Borough of Kingston Upon Thames Local Objectives 25
4.2 National Flood Risk Management Objectives 25

5. DELIVERY OF LOCAL FLOOD RISK MANAGEMENT ... 27

5.1 Overview 27
5.2 Delivery of Duties under the Act 27
5.3 Delivery of Local Flood Risk Management Measures 29
5.4 Including Allowances for Climate Change in Local Flood Risk Management 32
5.5 Funding Sources 32
5.6 RBKT Action Plan 35

6. DELIVERY OF WIDER ENVIROMENTAL OBJECTIVES 36

6.1 Overview 36
6.2 Habitats Regulations Assessment (HRA) 36
6.3 Strategic Environmental Assessment (SEA) 36
6.4 Water Framework Directive (WFD) 37

7. STRATEGY MONITORING & REVIEW 39

7.1 Overview 39
7.2 Annual Monitoring 39
7.3 Review 39

GLOSSARY & ABBREVIATIONS 40

APPENDIX A – FLOOD RISK MAPS 44

APPENDIX B – ACTION PLAN 45

APPENDIX C – SUMMARY OF COMMUNITY ENGAGEMENT 46

1. INTRODUCTION

1.1 Flood Risk in South West London

1.1.1 In England, 5.2 million properties are at risk of flooding. Of these, 1.4 million are at risk from rivers or the sea, 2.8 million are at risk from surface water and 1 million are at risk from both1. This risk was realised in many parts of the country during the summer floods of 2007, which resulted in 55,000 properties flooding, 7,000 rescues by emergency services, 13 deaths and an estimated £3billion of damages. The severity of this event generated changes in the way flooding should be managed by local and national organisations.

1.1.2 In 2012 the UK experienced a period of exceptionally wet weather from April to July and again in November, resulting in several significant flood events however these were not on the same scale as in summer 2007. The recent flooding in January 2014 involved rainfall events occurring in rapid succession and therefore high flows were sustained over a long period resulting in the highest recorded volume of water for any two and half month period since flow records began in 1883. The Thames Barrier was closed 50 times from 5th December 2013 to 5th March 2014. Of these closures, 41 have been classified as fluvial to protect west London from high flood flows arriving from upstream and 9 have been classified as tidal to protect London from high sea levels in the Thames estuary.

1.1.3 Across South West London there are risks of flooding from a range of sources, including surface water runoff and ponding, groundwater, sewer surcharging and flooding from main rivers and ordinary watercourses, and reservoirs. In some cases more than one of these sources of flooding can combine to cause a flood event.

1.1.4 Risks from tidal and fluvial flooding associated with the River Thames, Hogsmill and Beverley Brook are relatively well understood and have been managed at a national scale for many years by the Environment Agency. However, flood risk from more local sources, including surface water runoff and ponding, groundwater and small ditches and land drains are less well understood; these are typically very localised events which are often difficult to predict, and with sparse historical records available to provide supporting evidence. Local sources in Kingston Borough include the Pachesham Stream, Lambeth Stream, Keswick Avenue Drain, Bonesgate Stream and Surbiton Stream which are shown together with the main Rivers in Figure 1-1.

[1] Environment Agency (2009) Flooding in England: A National Assessment of Flood Risk
https://www.gov.uk/government/publications/flooding-in-england-national-assessment-of-flood-risk

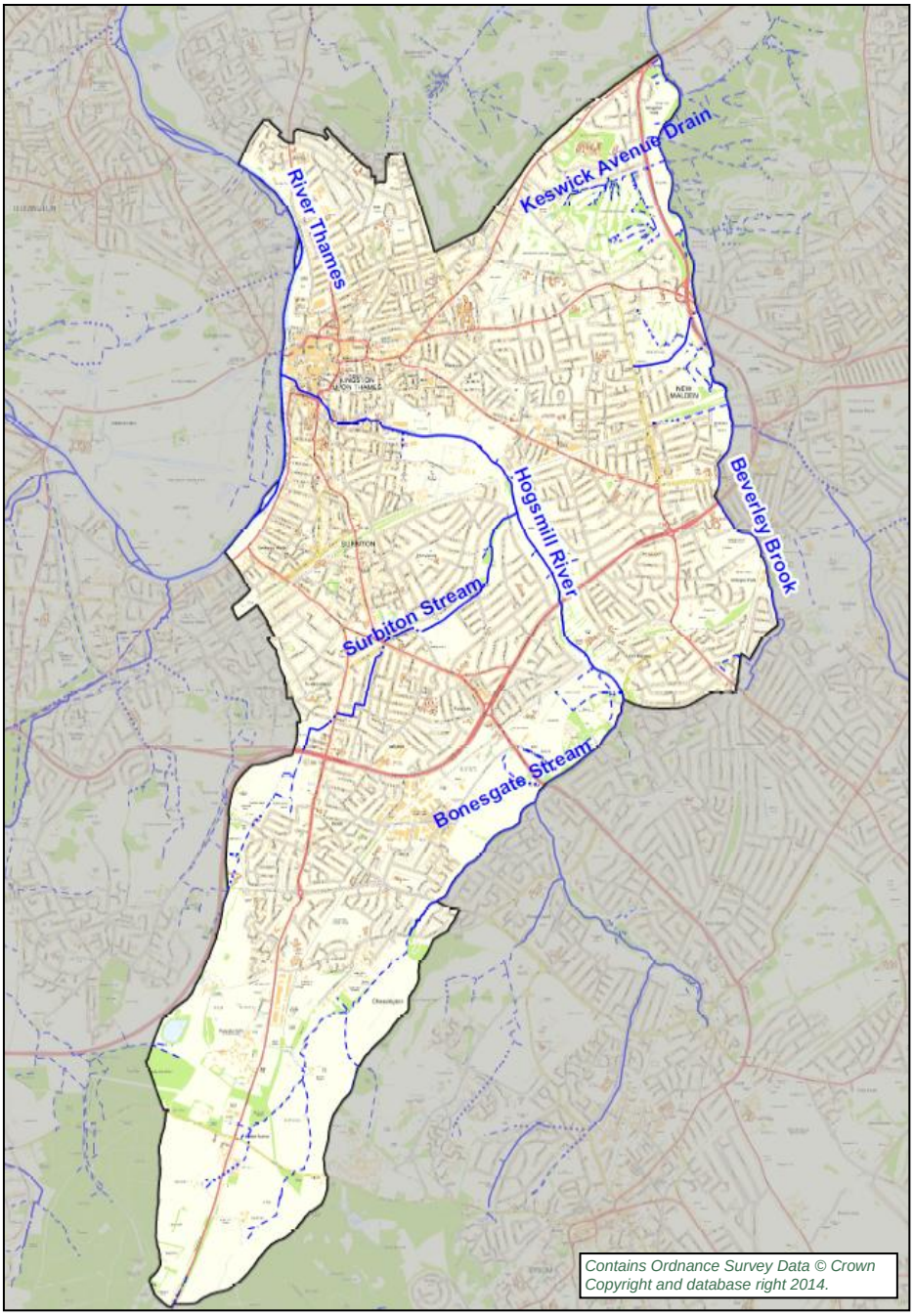


Figure 1-1 Watercourses within the Royal Borough of Kingston upon Thames

1.1.5 Parts of South West London have a particular susceptibility to surface water and sewer flooding due to the pressures from increasing urbanisation and climate change. Over recent years, severe surface water flooding has been experienced across the area causing damage to property and disruption to businesses and services. Details of historic flood records are provided in Section 2.

1.1.6 Modelling undertaken as part of the Royal Borough of Kingston upon Thames (RBKT) Surface Water Management Plan (SWMP) in 2012 shows that the risk of surface water flooding to properties within RBKT is considerable; up to 22,178 residential properties and 1,362 non-residential properties are modelled to be at risk of flooding during a rainfall event that has a 1 in 100 chance of occurring in any given year (1% Annual Exceedance Probability (AEP)). Further details are provided in Section 2. In December 2013 the Environment Agency

published its latest surface water flood mapping, the updated Flood Map for Surface Water (uFMfSW). The uFMfSW represents a refinement of the modelling undertaken as part of the RBKT SWMP, and initial high-level, borough-wide property counts undertaken to support this LFRMS indicate a reduction in the flood risk by comparison. As part of RBKTs ongoing local flood risk management work, the uFMfSW will be used to increase our understanding of local surface water flood risk and identify and prioritise those areas at greatest risk.

1.1.7 Typically, reactive mitigation measures have been implemented in response to past flood events, usually with the construction of new drainage infrastructure. However, 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 South West London

1.2.1 In response to the severe flooding across large parts of England and Wales in summer 2007, the Government commissioned Sir Michael Pitt to undertake a review of flood risk management. The Pitt Review – Learning Lessons from the 2007 Floods[2] and subsequent progress reviews outlined the need for changes in the way the UK is adapting to the increased risk of flooding and the role different organisations have to deliver this function.

1.2.2 The Flood and Water Management Act 2010 (The Act)[3], enacted by Government in response to The Pitt Review, designated unitary authorities, including all London Boroughs, as Lead Local Flood Authority (LLFA). As LLFA, each London Borough has responsibilities to lead and co-ordinate local flood risk management. Local flood risk is defined as the risk of flooding from surface water runoff, groundwater and small ditches and watercourses (collectively known as Ordinary Watercourses).

1.2.3 The Act also formalises the flood risk management roles and responsibilities for other organisations including the Environment Agency, water companies and highways authorities. The responsibility to lead and co-ordinate the management of flood risk from main rivers and the sea remains that of the Environment Agency. Further details regarding responsibilities and functions in relation to their flood risk management in South West London is provided in Section 3.

1.2.4 As LLFAs, each of the unitary authorities across South West London has a statutory duty to develop, maintain, apply and monitor a strategy for local flood risk management ('the Strategy').

1.2.5 The six LLFAs covering South West London, (namely, London Borough of Croydon, The Royal Borough of Kingston upon Thames, London Borough of Merton, London Borough of Sutton, London Borough of Richmond upon Thames and London Borough of Wandsworth), have chosen to partner together to commission the preparation of their Strategies in a coordinated manner. Further details of the South West London Strategic Flood Group are included in Section 5.2.

1.3 The Royal Borough of Kingston Upon Thames Strategy

1.3.1 The purpose of the RBKT Strategy is to set out the approach to managing flood risk from local sources (i.e. surface water, ground water and ordinary watercourses) in both the short and longer term, with proposals for actions that will help to manage the risk in a way that delivers the greatest benefit to its residents, businesses and the environment.

[2] Cabinet Office (2008) Sir Michael Pitt Report 'Learning lessons learned from the 2007 floods' http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_full%20pdf.pdf

[3] HMSO (2010) The Flood and Water Management Act 2010 http://www.legislation.gov.uk/ukpga/2010/29/contents

The RBKT Strategy includes:

- Section 2 and Appendix A: **Assessment of local flood risk** (from surface water, groundwater and ordinary watercourses),
- Section 3: **Roles and responsibilities** for local flood risk management,
- Section 4: **Objectives** for managing local flood risk,
- Section 5 and Appendix B: Proposed **measures to deliver the objectives**, including timescales to implement measures, and how the measures will be paid for, identifying costs and benefits,
- Section 6: How the Strategy contributes to **achievement of Environmental Objectives**, and
- Section 7: How and when the Strategy will be **monitored and reviewed**.

Figure 1-2 Structure of the Strategy

1.3.2 The Strategy complements and supports the National Strategy[4], 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.

1.3.3 This Strategy has been developed by RBKT in partnership with Risk Management Authorities (RMAs) the Environment Agency and Thames Water as well as local communities and neighbouring boroughs. Further details of RMAs and other organisations with responsibilities for local flood risk management are provided in Section 3.

1.3.4 In delivering flood risk management, RBKT have the opportunity to deliver wider environmental objectives and requirements, as set out in European legislation including the Water Framework Directive[5]. The approach for addressing this, including the preparation of a Strategic Environmental Assessment (SEA) Scoping Report, is outlined in Section 6.

1.4 Community Engagement and Consultation

1.4.1 A community engagement exercise was undertaken between January and April 2014 offering residents and businesses the opportunity to shape the development of the Strategy and future flood risk management priorities. It was assumed that the overall picture of flood risk would be captured from January to March 2014 and any results received after this time would be reviewed by RBKT.

1.4.2 After a period of online public consultation on the RBKT website between April and June 2015 the final version of the Strategy was produced in order to take into account the responses.

1.4.3 Details of the outcomes from both of the community engagement activities are included in Appendix C.

1.5 Supporting Plans and Documents

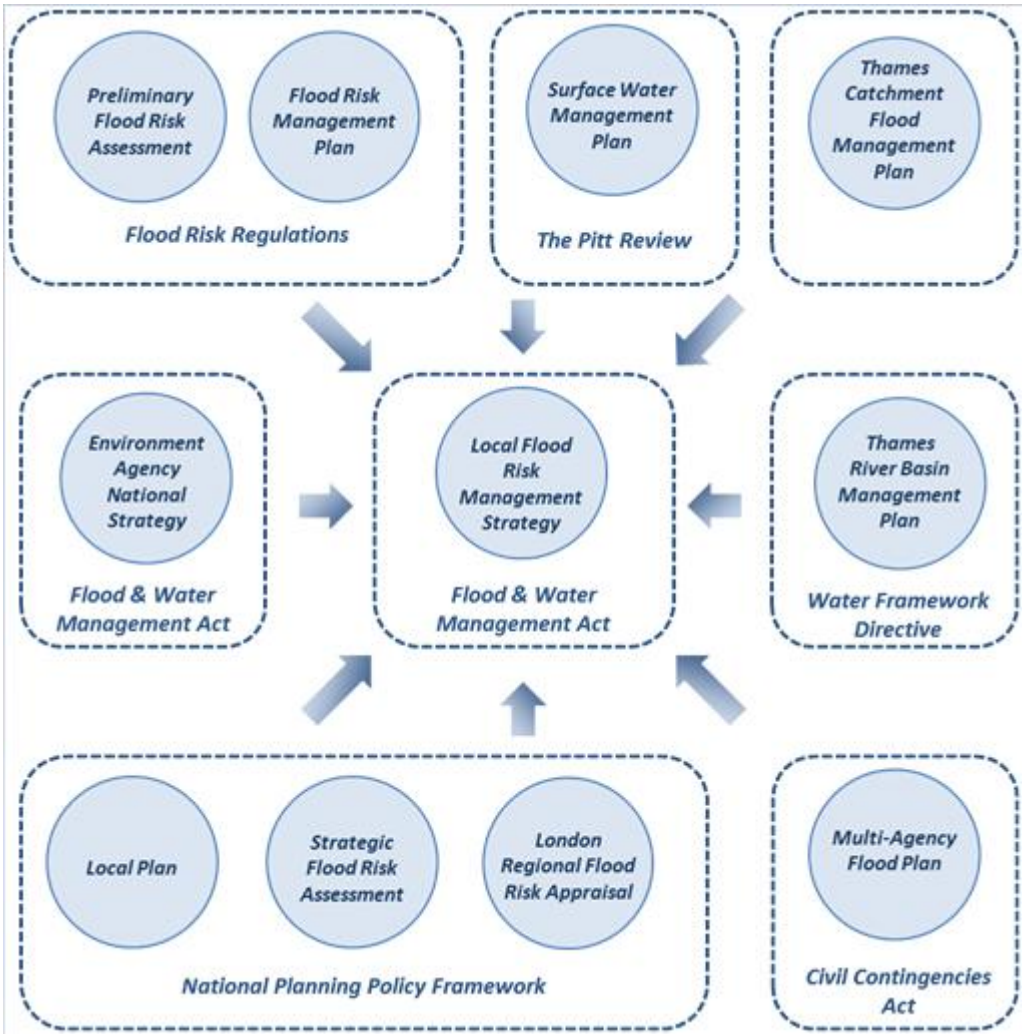
1.5.1 Over recent years, a number of documents have been prepared detailing the assessment and management of flood risk within RBKT. As indicated in Figure 1-2, it is intended that the Strategy forms a key document in this suite of flood risk management plans, drawing together

[4] Defra, Environment Agency (2011) The National Flood and Coastal Erosion Risk Management Strategy for England https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england
[5] European Union (2000) Water Framework Directive http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0060:EN:NOT

existing flood risk studies and plans into a single document that outlines how RBKT will manage local flood risk going forwards.

1.5.2 As part of the assessment of flood risk, the Strategy draws on technical information and historic records of flooding presented in the SWMP, Strategic Flood Risk Assessment (SFRA) and Preliminary Flood Risk Assessment (PFRA). These same documents and the partnerships forged between RMAs during their preparation are also built upon and formalised as part of the Strategy.

1.5.3 The Strategy also draws from wider environmental plans covering the Thames catchment including the Thames River Basin District Management Plan[6] and Thames Catchment Flood Management Plan[7] to ensure a coordinated approach to flood risk management across South West London.



[6] Environment Agency (2009) Thames River Basin District Management Plan
https://www.gov.uk/government/publications/thames-river-basin-management-plan
[7] Environment Agency (2009) Thames Catchment Flood Management Plan
https://www.gov.uk/government/collections/catchment-flood-management-plans

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

Flood Risk Management Plan

1.5.4 As well as the duties under the Act to prepare the Strategy, RBKT have legal obligations under the EU Floods Directive[8], which was transposed into UK Law through the Flood Risk Regulations 2009[9] ('the Regulations').

1.5.5 As part of the Greater London Flood Risk Area, RBKT is required to contribute to the preparation of a Flood Risk Management Plan for the Thames River Basin District outlining significant flood risk, receptors and consequences across their administrative area.

1.5.6 This Strategy has been prepared to meet the requirements the Regulations as well as the Act, and thereby avoid duplication of work.

[8] European Union (2007) EU Floods Directive http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0060:EN:NOT
[9] HSMO (2009) The Flood Risk Regulations http://www.legislation.gov.uk/uksi/2009/3042/contents/made

2. ASSESSMENT OF LOCAL FLOOD RISK

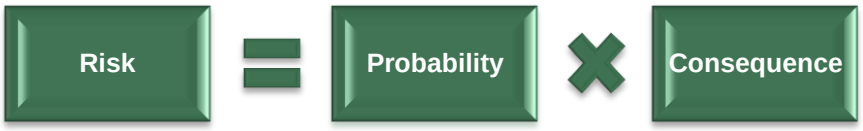
2.1 What is Flood Risk?

2.1.1 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.

2.1.2 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, loss and fear of repeat events. All available information and past experiences have been considered in developing our objectives for managing future flood risk.

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.

2.2 Local Sources of Flood Risk

2.2.1 This Section of the Strategy sets out the assessment of flood risk from *local* sources, i.e. surface water, groundwater and ordinary watercourses.

2.2.2 For each of these sources a description of the source and mechanism of flooding has been provided and an assessment of the risk has been made drawing on historical records, outcomes from the community engagement (refer to Appendix C) as well as assessments detailed in existing technical studies addressing both current and future risk. Figures 1 - 3, presented in Appendix A, show historic records of flooding and modelled potential future impacts of flooding from these sources.

2.2.3 The main perceived source of flood risk identified from the online survey is large rivers and runoff from roads and impermeable areas. There is little perceived risk of groundwater flooding however there have been thirty one reported incidents of groundwater flooding.

Table 2-1 Flooding from Local Source –Surface Water Flooding	
Description of Source	Surface water flooding usually occurs when high intensity rainfall generates runoff which flows over the surface of the ground and ponds in low lying areas, before the runoff enters a watercourse or sewer. It can be exacerbated when the soil is saturated and natural drainage channels or artificial drainage systems have insufficient capacity to cope with the additional flow.
Supporting Plans & Documents	Royal Borough of Kingston Surface Water Management Plan[10] Royal Borough of Kingston Preliminary Flood Risk Assessment[11]
Historic Flooding	The PFRA and SWMP identify parts of RBKT to be particularly susceptible to surface water flooding, including Kingston upon Thames town centre, New Malden and Hook. Six specific episodes of surface water flooding events within the Borough have been identified. May 2004 - multiple residential properties in localised areas were flooded after a large rainfall event. August 2004 - there were significant traffic disruptions around Kingston town centre and records of property flooding. September 2005 - many areas across the Borough were subjected to flash flooding after an intense rainfall event. August 2006 - Properties in the Berrylands area suffered pluvial flooding. June and November 2007 - significant storm events caused localised flooding to properties and transport networks. Kingston bypass (A3), the one way system within Kingston town centre, Wood Street, Richmond Road, London Road, and Cambridge Road were closed due to surface water flooding. Appendix A Figure 1 shows the locations of nine recorded incidents of historic surface water flooding. The main cause of historic flooding identified in the survey was heavy rainfall.

[10] Capita Symonds URS (2011) Royal Borough of Kingston upon Thames Surface Water Management Plan
[11] Capita Symonds URS (2011) Royal Borough of Kingston upon Thames Preliminary Flood Risk Assessment

Table 2-1 Flooding from Local Source –Surface Water Flooding	
Future Flood Risk	As part of the SWMP, direct rainfall modelling was undertaken to analyse the number of properties at risk of surface water flooding for a rainfall event with a 1 in 100 year probability of occurrence in any given year (1% Annual Exceedance Probability). It was determined that 22,178 residential and 1362 non-residential properties are at risk of flooding to depths greater than 0.03m during a 1% AEP event. Fourteen Critical Drainage Areas (CDAs) were identified in the Royal Borough of Kingston Upon Thames as a result of the modelling. The CDAs considered to be most at risk of surface water flooding are: • CDA_008 Acre Road / north Kingston • CDA_009 New Malden • CDA_018 Hook / Kelvin Grove • CDA_010 Kingston Town Centre • CDA_013 Network Rail Mainline Generally modelling results show that the extent and depth of pluvial flooding in the Borough are relatively small. Whenever funding becomes available, further studies will be undertaken in order to better understand the flood risk for each CDA using more accurate modelling. The results will be used to identify possible options to reduce flood risk in the CDA. Appendix A Figure 2 shows the Environment Agency updated Flood for Surface Water (uFMfSW). The uFMfSW shows relatively good correlation with the pluvial modelling presented in the SWMP. The uFMfSW shows surface water to be more constrained within roads and watercourse, which in part reflects the improved resolution of the modelling. Initial high-level, borough-wide assessment of the uFMfSW indicates a reduction in flood risk in RBKT. During a 1% AmEP event 16,558 residential and 2,170 non-residential properties were found to be at risk of flooding to a varying degree. Further, more detailed, analysis of the uFMfSW is required.

Table 2-2 Flooding from Local Source – Groundwater Flooding	
Description of Source	Groundwater flooding occurs as a result of water rising up from an underlying aquifer or from water flowing from springs. This tends to occur after much longer periods of sustained high rainfall and can be sporadic in both location and time often lasting longer than a fluvial or surface water flood. High groundwater level conditions may not always lead to widespread groundwater flooding; however, they have the potential to exacerbate the risk of pluvial and fluvial flooding by reducing rainfall infiltration capacity, and to increase the risk of sewer flooding through sewer / groundwater interactions. In permeable substrates, groundwater levels can rise, causing flooding problems in subsurface structures or at the ground surface. Areas within the Borough have permeable superficial deposits. The potential for these groundwater flooding mechanisms in the study area include:- • Claygate Member outcrop in Coombe, Chessington and Malden Rushett • Superficial aquifers along the River Thames, Hogsmill River and Beverley Brook, and in other various locations • Impermeable (silt and clay) areas down slope of superficial aquifers in various locations • Artificial ground in various locations Where there are gravel deposits, known as 'Thames gravels', permeability of soils and the subsurface increases, and groundwater flooding susceptibility increases. Intense heavy rainfall can lead to groundwater flooding away from main rivers where water passes through these permeable gravel layers.
Supporting Plans & Documents	Royal Borough of Kingston Surface Water Management Plan Royal Borough of Kingston Preliminary Flood Risk Assessment
Historic Flooding	Basements and other below ground level installations are particularly vulnerable to groundwater flooding, although property and land above ground level can be at risk. Thirty one incidents of groundwater flooding in the Royal Borough of Kingston were recorded between 2000 and 2010. The majority of these events surround the permeable superficial deposits within the centre of the Borough. However, ten of these events were recorded above the London Clay formation, an aquiclude which does not permit groundwater flow, suggesting the cause was not groundwater but instead surface water flooding due to poor infiltration capacity. Appendix A Figure 1 shows records of historic flooding from local sources including groundwater. The perceived risk from groundwater in the online survey is low and no historic incidents of flooding from groundwater were reported in the survey
Future Flood Risk	Appendix A Figure 3 shows a dataset from the SWMP described as 'Increased Potential for Elevated Groundwater'. This dataset was derived from four individual data sources (BGS Groundwater Flood Susceptibility maps; Environment Agency Thames Estuary 2100 groundwater hazard maps; DEFRA Groundwater emergence maps; and JBA. Groundwater flood maps) and identifies areas where there is increased potential for groundwater levels to rise within 2 m of ground surface following periods of higher than average recharge.

Table 2-3 Flooding from Local Source – Ordinary Watercourses (including small ditches and land drains)	
Description of Source	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 (see Section 2.3 Other sources of flooding). The responsibility for ordinary watercourses fall to riparian owners who typically own land on either bank and therefore are deemed to own the land to the centre of the watercourse. Small channels often receive most of their flow from inside the urban area and drain the urban areas. The ordinary watercourses in RBKT include Pachesham Stream, Lambeth Stream, Keswick Avenue Drain, Bonesgate Stream and Surbiton Stream. The total length of these channel reaches is approximately 12.5 km. These on shown in Appendix A Figure 5.
Supporting Plans & Documents	Royal Borough of Kingston Surface Water Management Plan Royal Borough of Kingston Preliminary Flood Risk Assessment
Historic Flooding	There are limited records of fluvial flooding from ordinary watercourses, only two are recorded in the south of the Borough at Old Kingston Road and Woodall Close. Many of the flooding events within the Borough are attributed to interlinked flooding mechanisms; it is likely that the ordinary watercourses have contributed to some of the flooding events reported as pluvial flood events.
Future Flood Risk	The SWMP models predict limited flooding along the ordinary watercourses in the Borough for all return periods. Appendix A Figure 2 shows the Environment Agency uFMfSW which generally correlates with the SWMP although more flooding is shown along the Surbiton Stream and the ordinary watercourse towards the south of the Borough.

2.3 Other Sources of Flooding

2.3.1 Parts of South West London are also at risk of flooding from *other* sources including the tidal River Thames, main rivers, sewer surcharging, and artificial sources. It should be noted that the focus of the Strategy is purely the management of *local* sources of flooding, however it is recognised that mechanisms of flooding may arise from interlinked sources of flooding and therefore other sources of flooding present in the RBKT have been identified to aid understanding and management of local flood risk in the area.

Table 2-4 Flooding from Other Source – Main Rivers	
Description of Source	River flooding occurs when water levels rise as a result of high or intense rainfall which flows into them, resulting in watercourses overflowing or bursting their banks. A Main River is defined by the Environment Agency on its Main River Map and is usually a larger river or stream. The following Main Rivers are present within the Royal Borough of Kingston; River Thames, Hogsmill River and Beverley Brook, these are shown in Appendix A Figure 5. The River Thames forms the north western boundary of the Borough and the Beverley Brook the north eastern boundary. The Hogsmill River flows through the centre of the Borough in a north westerly direction. Kingston upon Thames town Centre is at risk of flooding from the 1 in 1000 year food, as the EA Flood Zone 2 outline extends around most of the town centre. Flood Zone 2 is also extensive in the area to the west of Hook, however the areas at risk of flooding are mostly recreational vegetated areas, and thus impact and consequences are much lower.
Supporting Plans & Documents	Royal Borough of Kingston Strategic Flood Risk Assessment[12] Thames Catchment Flood Management Plan[13] Environment Agency Flood Map[14]
Historic Flooding	Historically, fluvial flooding from the River Thames and Hogsmill River has inundated the Kingston upon Thames town centre. Residential and commercial properties have been flooded, causing physical damage and economic disruption. During the extreme rainfall events in July 2007, many areas within Kingston town centre were flooded, including road and rail connections.
Future Flood Risk	Appendix A Figure 4 shows the Environment Agency Flood Zones 2 and 3. This is the 'Flood Map for Planning' which is used to determine the suitability of sites for development. However the main product which members of the public will use to understand their flood risk is the 'Flooding from Rivers and Sea' that takes into account the presence of defences and also uses a different risk classification – High, Medium, Low and Very Low. The NPPF defines Flood Zones associated with tidal and river flooding based upon the probability of flooding. Approximately 6764 properties are at medium risk (lie within flood zone 2) of flooding in the Borough. In Kingston Town Centre, approximately 57 properties within the town centre are at high risk of flooding as they lie within Flood Zone 3b, 1144 lie within Flood Zone 3a and 1103 in Flood Zone 2. Outside of the town centre, the flood risk from rivers is relatively low due to well defined valleys and effective planning controls; maintaining flood zones as open space. The Environment Agency has produced the Thames Estuary 2100 (TE2100) Plan[15] which sets out the strategic plan for managing tidal flood risk in the Thames estuary to the end of the century. The plan recommends the required flood risk management measures and when and where these will be needed, based on climate changes and sea level rises.

[12] Royal Borough of Kingston upon Thames Strategic Flood Risk Assessment, 201
[13] Thames Catchment Flood Management Plan, 2009
[14] https://www.gov.uk/government/organisations/environment-agency
[15] Environment Agency (2012) The Thames Estuary 2100 Plan https://www.gov.uk/government/publications/flooding-thames-estuary-2100-te2100-plan

Table 2-5 Flooding from Other Source – Tidal Flooding	
Description of Source	The section of the Thames that flows through the Borough does have some tidal influences, despite being upstream of what previously was thought to be the tidal extent at Teddington Weir. Tidal events may also impact the Borough if decisions to operate the Thames Barrier Defences had any effect further inland.
Supporting Plans & Documents	Royal Borough of Kingston upon Thames Strategic Flood Risk Assessment Environment Agency Flood Map
Future Flood Risk	Future tidal flood risk along the Thames in response to climate change has been modelled, and it is envisaged that the impacts could be mitigated with effect use of the Thames Barrier, although this cannot be guaranteed.

Table 2-6 Flooding from Other Source – Sewer Flooding	
Description of Source	During heavy rainfall flooding from the sewer system may occur if; (a) the rainfall event exceeds the capacity of the sewer system / drainage system, (b) the system becomes blocked by debris or sediment, (c) the system surcharges due to high water levels in receiving watercourses, and/or (d) the system surcharges due to the ingress of ground water, either through the fabric of the sewer or due to inundation above the surface. Sewer flooding generally results in localised short term flooding. Management of sewer flooding from public sewers (but not from private drains or land drainage) is the responsibility of Thames Water as the sewerage undertaker, although it is often difficult to disassociate from surface water runoff and groundwater flooding. The majority of the sewer system across RBKT is combined, taking both foul and surface water flows. The capacity of the sewer system is therefore limited and is only expected to accommodate a 1 in 10 or 1 in 15 year storm event. Any rainfall event exceeding this probability will likely result in overland flow and may cause a risk of flooding. High river levels due to rainfall or high tides can block drains by submerging river outlets. Surcharging can occur when overflows are blocked and rainfall entering the drainage system exceeds the capacity of the drains. Water may overflow into streets and houses if water is unable to escape.

Table 2-6 Flooding from Other Source – Sewer Flooding	
Supporting Plans & Documents	Royal Borough of Kingston Preliminary Flood Risk Assessment
Historic Flooding	As part of the SWMP and PFRA, Thames Water provided the DG5 database which details the total number of properties at risk of sewer flooding (both internally and externally) based on historic flooding over the previous 10 years. Thames Water focuses their efforts on removing properties from the DG5 register that have flooded in the past and therefore this dataset may not accurately represent those properties currently at risk or at risk in the future. The DG5 register highlights the areas of Kingston upon Thames town centre, Berrylands, the area surrounding the River Hogsmill at Berrylands and the Beverley Brook catchment as being at greatest risk of sewer flooding. The SFRA sewer flooding map (Figure D-5) highlights the postcode area of KT2 5, SW15 3, KT3 4 and KT9 1 as having the greatest number of recorded sewer flood incidents. Appendix A Figure 1 shows four recorded incidents of sewer flooding at Acre Road, York Road, London Road, and Alexandra Drive
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. Notwithstanding the above mentioned limitations, the DG5 register has been used to provide an indication of potential future impacts. The Hogsmill Integrated Urban Drainage Pilot Study indicated that Berrylands, Kingston Town Centre and Southborough are most susceptible to sewer network flooding as a result of design storm events with a probability of occurrence greater than 1 in 30 years. This is the design capacity of combined drains within the Borough due to economic cost benefit analysis. Approximately 280 properties have been highlighted as at risk of surcharging of the sewer system in the 1 in 100 year storm event.

Table 2-7 Flooding from Other Source – Artificial Sources	
Description of Source	Artificial sources include any water bodies not covered under other categories and typically include canals, lakes and reservoirs. There are no canals or lakes within the Borough. There are no formal reservoirs within the Borough. However, the Borough is at risk from reservoir flooding from a number of reservoirs located outside the Borough.
Supporting Plans & Documents	Environment Agency Risk of Flooding from Reservoirs
Historic Flooding	There are no reported incidents of flooding from lakes, canals or reservoirs within the Borough.

Table 2-7 Flooding from Other Source – Artificial Sources	
Future Flood Risk	A review of the Environment Agency reservoir inundation mapping indicates the area north and south of the Kingston town centre area is at risk should there be a failure in a number of reservoirs (located outside the Borough) including Wraysbury, Island Barn, King George VI and Queen Mary. This is not a complete list of the reservoirs that could potentially cause flooding in Kingston Borough, the Environment Agency's reservoir maps should be referred too. It should be noted that the depth and speed of flooding from the reservoirs in the area are also available on the Environment Agency's website.

2.4 Flood Warning Areas

2.4.1 The Environment Agency provided their current flood warning areas in April 2014. The flood warning areas and the Environment Agency Area that issues the warning are shown in the figure 2-1 below.

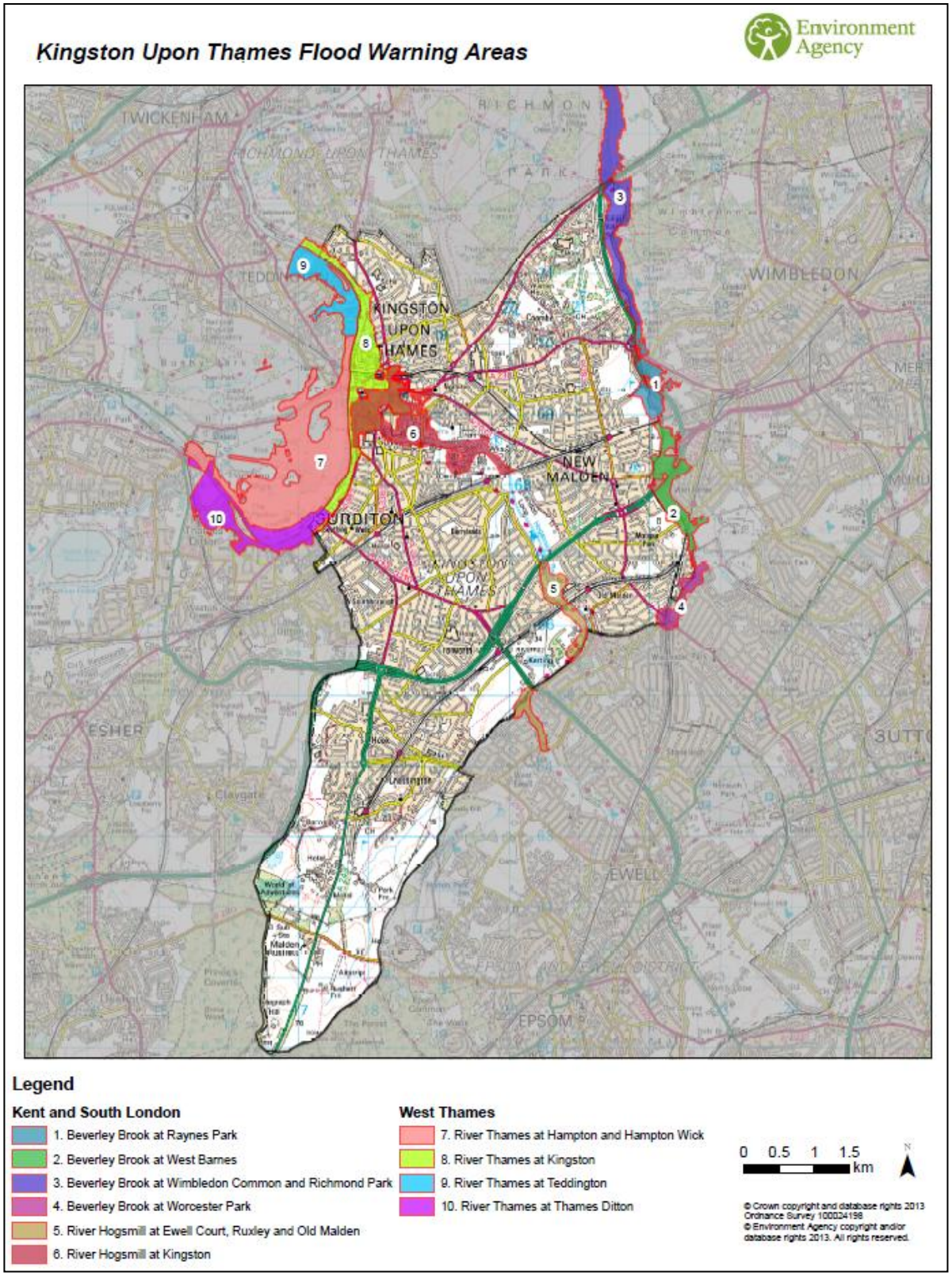


Figure 2-1 Environment Agency Flood Warning Areas

2.5 Impact of Climate Change

2.5.1 Current predictions of future rainfall indicate that we should expect increasing numbers of severe and extreme weather events 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 the UK Climate Projections 2009[16]. 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 1 in 5 annual chance or rarer) could increase locally by 40%. Consequently, the number of properties, business and critical infrastructure at risk will also increase.

Implications for Flood Risk

2.5.2 Climate changes 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. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

2.5.3 Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. There is a risk of flooding from groundwater-bearing chalk and limestone aquifers. Recharge of the aquifers may increase in wetter winters, or decrease in drier summers.

2.5.4 Where appropriate, local studies are needed to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help to adapt to climate change and manage the risk of damaging floods in the future.

Adapting to Change

2.5.5 Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our 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.

2.5.6 Although the broad climate change picture is clear, we have to make local decisions against deeper uncertainty. We 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 we do not increase our vulnerability to flooding.

Including allowances for Climate Change in RBKT Flood Risk Management

2.5.7 Existing flood risk studies, covering RBKT and the wider catchment, have assessed the impacts of climate change and flood risk and provide the evidence base for understanding how this may impact current and future communities and businesses. Further information on how the Strategy takes into account the impacts of climate change is outlined in Section 5.4.

2.6 Summary

2.6.1 This section has afforded a summary of past and future flood risk associated with local sources in RBKT which are the primary focus of the Strategy. A summary of the past and future risk associated with other sources of flooding has also been provided to ensure a comprehensive appreciation of flood risk across the Borough. The sources of flood risk that are of most significance to RBKT are considered to be surface water and groundwater.

[16] United Kingdom Climate Projections 2009 http://ukclimateprojections.defra.gov.uk//

3. RESPONSIBILITIES FOR FLOOD RISK MANAGEMENT

3.1 Overview

3.1.1 Flood events are often a complex interaction of flood source(s), pathway(s) and receptor(s), the responsibility for managing which can often lie with a number of different organisations or individuals. To add further complexity, the roles of organisations can vary according to the severity of the flood event for example a 1 in 10 year flood may be dealt with by the sewerage undertaker and the LLFA, whereas a 1 in 200 year event in the same location could involve all RMAs, emergency responders and central government. 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 is to be managed effectively.

3.1.2 The Flood and Water Management Act 2010 designates the following organisations as RMAs and sets out the legal responsibilities these organisations have for managing local flood risk:

- Lead Local Flood Authority i.e. Royal Borough of Kingston Upon Thames
- Environment Agency
- Sewerage Undertaker i.e. Thames Water Utilities
- Highways Authority i.e. Royal Borough of Kingston Upon Thames and Transport for London

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

3.1.4 In addition, other legislation (such as the Highways Act 1980, Land Drainage Act 1991[17], Water Resources Act 1991[18], Civil Contingencies Act 2004) place duties and powers upon specific organisations and individuals of relevance to local flood risk management.

3.1.5 This Section provides an overview of the legal responsibilities and functions held by different organisations and individuals under all the legislation.

3.2 Responsibilities of Risk Management Authorities

Royal Borough of Kingston upon Thames

…as the Lead Local Flood Authority

3.2.1 RBKT are a RMA under the Act as both the LLFA and the Highways Authority. Figure 3-1 presents the duties and powers given to LLFAs under the Act. It should be noted that the SuDS Approving Body role was not enacted but was superseded in December 2014 with the announcement that LLFAs were to become statutory consultees on major planning applications which had surface water implications. This came into force from 15th April 2015 and has enabled RBKT's LLFA to review and provide recommendations on the surface water and drainage proposals submitted for major planning applications. This role had previously been the responsibility of the Environment Agency.

…as a Highways Authority

3.2.2 The highway drainage system is integral in the management and behaviour of surface water during heavy rainfall events. As a Highways Authority, the Highways Act 1980[19] requires that RBKT ensure that highways are drained of surface water and where necessary maintain all drainage systems.

[17] HSMO (1991) Land Drainage Act http://www.legislation.gov.uk/ukpga/1991/59/contents
[18] HMSO (1991) Water Resources Act http://www.legislation.gov.uk/ukpga/1991/57/contents
[19] HSMO (1980) Highways Act http://www.legislation.gov.uk/ukpga/1980/66/contents

…as a Category 1 Responder

3.2.3 RBKT is a Category 1 Responder under the Civil Contingencies Act 2004[20] 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. The complex and diverse nature of flooding and the consequences that arise, require a comprehensive and often sustained response from a wide range of organisations, and as such RBKT has prepared a multi-agency flood plan[21] to allow all responding parties to work together on an agreed coordinated response to severe flooding.

…as a Local Planning Authority

3.2.4 As a Local Planning Authority RBKT has a responsibility to consider flood risk in their strategic land use planning and the development of their Local Development Framework. RBKT is also required to consider flood risk when assessing applications for development.

3.2.5 The National Planning Policy Framework[22] (NPPF) and supporting guidance[23] require LPAs to undertake a SFRA and to use their 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. The RBKT SFRA was produced in 2011 to support the Local Plan[24]. When considering applications for development, site-specific flood risk assessments are a requirement of the NPPF. Local requirements for these are outlined in the RBKT Level 2 SFRA.

…as Regulator of Ordinary Watercourses

3.2.6 RBKT has been the powers of ordinary watercourse consent under the Land Drainage Act 1991[25], which were transferred from the Environment Agency to LLFAs as of the 6th of April 2012. 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. RBKT therefore have:

- The power to serve notice on riparian landowners along ordinary watercourses who need to carry out maintenance to reduce flooding.
- The power to serve notice on a person to abate a nuisance in relation to an ordinary watercourse where that nuisance is an obstruction erected, raised or altered or any culvert erected or altered without prior consent as required under Section 23 of the Land Drainage Act 1991.

[20] HSMO (2004) Civil Contingencies Act http://www.legislation.gov.uk/ukpga/2004/36/contents
[21] The Royal Borough of Kingston upon Thames Multi-Agency Flood Plan, May 2011
[22] Communities and Local Government (2012) National Planning Policy Framework http://planningguidance.planningportal.gov.uk/
[23] Communities and Local Government (2012) Technical Guidance to the National Planning Policy Framework http://planningguidance.planningportal.gov.uk/
[24] See RBKT website for latest version of Local Plan https://www.kingston.gov.uk/
[25] HMSO (1991) Land Drainage Act http://www.legislation.gov.uk/ukpga/1991/59/contents

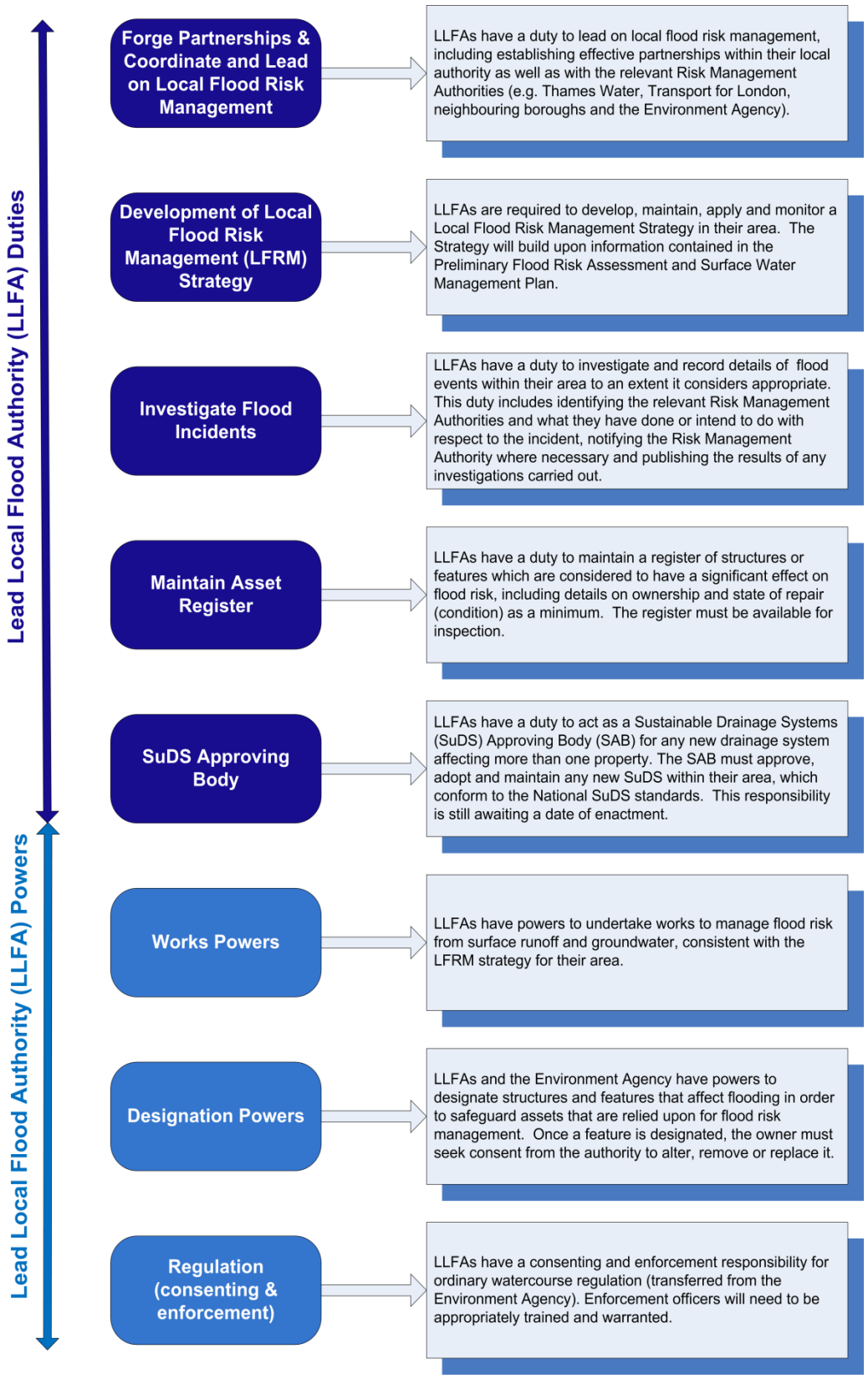


Figure 3-1 Duties and Powers for Royal Borough of Kingston upon Thames as set out in the Act

Environment Agency

3.2.7 The Environment Agency is designated a RMA under the Act. The Environment Agency is responsible for managing flooding from main rivers and the sea and has a responsibility to provide a strategic overview for all flooding sources and coastal erosion. The Environment Agency are a statutory consultee on fluvial flood risk in the planning process and also regulate third party works on main rivers.

Thames Water Utilities Ltd

3.2.8 As the sewerage undertaker serving RBKT, Thames Water is designated a RMA under the Act.

3.2.9 Thames Water is responsible for removing wastewater from premises and draining surface water from the roofs and yards and outbuildings appurtenant to premises.

3.2.10 In October 2011 water and sewerage companies in England and Wales became responsible for private sewers which were previously the responsibility of property owners. However, not all private sewers were included; there are some cases where the property owners remain responsible for the sections of pipe between the property and the transferred private sewer. Further information is available via Thames Water's website[26].

Transport for London

3.2.11 As a Highways Authority, Transport for London (TfL) is designated a RMA under the Act.

3.2.12 Under the Highways Act 1980, TfL have responsibilities for the effectual drainage of surface water from adopted roads along red routes insofar as ensuring that drains, including kerbs, road gullies and ditches and the pipe network which connect to the sewers, are maintained.

3.3 Responsibilities of Other Organisations / Individuals

3.3.1 Individuals, communities and businesses have an important role to play in managing local flood risk, alongside defined Risk Management Authorities.

- **Property owners** are responsible for maintaining a proper flow of water in any watercourse running through their land and protecting their property (through property level resilience and resistance measures).
- **Individuals** can reduce flood risk by taking action such as disposing of leaf litter rather than letting it block drains and getting involved in local flood risk management activities.

3.3.2 RBKT recognise 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. The Strategy, therefore, 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.

Property Owners and Residents

3.3.3 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

[26] Thames Water Utilities website http://www.thameswater.co.uk/

the publication 'Prepare your property for flooding' available on the Environment Agency website[27] and part H of the Building Regulations.

Riparian Owners

3.3.4 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, this includes piped and buried watercourses. 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.

3.3.5 RMAs have powers and responsibilities to manage flood risk and work with others to improve river environments. This may often affect riparian owners, who must also adhere to certain responsibilities including;

- To maintain the watercourse and to clear any obstructions (natural or otherwise) so the normal flow of water is not impeded,
- To maintain the banks and bed of the watercourse and any flood defences that exist on it,
- To accept the natural flow from your upstream neighbour and transfer it downstream without obstruction, pollution or diversion,
- To maintain any structures on your stretch of watercourse including culverts, weirs and mill gates, and
- To apply to RBKT for formal consent for any works in or adjacent to an ordinary watercourse, or to the Environment Agency for works within 8m of a Main River.
- To apply to the Environment Agency for formal consent for any works within 8m of a Main River or 16m of the landward side of the Thames Tidal Defences

3.3.6 RBKT has permissive powers to carry out flood defence works for ordinary watercourses at their discretion, in a similar manner to those powers used by the Environment Agency for Main Rivers. Further information for riparian owners is available in the Environment Agency publication 'Living on the Edge'[28] and the government licence information[29].

[27] Environment Agency website - 'Prepare your property for flooding' https://www.gov.uk/prepare-for-a-flood

[28] Environment Agency (2012) 'Living on the Edge' https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

[29] https://www.gov.uk/flood-defence-consent-england-wales

4. OBJECTIVES FOR MANAGING LOCAL FLOOD RISK

4.1 Royal Borough of Kingston Upon Thames Local Objectives

4.1.1 A workshop was held with officers from RBKT and the Environment Agency to identify and capture objectives for local flood risk management. Representatives were invited from a range of departments including highways, drainage, emergency planning, strategic planning, and development control to contribute to the development of the Council's flood risk management objectives.

4.1.2 An online survey was undertaken to capture community objectives and priorities for flood risk management in the Royal Borough of Kingston upon Thames (Appendix C). These were used to inform the development of the local objectives.

RBKT's objectives for managing local flood risk are set out below:

Royal Borough of Kingston upon Thames Strategy Objectives

- Educate, encourage and empower local stakeholders to take action on reducing flood risk
- Apply an intelligence-led risk based approach to the management of flood risk in the Royal Borough of Kingston upon Thames
- Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency
- Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change.

4.2 National Flood Risk Management Objectives

4.2.1 The objectives for the RBKT Strategy have been developed in line with the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy for England[30]. 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

[30] Environment Agency (2011) National flood and coastal erosion risk management strategic for England https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england

- **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.

Guiding Principles for Local Flood Risk Management

4.2.2 The National Strategy strategic aims and objectives are supported by six high-level principles, to guide decisions on risk management activities, and the process by which they are taken, at both a national and local level. Kingston Council has used these to guide the development of objectives and identification of measures to deliver local flood risk management within Kingston Borough.

Table 4-1 Guiding Principles for Local Flood Risk Management

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.

5. DELIVERY OF LOCAL FLOOD RISK MANAGEMENT

5.1 Overview

5.1.1 This section describes the measures and actions that form the basis of the Royal Borough of Kingston upon Thames Local Strategy, outlining:

- Proposed measures to deliver the objectives,
- Timescales to implement measures, and
- How the measures will be paid for, identifying costs and benefits.

5.1.2 It is appreciated that there is overlap and interaction between the delivery of specific local flood risk management measures and the general exercising of duties and powers by RBKT under the Act. As a result, this Section firstly provides a brief description of how RBKT are proposing to discharge their duties and responsibilities under the Act, followed by identification of their proposed local flood risk management measures and how they will be delivered.

5.1.3 The RBKT[31] website provides the latest information on flood risk management in the borough.

5.2 Delivery of Duties under the Act

Forge Partnerships and Lead on Local Flood Risk Management

Internal Flood Group

5.2.1 The flood risk management work sits in the Environment and Place directorate, in the Environment service. The internal flood group is made up of staff from the Highway Assets (including land drainage), Street Scene, Contingency Planning, Planning and Transport (which includes Development Management, Building Control, and Development Planning and Regeneration) and Green Spaces departments. The group has close links with the Communications team and ICT Services.

Local Stakeholders

5.2.2 Kingston Council works closely with the Environment Agency. Currently collaborations are underway with Kingston Voluntary Action Group to help raise awareness of flooding issues in the Borough and there is also the option of working with the South East Rivers Trust in the future.

South West London Strategic Flood Group

5.2.3 The South West London Flood Group was formed in 2011 and reports to the Thames Regional Flood and Coastal Committee. The South West London Flood Group comprises the six LLFAs covering South West London, namely, London Borough of Croydon, The Royal Borough of Kingston upon Thames, London Borough of Merton, London Borough of Richmond upon Thames, London Borough of Sutton and London Borough of Wandsworth, plus Surrey County Council, the Environment Agency and Thames Water Utilities Ltd.

5.2.4 The Group meet quarterly to share best practice and understanding of flood risk across South West London, and, where possible, provide coordinated and collaborative management of flooding.

[31] RBKT Council http://www.kingston.gov.uk/info/200283/flooding_and_drainage

Regional Flood and Coastal Committee

5.2.5 The Thames Regional Flood and Coastal Committee[32] (RFCC) was established in accordance with the Act and is composed of elected members appointed by each LLFA and independent members appointed by the Environment Agency with relevant experience in the Thames Region. The Committee has three primary functions:

- To ensure there are coherent plans for identifying, communicating and managing flood and coastal erosion risks across catchments,
- To promote efficient, targeted and risk-based investment in flood and coastal erosion risk management that optimises value for money and benefits for local communities, and
- To provide a link between the Environment Agency, Lead Local Flood Authorities, other RMAs, and other relevant bodies to engender mutual understanding of flood and coastal erosion risks in its area.

5.2.6 The South West London Strategic Flood Group is represented on the Thames RFCC by a Councillor from one of the six boroughs.

Investigate Flood Incidents

5.2.7 RBKT have a procedure in place for Section 19 Flood Investigations. There are three main methods that the Council uses to establish flooding incidents - notification from external agencies, internal officers, and members of the public (either directly, via the Call Centre or though the online report website function). A Section 19 investigation will occur if the flood meets RBKT's threshold criteria:

- If internal flooding of one building has been experienced on more than one occasion
- Where internal flooding of five or more properties has been experienced during a single flood incident
- Where critical infrastructure (e.g. roads impassable to traffic) has been affected by flooding more than once within a 12 month period

5.2.8 Each investigation will include a history of flooding at the location, detail the reason for doing the investigation, identify the location on a map, record information about the flood event (i.e. what occurred, when, identifying possible causes), establish the drainage system in the area, the associated RMAs (their roles and responsibilities and contact details), and any rainfall data about the storm event(s) that caused the flooding (where possible, from the Environment Agency). RBKT has a Section 19 investigation report template and to date there has been one Section 19 report completed (Kingsgate Road, under the railway bridge, 27th-30th July 2013) – this is available for public viewing upon request to the Council.

Maintain an Asset Register

5.2.9 RBKT have completed their Asset Register and it is available to view online on the RBK website in an interactive map format[33]. This GIS information has also been loaded onto Drain London's FloodStation resource.

SUDS Approving Body

[32] Environment Agency Website: Thames Regional Flood and Coastal Committee https://www.gov.uk/government/groups/thames-regional-flood-and-coastal-committee
[33] http://www6.kingston.gov.uk/landdrainage/

5.2.10 Government announced in December 2014 that Lead Local Flood Authorities would become statutory consultees to major planning applications (as defined in the Town and Country Planning (Development Management Procedure) Order 2015) from 6th April 2015 (later postponed until 15th April 2015). This has superseded the SuDS Approving Body (SAB) duty which been originally included in the Act but had never been enacted. RBKT will continue to review the requirements for the assessment of surface water implications of major planning applications in line with the April 2015 updates to the Planning Policy Guidance and Non-Statutory Technical Standards for Sustainable Drainage Systems.

Powers to do Works and Designate Structures

5.2.11 A four stage procedure is in place in order to designate structures:

- Identification of an asset, checking it meets the five criteria set by the Council for designation
- Consultation to establish the owner of the structure or feature
- Provisional designation
- Official designation

5.2.12 At present no structures or features have been designated within Kingston Borough, but when this occurs they will be added into RBKT's Asset Register with the relevant ownership details included.

Regulation of Ordinary Watercourses

5.2.13 RBKT has also been given certain powers to enforce local flood risk management practices in its administrative area. This includes the powers of ordinary watercourse consent under the Land Drainage Act 1991, which were transferred from the Environment Agency to LLFAs as of the 6th of April 2012. This means that 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.

5.2.14 At present no applications have been received for consent and Kingston have not had to enforce any powers on Ordinary Watercourses.

5.3 Delivery of Local Flood Risk Management Measures

5.3.1 For each of the local flood risk management objectives, potential measures were identified for further consideration. These were informed by Council staff and RMAs attending workshops throughout the strategy development and the outcomes from the online survey undertaken as part of the community engagement exercise described in Appendix C.

5.3.2 In order to agree appropriate measures and delivery of these to achieve the flood risk management objectives set by RBKT, a second workshop event was held with Council staff and the Environment Agency.

5.3.3 Table 5-1 outlines the measures agreed to deliver the local flood risk management objectives for the RBKT.

Table 5-1 RBKT Local Flood Risk Management Objectives and Measures	
Objective	**Measures to achieve the objective**
Educate, encourage and empower local stakeholders to take action on reducing flood risk	• Educate those at risk of flooding to improve their understanding of the potential implications their actions have on flood risk assets. • Ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond properly to flood warnings. • Organise community level incident exercises in high risk areas • Where appropriate investigate the use of Individual Property Protection
Apply an intelligence-led risk based approach to the management of flood risk in the Royal Borough of Kingston upon Thames	• Direct resources to areas predicted to be most at risk of flooding as identified by detailed hydraulic modelling • Explore methods of surface water flood forecasting including automated monitoring systems • Prioritise spending on maintenance of flood risk assets through a drainage investigation and maintenance programme
Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency	• Utilise a catchment based approach to address flood risk • Share the funding of mutually beneficial schemes between stakeholders • Work with neighbouring boroughs to investigate cross boundary issues such as Critical Drainage Areas • Work together with Thames Water to reduce the risk of flooding • Work together with the Environment Agency to reduce the risk of flooding
Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change	• Ensure that proposed schemes contribute to wider social and economic development • Ensure that local planning policy clearly sets out the requirements for a sustainable development and reduces flood risk overall where possible • Ensure that proposed schemes contribute to the enhancement of the natural environment • Build upon existing planning requirements to encourage the use of SuDS as an integral part of development

5.3.4 The Action Plan included in Appendix B sets out the measures that have been selected by RBKT as well as how these measures can be delivered including the timescales for delivery, potential costs, identification of potential funding sources and opportunities for partnership working to deliver multiple benefits.

Prioritisation of Measures

5.3.5 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). Several actions are based on improving communication and education of residents and property owners to enable them to help themselves, and putting procedures in place within the Council to improve understanding and future management of local flood risk across the Borough.

5.3.6 As understanding of flood risk improves specific mitigation schemes and activities will be developed to address flood risk in those areas at greatest risk. 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 terms,
- Consequence – how many people or properties the measure or scheme could impact, e.g. an individual property, ward or the Borough 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.

5.3.7 Moving forward, to ensure funding and resources are targeted to those areas and actions of highest importance we will prioritise our activities based on the following, where:

- There is a historic and ongoing flood risk from local flooding sources (surface water, groundwater and smaller watercourses and ditches),
- 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 including funding for biodiversity and ecology drivers,
- The measure delivers benefit and mitigation to areas identified as being at risk through RBKT's Local Flood Risk Management Strategy, SWMP, SFRA or PFRA, and
- Schemes deliver multiple benefits, including wider environmental benefits.

5.3.8 The prioritisation of schemes and actions will be reviewed six-monthly based on available funding, resources and local priorities, and published on the Kingston Council website.

Quick Wins

5.3.9 Following the outcomes of the public engagement exercise, the following actions have been prioritised for delivery in the first 2 years of the Strategy:

- Identify the best methods to communicate the risk of flooding to residents across the borough.
- Review Kingston Council's flood management webpages to ensure they include all relevant information on flood risk for the Borough and links to external websites where guidance is available on managing flood risk.
- Set up web reporting facility to allow the public to report flooding incidents
- Produce a Flood Risk Management Communications Plan
- Identify the demand for having a contact network of key individuals in community groups, to be used in the event of a flooding incident and/or to organise coordination of flood risk management.

5.4 Including Allowances for Climate Change in Local Flood Risk Management

5.4.1 RBKT will seek to use the best available information and evidence on climate change to inform ongoing local flood risk management.

5.4.2 In taking forward local flood risk management measures RBKT will:

- Seek to understand how climate change might impact flood risk to communities and businesses,
- Assess how climate change impacts on flood risk may affect the RBKT objectives for managing flooding over the longer term,
- Explore what options could be used to manage those impacts of climate change on flood risk, and
- Educate communities and businesses on the causes and potential impacts of climate change and how they can reduce these by taking action now.

5.5 Funding Sources

5.5.1 Local flood risk management measures will require funding from a variety of sources, both internal and external to the Council. The primary funding sources to date have been through central government funding. However, there are significant pressures on these funding sources in the current economic climate, and in the future there will be greater emphasis on LLFAs to fund activities and schemes from their own or alternative local sources of funding. There are a number of routes through which central government funding may contribute towards flood risk management activities, as detailed in Figure 5-1 and summarised below.

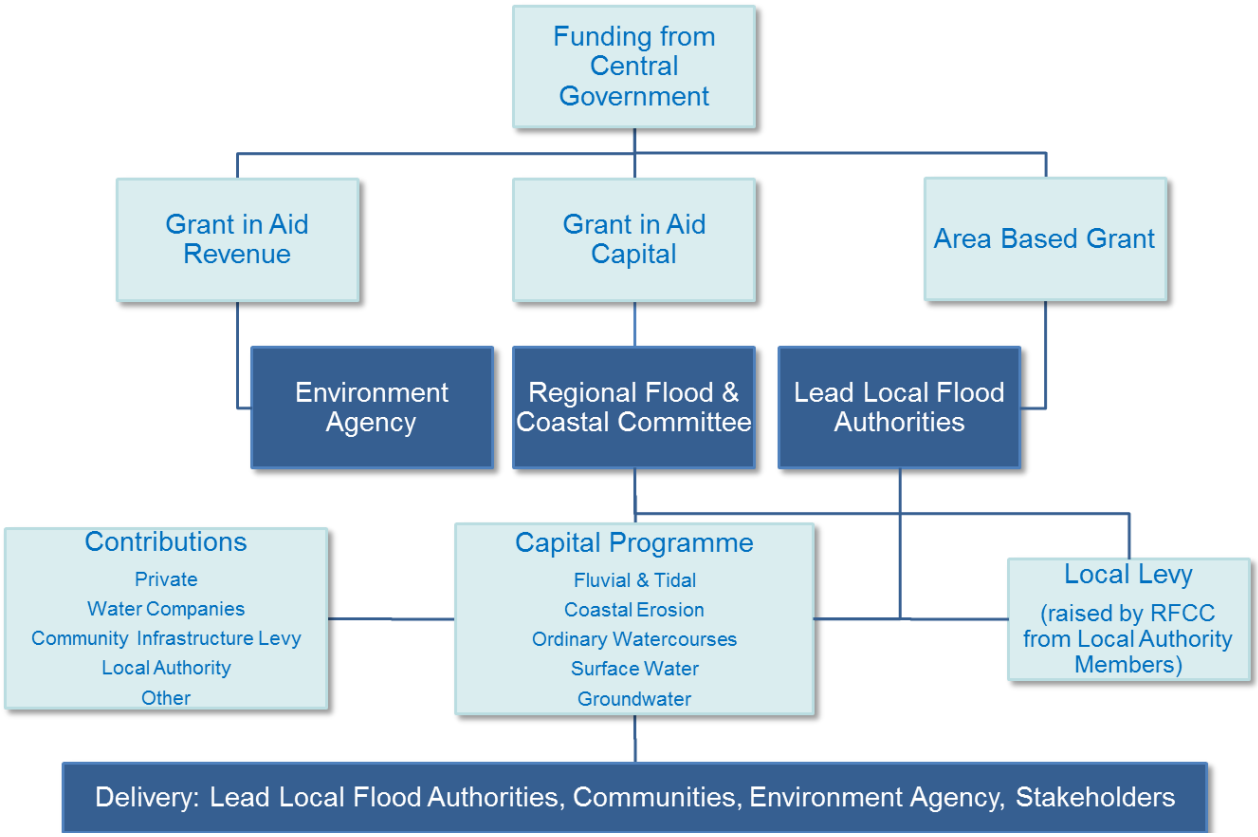


Figure 5-1 Summary of Lead Local Flood Authority Potential Funding Streams

Funding for Lead Local Flood Authorities Responsibilities

5.5.2 The Government has committed funding annually to support LLFAs in their 'new' flood management roles up to 2015. The funding is provided through 'Area Based Grants', which have been allocated by the Department for Environment and Rural Affairs (Defra) based on the individual flood risk each local authority faces. Beyond this period funding commitments are unclear and there are likely to be pressures on further funding given the significant challenges local government faces within the current spending review.

Funding for Lead Local Flood Authorities SuDS Approving Body Preparation

5.5.3 Defra has made additional funding available, for 2014-2015, to assist LLFAs in setting up and preparing for their role as a statutory consultee of major planning applications (superseding the SAB duty originally proposed under Schedule 3 of the Flood & Water Management Act 2010). The funding is intended to assist LLFAs to put the required systems, procedures and resources in place to fulfil their duties as a statutory consultee from 15th April 2015.

Funding for Flood Risk Management Studies and Schemes (Projects)

5.5.4 In the main, flood risk management projects are funding 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.

5.5.5 It should be noted that the mechanism for attracting the national (FCRM GiA) and regional (Local Levy) funding gives priority to the protection of residential properties.

Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

5.5.6 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, 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 key benefits of the new approach are:

- Communities, through their Regional Flood and Coastal Committees (RFCCs), can take decisions on which projects should process, cased 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.

Local Levy

5.5.7 This funding is raised by way of a levy on local authorities within the boundary of each 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.

5.5.8 The Local Levy allows locally important projects to go ahead to reduce the risk of flooding within each committee's area. In addition to prioritising where Local Levy is to be spent, each

RFCC annually sets the level of local levy funding that each local authority will contribute in the following year.

Other Sources of Funding

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

5.5.10 In taking forward flood risk management activities Kingston Council will need to consider securing funding from alternative sources, including Central Government, other RMAs and stakeholders and private beneficiaries. One of the key aspirations of Kingston Council is to maximise multi-beneficial outcomes of new schemes or activities. This could open up more avenues of internal revenue than purely flood risk management, particularly where measures address existing core activities for the Council.

5.5.11 Whilst the process of attracting funding from private sources is still in its infancy, Table 5-2 highlights possible sources of funding that could contribute to the delivery of flood risk management projects or schemes.

Table 5-2 Summary of Lead Local Flood Authority Potential Funding Streams

Funding Source	Description
Private Contributions	Voluntary contributions from private organisations / individuals who benefit from flood risk management projects. This could include local businesses & landlords.
Water Company Investment	Water companies are able to contribute to some types flood risk management projects where it can be demonstrated that joint benefits can be obtained and/or there is increased resilience for their assets.
Community Infrastructure Levy (CIL)[34]	A locally set general charge which local planning authorities can choose to implement. Levied on developers, per square metre of certain types of development across and authority's area. Local communities set their own priorities on how the majority of this funding is allocated.
Developer Contributions through Section 106 Agreements	Planning obligations or 'Section 106 Agreements' are a well-established mechanism for securing funding for agreed issues arising from a development proposal.
Other	There are a multitude of alternative funding sources available depending on the type of activity or scheme being proposed. For example, this could include delivery of Water Framework Directive (WFD) objectives, and will be dependent on the activity or scheme seeking funding.

5.5.12 It is clear from the above that funding to deliver capital projects will need to be sought from a variety of sources as government funding will be limited each year and is likely, in many cases, to be a contribution towards project costs rather than full funding. Any projects are therefore likely to be developed through partnership working, with partners and organisation with relevant flood risk responsibilities or assets relating to the project engaged in the production of the scheme. Partnership working may also provide opportunities for reduction in costs through shared benefits.

[34] Inside Government Website, Community Infrastructure Levy https://www.gov.uk/government/policies/giving-communities-more-power-in-planning-local-development/supporting-pages/community-infrastructure-levy

5.5.13 Timeframes for accessing funding sources will strongly influence decisions to implement particular measures as well as the viability of certain options. Particular types of funding will also require engagement of additional partners to maximise the likelihood of accessing them.

5.5.14 Further information on the different funding sources is available in the Defra guidance document 'Partnership Funding and Collaborative delivery of local flood risk management'[35].

Maintenance Activities

5.5.15 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, Kingston Council 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, we will seek to maximise income from external sources, including asset owners and riparian owners, for flood risk management.

5.6 RBKT Action Plan

5.6.1 The RBKT Action Plan is included in Appendix B. This details how the identified measures will be taken forward, the timescales for doing this, delivery partners and potential costs and funding routes.

5.6.2 The Action Plan will be reviewed on an annual basis or following a significant flood event and updated, where applicable, to reflect current priorities, funding availability, timescales for delivery and completed actions.

[35] Halcrow Group Ltd for Defra (2012) Partnership funding and collaborative delivery of local flood risk management. http://randd.defra.gov.uk/Document.aspx?Document=9958_FD2643_Partnershipfundingguide.pdf

6. DELIVERY OF WIDER ENVIROMENTAL OBJECTIVES

6.1 Overview

6.1.1 The Act states that the Strategy must specify how it contributes to the achievement of wider environmental objectives. In order to address this requirement a Strategic Environmental Assessment (SEA) of the Strategy has been undertaken in accordance with the European Union adopted Directive 2001/42/EC[36] on the assessment of the effects of certain plans and programmes on the environment (the 'SEA Directive'). Alongside this a Habitats Regulations Screening Assessment[37] has been undertaken to assess the impacts of implementing the Strategy policies and measures on European Designated Sites within 10km of RBKT.

6.1.2 Both the HRA and the SEA were developed alongside this Strategy and have been used to inform sustainable decision making throughout, including the development of social, economic and environment objectives, and the consideration of alternative options.

6.2 Habitats Regulations Assessment (HRA)

6.2.1 The requirement for a Habitats Regulations Assessment (HRA) is set out within Article 6 of the EC Habitats Directive 1992 (92/44/EEC)[1], and interpreted into British law by Regulation 48 of the Conservation (Natural Habitats &c) Regulations 1994[2]. The ultimate aim of the HRA is to "maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

6.2.2 A Habitats Regulations Assessment (HRA) screening assessment has been undertaken as part of the Strategy development. This screening exercise has assessed 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 Kingston Borough. Where the HRA determines that the Strategy would give rise to significant environment effects on a European site designated for its biodiversity value a full HRA will be required.

6.2.3 The key findings of the HRA Screening assessment are set out in the Habitats Regulations Assessment for the Strategy.

6.3 Strategic Environmental Assessment (SEA)

6.3.1 The main aim of the EU SEA Directive is to "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". The Directive was transposed into English law as the Environmental Assessment of Plans and Programmes Regulations[38] (Statutory Instrument No. 1633) on 21 July 2004.

6.3.2 SEA involves the systematic identification and evaluation of potential environmental impacts of specified plans and programmes before deciding which are adopted. Consideration should be made with regards to both the positive and negative impacts of options on wildlife and habitats, populations and health, soil, water, air, climate factors, landscape, cultural heritage and the inter-relationships between these receptors.

[36] European Union (2001) Strategic Environmental Assessment Directive
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0042:en:NOT
[37] Capita URS for the Royal Borough of Kingston upon Thames (2014) South West London Local Flood Risk Management Strategy – HRA for the Royal Borough of Kingston upon Thames
[38] HMSO (2004) Environmental Assessment of Plans and Programmes Regulations
http://www.legislation.gov.uk/nisr/2004/280/contents/made

6.3.3 The SEA has been undertaken in 2 stages:

- **Scoping Report** – a combined Scoping Report has been produced for all six South West London LFRMS[39]. It sets out the framework for undertaking a SEA for the Strategies, together with the scope of the assessment, including the environmental issues that may be significantly affected by implementing the Strategies, evidence base and review of related plans, programmes and policies to inform that assessment.

- **Environmental Report** – an Environmental Report[40] has been produced for RBKT that identifies the likely significant effects of the implementation of the Strategy on relevant environmental receptors. It also identifies how the Strategy can contribute to the achievement of wider environmental objectives, including Water Framework Directive (WFD) objectives.

6.3.4 Both the Scoping Report and the Environmental Report have been subject to statutory consultation with the Environment Agency, Natural England, and English Heritage. Non-statutory organisations, including the London Wildlife Trust and the Wandle Trust have also been consulted.

6.3.5 The SEA objectives (for all the South West London Boroughs) are as follows and have been assessed against each of the RBKT objectives:

1. Protect and enhance human health and wellbeing
2. Raise awareness and understanding of local flooding and its dangers
3. Conserve and enhance biodiversity, wildlife corridors and habitats
4. Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater.
5. Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses
6. Manage and mitigate the future effects of climate change in new and existing development
7. Conserve and enhance the historic environment, heritage assets and their settings
8. Protect, conserve and enhance the quality, character and availability of open spaces and natural resources

6.3.6 The key findings of the SEA process are set out in the Environmental Report for the Strategy. This broadly outlines how the objectives and the identified measures might be expected to affect a number of different aspects of the environment (referred to as 'receptors').

6.4 Water Framework Directive (WFD)

6.4.1 The strategy will complement work that is currently underway to comply with the requirements of the EU Water Framework Directive (WFD). The Directive seeks to improve the management, protection and enhancement of the water environment.

[39] Capita URS for the South West London Flood Group (2014) South West London Local Flood Risk Management Strategy SEA - Scoping Report

[40] Capita URS for the Royal Borough of Kingston upon Thames (2014) South West London Local Flood Risk Management Strategy SEA - Environmental Report for the Royal Borough of Kingston upon Thames

6.4.2 The Environment Agency is responsible for preparing management plans for river basin districts in England and Wales. Those plans must be prepared in line with the requirements of the WFD. 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 2015.

6.4.3 For the Thames river basin, the density of the population together with relatively low rainfall means that the water environment is 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 River Basin Management Plan are regarded having an ecological status of at least “good”. There are no water bodies in the Thames river basin or in Kingston Borough that were considered to exhibit “high” ecological status.

6.4.4 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 River Basin Management Plan 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.

6.4.5 Implementation of the statutory consultee duty of RBKT and requirements for new developments to incorporate SuDS under the Act will play an important role in contributing to the delivery of the Thames River Basin Management Plan. Increased communications with riparian owners and improved mapping of the RBKT’s drainage ditches will also contribute to the WFD by improving management of local watercourses that drain into larger river systems.

6.4.6 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, actions identified may require site specific environmental assessment to identify any potential environmental effects.

7. STRATEGY MONITORING & REVIEW

7.1 Overview

7.1.1 The Act requires the LLFA to specify how and when the Strategy will be reviewed, and, where considered appropriate, to update their identified objectives and measures for flood risk management on a regular basis.

7.2 Annual Monitoring

7.2.1 RBKT propose to monitor progress against the Strategy Action Plan every year. This will involve assessing which actions have been delivered, and determining whether there has been any change to the prioritisation of actions. Findings from this monitoring process will be presented to the RBKT Flood Group and the South West London Flood Group.

7.2.2 Progress against the Strategy Action Plan will be reported to Elected Members through an Annual Monitoring Report submitted to the Scrutiny Committee.

7.3 Review

7.3.1 The Strategy has been developed to deliver a short to medium (5-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 RBKT.

7.3.2 It is proposed that a review of the Strategy should be scheduled for 2020, and thereafter every six years (as a minimum) to coincide with the requirement under the FRR 2009 to revise the Flood Risk Management Plans.

7.3.3 However, the Strategy should be viewed as a dynamic strategy and may require review more regularly to recognise specific changes. Potential triggers for a review of the Strategy may include:

- Occurrence of a significant and widespread surface water flood event,
- Significant changes to datasets or information which may alter the understanding of risk within the study area,
- 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, or,
- Change in funding availability which has a significant effect on the Strategy Action Plan.

GLOSSARY & ABBREVIATIONS

Term	Definition
Aquifer	A source of groundwater comprising water bearing rock, sand or gravel capable of yielding significant quantities of water.
Attenuation	In the context of this strategy – the storing of water to reduce peak discharge of water.
Catchment Flood Management Plan	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.
Category 1 Responders	As defined under Schedule 1 of the Civil Contingencies Act, Category 1 responders are “core responders” in the event of an emergency and include emergency services, local authorities, health bodies and Government agencies including the Environment Agency.
Civil Contingencies Act 2004	Aims to deliver a single framework for civil protection in the UK and sets out the actions that need to be taken in the event of a flood. The Civil Contingencies Act is separated into two substantive parts: local arrangements for civil protection (Part 1) and emergency powers (Part 2).
Climate Change	Long term variations in global temperature and weather patterns caused by natural and human actions.
Critical Drainage Area	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 during severe weather thereby affecting people, property or local infrastructure.
Culvert / culverted	A channel or pipe that carries water below the level of the ground.
DG5 Register	A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.
Environment Agency	Environment regulator for England and Wales. Risk Management Authority responsible for management of flood risk from fluvial (main rivers), tidal and coastal sources of flooding and Reservoirs.
Flood Defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Floodplain	Area adjacent to river, coast or estuary that is naturally susceptible to flooding.
Flood Resilience	Resistance strategies aimed at flood protection.
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 Assessment	Considerations of the flood risks inherent in a project, leading to the development actions to control, mitigate or accept them.
Flood Storage	A temporary area that stores excess runoff or river flow often ponds or reservoirs.
Flood Resilience	Resistance strategies aimed at flood protection.
Flood Zone	The extent of how far flood waters are expected to reach.
Flood Zone 1	Low Probability of Flooding. In accordance with the NPPF, land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year.

Term	Definition
Flood Zone 2	Medium Probability of Flooding. In accordance with the NPPF, land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1-0.1%), or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5-0.1%) in any year.
Flood Zone 3a	High Probability of Flooding. In accordance with the NPPF, land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of sea flooding (>0.5%) in any year.
Flood Zone 3b	Functional Floodplain. In accordance with the NPPF, land where water has to flow or be stored in times of flood.
Fluvial	Relating to the actions, processes and behaviour of a watercourse (river or stream).
Fluvial flooding	Flooding by a river or a watercourse.
Functional Floodplain	Land where water has to flow or be stored in times of flood.
Greenfield	Previously undeveloped land.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Highways Act 1980	Sets out the main duties (management and operation of the road network) of highways authorities in England and Wales. The Act contains powers to carry out functions / tasks on or within the highways such as improvements, drainage, acquiring land etc.
Hydraulic Modelling	A computerised model of a watercourse and floodplain to simulate water flows in rivers too estimate water levels and flood extents.
Infiltration	The penetration of water through the grounds surface.
Infrastructure	Physical structures that form the foundation for development.
Land Drainage Act 1991	Sets out 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.
Local Flood Risk	Defined in the Flood and Water Management Act as flooding from surface runoff, ordinary watercourses and groundwater.
Lead Local Flood Authority (LLFA)	The statutory body defined under the Flood and Water Management Act responsible for the management of local flood risk, namely surface water runoff, groundwater and ordinary watercourses.
Local Planning Authority	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. The environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities for Main Rivers only.
Mitigation Measure	An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.

Term	Definition
Multi-Agency Flood Plan (MAFP)	Plan outlining how responding parties under the Civil Contingencies Act and key voluntary response organisations will work together on an agreed coordinated response to severe flooding in RBKT.
National Strategy	National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England, developed by the Environment Agency.
National Planning Policy Framework (NPPF)	National Planning Policy Framework (NPPF) for England, published by the Development for Communities and Local Government. This sets the government's planning policies for England and how these are expected to be applied.
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.
Overland Flow	Flooding caused when intense rainfall exceeds the capacity of the drainage systems or when, during prolonged periods of wet weather, the soil is so saturated such that it cannot accept any more water.
Pluvial Flooding	Flooding from water flowing over the surface of the ground; often occurs when the soil is saturated and natural drainage channels or artificial drainage systems have insufficient capacity to cope with additional flow
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.
Riparian Owner	Anyone who owns land or property alongside a river or other watercourse. Responsibilities include maintaining river beds/banks and allowing flow of water to pass without obstruction.
Risk	The probability or likelihood of an event occurring.
River Catchment	The areas drained by a river.
SuDS Approving Body	Statutory body responsible for the approval of Sustainable Drainage System (SuDS) systems in new planning applications, originally proposed under the Flood and Water Management Act 2010. This was never enacted and was superseded by the Lead Local Flood Authority requirement to assess the surface water implications of major planning applications as a statutory consultee.
Sewer Flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Standard of Protection	The flood event return period above which significant damage and possible failure of the flood defences could occur.
Sustainability	To preserve /maintain a state or process for future generations.
Sustainable Drainage System (SuDS)	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations meeting their own needs.
Tidal	Relating to the actions or processes caused by tides.
Tributary	A body of water, flowing into a larger body of water, such as a smaller stream joining a larger stream.
1 in 30 year event	Event that on average will occur once every 30 years. Also expressed as an event, which

Term	Definition
	has a 3.33% probability of occurring in any one year.
1 in 100 year event	Event that on average will occur once every 100 years. Also expressed as an event, which has a 1% probability of occurring in any one year.

APPENDIX A – FLOOD RISK MAPS

Figure 1 Historic Flooding from Local Sources

Figure 2 Potential Future Flood Risk: Updated Flood Map for Surface Water & Ordinary Watercourses

Figure 3 Potential Future Flood Risk: Increased Potential for Elevated Groundwater

Figure 4 Potential Future Flood Risk: Main River Flood Zones

Figure 5 Watercourses

APPENDIX B – ACTION PLAN

APPENDIX C – SUMMARY OF COMMUNITY ENGAGEMENT

RBKT wanted to engage the local community at an early stage in developing their Local Flood Risk Management Strategy in order to understand the perceptions and priorities that the general public have with respect to local flood risk and how it should be managed. There were two periods of public consultation; the first in early 2014 to aid the development of the draft Strategy and a second in mid 2015 of the final draft. A summary of both consultations is contained in this Appendix.

2014 Online Survey

RBKT ran an online survey between January 2014 and 4th April 2014. Questions covered 5 broad areas:

- Current understanding of flooding in RBKT,
- Previous experiences of flooding,
- Communication of flood risk information,
- Priorities for flood risk management, and
- Funding for flood risk management.

To promote the survey, RBKT carried out the following activities:

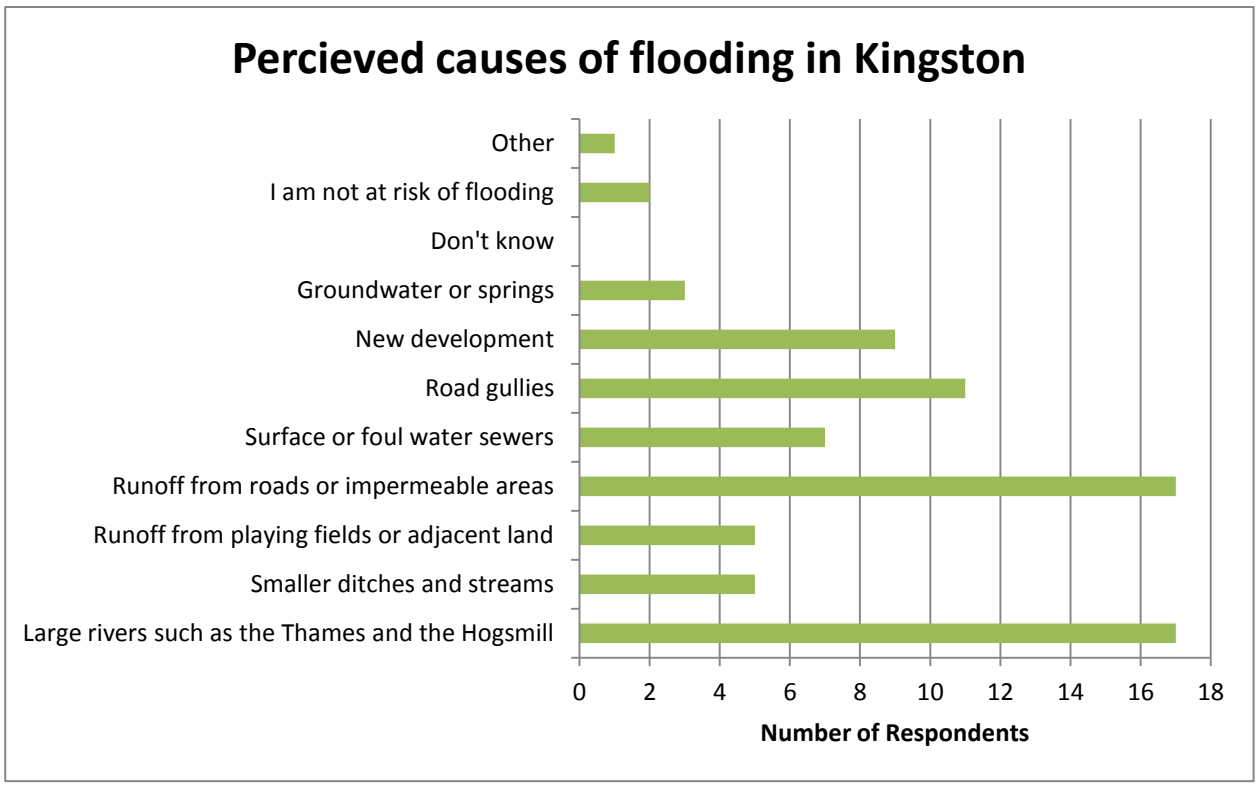
- Link emailed to Kingston Voluntary Action Group,
- Twitter announcement,
- Dedicated page created on the Council website,
- Leaflets in Community centres and libraries

Survey Results

Responses

The online survey received 40 responses, 36 from individuals, 1 on behalf of Street Scene, 2 on the behalf of organisations and 1 one other. Due to the low response rate, the survey is not necessarily statistically representative of the views of RBKT residents. However, the information gathered can still provide a useful indicator of wider opinion and any important issues.

Current understanding of flood risk in RBKT



The greatest concerns among respondents were flooding from large rivers and runoff from roads or impermeable areas.

Historic records from RBKT suggest that flooding from groundwater is actually more prevalent than perceived by residents.

Experiences of flooding in RBKT

30% of respondents provided details of flooding, the main causes of flooding was reported as heavy rainfall and blocked roads and drains.

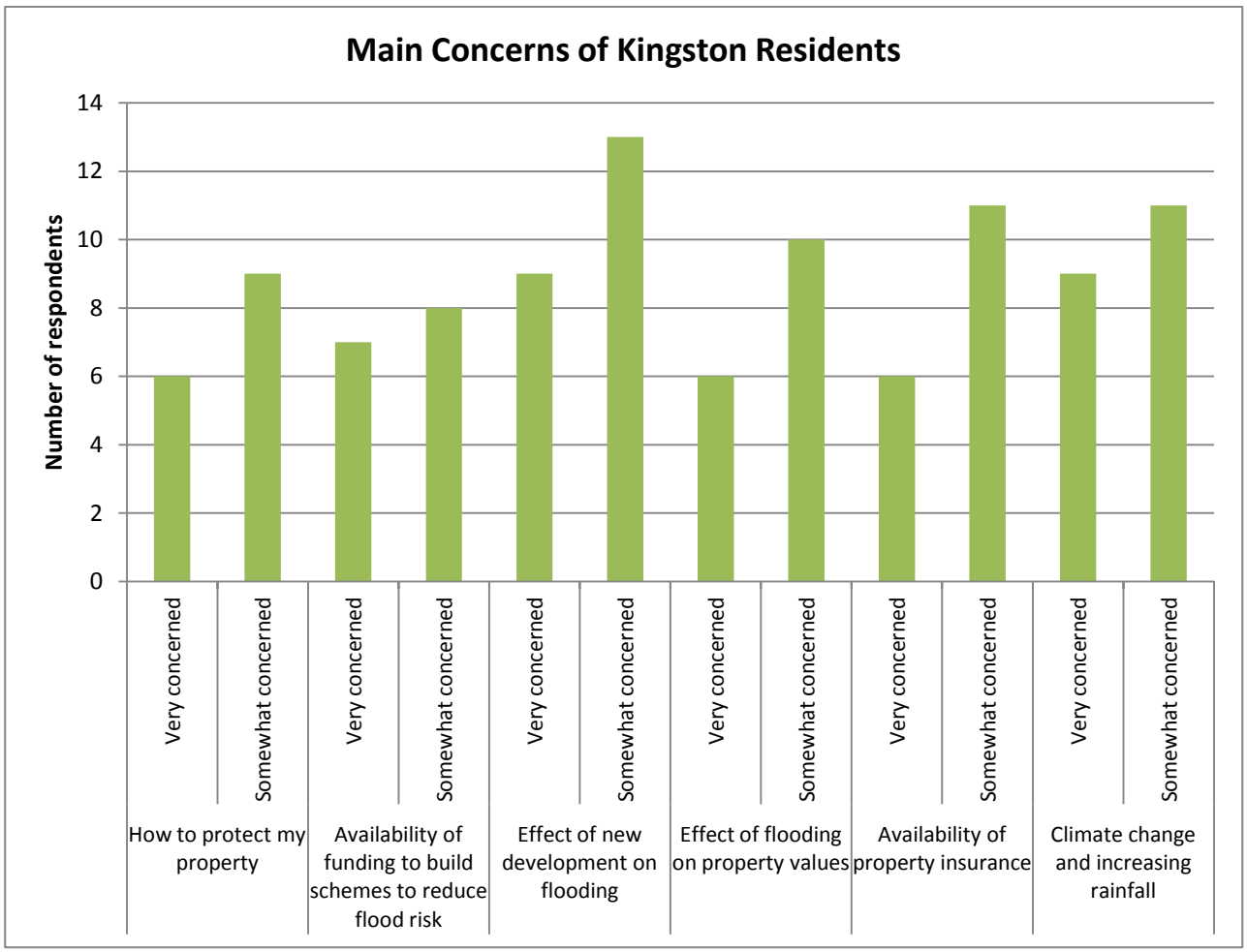
The most commonly affected receptors were local roads.

Communication of flood risk information

The top two responses to how people would like to be communicated within RBKT regarding flooding were;

Method	Percentage Response
Council Website	32%
Leaflets/letters through door	23%

Priorities for Flood Risk Management



The top three flood risk management priorities for residents and businesses in RBKT are:

Priority	Percentage Response
Protecting homes	28%
Protecting critical infrastructure such as electricity substations	27%
Keeping transport networks functioning	19%

Respondents think that flood risk management would be best achieved in RBKT by:

Priority	Percentage Response
More maintenance to reduce surface water flooding eg. Clearing road gullies and watercourses	23%
Working with planners to ensure new development does not make flooding worse	19%
Focusing work on areas that are at risk of flooding	16%

Funding for Flood Risk Management

The top responses to who should contribute financially to flood risk management activities were:

- Property Developers
- Environment Agency
- Water Companies

How has this feedback influenced the strategy?

- Respondents in the survey indicated that they are interested in receiving further information on who is responsible for dealing with different types of flooding, work that is being carried out in Kingston Borough to manage flooding and advice on how householders can prepare for a flooding incident. Therefore the Council are committed to reviewing and updating Kingston Council's flood management webpages to ensure they include all relevant information on flood risk for the Borough. Kingston Council will also contact all community groups to understand their current flood response role and outline the current flood risk information available.
- The Council has taken on board people's concerns regarding the effect of new developments on flooding by encouraging early pre-application dialogue between Kingston Council and developers and reviewing existing drainage guidance to assist developers in reducing flood risk to and from schemes.
- The Council have also listened to concerns regarding the capacity of emergency planning and response by preparing community specific emergency plans which are regularly reviewed and updated, setting up a contact network of key individuals in community groups to be used in the event of a flooding incident and carrying out incident exercises in high risk areas.
- Kingston Council will continue work on the current drainage investigation and maintenance programme of assets.

2015 Online Survey

RBKT ran an online survey between 28th April 2015 and 9th June 2015. Questions were based on the individual actions, measures and actions proposed in the final draft Strategy, and respondents were also given the opportunity to submit general comments on the Strategy and advise whether they had experienced flooding where they lived.

Survey Results

Responses

The online survey received 20 responses and requested respondents to rank each objective and action and provide comments if any were deemed to be unsatisfactory. Due to the low response rate, the survey is not necessarily statistically representative of the views of RBKT residents. However, from the information gathered minor amendments were made for the final Strategy and confirmed that each of the objectives and actions had been ranked as either excellent or satisfactory by the majority of the respondents.

The responses received regarding the four objectives of the Action Plan are summarised in the graphs and tables below.

Objective 1: Educate, encourage and empower local stakeholders to take action on reducing flood risk

Question responses: **20 (100.00%)**

Table 2

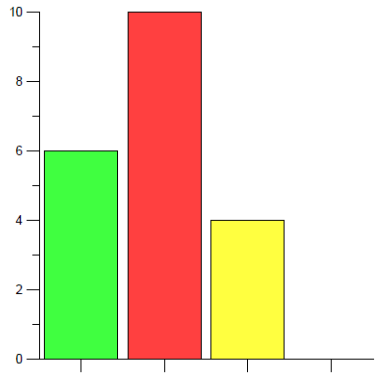


Table 3

	% Total	% Answer	Count
Excellent	30.00%	30.00%	6
Satisfactory	50.00%	50.00%	10
Non-satisfactory	20.00%	20.00%	4
Don't know	0.00%	0.00%	0
Total	100.00%	100.00%	20

Objective 2: Apply an intelligence-led risk based approach to the management of flood risk in the Royal Borough of Kingston upon Thames

Question responses: **20 (100.00%)**

Table 4

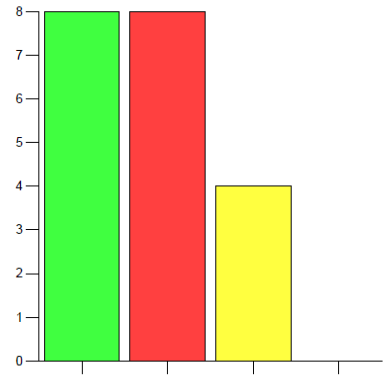


Table 5

	% Total	% Answer	Count
Excellent	40.00%	40.00%	8
Satisfactory	40.00%	40.00%	8
Non-satisfactory	20.00%	20.00%	4
Don't know	0.00%	0.00%	0
Total	100.00%	100.00%	20

Objective 3: Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency

Question responses: **20 (100.00%)**

Table 6

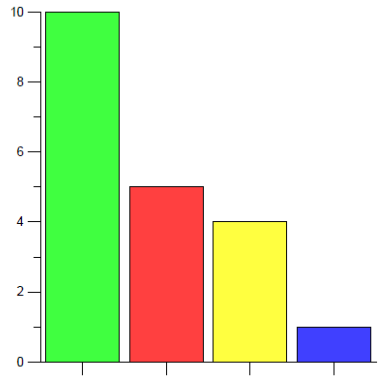


Table 7

	% Total	% Answer	Count
Excellent	50.00%	50.00%	10
Satisfactory	25.00%	25.00%	5
Non-satisfactory	20.00%	20.00%	4
Don't know	5.00%	5.00%	1
Total	100.00%	100.00%	20

Objective 4: Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change

Question responses: **20 (100.00%)**

Table 8

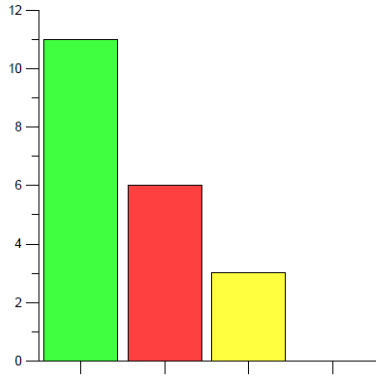


Table 9

	% Total	% Answer	Count
Excellent	55.00%	55.00%	11
Satisfactory	30.00%	30.00%	6
Non-satisfactory	15.00%	15.00%	3
Don't know	0.00%	0.00%	0
Total	100.00%	100.00%	20

A summary of the ranked responses regarding the actions can be found in the table below.

Objective	Action	Response				
		Excellent	Satisfactory	Non-satisfactory	Don't know	No Response
1	**1.1.1**	35%	55%	10%	0%	0%
	1.1.2	35%	55 %	10%	0%	0%
	1.1.3	50%	30%	15%	0%	5%
	1.1.4	65%	25%	10 %	0%	0%

Objective	Action	Response				
	1.1.5	50%	35%	15%	0%	0%
	1.2.1	30%	50%	20%	0%	0%
	1.2.2	35%	55%	10%	0%	0%
	1.2.3	30%	55%	10%	5%	0%
	1.2.4	40%	45%	15%	0%	0%
	1.3.1	20%	65%	15%	0%	0%
	1.3.2	30%	45%	20%	5%	0%
	1.3.3	30%	45%	15%	10%	0%
2	**2.1.1**	30%	50%	15%	5%	0%
	2.1.2	30%	30%	10%	30%	0%
	2.2.1	35%	45%	10%	0%	10%
	2.2.2	40%	45%	15%	0%	0%
	2.3.1	20%	60%	15%	5%	0%
	2.3.2	35%	40%	20%	5%	0%
3	**3.1.1**	15%	45%	10%	25%	5%
	3.2.1	10%	45%	20%	15%	10%
	3.3.1	30%	50%	10%	10%	0%
	3.3.2	25%	70%	0%	5%	0%
	3.4.1	45%	45%	10%	0%	0%
	3.4.2	45%	35%	20%	0%	0%
	3.5.1	35%	55%	10%	0%	0%
4	**4.1.1**	10%	45%	15%	20%	10%
	4.2.1	50%	40%	10%	0%	0%
	4.2.2	45%	40%	5%	10%	0%

Objective	Action	Response				
	4.2.3	45%	35%	15%	5%	0%
	4.3.1	45%	35%	15%	5%	0%
	4.3.2	35%	40%	20%	5%	0%
	4.4.1	40%	35%	0%	25%	0%
	4.4.2	35%	40%	5%	20%	0%
	4.4.3	25%	50%	0%	20%	0%
	4.4.4	40%	45%	10%	5%	0%